3500/20 Rack Interface Module
Bently Nevada™ Asset Condition Monitoring

Description

The Rack Interface Module (RIM) is the primary interface to the 3500 rack. It supports a proprietary protocol used to configure the rack and retrieve machinery information. The RIM must be located in slot 1 of the rack (next to the power supplies).

The RIM supports compatible Bently Nevada external communications processors such as TDXnet, TDIX, and DDIX. While the RIM provides certain functions common to the entire rack, the RIM is not part of the critical monitoring path and has no effect on the proper, normal operation of the overall monitoring system. One RIM is required per rack.

For Triple Modular Redundant (TMR) applications, the 3500 System requires a TMR version of the RIM. In addition to all the standard RIM functions, the TMR RIM also performs “monitor channel comparison.” The 3500 TMR configuration implements monitor voting using the setup specified in the monitor options. Using this method, the TMR RIM continually compares the outputs from three (3) redundant monitors. If the TMR RIM detects that the information from one of those monitors is no longer within a configured percent of the information of the other two monitors, it will flag that the monitor is in error and place an event in the System Event List.
Specifications

Inputs

Power

Consumption

4.75 watts, typical

Data

Front panel

Standard

RS232 serial communications

Data Rate

38.4 k baud.

I/O modules

Standards

RS232/RS422 serial communications

Internal modem communications

Data Rate

38.4 k baud maximum, serial communications

14.4 k baud, internal modem communications.

Outputs

Front Panel LEDs

OK LED

Indicates when the RIM is operating properly.

TX/RX LED

Indicates when the RIM is communicating with other modules in the 3500 rack.

TM LED

Indicates when the 3500 rack is in Trip Multiply.

CONFIG OK LED

Indicates that the 3500 rack has a valid configuration.

I/O Module OK Relay

Relay to indicate when the 3500 rack is operating normally or when a fault has been detected within the rack. User can select either an "OPEN" or "CLOSED" contact to annunciate a NOT OK condition. This relay always operates as "Normally Energized".

OK relay

Rated to 5A @ 24 Vdc/ 120 Vac, 120 Watts/600 VA Switched Power.

Normally closed contacts

Arc suppressors are provided.

Controls

Front Panel

Rack reset button

Clears latched alarms and Timed OK Channel Defeat in the rack. Performs same function as "Rack Reset" contact on I/O module.

Address switch

Used to set the rack address; 63 possible addresses.

Configuration Keylock

Used to place 3500 rack in either "RUN" mode or "PROGRAM" mode. RUN mode allows for normal operation of the rack and locks out configuration changes. PROGRAM mode allows for normal operation of the rack and also allows for local or remote rack configuration. The key can be removed from rack in either position, allowing switch to remain in either RUN or PROGRAM positions. Locking switch in the RUN position allows you to restrict unauthorized rack reconfiguration. Locking switch in PROGRAM position allows remote configuration of a rack at any time.
I/O Module

System

Contacts

**Trip multiply**
Used to place 3500 rack in Trip Multiply.

**Alarm inhibit**
Used to inhibit all alarms in the 3500 rack.

**Rack reset**
Used to clear latched alarms and Timed OK Channel Defeat.

**Maximum Current**
<1 mA dc, Dry Contact to Common.

**RS232/RS422 Switch**
(RS232/RS422 I/O module only)
Used to select between RS232 and RS422 for communications with the Bently Nevada host software.

**Communications**

**Front Panel**

**Communications**
RS232 serial communications only.

**Protocol**
Bently Nevada proprietary.

**Data rate**
38.4 k baud maximum (auto baud capable).

**Purpose**
Permits data collection and 3500 rack configuration.

**Cable length**
30 metres (100 feet) maximum.
Rack Connector Communications

- RS422 only.

Protocol

- Bently Nevada proprietary.

Baud rate

- 38.4 k baud maximum.

Purpose

- Allows multiple 3500 racks to be daisy-chained together for communications with 3500 Host Software.

Cable length

- 1200 metres (4000 feet) maximum.

Data Manager I/O Module (2 sets of ports)

Communications

- Bently Nevada proprietary.

Protocol

- Bently Nevada proprietary.

Baud rate

- 9600 baud fixed.

Purpose

- Permits static and dynamic data collection by Bently Nevada Transient Data Interface External or Dynamic Data Interface External Communication Processors.

Cable length

- 3 metres (10 feet) maximum.

Environmental Limits

Rack Interface Module and RS232/RS422 I/O

Operating Temperature:

- -30 °C to +65 °C (-22 °F to +150 °F).

Storage Temperature:

- -40 °C to +85 °C (-40 °F to +185 °F).

Modem I/O Module

Operating Temperature:

- 0 °C to +50 °C (+32 °F to +122 °F).

Storage Temperature:

- -40 °C to +85 °C (-40 °F to +185 °F).

Humidity:

- 95%, non-condensing.

