

Engineering Specification

Model No. EFL-1903X

19inches High resolution LCD Monitor

*Customer's logo display
on Booting is available*



- **Samsung/LG-Philips TFT LCD Panel**
- **High performance up-Scaling characteristic**
- **Automatic Scanning**
- **Wide Viewing Angle, High Speed Response**
- **Enhanced Video Quality**
- **Power Supply with enhanced Design Margin**
- **Test Pattern for Burn-in & Self Check**
- **Option**
 - **3 Input (RGB, AV, SVHS)**
 - **DVI Input**
 - **Touch Screen(3M, ...)**
 - **Stereo Audio Amplifier**

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1. GENERAL DESCRIPTION

1-1. Overview

Effinet open frame LCD Monitor EFL-1903X is a high performance TFT LCD monitor providing high quality image from the analog RGB input.

This monitor supports wide range signal input from VGA to SXGA 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

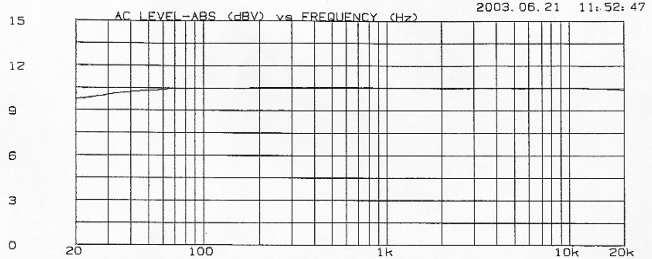
It also gives versatile optional features like, DVI input, Video input, Touch Screen, Stereo Audio amplifier, Boot up custom logo and custom designed frame.

1-2. Quick reference table of Characteristics

Panel (S/S)	Size	19" Diagonal
	Active Display Area	376.32 x 301.056 mm
	Type No.	Samsung, LTM190E1
	Number of Pixels	1280 (H) x 1024 (V)
	Pixel Arrangement	RGB Vertical Stripe
	Pixel Pitch	0.294 mm x 0.294 mm
	Color Depth	16.7M True Color
	Surface Treatments	Hard Coating (3H), Haze 44%
	Viewing Angle (CR≥10)	Horizontal : Θ L 85 degrees Θ R 85 degrees Vertical : Φ H 85 degrees Φ L 85 degrees
	Contrast Ratio	Typ. 500 : 1
	Response Time	Rise time(tr) : 15ms(Typ.) Fall time(tf) : 10ms(Typ.)
	Average Brightness	Typ. 250 cd/ m ²
	Frame Rate	Typ. 60Hz, Max. 75Hz
	Panel Dimension	(WHD) 404.2 x 330.0 x 20.0 mm
CCFT	4 Lamps (2 Dual)	

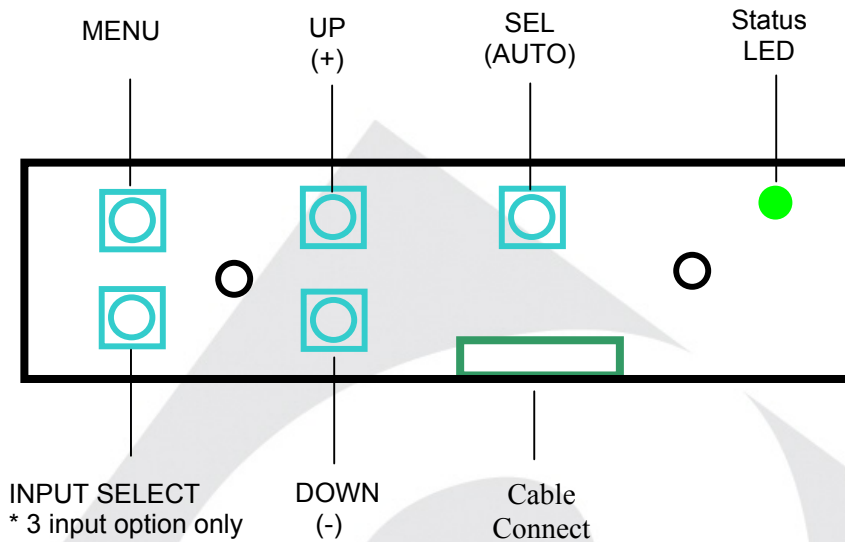
Panel (LG)	Size	19" Diagonal
	Active Display Area	376.32 x 301.056 mm
	Type No.	LG-Philips, LM190E01
	Number of Pixels	1280 (H) x 1024 (V)
	Pixel Arrangement	RGB Vertical Stripe
	Pixel Pitch	0.294 mm x 0.294 mm
	Color Depth	16.7M True Color
	Surface Treatments	Hard Coating (3H), Haze 44%
	Viewing Angle (CR≥10)	Horizontal: Θ L 88 degrees Θ R 88 degrees Vertical: Φ H 88 degrees Φ L 88 degrees
	Contrast Ratio	Typ. 400 : 1
	Response Time	Rise time (tr): 12ms(Typ.) Fall time (tf): 13ms(Typ.)
	Average Brightness	Typ. 250 cd/ m ²
	Frame Rate	Typ. 60Hz, Max. 75Hz
	Panel Dimension	(WHD) 404.2 x 330.0 x 22.3 mm
CCFT	4 Lamps (2 Dual)	

