# EL640.480-AM SERIES

## ICEBRITE<sup>™</sup> EL VGA DISPLAYS





## AM Series 10.4" VGA Flat Panel Displays

This manual supports these Planar ICEBrite displays:

- ♦ EL640.480-AM1
- EL640.480-AM8 IN (Industrial version)
- EL640.480-AM8 ET (Extended Temperature version)

The AM series of 10.4" diagonal VGA products offers designers an affordable and easily-implemented path to incorporate flat panel solutions to meet display requirements.

Utilizing Planar's proprietary ICEBrite technology (Integrated Contrast and Brightness Enhancement), these displays excel in ambient light environments ranging from dark rooms to nearly sunlight. This proprietary technology achieves very high contrast and exceptionally clear images. These displays are easy to integrate, enabling the quick replacement of existing LCDs. This family utilizes a common 8-bit FPD-type interface compatible with most LCD video controller chips. Up to five distinct gray levels are enabled by frame rate modulation algorithms generated by the controller chips.

Through simple design and advanced manufacturing technologies, Planar's new VGA displays bring the visual performance and image quality of electroluminescence (EL), long life, and ruggedness into cost-sensitive applications.

### Features

- Excellent viewing characteristics
- High brightness and contrast
- ♦ Wide viewing angle
- ♦ Long life
- Extreme ruggedness
- Designed for low EMI
- ♦ Fast response time
- Lower power

### Options

Anti-glare and conformal coating options are available on this display.

The anti-glare option adds an anti-glare film to the front of the display to reduce specular reflections (see Application Note 135 for more information).

The conformal coating option adds a protective layer to the display for applications in which the display may be subjected to high humidity, dust, or salt mist (see Application Note 122 for more information).

**2** Operations Manual (OM500-01)

## **Specifications**

The EL panel is a matrix structure with column and row electrodes arranged in an X-Y formation. Light is emitted when an AC voltage of sufficient amplitude is applied at a row-column intersection. The display operation is based on the symmetric, line at a time data addressing scheme. Operating voltages required are provided by a DC/DC converter.

Unless otherwise specified, performance characteristics are guaranteed when measured at 25°C.

### Power

The supply voltages required for the displays are shown in Table 1. All internal high voltages are generated from display supply voltage ( $V_H$ ). The logic supply voltage ( $V_L$ ) should be present whenever video input signals or  $V_H$  is applied.

	AM1	AM8	IN/ET	Notes
		12 V	24 V	
VL	+5 V ±5%	+5 V ±5%	+5 V ±5%	absolute max 7.0 V
V <sub>H</sub>	+12 V ±10%	+12 V ±10%	+24 V ±10%	absolute max. 15 V and 30 V respectively
I <sub>L</sub> , max	75 mA	75 mA	75 mA	@ V <sub>L</sub> = +5 V
I <sub>H</sub> , max	2.0 A	2.0 A	1.0 A	@ V <sub>H</sub> = +12 V
Ptyp, 120 Hz	11 W	11 W	11 W	3840 'E' characters
Pmax, 120 Hz	24 W	24 W	24 W	50/50 2x2 checkerboard

Table 1. DC Input Voltage Requirements.

**CAUTION:** Absolute maximum ratings are those values beyond which damage to the device may occur.

#### Table 2. Video Input Requirements.

Description	Min	Мах	Notes
Video logic high voltage	3.7 V	5.0 V	All input thresholds are CMOS
Video logic low voltage	0 V	0.9 V	Video lines have 100 $\Omega$ series resistors
Video logic input current	- 10 µA	+10 µA	

There is no overcurrent protection on either the  $V_H$  or  $V_L$  inputs to protect against catastrophic faults. Planar recommends the use of a series fuse on the 12 volt supply. A general guideline is to rate the fuse at 1.8 to 2 times the display maximum current rating.

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### Input Voltage Selection

The AM8 displays feature a jumper that allows the user to choose between 12 and 24 volt supply voltage. The displays are shipped with the JP1 jumper in the pin 1/pin 2 position which sets the supply voltage at 12 volts.

To select a 24 volt supply, move the JP1 jumper to the pin2/pin3 position. Pin one is marked on the +12 V end of JP1.



**Caution:** Providing a 24 volt supply to the display when the jumper is in the 12 volt supply position will damage the display.

The display will not function if the jumper is removed completely. Planar recommends the use of a non-conductive adhesive to secure the jumper in the desired position in environments where shock or vibration might loosen the jumper.

The minimum and maximum specifications in the manual should be met, without exception, to ensure the long-term reliability of the display. Planar does not recommend operation of the display outside these specifications.

### Connectors

### AM1 Data and Power Connector

The AM1 displays use the Samtec STMM-110-01-S-D or equivalent connector, and the AM8-IN displays use the Samtec STMM-110-01-T-D or equivalent connector. The mating connector for both the AM1 and AM8-IN displays is in the Samtec TCSD family of cable strips. The proper connector, user-specified cable length, and connector configuration are supplied as a single unit. Consult your Samtec representative (1 800-SAMTEC9) for the cable/connector options.



Figure 1. AM1 Data/Power Connector

### AM8 Data and Power Connector

The standard data and power connector for the AM8 displays is a Samtec ASP-61606-01-M or equivalent, J1 20-pin, 2mm pitch (Figure 2. Connector Locations). The mating connector is in the Samtec TCSD family of cable strips. The proper connector, user-specified cable length, and connector configuration are supplied as a single unit. Consult your Samtec representative (1 800-SAMTEC9) for the cable/connector options.



Figure 2. AM8 Connector Locations

Pin	Signal	Description	Pin	Signal	Description
1	UD1	Video data (upper)	2	UD0	Video data (upper)
3	UD3	Video data (upper)	4	UD2	Video data (upper)
5	LD1	Video data (lower)	6	LD0	Video data (lower)
7	LD3	Video data (lower)	8	LD2	Video data (lower)
9	CP2	Pixel clock	10	GND	Ground
11	CP1	Line pulse	12	GND	Ground
13	S	Frame pulse	14	GND	Ground
15	GND	Ground	16	GND	Ground
17	VL	+5 V logic supply	18	VL	+5 V Logic supply
19	V <sub>H</sub>	+12/24 V Display supply	20	V <sub>H</sub>	+12/24 V Display supply

Table 3. J1 Connector Pinouts.