

# Engineering Specification

Model No. **EFL-2903ULI-D**  
29inches High resolution LCD Monitor

- LGD IPS type TFT LCD Panel with LED Backlight
- High performance up-Scaling characteristic
- Automatic Scanning, Wide Viewing Angle
- High Speed Response
- Enhanced Video Quality
- Test Pattern for Burn-in & Self Check
- Built in Dual LCD Panel
- RoHS Compliance
- Dual inputs(HDMI, DP), Optional inputs(VGA, DVI)
- 24V DC Input

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Approval No.: 29-LGD-CAT	Revision No.: N1.0	Issue Date: Jul. 11. 2014

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## 1. GENERAL DESCRIPTION

### 1-1. Overview

Effinet dual type LCD Monitor EFL-2903ULI-D is a high performance TFT LCD monitor providing high quality image from the HDMI input, DP input with dual display. Also, it can be use the VGA and DVI inputs mode.

This monitor supports wide range signal input from VGA to WUXGA resolution at vertical refresh rate of 60 to 75Hz. It includes integrated signal processing unit, named LSP (LCD Signal Processor), which had all electronic function for user application.

It is designed for industrial use with Auto power on, up scaling performance adequate for low-resolution application and enhanced design margin for reliability.

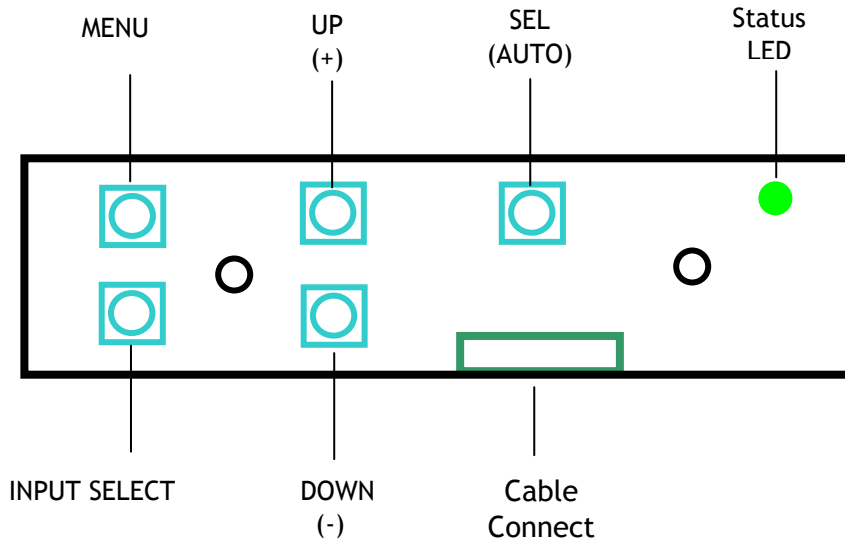
### 1-2. Quick reference table of Characteristics

Panel	Size	29" Diagonal
	Active Display Area	531.36 x 298.89 mm
	Type No.	AUO , M240HW02
	Number of Pixels	2560 (H) x 1080 (V)
	Pixel Arrangement	RGB Vertical Stripe
	Pixel Pitch	0.2628 mm x 0.2628 mm
	Color Depth	16.7M True Color
	Surface Treatments	Hard Coating (3H), Anti-glare
	Viewing Angle (CR≥10)	Horizontal :   ΘL   89 ΘR   89 Vertical :     Φ H  89 Φ L  89
	Contrast Ratio	Typ. 1000 : 1
	Response Time(Typ.)	Tr +Tf; 14ms
	Average Brightness	Typ. 300 cd/ m2
	Frame Rate	Typ. 60Hz, Max. 75Hz
	Panel Dimension(WHD)	693.6 x 308.9 x 17 mm
Backlight	LEDs	
Scanning Frequency	Horizontal	30 ~ 80KHz
	Vertical	50 ~ 75Hz

