RVON-I/O User Manual

PROPRIETARY NOTICE

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WARRANTY AND SERVICE INFORMATION

For warranty and service information, refer to the appropriate web site below:

RTS Intercoms ..... www.rtsintercoms.com/warranty
RTS Digital
RTSTW
AudioCom
RadioCom
Intercom Headsets .....www.telex.com

CUSTOMER SUPPORT

Technical questions should be directed to:

Customer Service Department
Bosch Security Systems, Inc.
www.telex.com

TECHNICAL QUESTIONS EMEA

Bosch Security Systems Technical Support EMEA
http://www.rtsintercoms.com/contact_main.php

DISCLAIMER

The manufacturer of the equipment described herein makes no expressed or implied warranty with respect to anything contained in this manual and shall not be held liable for any implied warranties of fitness for a particular application or for any indirect, special, or consequential damages. The information contained herein is subject to change without prior notice and shall not be construed as an expressed or implied commitment on the part of the manufacturer.

 THE LIGHTNING FLASH AND ARROWHEAD WITHIN THE TRIANGLE IS A WARNING SIGN ALERTING YOU OF "DANGEROUS VOLTAGE" INSIDE THE PRODUCT.	 CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER-SERVICABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.	 THE EXCLAMATION POINT WITHIN THE TRIANGLE IS A WARNING SIGN ALERTING YOU OF IMPORTANT INSTRUCTIONS ACCOMPANYING THE PRODUCT.
SEE MARKING ON BOTTOM/BACK OF PRODUCT.		

WARNING: APPARATUS SHALL NOT BE EXPOSED TO DRIPPING OR SPLASHING AND NO OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, SHALL BE PLACED ON THE APPARATUS.

WARNING: THE MAIN POWER PLUG MUST REMAIN READILY OPERABLE.

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, GROUNDING OF THE CENTER PIN OF THIS PLUG MUST BE MAINTAINED.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPRATUS TO RAIN OR MOISTURE.

WARNING: TO PREVENT INJURY, THIS APPARATUS MUST BE SECURELY ATTACHED TO THE FLOOR/WALL/RACK IN ACCORDANCE WITH THE INSTALLATION INSTRUCTIONS.

~	This product is AC only.
CE	

Important Safety Instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

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CHAPTER 1

Introduction

Description

Coupled with the same VOIP technology used with the RVON-8, the RVON-I/O can take legacy analog audio and convert it to digital VOIP audio. The RVON-I/O expands the boundaries of digital audio to include analog conversion. There are many applications in which the RVON-I/O can be used, such as:

- ADAM Matrix AIO to RVON-I/O to RVON-1, RVON-8, RVON-I/O or VOIP Virtual Keypanel.
- Zeus to RVON-I/O to RVON-1, RVON-8, RVON-I/O or VOIP Virtual Keypanel.
- ADAM to RVON-I/O to Zeus
- Cronus to RVON-I/O to RVON-1, RVON-8, RVON-I/O or VOIP Virtual Keypanel.
- McCurdy 9500 to RVON-I/O to RVON-1, RVON-8, RVON-I/O or VOIP Virtual Keypanel.

RVON-I/O is fully compatible with the following internationally recognized standards and protocols; G.711, G.729AB, G.723.

Features

8 Channels of Bidirectional Audio Plus Keypanel Data -	The RVON-I/O supports eight (8) channels in and out and has configurable network bandwidth parameters that can be tailored to individual network conditions. Supports local and remote keypanels.
Addressing -	Eight individually addressable audio channels. The RVON-I/O can feed simultaneously **VoIP** (Voice Over Internet Protocol)-capable keypanels, as well as, various other matrix intercom systems.
Ethernet Capabilities -	The RVON-I/O uses standard Ethernet protocols and is compatible with 10 BASE-T and 100 BASE-TX Ethernet compliant devices and networks.

Reference View

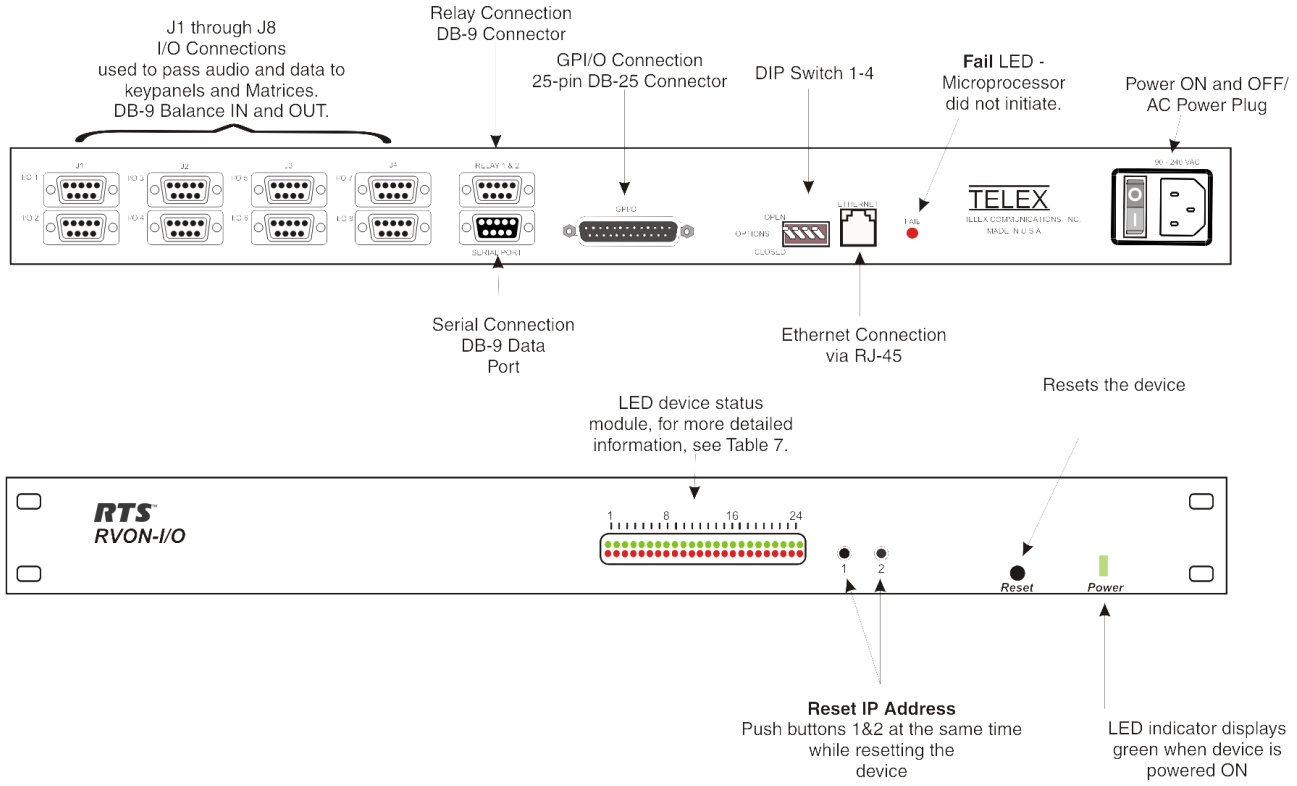


FIGURE 1. RVON-I/O Reference View

LED Explanation of the LED Device Status Module

#	Red LED	Green LED
1	VOIP not connected channel 1	VOIP connected Channel 1*
2	VOIP not connected channel 2	VOIP connected Channel 2*
3	VOIP not connected channel 3	VOIP connected Channel 3*
4	VOIP not connected channel 4	VOIP connected Channel 4*
5	VOIP not connected channel 5	VOIP connected Channel 5*
6	VOIP not connected channel 6	VOIP connected Channel 6*
7	VOIP not connected channel 7	VOIP connected Channel 7*
8	VOIP not connected channel 8	VOIP connected Channel 8*
9	GPO 1 asserted	GPI 1 asserted
10	GPO 2 asserted	GPI 2 asserted
11	GPO 3 asserted	GPI 3 asserted
12	GPO 4 asserted	GPI 4 asserted
13	GPO 5 asserted	GPI 5 asserted
14	GPO 6 asserted	GPI 6 asserted
15	GPO 7 asserted	GPI 7 asserted
16	GPO 8 asserted	GPI 8 asserted
17		
18	Pass-Through Serial TX Activity	Pass-Through Serial RX Activity
19		
20	Shell Log Message (TX) Activity	
21	Ethernet Half Duplex	Ethernet Full Duplex
22	Ethernet 10 Mbps	Ethernet 100 Mbps
23	Ethernet Not ‘AUTO’	Ethernet Link Good
24	Remote Mode	Processor Good

*Green LED wink periodically when a keypanel is connected.
** If both LEDs are off or not lit, the channel is not configured (this only applies to LEDs 23-16).

Specifications

Connections

RJ-45 Ethernet
DB-9 I/O Port (8 bidirectional audio and keypanel data; Male)
DB-25 GPI/O Connection (Female)
DB-9 Relay Port (Female)
DB-9 Serial Port

Power

90-240 VAC

Physical

1 RU (height)
19 inches (482.6 mm) wide X 8 inches (203.2 mm) deep

Digital

TABLE 1. Digital Specifications

Codec	Bit Rate	Coding Delay	Playout Delay	Bandwidth	MOS*
G.711	64	125 µs	20-60 ms	160-224 kbps	4.3
G.729AB	8	10 ms	20-120 ms	32-112 kbps	3.95
G.723	5.3, 6.3	30 ms	60-120 ms	29-45 kbps	3.5, 3.9
***MOS** (Mean Option Score) or **ACR** (Absolute Category Rating) is a widely known voice quality measuring method. The scale ranges from 5 (excellent) to 0 (unacceptable). The typical desirable range for VOIP transmission is from 3.5 to 4.2.					

NOTE: The playout delay and bandwidth depend on the configured amount of audio per packet. The bandwidth values are for bidirectional audio without **VAD** (Voice Activity Detection) enabled.

Analog Audio Specifications

Signal Type: Fully differential (balanced)
Nominal Level: 8dBu
Maximum Level: 20dBu
Input Impedance: High (22K Ω)
Output Impendance: Low (600 Ω)

A/D and D/A Specifications

Sampling Rate: 8 KHz
Resolution: 8 bits
Converter Architecture: 128x Over-sampling Σ - Δ Modulator

Default Ethernet IP Addresses

TABLE 2. Default Address for the RVON Product Line

Product	Default IP Address	Default Subnet Mask
RVON-I/O	192.168.0.1	255.255.0.0
RVON-8	192.168.0.2	255.255.0.0
RVON-1	192.168.0.3	255.255.0.0
RVON-C	192.168.0.4	255.255.0.0
RVON-16	192.168.0.5	255.255.0.0
GPIO-16	192.168.0.6	255.255.0.0
MCII-e	192.168.0.7	255.255.0.0
Cronus	192.168.0.8	255.255.0.0
Zeus III	192.168.0.9	255.255.0.0

Pin Outs for Connections

RJ-45 Pin	Function Ethernet
1	Ethernet TPO+
2	Ethernet TPO-
3	Ethernet TPI+
4	TPO+
5	TPO-
6	Ethernet TPI-
7	TPI+
8	TPI-

DB-9 Pin	Function I/O
1	RS485+
2	RS485-
3	N/A
4	RVON-I/O Audio IN+
5	RVON-I/O Audio IN-
6	N/A
7	RVON-I/O Audio OUT-
8	RVON-I/O Audio OUT+
9	N/A
See page Figure 2, “DB-9 Crossover Cable Connection Diagram,” on page 8.	

DB-9	Function Serial Port
1	N/A
2	RXD, RVON-I/O Received Data (RS485-)
3	TXD, RVON-I/O Transmitted Data (RS485+)
4	N/A
5	GND
6	N/A
7	N/A
8	N/A
9	N/A

DB-9 Pin	Function Relay 1&2
1	Closed 0
2	Open 0

DB-9 Pin	Function Relay 1&2
3	+12V Through 300 Ohm Resistor
4	Closed 1
5	Open 1
6	Common 0
7	GND
8	GND
9	Common 1

DB-25 Pin	Function GPI/O
1	GPO 1
2	GPO 2
3	GPO 3
4	GPO 4
5	GPO 5
6	GPO 6
7	GPO 7
8	GPO 8
9	GND
10	GND
11	GND
12	GND
13	GND
14	GPI 1
15	GPI 2
16	GPI 3
17	GPI 4
18	GPI 5
19	GPI 6
20	GPI 7
21	GPI 8
22	GND
23	GND
24	GND
25	GND

NOTE: The DB-25 pin GPI/O connector can be directly connected to the Zeus, Zeus II, ADAM CS, and ADAM

** Connection to a Cronus Intercom requires a customer cable assembly.

Connection Diagrams

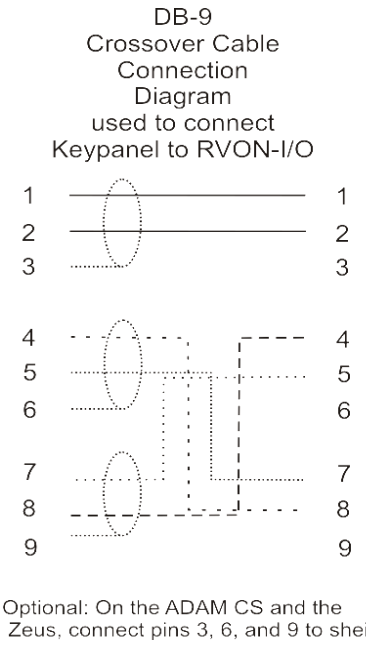


FIGURE 2. DB-9 Crossover Cable Connection Diagram

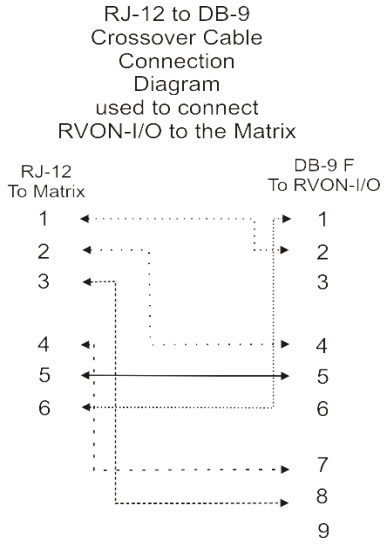


FIGURE 3. RJ-12 to DB-9 Crossover Cable Connection Diagram

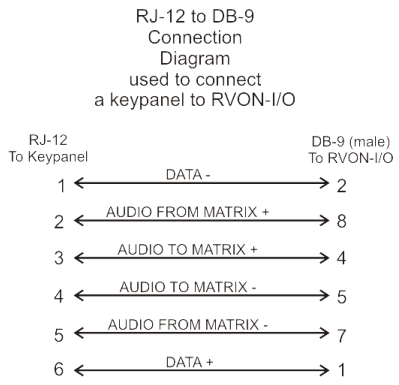


FIGURE 4. RJ-21 To DB-9 Connection Diagram

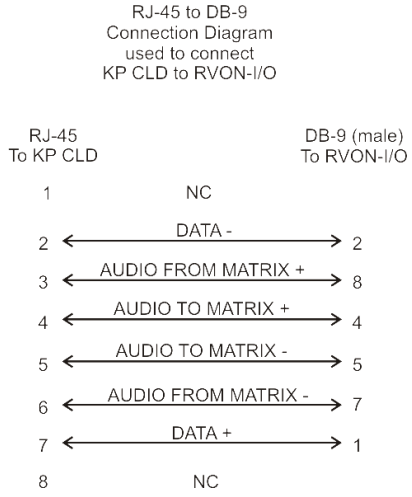


FIGURE 5. RJ-45 to DB-9 Connection Diagram

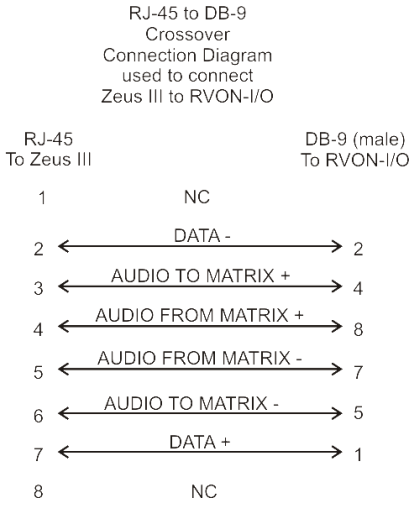


FIGURE 6. RJ-45 to DB-9 Crossover Connection Diagram

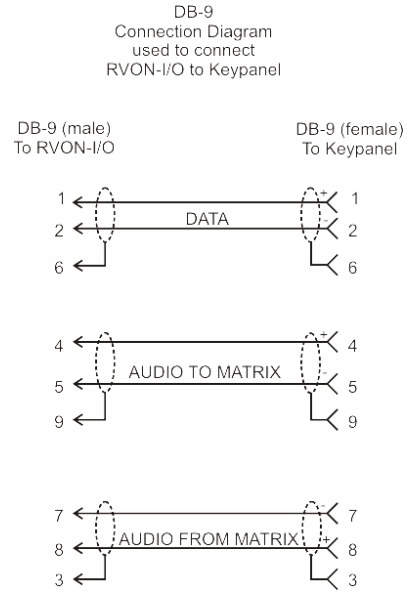


FIGURE 7. Straight DB-9 to DB-9 Connection Diagram

DIP Switches

DIP Switch 1:	**RVON-I/O Mode**
Default Position:	Open
Switch Position:	Open - Local Mode Closed - Remote Mode
Description:	There are two (2) modes in which the RVON-I/O can run: local and remote mode In **Local** mode, keypanels are directly connected to the RVON-I/O. For example, a KP-32 is connected serially to the RVON-I/O which is connected via Ethernet to the RVON-8 in the ADAM system. The connection between the KP-32 and the RVON-I/O is local. In **Remote** mode, a digital keypanel (such as a KP-32 with RVON-1) is connected to an RVON-I/O, which is then connected to an ADAM CS, Zeus, Cronus or an ADAM with AIO cards. **NOTE:** To see system drawing scenarios of both local and remote mode, see "System Diagrams" on page 17.

DIP Switch 2:	**Serial Debug Shell, IP Configuration on Port 8**
Default Position:	Open
Switch Position:	Open - Pass-through port enabled, IP configuration on Port 8 disabled. Closed - Serial Debug Shell enabled; IP configuration on Port 8 enabled.
Description	When the Dip switch is open, the pass-through port is enabled. The **Pass-through Port** is used to send serial port data over Ethernet. When the Dip Switch is closed, serial debug and IP Configuration on I/O port 8 is enabled. The **Serial Debug Shell** provides the user access to a command shell (this is similar to Telnet, except the connection is made through a serial cable). The **IP configuration on I/O Port 8** allows users to connect and configure the IP Address of the RVON-I/O using a compatible keypanel (KP-32, KP-632, KP-832, and KP-812) connected serially to I/O Port 8 on the back of the RVON-I/O. IP Configurations are made from the keypanel service menu. Note, you must have keypanel firmware version 2.02 or higher to configure the IP Address.

