RNA110 Installation and Operation Manual

NOTICE

Open Control Solutions assumes no responsibility for any
errors that may appear in this document, nor does it make any
commitment to update the information contained herein.
However, questions regarding the information contained in this
document are welcomed.

Open Control Solutions also reserves the right to make changes
to the specifications of the RNA110 (DFS-00512-008-01) and
to the information contained in this document at any time
without notice.

Table of Contents

This document provides instructions for installing, configuring, and testing the Rail Network Adapter (RNA), a small-sized, DIN-rail mounted serial-to-network converter. The RNA is one component of the RAIL system, a family of DIN-rail mounted products designed specifically for the purpose of remote control and acquisition. The RAIL (Remote Acquisition – Integrated Logic) system features a highly-integrated, modular design with a large point count. All RAIL system components are DIN-rail mounted and may be used alone or integrated with other components of the system.

ORGANIZATION

Chapter 1: Product Overview describes the function and uses of the RAIL Network Adapter (RNA) and also provides specifications, including types of interfaces, LED descriptions, dimensions, and interface overview.

Chapter 2: Before You Begin details safety precautions that should be observed when installing and servicing the RNA, issues to consider when selecting a site, and instructions on steps to take when equipment is received.

Chapter 3: Quick Start Guide provides an outline of the steps required to get the RNA up and running.

Chapter 4: Installing and Configuring the RNA provides instructions for mounting the RNA on a DIN-rail, powering the RNA, and connecting the RNA to a network and to a DTE or DCE device. It also provides instructions on configuring the RNA's serial and network settings.

Appendix A: Testing and Troubleshooting details steps to take when the RNA experiences power or communication errors.

Appendix B: Support, Service, and Warranty provides instructions on obtaining technical assistance and returning products for service or replacement. OCS' warranty statement can also be found in this section.

DEFINITION OF TERMS

The following terms are used throughout this document.

ASCII – A code for representing English characters as numbers, with each letter assigned a number from 0 to 127.

DCE – Data Communications Equipment; a device (e.g., a modem) that provides a path for RS-232 communication and is connected to a DTE device (e.g., a computer)

DTE – Data Terminal Equipment; the terminating end of an RS-232 communications channel. A DTE device (e.g., a computer) controls the flow of data and is connected to a DCE device (e.g., a modem)

Gateway – A node on a network that serves as an entrance to another network. A gateway is associated with both a router, which determines where packets are sent, and a switch, which provides the actual path for the packet in and out of the gateway.

Hyper SCADA Server – The HSS is a self-contained data collection and information server housed in a lockable wall-mounted enclosure. Utilizing Client-Server Architecture, the Human Machine Interface (HMI) is a typical Client Desktop PC connected to the Hyper SCADA Server using any one of the multiple connectivity options available to the user.

IP – A protocol that specifies the format of packets and the addressing scheme.

Modbus ASCII – A communications protocol developed by Modicon that transmits only ASCII characters and uses ASCII control code to transfer discrete/analog I/O and register data between control devices.

Modbus RTU – A communications protocol developed by Modicon that transmits blocks of data consisting of 8-bit binary characters (with an optional parity bit) between an RTU device and a host computer.

Modbus TCP – A communications protocol developed by Modicon that uses Ethernet and TCP/IP to transfer discrete/analog I/O and register data between control devices.

RDP180 – RAIL Data Processor; a compact, DIN-rail mounted PLC that supports the Modbus ASCII, RTU, and TCP protocols. The RDP180 runs ladder logic and provides status via supplied Process Management Toolkit software.

RDR200 – RAIL Data Radio; a 2W licensed radio available in 217-220 MHz frequencies featuring 1200, 2400, 4800 and 9600 data rates, and asynchronous and DCE protocols. Format is 8 bit characters, E/O/N Parity, 1 or 2 stop bits.

RIO032 – RAIL Input Output; a DIN-rail mounted I/O device that features 32 I/O points (8 digital inputs, 8 digital outputs, 8 analog inputs, and 8 analog outputs).

RIO128 – RAIL Input Output; a DIN-rail mounted I/O device that features 128 I/O points (40 digital inputs, 40 digital outputs, 40 analog inputs, and 8 analog outputs).

RNA – RAIL Network Adapter; a small-sized, DIN-rail mounted serial-to-network converter.

Router – A device that forwards data packets along networks. A router is connected to at least two networks, commonly two LANs or WANs or a LAN and its ISP. Routers are located at gateways.

Switch – A device that filters and forwards packets between LAN segments.

TCP – A protocol that enables two hosts to establish a connection and exchange streams of data. TCP guarantees delivery of data and also guarantees that packets will be delivered in the same order in which they were sent.

TCP/IP – A suite of communications protocols used to connect hosts on the Internet. TCP/IP uses several protocols, the two main ones being TCP and IP.

DESCRIPTION

The RAIL Network Adapter (RNA110; DFS-00512-008-01) is a small-sized, DIN-rail mounted serial-to-network converter that enables communications between:

- Modbus TCP master device and a Modbus serial (ASCII or RTU) slave device, such as aRIO032 or RIO128.
- Modbus serial (ASCII or RTU) master device and a Modbus TCP slave device, such as an RDP or other third-party PLC.

The RNA can communicate with both DCE and DTE serial devices, such as the RIO128 and the RDP180, to enable them to communicate with a host device over a network.

The RNA features an RJ-45 10/100Base-T Ethernet interface to enable network communications and a 9-pin DSUB (D-subminiature) male serial interface to enable 1200-38400 baud RS-232 communications. The Ethernet port should be connected to a switch or router that is compatible with the 10/100Base-T standard. The serial port should be connected to a serial port on the DCE/DTE device.

