tinyMicon MatisseCORE™

matiseye™-adapter User's Guide

Debug adapter for Matisse

No.67UG017E Rev.001
February 2024

Revision history

Date	Version	Remarks
2024/01/23	Rev.001	First release

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For Safety

Please read the following content first and make sure you fully understand the instructions before using the product for your safety. Additionally, this product is intended only for research and development, demonstration, and evaluation purposes, and is not a final product suitable for general consumer use. Therefore, please do not use this product, in whole or in part, as a final product. This product should only be used by professionals familiar with the risks associated with handling electrical and mechanical parts, solely for the purposes of research and development, demonstration, and evaluation.

・MEANING OF THE DISPLAY:

Indicates content that may lead to loss of life or serious injury.

Indicates content that may lead to minor injuries or damage to property.

・MEANING OF THE SYMBOLS:

Indicates prohibited actions.

Indicates instructions for actions that should be taken.

WARNING	
	・Do not disassemble or modify beyond what is described in the user's guide. It may cause fire or electric shock. ・Do not put water or foreign objects inside. It may cause fire or electric shock. ・Do not use the main unit or cables when they are damaged. It may cause fire or electric shock. ・Do not use with wet hands. It may cause electric shock.
	・Please connect cables correctly and securely. Incorrect connection may cause fire or electric shock. ・If you suspect a malfunction, stop using the device immediately, unplug the cables, and turn off the power. Continuing to use a malfunctioning device may cause fire or electric shock. ・If you notice smoke or a strange smell, stop using the device immediately, unplug the cables, and turn off the power. This may prevent fire or electric shock.

CAUTION	
	・Please do not use in places where water droplets, humidity, or dust are prevalent. It may cause fire or electric shock. ・Do not use inside a car during the summer or under direct sunlight. High temperatures may cause fire, electric shock, or malfunction. ・Do not place the product in unstable locations. It may cause the product to touch the body, leading to electric shock or injury. ・Do not use in places with significant vibration or where corrosive gases are generated. It may cause fire, electric shock, or malfunction.
	・Properly arrange the main unit and cables. Careless disconnection or snagging of cables may cause injury. ・Please use the cables and accessories provided. Using others may cause fire, electric shock, or malfunction. ・When not in use for an extended period, unplug the cables and turn off the power. It may cause fire.

1. Overview

1.1. What is matiseye™-adapter?

The matiseye™-adapter is a debug adapter used for the development, debugging, and programming of ICs operating on the Matisse CPU core. It is used by connecting to a PC with the integrated development environment matiseye™-studio installed and an IC equipped with the Matisse core. The Matisse debug I/F, a proprietary interface, is used for communication with the target board.

