

IV-U1

Ultra HD A/D Board Specification

Date : 2022.07.06



IVIEWKOREA

Table of Contents

1. System Specification	3
2. System Block Diagram	4
3. Board Layout Drawing	5
4. Board Picture	5
5. Connector Specification	6~14
6. Support Display Modes	15
7. OSD Menu	16
8. RS-232 Communication Protocol	17

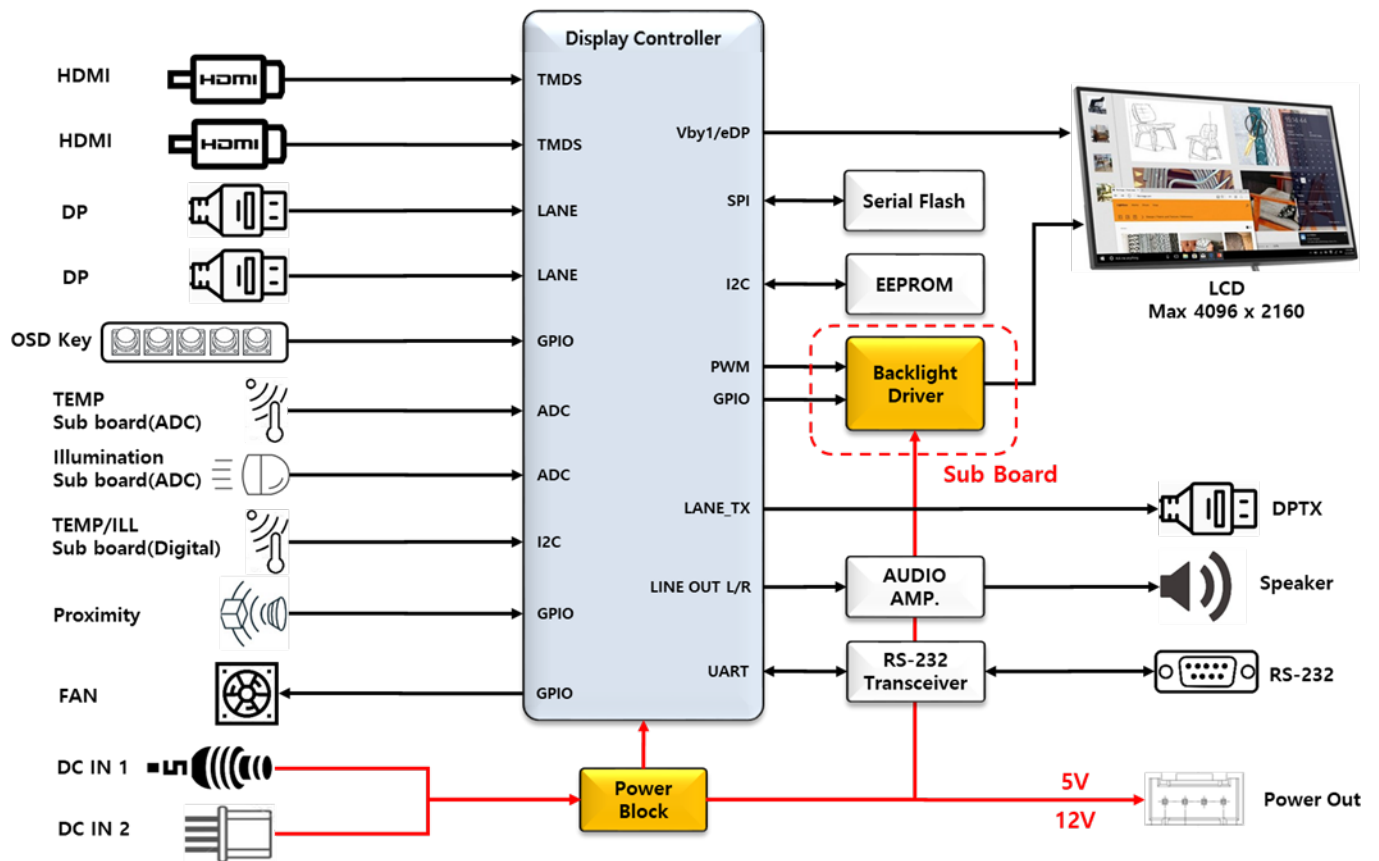
1. System Specification

Item		Description
System	MCU	Multi-Function Display Controller
	Flash	Serial NOR Flash, 16Mbit
Video Input	HDMI	Max Resolution 4096 x 2160@60Hz
	DP	Max Resolution 4096 x 2160@60Hz
Video Output	V by one	Max Resolution 4096 x 2160@60Hz
	eDP	Max Resolution 4096 x 2160@60Hz
	DPTX	Daisy chain, Max Resolution 4096 x 2160@60Hz
Input/ Output Port	OSD Key Input 1	OSD 6 Key : POWER, MENU, UP, DOWN, SELECT, AUTO LED : Green LED
	OSD Key Input 2	OSD 6 Key : POWER, MENU, UP, DOWN, SELECT, AUTO LED : Green LED
	Backlight Control 1	Power Supply Out, On/Off, Dimming(PWM)
	Backlight Control 2	Power Supply Out, On/Off, Dimming(PWM)
	Temp. Sensor	ADC Input : Temperature Sensor
	Illumination Sensor	ADC Input : Illumination Sensor
	Proximity Sensor	Proximity Sensor Input
	Digital Sensor	I2C Interface Sensor
	External Power	Power Supply 5V, 12V out
	Fan	External FAN Power Out
	Speaker Out	Speaker Output : Left N/P, Right N/P
	RS-232	External RS-232 Port
	Download	Firmware Download Port
	DC IN 1	Power Supply Input
	DC IN 2	Power Supply Input
Temperature Range		Operating: 0 to +70℃ Storage: -30 to +80℃
PCB		140 x 110mm, 1.6T, 2LAYER

