FORTEC GROUP

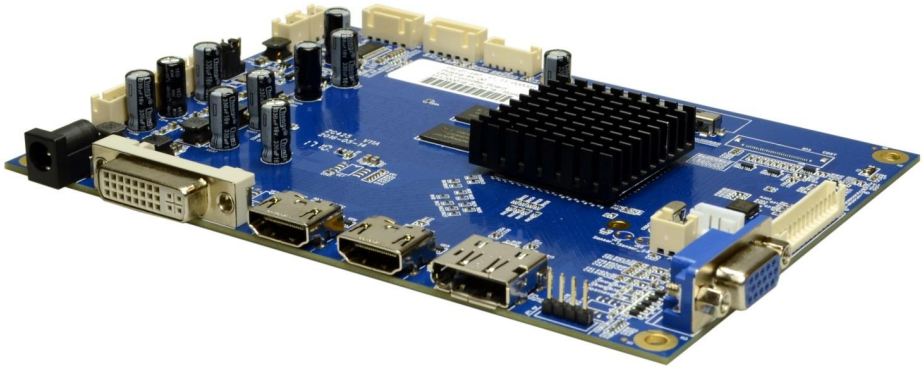
Datasheet

FORTEC Integrated

Prisma-4K-01

UDH Controller Board

PR-01-441_A1
PR-01-441_A2



Version 1.2.0

02.02.2024

APOLLO DISPLAY TECHNOLOGIES

FORTEC INTEGRATED

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1 Revision History

Date	Rev.No.	Description	Page
14.08.2018	1.0.0	Copy from PR-01-440 v1.0.19 Product Name and product number changed. Note for signal levels of the Backlight Control Connector changed to 3,3V. Termination resistors at the VBO interface updated.	All 1 19 21
23.08.2018	1.0.1	Termination resistors at pin 31, of VBO interface updated.	21
01.10.2018	1.0.2	Product ID updated.	22
15.10.2018	1.0.3	IR-Receiver added	8
16.11.2018	1.0.4	Added note about the voltage range of BL_ADJ, and BL_EN.	23
11.03.2019	1.0.5	Signal renamed to VCC_12V Signal renamed to LCD_3V3	19,20,21 23
08.08.2019	1.0.6	J26 updated	24
10.10.2019	1.0.7	KA-30-993 added KA-30-950 replaced with KA-30-971	26 26
13.12.2019	1.0.8	OSM Pictures added	10-14
23.06.2020	1.0.9	Removed Feature „Analog Input“ Audio Added Details Remote Control Added detailed OSM description	7 9 10~16
25.09.2020	1.0.10	VBO cable changed to KA-10-209	32
20.11.2020	1.0.11	Corrected:”Prisma-4K-00”>> “Prisma-4K-01”	6,9
14.01.2021	1.0.12	Corrected SAP Nr ZU-02-406 Added excel table for IR Remote hex	8
15.03.2021	1.0.13	Add Battery for remote control Add HDCP optional	32 6
02.02.2024	1.2.0	New Template Added SAP Nr “PR-01-441_A2” (changed ESM)	All 2

2 General description

Prisma-4K-01 is graphics processing board, providing high quality images for UHD TFT LCD panels, supporting 4K@60Hz resolution signal input and 4K@60Hz resolution image output.
It is capable of both 10bit 8-lane V-By-One and 4-lane eDP interfaces with up to 4096x2160 @60Hz resolution.

Prisma-4K-01 provides HDMI2.0, HDMI1.4/MHL2.1, Dual DVI, VGA and DP1.2 input interfaces and 2x8W(8Ω) stereo speaker output and brightness control by PWM.
High Bandwidth Digital Content Protection (HDCP1.4) is supported optional in the various input modes.
PRISMA-4K-01 supports PIP and PBP, up to 4-Window PxP with any four sources (4P).
PRISMA-4K-01 supports auto detection for all the input ports and image position/color auto calibration.
PRISMA-4K-01 contains a 12-bit color processing engine and supports programmable 14-bit gamma CLUT; Adobe and sRGB compliance, brightness and color uniformity.

3 General Features

High-Quality Advanced Scaling

- Zoom scaling up and down
- Fully programmable zoom ratios
- Independent horizontal/vertical scaling
- Advanced zoom algorithm provides high image quality
- Sharpness/Smooth filter enhancement
- Support non-linear scaling from 4:3 to 16:9 or 16:9 to 4:3
- PIP and PBP, up to 4-Window PxP with any four sources (4P)

Color Processor

- True 12-bit color processing engine
- Programmable 14-bit gamma support
- Programmable 12-bit 3D gamma support
- xvYCC supported
- Adobe/sRGB compliance
- Advanced dithering logic for the fewer panel
- color depth enhancement
- Dynamic overshoot-smear canceling engine
- Brightness and contrast control

DisplayPort 1.2 Receiver

- Up to 3846x2160@60Hz input support at 6-bit, 8-bit, 10-bit and 12-bit
- Three link layer speed HBR2 (5.4GHz), HBR (2.7GHz), RBR (1.62GHz) are supported
- HDCP1.4 support (optional)

Ultra-Reliable HDMI 2.0 Receiver

- Up to 3846x2160@60Hz input support at 6-bit, 8-bit, 10-bit and 12-bit
- HDMI2.0(6GHz), HDMI1.4 (3GHz), MHL2.1 (3GHz) support
- HDCP1.4 (3GHz) support (optional), MHL2.1 (3GHz) support

Ultra-Reliable HDMI 1.4 Receiver

- Up to 3846x2160@30Hz input support at 6-bit, 8-bit, 10-bit and 12-bit
- HDMI1.4 (3GHz) support (optional)
- HDCP1.4 support (optional)

Dual Link DVI/HDMI Receiver

- Up to 3846x2160@30Hz input support at 6-bit, 8-bit, 10-bit and 12-bit
- Direct connect to all DVI/HDMI 1.3 and 1.4 compliant TMDS transmitters

Analog RGB Input

- Support Sync-On-Green (SOG) and various kinds of composite sync modes
- YPbPr support up to HDTV 1080p resolution
- Supports up to 1792x1344@60Hz or 1920x1260@60Hz or 1600x1200@75Hz standard modes
- Supports up to 1920x1440@60Hz or 2128x1200@ 60Hz with reduced blanking
- Captures up to 210MHz

V-By-One Interface

- 8-lane up to 4096x2160@60Hz at 8-bit and 10-bit
- Fully programmable display timing generator

eDP HBR2 Interface

- 4-lane up to 4096x2160@60Hz at 8-bit and 10-bit
- Fully programmable display timing generator

Analog Output

- Frequency Response 120Hz - 14000Hz @±3dB
- Speaker Power 2×8W(8Ω) THD+N<10%@1KHz at 12V supply and Audio Input: 0.5VRMS
- Analog Stereo Voltage Range 0.2 to 2.0 Vrms

Power Management

- DC Jack 12V 3A
- Power Supply Module 12V, 5V and 5VSTB
- Lowest Power < 0.2W in Deep Sleep
- Panel Power Supply 5V, 10V, 12V

