

DSU-FR EMULATOR
F²MC-16FX LQFP-144P HEADER TYPE13
MB2198-506-E
OPERATION MANUAL

PREFACE

Thank you for purchasing the F²MC-16FX*¹ LQFP-144P*² header type13 (MB2198-506-E) for the DSU-FR*³ emulator.

The F²MC-16FX LQFP-144P header type13 is a header board*⁴ used to connect the DSU-FR emulator (MB2198-01)*⁵ and the DSU-FR emulator F²MC-16FX BGA-416P adapter (MB2198-500)*⁶ to a user system that uses an MB96330 series (LQFP-144P) microcontroller from the Fujitsu F²MC-16FX family.

This manual explains how to handle the F²MC-16FX LQFP-144P header type13 for the DSU-FR emulator. Read this manual before using the MB2198-506-E.

Please contact your sales or support representative for details on the mass production and evaluation MCU models that can be used with this product.

*1 : F²MC is the abbreviation of FUJITSU Flexible Microcontroller.

*2 : The package is the FPT-144P-M08 (lead pitch: 0.5mm, body size: 20mm × 20mm).

*3 : FR, the abbreviation of FUJITSU RISC controller, is a line of products of FUJITSU Limited.

*4 : Referred to as the “header board”

*5 : Referred to as the “emulator”

*6 : Referred to as the “adapter board”

■ Handling and Use

See the following manuals for details on how to handle and use this product, and for precautions on using the product safely.

- DSU-FR EMULATOR MB2198-01 HARDWARE MANUAL
- DSU-FR EMULATOR F²MC-16FX BGA-416P ADAPTER MB2198-500 OPERATION 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 Product Described in this Document

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



Indicates a feature that, if not used correctly, may result in minor or moderate injuries, and which may cause the customer system to malfunction.

Cuts	The product contains sharp edges that are left unavoidably exposed. Pointed parts may injure a body. Therefore, handle the product with due care.
Damage	When connecting the header board to the user system, correctly position the index mark (▲) on the NQPACK mounted on the user system with the index mark (▲) on the header board, otherwise the emulator system and user system might be damaged.
Damage	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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- The company names and brand names herein are the trademarks or registered trademarks of their respective owners.

1. Checking the Delivered Product

Before using the header board, confirm that the following components are included in the box:

- LQFP-144P header board*¹ : 1
- Screws for securing the header board (M2 × 10 mm, 0.4 mm pitch) : 4
- Washers : 4
- NQPACK144SD-ND*² : 1
- HQPACK144SD*³ : 1
- Operation manual (English version, this manual) : 1
- Operation manual (Japanese version) : 1

*1 : A YQPACK144SD-4W (manufactured by Tokyo Eletech Corporation and referred to as the “YQPACK”) is mounted on the header board.

*2 : The IC socket (manufactured by Tokyo Eletech Corporation and referred to as the “NQPACK”) which is supplied with a specialized screwdriver and 3 guide pins. The more reliable NQPACK144SD-ND-SL socket (Tokyo Eletech Corporation, sold separately) can be used by fabricating IC socket mounting holes in the user system board. For more information, contact Tokyo Eletech Corporation.

*3 : The IC socket cover (manufactured by Tokyo Eletech Corporation and referred to as the “HQPACK”). Includes 4 screws for securing the HQPACK (M2 × 6mm, 0.4mm pitch).

This product forms part of an emulator system when used in combination with an emulator and adapter board (both sold separately).

Consult a sales or support representative for information on the adapter boards and emulators that are used compatible with this product.

2. Handling Precautions

The header board is precision-manufactured to improve dimensional accuracy and to ensure reliable contact. The header is therefore sensitive to mechanical shock. Observe the following points to ensure that the header board can be used in the proper environment:

- Avoid placing any stress on the NQPACK mounted on the user system while the header board is connected.

■ Notes on the Sub Clock

When using this product, the sub clock cannot be supplied to the evaluation MCU from the user system.

To operate the evaluation MCU on the sub clock, use the sub clock on the adapter board.

Refer to the operating manual for details on the adapter board.

3. Notes on Designing

■ Notes on Designing the Printed Circuit Board for the User System

Once the header board is connected to the user system, the heights of parts mounted around the header board are restricted.

