



MB2146-271

# F<sup>2</sup>MC-8FX Family SSOP-30P (0.65mm pitch) Header Board Operation Guide

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# Preface



Thank you for purchasing the SSOP-30P (0.65mm pitch)\*<sup>1</sup> header board (model number: MB2146-271) for the F<sup>2</sup>MC-8FX family.

The MB2146-271 is a header board that is used to connect an MCU board (model number: MB2146-301A/303A) that is fitted with a F<sup>2</sup>MC-8FX family evaluation MCU to a user system.


This manual explains how to handle the MB2146-271 header board. Read this manual thoroughly before using the MB2146-271 header board.

Consult the Sales representatives or the Support representatives of Cypress for details on the mass-produced MCUs and evaluation MCUs that are supported by this product.

\*1: The lead pitch of the package (FPT-30P-M02) is 0.65mm and the body size is 5.6mm × 9.7mm.

## ■ Caution of the products described in this document

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

|  |  |
|--|--|
|  <b>CAUTION</b> | The wrong use of a device will give an injury and may cause malfunction on customers system.   |
| <b>Cuts</b>  | This product has parts with sharp points that are exposed. Take care when handling the product as there is a risk of injury if the exposed sharp edges are touched.  |
| <b>Damage</b>  | When connect the header board to the user system, correctly position the index mark (▲) on the conversion board mounted on the user system with the 1 pin direction (1) on the header board, otherwise the MCU board and user system might be damaged. |
| <b>Damage</b>  | When mounting a mass production MCU, correctly position pin 1, otherwise the mass production MCU and user system might be damaged.   |

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# 1. Product Outline



## 1.1 Product Outline

This product consists of a header board (referred to as the “header board”) that is used to connect an MCU board (model number: MB2146-301A/303A) that has an evaluation MCU of Cypress 8-bit microcontrollers F<sup>2</sup>MC-8FX family mounted on it to a user system, and a package product signal line conversion board (referred to as the “conversion board”) for connecting to a target board. An F<sup>2</sup>MC-8FX evaluation environment can be constructed by combining four products shown in Figure 1-1: the header board, conversion board, MCU board, and BGM adapter (model number: MB2146-09).

For more information please visit our following websites:

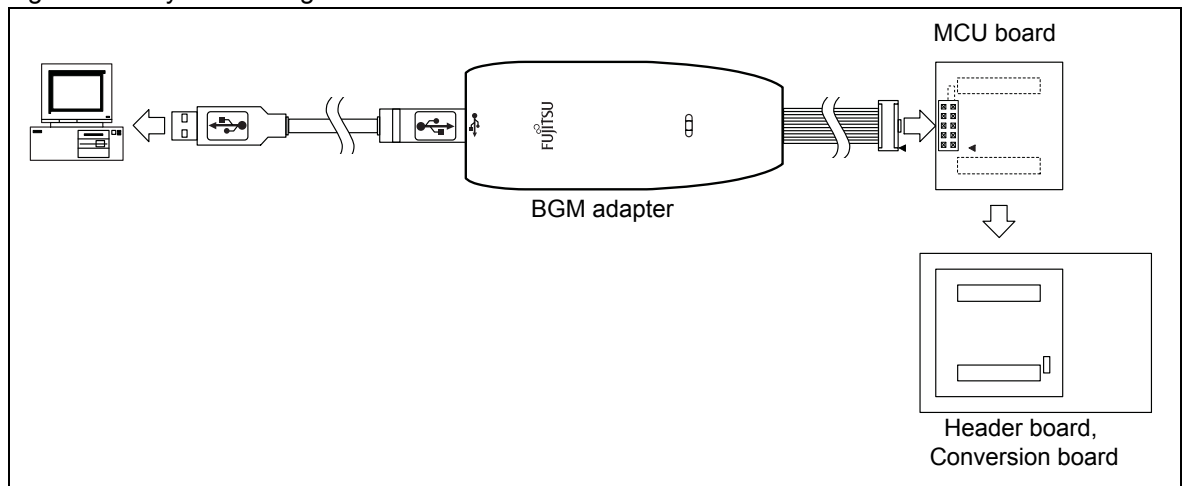
[www.cypress.com/documentation/development-kitsboards/mb2146-271](http://www.cypress.com/documentation/development-kitsboards/mb2146-271)

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[www.cypress.com/documentation/development-kitsboards/mb2146-303a-e](http://www.cypress.com/documentation/development-kitsboards/mb2146-303a-e)

Figure 1-1. System configuration



## 1.2 Product Configuration

Table 1-1 lists the product configuration of the header board, and Table 1-2 lists the optional parts.