OSD Control

- Keypad and IR

Remote Control

- DDC/CI
- UART on request

External Sensors

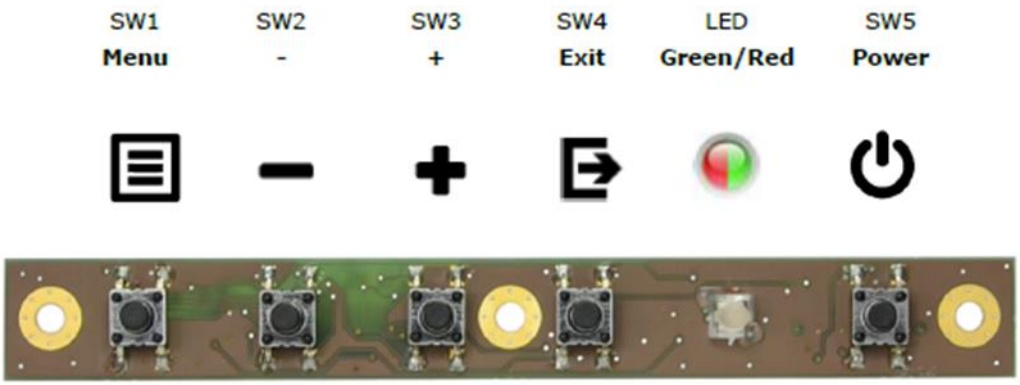
- Light and Temperature Sensor on request

4 OSD Menu and User Controls

The OSD allows selection of input source and fine tuning of various functional parameters like brightness, contrast etc. These parameters can be adjusted via an external interface.

4.1 OSD Control Through External Keypad

The 4-Button Keypad ZU-02-398 (IF398-00), by using at IR / OSD Keypad Connector J20 is fully supported.



The following tables give you an overview about the functionality.

	Menu	-	+	Exit	LED	Power
General					See below	Power ON/OFF
OSD closed	Open OSD	Volume-	Backlight*	Input Select*		
OSD open	Select	Down/Left/-	Up/Right/+	Exit/Back		

LED Status:

- Green : Signal Found
- Red : Power Safe
- LED OFF : Power OFF

Note (*): Available from the firmware revision v1.4.0

4.2 OSD Control through IR Remote Control

Alternative to the external keypads, the Prisma-4K-01 can also be controlled through a remote-control device. To communicate through IR, an IR-receiver **DB-07-327** or **ZU-02-406** can be attached to connector J16 of the Prisma-4K-01. With this receiver you can control the Prisma-4K-01 with the IR Remote Control **RC-10-006** (see picture below).

Key	HEX	Function		
		General	OSD Closed	OSD Open
Power	01	Power on/off	-	-
Number Keys	00-0E	Not used	-	-
Number „0“	13	Not used	-	-
ID	19	Not used	-	-
Recall/Return	10	Not used	-	-
Disp	1D	Not used	Display Mode	-
Mute	12	Not used	-	-
Input	18	-	Input Select	
Menu	41	-	Opens OSD	Select
Exit	09	-	-	Exit /Back
Up	17	Not used	-	-
Left	0D	-	Volume -	-
OK	15	-	-	Select
Right	14	-	Volume +	-
Down	1A	Not used	-	-

5 On-Screen-Menu (OSM)

Detailed Description of OSM including all menus:

5.1 Display Mode/Display Function

Main menu	Selection	Sub menu	Description	Remark
Display Mode 	1P		Sets one Input to complete screen	**Display Mode** selection will affect options in menus **Display Function**, **Select Region** and **Input**
	2P LR		Splits Screen (one Input left, one Input right)	
	2P TB		Splits Screen (one Input upper half, one Input lower half)	
	2P PIP		Sets screen to Picture in picture	
	4P		Splits screen in 4 parts for 4 different Inputs	
Display Function *Display Mode set to 1P* 	Disp Rotate	0	Rotates screen 0°	**Display Function** Menu depending on setting in **Display Mode**
		90	Rotates screen 90°	
		180	Rotates screen 180°	
		270	Rotates screen 270°	
Display Function *Display Mode set to 2P LR*	Disp L/R Ratio	0~4	Sets the division between left and right picture	
	Input Swap		Swaps the area where the inputs are displayed	
Display Function *Display Mode set to 2P TB*	Input Swap		Swaps the area where the inputs are displayed	
Display Function *Display Mode set to 2P PIP*	PIP Position	Left up	Sets Position of sub picture to left upper corner	
		Right Up	Sets Position of sub picture to right upper corner	
		Left Down	Sets Position of sub picture to left lower corner	
		Right Down	Sets Position of sub picture to right lower corner	
	Transparency	-		NOT AVAILABLE
	PIP Size	0~10	Sets small picture size from min to max	
	Input Swap		Swaps the Inputs	
Display Function *Display Mode set to 4P*	NA			NOT AVAILABLE

5.2 Select Region

Main menu	Selection	Sub menu	Description	Remark
Select Region *Display Mode set t* 	NA		NOT AVAILABLE	**Select Region** Menu depending on setting in Display **Mode**
Select Region *Display Mode set to 2P L/R*	Left Side		*Further Picture adjustments will be active for **left** picture	*Further Picture adjustments are set in the menus **Picture, Analog, Color** and **Advance**
	Right Side		*Further Picture adjustments will be active for **right** picture	
	Full		*Further Picture adjustments will be active for **both** pictures	
Select Region *Display Mode set to 2P TB*	Top Side		*Further Picture adjustments will be active for **upper** picture	
	Bottom Side		*Further Picture adjustments will be active for **lower** picture	
	Full		*Further Picture adjustments will be active for **both** pictures	
Select Region *Display Mode set to 2P PIP*	Main		*Further Picture adjustments will be active for **main** picture	
	Sub		*Further Picture adjustments will be active for **sub** picture	
	Full		*Further Picture adjustments will be active for **both** pictures	
Select Region *Display Mode set to 4P*	1P In		*Further Picture adjustments will be active for **picture 1**	
	1P Out		*Further Picture adjustments will be active for **picture 2, 3 and 4**	
	2P In		*Further Picture adjustments will be active for **picture 2**	
	2P Out		*Further Picture adjustments will be active for **picture 1, 3 and 4**	
	3P In		*Further Picture adjustments will be active for **picture 3**	
	3P Out		*Further Picture adjustments will be active for **picture 1, 2 and 4**	
	4P in		*Further Picture adjustments will be active for **picture 4**	
	4P Out		*Further Picture adjustments will be active for **picture 1, 2 and 3**	
	4P Full		*Further Picture adjustments will be active for **all 4 pictures**	