DIP Switch 3:	**Telnet Shell**
Default Position:	Open
Switch Position:	Open - Telnet Shell is enabled Closed - Disabled, user name and password are set to default
Description	Using telnet, you can set permissions and configurations within the RVON-I/O application. See Table , "RVON-I/O Command Table," on page 31.

DIP Switch 4:	**Boot Downloader**
Default Position:	Open
Switch Position:	Open - Boot downloader is disabled (runs the native flash program) Closed - Boot downloader is enabled (runs the boot downloader)
Description:	Switches to the boot downloader flash program. This program is sent with the RVON-I/O in case the native flash program becomes corrupt.

CHAPTER 2

Installation

The RVON-I/O can operate in one (1) of two (2) modes, local mode or remote mode. When operating in local mode, keypanels are directly connected to the RVON-I/O. For example, a KP-32 is connected serially to the RVON-I/O, which is connected via Ethernet to the RVON-8. The KP-32 RVON-I/O is in local mode. When operating in remote mode, a digital keypanel (such as KP-32 with RVON-1) is connected via Ethernet to an RVON-I/O, which is then connected to an intercom.

System Requirements

Before you install the RVON-I/O, verify the following items are updated:

Product	Firmware
RVON-I/O	1.0.0 or higher
RVON-1	1.1.0 or higher
RVON-8	1.2.0 or higher
Master Controller	9.22.0 or higher
KP-32	2.0.2 or higher
AZedit	2.08.0 or higher
VKP	1.0.1 or higher

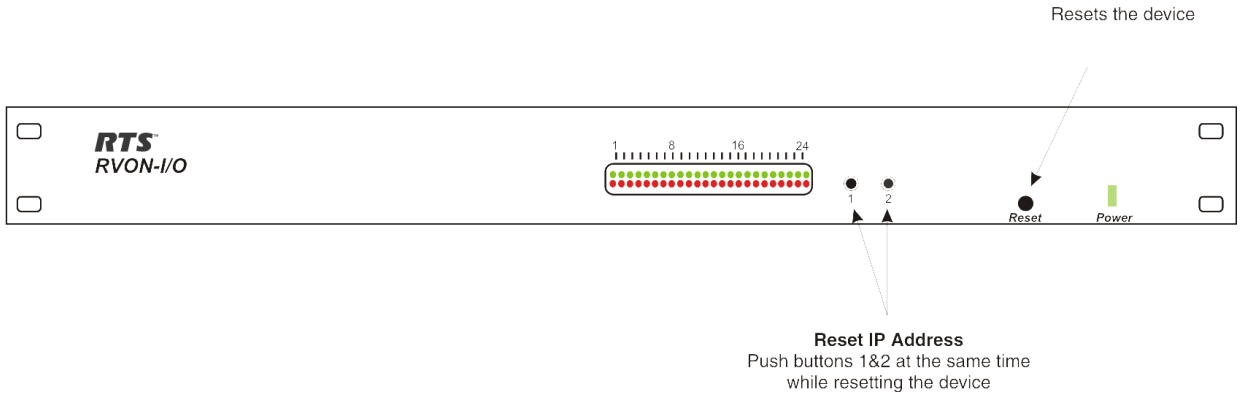
Reset the Current IP Address to the Default RVON-I/O IP Address

The RVON-I/O is shipped with a default IP Address already configured on the unit. The default IP Address is 192.168.0.1, the default Netmask is 255.255.0.0, the default Gateway is set to zero. This feature is useful when using an RVON-I/O in the field (i.e.; a mobile truck) where the IP Address is constantly changing from on destination network to the next. By being able to reset the IP Address to a default address, you will be able to connect to the RVON-I/O without having to remember the IP Address of the previous location. For more information on configuring the IP Address, see “Reset the Current IP Address to the Default RVON-I/O IP Address” on page 12.

To **reset the IP Address to default on the RVON-I/O**, do the following:

1. On the front of the RVON-I/O unit, push and hold buttons **1** and **2**, then push the **RESET** button.
   Hold the buttons in for 15 seconds or until all the LED lights blink rapidly. When all the LED lights blink rapidly, the RVON-I/O IP Address has been reset to the default.

   NOTE: If buttons 1 and 2 are pressed during power on, the unit will reset the IP Address.



Basic Installations

On the following pages, installation for Basic Local Mode, Basic Remote Mode, and Basic Trunked systems is explained.

IMPORTANT: When using Zeus with RVON-I/O or GPI/O you must clear the Configure onboard GPI/Os in FR9528 mode check box in AZedit before you configure your system. If you set this after you configure your panels, it causes the Zeus configuration to be reset.

Basic Local Mode Setup

NOTE: Keypanel version is not relevant in local mode.

In local mode, the keypanel is directly connected to the RVON-I/O through the use of a DB-9 serial cable.

To **setup an RVON-IO local mode system**, do the following

1. On the back of the RVON-I/O, put DIP switch 1 in the **Open** position (local mode).
2. **Power on** the RVON-I/O unit.
3. Connect **keypanels to the RVON-I/O** (I/O ports), using a straight DB-9 (serial cable). See page 8
4. Connect the **RVON-I/O to the Ethernet**.
5. Set the **IP Address** for the RVON-I/O.
6. Using telnet or serial programming, configure the **RVON-I/O** as follows:

   NOTE: To see actual Telnet commands, see “RVON-I/O Command Table” on page 31.

   set channel [chan]
   dest ip_addr (IP Address of the RVON-1, RVON-8, or RVON-I/O that is connected to the RVON-I/O)
   dest_type (the type of device, either an RVON-1, RVON-8, or RVON-I/O)
   dest_chan
   dest_codec (optional)
7. Once you are finished configuring the RVON-I/O, type **activate** into the command prompt to activate the configuration setup on the RVON-I/O.

Basic Remote Mode Setup

In Remote Mode, the keypanel with RVON-1 installed is directly connected to the RVON-I/O via Ethernet.

To **setup a basic remote mode system**, do the following:

1. On the back of the RVON-I/O, put DIP switch 1 in the **closed** position (remote mode).
2. Power **on** the RVON-I/O unit.
3. Connect the **matrix system to the RVON-I/O** (I/O ports), using a DB-9 crossover cable. See page 8 for the different connection diagrams.
4. Connect the **RVON-I/O to Ethernet**.
5. Set the IP Address for the **RVON-I/O** (see “Setup IP Addresses” on page 23).
6. Using Telnet or Serial programming (see “RVON-I/O Command Table” on page 31), configure the **RVON-I/O** as follows.

   NOTE: To see actual Telnet commands, see “RVON-I/O Command Table” on page 31.

   set channel [chan]
   dest ip_addr (IP Address of the RVON-1, RVON-8, or RVON-I/O that is connected to the RVON-I/O)
   dest_type (the type of device, either an RVON-1, RVON-8, or RVON-I/O)
   dest_chan
   dest_codec (optional)
   set panel [panel]
   poll_id (see “Set Panel” on page 37)
   baud
7. Once you are finished configuring the RVON-I/O, type **activate** into the command prompt to activate the configuration setup on the RVON-I/O.

   NOTE: If you do not have a RVON-1 pre-installed, the KP-32 or the KP-812 must have the RVON-1 component installed prior to Remote setup (See the RVON-1 User Manual for details).

RVON-I/O Trunk Setup

When trunking two intercom systems over Ethernet using RVON-I/O, you can setup the RVON-I/O on both ends of the trunks in either local or remote mode. However, a remote to remote mode system is the preferred way of trunking.

To **setup remote mode in a trunked system**, do the following:

1. On the back of the RVON-I/O, put DIP switch 1 in the **closed** position (Remote Mode).
2. Power **on** the RVON-I/O unit.
3. Connect the **Matrix to the RVON-I/O** (via I/O ports), using a DB-9 crossover cable. See page 8 for the different connection diagrams.
4. Connect the **RVON-I/O to Ethernet**.
5. Set the **IP Address** for the RVON-I/O (see “Setup IP Addresses” on page 23).
6. Using telnet or serial programming, configure the **RVON-I/O** as follows:

   set channel [chan]
   dest ip_addr (IP Address of the RVON-1, RVON-8, or RVON-I/O that is connected to the RVON-I/O)
   dest_type (the type of device, either an RVON-1, RVON-8, or RVON-I/O)
   dest_chan
   dest_codec
   set panel [panel]
   poll_id (see “Set Panel” on page 37)

   NOTE:*If the RVON-I/O is in Remote Mode, set the Panel Poll ID to 0, so it is not be seen as keypanel baud*

   NOTE: To see actual Telnet commands, see “RVON-I/O Command Table” on page 31.
7. Once you are finished configuring the RVON-I/O, type **activate** into the command prompt to activate the configuration setup on the RVON-I/O.
8. To set up the other side of the trunk system, repeat steps 1 through 7.

RVON Serial Pass-through Setup

The **Serial Pass-through** is the path in which data is sent and received.

1. Verify the **correct port** is selected - on J1 see “Pin Outs for Connections” on page 7.
2. Verify the **serial connections** are correct.
3. Verify Pass Through Port is **enabled** (DIP Switch 2 OPEN), see “Connection Diagrams” on page 8.
4. Verify the **RVON-I/O baud rate matches the baud rate of the device** it is connecting with.
5. Using Telnet or Serial programming, configure the **RVON-I/O** as follows:

   set serial
   mode
   ip_addr
   baud

   NOTE: To see actual Telnet commands, see “RVON-I/O Command Table” on page 31.
6. Once you are finished configuring the RVON-I/O, type **activate** into the command prompt to activate the configuration setup on the RVON-I/O.

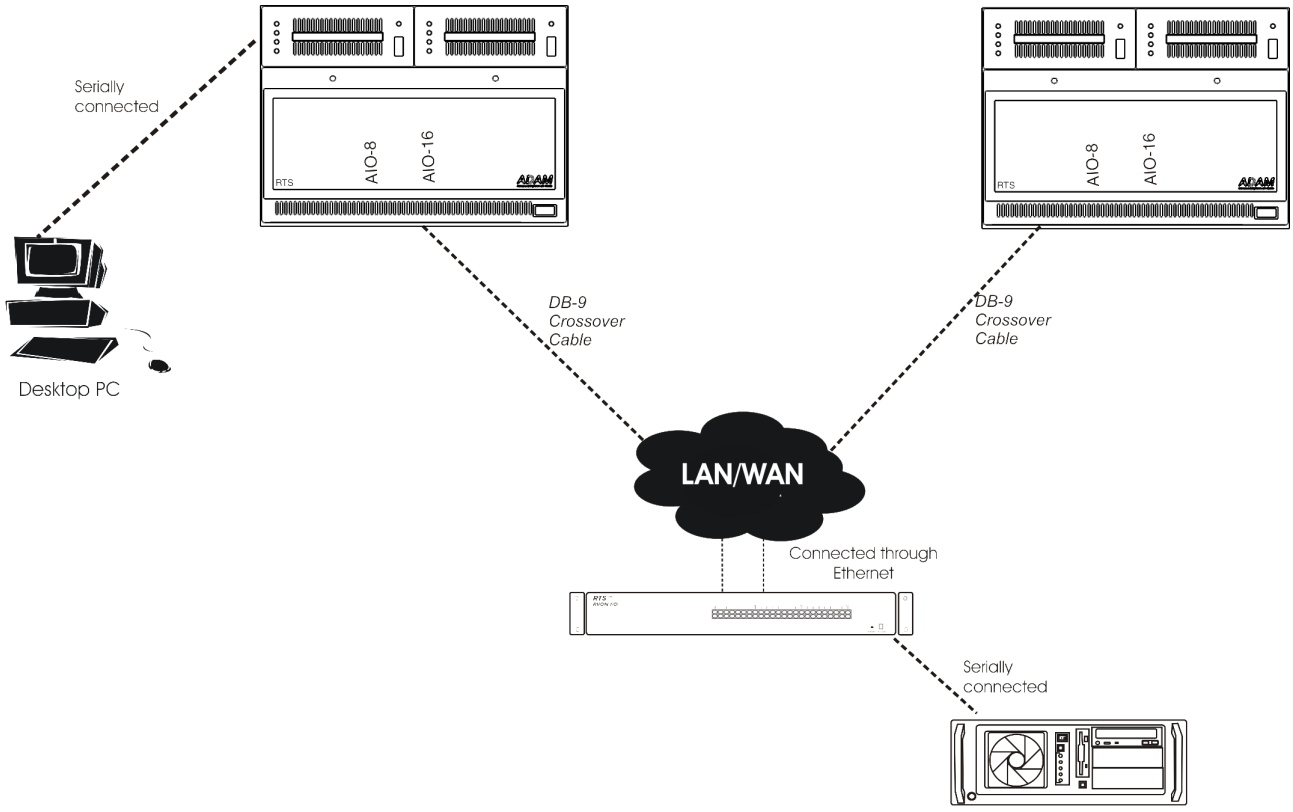


FIGURE 8. Serial Pass-Through system diagram

System Diagrams

FIGURE 9. Local Mode

This system diagram shows local mode. It is called local mode because the keypanel is connected directly to the RVON-I/O on the opposite side of the network from the Matrix. The keypanels act as though they are locally connected to the matrix.

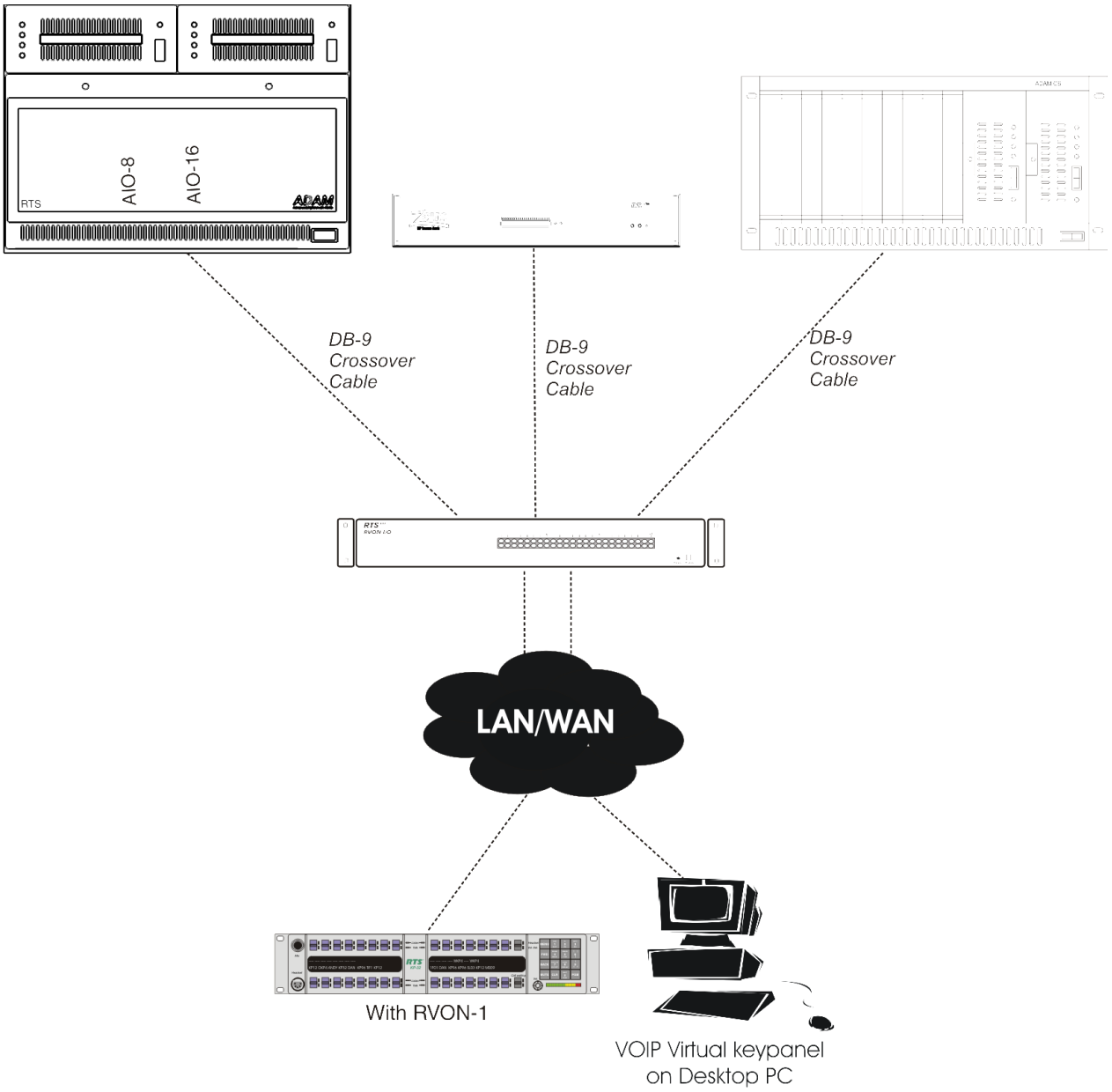


FIGURE 10. Remote Mode

Remote mode means the keypanels are not connected to the RVON-I/O directly. In the example, the KP-32 with RVON-1 or the **VKP** (Virtual Keypanel) has to pass through the LAN/WAN before connecting to the RVON-I/O. In remote mode, the RVON-I/O is on the Matrix side of the network and the keypanels are on the other side of the network.

FIGURE 11. Local and Remote Mode

The lower portion of Figure 11 shows a local setup (the keypanel is directly connected to the RVON-I/O), while the upper portion of the graphic shows a remote setup. The RVON-I/O works similar to an audio converter box. In the lower portion of the graphic, the audio coming from the KP-32 going towards the RVON-I/O changes from analog to digital audio (and vice versa). The same holds true for the upper portion of the graphic, where the audio coming from the RVON-I/O going towards the Zeus is converted to analog.

