

TB-FMCH-PH Hardware User Manual

Rev.1.00

Revision History

Version	Date	Description	Publisher
Rev.1.00	2012/04/16	Release version	Yoshioka

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Introduction

Thank you for purchasing the **TB-FMCH-PH** board. Before using the product, be sure to carefully read this user manual and fully understand how to correctly use the product. First read through this manual, then always keep it handy.




SAFETY PRECAUTIONS

Be sure to observe these precautions




Observe the precautions listed below to prevent injuries to you or other personnel or damage to property.

- Before using the product, read these safety precautions carefully to assure correct use.
- These precautions contain serious safety instructions that must be observed.
- After reading through this manual, be sure to always keep it handy.

The following conventions are used to indicate the possibility of injury/damage and classify precautions if the product is handled incorrectly.

 Danger	Indicates the high possibility of serious injury or death if the product is handled incorrectly.
 Warning	Indicates the possibility of serious injury or death if the product is handled incorrectly.
 Caution	Indicates the possibility of injury or physical damage in connection with houses or household goods if the product is handled incorrectly.

The following graphical symbols are used to indicate and classify precautions in this manual.
(Examples)



	Turn off the power switch.
	Do not disassemble the product.
	Do not attempt this.



Warning

	<p>In the event of a failure, disconnect the power supply. If the product is used as is, a fire or electric shock may occur. Disconnect the power supply immediately and contact our sales personnel for repair.</p>
	<p>If an unpleasant smell or smoking occurs, disconnect the power supply. If the product is used as is, a fire or electric shock may occur. Disconnect the power supply immediately. After verifying that no smoking is observed, contact our sales personnel for repair.</p>
	<p>Do not disassemble, repair or modify the product. Otherwise, a fire or electric shock may occur due to a short circuit or heat generation. For inspection, modification or repair, contact our sales personnel.</p>
	<p>Do not touch a cooling fan. As a cooling fan rotates in high speed, do not put your hand close to it. Otherwise, it may cause injury to persons. Never touch a rotating cooling fan.</p>
	<p>Do not place the product on unstable locations. Otherwise, it may drop or fall, resulting in injury to persons or failure.</p>
	<p>If the product is dropped or damaged, do not use it as is. Otherwise, a fire or electric shock may occur.</p>
	<p>Do not touch the product with a metallic object. Otherwise, a fire or electric shock may occur.</p>
	<p>Do not place the product in dusty or humid locations or where water may splash. Otherwise, a fire or electric shock may occur.</p>
	<p>Do not get the product wet or touch it with a wet hand. Otherwise, the product may break down or it may cause a fire, smoking or electric shock.</p>
	<p>Do not touch a connector on the product (gold-plated portion). Otherwise, the surface of a connector may be contaminated with sweat or skin oil, resulting in contact failure of a connector or it may cause a malfunction, fire or electric shock due to static electricity.</p>

**Caution**

	<p>Do not use or place the product in the following locations.</p> <ul style="list-style-type: none"> • Humid and dusty locations • Airless locations such as closet or bookshelf • Locations which receive oily smoke or steam • Locations exposed to direct sunlight • Locations close to heating equipment • Closed inside of a car where the temperature becomes high • Sticky locations • Locations close to water or chemicals <p>Otherwise, a fire, electric shock, accident or deformation may occur due to a short circuit or heat generation.</p>
	<p>Do not place heavy things on the product.</p> <p>Otherwise, the product may be damaged.</p>

Disclaimer

This product is a board intended for **converting FMC connector to 2.54mm Pin-Header**. Tokyo Electron Device Limited assumes no responsibility for any damages resulting from the use of this product for purposes other than those stated.

Even if the product is used properly, Tokyo Electron Device Limited assumes no responsibility for any damages caused by:

- (1) Earthquake, thunder, natural disaster or fire resulting from the use beyond our responsibility, acts by a third party or other accidents, the customer's willful or accidental misuse or use under other abnormal conditions.
- (2) Secondary impact arising from use of this product or its unusable state (business interruption or others)
- (3) Use of this product against the instructions given in this manual.
- (4) Malfunctions due to connection to other devices.

