RTS™ Digital Matrix Intercom Systems

RVON Resource Guide

RVON-8

RVON-1

RVON-I/O

CHAPTER 1

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.

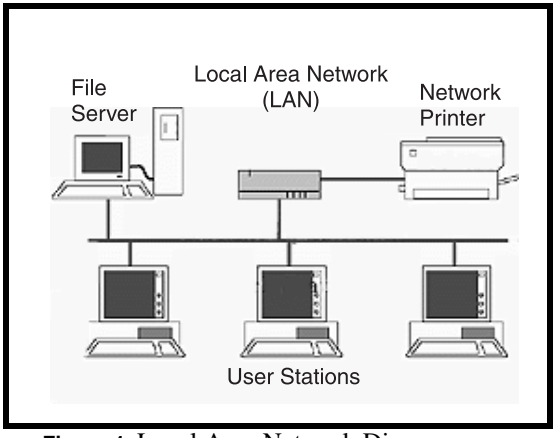


Figure 1. Local Area Network Diagram

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.

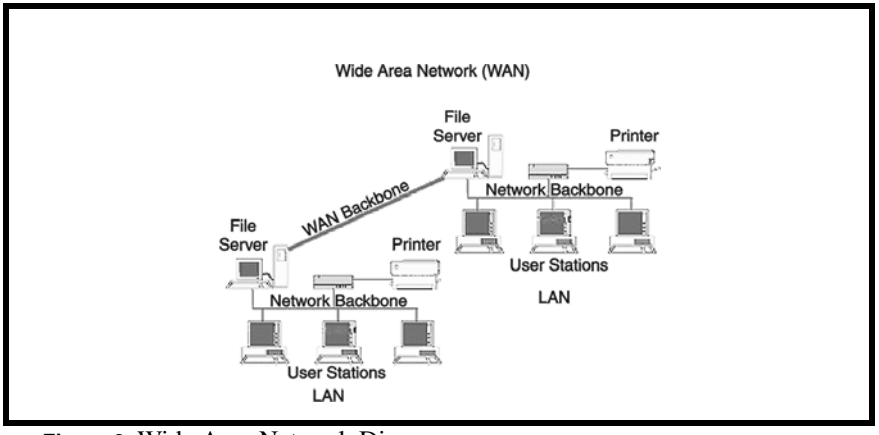


Figure 2. Wide Area Network Diagram

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.

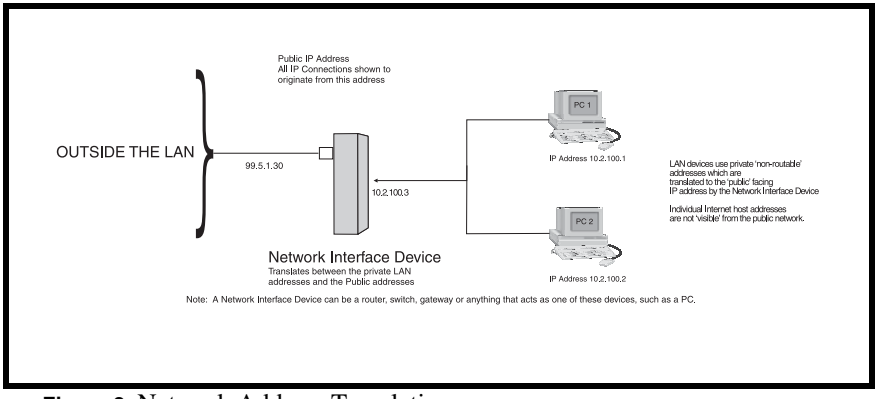


Figure 3. Network Address Translation

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
110	POP3

TABLE 3. Well-Known TCP Port Numbers

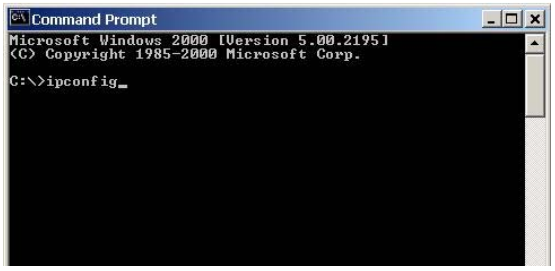
Port Number	Description
115	Simple File Transfer Protocol
118	SQL Services
119	Newsgroup (NNTP)
137	NetBIOS Name Service
139	NetBIOS Datagram Service
143	Interim Mail Access Protocol (IMAP)
150	NetBIOS Session Service
156	SQL Server
161	SNMP
179	Border Gateway Protocol (BGP)
190	Gateway Access Control 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
569	MSN
1080	Socks

IP ADDRESSES

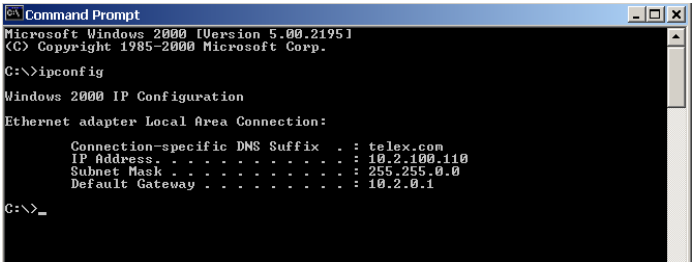
If you do not know your IP Address, you can open a DOS screen in a Windows®- based environment and bring up the ipconfig screen.

