



Product Specification

Model No.: G1 Series

7"-10.2" TFT-LCD

Description: Driving Board

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A: General Description

Promate's G1 series Color TFT LCD Driving Board is applied to drive AU's digital 7" & 10.2" Color TFT LCD Panel. The driving board provides an auto-input synchronization and easy to use interface.

B: Features

- Computer graphic signals of VGA, SVGA and XGA standard
- Video signals of NTSC, PAL and SECAM
- Maximum 3 sets of video input (Composite or S-video)
- Built-in volume control of audio
- OSD adjustments via IR/Switch/RS232/I2C/SPI interface
- Surge and reverse protects of power input
- X3 technology: Download firmware update

C: Applications

The product covered herein are designed and manufactured for following application areas.

- Office electronics
- Instrumentation and measuring equipment
- Machine tools
- Audiovisual equipment
- Home appliances
- Communication equipment other than trunk lines

Do not use the products covered herein for the following equipment that demands extremely high performance in terms of functionality, reliability, or accuracy.

- Aerospace equipment
- Medical equipment related to life support, etc.

The board is not user serviceable or repairable. Warranty does not cover user error in connecting up to the controller and is invalidated by unauthorized modification or repairs.



D: Assembly Notes

The following provides some guidelines for installation and preparation of a finished display solution.

Before proceeding it is important to familiarize yourself with the parts making up the system and the various connectors, mounting holes and general layout of the driving board. Guides to connectors and mounting holes are shown in the following E, F and G sections.

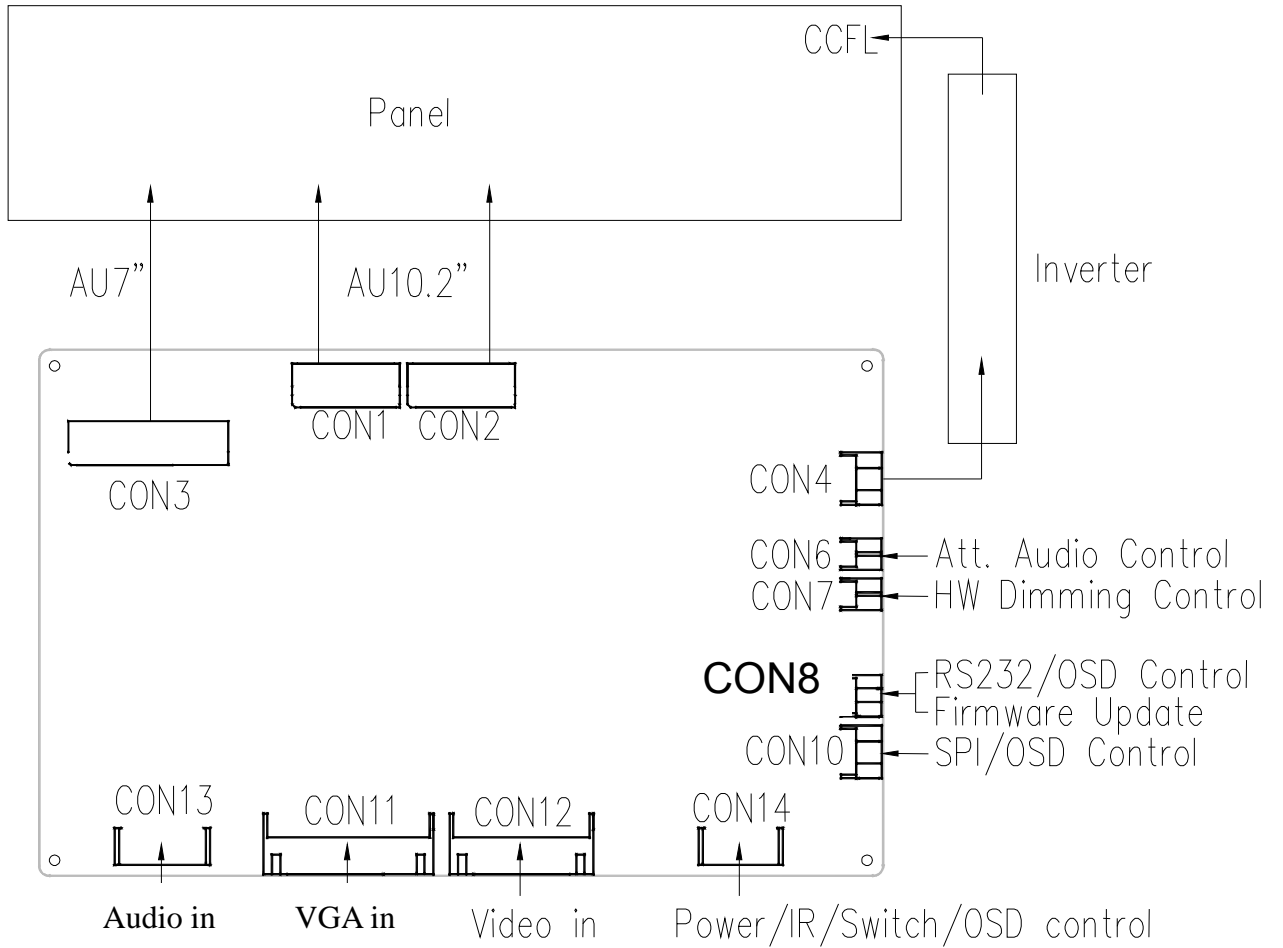
1. Driving board: Handle the controller with care as static charge may damage electronic components.
2. Ground: The various PCB mounting holes are connected to the ground plane.
3. Servicing: The board is not user serviceable or repairable. Warranty does not cover user error in connecting up to the driving board and is invalidated by unauthorized modification or repairs.
4. Driving board mounting: It is recommended that a clearance of at least 10mm is provided above and 5mm below the driving board when mounted. Additional consideration should be given to:
 - I Electrical insulation
 - I Grounding
 - I EMI shielding
 - I Cable management
 - I Heat and Ventilation
 - I Other issues that may affect safety or performance



