ORBIT 60 SERIES
Orbit Display System
Datasheet

Cordant™

154M8401 Rev. D







Orbit Display

The Orbit Display software runs on a range of available hardware display screen options and displays all Orbit 60 machinery protection system information such as:

- System Status Overview
- Direct measurements
- 1X measurements
- Gap measurements
- Other trended variables
- Measurement alarms
- System event list
- Alarm event list

The system **Status** overview tab displays overall system health severities, shows when a Protection Fault or channel Not Okay condition exists, and lists the most recent alarm event entries with options to easily filter the events based on severity, current activity, and/or unacknowledged alarms.

The **Current Values** tab shows protection measurements in bargraph lists with selectable filters including Primary measurements, including Gap/Bias voltages, showing only Relays or measurements in alarm, or optionally showing all enabled measurements.

The **Alarms** tab preserves detailed information of Setpoint Alarm and Instrumentation (Not Okay) events. The software's Acknowledge function allows operators to disposition and acknowledge individual system operational deviations.

The **System Events** tab list displays additional important system health information.

The **Settings** tab allows the selection of various display preferences such as selecting the following options:

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- the Light or Dark display modes
- various Date and Time formatting options
- language selections

Hardware Display Options

The Orbit Display software is available for the Integral Front Panel Display or a range of separate external display options including hazardous location certification options.

Integral Display

The Integral Display is a special-purpose, integrated Front Panel option that shows Orbit Display data for a single Orbit 60 system. It works with both Rack-mount and Panel-mount O60 chassis options and fits within the same envelope as the blank front panel option hardware. In fact, existing blank front panels can be easily replaced and upgraded to the Integral Display front panels without interrupting O60 machinery protection.

Note that the Integral Display is available for both 3U and 6U chassis hardware if it has an installed SIM module. For the 6U chassis, it includes a single display screen fitting within the top row of O60 modules.

External Displays

A separate, external display provides a larger display screen as well as the option to display data from up to 12 Orbit 60 systems.

The external display screens are managed by an industrial computer with a customized operating system for running Orbit Display software. The system can be certified for hazardous locations. Condition monitoring data is communicated to external displays via a Display Port or VGA connection. The touchscreen connection can use a Serial or USB connection.

If necessary, Bently Nevada can produce custom drivers for specific displays and pointing devices. For assistance, or for a list of supported displays and required drivers, contact Bently Support at Bently.com/support.

The Orbit Display is backwards compatible with the existing 10.4" and 15" displays currently supported by the 3500 system:

Supported Displays	
120M8155-01	10.4” 1024x768 Hazardous Location Display
102M8950	15” 1024x768 Hazardous Location Display
150M1466	21.5” 1920x1080 Industrial Display

Display Burn-in or Ghosting

All display technologies are susceptible to burn-in or ghosting, which occurs when static and cumulative non-uniform pixel use discolors areas on a screen. Burn-in can be noticed when the display changes and when the display is turned off.

Display Brightness

The brightness of an LCD display is the amount of light emitted and is measured in nits or candelas per square meter, which has units of nits or cd/m2. Most commercial desktop displays have a brightness of 200 to 300 nits. To see a display in outdoor light requires a brightness of about 700 nits or greater. Almost all new LCD displays use some form of white or RGB LED backlight.

Display Brightness Half-Life

An important characteristic of an LED backlight is the brightness half-life, which is the time measured in hours that the brightness output will decrease by half after running the LED backlight at full brightness. The decrease in brightness will not substantially decrease after the half-life time has elapsed. Most displays have a half-life of around 50,000 hours (or 5.7 years). Some of the brighter displays can have a half-life of 20,000 hours or less.

Bright Idea: The brightness life of the display can be dramaticallyincreased and burn-in can be mitigated by allowing the screen saver to dim and/or turn off the display when not in use.

