TBX-2

Triple Bus Expander for ADAM/ADAM-M

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

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

WARNING: THE MAIN POWER PLUG MUST REMAIN READILY OPERABLE.

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

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

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

~	This product is AC only.
CE	

Important Safety Instructions

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

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CHAPTER 1

Introduction

General Description

A single TBX-2 fiber card can link up to four (4) ADAM/ADAM-M frames, while multiple Tribus cards can link up to nine (9) frames. This makes it possible to increase the number of available users on a system by transparently integrating additional frames. The ADAM/ADAM-M frame must be equipped with an MCII-e Master Controller card (version 2.0.4 or later), allowing the TBX-2 to link together multiple ADAM/ADAM-M intercom systems. This functionality can be useful in mobile production scenarios to tie systems together via fiber using the digital audio of the TBX-2. In this scenario, the MCII-e Master Controllers are tied together via Ethernet connections. In a failure of the Ethernet connection of one (1) frame, the affected ADAM/ADAM-M can be automatically isolated as an autonomous frame, and the remaining frames function as a normal interconnected system. The TBX-2 works in both AIO-8 and AIO-16 frame environments with simple software settings in AZedit intercom software. The TBX-2 card comes with a fiber connection only, allowing a range of up to 24.8 miles (40km) between ADAM/ADAM-M frames.

Version Requirements

- MCII-e version 2.0.4 or later
- AZedit version 3.6.1 or later

IMPORTANT: When updating a system, the PC II-e must have the firmware changed to that of the MCII-e before the TBX-2 cards are inserted into the frame.

Features

Interface with ADAM/ ADAM-M

The TBX-2 card is backward compatible with all existing AES, AIO, and RVON cards in an ADAM/ADAM-M intercom system. The hardware and software is compatible to work seamlessly with the **TDM**[a] (Time Division Multiplexing) and control bus circuitry for routing audio and controlling data. This card provides a downloadable firmware feature through AZedit Intercom Software.

Channels Per Link

The TBX-2 has three (3) fiber links. Each link can support up to a maximum of 256 audio channels per link. This channel capability is provided in AIO-16 systems. Moreover, the link can also be scaled down to 128 channels, allowing it to support AIO-8 based intercom systems.

New System Architecture

The System Framework has been redefined for the TBX-2 allowing the system to reconfigure itself in the event of a frame failure. In the scenario where the master frame fails, another ADAM/ADAM-M frame within the system seizes control until the fault is fixed. This fail-save mechanism monitors both audio and control, and sends messages to report any corrupt behavior in the system.

NOTE: DBX cards are not compatible with TBX-2 cards.

Support for Multiple Distances

The backcard features three (3) **SFP** (Small Form-Factor Pluggable) connectors that allow for support of multiple distances. This allows the user to configure these cards based on their custom application. The user can insert **COTS** (Commercial Off-The-Shelf) modules (Multi Mode/Single Mode) to match their needs.

System Expansion

The TBX-2 employs the next generation **ASIC** (Application Specific Integrated Circuit) Nucleus for higher performance and future system expansion. See Table 1 on page 17.

Autonomous Mode

Normally, a TBX-2 frame communicates with other frames that are part of the same intercom. However, if an Ethernet link is not present, the TBX-2 automatically enters Autonomous mode.

AZedit also has a new option on the Intercom Configuration Options window (*Options|Intercom Configuration|Options Tab*) called “Force Autonomous Mode when no audio links up.” The **Force Autonomous Mode** check box is used to force the current frame into autonomous (independent) mode, if none of its TBX-2 links are up. Normally, a frame communicates with other frames that are part of the same intercom. If selected, the frame refuses to communicate with any other frames if none of its TBX-2 links are up, even if Ethernet communications are fine. And, once one (1) or more of its audio links are restored, the frame automatically tries to re-establish messaging links to the other frames in the cluster.

Automatic Transfer of Control

Within each frame, both the active and the standby MCII-e master controllers maintain Ethernet messaging links with every other frame in the cluster. If the Active controller in the frame loses its messaging links, but the standby controller has one (1) or more Ethernet links available, an automatic transfer of control is performed. When this transfer occurs, the standby controller becomes the active controller and the previously active controller becomes the standby controller when its messaging links are restored.

Alarms and Warnings

A new view in AZedit displays various alarms and warnings occur in the intercom. Once an alarm has been resolved, it is deleted after five (5) minutes.

AZedit Connections

AZedit Connections (*Options|Connect to Frame*) allow the user to select the frame AZedit should connect to.

AZedit version 3.6.1 or higher is required.

In Use Tally Indicator When a user turns a talk or listen key on to connect with a resource in another frame within the cluster, the key displays a busy tally, flashing between the *Alpha* and **, to indicate the resource is unavailable.

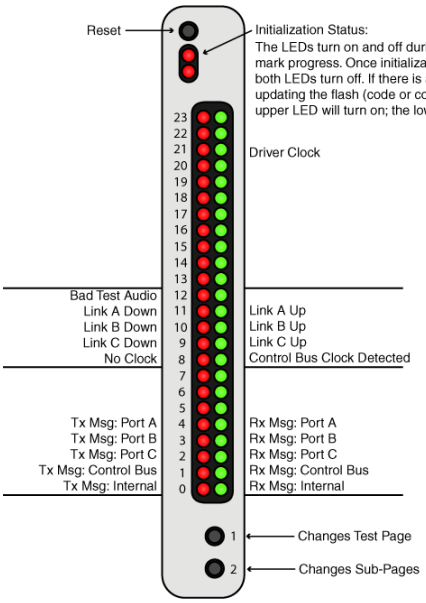
NOTE: For special lists and party lines, no unavailable tally is generated if there are any members of the special list or party line in accessible frames.

Logging Each frame in an intercom cluster generates its own log message and stores them locally. Normally, the log messages are identical from frame to frame, except when frames are synchronizing. Using the logging configuration window, you can select whether changes affect all frames in a cluster or just the locally connected frame.

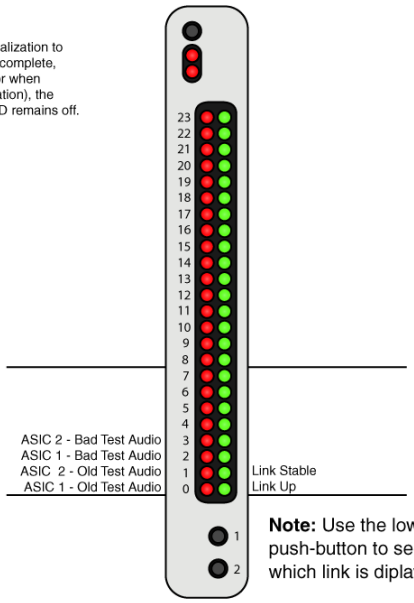
a. TDM is a technology that transmits multiple signals simultaneously over a single transmission path.

LED Indicators

Port Status



Link Status



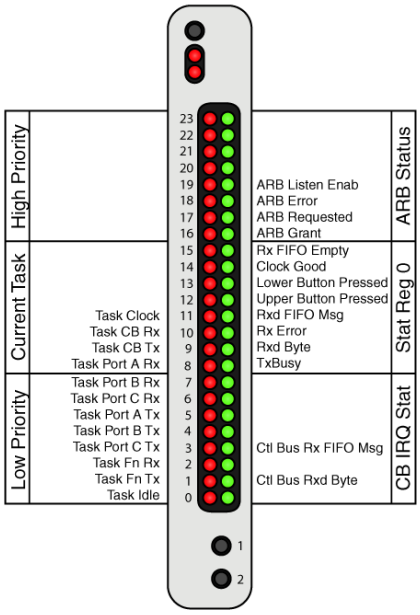
Note: Use the lower push-button to select which link is diplayed.

Sub-Page Codes

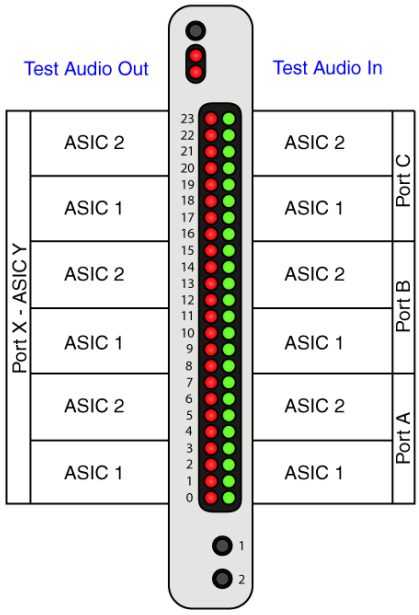
Link A - 0x08
Link B - 0x04
Link C - 0x02

Note: The sub-page code is displayed on bits 23-20 while lower push-button is held in.

Executive



Test Audio



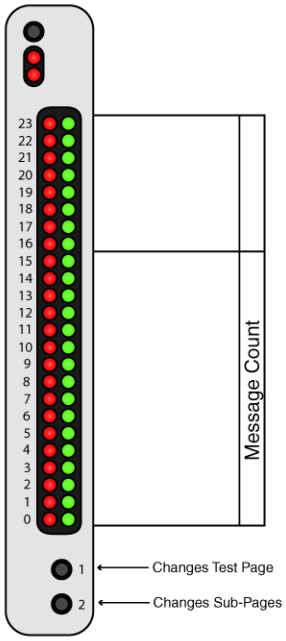
DIP Switch Settings

Ignore Port A Test Audio	1
Ignore Port B Test Audio	2
Ignore Port C Test Audio	3
	4
	5
	6
	7
Debug Only Mode	8

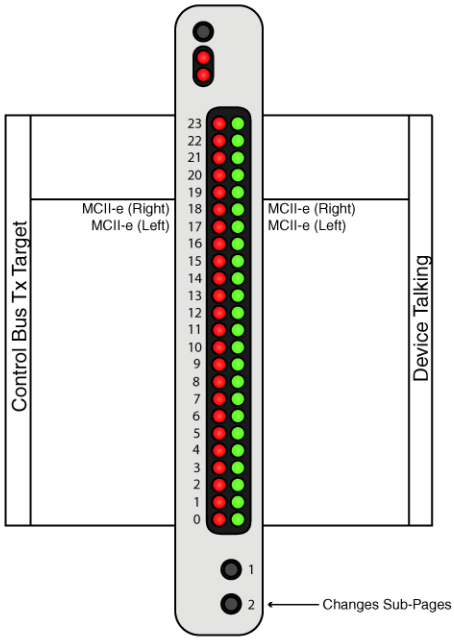
Sub-Page Codes

Port A - ASIC 0	**0x80**	Port A - ASIC 0
Port A - ASIC 1	**0x08**	Port A - ASIC 1
Port B - ASIC 0	**0x40**	Port B - ASIC 0
Port B - ASIC 1	**0x04**	Port B - ASIC 1
Port C - ASIC 0	**0x20**	Port C - ASIC 0
Port C - ASIC 1	**0x02**	Port C - ASIC 1
Combined Audio Out	**0xee**	Combined Audio Out

Message Queue Display



Card Status



Sub-Page Codes

Max msgs allocated	**Uxff**	Msgs currently in use
Queue to Local MC	**0x80**	Queue to this card

Note: Sub-page number is diplayed on bits 22-23 while bottom button is pressed and held in.

Specifications

Power

Input Power

2.6 Amps at 5 V (Combined)

Power Consumption

13.2 W

Audio

Audio Performance

THD+N at 1 kHz, 0.4%

Frequency Response

Within± 1 dB from 20 Hz to 20 kHz

Environmental

Weight

Front Card

0.72 lb (0.33 kg)

Back Card

0.42 lb (0.19 kg)

Temperature

Operating

0°C to 50°C (32°F to 122°F)

Storage

-40°C to 70°C (-40°F to 158°F)

Board Performance

Throughput Per Link:

360Mb/sec

SFP Fiber Transceivers:

Voltage:

3.3 V Rails

Standard Rate:

SONET OC12 or Gigabit Ethernet

Recommended Parts:

Multi-Mode:

Finisar - FTLF8519P2BNL (Oxide VCSEL, Maximum reach of 550m)

Single Mode:

Finisar - FTLF1422P1BTL (1310nm, Maximum reach 40km)

Fiber Cable Connector Type:

Multiple Mode Fiber LC–LC Duplex Connector – max length 500m (546.8yd.)

Single Mode Fiber LC–LC Duplex Connector – max length 40km (24.9mi)

Configuration Requirements

An MCII-e Master Controller card must be installed in the same frame as the TBX-2. For more information, see the MCII-e User Manual which can be found at www.rtsintercoms.com.

TABLE 1. Systems Supported by the TBX-2 Card

# of Frames	Links Used	# TBX-2 Cards per Frame	System	Channels	TBX-2 Only System
2	1	1	AIO-8	256	**ADAM with 1 TBX-2 Card -** Place TBX-2 Card in Slot 9
2	1	1	AIO-16	512	
3	3	1	AIO-8	384	
3	3	1	AIO-16	768	
4	6	1	AIO-8	512	
4	6	1	AIO-16	880	
5	10	2	AIO-8	640	**ADAM with 2 TBX-2 Cards -** Place TBX-2 Cards in Slots 8 and 9
6	15	2	AIO-8	768	
7	21	2	AIO-8	880	
8	28	3	AIO-8	880	**ADAM with 3 TBX-2 Cards -** Place TBX-2 Cards in Slots 8, 9, and 10

NOTE: The TBX-2–TBX-2 supports up to eight (8) frames in non-redundant mode. Slot 10 should be used if a third TBX-2–TBX-2 card is needed.

Fail-Over Modes

Audio and communications (called *control*[1]) between frames is separated between the TBX-2 card and the MCII-e Master Controller Card. Communication between frames using TBX-2 occurs using the MCII-e Master Controller over Ethernet. Audio is passed between frames using the TBX-2 card fiber connection (see Figure 28 to Figure 30).

Audio between frames exists as long as there is a single valid link between frames. There are three (3) types of system configurations:

- Full Redundancy
- Partial Redundancy
- Non-Redundancy

1. *Control is the ability to talk to keypanels and act on key presses.*

Full Redundancy

In **Full Redundancy** systems, there are two (2) links, shown in Figure 28, between each frame, so losing either one does not affect audio.

