



F²MC-8FX Family

8-bit Microcontroller

MB95200 Series BGM Adaptor MB2146-08-E Operation Manual

Doc. # 002-08065 Rev. *A

Cypress Semiconductor
198 Champion Court
San Jose, CA 95134-1709
Phone (USA): 800.858.1810
Phone (Intl): +1.408.943.2600
www.cypress.com

Copyrights

© Cypress Semiconductor Corporation, 2008-2016. This document is the property of Cypress Semiconductor Corporation and its subsidiaries, including Spansion LLC ("Cypress"). This document, including any software or firmware included or referenced in this document ("Software"), is owned by Cypress under the intellectual property laws and treaties of the United States and other countries worldwide. Cypress reserves all rights under such laws and treaties and does not, except as specifically stated in this paragraph, grant any license under its patents, copyrights, trademarks, or other intellectual property rights. If the Software is not accompanied by a license agreement and you do not otherwise have a written agreement with Cypress governing the use of the Software, then Cypress hereby grants you a personal, non-exclusive, nontransferable license (without the right to sublicense) (1) under its copyright rights in the Software (a) for Software provided in source code form, to modify and reproduce the Software solely for use with Cypress hardware products, only internally within your organization, and (b) to distribute the Software in binary code form externally to end users (either directly or indirectly through resellers and distributors), solely for use on Cypress hardware product units, and (2) under those claims of Cypress's patents that are infringed by the Software (as provided by Cypress, unmodified) to make, use, distribute, and import the Software solely for use with Cypress hardware products. Any other use, reproduction, modification, translation, or compilation of the Software is prohibited.

TO THE EXTENT PERMITTED BY APPLICABLE LAW, CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS DOCUMENT OR ANY SOFTWARE OR ACCOMPANYING HARDWARE, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. To the extent permitted by applicable law, Cypress reserves the right to make changes to this document without further notice. Cypress does not assume any liability arising out of the application or use of any product or circuit described in this document. Any information provided in this document, including any sample design information or programming code, is provided only for reference purposes. It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. Cypress products are not designed, intended, or authorized for use as critical components in systems designed or intended for the operation of weapons, weapons systems, nuclear installations, life-support devices or systems, other medical devices or systems (including resuscitation equipment and surgical implants), pollution control or hazardous substances management, or other uses where the failure of the device or system could cause personal injury, death, or property damage ("Unintended Uses"). A critical component is any component of a device or system whose failure to perform can be reasonably expected to cause the failure of the device or system, or to affect its safety or effectiveness. Cypress is not liable, in whole or in part, and you shall and hereby do release Cypress from any claim, damage, or other liability arising from or related to all Unintended Uses of Cypress products. You shall indemnify and hold Cypress harmless from and against all claims, costs, damages, and other liabilities, including claims for personal injury or death, arising from or related to any Unintended Uses of Cypress products.

Cypress, the Cypress logo, Spansion, the Spansion logo, and combinations thereof, PSoC, CapSense, EZ-USB, F-RAM, and Traveo are trademarks or registered trademarks of Cypress in the United States and other countries. For a more complete list of Cypress trademarks, visit cypress.com. Other names and brands may be claimed as property of their respective owners.

<Place unique Trademark attributes here that directly relate to the guide. For example for PSoC guides: PSoC Designer™, PSoC Creator™, and Programmable System-on-Chip™ are trademarks and PSoC® is a registered trademark of Cypress Semiconductor Corporation.

Preface



Thank you for purchasing the F²MC-8FX Family MB95200 Series BGM adapter (model number: MB2146-08-E).

The product is a development support tool for developing and evaluating applied products which use Cypress microcontrollers (hereafter MCU) that have a BDSU module.

This manual describes how to handle the MB95200 Series BGM adapter. Be sure to read it before using the product.

For information on the MCU supported by this product, contact the sales or support representative.

■ Using the product safely

This manual contains important information required for using the product safely. Be sure to read through the manual before using the product and follow the instructions contained therein to use it correctly.

In particular, carefully read “■ Caution of the products described in this manual” at the beginning of this manual to understand the requirements for safe use of the product before using it.

After reading the manual, keep it handy for future reference.