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.

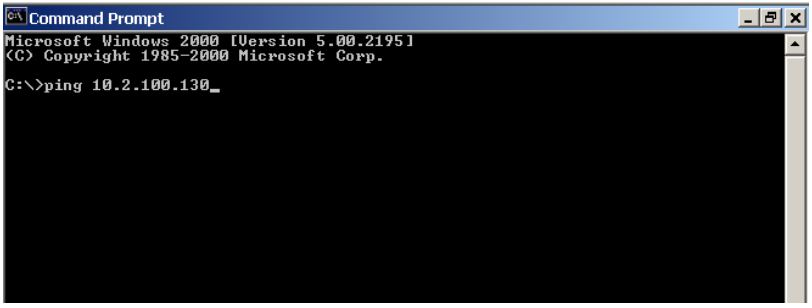
Ping a Computer

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

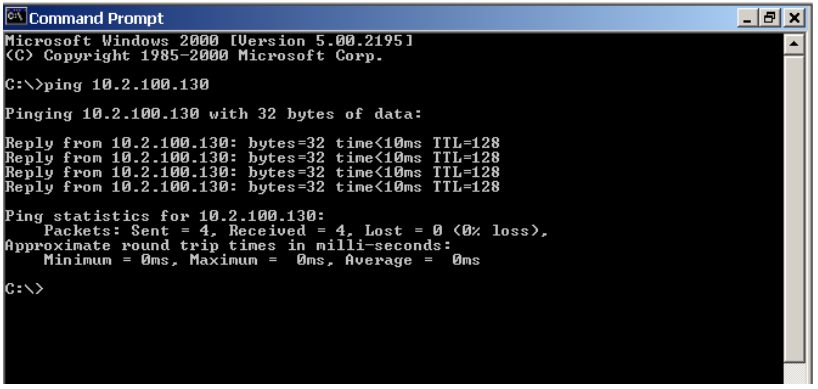
NOTE: You can also ping your RVON-8 card to verify that it is responding over the network by putting the cards IP Address in place of the computer IP Address.

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**.



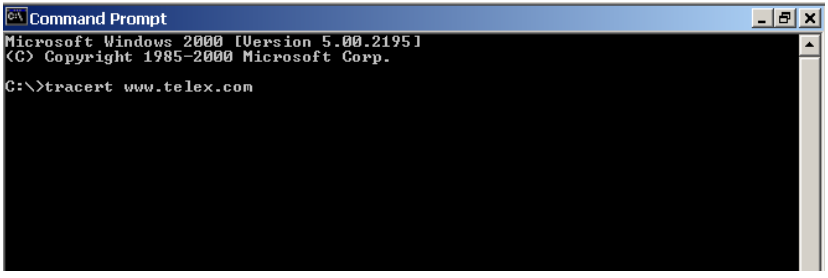
NOTE: If the computer you are pinging is not responding to the ping, you will receive a time-out message in the command prompt screen.

POSSIBLE PITFALL WITH ROUTERS, GATEWAYS, AND SWITCHES

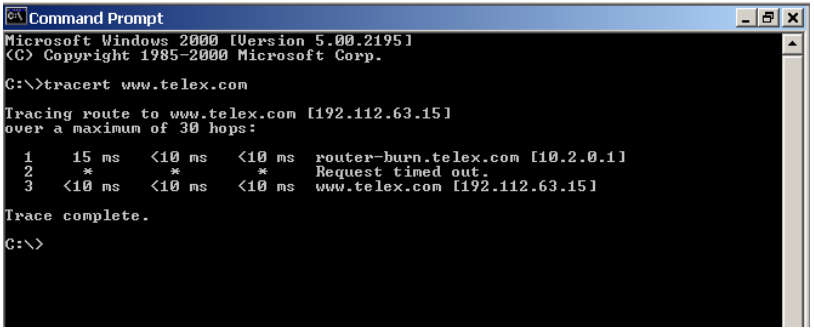
Anytime computers communicate through routers, gateways, and switches, they may be allowed or denied the connection. Network interface devices can be configured to block specific outgoing requests, as well as incoming requests, based on the IP Address and/or port. This is one of the security mechanisms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