When designing the printed circuit board of the user system, consider the height of the parts within range of the header board as shown in Figure 1 such that components mounted on the user system and the header board do not interfere with each other.

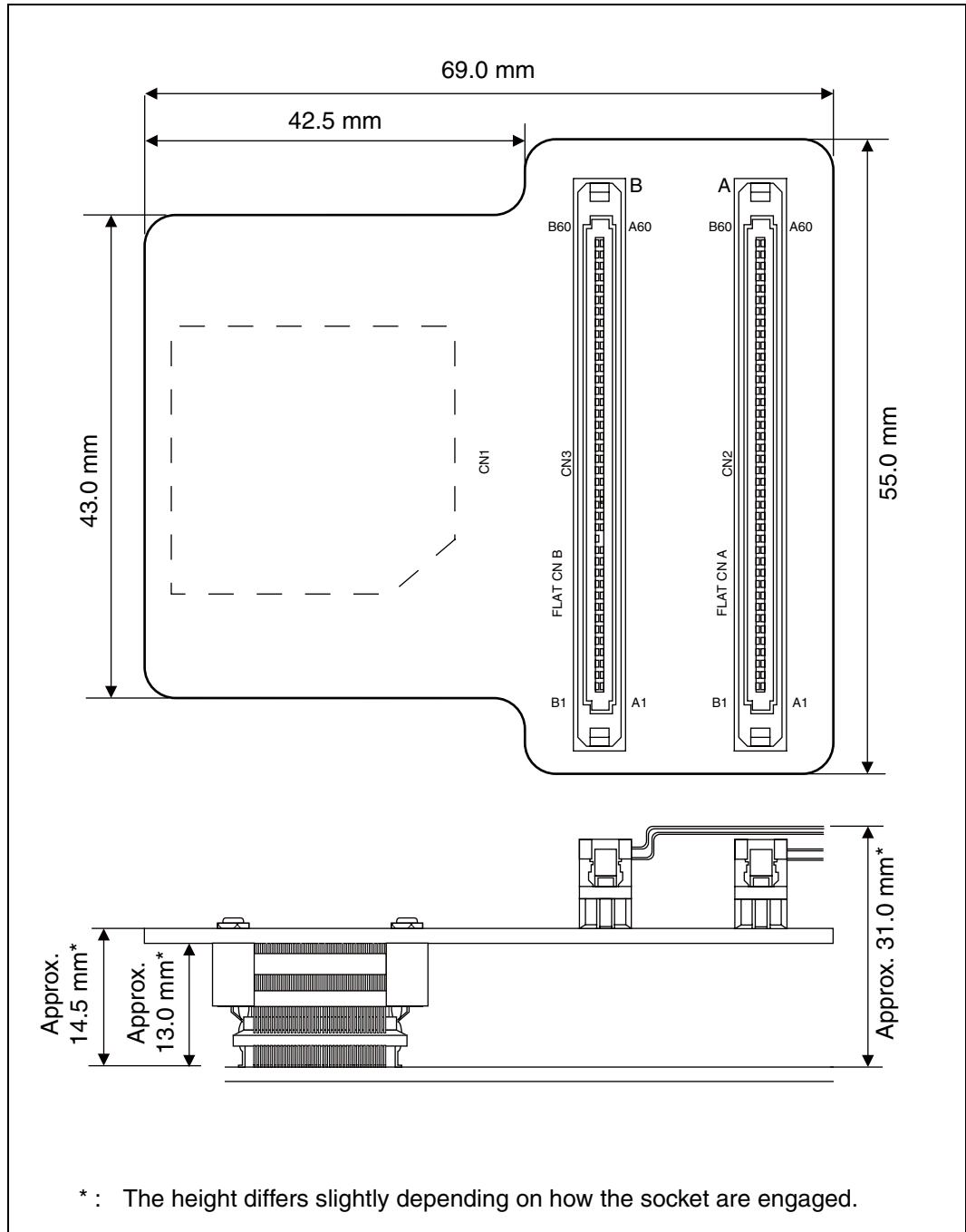


Figure 1 Header board dimensions

■ MCU Footprint Design Notes

Figure 2 shows the recommended dimensions of the footprint for mounting the NQPACK on the printed circuit board of the user system.

