

V20

technical reference manual

38222-3
Version 1.0



Preliminary

February 2020

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Overview

V20 SDI to CSI-2 adapter

The V20 features an SDI input and CSI-2 output with 2 lanes, to connect to the CSI-2 camera input and to emulate the Pi camera (version 1.3). No special driver required. Compatible only with Raspberry Pi.

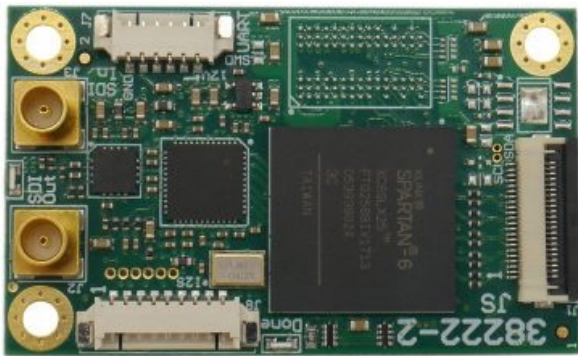
Technical details

- emulate Raspberry Pi camera 1.3
- SDI input (MCX): 1080p24, 1080p25, 1080p30
- loop through SDI output (MCX)
- 2 CSI-2 connectors (22 pin connector on top - 15 pin connector on bottom)
- size: 32.5mm x 53.5mm
- mounting: 3 holes with 3.2mm diameter each
- model: 38222-3
- order code: 70504

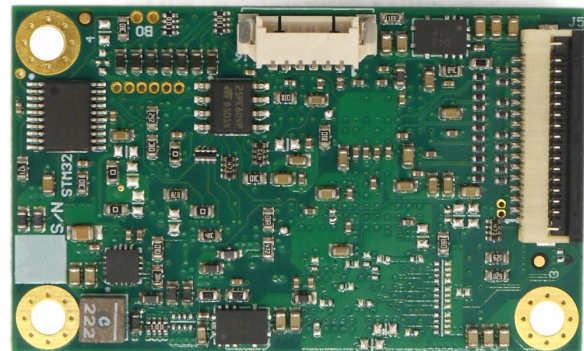
Power

- power: 6V - 12V

V20 top



V20 bottom



Pinout description

Power/GPIO (J7)

This is a 6 pin PicoBlade connector with 1.25 mm pitch. MCU UART and SWD programming interface.

Pin	Function	Description
1	V12.0	6V to 12V power in (1.5W max.)
2	UART2_TX	UART2_TXD (3.3V)
3	UART2_RX	UART2_RXD (3.3V)
4	SWCLK	SWCLK
5	SWDIO	SWDIO
6	GND	Ground

JTAG (J6)

This is a 6 pin PicoBlade connector with 1.25 mm pitch. Xilinx cable header

Pin	Function	Description
1	3.3V	3.3V power out
2	TMS	TMS
3	TCK	TCK
4	TDO	TDO
5	TDI	TDI
6	GND	Ground

CSI-2 output (J1)

This is a 22 pin 4 lane CSI-2 connector with 0.5mm pitch (Wuerth 687122149022). To open the connector and to release the cable just lift the brown lid upwards. This connector has the same pinout as the CSI-2 connector on the Raspberry Pi compute module carrier board or the Pi Zero. The contacts are on the bottom. Please use a FPC cable with contacts on the same side.

Pin	Function	Description
1	GND	Ground
2	CSI_D0-	CSI_D0_N
3	CSI_D0+	CSI_D0_P
4	GND	Ground
5	CSI_D1-	CSI_D1_N
6	CSI_D1+	CSI_D1_P
7	GND	Ground
8	CSI_CLK-	CSI_CLK_N
9	CSI_CLK+	CSI_CLK_P
10	GND	Ground
11	CSI_D2-	CSI_D2_N
12	CSI_D2+	CSI_D2_P
13	GND	Ground
14	CSI_D3-	CSI_D3_N
15	CSI_D3+	CSI_D3_P
16	GND	Ground
17	CAM_GPIO	CAM_GPIO (3.3V)
18	CAM_CLK	CAM_CLK (3.3V)
19	GND	Ground
20	SCL	SCL (3.3V)
21	SDA	SDA (3.3V)
22	V3.3	3.3V power (not used)

CSI-2 output (J5)

This is a 15 pin 2 lane CSI-2 connector with 0.5mm pitch (Wuerth 686115148922). To open the connector and to release the cable just lift the brown lid upwards. The contacts are on the bottom. Please use a FPC cable with contacts on the same side.

