

TB-FMCH-VFMC-HDMI Hardware User Manual

Rev. 0.1

Revision History

Version	Date	Description	Publisher
Rev.0.01		Draft	Usui
Rev.0.1	2021/12/14	Table 8-2 Changed slave address of IDT8T49N241 from 0x6C to 0x7C	H.U

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Introduction

Thank you for purchasing the **TB-FMCH-VFMC-HDMI** 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, and always keep it handy.

SAFETY PRECAUTIONS

Be sure to follow 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 ensure proper use.
- These precautions contain serious safety instructions that must be followed.
- 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

	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.
	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.
	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.
	Do not place the product on unstable locations. Otherwise, it may drop or fall, resulting in injury to persons or failure.
	If the product is dropped or damaged, do not use it as is. Otherwise, a fire or electric shock may occur.
	Do not touch the product with a metallic object. Otherwise, a fire or electric shock may occur.
	Do not place the product in dusty or humid locations or where water may splash. Otherwise, a fire or electric shock may occur.
	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.
	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.

**Caution****Do not use or place the product in the following locations.**

- Humid, **high temperature over 85 degrees Fahrenheit** 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
- Staticky locations
- Locations close to water or chemicals

Otherwise, a fire, electric shock, accident or deformation may occur due to a short circuit or heat generation.

**Do not place heavy things on the product.**

Otherwise, the product may be damaged.

■ Disclaimer

This product is an evaluation board intended for development of video interface. 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:

The latest version of hardware user manual and other documents can be downloaded from Inrevium website. This board is used with Xilinx's HDMI2.1 IP core. Documents for the IP core can be downloaded from Xilinx website.

Board accessories:

- M2.5 brass 27mm standoff: BSB-2527E qty. 2 (Installed onto the board)
- M2.5 brass 25mm standoff: BSB-2525E qty. 2
- M2.5 screw: B-2508-S qty. 2 (Installed onto the board)
- 2mm jumper socket: 2SN-BK-G qty. 3 (Installed onto the board)
- M2.6 10mm standoff for FMC connector: AS-2610 qty. 2
- M2.6 screw for FMC standoff: B-2608-S1N qty. 4
- 2.52 mm Jumper socket : 90059-0009 qty. 2 (Not used)

2. Overview

The TB-FMCH-VFMC-HDMI provides test environment of a system compliant with HDMI 2.1 Specifications. It features dynamic support of FRL and TMDS.

The TB-FMCH-VFMC-HDMI uses the NB7NQ621M quad channel redriver of ON Semiconductor. Also, it can be customized optionally by Inrevium design service.

This board is used with Xilinx's HDMI 2.1 IP core. Some functions of the board are not tested because IP does not support them.

The functions have not been tested are not covered by the warranty and no technical support is provided. Tested signals are described on the Table 9-2.

Inrevium has no plan to test it in the future. Questions for IP core and reference design, please contact to Xilinx (www.xilinx.com).

This board has been tested with Xilinx ZCU106. Compatibility with other boards are not guaranteed.

This board consists of Video FMC base and detachable Tx and Rx dongles, but please do not disassemble these boards. If it is disassembled manufacturer's warranty will be voided.

The board specification itself and Information in the technical documents are subject to change without notice.

Certificate of Compliance to RoHS cannot be issued.

Chip revision of the redriver IC depends on the board part number.

3. Feature

HDMI2.1 Redriver: ON Semiconductor NB7NQ621N

PLLIC: IDT IDT8T49N241-999NLGI, TI LMK03318RHST

Clock Generator: Silicon Labs Si5344D

Clock Multiplexer: IDT ICS854S054IGILF

HDMI connector: TE connectivity, 1747981-1

FMC connector: Samtec, ASP-134488-01 (Terminal)

4. Block Diagram

Block diagrams for HDMI signal path, clock sub-system, RX/TX sub-systems are shown in Figure 4-1, Figure 4-2, Figure 4-3 and Figure 4-4.

