

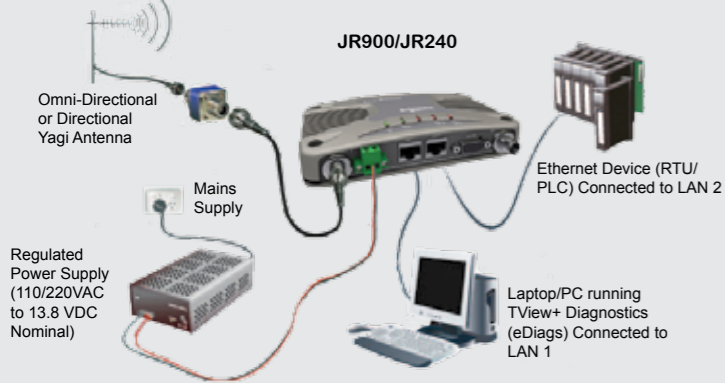
# Trio J-Series Quick Reference Guide JR900/JR240 Ethernet Radios



## Introduction

Welcome to the Quick Start Guide for the Trio™ J-Series Ethernet Radio. This guide provides step-by-step instructions to get you up-and-running. Before proceeding, read the product warning sheet for safety information. For further information, please refer to the J-Series User Manual.

## Typical Radio Setup



## Mounting and Installation Instructions

Mount the radio in a clean and dry location, protected from water, excessive dust, corrosive fumes, extremes of temperature and direct sunlight. In high power or high temperature applications, allow sufficient passive or active ventilation. To avoid moisture ingress mount the radio with the connectors facing downwards.

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## LED Indicators

### DC Power :

If all the LEDs are off, no DC power is reaching the radio modem or the internal fuse is open. Successful power-up is indicated by the Pwr/Tx LED showing a continuous GREEN state for Remotes or an alternating Red/Green for Access Points.

When the transmitter is active the Pwr/Tx LED is in a RED state.

The J-Series radio takes approximately 45 seconds to boot up - during this time, the DC power LED remains solid green and various LED activity may occur. Wait at least 45 seconds before attempting to use radio.

### Received Signal Indicator :

A regular flashing GREEN LED indicates that the modem is synchronised to its Access Point. The GREEN LED also flashes when the modem is receiving data.

A regular flashing RED LED indicates the REMOTE is not synchronised to an Access Point or BRIDGE. Check the antenna, all RF connections, and the radio configuration as the Subnet ID may not match the Access Point or there may be insufficient RX signal or too much interference.

### LAN 1 & LAN 2 :

The Red Tx/D and Green Rx/D LEDs indicate Ethernet status on the two LAN ports. These LEDs show solid Green when an Ethernet Link is established and flash Orange to indicate Ethernet data transmission is occurring.

### Port A / Port B Data Flow

The Rx/D/Tx/D LEDs indicate data flow into/out of the user port. Data being sent to the port for transmission is indicated by a RED flash, and data being received over the air and then sent from the port is shown as a GREEN flash.

### Error LED Indications

In some circumstances the radio indicates an error state. This is shown as all LEDs flashing RED for 1 sec and then a pattern of green LEDs for 1 sec. The pattern of green LEDs indicate the type of error. Consult the user manual for further information.

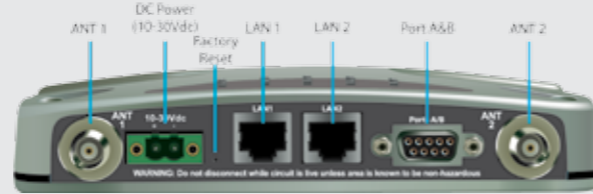
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Choose an enclosure that is appropriate for the size of the radio: 100 x 34 x 165mm (4.0 x 1.4 x 6.5 inches). The radio is rated for use in ambient (operating) environments from -40° to +70°C (-40° to +158°F).

## Connecting Antennas and RF Feeders

Install the RF antenna system in accordance with the manufacturer's instructions. Consider antenna gain when setting Transmit Power. Refer to Compliance information at the end of this document and in the user manual for more information.