Pin	Function	Description
1	3.3V	3.3V power (not used)
2	SDA	SDA (3.3V)
3	SCL	SCL (3.3V)
4	CAM_CLK	CAM_CLK (3.3V)
5	CAM_GPIO	CAM_GPIO (3.3V)
6	GND	Ground
7	CSI_CLK+	CSI_CLK_P
8	CSI_CLK-	CSI_CLK_N
9	GND	Ground
10	CSI_D1+	CSI_D1_P
11	CSI_D1-	CSI_D1_N
12	GND	Ground
13	CSI_D0+	CSI_D0_P
14	CSI_D0-	CSI_D0_N
15	GND	Ground

HD-SDI loop through out (J2)

This is a MCX connector (Molex-734151631).

Pin	Description
center pin	SDI signal output (75 Ohm)
shielding pin	Ground

HD-SDI in (J23)

This is a MCX connector (Molex-734151631).

Pin	Description
center pin	SDI signal input (75 Ohm)
shielding pin	Ground

I2S (J8)

This is a 9 pin Molex PicoBlade connector with 1.25mm pitch. I2S digital audio for future expansion. Currently not supported.

Pin	Function	Description
1	3.3V	3.3V power
2	MCLK	MCLK (3.3V)
3	BCK	BCK (3.3V)
4	LRCLK	
5	DATA0	Data line 0 output (3.3V)
6	DATA1	Data line 1 output (3.3V)
7	DATA2	Data line 2 output (3.3V)
8	DATA3	Data line 3 output (3.3V)
9	GND	Ground

MCU

The V20 micro controller (MCU: STM32F042F6P6) with 32 kByte Flash and 6kByte RAM. At this time the MCU is not used and not programmed. For future expansion only.

MCU pin description

MCU Pin	Name	Type	Function	Description
1	PB8/BOOT0	-	-	10k pull down
2	PF0	OD	POWER	1: inactive, 0: press power button
3	PF1	O	POWER	Power enable
4	NRST	-	-	hardware power on reset of MCU (RC circuit)
5	VddA	-	-	analog 3.3V supply (by always on LDO)
6	PA0	PP	LED	0: LED off, 1: LED on (default MCU heartbeat) (D6)
7	PA1	OD	SYS_RST_IN	System reset; open drain 1.8V
8	PA2	AF	UART2_TX	UART 2
9	PA3	AF	UART2_RX	UART 2
10	PA4	AF	SPI1_CS	SPI1_CS
11	PA5	AIN5	SPI1_SCK	SPI1_SCK
12	PA6	AIN6	SPI1_MISO	SPI1_MISO
13	PA7	-	SPI1_MOSI	SPI1_MOSI
14	PB1	Ain9	CAM_GPIO	CAM_GPIO
15	GND	-	-	Ground
16	VddA	-	-	digital 3.3V supply (by always on LDO)
17	PA9/PA11	AF	UART_TX	UART_TX to J14 connector (pin 2)
18	PA10/PA12	AF	UART_RX	UART_RX to J14 connector (pin 3)
19	PA13	-	SWDIO	SWD programming interface
20	PA14	-	SWCLK	SWD programming interface

Pin types:

PP - push/pull output
 OD - open drain output
 Ain - analog input
 AF - alternate function
 IO - Input/Output

The power supply to the MCU is supplied by a 3.3V LDO regulator which is always on. So the MCU is powered as soon as power is applied to the power input on J1. This allows the MCU to manage whether power should be applied to the carrier board.

The MCU tunnels the console UART interface to the Jetson Nano. Some instructions are intercepted by the MCU and executed by it. These instructions are not forwarded to the compute module.

V20 revisions

V20 revision 3 (38222-3)

- cleaned up VCCAUX supply:
 - added bead to 3.3V and added 470nF caps
 - alternative: 2.5V LDO
- add strapping pull down resistors J92-95 to preset GPIOs to FPGA (on J7)

FAQ

to be added.

Disclaimer

Thank you for reading this manual. If you have found any typos or errors in this document, please let us know. This is the preliminary version of this data sheet. Please treat all specifications with caution as there may be any typos or errors.

The Auvideo Team