

# 3500/94M VGA Display Monitor

## Datasheet

Cordant™

122M3217 Rev. N



## Description

The Bently Nevada™ 3500/94M VGA module displays all 3500 machinery protection system information, including:

- System event list
- Alarm event list
- All module and channel data
- Alarm and OK status
- Nine custom display options

Use the 3500 Rack Configuration Software to configure up to nine custom screens. By default, one bar graph screen shows all of the 1X-filtered vibration measurements, while another shows the proximity transducer gap values.

You can organize custom screens into machine train groups. You can also organize system data into any pages on the custom screen.

## System Components

The 3500/94M is comprised of:

- The 3500/94M VGA module
- An I/O module
- A 10" or 15" VGA touch screen display

You can mount the VGA display monitor using standard cables up to 6 m (20 ft) from a 3500 rack, or using a supported Keyboard Video Monitor (KVM) Extender, up to 10 km (6.2 miles) from the 3500 rack.



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## Touch Screen Displays

Use either the 10" and 15" Advantech VGA touch screen displays. These compact, durable displays are designed for excellent viewing quality in industrial applications.

The 10" Advantech display is certified for hazardous environments. Each display requires a separate power supply. The 3500 Rack Configuration Software supports both display drivers.

## Reduce the Number of Displays

Using a standard cable and the optional Display Router Box, you can view data from up to four 3500 racks on one display.

The alarm and OK status is continually displayed in the upper right corner of the VGA display. A rack select button changes color to indicate if any rack connected to the Display Router Box is Not OK or in Alarm status.



Due to limitations imposed by the VGA standard, the Display Router Box must be located within 6 m (20 ft) of each connected 3500 rack. Longer cables are not recommended because they may degrade image quality. Noisy electronic environments also degrade image quality.

## Access Data Remotely

If you need to display 3500 data at a greater distance, you have one option.

Distance from Display Router Box	Options	Notes
> 10 m to 10 km (33 ft to 6.2 mi)	Single-mode, fiber optic (SM FO) Keyboard Video Monitor (KVM) Extender	No loss in image quality.  Not certified for hazardous locations. Must be installed in a safe area or in an approved enclosure.



The SM FO KVM receiver and transmitter are not certified for hazardous area installations. Both the receiver and the transmitter must be installed in a safe area or enclosed in an approved enclosure.

## Specifications

### 3500/94M VGA Display Unit

Inputs	
Power consumption	4.6 W max.
High-speed network	Monitor status, data and values
RS232 port (I/O)	Touch controller data
Outputs	
OK LED	Indicates proper operation of the module
TX/RX LED	Indicates communications between other system modules
VGA port (I/O)	Analog red, green, blue and sync signals to the display
Front Port	24 Vdc Power out, VGA signal out, Touch commands in.

### Environmental Limits


Operating Temperature	-20°C to 65°C (-22°F to 149°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	95%, non-condensing


## Compliance and Certifications

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

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

EMC	Standards EN 61000-6-2 EN 61000-6-4  Directive 2014/30/EU
Electrical Safety	Standards CSA C22.2 61010-1 UL EN 61010-1  Directive 2014/35/EU
RoHS	Directive 2011/65/EU

**WARNING**



**EXPLOSION HAZARD**

Refer to User Manual **BEFORE** making connections.

DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

**AVERTISSEMENT - RISQUE D'EXPLOSION** - AVANT DE DECONNECTER L'EQUIPMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DESIGNÉ NON DANGEREUX.

**WARNING**



**HAZARDOUS VOLTAGE**

**RISK OF ELECTRIC SHOCK, BURN OR DEATH.**

Do not remove cover. No user servicable parts inside.

## 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](http://bntechsupport.com) and access the Bently Nevada Media Library.

## 3500/94M VGA Display Module



The following approvals apply to the 3500/94M monitor, its I/O module, and the 3500/94M Display Router Box.