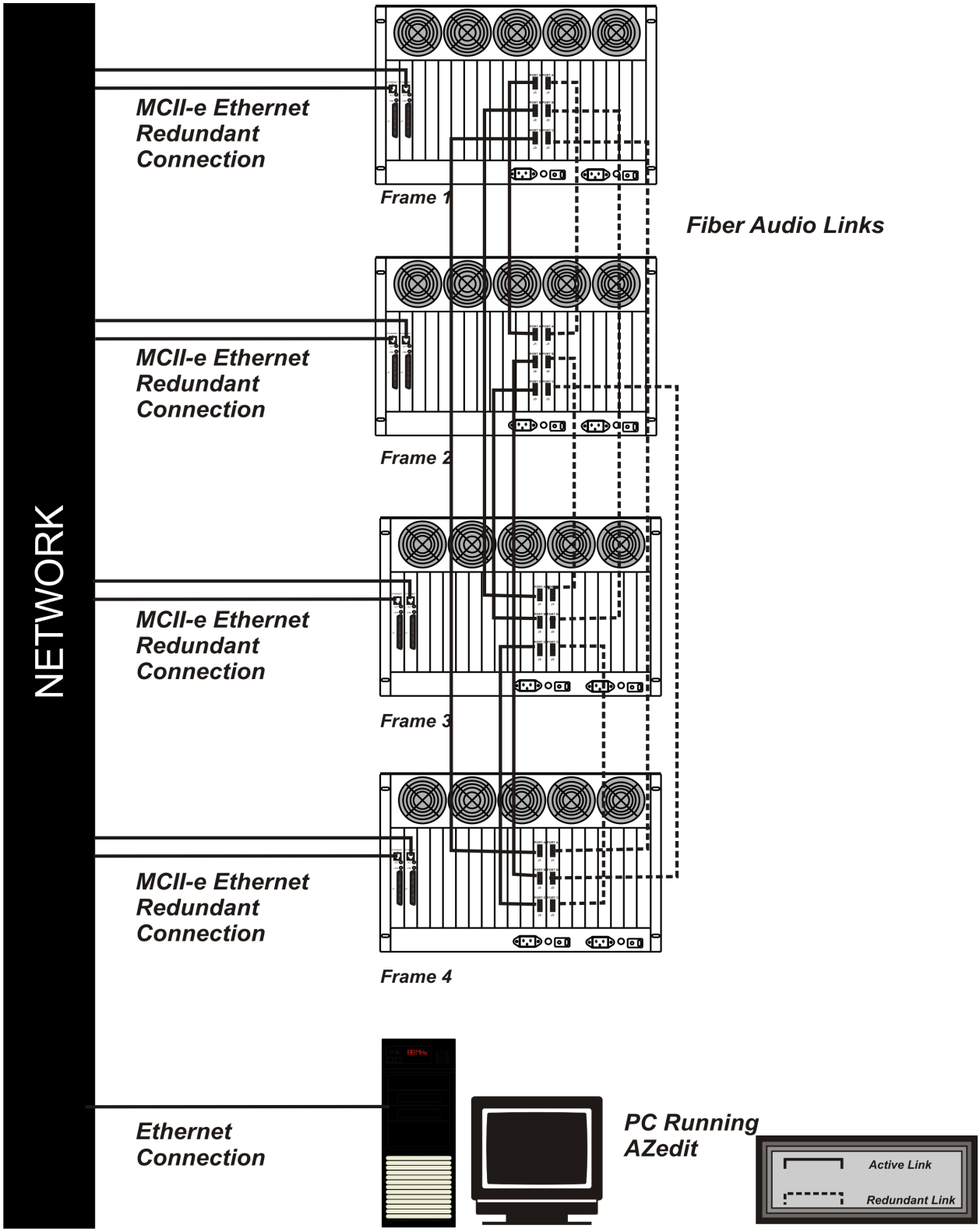


FIGURE 28. 4 Frame System with Full Redundancy, including failover Master Controller

Partial Redundancy

In a **Partially Redundant** system, multiple frames, but not all frames, have two (2) links configured between them. In the example shown in Figure 29, Frame 1 and Frame 2 have full redundancy between them; however, Frame 3 has only one (1) link to Frame 1. This means if the fiber connection between Frame 1 and Frame 3 is broken, Frame 3 cannot send or receive audio.

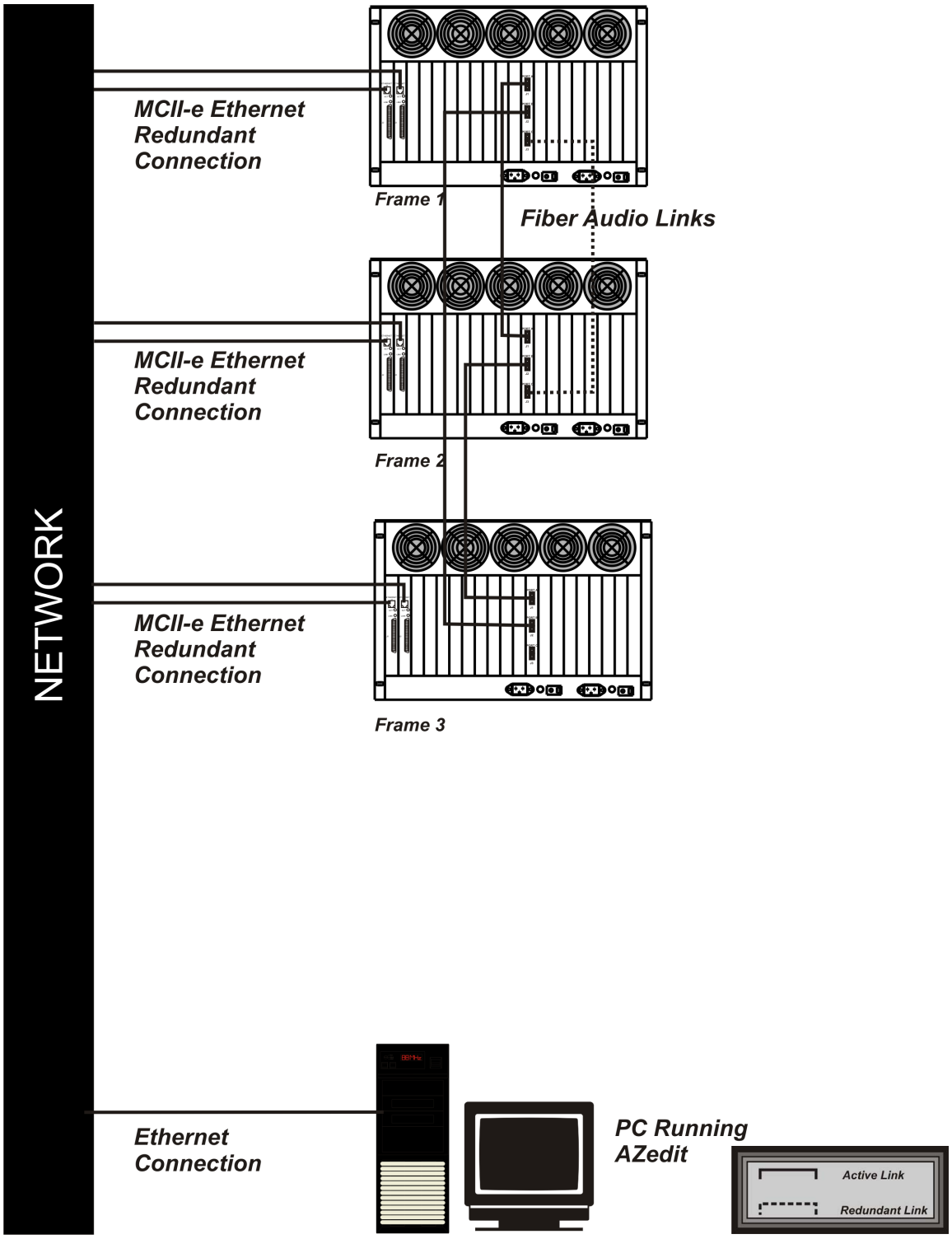


FIGURE 29. Partially Redundant system, including failover Master Controller

Non-Redundancy

In a **Non-Redundant** system, shown in Figure 30, there is only one (1) link between frames, so if the fiber link goes down, audio communications between the frames is lost.

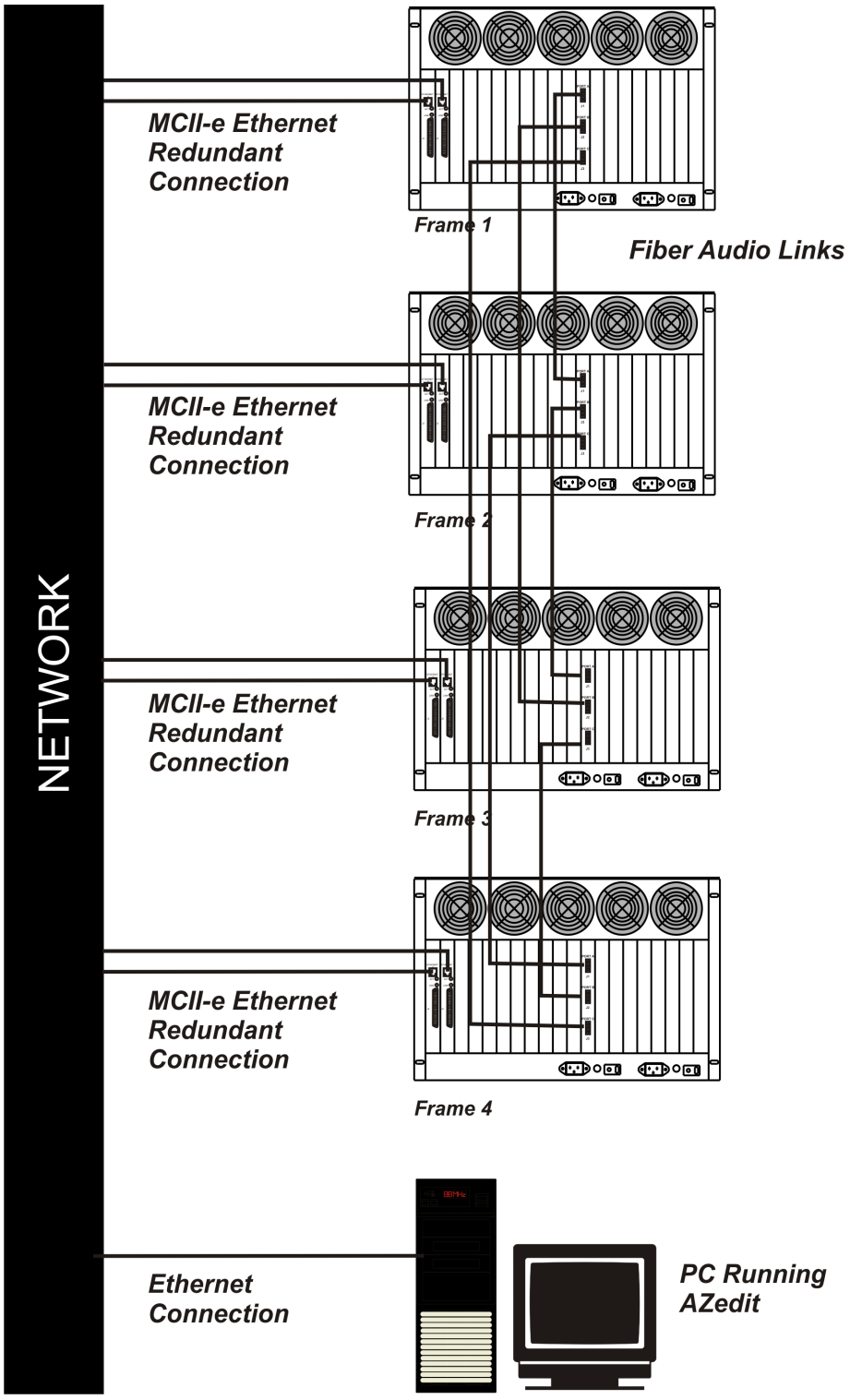


FIGURE 30. 4 Frame System with No Redundancy, including failover Master Controller

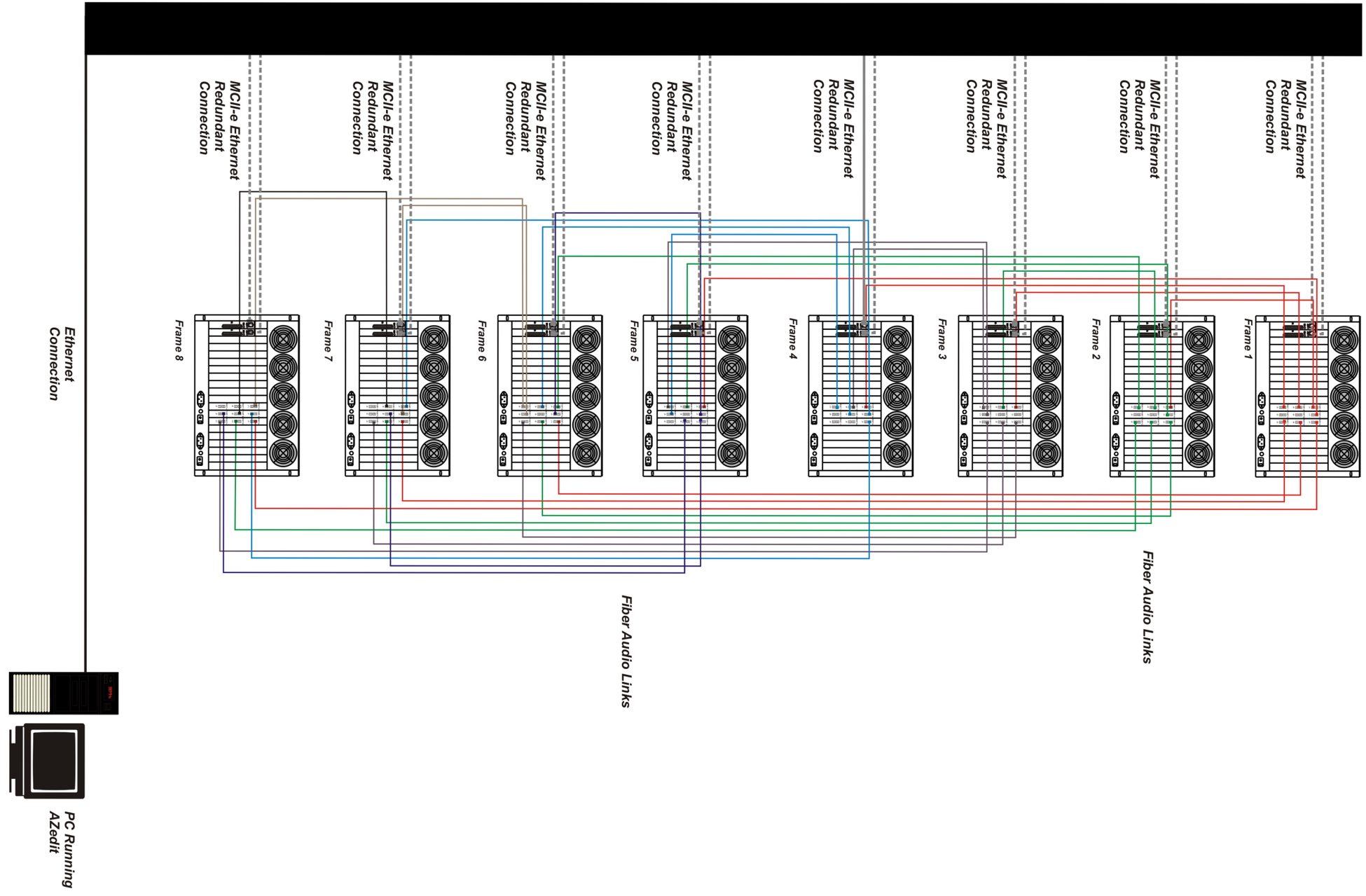


FIGURE 4. Eight Frame TBX-2 System – Non-Redundant

Debug Information

The **Debug Information** menu item, shown in Figure 5, allows you to send a flash file to RTS to help troubleshoot the reason for an intercom issue in AZedit. In the event of a processor crash, the processor saves diagnostic information about the cause of the problem to its flash memory. The menu item stays grayed-out until a flash file is created when the processor crashes.

NOTE: Every card in every frame stores its own debug information. So, if frame 3 has a processor crash, you must connect AZedit to frame three (3) to create an .azd file to send to RTS for debugging.

