FMC to 4-channel MIPI Module FL1404

User manual

Rev 1.0

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1．FL1404 Module Introduction

Alinx FMC to 4-channel MIPI extends the 4-channel MIPI on the FMC connector to facilitate the user to connect the MIPI camera or MIPI LCD screen through the FPC cable. Each MIPI is a LANE x4 interface with speeds up to 2.5Gbps.

The FMC interface of the FL1404 is a standard LPC interface for connecting to the FPGA development board and meets the VITA 57.1 standard. The connector model of the FMC is ASP_134604_01.
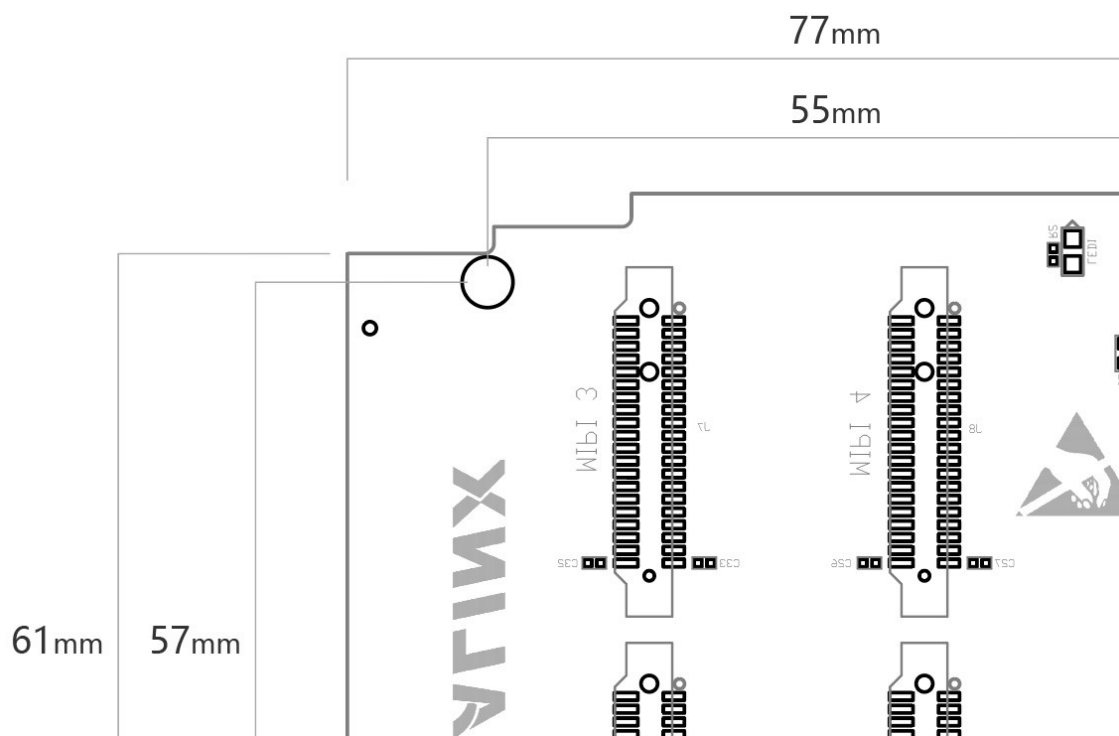
The photo of FL1404 module is as follows:
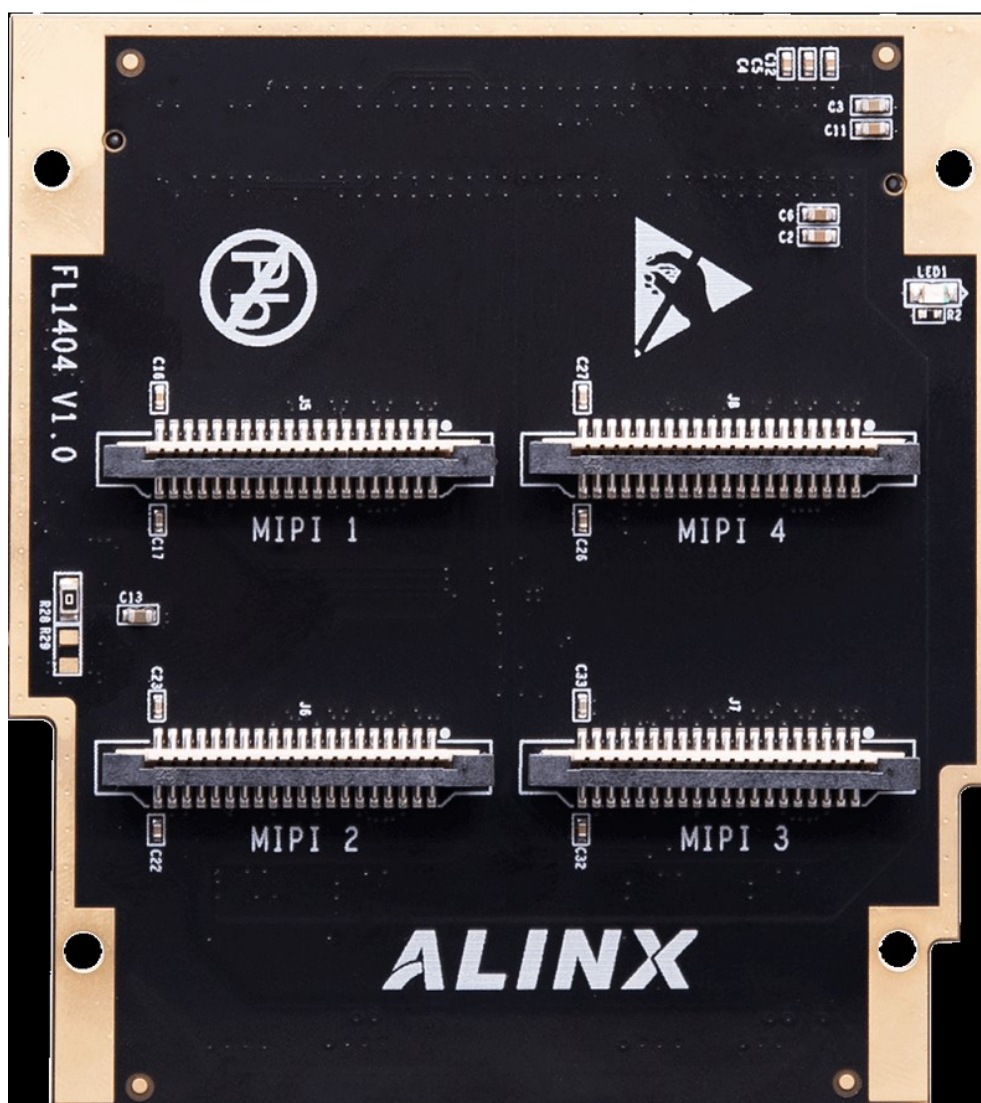
FL1404 Module

