RTS™ Digital Matrix Intercom Systems

Cronus
Digital Intercom Matrix

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See the enclosed warranty card for further details.

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Immediately upon receipt of the equipment, inspect the shipping container and the contents carefully for any discrepancies or damage. Should there be any discrepancies, notify factory service immediately. Notify the freight company and factory service of any shipping damage.

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Technical questions should be directed to:

Customer Service Department
Telex Communications, Inc.
12000 Portland Avenue South
Burnsville, MN 55337 U.S.A.
Telephone: (800) 392-3497
Fax: (800) 323-0498
Factory Service: (800) 553-5992 (Lincoln, NE)

RETURN SHIPPING INSTRUCTIONS

Customer Service Department
Telex Communications, Inc.
12000 Portland Avenue South
Burnsville, MN 55337 U.S.A.
Telephone: (800) 392-3497
Fax: (800) 323-0498
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Please include a note in the box which supplies the company name, address, phone number, contact person regarding the repair, the type and quantity of equipment, a description of the problem and the serial number(s)

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Factory Service Department
Telex Communications, Inc.
8601 Cornhusker Hwy.
Lincoln, NE 68507 U.S.A.
Attn: Service

This package should include:

Item	Description
38110-387	Warranty Statement
9010-44400-001 or 9010-7770-000	Cronus Final Assembly, Fiber Linking Cronus Final Assembly, Coax Linking
9020-7800-000	Cronus AI/O Rear Card, MDR SCSI
9020-7787-001	Cronus AI/O Rear Card, RJ12
690505	Cable Assy., CAT5, 7ft., black, RJ45 Plugs
600091	USB Cable, 6ft. 10 in. long
9015-7532-000	AZedit Software
9020-7297-05	RS232C
590446-000	PC Cable
576196-000	Cox Assy. Cronus
9015-7785-001	Cronus Intelligent Linking License
9002-7770-001	Cronus Rear Cover Plate
9030-7784-001	Cronus AI/O Front Card
8800102668	Power Cord
9350-7770-000	User Manual

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CHAPTER 1

Introduction

General Description

RTS™ Cronus is a 32-port digital matrix intercom in 2RU (rack units). Based upon an advanced DSP architecture, Cronus has the ability to link up to four units into a single 128 port matrix. Through the use of standard video coaxial cable, the maximum distance between the first and last Cronus system can be 300 ft., and still appear as a single matrix. However, when using the Fiber Option card, the distance is increased up to 15 kilometers nominally. When connected as a single matrix, the individual Cronus controls remains autonomous and independent at each matrix for the highest reliability.

Features

USB Connectivity	Convenient front panel access, as well as traditional rear access for system programming. Note, you may use either the front panel access or the rear panel access at a time.
	NOTE: The USB drivers for Cronus are installed with the AZedit software. You can find the folder at *C:\Telex\AZedit\V20606*. The drivers are bundled in version 2.06.06 or later.
Advanced DSP	Digital signal processing designed to support audio signal processing on all 32 ports (inputs).
Modular Architecture	The modular architecture allows for port expansion from 8 to 32 ports giving each user expandable systems in the field.
Redundant Power Supply	Each chassis is powered by two power supplies, either of which can sufficiently power all the equipment ALONE. This provides constant power and disaster recovery even with the failure of one power supply.

Differences between Cronus and ADAM

Cronus	ADAM
Most practical for small to medium systems.	Most practical for more complex systems because the number of users is much higher.
In small to medium-sized broadcast company, Cronus would be used like an ADAM.	Uses ASIC technology
Cronus is scalable - can keep adding on to the original configuration (up to four systems maximum)	ADAM has both a redundant power supply and a redundant Master Controller card.
Cronus has a redundant power supply.	
Has one USB port with front and rear access.	
Has capability for Ethernet connection	
Cronus has individual data drives, meaning the address does not need to be set at the keypanel.	

Front and Rear Panel Controls and Connections

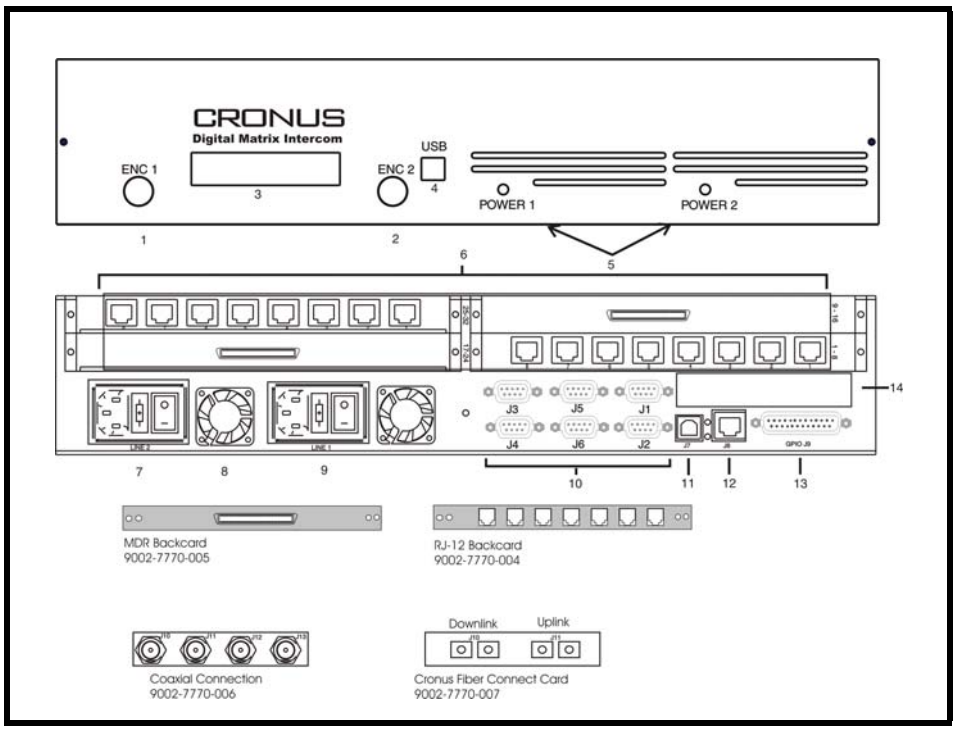


TABLE 1. Controls, Connections, and Cronus backcard. There are two Cronus backcards, an MDR backcard and an RJ-12 backcard. You can have up to four backcards installed on Cronus. You can have ny combination of backcards on the Cronus, too (for example, you can have two RJ-12 backcards and two MDR backcards.

1	ENC 1	This knob allows you to select a menu item, scroll through menus or exit out of the display menu.
2	ENC 2	This knob allows you to select a menu item, scroll through menus or exit out of the display menu.

NOTE: Only when you are in the crosspoint status menu do the left and right knob perform separate functions. The Right knob adjusts the output port, while the Left knob adjusts the input port.

3	Display Panel	LCD display showing menu options.

4	USB Connection	There are two USBUSB connections on the Cronus; one on the front panel and one on the back panel (J7). Cronus system can use the USB port connect with a PC. This allows for the most flexibility when planning where to use the system. In a rack unit where the back is inaccessible, or on a desktop where the back is accessible. Note, only one USB connector can be used at a time.
5	Power 1 & Power 2	The power source indicator is a green LED light displaying that power is ON. The Cronus has a redundant power source. This means there are two power supplies, so if power supply 1 fails, power supply 2 will take over powering the system.
6	Keypanel Ports (backcard)	One Cronus frame can have 32 ports through the use of either an RJ-12 backcard or an MDR backcard. In all, the Cronus system supports a maximum of 128 ports available for keypanels. You can also mix and match the backcards (for example, you can have 2 MDR backcards with 2 RJ-12 backcards on the same frame). The MDR backcard is primarily used to connect the three compatible breakout panels, XCP-32-DB9, XCP-48-RJ45 and the XCP-48-Telco (See “Breakout Panels” on page 41).

NOTE: Using an MDR backcard (9002-7770-005), you can utilize a DB-9 breakout panel (XCP-32-DB9 9000-7515-000). One DB-9 breakout panel can support all four AIO cards within Cronus.

7 & 9	LINE 1 and LINE 2	Cronus has two power sources; a primary source (LINE 1) and a redundant power source (LINE 2). Both power sources are running at the same time, so that if the primary source fails the redundant source will be able to power Cronus.
8	Fans	There are two fans to cool the power supplies
10, 11 & 12	DB-9 Serial Connections, USB Connector and RJ-45 Connectors	There are three ways to connect to a PC from the Cronus, through a DB-9 serial connection (10), USB connector (11), or an RJ-45 (Ethernet) connection (12). There are six DB-9 serial ports, however only five of the serial ports are used (J1, J2 [reserved], J3, J4, and J5) and one is undefined (J6). **NOTE**: J1 will always be connected to AZedit. For more information on AZedit baud rates, see “DIP Switch Settings” on page 8.
13	DB-25 Connection	General Purpose Input Output connection. **NOTE**: The pin-out of this connection is not the same as Zeus, ADAM, or ADAM CS.
14	Coaxial and Fiber Connection	There are four coaxial or two fiber connections used to connect the frames together. See, figure 4B for the configuration illustration. Requires optional licensing firmware. Contact Telex Customer Service for more information. When contacting Customer Service be sure to have the MAC address for each unit. For information on how to obtain the MAC address, see “Finding the MAC Address for Cronus” on page 26.

Cronus Gain Structure

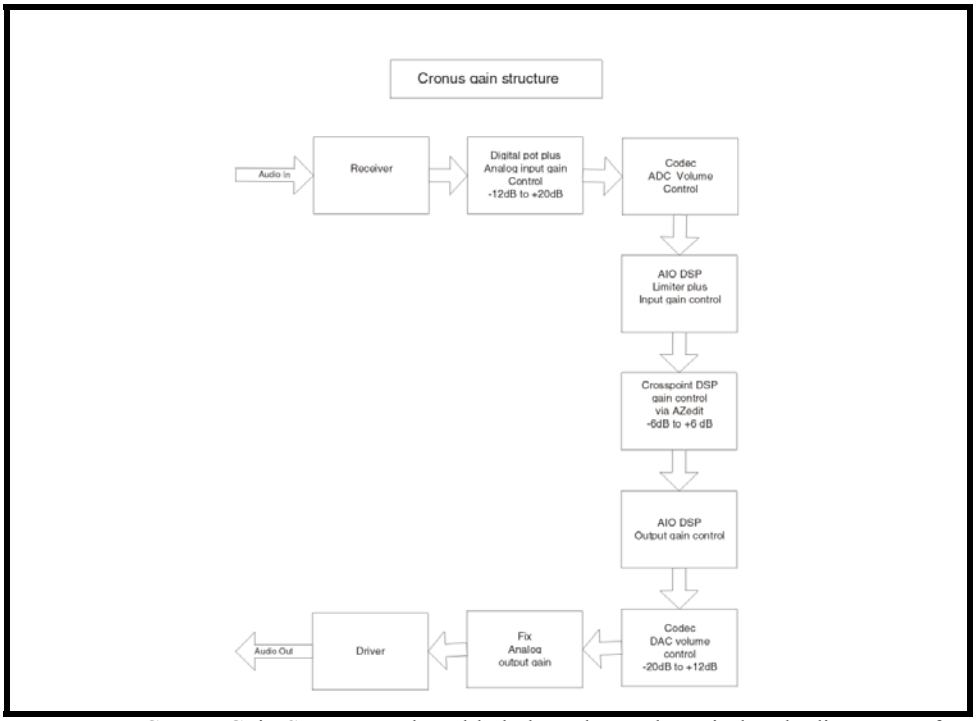


TABLE 2. Cronus Gain Structure. The table below shows the gain level adjustments for Cronus ADAM, and Zeus.