5.3 Picture/Analog/Color

Main menu	Selection	Sub menu	Description	Remark
Picture 	Backlight	0~100	Adjusts the Backlight Default=100	**HOT KEY "+"**
	Brightness	0~100	Adjusts Brightness Default=50	
	Contrast	0~100	Adjusts Contrast Default=50	
	Sharpness	0~4	Adjusts Sharpness Default=2	*Picture adjustments are active as set in Menu **Select Region***
Analog 	Auto Adjust		Auto Adjustment for VGA	Menu **Analog** only available for VGA
	HPos	0~100	Horizontal Shift for VGA	
	VPos	0~100	Vertical Shift for VGA	
	Clock	0~100	Clock Adjustment for VGA	
	Phase	0~100	Phase Adjustment for VGA	*Analog adjustments are active as set in Menu **Select Region***
Color 	Panel Uniformity	ON/OFF	Sets Panel Uniformity ON/OFF	
	Gamma	OFF	Sets Gamma correction OFF	*Color adjustments are active as set in Menu **Select Region***
		1.8	Sets Gamma correction to 1.8	
		2.0	Sets Gamma correction to 2.0	
		2.2	Sets Gamma correction to 2.2	
		2.4	Sets Gamma correction to 2.4	
	Temperature	9300	Sets Color Temperature to 9300K	
		7500	Sets Color Temperature to 7500K	
		6500	Sets Color Temperature to 6500K	
		sRGB	Sets Color Temperature to sRGB	
		USER	Sets Color Temperature to USER	R/G/B values can be adjusted manually via sub-sub menu
	Color Effect	Standard	Sets Color Effect to Standard	
		Game	Sets Color Effect to Game	
		Movie	Sets Color Effect to Movie	
		Photo	Sets Color Effect to Photo	
		Vivid	Sets Color Effect to Vivid	
		User	Sets Color Effect to User	R,Y,G,B,M Hue and saturation can be adjusted individually via sub-sub-sub Menu
	Demo	Off/Type1 ~5	Generates Demo patterns (showing red frames)	
	Color Format	RGB/YUV	Sets color format to RGB or YUV	
	PCM		Not available	NOT AVAILABLE
	HUE	0~100	Sets Hue	
	Saturation	0~100	Adjusts Color Saturation	

5.4Advance

Main menu	Selection	Sub menu	Description	Remark
Advance 	Aspect Ratio	Full	Sets aspect ratio to full screen	*Advance adjustments are active as set in Menu **Select Region***
		16:9	Sets aspect ratio to 16:9	
		4:3	Sets aspect ratio to 4:3	
		5:4	Sets aspect ratio to 5:4	
		1:1	Sets aspect ratio to 1:1	
	Over Scan	ON/OFF	Sets over scan on/off	
	Over Drive	ON/OFF	Sets overdrive	
		Gain 0~100	Sets gain	
	DDCCI	ON/OFF	Activates display control using DDC/CI protocol	
	Ultra-Vivid	OFF	Sets ultra-vivid off	
		L	Sets ultra-vivid to L	
		M	Sets ultra-vivid to M	
		H	Sets ultra-vivid to H	
	DCR	ON/OFF	Switches DCR on/off	DCR (dynamic contrast ratio) improves contrast ratio
	DP Option	D0	Sets Option for Display Port 0	Display Port version can be set to 1.1 and 1.2 using sub-sub-menu
		D1	Not available	DP 1 doesn't exist
		D6	Not available	DP6 doesn't exist
	DP EDID	1080p	Sets EDID for DP	
		2560x1440	Sets EDID for DP	
		4k2k@30Hz	Sets EDID for DP	
		4k2k@60Hz	Sets EDID for DP	
	Clone Mode	OFF	Sets clone mode off	Duplicates input signal
		A0:VGA		
		D0:DP		
		D1:HDMI		
		D2:MHL	Not used	
		D3:HDMI		
		D4:DVI		
		D5: NONE	Not used	
		D6:NONE	Not used	
	AMD Free Sync		Not available	NOT AVAILABLE

5.5Input

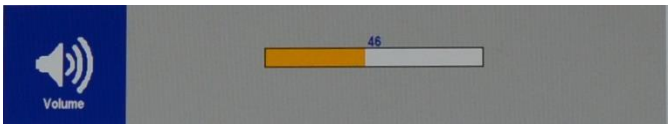
Main menu	Selection	Sub menu	Description	Remark
Input *Display Mode set to 1P* 	-	A0~D6 ~Auto Select	Selects Input A0~D6	**Input** Menu depending on setting in Display **Mode** **D5 and D6 not used** **HOT KEY "Exit"**
Input *Display Mode set to 2P LR*	Left Side	A0~D6 ~Auto Select	Selects Input A0~D6 for **left** side of screen	
	Right Side	A0~D6 ~Auto Select	Selects Input A0~D6 for **right** side of screen	
Input *Display Mode set to 2P TB*	Top Side	A0~D6 ~Auto Select	Selects Input A0~D6 for **upper** half of screen	
	Bottom Side	A0~D6 ~Auto Select	Selects Input A0~D6 for **lower** half of screen	
Input *Display Mode set to 2P PIP*	Main	A0~D6 ~Auto Select	Selects Input A0~D6 for **main** picture	
	Sub	A0~D6 ~Auto Select	Selects Input A0~D6 for **sub** picture	
Input *Display Mode set to 4P*	1P In	A0~D6 ~Auto Select	Selects Input A0~D6 for **upper left** picture	
	2P In	A0~D6 ~Auto Select	Selects Input A0~D6 for **upper right** picture	
	3P In	A0~D6 ~Auto Select	Selects Input A0~D6 for **lower left** picture	
	4P In	A0~D6 ~Auto Select	Selects Input A0~D6 for **lower left** picture	

5.6Audio/Other/Info

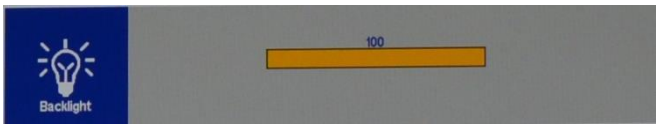
Main menu	Selection	Sub menu	Description	Remark
Audio	Volume	0~100	Sets audio volume	**HOT KEY "-"**
	Mute	ON/OFF	Mutes Audio	
	Stand Along	On/OFF	Not used	
	Audio Source *Display Mode set to 1P*	Analog	Not used	**Audio Source** Menu depending on setting in Display **Mode**
		Digital (region 1)	Audio uses Input for main picture	
	Audio Source *Display Mode set to 2P LR*	Analog	Not used	
		Digital (region1)	Audio uses Input for left picture	
		Digital (region 2)	Audio uses Input for right picture	
	Audio Source *Display Mode set to 2P TB*	Analog	Not used	
		Digital (region1)	Audio uses Input for upper picture	
		Digital (region 2)	Audio uses Input for lower picture	
	Audio Source *Display Mode set to 2P PIP*	Analog	Not used	
		Digital (region1)	Audio uses Input for main picture	
		Digital (region 2)	Audio uses Input for sub picture	
	Audio Source *Display Mode set to 4P*	Analog	Not used	
		Digital (region1)	Audio uses Input for upper left picture	
		Digital (region 2)	Audio uses Input for lower left picture	
		Digital (region3)	Audio uses Input for upper right picture	
		Digital (region 4)	Audio uses Input for lower right picture	
	Sound mode		Not used	
Other	Reset		Resets all adjustments Factory Reset	
	Menu Time	0~60	Sets OSD OFF time from 0~60 seconds	
	OSD H Position	0~100	Sets OSD Position Horizontal	
	OSD V Position	0~100	Sets OSD Position Vertical	
	Language	English/ Chinese	Switches OSD Language	
	Transparency	0~100	Sets Transparency of OSD Menu	
	Rotate	0/ 90/ 270	Rotates the OSD	
	Border With	0~10	Changes the Borders between Pictures (With)	Only usable with multiple Display Modes (2P,PIP,4P)
	Border Color	R / G / B / W	Changes the Borders between Pictures (Color) (Red, Green, Blue, White	
Info 	-		Displays Information: Resolution, Input, Frequency, Firmware version etc.	