1.1 FL1404 Module Parameters

The following are the detailed parameters of the FL1404 module:

➢ LPC connector

➢ LANE*4 FPC interface, 20PIN, 1.0mm spacing

➢ **Applicable development board: Z7-P, Z19-P, Z19.**
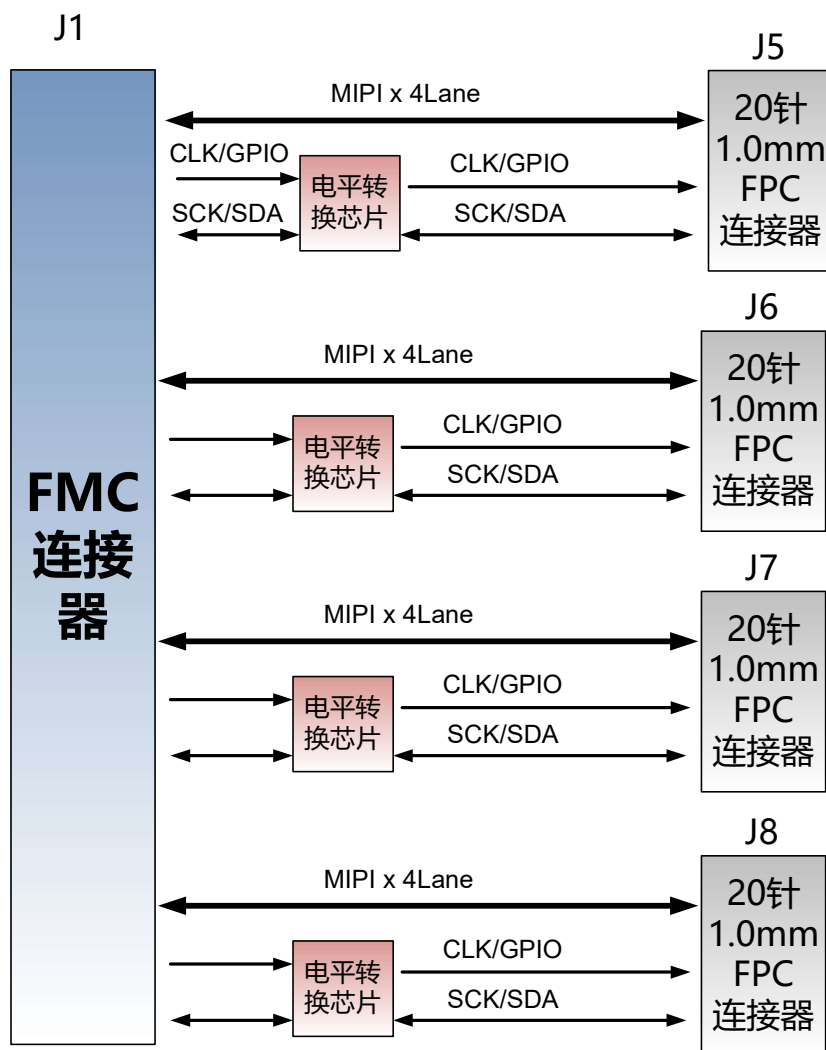
1.2 FL1404 Size and Structure