	MAX Audio Input Level	Input Gain Control Range via AZedit	Output Gain Control Range via AZedit	Max Input Gain	Cross Point Gain	Max Audio Output Level
Cronus V0.2.x	+10dBu	-20dB to +20dB	20dB to 12d	Nominal +10dB	-6dB to +6dB	+21dBu
V1.0.0	+20dB	-20dB to +20dB	-20dB to +20dB	Nominal +20dB	-6dB to +6dB	+24dBu
ADAM	+20dB	-20dB to +20dB	-20 to 20dB	Nominal +20dB	-6dB to +6dB	+28dBu
Zeus	+20dB	-20dB to +20dB	-20 to 13dB	Nominal +20dB	-6dB to +6dB	+22dBu

TABLE 3. RJ-12 backcard (9002-7770-006

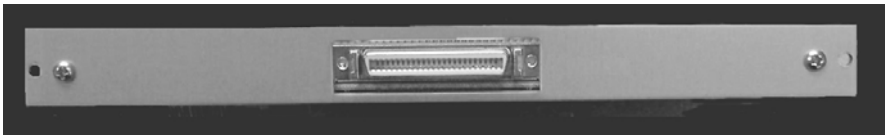


TABLE 4. MDR backcard (9002-7770-005)

Specifications

Analog Inputs and Outputs

Signal Type ..... balanced
Nominal Level 8dBu
Maximum Level..... 20dBu
Input Impedance ..... 22k Ohm
Output Impedance.....600 Ohm SNR at 20 dBu:

A/D and D/A

Sampling Rate..... 48 kHz
Resolution..... 24 bits

Performance

SNR at 20 dBu: (A-weighted) ..... >90dB
THD+N at 20dBu, 1 kHz (unweighted) .....<0.007%
Frequency Response at 20 dBu..... within ±1dB from 50 Hz - 20kHz
Crosstalk at 20dBu..... <-60 dBu
CMRR..... >70 dB

NOTE: All measurements performed using an Audio Precision System 1 Dual Domain System at f=1kHz and Level = 20dBu. Measurement bandwidth = 20Hz to 20kHz.

Connections

Intercom Channels (1-32)
Connector Type: 6-pin RJ-12
Pin 1 ..... Control -
Pin 2 .....Audio Out +
Pin 3 ..... Audio In +
Pin 4 ..... Audio In -
Pin 5 .....Audio Out-
Pin 6 ..... Control +

Serial Interface Port (J1 - J6)
Connector Type: 9-pin female D-sub
J1: RS-232 (AZedit)
Pin 1 .....Not Used
Pin 2 ..... GND
Pin 3 ..... Input RS-232
Pin 4 .....Not Used
Pin 5 .....Not Used
Pin 6 .....Not Used
Pin 7 ..... GND
Pin 8 .....Output RS-232
Pin 9 .....Not Used

J2: RS-232 (Debug)
Pin 1 ..... Not Used
Pin 2 ..... Input RS-232
Pin 3 .....Output RS-232
Pin 4 .....Not Used
Pin 5 ..... GND
Pin 6 ..... GND
Pin 7 .....Not Used
Pin 8 .....Not Used
Pin 9 .....Not Used

J3: RS-232/RS-485 (J3 is trunking)
Pin 1 ..... RS-485- / RS-485 +
Pin 2 ..... GND
Pin 3 .....Not Used
Pin 4 .....Not Used
Pin 5 .....Output RS-422+
Pin 6 ..... RS-485- / RS-485 +
Pin 7 ..... GND
Pin 8 .....Not Used
Pin 9 ..... Output RS-422 -

J4: RS-232/RS-485 (J4 is for peripheral devices, such as UIO-256, PAP-32)
Pin 1 .....RS-485- / RS-485 +
Pin 2 ..... GND
Pin 3 .....Not Used
Pin 4 .....Not Used
Pin 5 ..... Output RS-422+
Pin 6 .....RS-485- / RS-485 +
Pin 7 ..... GND
Pin 8 .....Not Used
Pin 9 ..... Output RS-422 -

J5: RS-485 (J5 is PAP-32)
Pin 1 .....RS-485 -
Pin 2 .....GND
Pin 3 ..... Not Used
Pin 4 ..... Not Used
Pin 5 ..... Not Used
Pin 6 .....RS-485 +
Pin 7 .....GND
Pin 8 ..... Not Used
Pin 9 ..... Not Used

J6: RS-232 (J6 is undefined)
Pin 1 ..... RS-485 -
Pin 2 ..... GND
Pin 3 ..... Not Used
Pin 4 ..... Not Used
Pin 5 ..... Not Used
Pin 6 ..... RS-485 +
Pin 7 .....GND
Pin 8 ..... Not Used
Pin 9 ..... Not Used

USB Connectors (front end and back end J7)
Connector Type .....Standard USB

Ethernet Interface Port (J8)

Connector Type ..... RJ-45 standard
10 base-T (Cat 3) /
100 Base Tx (Cat5)

GPIO Interface Port (J9)

Connector Type: 25-pin Female D-sub

Pin 1 ..... Input 1
Pin 2 ..... Common
Pin 3 ..... Input 2
Pin 4 ..... Common
Pin 5 ..... Input 3
Pin 6 ..... Common
Pin 7 ..... Input 4
Pin 8 ..... Common
Pin 9 ..... GND
Pin 10 ..... GND
Pin 11 ..... GND
Pin 12 ..... +5 V
Pin 13 ..... +5 V
Pin 14 ..... Relay 1 NC
Pin 15 ..... Relay 1 NO
Pin 16 ..... Common
Pin 17 ..... Relay 2 NC
Pin 18 ..... Relay 2 NO
Pin 19 ..... Common
Pin 20 ..... Relay 3 NC
Pin 21 ..... Relay 3 NO
Pin 22 ..... Common
Pin 23 ..... Relay 4 NC
Pin 24 ..... Relay 4 NO
Pin 25 ..... Common

NOTE: The pin-out of this connect does not confirm to the standard pin-out of Zeus, Zeus II, ADAM CS, or ADAM and cannot be directly connected to the GPI connector of the RVON I/O. **It requires a custom cable assembly**.

Hotlink Connectors

Coax Type (J10 - J11 ..... RG6 BNC Female
..... 75 Ohm coax connector
Fiber Optic Type HFCT-5208M
(single mode transceiver)
- 1300 nm laser based
transceiver in standard 1 x 9
mezzanine package for links
of 15km nominal with single
mode fiber cables.

The fiber cable recommended for Cronus Single mode SM SC-SC Duplex type. Two SC-SC simplex pair will work, but you will have to verify which end to connect to each other.

Physical

Dimensions ..... 19w x 3.5h x 14 deep
(482.6mm x 88.9mm x 355.6mm)
Weight ..... 14.15lbs (6.41 kilograms)

Environment

Operating ..... 0°C to 50°C (32°F to 122°F)
Storage ..... -20°C to 75°C (-4°F to 167°F)+

MDR Connector

Pin Number	Port	Function
8	1	Data +
33	1	Data -
24	1	Audio To Matrix +
49	1	Audio To Matrix -
25	1	Audio From Matrix +
50	1	Audio From Matrix -
7	2	Data +
32	2	Data -
22	2	Audio To Matrix +
47	2	Audio To Matrix -
23	2	Audio From Matrix +
48	2	Audio From Matrix -
6	3	Data +
31	3	Data -
20	3	Audio To Matrix +
45	3	Audio To Matrix -
21	3	Audio From Matrix +
46	3	Audio From Matrix -
5	4	Data +
30	4	Data -
18	4	Audio To Matrix +
43	4	Audio To Matrix -
19	4	Audio From Matrix +
44	4	Audio From Matrix -
4	5	Data +
29	5	Data -
16	5	Audio To Matrix +
41	5	Audio To Matrix -
17	5	Audio From Matrix +
42	5	Audio From Matrix -
3	6	Data +
28	6	Data -
14	6	Audio To Matrix +
39	6	Audio To Matrix -
15	6	Audio From Matrix +
40	6	Audio From Matrix -
2	7	Data +
27	7	Data -
12	7	Audio To Matrix +
37	7	Audio To Matrix -
13	7	Audio From Matrix +
38	7	Audio From Matrix -
1	8	Data +
26	8	Data -
10	8	Audio To Matrix +
35	8	Audio To Matrix -
11	8	Audio From Matrix +
36	8	Audio From Matrix -

Determining the Master System From the Slave Systems

By default, Cronus is set to operate in "stand alone" mode. You will need a license file to link Cronus frames together. In order to link 2 or more Cronus systems together, each must have the optional linking firmware installed. To purchase the firmware, contact RTS sales.

Setting the master frame is done through the display panel menu, as well as cabling the frames together.

To configure the master frame, do the following:

1. From the display panel of the frame you want to configure, tap the **ENC1** knob.
   SET FRAME ID appears.
2. Tap the **ENC1** knob once.
   SLAVE appears.
3. Tap **ENC1**.
   AUTO CONFIG appears.
4. Turn the **ENC1** knob to select Auto Config, Frame ID 2, Frame ID 3, or Frame ID 4.

NOTE: Once you have set the Master frame you can set the rest of the frames by using autoconfig.

To cable Cronus, use the coaxial connectors located on the back panel (see Figure 2 on page 4). On the first frame connect the two outside coax ports to the two inside coax ports on frame two. For more information, see Figure 5 on page 9. This determines the master frame and the first slave. Repeat this procedure with the two remaining frames.

In the way the system is cabled, the master is indicated by the two inside coax ports left open. The two coax ports on the master frame are used to connect to the matrix (ADAM system).

NOTE: Cronus has an internal mixing card, when not connected to an ADAM, that acts as a Master Controller. However, when Cronus is connected to the ADAM, the Matrix system card acts as a slave to the ADAM controller(s).

DIP Switch Settings

Switch 1: **AZedit Baud Rate**

Default Setting: CLOSED (38.4K; 38,400 kbps)

Description: Baud rate is a measure of the communications speed for a serial port. Baud is measured in bits per second or bps. By default, AZedit is set for COM1 and 38.4K.

NOTE: The baud rate set with Switch 1 must match the baud rate set in AZedit. To see what the baud setting is in AZedit, do the following:

1. Open **AZedit**.
   The Keypanels/Ports screen appears.
2. From the Options menu, select **Communications**.
   T*he Communications screen appears showing the AZedit session connection configurations*.

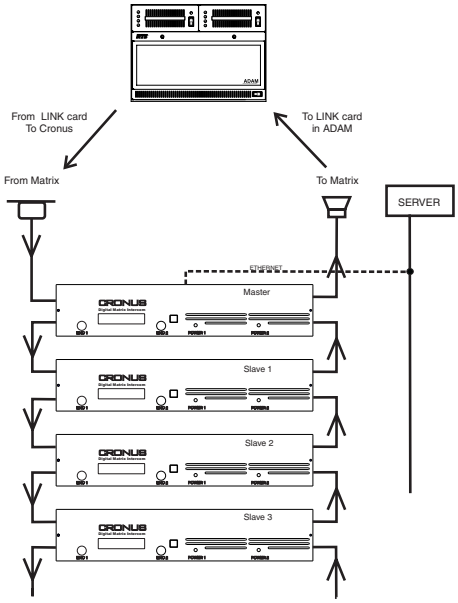
Settings OPEN: 9600 baud

CLOSED: 38.4K baud (default)

Switches 2-7 **Not Available**

Switch 8 **Reserved. Must be kept in OPEN position.**

Cronus System Diagram and Frame Cabling



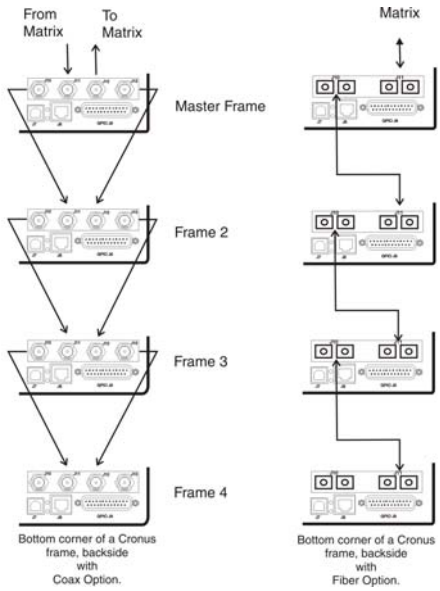


TABLE 5. The Cronus Intercom System has four frames, one Master and three Slave stations (see system diagram on left) connected via coaxial cables (see cabling diagram at right). Each frame can support up to 32 ports, and each system can have a maximum of 128 ports (all four frames available). By adding a connection to a Cronus Bus Expander (CBX) on ADAM, Cronus can be linked to other Cronus Systems, increasing the number of available ports able to communicate with one another.