The RF connectors on this product are TNC-type female connectors. Use good quality, low loss feeder cable, selected according to the length of the cable run. Waterproof all external connections.



## Power Supply Requirements

Tx: Nominal 13.8 Volts DC @ 800 mA (Max 1A)

Rx: Nominal 13.8 Volts DC @ 150 mA

Rated Operating Voltage 10 - 30 Volts DC

The J-Series Radio is supplied with a mating DC power connector:

Phoenix Contact Part Number 1777989. Install the DC Power connector with the locking screws done up tightly. Use #22 AWG (or larger) cable rated for 70° C (158° F) min. CSA maximum current rating: 2.5A. Utilise mating plugs that are secured in place by integral screws for connections to the power terminal and DE-9 port connector.

The J-Series Ethernet radio modem operates from a 10 to 30 volt (filtered) DC supply. The radio is designed to self-protect from permanent damage if the voltage exceeds 30V dc or if reverse polarity is applied. The replaceable internal fuse has a 3 Amp rating.

The current requirement is typically 180mA @ 13.8 V DC in receive mode, and varies in transmit mode according to RF output power level & duty cycle.

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Before connecting any wiring, verify that all components are earthed to a common ground point. Pay particular attention to 24V PLC power systems where DC-DC converters are used.

Connect the antenna, Ethernet and RS-232 plugs BEFORE applying power to the unit. Lastly, before inserting the power plug, re-check that the polarity and voltage on the DC power plug are correct, using a multi-meter.

## Communication Ports

### LAN 1 and LAN 2 Ethernet Ports

The LAN 1 and LAN 2 ports are 10/100 Base-T-compliant ports using an RJ45 connector. These ports support both TIA/EIA-568-A & B wiring as they have Auto MDI/MIDX Auto Sensing. This means you can use both straight-through and cross-over type CAT-5 or better patch cables. Utilise only RJ45 connector mating plugs that include an integral locking tab.



Pin	Pair	Wire	Color
1	3	tip	white/green
2	3	ring	green
3	2	tip	white/orange
4	1	ring	blue
5	1	tip	white/blue
6	2	ring	orange
7	4	tip	white/brown
8	4	ring	brown

If cable termination is required, use the following wiring arrangement (Compliant with TIA/EIA-568-A).

Maximum differential voltage is: 5v, 50mA max through each differential pair.

If 100-BaseT connection speed is required, use CAT-6 Shielded cable for installation to comply with ETSI EMC directives.

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## Serial Port A & B Ports

The J-Series Radio features a 9-pin miniature D-Shell (DE-9) Female connector that supports two individual serial port connections. Each serial port is associated with an embedded serial terminal server that provides RS-232 to TCP/UDP IP connectivity. Refer to the user manual for more information on serial terminal servers.

Data Port A uses pins 2 & 3 with pin 5 as the common ground.

Data Port B uses pins 4 & 6 with pin 5 as the common ground.

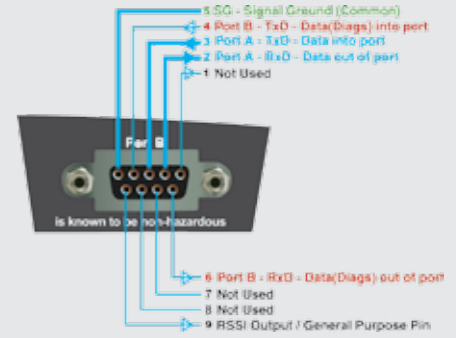
An RSSI output is available on pin 9 which is useful for antenna alignment. See below for details.

(1) Pins 2 & 6 are outputs rated at +/- 6v, 65mA max.

(2) Pins 3 & 4 are inputs rated at +/- 15v, 5mA max.

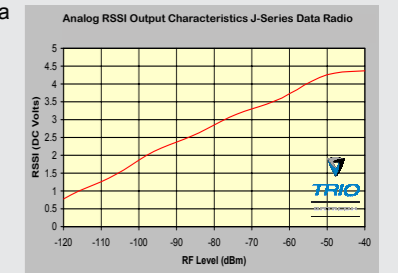
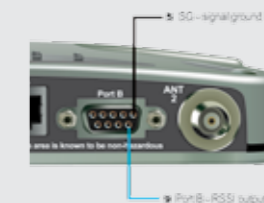
(3) Pin 9 is a multipurpose IO pin with 120mA max input / 5mA max output.