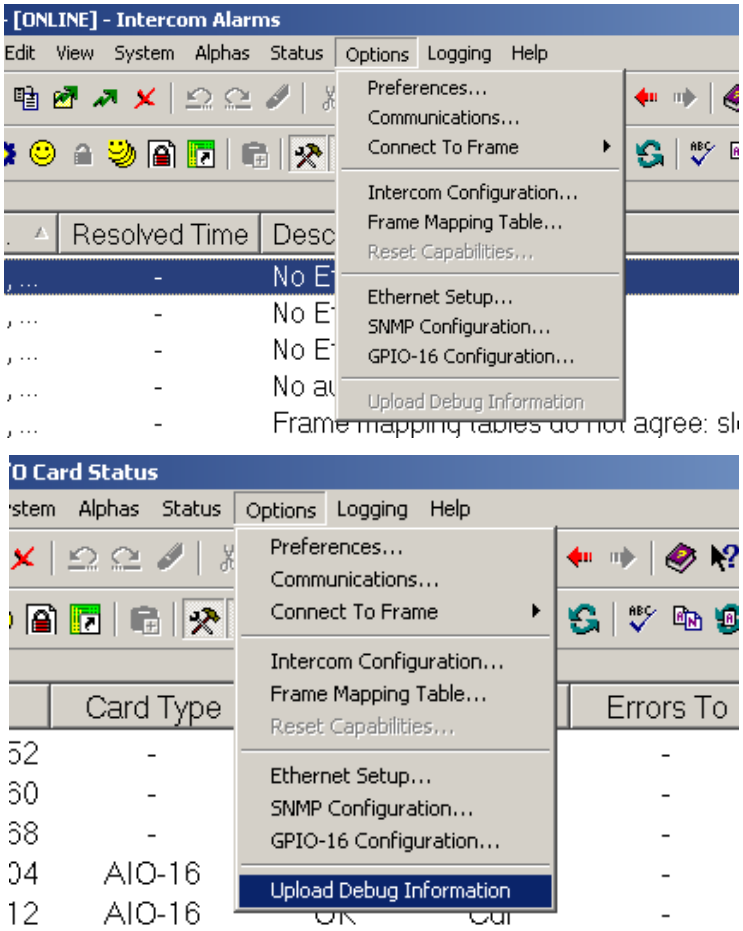
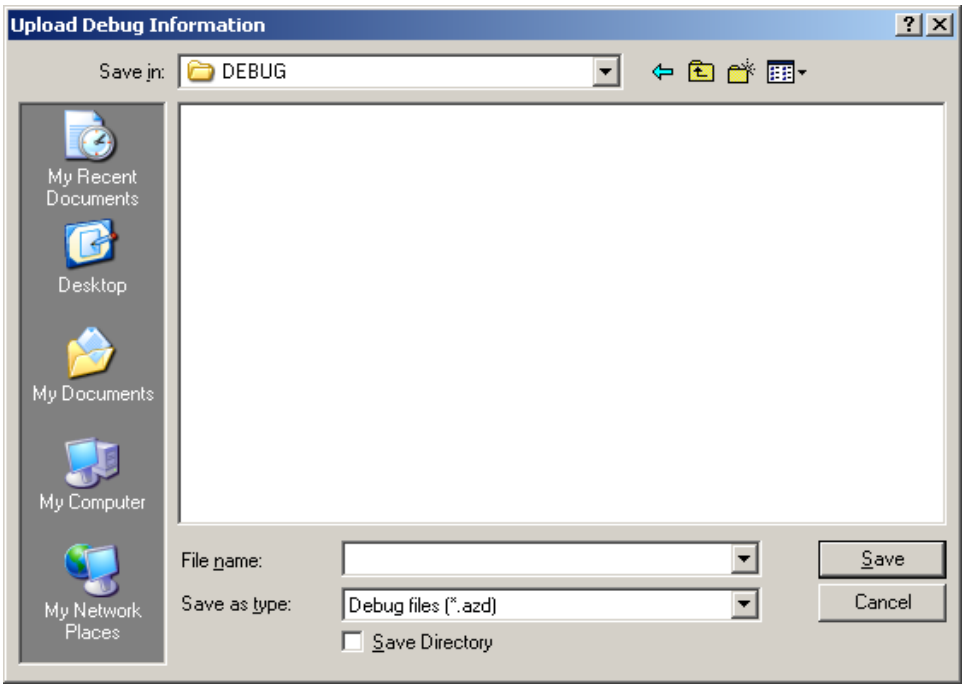


FIGURE 5. Upload Debug Information

To **create the debug file**, do the following:

NOTE: Once the processor has crashed the Upload Debug Information menu item becomes active.

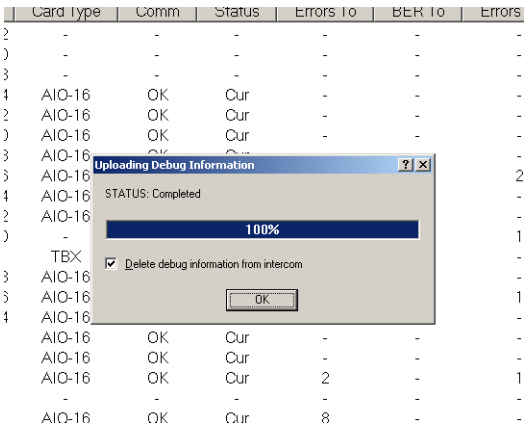
1. From the Options menu, select **Upload Debug Information**.
   The Upload Debug Information window appears.



   NOTE: By default, the Debug folder (*C:\Telex\AZedit\Debug*) is where the AZedit debug file you create is stored.

2. In the File name field, enter a **name** for the debug file you create. For example, you could use the date as the file name – 12152008.azd.

3. Click **Save**.
   The Uploading Debug Information Status window appears.

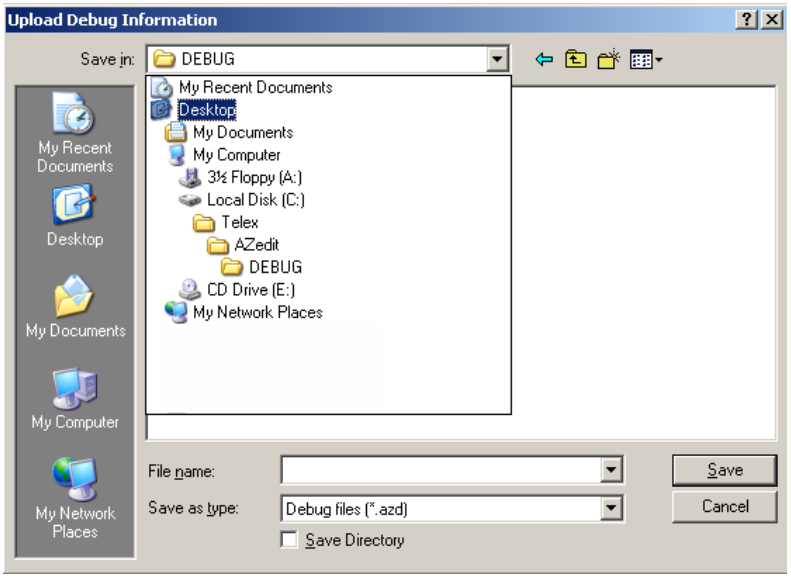


   NOTE: Select the *Delete debug information from intercom* check box if you want to delete the debug information from system once the .azd file is created. Otherwise, the information is kept on the intercom system. Remember, you can only save the most current debug information. This means if your processor fails twice you only capture the second failure's diagnostic information.

4. Click **OK**.
   The AZedit debug file is made.

To **find the file you just created**, do the following:

1. Right-click on **My Computer**, and from the popup menu, select **Explore**.
   The My Computer window appears with a navigation pane down the left hand side of the window.
2. Navigate to **C:\Telex\AZedit\Debug**.
   OR
   Navigate to the **folder** you store your AZedit debug file.
   The file you create is stored in this folder.



Once you have created the AZedit Debug file, please contact your RTS system engineering for further instructions. If you do not know your local system engineer, please see http://www.rtsintercoms.com/contact.php.

CHAPTER 4

Installation and Configuration

Installation

Requirements

- 10 Base-T or 100 Base TX Ethernet connection to the network
- AZedit 3.6.1 or higher
- MCII-e Master Controller 2.0.4 or higher

NOTE: See the MCII-e Master Controller User Manual (p/n 93507734000) user manual for specific DIP switch settings for proper TBX-2 operation.

IMPORTANT: All frames in a TBX-2 system must have the same firmware version on the Controllers and TBX-2 cards.

Supported ADAM Configurations

TABLE 2. Supported TBX-2 Configurations for the ADAM

ADAM with 1 TBX-2 Card

Place TBX-2 Card in Slot 9

ADAM with 2 TBX-2 Cards

Place TBX-2 Cards in Slots 8 and 9

ADAM with 3 TBX-2 Cards

Place TBX-2 Cards in Slots 8, 9, and 10

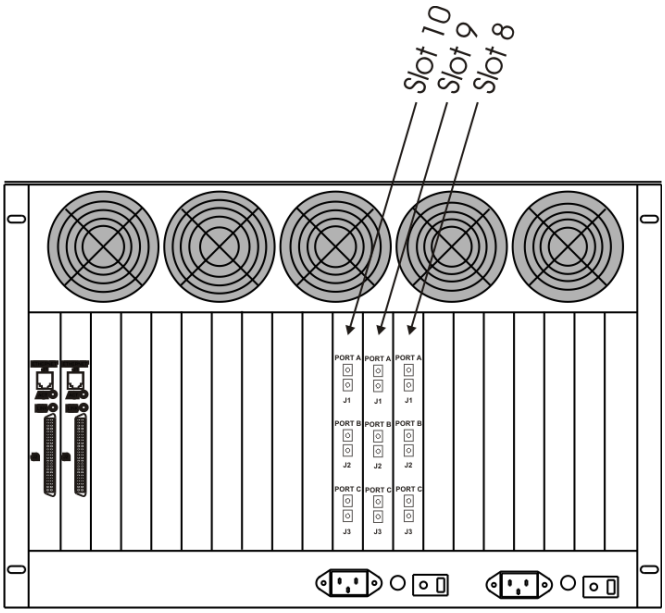


FIGURE 6. TBX-2 Slots in the ADAM frame

Supported ADAM-M Configurations

IMPORTANT: Remember to save your configuration, if needed, because it is deleted.

NOTE: Whenever possible avoid installing MADI cards in slot 6 due to improved reliability through heat reduction.

The ADAM-M has a limit of only two (2) MADI cards. The following configurations are supported:

TABLE 3. Supported MADI/TBX-2 Configurations for the ADAM-M

ADAM-M with 2 MADI cards and 0 TBX-2 Cards

Place MADI Cards in slots 5 and 6

ADAM-M with 2 MADI cards and 1 TBX-2 Card

Place MADI Cards in slots 5 and 8

Place TBX-2 Card in slot 6

ADAM-M with 2 MADI cards and 2 TBX-2 Cards

Place MADI Cards in slots 3 and 8

Place TBX-2 Cards in slots 5 and 6

ADAM-M with 1 MADI Card[a] and 3 TBX-2 Cards

Place MADI Card in slot 8

Place TBX-2 Cards in slots 4, 5, and 6

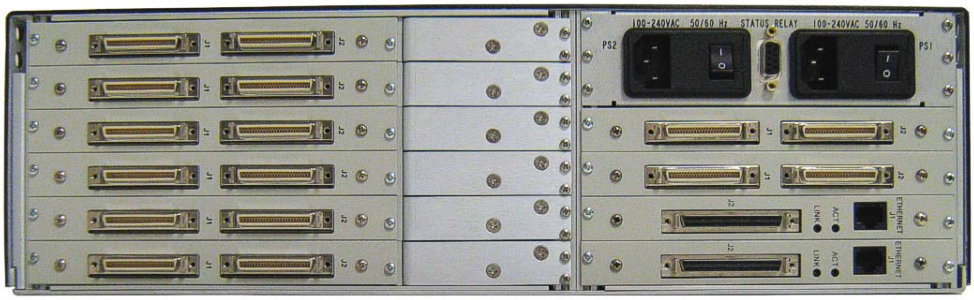
a. When three (3) TBX-2 cards are used in the ADAM-M, only one (1) MADI card can be used in the system. For complete system clock redundancy slots 5 and 6 must be populated.

To **install the TBX-2 into an ADAM/ADAM-M frame**, do the following:

1. Firmly push the **back card** into proper slot in the ADAM/ADAM-M frame.

   NOTE: See Table 2 or Table 3 for proper card placement in the intercom.

2. Using a screwdriver, secure the **back card** into the frame with the provided screws.
3. Firmly push the **front card** into the front corresponding back card slot.
4. Securely lock the **front card** in place with the top and bottom extractor handles.



Configuration

IMPORTANT: There are two (2) ways to configure multi-frame systems:

- Manual
- Dynamic - Ethernet links and TBX-2 links must be configured for dynamic operation.

Manual Configuration

To **manually configure the TBX-2 card**, the following steps must be completed for the Intercom System to be active:

Step 1 Configure each MCII-e Master Controller IP Address for the Ethernet (page 30)

Step 2 Configure the size of your Intercom system for each frame (page 31)

NOTE: Each frame must be configured exactly the same. The number of ports must not exceed the number of ports allowed for the number of frames in the intercom system.

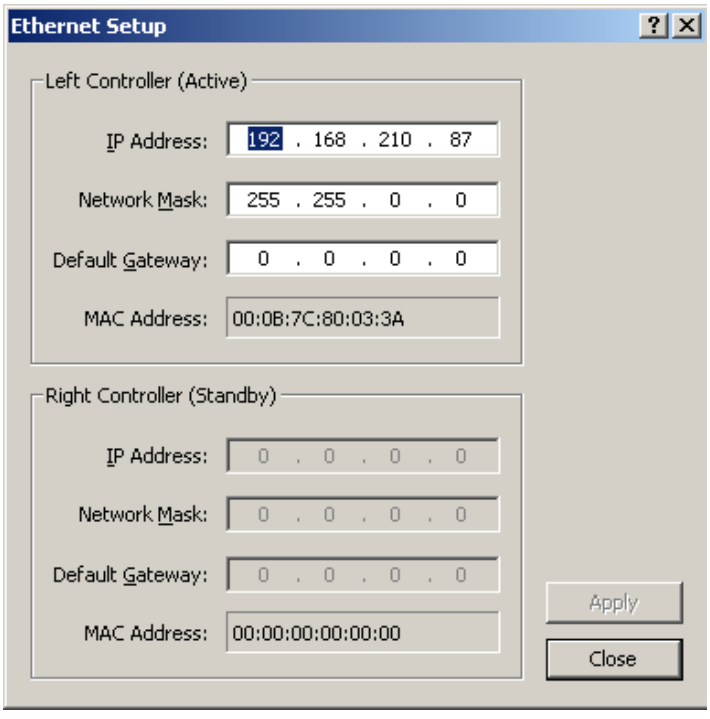
Step 3 Configure the frame using the Frame Mapping window in AZedit (page 35)

Step 4 Cable the Ethernet and TBX-2 Links (page 35)

Configure each MCII-e Master Controller IP Address for the Ethernet

To **configure the IP Address for the MCII-e**, do the following:

1. Verify you are **serially connected** to AZedit.
   You must be connected serially to make any changes to the Ethernet Setup window in AZedit.
2. Open **AZedit**.
3. From the Options menu, select **Ethernet Setup**.
   The Ethernet Setup window appears.