Table 1-1. Product configuration

| Name   | Description   | Remarks   |
|--|---|---|
| Header board for the SSOP-30P (0.65mm pitch) package     | A board that converts the signal lines of a package product from an MCU board |   |
| Conversion board for the SSOP-30P (0.65mm pitch) package | A package signal line conversion connector for mounting on the user system    | Capable of purchasing as option individually Model number: SSA-30BK1-M02(from Tokyo Eletech Corporation.) |

Table 1-2. Optional parts

| Name  | Description                        | Remarks  |
|---|------------------------------------|--|
| BGM adapter<br>(Model number: MB2146-09)      | ICE unit for F <sup>2</sup> MC-8FX |  |
| MCU board<br>(Model number: MB2146-301A/303A) | Built-in MB95FV100D-101/103        | Built-in F <sup>2</sup> MC-8FX evaluation MCU* |

\* : Several types of evaluation MCUs are available depending on the application and the power supply voltage. Purchase the one that satisfies the service conditions.

## 2. Checking the Delivered Product



Before using the MB2146-271, confirm that the following components are included in the box:

- SSOP-30P (0.65mm pitch) header board\*<sup>1</sup> : 1
- Signal line conversion board for SSOP-30P (0.65mm pitch)\*<sup>2</sup> : 1
- Operation manual (English version, this manual) : 1
- Operation manual (Japanese version) : 1

\*1: Referred to as the "header board".

\*2: Referred to as the "conversion board". The footprint of a mass-produced MCU is prepared on a user's target board, and it mounts there directly.

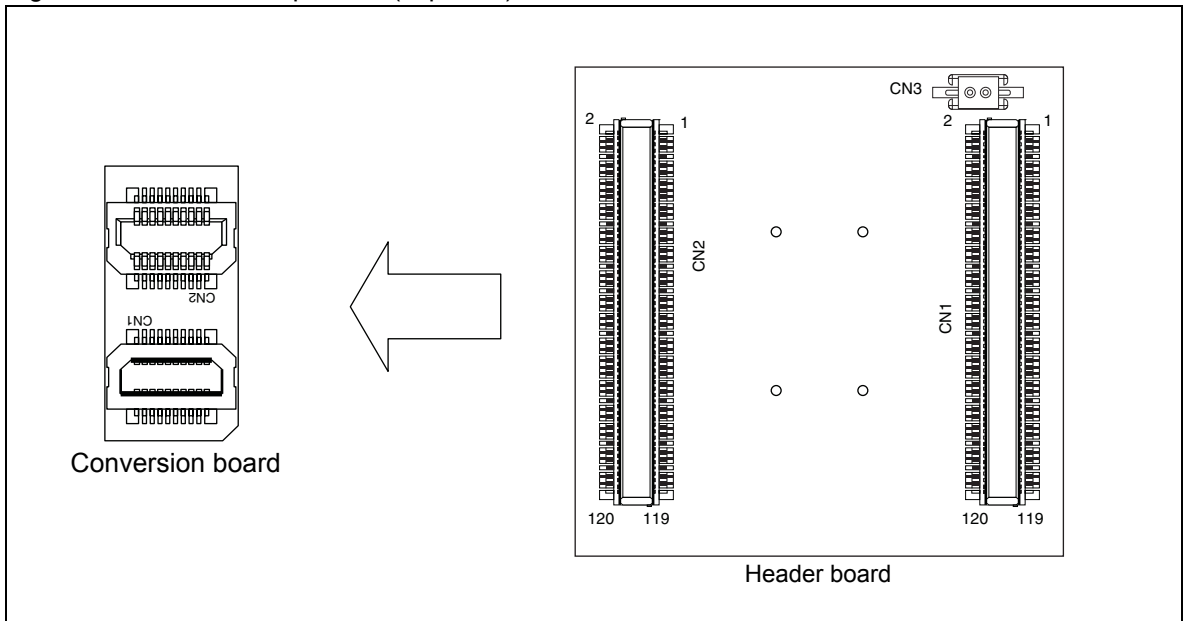
# 3. Procedure for Connecting to a User System



## 3.1 Connecting

1. Mount the conversion board on the user system.  
The location of pin 1 of the device is indicated by the cut-away corner of the conversion board.
2. Connect the header board to the user system on which the conversion board is mounted (The connector shape prevents incorrect connections) (See Figure 3-1).

Figure 3-1. Connection position (Top view)



## 3.2 Disconnection

When removing the conversion board from the header board, do not apply excessive force to avoid stripping the conversion board from the target board.



## 4. Notes



### 4.1 Handling precautions

Please take note of the following points to ensure that the header board and conversion board are always used correctly in a suitable environment.