RNA Interfacing Between Modbus TCP Master and Modbus Serial Slave
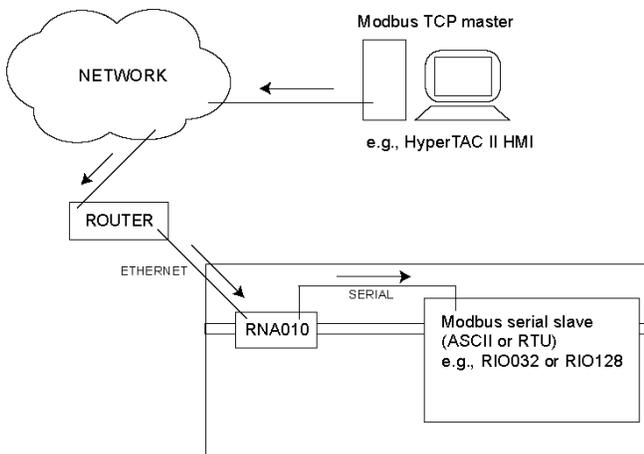
RNA Interfacing Between Modbus Serial Master and Modbus TCP Slave
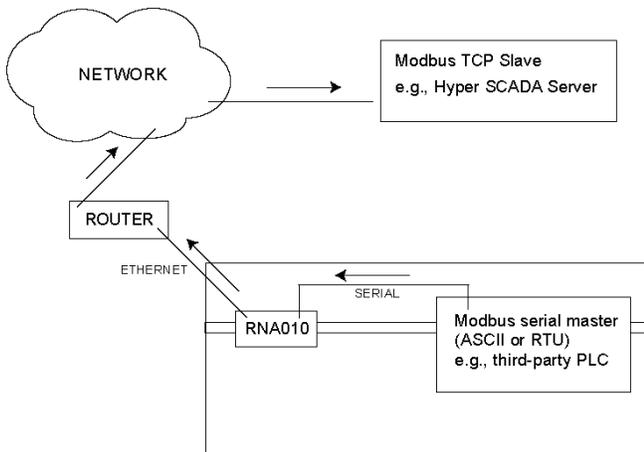
The RNA is configured over a network via a Web-based interface accessed by browsing to the RNA's current IP address. Using this interface, you can configure the RNA's IP address and gateway (if used) and its serial communication settings. This interface is also used to input the IP address of a network device when the RNA is an intermediary between a Modbus serial master device and a Modbus TCP slave device (Remote Port IP field on RNA's web-based configuration interface).

APPLICATIONS

- Protocol converter (Modbus TCP to Modbus ASCII/RTU; Modbus ASCII/RTU to Modbus TCP).
- Modbus serial tunnel for an Open Control Solutions' RTU fitted with an RDR200 radio.
- Modbus serial tunnel for an RS-485 network (requires an RS-232 to RS-485 converter).

SPECIFICATIONS

- RJ-45 10/100Base-T Ethernet interface
- 9-pin DSUB (D-subminiature) male Serial interface to enable 1200-38400 baud RS-232 serial communications
- ARM7 processor
- 4M Flash Memory / 8M RAM
- Supports Modbus TCP and DFS NIM protocols
- Configurable over the Ethernet interface
- Input voltage of 10-14VDC
- Current rating of 80mA at 12V; 70mA at 13.8V
- LEDs for RXD, TXD, Link, and Status
- Operate in 5%-90% humidity (noncondensing) within a temperature range of 32°-158° F (0°-70° C)
- Small size (5.00" x 3.25" x 2.50")
- No jumpers or switches need to be modified from manufacturer settings

LEDs

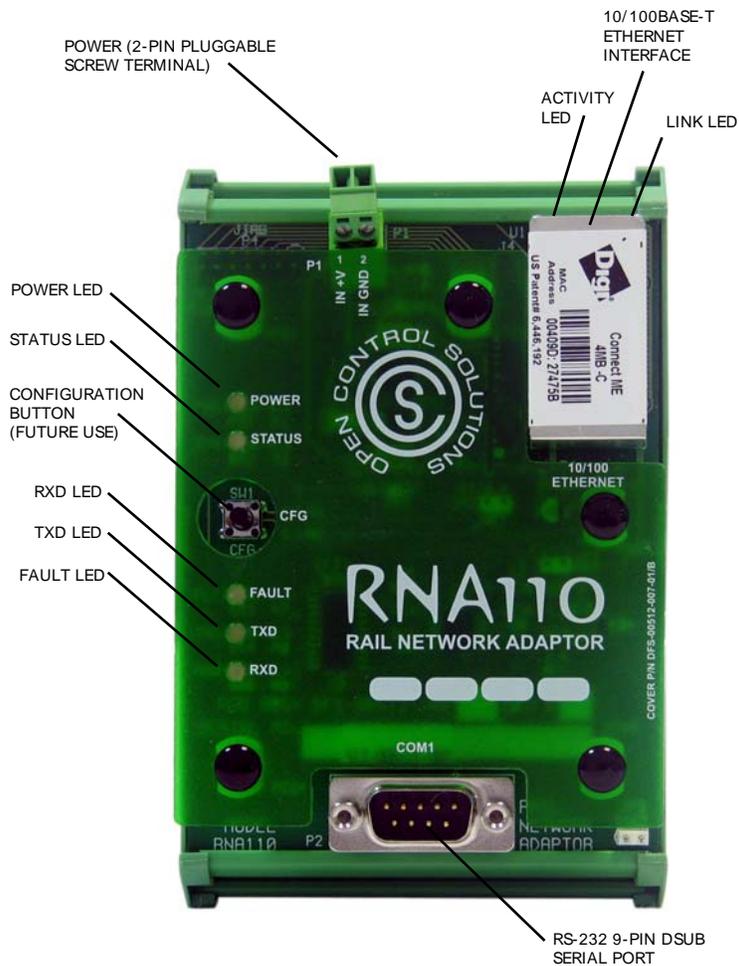| LED	Color	Action	Description
POWER	Green	On	Power to RNA is on and the device is ready
STATUS	Green	Blinking steadily	Normal operation
		4 quick flashes	Network setup conflicts with configurations; implementing default configuration settings
		6 quick flashes	No configuration found at power up; implementing default configuration settings
		8 quick flashes	New configuration has been downloaded via web or FTP
		12 quick flashes	Last IP octect polled from RIM/TCU or RIO has changed; updating IP address accordingly.
		20 quick flashes	Factory reset strap installed; will initiate default configuration settings on removal (see "Reset to Factory Default State" on p. 20
FAULT	Green	On	Processor is being reset.
RXD	Green	On	COM1 is receiving data
TXD	Green	On	COM1 is transmitting data
LINK*	Yellow	On	A network link has been detected
ACTIVITY*	Green	On	Network data is being transmitted or received

* These LEDs can be found on the upper corners of the Ethernet port.