The printed circuit board of the user system must be designed with due consideration given to this footprint as well as to the mass production MCU.

For more information, contact Tokyo Eletech Corporation.

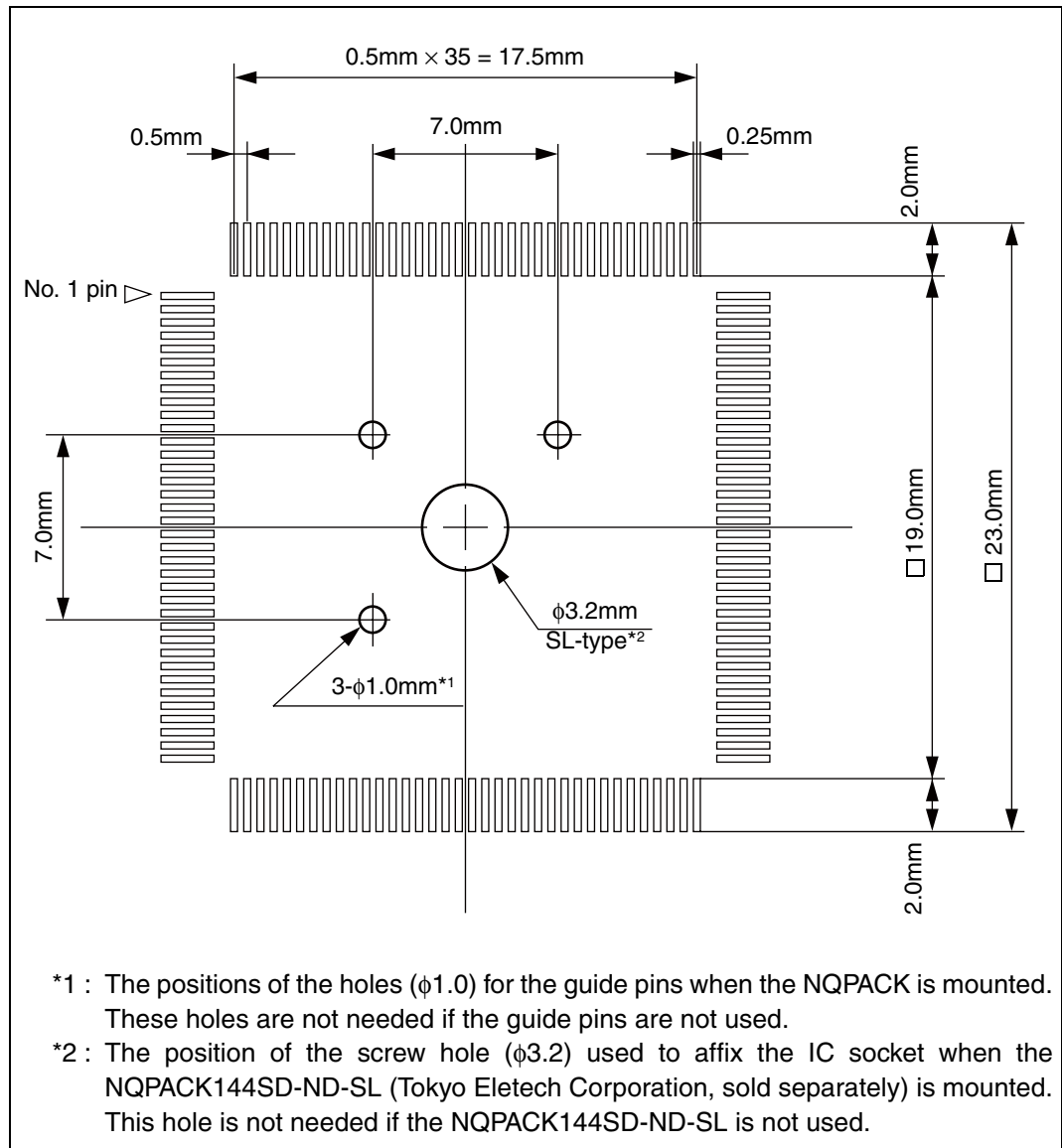


Figure 2 Recommended dimensions of the footprint for mounting the NQPACK

4. Procedure for Connecting to the User System

Before using the header board, mount the supplied NQPACK on the user system.

