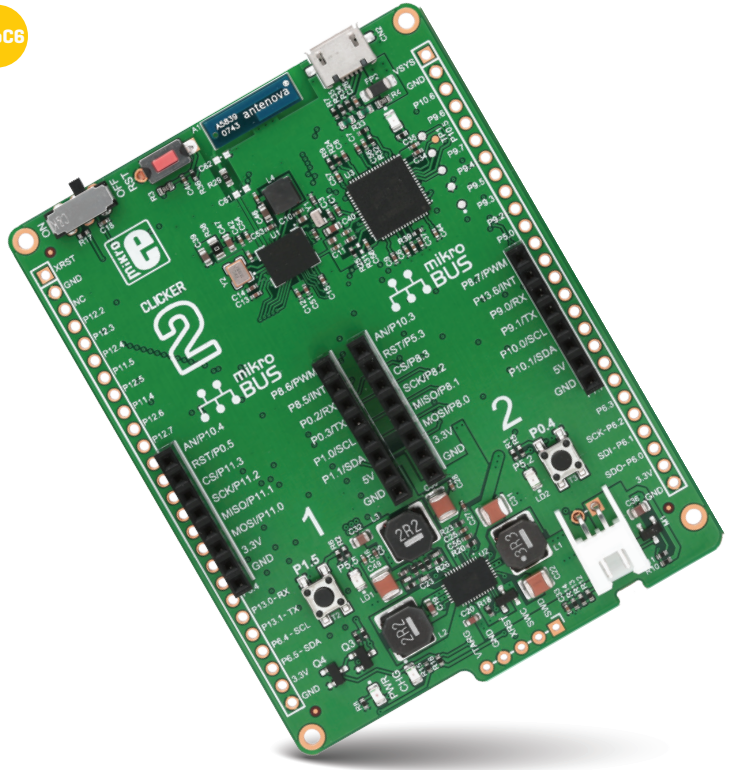
# CLICKER 2 PSoC6

## a fast Click board™ two-seater

A compact starter kit with a very powerful microcontroller and two mikroBUS™ sockets

mikroBUS · PSoC® 6 · USB




MikroElektronika
DEVELOPMENT TOOLS | COMPILERS | BOOKS

# To our valued customers

I want to express my thanks to you for being interested in our products and for having confidence in MikroElektronika.

The primary aim of our company is to design and produce high quality electronic products and to constantly improve the performance thereof in order to better suit your needs.

Nebojsa Matic
General Manager

# Table of Contents

# Introduction to Clicker 2 for PSoC®6

**Clicker 2 for PSoC® 6 is a compact development kit with two mikroBUS™ sockets for click board connectivity, an ideal solution for rapid development of custom applications.** It is equipped with the PSoC® 6, a dual-core 32-bit **CY8C6347BZI-BLD53** Microcontroller Unit (MCU). This powerful device is a combination of ARM® Cortex™ based dual-core MCU with low-power flash technology and digital programmable logic, programmable analog resources, industry leading CapSense® technology, and other standard communication and timing peripherals. One of the key features of this MCU is the support for the BLE 5 compliant wireless connectivity. Supported by the PSoC® Creator™ IDE and equipped with the KitProg2 compatible onboard programmer, this board is the one of the most powerful development platforms in the entire range of Clicker 2 products.

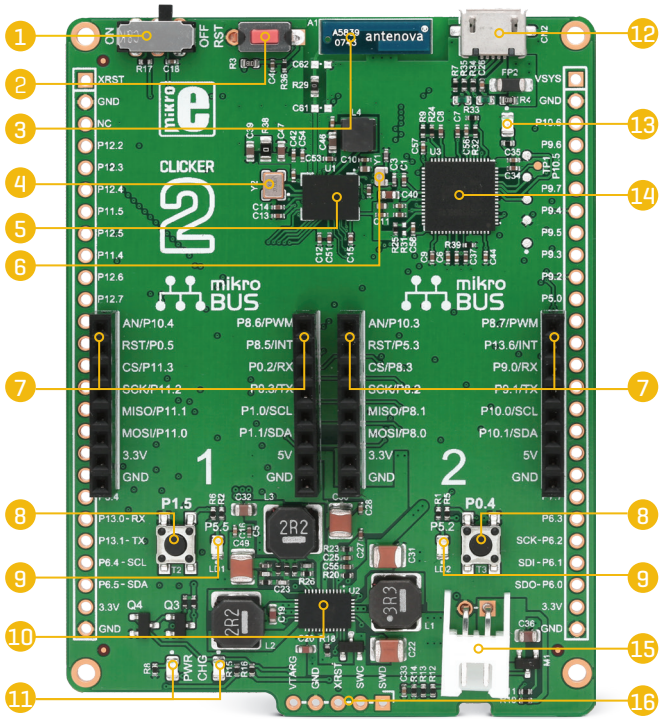

power supply
via USB cable (5V DC)


board dimensions
60.4 x 81 mm (2.4 x 3.2 inch)


weight
26 g (0. 057 lbs)

# Key features

1. ON/OFF switch
2. Reset button
3. Bluetooth 2.4GHz antenna
4. 32MHz Crystal
5. CY8C6347BZI-BLD53 MCU
6. 32.768kHz Crystal
7. mikroBUS™ sockets 1 and 2
8. Pushbuttons
9. General purpose LEDs
10. LTC3586 power management IC
11. Power and Charge indication LEDs
12. Micro USB-B connector
13. Onboard programmer status LED
14. KitProg2 compatible onboard programmer
15. Battery connector
16. External programmer connector



