

# DISPLAY HEAD ASSEMBLY 90-4104-015

Optically Enhanced, Extended Color Gamut, Sunlight Readable, 10.4" Navigation Display

General Digital has designed the 90-4104-015 LCD for integration into avionic (cockpit and simulation), and military applications. The LCD has been custom designed to incorporate a 10.4" XGA display with a MIL-L-85762A-compliant **sunlight readable LED backlight**. The LCD has been carefully selected so that we could incorporate **extended color gamut technology**, which provides deep, sharp reds for instant visual acquisition of screen content, such as warning indicators and other critical information. Additionally, the LCD features extended environmental performance and a 10-year manufacturing guarantee. Specially formulated ultra-clear antireflective glass with an index-matched, optically bonded EMI filter provides **class-leading specular and diffuse reflection, and extra high contrast**. What this means for the user is a dramatic increase in brightness and optical clarity. A variety of integration options are available including custom LED Rail Designs, LED Backlight Controllers, LCD Heaters, and Specialty Overlays, Filters and Coatings. The 90-4104-015 can be purchased separately, or integrated by General Digital into one of our standard or custom monitors, or smart display systems (Simulation or Cockpit). Please speak with a Sales Engineer for additional information at **800.952.2535**.



## FEATURES

- 10.4 inch, 1024 x 768 (XGA) Resolution
- Sunlight Readable Edge-lit LED Backlight
  - » Capable of Greater than 800 Nits Luminance @ 13.9 Watts
  - » Weber Contrast of 10.21:1 (Class 5 Performance)
- Ultra-Wide Color Gamut with Deep Reds for Warnings, etc.
- Extended Temperature Range
- Wide Viewing Angle ( $\pm 80^\circ$  H/ $+80^\circ, -60^\circ$  V)
- Very Low Specular and Diffuse Reflectance
- 10-Year Availability
- Ideal for Cockpit and Simulator Display Systems

## STANDARD ENHANCEMENTS

- Custom Sunlight Readable LED Rails
- Custom Light Guide Specially Tuned to the LED Rails
- Custom Film Stack to Optimize Brightness/Contrast
- Custom P-Frames (With and Without Optional LCD Heater)
- Custom Backlight Enclosure
- Optically Bonded EMI Glass Overlay with AR Coating

## OPTIONAL ENHANCEMENTS

- Optically Bonded LCD Heater
- Variety of Overlays (Touch Screens, Glass Substrates, EMI Filters, etc.) and Optical Coatings
- Variety of LED Backlight Controllers (~1000:1 Dimming Ratio)
- Direct-lit LED Backlight

**GENERAL SPECIFICATIONS**

<b>Backlight</b>	Sunlight Readable, High Efficiency LED Backlight (GDC manufactured)
<b>Luminance</b> (dark room) @ <b>Contrast</b> (dark room) @ <b>Power</b>	800 cd/m <sup>2</sup> @ 1206:1 @ 13.9 W [Note 1]
<b>Module Size</b> (mm)	221 (W) x 166.8 (H) x 1.26 (D)
<b>Display Area</b> (mm)	210.432 (H) x 157.824 (V)
<b>Display Size</b> (diagonal)	10.4 inches
<b>Drive System</b>	A-Si TFT Active Matrix
<b>Display Color</b>	16.7 Million Colors
<b>Pixels</b>	1024 (H) x 768 (V)
<b>Pixel Arrangement</b>	RGB 2 Domain Stripe
<b>Dot Pitch</b> (µm)	205.5 (H) x 205.5 (V)
<b>Viewing Angle</b>	Horizontal: ±85°; Vertical: ±85° (at the contrast ratio > 10:1)
<b>Color Gamut</b> (against NTSC 1987 color space)	112% typical (at LCD panel center)
<b>Response Time</b>	Ton + Toff (10–90%); 30 ms (typical)
<b>Signal System</b> [8-bit Digital Signals for Data of RGB Colors, Dot Clock (CLK), Data Enable (DE)]	LVDS 1 Port
<b>Shock</b>	220 G, 2 ms ½ Sine Wave
<b>Vibration</b>	1.5 G (10–300 Hz)
<b>Power Supply Voltage</b>	LCD Panel Signal Processing Board: 3.3 V
<b>Storage Temperature</b>	-55°–125° C
<b>Operating Temperature</b>	-30°–85° C
<b>Weight</b>	<200 g

