

Engineering Specification

Model No. **EFL-2903U**

29inches High resolution LCD Monitor

- **LGD Ultra WUXGA TFT LCD Panel**
- **High performance up-Scaling characteristic**
- **Automatic Scanning**
- **Wide Viewing Angle, High Speed Response**
- **Enhanced Video Quality**
- **Test Pattern for Burn-in & Self Check**
- **4 Inputs(VGA, DVI, DP, HDMI)**
- **12V DC Input**
- **RoHS Compliance**

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1. GENERAL DESCRIPTION

1-1. Overview

Effinet open frame LCD Monitor EFL-2903ULI is a high performance TFT LCD monitor providing high quality image from the analog VGA and DVI, DP, HDMI inputs. This monitor supports wide range signal input from VGA to Ultra WUXGA resolution at vertical refresh rate of 60 Hz. 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.

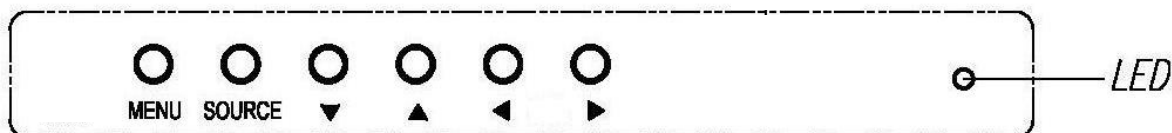
1-2. Quick reference table of Characteristics

Panel	Size	29" Diagonal
	Active Display Area	672.768 x 283.824mm
	Type No.	LGD, LM290WW1
	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 : Θ H 178degrees Vertical : Θ V 178degrees
	Contrast Ratio	Typ. 1000 : 1
	Response Time	14ms (GTG)
	Average Brightness	Typ. 300 cd/ m ²
	Frame Rate	Typ. 60Hz
	Panel Dimension	693.6 x 308.9 x 17 mm
	CCFT	LEDs
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	VGA (Video / Sync)	RGB Analog (0.7Vp-p, 75ohms) / H/V Separate(TTL)
	DVI	TMDS link
	HDMI	TMDS link
	DP	Main/Aux/HPD
Sync	Type	Separate H/V sync, Composite, SOG(Sync-On-Green)
	Level	TTL level (V high $\geq$ 2.0V, V low $\leq$ 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	12V
	Max. power dissipation	40Watts
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 $x=0.313\pm0.015$ / $y=0.329\pm0.015$
Demonstrated MTBF		More than 30,000 hours

2. USER CONTROL & OSD

2-1. Key Control Board



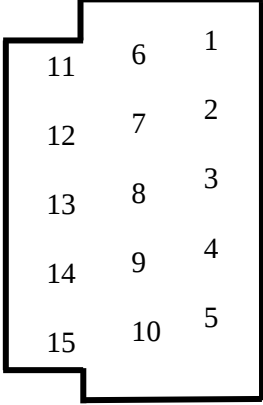
SWITCH NAME	SWITCH FUNCTIONS
MENU	▪ Displays the main on-screen menu.
SOURCE	▪ Selects the input source and confirms your choice
▼ and ▲	▪ Navigates through the on-screen menu.
◀ and ▶	▪ Selects or adjusts items on the on-screen menu.

2-2. OSD Control Functions

CONTROL	FUNCTION
Auto Tracking	Automatic screen adjustment process. If there is any noise on the screen or screen shift, just press “SEL” button. Since this monitor is equipped with “Auto Tracking” function, it will automatically configure the monitor setting.
Brightness	Adjust the brightness level of the Display
Contrast	Adjust the contrast level of the Display.
H position	Adjust the position of the display horizontally.
V position	Adjust the position of the display vertically.
Frequency	Adjust the clock frequency of the display
Phase	Adjust the clock phase of the display.
Language	Select the OSD language
Color Temp	Change color temperatures Normal/Cool/User Adjust the Red/ Green / Blue Gain in User mode.
Reset	Restore the original setting value.
Self Test Pattern	To enter auto burn-in mode, press “Up” key first and then “Sel” key simultaneously for 3 seconds. On this mode, Red – Green – Blue – White – Black test pattern will be displayed. Press Menu key for returning normal display mode.

3. CONNECTOR PIN DESCRIPTIONS

3-1. 15 Pin D-SUB Connector

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

3-2. DVI Connector

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-

3-3. 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		

3-4. 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		

4. STANDARD DISPLAY MODE

No.	Mode	Resolution	Horizontal		Vertical		Pixel clock
			Frequency	Polarity	Frequency	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