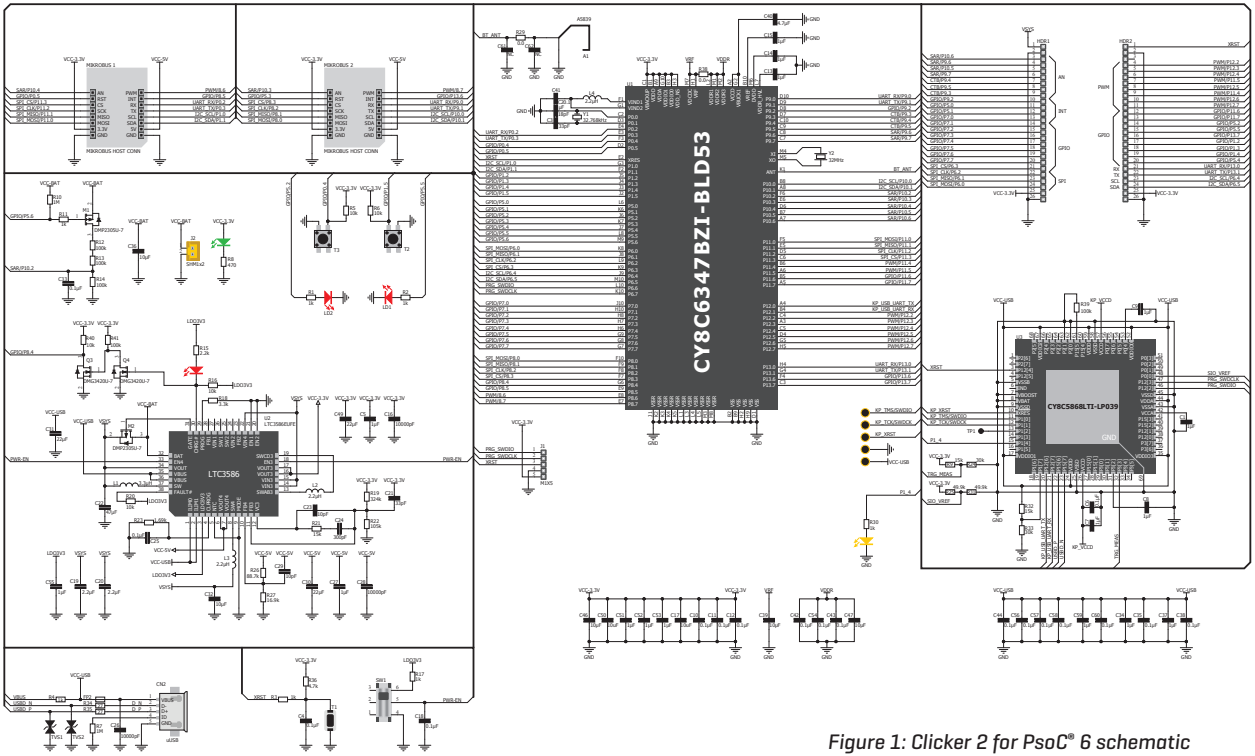



*Figure 1: Clicker 2 for PsoC® 6 schematic*

# 1. Power supply

## USB power supply

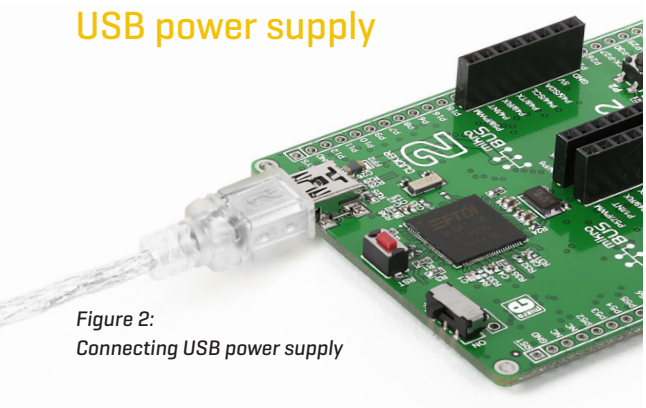


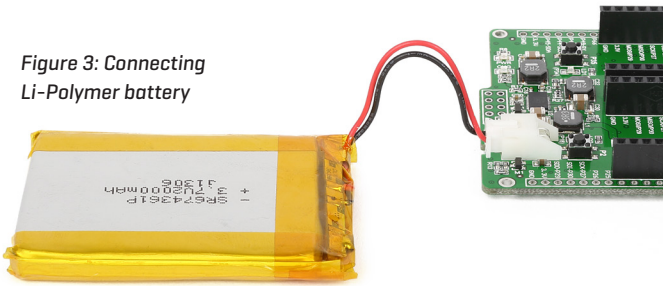
*Figure 2:*
*Connecting USB power supply*

You can supply power to the board with a **Mini-B USB** cable provided in the package. Onboard voltage regulators provide the appropriate voltage levels for each component on the board. **Power LED** (green) will indicate the presence of power supply.

## Battery power supply

You can also power the board using a **Lythium-Polymer (Li-Po)** battery, via on-board battery connector. On-board battery charger circuit enables you to charge the battery over USB connection. **Charging LED** (red) will indicate when battery is charging. Charging current is ~300 mA and charging voltage is 4.2V DC.

*Figure 3: Connecting*
*Li-Polymer battery*



NOTE | Click boards™ that use a 3.3V power supply can draw up to 750 mA of current, which is more current than a USB can supply (500 mA); In those cases you would need to use the battery as the power supply, or the vsys pin on the side of the board.