### North America


**Canada**  
 Ex nC [L] IIC T4 Gc:  
 Certified to CSA60079-0, -11, -15  
 Class I, Division 2, Groups A, B, C and D:  
 Certified to CSA213

**USA**  
 Class I, Zone 2: AEx nC IIC T4 Gc:  
 Conforms to: UL60079-0, -11, -15  
 Class I, Division 2, Groups A, B, C and D:  
 Conforms to ISA 12.12.01

T4 @  $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$   
 ( $-4^{\circ}\text{F} \leq \text{Ta} \leq +149^{\circ}\text{F}$ )  
 Per control drawing 149243

### ATEX/IECEx

**ATEX/IECEx**

II 3 G   
 Ex nA nC ic IIC T4 Gc  
 T4 @  $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$   
 ( $-4^{\circ}\text{F} \leq \text{Ta} \leq +149^{\circ}\text{F}$ )  
 Per control drawing 149243

## Advantech 10" Display (AN-D3510)


### North America

**Canada**  
 Ex ic nA IIC T4;  
 Certified to CSA C22.2 60079-0, -11, -15  
 Class I, Division 2, Groups A, B, C, D T4;  
 Certified to CSA C22.2 213

**USA**  
 Class I, Division 2, Group A, B, C, D T4;  
 Conforms to: ISA 12.12.01  
 Class I, Zone 2, AEx ic nA IIC T4;  
 Conforms to: UL60079-0, -11, -15

### ATEX/IECEx

**ATEX/IECEx**

Approval Option (02)   
 II 3G Ex ic nA IIC T4 Gc;  
 $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$   
 Ex ic nA IIC T4 Gc; IP54;  
 $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$



The Advantech 15" Display (FPM-8151) is not certified to meet ATEX/IECEx standards.

## Physical Characteristics

### 3500/94M VGA Display Module

Dimensions (height x width x depth)	241.3 mm x 24.4 mm x 241.8 mm (9.5 in x 0.96 in x 9.52 in)
Weight	0.73 kg (1.6 lb.)

### I/O Module

Dimensions (height x width x depth)	241.3 mm x 24.4 mm x 99.1 mm (9.50 in x 0.96 in x 3.90 in)
Weight	0.34 kg (0.75 lb.)

### 10" Advantech Display (ANA-D3510-100-A1)

Dimensions (height x width x depth)	249 mm x 389 mm x 48 mm 9.8 in x 15.3 in x 1.9 in
Touch screen (diagonal)	267 mm (10.5 in)
Weight	4.0 kg (8.78 lb)

### 15" Advantech Display (FPM-8151)

Dimensions (width x height x depth)	422 mm x 338 mm x 68 mm 16.61 in x 13.31 in x 2.68 in
Display screen (diagonal)	381 mm (15 in)
Weight	8.5 kg (18.75 lb)

## Rack Space Requirements

Monitor Module	
Rack space	1 full-height front slot
I/O Module	
Rack space	1 full-height rear slot
Keyboard Video Monitor (KVM) Extender	
Mounting	Shelf top
Power input	12 Vdc and 5 Vdc
Temperature range	0°C to 45°C (32°F to 113°F)
Humidity	80%, non-condensing
Rating	The SM FO KVM receiver and transmitter are not certified for hazardous area installations. Both the receiver and the transmitter must be installed in a safe area or enclosed in an approved enclosure.
NEMA 4X	Not approved



To install in a hazardous area, see the *3500/94M VGA Display Module Operation and Maintenance Manual* (document 122M3218).