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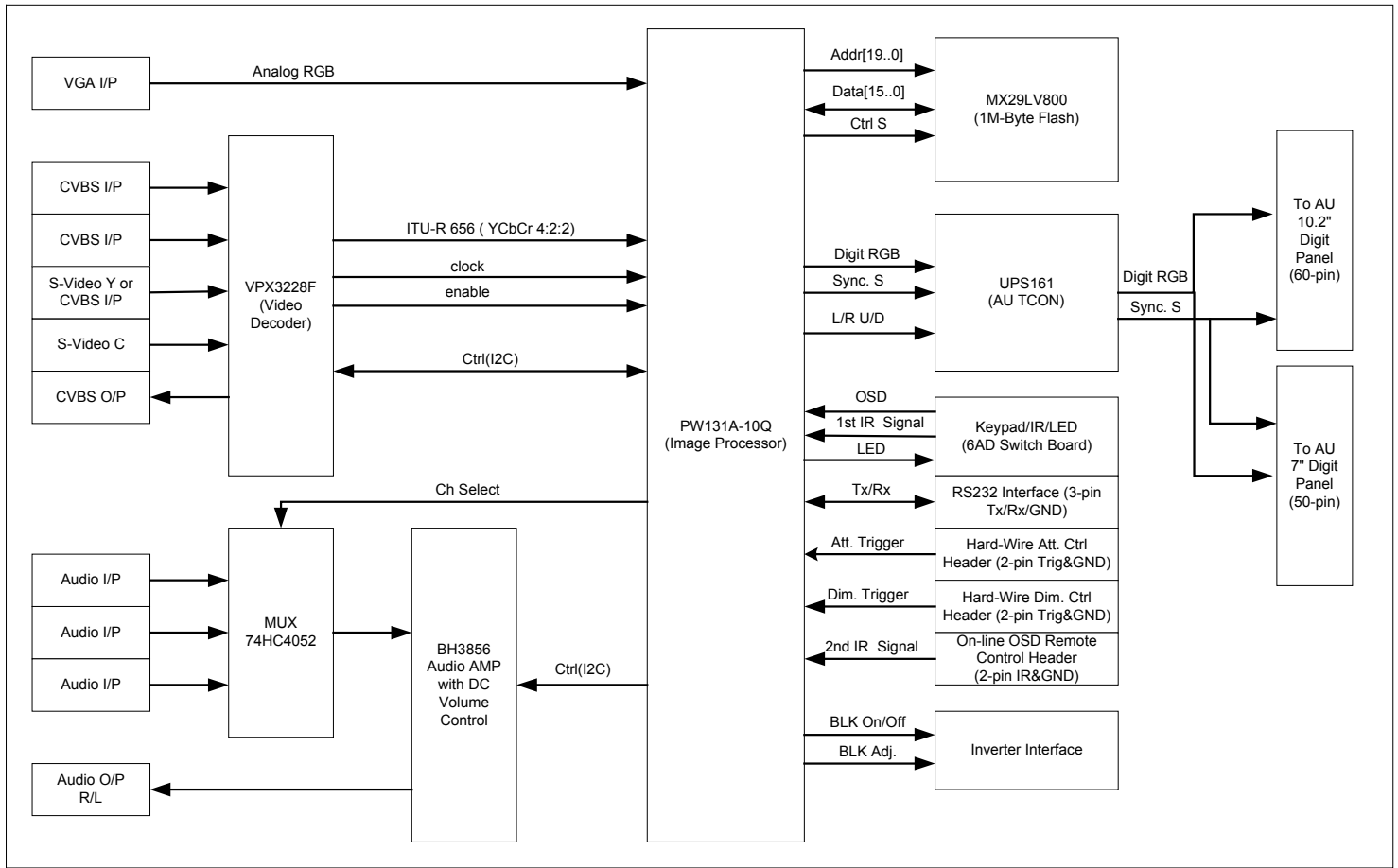
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E: System Design