5.7 Hot Keys

When OSM is off the following menus are available after pressing hot keys (SW2,3,4)



Menu Volume, Hot Key "-" (SW2)



Menu Backlight, Hot Key "+" (SW3)

Menu Input Select, Hot Key "Exit" (SW4)

6 Supported Input Modes

The Prisma-4K-01 can support the following input modes. Other modes can be implemented on request. Please ask your sales contact for more details.

6.1 VGA

The factory preset supported input modes include:

Resolution	Resolution
640 x 480 @ 60 Hz	1360 x 768 @ 60 Hz
800 x 600 @ 60 Hz	1366 x 768 @ 60 Hz
1024 x 768 @ 60 Hz	1368 x 768 @ 60 Hz
1280 x 768 @ 60 Hz	1440 x 900 @ 60 Hz
1280 x 800 @ 60Hz	1600 x 1200 @ 60 Hz
1280 x 1024 @ 60 Hz	1920 x 1080 @ 60 Hz

Table 1: Factory preset modes for VGA input

6.2 Display Port 1.2

The factory preset supported graphic input modes include:

Resolution	Resolution
640 x 480 @ 60 Hz	1440 x 900 @ 60 Hz
800 x 600 @ 75 Hz	1600 x 1200 @ 60 Hz
1024 x 768 @ 75 Hz	1680 x 1050 @ 60 Hz
1152 x 864 @ 75 Hz	1920 x 1080 @ 60 Hz
1280 x 768 @ 60 Hz	1920 x 1200 @ 60 Hz
1280 x 960 @ 60 Hz	1920 x 1440 @ 60 Hz
1280 x 1024 @ 75 Hz	2048 x 1536 @ 60Hz
1360 x 768 @ 60 Hz	2560 x 1440 @ 60 Hz
1366 x 768 @ 60 Hz	2560 x 1600 @ 60 Hz
1368 x 768 @ 60 Hz	3840 x 2160 @ 60Hz

Table 2: Factory preset modes for Display Port 1.2 input

6.3 Dual Link DVI/HDMI 1.4

The factory preset supported graphic input modes include:

Resolution	Resolution
640 x 480 @ 60 Hz	1440 x 900 @ 60 Hz
800 x 600 @ 75 Hz	1600 x 1200 @ 60 Hz
1024 x 768 @ 75 Hz	1680 x 1050 @ 60 Hz
1152 x 864 @ 75 Hz	1920 x 1080 @ 60 Hz
1280 x 768 @ 60 Hz	1920 x 1200 @ 60 Hz
1280 x 960 @ 60 Hz	1920 x 1440 @ 30 Hz
1280 x 1024 @ 75 Hz	2048 x 1536 @ 30Hz
1360 x 768 @ 60 Hz	2560 x 1440 @ 30 Hz
1366 x 768 @ 60 Hz	2560 x 1600 @ 30 Hz
1368 x 768 @ 60 Hz	3840 x 2160 @ 30Hz

Table 3: Factory preset modes for Dual Link DVI / HDMI1.4 input (graphics)

The factory preset supported video input modes include:

Resolution	Resolution
720 x 480 @ 60 Hz	1920 x 1080 @ 60 Hz
720 x 576 @ 50 Hz	1920 x 1200 @ 60 Hz
1768 x 992 @30 Hz	2560 x 1440 @ 30 Hz
1280 x 720 @ 60 Hz	3840 x 2160 @ 30Hz

Table 4: Factory preset modes for Dual Link DVI/HDMI1.4 input (video)

6.4HDMI 2.0

The factory preset supported graphic input modes include:

Resolution	Resolution
640 x 480 @ 60 Hz	1440 x 900 @ 60 Hz
800 x 600 @ 75 Hz	1600 x 1200 @ 60 Hz
1024 x 768 @ 75 Hz	1680 x 1050 @ 60 Hz
1152 x 864 @ 75 Hz	1920 x 1080 @ 60 Hz
1280 x 768 @ 60 Hz	1920 x 1200 @ 60 Hz
1280 x 960 @ 60 Hz	1920 x 1440 @ 60 Hz
1280 x 1024 @ 75 Hz	2048 x 1536 @ 60Hz
1360 x 768 @ 60 Hz	2560 x 1440 @ 60 Hz
1366 x 768 @ 60 Hz	2560 x 1600 @ 60 Hz
1368 x 768 @ 60 Hz	3840 x 2160 @ 60Hz
	4096 x 2160 @ 60Hz

Table 5: Factory preset modes for HDMI2.0 input (graphics)

The factory preset supported video input modes include:

Resolution	Resolution
720 x 480 @ 60 Hz	1920 x 1200 @ 60 Hz
720 x 576 @ 50 Hz	2560 x 1440 @ 60 Hz
1768 x 992 @30 Hz	3840 x 2160 @ 60Hz
1280 x 720 @ 60 Hz	4096 x 2160 @ 60Hz
1920 x 1080 @ 60 Hz	

Table 6: Factory preset modes for HDMI2.0 input (video)

7 Absolute Maximum Ratings

DESCRIPTION	Signal	Min.	Max.	Unit	Note
Supply Voltage	V_{CC}	-0.2	14	VDC	1, 2, 3,4
Storage Temperature	T_{ST}	-20	+60	°C	
Operating Temperature	T_{OP}	-20	+60	°C	
Relative humidity	R_H		80	%	

Note (1): Within operating temperature range.

Note (2): Permanent damage to the device may occur if maximum values are exceeded.

Note (3): Please refer to the panel datasheet for recommended voltage range.

Note (4) Supply voltage limits are for the Prisma-4K-01; inverter supply limits must be met as well, if the inverter is to be powered through the Prisma-4K-01 board.

8 Electrical Specifications

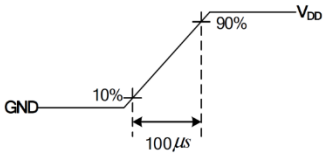
All measurements are done at 25°C ambient temperature and resolution of 3840 x 2160@60Hz.

Item	Condition	MIN.	TYP.	MAX.	Unit	Note
Supply Voltage (12V)		11.7	12.0	13.0	VDC	1
Current Consumption	Board Only HDMI2.0	-	0,34	-	A	
Current Consumption	Board Only No Video Source	-	0,24	-	A	
Current Consumption	Board Only Deep Sleep	-	0,02	-	A	
Continuous Current	VBO Panel only at 5V	0	1.2	2.4	A	
Continuous Current	VBO Panel only at 10V	0	1.2	2.4	A	
Continuous Current	VBO Panel only at 12V	0	2.0	3.0	A	
Inrush Current	VBO Panel only at 12V	-	-	10.0	A	3
Continuous Current	VBO Panel, Speaker and Backlight at 12V	0	4.0	5.0	A	
Continuous Current	eDP Panel DP4 at 3,3V	0	1.2	2.4	A	
Continuous Current	eDP Backlight at 5V, 10V or 12V	0	1.2	2.4	A	2

Note (1): Please refer to the TFT panel specification.

Note (2): Please refer to the cable specification.

Note (3): Measurement condition: Rising time = 100us.



8.1 Current Consumption

Two different application cases are considered.