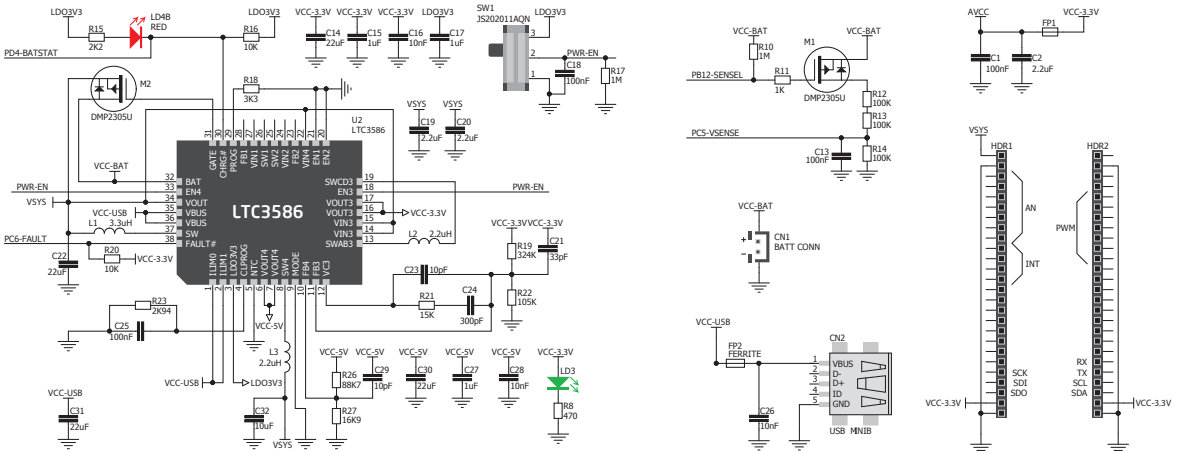



*Figure 4: Power supply schematic*

# 2. CY8C6347BZI-BLD53 microcontroller

The Clicker 2 for PSoC® 6 development system comes with the **CY8C6347BZI-BLD53** microcontroller unit (MCU). This high performance, low power, dual core 32-bit microcontroller is equipped with numerous programmable and fixed-function peripheral modules. Combined with two mikroBUS™ sockets available on the Clicker 2 board, it is an ideal solution for fast prototyping and rapid development of PSoC 6® applications.

## Key microcontroller features

- Dual-Core architecture with up to 150MHz/100MHz clock speed
- 1 MB Application Flash with 32-KB EEPROM area and 32-KB Secure Flash
- Nine independent serial communication blocks, each is configurable as I2C, SPI, or UART
- CapSense®, industry leading capacitive sensing technology
- Powerful audio subsystem, including two PDM channels and I2S interface
- 12 programmable logic blocks, each with 8 Macrocells and an 8-bit data path (UDBs)
- 78 GPIO pins, featuring advanced configuration options
- Energy Profiler block
- Cryptography accelerators and built-in security
- BLE (Bluetooth Smart) BT 5.0 subsystem, including programmable output power

Built on the 40nm technology, the **CY8C6347BZI-BLD53 MCU** is aimed towards the IoT development and low power consumption. While the **Arm® Cortex® M4 core** is able to perform demanding tasks with clock speed up to 150 MHz, the **Arm® Cortex® M0+** core allows lower power consumption while running less demanding tasks with clock speed up to 100 MHz.

Featuring unparalleled flexibility, this MCU offers a wide range of connectivity options, such as the BLE, WiFi, USB, CapSense® capacitive sensing technology, even software-defined peripherals that can be used for custom analog and digital circuits.

Increased security requirements for the **IoT applications** are met by the integrated security and cryptography elements built right into the platform architecture. Disabling of the debug and test ingress paths, secure execution of code in the execute-only mode for protected routines, authentication during boot using hardware hashing, hardware accelerated symmetric and asymmetric cryptographic methods, are just some of many security and cryptography features this MCU has to offer.

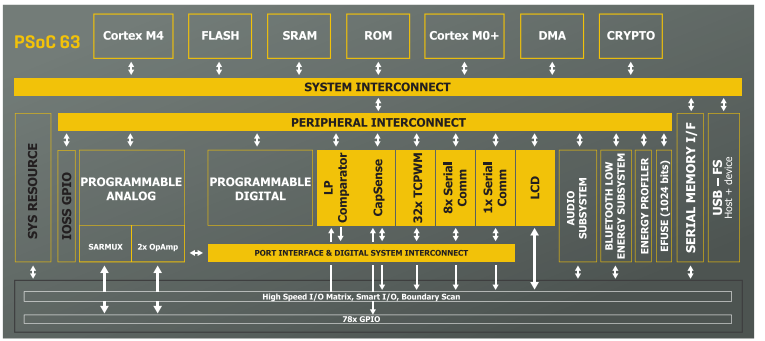



*Figure 5: Block diagram*

The ability to be powered by the Li-Po battery offers a unique opportunity to develop IoT and other portable applications. **The onboard PSoC® 6 compatible programmer** saves time and allows the MCU to be programmed anytime, anywhere.