## 3500/94 Display Router Box

Inputs	
Power +24 Vdc $\pm$ 6%	4.7 W max
Input range	22.5 to 25.5 Vdc input
VGA inputs (4)	Video image
RS232 inputs (4)	Touch screen control data
Outputs	
OK status LED	Indicates proper operation
VGA output (1)	Video image
RS232 output (1)	Touch screen control data

## Display Monitor Specifications


### Advantech 10" Display (ANA-D3510-100-A1)

Screen Size	10" diagonal
Type	LCD with LED back light
Industrial hardened	Yes
Mounting Styles	Face Mount 19" Rack Mount Panel Mount Independent Mount
Power	24 Vdc power supply included. (Permissible voltage range 10 Vdc to 28 Vdc)  Inrush Current: 3.5 A @ 24 V (< 500 μs)  Operating Current: < 500 mA
Agencies	CE, UL, CUL
IP54	Designed for.
Class I, Div 2	Yes
ATEX/IECEX	Yes
Temperature	-20°C to 65°C (-4°F to 149°F) Operating Temperature.

 The minimum temperature rating is -20°C (-4°F) for the screen, front bezel, and rear electronics. When the screen or front bezel is exposed to temperatures below -20°C (-4°F), a heated enclosure is required.


Humidity	10% to 85% RH non-condensing
Touch Interface	GFG Resistive Touch Screen

Manufacturer	Advantech
Dimensions (W x H x D)	387.4 mm (15.25 in) x 248.9 mm (9.8 in) x 49.0 mm (1.93 in) Panel Cutout: 342.9 mm (13.5 in) x 228.6 mm (9.0 in)
Weight Shipping	4.0 kg (8.78 lb)
Warranty	One year

 Recommended for industrial use. Certified for hazardous locations. The 10" housing is designed for IP54 ingress protection against dust and water spray.


## Advantech 15" Display (FPM-8151H)

Screen Size	15" diagonal
Type	LCD with LED backlight
Industrial hardened	Yes
Mounting Styles	19" Rack Mount Panel Mount
Power	24 Vdc power supply included. (Permissible voltage range 12 Vdc to 24 Vdc)  Inrush Current: 2.62 A @ 24 V (< 500 μs)  Operating Current: < 500 mA
IP65	Yes
Agencies	CE, UL
Class 1, Div 2	Yes
Temperature	0 to 60°C ( 32°F to 140°F) Operating Temperature.

 The minimum temperature rating is 0°C ( 32°F) for the screen, front bezel, and rear electronics. When the screen or front bezel is exposed to temperatures below 0°C ( 32°F) , a heated enclosure is required.

Humidity	95% RH
Touch Interface	Resistive
Manufacturer	Advantech
Dimensions (W x H x D) inches	422 mm (16.61 in) x 338 mm (13.31 in) x 68.0 mm (2.68 in)  Panel Cutout: 396 mm (15.59 in) X 296 mm (11.65 in)

Weight Shipping	8.5 kg (18.74 lb)
Warranty	Two years

 Recommended for industrial use. Not certified for hazardous locations.

## Ordering Considerations

### Firmware, Software, and Hardware Requirements

The 3500/94M requires the 3500/22 Transient Data Interface (TDI) module. It also requires these or newer versions of the following firmware and software:

3500/94M Firmware	4.06, Rev. C
3500/22 Firmware (TDI)	Rev 1.71
3500/01 Software (Rack Config)	Rev 5.6
3500/02 Software (Op Display)	Rev 2.21
3500/03 Software (Data Acquisition)	Rev 1.22

The 3500/94M requires the following hardware:

3500/22 TDI - Transient Data Interface

### Ordering a Display Router Box



Each 3500 rack requires both a 3500/94M VGA module and associated I/O card. Because of this requirement, every AA ordering option is structured to automatically include these components.

To order multiple racks with one display unit:

1. In the first rack install a router box with router cable (P/N 3500/94M-07-12-XX). This option also includes a power supply cable for the router box.
2. In the second rack install a display unit with router cable (P/N 3500/94M-(02 to 06)-12-XX). These options also include a power supply and power supply cable for the display unit.

3. In the third and fourth racks don't install another display, but install router box cables for each additional rack. P/N 3500/94M-00-12-XX accommodates these requirements.

To order a Display Router Box, use 3500/94M-AA option 07.