4. In the IP Address field, enter the **IP Address** for the MCII-e.
5. In the Network Mask field, enter the **Network Mask** for the MCII-e, if applicable

6. In the Default Gateway field, enter the **Default Gateway** for the MCII-e, if applicable.

   NOTE: If you are unsure of your IP Address, Network Mask, or Gateway Address, contact your System Administrator for this information.

7. Click **Apply**.
   The IP Address is set for the MCII-e.
8. Repeat **steps 1-7** for each frame in your system.

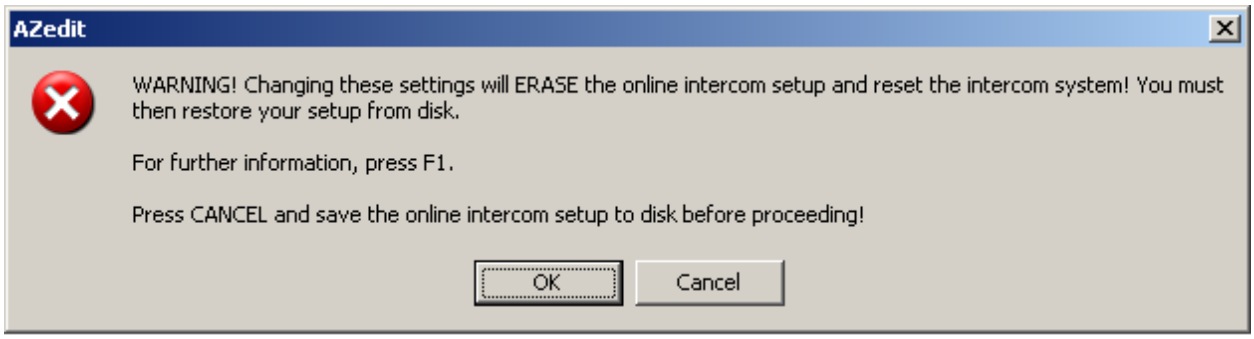
Configure the size of your Intercom system for each frame

NOTE: Each frame must be configured identically, otherwise they cannot talk to each other even when an Ethernet link is available.

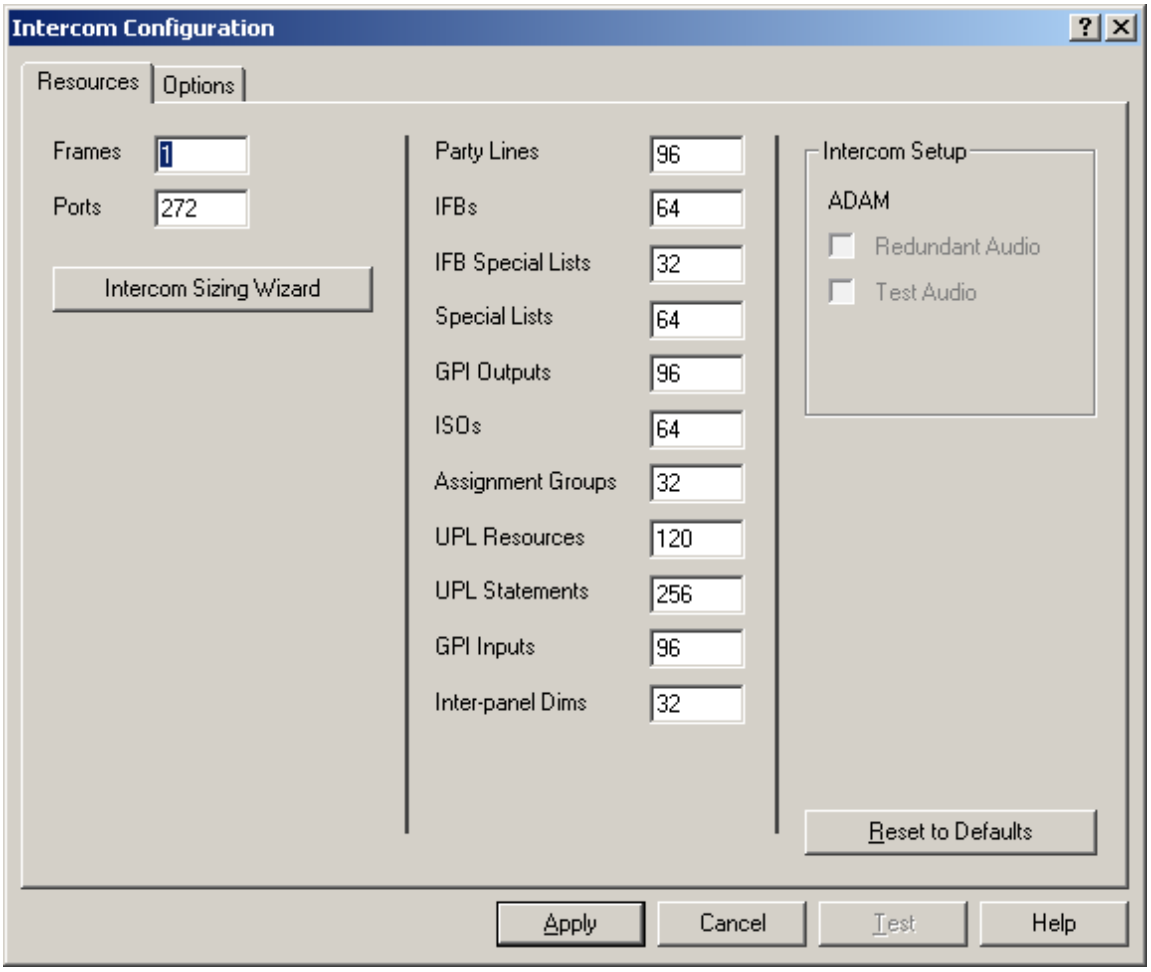
To **configure the size of your frame**, do the following:

IMPORTANT: You must know the number of frames and the number of ports your intercom system supports.

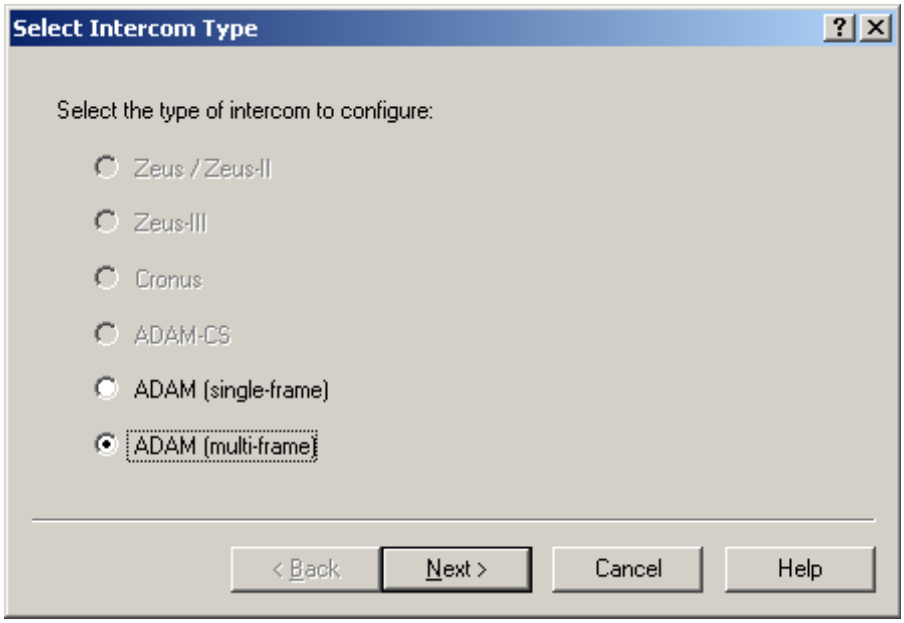
1. In AZedit, from the Options menu, select **Intercom Configuration**.
   A warning message appears.



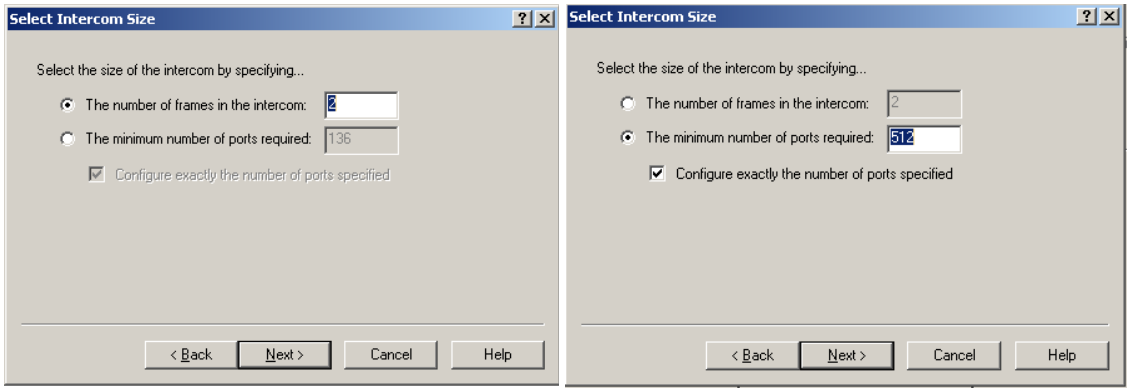
2. Click **OK**.
The Intercom Configuration window appears.



3. Click **Intercom Sizing Wizard**.
The Select Intercom Type window appears.

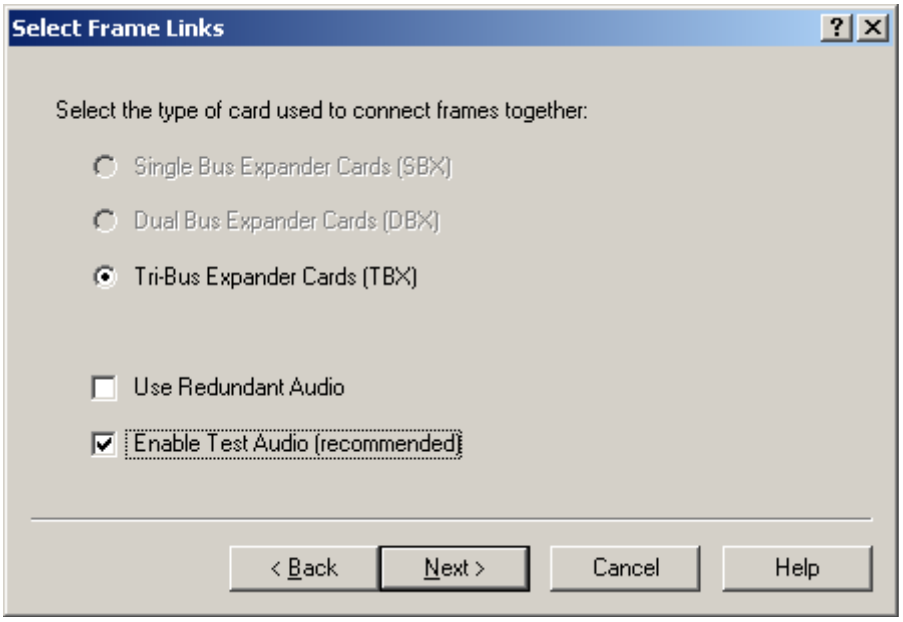


4. Select the **ADAM (multi-frame)** radio button.
5. Click **Next**.
   The Select Intercom Size window appears.



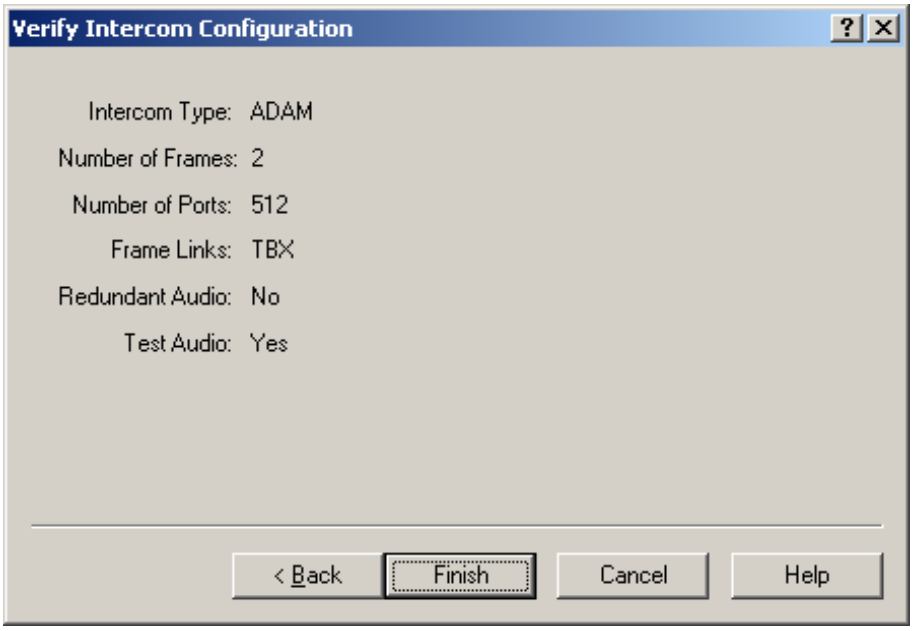
6. Select the **The number of frames in the intercom** radio button.
   OR
   Select the **minimum number of ports required** and enter the minimum number of ports you have.
7. Enter the **number of frames** in your system (up to eight (8) frames).

   NOTE: With TBX-2, no individual frame can have more than 256 ports and no single system can exceed 880 ports.
8. Click **Next**.
   The Select Frame Links window appears.

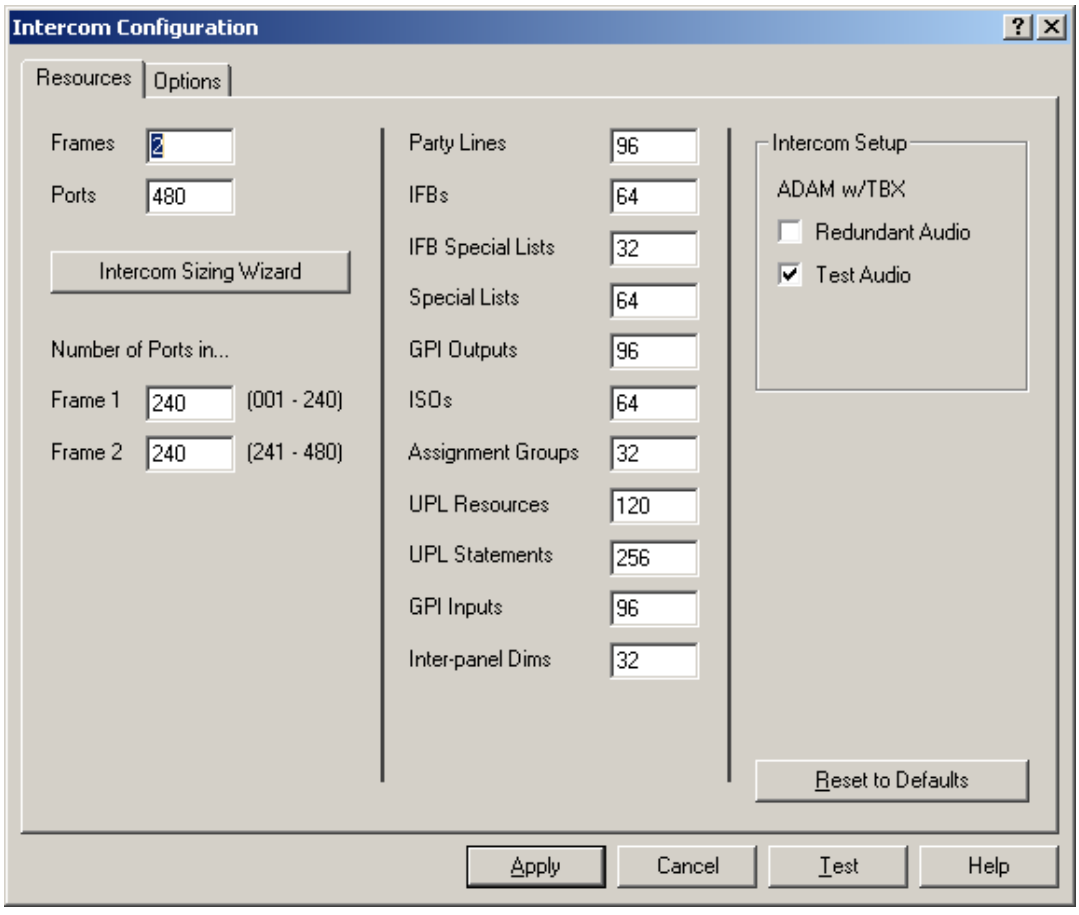


9. Verify the **TBX-2 Expander Cards (TBX-2)** radio button is selected.
10. Select the **Enable Test Audio (recommended)** check box.