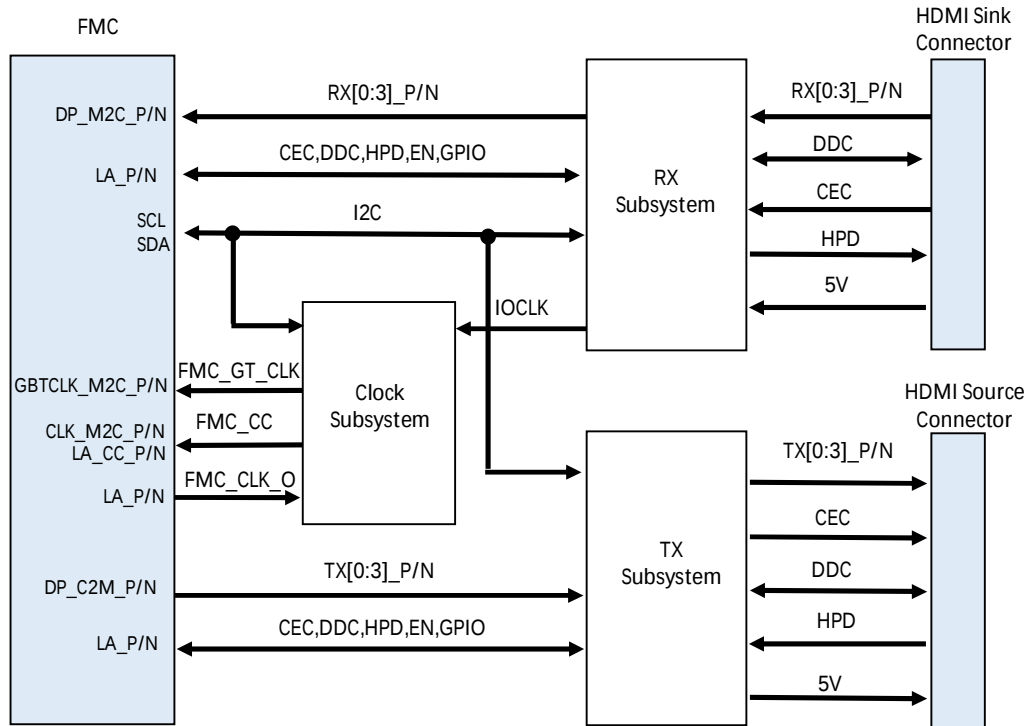


Figure 4-1 Block diagram for TB-FMCH-VFMC-HDMI

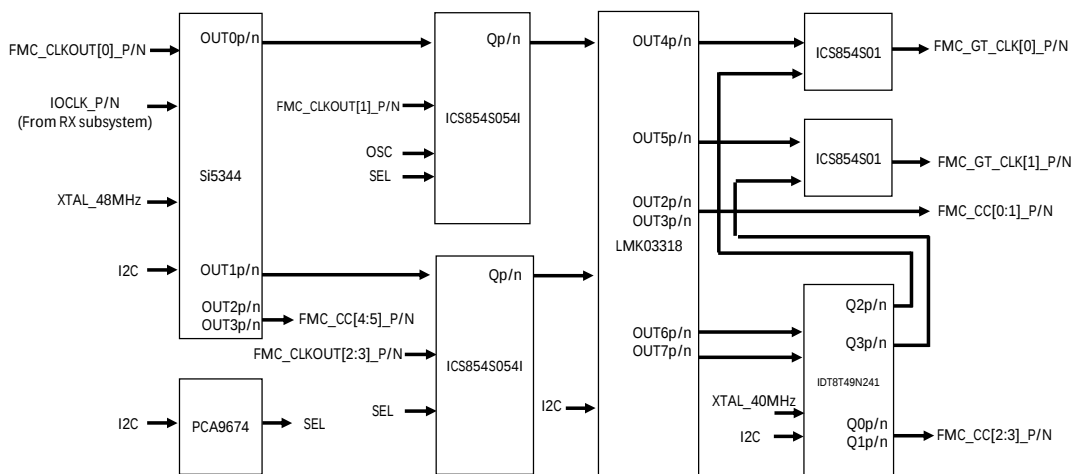


Figure 4-2 Block diagram for Clock sub-system

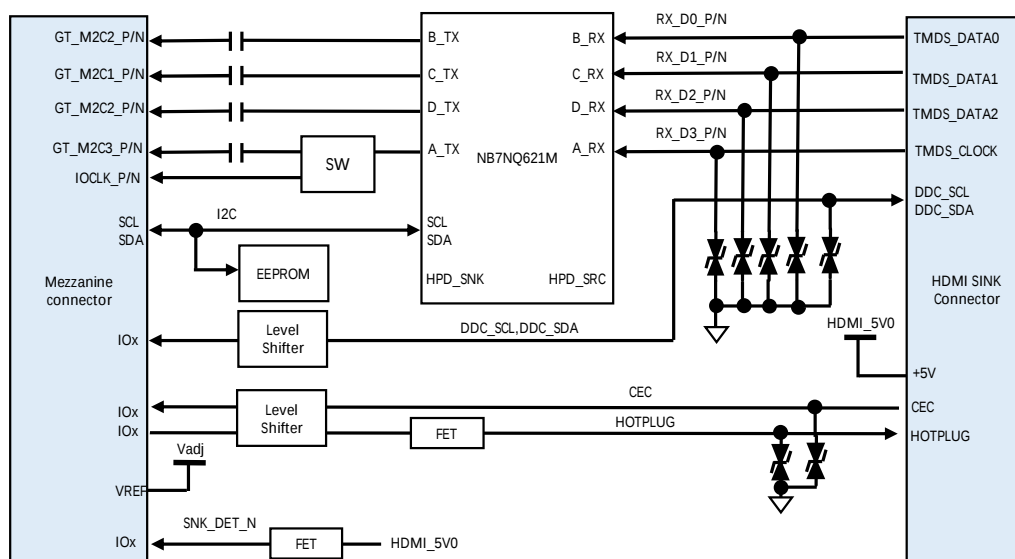


Figure 4-3 Block diagram for RX sub-system

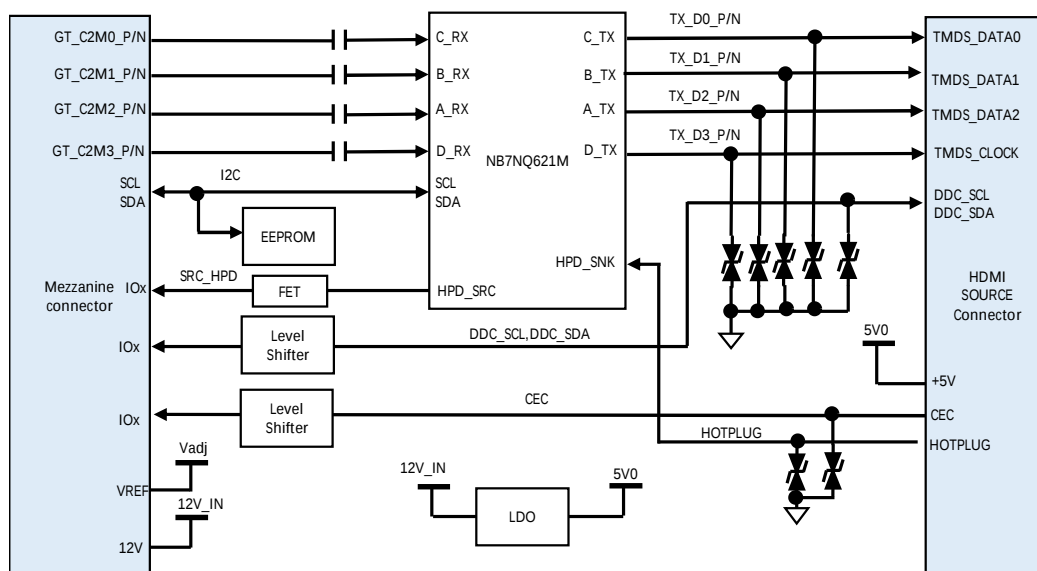


Figure 4-4 Block diagram for TX sub-system

5. External View of the Board

The board's components are shown on the top view and bottom view of Figure 5-1 and Figure 5-2.

