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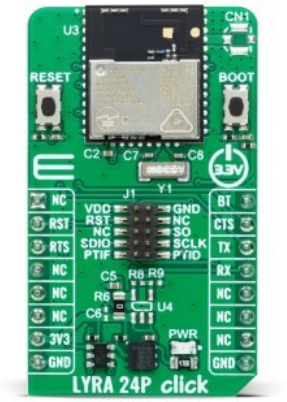
LYRA 24P Click



PID: MIKROE-6021

LYRA 24P Click is a compact add-on board for high-performance wireless connectivity in IoT devices running on Bluetooth. This board features the LYRA 24P (453-00145R), a secure high-performance wireless module from Ezurio. It features a 32-bit ARM® Cortex®-M33 core at 39MHz, Bluetooth® Low Energy (BLE) 5.3 connectivity, and industry-leading Secure Vault® technology for enhanced security and future-proofing. The module supports 2.4GHz wireless connectivity with a built-in antenna and offers global regulatory certifications. This Click board™ is ideal for applications such as smart home devices, lighting, building automation and security, gateways, digital assistants, and Bluetooth mesh low-power nodes.

How does it work?

LYRA 24P Click is based on the LYRA 24P (453-00145R), a secure, high-performance wireless module from Ezurio designed for line-powered IoT devices operating on Bluetooth networks. The LYRA 24P module is a highly integrated, high-performance system with all the necessary hardware components to enable 2.4GHz wireless connectivity. Based on the Series 2 EFR32BG24 SoC (32-bit ARM® Cortex®-M33 core at 39MHz), it enables Bluetooth® Low Energy (BLE) 5.3 connectivity, delivering exceptional RF performance and energy efficiency (+19.6dBm TX output power). It features industry-leading Secure Vault® technology (Lyra 24P module supports Secure Vault High) and futureproofing capabilities. Secure Vault is a collection of technologies providing state-of-the-art security and upgradability features to protect and futureproof IoT devices against costly threats, attacks, and tampering. A dedicated security CPU enables the Secure Vault functions, isolating cryptographic functions and data from the Cortex-M33 core. The LYRA 24P is a complete solution that offers fully upgradeable software stacks and global regulatory certifications. It is suitable for a broad range of applications, including smart home devices, lighting, building automation and security, gateways, digital

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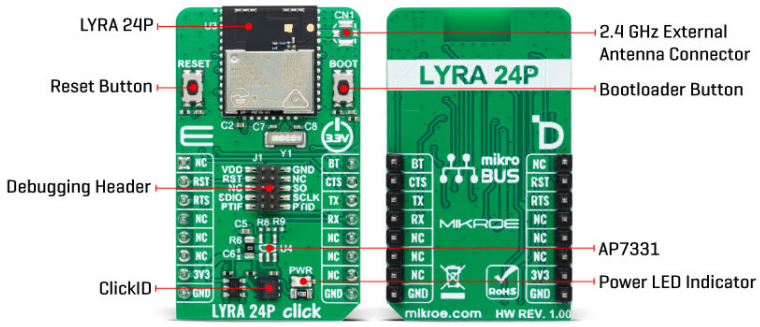
assistants, and Bluetooth mesh low-power nodes.



The main module power supply is 3.3V from the 3V3 mikroBUS™ power rail, automatically supplied via the R6 resistor. It can also be powered via the AP7331, a fixed-3.3V output voltage low-dropout linear regulator. This Click board™ is based on the 453-00145R module but is also compatible with other LYRA 24P modules. The module includes a built-in antenna and operates in the 2.4GHz ISM frequency band, from 2402 to 2480MHz. Additionally, it has an unpopulated connector for an external 2.4GHz antenna connection, suitable for module variants with an RF pin for an external antenna only, such as the 453-00148.

Communication between the LYRA 24P and the host MCU is established through a UART interface, using standard UART RX and TX pins and hardware flow control pins (CTS/RTS). The module communicates at 115200bps by default, allowing efficient data exchange. The board also includes a reset (RST) button/pin for resetting the module and a Boot (BT) button/pin used to determine when execution of the bootloader is required. Upon reset, execution of the bootloader begins. When the Boot button is pressed, the bootloader continues execution, facilitating firmware updates via the UART. When released, the bootloader stops execution and passes control to the main application firmware.

The LYRA 24P also supports hardware debugging via a 4-pin JTAG or 2-pin serial-wire debug (SWD) interface through the J1 header. This header includes two additional pins, the PTIF and PTID pins, providing a true PHY-level packet trace interface that captures packets non-intrusively to monitor and log device and network traffic without burdening processing resources in the module's SoC. These signals are a powerful debugging tool, especially when used with other hardware and software development tools.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before using MCUs with different logic levels. Also, it comes equipped with a library containing functions and an example code that can be used as a reference for further development.

Specifications

Type	BT/BLE
Applications	Ideal for smart home devices, lighting, building automation and security, gateways, digital assistants, and Bluetooth mesh low-power

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	nodes
On-board modules	453-00145R - secure high-performance wireless module from Ezurio
Key Features	32-bit ARM® Cortex®-M33 core, Bluetooth® Low Energy (BLE) 5.3 connectivity with a +19.6dBm TX output power, exceptional RF performance, energy efficiency, Secure Vault® technology for advanced security and upgradability, 2.4GHz ISM frequency band, built-in antenna with an option for an external antenna connection, UART interface, hardware debugging via JTAG or SWD interfaces, reset and boot buttons for firmware updates and control, and more
Interface	UART
Feature	ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on LYRA 24P 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	**BT**	Bootloader
Module Reset / ID SEL	**RST**	2	RST	INT	15	**CTS**	UART CTS
UART RTS / ID COMM	**RTS**	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	NC	
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
T1	BOOT	-	Bootloader Button
T2	RESET	-	Reset Button

LYRA 24P Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Frequency Range	2402	-	2480	MHz

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TX Output Power	-	-	+19.6	dBm

Software Support

We provide a library for the LYRA 24P Click as well as a demo application (example), developed using MIKROE compilers. The demo can run on all the main MIKROE development boards.

Package can be downloaded/installed directly from NECTO Studio Package Manager(recommended), downloaded from our LibStock™ or found on MIKROE github account.

Library Description

This library contains API for LYRA 24P Click driver.

Key functions

- lyra24p_write_command This function writes a desired command by using UART serial interface.
- lyra24p_write_cmd_param This function writes a desired command, command value, prefix and parameter by using UART serial interface.
- lyra24p_inquire_command This function writes a desired inquire command, command value and enable/disable quote by using UART serial interface.

Example Description

This example demonstrates the use of LYRA 24P Click board™ by processing the incoming data and displaying them on the USB UART.

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

Other MIKROE Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.LYRA24P

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 MIKROE compilers.

mikroSDK

This Click board™ is supported with mikroSDK - MIKROE 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.

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For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

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Downloads

AP7331 datasheet

LYRA 24P click example on Libstock

LYRA 24P click 2D and 3D files v100

LYRA 24P Datasheet

LYRA 24P click schematic v100