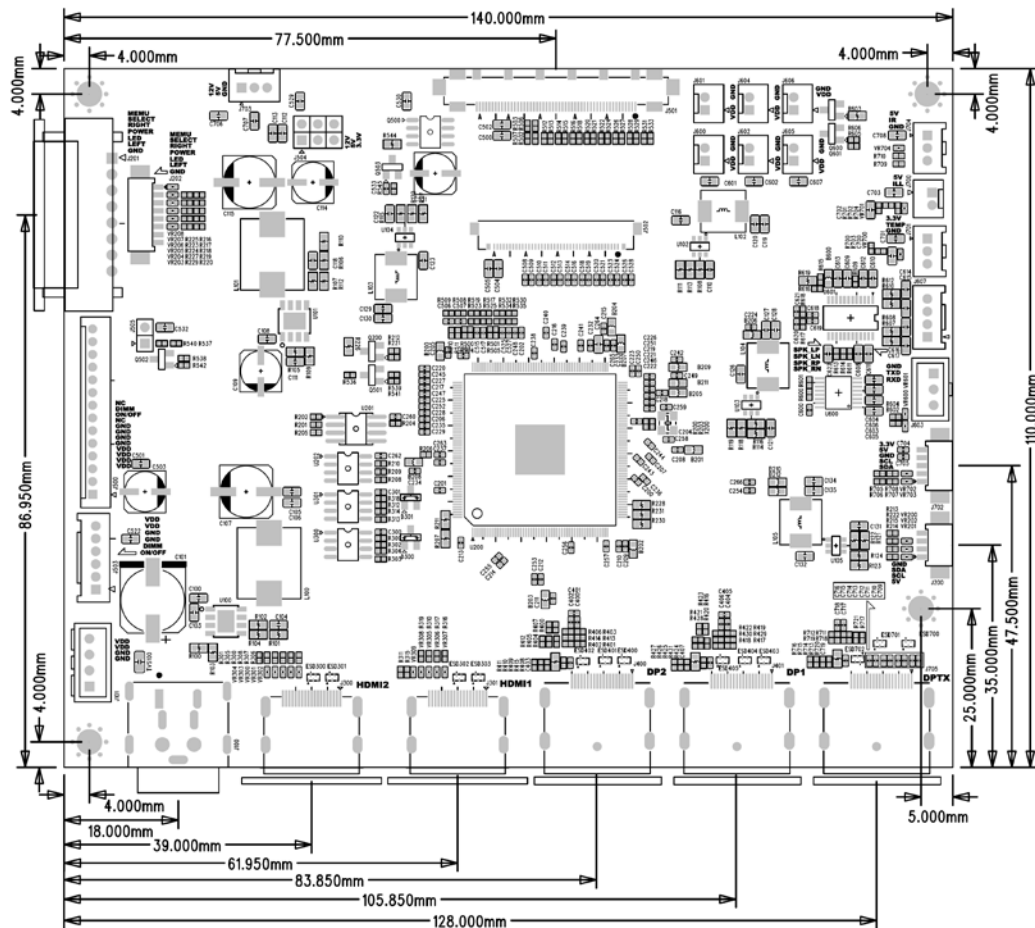
1-1. Electrical Specification

Description		Min	Typ.	Max	Unit	Remark
Power Supply Voltage		21.6	24	26.4	V	
LCD Power	3.3V	3.0	3.3	3.6	V	J504 Selectable
	5V	4.5	5.0	5.5	V	
	12V	10.8	12	13.2	V	
Power Consumption				3	W	Only board