F: Driving Board Function Block



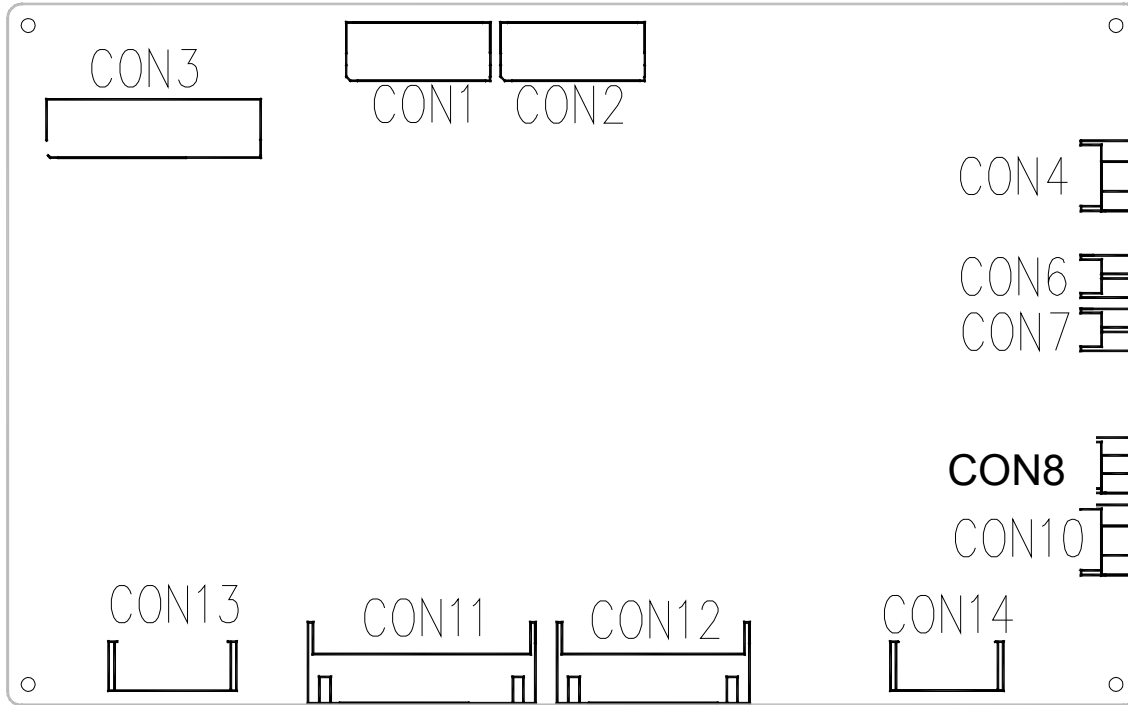


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G: Connectors and Pin Assignment

G-1: The various connectors:



G-2: Connectors

Ref.	Purpose	Equivalent Connector
CON1	FPC Connector to AU 10.2"	BL 112-30RU
CON2	FPC Connector to AU 10.2"	BL 112-30RU
CON3	FPC Connector to AU 7"	BL 112-50RU
CON4	Connector to Inverter	JST S4B-PH-K-S
CON5	None	None
CON6	HW/Attention Audio Control	JST S2B-PH-K-S
CON7	HW/Dimming Control	JST S2B-PH-K-S
CON8	RS232 with Level Shifting	Pin Header Pitch 2.54mm
CON9	None	None
CON10	SPI interface	JST S4B-PH-K-S
CON11	VGA Input	JST S16B-PHDSS-B
CON12	Video Input/Output	JST S10B-XH-A
CON13	Audio input/Output	JST S12B-XH-A
CON14	Power/Keypad Control	JST S14B-PHDSS-B
SW1	Panel/Scan mode Selection	DIP switch