### Supported Display Modules

The 3500/94M supports these displays:

- Advantech 10" touch screen display (P/N 120M8155-01)
- Advantech 15" touch screen display (P/N 102M8950)
- Parker touch screen displays (P/N 148653-01 - no longer available).

## 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](http://bntechsupport.com) and access the Bently Nevada Media Library.

## System Display

### 3500/94M-AA-BB-CC

#### A: Display Size and Mounting

<b>00</b>	None
<b>01</b>	10" display, face mount (only available for rack-mounted 3500 monitor)
<b>02</b>	10" display, 19" rack mount
<b>03</b>	10" display, panel mount (installation hardware included)
<b>04</b>	10" display, independent mount
<b>05</b>	15" display, 19" rack mount
<b>06</b>	15" display, panel mount (installation hardware included)
<b>07</b>	Router box, no display

#### B: KVM Extender and Display Router Box Cables

<b>00</b>	None
<b>12</b>	Display Router Box cable 20 ft (6 m)
<b>20</b>	SM FO KVM SNGL extender and cable 2,000' (609.6 m)

<b>21</b>	SM FO KVM SNGL extender and cable 4,000' (1219.2 m)
<b>22</b>	SM FO KVM SNGL extender and cable 6,000' (1828.8 m)
<b>23</b>	SM FO KVM SNGL extender and cable 8,000' (2438.4 m)
<b>24</b>	SM FO KVM SNGL extender with patch cables
<b>25</b>	SM FO KVM DUAL extender and cable 2,000' (609.6 m)
<b>26</b>	SM FO KVM DUAL extender and cable 4,000' (1219.2 m)
<b>27</b>	SM FO KVM DUAL extender and cable 6,000' (1828.8 m)
<b>28</b>	SM FO KVM DUAL extender and cable 8,000' (2438.4 m)
<b>29</b>	SM FO KVM DUAL extender with patch cables
<b>30</b>	SM FO KVM SNGL extender and cable 500' (152.4 m)
<b>31</b>	SM FO KVM DUAL extender and cable 500' (152.4 m)

#### C: Agency Approvals

<b>00</b>	None
<b>01</b>	CSA/NRTL/C (Class I, Division 2)
<b>02</b>	Multi (CSA/ATEX/IECEX) (only available for the 10" display)

## Accessories and Spares

### 3500/94M Module Accessories and Spares

122M3217	3500/94M VGA Display Monitor Product Datasheet
122M3218	3500/94M VGA Display Module Operation and Maintenance Manual
184826-01	3500/94M Main module
190214-01	3500/94M Normal I/O module
190214-02	3500/94M Power-only I/O module for front-mount display

### 3500/94M Advantech 10" Display Accessories

For display monitor specifications, See [Display Monitor Specifications on page 8](#).

120M8155-01	ANA-D3510-100-A1, Advantech 10" display. Does not include mounting screws.
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#### Front Mounting Accessories and Spares

122M3368-01	94M face mount for Advantech 10" display
122M4631-AA	Mounting standoff for face mount display with threaded mounting holes for 19" EIA rack. <b>AA:</b> mounting hole thread size. Choose one: <b>01</b> – M6 x 1 <b>02</b> – 10-32 <b>03</b> – M5 x 0.8

107M3696-01	3 ft (.91 m) v Video, serial, and power cable from front of rack-mounted 3500/94M Module to the 10" Advantech display. Note that cable assembly 119M6503-03 is also required from the 3500/94M IO Module (190214-02) to an industrial 24 VDC power supply.
119M6509-03	Power supply cable for 10" Advantech Display that connects the rear of a rack-mounted 3500/94M IO module (190214-02) to an industrial 24 VDC power supply. 10 ft (3.05 m). Note that cable assembly 107M3696-01 is also required from the front of the 3500/94M Module to the display.
02200794	24V DIN mount power supply with no cable

