

IPC.MNO21	Engineering Specifications Service Manual	
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OPEN FRAME 23.8 WIDE PCAP COD:IPC.MNO21

Edition: 2016-12-13

- **Preliminary Specification**
- **Final Specification**

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This monitor has been engineered and manufactured to assure your safety, and serious Electrical shock and other hazards can be prevented by observing the following precautions.

General safety precautions

1. Do not place heavy, wet, or magnetic material on the monitor or the power cord.
Never cover the ventilation openings with any material and never insert metal objects into the vent holes
2. Avoid operating the monitor in very hot, very humid, or very dusty places.
Temperature: 0~50°C
Humidity: 20~85% Relative Humidity
3. Make sure that the power cord and other cords are securely connected.
4. Overloaded AC outlets and extension cords are dangerous. Frayed power cords and broken plugs are also dangerous. They may result in a shock or fire hazard.
Call your service technician for replacement.
5. Do not use sharp tools like a pin or pencil on the LED surface. Scratching may result.
6. Do not use solvents such as benzene to clean the monitor. It will damage the LED surface.

Maintenance

Do not remove the monitor cover. There are no user serviceable components inside.

There are dangerous voltages inside, even when power is off.

If the display monitor does not operate properly, remove the power cord from the wall outlet, and contact your dealer.

Careless use and/or poor maintenance can cause serious problems.

This document provides technical data and theory of operation to aid in the repair of M TREE model GMEW238-L1P00C-EL.

The monitor uses a LGD type **LM238WF1**, 23.8inch TFT LED panel.

1. INSIDE SPECIFICATION

1. INSIDE SPECIFICATION

1-1. LED PANEL

1) Features

- RoHS compliance(Pb-free)
- High contrast ratio, High aperture structure, fast response time
- High speed response
- WUXGA resolution (1920 x 1080 pixels)
- Low power consumption
- Integral LED Backlight System
- DE mode
- LVDS (Low Voltage differential Signaling) interface (2 pixel/clock)

2) General information

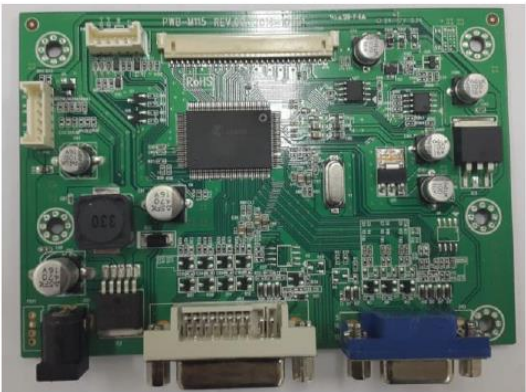
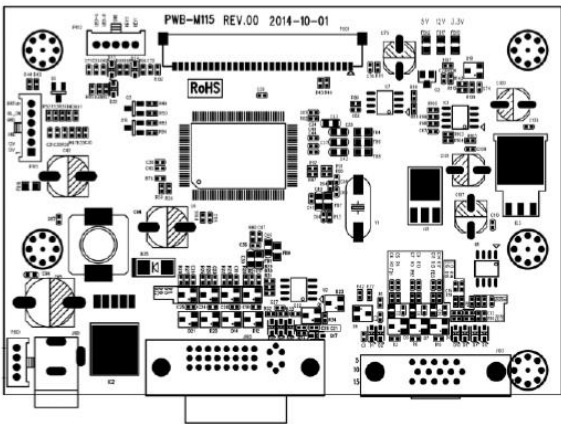
- **Display area:** 527.04mm (H) x 296.46mm (V)
- **Display color:** 16.7M color
- **Number of pixels:** 1920 x 1080 (WUXGA)
- **Pixel arrangement :** RGB vertical strips
- **Pixel pitch :** 0.274.5mm (H) x 0.274.5mm (W)
- **Display mode :** Normally Black
- **Input Voltage & Current :** DC12V , 2A
- **temperature :** Storage (-20 ~ 65°C), Operating (0 ~ 50°C)
- **Contrast Ratio :** 1000:1
- **Response Time :** 14msec,(Typ.)
- **Luminance of White :** 300cd/m²
- **Viewing Angle :** Hor L(89°) R(89°)
Ver H(89°) L(89°)