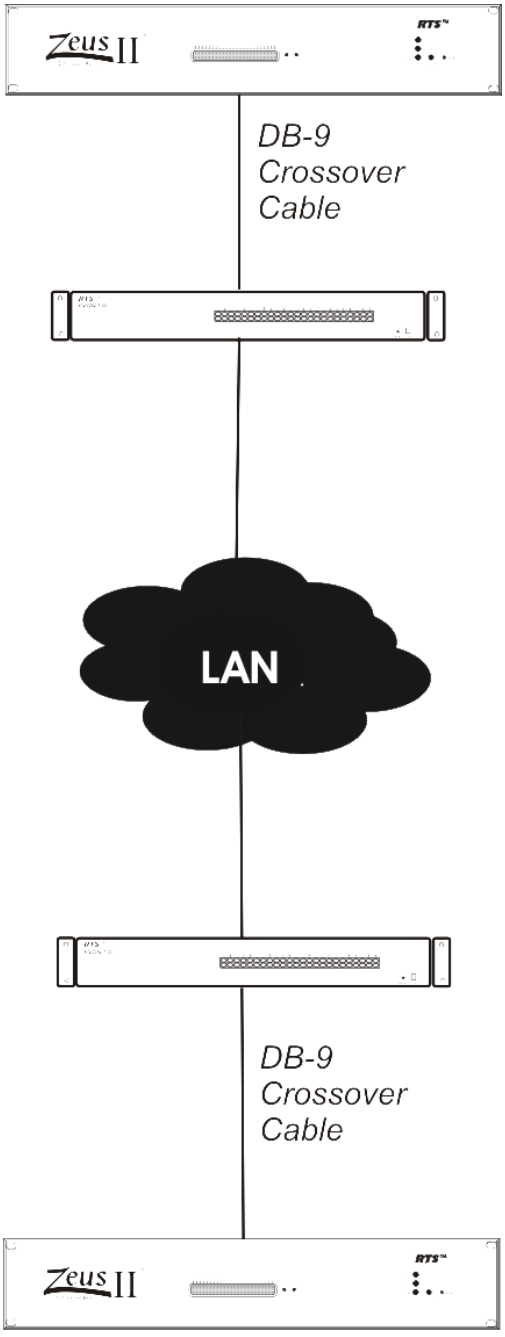


FIGURE 12. Trunking with RVON-I/O

When you trunk two (2) intercom systems together using two (2) RVON-I/O's, configure both in remote mode (see Figure 10 on page 18).

RVON-1 Jumpers and Connections

A selectable RS232/485 serial port is a connector J1. Jumper connections on J10, J11, and J12 select the signal mode on J1.

- When J10, J11, and J12 are jumped from pins 1 to 2 - J1 is configured for RS485. (default)
- When J10, J11, and J12 are jumped from pins 2 to 3 - J1 is configured for RS232.

J21 must be jumped from pins 1 to 2 to select UART B for RS485 RVON-1 keypanel operation.

J2 Connector

The RVON-1 card is designed to be used with either a keypanel or an RVON-I/O card. The J2 connector mounts the RVON-1 card onto a keypanel.

RS232 debug serial port via connector J3. J3 is a 6-pin heater that connects to RS-232 compatible serial ports of the TNETV2020.

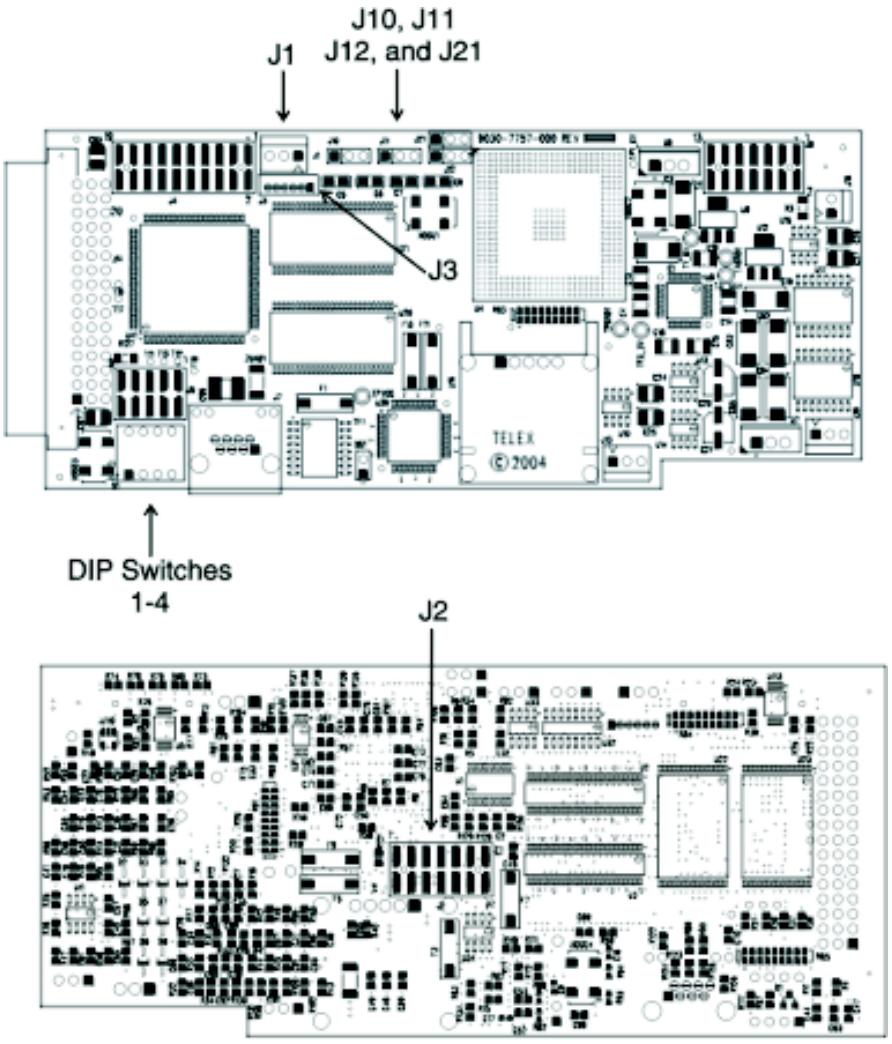


FIGURE 13. Front and back of the RVON-1 board

NOTE: Pin 1 of a jumper is shown as a black square.

CHAPTER 3

Configuration

Setup IP Addresses

There are three ways in which the IP Address can be set on the RVON-I/O; via a **keypanel**, through **Telnet**, or using the **Serial Debug Port**.

If you are using a keypanel to set the IP Address of the RVON-I/O, you must use a KP-32, KP-632, KP-832, or a KP-812. There are two sets of instructions to configure the IP Address from a KP-32, KP-632, KP-832 and a KP-812. This is because the KP-812 uses encoder knobs to navigate its menu system. For instructions on how to use the KP-812 to configure the IP Address, see "Configure the IP Address from a KP-812" on page 24.

Configure the IP Address from a KP-32, KP-632, or a KP-832

NOTE: Make sure DIP switch 1 is in the OPEN position (LOCAL mode - LED 24 RED is not lit). Also, make sure DIP switch 2 is in the CLOSED position (configuration via IO port 8 enabled).

To **configure the IP Address from a KP-32, KP-632, KP-832 keypanel**, do the following:

1. Connect the **RVON-I/O** using serial cable from the IO port 8 on the unit to the FRAME connector on the KP-32, KP-632, or KP-832.

   NOTE: The firmware on the KP-32, KP-632, KP-832 keypanels needs to be at version 2.0.2 or higher.
2. On the KP-32, KP-632, and KP-832, press **Menu**.
   The Display menu item appears.
3. Press the **up arrows** or **down arrows** to scroll to Service.
4. Press **PGM**.
   The Aux Inputs menu item appears.
5. Press the **up arrows** or **down arrows** to scroll to RVON Setup.
6. Press **PGM**.
   The IP Address menu item appears.
7. Press **PGM**.
   The current IP Address appears.
8. Enter the **first number** in the IP Address.
   This activates the first octet of the IP Address and clears the rest of the IP Address.
9. Press **PGM**.
   This confirms the first octet in the IP Address and moves you to the second octet.

   NOTE: Press **PGM** to skip over any octet that does not need modification.

10. Repeat steps **8** and **9** until the entire IP Address is entered.
11. Press **PGM**.
    The Netmask menu item appears.

    NOTE: Once you have entered the IP Address, you will then enter the Netmask. The Netmask is a string of numbers similar to an IP Address, except that it masks or screens out the network port of an IP Address so that only the host computer part of the address remains (for example, 255.255.255.0).
12. Press **PGM**.
    The current Netmask appears.
13. Enter the **first number** in the Netmask.
    This activates the first octet in the Netmask and clears the rest of the Netmask.
14. Press **PGM**.
    This confirms the first octet in the Netmask and moves you to the second octet.

    NOTE: Press **PGM** to skip over any octet that does not need modification.
15. Repeat steps **13** and **14** until the entire Netmask is entered.
16. Press **PGM**.
    The Gateway IP Address menu item appears.

    NOTE: Once you have entered the Netmask, you may need to enter the Gateway IP Address. A Gateway is a node (for example, a computer) on a network that serves as an entrance to another network.
17. Press **PGM**.
    The current Gateway IP Address appears.
18. Enter the **first number** in the Gateway IP Address.
    This activates the first octet of the Gateway IP Address and clears the rest of the address.
19. Press **PGM**.
    This confirms the first octet in the Gateway IP Address and moves you to the second octet.

    NOTE: Press **PGM** to skip over any octet that does not need modification.
20. Repeat steps **18** and **19** until the entire Gateway in entered.
21. Press **PGM**.
22. Press **CLR** to exit the menu.
    The changes are now enabled.

Configure the IP Address from a KP-812

To **configure the IP Address from a KP-812 keypanel**, do the following:

NOTE: The firmware must be at 1.1.1 or higher.

1. On the KP-812 turn the **Select** knob to scroll to Menu.
2. Tap the **Select** knob.
   The top level menu appears.
3. Turn the **Select** knob to scroll to the Service menu item.
4. Tap the **Select** knob.
   The Service menu appears.
5. Turn the **Select** knob to scroll to the RVON Setup menu item.
6. Tap the **Select** knob.
   The IP Address menu item appears.

7. Tap the **Select** knob.
   The current IP Address appears.
8. Enter the **first number** in the IP Address.
   This activates the first octet of the IP Address and clears the rest of the IP Address.
9. Tap the **Select** knob.
   This confirms the first octet in the IP Address and moves you to the second octet.

   NOTE: Tap the Select knob to skip over any octet that does not need modification.
10. Repeat steps **8** and **9** until the entire IP Address is entered.
11. Tap the **Select** knob.
    The Netmask menu item appears.

    NOTE: Once you have entered the IP Address, you will then enter the Netmask. The Netmask is a string of numbers similar to an IP Address, except that it masks or screens out the network part of an IP Address so that only the host computer part of the address remains (for example, 255.255.255.0).
12. Tap the **Select** knob.
    The current Netmask appears.
13. Enter the **first number** in the Netmask.
    This activates the first octet in the Netmask and clears the rest of the Netmask.
14. Tap the **Select** knob.
    This confirms the first octet in the Netmask and move you to the second octet.

    NOTE: Tap the Select knob to skip over any octet that does not need modifications.
15. Repeat steps **13** and **14** until the entire Netmask is entered.
16. Tap the **Select** knob.
    The Gateway IP Address menu item appears.

    NOTE: Once you have entered the Netmask, you may need to enter the Gateway IP Address. A Gateway is a node (for example, a computer) on a network that serves as an entrance to another network.
17. Tap the **Select** knob.
    The current Gateway IP Address appears.
18. Enter the **first number** in the Gateway IP Address.
    This activates the first octet of the Gateway IP Address and clears the rest of the address.
19. Tap the **Select** knob.
    This confirms the first octet in the Gateway IP Address and moves you to the second octet.

    NOTE: Tap the **Select** knob to skip over any octet that does not need modifications.
20. Repeat steps **18** and **19** until the entire Gateway is entered.
21. Tap the **Select** knob.
22. Press and hold the **Select** knob to exit the menu.
    The changes are now enabled.

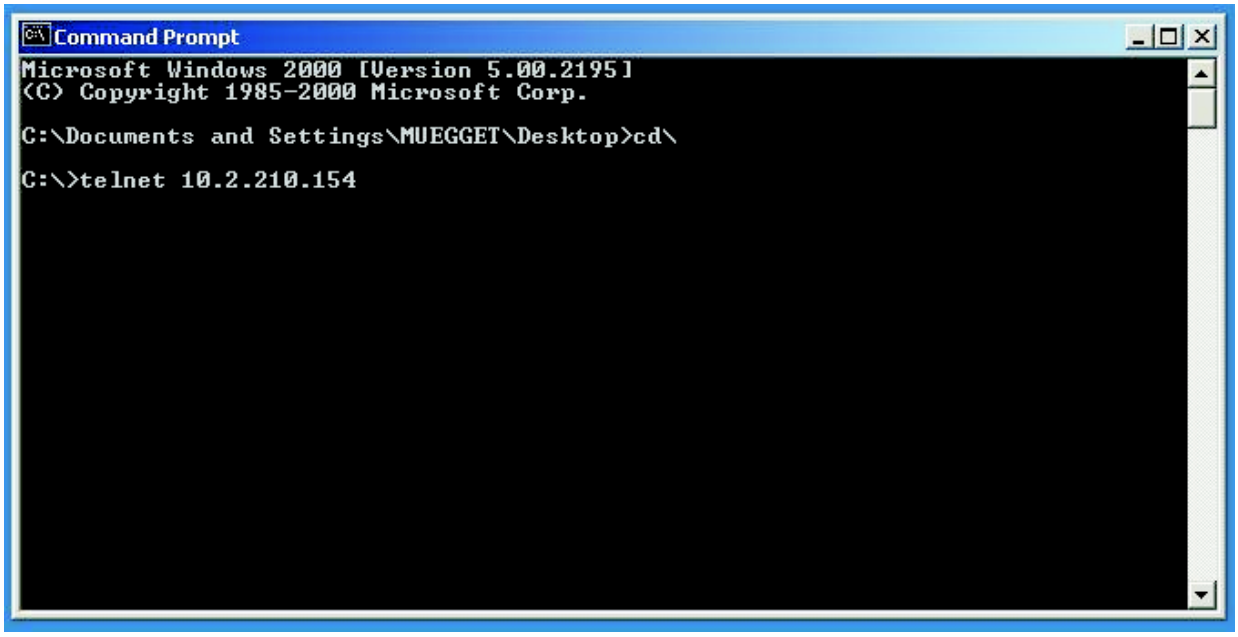
Configure the IP Address Using Telnet

NOTE: In order to use Telnet to set a new IP Address for you RVON-I/O, you must know the existing IP Address. If you do not know the existing IP Address, you can reset the IP Address. See “Configure the IP Address Using Telnet” on page 26. Also, you must make sure Telnet is enabled (DIP Switch 3 OPEN).

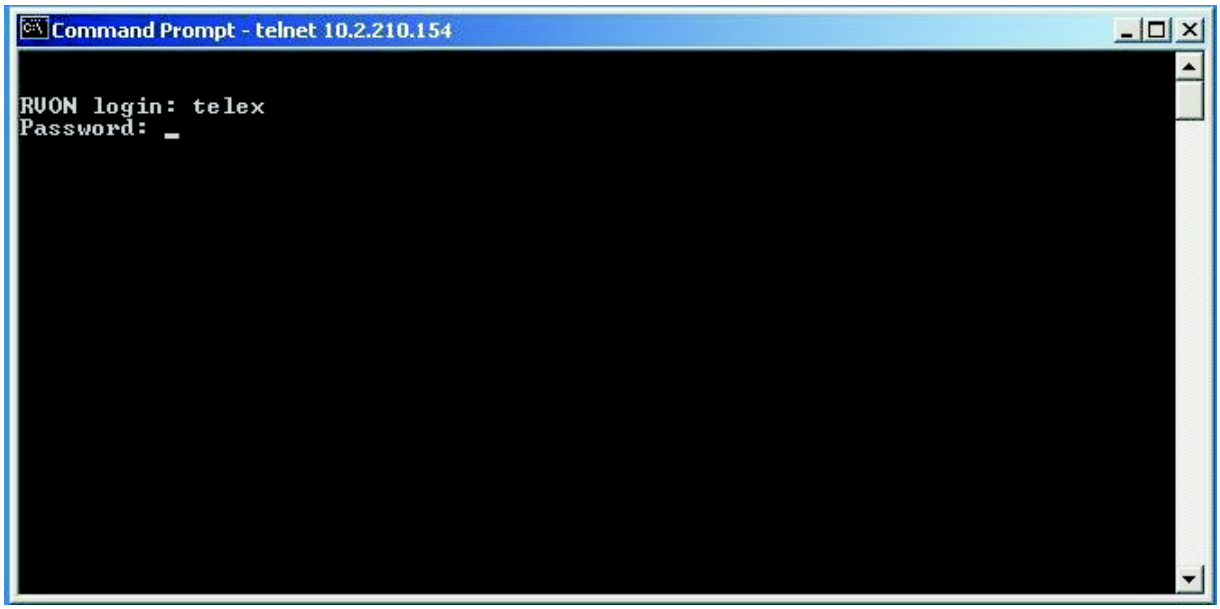
The following instructions will show you how to access the Telnet screens and show you some of the information you can display and edit.

To **display settings for the RVON-I/O**, do the following:

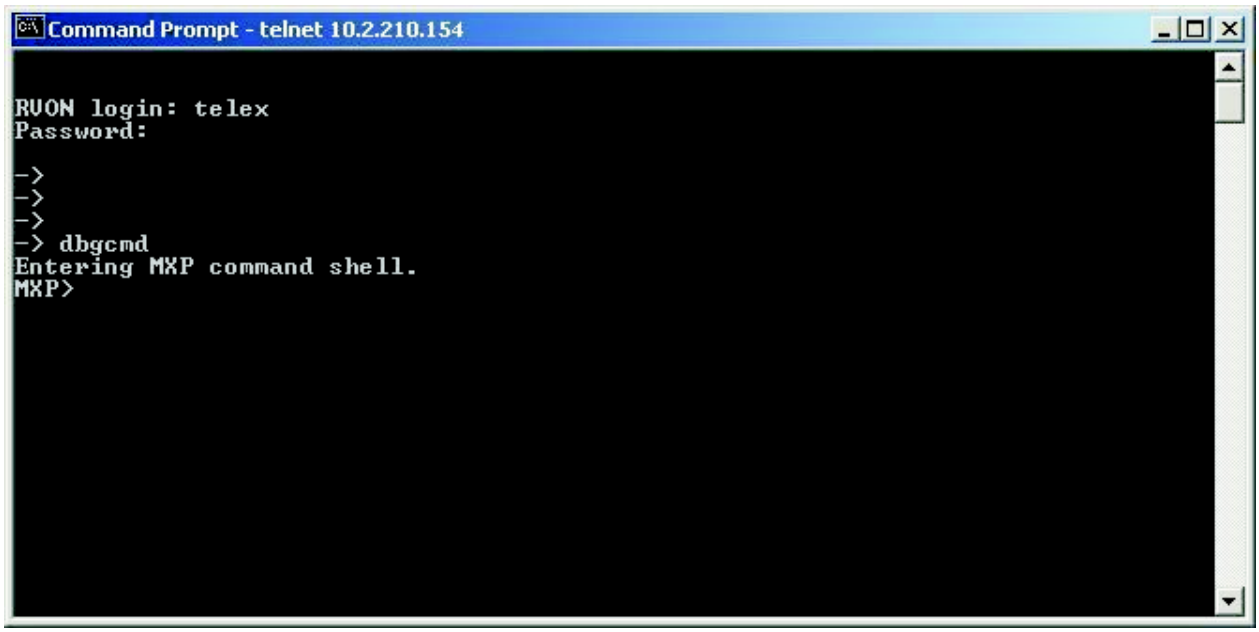
1. Open a **Command Prompt** application session.
2. At the prompt type **TELNET <**IP Address**>** (The IP Address is the existing IP Address assigned to the RVON-I/O).