Exclude speaker or panel Tcon

Power Supply	Voltage Range	Max Current	Ripple	Note
External Power Module at J20	5VON±5%	1,5A	60mVp-p@25°C	5V STB J20 Pin8
	12V±10%	1,0A	120mVp-p@25°C 200mVp-p@-10°C	J20 Pin1,2
DC Adaptor	12V±10%	2,0A	120mVp-p@25°C 200mVp-p@-10°C	J2 Center pin

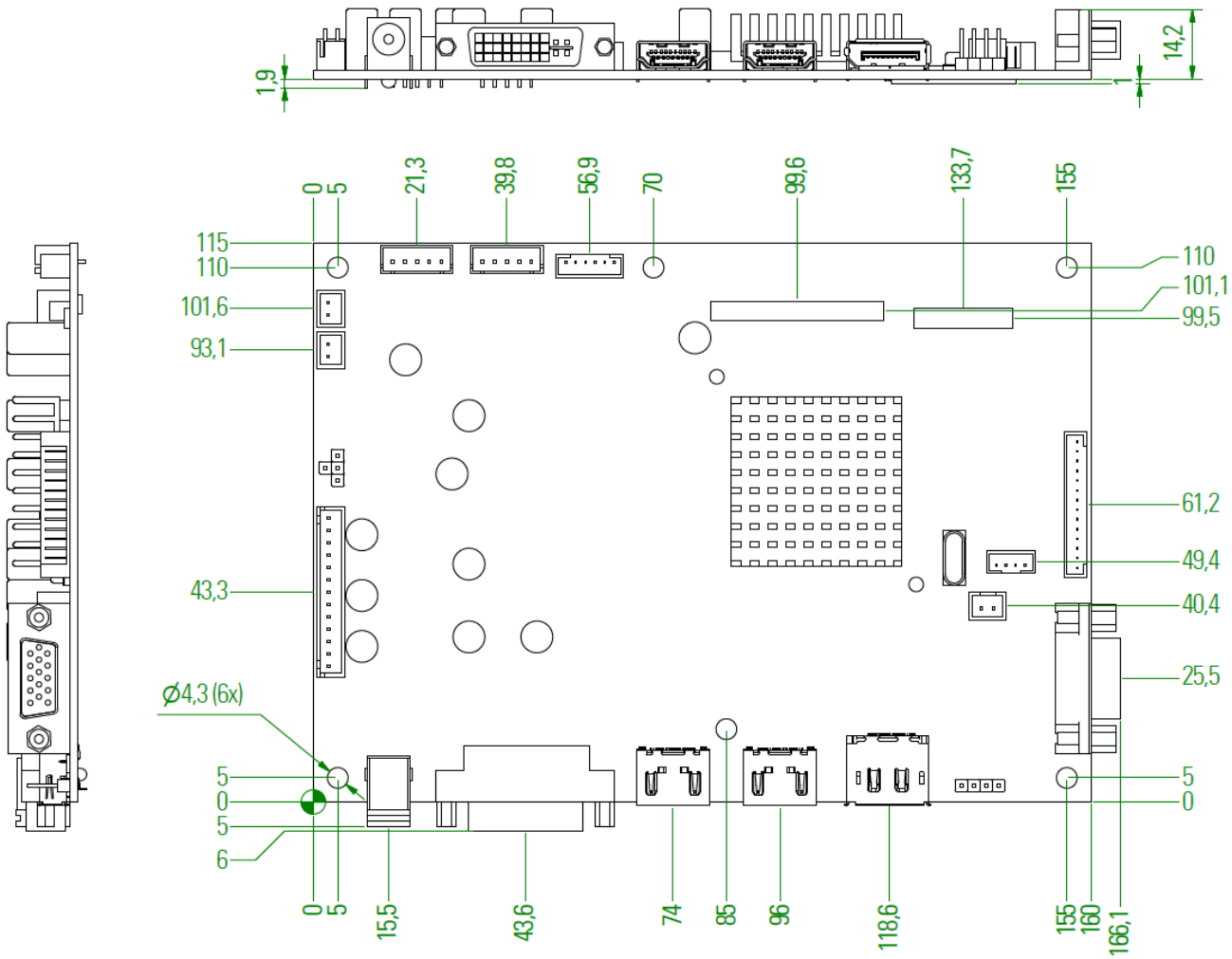
Include speaker and panel Tcon (1)

Power Supply	Voltage Range	Max Current	Ripple	Note
External Power Module at J20	5VON±5%	1,5A	60mVp-p@25°C	5V STB J20 Pin8
	12V±10%	4,0A	120mVp-p@25°C 200mVp-p@-10°C	J20 Pin1,2
DC Adaptor	12V±10%	5,0A	120mVp-p@25°C 200mVp-p@-10°C	J2 Center pin

Note (1): Here Max values means the peak currents the board could carry on, the specific values depend on the speaker and Panel Tcon power consumption.

9 Mechanical Specification

ITEM	DESCRIPTION	REMARKS
Length	160mm	± 0.2 mm
Width	110mm	± 0.2 mm
Height (top side)	13.3 mm	± 0.2 mm
Height (PCB)	1.7mm	± 0.1 mm
Height (bottom side)	3.5mm	± 0.1 mm
Weight	125g	