Resolution	Prime	2560 x 1080 @ 60 Hz
	Standard	720x400 @70 Hz, 640x480 @60 Hz 800x600 @56/60 Hz, 1024x768 @60 Hz 1280x768 @60 Hz, 1360x768 @60 Hz 1280x1024 @60Hz, 1440x900@60Hz 1680x1050 @ 60Hz
Input Signal	HDMI	TMDS link
	DP	Main link
	DVI → Optional	TMDS link
	VGA (Video / Sync) → Optional	RGB Analog (0.7Vp-p, 75ohms) / H/V Separate(TTL)
Sync	Type	Separate H/V sync, Composite, SOG(Sync-On-Green)
	Level	TTL level (V high ≥ 2.0V, V low ≤ 0.8V)
	Polarity	Positive or Negative
Input Signal Interface	VGA	15pin D-Sub
	DVI	24Pin D-Sub
	HDMI	19Pin HDMI
	DP	20 Pin DP
Power	DC Input	24V
	Max.power dissipation	85Watts
Regulation(Safety , Ergonomics, EMC)		TBD
Life time of Panel		Min. 30,000 hrs
Environmental Conditions	Operating	Temperature : 0 to 50°C / Humidity : 20 to 90%
	Storage	Temperature : -20 to 60°C / Humidity : 5 to 90%
White Color Temperature		10000°K : CIE x=0.313±0.015 / y=0.329±0.015
Demonstrated MTBF		More than 30,000 hours

## 2. USER CONTROL & OSD

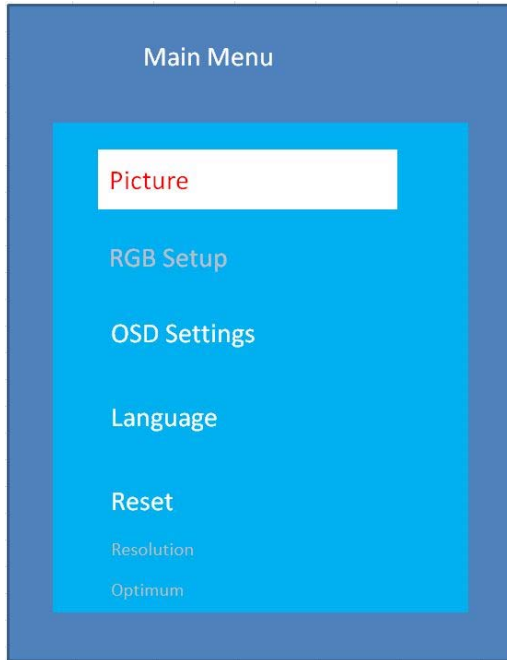
### 2-1. Key Control Board



SWITCH NAME	SWITCH FUNCTIONS
MENU	<ul style="list-style-type: none"> <li>▪ Activate / Deactivate the OSD Menu Window.</li> <li>▪ Move cursor to Sub Menu from Main menu.</li> </ul>
SEL	<ul style="list-style-type: none"> <li>▪ Move cursor in the Sub-Menu(Brightness ↔ Mode)</li> </ul>
UP(+)	<ul style="list-style-type: none"> <li>▪ Move cursor at Main Menu(Picture / Utility)</li> <li>▪ Increase the value of the selected function</li> </ul>
DOWN(-)	<ul style="list-style-type: none"> <li>▪ Move cursor at Main Menu(Picture / Utility)</li> <li>▪ Decrease the value of the selected function.</li> </ul>
INPUT SELECT (Enter)	<ul style="list-style-type: none"> <li>▪ Select the input signal (Display Port → HDMI → Display Port ...)</li> <li>▪ When power off / on, the last memorized input mode will be displayed.</li> <li>▪ Confirm your choice in the on-screen menu.</li> </ul>

→ The key control board is at side of the frame.

### 2-2. OSD Menu Screen



### 2-3. OSD Control Functions

CONTROL		FUNCTION
Information	Resolution	Displayed the resolution of input signal.
	Optimum	Displayed the optimum resolution of this model.
Picture	Brightness	Adjust the brightness level of the Display
	Contrast	Adjust the contrast level of the Display.
	Color Settings	Choose different preset color temperatures. (Normal/Warm/Cool) or set your own customized color parameters by Red, Green, Blue bar.
OSD Settings	H position	Adjust the position of the display horizontally.
	V position	Adjust the position of the display vertically.
	OSD Hold Time	Adjust the Hold time of OSD Menu
Language		Select the OSD languages(English, Española, French, Deutsch)
Reset		Recall the factory setting value.

