

# RFD family



U.S. Navy Photo by Joan Kreschmer



A range of 20" integrated Rugged Flat Displays

**BARCO**

Visibly yours

# A range of rugged flat displays



U.S. Navy photo by Michael W. Pendergrass

## Main features:

Barco's range of integrated 20.1" rugged flat panel displays has been designed and field proven to meet a wide variety of environmental specifications on airborne, shipboard and land-based platforms.

- Superior image quality
- Unique front LCD bonding avoiding humidity and condensation between front glass and LCD
- No image artifacts thanks to Automatic Phase Adjust functionality
- Fully qualified and field proven: more than **10,000** units in use worldwide, more than **5,000** units delivered to US Navy programs

## RFD-251

The RFD series offers MIL-tailored rugged flat panel displays with superior ruggedization (front bonded optical stack, LCD and backlight heating). The displays are direct 19" rack-mountable and can be remotely controlled via a serial link.

## RFD-251 S

The RFD-251 S is Barco's Rugged Flat Display specifically engineered for use in naval vessel environments. The unit meets the most demanding shock and temperature standards. The RFD-251 S has passed 901D qualification Grade A (hard mounted) tests in consoles for several naval programs.

## RFD-251 A

The RFD-251 A is Barco's Rugged Flat Display specifically engineered for use on board fixed and rotary wing applications. The unit meets the most demanding vibration, crash safety and decompression standards.



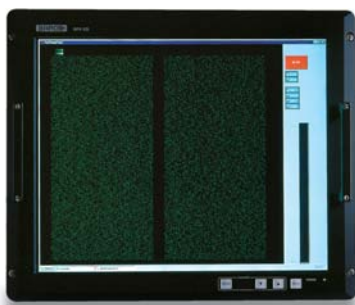
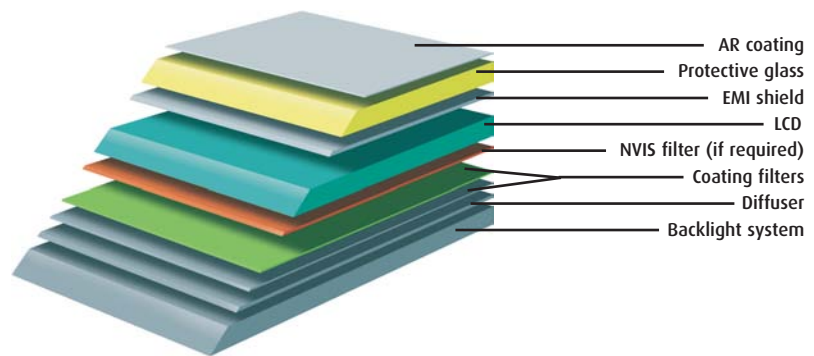
### Available options:

- LCD Flicker Compensation
- Replaceable front filter
- Analog resistive touch screen
- Barco Interface Protocol
- Loop through (RGBS)
- 2nd RGB input
- Barco Maintenance keypad
- Custom power connectors
- Humiseal - PCB formal coating

## Technologically advanced solutions

### Front bonding

Barco has developed unique bonding capabilities to protect the LCD against extreme environmental conditions (temperature, shock, vibration, humidity, EMI...) and to significantly improve optical performance.

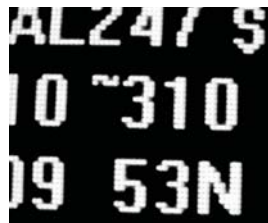


### LCD Flicker Compensation (patented)

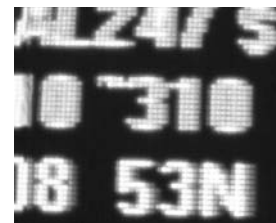
When updating images with high contrast and high density (such as sonar or dense tactical data) the LCD's brightness varies with the rate of updating. This luminance variation, referred to as 'LCD Flicker', can cause serious eye-fatigue and affect the interpretation of the displayed data. Barco has integrated a unique set of algorithms that reside in the hardware interface of the display (between the graphics generator and the LCD). This feature compensates for LCD Flicker, without affecting the displayed data, over all operating parameters.

### Automatic Phase Adjust (APA)

The APA function automatically locks the LCD sampling clock to the (drifting) graphics generator pixel frequency, thus avoiding image artifacts like pixel noise. Drift can be caused by temperature changes, electromagnetic interference and other environmental factors.



