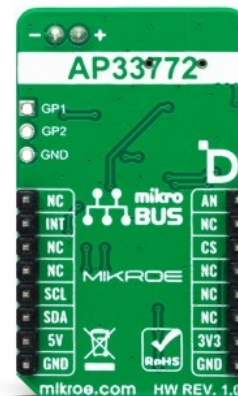


# USB-C Sink 2 Click



PID: MIKROE-5792

**USB-C Sink 2 Click** is a compact add-on board with a standalone autonomous USB power delivery controller. This board features the [AP33772](#), a high-performance USB PD sink controller from [Diodes Incorporated](#). It supports dead battery mode to allow a system to be powered from an external source directly, establishes a valid source-to-sink connection, and negotiates a USB power delivery (PD) contract with a PD-capable source device. It also supports a flexible PD3.0 and PPS for applications that require direct voltage and current requests, with fine-tuning capabilities. This Click board™ makes the perfect solution for the development of USB Type-C connector-equipped battery-powered devices or DC-power input devices, USB PD3.0 PPS testers, USB Type-C to traditional barrel-connector power-adaptor cables, and more.

USB-C Sink 2 Click is supported by a [mikroSDK](#) compliant library, which includes functions that simplify software development. This [Click board™](#) comes as a fully tested product, ready to be used on a system equipped with the [mikroBUS™](#) socket.

## How does it work?

USB-C Sink 2 Click is based on the AP33772, a high-performance USB PD sink controller from Diodes Incorporated. The host MCU can control the PPS with 20mV/step voltage and 50mA/step current. The PD controller supports overtemperature protection (OTP), OVP with auto-restart, OCP with auto-restart, one-time programming (OTP), power-saving mode, and a system monitor and control status register. For OTP, this Click board™ comes with an NTC temperature sensor, with selectable temperature points (25°C, 50°C, 75°C, 100°C) as a temperature threshold. The onboard FAULT LED serves as a visual presentation of the negotiation mismatch. The Multi-time programming (MTP) is reserved for future configuration.

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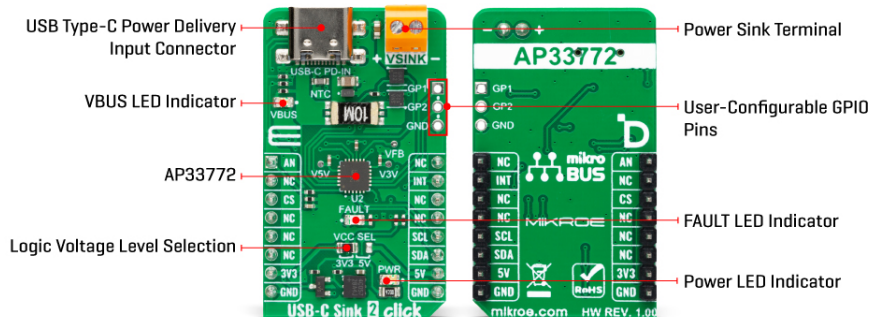
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This USB Type-C power delivery sink controller requires power from a standard USB source adapter, in our case from the USB connector labeled USB-C PD-IN, and then delivers power to connected devices on the VSINK connector. Between USB and VSINK terminal stands a pair of MOSFETs, according to the AP33772's driver for N-MOS VBUS power switch support. The PD controller can control the external NMOS switch ON or OFF (all control is done via the I2C interface). The USB C connector acts as a PD-IN discharge path terminal with a USB Type-C configuration channels 1 and 2. The presence of the power supply on the USB C is indicated over the VBUS LED.

The AP33772 is equipped with several GPIOs. The user-configurable GPIO1 and GPIO2 are available on the side header labeled GP1, and GP2, with additional GND. Also, this Click board™ has several test pads for testing purposes. The 5V and 3.3V LDO voltage output can be measured over the V5V and V3V pads, and voltage feedback over the VFB pad.

USB-C Sink 2 Click uses a standard 2-Wire I2C interface to communicate with the host MCU. The interrupts from AP33772 can be monitored over the INT pin. One of the additional features of the USB-C Sink 2 Click is the ability to track the VBUS voltage over the AN pin of the mikroBUS™ socket.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this Click board™ comes equipped with a library containing easy-to-use functions and an example code that can be used, as a reference, for further development.

## Specifications

Type	USB-C PD
Applications	Can be used for the development of USB Type-C connector-equipped battery-powered devices or DC-power input devices, USB PD3.0 PPS testers, USB Type-C to traditional barrel-connector power-adapter cables, and more
On-board modules	AP33772 - high-performance USB PD sink controller from Diodes Incorporated
Key Features	Large voltage operating range, compliant with USB PD rev3.0 V1.2 with PPS, PD sink

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	controller, supports PPS, OTP, interrupt and its mask, supports OVP, OCP, power-saving mode, a driver for N-MOS VBUS power switch, supports dead-battery mode, testing pads, and more
Interface	I2C
Feature	ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V

## Pinout diagram

This table shows how the pinout on USB-C Sink 2 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
Analog Input	<b>AN</b>	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	<b>INT</b>	Interrupt
	NC	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	<b>SCL</b>	I2C Clock
	NC	6	MOSI	SDA	11	<b>SDA</b>	I2C Data
Power Supply	<b>3.3V</b>	7	3.3V	5V	10	<b>5V</b>	Power Supply
Ground	<b>GND</b>	8	GND	GND	9	<b>GND</b>	Ground

## Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2	VBUS	-	VBUS LED Indicator
LD3	FAULT	-	Fault LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

## USB-C Sink 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
USB Input Voltage	-	5	-	V

## Software Support

We provide a library for the USB-C Sink 2 Click as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main MikroElektronika [development boards](#).

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Package can be downloaded/installed directly from NECTO Studio Package Manager (recommended), downloaded from our [LibStock™](#) or found on [Mikroe github account](#).

## Library Description

This library contains API for USB-C Sink 2 Click driver.

Key functions

- `usbcsink2_write_rdo` USB-C Sink 2 write the RDO function.
- `usbcsink2_get_pdo_voltage` USB-C Sink 2 get the voltage function.
- `usbcsink2_get_pdo_current` USB-C Sink 2 get the current function.

## Example Description

This example demonstrates the use of the USB-C Sink 2 Click board™ by setting DC power requests and control for Type-C connector-equipped devices (TCD).

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager(recommended), downloaded from our [LibStock™](#) or found on [Mikroe github account](#).

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.USBCSink2

## Additional notes and informations

Depending on the development board you are using, you may need [USB UART click](#), [USB UART 2 Click](#) or [RS232 Click](#) to connect to your PC, for development systems with no UART to USB interface available on the board. UART terminal is available in all MikroElektronika [compilers](#).

## mikroSDK

This Click board™ is supported with [mikroSDK](#) - MikroElektronika Software Development Kit. To ensure proper operation of mikroSDK compliant Click board™ demo applications, mikroSDK should be downloaded from the [LibStock](#) and installed for the compiler you are using.

For more information about mikroSDK, visit the [official page](#).

## Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

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[Click boards™](#)

[ClickID](#)

## Downloads

[USB-C Sink 2 click example on Libstock](#)

[USB-C Sink 2 click 2D and 3D files](#)

[AP33772 datasheet](#)

[USB-C Sink 2 click schematic](#)

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