(4) Use #26 AWG, or larger, connecting wires.



## Optimising the Antenna for Rx Signal

When using a directional antenna, align the antenna for the best received signal. This is done using TVView+ Diagnostics or by measuring the RSSI output on Pin 9 of the serial data port. RSSI voltage of 2.5v is approx. -90dBm. Slope is equal to 20dB/volt.



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## J-Series Configuration (Web Interface)

### Introduction and Warnings:

Read the following information carefully. Configuration errors with Ethernet connections can be difficult to find and resolve. It is strongly recommended that you follow these guidelines.

### IP Address and Factory Default Reset

The factory default IP address of the J-Series is 192.168.2.15. If you do not know the IP address of the J-Series, activate a factory reset.

A factory reset causes all previous configuration settings to be erased and returned to the factory default values. A factory default can be initiated by applying DC power to the radio (wait 45 seconds), then depressing the factory default switch using a paper clip or similar object and keeping the switch depressed for 5 seconds until all five LEDs illuminate solid GREEN indicating the radio is returning to the factory default settings. Wait 30 seconds for the factory default reset process to complete.

### Connection to Embedded HTML Web Server

The J-Series radio contains an embedded Web Server. To change a configuration parameter in the J-Series, connect a PC to one of the Ethernet Ports (LAN1 or LAN2) and direct the browser to the IP address of the J-Series. It is strongly recommended that you follow these guidelines for successful connection to the radio:

(1) Verify that the J-Series is powered up and has fully booted. This is indicated by a solid green power LED and a flashing Synch/NoRx LED. It takes approximately 45 seconds from applying DC power for the J-Series to fully power up.

(2) Disconnect the PC from any other Internet/LAN networks. Failure to do so may create a conflict in IP addresses or the J-Series IP might not meet the Subnet mask specified by the network.

(3) Connect the PC Ethernet Port to one of the Ethernet Ports (LAN 1 or LAN2) on the radio using an RJ45 patch cable. Cross-over cables also work. Successful cable connection is indicated by a solid Green "Link" LED on the Ethernet Port.

The LAN1/2 LEDs also flash orange when data is being transferred.

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(4) Verify that the PC LAN Port is configured for a suitable IP address. You can do this by configuring the LAN settings via the Control Panel. Navigate to the Windows® "Start" button and open Control Panel -> Network Connections -> Local Area Connection -> Properties.

Scroll Down and Select "Internet Protocol (TCP/IP)" and then click on Properties. The adjacent window is shown.

Verify that "Obtain IP Address Automatically" is not selected. It is recommended that you manually specify a compatible IP Address. In this example, a factory default radio is being configured. The IP address of that radio is 192.168.2.15 and a compatible IP address for the PC would be 192.168.2.1. Click OK to accept the changes.

Check with the Network Administrator before allocating IP addresses as each LAN/WAN network is different.

(5) Start the web browser and insert the IP address of the J-Series into the URL. In this case, "192.168.2.15" and the configuration page is now displayed in the browser.

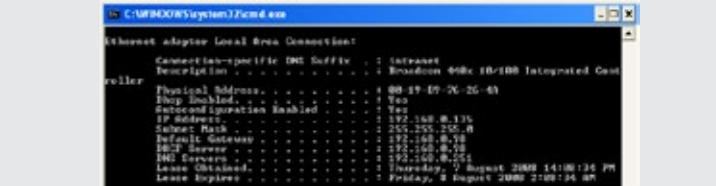


It may be necessary to disable a web proxy (if in use) or disable/modify a local firewall to help ensure the security rules allow access to the J Series IP address.

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## Troubleshooting Ethernet Configuration

Here are some basic tips to help along the way with Ethernet configuration troubleshooting. The Windows operating system (and others) comes complete with many useful tools. First, open a command window. This can be done by clicking on "Start" then "Run" and entering "CMD" and clicking OK.