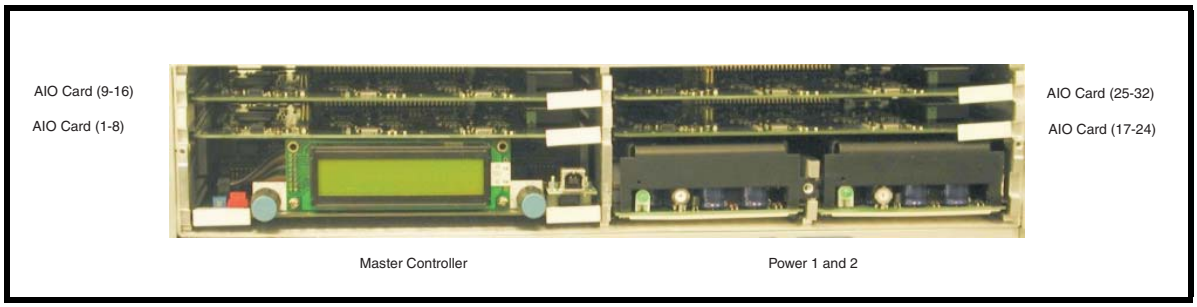


TABLE 6. Cronus from the inside.

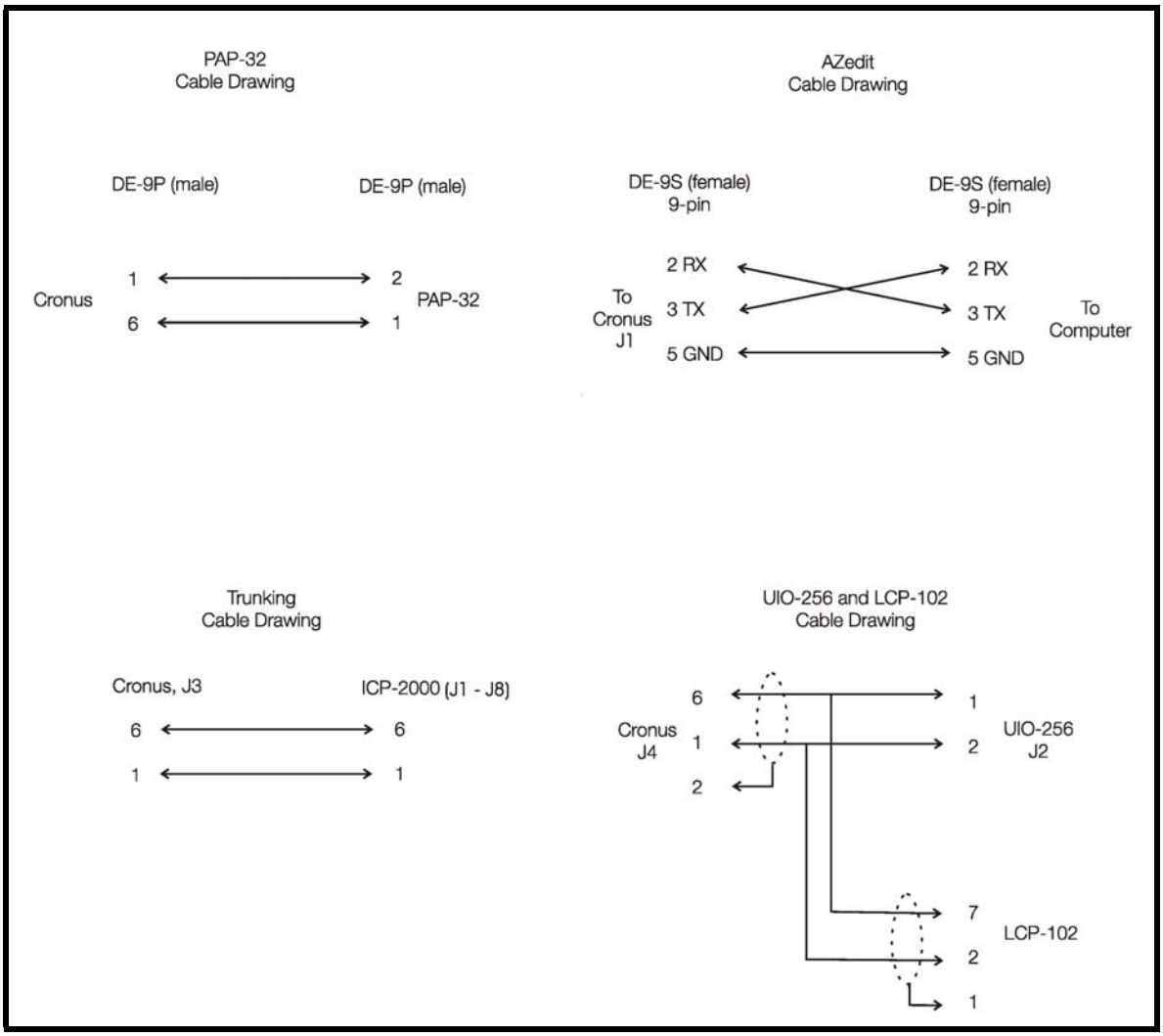


TABLE 7. Cable drawings for PAP32, AZedit, Trunking and UIO-256/LCP-102.

CHAPTER 2

Cronus Menu Structure

Cronus Menu System Introduction

1. On the front panel of the Cronus system, tap the **ENC1** encoder knob.
   SET FRAME ID appears.
2. Turn the **ENC1** encoder knob clockwise to scroll forward or counter-clockwise to scroll backwards through the list of menus.
   By scrolling, you will see Status or Version.
3. Tap the **ENC1** encoder knob to enter a menu.

Within a menu:

1. Turn the **ENC1** encoder knob clockwise to scroll forward, and counter-clockwise to scroll backward through a list of menus.
2. Tap the **ENC1** encoder knob to enter a menu.
   or
   Tap the **ENC1** encoder knob twice to exit a menu or press the encoder knob for 3 - 5 seconds to exit the menu system.

Configure Menu

Set Frame ID

In a single frame Cronus system, the frame will always be Stand Alone (or the Master frame). In a multi-frame system, the first time Cronus is powered on, each frame will show as Frame 1 and will need to be configured, either manually or by autoconfig, to designate which frame it is.

To set the FRAME ID, do the following:

1. Tap the **ENC1** knob.
   Configure appears.
2. Tap the **ENC1** knob.
   Frame ID appears.
3. Tap the **ENC1** knob.
   Set Frame ID displays.
4. Tap the ENC1 knob.
   SLAVE Frame Set Slave ID displays.

5. Tap the **ENC1** knob.
   Auto Config displays. You can either have auto-config set the frame or you can manually set the frame ID by turning the ENC1 knob to scroll through the Frame ID options.
6. Turn the **ENC1** knob to scroll through the choices (Auto Config, Frame ID 2, Frame ID 3, or Frame ID 4).
7. Tap the **ENC1** knob to make your selection.

IFB Program Ins

I/O Gains

Gain is the level of audio at which you hear and are heard. There may be occasions where you need to adjust the gain for some specific intercom port. For example, a belt pack operator may want to monitor a party line, but at a lower level than the normal intercom volume. Or, a beltpack operator may want to listen to the background music coming from some intercom input port, but at a reduced level.

To set Gain from the front panel of Cronus, do the following:

1. Tap the **ENC1** knob.
   Configure appears.
2. Tap the **ENC1** knob.
   Frame ID appears.
3. Turn the **ENC1** knob to I/O Gains.
4. Tap the **ENC1** knob.
   Select Port appears. There are 32 ports from which to select.
5. Turn the ENC1 knob to the port you want.
6. Tap the **ENC1**.
   IN Gain and OUT Gain appears.
7. Use the ENC1 knob to adjust the **IN Gain**.
   Use the ENC2 knob to adjust the **OUT Gain**.

NOTE: You can change the gain levels in AZedit and see the results on Cronus almost immediately. For more information on gain levels, see Figure 2 on page 4.

Vox Thresholds

Vox Threshold is the level of audio at which a channel becomes active. When the threshold is set, the microphone will not turn on until the set audio level hits the set threshold. This prevents a channel from staying active when no one is around in a high activity area.

To set and enable Vox Thresholds from the front panel of Cronus, do the following:

1. Tap the **ENC1** knob.
   Configure appears.
2. Tap the **ENC1** knob.
   Frame ID appears.
3. Turn the **ENC1** knob to Vox Thresholds
   Threshold appears.
4. Tap the **ENC1** knob.
   Select Port appears.
5. Turn the **ENC1** knob to the port to be set.
   You can set the thresholds on all 32 ports on the Cronus.
6. Tap the **ENC1** knob to select the port.
7. Turn the **ENC1** knob to set the threshold level (-127 dB to 0.0 dB)

8. Double-tap the **ENC1** knob to exit the threshold set menu item.
   Port displays.
9. Turn the **ENC1** knob to Hold Time.
10. Tap the **ENC1** knob.
    Hold Time appears.
11. Turn the **ENC1** knob to set the hold time (up to 12.5 seconds).

NOTE: Hold time is the amount of time the VOX will stay active on a port before closing the port.

12. Double-tap the **ENC1** knob to exit the Hold Time menu item.
    Port displays
13. Turn the **ENC1** knob to Enable.
14. Tap the **ENC1** knob.
    Enable appears. You can Enable or Disable from this point.
15. Double-tap the **ENC1** knob to exit the Enable menu item.

NOTE: You can also set the VOX within AZedit. For more information about setting VOX in AZedit see "Vox Settings in AZedit" on page 17.

Status Menu

The Status menu displays settings for the following:

- AZedit
- Crosspoints
- Frames
- GPI Input
- GPI Output
- Keypanels
- Links

NOTE: This chapter covers the menu display for the Master frame (Frame 1). On slave frames the only display you see under Status menu is Links.

Status, AZedit

The AZedit display shows if there is an active connection.

NOTE: This only shows the status of the primary serial cable.

1. Turn the **ENC1** knob to scroll to Status.
2. When Status is displayed, tap the **ENC1** knob.
   AZedit displays.
3. Tap the **ENC1** knob
   The status of AZedit appears.
   OK = there is a connection to AZedit.
   -- = there is no connection to AZedit.

Status, Crosspoints

The Crosspoints Status displays the status of each crosspoint closure. You can also view Crosspoint Status in AZedit.

1. Turn the **ENC1** knob to scroll to Status.
2. Tap the **ENC1** knob.
   AZedit displays.
3. Turn the **ENC1** knob to scroll to Crosspoints.
4. Tap the **ENC1** knob.
   The status of the crosspoints for input 1 and outputs 1 and 2 is shown.
5. Turn the **encoders** to change which crosspoints are displayed.
   ENC1 adjusts the input port. ENC2 adjusts the output port.
6. Once the status you want to display appears, tap the **ENC2** knob.
   The Crosspoint status appears.

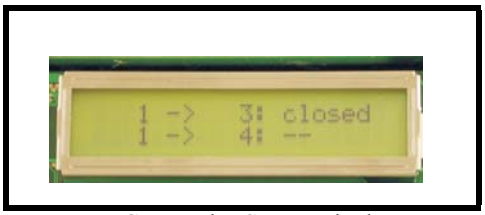


TABLE 8. Crosspoint Status Display

Status, Frames

Frames displays the status of each of the Cronus frames. It tells if the frame is still active or if it has been deactivated.

1. Turn the **ENC1** knob to scroll to Status.
2. When Status is displayed, tap the **ENC1** knob.
   AZedit displays.
3. Turn the **ENC1** knob to scroll to Frames.
4. Tap the **ENC1** knob.
   The status is shown for frames 1 & 2.
5. Turn the **encoders** to display the status of the other frames.

Status, GPI Input

GPI Input status displays the status of each GPI (General Purpose Input) assigned in the system. The GPI Input allows an external piece of equipment to trigger the intercom. For example, using an “on-air” tally to dim or mute specific outputs. GPI Inputs are created within AZedit.

1. Turn the **ENC1** knob to scroll to Status.
2. When Status is displayed, tap the **ENC1** knob.
   AZedit displays.
3. Turn the **ENC1** knob to scroll to GPI Input.
4. Tap the **ENC1** knob.
   1-64 displays.
5. Turn the **ENC1** knob to scroll through the GPI Input assignments.

For more information, see the AZedit User Manual.

Status, GPI Output

GPI Output status displays the status of each GPI Output assigned in the system. GPI output is similar to the GPI Input, except instead of triggering an action on the intercom, the intercom is programmed to perform a function as a result of an action on the intercom. For example, when a port is connected to a 2-way radio, the radio is normally in receive mode. Use a GPI Output to trigger the transmitter whenever anyone talks to the port.