With APA



Without APA

# Technical specifications

<b>ELECTRO OPTICAL</b>	
Panel Type	Front bonded analog active matrix LCD (Silicone TFT)
Panel Size	20.1" (51 cm) diagonal
Pixel Dimensions	0.312 x 0.312 (RGB vertical stripe)
Resolution	SXGA - 1280 x 1024 pixels
Image Dimensions	399 x 319 mm (15.7 x 12.6")
Panel Specifications	16M colors, 256 gray scales
Brightness	210 cd/m <sup>2</sup> (61.3 ftL) typical
Contrast Ratio	300:1 typ. in Dark Environment
Color Temperature	6800°K
White Uniformity	30% non-uniform
Viewing Angle	Horizontal and Vertical: ± 85° (CR ≥ 10)
Response time	t <sub>r</sub> = 10 ms, t <sub>f</sub> = 10 ms (Black to white)
<b>CONNECTIONS</b>	
Signal Inputs	Coax BNC connectors for RGB, HS/CS, VS (VGA to SXGA)
RS-232 Serial Port	9 pin sub-D connector
Power	MIL-C-38999 series I (28V <sub>DC</sub> + 115/230 V <sub>AC</sub> ) HE 308 type connector Optional for 115/230 ITT-Canon (MIL-C-5015)

<b>CONTROLS &amp; INDICATORS</b>	
Bezel Controls	SELECT/STAND BY/UP/DOWN
Bezel Indicators	Green 'Power' LED, Red 'Overtemp' & 'Fault' LED, Yellow 'Calibrated' LED
Remote Control	RS-232 port
<b>POWER</b>	
Power Supply	28 V <sub>DC</sub> ; 115/220 V <sub>AC</sub> ; or 115 V <sub>AC</sub> , 44-440Hz
Design Requirements	MIL-STD-704
Power Consumption	Nominal: 70W, Cold Start: 130W
<b>GENERAL DATA</b>	
Mounting	19" Rack Mount
Weight	< 13.4 kg (30 lbs)
Cooling	Natural Convection, No Fans
MTTR	< 30 minutes
<b>ENVIRONMENTAL OPTIONS</b>	
RFD-251	-25°C / -40°F cold start
RFD-251 A	6.6 g RMS Random Vibration, Endurance Level
RFD-251 S	Shock: 60 g - 33ms full sine (MIL-STD-810C and MIL-STD-901D Grade A)
<i>For other custom options, please contact Barco.</i>	

# Environmental specifications

Environment	RFD-251	RFD-251 A	RFD-251 S
<b>TEMPERATURE</b>			
operating	-25°C/-13°F - 55°C/131°F (MIL-STD-810E)	-25°C/-13°F - 55°C/131°F (MIL-STD-810E)	-25°C/-13°F - 55°C/131°F (MIL-STD-810E)
storage	-40°C/-40°F - +70°C/+158°F (MIL-STD-810E)	-40°C/-40°F - +70°C/+158°F (MIL-STD-810E)	-40°C/-40°F - +70°C/+158°F (MIL-STD-810E)
<b>HUMIDITY</b>	95% @ 40°C (MIL-STD-810E)	95% @ 40°C (MIL-STD-810E)	95% @ 40°C (MIL-STD-810E)
<b>VIBRATION</b>	MIL-STD-167-1, MIL-E-5400T, 2g	MIL-STD-167-1, MIL-E-5400T, 5g	MIL-STD-167-1, MIL-E-5400T, 2g
<b>SHOCK</b>	30g - 12,5ms half sine (MIL-STD-810C)	30g - 12,5ms half sine (MIL-STD-810C)	60g - 33ms full sine (MIL-STD-810C, MIL-STD-901D Grade A)
<b>ALTITUDE</b>	25,000 ft (MIL-STD-810E)	25,000 ft (MIL-STD-810E)	25,000 ft (MIL-STD-810E)
storage	40,000 ft (MIL-STD-810E)	40,000 ft (MIL-STD-810E)	40,000 ft (MIL-STD-810E)
<b>EMI/EMC</b>	MIL-STD-461D: Ground, army aircraft, air force	MIL-STD-461D: Aircraft, navy	MIL-STD-461D: Surface ship, submarine
<b>RAPID DECOMPRESSION</b>	N/A	35,000ft in max 15s (MIL-STD-810E)	N/A
<b>DRIP PROOF</b> (installed in console)	On the front	On the front	On the front
<b>MTBF</b>	80,000 hrs (G <sub>B</sub> @ 20°C) (MIL-HDBK-217F)	17,000 hrs (AIC @ 25°C) (MIL-HDBK-217F)	23,000 hrs (N <sub>5</sub> @ 25°C) (MIL-HDBK-217F)
<b>SAFETY</b>	Meets IEC 60950	Meets IEC 60950	Meets IEC 60950
<b>FUNGUS</b>	MIL-STD-810E	MIL-STD-810E	MIL-STD-810E

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Technical specifications are subject to change without prior notice