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G-3: Pin Assignment

CON1: To AU VW01 10.2" Panel

FPC Connector: BL112-30RU or Equivalent

Pin no	Symbol	I/O	Description	Remark
1	POL	I	Polarity selection	
2	DIO2	I/O	Start pulse signal input/output (Vertical)	
3	OEV	I	Output enable	
4	CKV	I	CLK (Vertical)	
5	DIO1	I/O	Start pulse signal input/output (Vertical)	
6	GND	P	Power ground	
7	EDGSL	P	Select raising edge or raising/falling edge	
8	VCC	I	Digital voltage for source driver	
9	V9	P	Gamma voltage level 9	
10	VGL	P	Gate OFF voltage	
11	V2	P	Gamma voltage level 2	
12	VGH	P	Gate ON voltage	
13	V6	P	Gamma voltage level 6	
14	U/D	P	Up or Down display control	
15	VCOM	P	Common voltage	
16	GND	P	Power Ground	
17	AVDD1	P	Power supply for analog circuit	
18	V14	P	Gamma voltage level 14	
19	V11	P	Gamma voltage level 11	
20	V8	P	Gamma voltage level 8	
21	V5	P	Gamma voltage level 5	
22	V3	P	Gamma voltage level 3	
23	GND	P	Power Ground	
24	R5	I	Red data	
25	R4	I	Red data	
26	R3	I	Red data	
27	R2	I	Red data	
28	R1	I	Red data	
29	R0	I	Red data	
30	GND	P	Power Ground	

CON2: To AU VW01 10.2" Panel

FPC Connector: BL112-30RU or Equivalent

Pin no	Symbol	I/O	Description	Remark
1	GND	P	Power Ground	
2	G5	I	Green data	
3	G4	I	Green data	



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4	G3	I	Green data	
5	G2	I	Green data	
6	G1	I	Green data	
7	G0	I	Green data	
8	STHL	I/O	Start pulse signal input/output (Horizontal)	
9	REV	I	Control data are inverted or not	
10	GND	P	Power Ground	
11	DCLK	P	Sample clock	
12	DVDD	P	Voltage for digital circuit	
13	STHR	P	Start pulse signal input/output (Horizontal)	
14	LD (OEH)	I	Latch and switch data to output	
15	B5	I	Blue data	
16	B4	I	Blue data	
17	B3	I	Blue data	
18	B2	I	Blue data	
19	B1	I	Blue data	
20	B0	I	Blue data	
21	L/R	I	Right or Left display control	
22	V1	P	Gamma voltage level 1	
23	V4	P	Gamma voltage level 4	
24	V7	P	Gamma voltage level 7	
25	V10	P	Gamma voltage level 10	
26	V12	P	Gamma voltage level 12	
27	V13	P	Gamma voltage level 13	
28	AVDD2	P	Power supply for analog circuit	
29	GND	P	Power ground	
30	VCOM	P	Common voltage	

CON3: To AU VW01 7" panel

FPC Connector: BL112-50RU or Equivalent

Pin no	Symbol	I/O	Description	Remark
1	GND	P	Ground for gate drive	
2	VCC	P	Digital voltage for gate driver; +3.3V	
3	VGL	P	TFT low voltage; -10V	
4	VGH	P	TFT high voltage; 15V	
5	STVL	I/O	Start pulse signal input/output (Vertical)	
6	STVR	I/O	Start pulse signal input/output (Vertical)	
7	CKV	I	CLK (Vertical)	
8	U/D	I	Up or Down display control	
9	OEV	I	Output enable	
10	VCOM	I	VCOM voltage	
11	DIO1	I/O	Start pulse signal input/output (Horizontal)	



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12	AVDD	P	Analog voltage for source driver; +8.4V	
13	AVSS	P	Analog ground for source driver	
14	GND	P	Digital ground for source driver	
15	VCC (DVDD)	P	Digital voltage for source driver; +3.3V	
16	EDGSL	I	Select raising edge or raising/falling edge	
17	CLK	I	Sample CLK	
18	SHL(R/L)	I	Right or Left display control	
19	R0	I	Red data	
20	R1	I	Red data	
21	R2	I	Red data	
22	R3	I	Red data	
23	R4	I	Red data	
24	R5	I	Red data	
25	G0	I	Green Data	
26	G1	I	Green Data	
27	G2	I	Green Data	
28	G3	I	Green Data	
29	G4	I	Green Data	
30	G5	I	Green Data	
31	V1	I	Reference voltage	
32	V2	I	Reference voltage	
33	V3	I	Reference voltage	
34	V4	I	Reference voltage	
35	V5	I	Reference voltage	
36	V6	I	Reference voltage	
37	V7	I	Reference voltage	
38	V8	I	Reference voltage	
39	V9	I	Reference voltage	
40	V10	I	Reference voltage	
41	B0	I	Blue Data	
42	B1	I	Blue Data	
43	B2	I	Blue Data	
44	B3	I	Blue Data	
45	B4	I	Blue Data	
46	B5	I	Blue Data	
47	LD (OEH)	I	Latch and switch data to output	
48	REV	I	Control data are inverted or not	
49	POL	I	Polarity selection	
50	DIO2	I/O	Start pulse signal input/output (Horizontal)	