DIMENSIONS

INTERFACE COMPONENTS

POWER (2-PIN PLUGGABLE SCREW TERMINAL)

10/100BASE-T ETHERNET INTERFACE

ACTIVITY LED

LINK LED

POWER LED

STATUS LED

CONFIGURATION BUTTON (FUTURE USE)

RXD LED

TXD LED

FAULT LED

RS-232 9-PIN DSUB SERIAL PORT

Notes

SAFETY PRECAUTIONS

Review the following statements before installing, servicing, or replacing the RNA or any of its components.

General Precautions

Only trained and qualified personnel should install, service, or replace this equipment.

Carefully read the installation and wiring instructions before installing the RNA and connecting it to its power source.

Do not work on the RNA, or connect or disconnect any of its cables, during periods of lightning activity.

The RNA is not designed for use with "high reliability" devices used in industries such as aerospace, nuclear power, and health care.

Do not use the RNA in an environment with any of the following conditions:

- Extreme cold or heat [recommended temperature range is 32°-158° F (0°-70° C)]
- Severe vibration
- High humidity [recommended relative humidity is 5%-90% (noncondensing)]
- Excessive amount of oil present
- Caustic or combustible gas
- Excessive electrical noise

Working with the RNA

When disconnecting a cable, pull on its connector or on its strain-relief loop, not on the cable itself. Some cables have a connector with locking tabs; when disconnecting this type of cable, press in on the locking tabs before disconnecting the cable. When pulling connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before connecting a cable, make sure both connectors are correctly oriented and aligned.

Protecting Against Electrostatic Discharge

Static electricity can harm delicate, static-sensitive components inside the RNA. To prevent static damage, observe proper ESD procedures during installation, such as putting on an electrostatic discharge wrist strap before touching any of the RNA's electronic components. Additionally, the following steps can be taken to prevent damage from electrostatic discharge (ESD):

- When unpacking a static-sensitive component from its shipping carton, do not remove the component's antistatic packing material until ready to install the component. Be sure to put on an electrostatic discharge wrist strap before unwrapping the antistatic packaging.
- When transporting a sensitive component, first place it in an antistatic container or packaging.
- Handle all sensitive components in a static-safe area. Place the equipment on a grounded surface. If possible, use antistatic floor pads and workbench pads.

Note: Contact OCS if electrostatic discharge packaging is needed for return shipments. See "Return Authorization (RA) Procedure," p. 22 for more information on returning equipment.

SITE SELECTION

When selecting a site for the RNA, keep the following in mind. The RNA…

- requires a power supply that provides DC 12V.
- is designed to operate at the recommended temperature range of 32°-158° F (0°-70° C).
- should not be use in an environment that experiences severe vibration.
- is designed to operate in an environment with a relative humidity of 5%-95% (noncondensing).
- should not be used in an environment where an excessive amount of oil is present.
- should not be used in an environment where there is caustic or combustible gas.
- should not be used in an environment with excessive electrical noise.
- is designed to be mounted in an industrial control panel with access limited to qualified personnel.
- should be installed in a location that provides easy accessibility for wiring and servicing.

RECEIPT OF EQUIPMENT

When equipment is received, examine the outside of the carton for any damage incurred during shipment. Remove the packing list and the equipment from the shipping carton. Carefully inspect the equipment for damage. Resolve any damage with the local carrier. Report damages to Open Control Solutions (321-435-5010). Include the serial number of the unit and the extent of damage in your report.

This chapter provides an outline of the steps needed to get your RNA up and running. Details on each step can be found elsewhere in the manual.

Step 1: Check Package Contents

- RNA unit
- "Read This First" sheet
- OCS Resource CD

Step 2: Hardware Installation

1. Mount the RNA on a DIN rail [DIN EN 50025 (32mm asymmetrical) OR DIN EN 50022 (35mm symmetrical)]

2. Connect the RNA to a minimum 100mA 12VDC power source (not included). Check that the Power LED is on.

3. Connect the RNA to the network. Check that the Link LED is on.

4. Connect the RNA to a DTE serial Modbus device, such as the RIO032/RIO128 (via a null modem cable) or DCE serial Modbus device, such as a Modbus PLC (via a straight cable).

Step 3: Configure Serial and Network Parameters

1. Temporarily change your computer's IP address so it is on the same subnet as the RNA's factory default IP address (192.168.1.10).

2. Open a Web browser and browse to the RNA's IP address. The configuration Web page will open.

3. Enter the desired serial and network settings and click Update. The Status LED will flash quickly eight times. The RNA will then reboot. Observe the Status LED. When the RNA has returned to normal operation, the Status LED will be blinking steadily.

Step 4: Communication Tests

1. Return your computer's network settings to their original values.

2. Open a MS-DOS prompt window and issue a PING command to the RNA's new IP address to verify that the RNA's IP address has been set correctly.

3. Verify serial communications by performing a data tap. A "data tap" is a procedure that enables you to view outgoing and incoming messages between the RNA and the Modbus-compatible device connected to the RNA's COM1 port.

   A. Open a Telnet connection by selecting Run from the Windows Start menu and typing

   ```
   telnet xxx.xxx.xxx.xxx 504
   ```

   Where xxx.xxx.xxx.xxx is the IP address assigned to an RNA that is on the network. If you are using a closed network to connect to the RNA (crossover cable between the RNA and the

computer), change the network settings for your computer so that it is on the 192.168.1 network (for example, set the computer to 192.168.1.101) and telnet to the default IP of 192.168.1.10.

B. Click OK to open a Telnet connection. You should begin seeing transmitted messages and responses. Transmitted messages (messages sent from the RNA to the COM1 port) are green in color and are preceded by a left-pointing carat (<). Responses (messages sent from the COM1 port to the RNA) are white in color and are preceded by a right-pointing carat (>). A problem communicating with the COM1 port hardware is indicated when intermittent or no responses are received.

IMPORTANT

A qualified technician should install the RNA.

The RNA is designed to be mounted in an industrial control panel with access limited to qualified personnel.

If the RNA is to be installed into an existing control panel, make sure that all breakers are shut off before starting the installation.