### Obtaining IP information about your PC

Additional information about your computer's Ethernet IP configuration, network gateways and DNS servers is provided by a tool called "IPConfig". Simply type "IPconfig/all" into your command window to view this information.

### Checking IP connectivity

The most reliable way to check IP connectivity to a device is using the "Ping" utility. Type "ping xxx.xxx.xxx.xxx" where xxx.xxx.xxx.xxx is the complete IP address of the destination device you want to check. Ping either responds with latency results (as shown) or say "timed out" if no connection was possible.

### Repeated connections to multiple devices with the same IP address

This is a common occurrence when attempting to configure multiple radios with the same IP address (such as factory default radios) and is caused by invalid MAC table entries.

If the Ethernet connection between two devices with the same IP address is changed quickly, the MAC look-up table in the PC may need to be reset. This is done by typing "arp -d \*" in the command window.

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# Trio J-Series Quick Reference Guide JR900/JR240 Ethernet Radios

## Step-by-Step Point-to-Point Setup

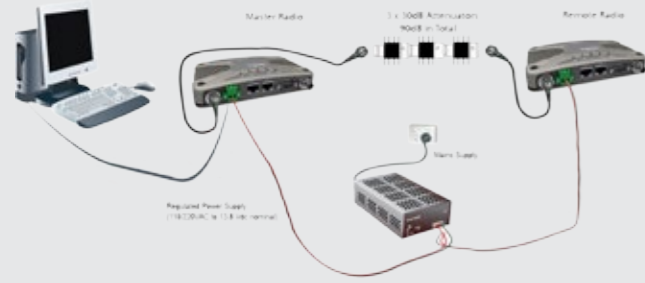
### Introduction

This document describes 10 key steps required for configuring the radio and demonstrating remote diagnostics on a pair of J-Series radios operating in Point-to-Point (PTP) mode. After successful diagnostics polling is achieved, subsequent testing can then be done on user equipment such as RTUs or PLCs.

For more information consult the following documents:

- J-Series User Manual
- TView+™ Diagnostics User Manual

### Typical Radio Setup



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## Step 1 - RF and DC power connection

### RF Connection

It is recommended that whip antennas are not used to simulate a long distance RF link. RF attenuators are far superior to antennas for short-distance bench testing as the attenuation of the RF signals between both radios is consistent and is not subject to external interference. Alternatively, 90dB of separation can be achieved with 50 ohm dummy loads or small whip antennas (minimum separation 1m (3ft)).

(1) If the TX power of each radio is set to 20dBm (100mW) then low cost attenuators can be used.

(2) Small whip antennas can also be used, but the signal into the receiving radio should be no greater than -30dBm (set Tx power on all radios to 20dBm).

### DC Power Connection

Use the correct polarity when wiring each radio and a regulated power supply that has adequate current delivering capacity.

## Step 2 - Power Up Radios

Nominal Power Supply Requirements 13.8V @ 500 mA



Apply DC power to the radios. The "Pwr" LED illuminates solid GREEN. Wait for 45 secs for the radio to boot (During boot, other LEDs may flash). If the radio is configured as a Remote (factory default) the LED is solid GREEN. If it flashes RED/GREEN it is configured as an Access Point (If there is no LED indication, the internal fuse may have opened). Re-check the DC polarity and verify the DC voltage is between 10V and 30V.

## Step 3 - Setup for Radio Configuration

### IP Address and Factory Default

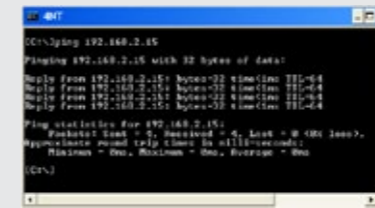
The default IP address of the J-Series radio is 192.168.2.15. To configure the J-Series radio, the IP address of the radio is required. If the current IP address is unknown or if you are uncertain, the radio will require a reset to return the radio configuration to factory default values.

