# 3G SDI input output

# FL2971 Module

# User Manual

**Rev 1.0**

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| 1.0 | 2021/8/12 | First Release |
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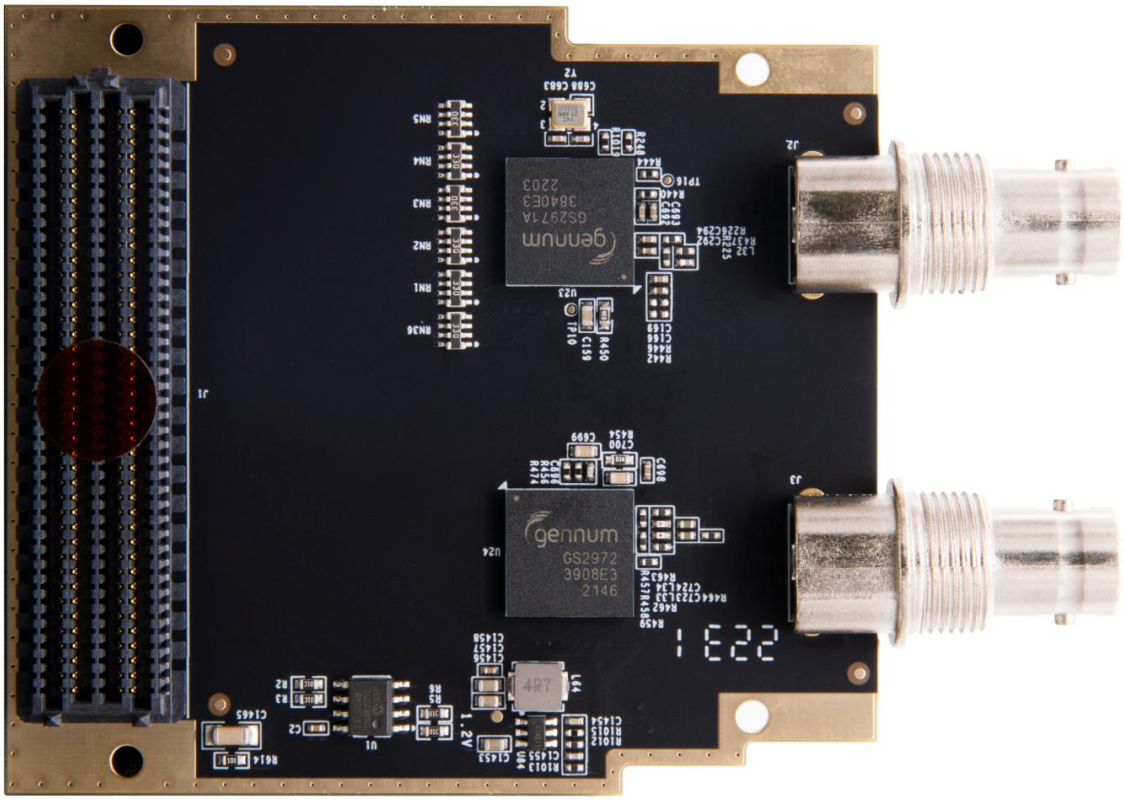
# Part 1 Introduction of FMC FL2971 Module

FL2971 is a 3G SDI input and output module. The SDI input chip is selected from SEMTECH's GS2971A-IBE3 driver chip, while the SDI output chip is selected from GS2972-IBE3 driver chip. Supports SD/HD/3G SDI signal data format.

The FL2971 module is connected through the FPGA development board of the FMC interface ALINX to achieve video image transmission. The FMC interface is a standard LPC interface that meets the VITA 57.1 standard. The connector model of FMC is ASP_ 134604_ 01.

The physical photos of the FL2971 module are as follows:

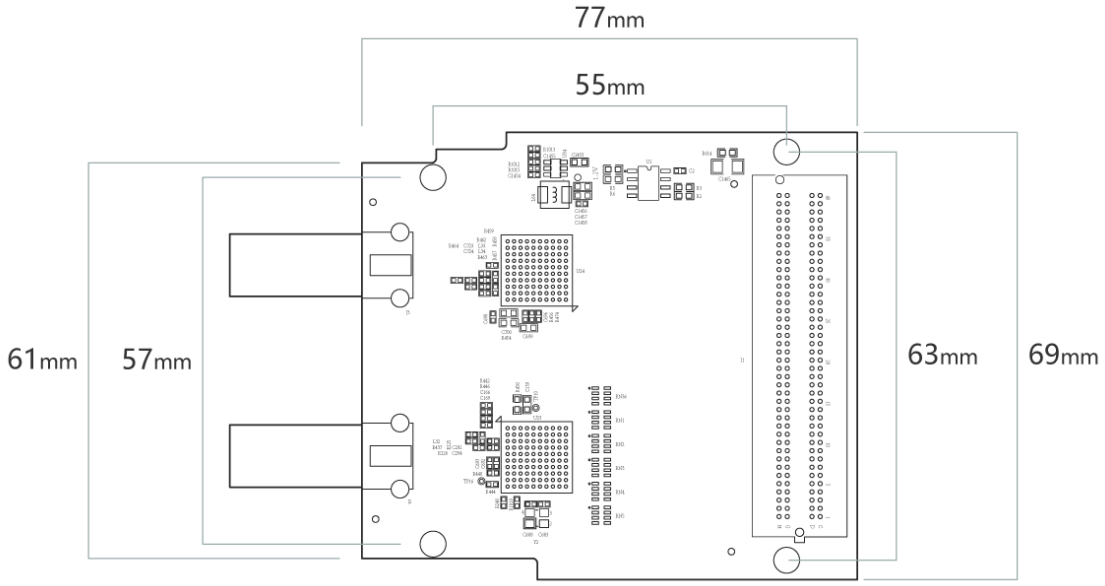



FL2971 Module

## 1.1 Parameter Description of FL2971 Module

1) 1 SDI input and 1 SDI output
2) Supports SD/HD/3G SDI signal formats
3) Support audio input and output
4) SDI interface: RF coaxial connector (75 ohm BNC connector)
5) FMC LPC interface, model：ASP_134604_01

## 1.2 Structure diagram of the module FL2971

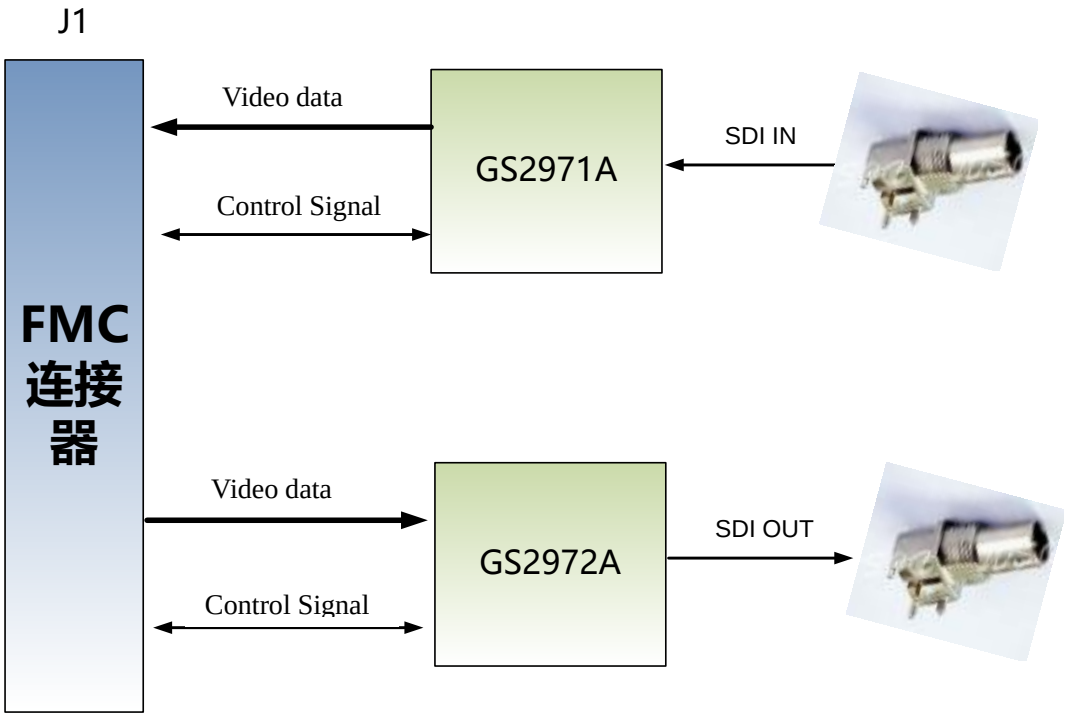



FL2971 Structure diagram

# Part 2 Module Function Description

## 2.1 FL2971 Module Block Diagram

The schematic design diagram of the module FL2971 is as follows:




**SDI Input Output Design Diagram**

## 2.2 Pin allocation for module FMC LPC:

The following only lists the signals, but the power and GND signals are not listed. The following figure shows the FMC1 pin allocation for the FL2971 and AXKU040 development boards.

| FMC Pin No. | Web | FPGA Pin No. | Description |
|---|---|---|---|
| D8 | SDI1_PCLK | W23 | SDI video input clock |
| C18 | SDI1_VSYNC | V22 | SDI video input frame synchronization |
| C19 | SDI1_HSYNC | V23 | SDI video input line synchronization |
| D18 | SDI1_DE | Y25 | SDI video input data valid signal |
| G6 | SDI1_D0 | AA24 | SDI Video Input Data 0 |
| H7 | SDI1_D1 | AB21 | SDI Video Input Data 1 |
| G7 | SDI1_D2 | AA25 | SDI Video Input Data 2 |
| H8 | SDI1_D3 | AC21 | SDI Video Input Data 3 |
| D9 | SDI1_D4 | W24 | SDI Video Input Data 4 |
| G9 | SDI1_D5 | AC22 | SDI Video Input Data 5 |