#### Other Mounting Accessories

122M3369-01	94M rack mount for Advantech 10" display
122M3370-01	94M panel mount for Advantech 10" display
122M3371-01	94M independent mount for Advantech 10" display
119M6509-01	Power supply cable only for 10" Advantech Display that connects from the display to an industrial 24 VDC power supply. 10 ft (3.05 m).
119M6509-02	
161087-AA-00	VGA male-male cable for display to 3500/94M I/O <b>AA:</b> cable length. Choose one: <b>10</b> – 10 ft (3.05 m) <b>20</b> – 20 ft (6.1 m)

148638-AA	<p>DB-9 male-female cable for display to 3500/94M I/O or 3500/94 Display Router Box.</p> <p><b>AA:</b> cable length. Choose one:</p> <p><b>01</b> - 10 ft (3.05 m)  <b>02</b> - 25 ft (7.62 m)</p>
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### 3500/94M Advantech 15" Display Accessories

For display monitor specifications, See [Display Monitor Specifications on page 8](#).

102M8950	<p>FPM-8151, Class I, Division 2, 15" Advantech display. Includes screws and hardware for panel mounting.</p>
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#### Display Accessories and Spares

104M3812-AA	<p>19" EIA mounting plate for the FPM-8151H 15" display (9U rack mount)</p> <p><b>AA:</b> panel color. Choose one:</p> <p><b>01</b> RAL 7032 (Pebble Gray)  <b>02</b> RAL 7035 (Light Gray)</p>
161087-AA-00	<p>VGA male-male cable for display to 3500/94M I/O</p> <p><b>AA:</b> cable length. Choose one:</p> <p><b>10</b> - 10 ft (3.05 m)  <b>20</b> - 20 ft (6.1 m)</p>
148638-AA	<p>DB-9 male-female cable for display to 3500/94M I/O or 3500/94 Display Router Box.</p> <p><b>AA:</b> cable length. Choose one:</p> <p><b>01</b> - 10 ft (3.05 m)  <b>02</b> - 25 ft (7.62 m)</p>
119M6509-02	<p>Power supply cable for 15" Advantech Display that connects from the display to an industrial 24 VDC power supply. 10 ft (3.05 m).</p>

02200794	<p>24V DIN mount power supply with no cable</p>
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### 3500/94M Display Router Box

149356-01	<p>Display Router Box</p>
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#### Display Router Box Accessories and Spares

149710-AA-BB	<p>Split digital cable for display router box for router to 3500/94M I/O</p> <p><b>AA:</b> cable length. Choose one:</p> <p><b>10</b> - 10 ft (3.05 m)  <b>20</b> - 20 ft (6.1 m)</p> <p><b>BB:</b> connectors. Choose one:</p> <p><b>00</b> Assembled I/O connector  <b>01</b> Unassembled I/O connector</p>
161087-AA-00	<p>VGA male-male cable for display to 3500/94M I/O</p> <p><b>AA:</b> cable length. Choose one:</p> <p><b>10</b> - 10 ft (3.05 m)  <b>20</b> - 20 ft (6.1 m)</p>
148638-AA	<p>DB-9 male-female cable for display to 3500/94M I/O or 3500/94 Display Router Box to Advantech display.</p> <p><b>AA:</b> cable length. Choose one:</p> <p><b>01</b> - 10 ft (3.05 m)  <b>02</b> - 25 ft (7.62 m)</p>
119M6509-04	<p>Industrial DC power supply cable to 3500/94 router box 10 ft (3.05 m).</p>

## Single-Mode Fiber Optic (SM FO) KVM Extender



The SM FO KVM receiver and transmitter are not certified for hazardous area installations. Both the receiver and the transmitter must be installed in a safe area or enclosed in an approved enclosure.