Scanning Frequency	Horizontal	30 ~ 80 KHz
	Vertical	50 ~ 75 Hz
Resolution	Prime	1280 x 1024 @ 60 Hz
	Standard	720x400 @70 Hz 640x480 @60/67/72/75 Hz 800x600 @56/60/72/75 Hz 1024x768 @60/70/75 Hz 1280x1024 @60/75 Hz
Input Signal	RGB (Video / Sync)	RGB Analog (0.7Vp-p, 75ohms) / H/V Separate (TTL)
	CVBS	Composite Video 1Vp-p, 75ohms
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	RGB	15pin D-Sub
	Video	RCA Jack - 1 ea.
	S-Video	SVHS Jack - 1 ea.
Compatible Color System		NTSC M / NTSC 4.43 / PAL M / PAL N / SECAM
Power	AC Input	AC 90 ~ 265V @60/50Hz
	max. power dissipation	35Watts
	Adapter Rating	12V 5A
Regulation(Safety , Ergonomics, EMC)		CUL (UL+CSA), CE, FCC
Environmental Conditions	Operating	Temperature: 10 to 50°C / Humidity: 8 to 80%
	Storage	Temperature: -20 to 70°C / Humidity: 5 to 90%
White Color Temperature		9300°K: CIE $x=0.281\pm0.015$ / $y=0.311\pm0.015$ 6500°K : CIE $x=0.313\pm0.015$ / $y=0.329\pm0.015$
Demonstrated MTBF		More than 20,000 hours
<i>Touch Screen</i> <i>(Optional)</i>	Touch Panel	3M Touch / 13-5471-01MA
	Controller	EXII-1060SC (Serial) or EXII-5050UC (USB)
	Controller Interface	Serial or USB Interface
<i>Audio</i> <i>(Optional)</i>	Mono / Stereo	Stereo
	Input Audio Jack	3.5mm mini jack

<i>Audio</i> <i>(Optional)</i>	Audio Output	Nominal 1.3 Wrms at 8 ohms <i>* No external power for audio operation is needed</i>
	Speaker Connector	Molex 5240 : 2p(Left), 3p(Right) ; <i>* Speaker side : Molex 5102</i>
	S/N Ratio	Over than 80dB
	THD	Under 10% (THD : Total Harmonic Distortion)
	Frequency Response	 <p>AC LEVEL-ABS (dBV) vs FREQUENCY (Hz) 2003.06.21 11:52:47</p>