■ Related manuals

You should refer to the following manuals as well:

- “HARDWARE MANUAL” for each type of MCU
- “DATA SHEET” for each type of MCU
- “SOFTUNE Workbench OPERATION MANUAL”
- “SOFTUNE Workbench USER’S MANUAL”
- “SOFTUNE Workbench COMMAND REFERENCE MANUAL”

■ European RoHS compliance

Products with a -E suffix on the part number are European RoHS compliant products.

■ Notice on this document

All information included in this document is current as of the date it is issued. Such information is subject to change without any prior notice.

Please confirm the latest relevant information with the sales representatives.

■ **Caution of the products described in this manual**

The following precautions apply to the product described in this manual.



Indicates a potentially hazardous situation which could result in death or serious injury and/or a fault in the user's system if the product is not used correctly.

Electric shock, Damage	Before performing any operation described in this manual, turn off all the power supplies to the system. Performing such an operation with the power on may cause an electric shock or device fault.
Electric shock, Damage	Once the product has been turned on, do not touch any metal part of it. Doing so may cause an electric shock or device fault.



Indicates the presence of a hazard that may cause a minor or moderate injury, damages to this product or devices connected to it, or may cause to loose software resources and other properties such as data, if the device is not used appropriately.

Cuts, Damage	Before moving the product, be sure to turn off all the power supplies and unplug the cables. Watch your step when carrying the product. Do not use the product in an unstable location such as a place exposed to strong vibration or a sloping surface. Doing so may cause the product to fall, resulting in an injury or fault.
Damage	Do not place anything on the product or expose the product to physical shocks. Do not carry the product after the power has been turned on. Doing so may cause a malfunction due to overloading or shock.
Damage	Since the product contains many electronic components, keep it away from direct sunlight, high temperature, and high humidity to prevent condensation. Do not use or store the product where it is exposed to much dust or a strong magnetic or electric field for an extended period of time. Inappropriate operating or storage environments may cause a fault.
Damage	Use the product within the ranges given in the specifications. Operation over the specified ranges may cause a fault.
Damage	To prevent electrostatic breakdown, do not let your finger or other object come into contact with the metal parts of any of the connectors. Before handling the product, touch a metal object (such as a door knob) to discharge any static electricity from your body.
Damage	Before turning the power on, in particular, be sure to finish making all the required connections. Furthermore, be sure to configure and use the product by following the instructions given in this document. Using the product incorrectly or inappropriately may cause a fault.

Damage	Always turn the power off before connecting or disconnecting any cables from the product. When unplugging a cable, unplug the cable by holding the connector part without pulling on the cable itself. Pulling the cable itself or bending it may expose or disconnect the cable core, resulting in a fault.
Damage	It is recommended that it be stored in the original packaging. Transporting the product may cause a damage or fault. Therefore, keep the packaging materials and use them when re-shipping the product.

Contents



1. Checking the Delivered Product	8
2. Optional Parts	9
3. Appearance and Part Names	10
4. System Configuration	11
5. Connections	12
6. Specifications	14
7. Additional Informations	21
Revision History	22

1. Checking the Delivered Product



Before using the product, make sure that the package contains the following items:

- BGM adapter*:1
- USB cable (1.0m):1
- Operation manual (English version, this document):1
- Operation manual (Japanese version):1
- Hardcopy (China RoHS report):1

* : Referred to as the adapter.

2. Optional Parts



A variety of optional parts are available for this adapter that may be purchased separately as needed. Consult a sales or support representative for details.

Note: *This MB95200 series BGM adapter (MB2146-08-E) doesn't supersede F²MC-8FX Family MB95100 series (MB2146-09, MB2146-09A-E) and is not compatible with its parts, although they are similar in appearance. Do not interchange these two BGM adapters and their respective parts. This may cause malfunction of Debug system.*

3. Appearance and Part Names

Figures 3-1 and 3-2 show the adapter appearance, major dimensions and part names.

