

Engineering Specification

Model No. **EFL-2402H**

23.8inches High resolution LCD Monitor

- Ordering information

- 23.8" LCD without Glass/Touch
 - EFL-2402HUI
- 23.8" LCD with 3M Capacitive Touch Screen
 - EFL-2402HLIT
- 23.8" LCD with Tempered Glass
 - EFL-2402HLIG

- AUO VA type TFT LCD Panel with LED backlight
- 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
- 2 Inputs(VGA, DVI)
- RoHS Compliance

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5-1. EFL-2402HUI	오류! 책갈피가 정의되어 있지 않습니다.
5-2. EFL-2402HUIT/2402HUIG	오류! 책갈피가 정의되어 있지 않습니다.

1. GENERAL DESCRIPTION

1-1. Overview

Effinet open frame LCD Monitor EFL-2402HUI is a high performance TFT LCD monitor providing high quality image from the analog VGA and DVI inputs with optional 3M capacitive touch screen or tempered glass. This monitor supports wide range signal input from VGA to WUXGA resolution at vertical refreshrate 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

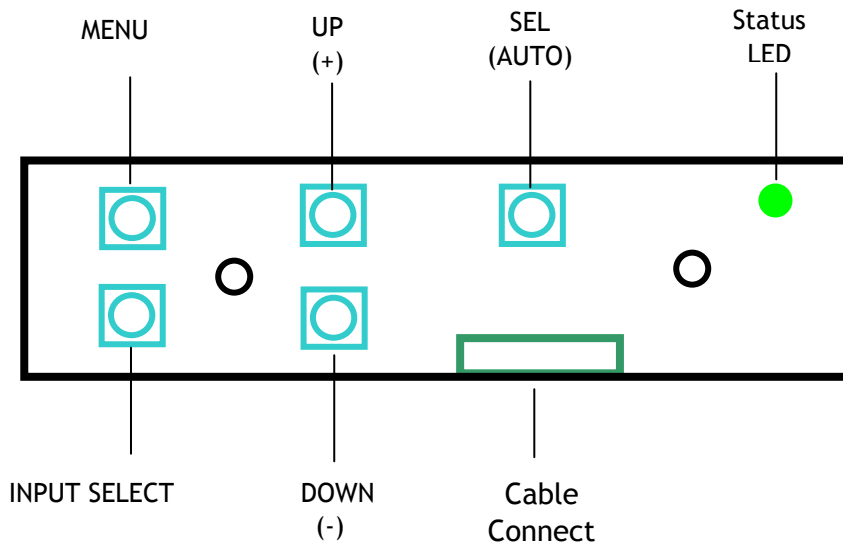
1-2. Quick reference table of Characteristics

Panel	Size	23.8" Diagonal
	Active Display Area	527.04 x 296.46mm
	Type No.	AUO, M238HVN01.0
	Number of Pixels	1920 (H) x 1080 (V)
	Pixel Arrangement	RGB Vertical Stripe
	Pixel Pitch	0.2745mm x 0.2745mm
	Color Depth	16.7M True Color
	Surface Treatments	Hard Coating (3H), Anti-Glare
	Viewing Angle (CR≥10)	Horizontal : 0L 89degrees 0L 89degrees Vertical : 0L 89degrees 0L 89degrees
	Contrast Ratio	Typ. 3000 : 1
	Response Time	Tr+Tf : 12ms
	Average Brightness	Typ. 250 cd/ m ²
	Frame Rate	Typ. 60Hz (50Hz ~ 75Hz)
	Panel Dimension	543.0 x 317.4 x 11.2mm
Backlight	LEDs	
Resolution	Prime	1920 x 1080 @ 60 Hz

