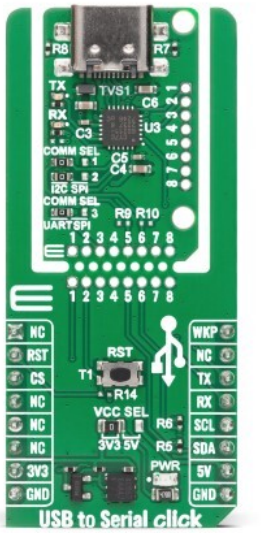
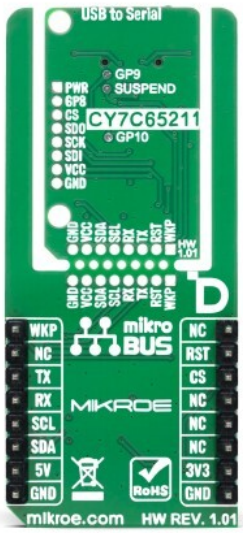
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USB to Serial Click





PID: MIKROE-7011

USB to Serial Click is a configurable USB-to-serial bridge for connecting USB hosts to UART, I2C, or SPI devices. It features the CY7C65211-24LTXI from Infineon Technologies, supporting USB 2.0 Full-Speed at 12Mbps, UART rates up to 3Mbaud, I2C clocks up to 400kHz, and SPI clocks up to 3MHz. Onboard jumpers enable communication routing and 3.3V or 5V logic selection, while a USB Type-C connector and external SPI header simplify integration. Remote wake-up, Suspend mode, activity LEDs, ClickID, and Click Snap add flexibility. It is suitable for healthcare, POS terminals, test systems, gaming platforms, networking hardware, industrial electronics, and legacy peripherals.

For more information about **USB to Serial Click** visit the official product page.

How does it work?

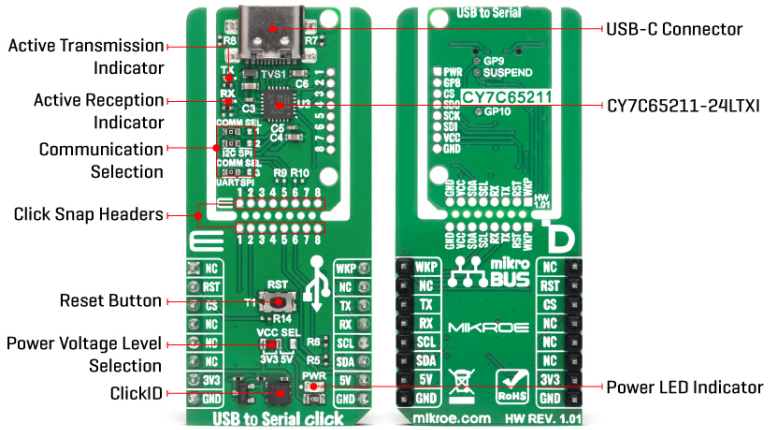
USB to Serial Click is based on the CY7C65211-24LTXI, a single-channel USB-to-serial bridge controller from Infineon Technologies. The device provides connectivity between a USB host and embedded systems using UART, I2C, or SPI communication. It integrates a USB 2.0-certified Full-Speed transceiver operating at 12Mbps, along with USB termination resistors, a D+ pull-up resistor, a 48MHz oscillator, a 32kHz low-power oscillator, a voltage regulator, and 512 bytes of Flash memory. This high level of integration allows the complete USB protocol and serial data conversion to be handled by the IC without requiring USB-specific firmware on the host MCU. The internal Flash stores configurable parameters such as the USB VID and PID, serial number, manufacturer and product descriptors, serial interface settings, GPIO configuration, and power-management options. A unique serial-number function can also maintain a consistent COM-port assignment when the device is configured as a CDC UART bridge.

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The CY7C65211 contains one configurable serial communication block that can operate as a UART, I2C, or SPI interface. In UART mode, it supports full-duplex communication at data rates from 300 baud up to 3Mbaud, seven or eight data bits, one or two stop bits, and no, even, odd, mark, or space parity. It also provides parity, overrun, and framing-error detection, a break signal, and optional hardware flow control. The UART interface can enumerate as either a CDC virtual COM port or a vendor-specific USB device. The I2C interface supports controller and target operation, multi-controller buses, and clock rates up to 400kHz, while the SPI interface supports controller operation at up to 3MHz and peripheral operation at up to 1MHz, configurable word lengths from 4 to 16 bits, and Motorola, TI, and National Microwire formats. I2C and SPI communication on this CY7C65211 variant uses the vendor-specific USB interface. Infineon provides a Windows-based configuration utility for selecting and configuring the serial protocol, USB descriptors, GPIO functions, and power-management features. The device also supports USB Suspend mode with a typical current consumption of only 5µA and remote wake-up through its configurable WAKEUP input.

USB to Serial Click connects to the USB host through the onboard USB Type-C connector and exchanges serial data with the host MCU or external circuitry through UART, I2C, or SPI. As the CY7C65211 uses shared pins for its three serial protocols, JP2-JP4 communication-selection jumpers determine where these signals are routed. With JP2 COMM SEL1 and JP3 COMM SEL2 in their default left positions, the shared SCL/SDO and SDA/SDI signals are connected to the mikroBUS™ SCL and SDA pins, with 4.7kΩ pull-up resistors to the selected VCC rail. JP4 COMM SEL3 is also placed in the default left position, routing the shared TX/SCK signal to the mikroBUS™ TX pin, while the RX line is connected directly to the mikroBUS™ RX pin. For SPI operation, all three jumpers must be moved to their right SPI positions, routing SDO, SDI, and SCK to the external J1 header, where the dedicated CS signal is also available. Only one serial protocol can be active at a time, and the jumper arrangement must correspond to the interface selected in the CY7C65211 configuration. The WKP remote-wakeup input is routed to the mikroBUS™ PWM pin, the active-low hardware reset input is available on the RST pin, and the mikroBUS™ CS pin is used for ClickID communication.