Figure 3-1. Adapter appearance (top view)

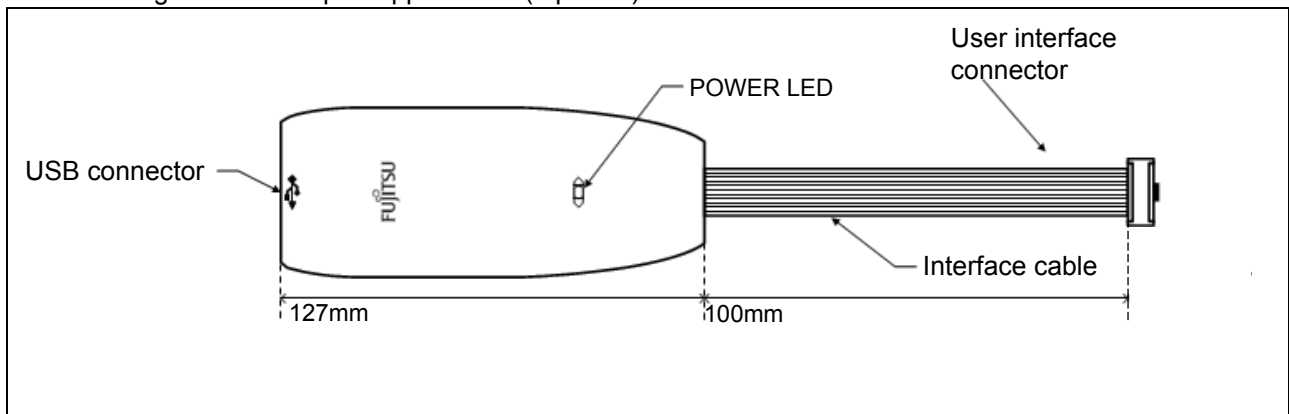
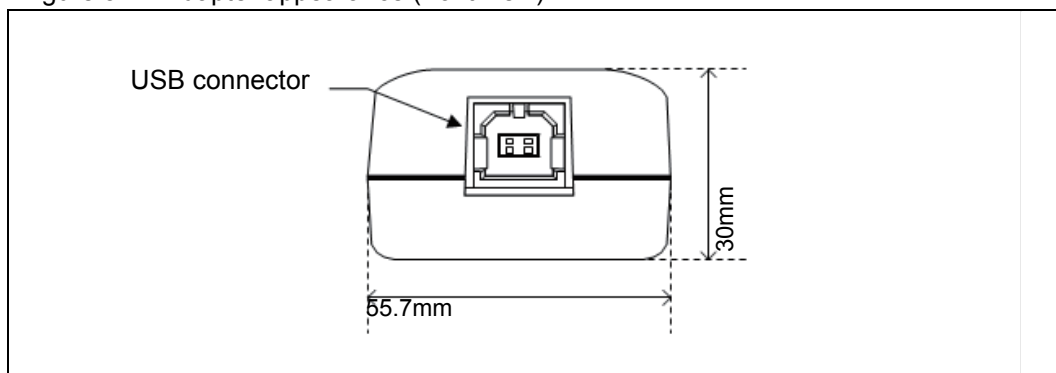


Figure 3-2. Adapter appearance (front view)



4. System Configuration

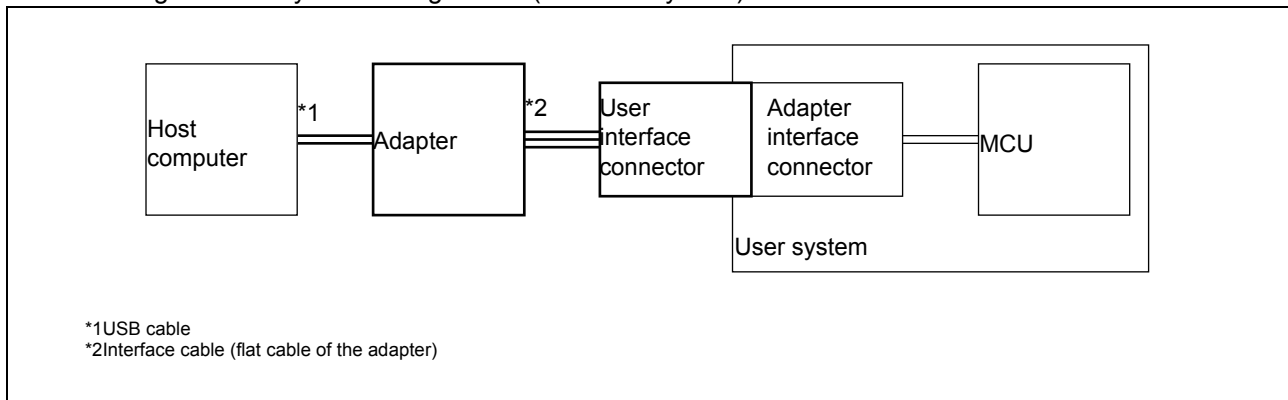


■ Using the adapter as an emulator system

Connect the adapter between the host computer and the user system so that the adapter can serve as an emulator under control of the host computer. For using emulator debugger software on the host computer, refer to the "SOFTUNE Workbench OPERATION MANUAL".