11. Click **Next**.
The Verify Intercom Configuration window appears.



12. Verify the **information** displayed is correct.
13. Click **Finish**.
The Intercom Configuration window reappears.

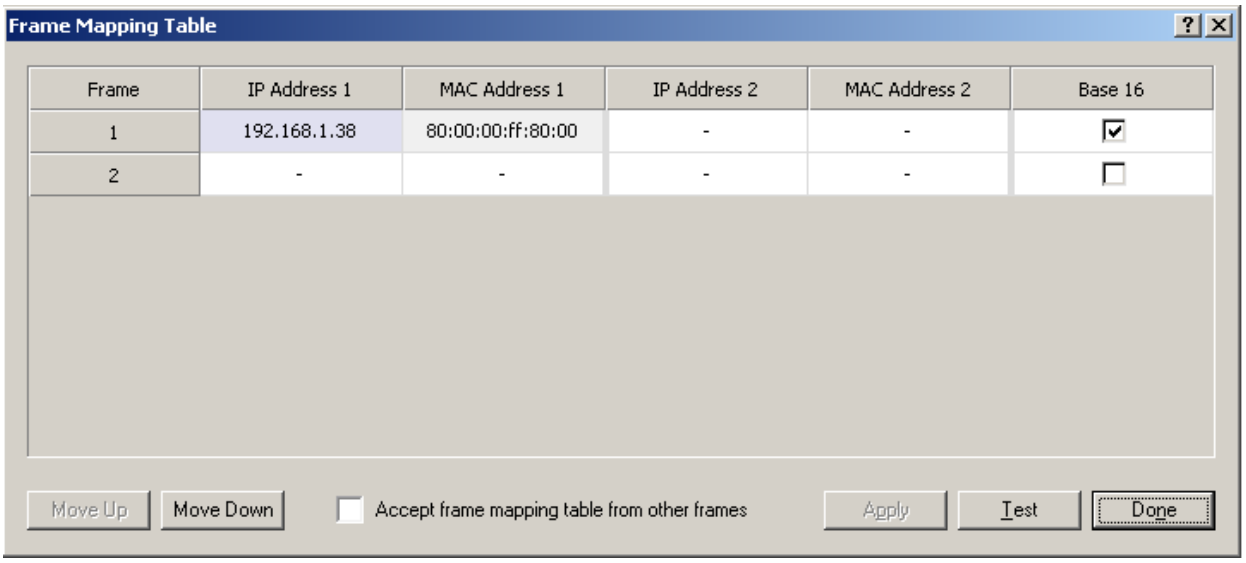


14. Under Number of Ports in, make any **changes to the frames** for port allocation, as needed.
15. Click **Test** to verify the configuration validity.
16. Click **Apply** to apply the configuration to the intercom system.
    The Intercom Configuration window closes and the configuration is applied to the intercom system.

Configure The Frame Using The Frame Mapping Window In Azedit

To **configure the frames with the Frame Mapping window**, do the following:

1. From the Options menu in AZedit, select **Frame Mapping Table**.
   The Frame Mapping Table appears with the current frame's IP and MAC Address(es) already entered in the table.



2. Click the **Frame 2 IP Address 1** field.
   The field becomes active and a browse button appears.
3. Enter the **IP Address** for Frame 2.
4. Repeat **step 2** and **step 3** for every frame to be included in the system.
5. Using the Move Up and Move Down buttons, move the **frame** to the hierarchical position you desire.
6. Repeat **step 5** for all the frames in the intercom system.
7. Click **Test**.
   The results will tell you the mapping is either valid or invalid.
8. Click **Apply**.
   The frames are mapped together.

Cable the Ethernet and TBX-2 Links

To **cable the Ethernet and TBX-2 Links**, do the following:

1. Power **off** all the frames in the system.
2. Using an Ethernet cable, connect **each frame** to the network.
3. Using figures 28 through 4, connect the **frames** with the fiber links.
4. Power **on** the system.

Dynamic Configuration

IMPORTANT: Remember to save your configuration, if needed, because it is deleted when making changes to the Intercom Configuration menu item.

To dynamically configure the TBX-2 card, the following steps must be completed for the Intercom System to be active:

Step 1 Configure each MCII-e Master Controller IP Address for the Ethernet (page 30)

Step 2 Configure the size of your Intercom system for each frame (page 31)

NOTE: Each frame must be configured exactly the same. The number of ports must not exceed the number of ports allowed for the number of frames in the intercom system.

Step 3 Cable the Ethernet and TBX-2 Links (page 40)

Step 4 Configure the frame using the Frame Mapping window in AZedit (page 35)

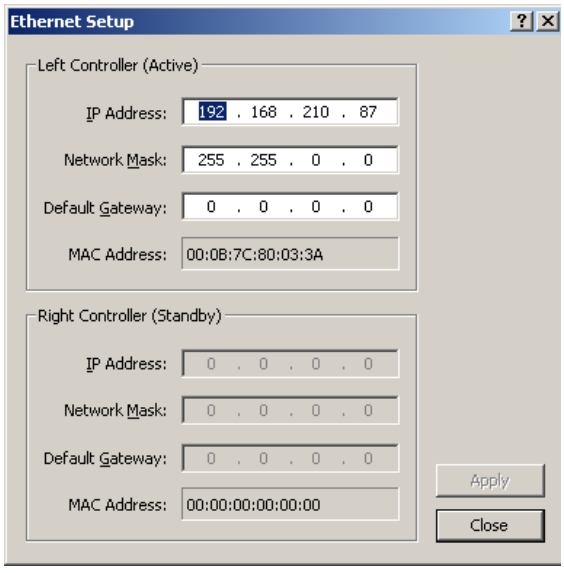
Configure each MCII-e Master Controller IP Address for the Ethernet

To **configure the IP Address for the MCII-e**, do the following:

1. Verify you are **serially connected** to AZedit.

IMPORTANT: You must be connected serially to make any changes to the Ethernet Setup window in AZedit.

2. Open **AZedit**.
3. From the Options menu, select **Ethernet Setup**.
   The Ethernet Setup window appears.



4. In the IP Address field, enter the **IP Address** for the MCII-e.
5. In the Network Mask field, enter the **Network Mask** for the MCII-e, if applicable
6. In the Default Gateway field, enter the **Default Gateway** for the MCII-e, if applicable.

NOTE: If you are unsure of your IP Address, Network Mask, or Gateway Address, contact your System Administrator for this information.

7. Click **Apply**.
   The IP Address is set for the MCII-e.
8. Repeat **steps 1-7** for each frame in your system.

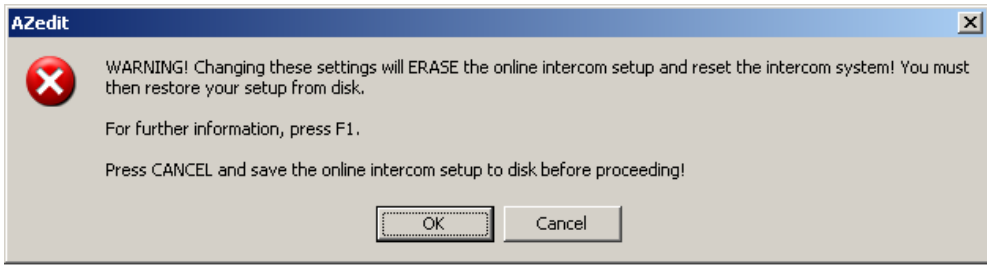
Configure the Size of your Intercom System for each Frame

NOTE: Each frame must be configured identically, otherwise they cannot talk to each other even when an Ethernet link is available.

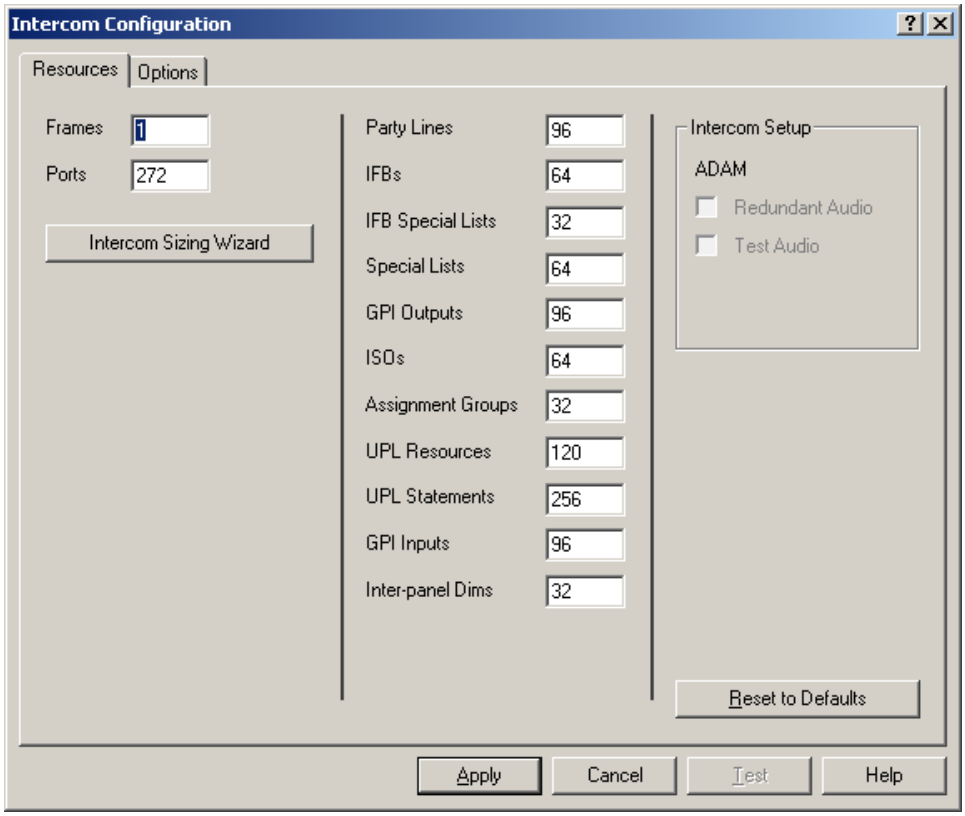
To **configure the size of your frame**, do the following:

IMPORTANT: You must know the number of frames and the number of ports your intercom system supports.

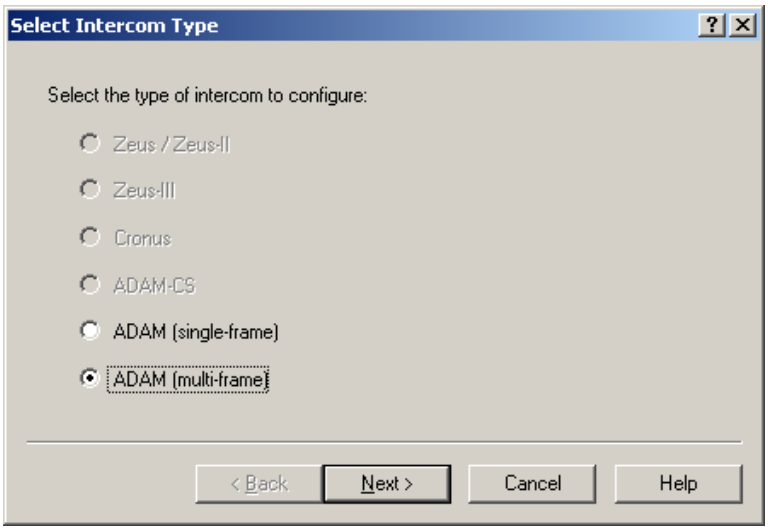
1. In AZedit, from the Options menu, select **Intercom Configuration**.
   A warning message appears.



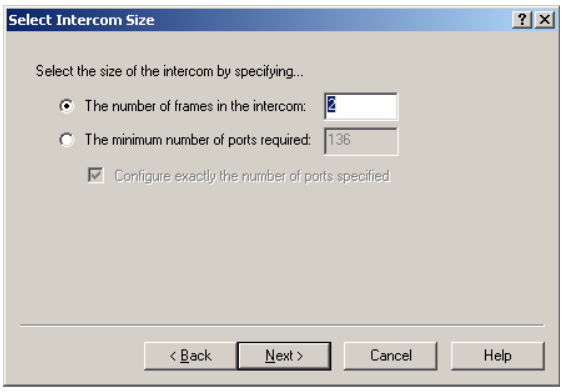
2. Click **OK**.
   The Intercom Configuration window appears.

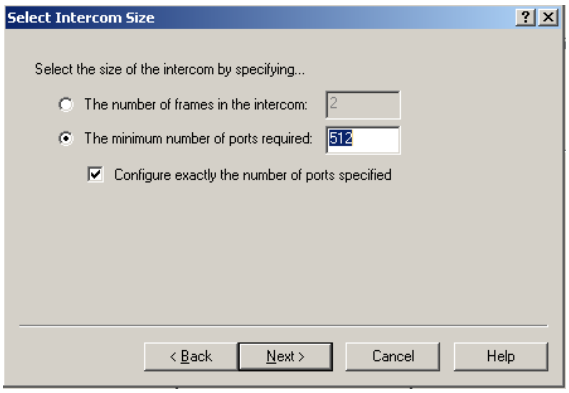


3. Click **Intercom Sizing Wizard**.
The Select Intercom Type window appears.



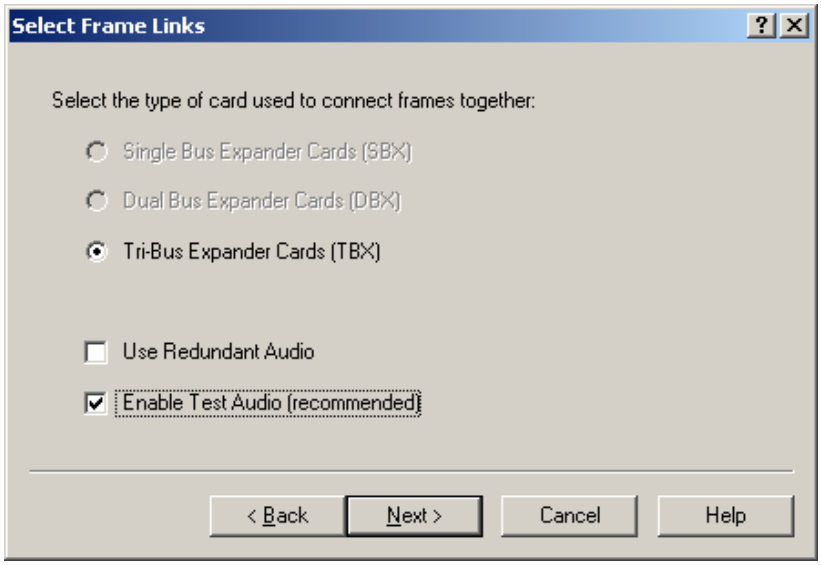
4. Select the **ADAM/ADAM-M (multi-frame)** radio button.
5. Click **Next**.
The Select Intercom Size window appears.