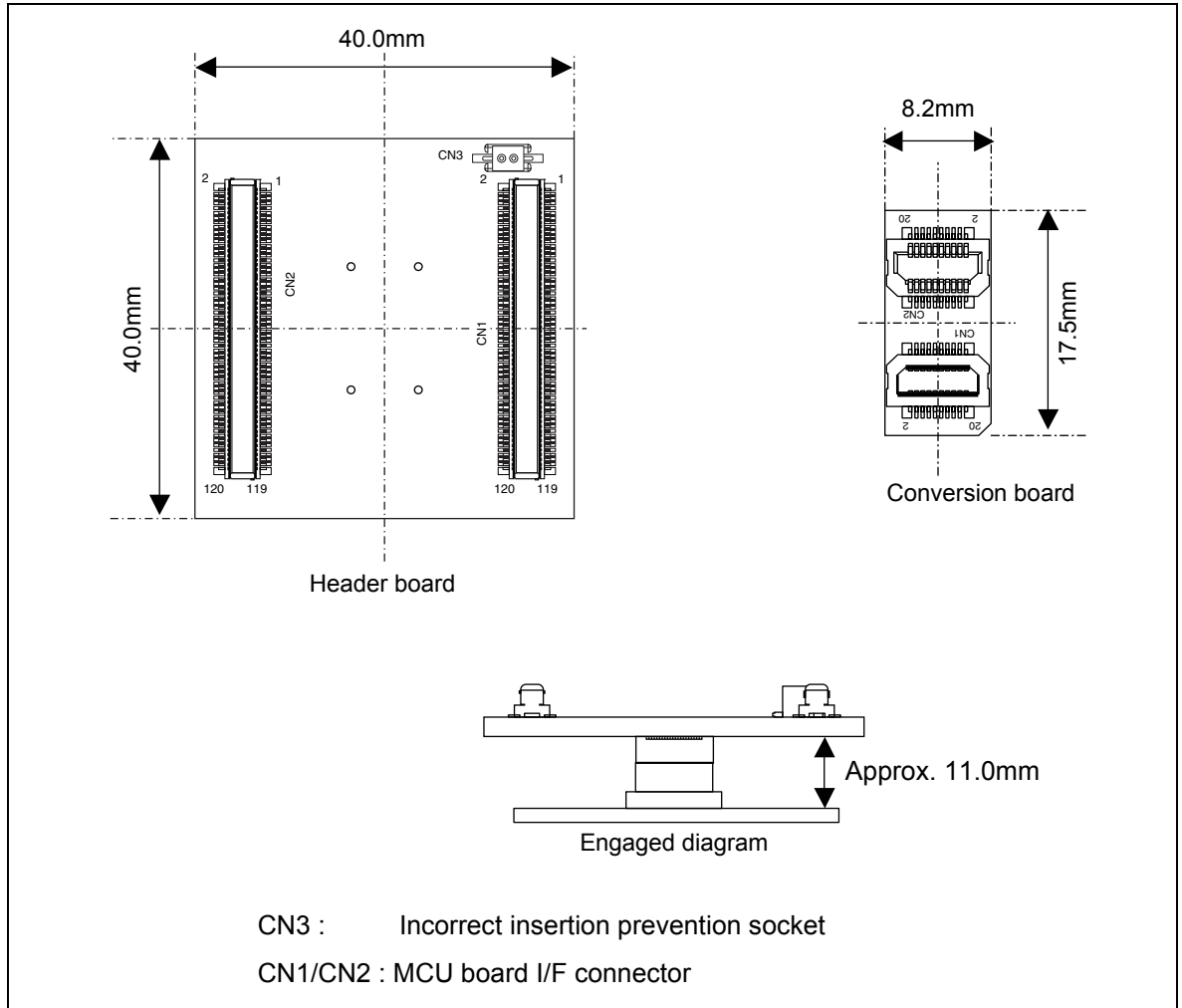
- Do not apply excessive force to the conversion board mounted on the user system when the header board and conversion board are connected.
- Take care not to apply excessive force to the conversion board mounted on the user system when connecting or disconnecting the header board and conversion board.

## 4.2 Notes on designing

### 4.2.1 Notes on designing the printed circuit board for the user system

When the header board is connected to the user system, parts mounted around the conversion board on the user system may come into contact with the header board if the heights of the parts are too large. To prevent this, design the printed circuit board for the user system such that the components do not exceed the height shown in Figure 4-1. Figure 4-1 shows the dimensions of the header board and conversion board.