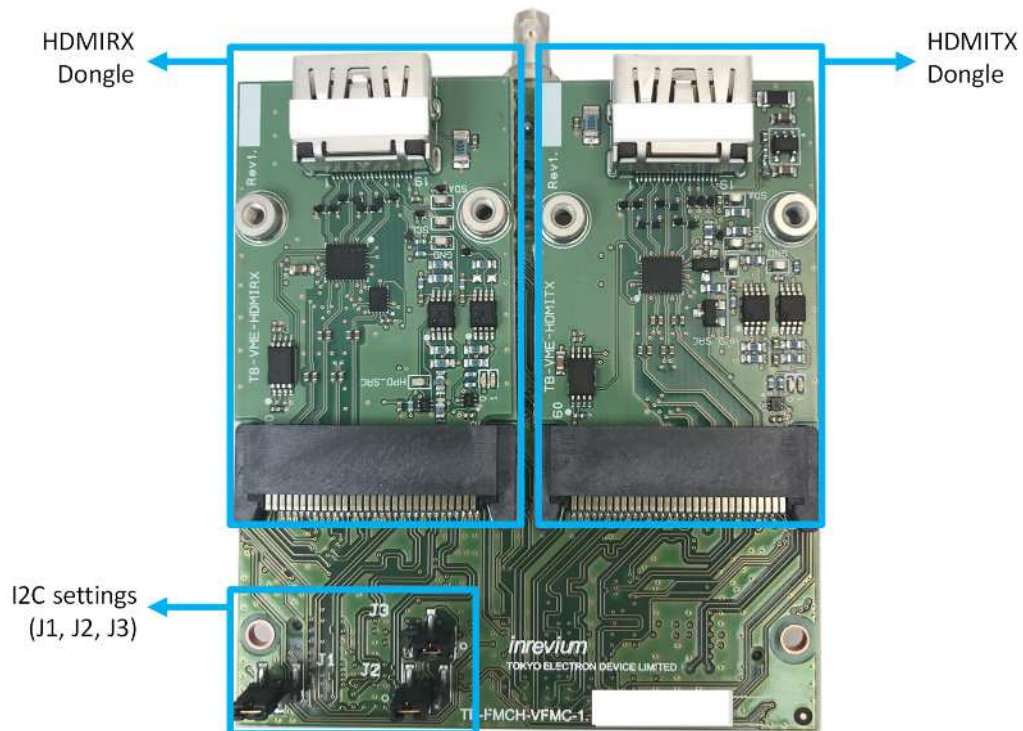


Figure 5-1 Top view

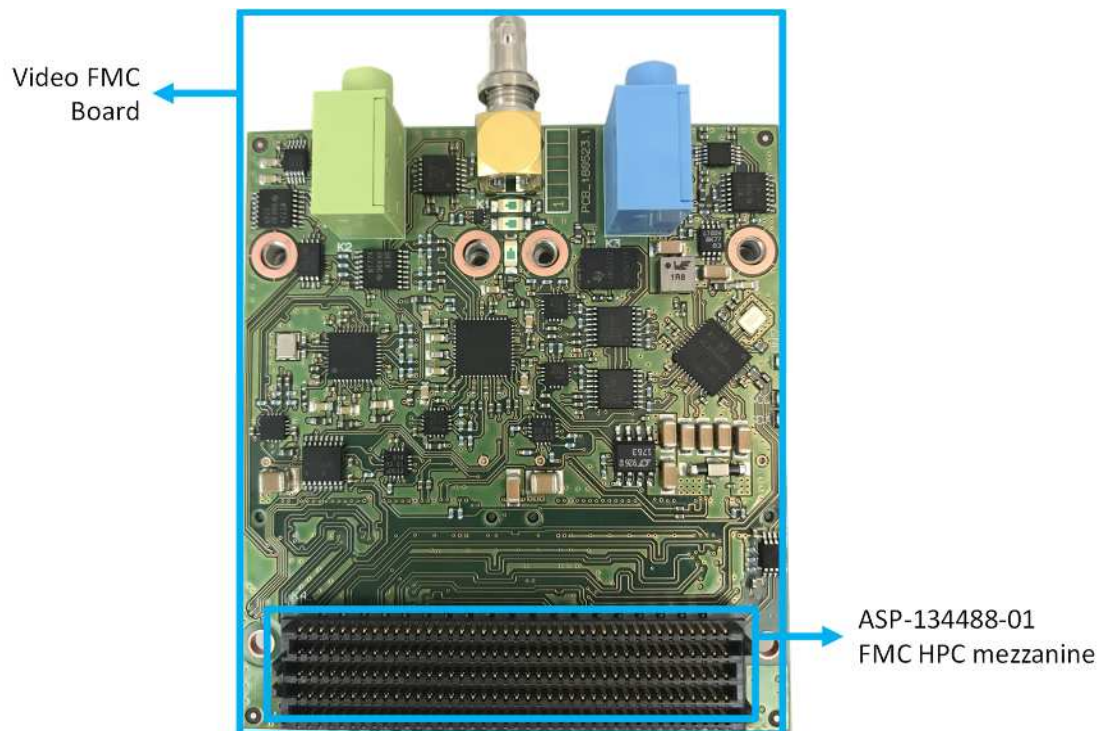


Figure 5-2 Bottom view

6. Board Specifications

Figure 6-1 shows the board dimensions.