The header board is connected to the adapter board using the 2 flat cables (standard or long) included with the adapter board (which is sold separately). See the operation manual of the adapter board for details on how to connect the flat cables.

■ Connecting

1. To connect the header board to the user system, align pin 1 indicated by the index mark (▲) on the NQPACK mounted on the user system with the index mark on the header board and then insert the header board (see Figure 3).

The YQPACK pins are thin and easy to bend. Check that the YQPACK pins are not bent before inserting the YQPACK into the NQPACK.

2. Insert each of the screws for securing the header board through a washer and into each of the four holes in the header board. To tighten the screws, use the special screwdriver supplied with the NQPACK to evenly tighten the diagonally opposite screws in turn (see Figure 4).

Be careful to avoid overtightening the screws as this may cause a bad connection.

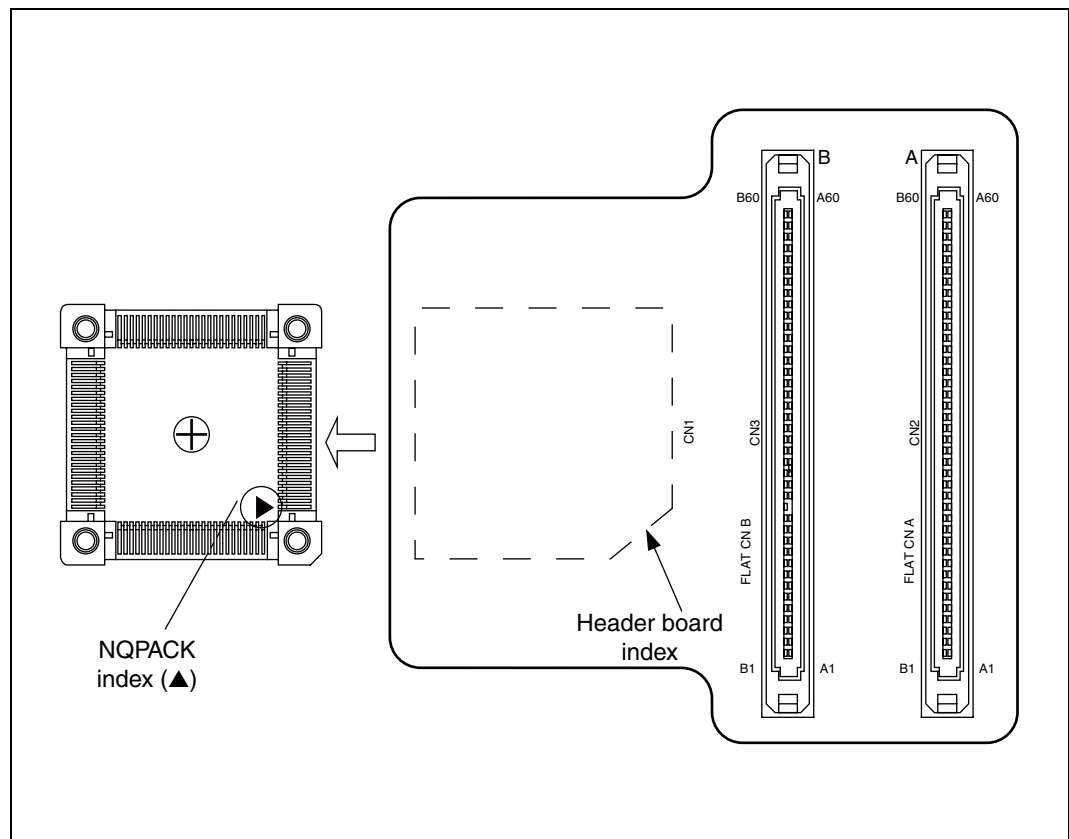


Figure 3 Index position

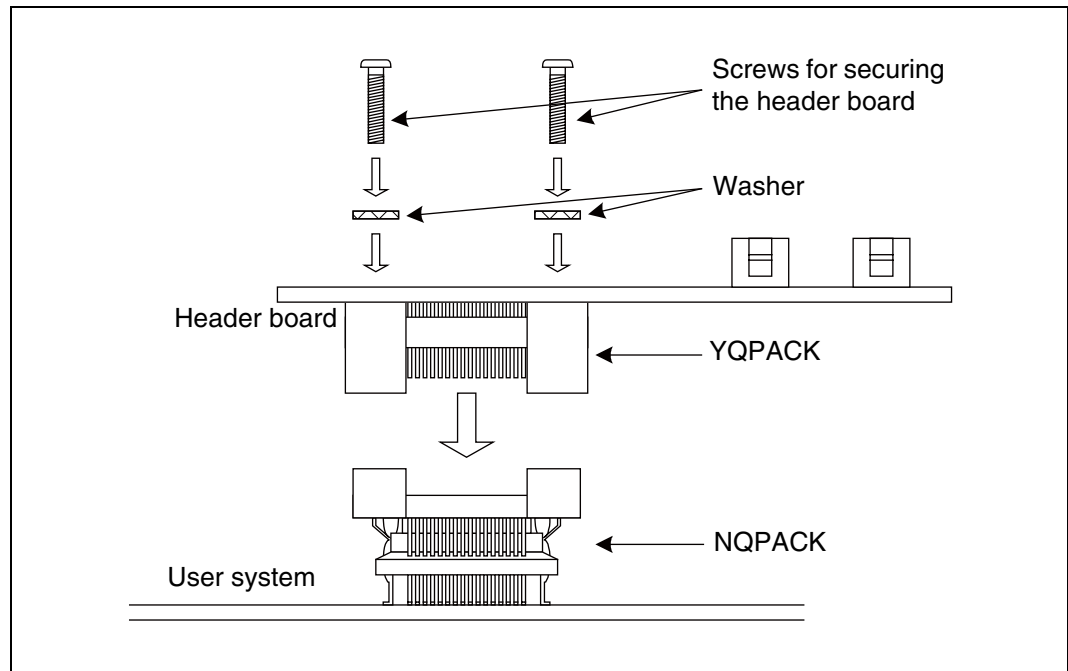


Figure 4 Header board connection

■ **Disconnecting**

To disconnect the header board from the user system, remove all four screws, and then pull the header board straight out of the NQPACK.

5. Mounting Mass Production MCUs

To mount a mass production MCU on the user system, use the supplied HQPACK.

■ Mounting

1. Align the index mark (▲) on the NQPACK mounted on the user system with the index mark (●) on the mass production MCU and mount the MCU on the NQPACK.
2. Confirm that the mass production MCU is correctly mounted on the NQPACK and then align the index mark on the HQPACK with the index mark on the NQPACK (the corner with an angle cut out of it) and insert the HQPACK into the NQPACK (see Figure 5).
The HQPACK pins are thin and easy to bend. Check that the HQPACK pins are not bent before inserting it into the NQPACK.
3. Insert the screws for securing the HQPACK into the four holes in the HQPACK, and then evenly tighten the diagonally opposite screws in turn using the special screwdriver that was included with the NQPACK. Be careful to avoid overtightening the screws as this may cause a bad connection.