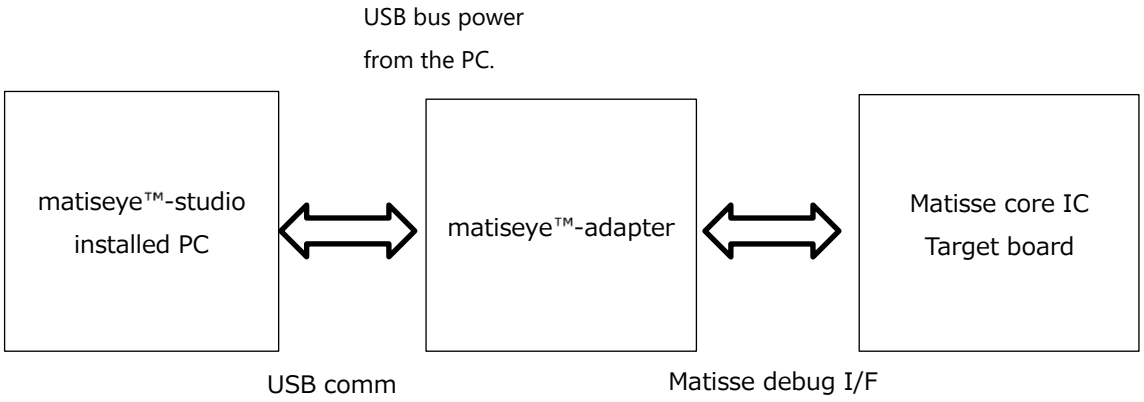

Figure 1. matiseye™-adapter overview

1.2. Names

Figure 2. Top

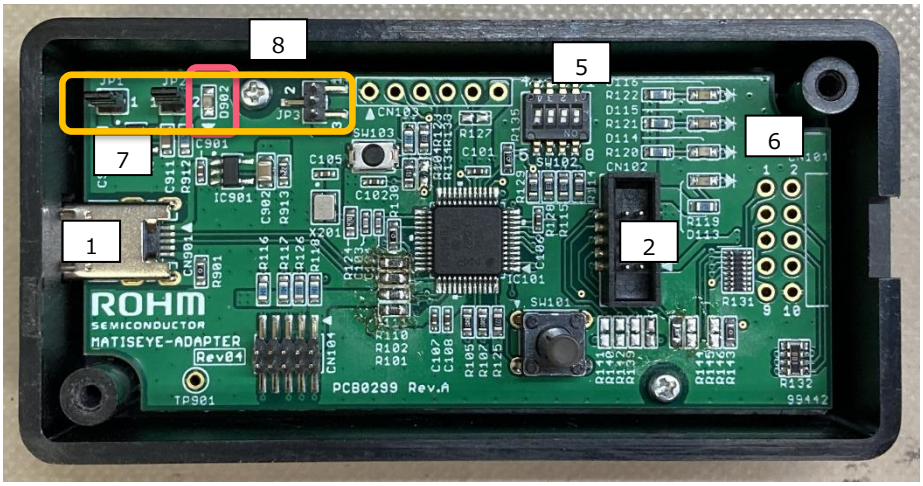

Figure 3. Inside

Table 1. Naming and functions of the main unit

No.	Circuit No.	Name	Function
1	CN901	USB Terminal	Connects to a PC via a MicroUSB terminal.
2	CN102	Debug I/F Terminal	A 10-pin connector with a 1.27mm pitch.
3	SW101	Push switch	A general-purpose push switch.
4	D113-116	LED	4-channel LEDs that indicate the status of the matiseye™-adapter.
5	SW102	Slide switch	A general-purpose 4-channel slide switch.
6	SW103	Reset switch	A switch to reset the matiseye™-adapter.
7	JP1/JP2/JP3	Power line pin headers	Pin headers to switch power supply from USB bus power and Debug I/F terminal.
8	D902	Power LED	An LED that lights up when powered.

1.3. Contents

・matiseye™-adapter main unit
・1.27mm pitch flat cable
・USB cable (Type-A/Micro-B)

1.4. Ratings

・Power supply
Power supply operates at 5V from USB bus power or 5V/3.3V from the Debug I/F terminal. When operating on USB bus power, it is possible to supply 5V or 3.3V from the Debug I/F terminal to external ICs or boards connected to it. For more details, please refer to section 1.4.

Table 2. Available Power Sources

Name	Power voltage	Description
USB	5V	Supply 50mA from Debug I/F terminal at 3.3V/5V.
Debug I/F Terminal	5V・3.3V	—

・IO Voltage
IO voltage of the Matisse debug I/F is 5V tolerant, allowing for a maximum input IO voltage of 5V. The output is fixed at 3.3V.

1.5. About the Debug I/F Terminals

The pin configuration for the Matisse debug I/F terminals to connect to the target board is as follows. Please refer to the pin configuration below when designing the target board. Note that a pull-up resistor is required for DBDATA and a pull-down resistor is required for DBCLK. Please prepare these on the target board.

Table 3. Pin configuration of Debug I/F Terminal

No.	Name	Remarks	No.	Name	Remarks
1	VCC		2	DBDATA	100kohm pull up required
3	GND		4	VBCLK	22kohm pull down required
5	GND		6	Reserved	
7	Reserved		8	Reserved	
9	GND		10	Reserved	

1.6. Removing the Case

By removing the two screws on the top surface of the case and opening the top cover, you can access the circuit board. You can set the operation mode and other settings using the switches on the circuit board. When opening the top cover, be careful not to damage the components in the LED area.

Figure 4. Positions of Screws

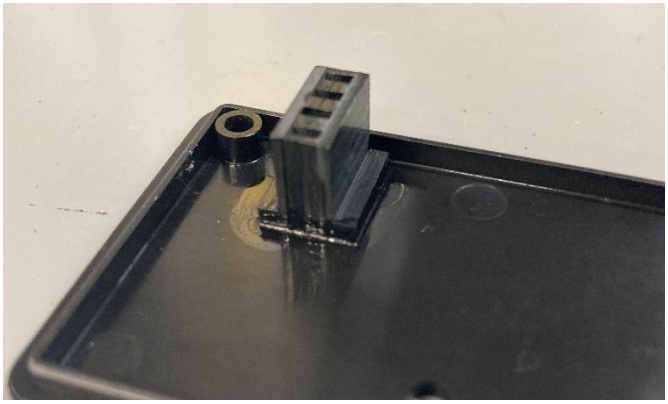

Figure 5. Bottom side of Top cover (LED area)

2. Function descriptions

2.1. How to Use

① Connect the flat cable to the target board.