CON4: Inverter Connector

Connector Type: JST S2B-PH-K-S or Equivalent



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Pin no	Symbol	I/O	Description	Remark
1	VCC	P	+12V power	
2	GND	P	Power ground	
3	ADJ	I	Dimming adjustment	
4	ON/OFF	I	BLK ON/OFF control	

CON6: Hardware Attention/Audio control

Connector Type: JST S2B-PH-K-S

Pin no	Symbol	I/O	Description	Remark
1	Att	I	Attention signal input	Audio mute when 12V input
2	GND	P	Signal ground	

CON7: Hardware Dimming control

Connector Type: JST S2B-PH-K-S

Pin no	Symbol	I/O	Description	Remark
1	Dim	I	Dimming signal input	70% dimming when 12V input
2	GND	P	Signal ground	

CON9: RS232 Connector with level shifting

Connector Type: JST S3B-PH-K-S

Pin no	Symbol	I/O	Description	Remark
1	TX	O	Transmit pin	
2	GND	P	Signal ground	
3	DX	I	Receive pin	

CON10: SPI connector

Connector Type: JST S4B-PH-K-S

Pin no	Symbol	I/O	Description	Remark
1	SPI1	I/O	SPI1	
2	SPI2	I/O	SPI2	
3	SPI3	I/O	SPI3	
4	GND	P	Signal ground	

CON13: Audio Connector

Connector Type: JST S12B-XH-A

Pin no	Symbol	I/O	Description	Remark
1	Out R	O	Audio right output	
2	GND	P	ground	



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3	Out L	O	Audio left output	
4	GND	P	ground	
5	INR1	I	Audio channel 1 right input	
6	GND	P	ground	
7	INL1	I	Audio channel 1 left input	
8	GND	P	ground	
9	INR2		Audio channel 2 right input	
10	GND	P	ground	
11	INL2		Audio channel 2 left input	
12	GND	P	ground	
13	INR3		Audio channel 3 right input	
14	GND	P	ground	
15	INL3		Audio channel 3 left input	
16	GND	P	ground	

CON12: Video Connector

Connector Type: JST S10B-XH-A

Pin no	Symbol	I/O	Description	Remark
1	CVBSOUT	O	CVBS signal output	
2	GND	P	ground	
3	CVBS1	I	CVBS channel 1 input	
4	GND	P	ground	
5	CVBS2	I	CVBS channel 2 input	
6	GND	P	ground	
7	CVBS3	I	CVBS channel 3 input	
8	GND	P	ground	
9	NC			
10	NC			

CON11: VGA Connector

Connector Type: JST S16B-PHDSS-B

Pin no	Symbol	I/O	Description	Remark
1	5V_DSUB	P	5V power input	
2	DDC_SDA	I/O	DDC SDA	
3	DDC_SCL	I/O	DDC SCL	
4	Vsync	I	V sync	
5	Hsync	I	H sync	
6	GND	P	ground	
7	GND	P	ground	
8	RED	I	Red signal	
9	GND	P	ground	



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10	GREEN	I	Green signal	
11	GND	P	Ground	
12	BLUE	I	Red signal	

CON14: Power/Keypad Connector

Connector Type: JST S14B-PHDSS-B

Pin no	Symbol	I/O	Description	Remark
1	LED R	O	Audio right output	
2	VCC	P	Infrared power	
3	LED G	O	Audio left output	
4	GND	P	Keypad ground	
5	POWER	I	Power key	
6	VCC	P	Infrared power	
7	SOURCE	I	Source select key	
8	IR	I	Infrared input	
9	RIGHT		Right(Increment) key	
10	GND	P	Infrared ground	
11	MENU		Menu key	
12	VINSYS	P	Power input	
13	LEFT	I	Left(Decrement) key	
14	GNDSYS	P	Power ground	