1. Turn the **ENC1** knob to scroll to Status.
2. When Status is displayed, tap the **ENC1** knob.
   AZedit displays.
3. Turn the **ENC1** knob to scroll to GPI Output.
4. Tap the **ENC1** knob.
   1-64 displays.
5. Turn the **ENC1** knob to scroll through the GPI Output assignments.

For more information, see the AZedit User Manual.

Status, Keypanels

The Keypanel status menu displays the status of each of the keypanels in the Cronus system.

1. Turn the **ENC1** knob to scroll to Status.
2. When Status is displayed, tap the **ENC1** knob.
   AZedit displays.
3. Turn the **ENC1** knob to scroll to Keypanels.
4. Tap the **ENC1** knob.
   The status is shown for keypanels 1 & 2.
5. Turn the **encoders** to display the status of the other keypanels (up to 32 keypanels per frame.
   The status will display as OK or blank.

Status, Links

The Links status menu displays the status of the links (connections) between frames, see “Cronus System Diagram and Frame Cabling” on page 9. Each frame in the system has two links, Link A and Link B. Link A on each frame connects to the preceding frame (connecting to Link B).

1. Turn the **ENC1** knob to scroll to Status.
2. When Status is displayed, tap the **ENC1** knob.
   AZedit displays.
3. Turn the **ENC1** knob and scroll to Links.
4. Tap the **ENC1** knob.
5. Turn the **ENC1** knob to scroll through the Links.

You should check the status of the Frame Clock and the Link to each frame. This is good for diagnostic troubleshooting.

NOTE: Frame 1 (Master) will only show the Frame 2 status because it only connects to one other Cronus frame.

Version, Intercom

The Version, Intercom menu, displays the firmware version that is current on the intercom.

NOTE: For Firmware upgrades, contact Telex Customer Service. The Cronus Firmware can be upgraded through AZedit. See page “Download Firmware for Cronus” on page 24, for more information.

Cronus Menu System Quick Reference

Menu Access

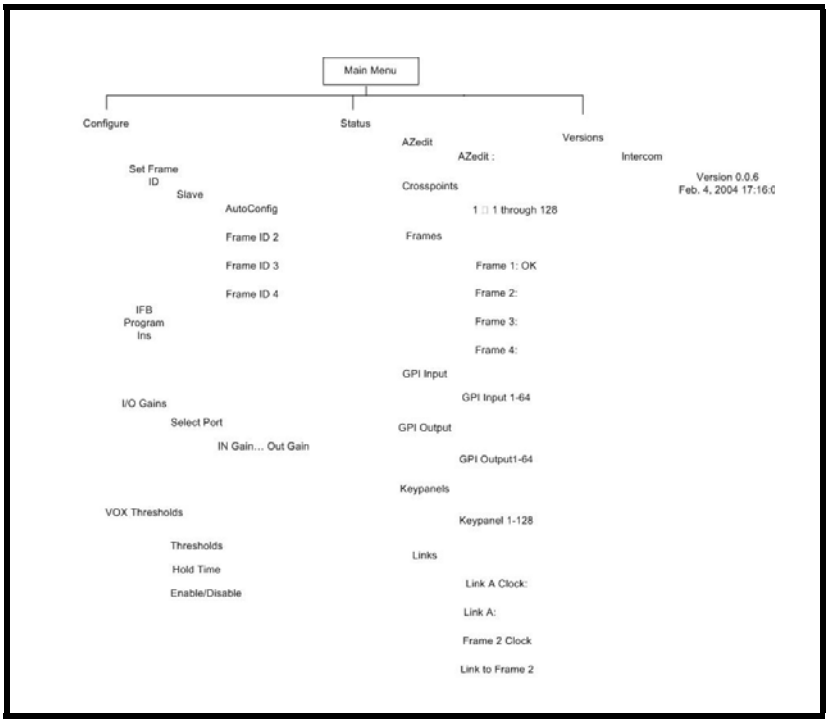


TABLE 9. Menu List - Tree Diagram

1. On the front panel of the Cronus system, tap the **ENC1** encoder knob.
   The word Status appears.
2. Turn the **ENC2** encoder knob clockwise to scroll forward or counter-clockwise to scroll backwards through the list of menus.
3. Tap the **ENC1** encoder knob to enter a menu.

Within a menu:

1. Turn the **ENC1** encoder knob clockwise to scroll forward, and counter-clockwise to scroll backward through a list of menus.
2. Tap the **ENC1** encoder knob to enter a menu.
   or
   Tap the **ENC1** encoder knob twice to exit a menu or press the encoder knob for 3 - 5 seconds to exit the menu system.

NOTE: In Slave mode, the Status Menu will only show Links Status.

Vox Settings in AZedit

Cronus and the AIO-16 card are the only devices presently that support Vox. Vox refers to voice activation. This means that once audio is passed through Cronus or AIO-16 at a preset threshold level, the audio lines are open for conversation between ports.

With Cronus, you can set the Vox threshold from the front panel or you can set it through AZedit. In AZedit there are two ways to access the Vox Settings screen.

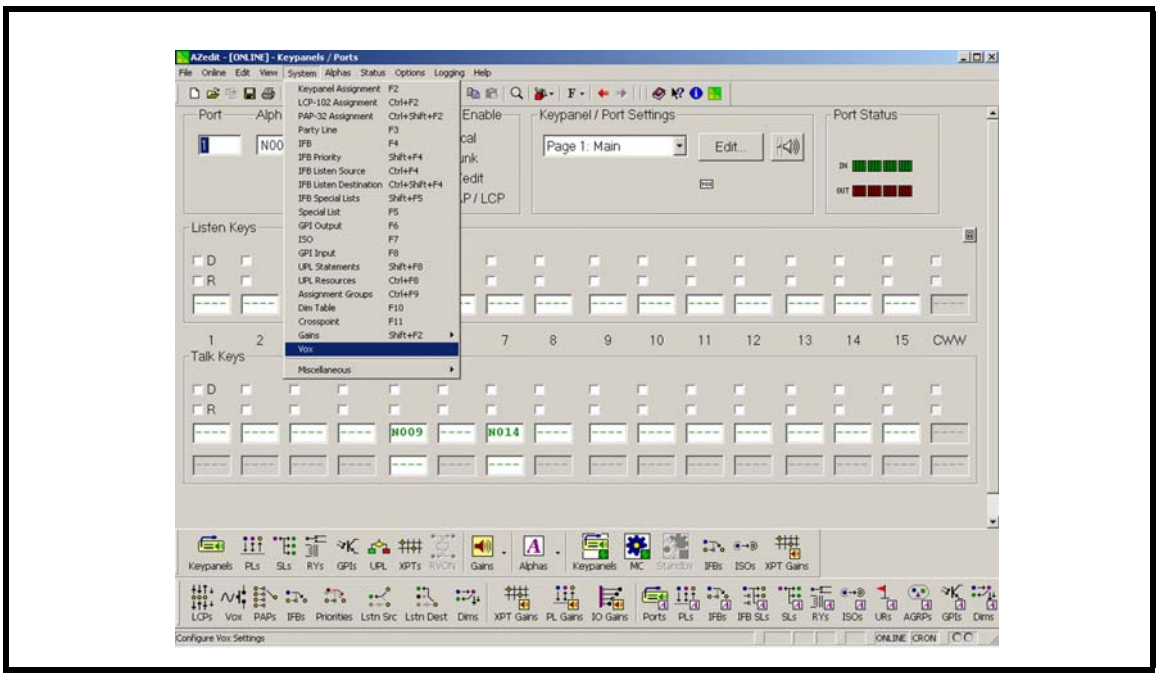
NOTE: AZedit must be at version 2.09.0 or later.

- An icon on a customized tool bar.
- From the System menu.

Accessing Vox

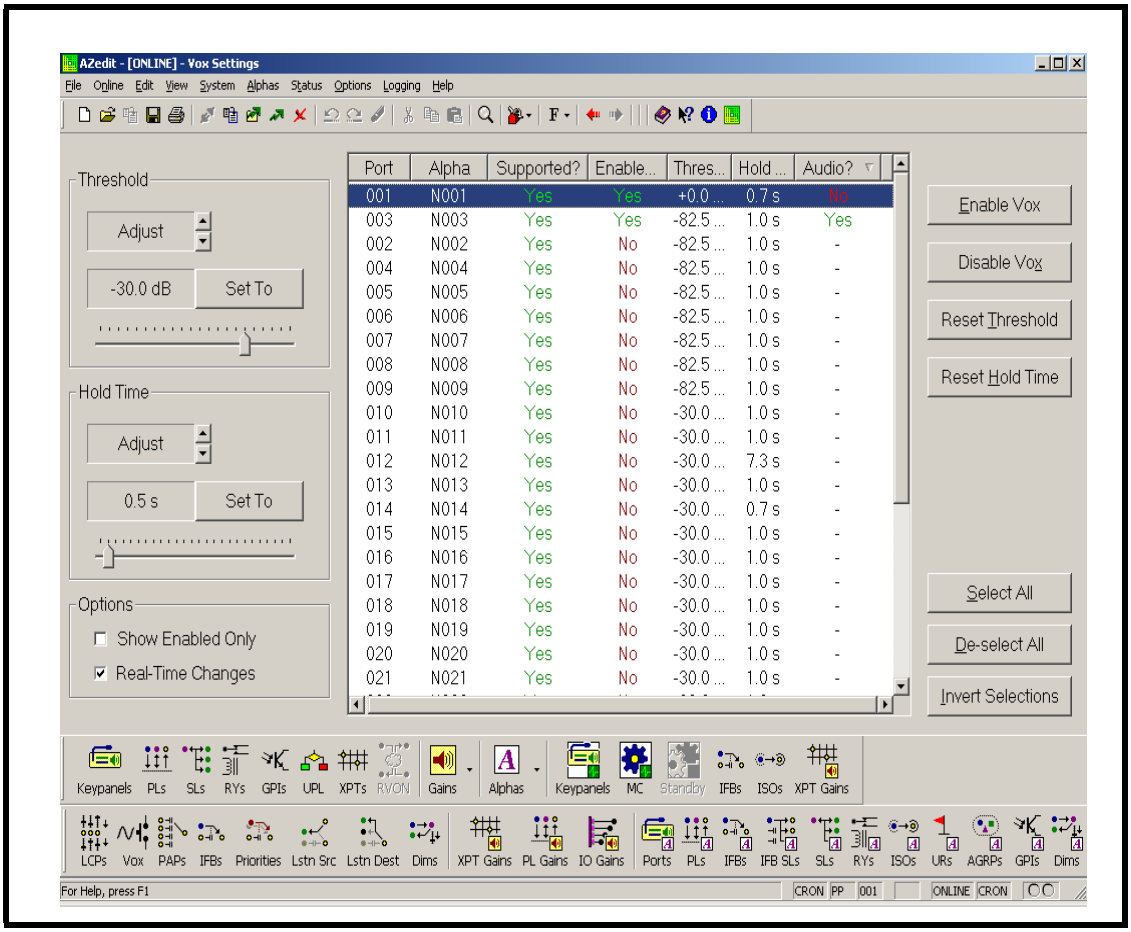
To access the Vox Settings screen from the System menu, do the following:

1. From the System menu in AZedit, select **Vox**.



The Vox Settings Screen appears.