Tokyo Electron Device Limited assumes no responsibility or liability for:

- (1) Erasure or corruption of data arising from use of this product.
- (2) Any consequences or other abnormalities arising from use of this product, or
- (3) Damage of this product not due to our responsibility or failure due to modification

This product has been developed by assuming its use for research, testing or evaluation. It is not authorized for use in any system or application that requires high reliability.

Repair of this product is carried out by replacing it on a chargeable basis, not repairing the faulty devices. However, non-chargeable replacement is offered for initial failure if such notification is received within two weeks after delivery of the product.

The specification of this product is subject to change without prior notice.

The product is subject to discontinuation without prior notice.

1. Related Documents and Accessories

Related documents:

All documents relating to this board can be downloaded from our website. Please see attached paper on the products.

Board accessories:

- FMC spacer set

2. Overview

This board is converting High-Pin-Count FMC connector to 2.54mm Pin-Header. All standard IO signal patterns are supporting differential signals(ex. LVDS). Hi-Speed Serial Interface pins are not supported.

3. Feature

- Supported Hi-Pin-Count FMC connector. Please see section for more detail connection.
- Standard 2.54mm pitch Pin-Headers

	K	J	H	G	F	E	D	C	B	A
1	VREF_B M2C	GND	VREF_A M2C	GND	PG M2C	GND	PG C2M	GND	RES1	GND
2	GND	CLK3 M2C P	PRSN1 M2C L	CLK1 M2C P	GND	HA01 P CC	GND	DP0 C2M P	GND	DP1 M2C P
3	GND	CLK3 M2C N	GND	CLK1 M2C N	GND	HA01 N CC	GND	DP0 C2M N	GND	DP1 M2C N
4	CLK2 M2C P	GND	CLK0 M2C P	GND	HA00 P CC	GND	GBTCLK0 M2C P	GND	DP9 M2C P	GND
5	CLK2 M2C N	GND	CLK0 M2C N	GND	HA00 N CC	GND	GBTCLK0 M2C N	GND	DP9 M2C N	GND
6	GND	HA03 P	GND	LA00 P CC	GND	HA05 P	GND	DP0 M2C P	GND	DP2 M2C P
7	HA02 P	HA03 N	LA02 P	LA00 N CC	HA04 P	HA05 N	GND	DP0 M2C N	GND	DP2 M2C N
8	HA02 N	GND	LA02 N	GND	HA04 N	GND	LA01 P CC	GND	DP8 M2C P	GND
9	GND	HA07 P	GND	LA03 P	GND	HA09 P	LA01 N CC	GND	DP8 M2C N	GND
10	HA06 P	HA07 N	LA04 P	LA03 N	HA08 P	HA09 N	GND	LA06 P	GND	DP3 M2C P