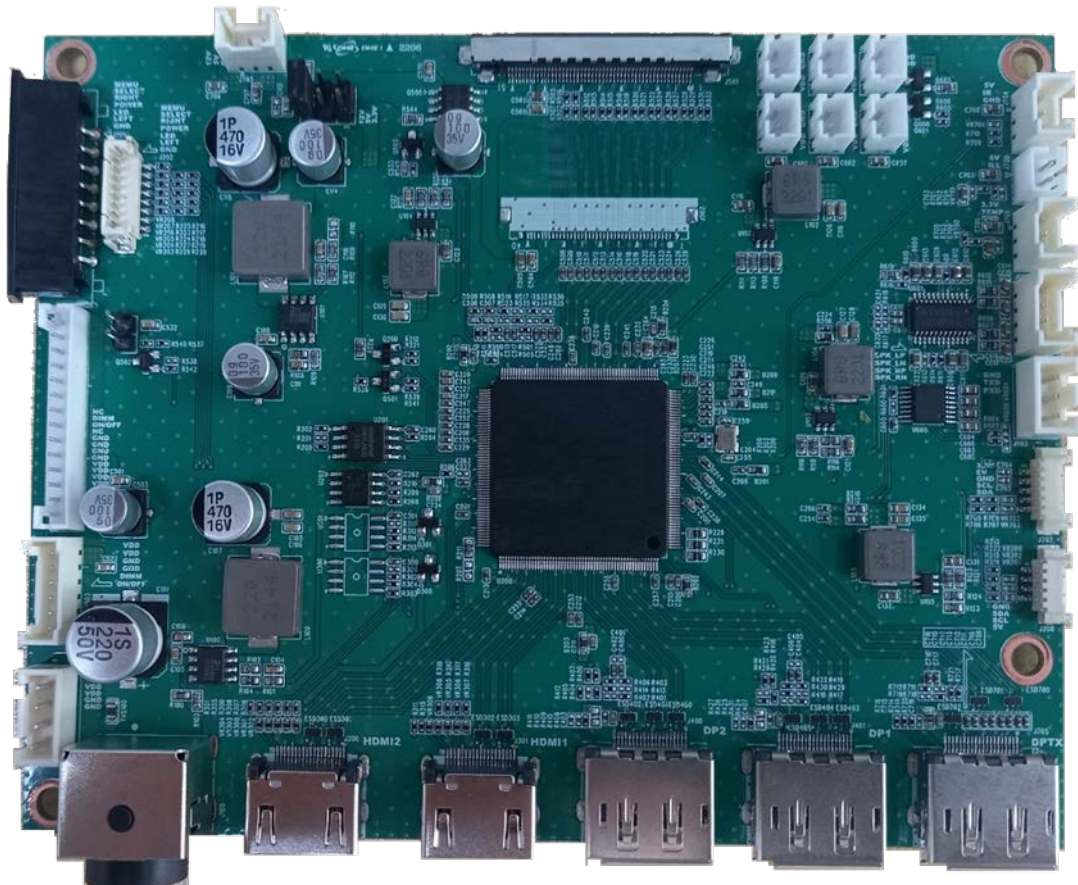
2. System Block Diagram



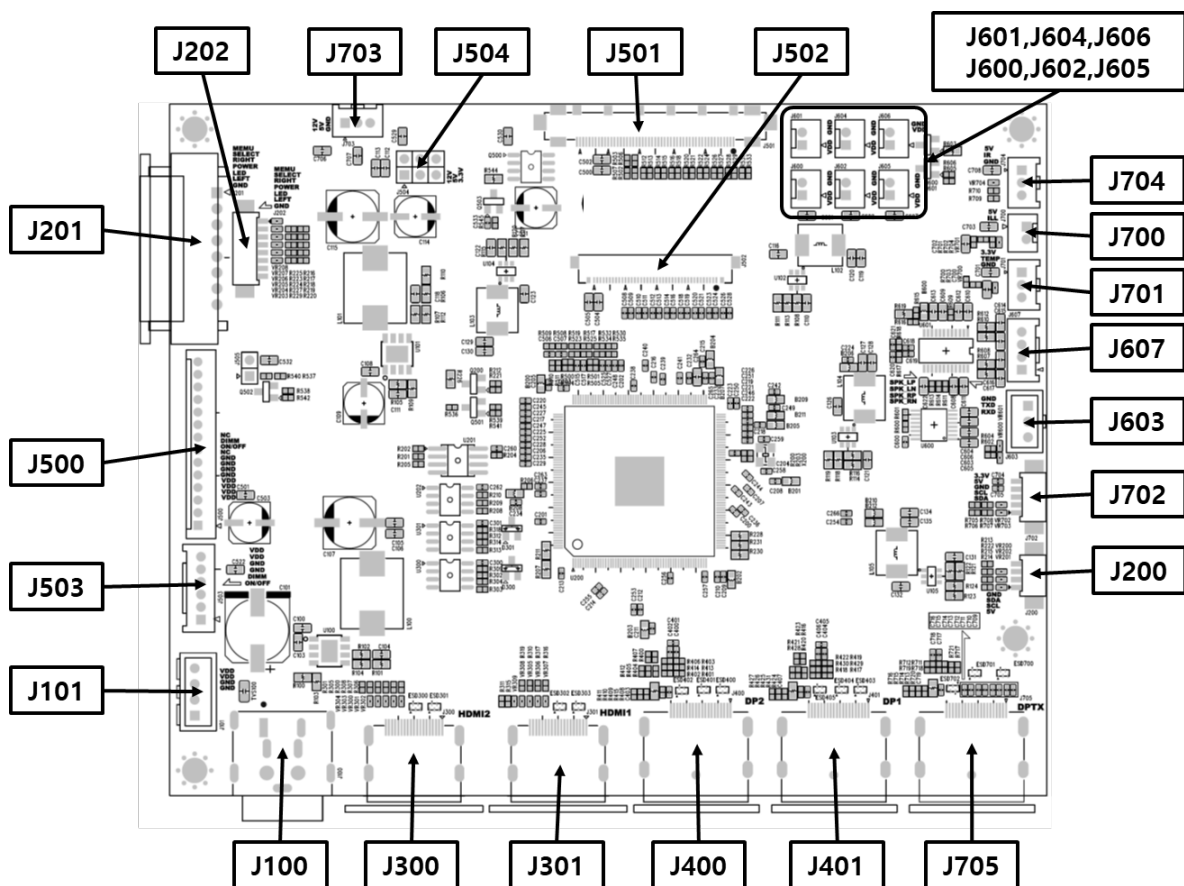
3. Board Layout Drawing



4. Board Picture

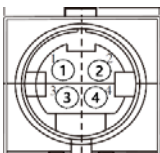


5. Connector Specification

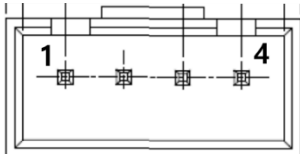


No.	Reference	Part Name	Description	Function	Housing
5-1	J100	DIN-422	Right angle, 4pin DC-Jack	Power Supply Input 1	
5-2	J101	SMW250-04P	Straight, 4pin, 2.50mm	Power Supply Input 2	SMH250-04
5-3	J200	12505WR-04A00	Right angle, 4pin, 1.25mm	Download Port	12505HS-04
5-4	J201	FCZ254-08R	Right angle, 8pin, 2.54mm, FPCB	OSD Key Input 1	
5-5	J202	12505WS-08A00	Straight, 8pin, 1.25mm	OSD Key Input 2	12505HS-08
5-6	J300,J301	51U019S-30S1N-AR BIM	Right angle, HDMI Receptacle	HDMI Input	
5-7	J400,J401	WDPE-20F3L1BU 3	Right angle, DP Receptacle	DP Input	
5-8	J500	20010WS-14	Straight, 14pin, 2.00mm	Backlight Interface 1	20010HS-14
5-9	J501	FI-RE51S-HF	Right angle, 51pin, 0.5mm	V By One Output	FI-RE51HL
5-10	J502	20455-040E-12	Right angle, 40pin, 0.5mm	eDP Output	20453-040T
5-11	J503	SMW200-06P	Straight, 6Pin, 2.00mm	Backlight Interface 2	SMH200-06
5-12	J504	PH01-06DS	Straight, 2x3pin, 2.54mm	LCD Power Select	
5-13	J600,J601 J602,J604 J605,J606	20010WS-02	Straight, 2pin, 2.00mm	Fan Power Out	20010HS-02