NOTE: You can change the threshold levels and hold times of more than one port at a time by pressing the **CTRL** key and clicking the ports you want to change or



Screen Item	Field Type	Description
Threshold		
Adjust	arrow keys	Use the **UP** or **Down** arrow keys to increase or decrease the vox threshold by.5 dB (-127 dB to 0.0 dB). You can see the level adjustments in the parameter display window (to the right). **NOTE**: You can select multiple ports to change at the same time. However, when you increase or decrease the threshold of multiple ports the levels change from each port's starting dB level. For example, Port 002 is set to -82.5 dB and Port 010 is set to -30.0. If both are selected and the vox threshold is increased by clicking the up arrow twice the ending threshold for each port would be as follows: Port 002 = -81.5 Port 010 = -29.0
Threshold Level	display box	The **Threshold Level** display box displays the threshold level selected by the slider bar below.
Threshold adjust	slider	The **Threshold Adjust** slider allows you to set the vox threshold by moving the slider right (increase) or left (decrease). **NOTE**: This sets the threshold to the level you set by the slider bar. It *does not* increase or decrease the threshold from the individual port starting dB. **1.** Slide the **threshold slider** bar to the level you want to set the port (s) selected.
Set To	button	The **Set To** button activates the Threshold Level slider selection. The Set To button must be clicked to accept the threshold level. **1.** Once the threshold slider is at the desired threshold level, click **Set To.**

Hold Time		
Adjust	arrow keys	Use the **UP** or **Down** arrow keys to increase or decrease the time the port is active from meeting the threshold level set above. Once a port meets or exceeds its threshold level, the hold time determines how long that port will stay active before closing (up to 12.5 seconds). You can see the adjustments in the parameter display window (to the right) **NOTE:** You can select multiple ports to change at the same time. However, when you increase or decrease the hold time of multiple ports the time changes from each port's starting point. For example, Port 002 has a hold time of 0.7 seconds and Port 010 has a hold time of 1.0. If both are selected and the hold time is increased by clicking the up arrow twice the ending threshold for each port would be as follows: Port 002 = 1.7 Port 010 = 2.0
Hold Time	display box	The **Hold Time** display box displays the hold time level selected by the slider bar below.
Hold Time Adjust	slider	The **Hold Time Adjust** slider allows you to set the time by moving the slider right (increase) or left (decrease). **NOTE**: This sets the threshold to the level you set by the slider bar. It *does not* increase or decrease the threshold from the individual port starting dB. **1.** Slide the **hold time slider** bar to the level you want to set the port (s) selected.
Set To	button	The **Set To** button activates the Hold Time slider selection. The Set To button must be clicked to accept the hold time. **1.** Once the hold time slider is at the desired level, click **Set To.**
Options		
Show Enabled Only	check box	The **Show Enabled Only** check box, when selected will only display the **Vox enabled** ports in the display list to the right. When the check box is cleared, all ports are displayed.
Real-Time Changes	check box	The **Real-Time Changes** check box allows you to see the adjustments to the Vox and hold time dynamically on the connected device (Cronus or AIO-16). **NOTE**: When making adjustments from the front panel of the Cronus take into consideration that AZedit has a 5 second display refresh rate which will cause a delay in what is seen in the application.
Parameter Display Window		
Port	display	The **Port** column displays the port identification number for the intercom port. This identification number cannot be changed
Alpha	display	The **Alpha** column displays the label given to the port (input/output) of the matrix. Alphas are the names that appear in the alphanumeric displays on keypanels when keys are assigned to talk to destinations in the intercom system. Alpha names for intercom ports are assigned using *Port Alphas* setup. Alpha names for everything else are assigned using *Other Alphas* setup.
Supported?	display	The **Supported?** column displays whether the port is attached to a device that supports Vox (either a Cronus or AIO-16 card). **NOTE**: Cronus and AIO-16 are the only devices, presently, that support Vox. When a green **Yes** is displayed, the device supports Vox. When a red **No** is displayed, the device does not support Vox.
Enabled?	display	The **Enabled?** column displays whether Vox is enabled on the specific port. When a green **Yes** is displayed, Vox is enabled. When a red **No** is displayed it is not active.
Threshold	display	The **Threshold** column displays the threshold level for the specific port.
Hold Time	display	The **Hold Time** column displays the amount of time a port will stay active once the Vox threshold level has been met or exceeded.
Audio?	display	The **Audio?** column displays whether audio is being detected on the port. When a green **Yes** is displayed, audio is detected. When a red **No** is displayed, no audio is detected.
Enable Vox	button	The **Enable Vox** button enables Vox on the selected port (s). **1.** Select a **port** or **multiple ports**. **2.** Click **Enable Vox**. *Vox is enabled on the selected port (s).*

Disable Vox	button	The Disable Vox buttons disables Vox on the selected port (s). **1.** Select a **port** or **multiple ports** where Vox is enabled. **2.** Click **Disable Vox**. *Vox is disabled on the selected port (s).*
Reset Threshold	button	The **Reset Threshold** button resets the threshold level of the selected port (s) to default (-30 dB). **1.** Select a **port** or **multiple ports** you want to reset to the default threshold level. **2.** Click **Reset Threshold**. *The Threshold is reset to the default value*.
Reset Hold Time	button	The **Reset Hold Time** button resets the hold time of the selected port (s) to default (.5 seconds). **1.** Select a **port** or **multiple ports** you want to reset to the default hold time. **2.** Click **Reset Hold Time**. *The Threshold is reset to the default value*.
Select All	button	**Select All** selects all the list items in the current view. **1.** Click **Select All** to select all the items in the current view.
De-select All	button	**De-select All** de-selects all the list items in the current view that are selected. **1.** Click **De-select All** to de-select all ports in the current screen view.
Invert Selection	button	The **Invert Selection** button reverses the order in which the list is currently displayed. **1.** Click **Invert Selection** to reverse the list of ports from the current view.

CHAPTER 4

Ethernet Setup for Cronus

Connecting Cronus to the PC and the Network

NOTE: The PC must be running version 2.06.07 or later of AZedit and have an Ethernet card installed.

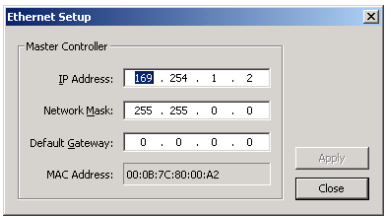
Verify Cronus is connected to the PC using either a USB (universal) or RS-232 (ADAM standard) cable. The USB drivers can be found in the AZedit software directory (C:\Telex\AZedit|V20701|USB). You may only use on USB connection (front panel or back panel) at a time.

NOTE: Cronus can support up to 32 multiple sessions of AZedit on Ethernet.

To connect Cronus to the PC with a serial cable, do the following:

NOTE: For more information on Network Basics, “Basic Network Configuration” on page 31.

1. Open **AZedit**.
   The Keypanels/Ports screen appears.
2. From the Options menu, select **Ethernet Setup**.
   The Ethernet Setup Screen appears.



3. In the IP Address field, enter the **IP Address** for the Cronus system.
4. In the Network Mask field, enter the **Network Mask** number for the Cronus System.
5. Where appropriate, in the Default Gateway field, enter the **gateway number** for Cronus.

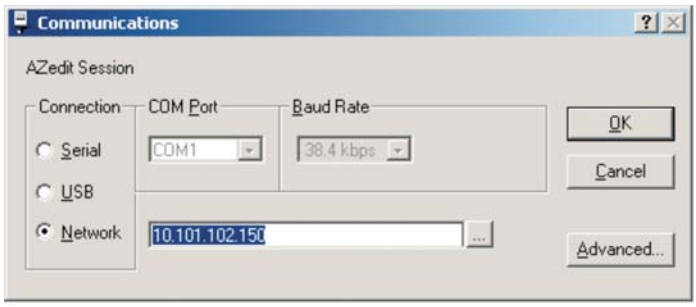
NOTE: If you do not know these numbers, your system administrator can give you the IP Address and Netmask to use.

6. Click **Apply**.
7. Click **Close**.
   The Ethernet Setup window is closed.
8. Connect the Cronus to your network with an Ethernet cable.

9. Connect the PC to you network with an Ethernet cable.

Once you have entered the IP Address and Network Mask, do the following:

1. From the Options menu, select **Communications**.
   The Communications screen appears.



2. In the Connection area, select the **Network** radio button.
3. In the IP Address field, either enter the **Cronus IP Address** you wish to connect with, or click the **Search** button.
   The search button scans the network for any Cronus devices. If multiple units are on the network, each will appear in the list. Select the Cronus you wish to work with.
4. Click **OK**.
   The Communications screen closes.

Download Firmware for Cronus

When firmware is downloaded to Cronus, all the code is put on the Master Controller card. This includes code for the AIO cards. Therefore, because the Master Controller downloads the firmware for the system and the code for the AIO cards, the download time is extended while the Master Controller pushes the AIO code out to the appropriate cards.

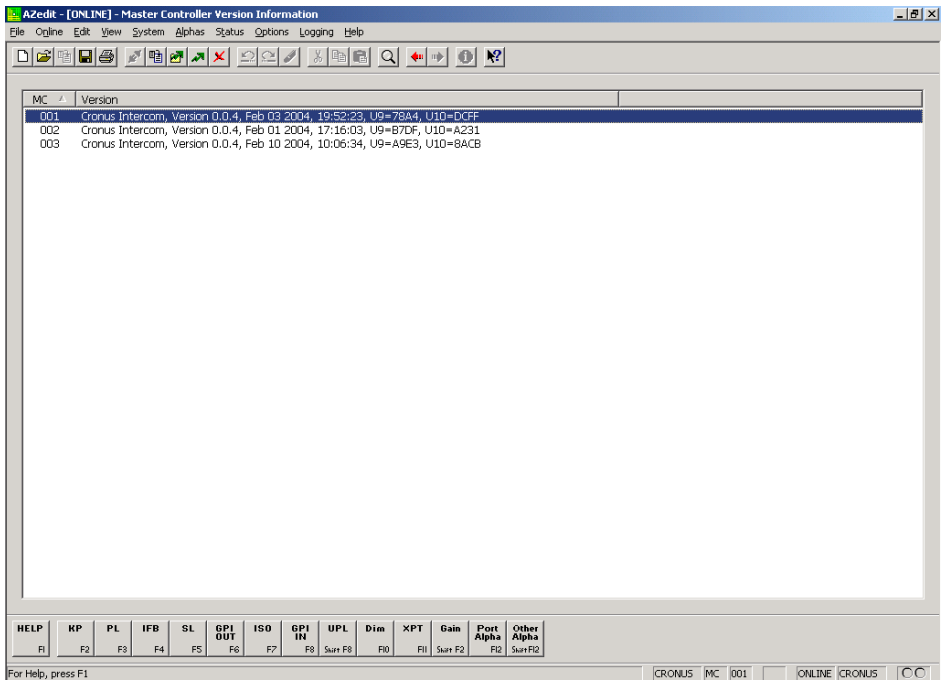
NOTE: Cronus must have AZedit version 2.06.07 or later.

Also, every time the system is reset or rebooted, the Master Controller card will reload each of the AIO cards with the most current version of code it is housing.

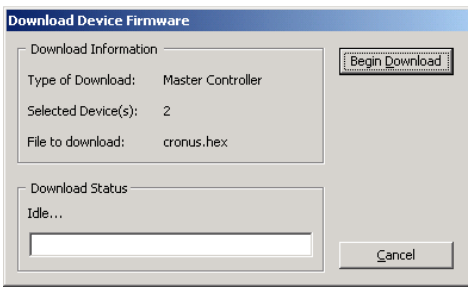
To download firmware to the Master Controller, do the following:

1. Open **AZedit**.
   The Keypanels/Ports screen appears.

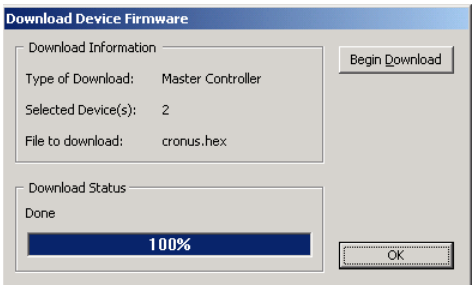
2. From the Status menu, select **Software Versions**, then **Master Controllers**.
   The Master Controller Version Information screen appears.



3. Highlight the **Cronus version** to be updated.
   You may select more than one version at a time by holding the CTRL key down while you select.
4. Right-click the highlighted selections and select **Download Firmware**.
   The Firmware Download screen appears.
5. Using the browse feature, browse to the **file** to be downloaded.
6. Click **Open**.
   The Download Device Firmware screen appears.



7. Click **Begin Download**.
   The download begins.

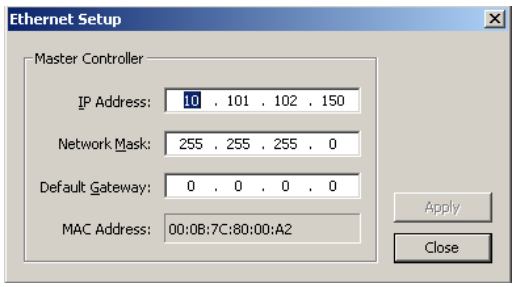


8. Once the Download is finished, click **OK**.
   The Cronus firmware download is complete. This will take a minute or two depending upon the type of connection you use (network or serial).
9. Verify the **version upgrade** in the Master Controller Version Information window.