Figure 4-1 shows the system configuration when the adapter is used as an emulator system.

Figure 4-1. System configuration (emulator system)

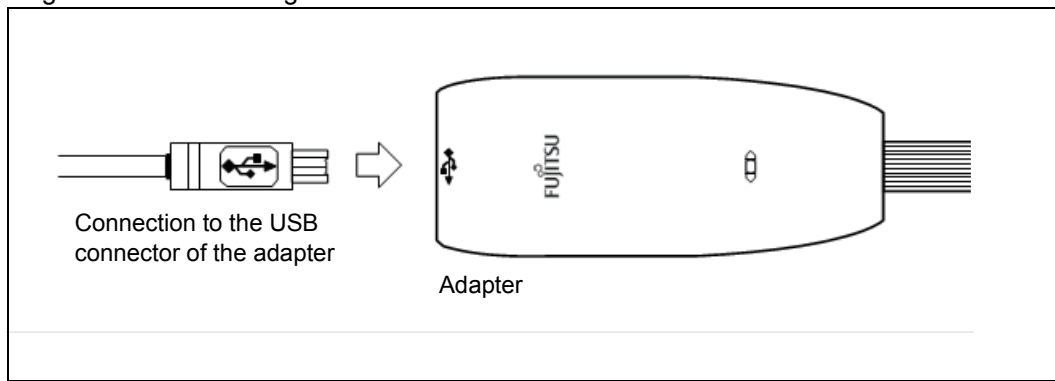


5. Connections

■ Connection to the host computer

Connect the adapter to the host computer using the USB cable. Figure 5-1 shows how to connect the USB cable.

Figure 5-1. Connecting the USB cable



■ Connection to the user system

Connect the adapter to the user system.

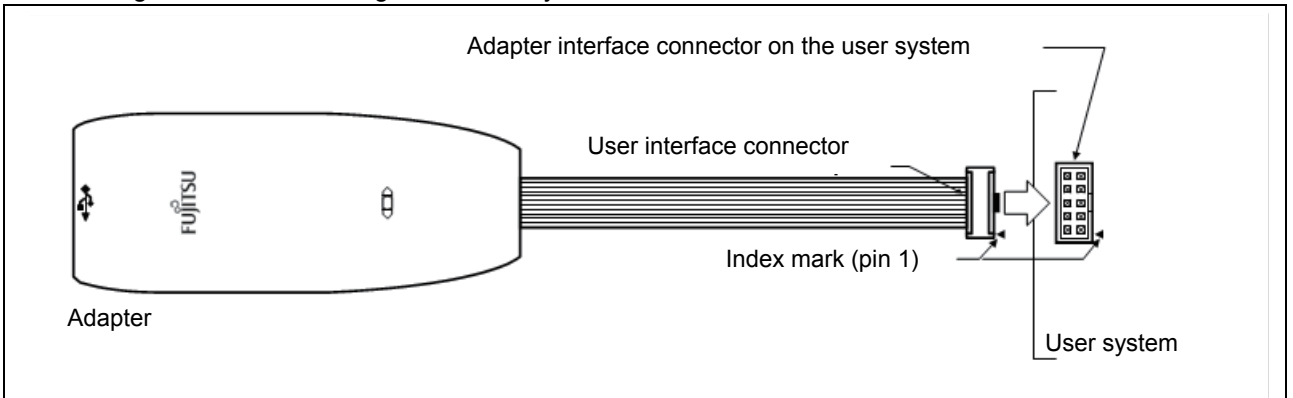
Plug the user interface connector of the adapter into the adapter interface connector on the user system.