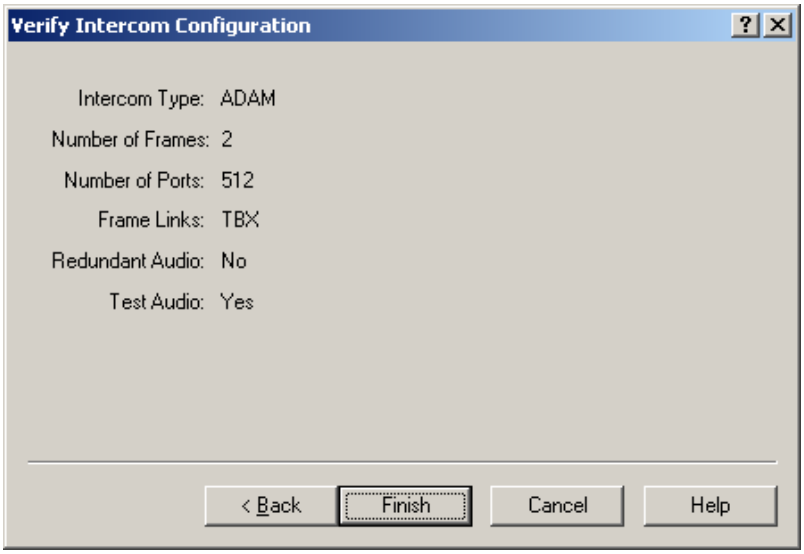


6. Select the **The number of frames in the intercom** radio button.
OR
Select the **minimum number of ports** required and enter the **minimum number of ports** you have.
7. Enter the **number of frames** in your system (up to eight (8) frames).

8. Click **Next**.
The Select Frame Links window appears.

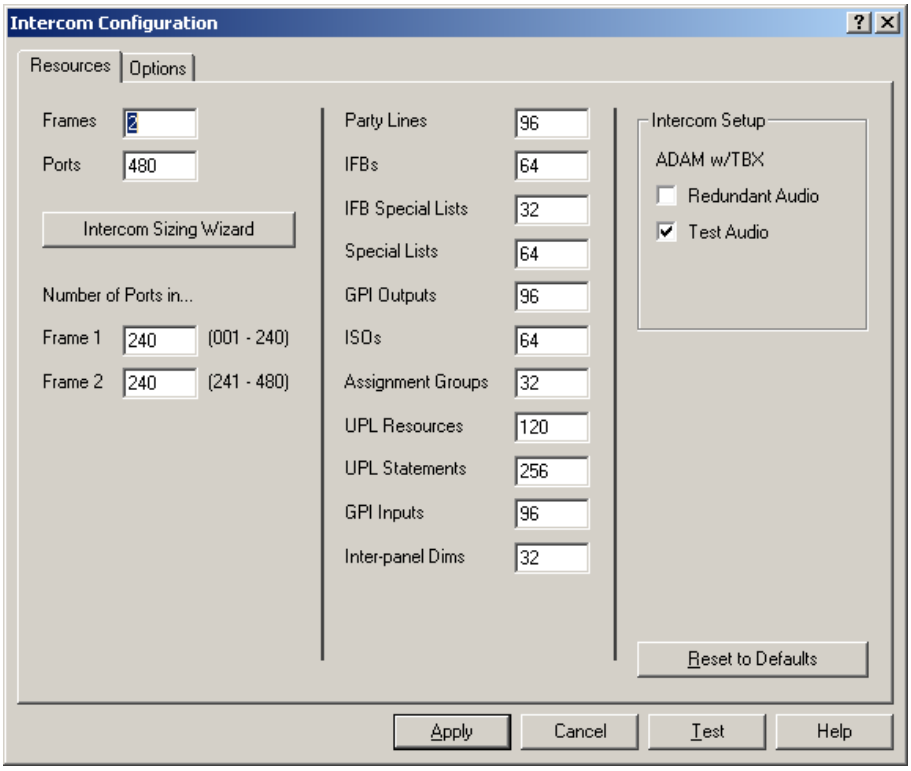


9. Verify the **TBX-2 Expander Cards (TBX-2)** radio button is selected.
10. Select the **Enable Test Audio (recommended)** check box.
11. Click **Next**.
The Verify Intercom Configuration window appears.



12. Verify the **information** displayed is correct.

13. Click **Finish**.
The Intercom Configuration window reappears.



NOTE: If redundant is not selected, redundant TBX-2 cards cannot be used in the same frame because ports are allocated to slot 9 and the Matrix cannot register the second TBX-2 card.

Test audio uses ports at the end of the 256 slots to send an audio test signal to other frames in the system and waits for them to be acknowledge. If the port gets back something different/out of range, it tears down the audio links and remakes them. Once finished, the process starts over. Test Audio should always be selected.

14. Under Number of Ports in, make any **changes to the frames** for port allocation, as needed.
15. Click **Test** to verify the configuration validity.
16. Click **Apply** to apply the configuration to the intercom system.
The Intercom Configuration window closes and the configuration is applied to the intercom system.

Cable the Ethernet and TBX-2 Links

To **cable the Ethernet and TBX-2 Links**, do the following:

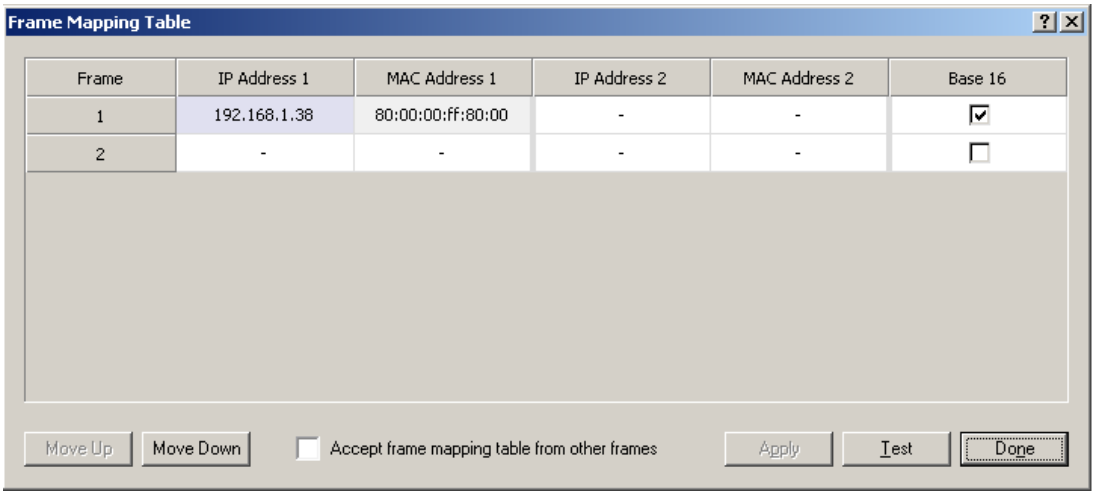
1. Power **off** all the frames in the system.
2. Using an Ethernet cable, connect **each frame** to the network.
3. Using figures 28 through 4, connect the **frames** with the fiber links.
4. Power **on** the system.

Configure the frame using the Frame Mapping window in AZedit

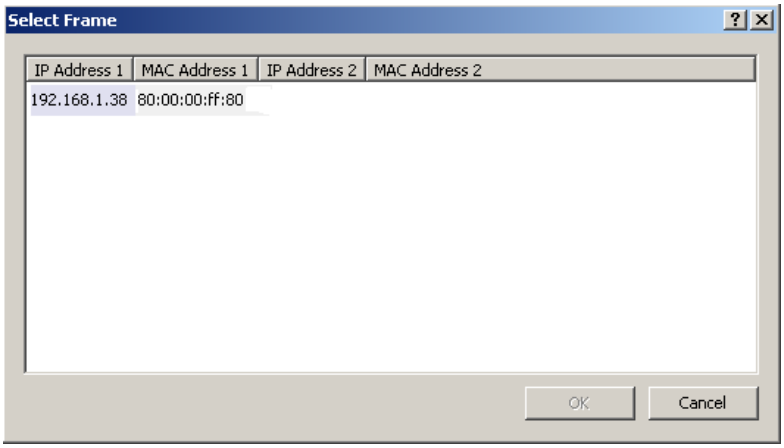
To **configure the frames with the Frame Mapping window**, do the following:

TIP: To save time from manually entering in the IP Addresses and MAC Addresses for all you frames, be sure to connect to Ethernet. By being connected via Ethernet, you can browse for the other ADAM/ADAM-M frame's addresses, select them, and automatically update the table.

1. From the Options menu in AZedit, select **Frame Mapping Table**.
   The Frame Mapping Table appears with the current frame's IP and MAC Address(es) already entered in the table.



2. Click the **Frame 2 IP Address 1** field.
   The field becomes active and a browse button appears.
3. Click the **browse** button.
   The Select Frame window appears.



4. Select the **Frame(s)** to add to the Frame Mapping Table.
5. Click **OK**.
   The Select Frame window closes and the frame information appears in the Frame Mapping Table.
6. Using the Move Up and Move Down buttons, move the **frame** to the hierarchical position you desire.
7. Repeat **step 6** for all the frame in the intercom system.
8. Click **Test**.
   The results display the mapping is either valid or invalid.

9. Click **Apply**.
   *The frame reset*s.
10. Open the **Frame Mapping Table**.

    NOTE: Steps 11 through 13 must be done on each frame in the system, except frame 1.

11. Select the **Accept frame mapping table from other frames** check box.
12. Click **Test**.
13. Click **Apply**.
    The frame resets.

Base 8 vs. Base 16 Port Number Systems

With the advent of the TBX-2 card and the ever-evolving technology to a 16-channel port system, **Base 8** (or standard density) and **Base 16** (or high density) port number systems were created.

NOTE: Any 16-channel card, must use the high density (Base 16) port numbering system. Alternatively, any 8-channel card can use either the standard density (Base-8) or high density (Base 16) port numbering system

Base 8 Port Number System

The **Base 8 Port Number System** splits 16 ports between a top and bottom group. The bottom group starts with 1 through 136; the top group consists of ports 137 through 272 (see Figure 7).

EXAMPLE: This means that if you have an AIO-16 in slot 1, ports 1–8 and 137–144 is used by the AIO-16 card. Alternatively, if you have AIO-16's in slots 1 and 3 and an AIO-8 in slot 2, the following port mapping applies:

Figure 4. Example for Base 8 Port Numbering

<table>
<tr><td rowspan="2">AIO-16 Ports 1– 8 and 137–144</td><td>Ports 145-161 are not used when an AIO-8 card is in the slot</td><td rowspan="2">AIO-16 Ports 17–33 and 162–178</td></tr>
<tr><td>AIO–8 Ports 9–16</td></tr>
</table>