3. Press **Enter**.
   The RVON login screen appears.



4. In the logon field, type the **RVON login** (default = telex).
5. Press **Enter**.
6. In the password field, type the **RVON password** (default = password).
7. Press **Enter**.
   An arrow prompt appears.
8. At the prompt, type **dbgcmd** to access the debug command screens.



9. Press **Enter**.
   An MXP prompt appears.
10. At the MXP prompt, type **set rvon ip_addr 10.3.210.12** (this IP Address is for example purposes only).
11. Press **Enter**.
    The IP Address is set for the RVON-I/O.
12. Set the **Netmask**.
13. At the MXP prompt, type **Activate**.
    RVON-I/O will reset itself to the new IP Address. The current telnet session becomes invalid.

Configure the IP Address Using the Serial Debug Port

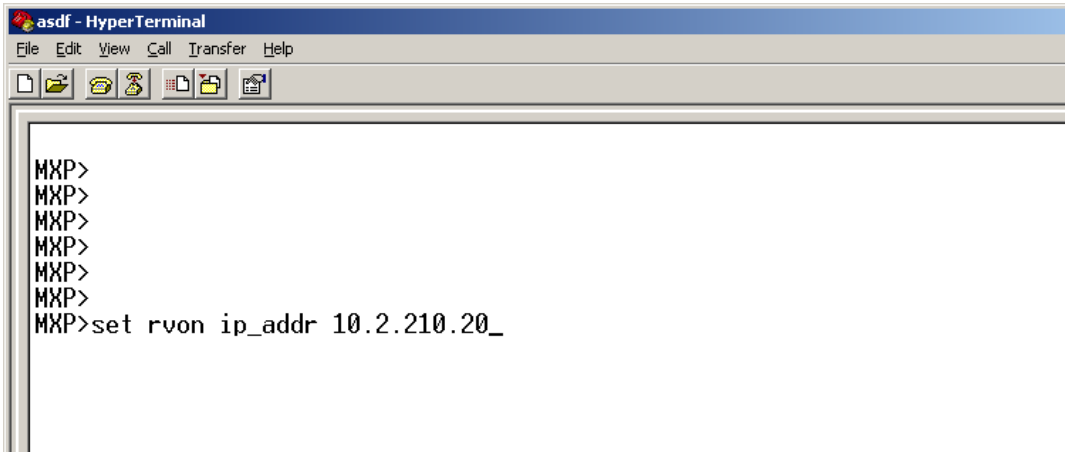
NOTE: In order to use the Serial Debug Port to set the IP Address for your RVON-I/O, you must know the intended IP Address. Also, you must make sure DIP switch 2 is not enabled (CLOSED).

The following instructions will show you how to access the Serial Debug Port screens and show you how to configure the IP Address for the RVON-I/O

To **configure the IP Address for the RVON-I/O**, do the following:

1. Connect the PC's COM port to the RVON-I/O's serial connector.
2. Run a **HyperTerminal** program.
   The window provided Hyper Terminal is located at Start Programs>Accessories>Communications >HyperTerminal.
3. At the prompt, type **dbgcmd**.

4. At the MXP prompt, **set rvon ip_addr 10.3.210.20** (this IP Address is for example purposes only).



5. Press **Enter**.
   An MXP prompt appears.
6. Press **Enter**.
   The IP Address is set for the RVON-I/O.
7. Set the **Netmask**.
8. At the MXP prompt, type **Activate**.
   RVON-I/O will reset itself to the new IP Address. The current telnet session becomes invalid.

Configure the RVON-I/O Using Telnet or a Serial Port

RVON-I/O programming can be done using a direct serial connect to or a Telnet connection. There are two physical connections to an RVON-I/O:

Direct serial through a custom serial cable (connected on the back of the RVON-I/O at SERIAL)
Ethernet (Telnet Only)

Setup

Serial Port: 38,4000 baud, 8 data bits, 1 stop bit, No Parity, NO-Flow control
Telnet: IP Address, port 23

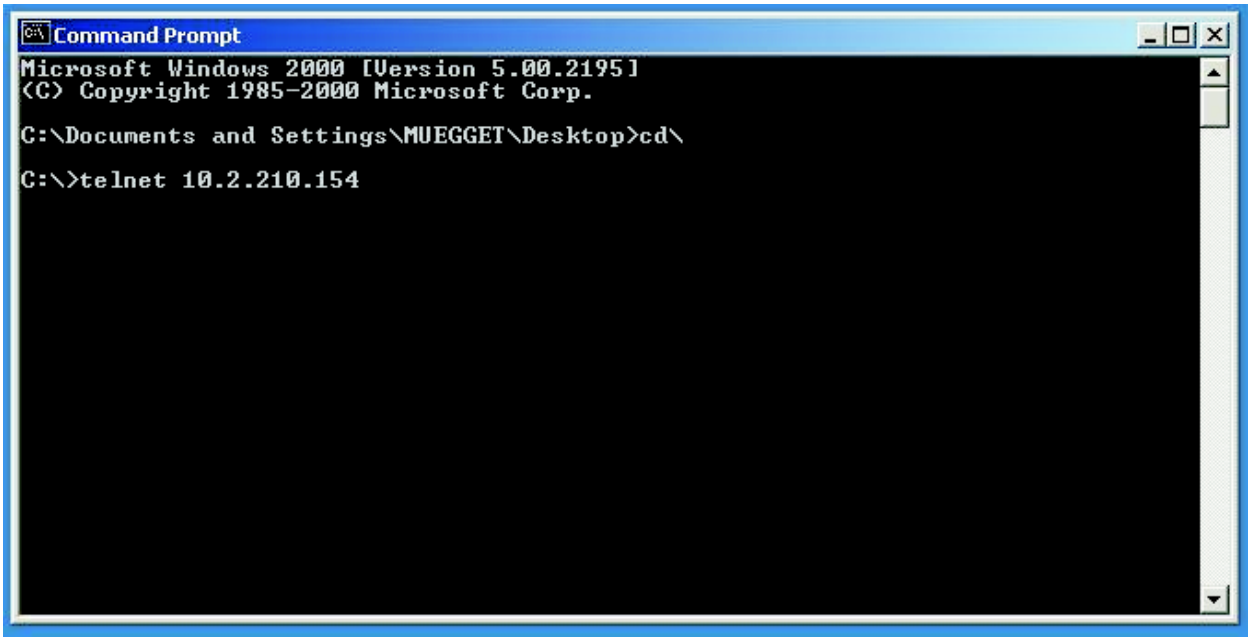
Configure RVON-I/O Using Telnet and Serial Port

IMPORTANT: Because the RVON-I/O is shipped with a default IP Address it may not be accessible on the network. The IP Address should already be configured before attempting to try to connect through Telnet. To set the IP Address, see “Setup IP Addresses” on page 23.

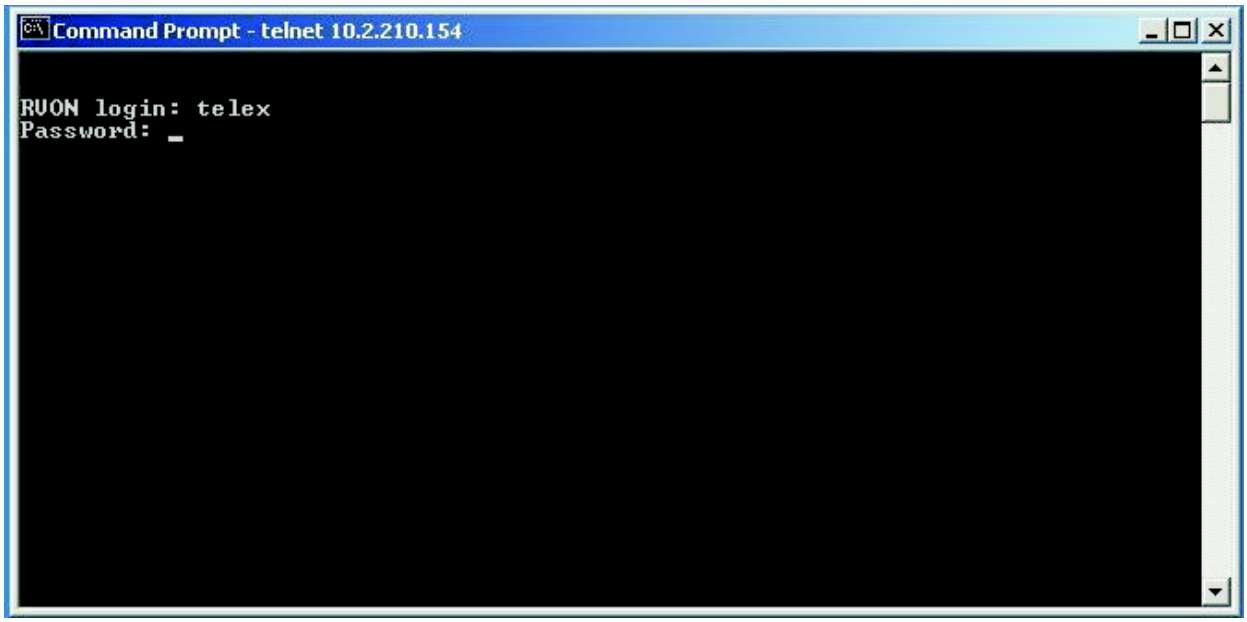
If the RVON-I/O already has an IP Address compatible with your network, you can configure the RVON-I/O thr4ough the use of Telnet. The following instructions will show you how to access the Telnet screens and show you some of the information you can display and edit.

To **display the settings for an RVON-I/O**, do the following:

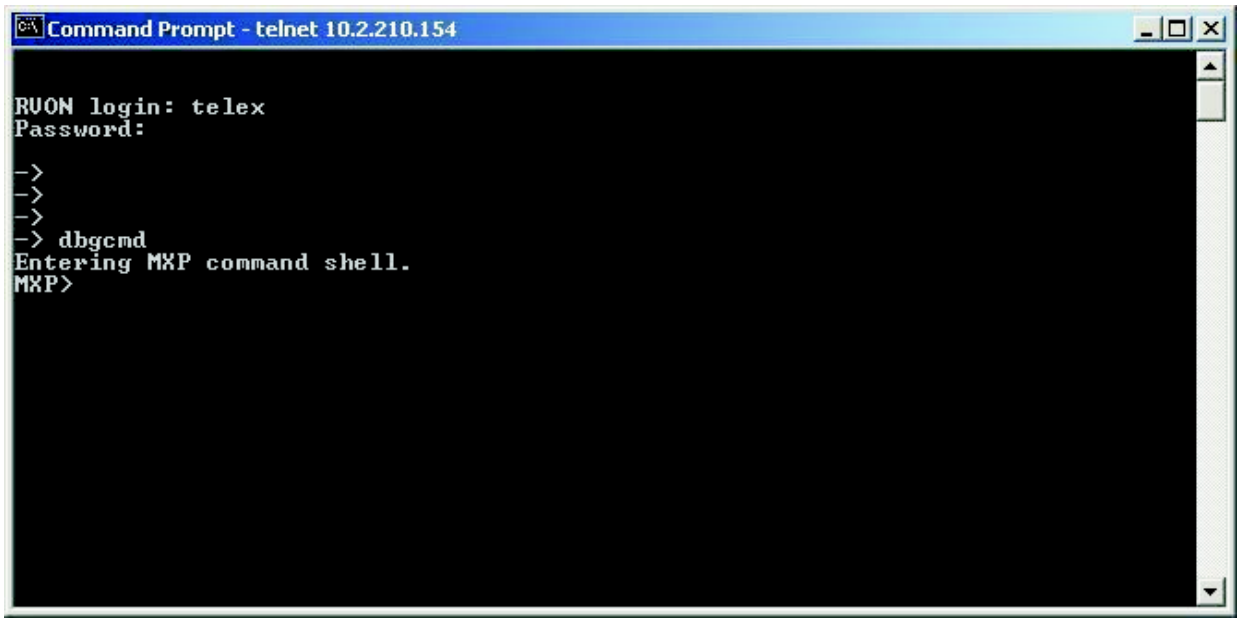
1. Open a command prompt.
2. At the prompt, type **TELNET <IP Address>** (The IP Address is the IP Address assigned to the RVON-I/O).



3. Press **Enter**.
   The RVON login screen appears.



4. In the login field, type the **RVON login** (default = telex).
5. Press **Enter**.
6. In the password field, type the **RVON password** (default = password).
7. Press **Enter**.
   A prompt appears.
8. At the prompt, type **dbgcmd** to access the debug command screens.



9. Press **Enter**.
   An MXP prompt appears.

RVON-I/O Command Table

TABLE 3. RVON-I/O Command Table

Command	Parameter 1	Parameter 2	Description
show rvon			Shows RVON-I/O IP Address and other general information.
show channel			Shows destination address and connection information.
show serial			Shows serial port setting.
show gpio			Shows gpio settings.
show panel			Shows the channel control settings (poll id and baud rate).
show emac			Shows Ethernet settings.
set rvon			Help screen which lists all “set rvon” commands.
set rvon	ip_addr	X.X.X.X	Set the IP Address for the RVON-I/O.
set rvon	net mask	X.X.X.X	Set the Network Mask for the RVON-I/O.
set rvon	gateway	X.X.X.X	Set the Gateway IP Address for the RVON-I/O.
set rvon	vad_threshold	adaptive (#)	Set the VAD threshold (silence detection). Adaptive refers to autoselect. The # can be -20 to +10 dBm.
set channel [chan]			Help screen, which lists all “set chan” commands (0-7). This refers to VOIP channel setting.
set channel [chan]	dest_ip	X.X.X.X	Set the destination IP Address for this particular RVON channel.
set channel [chan]	dest_type	X	X = 0 (rvon-8), 1 (rvon-1, 2 (rvon-I/O
set channel [chan]	dest_chan	X	Set the destination channel - the port on the far end (0-7).
set channel [chan]	chan_codec	X	Set the profile to use which includes the compression codec (0-27) (see Table 3 on page 31).
set channel [chan]	input_gain	X	Set the input gain for the specified channel -14 to +14dB
set channel [chan]	output_gain	X	Set the output gain for the specified channel -14 to +14 dB.
set channel [chan]	onhook		force the channel to disconnect.
set channel [chan]	offhook		force the channel to connect.
set serial			Help screen, which lists all “set serial” commands.
set serial	mode	X	Set the serial mode. 0 = Pass Through mode
set serial	ip_addr	X.X.X.X	Set the destination IP Address for this serial pass-through port.

TABLE 3. RVON-I/O Command Table

Command	Parameter 1	Parameter 2	Description
set serial	ip_addr_2	X.X.X.X	Not Available
set serial	baud	X	Set the baud rate to use: 50 through 115000.
set gpio			Help screen, which lists all “set gpio” commands.
set gpio	mode	X	Set the gpio mode. 0 = Pass Through 1 = 1 Keypanel 2 = All Keypanels
set gpio	ip_addr	X.X.X.X	Set the destination IP Address for pass-through mode.
set gpio	panel	X	Set the IO port the gpio are associated with on the RVON-I/O.
set panel			Help screen, which lists all “set panel” commands.
set panel [pnl]	poll_id	X	Make sure the panel poll_id corresponds to the source of the audio it is connected to. 0-10 0= do not respond to polls
set panel [pnl]	baud	X	Set the baud rate for the panel. 9600 or 76800

Examples:

Set RVON ip_addr to 10.3.210.12.

> At the command prompt, type
set rvon ip_addr 10.3.210.12

Set the destination channel type to RVON-I/O.

> At the command prompt, type:
set channel [chan_dest num_type 2

Set the RVON login user name to Keypanel

> At the command prompt, type:
set rvon user Keypanel

NOTE: For more information on Set Serial, Set GPIO, and Set Panel see, “Set Serial” , “Set GPIO” and “Set Panel” on page 37.

TABLE 4. Codec Specifications.

Coding Profile	Codec	Codec Rate	Audio (ms) / Packet	Packets/Second	Encoded Audio (bytes)	IP Overhead (bytes)	Total Packet Size (bytes)	Bandwidth (Bytes/sec)	Bandwidth (kbps/side)	Bandwidth (kbps/channel)
0,3,6,9	G.711	64k	10	100.00	80	60	140	14000	112	224
1,4,7,10	G.711	64k	20	50.00	160	60	220	11000	88	176
2,5,8,11	G.711	64k	30	33.33	240	60	300	10000	80	160
12,16	G.729	8k	10	100.00	10	60	70	7000	56	112
13,17	G.729	8k	20	50.00	20	60	80	4000	32	64
14,18	G.729	8k	40	25.00	40	60	100	2500	20	40
15,19	G.729	8k	60	16.67	60	60	120	2000	16	32
20,22	G.723	5.3k	30	33.33	24	60	84	2800	22.4	44.8
24,26	G.723	6.3k	30	33.33	24	60	84	2800	22.4	44.8
21,23	G.723	5.3k	60	16.67	48	60	108	1800	14.4	28.8
25,27	G.723	6.3k	60	16.67	48	60	108	1800	14.4	28.8

NOTE: A channel consists of a transmitting and a receiving side, so the bandwidth is double for a bi-directional audio stream.

NOTE: Bandwidth values are approximate maximums, actual bandwidth could be considerably lower with VAD enabled.

Codec:Determines how the audio is compressed/decompressed and the name given to the defined algorithm.

Codec Rate:Actual bits per second of the audio in compressed form. This is sent over the network through various data packets. Network efficiency can be calculated with an IP header for each packet of X ms of audio.

Size:Amount of audio in each IP Packet, milliseconds (ms)

VAD:Voice Activity Detection, when enabled and only when audio is above a certain threshold, will send packets. Otherwise, a silence packet is sent once, and not again until audio is above the threshold. Enabling this will result in a more efficient network, but care must be taken to because of the mother's day phenomenon. If there is ever a need to have all audio paths open and active, a network designer must account for this scenario.

TABLE 5. Supplemental Coding Table

Coding	Codec	Codec Rate	Size	VAD
0	711u	64k	10	Y
1	711u	64k	20	Y
2	711u	64k	30	Y
3	711u	64k	10	N
4	711u	64k	20	N
5	711u	64k	30	N
6	711A	64k	10	Y
7	711A	64k	20	Y
8	711A	64k	30	Y
9	711A	64k	10	N
10	711A	64k	20	N
11	711A	64k	30	N
12	729AB	8k	10	Y
13	729AB	8k	20	Y
14	729AB	8k	40	Y
15	729AB	8k	60	Y
16	729AB	8k	10	N
17	729AB	8k	20	N
18	729AB	8k	40	N
19	729AB	8k	60	N
20	723	5.3k	30	Y
21	723	5.3k	60	Y
22	723	5.3k	30	N
23	723	5.3k	60	N
24	723	6.3k	30	Y
25	723	6.3k	60	Y
26	723	6.3k	30	N
27	723	6.3k	60	N

Default Setup

Every attempt is made to ensure the board is shipped from the factory containing the following settings.