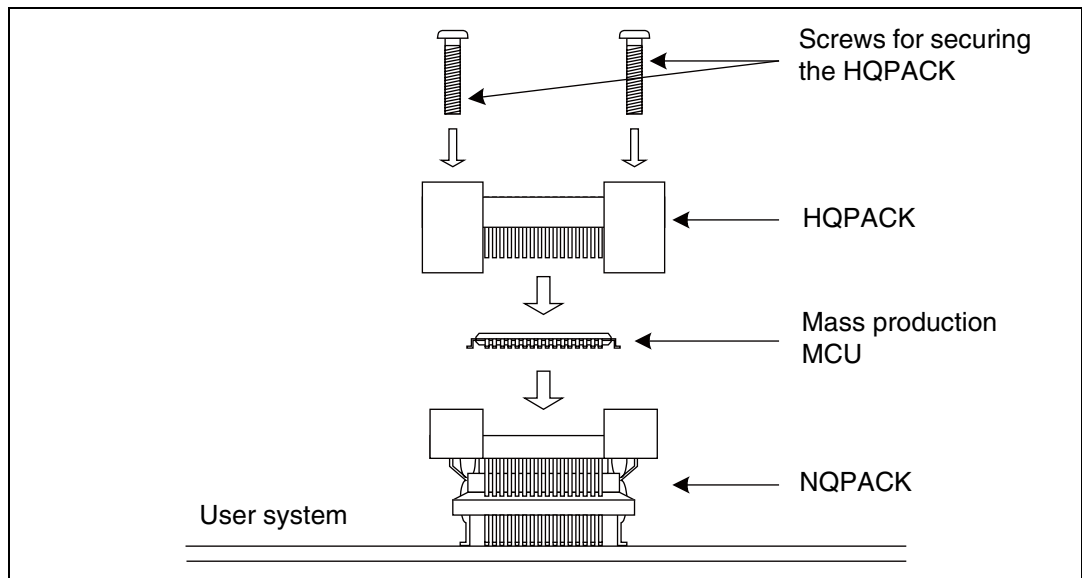


Figure 5 Mounting a mass production MCU

■ Disconnecting

To remove the HQPACK, remove all four screws, and pull the HQPACK vertically out from the NQPACK.

6. Connector Pin Assignment

The signals from the evaluation MCU that is mounted on the adapter board are connected to the YQ-PACK (which has the same pin configuration as the production MCU) via flat cable connectors A and B on the header board.

The adapter board and header board are connected using the 2 flat cables (standard or long) that are included with the adapter (which is sold separately). See the operation manual for the adapter board for details on how to connect the flat cables.

See the data sheet or hardware manual of each of the mass production MCUs for details on the MCU pins.

■ Pin Assignment


Tables 1 and 2 list the corresponding pin assignments for flat cable connectors A and B, the evaluation MCU on the adapter board, and the production MCU.

The notes in the tables have the following meanings:

*1 : PIDB and PIDA are left unconnected (open) and connected to GND, respectively (for determining the header connection).

*2 : For the shared ports (X1A/P04_1 and X0A/P04_0), set the port selection circuit (CLKSEL0/CLKSEL1) on the adapter board to match the production MCU port specifications (For devices with a “W” suffix in the mass production MCU part number: X1A, X0A. For devices with an “S” suffix: P04_1, P04_0).

— : Unconnected pin (left open).


 : UVCC

The pin numbers of the power supply (UVCC) pins on the evaluation MCU are as follows.

VCC = E2, R2, AE4, AG6, AG10, AG13

The pin numbers of the power supply (UVCC) pins on the mass production MCU are as follows.


VCC = 36, 72, 108, 144

 : DVCC

The pin numbers of the power supply (DVCC) pins on the evaluation MCU are as follows.

VCC = A11, D6, D10, F4

The mass production MCU does not have a DVCC pin. Connect the power supply to the UVCC pin on the mass production MCU.

 : VSS

The pin numbers of the ground (VSS) pins on the evaluation MCU are as follows.

VSS = A1, A30, D4, D8, D12, D19, D23, D27, H4, H27, M4, M27, W4, W27, AC4, AC27, AG4, AG8, AG12, AG19, AG23, AG27, AK1, AK30

The pin numbers of the ground (VSS) pins on the mass production MCU are as follows.