128M4539	Rose Electronics single 5V power supply SM FO KVM receiver
128M4540	Rose Electronics dual 5V power supply SM FO KVM receiver
128M4541	Rose Electronics single 5V power supply SM FO KVM transmitter
128M4542	Rose Electronics dual 5V power supply SM FO KVM transmitter

### KVM SM FO Extender Accessories and Spares

128M4543	Rose Electronics 19" EIA rack mount kit for SM FO KVM receiver or transmitter
128M4545	DVI-I to VGA cable for SM FO KVM transmitter to 3500/94M I/O or SM FO KVM receiver to display. 10 ft (3.05 m)
128M4552	SM FO patch cable 20 ft (6.1 m)
128M4548	SM FO cable 2000 ft (609.6 m)
128M4549	SM FO cable 4000 ft (1219.2 m)
128M4550	SM FO cable 6000 ft (1828.8 m)
128M4551	SM FO cable 8000 ft (2438.4 m)
192M9456	SM FO cable 500 ft (152.4 m)

# Graphs and Figures

The examples in this section show included components and installation arrangements for various ordering options.

Ordering options are structured as 3500/94M-AA-BB-CC, where:

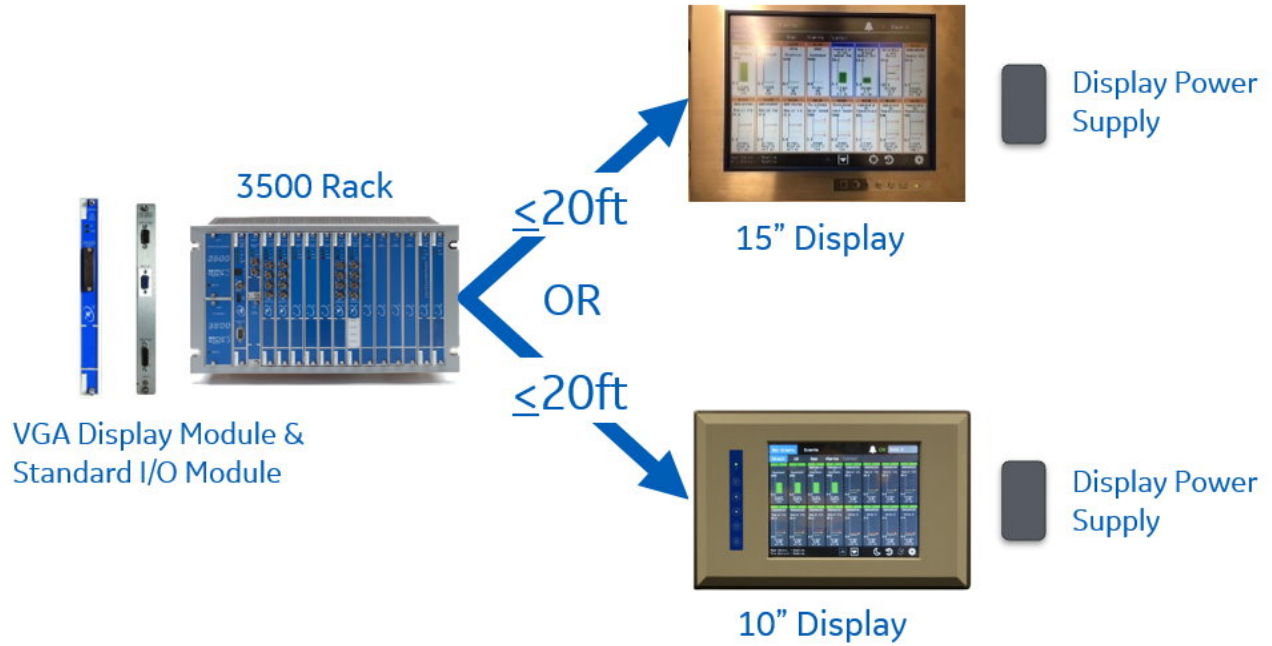
- AA = Display size and mounting
- BB = KVM Extender, router box and cables
- CC = Agency approvals