All are "**set rvon**" commands

COMMAND	DEFAULT VALUE	DESCRIPTION
ip_addr	192.168.0.1	IP address for the RVON-I/O
netmask	255.255.0.0	Network mask for the RVON-I/O
gateway	none	Gateway IP address for the RVON-I/O
user	telex	RVON-I/O username for Telnet access.
password	password	RVON-I/O password for Telnet access (8-40 characters).
vad_threshold	10	VAD Threshold

There are more parameters the software will auto-configure if they have not been previously setup.

All are "set channel #" commands because they are for each audio channel.

COMMAND	DEFAULT VALUE	DESCRIPTION
dest_ip	0.0.0.0	Destination IP Address for this particular channel.
dest_type	0	Destination type X = 0 (rvon-8), 1 (rvon-1), 2 (rvon-I/O)
dest_chan	0	Destination channel - the port on the far end (0-7)
chan_codec	0	Profile to use (previous coding table).

Set Serial

When using Serial Pass-Through Mode, you must set the serial port you will use with the IP Address for the destination serial pass-through port you are going to use. You must also set the baud rate at which data will be transmitted over the serial port (DIP Switch 2 OPEN). For more information on DIP switches, see "Connection Diagrams" on page 8.

Set GPIO

When configuring the GPI/O on the RVON-I/O, there are three different mode options you may choose:

*Pass-Through Mode for GPI/O:*In Pass-Through mode, GPI/O status is sent over Ethernet, therefore you must set the IP Address of the destination GPI/O pass-through port.

1 Keypanel (Single Port) Mode:In 1 Keypanel mode, also referred to as single port mode, all GPI/O on the RVON-I/O are associated with only one keypanel. Associating the GPI/O with a keypanel allows you to access/address the GPI/O in UPL Statements. Use the Set Panel parameter to designate which RVON-I/O port is associated with all the GPI/O's on the unit.

1 KEYPANEL MODE EXAMPLE

The GPI/O is associated with Port 0. This means that Port 0 will have eight GPI/O's mapped to it. Connected to Port 0 is a keypanel with the keypanel ID of 33 in AZedit. To use the GPI/O, you can create UPL statements. But be careful to assign the correct Output Action parameters.

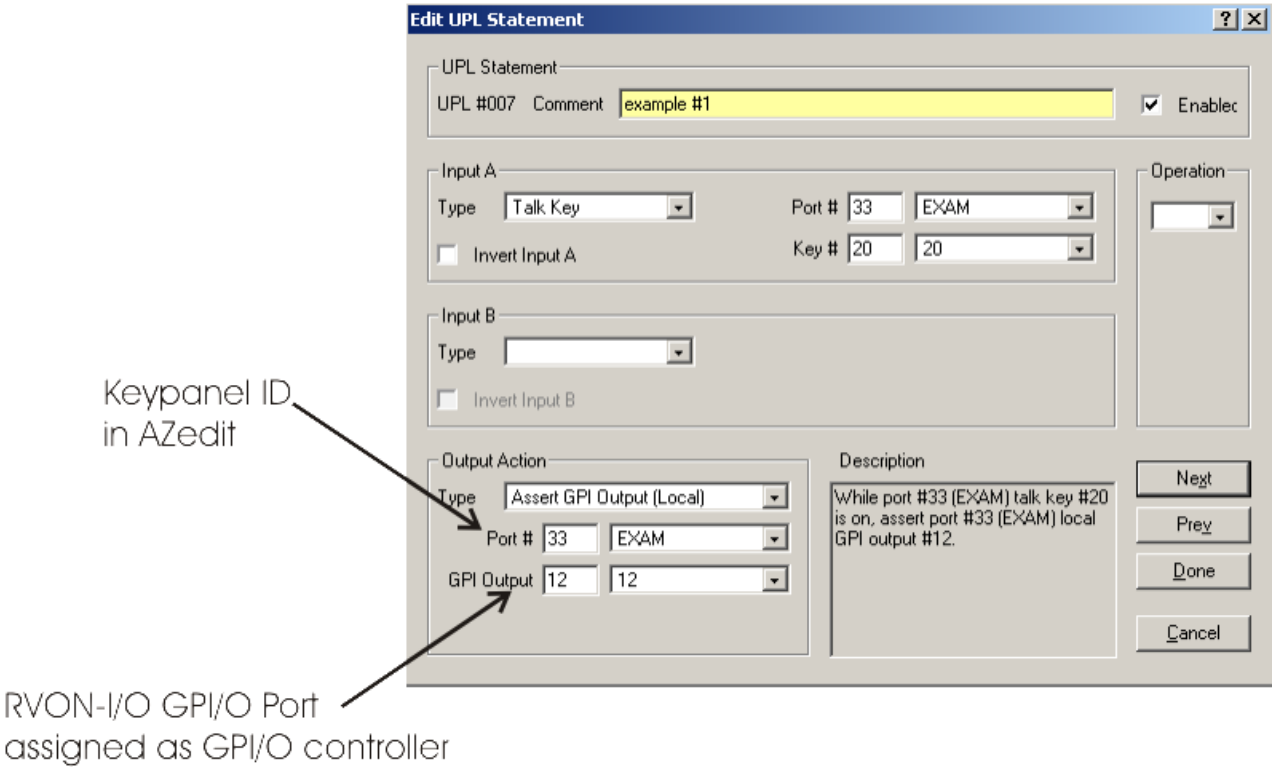


FIGURE 14. UPL Statement Example

TABLE 6. 1 Keypanel Mode GPI/O assignments

LOCAL GPI/O	RVON-I/O GPI/O HARDWARE PORT
GPI/O 9	DB-25 Port 1
GPI/O 10	DB-25 Port 2
GPI/O 11	DB-25 Port 3
GPI/O 12	DB-25 Port 4
GPI/O 13	DB-25 Port 5
GPI/O 14	DB-25 Port 6
GPI/O 15	DB-25 Port 7
GPI/O 16	DB-25 Port 8

- **GPI/O 1 through 4** are assigned as local GPI/O's on keypanels (for example, a KP-32 with an optional GPI/O card.
- **GPI/O 5 through 8** are reserved and not used at this

All Keypanel (Multiple Port) Mode:In All Keypanel mode, also referred to as multiple port mode, each keypanel is associated to its corresponding GPI/O. For example, if keypanel 1 is connected to GPI/O 1, it is associate with the corresponding GPI/O port. When using All Keypanel mode, an additional GPI/O is available. This means that each keypanel has 4 GPI/O and then a GPI/O associated with port 9.

NOTE: The extra port 9 only is currently applicable to the ADAM Intercom System setup.

TABLE 7. All Keypanel Mode GPI/O assignments

LOCAL GPI/O	RVON-I/O GPI/O HARDWARE PORT
GPI/O 9	DB-25 Port 1
GPI/O 9	DB-25 Port 2
GPI/O 9	DB-25 Port 3
GPI/O 9	DB-25 Port 4
GPI/O 9	DB-25 Port 5
GPI/O 9	DB-25 Port 6
GPI/O 9	DB-25 Port 7
GPI/O 9	DB-25 Port 8

Set Panel

Set Panel sets the address at which the RVON-I/O will respond to polls sent by the Intercom. If the RVON-I/O is connecting to a Zeus or AIO-8, you must set a Panel Poll ID. The **panel poll ID** is the data port address from which it communicates. Also, the panel poll ID is only used in remote mode.

Because the Zeus and AIO-8 share their data across 8 ports, they need to differentiate ports by using addresses. Therefore, to communicate with the right port you need to communicate with the specified address.

EXAMPLE:

2 RVON-I/O units are connected to the same Zeus System (RVON-I/O A and RVON-I/O B)

RVON-I/O A is connected to Zeus ports 1 and 2 on RVON-I/O ports 1 and 2.

RVON-I/O B is connected to Zeus ports 3 and 4 on RVON-I/O ports 1 and 2.

Because the Zeus cannot differentiate either of the RVON-I/O ports 1 and 2, it is necessary to adding an address to the ports:

RVON-I/O A	port 1 set to 1 (set panel 0, poll ID 1)
	port 2 set to 2 (set panel 1, poll ID 2)
RVON-I/O B	port 1 set to 3 (set panel 0, poll ID 3)
	port 2 set to 4 (set panel 1, poll ID 4)

If you are using Cronus or AIO-16 with RVON-I/0 in Remote mode for keypanels, you will still have to set a panel poll ID. This is because the RVON-I/O has a default panel poll ID of 0 (zero). This must be changed to a non-zero number.

NOTE: Make sure to set the panel poll ID to 0 when trunking in Remote Mode. Doing this will ensure the RVON-I/O will not respond to polls as a keypanel.

If the RVON-I/O in local mode is directly connected to a keypanel, the panel poll ID does not have to be set. The RVON-I/O through polling will discover the address of the keypanel.

NOTE: If you are getting audio, but cannot see the alphas on the keypanels, verify the set panel ID is set correctly.

If you connect an RVON-I/O in Local mode to an intercom serially, you must NOT connect the data lines.

Appendix A

RVON-I/O Quick Start

NOTE: In this example, the RVON-I/O is directly connected to the ADAM Intercom System with an RVON-8 installed.

This example installs a keypanel on the first port of an RVON-I/O that connects back to the first channel of the RVON-8.

RVON-I/O Unit Settings

- All four DIP switches need to be in the OPEN position (Up).
- RVON-I/O IP Address should be set to 192.168.0.1
- Running version 1.0.0 firmware or higher

RVON-8 Unit settings (done in AZedit)

- RVON-8 IP Address should be set to 192.168.0.10
- Running version 1.2.0 firmware or higher

To **set the channel information**, do the following:

1. Connect a **keypanel to the J1 I/O 1** (Ethernet) connector on the RVON-I/O.
   Addressing the keypanel is not needed.
2. Open a **Telnet session**.
3. At the prompt, type **telnet 192.168.0.1** (default RVON-I/O IP Address).
   The RVON login screen appears.
4. In the logon field, type **telex** (default user logon for the unit).
5. Press **Enter**.
6. In the password field, enter **password** (default password for the unit).
7. Press **Enter**.
8. At the prompt, type **dbgcmd** and press **Enter** to access the MXP programming shell.
9. At the prompt, type **set channel**.
10. Press **Enter**.
    The Set Channel menu list appears.
11. At the prompt, type **set channel 0 dest_ip 192.168.0.10** (the address of the RVON-8 you want to connect with).
12. Press **Enter**.
13. At the prompt, type **set channel 0 dest_type 0** (this tells the RVON-I/O it is connecting to an RVON-8).

14. Press **Enter**.
15. At the prompt, type **set channel 0 dest_chan 0** (this tells the RVON-I/O it is connecting to channel 0 of the RVON-8).
16. Press **Enter**.
17. At the prompt, type **set channel 0 chan_codec 2**.
    This tells the RVON-I/O to use Codec G.711u, 64k 30ms packtes, VAD ON connecting back to the RVON-8.
18. Once finished, type **activate**.
19. Press **Enter**.
20. Configure the **RVON-8 via AZedit** to connect to the RVON-I/O.
    The panel connected should be passing data and audio within a few moments.The front panel Green LED for the first channel should be flashing, instead of solid, from the data.

Setting Channel Information of an RVON-I/O for a Remote Keypanel

NOTE: In this example, the first port of Zeus (J1) is connected to the I/O connector of the RVON-I/O, then connected via Ethernet back to the first channel of an RVON-1 card installed in a KP-32.

RVON-I/O Unit Settings

- DIP switches two through four need to be in the OPEN position (Up).
- DIP Switch 1 should be in the “Down” position (Remote)
- RVON-I/O IP Address should be set to 192.168.0.1
- Running version 1.0.0 firmware or higher

KP-32 Unit settings

- The KP-32 with RVON-1 IP Address should be set to 192.168.0.10
- Running version 1.1.0 firmware or higher on the RVON-1 card

To **find the RVON-1 version of the KP-32**, do the following:

1. Open a **Telnet Session**.
2. Type **telnet 192.168.0.10** (default).
3. Press **Enter**.
   RVON login appears.
4. Type **telex**, and press **Enter**.
   RVON password appears.
5. Type **password**, and press **Enter**.
6. At the prompt, type **dbgcmd** and press **Enter**.
   You have entered MXP programming shell.
7. At the MXP prompt, type **show rvon** and press **Enter**.
   A list of settings will appear which contains the RVON-1 version.

   NOTE: If the RVON-1 is not at Version 1.1.0 or higher, contact your RTS service engineer.

To **set the channel information**, do the following:

1. Connect the **RVON-I/O Ethernet to the LAN**.
2. Open a **Telnet session**.
3. At the prompt, type **telnet 192.168.0.1** (default RVON-I/O IP Address).
   The RVON login screen appears.
4. In the logon field, type **telex** (default user logon for the unit).
5. Press **Enter**.
6. In the password field, enter **password** (default password for the unit).
7. Press **Enter**.
8. At the prompt, type **dbgcmd** and press **Enter** to access the MXP programming shell.
9. At the prompt, type **set channel**.
10. Press **Enter**.
    The Set Channel menu list appears.
11. At the prompt, type **set channel 0 dest_ip 192.168.0.10** (the address of the RVON-1 you want to connect with).
12. Press **Enter**.
13. At the prompt, type **set channel 0 dest_type 1** (this tells the RVON-I/O it is connecting to an RVON-1).
14. Press **Enter**.
15. At the prompt, type **set channel 0 dest_chan 0** (this tells the RVON-I/O it is connecting to channel 0 of the RVON-1).
16. Press **Enter**.
17. At the prompt, type **set channel 0 chan_codec 3**.
    This tells the RVON-I/O to use Codec G.711u, 64k 30ms packtes, VAD ON connecting back to the RVON-1 channel.
18. Type the s**et panel 0 poll_id 1** and press **Enter**.
    This tells the RVON-I/O channel that is connection back to a matrix port with a poll id address of 1, por 1,9,17,25, etc.).
19. Type **set panel 0 baud 9600** and press **Enter**.
    This tells the RVON-I/O that the data baud rate is 9600 bps for this channel.
20. Once finished, type **activate**.
21. Press **Enter**.
22. Configure the **RVON-1 to accept the RVON-I/O connection**.
    The panel connected should be passing data and audio within a few moments. The front panel green LED for the first channel of the RVON-I/O should be flashing from the data instead of just solid when the keypanel is connected.

APPENDIX E

Basic Network Configuration

Basic Network Configuration

This section covers basic network configuration set-up and testing. Also covered are basic concepts and operations, including the difference between LAN and WAN networks and how IP Addressing is used.

In a networked environment, such as a company, typically there are many computers connected together using a **router** or a **switch**. In larger companies, there may be several different routers distributed in buildings and plant locations. A router allows any LAN-side computer to communicate with other computers and devices outside the LAN (local area network). Routers send data packets from one place to another place on a network. routers use network addresses to route packets to the correct destination. For example, in a TCP/IP network, the IP (internet protocol) address of the network interface is used to direct router destinations.

Because routers help computers inside the LAN "talk" with computers outside of the LAN, the security of a company's LAN may be compromised by gaps of open ports in the router. Security measures may have been instituted to compensate for these vulnerabilities. Consult you network administrator to learn about the security measures taken to protect your network. **VPN**, or virtual private network, is one such security measure to protect the intelligence of the LAN. A computer outside the LAN must have an address or key known by the VPN to allow access to the LAN. Many companies use a VPN to connect two different LANs, thus allowing the transfer of data between two networks.

LAN (local area network) vs. WAN (wide area network)

LOCAL AREA NETWORK

Simply put, a LAN is a computer network that connects a relatively small area (a single building or group of buildings). Most LANs connect workstations and computers to each other. Each computer (also known as a "node"), has its own processing unit and executes its own programs; however, it can also access data and devices anywhere on the LAN. This means many users can access and share the same information and devices. A good example of a LAN device is a network printer. Most companies cannot afford the budgetary or hardware expense of providing printers for each of its users; therefore, one printer (or device) is placed on the LAN where every user can access the same printer.

The LAN uses IP Addresses to route data to different destinations on the network. An IP Address is a 32-bit numeric address consisting of four numbers separated by periods (for example, 1.160.10.240).

NOTE: For more information on IP Addresses, see you local network administrator.

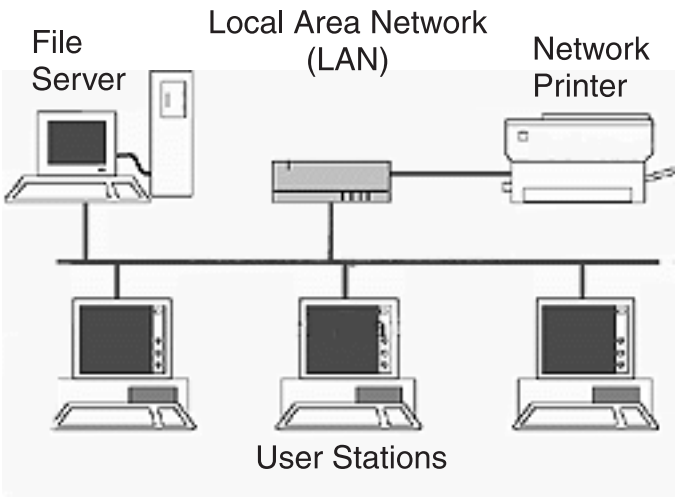


Figure 8. Local Area Network Diagram

WIDE AREA NETWORK

A wide area network (WAN) connects two or more LANs and can span a relatively large geographical area. For example, Telex Headquarters in Burnsville, MN is connected to several branch offices in Nebraska and Arkansas over a WAN. The largest WAN in existence is the Internet.