Integral Display Panel





Integral Display Panel	
3U Integral Display Part Number	60R/PNL02
6U Integral Display Part Number	60R/PNL08
Warranty	3 Years
Screen Specifications	
Touch Screen Type	Capacitive Touch Screen
Screen Size	13.5 in W × 2.25 in H (343 × 57 mm)
Resolution	1920 × 320 pixels (24-bit color)
Contrast Ratio	800:1 typical
Brightness	700 nits (cd/m2)
Brightness Half-Life	50,000 hours (5.7 years)

Integral Display Panel	
Display Life Brightness	Backlight Brightness > 70% after 50000 hours at 50°C and 700nits
Viewing Angle	±85° Horizontal ±85° Vertical
Features	
Supported Mounting Styles	3U Rack Mount Chassis 3U Panel Mount Chassis 6U Rack Mount Chassis 6U Panel Mount Chassis
Front Port Network Interface	Allows connection to SIM and Front Panel Display
Power	
Operating Power	15 Watts
Physical Characteristics	
Weight	3U Weight = 1.06 kg (2.34 lb.) 6U Weight = 1.86 kg (4.10 lb.)
Dimensions	15.25 x 9.8 x 1.93 in (387.4 x 248.9 x 49 mm)
Environmental Limits - Indoor Use Only	
IP Rating	IP20
Operating Temperature	-30 to 70°C (-22 to 158°F)
Storage Temperature	-40 to 70° (-40 to 158°F)
Ambient Relative Humidity	95% non-condensing

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10.4" Hazardous Area Display



10.4” Hazardous Area Display	
Part Number	120M8155-01
Warranty	1 Year
Screen Specifications	
Screen	10.4” Diagonal Size LCD with LED back light
Resolution	640 x 480 pixels 4:3 Aspect Ratio
Brightness	450 nits (cd/m^2)
Brightness Half-Life	50,000 hours (5.7 years)
Features	
Video Interface	VGA
Touch Screen Type	Resistive Touch Screen
Cable Interface	Serial
Control Settings	Front panel button
Mounting Styles	Panel Mount, 19” EIA Rack Mount, and Independent Mount

10.4” Hazardous Area Display	
Power	
Voltage	24 Vdc nominal voltage range 10 to 28 Vdc
Inrush Current	3.5 A @ 24 Vdc Less than 500 µs duration
Operating Current	Less than 500 mA
Physical Characteristics	
Weight	4.0 kg (8.78 lbs.)
Dimensions	15.25 x 9.8 x 1.93 in (387.4 x 248.9 x 49 mm)
Panel Cutout	13.5 x 9.0 in (342.9 x 228.6 mm)
Environmental Limits - Indoor Use Only	
IP Rating	Designed for IP54 ingress protection against dust and water spray to the front only.
Operating Temperature	-20°C to 65°C (-4°F to 149°F)
Storage Temperature	-20°C to 70°C (-4°F to 158°F)
Ambient Relative Humidity	10 to 85% non-condensing
Standards and Certifications	
Refer to External Display Datasheet (154M8401)	

15" Hazardous Area Display



15” Hazardous Location Display (for Class 1 Div 2) CSA/NRTL/C	
Part Number	102M8950
Warranty	1 Year
Screen Specifications	
Screen	15” Diagonal Size TFT LCD with LED back light
Resolution	1024 x 768 pixels 4:3 Aspect Ratio
Brightness	350 nits (cd/m^2)
Brightness Half-Life	50,000 hours (5.7 years)
Features	
Video Interface	VGA and DVI-D
Touch Screen Type	5-Wire Resistive Touch Screen
Touch Screen Interface	Serial and USB-B
Control Settings	Front panel button
Mounting Styles	Panel Mount and 19” EIA Rack Mount

15” Hazardous Location Display (for Class 1 Div 2) CSA/NRTL/C	
Power	
Voltage	24 Vdc nominal voltage range 12 to 24 Vdc
Inrush Current	2.62 A @ 24 Vdc Less than 500 µs duration
Operating Current	~100 mA
Physical Characteristics	
Weight	8.5 kg (18.74 lbs.)
Dimensions	16.61 x 13.31 x 2.68 in (422 x 338 x 68 mm)
Panel Cutout	15.59 x 11.65 in (396 x 296 mm)
Environmental Limits - Indoor Use Only	
IP Rating	IP65 ingress protection against dust and water spray compliant to the front only.
Operating Temperature	-20°C to 60°C (-4°F to 140°F)
Storage Temperature	-20°C to 80°C (-4°F to 176°F)
Ambient Relative Humidity	10 to 95% non-condensing
Standards and Certifications	
Refer to External Display Datasheet (154M8401)	