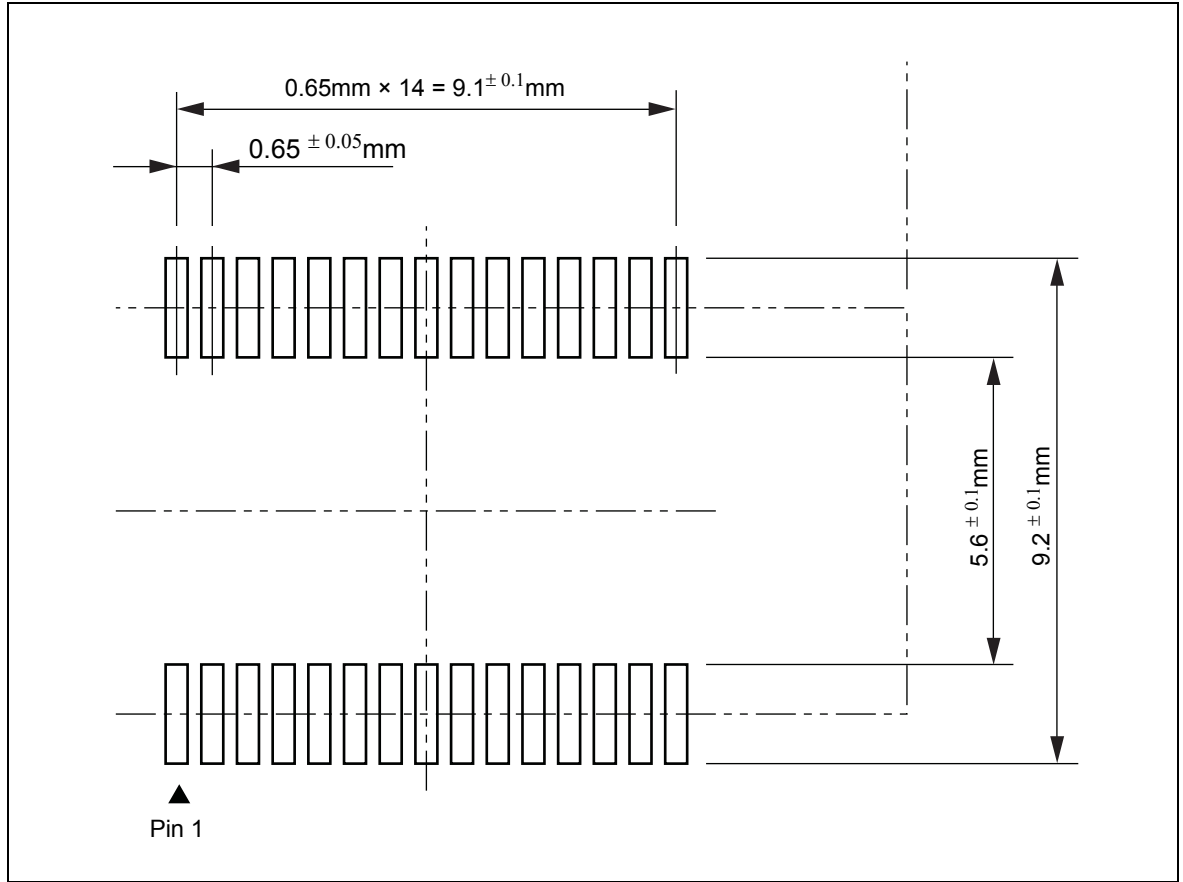
Figure 4-1. Header board and conversion board dimensions



### 4.2.2 MCU Footprint Design Precautions

Figure 4-2 shows the recommended footprint dimensions for the conversion board mounted on the printed circuit board of the user system. Take the footprint in Figure 4-2 into consideration as well as the footprint of the mass-produced MCU when designing the printed circuit board for the user system.

Figure 4-2. Recommended footprint dimensions for mounting conversion board



### 4.2.3 Notes on Mounting Mass-produced MCUs

Unlike previous header boards, this product does not use the YQPACK manufactured by Tokyo Eletech Corporation.

As a result, you cannot perform evaluation by mounting a mass-produced MCU on the conversion board.

# 5. Specifications



## 5.1 General Specifications

Table 5-1 lists the general specifications of the header board.

Table 5-1. General specifications

| Item  |                  | Description   | Remarks         |
|---|------------------|---|-----------------|
| Operating temperature and storage temperature |                  | Operation: +10°C to +35°C<br>Storage: -10°C to +50°C                          |                 |
| Operating humidity and storage humidity       |                  | Operation: 35% to 85%<br>Storage: 35% to 85%                                  | No condensation |
| External dimensions                           | Header board     | Approximately: 40.0mm × 40.0mm × 8.0mm<br>(The height includes the connector) |                 |
|   | Conversion board | Approximately: 17.5mm × 8.2mm × 8.0mm<br>(The height includes the connector)  |                 |

## 5.2 Main Parts

Table 5-2 lists the main parts of the header board and conversion connector.