When connecting the user interface connector, align the index marks (pin 1) on each of the connectors.

For the specifications of the adapter interface connector, see “■ Adapter interface specifications” in Section 6 “Specifications”.

Figure 5-2 shows how to connect the adapter to the user system.

Figure 5-2. Connecting to the user system



6. Specifications



■ General specifications

Table 6-1 lists the general specifications of the adapter.

Table 6-1. General specifications

Item		Specification
Name		MB95200 Series BGM adapter
Model number		MB2146-08-E
Power supply specifications	Adapter power input	Max: 50mA (uses USB BUS power)
	User power input	+ 2.7 V to + 5.5 V * ¹ , Max: 20mA* ²
POWER LED indication		[Green] : On when only adapter power is supplied (with the USB cable connected). [Red] : On when only user power is supplied. [Orange] : On when both adapter power and user power are supplied.
User interface connector * ³		AMP LATCH MIL type receptacle connector
Operation temperature / humidity		+5 °C to +35 °C / 20% to 80% (no condensation)
Storage temperature / humidity		0 °C to +70 °C / 20% to 80% (no condensation)
Dimensions		Adapter case: 55.7mm(W) × 127mm(D) × 30mm(H) (excluding protrusions)
		Interface cable length: 100mm (excluding user interface connector)
Weight		169g (Including USB Cable).

*¹The maximum and minimum voltage depends on the MCU used.

*²For details, contact the sales or support representative.

*³Does not include the power consumption of the MCU.

*⁴The part number of the connector is: 1-215882-0 (Tyco Electronics Corporation)

■ USB line specifications

Table 6-2 lists the USB line specifications of the adapter.

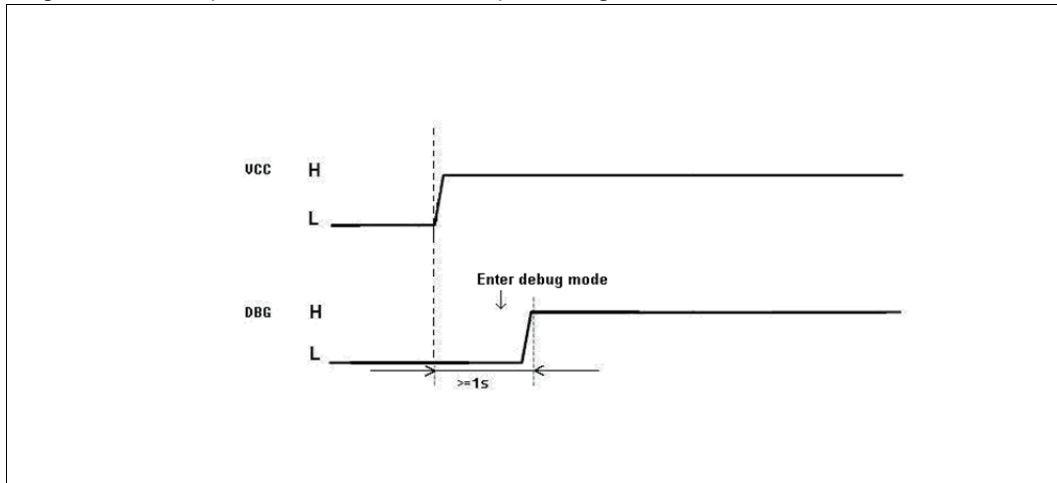
Table 6-2. USB line specifications

Item	Description
Conforming standard	USB1.1
Communication method	Full speed bulk transfer
Data transfer rate	12Mbps
Connector shape	Series B
Power supply	BUS Powered

■ **Debug mode entry specifications**

The following timing will enable MB95200 Series MCU enter Debug mode.

Figure 6-1. Adapter interface connector pin configuration



■ **Adapter interface specifications**

The pin outs of the adapter interface connectors mounted on the user system are shown in Tables 6-3. The recommended connectors are listed in Table 6-4, and the pin configuration is shown in Figure 6-2.

When the adapter interface connector is mounted on the user system, connect the MCU to the adapter interface connector according to the following specifications.

For the detailed method of connecting the user system and the adaptor, refer to the hardware manual of MCU to be used.