In addition to these options, all purchasing options automatically include a 3500/94M VGA display module and appropriate I/O module. Separate components are available individually. 11



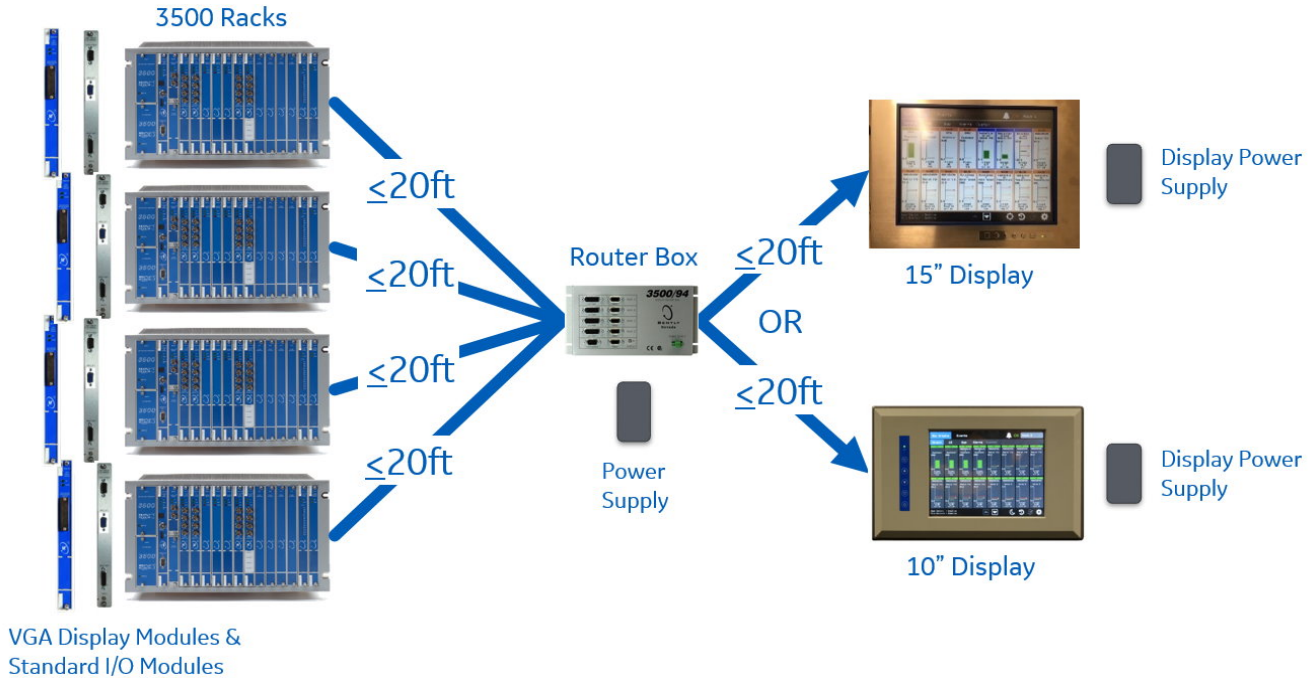
**Figure 1: Single Rack with One Face Mount Display**

Ordering Option	Description
3500/94M-01-00-00	10" display with hinged face mount for EIA 19" rack



**Figure 2: Single Rack with One Display**

Ordering Option	Description
3500/94M-02-00-(00/01/02)	10" display for mounting in 19" EIA rack
3500/94M-03-00 (00/01/02)	10" display, panel mount (installation hardware included)
3500/94M-04-00-(00/01/02)	10" display with independent mounting hardware
3500/94M-05-00-(00/01)	15" display for mounting in EIA 19" Rack
3500/94M-06-00-(00/01)	15" display, panel mount (installation hardware included)