11	HA06 N	GND	LA04 N	GND	HA08 N	GND	LA05 P	LA06 N	GND	DP3 M2C N
12	GND	HA11 P	GND	LA08 P	GND	HA13 P	LA05 N	GND	DP7 M2C P	GND
13	HA10 P	HA11 N	LA07 P	LA08 N	HA12 P	HA13 N	GND	GND	DP7 M2C N	GND
14	HA10 N	GND	LA07 N	GND	HA12 N	GND	LA09 P	LA10 P	GND	DP4 M2C P
15	GND	HA14 P	GND	LA12 P	GND	HA16 P	LA09 N	LA10 N	GND	DP4 M2C N
16	HA17 P CC	HA14 N	LA11 P	LA12 N	HA15 P	HA16 N	GND	GND	DP6 M2C P	GND
17	HA17 N CC	GND	LA11 N	GND	HA15 N	GND	LA13 P	GND	DP6 M2C N	GND
18	GND	HA18 P	GND	LA16 P	GND	HA20 P	LA13 N	LA14 P	GND	DP5 M2C P
19	HA21 P	HA18 N	LA15 P	LA16 N	HA19 P	HA20 N	GND	LA14 N	GND	DP5 M2C N
20	HA21 N	GND	LA15 N	GND	HA19 N	GND	LA17 P CC	GND	GND	GND
21	GND	HA22 P	GND	LA20 P	GND	HB03 P	LA17 N CC	GND	GBTCLK1 M2C P	GND
22	HA23 P	HA22 N	LA19 P	LA20 N	HB02 P	HB03 N	GND	LA18 P CC	GND	DP1 C2M P
23	HA23 N	GND	LA19 N	GND	HB02 N	GND	LA23 P	LA18 N CC	GND	DP1 C2M N
24	GND	HB01 P	GND	LA22 P	GND	HB05 P	GND	GND	DP9 C2M P	GND
25	HB00 P CC	HB01 N	LA21 P	LA22 N	HB04 P	HB05 N	GND	GND	DP9 C2M N	GND
26	HB00 N CC	GND	LA21 N	GND	HB04 N	GND	LA26 P	LA27 P	GND	DP2 C2M P
27	GND	HB07 P	GND	LA25 P	GND	HB09 P	LA26 N	LA27 N	GND	DP2 C2M N
28	HB06 P CC	HB07 N	LA24 P	LA25 N	HB08 P	HB09 N	GND	GND	DP8 C2M P	GND
29	HB06 N CC	GND	LA24 N	GND	HB08 N	GND	TCK	GND	DP8 C2M N	GND
30	GND	HB11 P	GND	LA29 P	GND	HB13 P	TDI	SCL	GND	DP3 C2M P
31	HB10 P	HB11 N	LA28 P	LA29 N	HB12 P	HB13 N	TDO	SDA	GND	DP3 C2M N
32	HB10 N	GND	LA28 N	GND	HB12 N	GND	3P3VAUX	GND	DP7 C2M P	GND
33	GND	HB15 P	GND	LA31 P	GND	HB19 P	TMS	GND	DP7 C2M N	GND
34	HB14 P	HB15 N	LA30 P	LA31 N	HB16 P	HB19 N	TRST_L	GA0	GND	DP4 C2M P
35	HB14 N	GND	LA30 N	GND	HB16 N	GND	GA1	120V	GND	DP4 C2M N
36	GND	HB18 P	GND	LA33 P	GND	HB21 P	3P2V	GND	DP6 C2M P	GND
37	HB17 P CC	HB18 N	LA32 P	LA33 N	HB20 P	HB21 N	GND	120V	DP6 C2M N	GND
38	HB17 N CC	GND	LA32 N	GND	HB20 N	GND	3P3V	GND	GND	DP5 C2M P
39	GND	VIO_B M2C	GND	RES0	GND	RES0	GND	3P3V	GND	DP5 C2M N
40	VIO_B M2C	GND	RES0	GND	RES0	GND	3P3V	GND	RES0	GND

Figure 3-1 FMC(HPC) pin assign

4. Block Diagram

Following Figure shows a block diagram of TB-FMCH-PH.

FMC connector is mounted on bottom side.

Connections

- FMC connector and Pin-Header(CN1, CN2, CN3, CN4, CN11)
- External power Supply, GND(CN5, CN6, CN7, CN9)