### 3. CONNECTOR PIN DESCRIPTIONS

#### 3-1. HDMI PIN Configuration

Pin	Symbol	Pin	Symbol	Pin	Symbol
1	T.M.D.S. Data2+	8	TDMS Data0 Shield	15	DDC Clock(SCL)
2	TDMS Data2 Shield	9	T.M.D.S. Data0-	16	DDC Data(SDA)
3	T.M.D.S. Data2-	10	TDMS Clock+	17	CEC/GND
4	T.M.D.S. Data1+	11	TDMS Clock Shield	18	+5V Power
5	TDMS Data1 Shield	12	TDMS Clock-	19	HPD
6	T.M.D.S. Data1-	13	CEC		
7	T.M.D.S. Data0+	14	No Connection		

#### 3-2. Display Port Pin Configuration

Pin	Symbol	Pin	Symbol	Pin	Symbol
1	ML Lane 0+	8	ML Lane 2 Shield	15	AUX CH +
2	ML Lane 0 Shield	9	ML Lane 2-	16	GND
3	ML Lane 0-	10	ML Lane 3+	17	AUX CH -
4	ML Lane 1+	11	ML Lane 3 Shield	18	HPD
5	ML Lane 1 Shield	12	ML Lane 3-	19	RETURN
6	ML Lane 1-	13	CONFIG 1	20	DP POWER
7	ML Lane 2+	14	CONFIG 2		

3-3. 15 Pin D-SUB(VGA) Connector → Optional

Shape and pin number	Pin	Description	Pin	Description
	1	Red	9	No Connection
	2	Green	10	Ground - Sync
	3	Blue	11	No Connection
	4	Ground	12	DDC-SDA
	5	Ground	13	Horizontal Sync
	6	Ground - Red	14	Vertical Sync
	7	Ground - Green	15	DDC-SCL
	8	Ground - Blue		

3-4. DVI Connector → Optional

Pin	Symbol	Pin	Symbol	Pin	Symbol
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	TDMS Data2 Shield	11	TDMS Data1 Shield	19	TDMS Data 0 Shield
4	No Connection	12	No Connection	20	No Connection
5	No Connection	13	No Connection	21	No Connection
6	DDC Clock	14	+5V Power	22	TDMS Clock Shield
7	DDC Data	15	Ground (H/V Sync, 5V return)	23	TDMS Clock+
8	Analog Vertical Sync	16	Hot Plug Detect	24	TDMS Clock-



**4. STANDARD DISPLAY MODE**

No.	Mode	Resolution	Horizontal		Vertical		Pixel clock
			Frequenc y	Polarity	Frequenc y	Polarity	
1	VGA	720 x 400	31.47 KHz	N	70.0 Hz	P	28.322 MHz
2		640 x 480	31.47 KHz	N	60.0 Hz	N	25.175 MHz
3	SVGA	800 X 600	35.16 KHz	N / P	56.3 Hz	N / P	36.000 MHz
4		800 X 600	37.88 KHz	P	60.3 Hz	P	40.000 MHz
5	XGA	1024 X 768	48.36 KHz	N	60.0 Hz	N	65.000 MHz
6	WXGA	1280 X 768	47.7 KHz	N	60.0 Hz	P	80.152 MHz
7		1360 X 768	60.0 KHz	N	60.0 Hz	P	85.496 MHz
8		1366 X 768	60.2 KHz	N	60.0 Hz	P	85.496 MHz
9		1440 X 900	55.56 KHz	N	60.0 Hz	P	89.000 MHz
10	SXGA	1280 X 1024	63.98 KHz	P	60.0 Hz	P	108.00 MHz
11	WSXGA	1680 X 1050	64.674KHz	N/P	60.0Hz	N/P	147 MHz
12	WUXGA	1920 X 1080	67.5KHz	N/P	60.0Hz	N/P	148.5MHz
13	U-WUXGA	2560 x1080	66.7KHz	N/P	60.0Hz	N/P	185.58MHz

### 5. MECHANICAL STRUCTURE