# 3. Programming the microcontroller

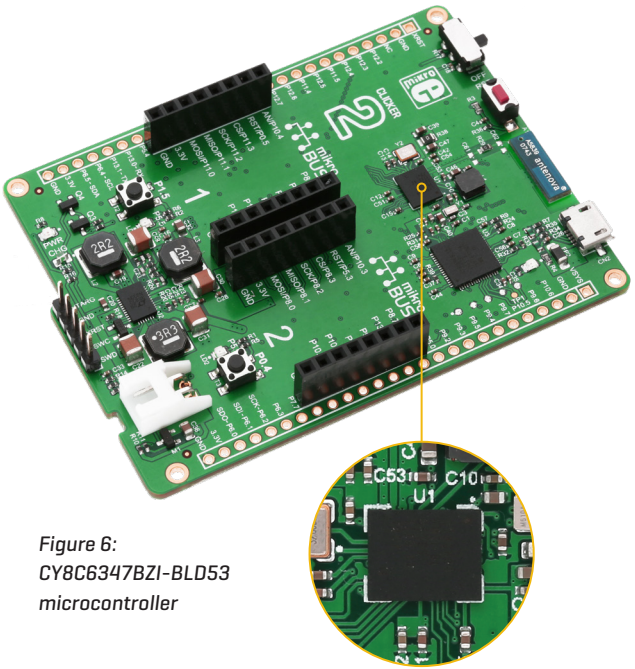



*Figure 6: CY8C6347BZI-BLD53 microcontroller*

For both methods, PSoC® Creator™ Integrated Design Environment (IDE) needs to be downloaded from the link below and installed to the host computer.

***www.cypress.com/products/psoc-creator-integrated-design-environment-ide***

The software package includes the PSoC Programmer as well, which can be also downloaded as a separate, stand-alone application.

***www.cypress.com/products/psoc-programming-solutions***

The microcontroller can be programmed in two ways:

01 Using the **onboard KitProg2** compatible programmer

02 Using **external programmers**

# 4. Programming with onboard programmer

Programming the Clicker 2 for PSoC® board by using the onboard programmer is very simple. The connection is established via the USB cable. The USB cable will supply the board with power in this case, so no external power source (battery) is required connected. Once the cable is plugged in, the Clicker 2 for PSoC® 6 should be powered ON (by the ON/OFF switch at the top of the board).

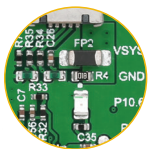



*Figure 7: Programmer status LED*

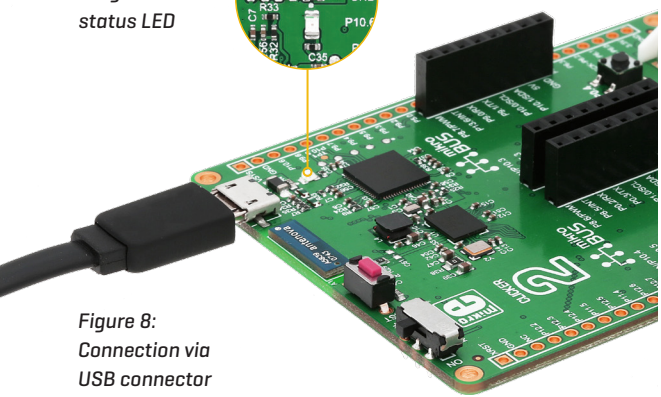


*Figure 8: Connection via USB connector*

As soon as the cable is plugged, the onboard programmer will be detected by the host computer, regardless of the ON/OFF switch position. It is a USB HID device class and requires no additional drivers under Windows OS. When the link is established and enumeration of the device is done, the amber programmer status LED near the USB connector will indicate the connection. Turning the ON/OFF switch to ON position will enable the power to the main MCU, allowing it to be detected and programmed.

The PSoC® Creator™ / PSoC® Programmer detects the connected Clicker 2 for PSoC® 6 as the KitProg2 and it requires no additional programming options to be adjusted. In fact, the options not available for the programmer will be greyed out. The standalone PSoC® Programmer application offers an easy and convenient way to directly program the selected firmware .hex file to the MCU. Otherwise, the PSoC Creator IDE can be used for the firmware development, compiling, programming and debug, without any restrictions.

# 4.1 Programming using the PSoC® Creator™ IDE

Programming procedure using the PSoC® Creator™ IDE is simple:

- Connect the Clicker 2 for PSoC® 6 board via the USB, or an external programmer
- Power up the board via the ON/OFF switch and start up the PSoC® Creator™ IDE
- Open one of the projects in the Examples folder
- Click on Program button (Debug >> Program or shortcut CTRL+F5)
- A pop-up window may appear, offering a selection of the detected MCU
- MCU cores will be detected as two separate items, selecting any of them will enable the OK button
- By clicking the OK button, the programming will start, and the progress can be monitored on the status bar.