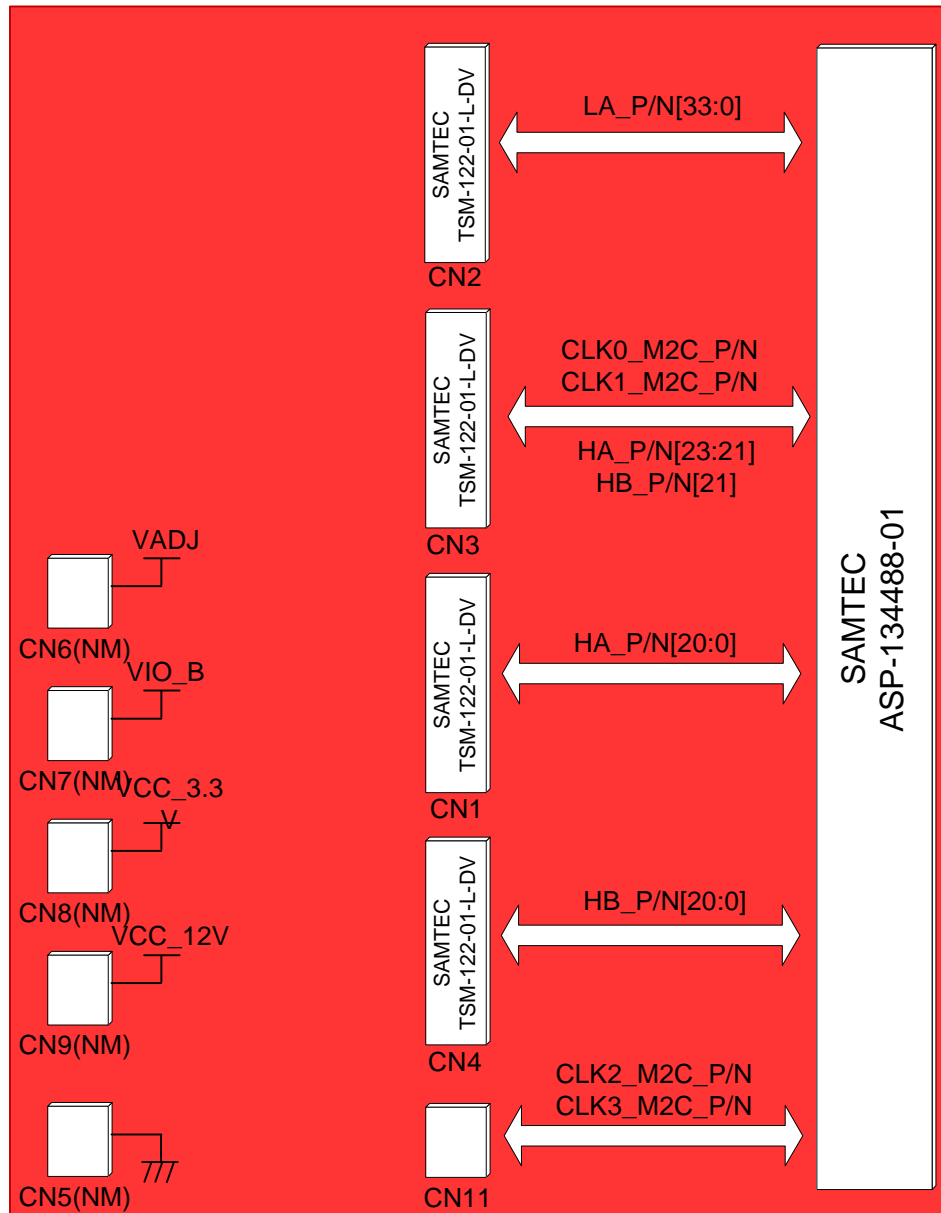


Figure 4-1 Block Diagram

5. External View of the Board

Following Figures show external view of the board.