	Standard	720x400 @70 Hz, 640x480 @60 Hz 800x600 @56/60 Hz, 1024x768 @60 Hz 1280x768 @60/75 Hz, 1360x768@60 Hz 1600x900@60Hz, 1280x800@60/75Hz 1280x1024 @60/75Hz, 1680 x 1050 @ 60 Hz
Input Signal	VGA (Video / Sync)	RGB Analog (0.7Vp-p, 75ohms) / H/V Separate(TTL)
	DVI	TMDs link
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
Power	AC Input	AC 90 ~ 265V @60/50Hz, Universal Power
	Max. power dissipation	40Watts
	Power Supply	Built in Power Supply (SMPS)
Regulation(Safety , Ergonomics, EMC)		TBD
Environmental Conditions	Operating	Temperature : 0 to 50°C / Humidity : 10 to 90%
	Storage	Temperature : -20 to 60°C / Humidity : 10 to 90%
White Color Temperature		6500°K : CIE x=0.313 \pm 0.015 / y=0.329 \pm 0.015
Demonstrated MTBF		More than 30,000 hours
Touch Screen → EFL-2402HUIT	Touch Panel	3M Touch/98-0003-3875-0(Serial) 98-0003-3375-1(USB)
	Controller	EXII-7720SC(Serial)/EXII-7769UC(USB)
	Interface	Serial or USB Interface
Glass → EFL-2402HUIG		Semi Tempered, 3mm thickness, Glare type

2. USER CONTROL & OSD

2-1. Key Control Board



SWITCH NAME	SWITCH FUNCTIONS
MENU	<ul style="list-style-type: none"> • Activate / Deactivate the OSD Menu Window. • Move cursor to Sub Menu from Main 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 (VGA → DVI → VGA...) • When power off / on, the last memorized input mode will be displayed. • Apply for 2 inputs model.(VGA,DVI)

2-2. OSD Menu Screen

- Picture OSD

PICTURE	1920 X 1080	60Hz
Brightness	⇩	50 ⇧
Contrast	⇩	80 ⇧
H Position	⇩	52 ⇧
V Position	⇩	32 ⇧
Phase	⇩	9 ⇧
Frequency	⇩	51 ⇧
Auto Adjust		

- Utility OSD

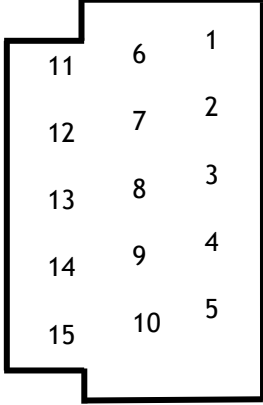
UTILITIES	1920 X 1080	60Hz
Color Temp		6500
Language		ENGLISH
Factory		

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.
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
Color Temp	Change color temperatures Adjust the Red/ Green / Blue Gain
Language	Select the OSD language
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 PIN Configuration

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 Data0 Shield
4	No Connection	12	No Connection	20	No Connection
5	No Connection	13	No Connection	21	No Connection
6	DDC Clock(SCL)	14	+5V Power	22	TDMS Clock Shield
7	DDC Data(SDA)	15	Ground (H/V Sync, 5V return)	23	TDMS Clock+
8	No Connection	16	Hot Plug Detect	24	TDMS Clock-

3-3. Serial (RS-232C) Connector- EFL-2402HUIT model

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		

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		1280 X 768	60.35KHz	N	75.0 Hz	P	102.353MHz
8		1360 X 768	60.0 KHz	N	60.0 Hz	P	85.496 MHz
9		1280 X 800	48.635KHz	N/P	60.0Hz	N/P	68.900MHz
10		1280 X 800	62.0KHz	N/P	75.0Hz	N/P	89.0 MHz
11	HD+	1600 X 900	60.0 KHz	N/P	60.0 Hz	N/P	108.0 MHz
12	SXGA	1280 X 1024	63.98 KHz	P	60.0 Hz	P	108.00 MHz
13		1280 X 1024	79.98 KHz	P	75.0 Hz	P	135.00 MHz
14	WSXGA	1680 X 1050	64.674KHz	N/P	60.0Hz	N/P	119 MHz
15	WUXGA	1920 X 1080	67.5KHz	N/P	60.0Hz	N/P	148.5MHz