All wiring should conform to federal, state, and local electrical codes.

Attention should be given to the location of the RNA to provide accessibility for wiring and servicing. Allow room above and below the device to provide easy access.

MOUNTING THE RNA

When mounting the RNA, either of the DIN-rail models listed below may be used.

- DIN EN 50025 (32mm asymmetrical)
- DIN EN 50022 (35mm symmetrical)

Hook the RNA on the top of the DIN-rail and press down to snap it into place.

WIRING FOR POWER

The RNA operates from 10-16 VDC and is compatible with other components of the RAIL system.

The RNA can be powered with a 13.8 V power supply and backed up with a 12V sealed lead-acid battery.

Two terminals are provided for wiring power:

- P1-1, IN +V (incoming power)
- P1-2, IN GND (incoming power return)

Verify the input voltage on the RNA's connector label before wiring. Wire in accordance with Federal, State, and Local Electrical Codes.
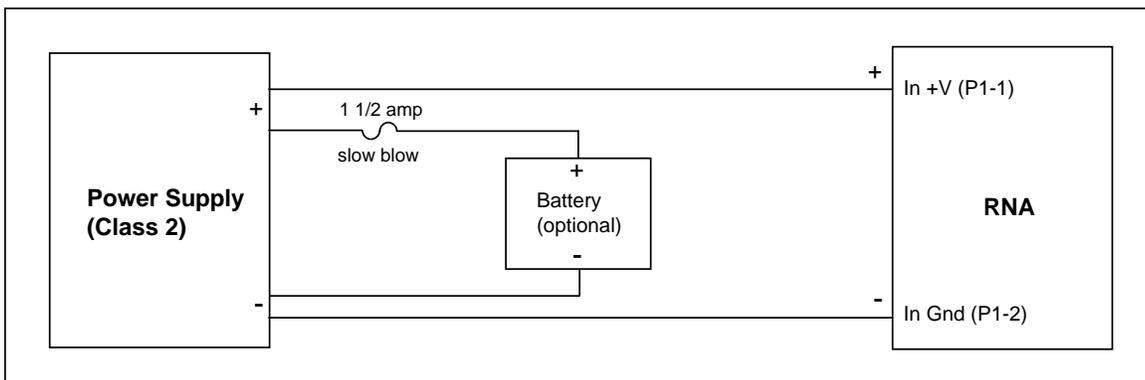
Once power has been applied, check that the Power LED is on. If the Power LED is not on, refer to the "Check Power" in Appendix A: Testing and Troubleshooting. After checking the LED, connect the serial and Ethernet cables to the appropriate ports on the RNA. The RNA can now be connected to a switching hub and a DCE/DTE device.

CONNECT TO THE NETWORK

The Ethernet port of the RNA should be connected to a switch or router that is compatible with the 10/100Base-T standard. The RNA's LINK LED will light if the RNA's Ethernet cable has been correctly connected to a switch or router.
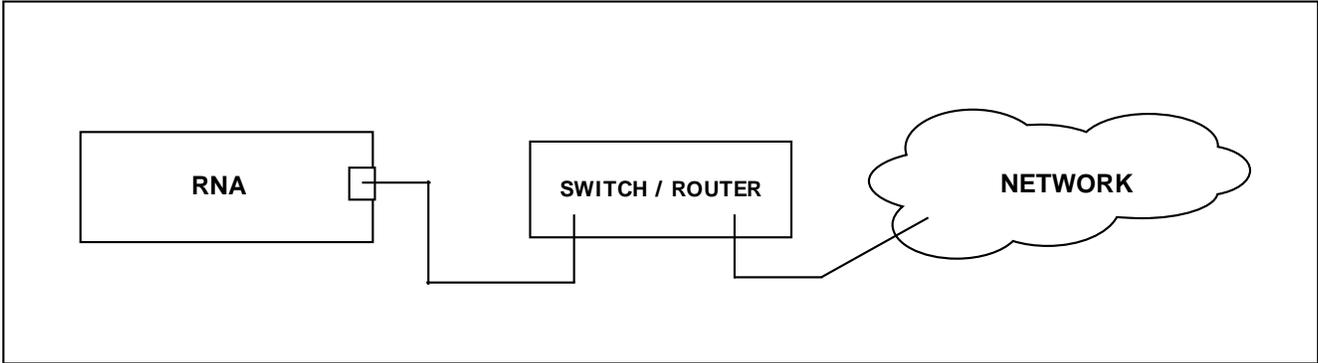

CONNECT TO A DTE DEVICE

The RS-232 serial port of the RNA should be connected to a serial port of a DTE device (for example, the RIO128) using a null modem. Note that request to send (RTS) and clear to send (CTS) connections are required to enable hardware flow control. Additionally, if a 3-wire interface is required, jumper RTS to CTS on both connectors on the cable.

NOTES:

1. RTS (request to send) and CTS (clear to send) connections are required to enable hardware flow control.
2. If a 3-wire interface is required, jumper RTS to CTS on both ends of the cable.
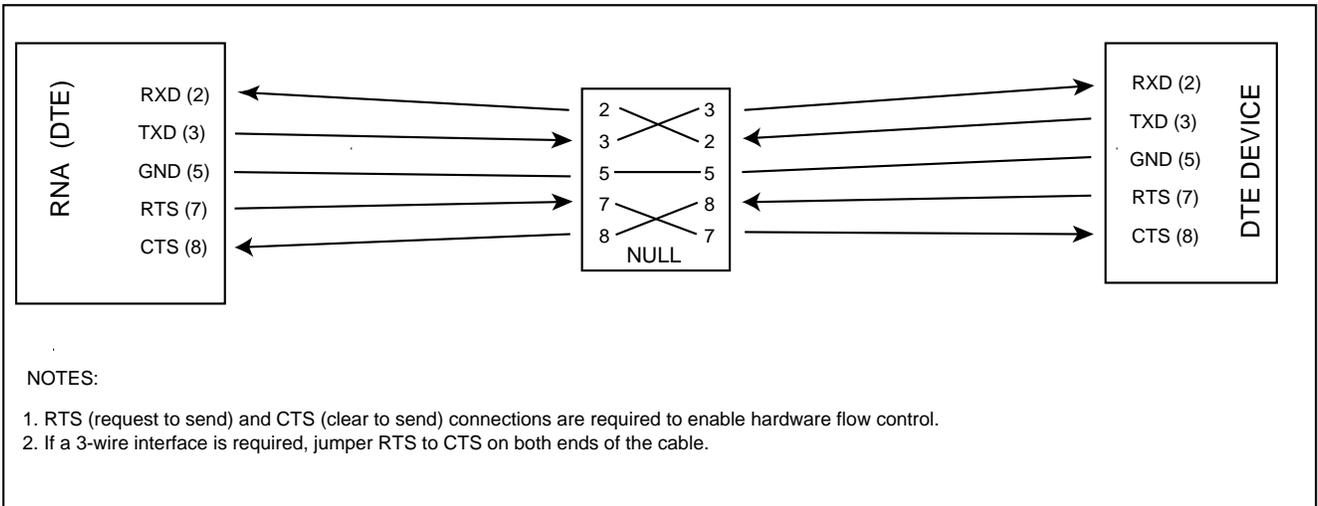
CONNECT TO A DCE DEVICE