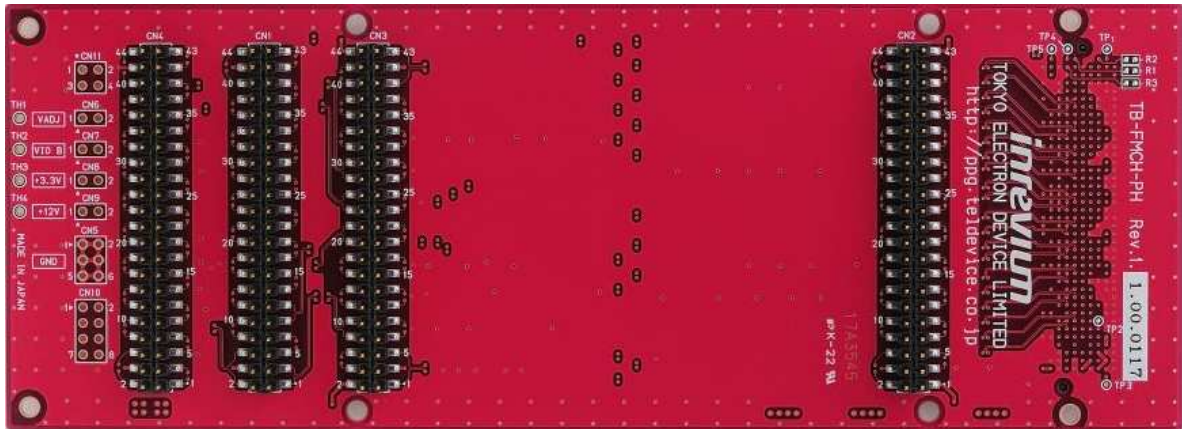


Figure 5-1 Component Side

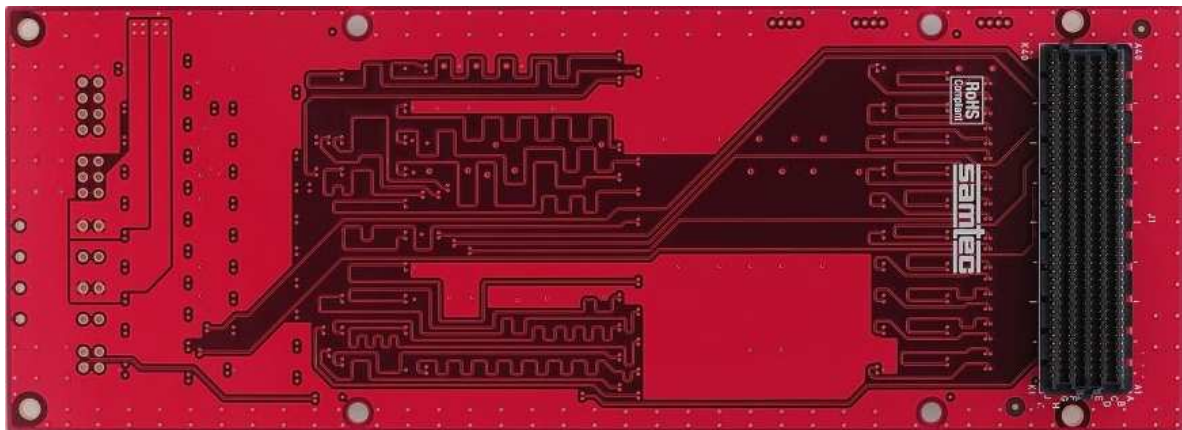


Figure 5-2 Solder Side

6. Board Specifications

Figure 6-1 shows the board specifications.

External Dimensions:	190.0 mm (W) x 69.0 mm (H)
Number of Layers:	8 layers
Board Thickness:	1.6 mm
Material:	FR-4
FMC Connector:	Samtec ASP-134488-01
2.54 Pin-Header:	Samtec TSM-122-01-L-DV or same spec connector