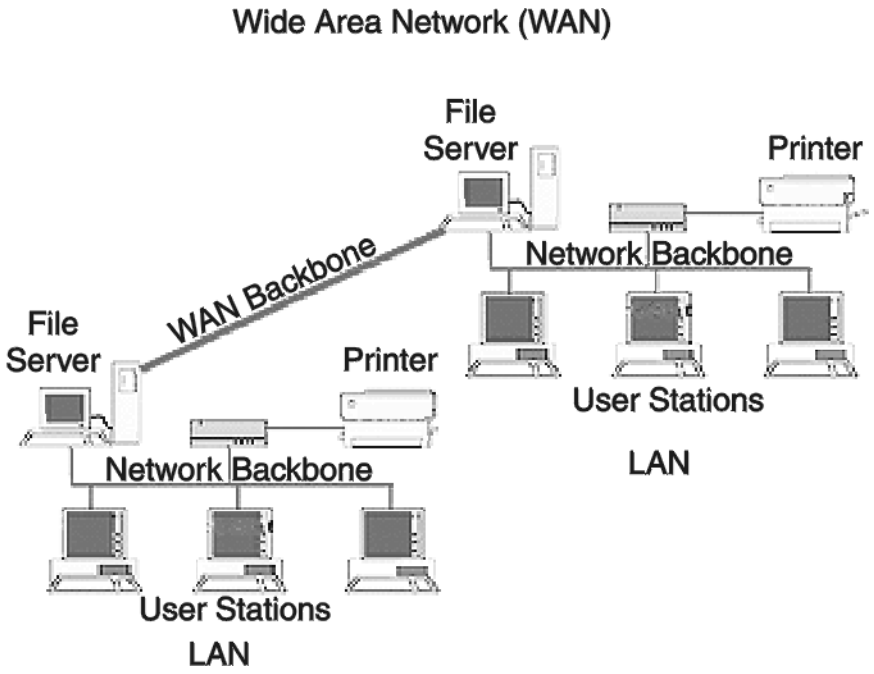


Figure 9. Wide Area Network Diagram

ACCESSING THE WIDE AREA NETWORK (WAN)

Figure 3 shows LAN IP Addresses using a common IP Address, 10.2.100.X (192.168.X.X is another common address). Most devices are shipped with these addresses as its default. It is recommended to use these addresses for LANs.

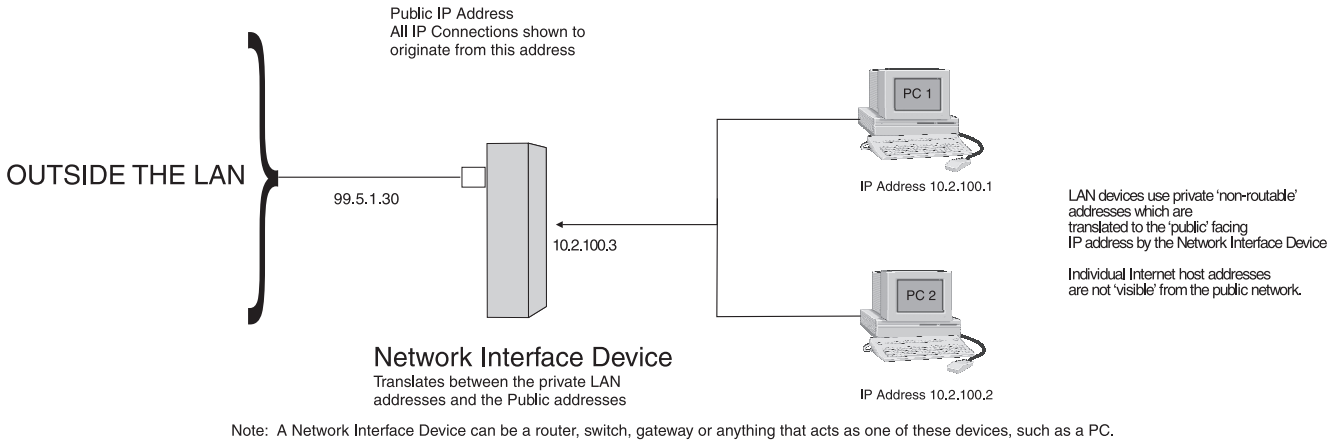


Figure 10. Network Address Translation

NETWORK ADDRESS TRANSLATION (NAT)

Using the initial IP Address, then converting it to a valid WAN IP Address is how the network address translation works, in theory. Once the IP address is changed, it is up to the network interface device (such as a router, gateway, switch, etc.) to keep track of which computers are talking on which ports. For example, if two local devices (PC1 and PC2 in Figure 3) both wanted to talk via port 1031, then the network interface device would have to change one of the port requests to the next available port, 1032.

PORTS

In general, a network port is an endpoint to a logical connection. The port number identifies what type of port it is. For example, port 80 is used for HTTP traffic. When you type an address into the *address bar* of a web browser, your computer goes to find an IP Address for the url you are requesting (http://www.telex.com). To obtain this address, the computer contacts a DNS server (Domain Name Server). Once the IP Address is found, it tries to connect to the http port of the network device (port 80). See Table 1 for a list of the more well-known port numbers.

Each network device can be set-up to respond or not respond to the various ports. The function of responding or "hosting a service" is called "serving".

TABLE 1. Packet Translation

	Packet before Translation				**Packet after Translation**			
	Source		Destination		Source		Destination	
	IP Address	Port Number	IP Address	Port Number	IP Address	Port Number	IP Address	Port Number
To Internet	10.2.100.2	1031	192.156.136.22	80	99.5.1.30	1031	192.156.136.22	80
From Internet	192.156.136.22	80	99.5.1.30	1031	192.156.136.22	80	10.2.100.2	1031

If a second workstation on the LAN wants to communicate to the same server, and happens to use the same source port number, then the LAN Modem will translate the source port number as well as the source IP address. In Table, 2, a second

LAN computer wants to access a web page. The NAT device now uses port 1032 for this connection where it used port 1031 in Table 1.

TABLE 2. Packet Translation

	Packet before Translation				Packet After Translation			
	Source		Destination		Source		Destination	
	IP Address	Port Number	IP Address	Port Number	IP Address	Port Number	IP Address	Port Number
To Internet	10.2.100.1	1031	192.156.136.22	80	99.5.1.30	1032	192.156.136.22	80
From Internet	192.156.136.22	80	99.5.1.30	1032	192.156.136.22	80	10.2.100.1	1031

Amazingly, all the address translation that occurs takes place automatically in order to make web browsing and other functions easier. This is also a way for large web hosting services to speed up the network by having different devices perform different functions.

TABLE 3. Well-Known TCP Port Numbers

Port Number	Description
1	TCP Port Service Multiplexer (TCPMUX)
5	Remote Job Entry (RJE)
7	ECHO
18	Message Send Protocol (MSP)
20	FTP-Data
21	FTP- Control
23	Telnet
25	Simple Mail Transfer Protocol (SMTP)
29	MSG ICP
37	Time
42	Host Name Server (Nameserv)
43	Whols
49	Login Host Protocol (Login)
53	Domain Name Server (DNS)
69	Trivial File Transfer Protocol (TFTP)
70	Gopher Service
79	Finger
80	HTTP
103	X.400 Standard
108	SNA Gateway Access Server
109	POP2

TABLE 3. Well-Known TCP Port Numbers

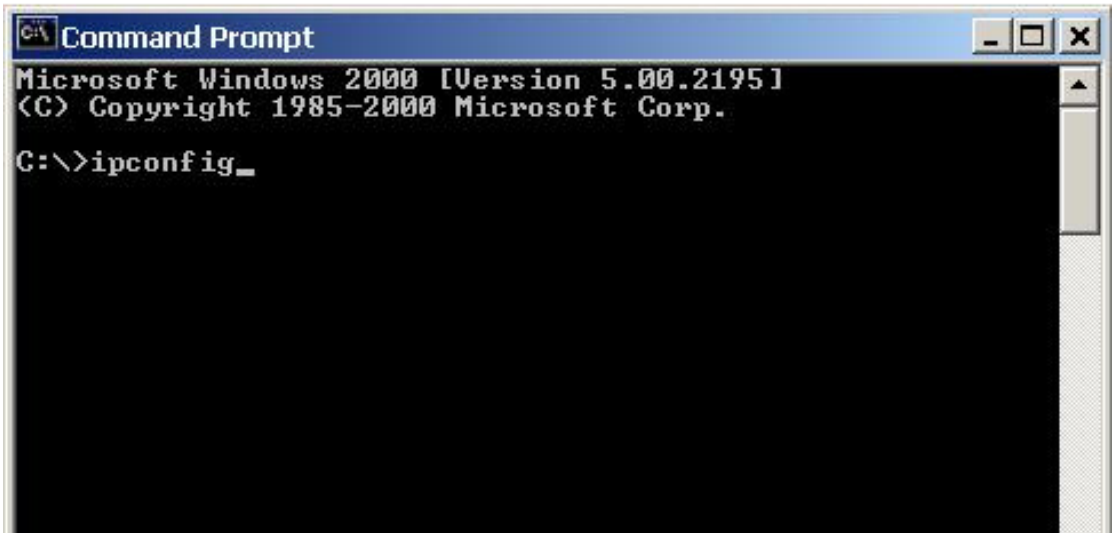
Port Number	Description
110	POP3
115	Simple File Transfer Protocol
118	SQL Services
119	Newsgroup (NNTP)
137	NetBIOS Name Service
139	NetBIOS Datagram Service
143	Interim Mail Access Protocol (IMAP)
150	NetBIOS Session Service
156	SQL Server
161	SNMP
179	Border Gateway Protocol (BGP)
190	Gateway Access Control Protocol (GACP)
194	Internet Relay Chat (IRC)
197	Directory Location Services (DLS)
389	Lightweight Directory Access Protocol (LDAP)
396	Novell Netware over IP
443	HTTPS
444	Simple Network Paging Protocol (SNPP)
445	Microsoft-DS
458	Apple Quick Time
546	DHCP Client
547	DHCP Server
563	SNEWS

IP ADDRESSES

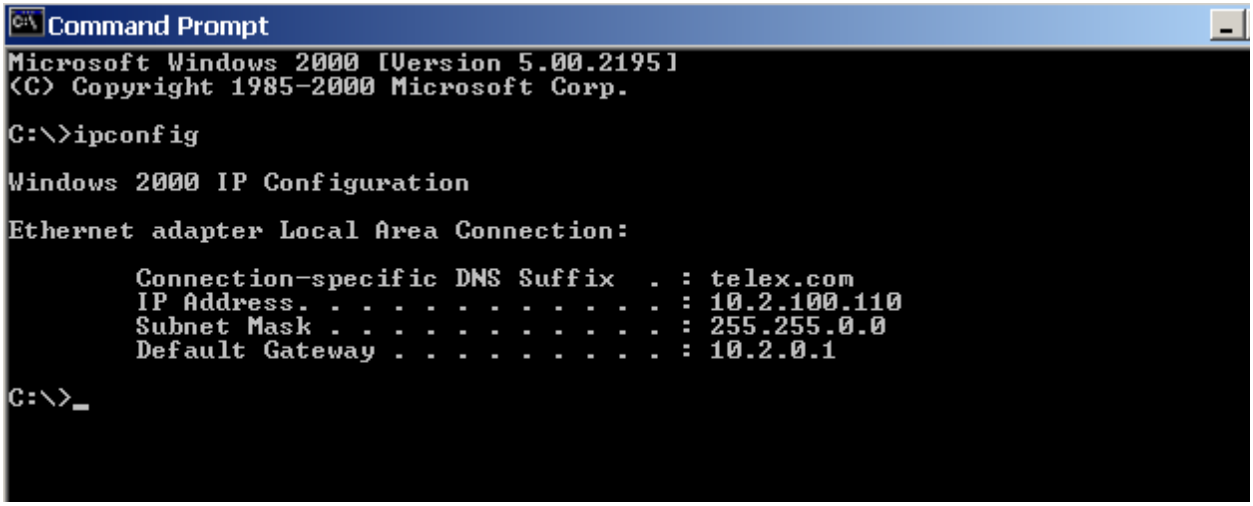
If you do not know your IP Address, you can open a DOS screen in a Windows®- based environment and bring up the ipconfig screen.

To find your IP Address using ipconfig, do the following:

1. From the Start Menu, open a **Command Prompt** screen.



2. At the prompt, type **ipconfig**, then press **Enter**.
The IP configurations appear for your machine, such as the DNS suffix, IP Address, Subnet Mask, and Default Gateway.



3. At the prompt, type **Exit** to close the screen.

NOTE: If you want more detailed parameters for your machine, type **ipconfig/All**. This screen shows the computers network configuration settings.

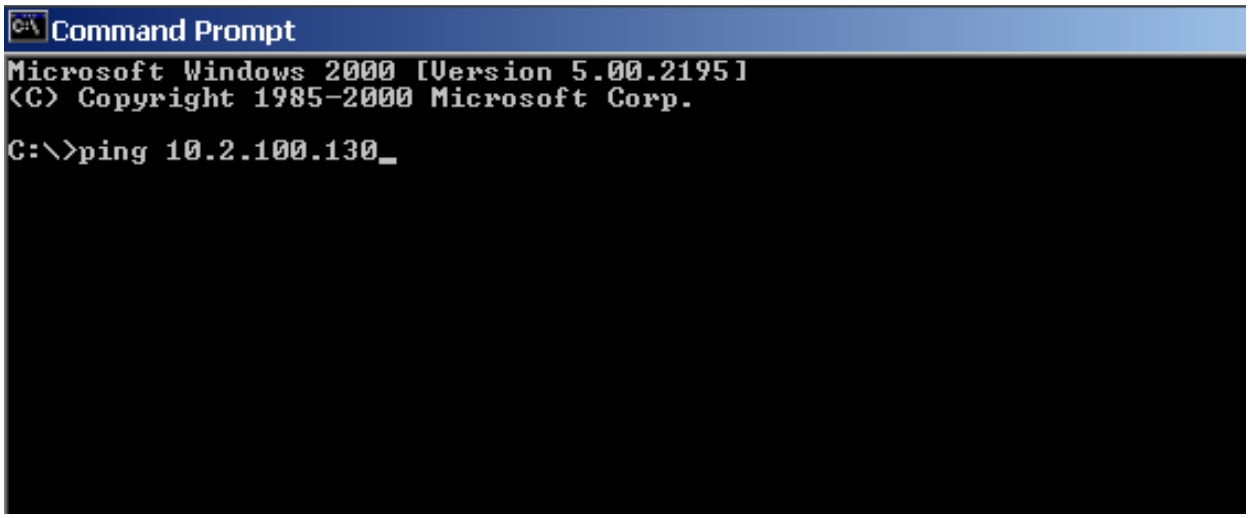
Ping a Computer

Pinging a computer on the network makes sure it is able to be “seen” and receive messages on the network.

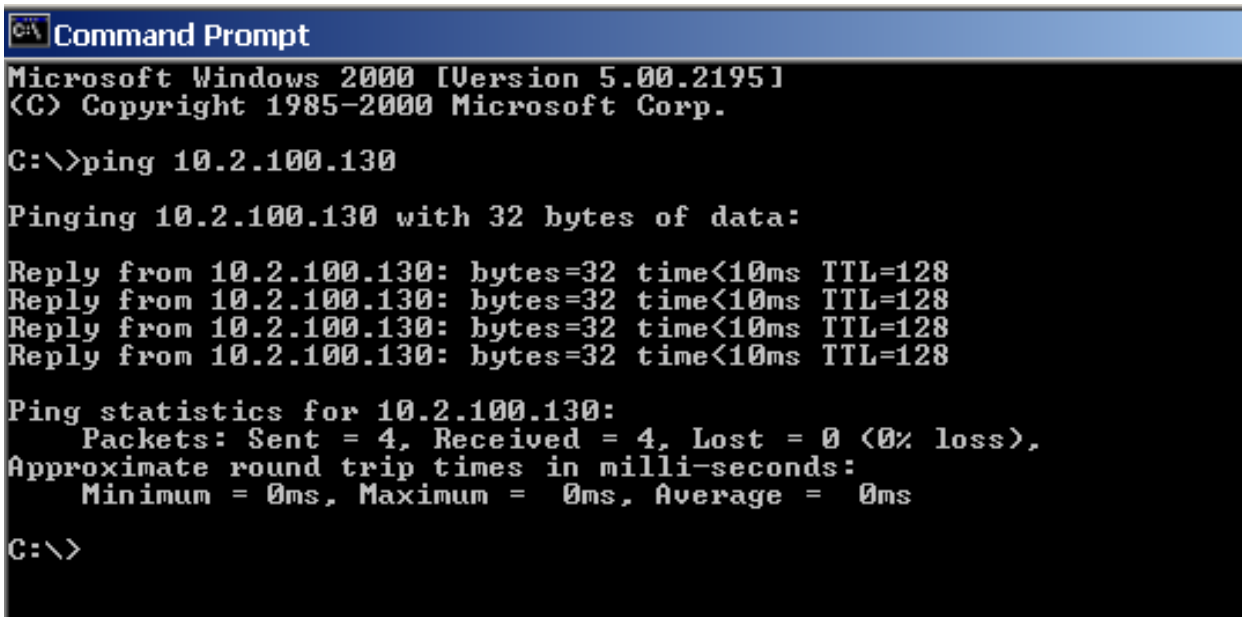
NOTE: You can also ping your RVON-8 card to verify that it is responding over the network by putting the cards IP Address in place of the computer IP Address.

To Ping a computer on the network, do the following:

1. From the Start menu, select **Run...** .
2. At the Run command, type **CMD** to open a **Command Prompt** screen.



3. At the prompt, type the **IP Address** of the computer you wish to ping (for example, 10.2.100.130).
4. Press **Enter**.



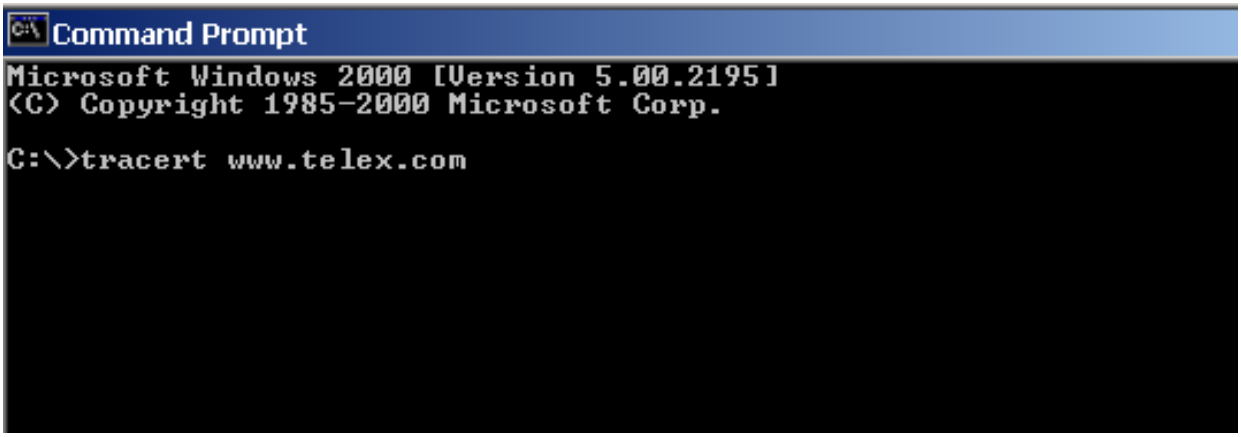
NOTE: If the computer you are pinging is not responding to the ping, you will receive a time-out message in the command prompt screen.

