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RS232 3 Click





PID: MIKROE-5109

RS232 3 Click is a compact add-on board representing a universal usable RS232 transceiver. This board features the SP3221E, a low-power RS232 transceiver from MaxLinear. The SP3221E uses an internal high-efficiency, charge-pump power supply and is compliant with EIA/TIA-232-F standards when powered by any of the mikroBUS™ power rails. The AUTO ON-LINE® feature allows the SP3221E to automatically "Wake-Up" from a Shutdown state when an RS232 cable is connected and a peripheral device is turned on. When not connected or not in use, the SP3221E will automatically shut down, drawing less supply current. This Click board™ is suitable for low-power serial communications, portable serial devices, point-of-sale equipment, and many more applications.

RS232 3 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?

RS232 3 Click as its foundation uses the SP3221E, a low power, RS232 transceiver (single driver/single receiver) solution with a 250kbps data rate from MaxLinear. The SP3221E uses an internal high-efficiency, charge-pump power supply and is compliant with EIA/TIA-232-F standards when powered by any of the mikroBUS™ power rails. This charge pump and MaxLinear's driver architecture allow the SP3221E to deliver compliant RS-232 performance from a single power supply intended for portable or handheld applications such as embedded computers, data logging devices, medical diagnostics, and remote sensors.

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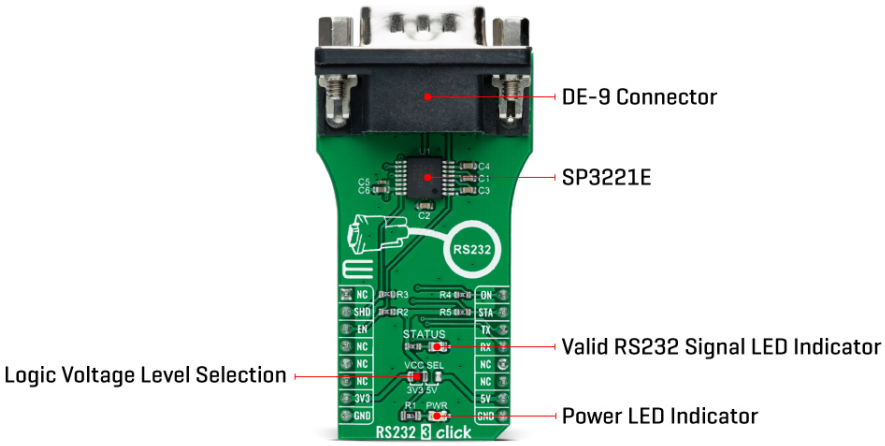

The SP3221E communicates with MCU using the UART interface with the default baud rate of 115200bps for the data transfer. It also comes equipped with the standard DB-9 connector, which makes interfacing with the RS232 simple and easy, and a red LED indicator labeled as STATUS that indicates whether a valid RS232 signal is present not. This signal is also routed to the INT pin of the mikroBUS™ socket, labeled as STA. Alongside UART communication, several signals connected to the mikroBUS™ socket pins are also used to forward the information to the MCU.

For proper operation of SP3221E, this board uses a combination of two pins, EN and SHD pins routed to the CS and RST pins of the mikroBUS™ socket. The receiver is active when the AUTO ON-LINE® circuitry is enabled or when in Shutdown. The AUTO ON-LINE® feature, controlled via ON pin routed to the PWM pin of the mikroBUS™ socket, allows the SP3221E to automatically "Wake-Up" from a Shutdown state when an RS232 cable is connected, and a peripheral device is turned on. During the Shutdown, the receiver will continue to be active. If there is no activity at the receiver for a more extended period or when the SHD pin is enabled, the device goes into a Standby mode. Also, driving the EN pin to a high state forces the receiver's output into a high impedance state.

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

Specifications

Type	RS232
Applications	Can be used for low-power serial communications, portable serial devices, point-of-sale equipment, and many more applications
On-board modules	SP3221E - low-power RS232 transceiver from MaxLinear
Key Features	EIA/TIA-232-F standards, AUTO ON-LINE® circuitry automatically wakes up from a shutdown, minimum 250kbps data rate under

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	load, Regulated charge pump yields stable RS-232 outputs regardless of power supply, and more
Interface	UART
ClickID	No
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on RS232 3 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	**ON**	AUTO ON-LINE®
Shutdown	**SHD**	2	RST	INT	15	**STA**	RS232 Signal Status
Enable	**EN**	3	CS	RX	14	**TX**	UART TX
	NC	4	SCK	TX	13	**RX**	UART RX
	NC	5	MISO	SCL	12	NC	
	NC	6	MOSI	SDA	11	NC	
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
LD2	STATUS	-	Valid RS232 Signal LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

RS232 3 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Data Rate	250	-	-	kbps
Operating Temperature Range	-40	+25	+85	°C

Software Support

We provide a library for the RS232 3 Click as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all the main MikroElektronika development boards.

Package can be downloaded/installed directly from NECTO Studio Package

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Manager(recommended way), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

This library contains API for RS232 3 Click driver.

Key functions

- rs2323_generic_write This function writes a desired number of data bytes by using UART serial interface.
- rs2323_generic_read This function reads a desired number of data bytes by using UART serial interface.

Example Description

This example demonstrates the use of an RS232 3 Click board™ by showing the communication between the two click board configured as a receiver and transmitter.

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

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.RS2323

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™

Downloads

RS232 3 click example on Libstock

SP3221E datasheet

RS232 3 click 2D and 3D files

RS232 3 click schematic

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