5-14	J603	SMW250-03P	Straight, 3pin, 2.50mm	RS-232	SMH250-03
5-15	J607	SMW200-04P	Straight, 4pin, 2.00mm	Speaker	SMH200-04
5-16	J700	20010WS-02	Straight, 2pin, 2.00mm	Illumination Sensor	20010HS-02
5-17	J701	SMW200-03P	Straight, 3pin, 2.00mm	Temperature Sensor	SMH200-03
5-18	J702	12505WS-05A00	Straight, 5pin, 1.25mm	Digital Sensor	12505HS-05
5-19	J703	SMW200-03P	Straight, 3pin, 2.00mm	External Power Out	SMH200-03
5-20	J704	SMW200-03P	Straight, 3pin, 2.00mm	Proximity Input	SMH200-03
5-21	J705	WDPE-20F3L1BU 3	Right angle, DP Receptacle	DP Output	

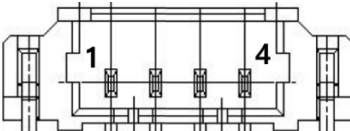
5-1. J100(Power Supply Input 1)

Pin no.	Signal	Description	Connector pin arrangement
1	GND	GND	
2	DC_IN	Power Supply Input	
3	GND	GND	
4	DC_IN	Power Supply Input	

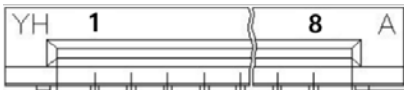
5-2. J101(Power Supply Input 2)

Pin no.	Signal	Description	Connector pin arrangement
1	GND	GND	
2	GND	GND	
3	DC_IN	Power Supply Input	
4	DC_IN	Power Supply Input	

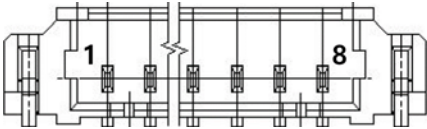
5-3. J200(Download Port)

Pin no.	Signal	Description	Connector pin arrangement
1	5DVCC	5V Power Out	
2	DDCSCL_VGA	Serial Clock Signal	
3	DDCSDA_VGA	Serial Data Signal	
4	GND	GND	

