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The user expansion component is plugged in the backward of thermal imaging module. Different user expansion components provide different user control interfaces and video output interfaces and possess the functions of over-voltage, under-voltage, reverse connection. All the digital videos are off in default and can be turned on through PC software or sending corresponding open commands. The thermal imaging modules only support one type digital video signal output at same time when selecting the digital video signals.

1. V101F011C User Expansion Component

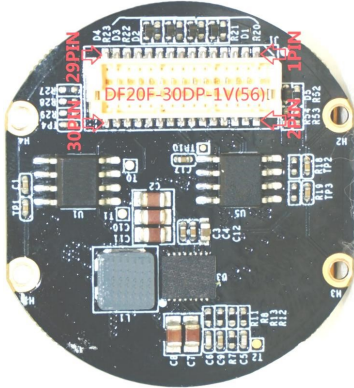


Figure 1 V101F011C user expansion component

1.1 V101F011C User Expansion Component

The Hirose 30pin connector named DF20F-30DP-1V(56) is adopted on this user expansion component which contains power supply interface(5~24VDC), RS-232 interface, RS-422 interface, one channel analog video interface, LVDS digital video interface and four key interfaces. In addition, a Hirose 30pin connector is adopted one side of which is connected to DF20F-30DP1V(56) and the other side can be connected to other system board.

Table 1 DF20F-30DP-1V(56) connector interface definition

NO.	Name	Type	Description
1、 2、 5、 6	GND	Power	Ground of power ⁽³⁾
3	Power Supply	Power	Power input (5 ~ 24VDC) ⁽¹⁾
4	+3.3V	Output	Power output (Typ. 3.3V/100mA)
7	RS-422_TX-	Input/Output	RS-422 Serial communication interface ⁽²⁾
8	RS-422_TX+		
10	RS-422_RX+		

12	RS-422_RX-			
9	RS-232_RX	Input/Output	RS-232 Serial communication interface ⁽²⁾	
11	RS-232_TX			
13	LVDS_DATA1-	Output	LVDS digital video (2.5V)	Data signal
15	LVDS_DATA1+			
17	LVDS_SYNC-	Output		Synchronizing signal
19	LVDS_SYNC+			
21	LVDS_CLK-	Output		Clock signal
23	LVDS_CLK+			
22	LVDS_DATA2-	Output		Data signal
24	LVDS_DATA2+			
25、26、28、30	——	——	Not available	
27	VGND	Power	Ground of analog video ⁽³⁾	
29	VIDEO	Output	Analog video	
14	KEY1	Input	Key interface (3.3V) ⁽⁴⁾	C
16	KEY2	Input		-
18	KEY3	Input		+
20	KEY4	Input		M

Note:

- (1) The recommended value of operation voltage is 12VDC;
- (2) TX and RX of Serial Communication interfaces are relative to the imaging module;
- (3) GND and VGND are connected internally;
- (4) KEY1~KEY4 are low level valid and pulled up internally on the expansion component .

1.2 LVDS Digital Video

This imaging module can output LVDS digital video which consists of one clock signal(LVDS_CLK), one synchronizing signal(LVDS_SYNC) and two data signals (LVDS_DATA1 and LVDS_DATA2). The output data can be 14bits or 10bits. When users select the ORG data or NUC data as data source, the output data are 14bits. When users select DRC data as data source, the output are 10bits. Each pixel occupies seven clocks and the high 7bits of the 14bits data which are bit[13:7] are transformed by line LVDS_DATA2 and the low 7bits of the 14bits data which are bit[6:0] are transformed by line LVDS_DATA1. The high 3bits of the 10bits data which are bit[9:7] are transformed

by line LVDS_DATA2 and the other high bits of LVDS_DATA2 are set to '0. The low 7bits of the 10bits data which are bit[6:0] are transformed by line LVDS_DATA1. LVDS_SYNC is the frame synchronizing signal and“111XXXX”is the flag of frame synchronizing, “11XX1XX”is the flag of pixel valid, “11XX0XX”is the flag of idle state. The sequence of flags are that MSB is in the front. The LVDS digital clock frequency are shown in table 2.

LVDS digital video is off in default. It should be turned on through PC software or sending corresponding command when this function needs to be used. When LVDS digital video is selected, the product supports the function of brightness/contrast adjustment and polarity selection, but not support the function of palette selection, reticle control, electric zoom and image mirroring.