The RS-232 serial port of the RNA should be connected to a serial port of a DCE device using a straight cable. Note that request to send (RTS) and clear to send (CTS) connections are required to enable hardware flow control. Additionally, if a 3-wire interface is required, jumper RTS to CTS on both connectors on the cable.

RNA

RXD (2)   TXD (3)   GND (5)   RTS (7)   CTS (8)

NOTES:

1. RTS (request to send) and CTS (clear to send) connections are required to enable hardware flow control.
2. If a 3-wire interface is required, jumper RTS to CTS on both ends of the cable.

RXD (2)   TXD (3)   GND (5)   RTS (7)   CTS (8)

DCE DEVICE
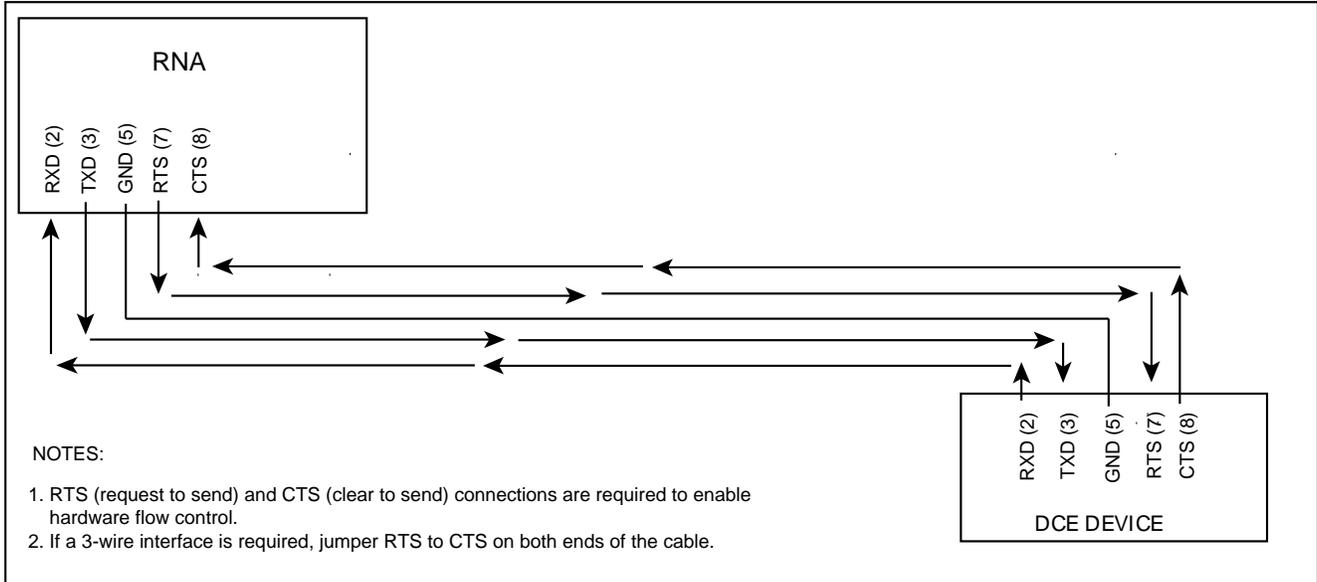
CONFIGURE NETWORK AND SERIAL SETTINGS

The RNA leaves the factory set to a default IP address of 192.168.1.10. Before you can begin using the RNA as a protocol converter, you must configure it with the IP address assigned to it by your Network Administrator as well as the serial settings of the RS-232 device the RNA is communicating with.

In order to configure the RNA's network and serial settings, you must place the RNA on your network (see "Connect to the Network" on page 12) and temporarily change your computer's IP address so that it is on the same subnet (192.168.1) as the RNA.

IMPORTANT: It is advisable to contact your Network Administrator before making any changes to your computer's network settings.

Change Your Computer's IP Address

(The steps below are for a computer running Windows. If you are using an operating system other than Windows, check the documentation for that operating system.)

1. Click **Start** and select **Control Panel**.

2. Open **Network Connections**.

3. Right click **Local Area Connection** and select **Properties**.

4. Under **This connection uses the following properties**, select **Internet Protocol (TCP/IP)** and click **Properties**.

5. Click the radio button for the **Use the Following IP Address** option. Enter an available IP address in the 192.168.1 subnet.

Configure the RNA's Network and Serial Settings

1. Open your Web browser and browse to the RNA's IP address (type the RNA's IP address in the browser's address/location bar). The configuration page (as shown on the next page) opens.

2. Enter the desired settings (more information on these settings appear on the next several pages) and click **Update**.

3. Enter the user name and password and click **Login** (user name: *convert*; password: *solution*). The user name and password are set at the factory and can't be changed.

4. The next screen to appear will include the statement "Reconfiguring System. Will automatically restart in 10 seconds." The STATUS LED will flash quickly eight times. The RNA will then reboot. Observe the Status LED. When the RNA has returned to normal operation, the Status LED will be blinking steadily.

