

DISPLAY HEAD ASSEMBLY 90-4104-014

Optically Enhanced, NVIS-Compatible, Sunlight Readable, 10.4" Navigation Display

General Digital has designed the 90-4104-014 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** and MIL-STD-3009 Class B Type II **NVIS switchable LED backlight**. The LCD has been carefully selected for its wide color gamut, extended environmental performance and 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 90-4104-014 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/NVIS Edge-lit LED Backlight
 - » Capable of Greater than 1600 Nits Luminance @ 14.1 Watts
 - » Weber Contrast of 18:0 (Class 6 Performance)
 - » MIL-STD-3009 NVIS Compliant
 - » Separately Addressable LEDs for NVIS and non-NVIS Environments
- Wide Color Gamut (70%)
- 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 and NVIS Edge-lit 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
- Color Gamut Enhancements

GENERAL SPECIFICATIONS

Backlight	Sunlight Readable, NVIS Compatible, Dual Mode, High Efficiency LED Backlight (GDC manufactured)
Luminance (dark room) @ Contrast (dark room) @ Power	712 cd/m ² @ 1186:1 @ 5.4 W 1000 cd/m ² @ 1061:1 @ 7.89 W 1670 cd/m ² @ 1050:1 @ 14.1 W [Note 1]
NVIS-B Radiance	Compliant
NVIS White	Compliant
Module Size (mm)	221 (W) x 166.8 (H) x 1.26 (D)
Display Area (mm)	210.432 (H) x 157.824 (V)
Display Size (diagonal)	10.4 inches
Drive System	A-Si TFT Active Matrix
Display Color	16.7 Million Colors
Pixels	1024 (H) x 768 (V)
Pixel Arrangement	RGB 2 Domain Stripe
Dot Pitch (µm)	205.5 (H) x 205.5 (V)
Viewing Angle	Horizontal: ±85°; Vertical: ±85° (at the contrast ratio > 10:1)
Color Gamut (against NTSC color space)	70% typical (at LCD panel center)
Response Time	T _{on} + T _{off} (10–90%); 30 ms (typical)
Signal System [8-bit Digital Signals for Data of RGB Colors, Dot Clock (CLK), Data Enable (DE)]	LVDS 1 Port
Shock	220 G, 2 ms ½ Sine Wave
Vibration	1.5 G (10–300 Hz)
Power Supply Voltage	LCD Panel Signal Processing Board: 3.3 V
Storage Temperature	-55°–125° C
Operating Temperature	-30°–85° C
Weight	<200 g

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

Antireflective EMI Shield Overlay with Heater

Luminance (dark room) @ Contrast (sunlight conditions) @ Power	1670 cd/m ² @ 19.41:1 @ 14.1 W [Note 1]
Weber Contrast / Class @ Luminance (dark room)	8.15 / 5 @ 712 Nits; 11.33 / 6 @ 1000 Nits; 18.4 / 6 @ 1670 Nits

NVIS nIRb COLOR

Antireflective EMI Shield Overlay with Heater

U'	0.295
V'	0.426
Error Radius (max. passing = 0.04)	0.020

CONTRAST @ 8000FC AMBIENT ILLUMINATION

Antireflective EMI Shield Overlay with Heater

Luminance (dark room) @ Contrast (sunlight conditions) @ Power	1670 cd/m ² @ 19.51:1 @ 14.1 W [Note 1]
Weber Contrast @ Luminance (dark room)	14.04 @ 712 Nits; 19.09 @ 1000 Nits; 29.54 @ 1670 Nits

DIFFUSE & SPECULAR REFLECTION

Antireflective EMI Shield Overlay with Heater

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

NVIS RADIANCE B

Antireflective EMI Shield Overlay with Heater

NVIS Radiance B (max. passing = 2.2 nW/cm ² /sr)	1.495 nW/cm ² /sr (Compliant)
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NOTES

1 Rail temperature of 50° C.

2 All the data for the 90-4104-014 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	TBD	TBD
sRGB, HDTV	TBD	TBD

The 90-4104-014 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 NVIS 10.4"



CoPilot 6104 10.4"