3) Operation Life Time :30,000 (Hour)

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1-2. MAIN BOARD

- 1) Model Name : MY BOARD
- 2) Scaler Maker : NOVATEK
- 3) Signal Input : RGB Analog (15Pin D-sub)
DVI
- 4) Support Voltage : DC12V 2.0A



NO	Location	Description
1	J101	DC POWER INPUT
2	J102	VGA (RGB Input)
3	J103	DVI Input
4	P101	INVERTER Interface
5	P102	KEY Interface
6	P501	LVDS Interface
7		
8		

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2. MODEL SPECIFICATION

2-1. Sync

- 1) **H-Frequency:** Timing chart reference
- 2) **V-Frequency:** Timing chart reference

3-2. POWER Requirements

- 1) **Power Source:** DC12V
- 2) **Power Consumption:** 22W

4-3. Touch : Projected Capacitive Touch (USB) / 10 points Multi Touch 5 mm Glass antivandalic
USB controller : ILITEK

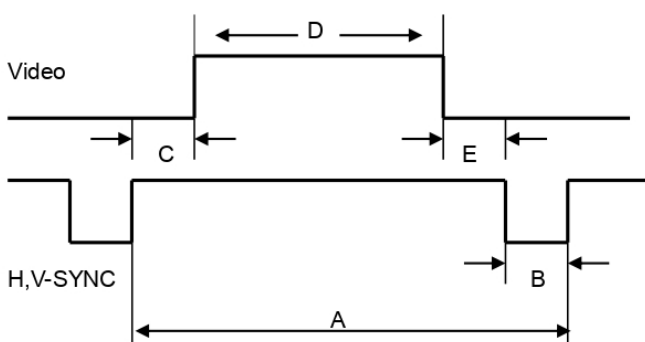
2-4. Frame : Open Frame

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The microprocessor measures the H-sync, V-sync and V-sync/H-sync polarity for RGB inputs, and uses this timing information to control all of the display operation to get the proper image on a screen.

This board can detect all VESA standard Graphic modes shown on the table below and provide more clear and stable image on a screen.

Timing Description

FH: H-Frequency

A: Total time

B: Sync time

C: Back porch

D: Active Area

E: Front Porch

Description		720x400@70	640x480@60	800x600@60	1024x768@60	1280x1024@60
Horizontal	FH	31.469KHZ	31.469KHZ	37.879KHZ	47.816KHZ	63.688KHZ
	A	31.777us	31.778us	26.4us	20.913us	15.706us
	B	3.8130us	3.813us	32.00us	1.718us	1.248us
	C	1.977us	1.589us	2.200us	2.394us	1.982us
	D	25.422us	25.422us	20.00us	16.126us	11.743us
	E	0.636us	0.318us	1.00us	0.756us	0.734us
	POL	Negative	Negative	Negative	Negative	Negative
Vertical	VH	70.087HZ	59.949HZ	60.317HZ	60.0HZ	59.799HZ
	A	14.268ms	16.683ms	16.579ms	16.689ms	16.696ms
	B	0.064ms	0.064ms	0.106ms	0.111ms	109.0us
	C	1.080ms	0.794ms	0.607ms	0.481ms	455.48us
	D	12.711ms	15.253ms	15.840ms	16.061ms	16.083ms
	E	0.413ms	0.064ms	0.026ms	0.062ms	48.119us
	POL	Positive	Negative	Positive	Positive	Positive

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Description		1360x768@60	1920x1080 @60
Horizontal	FH	31.469KHZ	67.158KHZ
	A	31.777us	14.896us
	B	3.8130us	1.156us
	C	1.977us	1.896us
	D	25.422us	11.098us
	E	0.636us	0.742us
	POL	Negative	Negative
Vertical	VH	70.087HZ	59.949HZ
	A	14.268ms	16.677ms
	B	0.064ms	0.074ms
	C	1.080ms	0.476ms
	D	12.711ms	16.081ms
	E	0.413ms	0.044ms
	POL	Positive	Negative

The monitor is compatible with additional modes within the one of following specified frequency ranges provided that they are different at least for one of the following:

Horizontal frequency: +/- 1 KHz

Vertical frequency: +/- 1Hz

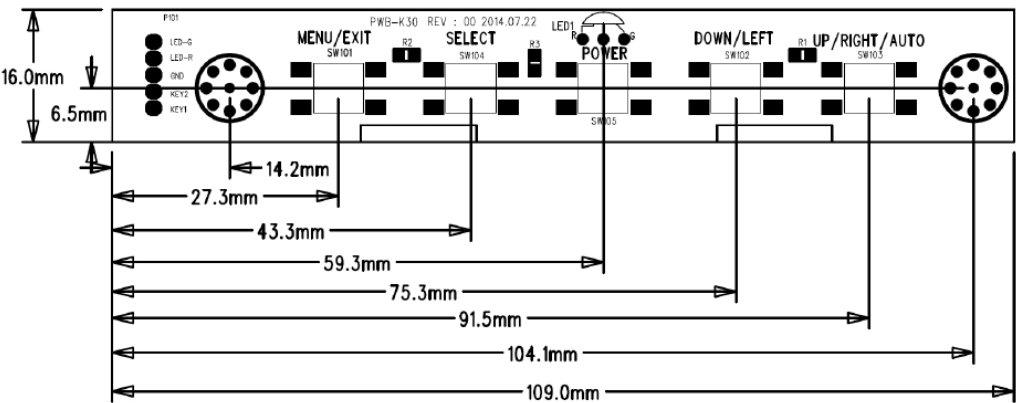
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4. OSD(On Screen Display)

4-1. OSD(On Screen Display) Control Button

The OSD (On Screen Display) provides certain functions to have clear image and others. This board supports 5 buttons OSD operation as a standard. The control functions defined on OSD operation are as below.



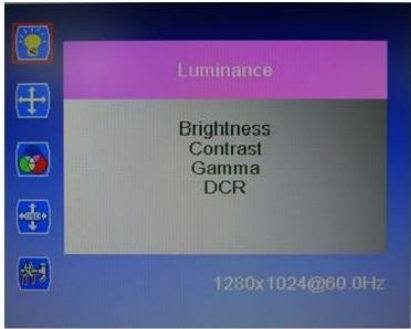
4-2. OSD(On Screen Display) Control

4.1 MAIN ICON

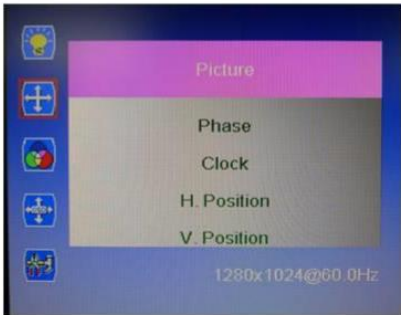
MAIN ICON	Description	Remark
ICON 1	LUMINANCE	
ICON 3	PICTURE	D-SUB ONLY
ICON 4	COLOR	
ICON 5	OSD SETTING	
ICON 6	SETUP	

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ICON 1 : LUMINANCE



ICON 2 : PICTURE



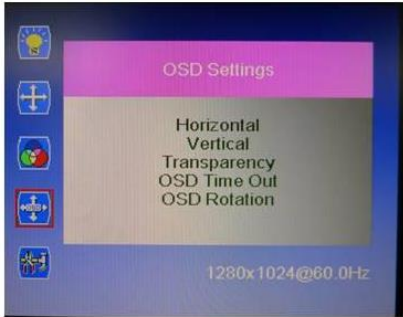
ICON 3 : COLOR



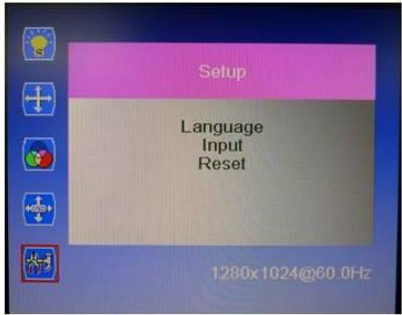
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ICON 4 : OSD Setting