SW1: Panel/Scan mode selection

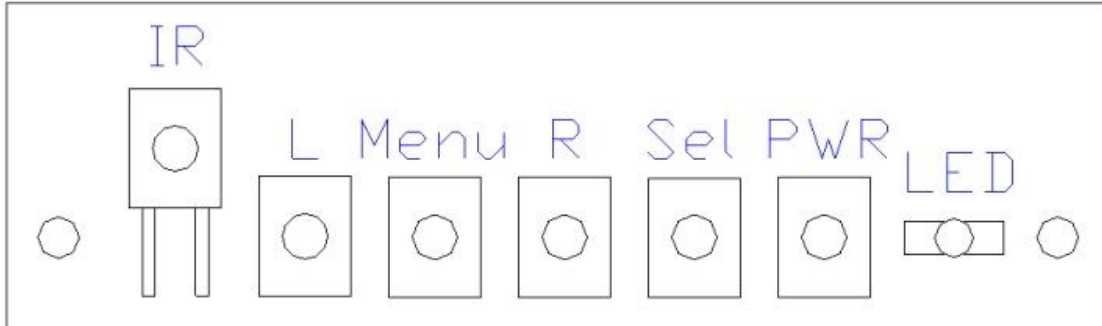
Switch Type: DIP switch

Panel Selection	1	2	3	4	5	6	7	8	11	12	Scan Selection		9	10		
	A070VW01	On	Off	Off	On	Off	On	On	Off	Off	On	UàD, LàR	Off	On	DàU, RàL	On
A102VW01	Off	On	On	Off	On	Off	Off	On	Off	Off	UàD, LàR	On	On	DàU, RàL	Off	Off



H: On Screen Display Settings (OSD)

A PCB assembly for OSD control setting is available as an optional item. Please refer to the following switch layout and description



- I Power On/Off control: PWR
- I Input Channel Selection: Sel
- I Turn-on and Switching OSD menu: Menu
- I Increase/decrease setting: L/R buttons

Displaying an OSD menu, if the buttons remain untouched for a few seconds, the screen will be disappeared and the existing parameters will be saved.

OSD function in VGA/Video mode

Mode	Menu	Range of Control
VGA	Brightness	0~100
	Contrast	0~100
	H Position	0~100
	V Position	0~100
	Phase	0~31
	Dimming	0~100
	Reset	Reset to default value
Video	Brightness	0~100
	Contrast	0~100
	Picture	0~100
	Tint	0~100
	Dimming	0~100
	Volume	0~100
	Zoom	4:3/16:9 control
	Reset	Reset to default value



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I: Graphic/Video Modes Supported

Mode	H Freq(KHz)	V Freq(Hz)
640 ·350@70hz	+31.500	-70.100
640 ·480@67hz	-35.000	-66.700
640 ·480@60hz	-31.469	-59.9404
640 ·480@72hz	-37.816	-72.809
640 ·480@75hz	-37.500	-75.000
720 ·400@70hz	-31.500	+70.100
800 ·480@60hz	-31.469	-59.9404
800 ·480@60hz	+37.900	+60.300
800 ·600@56hz	+35.156	+56.250
800 ·600@60hz	+37.900	+60.300
800 ·600@72hz	+48.100	+72.000
800 ·600@75hz	+46.880	+75.000
1024 ·768@60hz	-48.363	-60.004
1024 ·768@70hz	+56.500	+70.069
1024 ·768@75hz	+60.030	+75.030
1152 ·864@75hz	+67.500	+75.000
1280 ·960@60hz	+60.000	+60.000
1280 ·1024@60hz	+63.981	+60.020
1280 ·1024@75hz	+80.000	+75.000
NTSC S-Video	14.318	15.734
PAL S-Video	17.75	15.625
NTSC Composite	14.318	15.734
PAL Composite	17.75	15.625

J: Specifications

Power consumption	With AU 7" Panel: TBD With AU 10.2" Panel: TBD (not including Inverter power consumption)
Power load maximum	The controller has an overall 3Amp current limit
Input voltage	9-16V DC
Power protection	Fuse fitted
Storage temperature limits	-40°C to +90°C
Operating temperature limits	-30°C to +85°C