5. When reconfiguration is complete, the first configuration screen will be reloaded in your Web browser and will reflect the new values. Note that if you change any of the network settings, you will need to reconfigure your workstation in order to see the RNA (See "Change Your Computer's IP Address," above).

Communication Tests

After configuring the RNA, perform the tests outlined in Appendix A: Testing and Troubleshooting to ensure that all parameters have been configured properly.

OCS Rail Network Adapter(RNA110)

Serial Parameters:	9600e81	Network Address:	192.168.10.176
Serial Protocol:	RTU	Network Netmask:	255.255.255.0
FlowControl:	NONE	Network Gateway:	0.0.0.0
Poll for IP:	NONE	Remote Port IP:	192.168.10.170

Update

Release = 4/3/2007   Uptime = 3d 04h 31m

Configuration File Upload: [   ] Browse...   Send File

(c) 2006 Open Control Solutions

Serial Settings

When completing this section, be sure that the combination of serial settings you specify is "legal." An example of an illegal combination is RTU protocol with 7 data bits.

Speed, Parity, Data Bits and Stop Bits

Enter the serial communication parameters of the serial device connected to the RNA's COM1 port. The parameters must be in the format of aaaabcd, where aaaa is the baud rate, b is the parity, c is the data bits, and d is the stop bits. In the example above, the RNA is configured for 9600 baud, Odd parity, 7 data bits, and 2 stop bits (9600o72).

Protocol

Enter the protocol to be used by the RNA when communicating with the serial device connected to the RNA's COM1 port. This must be either (Modbus) ASCII or (Modbus) RTU.

Flow Control

Enter the type of hardware flow control used by the serial device connected to the RNA's COM1 port.

- NONE
- BUS (for CTS hardware flow control)
- RADIO (for RTS-CTS hardware flow control)

Network Settings

IP Address

Enter the IP address assigned to the RNA by your Network Administrator.

Network Netmask (optional)

Enter the network netmask (subnet mask) assigned to the RNA by your Network Administrator. Leave at the default value (255.255.255.0) if not required.

Network Gateway (optional)

Enter the gateway address assigned to the RNA by your Network Administrator.

Remote Port IP (optional)

Enter the IP address of the Modbus TCP slave device that is being polled through the RNA by a Modbus serial master device.

FIRMWARE UPDATES

Firmware updates for the RNA are accomplished via the Process Management Toolkit software. You will be contacted by our Service Department when firmware updates are issued.

1. Launch PMT and select Update RNA from the Network menu.

2. Enter the RNA's IP address and click OK. PMT will connect to our FTP server. It will compare the firmware currently installed on the RNA to the latest available on the server. If updates are available, the files will be downloaded. The dialog box will show a series of files being downloaded. When download is complete, the dialog box's Cancel button will change to read Done.

3. Click Done to close the dialog box.

4. Reboot the RNA (cycle power) to complete the update.

Appendix A: Testing and Troubleshooting

CHECK POWER

If the RNA is connected to a power source, but it isn't powering up, verify that the RNA is correctly connected to a good 10-14VDC power supply. Use a multimeter to check for reversed polarity (a condition that can cause the RNA to not function and could result in damage to the RNA).

CHECK IP ADDRESS

Use the `PING` command to verify that the RNA's IP address has been set correctly.

From a Windows computer, open a MS-DOS prompt window and issue the `PING` command where xxx.xxx.xxx.xxx represents the RNA's IP address:

```
c:\ping xxx.xxx.xxx.xxx
```

If the RNA's IP address has been set correctly, the `PING` results will be displayed as follows:

```
Pinging xxx.xxx.xxx.xxx with 32 bytes of data:

Reply from xxx.xxx.xxx.xxx: bytes=32 time=1ms TTL=128
Reply from xxx.xxx.xxx.xxx: bytes=32 time=1ms TTL=128
Reply from xxx.xxx.xxx.xxx: bytes=32 time=1ms TTL=128
```

If the PING test fails, check that the RNA is powered. If there are any network switches between the RNA and the client computer, check that they are functioning properly. If there are any routers between the RNA and the client computer, check that they are configured properly. If there doesn't appear to be a problem with any of the network hardware, perform the "broadcast IP" procedure outlined on page 19 to verify the RNA's IP address.

CHECK SERIAL COMMUNICATION

A procedure called a "data tap" enables you to view outgoing and incoming messages from the RNA to the Modbus-compatible device connected to its COM1 port. A data tap should be done after connecting a device to the RNA's COM1 port to verify that communications are occurring over the COM1 serial port.

A data tap is also a useful troubleshooting tool. A data tap, performed using a standard Telnet connection, can help you determine if the problem is hardware related. If messages are going out from the RNA to the device, but no messages are coming in, the problem may lie with the serial configurations (Were they uploaded to the RNA? Are they correct?), the connection to the device (Is it connected properly? Is the cable damaged?), or with the device itself.

1. Open a Telnet connection by selecting **Run** from the Windows **Start** menu and typing

    ```
    telnet xxx.xxx.xxx.xxx 504
    ```

    Where xxx.xxx.xxx.xxx is the IP address assigned to a RNA that is on the network. If you are using a closed network to connect to the RNA (crossover cable between the RNA and the computer), change the network settings for your computer so that it is on the 192.168.1 network (for example, set the computer to 192.168.1.101) and telnet to the default IP of 192.168.1.10.

2. Click **OK** to open a Telnet connection. You should begin seeing transmitted messages and responses. Transmitted messages (messages sent from the RNA to the COM1 port) are green in color and are preceded by a left-pointing carat (<). Responses (messages sent from the COM1 port to the RNA) are white in color

and are preceded by a right-pointing carat (>). A problem communicating with the COM1 port hardware is indicated when intermittent or no responses are received.

TROUBLESHOOT COMMUNICATION PROBLEMS

The Data Tap utility discussed in the previous section and the "loop back test" described below can be used to test the operation of the RNA to help isolate communication problems.

Loop Back Test

Using a loop back connector and a telnet terminal, you can verify that the RNA is capable of communicating over the network and via the serial port's RX and TX.

1. Insert an RS-232 loop back connector into the RNA's serial port. The loop back connector should have pins two (2) and three (3) wired together and pins seven (7) and eight (8) wired together.