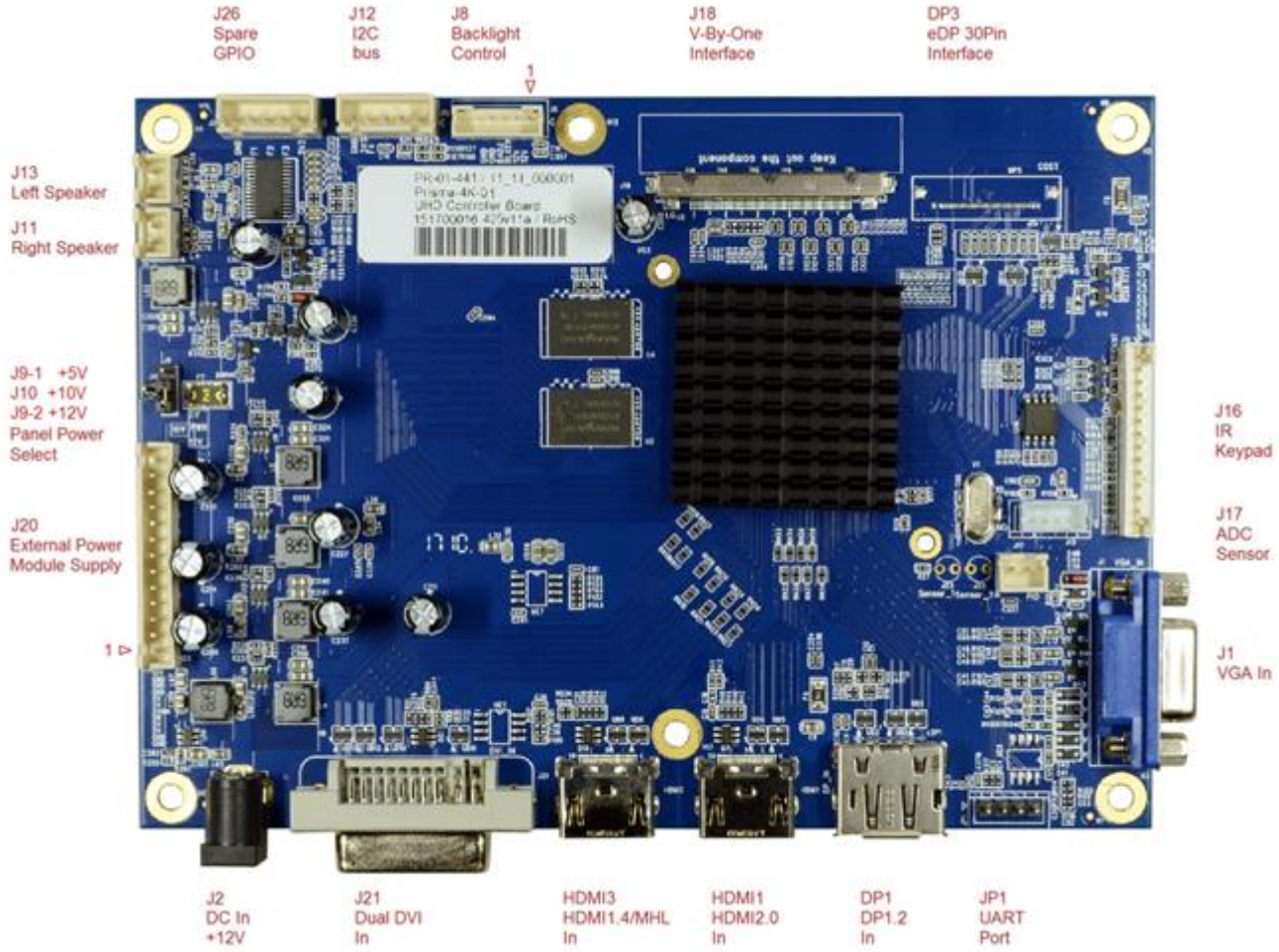
10 Connectors and Switches

The following drawing shows the input and output interfaces of the PRISMA-4K. The design is implemented as a single printed circuit board.

10.1 Bottom view

The eDP 40Pin connector is placed on the backside of the board.

10.2 Top view



10.3 Front view

10.4 Connector Overview

Connector	DESCRIPTION	TYPE	MANUFACTURER
DP1	DisplayPort Input	3660HF1R	Nexus
DP3	eDP 30Pin Output	20455-030E-02	I-PEX
DP4	eDP 40Pin Output (Bottom)	20455-040E-02	I-PEX
HDMI1	HDMI2.0 Input	3600HFR	Nexus
HDMI3	HDMI1.4 Input	3600HFR	Nexus
J1	Analog VGA Input	15-pin H-DSUB female	---
J2	Power Supply Input	Power Jack 2.0 mm	e.g. Kycon
J8	Backlight Control Output	B6B-PH-K-S 2.0mm	JST
J9, J10	Panel Power Select, TCON Power	4Pin/2.5mm	---
J11	Left Speaker Output	B2B-XH-A	JST
J12	I2C Bus	B5B-XH-A	JST
J13	Right Speaker Output	B2B-XH-A	JST
J16	IR / OSD Keypad	B14B-PH-K-S 2.0mm	JST
J17	ADC Sensor	B2B-XH-A	JST
J18	V-By-One Output	FI-RES51S-HF	JAE
J20	External Power Module Supply Input	B13B-XH-A	JST
J21	Dual DVI Input	DVI-I female	e.g. Molex
J26	Spare GPIO	B5B-XH-A	JST
JP1	UART (TTL level RS232) Interface	5-146290-4, 2.54mm	TE Connectivity

10.5 Input Connectors

10.5.1 DP1: Display Port Input Connector

Pin	Signal	Description
1	DP3-_IN	Pair-3 negative
2	GND	Ground
3	DP3+_IN	Pair-3 positive
4	DP2-_IN	Pair-2 negative
5	GND	Ground
6	DP2+_IN	Pair-2 positive
7	DP1-_IN	Pair-1 negative
8	GND	Ground
9	DP1+_IN	Pair-1 positive
10	DP0-_IN	Pair-0 negative

Pin	Signal	Description
11	GND	Ground
12	DP0+_IN	Pair-0 positive
13	GND	Ground
14	GND	Ground
15	DPA+_IN	Aux channel positive
16	GND	Ground
17	DPA-_IN	Aux channel negative
18	HPD	Hot Plug Detect
19	Power Return	Return for +3.3V
20	+3.3V_DP	DisplayPort +3.3V

10.5.2 HDMI1: HDMI2.0 Input Connector

Pin	Signal	Description
1	TMDS2+	Differential TMDS Data 2+
2	GND	Ground
3	TMDS2-	Differential TMDS Data 2-
4	TMDS1+	Differential TMDS Data 1+
5	GND	Ground
6	TMDS1-	Differential TMDS Data 1-
7	TMDS0+	Differential TMDS Data 0+
8	GND	Ground
9	TMDS0-	Differential TMDS Data 0-
10	TMDSCLK+	Differential TMDS Clock+

Pin	Signal	Description
11	GND	Ground
12	TMDSCLK-	Differential TMDS Clock-
13	CEC	Consumer Electronic Control
14	Reserved	
15	HDMI_SCL	DDC Clock
16	HDMI_SDA	DDC Data
17	GND	Ground
18	HDMI_VCC	+5V
19	Hot Plug	Hot Plug Detection

10.5.3 HDMI3: HDMI1.4 Input Connector

Pin	Signal	Description
1	TMDS2+	Differential TMDS Data 2+
2	GND	Ground
3	TMDS2-	Differential TMDS Data 2-
4	TMDS1+	Differential TMDS Data 1+
5	GND	Ground
6	TMDS1-	Differential TMDS Data 1-
7	TMDS0+	Differential TMDS Data 0+
8	GND	Ground
9	TMDS0-	Differential TMDS Data 0-
10	TMDSCLK+	Differential TMDS Clock+

Pin	Signal	Description
11	GND	Ground
12	TMDSCLK-	Differential TMDS Clock-
13	CEC	Consumer Electronic Control
14	Reserved	
15	HDMI_SCL	DDC Clock
16	HDMI_SDA	DDC Data
17	GND	Ground
18	HDMI_VCC	+5V
19	Hot Plug	Hot Plug Detection

10.5.4 J1: VGA Input Connector

Pin	Signal	Description
1	RED	Analog Red
2	GREEN	Analog Green
3	BLUE	Analog Blue
4	NC	Not connected
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground

Pin	Signal	Description
9	VGA_5V	Fused VCC
10	GND	Ground
11	NC	Not Connect
12	VGA_SDA	DDC Data
13	HSYNC	Horizontal Sync Input
14	VSYNC	Vertical Sync Input
15	VGA_SCL	DDC Clock

10.5.5 J2: Power Supply Connector

There are two different ways for powering the board: Either by using only the 12V DC Adaptor, see 10.5.11 J20: External Power Module Supply Connector.

Pin	Signal	Description
Center	VCC_12V	12V Power supply (**up to 5A**)

Pin	Signal	Description
Bottom	GND	Ground

10.5.6 J8: Backlight Control Connector

Pin	Signal	Description
1	VCC_12V	Inverter Power Output
2	VCC_12V	Inverter Power Output
3	BLKEN	Backlight ON/OFF 1)

Pin	Signal	Description
4	BADJ	Backlight PDIM control 1)
5	GND	Ground
6	GND	Ground

Note: Please refer to 10.2Top view for Pin1 location, different to the specification of JST B6B-PH-K-S.