Finding the MAC Address for Cronus

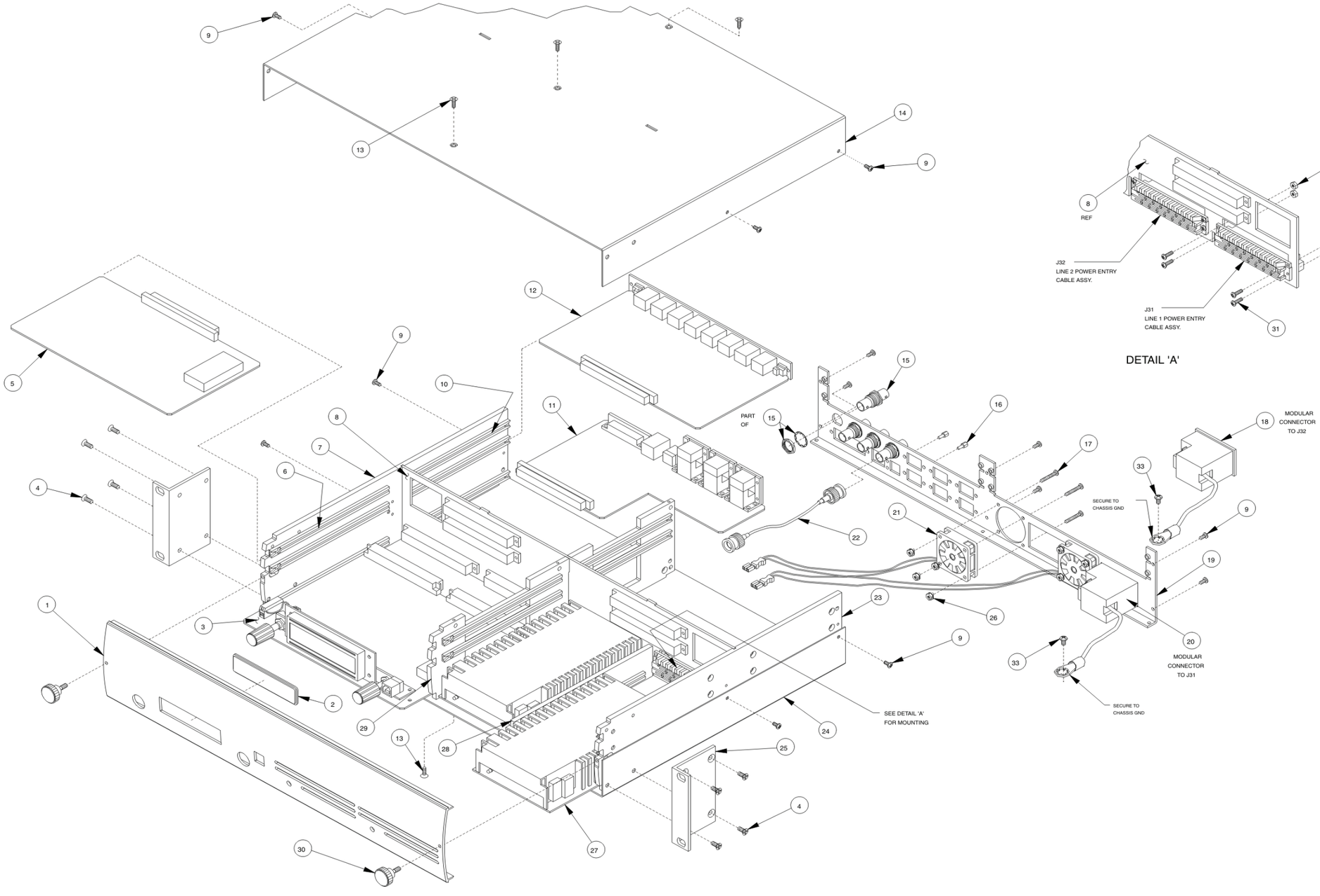
To get the MAC Address, do the following:

1. Open **AZedit**.
   The Keypanels/Ports screen appears.
2. From the Options menu, select **Communications.**
   The Communications screen appears.
3. Verify that USB is selected.
4. Click **OK**.
   The Communications screen closes.
5. From the Options menu, select **Ethernet Setup**.
   The Ethernet Setup screen appears. The MAC Address aappears at the bottom of the screen.



NOTE: If you have multiple Cronus systems linked together, you will need to individually connect them to the PC to see the MAC address. You cannot look at multiple Cronus MAC Addresses at the same time.

Final Assembly Drawing



DETAIL 'A'

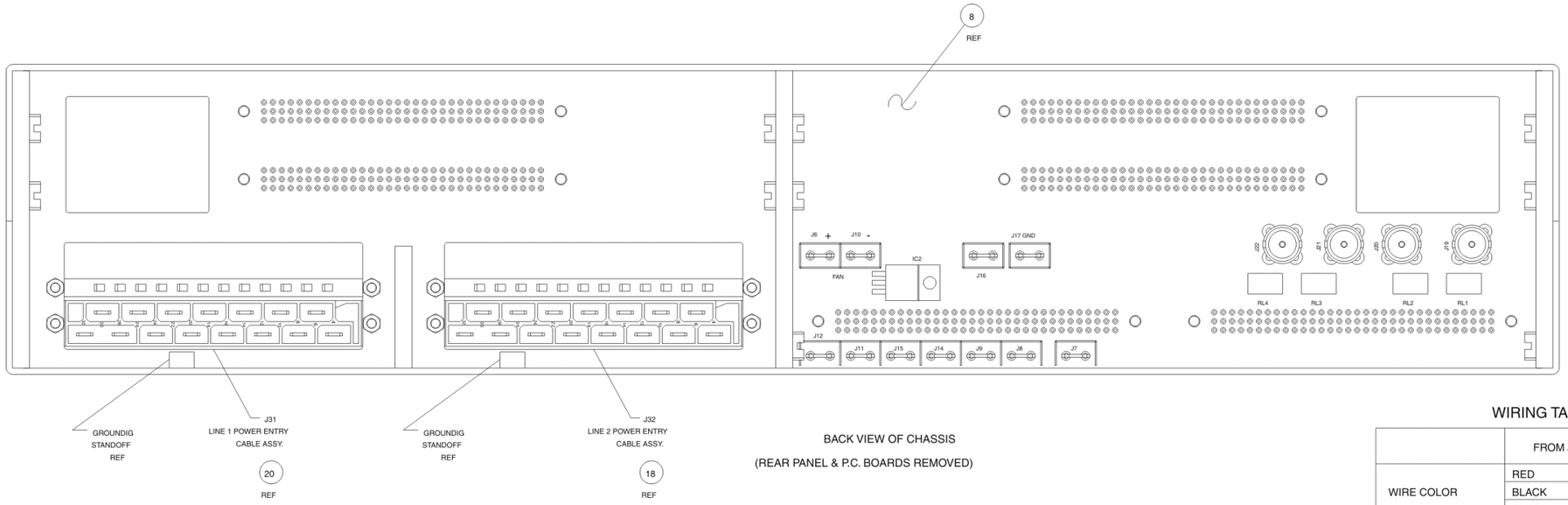
Cronus Final Assembly - see Table 10, “Final Assembly,” on page 28 for descriptions to the corresponding numbers.

Figure 10. Final Assembly

Item No.	Description	Part No.
1	Front panel, Cronus	9070-7770-000
2	Lens	9150-7770-000
3	Master Controller Assembly	9020-7770-000
4	Screw, FH, 6-32 x 3/8” LG.	51847-022
5	AI/O PC Board Assembly	9030-7784-000
6	Card Guide 6” LG	591601-001
7	Left Wall, Cronus	9110-7770-000
8	Back Plane PC Board Assembly	9110-7786-000
9	Screw, PH, 4-40 x 1/4” LG.	51845-038
10	Card Guide, 5” LG	591601-000
11	Master Controller Rear PC Board Assembly	9030-7788-000
12	AI/O Rear PC Board Assembly (RJ-12)	9020-7787-000
13	Screw, FH, 4-40 x 3/8” LG.	51847-012
14	Top Cover, Cronus	9100-7770-000
15	Bulkhead Jack, BNC, Feedthru	539074-000
16	Screwlock, 4-40	58421-000
17	Screw, PH, 4-40 x 1.0” LG	500125
18	Line 1 Power Entry Cable Assembly	2502-7770-002
19	Rear Panel, Cronus	9080-7770-004
20	Line 2 Power Entry Cable Assembly	2502-7770-003
21	Fans w/ Cable Assembly	2502-7770-004
22	Coax Cable Assembly	2502-7770-000
23	Right Wall, Cronus	9111-7770-000
24	Chassis, Cronus	9090-7770-000
25	Rack Ear, Cronus	9114-7770-000
26	Keps Nut, #4	51745-000
27	Power Supply, Switching	532073-000
28	Power Supply Wall, Cronus	9112-7770-000
29	Middle Wall, Cronus	9113-7770-000
30	Captive Panel Screw	58095-000
31	Screw, PH, 4-40 x 3/8” LG	51845-039
32	Nut, Special 4-40, Small, #4	50033-022
33	Screw, PH, 6-32 x 1/4” LG	51845-074
34	Spacer,.25 O.D. x.14 I.D., Stainless Steel	701840-000
35	Retaining Ring, External	50016-001
36	Rear Card Plate	9110-7784-003
37	Connector Key	539207-001
38	Foam Tape, Double Sided, 1” Wide	840051

Figure 10. Final Assembly

Item No.	Description	Part No.
39	AI/o Rear PC Board Assembly, MDR SCSI	9030-7800-000
40	Coax Link Module Card Plate	9110-7784-008
41	Cronus Fiber Link Module PCB	9030-7827-000
42	Fiber Link Module Card Plate	9110-7784-011
43	Fiber Link Module Cable Assy	2502-7770-005



BACK VIEW OF CHASSIS

(REAR PANEL & P.C. BOARDS REMOVED)

WIRING TABULATION

	FROM J31	TO BACK PLANE
WIRE COLOR	RED	J11
	BLACK	J14
	BLUE	J8
	FROM J32	TO BACK PLANE
WIRE COLOR	RED	J12
	BLACK	J15
	BLUE	J9
	FROM FANS	TO BACK PLANE
WIRE COLOR	RED	J6
	BLUE	J10
	FROM COAX LINKING MODULE	TO BACK PLANE
USE ITEM 22 QTY. 4	J10	J22
	J11	J21
	J12	J20
	J13	J19
	FROM FIBER LINKING MODULE (ITEM 41)	TO BACK PLANE
USE ITEM 43 QTY. 4	J1	J22
	J2	J19
	J3	J20
	J4	J21

Wiring Diagram

Appendix A

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.

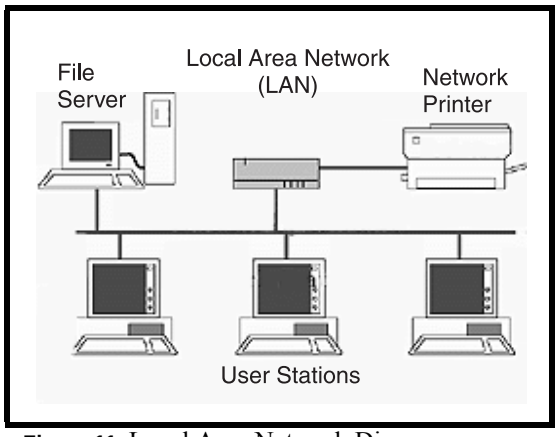


Figure 11. Local Area Network Diagram

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 WAN in existence is the Internet.

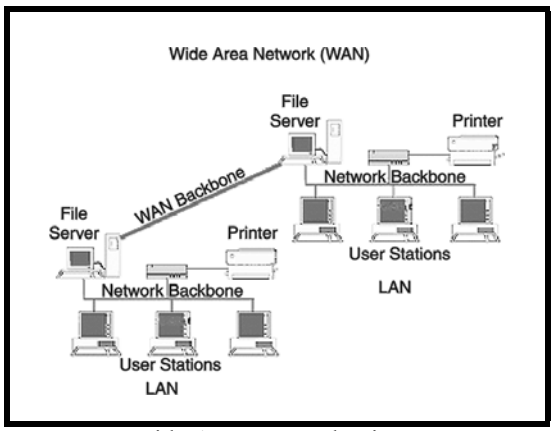


Figure 12. Wide Area Network Diagram

ACCESSING THE WIDE AREA NETWORK (WAN)

Figure 13 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.