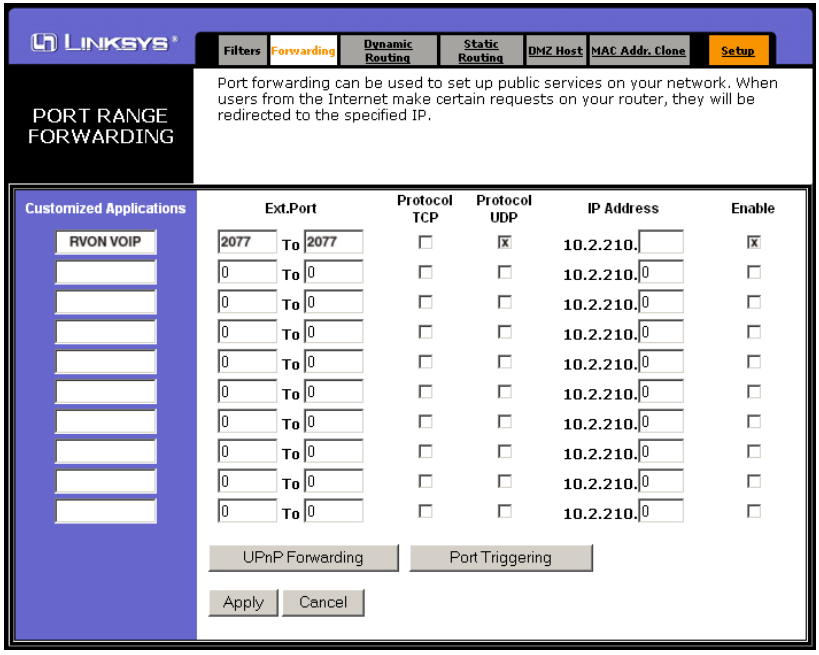
RVON Configuration

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

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



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.

CHAPTER 2

Serial Port Programming

RVON Serial and Telnet Commands

RVON card programming can be done via direct serial or telnet connection. There are several physical connections to an RVON board:

- Direct serial through custom debug cable (J20 6-pin bottom front)
  The customer debug cable always functions as the general-purpose debug tool.
- Backcard DB-9 J2
  The backcard DB-(must be disabled/enabled via a DIP Switch because it can also be used for serial port pass-through. The backcard DB-9 can be used for a debug terminal when DIP switch 6 is switched to the ON position.
- Backcard RJ-45 J1 (Telnet Only)

Setup

Serial Port	38.400 baud, No-flow control
Telnet	IP Address, port 23

TABLE 1. RVON-I/O supplemental Coding Table

Coding	Codec	Codec Rate	Size	VAD
1	711u	64k	10	Y
2	711u	64k	20	Y
3	711u	64k	30	Y
4	711u	64k	10	N
5	711u	64k	20	N
6	711u	64k	30	N
7	711A	64k	10	Y
8	711A	64k	20	Y
9	711A	64k	30	Y
10	711A	64k	10	N
11	711A	64k	20	N
12	711A	64k	30	N
13	729AB	8k	10	Y
14	729AB	8k	20	Y
15	729AB	8k	40	Y
16	729AB	8k	60	Y
17	729AB	8k	10	N
18	729AB	8k	20	N
19	729AB	8k	40	N
20	729AB	8k	60	N
21	723	5.3k	30	Y
22	723	5.3k	60	Y
23	723	5.3k	30	N
24	723	5.3k	60	N
25	723	6.3k	30	Y
26	723	6.3k	60	Y
27	723	6.3k	30	N
28	723	6.3k	60	N