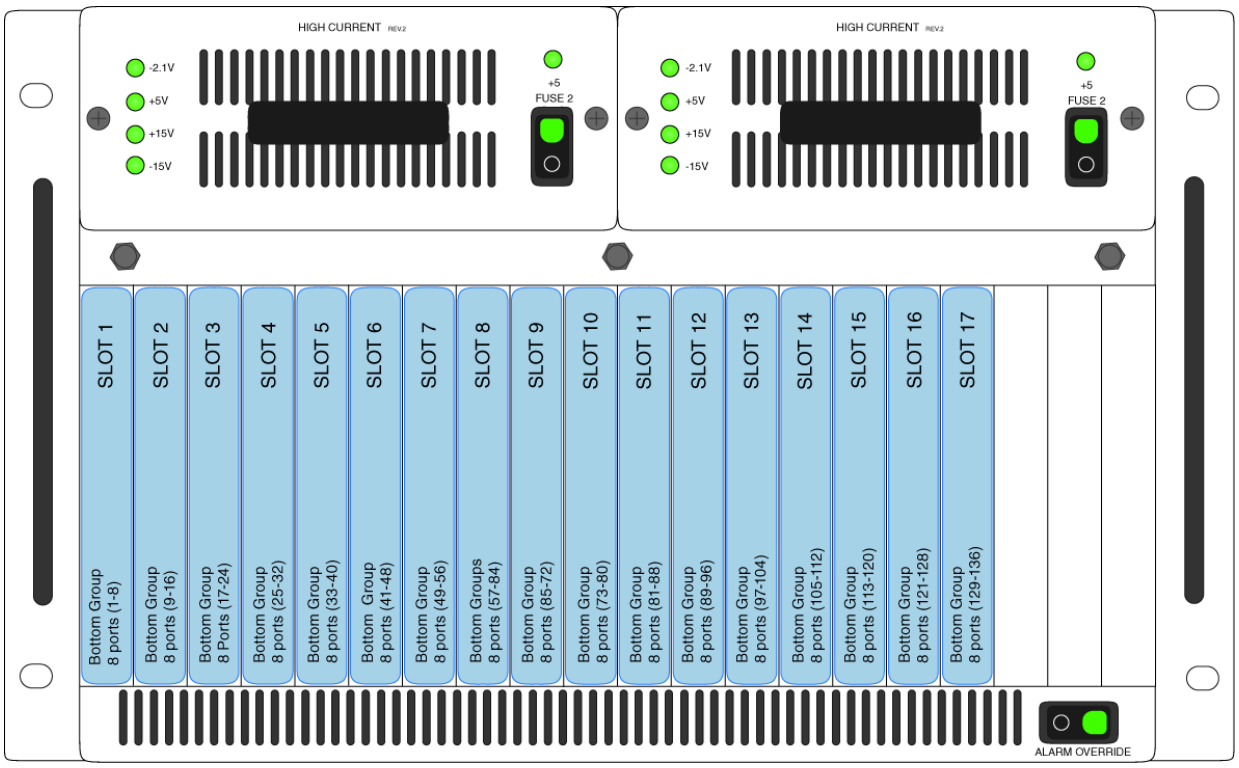


FIGURE 7. Base 8 Port Numbering System Example

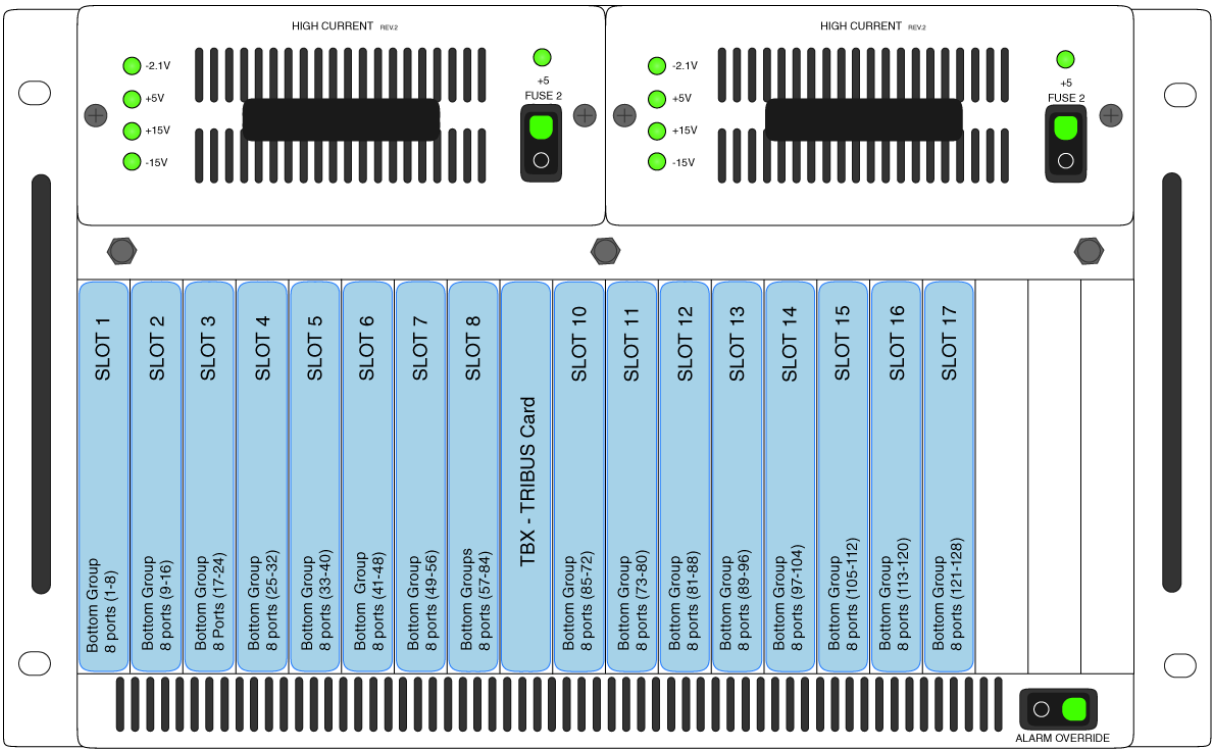


FIGURE 8. Tribus Slot in the ADAM Frame

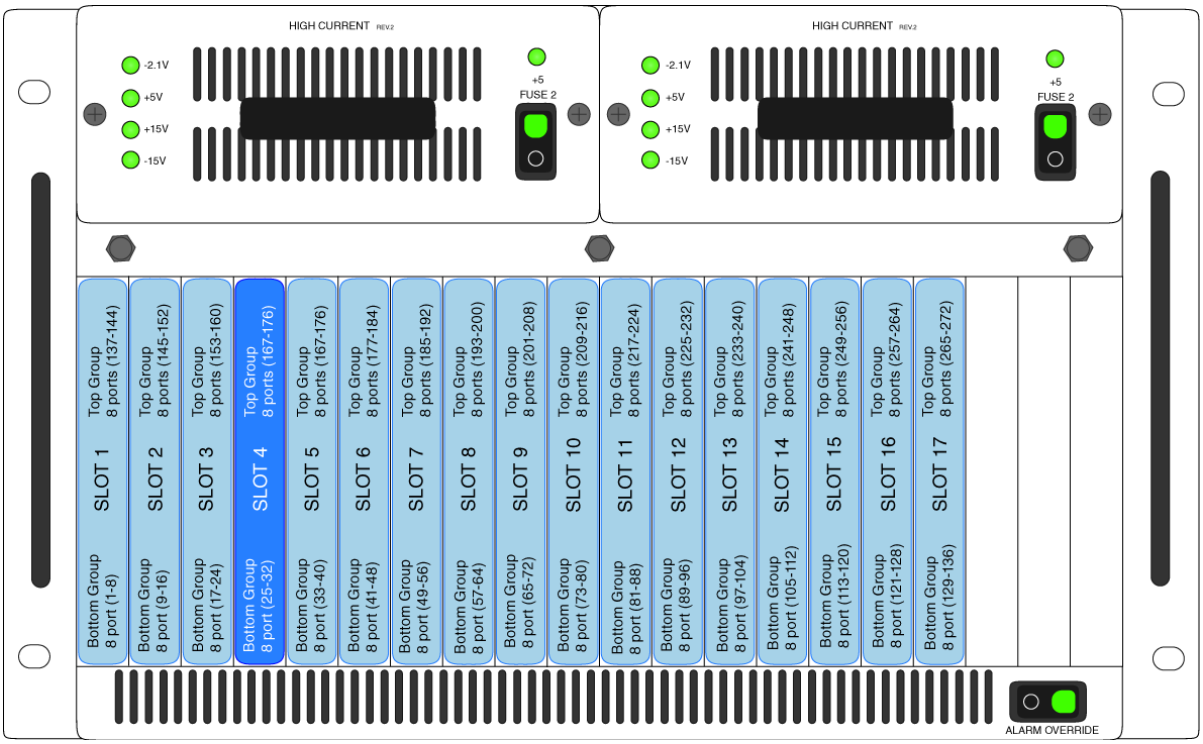


FIGURE 9. Base 8 Port Numbering scheme with both AIO-16 and an AIO-8 card installed.

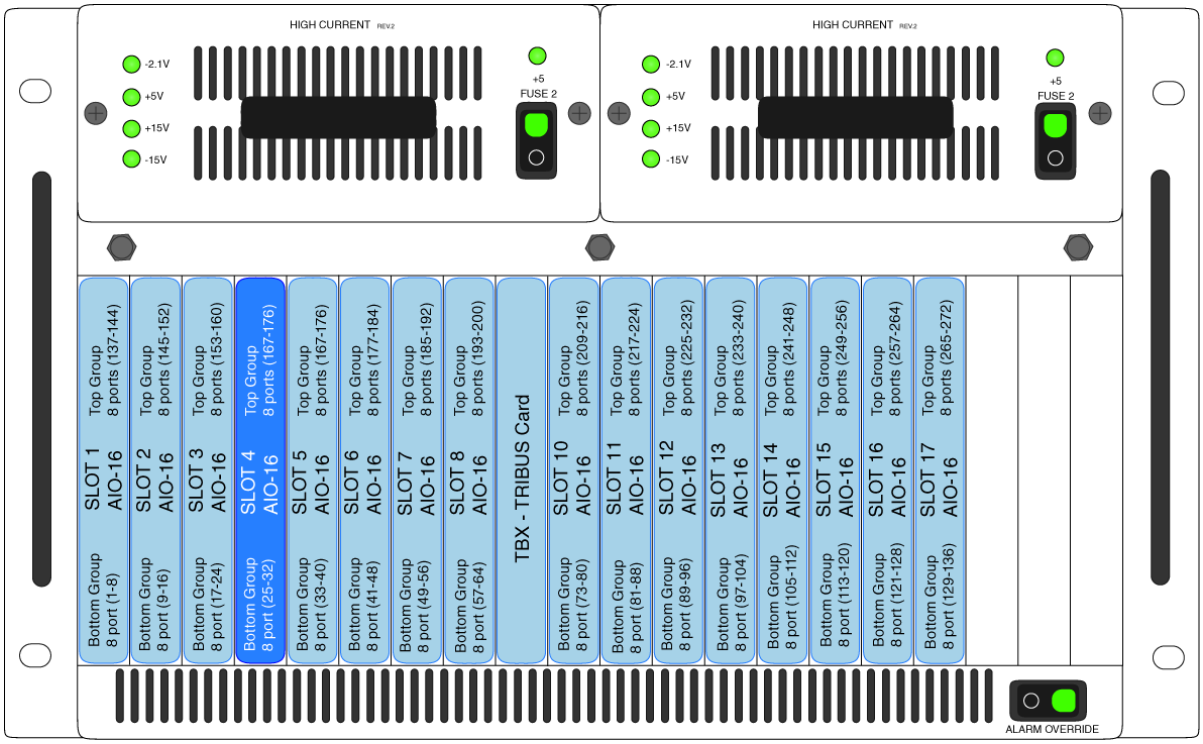
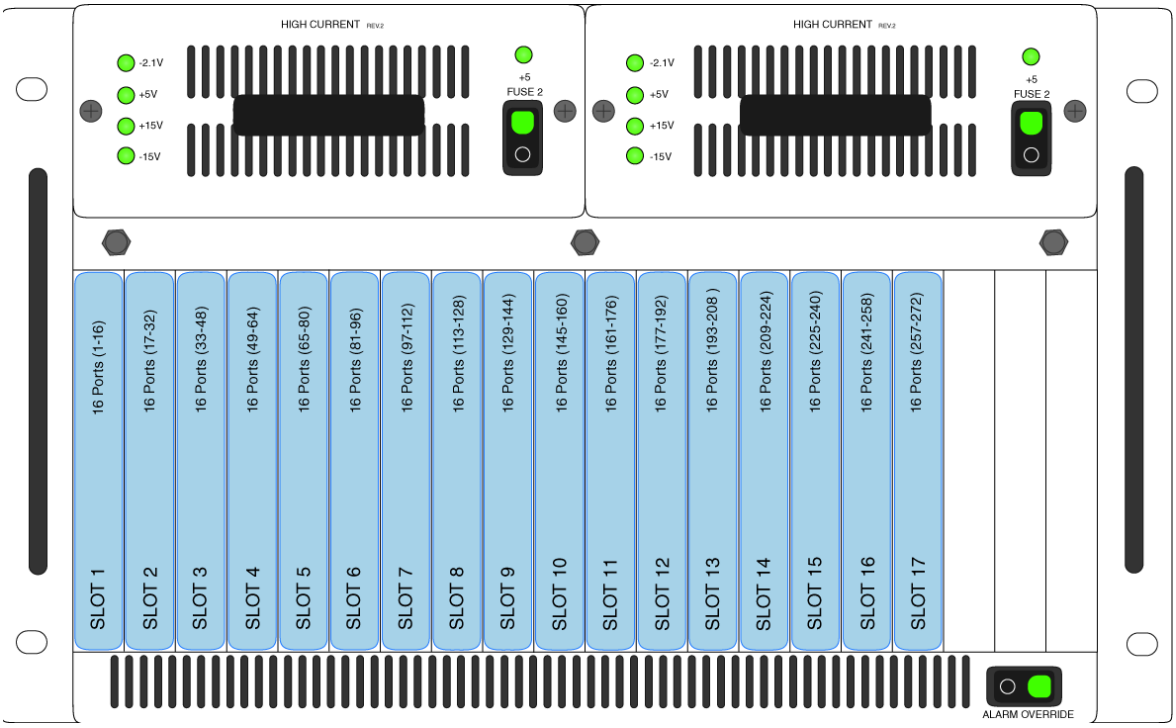
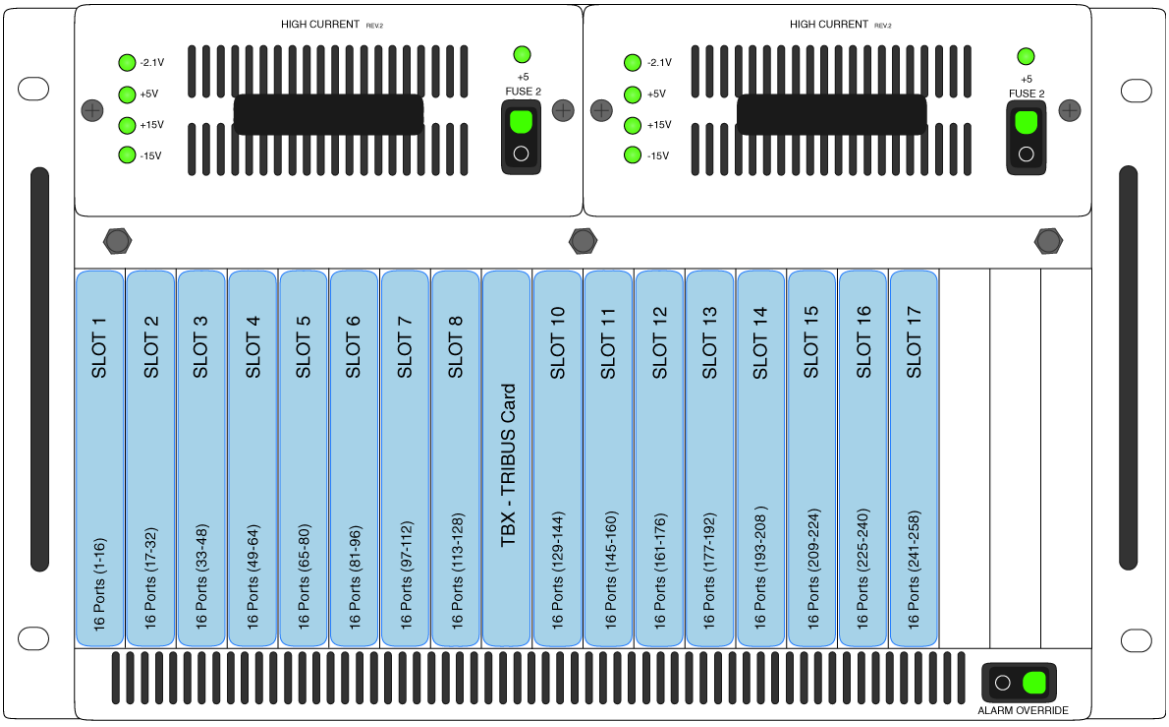


FIGURE 10. Base 8 Port Numbering scheme with both AIO-16 and AIO 8 card installed

Base 16 Port Number System

The **Base 16 Port Number System** is newly supported with the TBX-2 Card. Unlike the Base 8 Port Number System, where the ports were split into an upper and lower set of eight (8) ports, the Base 16 Port Number System puts all 16 ports in one slot. This means, when you configure your intercom system to support Base 16, slot 1 in the ADAM holds ports 1through 16, slot 2 holds ports 17 through 33, slot 3 holds 34 through 49, and so on. When a TBX-2 card is inserted into the frame, the port numbering system jumps to the next available AIO card slot,.





Force Autonomous Mode Check Box

The **Force Autonomous Mode** check box, shown in Figure 11, is used to force the current frame into autonomous (independent) mode, if none of its TBX-2 audio links are active. Normally, a frame communicates with other frames that are part of the same intercom. However, the Options page of the Intercom Configuration dialog has a new option, *Force Autonomous Mode when no audio links up*. If selected, the frame refuses to communicate with any other frames if none of its TBX-2 links are up, even if Ethernet communications are fine. And, once one (1) or more of its audio links are restored, the frame automatically tries to re-establish messaging links to the other frames in the cluster.