2. In a Windows MS-DOS prompt window, run telnet terminal by issuing the following command:

   ```
   c:\telnet xxx.xxx.xxx.xxx 504
   ```

   (where xxx.xxx.xxx.xxx represents the RNA's IP address)

   With the loop back connector in place, data is traveling over the network, out the serial port, back in the serial port, and back over the network to the client. You should begin seeing transmitted messages and responses. The responses should be the exact same message that was transmitted [Transmitted messages are green in color and are preceded by a left-pointing carat (<). Responses are white in color and are preceded by a right-pointing carat (>)]. Use the data tap procedure discussed on the previous page to see the exact message that should be received.

"Connection refused" or "Unable to connect to server" errors

Receiving the above errors while trying to telnet to the RNA could be the result of:

- Bad network connection (run the PING test; check network cabling from the RNA to the hub/router; verify that the router is properly configured).
- No power at the RNA (check that the RNA's LEDs are on; check that the RNA is properly connected to a power source).
- Improperly configured RNA (Use your Web browser to browse to the RNA's IP and review the RNA's configuration settings).
- Faulty RNA (replace the RNA with another known functioning RNA)

Positive loop back test results, but station still not communicating

This result indicates a problem with:

- The target device, i.e., the serial device to which the RNA is communicating (replace the target device with another known functioning device)
- The cabling between the RNA and the target device (check the cabling between the two devices)
- The parameters of the RNA (verify that the RNA's parameters match those required by the target device)

BROADCAST IP

If you need to find out the IP address to which the RNA is set, you can have it broadcast the IP address to the serial port and view the results in a terminal program such as Hyper Terminal. This may be necessary if you've forgotten the RNA's IP. The only solution in that case is to either have the RNA broadcast its IP or reset the RNA to its factory default state (see "Reset to Factory Default State" on page 20).

1. Power down the RNA.

2. Place a jumper on pin JP3 (FACT).
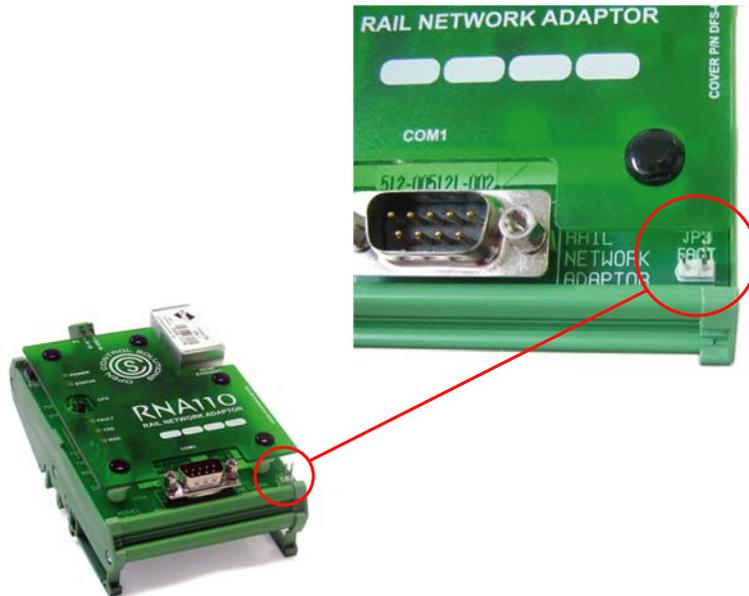
3. Using a service cable, connect a laptop to the RNA's COM1 port.

4. Start a terminal program session (e.g., Hyper Terminal) and configure the connection as follows:

   - Bits per second = 38400
   - Data bits = 8
   - Parity = None
   - Stop bits = 2
   - Flow control = None

5. With the jumper in place, power the RNA. Observe the status LED. The blinking pattern will be 8 quick flashes followed by a pause to indicate the RNA has been started in reset mode.

   IMPORTANT: Do not remove the jumper while the RNA is powered. This will result in the RNA being reset to its factory default state. All configurations will be deleted and the IP address will be reset to 192.168.1.10.

6. The RNA's IP address should be displayed on the terminal program's screen along with the message "Reset to Factory Default on Jumper Removal."

7. When the RNA's IP address has been verified, power down the RNA and then remove the jumper.

RESET TO FACTORY DEFAULT STATE

It is possible to reset the RNA to its factory default state. When this is done, all of the configurations are deleted and the RNA's IP is reset to the default IP address of 192.168.1.10.

1. Power down the RNA.

2. Place a jumper on pin JP3 (FACT).
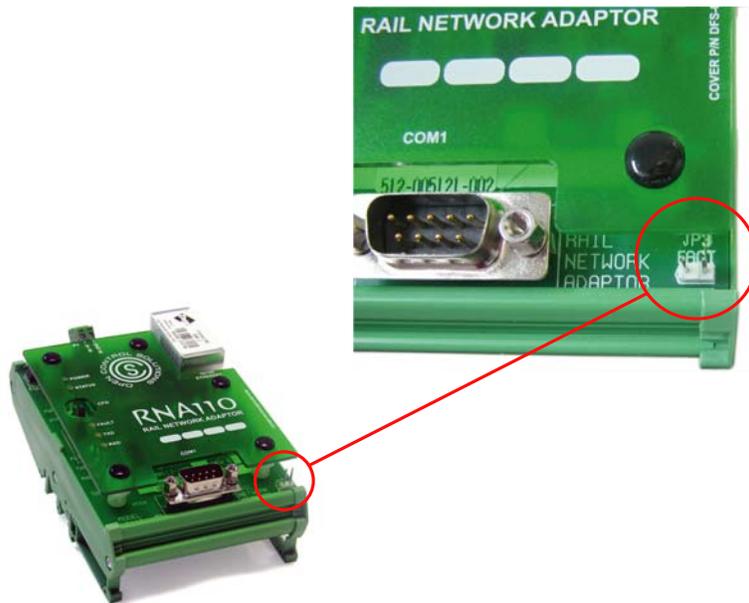
3. With the jumper in place, power the RNA. Observe the status LED. The blinking pattern will be 8 quick flashes followed by a pause to indicate the RNA has been started in reset mode.