POSSIBLE PITFALL WITH ROUTERS, GATEWAYS, AND SWITCHES

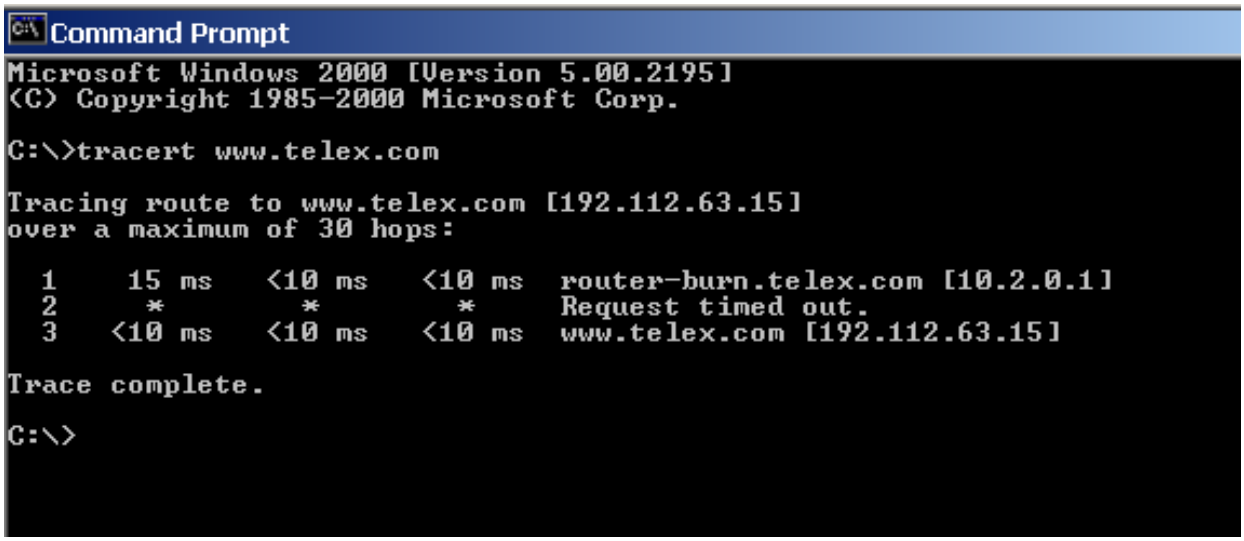
Anytime computers communicate through routers, gateways, and switches, they may be allowed or denied the connection. Network interface devices can be configured to block specific outgoing requests, as well as incoming requests, based on the IP Address and/or port. This is one of the security mechanisms of a router. This also happens when broadcast messages are sent and received.

To view the path an IP Address takes to retrieve information, you can execute a tracert from the Command Prompt Screen.

1. From the Start Menu, open a **Command Prompt** screen.
2. At the prompt, type **tracert** and type the url or IP Address you want to trace.



3. Press **Enter**.
   The details of the tracer route are displayed.



NOTE: You will the message “request timed out” if the IP Address/ port IN or OUT is denied to the incoming or outgoing message.

4. When you are finished, type **exit** to close the Command Prompt screen.

RVON Configuration

RVON cards use ports for communication of audio and control packets. Because routers can be configured to block certain incoming and outgoing requests, you will need to open the following ports in your network to allow WAN connections to and from a Network Interface Device. See Table X for the ports that need to be opened for the RVON cards to operate properly.

TABLE 4. Ports necessary for RVON card functionality.

Port	Port Description
2076	UDP Call Control Signalling
2077	UDP Audio Packets
2079	UDP Telex Proprietary Signalling
2080	TCP Telex Keypanel Protocol
2081	UDP Pass Through Serial
2082	TCP Firmware Download
2100	Remote Administration
2102	Authentication Server

Below, is an example of a router configuration screen. Not all routers are configured the same way and may not look exactly like this screen.

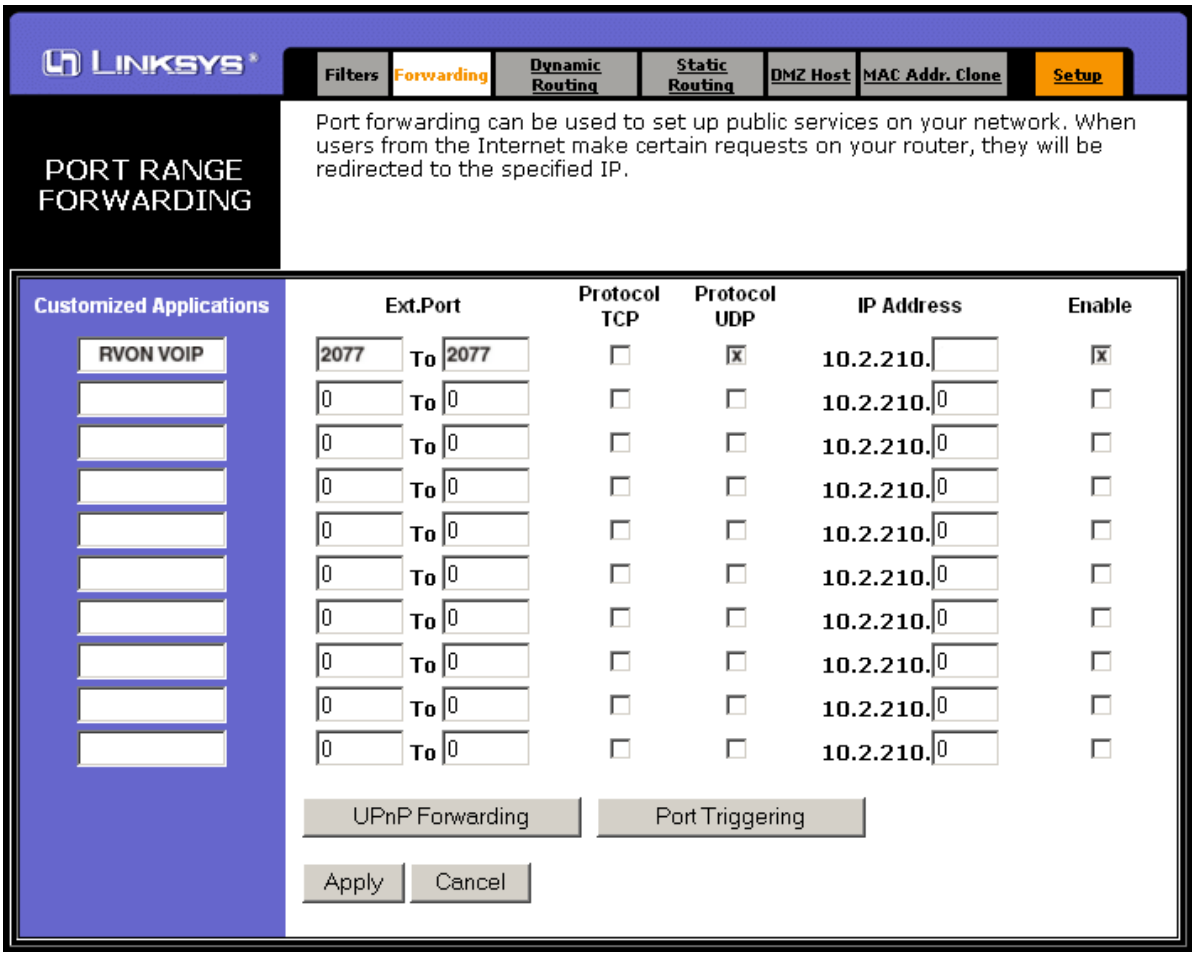


Figure 5. Port Forwarding

NOTE: Linksys™ supports up to 253 nodes on a router. This is why it is called a Router/Switch because there are WAN functions like a router as well as having a 4-port LAN switch. It also does not support simultaneous forward and DHCP.

Network Terminology

Bridges

A **bridge** is a device that connects two LANs, or two segments of the same LAN that use the same protocol. Sometimes called “transparent bridges, they work at the OSI model Layer 2. Simply put, they are not concerned with protocols. Their main job is to pass data to a destination address that is predetermined in the data packet.

With a bridge, all of your computers are on the same network subnet (see Subnet). This means your computers can communicate with each other and have their own Internet connection. If you assign your own IP Addresses be sure to use the same first 3 “octets” of the IP Address (for example, 192.168.0.X).

Domain Name Server (DNS)

A **DNS Server** is an Internet service that translates domain names (for example, in the URL *http:// www.telex.com*, the domain name is the telex.com) into IP Addresses. The Internet is based on IP Addresses which are numeric and since domain names are alphabetic, they are easier to remember. Every time a domain name is used it must go through the DNS server to be translated into an IP Address.

Gateway

A **gateway** is a node on a network that serves as an entrance to another network. The gateway routes traffic from a computer to an outside network that is serving the web pages. For example, the gateway for a home computer is the ISP provider that connects the user to the Internet.

In a corporate environment, the gateway often acts as a proxy server and a firewall. Gateways are similar to routers and switches in that they forward data to the destination and provide the path for which the data will travel to the destination.

Hub

A hub is a common connection point for devices in a network. A hub has multiple ports. When a data packet arrives at a hub, it is copied and distributed to all of its ports so that all nodes on the LAN can see the packets.

There are three types of hubs:

passive hub - this hub serves as a conduit for the data, enabling it to go from one device to another.
intelligent hub *(also known as manageable hubs)* - this hub includes addition features that enable administrators to monitor traffic through the hub.
switching hub - this hub reads the destination address of each packet and then forwards the data pack to the appropriate port.

IP Address (Internet Protocol Address)

An **IP Address** is an identifier or numerical name for a computer or device on a network. Data between computers are routed over the network using these addresses to identify the computer the message is being sent to and the computer the message is being sent from.

The format of an IP Address is a 32-bit numeric address written as four numbers separated by periods. For example, an IP Address looks like 10.100.1.1.

IMPORTANT: When working within an isolated network (meaning there is no Internet access), IP Addresses can be assigned at random just as long as they are unique to each computer and device. When the isolated network is connected to the Internet, registered Internet Addresses must be obtained. This is to prevent duplication of addresses.

The four numbers in and IP Address are used in different was to identify a particular network and host on that network. There are three classes of Internet Addresses.

CLASS A - supports 16 million hosts on each of 127 networks.
CLASS B - supports 65,000 hosts on each of 16,000 networks.
CLASS C - supports 254 hosts on each of 2 million networks.

LAN

A LAN is a computer network that connects a relatively small area (a single building or group of buildings). Most LANs connect work stations and computers to each other. Each computer (also known as a “node”), has its own processing unit and executes its own processing unit and executes its own programs; however it can also access data and devices anywhere on the LAN. This means that many users can access and share the same information and devices. A good example of a LAN device is a network printer. Most companies

cannot afford the budgetary or hardware expense of providing printers for each of its users; therefore, one printer (i.e., device) is placed on the LAN where every user can access the same printer.

The LAN uses IP Addresses to route data to different destinations on the network. An IP Address is a 32-bit numeric address written as four numbers separated by periods (for example 1.160.10.240).

Port

A port, when referring to TCP and UDP networks, is an endpoint in a logical connection. The port number identifies the type of port it is. For example, port 80 is used for HTTP traffic.

Routers

A **router** is a device that forwards data packets over networks. Most commonly, a router is connected to at least two networks (normally LANs or WANs). Routers are located at gateways, the place where two networks are connected. Routers do little data filtering, they mainly deliver the data.

Subnet

A **subnet** is a portion of a network that shares a common address component. On a TCP/IP network, a subnet is described as all computers or devices whose IP Address have the same prefix.

Subnetting a network is useful because it provides security for the network as well as increases performance of the network. IP networks are divided using subnet masks.

Switches

A **switch** is a device that filters and forwards data packets between networks. Switches operate at the data layer, and sometimes at the network layer.

WAN

A **wide area network** connects two or more LANs and can span a relatively large geographical area. For example, Telex Headquarters in Burnsville, MN is connected to several of its branch offices in Nebraska and Arkansas over the wide area network. The largest WAN is the Internet.

APPENDIX E

RVON Trunking Connections

In this chapter, find the following drawings:

- AZedit Via RVON-8 RS-232 Mode
- CS9500 Trunking Via RVON-I/O To RVON-8
- ADAM Trunking Via RVON-8
- Zeus II Trunking Via RVON-I/O To RVON-C
- Cronus Trunking Via RVON-I/O To RVON-8

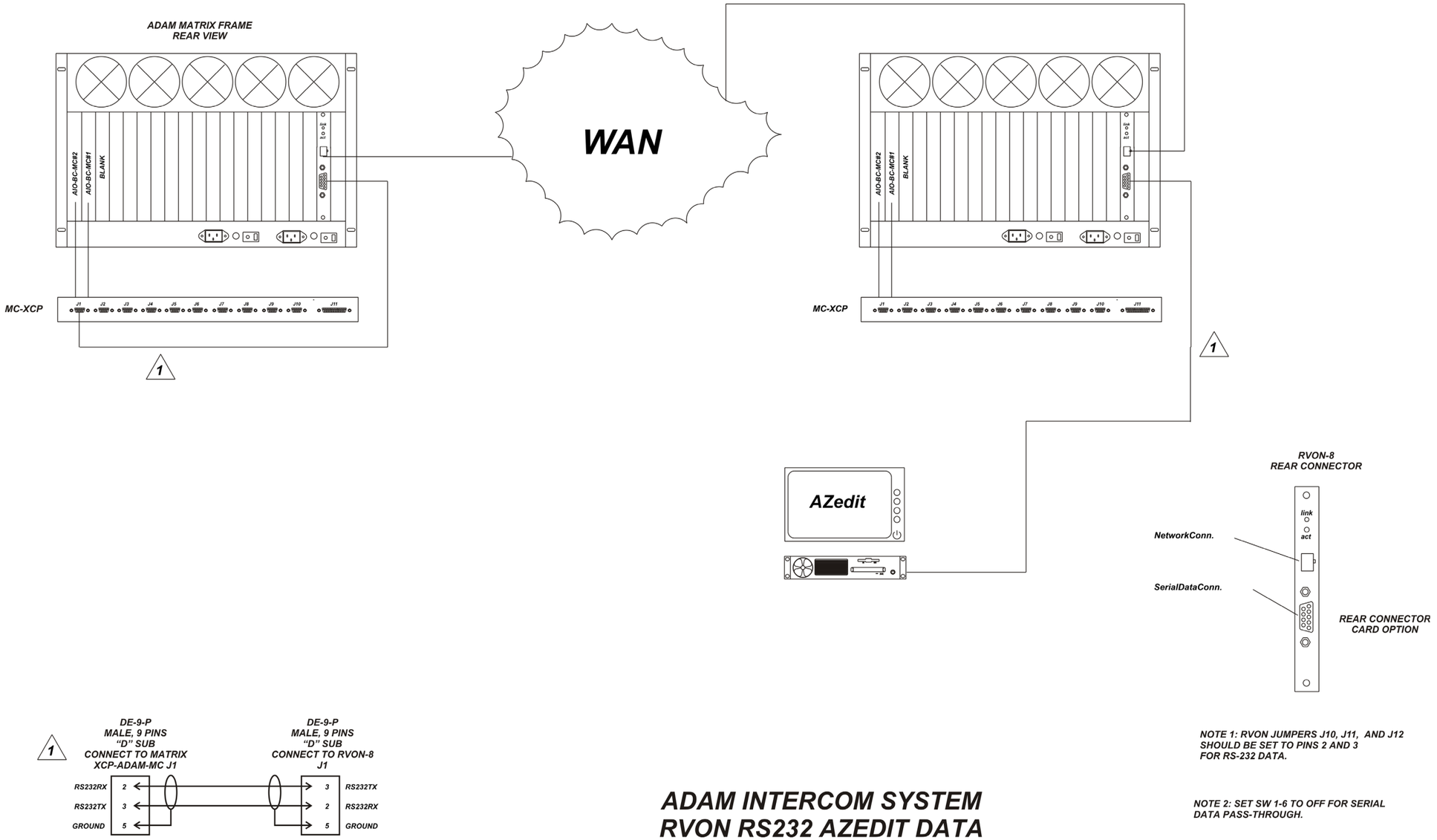
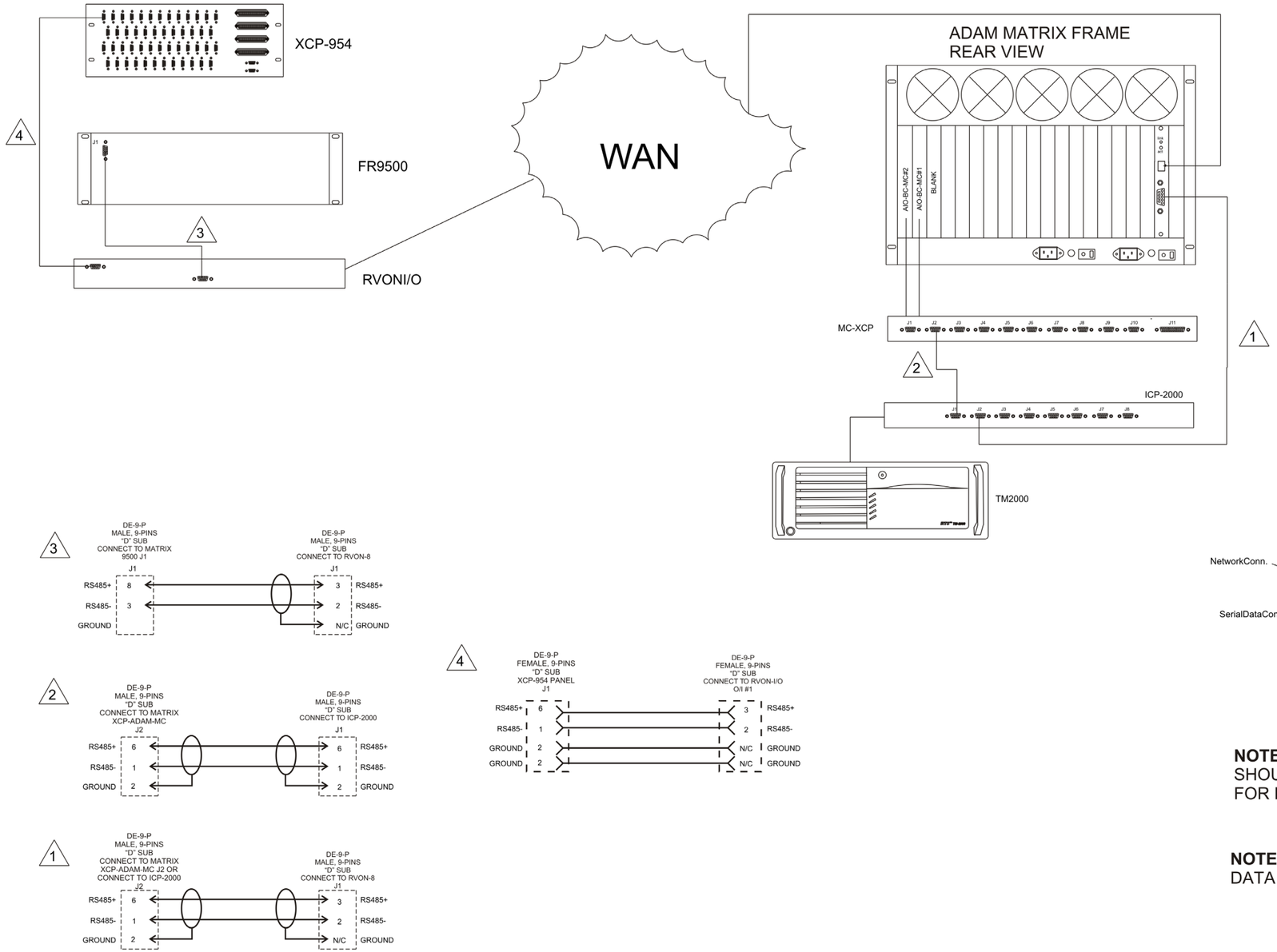
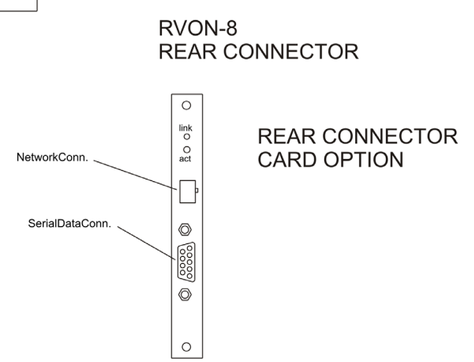