Table 2 Clock frequency

Product model	Clock frequency (LVDS_CLK) PAL	Clock frequency (LVDS_CLK) NTSC
M2-38 4	44MHz	56MHz
M2-64 0	150 MHz	180MHz

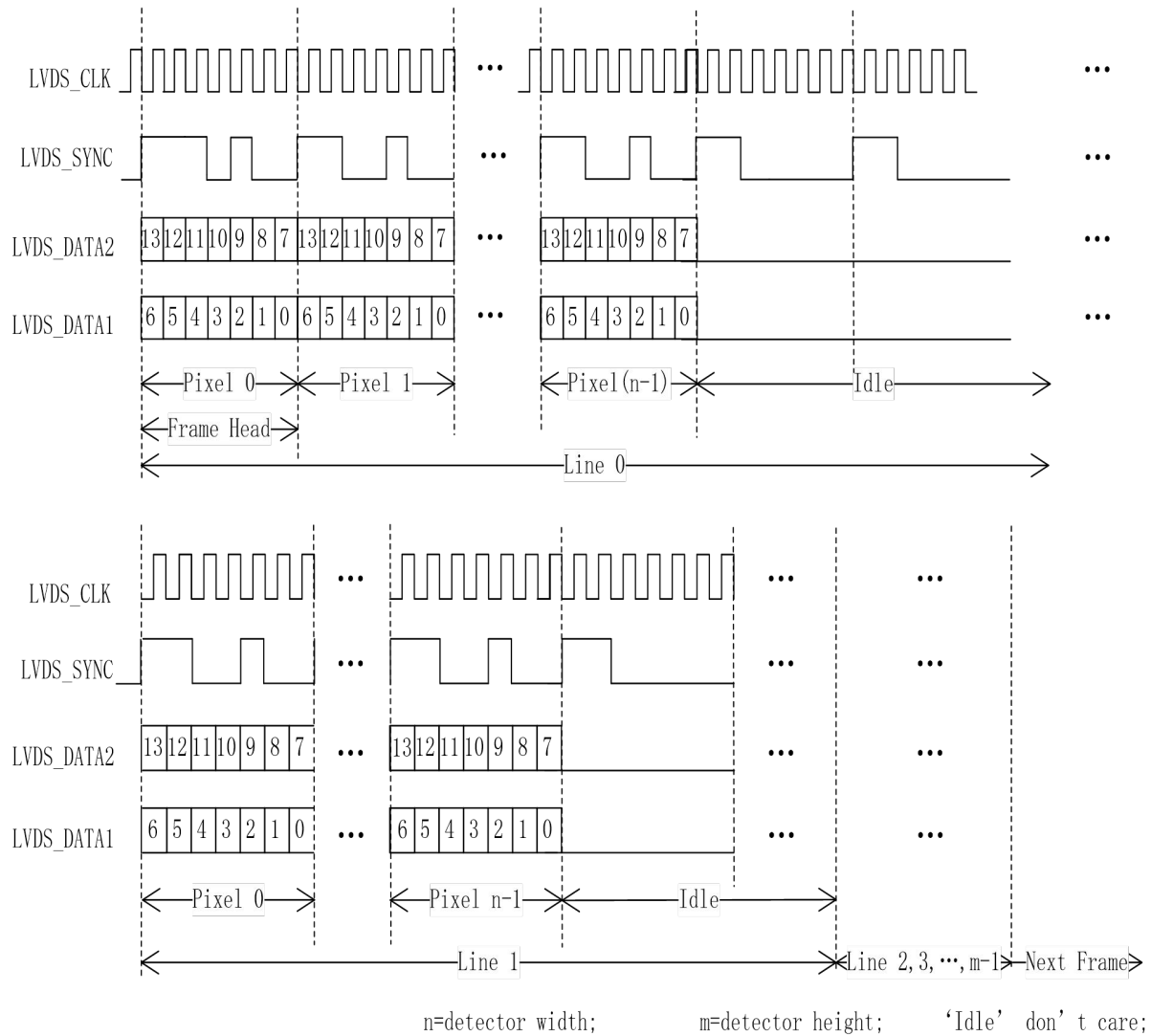


Figure 3 LVDS digital video timing diagram (Taking 14bit、 $n \times m$ array for example)

