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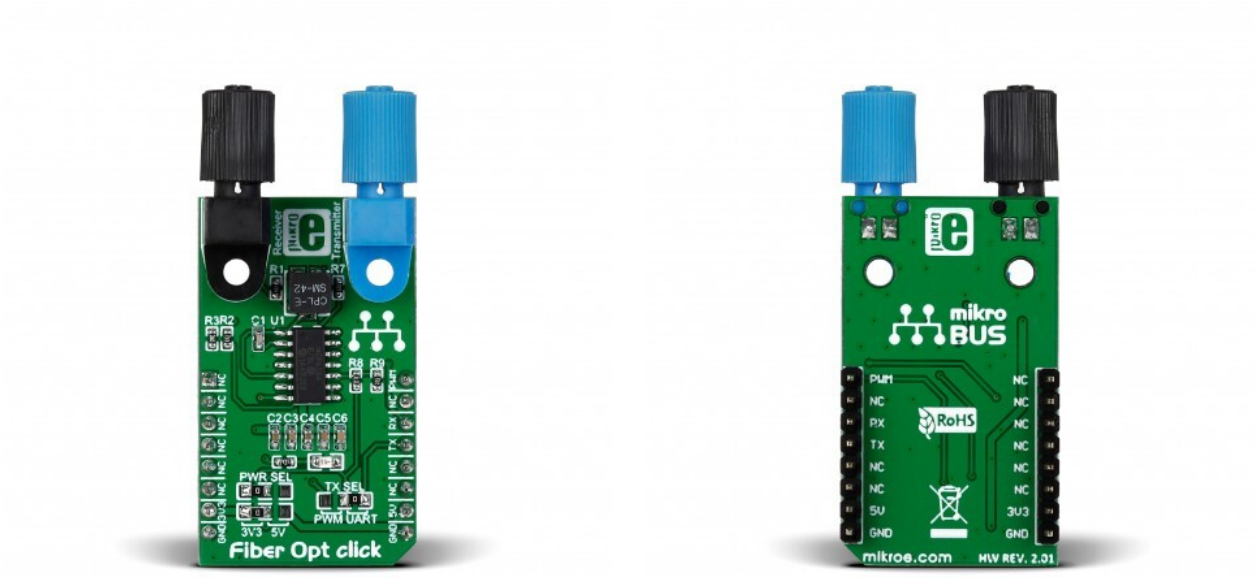
Fiber Opt Click



PID: MIKROE-1940

Fiber Opt Click is a compact add-on board that adds fiber-optic communication to your design. This board features one IF-D91, a fiber-optic photodiode, and one IF-E97, a fiber-optic LED, both from Industrial Fiber Optics. It provides a plastic optic connection feature over a plastic fiber cable with typical data rates of up to 512Kbps, and a maximum of up to 1Mbps, depending on the driving circuitry and implementation. Received data from the IF-D91 photodiode is filtered and amplified through a dual operational amplifier, the MCP6284from Microchip, and sent for further processing via selected mikroBUS™ lines. This Click board™ makes the perfect solution for high-speed digital data links, local area networks, video links, EMC/EMI signal isolation, fiber optic modems, and more.

Fiber Opt 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?

Fiber Opt Click is based on one IF-D91, a fiber-optic photodiode, and one IF-E97, a fiber-optic LED, both from Industrial Fiber Optics. The IF-D91 is a high-speed photodiode detector housed in a connector-less plastic fiber optic package. Its optical response extends from 400 to 1100nm, making it compatible with a wide range of visible and near-infrared LED and laser diode sources. The detector package features an internal micro-lens and a precision-molded PBT housing to ensure efficient optical coupling with standard 1000µm core 2.2mm jacketed plastic fiber cable. When used with high-speed sources, the IF-D91 is capable of data rates up to 100Mbps. It can also be used for analog video links with bandwidths up to 70MHz.

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The IF-E97 is a high-optical-output visible red LED, also housed in a precision-molded PBT package with an internal micro-lens for optimal optical coupling with the same type of plastic fiber cable. Its output spectrum, produced by a GaAlAs die, peaks at 650nm — an optimal transmission window for PMMA plastic optical fiber. The red light has low attenuation in PMMA fibers and helps with installation diagnostics. Combined with its high optical power and linearity, the IF-E97 supports data rates of up to 1Mbps under appropriate driving conditions.

This Click board™ communicates with the host MCU over selectable pins of the mikroBUS™ socket. Transmission can be selected through the TX SEL selection jumper between the UART TX pin or PWM pin of the mikroBUS™ socket, as UART is selected by default. Received data is available on the RX pin of the mikroBUS™ socket.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the PWR 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	Fiber optics
Applications	Ideal for data links, local area networks, motor controller triggering, medical instruments, EMC/EMI signal isolation and many more
On-board modules	IF-D91 - fiber-optic photodiode from Industrial Fiber Optics | IF-E97 – fiber-optic LED from Industrial Fiber Optics | MCP6284 – dual operational amplifier from Microchip
Key Features	High-speed fiber-optic communication interface, compatible with standard 1000µm core 2.2mm jacketed plastic optical fiber, features integrated micro-lens and precision-molded housings for efficient optical coupling, includes signal conditioning via MCP6284 operational amplifier, designed for digital data links, EMC/EMI isolation, and short-range optical communication
Interface	PWM,UART
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

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

Notes	Pin		Pin	Notes

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		mikro™ BUS					
	NC	1	AN	PWM	16	**PWM**	GPIO TX
	NC	2	RST	INT	15	NC	
	NC	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
J1-J2	TX SEL	Right	Communication Lines Selection PWM/UART: Left position PWM, Right position UART

Fiber Opt Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Wavelength Peak	-	650	-	nm
Data Rate	-	512	1000	kbps

Software Support

Fiber Opt 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 an Fiber Opt Click board by showing the communication between the two Click boards.

Key Functions

- fiberopt_cfg_setup Config Object Initialization function.
- fiberopt_init Initialization function.
- fiberopt_generic_write Generic single write function.
- fiberopt_generic_read Generic single read function.

Application Init

Initalizes device and makes an initial log.

Application Task

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Depending on the selected application mode, it reads all the received data or sends the desired text message with the message counter once per second.

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

mikroBUS™

mikroSDK

Click board™ Catalog

Click Boards™

Downloads

Fiber Opt click example on Libstock

Fiber Opt click schematic

Learn Article - Fiber Optics

Fiber Opt click 2D and 3D files

MCP6284 datasheet

IF-E97 datasheet

IF-D91 datasheet