Note 1): Open collector output, terminated by a 10kOhm resistor to the internal +3.3VDC.

10.5.7 J9, J10: Voltage selection for Panel Power and Backlight Power

The jumper J9-J10 is responsible for voltage selection of the Panel voltage of the V-by-One connector J18, eDP connector DP3 and the backlight voltage of the eDP connector DP4.

+ 12V J9-1 (default setting)

+ 10V J10

+ 5V J9-2 (only available by using the external +5V PWR Input, see 10.5.11 J20: External Power Module Supply Connector.

10.5.8 J12: I2C Bus Connector

Pin	Signal	Description
1	GND	Ground
2	+3.3V	VCC +3.3V
3	F4	Interrupter

Pin	Signal	Description
4	SCL2	I2C SCL
5	SDA2	I2C SDA

10.5.9 J16: IR / OSD Keypad Connector

Pin	Signal	Description
1	+3.3V	+3.3V Power supply to keypad and IR
2	RLED	LED Red indicator
3	GLED	LED Green indicator
4	IR	IR
5	GND	Ground
6	K1	Key 1
7	K2	Key 2

Pin	Signal	Description
8	K3	Key 3
9	K4	Key 4
10	K5	Key 5
11	K6	Key 6
12	K7	Key 7
13	K8	Key 8
14	GND	Ground

10.5.10J17: ADC Sensor Connector

Pin	Signal	Description
1	ADC+	ADC+

Pin	Signal	Description
2	ADC-	ADC-

10.5.11J20: External Power Module Supply Connector

There are two different ways for powering to the board: You could either use only the 12V DC Adaptor, see 10.5.5 J2: Power Supply Connectoror the External Power Module connector J20.

Pin	Signal	Description
1	GND	Ground
2	GND	Ground
3	+5V	+5V PWR Input, 2)
4	+5V	+5V PWR Input, 2)
5	SW	Standby Control Output, 1)
6	+5VON	+5V Input/Output
7	+5V	+5V PWR Input, 2)

Pin	Signal	Description
8	+5V	+5V PWR Input, 2)
9	GND	Ground
10	GND	Ground
11	GND	Ground
12	VCC_12V	+12V Input
13	VCC_12V	+12V Input

Note (1): Use SW, Pin9 for switching the external power supply to the standby mode, e. g. power supply MLT199TL. Output voltage level: 0V for standby mode and +5V for normal operation.

The +5VON input voltage should be always present, even in standby mode. For power consumption, please refer to 8.1 Current Consumption. Internal, +5VON is generated from +12V input by a voltage-converter, that assumes the power supply of Prisma-4K-01, as soon as the external +5VON has fallen below 5.0V.

Note (2): Use the +5V PWR Input to supply both, the +5V-driven-VBO-panels and BL_PWR of the eDP connector DP4 by switching the J9-2 to +5V, see 10.5.7 J9, J10: Voltage selection for Panel Power and Backlight Power.

10.5.12J21: Dual Link DVI Input Connector

Pin	Signal	Description
1	TMDS2-	Differential TMDS Data 2-
2	TMDS2+	Differential TMDS Data 2+
3	GND	TMDS Shield
4	NC	Not connected
5	NC	Not connected
6	DVI_SCL	DDC EDID data clock
7	DVI_SDA	DDC EDID data
8	DVI_VS	Analog VSYNC
9	TMDS1-	Differential TMDS Data 1-
10	TMDS1+	Differential TMDS Data 1+
11	GND	TMDS Shield
12	NC	Not connected
13	NC	Not connected
14	DVI_5V	5V / 100mA Power Supply
15	GND	Ground

Pin	Signal	Description
16	DISPDET	Hot Plug Detection
17	TMDS0-	Differential TMDS Data 0-
18	TMDS0+	Differential TMDS Data 0+
19	GND	TMDS Shield
20	NC	Not connected
21	NC	Not connected
22	GND	TMDS Clock Shield
23	TMDSSCL+	Differential TMDS Clock +
24	TMDSCL-	Differential TMDS Clock -
C1	NC	Not connected
C2	NC	Not connected
C3	NC	Not connected
C4	NC	Not connected
C5	NC	Not connected
C6	NC	Not connected

10.5.13JP1: UART Connector

Pin	Signal	Description
1	+3.3V	VCC +3.3V output
2	TX	TTL level output 1)

Pin	Signal	Description
3	RX	TTL level input 1)
4	GND	Ground

Note (1): Use the UART-to-RS232 adapter board (ZU-02-370) and the cable KA-30-977 to convert the signals between the 5V-level-UART of the Prisma-4K-01 and the RS232 interface of your computer.

10.6 Output Connectors

10.6.1 J18: V-By-One Connector

Pin	Signal	Description
1	GND	GND
2	TxA0+	Vx1 A lane 7+
3	TxA0-	Vx1 A lane 7-
4	GND	GND
5	TxA1+	Vx1 A lane 6+
6	TxA1-	Vx1 A lane 6-
7	GND	GND
8	TxA2+	Vx1 A lane 5+
9	TxA2-	Vx1 A lane 5-
10	GND	GND
11	TxA3+	Vx1 A lane 4+
12	TxA3-	Vx1 A lane 4-
13	GND	GND
14	TxA4+	Vx1 A lane 3+
15	TxA4-	Vx1 A lane 3-
16	GND	GND
17	TxA5+	Vx1 A lane 2+
18	TxA5-	Vx1 A lane 2-
19	GND	GND
20	TxA6+	Vx1 A lane 1+
21	TxA6-	Vx1 A lane 1-
22	GND	GND
23	TxA7+	Vx1 A lane 0+
24	TxA7-	Vx1 A lane 0-
25	GND	GND
26	LOCKn	LOCKn 4)

Pin	Signal	Description
27	HTPDn	HTPDn 4)
28	8b_10b	Vx1 8bit/10bit Select 2)
29	NC	NC (DF3)
30	NC	NC (DIM)
31	GND	GND (DF2) 6)
32	NC	NC (optional SDA)
33	NC	NC (optional SCL)
34	NC	NC (optional SDA)
35	NC	NC (PCID)
36	NC	NC (optional DF1)
37	GND	Local Dimming ON/OFF 6)
38	GND	GND
39	GND	GND
40	GND	GND
41	GND	GND
42	GND	GND
43	NC	NC
44	LCD_SVCC	Selectable Panel Power 1)
45	LCD_SVCC	Selectable Panel Power 1)
46	LCD_SVCC	Selectable Panel Power 1)
47	LCD_SVCC	Selectable Panel Power 1)
48	LCD_SVCC	Selectable Panel Power 1)
49	LCD_SVCC	Selectable Panel Power 1)
50	LCD_SVCC	Selectable Panel Power 1)
51	LCD_SVCC	Selectable Panel Power 1)

Note (1): The Panel supply voltage of the V-by-One connector J18 has to be selected (together with backlight voltage BL_PWR and Panel supply voltage of eDP connector DP3) by using the PWR switch, see 10.5.7 J9, J10: Voltage selection for Panel Power and Backlight Power.

Note (2): This pin is connected to a GPIO of the scaler. Per default it is high-resistance. Please connect it to GND or let it open. For TFT-panels, which are using this pin for 8b_10b selection, it can be set to HIGH or LOW by the firmware.