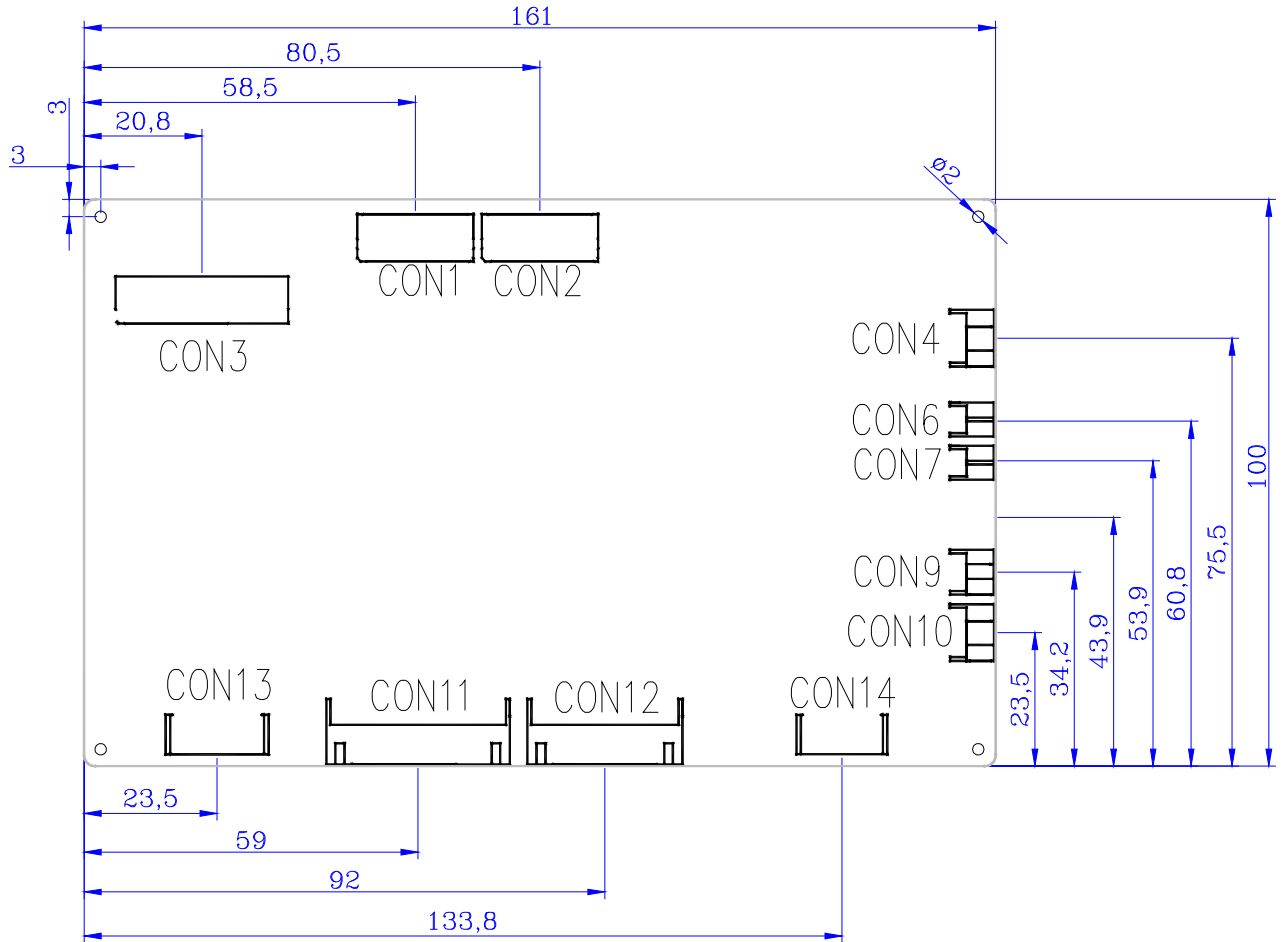
Note: Re-layout and custom development services are available.



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K: Mechanical Drawing (mm)





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- 5.2 THE LIABILITY OF PROMATE ARISING OUT OF THIS AGREEMENT OR ANY GOODS SOLD WILL BE LIMITED TO REFUND OF THE PURCHASE PRICE OR (WITH PROMATE'S PRIOR WRITTEN CONSENT) REPAIR OR REPLACEMENT OF PURCHASED GOODS (RETURNED TO PROMATE FREIGHT PRE-PAID); OR IN THE EVENT OF A FAILURE OR BREACH BY PROMATE REGARDING DELIVERY, AN AMOUNT EQUAL TO THE TOTAL PURCHASE PRICE OF THE GOODS THAT HAVE NOT BEEN DELIVERED DUE TO SUCH FAILURE.
- 5.3 Buyer will not return any goods without first obtaining a customer return order number.
- 5.4 AS A SEPARATE LIMITATION, IN NO EVENT WILL PROMATE BE LIABLE (i) FOR COSTS OF SUBSTITUTE GOODS, (ii) FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL, RELIANCE OR INDIRECT DAMAGES, OR (iii) FOR LOSS OF USE, OPPORTUNITY, MARKET POTENTIAL, GOODWILL AND/OR PROFIT ON ANY THEORY (CONTRACT, TORT, FROM THIRD PARTY CLAIMS OR OTHERWISE). THESE LIMITATIONS SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OR OF ANY FAILURE OR INADEQUACY OF ANY REMEDY. THIS AGREEMENT STATES THE ONLY AND EXCLUSIVE REMEDY FOR ANY AND ALL CLAIMS MADE AGAINST PROMATE UNDER ANY AGREEMENT AND/OR WITH RESPECT TO PANELS, COMPONENTS, SERVICES AND/OR GOODS.
- 5.5 No action or proceeding may be commenced by either party against the other (other than to collect money due for goods delivered or services rendered), whether for breach, indemnification, contribution or otherwise, more than one year after delivery of the goods to the carrier; and no claim may be brought unless the non-claiming party has first been given commercially reasonable notice, a full written explanation of all pertinent details (including copies of all materials), and a good faith opportunity to resolve the matter.
- 5.6 BUYER EXPRESSLY AGREES TO THE LIMITATIONS OF ARTICLES 5, 8 AND 9 AND TO THEIR REASONABLENESS.
- 5.7 The exclusions and limitations of Articles 5, 8 and 9 will survive the termination of the applicable Agreements, and shall apply notwithstanding any claim of a failure of any one or more remedies to accomplish their purpose, and THE PARTIES EXPRESSLY WAIVE AND RELINQUISH ANY CONTRARY RIGHTS UNDER ANY AGREEMENT, AND/OR LAW, DECISION, CUSTOM OR PRACTICE.