Table 1. 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.

```
******************************************************
RVON-8 Revision 1.00.00
(C) Copyright 2003 Telex, Inc. All Rights Reserved.

Flash File System initialized.

DIP Switch settings:........X

Configuration via AZedit disabled (via DIP Switch 1 ON)
Back Card UART enabled for pass-through serial (via DIP Switch 6 OFF)
Boot Downloader disabled (via DIP Switch 7 OFF)
Autoload enabled (via DIP Switch 8 OFF)

Monitor Revision                                    1.00.00
Monitor Compilation time                            Sept 4 2003, 15.52.31
Board type / revision                               0 (RVON-8) / 1
RTL ID / revision                                   9 (RVON-8) / 0.16
Processor ID / Revision                             0x80 (4Kc) / 0x50
Avalanche Device Type                               Avalanche-1, Revision 1.3
Memroy Controller Revision                          1.204
Endianness                                          Big
External Memory rate                                Full
CPU Frequency                                       125 MHz
Flash memory size                                   8 MBytes
RAM size                                            64 MBytes
First free RAM address                              0x9401fla8
PLL Mode                                            Operating 2.50X

Press any key to abort OS load, or wait 5 seconds for OS to boot....
**Defragmenting File System flash area(s)**
Reading flash file system... No deleted flash file entries found.
Loading file/ bin/telex1 from EFS
PC: 94020000
FTP done!, PC: 94020000
Target Name: vxTarget
Attached TCP/IP interface to emac unit 0
Attaching network interface lo0,,, done
NFS client support not included.

Adding 5270 symbols for standalone.
appCreate: autoBootLevel=2
MXP environment is created.
Creating RVON-8 application...
-> Bringing DSP subsystem out of reset...
DSP Daughtercard type is set to NONE - No DSP Daughtercard Found
0000002223 - ROOT: FPGA Version = ff24
0x97e796f0 (tNetTask): Link is up on EMAC A: 100 MBps and HALF duplex.
```

```
About to create Idle Task
About to create Measurement Task
Idle Measurement Tasks created
0000002536 - SERV: initializing connection server
0000002536 - DNLD: initializing download server
0000002535 - NMM: ATPM Update Database Granted
0000002735 - NMM: ATPM Configured for RVON operation
0000002735 - NMM: ATPM Update database done
0000002735 - NMM: 0, states: oper=NORMAL, admin=NORMAL, call=IDLE
0000002741 - NMM: 1, states: oper=NORMAL, admin=NORMAL, call=IDLE
0000002742 - NMM: 2, states: oper=NORMAL, admin=NORMAL, call=IDLE
0000002743 - NMM: 3, states: oper=NORMAL, admin=NORMAL, call=IDLE
0000002744 - NMM: 4, states: oper=NORMAL, admin=NORMAL, call=IDLE
0000002744 - NMM: 5, states: oper=NORMAL, admin=NORMAL, call=IDLE
0000002745 - NMM: 6, states: oper=NORMAL, admin=NORMAL, call=IDLE
0000002746 - NMM: 7, states: oper=NORMAL, admin=NORMAL, call=IDLE
0000002746 - RVON: port 0, now idle
0000002746 - RVON: port 1, now idle
0000002746 - RVON: port 2, now idle
0000002746 - RVON: port 3, now idle
0000002746 - RVON: port 4, now idle
0000002746 - RVON: port 5, now idle
0000002746 - RVON: port 6, now idle
0000002746 - RVON: port 7, now idle
0000003037 - CBTX: MC/DBX is talking
0000003041 - FNRX: control bus FIFO now enabled
0000003093 - FNRX: new card configuration received
```

Following the power-ON messages, press **Return**.
The -> appears. This is the operating system prompt.

There are many different serial port commands support from here, but is **NOT** recommended that any be used ***EXCEPT***:

dbgcmd

Type “dbgcmd”, then press Return.
This places the serial port into the MXP> (MXP command mode)

The MXP Command Mode is the only mode that will be used. Table 1 is a list of commands support from the MXP Shell Prompt.

RVON-8 Command Table

TABLE 5. RVON-8 Command Table

Command	Variable 1	Variable 2	Description
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-8 Card.
set rvon	netmask	X.X.X.X	Set network mask for the RVON-8 Card.
set rvon	gateway	X.X.X.X	Set the gateway IP Address for the RVON-8 card.
set rvon	user	abcdefg	Set the RVON-8 user name for telnet access. *Default “telex”*
set rvon	password	abcdefg	Set the RVON-8 password for telnet access (8-40 characters). *Default “password”*
set rvon	vad_threshold	[adaptive | #]	Set the VAD threshold (silence detection) Adaptive refers to auto-select. The # can be -20 to +10dBm.
set channel [chan]			Help screen which lists all “set tcid” commands (TCID 0-7).
set channel [chan]	dest_ip	X.X.X.X	Set the destination IP Address for this particular RVON_Channel (same as tcid).
set channel [chan]	dest_type	X	dest_type X = 0 (rvon-8), 1 (rvon-1), 2 (rvon-I/O).
set channel [chan]	chan_codec	X	Set the profile to use which includes the compression codec see below (0-27).
set channel [chan]	onhook		Force the channel to disconnect the port.
set channel [chan]	offhook		Force the channel to connect the port.
set emac auto*			Enables auto-negotiation of the Ethernet interface configuration.
set emac 10 half			Configures the Ethernet interface for 10Mbps half duplex.
set emac 10 full			Configures the Ethernet interface for 10Mbps full duplex.
set emac 100 half			Confgures the Ethernet interface for 100 Mbps half duplex.