② Connect the USB cable to the PC.

③ Launch matiseye™-studio. When the debug adapter is recognized, the COM LED will light up. The COM LED will flash when the PC and matiseye™-adapter are communicating. For more details, please refer to the matiseye™-studio user's guide.

2.2. Functions in details

①Debug I/F Terminal

This terminal is used to connect to the target board. The pin layout and signal names are as follows. The Reserved pins will be used for future expansion of the main unit's functions.

Table 4. Signals of Debug I/F

CN102 pin No.	Name
1	VCC
2	DBDATA
3	GND
4	DBCLK
5	GND
6	Reserved
7	NC
8	NC
9	GND
	Reserved

②4ch LED

It is a 4-channel LED. It indicates the operational status of the matiseye™-adapter. The colors and names of the LEDs are as follows.

Table 5. Name and colors of LED

Circuit No.	Name	Color
D113	WRITER	Orange
D114	COM	Orange
D115	OK	Green
D116	ERROR	Red

③Slide switch

Powering with turning switch No.3 ON, The main unit enters firmware update mode, allowing firmware updates for the matiseye™-adapter main unit via USB. For more details, please refer to ⑧ USB Communication. Other switches will be used for future functional expansions of the main unit."

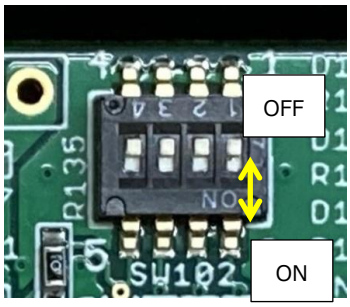

Figure 6. Slide switch

Table 6. Function of Slide switch

Item	No.	Details
SW201	1	Reserved
	2	Reserved
	3	Switch to ON for main body firmware update mode.
	4	Reserved

④Push switch

It is a general-purpose push switch. It will be used when the main unit is expanded with additional functions in the future.

Table 7. Function of push switch

Item	Name
SW101	START

Figure 7. Push switch

⑤USB communication

matiseye™-adapter has the capability to update the firmware of the main unit via USB. When the 3-pin slide switch is set to ON and the USB cable is connected, the microcontroller on the matiseye™-adapter starts in USB-ISP mode. In this mode, the built-in flash of the microcontroller is recognized as storage on the PC, allowing firmware to be rewritten via drag and drop.

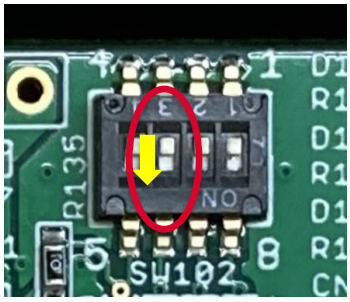

Figure 8. No.3 pin of Slide switch

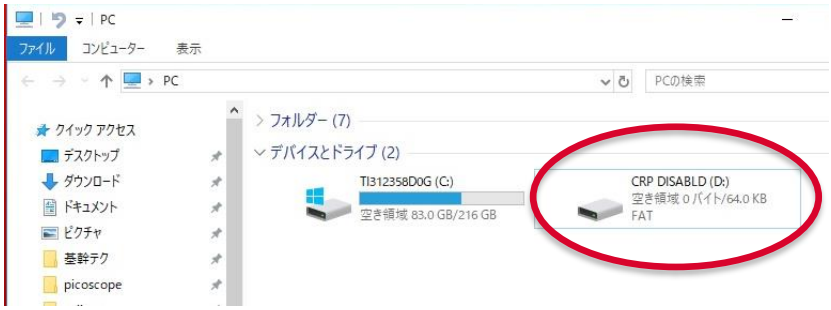

Figure 9. The appearance of the microcontroller's built-in flash being recognized as storage (Drive name: CRP DISABLD)