Dimensions : 76.50mm x 69.00mm (excluding the protuberance)
 Number of layers (Video FMC board) : 6-layer
 Thickness (Video FMC board) : 1.7mm
 Number of layers (Tx and Rx dongle) : 4-layer
 Thickness (Tx and Rx dongle) : 1.6mm
 Material : Panasonic R-1755S

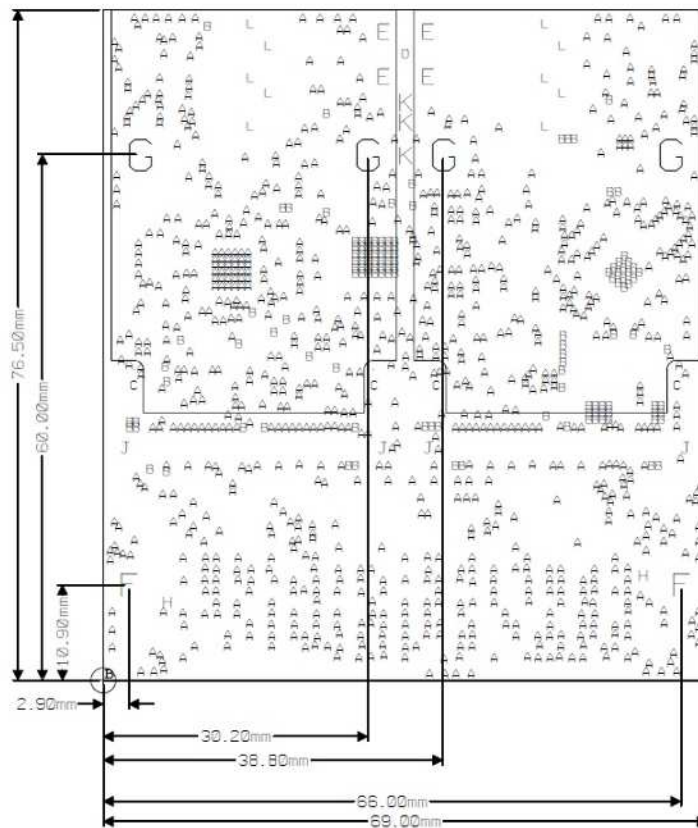


Figure 6-1 Board Dimensions

7. Power supply for the board

12V, 3.3V and VADJ have to be provided from the carrier board. Figure 7-1 shows the power block of the TB-FMCM-VFMC-HDMI.

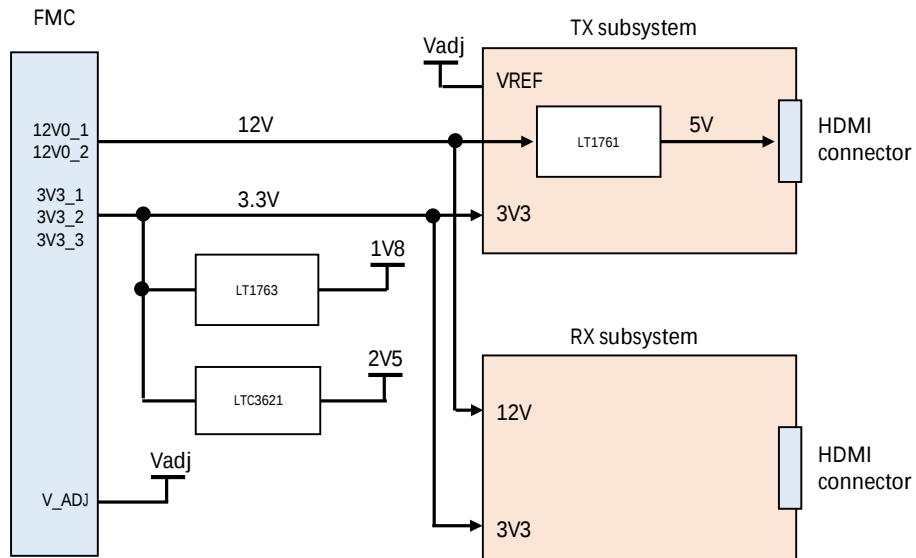


Figure 7-1 Power Block Diagram

8. I2C bus

8.1. I2C Sub-system

The FMC card contains several I2C programmable devices. These devices can be mastered by either dedicated I2C or IO pins from the FMC connector. J1, J2 and J3 can be used for I2C selection. I2C bus goes through PCA9517 to shift the voltage level from selected voltage to 3.3V. Figure 8-1 shows I2C connection on the board.