FL1404 Size and Structure

2. Module Function

2.1 FL1404 Module Block Diagram

The schematic design diagram of the module FL1404 is as follows:

2.2 FMC LPC Pin Assignment

The following only lists the signals of the power supply and interface, and the signals of GND are not listed. Please refer to the schematic diagram for details. The figure below shows the pin assignment of the FL1404 and Z7-P development boards.

FMC Pin No.	Signal Name	Network Name	FPGA Pin No.	Description
G15	MIPI1_CLK_P	FMC_LA12_P	AL20	1st-channel MIPI clock P
G16	MIPI1_CLK_N	FMC_LA12_N	AL21	1st-channel MIPI clock N
G12	MIPI1_LAN0_P	FMC_LA08_P	AJ20	1st-channel MIPI LANE0 P

G13	MIPI1_LAN0_N	FMC_LA08_N	AK20	1st-channel MIPI LANE0 N
H13	MIPI1_LAN1_P	FMC_LA07_P	AJ19	1st-channel MIPI LANE1 P
H14	MIPI1_LAN1_N	FMC_LA07_N	AK19	1st-channel MIPI LANE1 N
C10	MIPI1_LAN2_P	FMC_LA06_P	AL22	1st-channel MIPI LANE2 P
C11	MIPI1_LAN2_N	FMC_LA06_N	AL23	1st-channel MIPI LANE2 N
D14	MIPI1_LAN3_P	FMC_LA09_P	AK22	1st-channel MIPI LANE3 P
D15	MIPI1_LAN3_N	FMC_LA09_N	AK23	1st-channel MIPI LANE3 N
G6	MIPI1_CLK	FMC_LA00_CC_P	AJ21	1st-channel MIPI clock reference
G7	MIPI1_GPIO	FMC_LA00_CC_N	AJ22	1st-channel MIPI GPIO
G9	MIPI1_SDA	FMC_LA03_P	AF21	1st-channel MIPI I2C data
G10	MIPI1_SCL	FMC_LA03_N	AF22	1st-channel MIPI I2C clock
C18	MIPI2_CLK_P	FMC_LA14_P	AE18	2nd-channel MIPI clock P
C19	MIPI2_CLK_N	FMC_LA14_N	AE19	2nd-channel MIPI clock N
D17	MIPI2_LAN0_P	FMC_LA13_P	AD20	2nd-channel MIPI LANE0 P
D18	MIPI2_LAN0_N	FMC_LA13_N	AE20	2nd-channel MIPI LANE0 N
G18	MIPI2_LAN1_P	FMC_LA16_P	AC18	2nd-channel MIPI LANE1 P
G19	MIPI2_LAN1_N	FMC_LA16_N	AD19	2nd-channel MIPI LANE1 N
H16	MIPI2_LAN2_P	FMC_LA11_P	AB19	2nd-channel MIPI LANE2 P
H17	MIPI2_LAN2_N	FMC_LA11_N	AC19	2nd-channel MIPI LANE2 N
H19	MIPI2_LAN3_P	FMC_LA15_P	AA18	2nd-channel MIPI LANE3 P
H20	MIPI2_LAN3_N	FMC_LA15_N	AB18	2nd-channel MIPI LANE3 N
C22	MIPI2_CLK	FMC_LA18_CC_P	AH18	2nd-channel MIPI clock reference
C23	MIPI2_GPIO	FMC_LA18_CC_N	AH17	2nd-channel MIPI GPIO
G21	MIPI2_SDA	FMC_LA20_P	AE17	2nd-channel MIPI I2C data
G22	MIPI2_SCL	FMC_LA20_N	AF17	2nd-channel MIPI I2C clock
D26	MIPI3_CLK_P	FMC_LA26_P	AP18	3rd-channel MIPI clock P
D27	MIPI3_CLK_N	FMC_LA26_N	AP17	3rd-channel MIPI clock N
H25	MIPI3_LAN0_P	FMC_LA21_P	AP16	3rd-channel MIPI LANE0 P
H26	MIPI3_LAN0_N	FMC_LA21_N	AP15	3rd-channel MIPI LANE0 N
D23	MIPI3_LAN1_P	FMC_LA23_P	AM18	3rd-channel MIPI LANE1 P
D24	MIPI3_LAN1_N	FMC_LA23_N	AN18	3rd-channel MIPI LANE1 N
G24	MIPI3_LAN2_P	FMC_LA22_P	AM14	3rd-channel MIPI LANE2 P
G25	MIPI3_LAN2_N	FMC_LA22_N	AN14	3rd-channel MIPI LANE2 N
C26	MIPI3_LAN3_P	FMC_LA27_P	AN13	3rd-channel MIPI LANE3 P
C27	MIPI3_LAN3_N	FMC_LA27_N	AP13	3rd-channel MIPI LANE3 N
H23	MIPI3_CLK	FMC_LA19_N	AM15	3rd-channel MIPI clock reference
H22	MIPI3_GPIO	FMC_LA19_P	AM16	3rd-channel MIPI GPIO
D20	MIPI3_SDA	FMC_LA17_CC_P	AF18	3rd-channel MIPI I2C data
D21	MIPI3_SCL	FMC_LA17_CC_N	AG18	3rd-channel MIPI I2C clock
G30	MIPI4_CLK_P	FMC_LA29_P	AD15	4th-channel MIPI clock P