TABLE 5. RVON-8 Command Table

Command	Variable 1	Variable 2	Description
set emac 100 full			Configures the Ethernet interface for 100 Mbps full duplex.
set serial	ip_addr	X.X.X.X	Set the destination IP Address for this serial pass-through port.
set serial	baud	X	Set the baud rate to use: 50 through 115000.
activate			Must do an activate command to cause changes to take effect.
show rvon			Display current settings
show channel [chan]			Display current settings
show emac			Display current settings

RVON-1 Command Table

TABLE 6. RVON-1 Command Table

Command	Variable 1	Variable 2	Description
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-1 Card.
set rvon	netmask	X.X.X.X	Set network mask for the RVON-1 Card.
set rvon	gateway	X.X.X.X	Set the gateway IP Address for the RVON-1 card.
set rvon	user	abcdefg	Set the RVON-1 user name for telnet access. *Default “telex”*
set rvon	password	abcdefg	Set the RVON-1 password for telnet access (8-40 characters). *Default “password”*
set rvon	vad_threshold	[adaptive | #]	Set the VAD threshold (silence detection) Adaptive refers to auto-select. The # can be -20 to +10dBm.
set channel [chan]			Help screen which lists all “set chan” commands (CHAN 0-7).
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	dest_type X = 0 (rvon-8), 1 (rvon-1), 2 (rvon-I/O).
set channel [chan]	dest_chan	X	Set the destination channel - the port at the far end of the connection (0-7).
set channel [chan]	chan_codec	X	Set the profile to use, which includes the compression codec see below (0-27).
set channel [chan]	onhook		Force the channel to disconnect the port.
set channel [chan]	offhook		Force the channel to connect the port.
activate			Must do an activate command to cause changes to take effect.
show rvon			Display current settings.
show channel [chan]			Display current settings

RVON-I/O Command Table

TABLE 7. 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			Shwos 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	netmask	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	user	username	Set the RVON-I/O user name for Telnet access. *Default = telex*
set rvon	password	password	Set the RVON-I/O password for Telnet access (8-40 characters). *Default = password*
set rvon	vad_threshold	adaptive (#)	Set the VAD threshold (silence detection). Adaptvie 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 (see page X) (0-27).

TABLE 7. RVON-I/O Command Table

Command	Parameter 1	Parameter 2	Description
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.
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.

TABLE 7. RVON-I/O Command Table

Command	Parameter 1	Parameter 2	Description
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

Default RVON-8 Setup

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

All are "**set rvon**" commands

TABLE 1. Default Set RVON-8 Commands

Variable	Environment Name	Default Value	Description
ip_addr	EMACA_IPADDR	192.168.1.1	IP Address for the RVON-8 card.
netmask	EMACA_NETMASK	255.255.255.0	Network mask for the RVON-8 card.
gateway	EMACA_GW	none	Gateway IP Address for the RVON-8 card.
serial_ip	RVON_SERIAL_IP	none	Pass-thru serial port IP Address for the RVON-8
serial_baud	RVON_SERIAL_BAUD	9600	Set the pass-thru serial port baud rate for the RVON-8 card
user	RVON_USER	telex	RVON-8 user name for Telnet access
password	RVON_PASSWORD	password	RVON-8 password for Telnet access (8-40 characters)
vad_threshold	RVON_THRESHOLD_VAD	adaptive	VAD Threshold

There are more parameters that the software will auto-configure if they have not been previously setup. The user can also set these parameters, in which case the software would not modify, but take them as they are.

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

TABLE 2. Set Chan # Setup Commands

Variable	Environment Name	Value	Description
dest_ip	RVON_DEST_IP_#	X.X.X.X	Destination IP Address for this particular RVON_CH
dest_type	RVON_DEST_TYPE_#	X	Destination Type - Y = 0 (rvon-8), 1 (rvon-1), 2 (rvon-I/O).
dest_chan	RVON_DEST_CHAN_#	X	Destination Channel - What port of far-end (0-7).
chan_codec	RVON_CHAN_CODEC_#	X	Profile to use (see coding table)

Typing "**printenv**", then pressing **Return** from RVON-8 boot code or "**sys_printenv**" from the "MXP" debug system prompt may show these commands. The Environment name is listed because this is the label used by the software.

IMPORTANT: If the user is attempting to do a "setenv" to change a parameter from the RVON-8 boot code, the Environment Name must be used, NOT the "set rvon" Variable name.

Default RVON-1 Setup Commands

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

All are "**set rvon**" commands

TABLE 1. Default RVON-1 Setup Commands

Command	Environment Name	Default Value	Description
ip_addr	EMACA_IPADDR	10.2.210.170	IP Address for the RVON-1 card.
netmask	EMACA_NETMASK	255.255.255.0	Network mask for the RVON-1 card.
gateway	EMACA_GW	none	Gateway IP Address for the RVON-1 card.
user	RVON_USER	telex	RVON-1 user name for Telnet access.
password	RVON_PASSWORD	password	RVON-1 password for Telnet access (8-40 characters).
vad_threshold	RVON_THRESHOLD	adaptive	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.

TABLE 2. Set Channel # Setup Commands

Command	Environmental Variable Name	Value	Description
dest_ip	RVON_DEST_IP_# (0,1)	X.X.X.X	Destination IP Address for this particular channel.
dest_type	RVON_DEST_TYPE_# (0,1)	X	Destination Type: X = 0 (rvon-8), 1 (rvon-1), 2 (rvon-I/O).
dest_chan	RVON_DEST_CHAN_# (0,1)	X	Destination Channel - what port of far-end (0-7).
chan_codec	RVON_CHAN_CODEC_# (0,1)	X	Profile to use (see coding table).