21.5" Industrial Display



21.5” Industrial Display	
Part Number	150M1466
Warranty	1 Year
Screen Specifications	
Screen	21.5” Diagonal Size TFT LED LCD
Resolution	1920 x 1080 pixels 16:9 Aspect Ratio
Brightness	300 nits (cd/m^2)
Brightness Half Life	50,000 hours (5.7 years)
Features	
Video Interface	VGA and DVI-D
Touch Screen Type	Projected Capacitive Touch Screen
Touch Screen Interface	USB-B and Serial
Control Settings	Control buttons on rear panel
Mounting Styles	Panel Mount and 19” EIA Rack Mount

21.5” Industrial Display	
ower	
Voltage	24 Vdc nominal voltage range 22 to 26 Vdc
Inrush Current	≈ 3 A @ 24 Vdc Less than 500 µs duration
Operating Current	≈ 200 mA
Physical Characteristics	
Weight	8 kg (17.6 lbs.)
Dimensions	21.98 x 13.77 x 1.88 in (558.4 x 349.8 x 47.7 mm)
Panel Cutout	21.67 x 13.46 in (550.3 x 341.8 mm)
Environmental Limits - Indoor Use Only	
IP Rating	IP66 ingress protection against dust and water spray compliant to the front only.
Operating Temperature	-30°C to 70°C (-22°F to 158°F)
Storage Temperature	-40°C to 75°C (-40°F to 167°F)
Ambient Relative Humidity	10 to 90% non-condensing
Standards and Certifications	
Refer to External Display Datasheet (154M8401)	

Industrial Computer for Display



CPU Module	
CPU	Intel Atom processor E3845 (quad-core, 1M cache, 1.91 GHz)
System Memory	4 GB
Storage	SD 3.0 (SDHC/SDXC) 128 GB
Display	Intel HD Graphics 4000
Peripherals	
USB	2 – USB-A 2.0
VGA	Resolution up to 1920 x 1200 pixels at 75 Hz HDDB-15F port
DisplayPort	Resolution up to 2560 x 1600 pixels at 60 Hz receptacle
Ethernet	4 – Auto-sensing 10/100/1000 Mbps RJ45 ports Magnetic Isolation Protection 1.5 kV
Serial	2 – RS-232/422/485 DB9M ports
Power	
Voltage	12/24 Vdc (11.4 to 36 Vdc)
Power	Less than 30 W (nominal)
LEDs	
System	Power
Storage	SD

CPU Module	
LAN	2 LEDs per port for 100/1000 Mbps
Serial	2 LEDs per port (Tx and Rx)
Physical Characteristics	
Weight	1.75 kg (3.86 lbs.)
Dimensions	132 x 122 x 87 mm (5.20 x 4.81 x 3.43 in.)
Environmental Limits - Indoor Use Only	
Operating Temperature	-40°C to 70°C (-40°F to 158°F)
Storage Temperature	-45°C to 75°C (-49°F to 167°F)
Ambient Relative Humidity	5 to 95% (non-condensing)
Anti-Vibration	• 0.7 g @ DNV GL (Class A), sine wave, 2-100 Hz, 1 Oct./min., 1.5 hr. per axis • 1 g @DNV GL, random wave, 3-100 Hz, 2.5 hr. per axis
Anti-Shock	50 g, 11 ms ±X, ±Y, ±Z, 3 shocks each axis with SD
Standards and Certifications	
Refer to External Display Datasheet (154M8401)	

Compliance and Certifications

FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

EMC

European Community Directive:

EMC Directive 2014/30/EU

Standards:

EN 61000-6-2; Immunity for Industrial Environments
EN 61000-6-4; Emissions for Industrial Environments

RoHS

European Community Directive:

RoHS Directive 2011/65/EU

Electrical Safety

10.4" Hazardous Area Display

European Community Directive:

LV Directive 2014/35/EU

Standards:

EN 61010-1

15" Hazardous Area Display

European Community Directive:

LV Directive 2014/35/EU

Standards:

EN 62368-1

21.5" Industrial Display

European Community Directive:

LV Directive 2014/35/EU

Standards:

EN 62368-1

Industrial Computer

European Community Directive:

LV Directive 2014/35/EU

Standards:

EN 61010-1
EN 61010-2-201

Integral Front Panel Display

European Community Directive:

LV Directive 2014/35/EU

Standards:

EN 61010-1
EN 61010-2-201

Hazardous Area Approvals

For the detailed listing of country and product-specific approvals, refer to the *Approvals Quick Reference Guide (108M1756)*.

For additional technical documentation, please log in to bntechsupport.com and access the Bently Nevada Media Library.

10.4" Hazardous Area Display

cNRTLus

Class I, Zone 2: AEx/Ex ic nA IIC T4
Class I, Zone 2: AEx/Ex ic ec IIC T4

T4 @ Ta= -20°C to +65°C (-4°F to +149°F)

ATEX/IECEx

II 3 G
Ex ic ec nA IIC T4 Gc

T4 @ Ta= -20°C to +65°C (-4°F to +149°F)

15" Hazardous Area Display

cNRTLus

Class I, Division 2, Groups A, B, C, D

Industrial Computer

cNRTLus

Class I, Zone 2: AEx/Ex ec IIC T4 Gc
Class I, Division 2, Groups A, B, C, D T4

T4 @ Ta= -40°C to +70°C (-40°F to +158°F)

ATEX/IECEx

II 3 G
Ex ec I IC T4 Gc
T4 @ Ta= -40˚C to +70˚C (-40˚F to +158˚F)

Ordering Information

For the detailed listing of country and product-specific approvals, refer to the *Approvals Quick Reference Guide (108M1756)*.

For additional technical documentation, please log in to bntechsupport.com and access the Bently Nevada Media Library.

External Display

Bently Nevada offers three display systems with different resolution, capabilities, mounting options, accessories, and certifications. Not all options are available for all displays.

60X/EXDAA-BB-CC	
AA – Display	
01	10.4" Hazardous Area Display
02	15" Hazardous Area Display (for Class 1 Div 2) CSA/NRTL/C
04	21.5" Display
BB – Agency Approvals	
00	No Approval Certifications
01	CSA/NRTL/C (Class 1 DIV 2) (only available for the 60X/EXD01 10.4 in display and 60X/EXD02 15 in display)
02	Multi (CSA, ATEX, IECEX) (only available for the 60X/EXD01 10.4 in display)
CC – Mounting Options	
01	19" Rack Mount Panel
02	Panel Mount Kit
04	Independent Mount (only available for the 60X/EXD01 10.4 in display)

Industrial Computer for Display

60X/CMP01-AA	
AA – Agency Approvals	
00	No Approval Certifications
01	CSA/NRTL/C (Class 1 DIV 2)
02	Multi (CSA, ATEX, IECEX)

Includes DIN Mounting Kit, 24 Vdc 90-Watt DIN Mountable Power Supply, USB Mouse, 24 Vdc Power Cable, 10' (3 m) Ethernet Cable. A 20' Ethernet cable accessory is available.

Front Panel Configurations

60R/PNLAA	
3U Front Panel: SIM w/ Integral Display	
60R/PNL02	with options for country-specific codes
6U Front Panel: SIM w/ Integral Display	
60R/PNL08	with options for country-specific codes
3U Front Panel: SIM w/ No Display	
60R/PNL01	with options for country-specific codes
3U Front Panel: No SIM & No Display	
60R/PNL03	with options for country-specific codes
6U Front Panel: SIM w/ No Display	
60R/PNL07	with options for country-specific codes

No part number is offered for Bulkhead spare or replacement front panel.