Additional onboard elements simplify configuration, testing, and integration. The USB Type-C connector includes the required 5.1kΩ configuration-channel resistors, while a TVS protection device protects the USB VBUS line. The T1 pushbutton allows the CY7C65211 to be reset manually by driving its nXRES input low. The green PWR LED indicates the presence of the selected board supply, while the RX and TX LEDs provide visual feedback during USB receive and transmit activity. The eight-pin J1 header exposes the PWR output, GPIO8, CS, SDO, SCK, SDI, VCC, and GND signals for external SPI devices and additional control functions. The PWR

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signal can be used to control external circuitry according to the USB configuration and suspend state. Additional test points provide access to GPIO9, GPIO10, and the SUSPEND output. The board also incorporates ClickID based on the DS28E36BQ identification device, allowing compatible host systems to identify the board automatically. Its Click Snap design allows the main USB bridge section to be physically detached and integrated independently through the numbered connection pads for more flexible placement in custom applications.

USB to Serial Click uses either the 3.3V or 5V power rail from the mikroBUS™ socket for its VCC supply and serial-interface logic. The operating voltage is selected through the JP1 VCC SEL jumper, which is set to the 3.3V position by default and can be moved to the 5V position when used with a 5V host system. The USB Type-C connector provides the separate VBUS input required by the CY7C65211 for USB connection detection and operation. This Click board™ comes with a library containing easy-to-use functions and a ready-to-use code example that can be downloaded and used as a reference for further development.

Click Snap

Click Snap is an innovative feature of our standardized Click add-on boards, designed to bring greater flexibility and optimize your prototypes. By simply snapping the PCB along predefined lines, you can easily detach the main sensor/IC/module area, reducing the overall size, weight, and power consumption - ideal for the final phase of prototyping. For more details about Click Snap, visit the official page dedicated to this feature.

Specifications

Type	USB
Applications	Ideal for applications such as medical and healthcare devices, POS terminals, test and measurement systems, gaming platforms, set-top boxes, industrial equipment, networking hardware, automotive systems, and USB upgrades for legacy peripherals
On-board modules	CY7C65211-24LTXI - USB 2.0 Full-Speed single-channel UART/I2C/SPI bridge controller from Infineon Technologies
Key Features	USB 2.0 Full-Speed operation at 12Mbps, configurable UART/I2C/SPI bridging, UART rates up to 3Mbaud, I2C clocks up to 400kHz, SPI clocks up to 3MHz, USB Type-C connectivity, selectable 3.3V or 5V logic, communication-routing jumpers, remote wake-up, Suspend mode, activity LEDs, external SPI header, ClickID, Click Snap, and more
Interface	I2C,SPI,UART
Feature	Click Snap,ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

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Pinout diagram

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

Notes	Pin	mikroBUS				Pin	Notes
	NC	1	AN	PWM	16	**WKP**	Wakeup
Reset / ID SEL	**RST**	2	RST	INT	15	NC	
ID COMM	**CS**	3	CS	RX	14	**TX**	UART Transmit
	NC	4	SCK	TX	13	**RX**	UART Receive
	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

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	VCC SEL	Left	Power/logic voltage level selection 3.3V/5V: Left position 3.3V, Right position 5V
JP2	COMM SEL 0	Left	Communication selection I2C/SPI: Left position I2C, Right position SPI
JP3	COMM SEL 1	Left	Communication selection I2C/SPI: Left position I2C, Right position SPI
JP4	COMM SEL 2	Left	Communication selection UART/SPI: Left position UART, Right position SPI
LD2	RX	-	USB Receive Indication
LD3	TX	-	USB Transmit Indication

USB to Serial Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Operating Temperature	-40	-	85	°C
USB Standard	USB 2.0 Full-Speed	-	-	-
USB Data Rate	-	12	-	Mbit/s
UART Baud Rate	-	-	3	Mbps
Suspend Current	-	5	-	uA

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Software Support

USB to Serial 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 USB to Serial Click board's ability to act as a USB-to-UART bridge. It enables bidirectional communication between a USB host and a UART device by forwarding received data between the USB and UART interfaces.

Key Functions

- usbtoserial_cfg_setup This function initializes Click configuration structure to initial values.
- usbtoserial_init This function initializes all necessary pins and peripherals used for this Click board.
- usbtoserial_generic_write This function writes a desired number of data bytes by using UART serial interface.
- usbtoserial_generic_read This function reads a desired number of data bytes by using UART serial interface.
- usbtoserial_reset_device This function resets the device by toggling the reset pin logic state.
- usbtoserial_set_wkp_pin This function sets the WKP pin to the selected logic state.

Application Init

Initializes the logger and the Click board and enables the device.

Application Task

Continuously reads the data from one UART interface and forwards it to the other, enabling seamless USB to UART data transfer and vice versa.

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

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mikroBUS™

mikroSDK

Click board™ Catalog

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Downloads

USB to Serial Click example package

USB to Serial Click 2D and 3D files v101

USB to Serial Click schematic v101

CY7C65211-24LTXI datasheet

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