2.3. Power

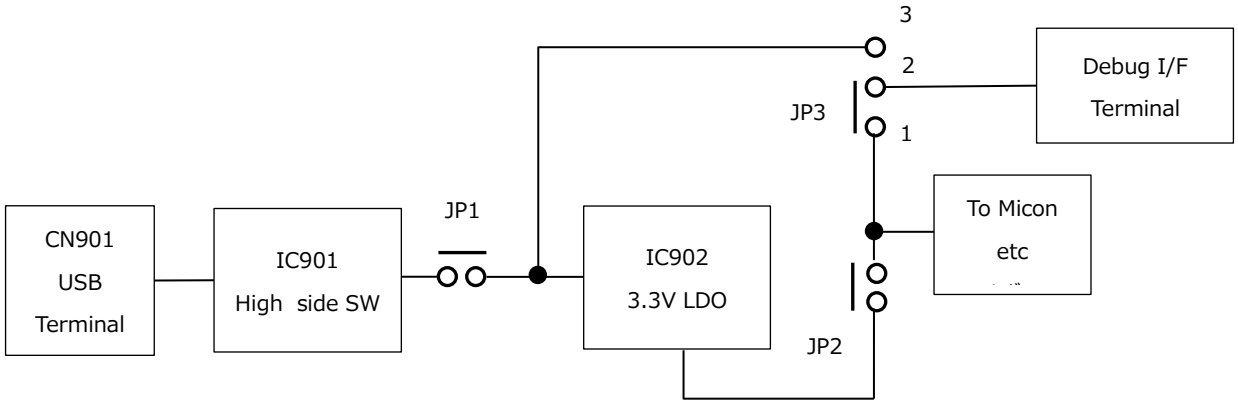

Figure 10. Block diagram of power line

There are two methods for supplying power: First is from the USB terminal (CN901) with 5V, and second is by inputting 5V or 3.3V from pin 1 of the Debug I/F terminal. Depending on the application, it is necessary to set JP1/JP2/JP3 accordingly. Please use 1.27mm pitch shorting pins like Hirosugi Keiki's JS-71055.

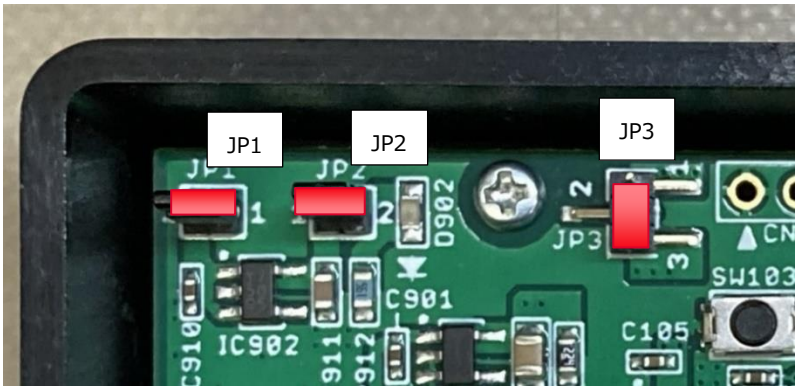

Figure 11. Positions of JP1/JP2/JP3

・When supplying power from the USB terminal.

When supplying power from the USB terminal using bus power, you can supply 5V or 3.3V to the external port. The combination of JP1/JP2/JP3 for this is as follows. The current that can be supplied from the External port is 50mA for both 5V and 3.3V."

Table 8. Jumper setting（In case of the power from USB）

Output voltage from Debug I/F terminal	JP1	JP2	JP3
5V	○	○	2-3
3.3V	○	○	1-2

・When supplying power from the Debug I/F terminal,

When supplying power from the Debug I/F terminal, it is possible to operate the matiseye™-adapter by supplying 5V or 3.3V from the Debug I/F terminal. The combination of JP1/JP2/JP3 for this purpose is as follows.

Table 9. Jumper setting（In case of the power from Debug I/F Terminal）

Input voltage from Debug I/F terminal	JP1	JP2	JP3
5V	×	○	2-3
3.3V	×	×	1-2

・Protection Circuit

For the purpose of circuit protection, a High side SW is provided for the 5V power supply from the USB terminal, and the power supply will be stopped if excessive current flows.

3. Specifications

Item	Description
Power supply Voltage	5V (USB Bus Power)、5V or 3.3V(Debug I/F Terminal)
USB Terminal	Micro USB B Terminal
Debug I/F Terminal	2*5pin 1.27mm pitch
LED	4pcs (ERROR / OK / COM / WRITER)
Matisse debug I/F Maximum Frequency	1MHz
Dimensions	40.3mm*20mm*80.3mm (W*H*D)
Weight	39g
Accessories	1.27mm pitch flat cable USB cable(Type-A/Micro-B)

4. References

For the information about the integrated development environment matiseye™-studio, please refer to the matiseye™-studio User's Guide.

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