**Figure 3: Multiple Racks with Router Box to One Display**

### First Rack Option – router box

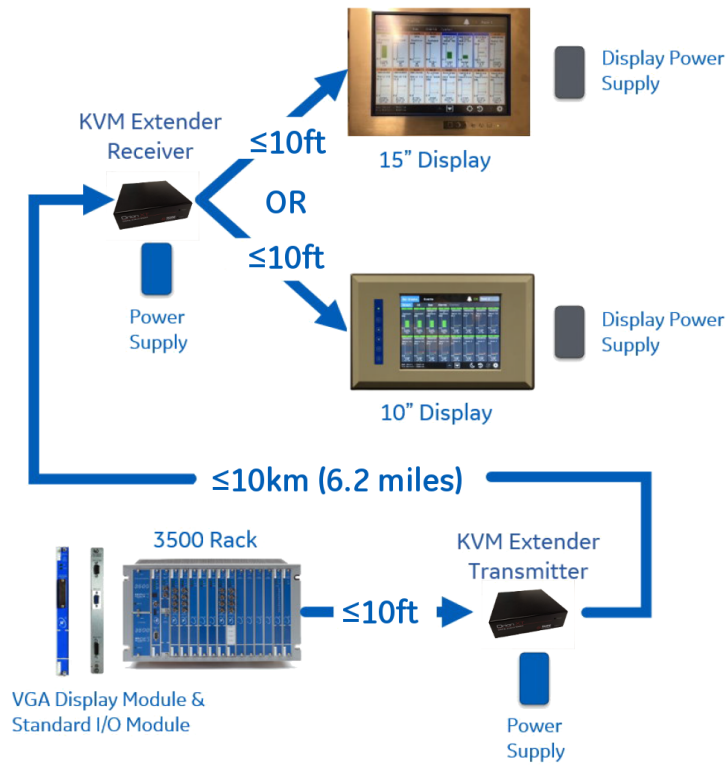
Ordering Option	Description
3500/94M-07-12-(00/01/02)	Router box and rack-to-router cables

### Second Rack – display options

Ordering Option	Description
3500/94M-02-12-(00/01/02)	10" display for mounting in 19" EIA rack, and required cables
3500/94M-03-12-(00/01/02)	10" display, panel mount (installation hardware and required cables included)
3500/94M-04-12-(00/01/02)	10" display with independent mount housing, and required cables
3500/94M-05-12-(00/01)	15" display for mounting in EIA 19" Rack, and required cables
3500/94M-06-12-(00/01)	15" display, panel mount (installation hardware and required cables included)

### Third and Fourth Rack - router cable for each additional rack

Ordering Option	Description
3500/94M-00-12-(00/01/02)	Rack-to-router cable



**Figure 4: Single-mode Fiber Optic (SM FO) Keyboard Video Monitor (KVM) Extender to One Display**

Ordering Option	Single-mode Fiber Optic KVM Extender including:
3500/94M-XX-20-00	Single Power supply and 2000' SM FO cable.
3500/94M-XX-21-00	Single Power supply and 4000' SM FO cable.
3500/94M-XX-22-00	Single Power supply and 6000' SM FO cable.
3500/94M-XX-23-00	Single Power supply and 8000' SM FO cable.
3500/94M-XX-24-00	Single Power supply and a pair of 20' SM FO patch cables.
3500/94M-XX-25-00	Dual Power supplies and 2000' SM FO cable
3500/94M-XX-26-00	Dual Power supplies and 4000' SM FO cable
3500/94M-XX-27-00	Dual Power supplies and 6000' SM FO cable
3500/94M-XX-28-00	Dual Power supplies and 8000' SM FO cable
3500/94M-XX-29-00	Dual Power supplies and a pair of 20' SM FO patch cables.
3500/94M-XX-30-00	Single Power supply and 500' SM FO cable
3500/94M-XX-31-00	Dual Power supplies and 500' SM FO cable



The SM FO KVM receiver and transmitter are not certified for hazardous area installations. Both the receiver and the transmitter must be installed in a safe area or enclosed in an approved enclosure.

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