Table 6-3. Adapter interface connector pin out (emulator system)

Connector pin number	Input / output	Evaluation MCU connection pin name	Function	Remarks
1	BGMA* ¹ ←MCU* ²	UVCC	User power supply input	Connected to the MCU V _{CC} pin.
2	-	GND	V _{SS} pin	Connected to the MCU V _{SS} pin.
3	BGMA→MCU	RSTIN	Tool reset output	BDSU, Initialization of users logic, 10 V output
4	BGMA←MCU	RSTOUT	User System reset output	Connected to user System reset circuit
5	-	RSV	-	
6	-	RSV	-	
7	-	RSV	-	
8	BGMA←MCU BGMA→MCU	DBG	Communication line	1 line UART
9	-	RSV	-	
10	-	RSV	-	

"1BGMA" represents the BGM adapter.
 "2MCU" represents the evaluation MCU.

Note: The pin assignment of MB2146-08-E is not compatible with MB2146-09, MB2146-09A-E. Do not interchange these two BGM adapters with their respective target MCU. This may cause malfunction of Debug system.

Table 6-4. Recommended adapter interface connectors

Part number	Specifications		Manufacturer
0-281271-1	Straight solder dip	Housing provided, post support	Tyco Electronics Corporation

Figure 6-2. Adapter interface connector pin configuration

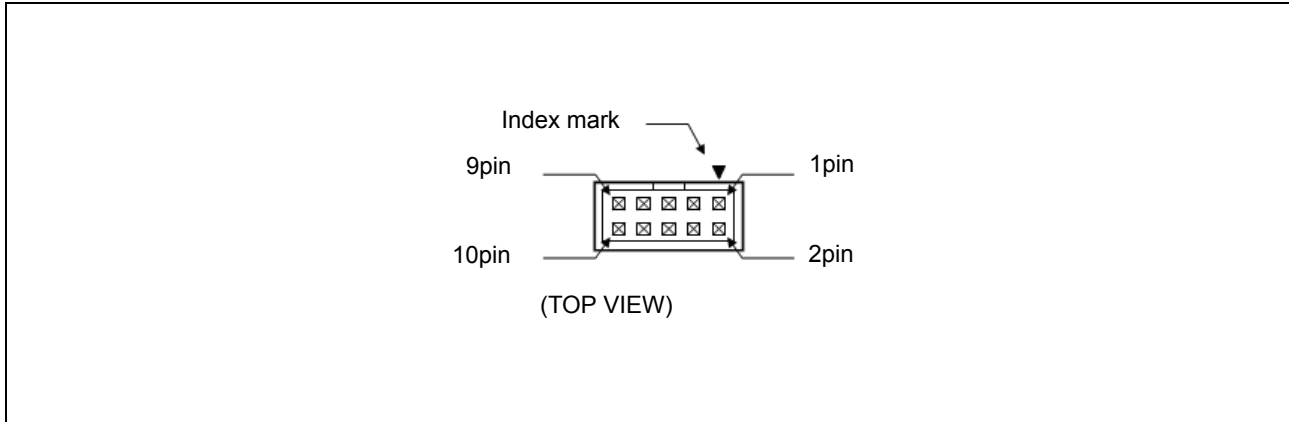


Figure 6-3. User interface circuitry