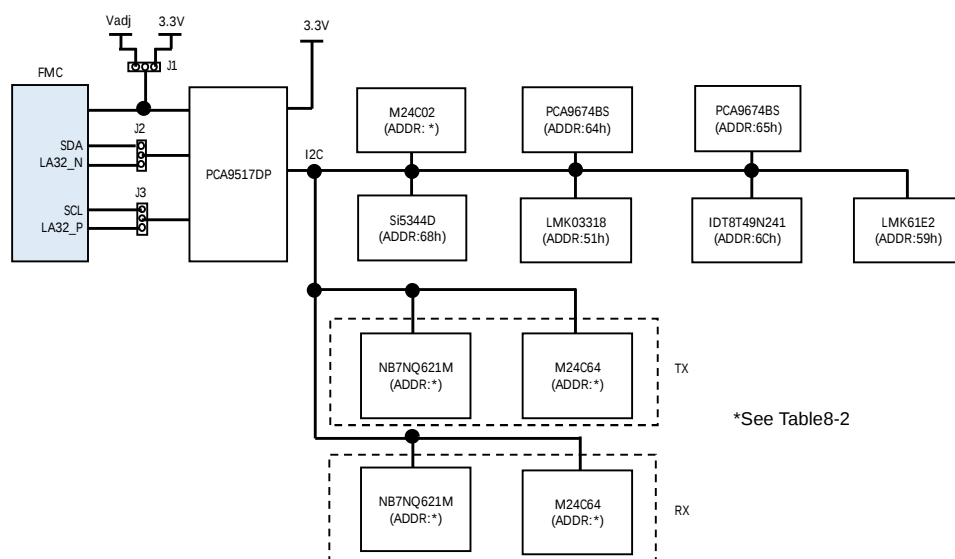


Figure 8-1 I2C sub-system

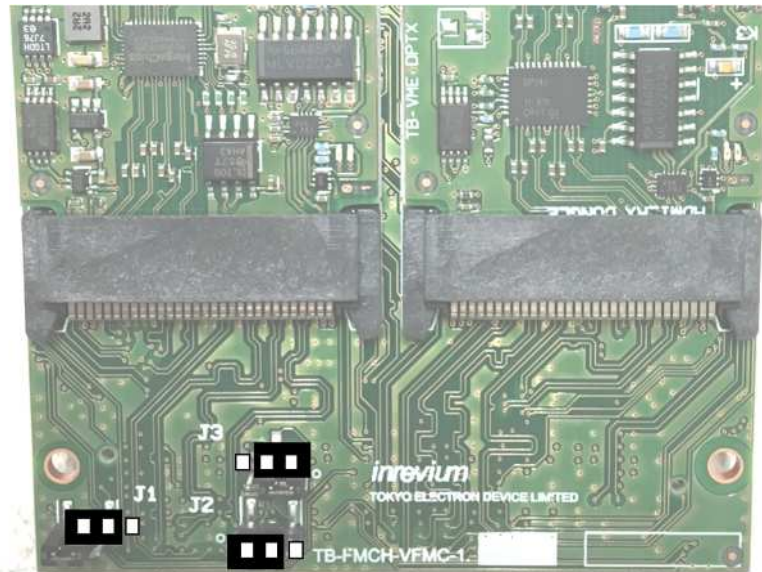
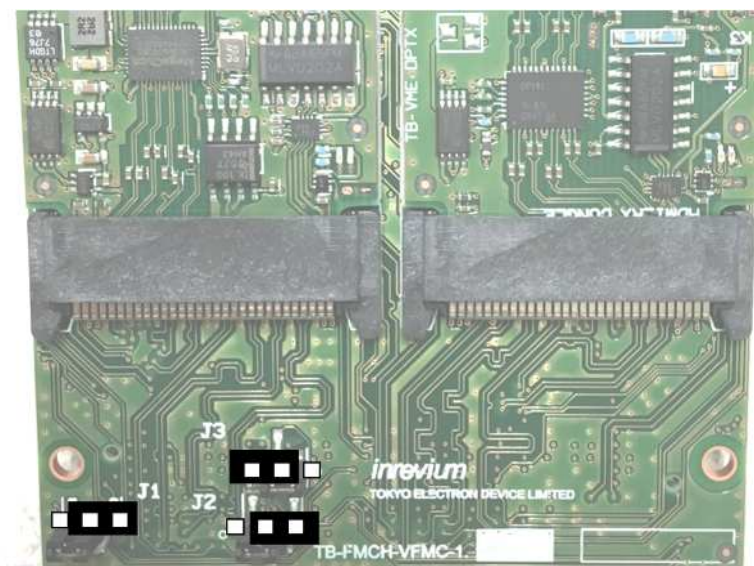
Table 8-1 shows I2C pin assignment of FMC and jumper settings.

Table 8-1 Jumper Settings

FMC pin No	FMC Pin name	J1	J2	J3
C30, C31	SCL, SDA	1-2	1-2	1-2

Short	J1	J2	J3	
1-2	3.3V	FMC_SDA	FMC_SCL	Setting A
2-3	Vadj	FMC_MZ0_IOn(7)	FMC_MZ0_IOP(7)	Setting B

Figure 8-2 and Figure 8-3 show examples of board jumper settings. The settings A is board default settings and it offers a selection of the dedicated I2C pins. The setting B offers a selection of user IO pins. Jumper settings should be followed to user requirements. For example, the dedicated I2C line is pulled up to 3V3 on ZCU106, hence 1-2 pins of J1 to J3 should be shorted. Please refer Table 8-1 for the jumper settings.

**Figure 8-2 Jumper setting A****Figure 8-3 Jumper setting B**

8.2. I2C Slave addresses

Slave address for EEPROM on the Video FMC depends on the FMC GA pin level. Table 8-3 shows I2C slave address examples when the carrier board is ZCU106. For more details please contact to Inrevium technical support.

Note: Please do not read registers of IO expander (IC21) on the Video FMC. Entire I2C bus will be hanged up due to errata of a PLL chip. **EEPROM on Tx dongle Rx dongle are not tested at the factory shipment.**

Table 8-2 I2C slave address

	Component	Part number	Reference	Slave address	Note
Video FMC	EEPROM	M24C02-RDW6	IC6	0x50	K4 GA0=0, GA1=0
	IO expander	PCA9674BS	IC18	0x64	-
	IO expander	PCA9674BS	IC21	0x65	-
	PLL	Si5344D-D-GM	IC13	0x68	-
	PLL	LMK03318RHST	IC12	0x51	-
	PLL	IDT8T49N241-999NLGI	IC11	0x7C	-
	Programmable Oscillator	LMK61E2-SIAT	IC8	0x59	-
HDMI Tx Dongle	EEPROM	M24C64-WDW6	IC2	0x57	K1 ID = 1
	Redriver	NB7NQ621M	IC7	0x5B	K1 ID = 1
HDMI RX Dongle	EEPROM	M24C64-WDW6	IC1	0x53	K1 ID = 0
	Redriver	NB7NQ621M	IC5	0x5C	K1 ID = 0

8.3. FMC I2C EEPROM

FMC I2C EEPROM(IC6) on the Video FMC has been programmed at the factory. Please do not erase it.

9. Connectors

9.1. HDMI Connector

HDMI Sink and Source connectors are populated on the top side of the board.

HDMI5V in RX is supplied from a sourcing device. 5V in TX is generated using the on board LDO. The signals from/to the connectors have ESD protection diodes.