4. Remove the jumper with the RNA still powered. Observe the status LED. The blinking pattern will be 5 quick flashes followed by a pause to indicate the RNA is going through the reset process. The LED will turn off for approximately 30 seconds and then will return to its normal blinking pattern (slowly turns on and then off).

5. Using a crossover cable, connect a laptop to the RNA. (You may need to change the network settings for your computer so that it is on the 192.168.1 network. For example, set the computer to 192.168.1.101). Issue a PING command to the factory default IP (192.168.1.10) to verify that the factory default reset was successful.

Appendix B: Support, Service, and Warranty

Open Control Solutions offers support services nationwide from its home office and through authorized representatives. Contact your local Open Control Solutions representative for:

- Sales and order support
- Product technical training
- Warranty support
- Support service agreements

If you are unsure of who to contact, call OCS' Melbourne headquarters at 321-435-5010 and ask for the Sales Department. Alternatively, send email to sales@opencontrolsolutions.com.

TECHNICAL PRODUCT ASSISTANCE

Please review the information in Appendix A: Testing and Troubleshooting, before contacting Open Control Solutions. If you need further assistance, contact your local Open Control Solutions representative. If you are unsure of who to contact, call OCS' Melbourne headquarters at 321-435-5010 and ask for the Sales Department. Alternatively, send email to sales@opencontrolsolutions.com.

WARRANTY

Product Warranty

Open Control Solutions (OCS) labeled products carry a (3) year return-to-factory warranty against defects in material and workmanship. OCS will repair or replace at its option, F.O.B. Melbourne, Florida, any part or parts of its products, which become defective during this warranty period. When returning parts to OCS, a Return Authorization (RA) must be obtained by contacting our Melbourne Factory Repair Center via telephone at 321-259-5009 or by email at rma@dataflowsys.com.

HT3 SCADA Software Warranty

The HT3 SCADA Software is warranted for as long as it is in use by the Owner. All HT3 SCADA Software upgrades are provided to the Owner and are performed free of charge, but they must be installed by an authorized service technician. If remote access to the SCADA server is available via a VPN or dial-up connection, our service department will perform all upgrades free of charge. Please open a service ticket to coordinate a time to perform the remote upgrade. If remote access is not available, or if preferred, an on-site upgrade can be performed. Please request a quotation by contacting our Service Department via telephone at 321-259-5009 or by email at service@dataflowsys.com.

Onsite Installation Warranty

When an OCS product has been installed and/or on-site inspected by a DFS (Data Flow Systems, Inc.) certified technician, on-site warranty services are provided for one (1) year covering defects in installation, material and workmanship. The one year on-site installation warranty also includes 24/7 factory phone support. On-site warranty services must be initiated by contacting our Service Department via telephone at 321-259-5009.

Phone Support

Factory phone support will be supplied during normal business hours, for the life of the product. Normal business hours are weekdays, excluding holidays, 8:00 AM to 5:00 PM Eastern Time Zone. Factory phone support outside of normal business hours, weekends and holidays will be charged against the current hourly rate. A one-hour minimum charge will apply. A dial-up phone line must be connected to the Hyper SCADA Server (if applicable) to receive full support. Contact our Service Department via telephone at 321-259-5009.

RETURN AUTHORIZATION (RA) PROCEDURE

Open Control Solutions' products are designed to be robust and highly reliable. We back this performance with a one-year full warranty (see our warranty statement for details). In the event that a product fails, during or after the warranty period, it may be returned to Open Control Solutions to be repaired or replaced.

All RA's will be subject to standard shipping and handling charges. Standard shipping and charges will be based on UPS ground, please advise if other arrangements are needed (UPS Red, FedEx, Pickup, Freight…). Standard cost of repairs and shipping charges can be obtained by contacting our Sales Department by phone or e-mail.

STEP 1:

Replace the failed product with a spare product of the same type, if one is available.

STEP 2:

Contact Open Control Solutions in one of the following ways to receive RA #.

E-mail – RA # can be obtained by e-mailing OCS at sales@opencontrolsolutions.com and must include the following information.

- Customer/Utility Name and Ship to Address
- Contact Name and Phone Number
- Products to be returned and Serial Numbers
- Detailed description of failure
- PO#

Phone – RA# will be issued over the phone by calling OCS at 321-435-5010 during normal operating hours. The following information will be needed.

- Customer/Utility Name and Ship to Address
- Contact Name and Phone Number
- Products to be returned and Serial Numbers
- Detailed description of failure
- PO#

Note: The lack of "Detailed description of failure" could result in the return of equipment due to the inability to properly determine the nature of the failure or testing resulting in "No Problem Found"

STEP 3:

Place the product in a sturdy box filled with popcorn-type or bubble wrap packing material. Include a packing slip with the following information:

- Model, serial number, probable cause of failure, and the RA number
- Shipping address
- Shipping instructions (shipping costs greater than UPS ground are charged to the customer)

STEP 4:

Address the box to:

> RA Department # {the RA number you received here}
> Open Control Solutions
> 605 N John Rodes Blvd.
> Melbourne, FL 32934-9105

STEP 5:

Ship the box to OCS using any typical shipping carrier (for example, UPS, FedEx, etc.). If circumstances permit, have an OCS employee hand carry the package to the headquarters for you.

NOTE: OCS employees are not permitted to hand carry unpacked products.

Products are typically repaired and shipped back to the customer within a 2-week period starting at the time the product reaches the RA Department. If additional information is required during the repair of the product(s), the OCS RA department will contact you.

To get information on the progress of any of your equipment in for repair, contact the OCS Sales Department at sales@opencontrolsolutions.com or 321-435-5010.

Replacement of equipment may be necessary in the event that the equipment and/or parts are unrepairable. Warranty equipment will be replaced with out prior notification as warranty replacement.

The customer will be notified by phone, if equipment not under warranty cannot be repaired, with information of available options.

OCS reserve the right to return any material received without RA # or not conforming to the requirements of this RA process.

QUESTIONS OR COMMENTS ON THIS MANUAL

If you find a problem with any of the information in this manual or have suggestions on how it could be improved, please contact us at the address below:

> Open Control Solutions
> Documentation Department
> 605 N. John Rodes Blvd.
> Melbourne, FL 32934

Alternatively, e-mail us at:

> sales@opencontrolsolutions.com

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