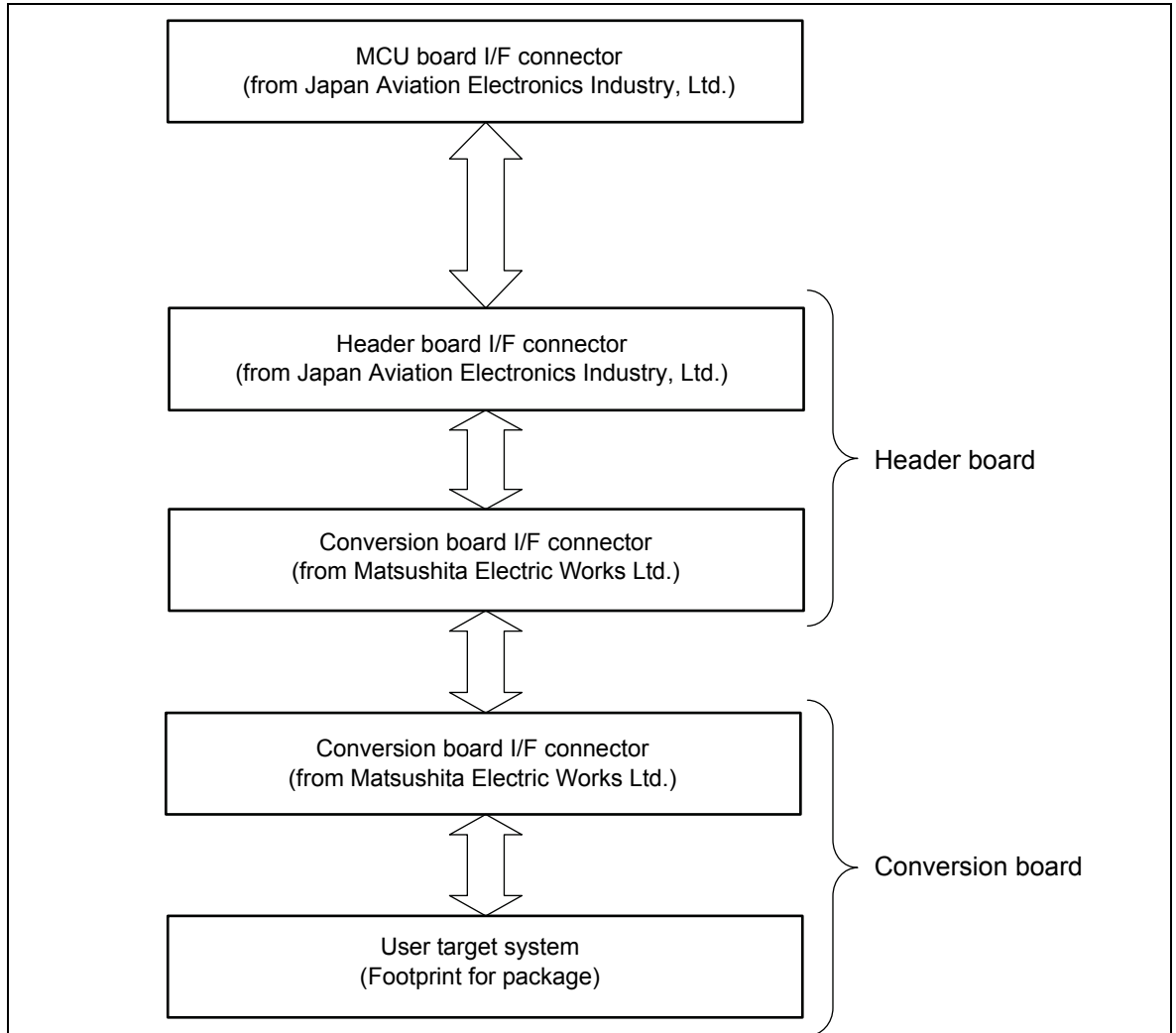
Table 5-2. Main parts

| Part  | Description  |
|---|--|
| MCU board I/F connector<br>(Header board side)  | 120 pins, 0.5mm pitch, 2-piece connector<br>(Straight) × 2<br>Model number: WR-120SB-VF-N1<br>(from Japan Aviation Electronics Industry, Ltd.) |
| Incorrect insertion prevention socket<br>(Header board side)  | 2 pins, 2.54mm pitch, 1-piece socket<br>(Straight)<br>Model number: PCW-3-1-1PW<br>(from Mac Eight Co. Ltd.)                                   |
| I/F connector between header board and conversion board<br>(Header board side, conversion board side) | Socket<br>20 pins, 0.5mm pitch × 1 each<br>Model number: AXK5S20535<br>(from Matsushita Electric Works Ltd.)                                   |
| I/F connector between header board and conversion board<br>(Header board side, conversion board side) | Socket<br>20 pins, 0.5mm pitch × 1 each<br>Model number: AXK5S20330<br>(from Matsushita Electric Works Ltd.)                                   |

### 5.3 Function Block Diagram

The header board connects to the mass-produced MCU's pin signals via the MCU board I/F connector and the conversion board connected to the target board. The header board does not contain any ICs or other internal components. Figure 5-1 shows the block diagram.