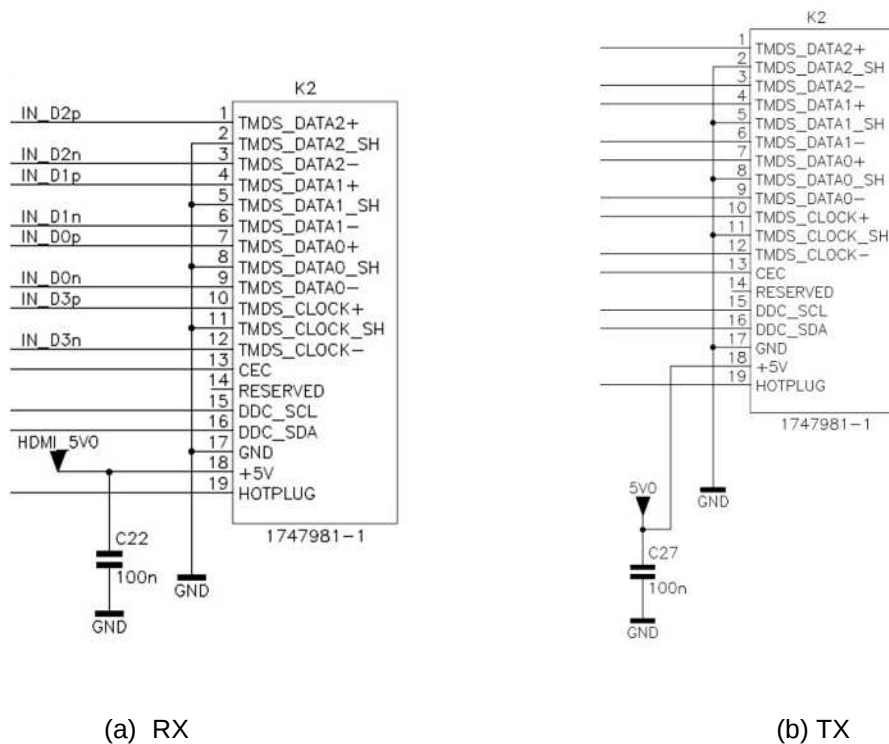


Figure 9-1 HDMI connector (a)RX, (b)TX

9.2. FMC connector

This board has one HPC 400 pin FMC connection board as shown on the block diagram. This FMC connector follows the VITA 57.1 standard with Samtec ASP-134486-01 socket.

Presented below is the standard pin assignment on FMC HPC connectors.

Not all the pins are connected on the FMC connectors. Please follow this section for more details on all the FMC pinouts.

	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	CLK DIR	GND
2	GND	CLK3 BIDIR_P	PRSN1 M2C_L	CLK1 M2C_P	GND	HA01_P CC	GND	DP0_C2M_P	GND	DP1 M2C_P
3	GND	CLK3 BIDIR_N	GND	CLK1 M2C_N	GND	HA01_N CC	GND	DP0_C2M_N	GND	DP1 M2C_N
4	CLK2 BIDIR_P	GND	CLK0 M2C_P	GND	HA00_P CC	GND	GBTCLK3_M2C_P	GND	DP9 M2C_P	GND
5	CLK2 BIDIR_N	GND	CLK0 M2C_N	GND	HA00_N CC	GND	GBTCLK3_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	DP7 M2C_N	GND	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	GBTCLK1_M2C_P	GND
21	GND	HA22_P	GND	LA20_P	GND	HB03_P	LA17_N CC	GND	GBTCLK1_M2C_N	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	LA23_N	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	3P3V/AUX	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	12P0V	GND	DP4 C2M_N
36	GND	HB18_P	GND	LA33_P	GND	HB21_P	3P3V	GND	DP6 C2M_P	GND
37	HB17_P CC	HB18_N	LA32_P	LA33_N	HB20_P	HB21_N	GND	12P0V	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	VADJ1	GND	VADJ1	GND	3P3V	GND	DP5 C2M_N
40	VIO_B M2C	GND	VADJ1	GND	VADJ1	GND	3P3V	GND	RES0	GND
			LPC Connector	LPC Connector			LPC Connector	LPC Connector		

Figure 9-2 High Pin Count FMC

9.3. Pin assignment on FMC connector

Table 9-1 shows pin assignment for FMC connector of this board except for the power rails and GND. The pins in a row filled with grey are “not connected” or “GND” on the board, hence they are not functional.