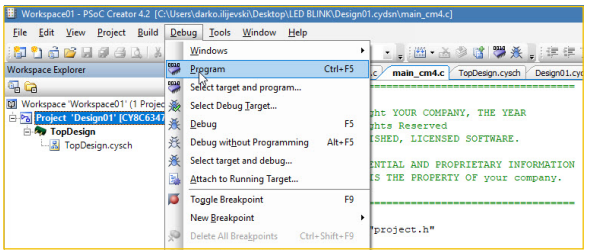



*Figure 9: Opened project, ready for programming*

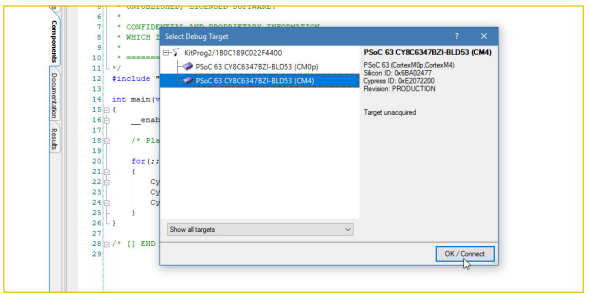


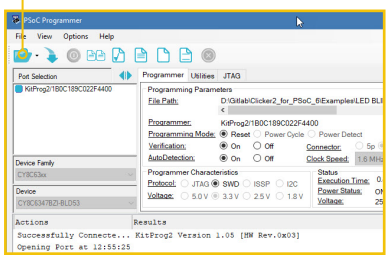

*Figure 10: MCU selection and starting programming operation*

# 4.2 Programming using the PSoC® Programmer application

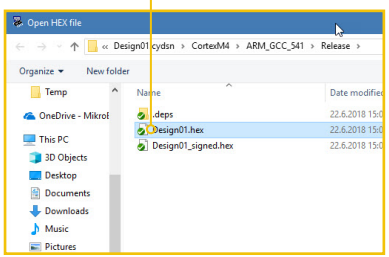
Programming by using the stand-alone PSoC® Programmer application is even easier. However, it requires a previously compiled .hex file:

- Connect the Clicker 2 for PSoC® 6 board via the USB, or an external programmer
- Power up the board via the ON/OFF switch and start up the PSoC® Programmer application
- Click on File > File Load (or F4 shortcut, or click the folder icon) and browse for the required firmware .hex file
- Click on File > Program (or F5 shortcut, or click the arrow icon, next to the folder icon)
- The programming status can be monitored in the lower part of the programmer application window
- The status bar contains colored tabs which reflect the status of the programmer and its actions

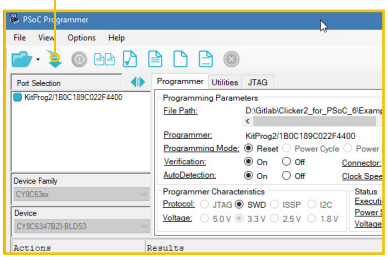
1 *Open the file browser*




2 *Browse for the .hex file*




3 *Program selected .hex file*



# 5. Programming with external programmers

When using an external programmer such as the MiniProg3, it is possible to program the MCU by using the 1x5 header at the bottom of the Clicker 2 for PSoC® 6 board. This programmer will be detected by the PSoC® Creator™ Studio / PSoC® Programmer application, as usual. However, if the USB cable is still plugged in at the same time (i.e. to provide power), the onboard programmer will still be detected. It is necessary to select the desired programming device, and the programming process can be continued as usual.

NOTE | The 1x5 header is not mounted by default, so you will have to solder it on the board prior to use

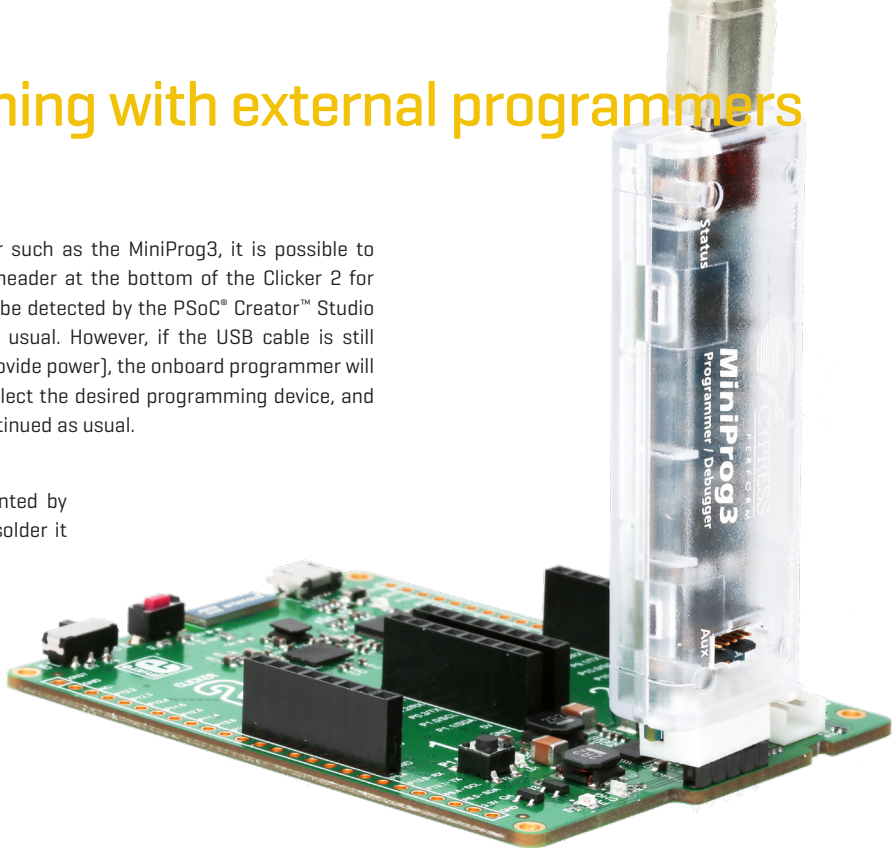



*Figure 11: MiniProg3 external programmer*

# 6. Buttons and LEDs

Clicker 2 for PSoC® is equipped with the reset button and a pair of pushbuttons and LEDs. The Reset button is used to manually reset the microcontroller. It generates a LOW logic level on the XRST pin of the main MCU. Two LEDs can be used for visual indication of the logic states on the pins they are routed to (pin P5.2 and pin P5.5). An active LED indicates that a logic HIGH level (1) is present on that pin. The current through these LEDs is limited by 1K resistors.

Two pushbuttons can change the logic state of the pins they are routed to (pin P0.4 and pin P1.5) from logic HIGH (1) to logic LOW (0). The pins are pulled up by 10K resistors, setting pins to a HIGH logic level when not pressed. Pressing the button will connect the pin to the GND, setting it to a LOW logic level.