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This is done by powering up the radio (wait 45 seconds), depressing the factory default switch (using a paper clip or similar thin blunt wire) and keeping the switch depressed for 5 seconds. All 5 LEDs illuminate solid GREEN indicating the radio is returning to factory default settings. Wait 30 seconds while the factory default reset process occurs.

### Connection to Embedded HTML Web Server - HTTP connection

Connect the PC LAN Port to either of the radio's Ethernet Ports (LAN1 or LAN2). Ping the radio to verify that you can communicate with the J-Series.



Open a command window on the PC by going to "Start" -> Run and typing "CMD", then OK. Type "ping 192.168.2.15" which is the default address of the radio. If both the radio and PC have correct LAN port connections and configurations, the radio will respond to the ping as shown above. If not, check the network settings as described on the opposite page.

HTTPS connection is also available. For further details, refer to the J-Series user manual.

The J-Series can also be configured via a Text User Interface (TUI). Console protocols such as Telnet, SSH or a serial connection may be used. For further details on configuring the J-Series via TUI, please refer to the J-Series user manual.

## Step 4 - Start Web Browser on the PC

Start a web browser session and enter the IP address of the J-Series into the browser's URL field. In this case, "192.168.2.15" is entered and the configuration page is displayed in the browser.



Click on the "Wizards" button to activate the Wizards menu in the HTML configuration programmer. Connection to Embedded HTML Web Server

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## Step 5 - Activate Access Point - PTP Wizard

Select Point-to-Point - Access Point

Select the "Point-to-Point - Access Point" button and click on the "Start The Wizard" button. The Access Point Wizard screen is shown.

The Wizard now prompts the user to configure some important items for point-to-point operation. For each configuration item, help text is provided on the HTML programmer interface. If the IP addresses are manually specified, record them for future reference. The IP address "of each radio is required in subsequent steps.



The Subnet ID should be a descriptive text name for the radio link and identical in both Access Point and Remote radios, for correct operation. The configuration cannot be saved with the factory default Subnet ID. Choose a unique ID and record it for future use. Up to 20 printable characters can be used.

After the configuration of all items is complete, activate the configuration by clicking on the "Activate Configuration" button in the top right corner.

## Step 6 - Activate Remote - PTP Wizard

Repeat steps (3) to (5) for the Remote radio. When in Step 5, select the "Point-to-Point - Remote" button and click on the "Start The Wizard" button.

## Step 7 - Verify Modem Operation

The J-Series Ethernet radio modems are now ready for operation. Allow 15 seconds for the Remote radio to synchronise with the Access Point radio

### Access Point LEDs

Pwr/Tx LED is solid Green and flashes Red once per second on Tx.

### Remote LEDs

Pwr/Tx LED is solid Green (it may flash RED occasionally) and Sync/NoRx LED flashes Green once per second indicating the Remote has synchronised with the Access Point.

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## Step 8- Embedded Diagnostics Testing

### 8.1 Review Access Point.

Start a web browser session and enter the IP address of the J-Series Access Point (as recorded in Step 5) into the URL field. Once the page has loaded, click on the Diagnostics tab, then select the Summary sub-menu. This displays the Diagnostics summary page. Review the diagnostics parameters, checking for abnormal items such as high VSWR (high TX reverse power) and lower than expected radio RSSI (Received Signal Strength).

8.2 Review Remote Radio.

Click on the sub-menu "Browse Network". The remote radio appears in the list (serial number and unit type is listed). Click on the Serial Number of the Remote Radio. The browser re-directs to the Remote radio. Click on the "Summary" tab and the remote radios diagnostics can now be reviewed.



## Step 9 - Packet Error Testing

This tool provides a useful way to test a radio communication link by transmitting data packets between two units in a loop-backed mode.

To start the test, direct the browser to the Access Point by typing the IP address of this unit into the URL field. Select the "Diagnostics" tab and click on the "Packet Error Test" sub-menu.

Enter the "Destination Serial Number" of the Remote radio and verify that the "Number of Packets" is set to 1000. Click on the "Start Packet Test" button. The radio will indicate that the packet test has started and is currently running. Both radios will have flashing Tx LEDs indicating that data is being transmitted.