2. V101F012C User Expansion Component

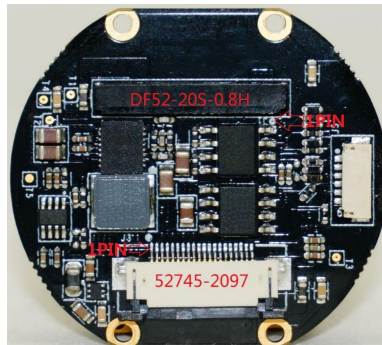


Figure 2 V101F012C User Expansion Component

2.1 V101F012C User Expansion Component

This expansion component provides two kinds of connectors for users to select. The Hirose 20pin connector named DF52-20S-0.8H is adopted which contains power supply interface(3.8~18VDC), RS-232 interface, one channel analog video interface and four key interfaces. The pin definitions are shown in table 3. And a Hirose 20pin FPC named DF52-20P-0.8C is provided for users to connect with user system.

Table 3 DF52-20S-0.8H connector interface definition

NO.	Name	Type	Description
1、 3	VGND	Power	Ground of analog video ⁽²⁾
2	VIDEO	Output	Analog video
4	RS232_RX	Input/Output	RS-232 Serial communication interface ⁽¹⁾
5	RS232_TX		
6、 15、 18、 19、 20	GND	Power	Ground of power ⁽²⁾
7、 8、 9、 10	——	——	Not available
11	KEY1	Input	Key interface (3.3V) ⁽³⁾
12	KEY2		
13	KEY3		
14	KEY4		
16、 17	Power Supply	Power	Power input (3.5 ~ 18VDC) ⁽⁴⁾

Note:

- (1) TX and RX of Serial Communication interfaces are relative to the imaging module;
- (2) GND and VGND are connected internally;
- (3) KEY1~KEY4 are low level valid and pulled up internally on the expansion component ;
- (4) The recommended value of operation voltage is 12VDC.

The other interface adopts Molex 20pin connector named 52745-2097 which can be connected through FPC. It contains power supply(3.5~18VDC), UART(3.3V) communication interface, BT.656

digital video and the interface definitions are shown in table 4. Users can select FPC(not standard) to achieve the connection between thermal imaging module and other systems.

Table 4 Molex 52745-2097 connector interface definition

NO.	Name	Type	Description
1	Clock	Output	Clock signal
2	DV0		Data signal LSB
3	DV1		Data signal
4	DV2		Data signal
5	DV3		Data signal
6	DV4		Data signal
7	DV5		Data signal
8	DV6		Data signal
9	DV7		Data signal MSB
10、11、12、 13	GND	Power supply	Ground of power ⁽²⁾
14	——	——	Not available
15、16、17、 18	Power supply	Power supply	Power input (3.5 ~ 18VDC) ⁽³⁾
19	UART_TX (1)	Input/Output	UART communication interface (3.3V)
20	UART_RX (1)		

Note:

- (1) TX and RX of Serial Communication interfaces are relative to the imaging module;
- (2) GND and VGND are connected internally;
- (3) The two channels of power supply are connected internally and it is recommended to select one channel to provide power. If the two channels of power supply are provided at same time, please keep the voltages in the same. The recommended value of operation voltage is 12VDC.

2.2 BT.656 Digital Video

The digital video of BT.656 consists of one clock signal(Clock) and eight data signals(DV0~DV7). The BT.656 digital video supports the functions of brightness/contrast adjustment, polarity selection, palette selection, reticle control, electric zoom and image mirror. And the data source of BT.656 must be the DRC data.

3. Announcements

To protect you and others from injury or to protect your equipment from damage, please read all of the following information before using your equipment.

1. The product should not be made towards the sun directly and other high-intensity radiation sources;
2. The optimal environment temperature for operating is - 20 °C to 50 °C;
3. Do not touch or hit the detector window with hands or other objects;
4. Do not touch the equipment and cables with wet hands;
5. Do not scrub your equipment with diluents;
6. Should not unplug and plug other cables without disconnecting the power supply;
7. Wrong cable should not be connected in case that brings damages to the equipment;
8. Please pay attention to prevent static electricity;
9. Please do not disassemble the equipment. If there is any fault, please contact our company, and professional personnel will carry out maintenance.

4. Supports and Services

4.1 Technical Supports

1. Refitting and designing schemes according to users' application requirements;
2. Providing professional and systematic technical training for users and operators;
3. Answering the technical puzzles and design problems during the process of users' design and use.

4.2 After-sales Services

If you have any requirements, please contact Quanhom.