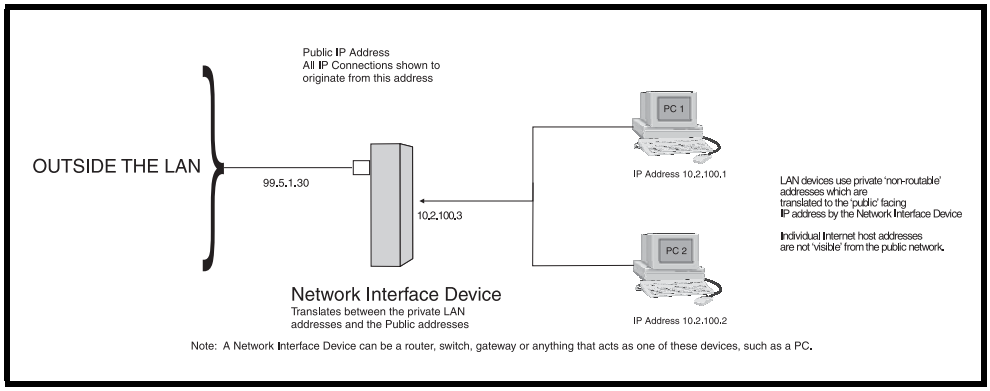


Figure 13. Network Address Translation

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

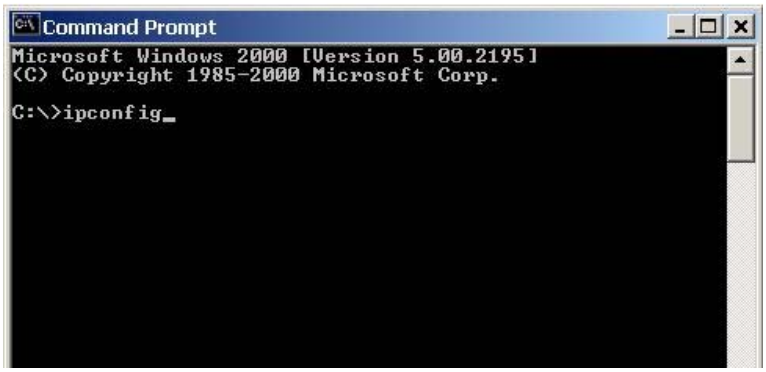
Port Number	Description
115	Simple File Transfer Protocol
118	SQL Services
119	Newsgroup (NNTP)
137	NetBIOS Name Service
139	NetBIOS Datagram Service
143	Interim Mail Access Protocol (IMAP)
150	NetBIOS Session Service
156	SQL Server
161	SNMP
179	Border Gateway Protocol (BGP)
190	Gateway Access Control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

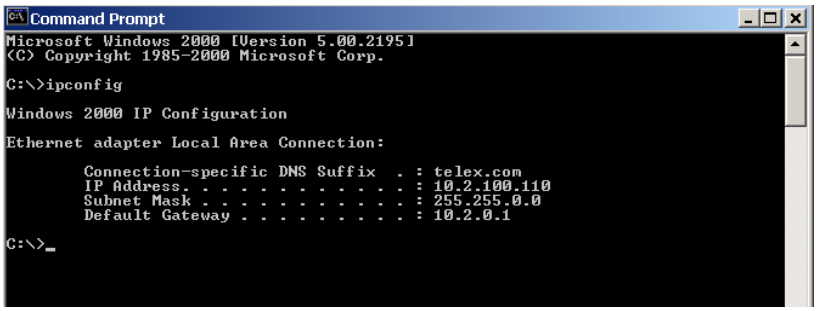
If you do not know your IP Address, you can open a DOS screen in a Windows®- based environment and bring up the ipconfig screen.

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.

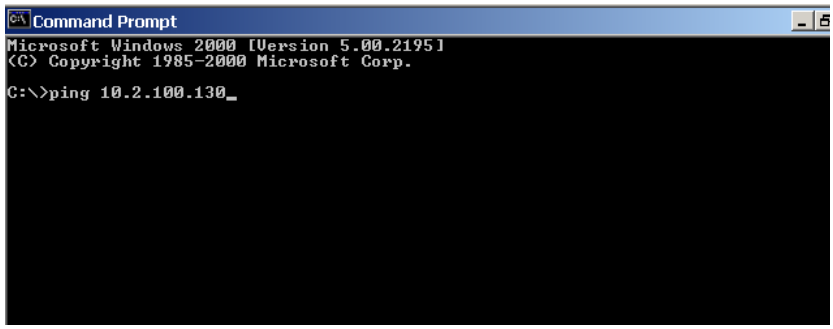
Ping a Computer

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

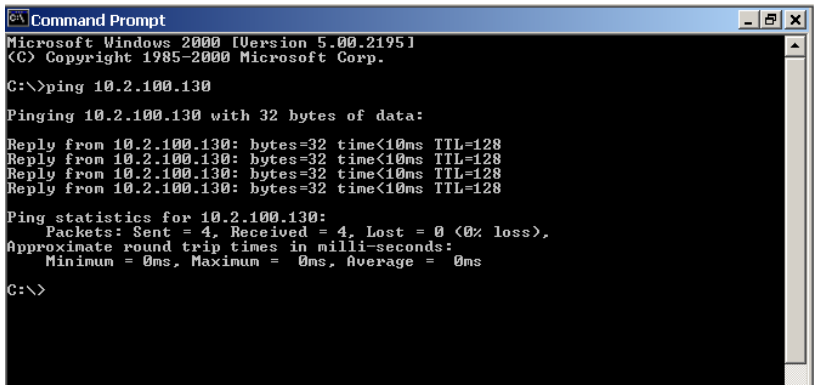
NOTE: You can also ping your RVON-8 card to verify that it is responding over the network by putting the cards IP Address in place of the computer IP Address.

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

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



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

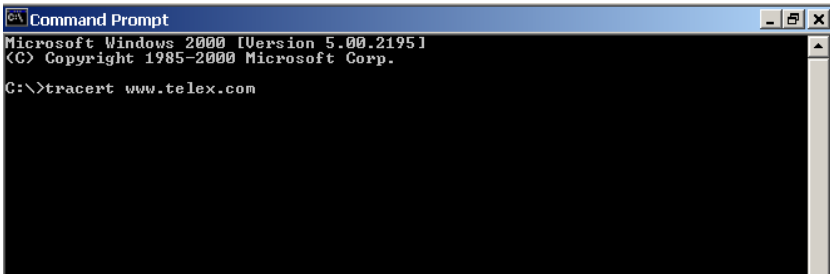
POSSIBLE PITFALL WITH ROUTERS, GATEWAYS, AND SWITCHES

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.

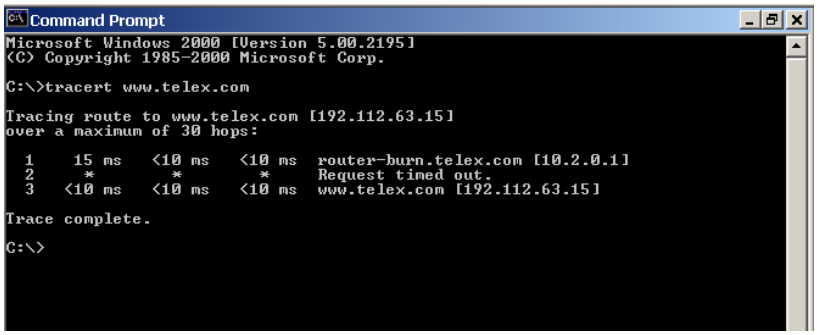
To view the path an IP Address takes to retrieve information, you can execute a tracert from the Command Prompt Screen.

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.

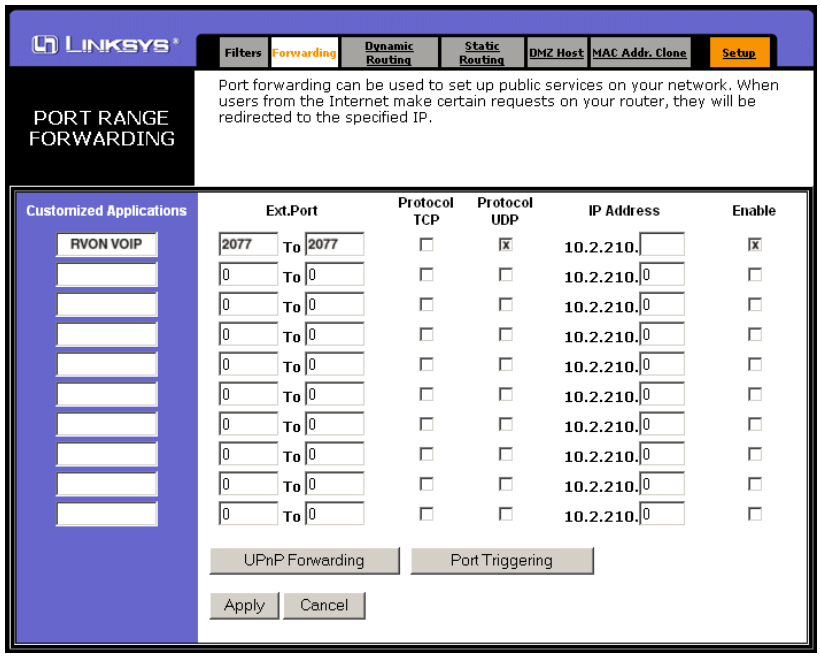
RVON Configuration

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 the table below 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.



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 B

Breakout Panels

Breakout Panels provide a convenient way of expanding the port capacity of a Cronus Intercom System. Currently, there are three breakout panels for use with the Cronus MDR backcard: XCP-32-DB9, XCP-48-RJ45, and XCP-48-Telco. On the Cronus you can have up to four MDR backcards mounted on the chassis to give you that many more keypanel ports.

Pin Number	Port	Function
8	1	Data +
33	1	Data -
24	1	Audio to Matrix +
49	1	Audio to Matrix -
25	1	Audio from Matrix +
50	1	Audio from Matrix -
7	2	Data +
32	2	Data -
22	2	Audio to Matrix +
47	2	Audio to Matrix -
23	2	Audio from Matrix +
48	2	Audio from Matrix -
6	3	Data +
31	3	Data -
20	3	Audio to Matrix +
45	3	Audio to Matrix -
21	3	Audio from Matrix +
46	3	Audio from Matrix -
5	4	Data +
30	4	Data -
18	4	Audio to Matrix +
43	4	Audio to Matrix -
19	4	Audio from Matrix +
44	4	Audio from Matrix -

Pin Number	Port	Function
4	5	Data +
29	5	Data -
16	5	Audio to Matrix +
41	5	Audio to Matrix -
17	5	Audio from Matrix +
42	5	Audio from Matrix -
3	6	Data +
28	6	Data -
14	6	Audio to Matrix +
39	6	Audio to Matrix -
15	6	Audio from Matrix +
40	6	Audio from Matrix -
2	7	Data +
27	7	Data -
12	7	Audio to Matrix +
37	7	Audio to Matrix -
13	7	Audio from Matrix +
38	7	Audio from Matrix -
1	8	Data +
26	8	Data -
10	8	Audio to Matrix +
35	8	Audio to Matrix -
11	8	Audio from Matrix +
36	8	Audio from Matrix -

XCP-32-DB9 Breakout Panel

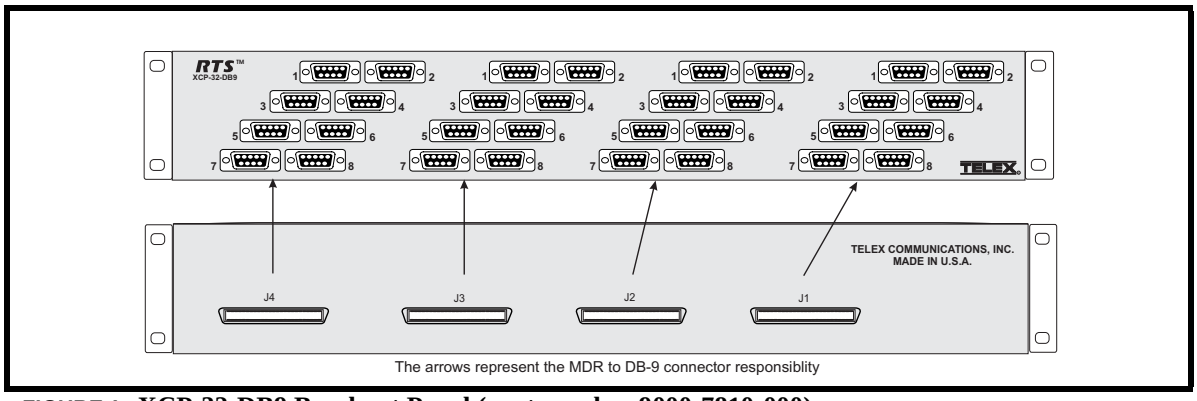


FIGURE 1. XCP-32-DB9 Breakout Panel (part number 9000-7810-000)

The XCP-48-DB9 breakout panel is the newly created 32-port DB9 breakout panel with MDR connecotr for the AIO-16. It allows you to expand the number of DB-9 serial ports on the Cronus.