Table 9-1 FMC pin assign

FMC Pin No	Name	I/O	Schematic Signal Name	Description
A2	DP1_M2C_P	O	GT_M2Cp(1)	HDMI RX1 (Positive)
A3	DP1_M2C_N	O	GT_M2Cn(1)	HDMI RX1 (Negative)
A6	DP2_M2C_P	O	GT_M2Cp(2)	HDMI RX2 (Positive)
A7	DP2_M2C_N	O	GT_M2Cn(2)	HDMI RX2 (Negative)
A10	DP3_M2C_P	O	GT_M2Cp(3)	HDMI RX3 (Positive)
A11	DP3_M2C_N	O	GT_M2Cn(3)	HDMI RX3 (Negative)
A14	DP4_M2C_P		GT_M2Cp(4)	Connected to GND
A15	DP4_M2C_N		GT_M2Cn(4)	Connected to GND
A18	DP5_M2C_P		GT_M2Cp(5)	Connected to GND
A19	DP5_M2C_N		GT_M2Cn(5)	Connected to GND
A22	DP1_C2M_P	I	GT_C2Mp(1)	HDMI TX1 (Positive)
A23	DP1_C2M_N	I	GT_C2Mn(1)	HDMI TX1 (Negative)
A26	DP2_C2M_P	I	GT_C2Mp(2)	HDMI TX2 (Positive)
A27	DP2_C2M_N	I	GT_C2Mn(2)	HDMI TX2 (Negative)
A30	DP3_C2M_P	I	GT_C2Mp(3)	HDMI TX3 (Positive)
A31	DP3_C2M_N	I	GT_C2Mn(3)	HDMI TX3 (Negative)
A34	DP4_C2M_P		GT_C2Mp(4)	NC
A35	DP4_C2M_N		GT_C2Mn(4)	NC
A38	DP5_C2M_P		GT_C2Mp(5)	NC
A39	DP5_C2M_N		GT_C2Mn(5)	NC
B12	DP7_M2C_P		GT_M2Cp(7)	Connected to GND
B13	DP7_M2C_N		GT_M2Cn(7)	Connected to GND
B16	DP6_M2C_P		GT_M2Cp(6)	Connected to GND
B17	DP6_M2C_N		GT_M2Cn(6)	Connected to GND
B20	GBTCLK1_M2C_P	O	FMC_GT_CLKp(1)	TX REFCLK (Positive)
B21	GBTCLK1_M2C_N	O	FMC_GT_CLKn(1)	TX REFCLK (Negative)
B32	DP7_C2M_P		GT_C2Mp(7)	NC
B33	DP7_C2M_N		GT_C2Mn(7)	NC
B36	DP6_C2M_P		GT_C2Mp(6)	NC
B37	DP6_C2M_N		GT_C2Mn(6)	NC
C2	DP0_C2M_P	I	GT_C2Mp(0)	HDMI TX0 (Positive)
C3	DP0_C2M_N	I	GT_C2Mn(0)	HDMI TX0 (Negative)
C6	DP0_M2C_P	O	GT_M2Cp(0)	HDMI RX0 (Positive)
C7	DP0_M2C_N	O	GT_M2Cn(0)	HDMI RX0 (Negative)
C10	LA6_P	I	FMC_MZ1_IOP(4)	TX Redriver Enable
C11	LA6_N		FMC_MZ1_IOn(4)	NC
C14	LA10_P		FMC_MZ1_IOP(6)	NC
C15	LA10_N		FMC_MZ1_IOn(6)	NC
C18	LA14_P	I	FMC_MZ1_IOP(1)	TX LED D3 control

FMC Pin No	Name	I/O	Schematic Signal Name	Description
C19	LA14_N	I	FMC_MZ1_IOn(1)	TX LED D2 control
C22	LA18_CC_P		FMC_CCp(5)	Si5344D (IC13) CK_OUT3p
C23	LA18_CC_N		FMC_CCn(5)	Si5344D (IC13) CK_OUT3n
C26	LA27_P		FMC_LOL	Si5344D (IC13) LOL n
C27	LA27_N		FMC_STATUS(1)	LMK03318 (IC12) Status1
C30	SCL		FMC_SCL	I2C SCL (J3 1-2 short)
C31	SDA		FMC_SDA	I2C SDA (J2 1-2 short)
C34	GA0		FMC_GA0	M24C02 (IC6) EEPROM A1
D4	GBTCLK0_M2C_P	O	FMC_GT_CLKp(0)	HDMI RX Clock (Positive)
D5	GBTCLK0_M2C_N	O	FMC_GT_CLKn(0)	HDMI RX Clock (Negative)
D8	LA1_CC_P		FMC_CCp(4)	Si5344D (IC13) CK_OUT2p
D9	LA1_CC_N		FMC_CCn(4)	Si5344D (IC13) CK_OUT2n
D11	LA5_P		FMC_DAC_MCLK	Master clock for Audio DAC
D12	LA5_N		FMC_DAC_SDIN	Serial data input for Audio DAC
D14	LA9_P		FMC_DAC_LRCK	LR clock for Audio DAC
D15	LA9_N		FMC_DAC_SCLK	Serial clock for Audio DAC
D17	LA13_P	O	FMC_MZ1_IOP(3)	TX HPD
D18	LA13_N		FMC_MZ1_IOn(3)	HDMI TX CEC
D20	LA17_CC_P		FMC_CCp(2)	IDT8T49N241 (IC11) Q1p
D21	LA17_CC_N		FMC_CCn(2)	IDT8T49N241 (IC11) Q1n
D23	LA23_P		FMC_STATUS(0)	LMK03318 (IC12) Status0
D24	LA23_N	O	FMC_IDT_GPIO3	Loss of lock status of IDT8T49N241
D26	LA26_P		FMC_ADC_SDOUT	Serial data output for audio ADC
D27	LA26_N		FMC_ADC_MCLK	Master clock for Audio ADC
D35	GA1		FMC_GA1	M24C02 (IC6) EEPROM A0
G2	CLK1_M2C_P		FMC_CCp(0)	LMK03318 (IC12) CK_OUT2p
G3	CLK1_M2C_N		FMC_CCn(0)	LMK03318 (IC12) CK_OUT2n
G6	LA0_CC_P		FMC_CCp(3)	IDT8T49N241 (IC11) Q0p
G7	LA0_CC_N		FMC_CCn(3)	IDT8T49N241 (IC11) Q0n
G9	LA3_P	IO	FMC_MZ1_IOP(2)	TX DDC SDA
G10	LA3_N	IO	FMC_MZ1_IOn(2)	TX DDC SCL
G12	LA8_P	I	FMC_CLKOUT(1)p	RX REFCLK (Positive)
G13	LA8_N	I	FMC_CLKOUT(1)n	RX REFCLK (Negative)
G15	LA12_P		FMC_MZ1_IOP(7)	NC
G16	LA12_N		FMC_MZ1_IOn(7)	NC
G18	LA16_P		FMC_CLKOUT(0)p	Si5344D (IC13) CK_IN0p
G19	LA16_N		FMC_CLKOUT(0)n	Si5344D (IC13) CK_IN0n
G21	LA20_P		FMC_INTn(0)	NC
G22	LA20_N		FMC_INTn(1)	NC
G24	LA22_P		FMC_ADC_SCLK	Serial clock for Audio ADC
G25	LA22_N		FMC_ADC_LRCK	LR clock for Audio ADC
G27	LA25_P		FMC_MZ0_IOP(0)	NC
G28	LA25_N		FMC_MZ0_IOn(0)	NC

