

USB-C Power 2 Click



PID: MIKROE-6939

USB-C Power 2 Click is a compact add-on board designed for USB Type-C power-role control and 5V power-path management in source, sink, and dual-role applications. This board is based on the [PTN5150A](#) USB Type-C CC logic controller and the [NX5P3090](#) USB Power Delivery power switch from [NXP Semiconductor](#). It features Configuration Channel detection and indication, plug orientation and role status monitoring, autonomous or I2C-controlled operation, DFP/UFP/DRP role selection, 5V source supply, selectable current limiting of 330mA, 1040mA, 1880mA, or 2570mA, sink/source current-limit routing, and many more features. This Click board™ is suitable for USB-C power management interfaces, portable devices, embedded sink/source systems, and 5V USB Type-C power-path supervision applications.

For more information about **USB-C Power 2 Click** visit the official [product page](#).

How does it work?

USB-C Power 2 Click is based on the PTN5150A, a USB Type-C CC logic controller and the NX5P3090 USB Power Delivery power switch from NXP Semiconductor. The PTN5150A is a small, thin, low-power Configuration Channel (CC) logic device that supports USB Type-C connector applications by providing CC control logic detection and indication functions. These features allow the USB Type-C connector to be used on both host and device ends of a Type-C cable, making the board suitable for applications that require source, sink, or dual-role power operation. This Click board is well suited for developing and evaluating USB Type-C power management interfaces, embedded sink/source control systems, portable devices, and applications that require 5V USB-C power-path supervision.

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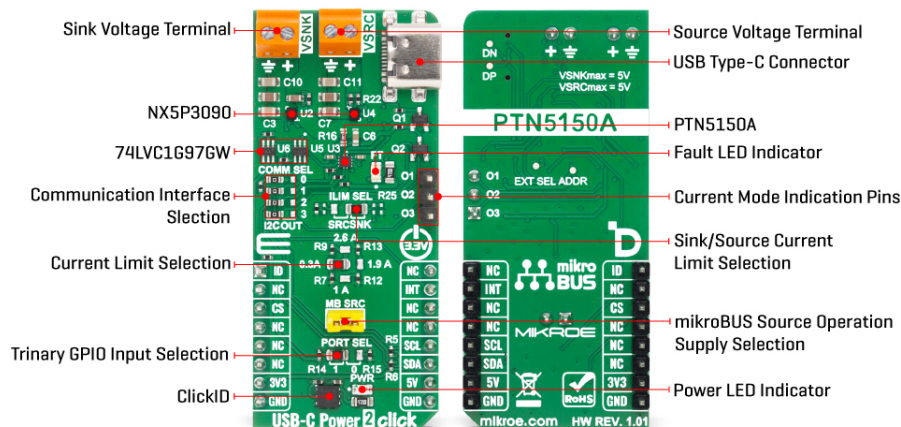
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The PTN5150A can operate autonomously or communicate with a host controller through an I2C interface, allowing the system to monitor Type-C connection status, cable plug orientation, operating role, and other internal status information through I2C registers. Upon plug orientation detection, the ID pin can show whether the PTN5150A is operating in host or device role, while this same control path can also be used to manage the NX5P3090 power switch for sink and source operation.

The operating role of USB-C Power 2 Click is configured through the PORT SEL jumper, which defines how the PTN5150A presents itself on the USB Type-C connection. Depending on the application, the board can be set to operate as a downstream-facing port in DFP mode, with $R_p = 80\mu A$ default power advertisement in non-I2C mode, as an upstream-facing port in UFP mode, or as a dual-role port in DRP mode when the jumper is left floating. This allows the same board to be adapted to systems that need to provide power, consume power, or negotiate between both roles. When the ADDR pin on the back of the board is configured high or low and I2C operation is enabled, the selected PORT status is latched only during power-up. After that point, role selection can no longer be changed only through the jumper state, so the host system must override the mode by writing to the appropriate I2C register bit.

Once the desired Type-C role is selected, the board's power path can be configured for either sink or source operation. In source mode, the output supply can be provided from the VSRC terminal or directly from the mikroBUS 5V rail, depending on the target setup. If the mikroBUS 5V rail is used as the source supply, the MB SRC jumper must be populated to route this supply correctly. For protected power delivery, the board includes a current-limit selection jumper that allows the limit to be set to one of four available values: 330mA, 1040mA, 1880mA, or 2570mA. The ILIM SEL jumper then defines whether this selected current limit is applied to the sink path or the source path, giving the user control over which operating direction is actively protected by the NX5P3090 power switch.