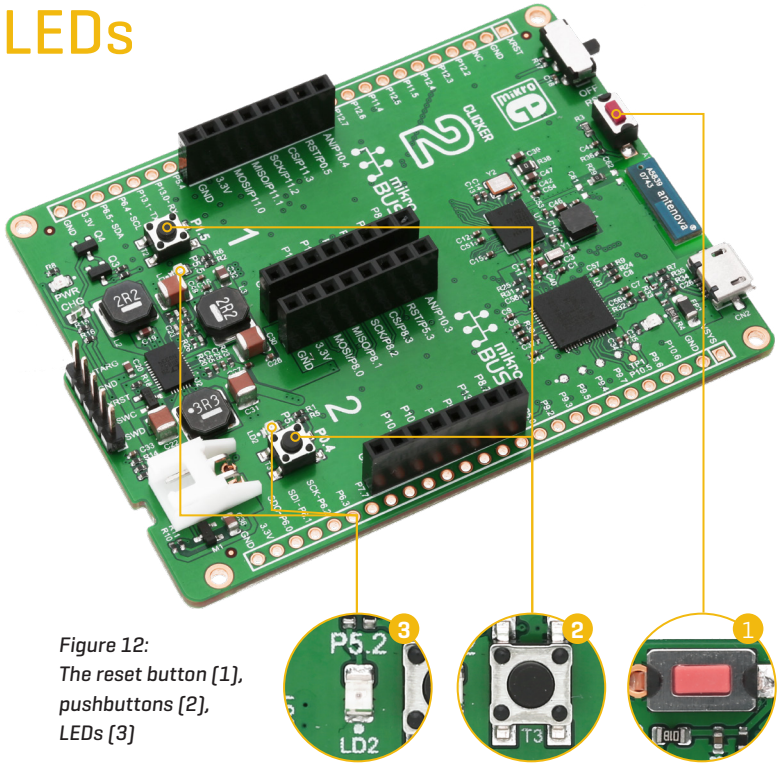



*Figure 12:*
*The reset button (1), pushbuttons (2), LEDs (3)*

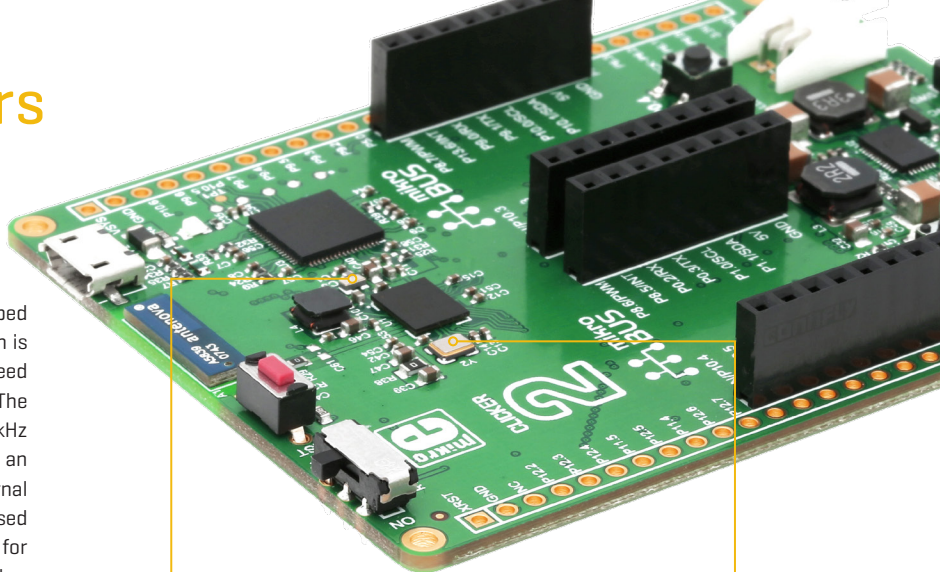
# 7. Power management and battery charger

Clicker 2 for PSoC® 6 is equipped with the LTC3586, a high-efficiency USB power manager, and battery charger, featuring the proprietary PowerPath™ and Bat-Track™ technologies, from Linear Technology. The LTC3586 power manager takes care of all the power options of the Clicker 2 for PSoC® 6, providing stable and low ripple voltage outputs for all parts of the board while ensuring proper Li-Po battery charging conditions. The power manager IC allows charging of the Li-Po battery while the Clicker 2 for PSoC® 6 board is connected to the USB port of the computer.


*Figure 13: Power management and battery charger IC*

# 8. Oscillators

The Clicker 2 for PSoC® 6 board is equipped with the accurate 32MHz crystal, which is used for generating the main high-speed clock signal for the MCU operation. The board is also equipped with the 32.768kHz crystal oscillator, which provides an external clock source for the internal low speed clock generator, typically used for the watchdog timer (WDT), or for peripheral operation in Deep Sleep mode.