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Display Accessories

10.4" C1D2 Hazardous Area Display	
120M8155-01	Bently Nevada 10.4" Hazardous Area Display
122M3369-01	Rack Mount kit for 10" Display
122M3370-01	Panel Mount kit for 10" Display
122M3371-01	Independent Mount for 10" Display
15" C1D2 Hazardous Area Display	
102M8950	15" Hazardous Area Display
104M3812-01	Rack Mount Kit for 15" Display
21.5" Industrial Area Display	
150M1466	21.5" Industrial Display
150M0633-01	19" Rack Mount Panel for 21.5" Display

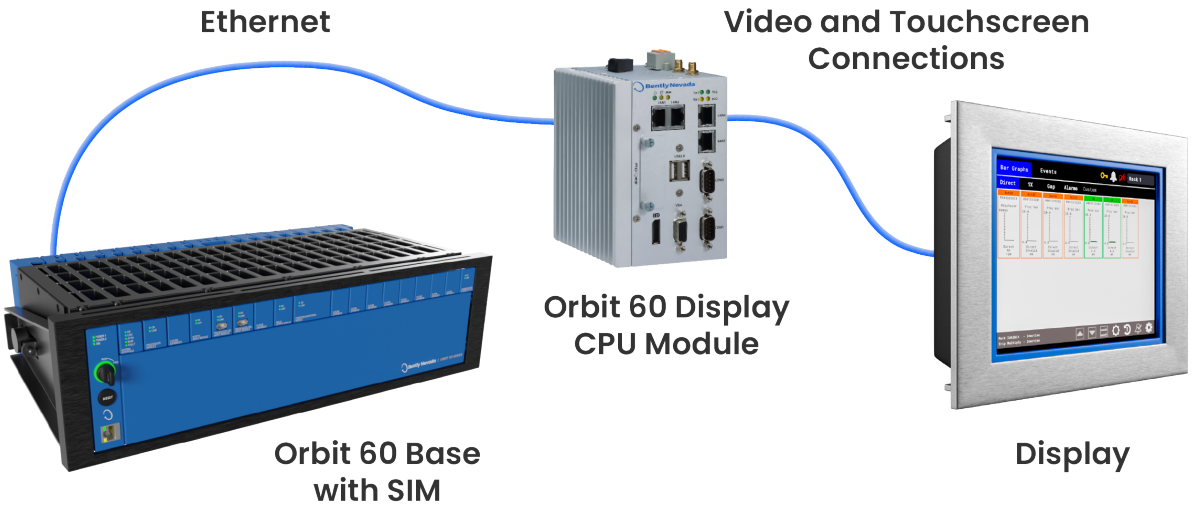
Display Cables		10.4"	15"	21.5"
02200794	24 Vdc 90-Watt Power Supply	X	X	X
119M6509-01	10' Power cable/plug	X		
119M6509-02	10' Power cable/ plug		X	X
161087-10-00	10' VGA cable	X	X	X
161087-20-0	20' VGA cable	X	X	X
148638-01	10' Serial cable		X	
187M1995*	10' Custom serial cable	X		
148638-02	25' Serial cable		X	
174013	3m (9.8') USB Cable			X
149M1306	7m (25') USB Cable			X

*Custom Touch Screen Commands cable pinout for 187M1995

AWG	CONN 1	COLOR	CONN 2
22	2	RED	2
	3	WHITE	3
	5	BLACK	5
	SHELL	SHIELD	SHELL

Bently Nevada Industrial Computer	
142M4200	Industrial Computer
02200794	24 Vdc 90-Watt Power Supply (both computer and display)
119M6509-05	10' Power cable and plug
149M1309	USB Mouse
149M1310	3m (10') Ethernet patch cable
138131-010	3m (10') shielded Ethernet cable
149M1311	7m (25') Ethernet patch cable
138131-025	7m (25') shielded Ethernet cable

Graphs and Figures



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