Typing "**sys_printenv**" from the "MXP" Debug system prompt these settings.

Default RVON-I/O 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	adaptive	VAD Threshold

Table 1. Set rvon default values. For more information shee table on page X.

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

Table 2. Set Channel # commands

CHAPTER 8

Product Specific Descriptions

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.
- 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.

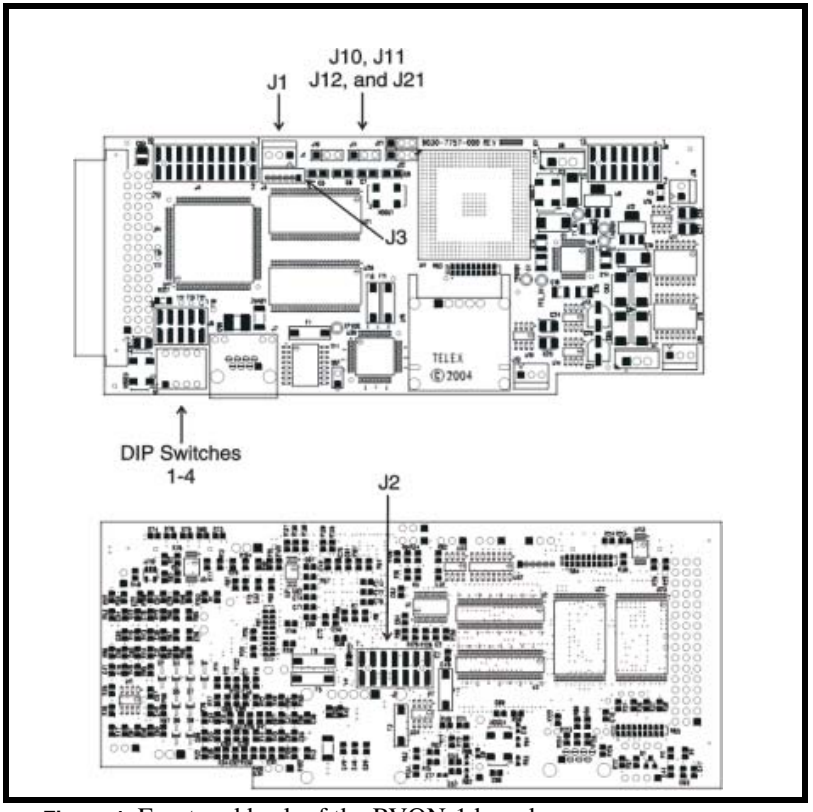


Figure 1. Front and back of the RVON-1 board

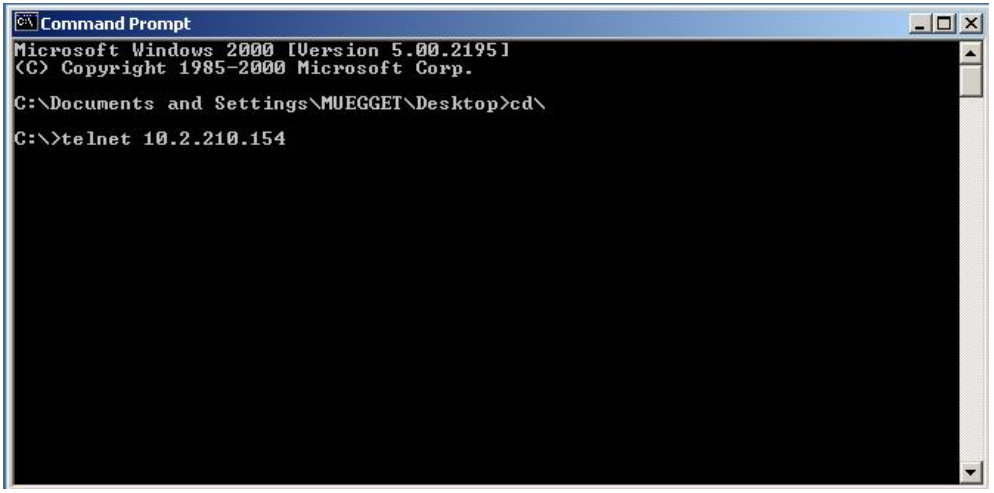
How to Configure the RVON-1 using Telnet

Without access to the physical KP-32 with RVON-1 installed on it, you can still configure the card through the use of Telnet. The following instructions will show you how to access the Telnet screen and show you some of the information you can see and edit.