System communication and status reporting are also configurable. Through the COMM SEL jumpers, the board can communicate with the host MCU over the I2C interface together with the INT interrupt pin, allowing software-based monitoring and control. Alternatively, it can use open-drain output signals for current-mode indication, which are available on the 3-pin header located on the right side of the board. This provides a simple hardware-level indication option when full I2C communication is not required. During operation, fault conditions from the NX5P3090 USB power switch are indicated by the onboard red FT LED, providing immediate visual feedback if a fault occurs. The board also includes two external power terminals, VSINK for sink operation and VSRC for source operation, both supporting a maximum voltage of 5V.

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This Click board™ communicates with the host MCU only at a 3.3V logic voltage level. Although the board can use the mikroBUS 5V rail as a source supply when configured through the MB SRC jumper, its communication and control signals remain 3.3V logic-compatible. Therefore, appropriate logic voltage level conversion must be performed before using this board with MCUs that operate at different logic levels. It also comes equipped with a library containing functions and example code that can be used as a reference for further development.

Specifications

Type	USB-C PD
Applications	Ideal for USB-C power management interfaces, portable devices, embedded sink/source systems, and 5V USB Type-C power-path supervision applications
On-board modules	PTN5150A - CC logic for USB Type-C applications from NXP NX5P3090 - USB power switch from NXP
Key Features	USB Type-C Configuration Channel detection and indication, source, sink, and dual-role power operation, autonomous or I2C-controlled operation, plug orientation detection, host and device role indication, DFP, UFP, and DRP role selection, configurable source supply, selectable current limit of 330mA, 1040mA, 1880mA, or 2570mA, sink or source current-limit assignment, and more
Interface	I2C
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V,5V,External

Pinout diagram

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

Notes	Pin					Pin	Notes
Type-C Role / Orientation Control	ID	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	INT	Interrupt
ID COMM	CS	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	SCL	I2C Clock
	NC	6	MOSI	SDA	11	SDA	I2C Data
Power Supply	3.3V	7	3.3V	5V	10	5V	Power Supply
Ground	GND	8	GND	GND	9	GND	Ground

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Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2	FT	-	Fault LED Indicator
JP2	ILIM SEL	Right	Sink/Source Current Limit Selection SRC/SNK: Left position SRC, Right position SNK
JP3	-	Left	Current Limit Selection 0.3A/2.6A/1.9A/1A: Left position 0.3A, Upper position 2.6A, Right position 1.9A, Lower position 1A
JP4-JP8	COMM SEL	Left	Communciation Interface Selection I2C/OUT: Left position I2C, Right position OUT
J3	MB SRC	Populated	mikroBUS Source Operation Supply Selection

USB-C Power 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Sink/Source Terminal Voltage	-	-	5	V
Selectable Current Limit	330	-	2570	mA

Software Support

[USB-C Power 2 Click](#) demo application is developed using the [NECTO Studio](#), ensuring compatibility with [mikroSDK](#)'s open-source libraries and tools. Designed for plug-and-play implementation and testing, the demo is fully compatible with all development, starter, and mikromedia boards featuring a [mikroBUS™](#) socket.

Example Description

This example demonstrates the use of the USB-C Power 2 Click board for detecting USB cable attachment and monitoring CC (Configuration Channel) status. The application reads interrupt and CC status registers and logs the interpreted results to the serial terminal.

Key Functions

- `usbcpower2_cfg_setup` This function initializes Click configuration structure to initial values.
- `usbcpower2_init` This function initializes all necessary pins and peripherals used for this Click board.

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- `usbcpower2_default_cfg` This function executes a default configuration of USB-C Power 2 Click board.
- `usbcpower2_check_com` This function checks communication with the device by reading the vendor ID register and validating the returned value.
- `usbcpower2_get_int_pin` This function reads and returns the logic state of the INT pin.
- `usbcpower2_read_reg` This function reads a single byte of data from the selected readable register address.

Application Init

Initializes the logger and USB-C Power 2 Click driver, and applies the default device configuration.

Application Task

Waits for an USB detached/attached interrupt event, then reads and displays cable connection status and CC line status information including VBUS detection, Rp value, port attachment state, and cable polarity.

Application Output

This Click board can be interfaced and monitored in two ways:

- Application Output - Use the "Application Output" window in Debug mode for real-time data monitoring. Set it up properly by following [this tutorial](#).
- UART Terminal - Monitor data via the UART Terminal using a [USB to UART converter](#). For detailed instructions, check out [this tutorial](#).

Additional Notes and Information

The complete application code and a ready-to-use project are available through the NECTO Studio Package Manager for direct installation in the [NECTO Studio](#). The application code can also be found on the MIKROE [GitHub](#) account.

Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

[ClickID](#)

Downloads

[USB-C Power 2 Click example package](#)

[USB-C Power 2 Click 2D and 3D files v101](#)

[PTN5150A datasheet](#)

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[NX5P3090 datasheet](#)

[USB-C Power 2 Click schematic v1.01](#)

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