Note (3): This pin is terminated by a 4.7kOhm resistor to the internal +3.3VDC. The I^2C interface functionality can be activated by the firmware.

Note (4): This pin is terminated by a 10kOhm resistor to the internal +3.3VDC.

Note (5): This pin is terminated by a 10kOhm resistor to the ground.

Note (6): This pin is terminated by a 0 Ohm resistor to the ground.

10.6.2 DP3: eDP 30Pin Connector (optional)

Pin	Signal	Description
1	GND	GND
2	NC	NC
3	BIST	BIST
4	GND	GND
5	Lane_3N	DP Channel 3 Output -
6	Lane_3P	DP Channel 3 Output +
7	GND	GND
8	Lane_2N	DP Channel 2 Output -
9	Lane_2P	DP Channel 2 Output +
10	GND	GND
11	Lane_1N	DP Channel 1 Output -
12	Lane_1P	DP Channel 1 Output +
13	GND	GND
14	Lane_0N	DP Channel 0 Output -
15	Lane_0P	DP Channel 0 Output +

Pin	Signal	Description
16	GND	GND
17	AUX_P	DP Channel Aux +
18	AUX_N	DP Channel Aux -
19	GND	GND
20	HPD	Hot Plug Detect
21	GND	GND
22	NC	NC
23	NC	NC
24	GND	GND
25	NC	NC
26	LCD_SVCC	Selectable Panel Power 1)
27	LCD_SVCC	Selectable Panel Power 1)
28	LCD_SVCC	Selectable Panel Power 1)
29	LCD_SVCC	Selectable Panel Power 1)
30	LCD_SVCC	Selectable Panel Power 1)

10.6.3 DP4: eDP 40Pin Connector (Bottom)

Pin	Signal	Description
1	NC	NC
2	BL_PWR	Selectable Backlight Power 1)
3	BL_PWR	Selectable Backlight Power 1)
4	BL_PWR	Selectable Backlight Power 1)
5	BL_PWR	Selectable Backlight Power 1)
6	NC	NC
7	NC	NC
8	BL_ADJ	Backlight PWM 2)
9	BL_EN	Backlight Enable 2)
10	BL_GND	Backlight GND
11	BL_GND	Backlight GND
12	BL_GND	Backlight GND
13	BL_GND	Backlight GND
14	HPD	Hot Plug Detect
15	LCD_GND	Panel Logic GND
16	LCD_GND	Panel Logic GND
17	LCD_GND	Panel Logic GND
18	LCD_GND	Panel Logic GND
19	NC	NC
20	LCD_3V3	Panel Power +3.3V

Pin	Signal	Description
21	LCD_3V3	Panel Power +3.3V
22	LCD_3V3	Panel Power +3.3V
23	LCD_3V3	Panel Power +3.3V
24	GND	GND
25	AUX_N	DP Channel Aux -
26	AUX_P	DP Channel Aux +
27	GND	GND
28	Lane_0P	DP Channel 0 Output +
29	Lane_0N	DP Channel 0 Output -
30	GND	GND
31	Lane_1P	DP Channel 1 Output +
32	Lane_1N	DP Channel 1 Output -
33	GND	GND
34	Lane_2P	DP Channel 2 Output +
35	Lane_2N	DP Channel 2 Output -
36	GND	GND
37	Lane_3P	DP Channel 3 Output +
38	Lane_3N	DP Channel 3 Output -
39	GND	GND
40	NC	NC

Note 1): The backlight voltage BL_PWR has to be selected (together with the Panel supply voltage of the V-by-One connector J18 and eDP connector DP3) by using the PWR switch, see 10.5.7 J9, J10: Voltage selection for Panel Power and Backlight Power.

Note 2): Open collector output, terminated by a 10kOhm resistor to the internal +3.3VDC.

10.6.4 J26: GPIO Connector

Pin	Signal	Description
1	+3.3V	VCC +3.3V
2	F3	GPIO 3
3	F2	GPIO 2

Pin	Signal	Description
4	F1	GPIO 1
5	GND	Ground

11 Supported Panels

Overview 4k Panels (3840x2160)									
Mfg	Panel	Size [inch]	Interface	Colors	PNL Voltage [V]	PNL Current [A] (max.)	BKLT Voltage [V]	BKLT current [A] (max.)	Op. Temp. [°C]
AUO	P650QVF03.1	65	V-by-One	10bit	12	2,88	24	12,6	0-50
AUO	P550QVN02.0	55	V-by-One	8bit + FRC	12	2,16	24	9,78 (typ.)	0-50
AUO	P430QVN02.0	43	V-by-One	10bit	12	1,9	24	5,86	0-50
InnoLux	S400DJ1-KS5	40	V-by-One	8bit + FRC	12	1,9	24	1,5	0-50
InnoLux	M280DGJ-L30	28	V-by-One	8bit + FRC	12	1,6	26W (w/o conv)	2,2@12V	0-50
AUO	B173ZAN01.0	17,3	eDP HBR2	8bit	3,3	0,83	12	0,83	0-50
AUO	B156ZAN03.1	15,6	eDP HBR2	8bit	3,3	0,63	12	0,48	0-50

Note 1): Support of the 120Hz-TFT panels by using a Frame Rate Converter Board is on request.

Note 2): Other panel voltages are available, see 10.5.7 J9, J10: Voltage selection for Panel Power and Backlight Power.

12 Reference KIT

12.1 KI-54-000 28.0" M280DGJ-L30/Prisma-4K

Ordering Code	Description	Comment
CH-01-050R1.1	M280DGJ-L30	
KA-25-013	Cable BL SmartLEDIII/A1024HA-06PN 250mm	
IN-54-009	SmartLED-IV / PDIM 4x150mA	
PA-37-000	Prisma-4K-01/M280DGJ-L30	
KA-10-209	Cable Prisma-4K VBO/FI-RE51CL#1 500mm	MicroCoax Cable
KA-20-116	Conv.cable Prisma-4K/SmartLEDII-IV 500mm	
KA-30-904	Cable OSD Prisma-4K/IF398 450mm	For IF-398-00 only
KA-30-971	Cable OSD P4k t OSD(IF398)&IR 490/300mm	For IF-398-00 & IR
KA-30-993	Cable OSD P4k t OSD(IF398)&IR(IF406)1500	For IF-398-00 & IF406
ZU-02-398	IF398-00-OSD-Board-Universal 4+1Button	
DB-07-327	IR-Receiver Board B.IRYC42 for Prisma-4K	
ZU-02-406	IF406-00 Small Size IR-Sensor	
RC-10-006	IR Remote Contr.ZRC-02 (Prisma-4K-01)	
ZX-42-179	Battery 1.5V Micro(AAA)Energizer	Optional for remote control (2pcs required)
ZU-02-370	Programming adapter Pris./Art.NET	For Remote-OSD
KA-30-977	Cable Serial UART to P4K 300mm	For Remote-OSD
ZU-03-015	USBISP Board Rev:3.2 (Prisma-4K flasher)	For internal use only
KA-30-051	USB-Cable, Highspeed, type A/B m/m 1,8m	For internal use only
KA-40-081	Cable HDMI 4k Typ A male/male 2m	For internal use only

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