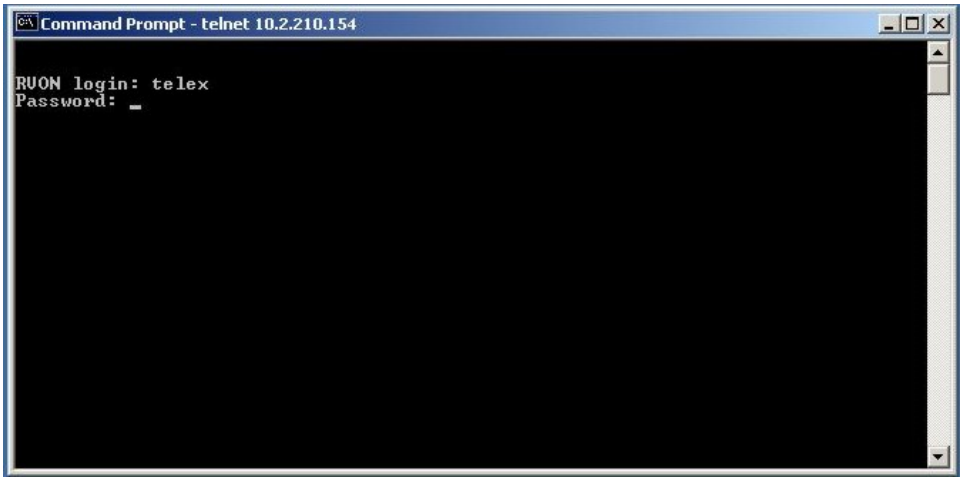
NOTE: These instructions are to help you get to the Telnet screens and give you an overview of what can be done. This is NOT an all inclusive document. Not every action that can be performed are contained within the document.

To Display the settings for the RVON-1 Card, do the following:

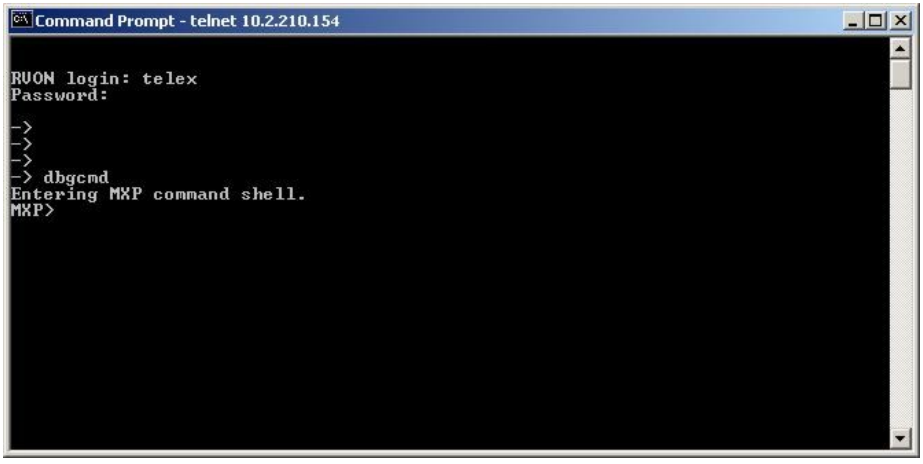
1. Open a command prompt.
2. At the prompt, type **Telnet <*IP ADDRESS*>** (The IP Address is the IP Address assigned to the RVON-1 card).



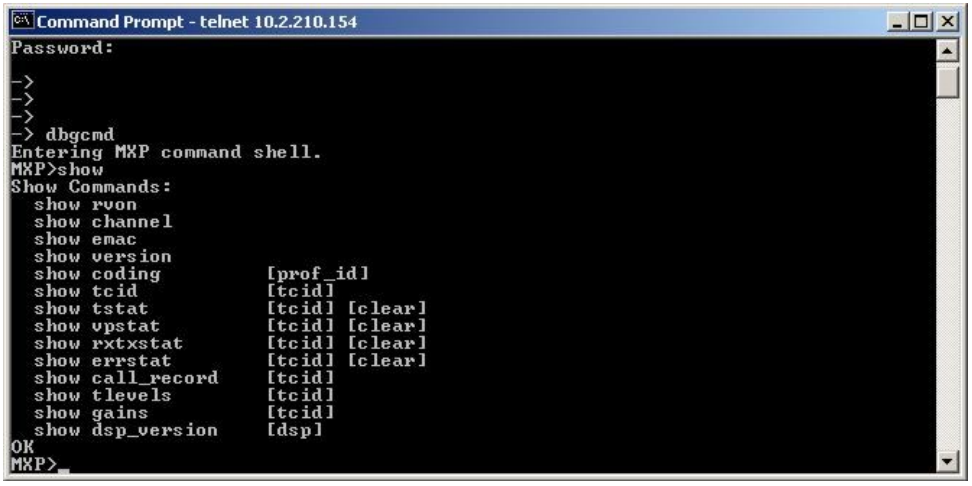
3. Press **Enter**.
   The RVON logon screen appears.