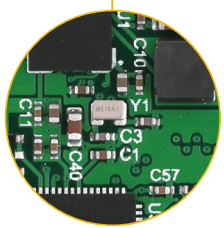



*Figure 14: 32.768 kHz crystal oscillator module*

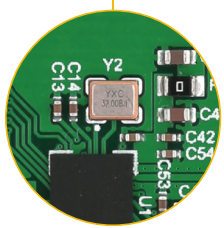
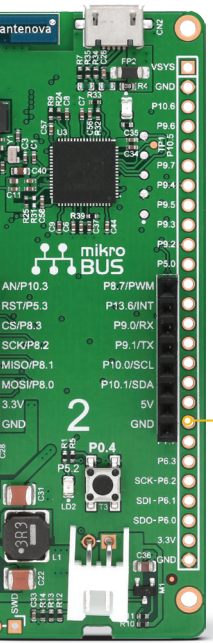



*Figure 15: 32MHz crystal oscillator module*

# 9. Pads



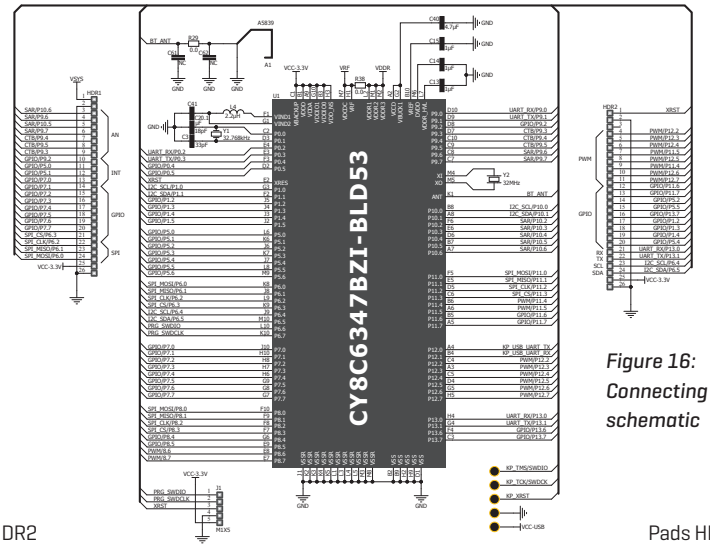




*Figure 16: Connecting pads schematic*


Pads HDR2

Pads HDR1

Most microcontroller pins are available for further connectivity via two 1x26 rows of connection pads on both sides of the Clicker 2 for PSoC® 6. They are designed to allow interfacing to additional shields, such as Battery Boost shield, Gaming shield, PROTO shield and others.

# 10. mikroBUS™ pinouts

The CY8C6347BZI-BLD53 MCU has unparalleled flexibility and quite a large number of pins, thus offering two completely independent mikroBUS™ slots, with no shared pins. Two mikroBUS™ sockets provide the standardized set of communication pins, such as the UART, SPI, I2C, as well as PWM, a pair of GPIOs, and analog input pins. Since the CY8C6347BZI-BLD53 uses custom defined peripheral pinout, Figure x.x shows how the mikroBUS™ pinout should be configured. For example, P0.2 should be set as the UART RX pin, since it is routed to the mikroBUS™ UART RX pin. This will ensure proper operation of the Click boards™ and compliance with the mikroBUS™ standard.