FMC Pin No	Name	I/O	Schematic Signal Name	Description
G30	LA29_P	I	FMC_MZ0_IOP(4)	FRL select signal
G31	LA29_N	O	FMC_MZ0_IOn(4)	RX HDMI 5V detection
G33	LA31_P		FMC_MZ0_IOP(5)	NC
G34	LA31_N	I	FMC_MZ0_IOn(5)	RX Redriver Enable
G36	LA33_P		LED_0	D1 control
G37	LA33_N		LED_1	D2 control
H4	CLK0_M2C_P		FMC_CCp(1)	LMK03318 (IC12) CK_OUT2p
H5	CLK0_M2C_N		FMC_CCn(1)	LMK03318 (IC12) CK_OUT2n
H7	LA2_P		FMC_MZ1_IOP(0)	NC
H8	LA2_N		FMC_MZ1_IOn(0)	NC
H10	LA4_P		FMC_MZ1_IOP(5)	NC
H11	LA4_N		FMC_MZ1_IOn(5)	NC
H13	LA7_P		FMC_ASYNC_VS	LMH1981 (IC3) Vsync output
H14	LA7_N		FMC_ASYNC_HS	LMH1981 (IC3) Hsync output
H16	LA11_P		FMC_CLKOUT(2)p	ICS854S054I (IC10) PCLK1p
H17	LA11_N		FMC_CLKOUT(2)n	ICS854S054I (IC10) PCLK1n
H19	LA15_P		FMC_ASYNC_FS	LMH1981 (IC3) Odd/Even field output
H22	LA19_P		FMC_CLKOUT(3)p	ICS854S054I (IC10) PCLK3p
H23	LA19_N		FMC_CLKOUT(3)n	ICS854S054I (IC10) PCLK3n
H25	LA21_P	I	FMC_MZ0_IOP(1)	RX LED D2 control
H26	LA21_N	I	FMC_MZ0_IOn(1)	RX LED D3 control
H28	LA24_P	IO	FMC_MZ0_IOP(2)	RX DDC SDA
H29	LA24_N	IO	FMC_MZ0_IOn(2)	RX DDC SCL
H31	LA28_P	I	FMC_MZ0_IOP(3)	RX HPD
H32	LA28_N		FMC_MZ0_IOn(3)	HDMI TX CEC
H34	LA30_P		FMC_MZ0_IOP(6)	NC
H35	LA30_N		FMC_MZ0_IOn(6)	NC
H37	LA32_P		FMC_MZ0_IOP(7)	I2C SCL (J3 2-3 short)
H38	LA32_N		FMC_MZ0_IOn(7)	I2C SDA (J2 2-3 short)

The FMC pins listed in Table 9-2 are tested by using an example design of Xilinx HDMI2.1 IP. Note that the other pins and functions that are related to the other pins (e.g. Audio DAC, ADC, Sync separator and PLLs) are not tested and not guaranteed.

Table 9-2 Tested pins of the FMC

FMC Pin No	Name	I/O	HDMI 2.1 Example Design
A30	DP3_C2M_P	I	HDMI_TX_DAT_P_OUT[3]
A31	DP3_C2M_N	I	HDMI_TX_DAT_N_OUT[3]
A26	DP2_C2M_P	I	HDMI_TX_DAT_P_OUT[2]
A27	DP2_C2M_N	I	HDMI_TX_DAT_N_OUT[2]
A22	DP1_C2M_P	I	HDMI_TX_DAT_P_OUT[1]
A23	DP1_C2M_N	I	HDMI_TX_DAT_N_OUT[1]
C2	DP0_C2M_P	I	HDMI_TX_DAT_P_OUT[0]
C3	DP0_C2M_N	I	HDMI_TX_DAT_N_OUT[0]
B20	GBTCLK1_M2C_P	O	TX_REFCLK_N_ck_p[0]
B21	GBTCLK1_M2C_N	O	TX_REFCLK_N_ck_n[0]
C10	LA6_P	I	VFMC_TX_CH4_FRLSELn[0]
C18	LA14_P	I	VFMC_TX_LED1[0]
C19	LA14_N	I	VFMC_TX_LED0[0]
G9	LA3_P	D	TX_DDC_OUT_sda_io
G10	LA3_N	D	TX_DDC_OUT_scl_io
D17	LA13_P	O	TX_HPD_N
A10	DP3_M2C_P	O	HDMI_RX_DAT_P_N[3]
A11	DP3_M2C_N	O	HDMI_RX_DAT_N_N[3]
A6	DP2_M2C_P	O	HDMI_RX_DAT_P_N[2]
A7	DP2_M2C_N	O	HDMI_RX_DAT_N_N[2]
A2	DP1_M2C_P	O	HDMI_RX_DAT_P_N[1]
A3	DP1_M2C_N	O	HDMI_RX_DAT_N_N[1]
C6	DP0_M2C_P	O	HDMI_RX_DAT_P_N[0]
C7	DP0_M2C_N	O	HDMI_RX_DAT_N_N[0]
D4	GBTCLK0_M2C_P	O	HDMI_RX_CLK_P_N
D5	GBTCLK0_M2C_N	O	HDMI_RX_CLK_N_N
G12	LA8_P	I	RX_REFCLK_P_OUT
G13	LA8_N	I	RX_REFCLK_N_OUT
G34	LA31_N	I	VFMC_RX_ONSEMIENABLE[0]
H26	LA21_N	I	VFMC_RX_LED0[0]
H25	LA21_P	I	VFMC_RX_LED1[0]
H31	LA28_P	I	RX_HPD_OUT[0]
G31	LA29_N	O	RX_DET_N_N
H28	LA24_P	D	RX_DDC_OUT_sda_io
H29	LA24_N	D	RX_DDC_OUT_scl_io
G30	LA29_P	I	VFMC_RX_CH4_FRLSELn[0]
D24	LA23_N	O	DT8T49N241_LOL_N
C30	SCL	I	2C SCL (J3 1-2 short)
C31	SDA	D	2C SDA (J2 1-2 short)

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