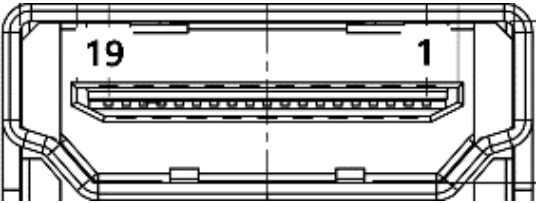
5-4. J201(OSD Key Input 1)

Pin no.	Signal	Description	Connector pin arrangement
1	CON_MENU	Menu Key Input	
2	CON_SEL	Select Key Input	
3	CON_RIGHT	Right(Up) Key Input	
4	CON_POWER	Power Key Input	
5	EXT_LED	LED Green	
6	CON_LEFT	Left(Down) Key Input	
7	GND	GND	
8	CON_AUTO	Auto Key Input	

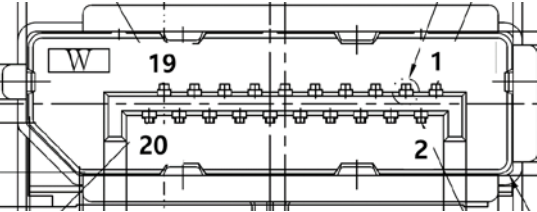
5-5. J202(OSD Key Input 2)

Pin no.	Signal	Description	Connector pin arrangement
1	CON_MENU	Menu Key Input	
2	CON_SEL	Select Key Input	
3	CON_RIGHT	Right(Up) Key Input	
4	CON_POWER	Power Key Input	
5	EXT_LED	LED Green	
6	CON_LEFT	Left(Down) Key Input	
7	GND	GND	
8	CON_AUTO	Auto Key Input	

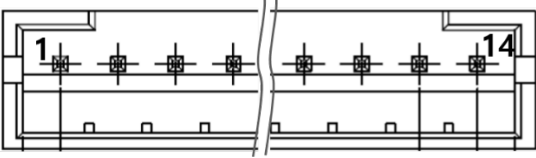
5-6. J300, J301(HDMI Input)

Pin no.	Signal	Description	Connector pin arrangement
1	HDMI_RX2P	TMDS Data 2 Positive Input	
2	GND	GND	
3	HDMI_RX2N	TMDS Data 2 Negative Input	
4	HDMI_RX1P	TMDS Data 1 Positive Input	
5	GND	GND	
6	HDMI_RX1N	TMDS Data 21Negative Input	
7	HDMI_RX0P	TMDS Data 0 Positive Input	
8	GND	GND	
9	HDMI_RX0N	TMDS Data 0 Negative Input	
10	HDMI_RXCP	TMDS Clock Positive Input	
11	HDMI_CABLE_DET	GND	
12	HDMI_RXCN	TMDS Clock Negative Input	
13	NC	No Connection	
14	NC	No Connection	
15	HDMI_SCL	DDC Serial Clock Input	
16	HDMI_SDA	DDC Serial Data Input	
17	GND	GND	
18	HDMI_5V	5V Power Input	
19	HDMI_HPD	HDMI Hot Plug Detect Signal	

5-7. J400, J401(DP Input)

Pin no.	Signal	Description	Connector pin arrangement
1	LANE3N	DP Lane 3 Negative Input	
2	GND	GND	
3	LANE3P	DP Lane 3 Positive Input	
4	LANE2N	DP Lane 2 Negative Input	
5	GND	GND	
6	LANE2P	DP Lane 2 Positive Input	
7	LANE1N	DP Lane 1 Negative Input	
8	GND	GND	
9	LANE1P	DP Lane 1 Positive Input	
10	LANE0N	DP Lane 0 Negative Input	
11	GND	GND	
12	LANE0P	DP Lane 0 Positive Input	
13	GND	GND	
14	GND	GND	
15	AUX_CHP	Aux Channel Positive Input	
16	DP_CALBLE_DET	DP Cable Detect Signal	
17	AUX_CHN	Aux Channel Negative Input	
18	DP_HPD	DP Hot Plug Detect Signal	
19	GND	GND	
20	NC	No Connection	

5-8. J500(Backlight Interface 1)

Pin no.	Signal	Description	Connector pin arrangement
1	VDD	24V Power Out	
2	VDD	24V Power Out	
3	VDD	24V Power Out	
4	VDD	24V Power Out	
5	VDD	24V Power Out	
6	GND	GND	
7	GND	GND	
8	GND	GND	
9	GND	GND	
10	GND	GND	
11	NC	No Connection	
12	ON_BLT	Backlight On/Off Control Signal	
13	ADJ_BLT	Backlight PWM Control Signal	
14	NC	No Connection	

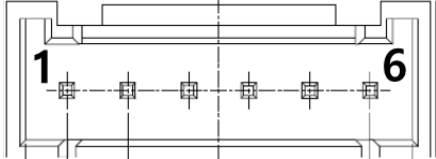
5-9. J501(V By One Output)

