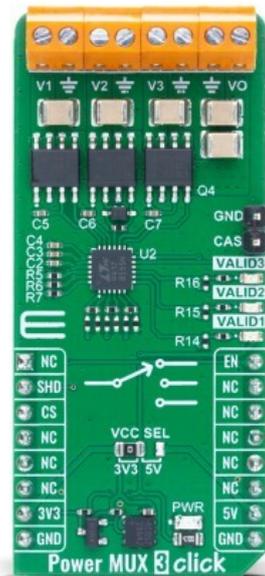


Power MUX 3 Click



PID: MIKROE-6622

Power MUX 3 Click is a compact add-on board designed to manage multiple power sources in systems requiring high availability and power switching. It is based on the [LTC4417](#), a prioritized PowerPath™ controller from [Analog Devices](#) that autonomously selects and connects one of up to three valid power supplies to a common output based on predefined priority (user-defined undervoltage and overvoltage thresholds for at least 256ms). The board uses only EN and SHD control pins, supports cascading via the CAS pin for expanded configurations, and features fast non-overlap switching, inrush current control, gate protection for onboard MOSFETs ([IRF7324](#)), and red VALID LED indicators for each channel. This Click board™ is ideal for battery backup systems, industrial handheld instruments, high-availability devices, and server peripherals.

For more information about **Power MUX 3 Click** visit the official [product page](#).

How does it work?

Power MUX 3 Click is based on the LTC4417, a prioritized PowerPath™ controller from Analog Devices that autonomously selects and connects one of up to three valid power sources to a common output (VO terminal) based on a predefined priority. The board represents a 12V system setup using a swappable and backup battery configuration, where V1 is typically connected to a 12V wall adapter, V2 to a NiCd battery supply, and V3 to a Li-Ion battery supply. The priority of the sources is hardwired, with V1 being the highest and V3 the lowest. The Power MUX 3 Click is designed to manage multiple power sources in systems requiring high availability and controlled power switching, such as industrial handheld instruments, battery backup systems, and computer peripherals.

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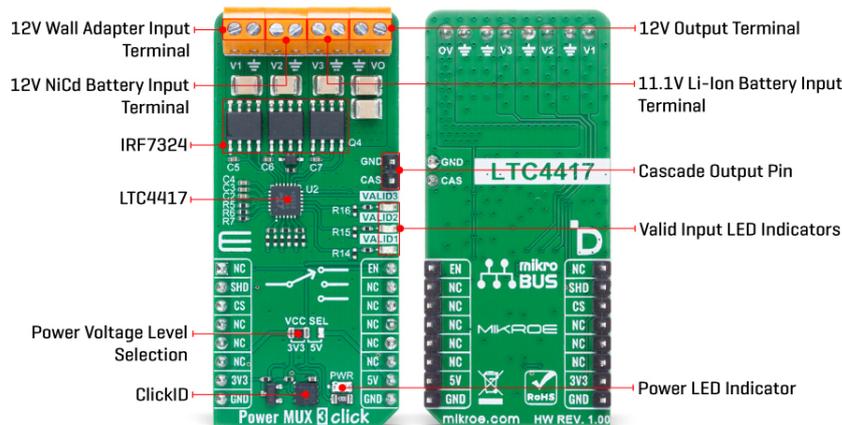
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A power source is considered valid if its voltage remains continuously within the undervoltage (UV) and overvoltage (OV) limits for at least 256 milliseconds. As soon as the currently connected highest-priority valid input falls outside of this window, the LTC4417 automatically disconnects it and connects the next highest-priority input that meets the UV/OV criteria. This ensures uninterrupted and reliable power delivery without manual intervention.

Power MUX 3 Click uses only two control pins from the mikroBUS™ socket: EN and SHD. The EN (Enable) pin allows the user to swiftly connect or disconnect channels without resetting the UV/OV validation timers, while the SHD (Shutdown) pin forces the LTC4417 into a low-power mode and resets all 256ms timers for each channel, effectively restarting the validation process. The board also supports cascading of two or more Power MUX 3 Clicks via the CAS pin, enabling the creation of advanced power path management topologies with more than three inputs.

The LTC4417 integrates fast non-overlap switching logic to prevent both reverse conduction and cross conduction during transitions, thereby minimizing output droop and ensuring safe switching. It features a 6V gate clamp to protect external MOSFETs (such as the onboard IRF7324 MOSFETs), and a controlled output ramp function that suppresses inrush currents at power-up. Additionally, each input has an open-drain VALID LED indicator which lights up red to signify that the respective input has been continuously valid for at least 256ms, providing immediate visual feedback on power source health and readiness.

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	Power Switch
Applications	Ideal for battery backup systems, industrial handheld instruments, high-availability devices, and server peripherals
On-board modules	LTC4417 - prioritized PowerPath™ controller from Analog Devices
Key Features	Automatic power path prioritization and

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	switching, validation of input voltages through undervoltage and overvoltage thresholds with 256ms timing, support for three independent power sources with fixed priority, EN and SHD control pin functionality for quick channel control and shutdown, cascading capability, fast non-overlap switching to prevent reverse and cross conduction, 6V gate clamp protection for external IRF7324 MOSFETs, and more
Interface	GPIO
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V, External

Pinout diagram

This table shows how the pinout on Power MUX 3 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
	NC	1	AN	PWM	16	EN	Output Enable
Shutdown Mode	SHD	2	RST	INT	15	NC	
ID COMM	CS	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	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-LD4	VALID1-3	-	Valid Input LED Indicators
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V

Power MUX 3 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Input Voltage	-	12	-	V
Output Voltage	-	12	-	V
Timer Validation Delay	-	256	-	sec

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Software Support

[Power MUX 3 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 Power MUX 3 Click board. It enables automatic selection between three power sources, selecting the highest voltage as the input source. The demo toggles the output ON and OFF at regular intervals, allowing observation of the output control functionality.

Key Functions

- `powermux3_cfg_setup` This function initializes Click configuration structure to initial values.
- `powermux3_init` This function initializes all necessary pins and peripherals used for this Click board.
- `powermux3_enable_device` This function enables the device by setting the SHD pin to HIGH on the Power MUX 3 Click board.
- `powermux3_disable_device` This function disables the device by setting the SHD pin to LOW on the Power MUX 3 Click board.
- `powermux3_enable_output` This function enables the output by setting the EN pin to HIGH on the Power MUX 3 Click board.
- `powermux3_disable_output` This function disables the output by setting the EN pin to LOW on the Power MUX 3 Click board.

Application Init

Initializes the logger and the Power MUX 3 Click driver, then enables the device.

Application Task

Alternates enabling and disabling the output in 5-second intervals while logging the status.

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.

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Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

[ClickID](#)

Downloads

[Power MUX 3 click example package](#)

[Power MUX 3 click 2D and 3D files v100](#)

[LTC4417 datasheet](#)

[IRF7324 datasheet](#)

[Power MUX 3 click schematic v100](#)

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