Figure 5-1. Function Block Diagram



## 5.4 MCU Board I/F Connectors (CN1/CN2/CN3)

CN1 and CN2 are MCU board I/F connectors. CN3 is the incorrect insertion prevention socket of the MCU board. The pin assignment of the MCU board I/F connector CN1 is shown in Table 5-3, and the pin assignment of the MCU board I/F connector CN2 is shown in Table 5-4.

Table 5-3. Pin assignment of the MCU board I/F connector CN1

| Connector pin number | Evaluation MCU pin number | Signal name | Connector pin number | Evaluation MCU pin number | Signal name | Connector pin number | Evaluation MCU pin number | Signal name |
|----------------------|---------------------------|-------------|----------------------|---------------------------|-------------|----------------------|---------------------------|-------------|
| 1                    | A9                        | PC4         | 41                   | E2                        | LVR3        | 81                   | P3                        | BSOUT       |
| 2                    | B9                        | PC1         | 42                   | E1                        | LVSS        | 82                   | P4                        | BDBMX       |
| 3                    | C9                        | PC2         | 43                   | F4                        | LVDREXT     | 83                   | R1                        | P83         |
| 4                    | D9                        | PC3         | 44                   | F3                        | LVDBG       | 84                   | R2                        | BRSTX       |
| 5                    | A8                        | PC0         | 45                   | F2                        | LVDEX       | 85                   | R3                        | X0A         |
| 6                    | B8                        | PB4         | 46                   | F1                        | P22A        | 86                   | R4                        | RSTX        |
| 7                    | C8                        | PB5         | 47                   | /                         | GND         | 87                   | T1                        | ROMS1       |
| 8                    | D8                        | PB6         | 48                   | /                         | GND         | 88                   | T2                        | BSIN        |
| 9                    | A7                        | PB7         | 49                   | G4                        | P20A        | 89                   | T3                        | Vss         |
| 10                   | B7                        | PB2         | 50                   | G3                        | NC1         | 90                   | T4                        | X0          |
| 11                   | C7                        | PB0         | 51                   | G2                        | P21A        | 91                   | U1                        | BEXCK       |
| 12                   | D7                        | PB1         | 52                   | G1                        | P23A        | 92                   | U2                        | X1          |
| 13                   | A6                        | PB3         | 53                   | H4                        | P24A        | 93                   | U3                        | MOD         |
| 14                   | B6                        | PA2         | 54                   | H3                        | P25A        | 94                   | U4                        | PF2         |
| 15                   | C6                        | P95         | 55                   | H2                        | P26A        | 95                   | V1                        | X1A         |
| 16                   | D6                        | PA0         | 56                   | H1                        | P27A        | 96                   | V2                        | Vcc53       |
| 17                   | A5                        | PA3         | 57                   | J4                        | P24B        | 97                   | /                         | GND         |
| 18                   | B5                        | P94         | 58                   | J3                        | P50         | 98                   | /                         | GND         |
| 19                   | C5                        | P90         | 59                   | J2                        | P23B        | 99                   | V3                        | PINT0       |
| 20                   | D5                        | P91         | 60                   | J1                        | P51         | 100                  | V4                        | PSEL_EXT    |
| 21                   | A4                        | PA1         | 61                   | K1                        | P52         | 101                  | R5                        | PF1         |
| 22                   | A3                        | P93         | 62                   | K2                        | P55         | 102                  | T5                        | PF0         |
| 23                   | /                         | GND         | 63                   | K3                        | P54         | 103                  | U5                        | NC2         |
| 24                   | /                         | GND         | 64                   | K4                        | P53         | 104                  | V5                        | PENABLE     |
| 25                   | A2                        | CSVENX      | 65                   | L1                        | P70         | 105                  | R6                        | APBENX      |
| 26                   | A1                        | Vss         | 66                   | L2                        | P74         | 106                  | T6                        | PINT1       |
| 27                   | B4                        | P92         | 67                   | L3                        | P73         | 107                  | U6                        | PCLK        |
| 28                   | B3                        | TCLK        | 68                   | L4                        | P72         | 108                  | V6                        | PADDR0      |
| 29                   | B2                        | LVCC        | 69                   | M1                        | P71         | 109                  | R7                        | PACTIVE     |
| 30                   | B1                        | LVDIN       | 70                   | M2                        | P76         | 110                  | T7                        | PLOCK       |
| 31                   | C4                        | Cpin        | 71                   | M3                        | P80         | 111                  | U7                        | PWRITE      |
| 32                   | C3                        | Vcc51       | 72                   | M4                        | P77         | 112                  | V7                        | PADDR1      |
| 33                   | C2                        | LVDEX2      | 73                   | /                         | GND         | 113                  | R8                        | PADDR2      |
| 34                   | C1                        | LVR4        | 74                   | /                         | GND         | 114                  | T8                        | PADDR3      |
| 35                   | D4                        | TESTO       | 75                   | N1                        | P75         | 115                  | U8                        | PADDR4      |
| 36                   | D3                        | LVDOUT      | 76                   | N2                        | P82         | 116                  | V8                        | PADDR5      |
| 37                   | D2                        | LVR2        | 77                   | N3                        | PG0         | 117                  | R9                        | PADDR7      |
| 38                   | D1                        | BGOENX      | 78                   | N4                        | P84         | 118                  | T9                        | PRDATA0     |
| 39                   | E4                        | LVR1        | 79                   | P1                        | P81         | 119                  | U9                        | PADDR6      |
| 40                   | E3                        | LVR0        | 80                   | P2                        | ROMS0       | 120                  | V9                        | PRDATA1     |