G31	MIPI4_CLK_N	FMC_LA29_N	AE15	4th-channel MIPI clock N
H34	MIPI4_LAN0_P	FMC_LA30_P	AA16	4th-channel MIPI LANE0 P
H35	MIPI4_LAN0_N	FMC_LA30_N	AA15	4th-channel MIPI LANE0 N
G36	MIPI4_LAN1_P	FMC_LA33_P	AA14	4th-channel MIPI LANE1 P
G37	MIPI4_LAN1_N	FMC_LA33_N	AB14	4th-channel MIPI LANE1 N
G33	MIPI4_LAN2_P	FMC_LA31_P	AC17	4th-channel MIPI LANE2 P
G34	MIPI4_LAN2_N	FMC_LA31_N	AC16	4th-channel MIPI LANE2 N
H37	MIPI4_LAN3_P	FMC_LA32_P	AB16	4th-channel MIPI LANE3 P
H38	MIPI4_LAN3_N	FMC_LA32_N	AB15	4th-channel MIPI LANE3 N
G28	MIPI4_CLK	FMC_LA25_N	AK14	4th-channel MIPI clock reference
G27	MIPI4_GPIO	FMC_LA25_P	AK15	4th-channel MIPI GPIO
H31	MIPI4_SDA	FMC_LA28_P	AF16	4th-channel MIPI I2C data
H32	MIPI4_SCL	FMC_LA28_N	AF15	4th-channel MIPI I2C clock
C30	FMC_SCL	FMC_SCL	M10	FMC I2C clock
C31	FMC_SDA	FMC_SDA	L10	FMC I2C data

2.3 IO Level

The four signals on the four FPC connectors (MIPI*_CLK/ MIPI*_GPIO/ MIPI*_SCL/ MIPI*_SDA) are all 1.8V level standards by default. If the camera or peripheral connected to the FPC connector requires a 3.3V level standard, you need to change the resistor on the FMC module (change R28 resistor to R29 resistor).
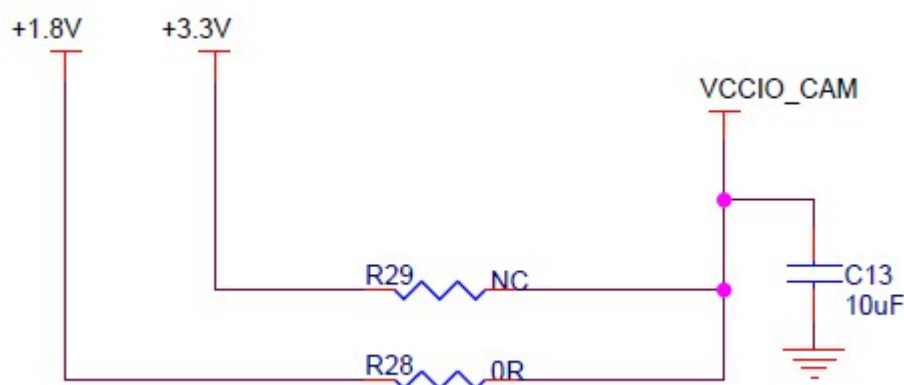
3. Functional Testing

All four MIPIs support CSI input or output. We provide a routine where 2 MIPI interfaces are configured as inputs and 2 MIPI interfaces are configured as outputs. 2 FPC connectors are connected with FPC cables (as shown below), input and output loop MIPI data transmission to verify whether the data is correct. Please refer to routine for details.