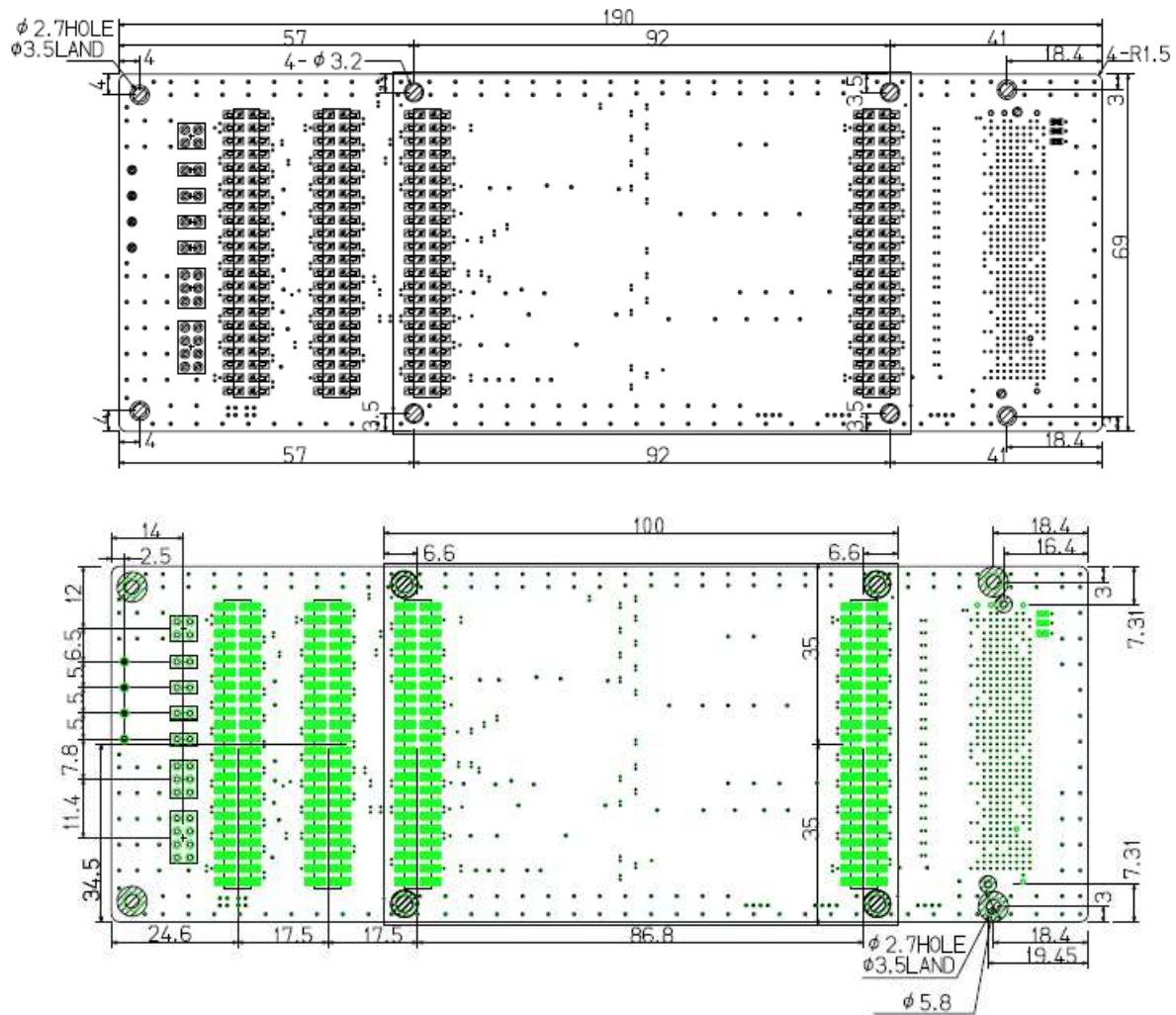


Figure 6-1 Board Dimensions

7. Description of Components

7.1. Signal connections

Following table shows signal assign of Pin-Header. Signal name is FMC standard name.

Table 7-1 Pin Assign(CN2)

FMC Pin	Signal Name	Pin-Header (CN2)		Signal Name	FMC Pin
-	VCC3.3V	1	2	LA31_P	G33
H34	LA30_P	3	4	GND	-
H35	LA30_N	5	6	LA31_N	G34
H31	LA28_P	7	8	LA29_P	G30
H32	LA28_N	9	10	LA29_N	G31
H28	LA24_P	11	12	LA25_P	G27
H29	LA24_N	13	14	LA25_N	G28
H25	LA21_P	15	16	LA22_P	G24
H26	LA21_N	17	18	LA22_N	G25
H22	LA19_P	19	20	LA20_P	G21
H23	LA19_N	21	22	LA20_N	G22
H19	LA15_P	23	24	LA16_P	G18
H20	LA15_N	25	26	LA16_N	G19
H16	LA11_P	27	28	LA12_P	G15
H17	LA11_N	29	30	LA12_N	G16
H13	LA7_P	31	32	LA8_P	G12
H14	LA7_N	33	34	LA8_N	G13
H10	LA4_P	35	36	LA3_P	G9
H11	LA4_N	37	38	LA3_N	G10
H7	LA2_P	39	40	LA0_P	G6
H8	LA2_N	41	42	GND	-
-	VCC3.3V	43	44	LA0_N	G7