Table 5-4. Pin assignment of the MCU board I/F connector CN2

| Connector pin number | Evaluation MCU pin number | Signal name | Connector pin number | Evaluation MCU pin number | Signal name | Connector pin number | Evaluation MCU pin number | Signal name |
|----------------------|---------------------------|-------------|----------------------|---------------------------|-------------|----------------------|---------------------------|-------------|
| 1                    | A10                       | PC5         | 41                   | E17                       | NC4         | 81                   | P16                       | P34         |
| 2                    | B10                       | PD0         | 42                   | E18                       | SEL0        | 82                   | P15                       | P35         |
| 3                    | C10                       | PC6         | 43                   | F15                       | SEL3        | 83                   | R18                       | P44         |
| 4                    | D10                       | PC7         | 44                   | F16                       | SEL4        | 84                   | R17                       | P36         |
| 5                    | A11                       | PD1         | 45                   | F17                       | SEL1        | 85                   | R16                       | P31         |
| 6                    | B11                       | PD2         | 46                   | F18                       | P04C        | 86                   | R15                       | AVcc3       |
| 7                    | C11                       | PD3         | 47                   | /                         | GND         | 87                   | T18                       | P40         |
| 8                    | D11                       | PD4         | 48                   | /                         | GND         | 88                   | T17                       | P32         |
| 9                    | A12                       | PD5         | 49                   | G15                       | P06C        | 89                   | T16                       | AVss        |
| 10                   | B12                       | PD7         | 50                   | G16                       | P07C        | 90                   | T15                       | AVR         |
| 11                   | C12                       | P61         | 51                   | G17                       | P05C        | 91                   | U18                       | P33         |
| 12                   | D12                       | P60         | 52                   | G18                       | P00C        | 92                   | U17                       | P30         |
| 13                   | A13                       | PD6         | 53                   | H15                       | P01C        | 93                   | U16                       | AVR3        |
| 14                   | B13                       | P64         | 54                   | H16                       | P02C        | 94                   | U15                       | P15         |
| 15                   | C13                       | P66         | 55                   | H17                       | P03C        | 95                   | V18                       | AVcc        |
| 16                   | D13                       | P65         | 56                   | H18                       | P07A        | 96                   | V17                       | DA0         |
| 17                   | A14                       | P62         | 57                   | J15                       | P04A        | 97                   | /                         | GND         |
| 18                   | B14                       | PE0A        | 58                   | J16                       | P05A        | 98                   | /                         | GND         |
| 19                   | C14                       | PE3A        | 59                   | J17                       | P06A        | 99                   | V16                       | P14         |
| 20                   | D14                       | PE2A        | 60                   | J18                       | P03A        | 100                  | V15                       | P10         |
| 21                   | A15                       | P63         | 61                   | K18                       | P02A        | 101                  | R14                       | P16         |
| 22                   | A16                       | P67         | 62                   | K17                       | P07B        | 102                  | T14                       | DA1         |
| 23                   | /                         | GND         | 63                   | K16                       | P01A        | 103                  | U14                       | P13         |
| 24                   | /                         | GND         | 64                   | K15                       | P00A        | 104                  | V14                       | PWDATA7     |
| 25                   | A17                       | PE4A        | 65                   | L18                       | P06B        | 105                  | R13                       | P11         |
| 26                   | A18                       | Vcc54       | 66                   | L17                       | P05B        | 106                  | T13                       | P12         |
| 27                   | B15                       | PE1A        | 67                   | L16                       | P04B        | 107                  | U13                       | NC3         |
| 28                   | B16                       | PE5A        | 68                   | L15                       | P03B        | 108                  | V13                       | PWDATA3     |
| 29                   | B17                       | PE7A        | 69                   | M18                       | P02B        | 109                  | R12                       | PWDATA5     |
| 30                   | B18                       | PE3B        | 70                   | M17                       | P00B        | 110                  | T12                       | PWDATA6     |
| 31                   | C15                       | PE6A        | 71                   | M16                       | P46         | 111                  | U12                       | PWDATA4     |
| 32                   | C16                       | Vss         | 72                   | M15                       | P47         | 112                  | V12                       | PRDATA7     |
| 33                   | C17                       | PE2B        | 73                   | /                         | GND         | 113                  | R11                       | PWDATA0     |
| 34                   | C18                       | PE7B        | 74                   | /                         | GND         | 114                  | T11                       | PWDATA1     |
| 35                   | D15                       | PE1B        | 75                   | N18                       | P01B        | 115                  | U11                       | PWDATA2     |
| 36                   | D16                       | PE0B        | 76                   | N17                       | P43         | 116                  | V11                       | PRDATA6     |
| 37                   | D17                       | PE6B        | 77                   | N16                       | P41         | 117                  | R10                       | PRDATA3     |
| 38                   | D18                       | SEL2        | 78                   | N15                       | P42         | 118                  | T10                       | PRDATA4     |
| 39                   | E15                       | PE5B        | 79                   | P18                       | P45         | 119                  | U10                       | PRDATA5     |
| 40                   | E16                       | PE4B        | 80                   | P17                       | P37         | 120                  | V10                       | PRDATA2     |