VSS = 1, 37, 73, 79, 109

Table 1 Pin assignment of flat cable connector A

Connector pin number	Evaluation MCU pin number	Production MCU pin number	Connector pin number	Evaluation MCU pin number	Production MCU pin number
A1	VSS		B1	VSS	
A2	—	—	B2	—	—
A3	—	—	B3	—	—
A4	—	—	B4	—	—
A5	—	*1	B5	—	VSS*1
A6	VSS		B6	VSS	
A7	—	—	B7	AH9	74
A8	AJ7	75	B8	AH8	76
A9	VSS		B9	VSS	
A10	AG9	82	B10	AK2	2
A11	VSS		B11	VSS	
A12			B12		
A13	AK7	78	B13	AK6	77
A14	VSS		B14	VSS	
A15	AJ8	81*2	B15	AK8	80*2
A16	VSS		B16	VSS	
A17	AG5	133	B17	AH4	134
A18	AJ3	135	B18	AJ2	136
A19	AH3	137	B19	AJ1	138
A20	AH2	139	B20	AG3	140
A21	VSS		B21	VSS	
A22	AE2	—	B22	AD4	—
A23	AD3	—	B23	AD1	—
A24	AE1	141	B24	AC3	142
A25	AD2	143	B25	AC2	3
A26	VSS		B26	VSS	
A27	Y3	12	B27	AA1	13
A28	Y1	14	B28	W3	15
A29	Y2	16	B29	W1	17
A30	W2	18	B30	V4	19
A31	VSS		B31	VSS	
A32	T2	34	B32	T1	35
A33	R1	38	B33	R4	39
A34	R3	40	B34	P1	41
A35	P2	42	B35	N1	43
A36	VSS		B36	VSS	
A37	—	—	B37	—	—
A38	L4	44	B38	L3	45
A39	K1	46	B39	L1	47
A40	—	—	B40	—	—
A41	VSS		B41	VSS	
A42	G2	64	B42	H3	65
A43	F1	66	B43	G1	67
A44	G3	68	B44	G4	69
A45	F2	70	B45	E1	71
A46	VSS		B46	VSS	
A47	B1	—	B47	B2	—
A48	C3	—	B48	A2	96
A49	B3	97	B49	C4	—
A50	D5	98	B50	A3	—
A51	VSS		B51	VSS	
A52	C7	99	B52	A7	100
A53	A6	101	B53	C8	102
A54	B7	103	B54	B8	104
A55	A8	105	B55	C9	106
A56	VSS		B56	VSS	
A57	UVCC		B57	DVCC	UVCC
A58			B58		
A59	—	—	B59	—	—
A60	VSS		B60	VSS	

Table 2 Pin assignment of flat cable connector B

Connector pin number	Evaluation MCU pin number	Production MCU pin number	Connector pin number	Evaluation MCU pin number	Production MCU pin number
A1	VSS		B1	VSS	
A2	AH13	107	B2	AJ13	110
A3	AJ12	111	B3	AK12	112
A4	AJ11	113	B4	AH12	114
A5	AK11	115	B5	AK10	116
A6	VSS		B6	VSS	
A7	AH11	117	B7	AG11	118
A8	AK9	119	B8	AJ10	120
A9	AH10	121	B9	AJ9	122
A10	AH7	123	B10	AG7	124
A11	VSS		B11	VSS	
A12	AJ6	125	B12	AK5	126
A13	AJ5	127	B13	AK4	128
A14	AH6	129	B14	AJ4	130
A15	AH5	131	B15	AK3	132
A16	VSS		B16	VSS	
A17	AF4	—	B17	AH1	—
A18	AF3	20	B18	AG2	21
A19	AE3	22	B19	AG1	23
A20	AF2	24	B20	AF1	25
A21	VSS		B21	VSS	
A22	AC1	4	B22	AB3	5
A23	AB4	6	B23	AB2	7
A24	AA3	8	B24	AA2	9
A25	AB1	10	B25	Y4	11
A26	VSS		B26	VSS	
A27	V2	26	B27	V3	27
A28	U3	28	B28	V1	29
A29	U2	30	B29	U1	31
A30	T3	32	B30	T4	33
A31	VSS		B31	VSS	
A32	P3	48	B32	N3	49
A33	N2	50	B33	N4	51
A34	M2	52	B34	M1	53
A35	L2	54	B35	M3	55
A36	VSS		B36	VSS	
A37	J1	56	B37	K2	57
A38	K3	58	B38	J2	59
A39	J4	60	B39	J3	61
A40	H1	62	B40	H2	63
A41	VSS		B41	VSS	
A42	D1	—	B42	F3	—
A43	D2	—	B43	E3	—
A44	C1	—	B44	E4	—
A45	D3	—	B45	C2	—
A46	VSS		B46	VSS	
A47	C5	83	B47	B4	84
A48	C6	85	B48	A4	86
A49	B5	87	B49	A5	88
A50	B6	89	B50	D7	90
A51	VSS		B51	VSS	
A52	D9	91	B52	B9	92
A53	C10	93	B53	B10	94
A54	A9	95	B54	D11	—
A55	C11	—	B55	A10	—
A56	VSS		B56	VSS	
A57	UVCC		B57	DVCC	UVCC
A58			B58		
A59	—	—	B59	—	—
A60	VSS		B60	VSS	

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