**CONTRAST (Per MIL-L-85762-A) [Note 2]**

**Antireflective EMI Shield Overlay with Heater**

<b>Luminance</b> (dark room) @ <b>Contrast</b> (sunlight conditions) @ <b>Power</b>	800 cd/m <sup>2</sup> @ 10.21:1 @ 13.9 W [Note 1]
<b>Weber Contrast / Class</b>	9.21 / 5

**CONTRAST @ 10,000FC AMBIENT ILLUMINATION**

**Antireflective EMI Shield Overlay with Heater**

<b>Luminance</b> (dark room) @ <b>Contrast</b> (sunlight conditions) @ <b>Power</b>	800 cd/m <sup>2</sup> @ 30.79:1 @ 13.9 W [Note 1]
<b>Weber Contrast</b>	29.79

**DIFFUSE & SPECULAR REFLECTION**

**Antireflective EMI Shield Overlay with Heater**

<b>Diffuse Reflection</b>	<0.15% (0.131% actual)
<b>Specular Reflection</b>	<1.3%, subject to testing (1.44% with non-index-matched bond)

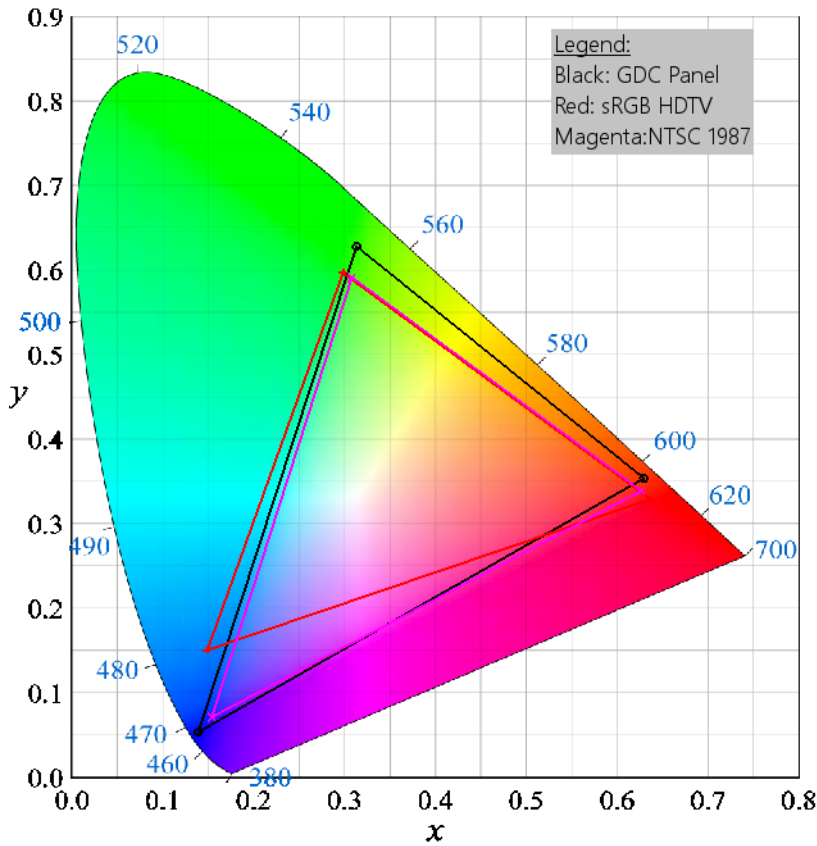
**NOTES**

**1** Rail temperature of 50° C.

**2** All the data for the 90-4104-015 was obtained while driven by a Kikisui PAD35-10L power supply. Measurements were taken with a Minolta CS-100 photometer.

**COLOR AREA COVERAGE & TOTAL AREA COMPARISON OF NTSC 1987 AND sRGB COLOR SPACES**

Color Space	Area Coverage	Area Comparison
NTSC 1987	98.3%	112.24%
sRGB, HDTV	94.3%	120%



The 90-4104-015 Display Head Assembly can be integrated into a variety of General Digital monitors, monitor kits, flight simulator display systems and cockpit display systems.



VueSim 10.4"



Saber Standalone Solar 10.4"



CoPilot 6104 10.4"