Pin no.	Signal	Description	Connector pin arrangement
1	GND	GND	
2	VTX_TX7N	VbyOne Lane 7 Negative Output	
3	VTX_TX7P	VbyOne Lane 7 Positive Output	
4	GND	GND	
5	VTX_TX6N	VbyOne Lane 6 Negative Output	
6	VTX_TX6P	VbyOne Lane 6 Positive Output	
7	GND	GND	
8	VTX_TX5N	VbyOne Lane 5 Negative Output	
9	VTX_TX5P	VbyOne Lane 5 Positive Output	
10	GND	GND	
11	VTX_TX4N	VbyOne Lane 4 Negative Output	
12	VTX_TX4P	VbyOne Lane 4 Positive Output	
13	GND	GND	
14	VTX_TX3N	VbyOne Lane 3 Negative Output	
15	VTX_TX3P	VbyOne Lane 3 Positive Output	
16	GND	GND	
17	VTX_TX2N	VbyOne Lane 2 Negative Output	
18	VTX_TX2P	VbyOne Lane 2 Positive Output	
19	GND	GND	
20	VTX_TX1N	VbyOne Lane 1 Negative Output	
21	VTX_TX1P	VbyOne Lane 1 Positive Output	
22	GND	GND	
23	VTX_TX0N	VbyOne Lane 0 Negative Output	
24	VTX_TX0P	VbyOne Lane 0 Positive Output	
25	GND	GND	
26	VX1LOCK	VbyOne Lock	
27	VX1HPD	VbyOne Hot Plug	
28	NC	No Connection	
29	NC	No Connection	
30	NC	No Connection	
31	NC	No Connection	
32	NC	No Connection	
33	CON_VX1_SCL	VbyOne Serial Clock	
34	CON_VX1_SDA	VbyOne Serial Data	
35	NC	No Connection	
36	NC	No Connection	
37	NC	No Connection	
38	GND	GND	
39	GND	GND	
40	GND	GND	
41	GND	GND	
42	NC	No Connection	
43	NC	No Connection	
44	PANEL_POWER	Panel Power Out	
45	PANEL_POWER	Panel Power Out	
46	PANEL_POWER	Panel Power Out	
47	PANEL_POWER	Panel Power Out	
48	PANEL_POWER	Panel Power Out	
49	PANEL_POWER	Panel Power Out	
50	PANEL_POWER	Panel Power Out	
51	PANEL_POWER	Panel Power Out	

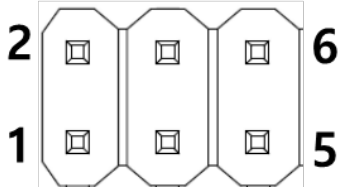
5-10. J502(eDP Output)

Pin no.	Signal	Description	Connector pin arrangement
1	EDP_TX7N	eDP Lane 7 Negative Output	
2	EDP_TX7P	eDP Lane 7 Positive Output	
3	GND	GND	
4	EDP_TX6N	eDP Lane 6 Negative Output	
5	EDP_TX6P	eDP Lane 6 Positive Output	
6	GND	GND	
7	EDP_TX5N	eDP Lane 5 Negative Output	
8	EDP_TX5P	eDP Lane 5 Positive Output	
9	GND	GND	
10	EDP_TX4N	eDP Lane 4 Negative Output	
11	EDP_TX4P	eDP Lane 4 Positive Output	
12	GND	GND	
13	EDPTX2_AUX_P	eDP 2 Aux Channel Positive Output	
14	EDPTX2_AUX_N	eDP 2 Aux Channel Negative Output	
15	EDPTX2_HPD	eDP 2 Hot Plug Detect	
16	EDP_TX3N	eDP Lane 3 Negative Output	
17	EDP_TX3P	eDP Lane 3 Positive Output	
18	GND	GND	
19	EDP_TX2N	eDP Lane 2 Negative Output	
20	EDP_TX2P	eDP Lane 2 Positive Output	
21	GND	GND	
22	EDP_TX1N	eDP Lane 1 Negative Output	
23	EDP_TX1P	eDP Lane 1 Positive Output	
24	GND	GND	
25	EDP_TX0N	eDP Lane 0 Negative Output	
26	EDP_TX0P	eDP Lane 0 Positive Output	
27	GND	GND	
28	EDPTX1_AUX_P	eDP 1 Aux Channel Positive Output	
29	EDPTX1_AUX_N	eDP 1 Aux Channel Negative Output	
30	EDPTX1_HPD	eDP 1 Hot Plug Detect	
31	NC	No Connection	
32	NC	No Connection	
33	NC	No Connection	
34	GND	GND	
35	GND	GND	
36	GND	GND	
37	NC	No Connection	
38	PANEL_POWER	Panel Power Out	
39	PANEL_POWER	Panel Power Out	
40	PANEL_POWER	Panel Power Out	

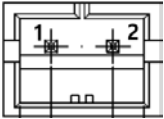
5-11. J503(Backlight Interface 2)

Pin no.	Signal	Description	Connector pin arrangement
1	ON_BLT	Backlight On/Off Control Signal	
2	ADJ_BLT	Backlight PWM Control Signal	
3	GND	GND	
4	GND	GND	
5	VDD	12V Backlight Power Out	
6	VDD	12V Backlight Power Out	

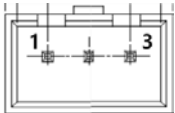
5-12. J504(LCD Power Select)