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When the test is complete, a message stating "Packet error test completed" is shown and the test results summarised in the "Test Results" section.

The test results show TX & RX Packets, Lost Packets and the Packet Error Rate.

## Step 10 - Commissioning Record

After an Indicative Packet Error test has been performed, a Commissioning Record can be prepared. This facility is activated by clicking on the "Commissioning Record" button.

It is recommended that the radio be configured to obtain the current date / time from an NTP server, otherwise the date / time shown may not be correct.

An appropriate Unit Name and Location may be entered for reference purposes. Additionally, a comment may be added indicating the type of antenna in use. Once this information has been added, the web page can be printed using the print facility in the web browser. It may also be useful to print the commissioning record to PDF for future reference.



This completes the requirements for setting up a Point-to-Point J-Series Link. The radios are now ready for application testing. The application can be connected to either LAN1 or LAN2 or both (as required).

For more information on testing, consult the J-Series User Manual.

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## Important Information for Class I, Division 2 Groups A, B, C & D Hazardous Locations

### Applies to models TBURJR900-xxxxxxHx(CSA Marked)

This product is suitable for use in Class I, Division 2, Groups A, B, C & D hazardous locations or non hazardous locations only.

The transceiver has been recognised for use in these hazardous locations subject to the following conditions of approval:

1. This device is OPEN type equipment that must be used within a suitable end-use system enclosure, the interior of which is accessible only through the use of a tool. The suitability of the enclosure is subject to investigation by the local Authority Having Jurisdiction at the time of installation.
2. Wiring to or from this device, which enters or leaves the system enclosure, must utilize wiring methods suitable for Class I, Division 2 Hazardous Locations, as appropriate for the installation.
3. Installation, operation and maintenance of the radio modem should be in accordance with the radio modem's user manual.
4. A power connector with locking screws as supplied by Trio Datacom MUST be used.

## WARNING

### HAZARD OF EXPLOSION

Do not connect or disconnect this equipment unless power has been removed or the area is known to be non-hazardous. Tampering or substitution of components may adversely affect the safe use of the radio modem in hazardous locations and may void the approval.

A power connector with locking screws as supplied by Schneider Electric MUST be used.

Failure to follow these instructions can result in death or serious injury, and equipment damage.



## Compliance Information

### FCC Part 15 Notice

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, and (2) this device must accept any interference received including interference that may cause undesired operation.

### FCC Approved Antennas

This device can only be used with Antennas listed in the Appendix of the J-Series User Manual. Contact Trio Datacom if you need more information or would like to order an antenna.

### RF Exposure

To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended. The antenna used for this transmitter must not be co-located in conjunction with any other antenna or transmitter.

### MAXIMUM EIRP

FCC Regulations allow up to 36 dBm effective isotropic radiated power (EIRP). Therefore, the sum of the transmitted power (in dBm), the cabling loss and the antenna gain (in dBi) cannot exceed 36 dBm.

### AUSTRALIAN COMPLIANCE NOTICE: MAXIMUM EIRP

ACMA Regulations allow up to 30 dBm (1 Watt) of effective isotropic radiated power (EIRP) in the 915MHz license free band and 36 dBm (4 Watts) of EIRP in the 2.4GHz band. Therefore, the sum of the transmitted power (in dBm), the cabling loss and the antenna gain cannot exceed the above stated EIRP limits.

### ETSI EN 300 328 v1.8.1 COMPLIANCE NOTICE for 2.4GHz installations in Europe:

In order to meet the directions of ETSI EN 300 328 v1.8.1 firmware versions 3.6.x or earlier, EIRP must be limited to 10mW (10dBm). Later firmware versions can operate up to 500mW (27dBm) EIRP.

## Contact Details

Technical Support: The Americas, Europe, Middle East, Asia  
Available Monday to Friday 8:00am - 6:30pm Eastern Time  
Toll free within North America: 1-888-226-6876  
Direct Worldwide: +1-613-591-1943  
Email: SupportTRSS@schneider-electric.com

Technical Support: Australia  
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