## 5.5 Pin Assignments for I/F between Header Board and Conversion Board (Connection Table)

Table 5-5 lists the pin assignments for the interface between the header board and conversion board.

Table 5-5. Pin assignments (connection table)

| Conversion board edge face through hole part | Matsushita Electric Works Ltd. connector part (Conversion board/header board) | Japan Aviation Electronics Industry Ltd. connector part (Header board) | Remarks         |
|--|---|--|-----------------|
| 1  | CN1- 2  | CN2- 101   |                 |
| 2  | CN1- 6  | CN1- 102   |                 |
| 3  | CN1- 4  | CN1- 101   |                 |
| 4  | CN1- 1  | CN1- 93  |                 |
| 5  | CN1- 5  | CN1- 90  |                 |
| 6  | CN1- 7  | CN1- 92  |                 |
| 7  | CN1- 3, CN1- 8, CN1- 16, CN2- 8, CN2- 16                                      | CN1- 89  | V <sub>SS</sub> |
| 8  | CN2- 19   | CN1- 96  | V <sub>CC</sub> |
| 9  | CN2- 15   | CN1- 77  |                 |
| 10   | CN2- 13   | CN1- 95  |                 |
| 11   | CN2- 17   | CN1- 85  |                 |
| 12   | CN2- 20   | CN1- 86  |                 |
| 13   | CN2- 14   | CN2- 95  |                 |
| 14   | CN2- 18   | CN2- 89  |                 |
| 15   | CN2- 2  | CN2- 70  |                 |
| 16   | CN2- 6  | CN2- 75  |                 |
| 17   | CN2- 4  | CN2- 69  |                 |
| 18   | CN2- 1  | CN2- 68  |                 |
| 19   | -   | -  |                 |
| 20   | CN2- 5  | CN2- 67  |                 |
| 21   | CN2- 7  | CN2- 66  |                 |
| 22   | CN2- 3  | CN2- 65  |                 |
| 23   | CN1- 19   | CN2- 62  |                 |
| 24   | CN1- 15   | CN2- 100   |                 |
| 25   | CN1- 13   | CN2- 105   |                 |
| 26   | -   | -  |                 |
| 27   | CN1- 17   | CN2- 106   |                 |
| 28   | CN1- 20   | CN2- 103   |                 |
| 29   | CN1- 14   | CN2- 99  |                 |
| 30   | CN1- 18   | CN2- 94  |                 |



# Revision History



## Document Revision

| <b>Document Title: MB2146-271 F<sup>2</sup>MC-8FX Family SSOP-30P (0.65mm pitch) Header Board Operation Guide</b> |         |            |                  |  |
|---|---------|------------|------------------|--|
| <b>Document Number: 002-07494</b>   |         |            |                  |  |
| Revision  | ECN#    | Issue Date | Origin of Change | Description of Change  |
| **  | —       | 08/06/2007 | HUAL             | Initial release  |
| *A  | 5287117 | 06/01/2016 | HUAL             | Migrated Spansion Guide from SS01-26025-1E to Cypress format |