Pin no.	Signal	Description	Connector pin arrangement
1	12V	12V Power Out / Jumper 1-2 Connection	
2	LVDS_PWR	LCD Power Supply	
3	5V	5V Power Out / Jumper 3-4 Connection	
4	LVDS_PWR	LCD Power Supply	
5	3.3V	3.3V Power Out / Jumper 5-6 Connection	
6	LVDS_PWR	LCD Power Supply	

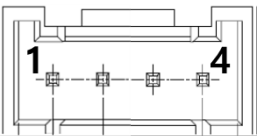
5-13. J600, J601, J602, J604, J605, J606(Fan Power Out)

Pin no.	Signal	Description	Connector pin arrangement
1	VDD	12V Power Out	
2	GND	GND	

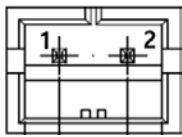
5-14. J603(RS-232)

Pin no.	Signal	Description	Connector pin arrangement
1	GND	GND	
2	TXD	RS-232 Driver Output	
3	RXD	RS-232 Receiver Input	

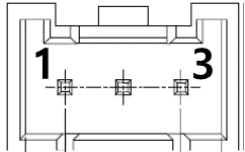
5-15. J607(Speaker)

Pin no.	Signal	Description	Connector pin arrangement
1	SPK_OUT_RN	Speaker Right Negative Output	
2	SPK_OUT_RP	Speaker Right Positive Output	
3	SPK_OUT_LN	Speaker Left Negative Output	
4	SPK_OUT_LP	Speaker Left Positive Output	

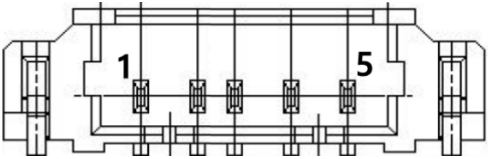
5-16. J700(Illumination Sensor)

Pin no.	Signal	Description	Connector pin arrangement
1	VDD	5V Power Out	
2	ILL_IN	Illumination Sensor ADC Input	

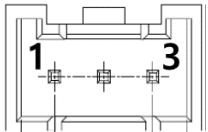
5-17. J701(Temp. Sensor)

Pin no.	Signal	Description	Connector pin arrangement
1	3.3V	3.3V Power Out	
2	TEMP_ADC	Temperature Sensor ADC Input	
3	GND	GND	

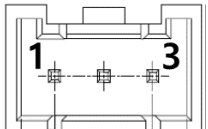
5-18. J702(Digital Sensor)

Pin no.	Signal	Description	Connector pin arrangement
1	SENSOR_SDA	Serial Data Signal	
2	SENSOR_SCL	Serial Clock Signal	
3	GND	GND	
4	5V	5V Power Out	
5	3.3V	3.3V Power Out	

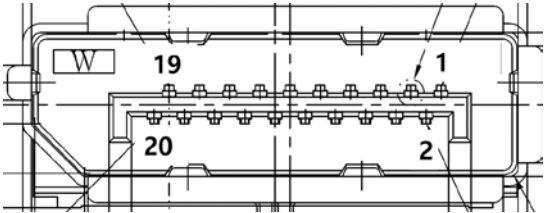
5-19. J703(External Power Out)

Pin no.	Signal	Description	Connector pin arrangement
1	12V	12V Power Out	
2	5V	5V Power Out	
3	GND	GND	

5-20. J704(Proximity Sensor Input)

Pin no.	Signal	Description	Connector pin arrangement
1	5V	5V Power Out	
2	IR_IN	Proximity Signal Input	
3	GND	GND	

5-7. J400, J401(DP Output)

Pin no.	Signal	Description	Connector pin arrangement
1	DPTX_L0P	DP TX Lane 0 Positive Output	
2	GND	GND	
3	DPTX_L0N	DP TX Lane 0 Negative Output	
4	DPTX_L1P	DP TX Lane 1 Positive Output	
5	GND	GND	
6	DPTX_L1N	DP TX Lane 1 Negative Output	
7	DPTX_L2P	DP TX Lane 2 Positive Output	
8	GND	GND	
9	DPTX_L2N	DP TX Lane 2 Negative Output	
10	DPTX_L3P	DP TX Lane 3 Positive Output	
11	GND	GND	
12	DPTX_L3N	DP TX Lane 3 Negative Output	
13	GND	GND	
14	GND	GND	
15	AUX_CHP	Aux Channel Positive Output	
16	GND	GND	
17	AUX_CHN	Aux Channel Negative Output	
18	DP_HPD	DP Hot Plug Detect Signal	
19	GND	GND	
20	DP_TX_33V	3.3V Power Out	

6. Support Display Modes

Mode \ Spec	Horizontal Timing		Vertical Timing	
	Freq.	Active	Freq.	Active
	KHz	Pixel	Hz	Line
720x576	15.625	720	50	288
720x576	31.25	720	50	576
720x480	15.734	720	59.94	240
720x480	31.469	720	59.94	480
1280x720	37.50	1280	50	720
1280x720	45	1280	60	720
1920x1080	26.973	1920	23.976	1080
1920x1080	28.125	1920	50	540
1920x1080	33.75	1920	60	540
1920x1080	33.75	1920	30	1080
1920x1080	56.25	1920	50	1080
1920x1080	67.432	1920	59.94	1080
2560x1440	88.787	2560	60	1440
3440x1440	88.819	3440	60	1440
3840x2160	65.688	3840	30	2160
3840x2160	133.313	3840	60	2160