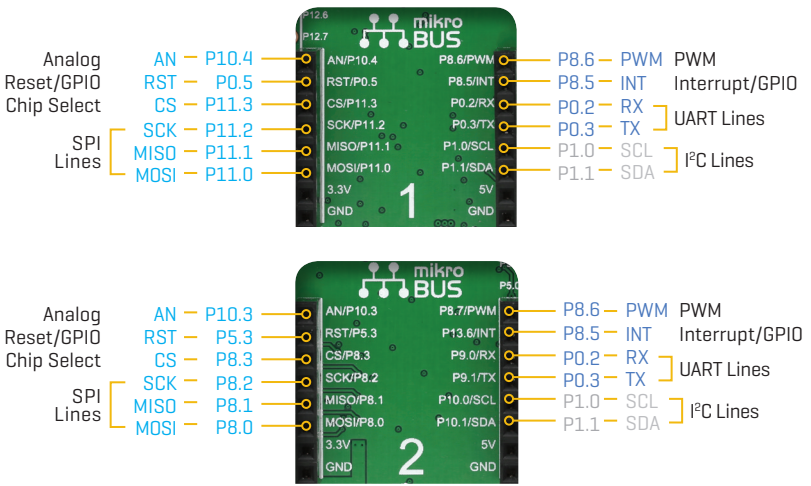



*Figure 17: mikroBUS™ sockets pinout*

# 11. Click boards™ are plug and play!

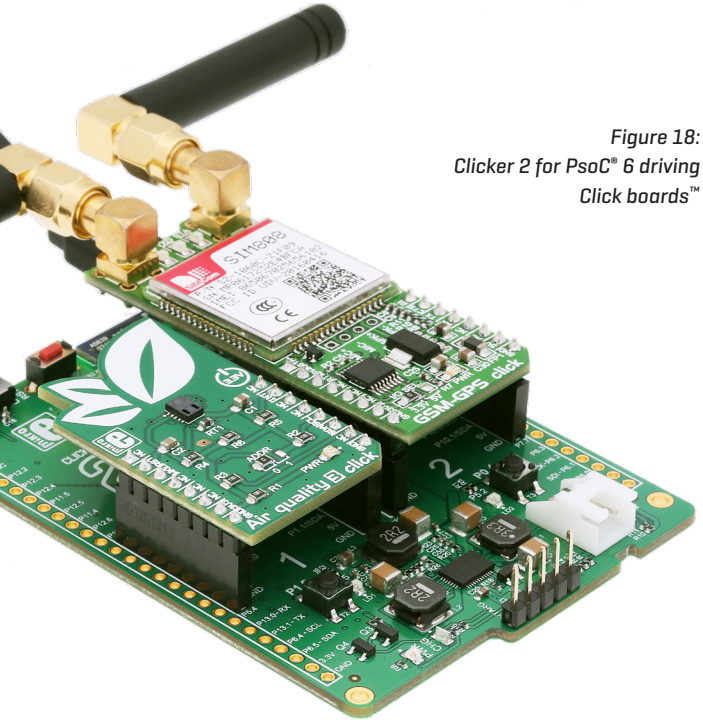
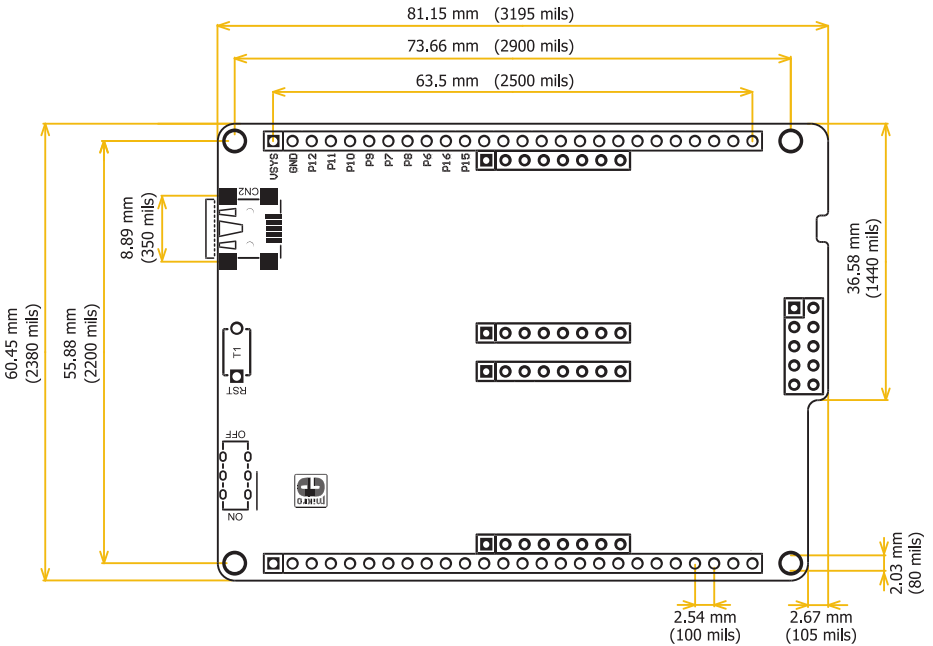



*Figure 18:*
*Clicker 2 for PsoC® 6 driving Click boards™*

Up to now, MikroElektronika has released a vast number of mikroBUS™ compatible Click boards™, with their number growing on a daily basis. It is our intention to provide users with as many Click boards™ as possible, allowing expansion of the Clicker 2 for PSoC® 6 development system with a wide range of different devices. Each Click board™ is designed with care by our hardware engineers, providing the best performances of the device so that the custom application developers and system integrators do not have to waste time by making prototypes and test instances of the project they are working on. Click boards™ use the mikroBUS™ - a standardized 2x8 pinout, making them easily switchable and reusable.

**www.mikroe.com/click**

# 12. Dimensions



# DISCLAIMER

All the products owned by MikroElektronika are protected by copyright law and international copyright treaty. Therefore, this manual is to be treated as any other copyright material. No part of this manual, including product and software described herein, may be reproduced, stored in a retrieval system, translated or transmitted in any form or by any means, without the prior written permission of MikroElektronika. The manual PDF edition can be printed for private or local use, but not for distribution. Any modification of this manual is prohibited. MikroElektronika provides this manual 'as is' without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties or conditions of merchantability or fitness for a particular purpose. MikroElektronika shall assume no responsibility or liability for any errors, omissions and inaccuracies that may appear in this manual. In no event shall MikroElektronika, its directors, officers, employees or distributors be liable for any indirect, specific, incidental or consequential damages (including damages for loss of business profits and business information, business interruption or any other pecuniary loss) arising out of the use of this manual or product, even if MikroElektronika has been advised of the possibility of such damages. MikroElektronika reserves the right to change information contained in this manual at any time without prior notice, if necessary.

## HIGH RISK ACTIVITIES

The products of MikroElektronika are not fault – tolerant nor designed, manufactured or intended for use or resale as on – line control equipment in hazardous environments requiring fail – safe performance, such as in the operation of nuclear facilities, aircraft navigation or communication systems, air traffic control, direct life support machines or weapons systems in which the failure of Software could lead directly to death, personal injury or severe physical or environmental damage ('High Risk Activities'). MikroElektronika and its suppliers specifically disclaim any expressed or implied warranty of fitness for High Risk Activities.

## TRADEMARKS

The MikroElektronika name and logo, mikroC, mikroBasic, mikroPascal, Visual TFT, Visual GLCD, mikroProg, Ready, MINI, mikroBUS™, EasyPIC, EasyAVR, Easy8051, Click boards™ and mikromedia are trademarks of MikroElektronika. All other trademarks mentioned herein are property of their respective companies.All other product and corporate names appearing in this manual may or may not be registered trademarks or copyrights of their respective companies, and are only used for identification or explanation and to the owners' benefit, with no intent to infringe.

*The FTDI Chip® and Windows® logos and product names are trademarks of FTDI Chip and Microsoft® in the U.S.A. and other countries.*


- If you want to learn more about our products, please visit our website at www.mikroe.com
- If you are experiencing some problems with any of our products or just need additional information, please place your ticket at www.mikroe.com/support
- If you have any questions, comments or business proposals, do not hesitate to contact us at office@mikroe.com

Clicker 2 for PSoC® 6 manual
**ver 1.00**

Designed by
MikroElektronika Ltd.