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



9. Press **Enter**.
   An MXP prompt appears.
10. At the prompt, type **Show**.
11. Press **Enter**.
    The show commands screen and MXP prompt appears.



12. At the MXP prompt, type the **show command** you want to see (for example, “show rvon”).
13. Press **Enter**.
    The values for the RVON-1 card appear.

To edit the RVON-1 configuration, do the following:

1. Repeat steps 1 through 9 from above.
2. At the MXP prompt, type either set **RVON** or **set EMAC** (see screen descriptions below).
3. Press **Enter**.

set rvon ip_addr	Allows you to edit the IP Address
set rvon netmask	Allows you to edit the netmask
set rvon gateway	Allows you to edit the gateway
set rvon serial_ip	Allows you to edit the serial IP Address
set rvon serial_baud	Allows you to set the baud rate (50-38400)
set rvon user	Allows you to set the username for the RVON-1 card. By default the user name is “telex”
set rvon password	Allows you to set the password for the RVON-1 card. By default, the password is “password”
set rvon vad_threshold	Lets you set the vad threshold. **NOTE**: In AZedit, you can enable and disable VAD, however, through Telnet you able to set the amount. You will able to set the VAD threshold in later versions of AZedit.

Note: This Telnet screen is almost duplicate to the right side of the Configuration screen for the RVON in AZedit.

```
MXP>set channel

RVON CHANNEL RELATED:
  set channel [chan] dest_ip <ip address (x.x.x.x)>
  set channel [chan] dest_type <type (0-2), 0=RVON-8, 1=RVON-1, 2=RVON-IO>
  set channel [chan] dest_chan <chan (0-7)>
  set channel [chan] chan_codec <prof_id (0 to (max_prof - 1))>

  set channel [chan] input_gain <gain (-14 to +14 dB)>
  set channel [chan] output_gain <gain (-14 to +14 dB)>

  set channel [chan] onhook
  set channel [chan] offhook
```

set channel dest_ip	Allows you edit the destination IP Address the RVON-1 card will communicate with
set channel dest_type	Allows you to edit the destination type for the device the RVON-1 card will talk with
set channel dest_channel	Allows you to edit the destination channel of the device the RVON-1 will talk with
set channel channel_codec	Allows you to edit the CODEC to be used for transferring the data between the two devices
set channel input_gain	Allows you to edit the input gain for the RVON-1 card
set channel output_gain	Allows you to edit the output gain for the RVON-1 card.
set the channel onhook	onhook = hang up If the channel was already connected, going offhook will have no effect (it is already offhook if connected). Going onhook will hang up the call, and it should then try to reconnect. If the channel was not already connected, going offhook will cause it to try and establish a connection. Going onhook in this state will have no effect (it is already onhook if idle.
set channel offhook	offhook = connected If the channel was already connected, going offhook iwll have no effect (it is already offhook if connected). Goign onhook will hang up the call, and it should then try to reconnect. If the channel was not already connected, going offhook will cause it to try and establish a connection . Going onhook in this state will have no effect (it is already onhook).

NOTE: This Telnet screen is almost duplicate to the left side of the Configuration screen for the RVON in AZedit. One item to note is the ONHOOK and OFFHOOK.....this is a setting regarding the connection of the card to the Matrix.

set emac	Allows you to edit the Ethernet Speed settings Auto (automatically negotiates the Ethernet settings) 10 half duplex 10 full duplex 100 half duplex 100 full duplex

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

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** 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 0**.
    This tells the RVON-I/O to use Codec G.711u, 64k 30ms packtes, VAD ON connecting back to the RVON-8. To use a different codec, see X.
18. Once finished, type **activate**.
19. Press **Enter**.
    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

Figure 8. RVON-I/O supplemental Coding Table

Coding	Codec	Codec Rate	Size	VAD
1	711u	64k	10	Y
2	711u	64k	20	Y
3	711u	64k	30	Y
4	711u	64k	10	N
5	711u	64k	20	N
6	711u	64k	30	N
7	711A	64k	10	Y
8	711A	64k	20	Y
9	711A	64k	30	Y
10	711A	64k	10	N
11	711A	64k	20	N

Figure 8. RVON-I/O supplemental Coding Table

Coding	Codec	Codec Rate	Size	VAD
12	711A	64k	30	N
13	729AB	8k	10	Y
14	729AB	8k	20	Y
15	729AB	8k	40	Y
16	729AB	8k	60	Y
17	729AB	8k	10	N
18	729AB	8k	20	N
19	729AB	8k	40	N
20	729AB	8k	60	N
21	723	5.3k	30	Y
22	723	5.3k	60	Y
23	723	5.3k	30	N
24	723	5.3k	60	N
25	723	6.3k	30	Y
26	723	6.3k	60	Y
27	723	6.3k	30	N
28	723	6.3k	60	N

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