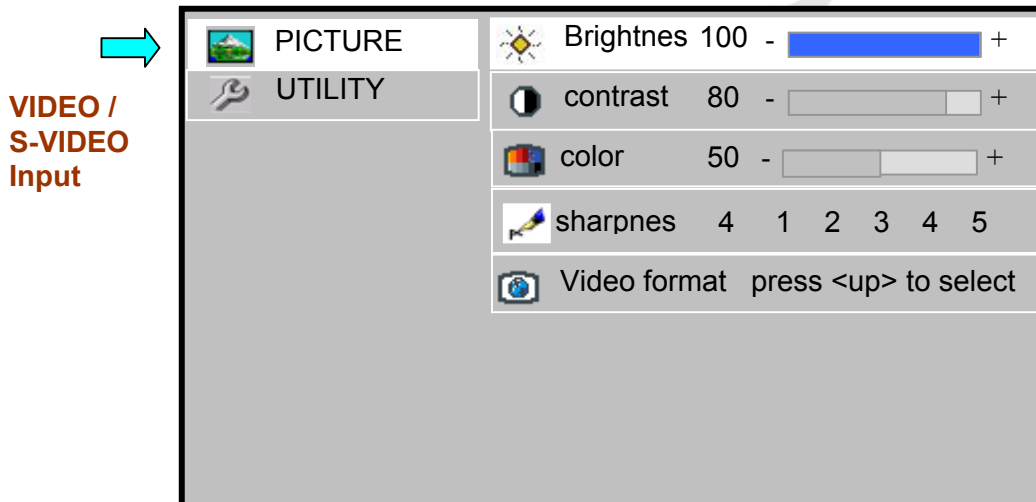
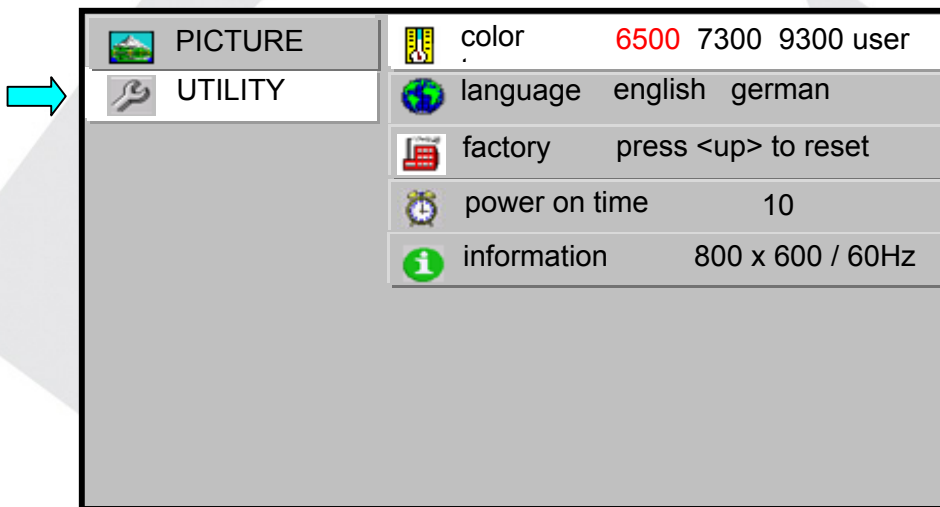
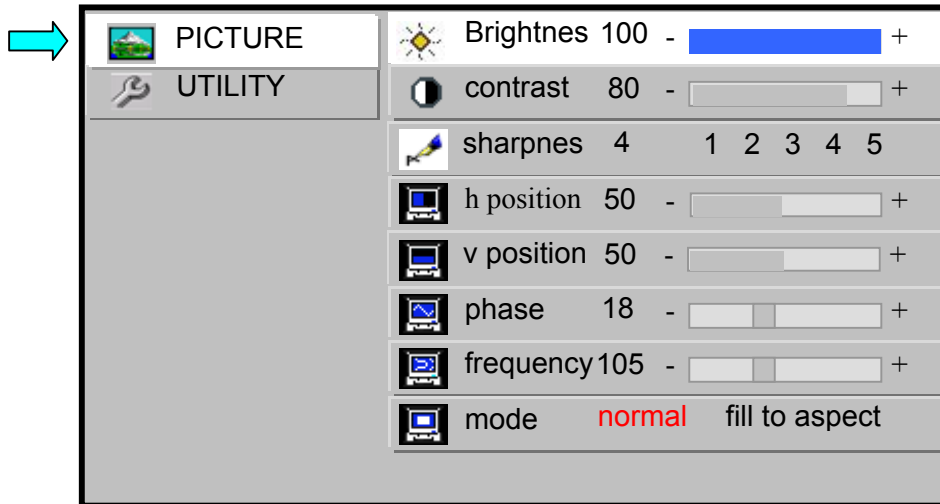
2. USER CONTROL & OSD

2-1. Description of Control Key



SWITCH NAME	SWITCH FUNCTIONS
MENU	<ul style="list-style-type: none"> ▪ Activate / Deactivate the OSD Menu Window. ▪ Move cursor to Main Menu from sub-menu.
SEL (AUTO)	<ul style="list-style-type: none"> ▪ Move cursor in the Sub-Menu(Brightness ↔ Mode) ▪ Auto Tracking (Pressing "SEL" key)
UP(+)	<ul style="list-style-type: none"> ▪ Move cursor at Main Menu(Picture / Utility) ▪ Increase the value of the selected function
DOWN(-)	<ul style="list-style-type: none"> ▪ Move cursor at Main Menu(Picture / Utility) ▪ Decrease the value of the selected function.
INPUT SELECT	<ul style="list-style-type: none"> ▪ Select the input signal(RGB → Video → S-Video → RGB...) ▪ When power off / on, the last memoried input mode will be displayed. ▪ Apply for 3 input model.