7. OSD Menu

Main Menu	Sub Menu	Description	Default	Remark
Picture	Backlight	0 ~ 100	100	Hot Key : Down
	Brightness	0 ~ 100	50	
	Contrast	0 ~ 100	50	
	Sharpness	0 ~ 4	2	
Display	Display Rotate	0, 180	0	
	Aspect Ratio	Full, 16:9, 4:3, 5:4, 1:1	Full	
Color	Gamma	OFF, 1.8, 2.0, 2.2, 2.4	OFF	
	Temperature	sRGB, User(R:255, G:255, B:255)	sRGB	
	Color Effect	Standard, Game, Movie, Photo, Vivid, User	Standard	
	Color Format	RGB, YUV	RGB	Only RGB Mode
	Hue	0 ~ 100	50	
	Saturation	0 ~ 100	50	
Advance	DP MST	OFF, DP1, DP2	OFF	DP Daisy Chain port select
	Clone Mode	OFF, ON	OFF	DP Daisy Chain Clone mode
	Temperature	OFF, 0 ~ 99	OFF	0도~99도
	Light Sensor	OFF, 0 ~ 63	OFF	값이 낮을수록 약한 밝기에서 동작
	Minimum	0 ~ 100	20	Light Sensor 동작 시 백라이트 밝기 레벨
	Proximity	OFF, 60 ~ 300	OFF	센서 동작 후 대기 시간 60초~300초, 5초단위로 조절
Input	-	Auto Select, DP1, DP2, HDMI1, HDMI2	Auto Select	
Audio	Volume	0 ~ 100	50	Hot Key : Up
	Mute	ON, OFF	OFF	
Other	Reset	Factory reset		
	Menu Time	0 ~ 60	10	
	OSD H Position	0 ~ 100	50	
	OSD V Position	0 ~ 100	50	
	Transparency	0 ~ 255	0	
	Rotate	0, 90, 270, 180	0	

8. RS-232 Communication Protocol

- Both: Request / Response 총 길이(5Byte)

Header(1)	Command(1)		Data Type(1)	Data(1)	Check(1)	
Request: 0xCA Response: 0x35	Power	0x01	0x00: Value 0xFF: Status Read	0x00: Power Off 0x01: Power On	-	
	Input Select	0x02	0x00: Value 0xFF: Status Read	0x00: VGA 0x01: DVI 0x02: HDMI	-	
	Auto Adjust	0x03	0x00: Value	0x01: 실행	-	
	Brightness	0x04	0x00: Value 0x80: Decrease by 1 0x81: Increase by 1 0xFF: Status Read	0x00(0) ~ 0x64(100)	-	
	Contrast	0x05	0x00: Value 0x80: Decrease by 1 0x81: Increase by 1 0xFF: Status Read	0x00(0) ~ 0x64(100)	-	
	Backlight	0x06	0x00: Value 0x80: Decrease by 1 0x81: Increase by 1 0xFF: Status Read	0x00(0) ~ 0x64(100)	-	
	Reset All Settings	0x07	0x00: Value	0x01: 실행	-	
	Volume	0x08	0x00: Value 0x80: Decrease by 1 0x81: Increase by 1 0xFF: Status Read	0x00(0) ~ 0x64(100)	-	
	Temperature	0x11	0x00: Value 0x80: Decrease by 1 0x81: Increase by 1 0xFF: Status Read	0x00(0) ~ 0x64(100)	-	
	Light Sensor	0x12	0x00: Value 0x80: Decrease by 1 0x81: Increase by 1 0xFF: Status Read	0x00(OFF) ~ 0x3F(63)	-	
Response: 0x35	Light Minimum	0x13	0x00: Value 0x80: Decrease by 1 0x81: Increase by 1 0xFF: Status Read	0x00(0) ~ 0x64(100)	-	
	Proximity	0x14	0x00: Value 0x80: Decrease by 1 0x81: Increase by 1 0xFF: Status Read	0x00(OFF) ~ 0x31(49) Time = (Data-1)*5+60 Time : 60sec ~ 300sec	-	
	Protocol Error (비정상적인 명령어)	0xFF	0x01	0x00	-	존재하지 않는 Protocol, Checksum 값이 맞지 않을 때
	Not active (동작 할 수 없는 상태)	0xFF	0x02	0x00	-	Backlight 값과 Light Minumum 값 충돌 시

- Check Byte = Header(1) XOR Command(1) XOR Data Type(1) XOR Data(1)

- 명령어 예

* Power Status read: 0xCA 0x01 0xFF 0x00 0x34

* Power On: 0xCA 0x01 0x00 0x00 0xCB

* Power Off: 0xCA 0x01 0x00 0x01 0xCA