ICON 5 : SETUP



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4.3 Menu Controls

Menu Controls			
	Item	Adjust	Remark
LUMINANCE	Brightness	0-100	
	Contrast	0-100	
	Gamma	ON/OFF	
	DCR	OFF/DCR/DBC	
PICTURE(D-SUB Only)	PHASE	0~100	
	CLOCK	0-100	
	H.POSITION	0~100	
	V.POSITION	0~100	
COLOR	Color temperature	6500K,7500K,8200K,9300K, 11500K,sRGB,User Define	
	Red	0~100	
	Green	0~100	
	Blue	0~100	
OSD setting	Horizontal	0~100	
	Vertical	0~100	
	Transparente	0~4	
	OSD TIMER	15(5~60Sec)	
Setup	LANGUAGE	English (English/Italian/French/Spanish/German/Portug	
	Mute	OFF(OFF/ON)	
	input	D-SUB/DVI	
	Display Size	4:3/Full Screen	
	Reset	No/Yes	

Hardware Controls	
Power Switch	Sub Power Switch
LED	Power/ Operation Lamp : Green,
Controls Switch	MENU/SELECT, ◀/▼, ▶/▲, AUTO/EXIT, POWER

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Environmental Conditions	
Operating Temperature Range	0°C to +50°C
Storage Temperature	-20°C to 70°C
Operating Relative Humidity	20% to 80% (Non-Condensing)
Storage Relative Humidity	10% to 90% (Non-Condensing)

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5. PCB Assembly Functional Description

5.1 Input Signal Specification

DVI Interface	
DVI Input Connector	DVI24-Pin Jack
Signal type	Base on TMDS technology

D-SUB Interface	
RGB Input Connector	D-Sub 15-Pin Jack (Female)
Signal type	Separate analog R,G,B
RGB Input Signals	700 mV full scale
RGB Signal Impedance	75 Ohms
RGB Sync Signals	TTL 2.2k ohm internal pull-up resistors.
DDC 1/2B	VER 1.3

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5.2. Electrical Connectors

DC Power Input (J101)

Pin	Description
1	GND
2	12v
3	GND

DVI Input (J102)

Pin	Signal	Pin	Signal	Pin	Signal
1	T.M.D.S Data2-	9	T.M.D.S Data1-	17	T.M.D.S Data0-
2	T.M.D.S Data2+	10	T.M.D.S Data1+	18	T.M.D.S Data0+
3	T.M.D.S Data2/4 shield	11	T.M.D.S Data1/3 shield	19	T.M.D.S Data0/5 shield
4	T.M.D.S Data4-	12	T.M.D.S Data3-	20	T.M.D.S Data5-
5	T.M.D.S Data4+	13	T.M.D.S Data3+	21	T.M.D.S Data5+
6	DDC Clock	14	+5V Power	22	T.M.D.S Clock shield
7	DDC Data	15	GND Shield	23	T.M.D.S Clock-
8	NC	16	Hot Plug Detect	24	T.M.D.S Clock+

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Pin	Signal	Pin	Signal
1	RED	9	5V
2	GREEN	10	GROUND
3	BLUE	11	NC
4	NC	12	SDA
5	GROUND	13	H-SYNC
6	RED_GND	14	V-SYNC
7	GREEN_GND	15	SCL
8	BLUE_GND		

INVERTER Interface (P101)

- Connector Type : SMW200-06

Pin	Description
1	+12V
2	+12V
3	GND
4	GND
5	BRIGHT CONTROL
6	INVERTER ON/OFF

KEY Interface (P102)

- Connector Type : SMW200-05

Pin	Description
1	LED_G

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2	LED_R
3	GND
4	KEY2
5	KEY1

LVDS Interface (P501)

- Connector Type : 12507WR-30

Pin	Signal	Pin	Signal
1	PANEL_VCC	16	RXO1-
2	PANEL_VCC	17	GND
3	PANEL_VCC	18	RXO0+
4	NC(Option)	19	RXO0-
5	NC	20	RXE3+
6	NC	21	RXE3-
7	GND	22	RXEC+
8	RXO3+	23	RXEC-
9	RXO3-	24	GND
10	RXOC+	25	RXE2+
11	RXOC-	26	RXE2-
12	RXO2+	27	RXE1+
13	RXO2-	28	RXE1-
14	GND	29	RXE0+
15	RXO1+	30	RXE0-

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5.3 PCB Assembly Dimension