2-2. OSD MENU SCREEN



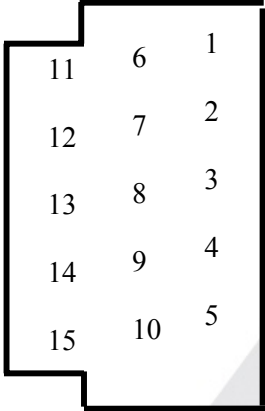
2-3. OSD Control Functions

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.
Sharpness	Adjust the sharpness level of the Display
H position	Adjust the position of the display horizontally.
V position	Adjust the position of the display vertically.
Phase	Adjust the clock phase of the display.
Frequency	Adjust the clock frequency of the display
Mode	Select the video aspect ratio. It depends on the input video format.
COLOR TEMP	Choose different preset color temperatures (6500/7300/9300) or set your own customized color parameters.
Red /Green / Blue GAIN	Adjust the Red/ Green / Blue Gain
Language	Select the OSD language
Factory recall	Recall the factory setting value.
Power On time	Displayed the total power on time.
Information	Displayed the resolution of input signal
Color	Set the color (saturation) level
Tint(Hue)	Set the hue level. Only for the “NTSC” system
Video Format	Select the corresponding input video system. “Auto” setting means monitor automatically recognize the input video system. – Default setting AUTO, NTSC M, NTSC 4.43, PAL M, PAL BGDHI, PAL N SECAM
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.

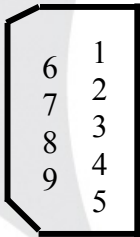
- * Brightness and Contrast value can be set individually for each input mode.
- * Color Temperature can be set individually for RGB and Video (S-Video).

3. CONNECTOR PIN DESCRIPTIONS

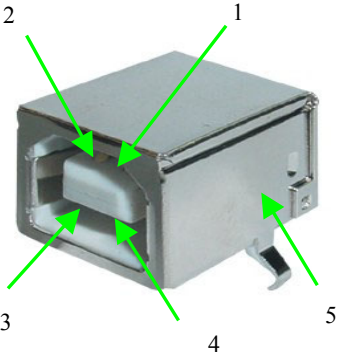
3-1. 15 Pin D-SUB Connector

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

3-2. Serial(RS-232C) Connector

Shape and pin number	Pin	Description	Pin	Description
	1	DCD	6	DSR
	2	RXD	7	RTS
	3	TXD	8	CTS
	4	DTR	9	N/A
	5	Ground		

3-3. USB Connector

Shape and pin number	Pin	Description
	1	+5V
	2	DATA (DN)
	3	DATA (DP)
	4	0V
	5	Cable Shield Shell

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		640 x 480	35.00 KHz	N	66.7 Hz	N	30.240 MHz
4		640 x 480	37.86 KHz	N	72.8 Hz	N	31.500 MHz
5		640 x 480	37.50 KHz	N	75.0 Hz	N	31.500 MHz
6	SVGA	800 X 600	35.16 KHz	N / P	56.3 Hz	N / P	36.000 MHz
7		800 X 600	37.88 KHz	P	60.3 Hz	P	40.000 MHz
8		800 X 600	48.08 KHz	P	72.2 Hz	P	50.000 MHz
9		800 X 600	46.87 KHz	P	75.0 Hz	P	49.500 MHz
10		832 X 624	49.73 KHz	N	74.6 HZ	N	57.284 MHz
11	XGA	1024 X 768	48.36 KHz	N	60.0 Hz	N	65.000 MHz
12		1024 X 768	56.49 KHz	N	70.1 Hz	N	75.000 MHz
13		1024 X 768	60.02 KHz	P	75.0 Hz	P	78.750 MHz
14	SXGA	1280 X 1024	63.98 KHz	P	60.0 Hz	P	108.00 MHz
15		1280 X 1024	79.98 KHz	P	75.0 Hz	P	135.00 MHz

5. MECHANICAL STRUCTURE