6 SUBSTITUTIONS AND MODIFICATIONS

Promate may at any time make substitutions for product ordered which do not materially and adversely affect overall performance with the then current specifications in the typical and intended use. Promate reserves the right to halt deliveries and shipments and alter specifications and prices without notice. Buyer shall verify that the literature and information is current before purchasing. Other changes to process and/or specifications by Promate shall be pursuant to Promate's standard ECN procedures.

7 CANCELLATION

- 7.1 This Agreement may not be canceled by Buyer except with written consent by Promate and Buyer's payment of reasonable cancellation charges (including but not be limited to expenses already incurred for labor and material, overhead, commitments made by Promate, and a reasonable profit).
- 7.2 In no event will Buyer have rights in partially completed goods.

8 INDEMNIFICATION

- 8.1 Promate will, at its own expense, assist Buyer with technical support and information in connection with any claim that any parts as shipped by Promate under this purchase order infringe any valid, enforceable, unexpired R.O.C. patent, copyright, or trademark, provided however, that Buyer (i) gives immediate written notice to Promate, (ii) permits Promate to participate and to defend if Promate requests to do so, and (iii) gives Promate all needed information, assistance and authority. However, Promate will not be responsible for infringements resulting from anything not entirely manufactured by Promate, or from any combination with products, equipment, or materials not furnished by Promate. Promate will have no liability with respect to intellectual property matters arising out of products made to Buyer's specifications, code, or designs.
- 8.2 Except as expressly stated in this Article 8 or in another writing signed by an authorized officer, Promate makes no representations and/or warranties with respect to intellectual and/or industrial property and/or with respect to claims of infringement.
- 8.3 Except as to claims Promate agrees in writing to defend, BUYER WILL INDEMNIFY, DEFEND AND HOLD HARMLESS PROMATE FROM ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING ATTORNEYS FEES) AGAINST AND/OR ARISING OUT OF GOODS SOLD AND/OR SHIPPED HEREUNDER.

9 NO CONFIDENTIAL INFORMATION

Promate shall have no obligation to hold any information in confidence except as provided in a separate non-disclosure agreement signed by both parties.

10 ENTIRE AGREEMENT

These terms and conditions are the entire agreement between Promate and Buyer, and no addition, deletion or modification shall be binding on Promate unless expressly agreed to in a writing signed by an officer of Promate. Buyer is not relying upon any warranty or representation except for those specifically stated here.

11 APPLICABLE LAW

This Agreement and all performance and disputes arising out of or relating to goods involved will be governed by the laws of Taiwan, Republic of China, without reference to conflict of laws principles and excluding the U.N. Convention on Contracts for the International Sale of Goods. Buyer agrees at its sole expense to comply with all applicable laws in connection with the purchase, use or sale of the goods provided hereunder.

12 DISPUTE RESOLUTION

- 12.1 Buyer and Promate shall cooperate and attempt in good faith to resolve any and all disputes arising out of and/or relating to this Agreement and/or goods furnished pursuant to this Agreement.
- 12.2 Any disputes relating to and/or arising out of any Agreement and/or goods furnished pursuant to this Agreement that cannot be so resolved will be decided exclusively by binding arbitration. Such arbitration shall take place in Taipei, Taiwan pursuant to the Rules for International Arbitration under the American Arbitration Association.
- 12.3 Notwithstanding anything to the contrary, any party may apply to any court of competent jurisdiction for interim injunctive relief with respect to irreparable harm which cannot be avoided and/or compensated by such arbitration proceedings, without breach of this Article 12 and without any abridgment of the powers of the arbitrators.

13 ATTORNEYS' FEES

Reasonable attorneys' fees and costs will be awarded to the prevailing party in the event of litigation involving the enforcement or interpretation of this Agreement.