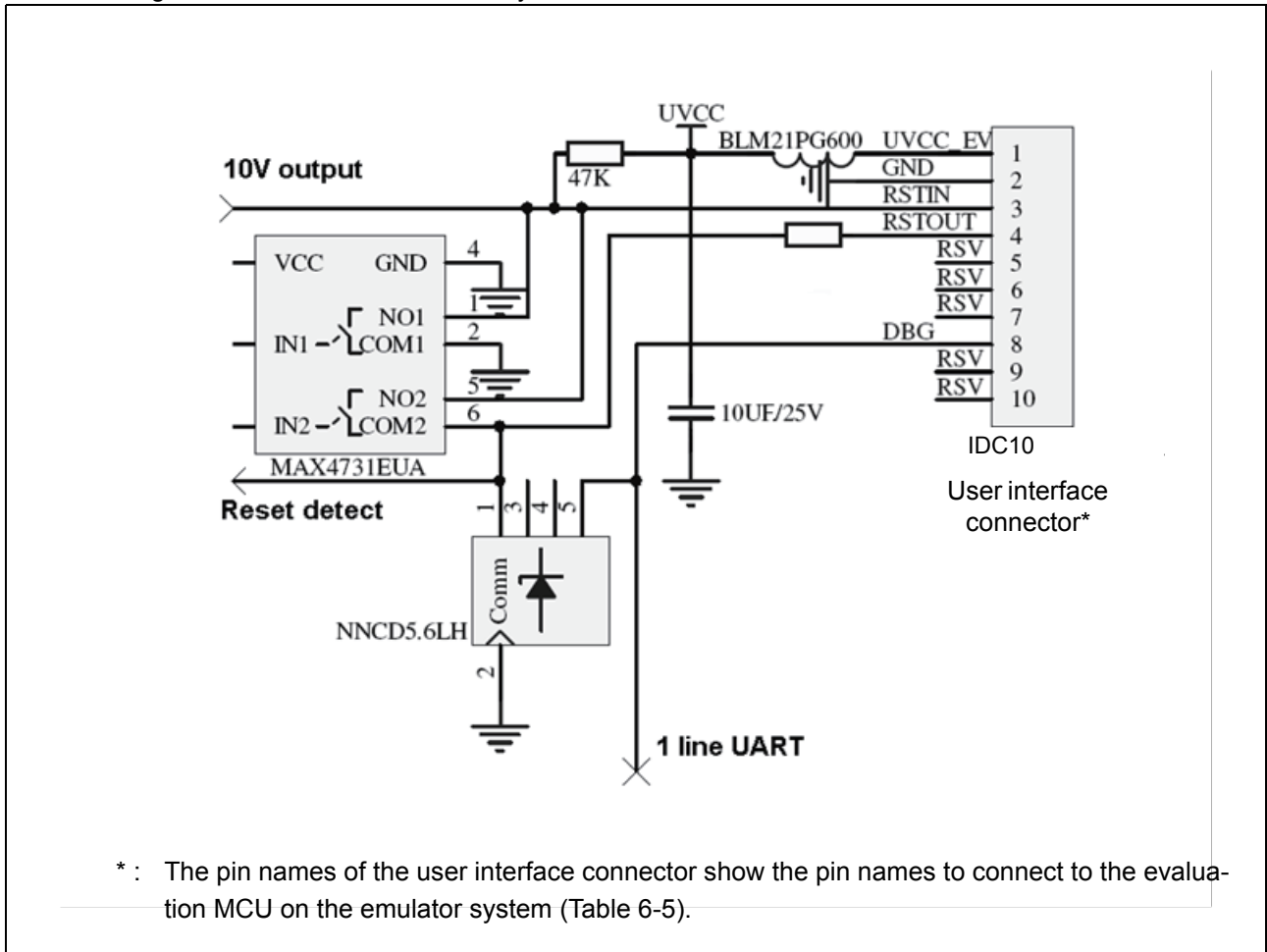


Table 6-5. DC specifications of the user interface

Connector pin number	Circuit type	I_{OH}^{*1} (mA)	I_{OL}^{*2} (mA)	I_{LI}^{*3} (μ A)	Resistor connection	Remarks
3	Open drain output	-	64.0* ⁴	1* ⁴	Connected to UVCC by 47 k Ω	Connected to GND via bus switch* ⁵
4	CMOS input	-	-	$\pm 5^{*4}$	See Figure 8	
8	CMOS input Open drain output	-	4.0* ⁴	$\pm 5^{*4}$		

*1The "H" level output current.

*2The "L" level output current.

*3The input leakage current.

*4Does not include the current through the pull-up resistance.

*5The voltage monitoring IC controls the on/off connection to the GND via bus switch.

7. Additional Informations



For more informations please visit our website:

<http://www.cypress.com/documentation/development-kitsboards/mb2146-08-e>

Please contact your local support team for any technical question.

Revision History



Document Revision History

Document Title: F²MC-8FX Family 8-bit Microcontroller MB95200 Series BGM Adaptor MB2146-08-E Operation Manual

Document Number: 002-08065

Revision	ECN#	Issue Date	Origin of Change	Description of Change
**	—	12/25/2008	HUAL	Initial release
*A	5277735	05/19/2016	HUAL	Migrated to Cypress format