CE Mark Directives

EMC Directives:

**EN50081-2:**

- Radiated Emissions
  - EN 55011, Class A

- Conducted Emissions
  - EN 55011, Class A

**EN50082-2:**

- Electrostatic Discharge
  - EN 61000-4-2, Criteria B

- Radiated Susceptibility
  - EN 61000-4-4, Criteria B

- Conducted Susceptibility
  - ENV 50140, Criteria A

- Electrical Fast Transient
  - ENV 50141, Criteria A

- Surge Capability
  - EN 61000-4-4, Criteria B
EN 61000-4-5, Criteria B
Magnetic Field
EN 61000-4-8, Criteria A
Power Supply
Dip
EN 61000-4-11, Criteria B
Radio
Telephone
ENV 50204, Criteria B
Low Voltage
Directives:
EN 61010-1
Safety Requirements

Hazardous Area Approvals
CSA/NRTL/C:
Approval Option (01)
Class I, Div 2
Groups A, B, C, D
T4 @ Ta = -20 °C to +65 °C
(-4 °F to +150 °F)

Certification Number
CSA 150268-1002151 (LR 26744)

Physical
RIM
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:
0.91 kg (2.0 lb.).
RS232/RS422 I/O
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:
0.45 kg (1.0 lb.).
Modem I/O
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:
0.45 kg (1.0 lb.).
Data Manager I/O
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:
0.45 kg (1.0 lb.).

Rack Space Requirements
RIM Main Board:
1 full-height front slot.
RIM I/O Modules:
1 full-height rear slot.
Data Manager I/O Modules:
1 full-height rear slot.

Ordering Information
3500/20-AXX-BXX-CXX
A:
0 1 Standard RIM I/O (use for standard monitoring applications)
0 2 TMR RIM I/O (use only for applications that require Triple Modular Redundant Configuration)
B:
0 1 I/O module with built-in modem
0 2 I/O module with RS232/RS422 interface
C:
0 0 None

Specifications and Ordering Information
Port Number 141531-01
Rev. A (03/07)
### Spares

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>125744-02</td>
<td>Standard Rack Interface Module</td>
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<tr>
<td>125744-01</td>
<td>TMR Rack Interface Module</td>
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<tr>
<td>135031-01</td>
<td>RIM I/O Module with Modem Interface</td>
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<tr>
<td>125768-01</td>
<td>RIM I/O Module with RS232/RS422 Interface</td>
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<tr>
<td>125760-01</td>
<td>Data Manager I/O Module</td>
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<tr>
<td>04425545</td>
<td>Grounding Wrist Strap (single use)</td>
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<tr>
<td>00801286</td>
<td>Real-Time Clock IC</td>
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<tr>
<td>128755-01</td>
<td>Firmware IC (for PWA 125744-01 Rev P or later, or for PWA 125744-02 Rev N or later)</td>
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### Cables

<table>
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<th>Part Number</th>
<th>Description</th>
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<tr>
<td>02290860</td>
<td>RS232 Modem cable from: 3500 Rack External Modem Host Computer to External Modem</td>
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<tr>
<td>130119-01</td>
<td>Host Computer to RS232/RS422 Converter Cable RS232</td>
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### Cables - 3500 Rack Interface Module (Cable Length and Assembly Instructions)

<table>
<thead>
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<th>A: Cable Length</th>
<th>B: Assembly Instructions</th>
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<tr>
<td>00 10</td>
<td>01 Not Assembled</td>
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<tr>
<td>00 25</td>
<td>02 Assembled</td>
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<tr>
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<td>01 00</td>
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**Note:** The above table provides a limited sample of the cable specifications and ordering information. For complete details, consult the full document.
### Host Computer to 3500 Rack Cable, RS422, PVC Insulated

**132632-AXXXX-BXX**

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<tr>
<td>0 0 2 5</td>
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<td>0 0 5 0</td>
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<td>0 2 5 0</td>
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### Host Computer to 3500 Rack Cable, RS422, Teflon® Insulated

**132633-AXXXX-BXX**

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<td>0 2 5 0</td>
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### 3500 Rack to 3500 Rack Cable, RS422, PVC Insulated

**130122-AXXXX-BXX**

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<td>Not Assembled</td>
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<td>0 2 5 0</td>
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### 3500 Rack to 3500 Rack Cable, RS422, Teflon® Insulated

**131107-AXXXX-BXX**

<table>
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</tr>
<tr>
<td>0 2 5 0</td>
<td></td>
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<td>0 5 0 0</td>
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### 500 Foot (152 metres) Extension Cable, RS422 (Used with Cables 130120, 131106, 130122 and 131107 for lengths greater than 500 feet (152 metres)).

**130121-AXXX-BXX**

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<th>A: Assembly Instructions</th>
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### Insulation

<table>
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<tr>
<td>0 2</td>
</tr>
</tbody>
</table>
Graphs and Figures

1) **LEDs:** Indicate the operating status of the module
2) **Hardware Switches:**
3) **Configuration Port:** Configure or retrieve machinery data from only this rack using RS-232 protocol.
4) **Rack Interface I/O Module:** Daisy chain or configure racks using RS-232 and RS-422 protocol
5) **Data Manager I/O Module:** Connect two Bently Nevada Communication Processors to the 3500 rack.

**Figure 1:** Front and rear view of the Rack Interface Module

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