FIGURE 15. AZedit Via RVON-8 RS-232 Mode

ADAM INTERCOM SYSTEM RVON RS232 AZEDIT DATA WIRING DATA





NOTE 1: RVON JUMPERS J10, J11, AND J12 SHOULD BE SET TO PINS 1 AND 2 FOR RS-485 DATA

NOTE 2: SET SW1-6 TO OFF FOR SERIAL DATA PASS-THROUGH

FIGURE 16. CS9500 Trunking Via RVON-I/O To RVON-8

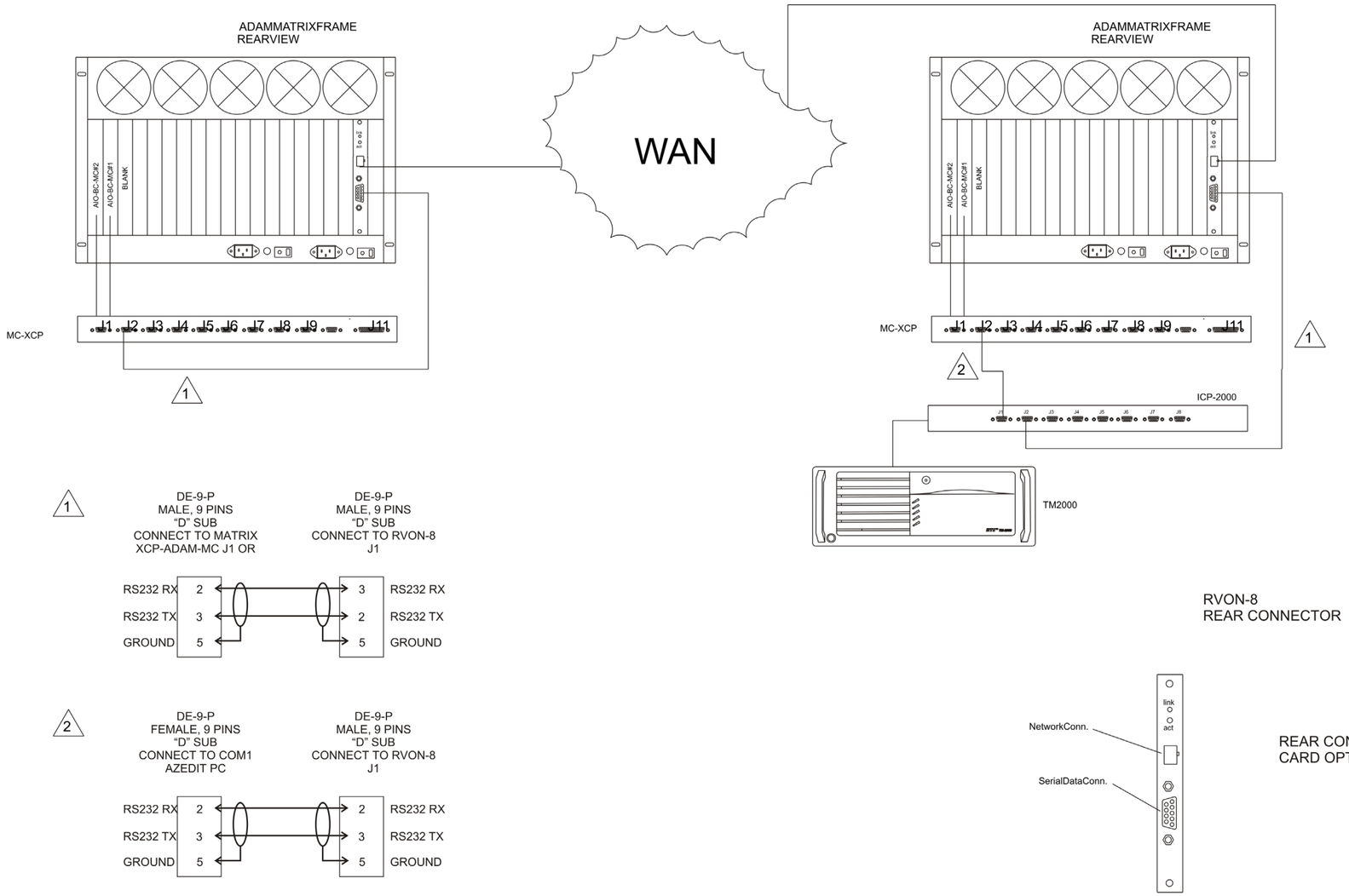
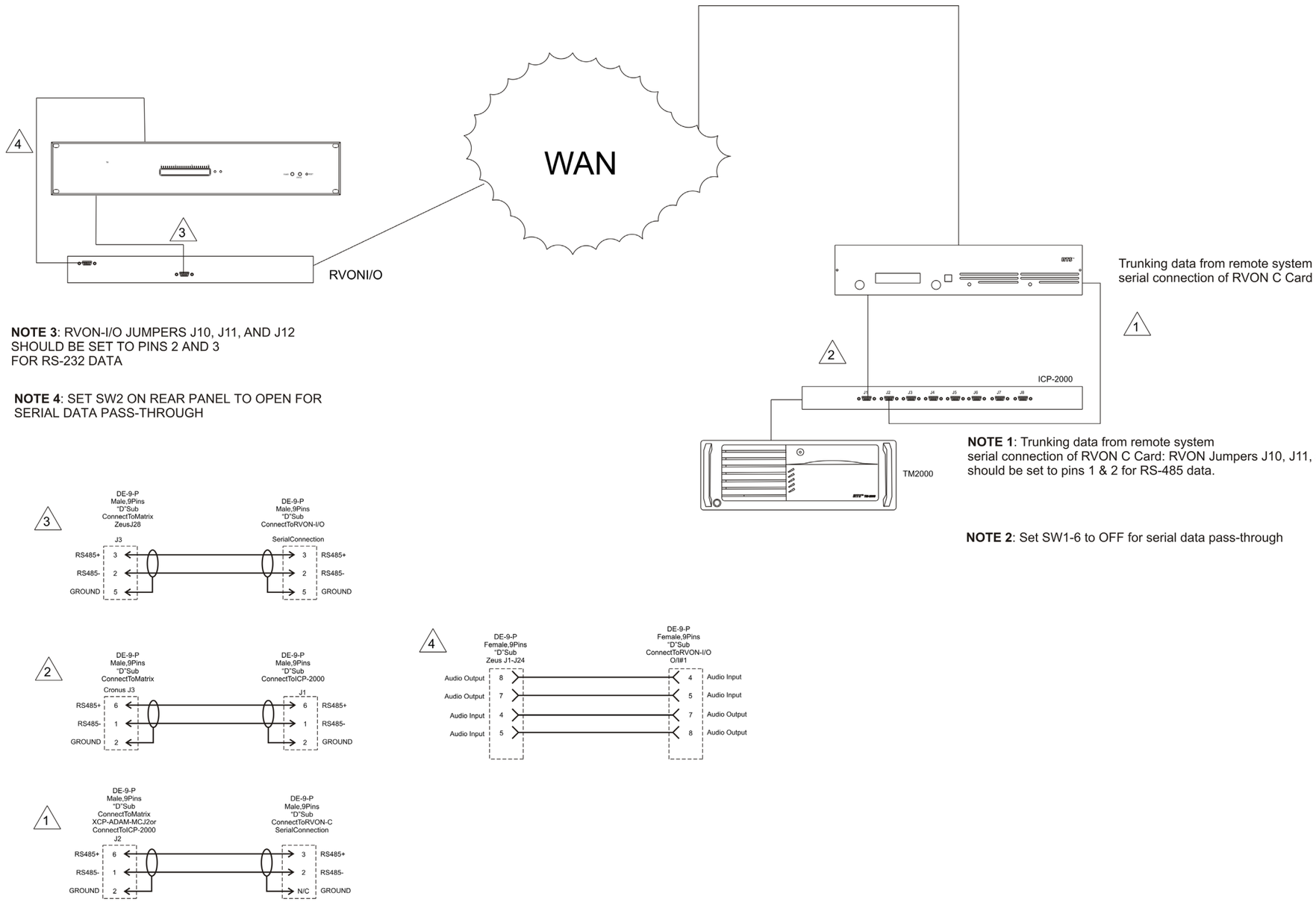


FIGURE 17. ADAM Trunking Via RVON-8



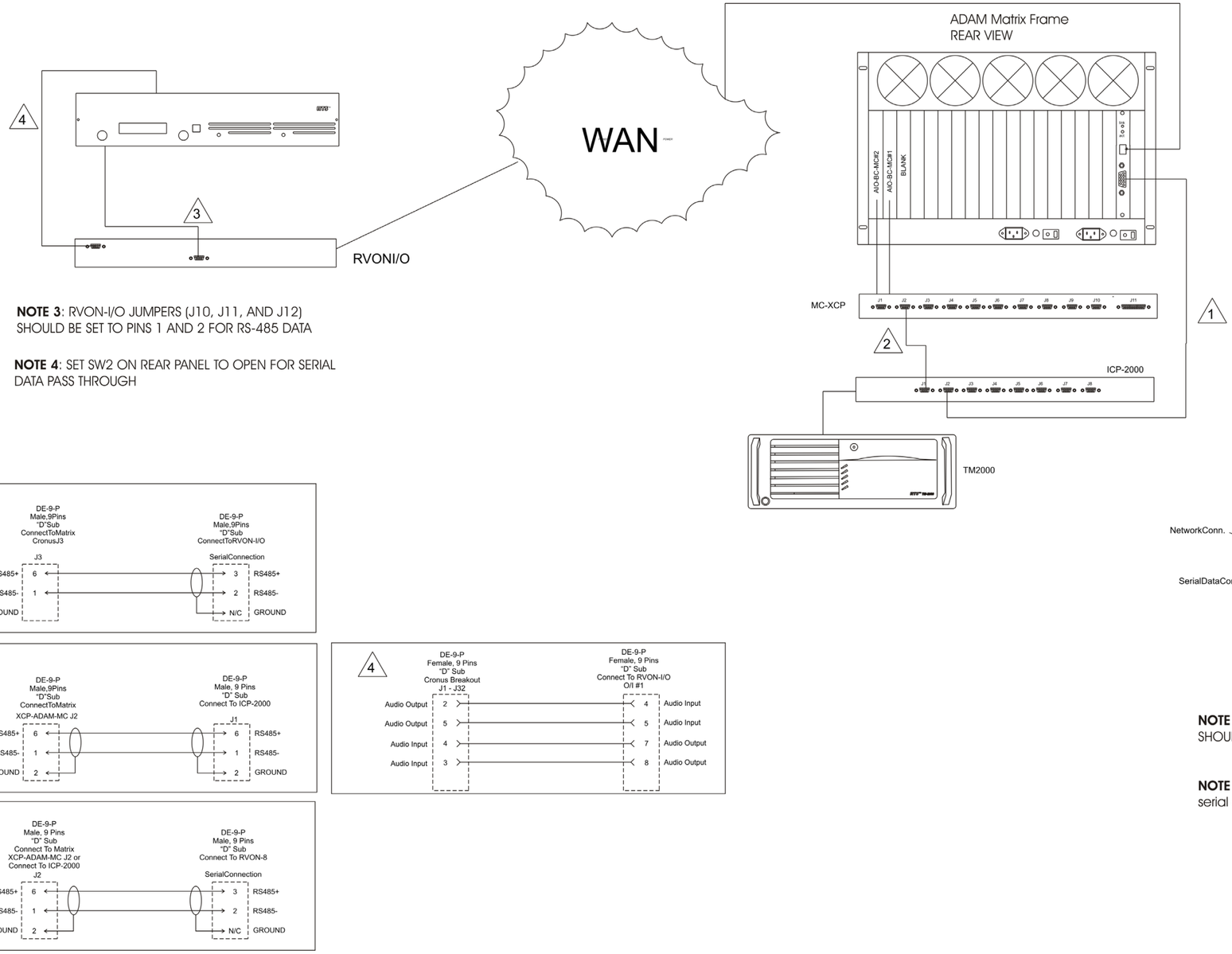
NOTE 3: RVON-I/O JUMPERS J10, J11, AND J12 SHOULD BE SET TO PINS 2 AND 3 FOR RS-232 DATA

NOTE 4: SET SW2 ON REAR PANEL TO OPEN FOR SERIAL DATA PASS-THROUGH

NOTE 1: Trunking data from remote system serial connection of RVON C Card: RVON Jumpers J10, J11, and J12 should be set to pins 1 & 2 for RS-485 data.

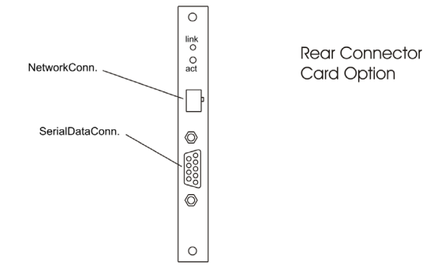
NOTE 2: Set SW1-6 to OFF for serial data pass-through

FIGURE 18. Zeus II Trunking Via RVON-I/O to RVON-C



NOTE 3: RVON-I/O JUMPERS (J10, J11, AND J12) SHOULD BE SET TO PINS 1 AND 2 FOR RS-485 DATA

NOTE 4: SET SW2 ON REAR PANEL TO OPEN FOR SERIAL DATA PASS THROUGH



NOTE 1: RVON-I/O JUMPERS (J10, J11, AND J12) SHOULD BE SET TO PINS 1 AND 2 FOR RS-485 DATA

NOTE 2: Set SW1-6 to OFF for serial data pass-through

FIGURE 19. Cronus Trunking Via RVON-I/O To RVON-8

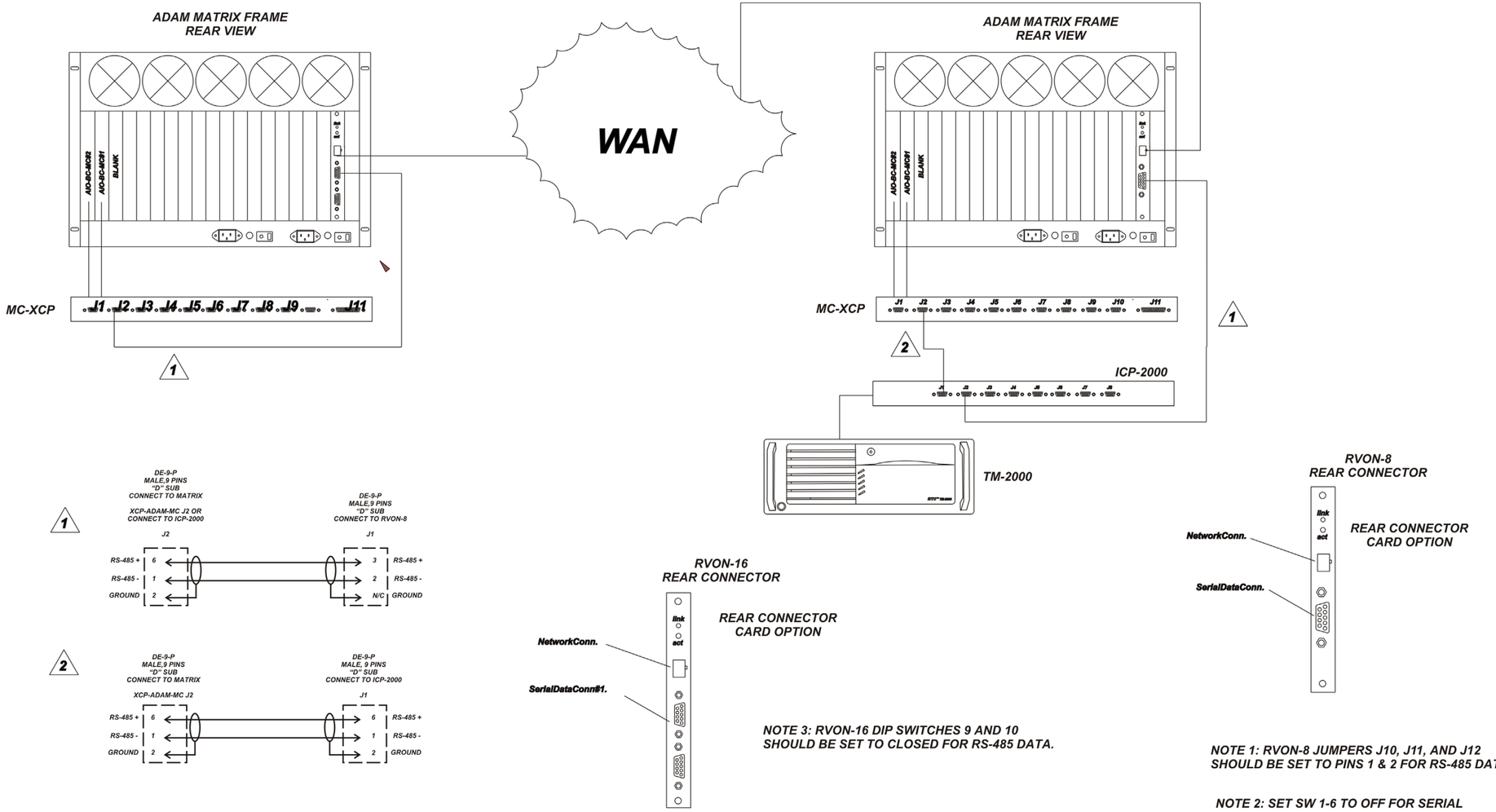


FIGURE 20. RVON-16 Trunking

Notes