Table 7-2 Pin Assign(CN3)

FMC Pin	Signal Name	Pin-Header (CN3)		Signal Name	FMC Pin
H37	LA32_P	1	2	VCC3.3V	-
-	GND	3	4	LA33_P	G36
H38	LA32_N	5	6	LA33_N	G37
C26	LA27_P	7	8	HA21_P	K19
C27	LA27_N	9	10	HA21_N	K20
D26	LA26_P	11	12	HA22_P	J21
D27	LA26_N	13	14	HA22_N	J22
D23	LA23_P	15	16	HA23_P	K22
D24	LA23_N	17	18	HA23_N	K23
C22	LA18_P	19	20	HB21_P	E36
C23	LA18_N	21	22	HB21_N	E37
D20	LA17_P	23	24	CLK1_M2C_P	G2
D21	LA17_N	25	26	CLK1_M2C_N	G3
C18	LA14_P	27	28	CLK0_M2C_P	H4
C19	LA14_N	29	30	CLK0_M2C_N	H5
D17	LA13_P	31	32	LA9_P	D14
D18	LA13_N	33	34	LA9_N	D15
D11	LA5_P	35	36	LA10_P	C14
D12	LA5_N	37	38	LA10_N	C15
D8	LA1_P	39	40	LA6_P	C10
-	GND	41	42	LA6_N	C11
D9	LA1_N	43	44	VCC3.3V	-

Table 7-3 Pin Assign(CN1)

FMC Pin	Signal Name	Pin-Header (CN1)		Signal Name	FMC Pin
E18	HA20_P	1	2	HA17_P	K16
E19	HA20_N	3	4	GND	-
F19	HA19_P	5	6	HA17_N	K17
F20	HA19_N	7	8	HA18_P	J18
F13	HA12_P	9	10	HA18_N	J19
F14	HA12_N	11	12	HA14_P	J15
E15	HA16_P	13	14	HA14_N	J16
E16	HA16_N	15	16	HA11_P	J12
K13	HA10_P	17	18	HA11_N	J13
K14	HA10_N	19	20	HA8_P	F10
K10	HA6_P	21	22	HA8_N	F11
K11	HA6_N	23	24	HA2_P	K7
J9	HA7_P	25	26	HA2_N	K8
J10	HA7_N	27	28	HA15_P	F16
E12	HA13_P	29	30	HA15_N	F17
E13	HA13_N	31	32	HA9_P	E9
E6	HA5_P	33	34	HA9_N	E10
E7	HA5_N	35	36	HA4_P	F7
F4	HA0_P	37	38	HA4_N	F8
F5	HA0_N	39	40	HA3_P	J6
E2	HA1_P	41	42	GND	-
E3	HA1_N	43	44	HA3_N	J7

Table 7-4 Pin Assign(CN4)

FMC Pin	Signal Name	Pin-Header (CN4)		Signal Name	FMC Pin
F34	HB16_P	1	2	HB20_P	F37
F35	HB16_N	3	4	GND	-
F25	HB4_P	5	6	HB20_N	F38
F26	HB4_N	7	8	HB18_P	J36
F22	HB2_P	9	10	HB18_N	J37
F23	HB2_N	11	12	HB7_P	J27
E21	HB3_P	13	14	HB7_N	J28
E22	HB3_N	15	16	HB5_P	E24
E33	HB19_P	17	18	HB5_N	E25
E34	HB19_N	19	20	HB15_P	J33
J30	HB11_P	21	22	HB15_N	J34
J31	HB11_N	23	24	HB12_P	F31
F28	HB8_P	25	26	HB12_N	F32
F29	HB8_N	27	28	HB13_P	E30
J24	HB1_P	29	30	HB13_N	E31
J25	HB1_N	31	32	HB9_P	E27
K34	HB14_P	33	34	HB9_N	E28
K35	HB14_N	35	36	HB17_P	K37
K31	HB10_P	37	38	HB17_N	K38
K32	HB10_N	39	40	HB0_P	K25
K28	HB6_P	41	42	GND	-
K29	HB6_N	43	44	HB0_N	K26