NOTE: When using the 32-port DB-9 breakout panel, you must use the MDR backcard

Pin Number	PORT	FUNCTION
8	1	Data +
33	1	Data -
24	1	Audio to Matrix +
49	1	Audio to Matrix -
25	1	Audio from Matrix +
50	1	Audio from Matrix -
7	2	Data +
32	2	Data -
22	2	Audio to Matrix +
47	2	Audio to Matrix -
23	2	Audio from Matrix +
48	2	Audio from Matrix -
6	3	Data +
31	3	Data -
20	3	Audio to Matrix +
45	3	Audio to Matrix -
21	3	Audio from Matrix +
46	3	Audio from Matrix -
5	4	Data +
30	4	Data -
18	4	Audio to Matrix +
43	4	Audio to Matrix -
19	4	Audio from Matrix +
44	4	Audio from Matrix -
4	5	Data +
29	5	Data -
16	5	Audio to Matrix +
41	5	Audio to Matrix -
17	5	Audio from Matrix +
42	5	Audio from Matrix -
3	6	Data +
28	6	Data -
14	6	Audio to Matrix +
39	6	Audio to Matrix -
15	6	Audio from Matrix +
40	6	Audio from Matrix -
2	7	Data +
27	7	Data -
12	7	Audio to Matrix +
37	7	Audio to Matrix -
13	7	Audio from Matrix +
38	7	Audio from Matrix -
1	8	Data +
26	8	Data -
10	8	Audio to Matrix +
35	8	Audio to Matrix -

Pin Number	PORT	FUNCTION
11	8	Audio from Matrix +
36	8	Audio from Matrix -

NOTE: There are 4 MDR connectors on the XCP-32-DB9 Breakout Panel.

MDR Connector	Port
J1	1-8
J2	9-16
J3	17-24
J4	25-32

Pin	Description
Pin 1	Keypanel Data +
Pin 2	Keypanel Data -
Pin 3	N/A
Pin 4	Audio Out +
Pin 5	Audio Out -
Pin 6	N/A
Pin 7	Audio In +
Pin 8	Audio In -
Pin 9	N/A

XCP-48-RJ45 Breakout Panel

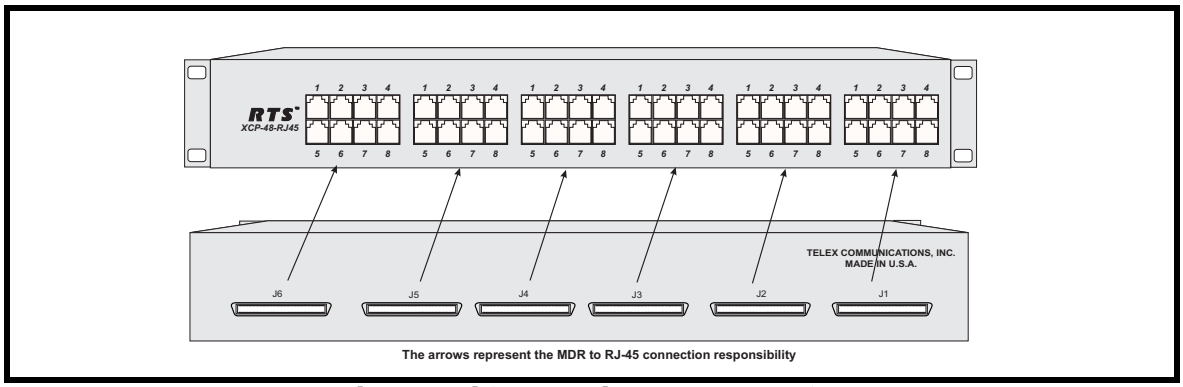


FIGURE 2. XCP-48-RJ45 Breakout Panel (part number 9000-7809-000)

The XCP-48-RJ45 is the newly created 48-port RJ45 breakout panel with MDR connector for the Cronus. It allows you to expand the number of RJ-45 ports on the ADAM system, up to 48 ports.

NOTE: When using the 48-port RJ-45 breakout panel, you must use the MDR backcard with the Cronus.

Pin Number	Port	Function
8	1	Data +
33	1	Data -
24	1	Audio to Matrix +
49	1	Audio to Matrix -
25	1	Audio from Matrix +
50	1	Audio from Matrix -
7	2	Data +
32	2	Data -
22	2	Audio to Matrix +
47	2	Audio to Matrix -
23	2	Audio from Matrix +
48	2	Audio from Matrix -
6	3	Data +
31	3	Data -
20	3	Audio to Matrix +
45	3	Audio to Matrix -
21	3	Audio from Matrix +
46	3	Audio from Matrix -
5	4	Data +
30	4	Data -
18	4	Audio to Matrix +
43	4	Audio to Matrix -
19	4	Audio from Matrix +
44	4	Audio from Matrix -
4	5	Data +
29	5	Data -
16	5	Audio to Matrix +
41	5	Audio to Matrix -
17	5	Audio from Matrix +
42	5	Audio from Matrix -
3	6	Data +
28	6	Data -
14	6	Audio to Matrix +
39	6	Audio to Matrix -
15	6	Audio from Matrix +
40	6	Audio from Matrix -
2	7	Data +
27	7	Data -
12	7	Audio to Matrix +
37	7	Audio to Matrix -
13	7	Audio from Matrix +
38	7	Audio from Matrix -
1	8	Data +
26	8	Data -
10	8	Audio to Matrix +
35	8	Audio to Matrix -

Pin Number	Port	Function
11	8	Audio from Matrix +
36	8	Audio from Matrix -

NOTE: There are 6 MDR Connector on the XCP-48 Telco Breakout

MDR Connector	port
J1	1-8
J2	9-16
J3	17-24
J4	25-32
J5	33-40
J6	41-48

Pin	Description
Pin 1	N/A
Pin 2	Keypanel Data -
Pin 3	Audio Out +
Pin 4	Audio In +
Pin 5	Audio In -
Pin 6	Audio Out -
Pin 7	N/A

Table 5. RJ-45 Breakout Panel

XCP-48-Telco Breakout Panel

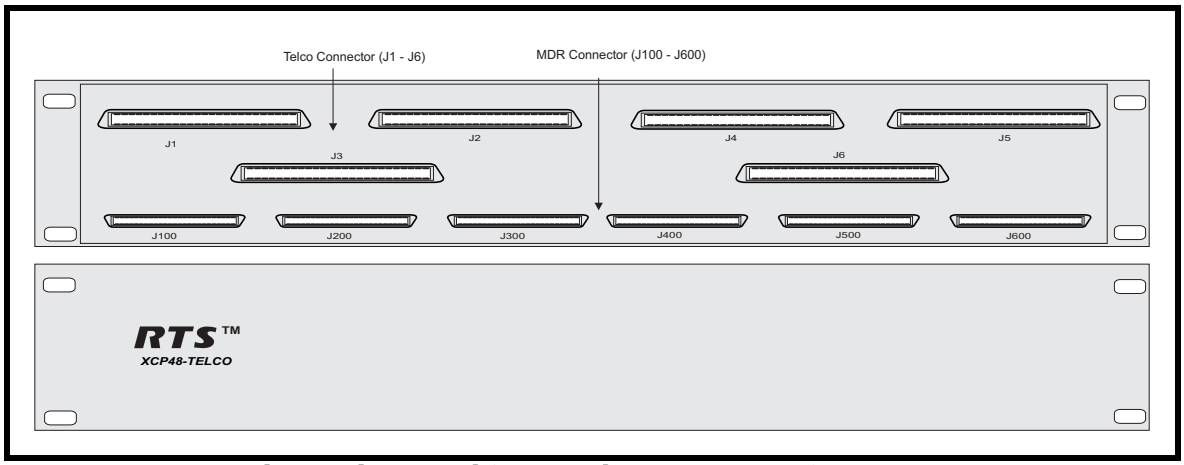


FIGURE 3. XCP-48-Telco Breakout Panel (part number 9000-7822-000)

The XCP-48-Telco is the newly created breakout panel with MDR connector for the Cronus. It combines audio to matrix, audio from matrix, and data pairs. It then routes them on individual Telco connectors.

NOTE: When using the XCP-48-Telco breakout panel, you must use the MDR backcard with the Cronus.

Pin Number	Port	Function
8	1	Data +
33	1	Data -
24	1	Audio to Matrix +
49	1	Audio to Matrix -
25	1	Audio from Matrix +
50	1	Audio from Matrix -
7	2	Data +
32	2	Data -
22	2	Audio to Matrix +
47	2	Audio to Matrix -
23	2	Audio from Matrix +
48	2	Audio from Matrix -
6	3	Data +
31	3	Data -
20	3	Audio to Matrix +
45	3	Audio to Matrix -
21	3	Audio from Matrix +
46	3	Audio from Matrix -
5	4	Data +
30	4	Data -
18	4	Audio to Matrix +
43	4	Audio to Matrix -
19	4	Audio from Matrix +
44	4	Audio from Matrix -
4	5	Data +
29	5	Data -
16	5	Audio to Matrix +
41	5	Audio to Matrix -
17	5	Audio from Matrix +
42	5	Audio from Matrix -
3	6	Data +
28	6	Data -
14	6	Audio to Matrix +
39	6	Audio to Matrix -
15	6	Audio from Matrix +
40	6	Audio from Matrix -
2	7	Data +
27	7	Data -
12	7	Audio to Matrix +
37	7	Audio to Matrix -
13	7	Audio from Matrix +
38	7	Audio from Matrix -
1	8	Data +
26	8	Data -
10	8	Audio to Matrix +

Pin Number	Port	Function
35	8	Audio to Matrix -
11	8	Audio from Matrix +
36	8	Audio from Matrix -

There are 6 MDR Connectors on the XCP-48-TELCO Breakout Panel.

MDR Connector	port
J1	1-8
J2	9-16
J3	17-24
J4	25-32
J5	33-40
J6	41-48

Telco Backcard
Telco Connector J1, J4

Pin Number	Port	Function
1	1	Audio to Matrix +
26	1	Audio to Matrix -
2	2	Audio to Matrix +
27	2	Audio to Matrix -
3	3	Audio to Matrix +
28	3	Audio to Matrix -
4	4	Audio to Matrix +
29	4	Audio to Matrix -
5	5	Audio to Matrix +
30	5	Audio to Matrix -
6	6	Audio to Matrix +
31	6	Audio to Matrix -
7	7	Audio to Matrix +
32	7	Audio to Matrix -
8	8	Audio to Matrix +
33	8	Audio to Matrix -
9	9	Audio to Matrix +
34	9	Audio to Matrix -
10	10	Audio to Matrix +
35	10	Audio to Matrix -
11	11	Audio to Matrix +
36	11	Audio to Matrix -
12	12	Audio to Matrix +
37	12	Audio to Matrix -
13	13	Audio to Matrix +
38	13	Audio to Matrix -
14	14	Audio to Matrix +
39	14	Audio to Matrix -
15	15	Audio to Matrix +
40	15	Audio to Matrix -
16	16	Audio to Matrix +
41	16	Audio to Matrix -
17	17	Audio to Matrix +
42	17	Audio to Matrix -
18	18	Audio to Matrix +
43	18	Audio to Matrix -
19	19	Audio to Matrix +
44	19	Audio to Matrix -
20	20	Audio to Matrix +
45	20	Audio to Matrix -
21	21	Audio to Matrix +
46	21	Audio to Matrix -
22	22	Audio to Matrix +
47	22	Audio to Matrix -
23	23	Audio to Matrix +
48	23	Audio to Matrix -
24	24	Audio to Matrix +
49	24	Audio to Matrix -

Table 6. Telco Backcard Connector (J1, J4)


TELEX
COMMUNICATIONS
BE HEARD