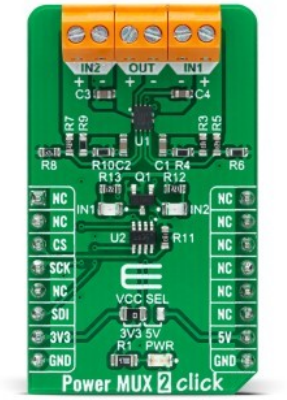
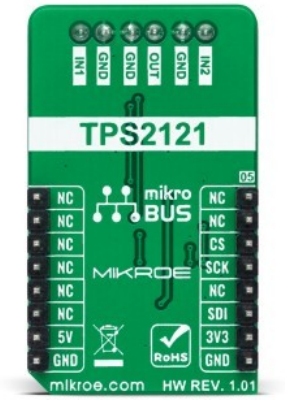
MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com

Power MUX 2 Click





PID: MIKROE-4575

Power MUX 2 Click is a compact add-on board that contains a highly configurable power mux. This board features the TPS2121, a dual-input single-output power multiplexer with an automatic switchover feature from Texas Instruments. This Click board™ prioritizes the main supply when present and quickly switches to auxiliary supply when the main supply drops. During switchover, the voltage drop is controlled to block reverse current before it happens and provide uninterrupted power to the load with minimal hold-up capacitance. This Click board™ is suitable for applications as a backup and standby power, input source selection, and various systems having multiple power sources.

Power MUX 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?

Power MUX 2 Click as its foundation uses the TPS2121, a highly configurable power mux with an automatic switchover feature from Texas Instruments. This dual-input single-output power multiplexer prioritizes the main supply of 12V when present and quickly switches to an auxiliary supply of 5 V when the main supply drops. A priority voltage supervisor is used to select an input source. During switchover, the voltage drop is controlled to block reverse current before it happens and provide uninterrupted power to the load with minimal hold-up capacitance.

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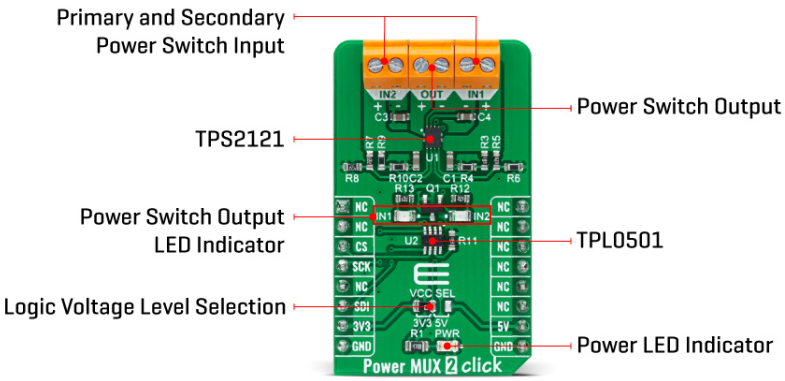

If one of the input power supplies were to fail, the system needs to automatically switchover to a backup power source without interrupting regular operation. When the 12V supply on IN1 drops below 7.6V, the device will automatically switch to the 5V auxiliary supply on IN2. When the 12V supply returns, it will become the output supply again. Furthermore, the voltage drop on the output should be minimal, providing the output with uninterrupted redundant power.

The Power MUX 2 Click communicates with MCU through the 3-Wire SPI serial interface using the TPL0501, an onboard 256-taps digital potentiometer from Texas Instruments. This way, the TPL0501 serves a current limiter that adjusts the output current of the TPS2121 instead of an external resistor. Current limiting can be used during Startup and switchover to protect against overcurrent events and protect the device during regular operation.

As an additional feature, this Click board™ also has two red LED indicators labeled as IN1 and IN2, which visually indicate to the user the fact which one of the two power supplies, IN1 or IN2, is located on the output more precisely on the output connector of the Click board, labeled as OUT.

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 properly use the SPI communication lines. However, the 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	Power Switch
Applications	Can be used for applications as a backup and standby power, input source selection, and various systems having multiple power sources.
On-board modules	TPS2121 - highly configurable power mux with an automatic switchover feature from Texas Instruments TPL0501 - 256-taps digital potentiometer from Texas Instruments
Key Features	Low power consumption, automatic switchover, output current limit, uninterrupted

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	power solution, and more.
Interface	SPI
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V,External

Pinout diagram

This table shows how the pinout on Power MUX 2 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	NC	
	NC	2	RST	INT	15	NC	
SPI Chip Select	**CS**	3	CS	RX	14	NC	
SPI Clock	**SCK**	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	NC	
SPI Data IN	**SDI**	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
LD3	IN1	-	Primary Power Switch LED Indicator
LD2	IN2	-	Secondary Power Switch LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

Power MUX 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage VCC	3.3	-	5	V
Supply Voltage IN1	7.6	-	12	V
Supply Voltage IN2	-	5	-	V
Output Voltage OUT	5	-	12	V
Output Current Limit	1	-	4	A
Current Limit Resistance	18	-	100	kΩ
Operating Temperature Range	-40	+25	+85	°C

Software Support

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We provide a library for the PowerMux2 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 Manager(recommended way), downloaded from our LibStock™ or found on mikroE github account.

Library Description

This library contains API for PowerMux2 Click driver.

Key functions:

- powermux2_cfg_setup - Config Object Initialization function.
- powermux2_init - Initialization function.
- powermux2_default_cfg - Click Default Configuration function.

Examples description

This library contains API for the Power MUX 2 Click driver. The Power MUX 2 operates in automatic switchover mode with a priority prioritizing supply 1 when present and quickly switches to supply 2 when supply 1 drops below approximately 6V.

The application is composed of three sections :

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.PowerMux2

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. The terminal available in all MikroElektronika compilers, or any other terminal application of your choice, can be used to read the message.

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

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mikroBUS™

mikroSDK

Click board™ Catalog

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Downloads

TPL0501 datasheet

TPS2121 datasheet

Power MUX 2 click 2D and 3D files

Power MUX 2 click schematic

Power MUX 2 click example on Libstock

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