Table 7-5 Pin-Header(CN11)

FMC Pin	Signal Name	Pin-Header (CN11)		Signal Name	FMC Pin
K4	CLK2_M2C_P	1	2	CLK3_M2C_P	J2
K5	CLK2_M2C_N	3	4	CLK3_M2C_N	J3

7.2. Power Connectors

This board has through hole(CN5 to CN9) for power from FMC.

Also, CN10 is non connection through hole.

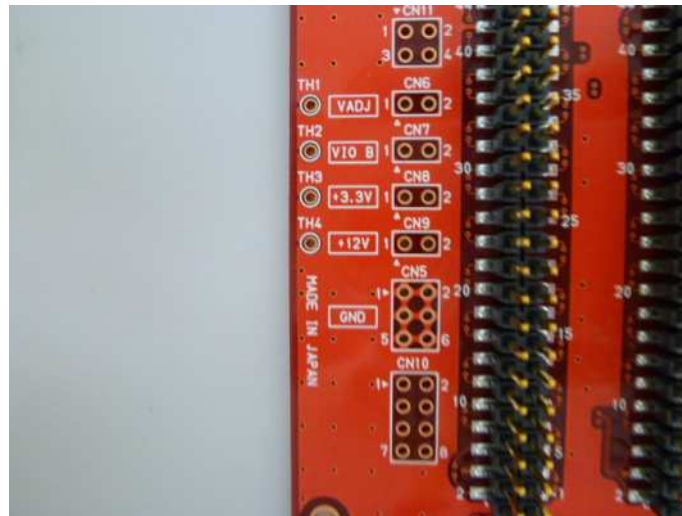


Figure 7-1 Power Connectors

7.3. Specific FMC signal procedure

7.3.1. Power supply

Following 4 power supply is connected through hole.

Table 7-6 Power Supply Connection

FMC Pin No.	Power	TH
E39,F40,G39,H40	VADJ	TH1
J39,K40	VIO B	TH2
C39,D32,D36,D38,D40	+3.3V	TH3
C35,C37	+12V	TH4

7.3.2. Test Point (TP)

Following signals are connected to Test Point.

Table 7-7 Test Point

FMC Pin No.		Test PAD
Pin No.	Pin Name	
B1	RES1	TP1
D35	GA1	TP2
B40	RES0	TP3
H1	VREF_A_M2C	TP4
K1	VREF_B_M2C	TP5

7.3.3. GND connection of FMC

Following signals have a pad for connecting to GND. These resistors are not mounted.

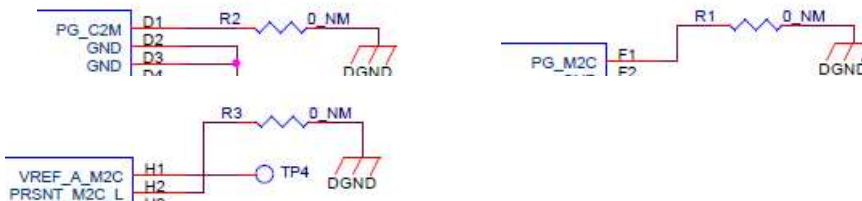


Table 7-8 Register for GNC connection

Table 7-9 Signals and resistor for GND connection

FMC Pin No.		Resistor
Pin No.	Pin Name	
F1	PG_M2C	R1
D1	PG_C2M	R2
H2	PRSNT_M2C_L	R3



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