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|---|---|---|---|
| C10 | SDI1_D6 | AB24 | SDI Video Input Data 6 |
| G10 | SDI1_D7 | AC23 | SDI Video Input Data 7 |
| H10 | SDI1_D8 | AA22 | SDI Video Input Data 8 |
| H11 | SDI1_D9 | AB22 | SDI Video Input Data 9 |
| C11 | SDI1_D10 | AC24 | SDI Video Input Data 10 |
| D11 | SDI1_D11 | AD25 | SDI Video Input Data 11 |
| D12 | SDI1_D12 | AD26 | SDI Video Input Data 12 |
| H13 | SDI1_D13 | AB25 | SDI Video Input Data 13 |
| C14 | SDI1_D14 | AA27 | SDI Video Input Data 14 |
| D14 | SDI1_D15 | Y26 | SDI Video Input Data 15 |
| H14 | SDI1_D16 | AB26 | SDI Video Input Data 16 |
| C15 | SDI1_D17 | AB27 | SDI Video Input Data 17 |
| D15 | SDI1_D18 | Y27 | SDI Video Input Data 18 |
| D17 | SDI1_D19 | W25 | SDI Video Input Data 19 |
| H5 | SDI1_MCLK | AA23 | SDI audio input master clock |
| G12 | SDI1_AOUT12 | AC26 | SDI audio input data channels 1 and 2 |
| G3 | SDI1_AOUT34 | AD31 | SDI audio input data channels 3 and 4 |
| G13 | SDI1_ACLK | AC27 | SDI audio input 64fs sampling clock |
| G15 | SDI1_WCLK | AA20 | SDI audio input 48Khz byte clock |
| G16 | SDI1_DVB_ASI | AB20 | SDI input control signal |
| H16 | SDI1_RC_BYP | V21 | SDI input control signal |
| H17 | SDI1_BYPASS | W21 | SDI input control signal |
| G2 | SDI1_861_EN | AD30 | SDI input control signal |
| D20 | SDI2_PCLK | AC31 | SDI video output clock |
| H31 | SDI2_VSYNC | AA34 | SDI video output frame synchronization |
| H32 | SDI2_HSYNC | AB34 | SDI video output line synchronization |
| H29 | SDI2_DE | AD34 | SDI video output data valid signal |
| H35 | SDI2_D0 | AF28 | SDI video output data 0 |
| G33 | SDI2_D1 | AD29 | SDI video output data 1 |
| H34 | SDI2_D2 | AE28 | SDI video output data 2 |
| G34 | SDI2_D3 | AE30 | SDI video output data 3 |
| G30 | SDI2_D4 | AC33 | SDI video output data 4 |
| G31 | SDI2_D5 | AD33 | SDI video output data 5 |
| H28 | SDI2_D6 | AC34 | SDI video output data 6 |
| G28 | SDI2_D7 | AF32 | SDI video output data 7 |
| D27 | SDI2_D8 | AB29 | SDI video output data 8 |
| G27 | SDI2_D9 | AE32 | SDI video output data 9 |
| D24 | SDI2_D10 | AG29 | SDI video output data 10 |
| H25 | SDI2_D11 | AE33 | SDI video output data 11 |
| G21 | SDI2_D12 | AF30 | SDI video output data 12 |
| D23 | SDI2_D13 | AF29 | SDI video output data 13 |
| G24 | SDI2_D14 | AF33 | SDI video output data 14 |
| C23 | SDI2_D15 | AB32 | SDI video output data 15 |

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|---|---|---|---|
| H23 | SDI2_D16 | AG32 | SDI video output data 16 |
| C22 | SDI2_D17 | AA32 | SDI video output data 17 |
| H22 | SDI2_D18 | AG31 | SDI video output data 18 |
| G22 | SDI2_D19 | AG30 | SDI video output data 19 |
| C26 | SDI2_861_EN | AB30 | SDI GS2972 control signal |
| C27 | SDI2_DETECT_TRS | AB31 | SDI GS2972 control signal |
| G25 | SDI2_RATE_SEL0 | AG34 | SDI GS2972 control signal |
| D26 | SDI2_RATE_SEL1 | AA29 | SDI GS2972 control signal |
| H26 | SDI2_656_BYPASS | AF34 | SDI GS2972 control signal |
| G36 | SDI2_AIN12 | AC28 | SDI audio serial output channels 1 and 2 |
| H37 | SDI2_AIN34 | AE27 | SDI audio serial output channels 3 and 4 |
| G37 | SDI2_WCLK1 | AD28 | SDI Audio 48Khz Byte Clock |
| H38 | SDI2_ACLK1 | AF27 | SDI Audio 64xWCLK Clock |
| D21 | SDI_NRESET | AC32 | SDI input/output reset signal |
| H19 | SDI1_CS | T22 | SPI SDI Input Slice Selection |
| H4 | SDI2_CS | Y23 | SPI SDI Output Film Selection |
| G18 | SDI_SCLK | U21 | SPI clock |
| H20 | SDI_SDOUT | T23 | SPI data output |
| G19 | SDI_SDIN | U22 | SPI data input |

# Part 3 FL2971 Module SDI Test

At present, the FL9712 module can only be adapted to development boards with FMC interfaces. The following figure shows the SDI input/output loop test connection diagram of the FL2971 module (if the customer has an SDI input/output device, there is no need to add a converter).