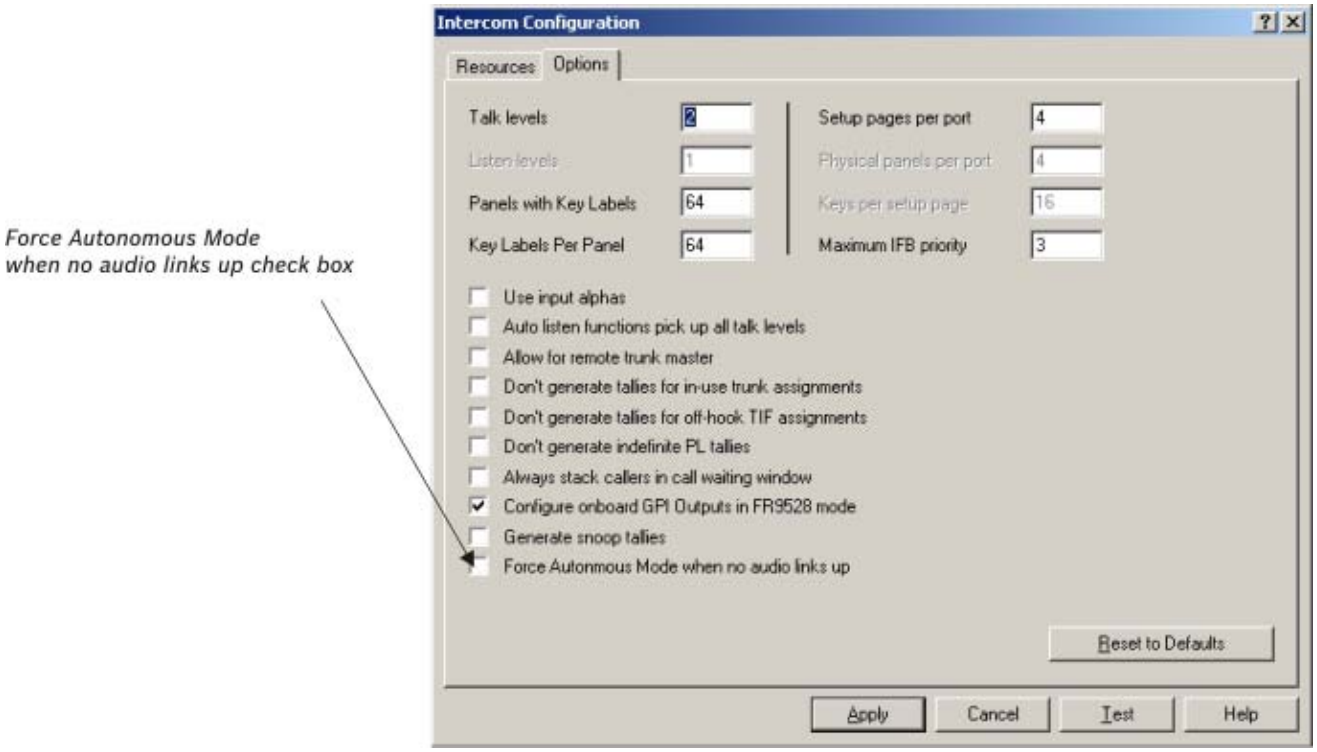
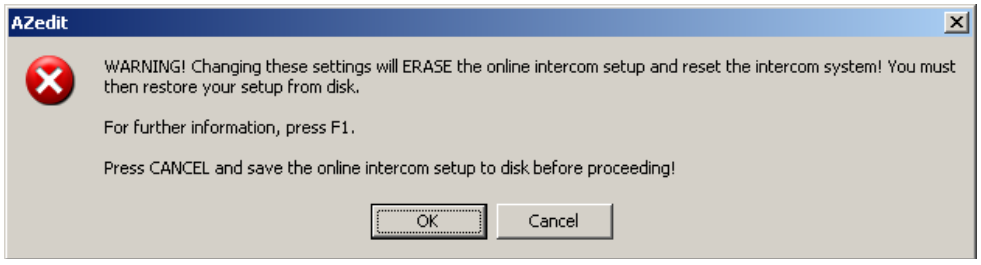


FIGURE 11. Force Autonomous Mode when no audio links up

To **Force Autonomous Mode when no audio links are up**, do the following:

1. From the Options menu in AZedit, select **Intercom Configuration**.
   A warning window appears.



2. Click **OK**.
   The Intercom Configuration window appears.
3. Click the **Options tab**.
   The Options page appears.
4. Select the **Force Autonomous Mode when no audio links up** check box.
   Force Autonomous Mode is enabled.
5. Click **Apply**.
   The Intercom Configuration window closes.

AZedit Connections

The **AZedit Connections** menu item, shown in Figure 12, is used to select a frame that AZedit connects to. This menu also has the option to *Auto Connect*. If this is selected, AZedit automatically tries to connect to another frame if it loses its connection to the current frame.

NOTE: This menu is only available when AZedit is configured to communicate using Ethernet.

TIP: You can also change the frame, the serial port, or IP Address in the Communications window (*Options*|*Communications*).

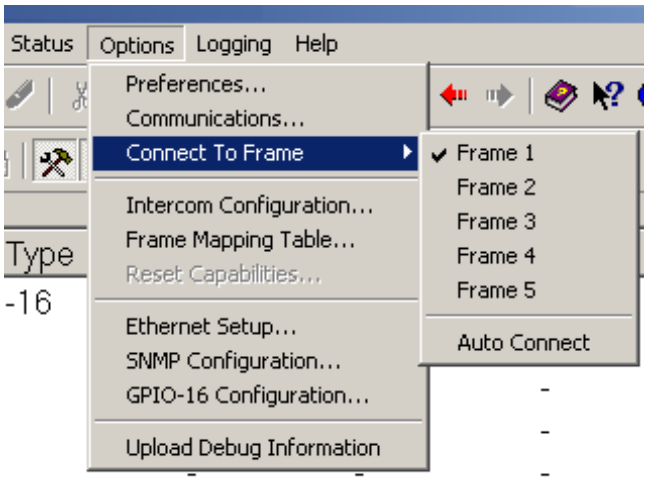


FIGURE 12. Connect To Frame Menu

Frame Mapping Table Window

The **Frame Mapping Table** window, shown in Figure 13, is used to link TBX-2 frames together. Determine the frame position (1 through 8) and enter the primary and secondary MCII-e Master Controller IP Addresses.

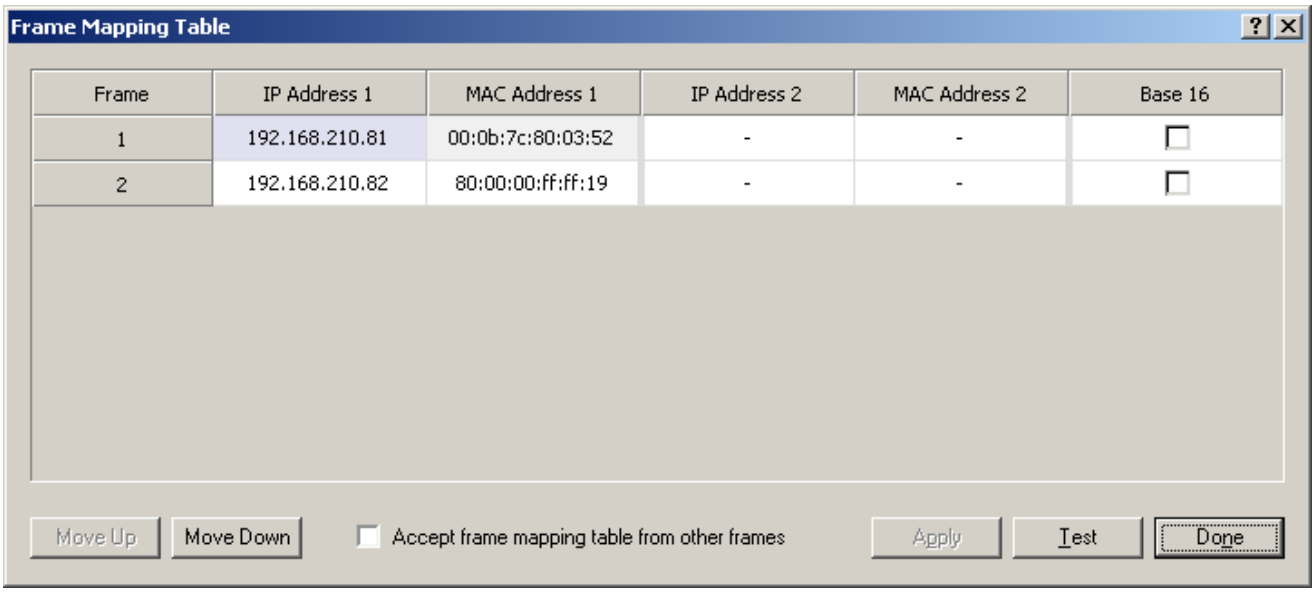


FIGURE 13. Frame Mapping Table

Frame Column

The **Frame** column displays the frame's positional rank within the intercom system.

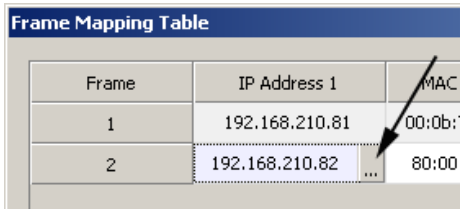
IP Address 1 Column

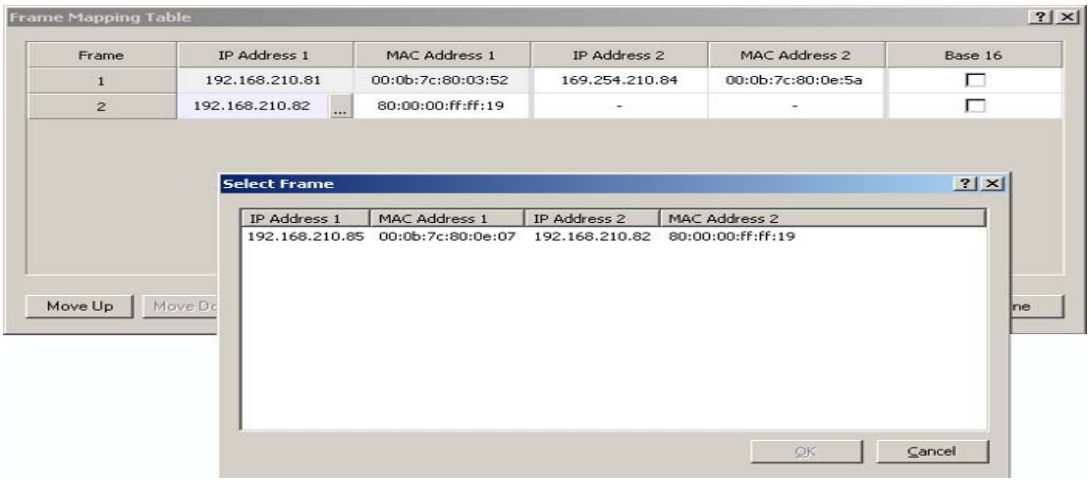
The **IP Address 1** column indicates the IP Address of the Active MCII-e Master Controller.

To **set the IP Address**, do the following:

1. Click the **Address** to make the field active and the Browse button appear.
2. Click the **Browse** button to open the Select Frame Window.

   NOTE: For more information, see “Select Frame Window” on page 52.





MAC Address 1 Column

The **MAC Address 1** column indicates the MAC Address of the active MCII-e Master Controller in the frame.

IP Address 2 Column

The **IP Address 2** column indicates the standby MCII-e Master Controller IP Address.

To **set the IP Address 2**, do the following:

1. Click the **Address** to make the field active and the Browse button appear.
2. Click the **Browse button** to open the Select Frame Window.

   NOTE: For more information, see “Select Frame Window” on page 52.

MAC Address 2 Column

The **MAC Address 2** column indicates the MAC Address of the standard MCII-e Master Controller in the frame.

Base 16 Column Check Box

The **Base 16** check box is used to enable the Base 16 port number system. For more information, see “Base 8 vs. Base 16 Port Number Systems” on page 42.

Move Up Button

The **Move Up** button allows you to set the frame position of the system up in the frame hierarchy. Frame 1 is the master frame and holds the most complete frame mapping table. If frame 1 fails, then frame 2 becomes the master frame.

Move Down Button

The **Move Down** button allows you to set the frame position of the system down in the frame hierarchy. Frame 1 is the master frame and holds the most complete frame mapping table. If frame 1 fails, then frame 2 becomes the master frame.

Accept Frame Mapping Table from Other Frames Check Box

The **Accept Frame Mapping Table from Other Frames** check box is used to allow other frames to send their frame mapping information to the selected frame.

IMPORTANT: This check box does not remain selected once the frame has been tested and accepted.

NOTE: Each frame in a valid system must be defined in a table map to be able to communicate with the other frames in the system.

Apply Button

The **Apply** button is used to accept the modifications you make and send them to the Intercom System. Once the modifications have been applied, AZedit displays the message below and then reboots itself.

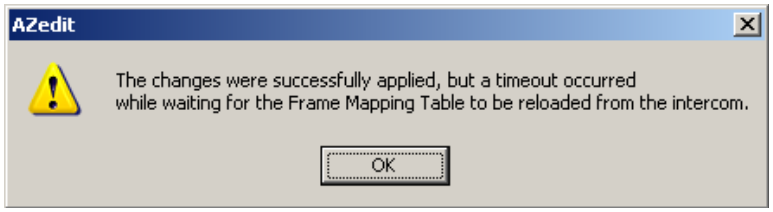


FIGURE 14. Apply Button message

NOTE: You must press the **Test** button before the Apply button becomes active.

Test Button

The **Test** button is used to test the frame mapping configuration you create. Once you have tested your frame map configuration, press the **Apply** button to implement the modifications you make. The message below appears if the frame map is deemed valid.

FIGURE 15. Frame Mapping Table Valid message

Done Button

The **Done** button is used to close the Frame Mapping window.

Select Frame Window

The **Select Frame** window, shown in Figure 16, is used to select a Frame (IP Address and MAC Address) to include in the Frame Mapping table for your TBX-2 Intercom System.

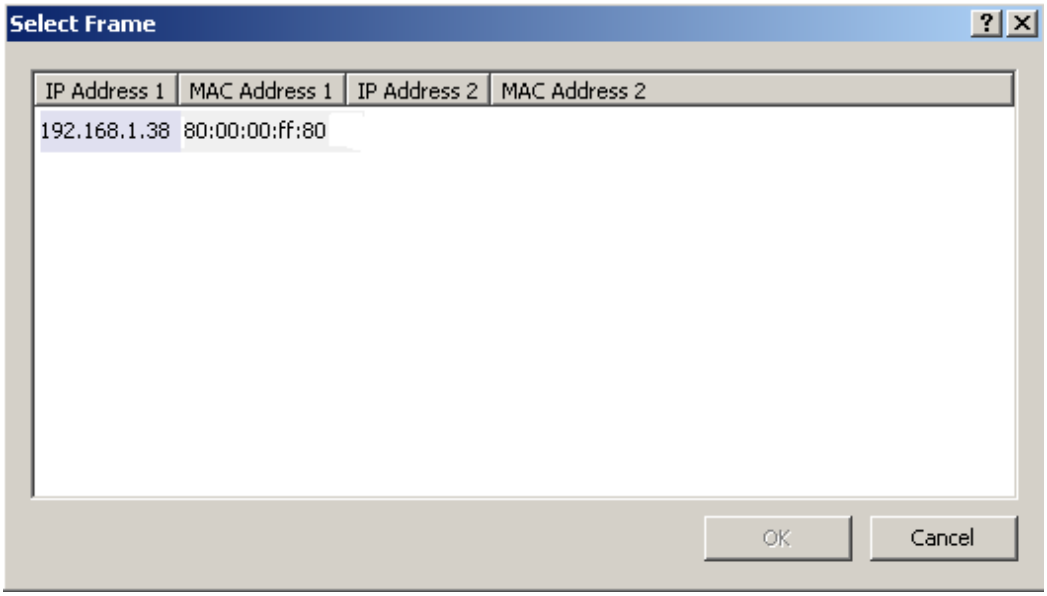


FIGURE 16. Select Frame Window

IP Address 1 Column

The **IP Address 1** column displays the IP Address of the active master controller in the ADAM/ADAM-M frame.

MAC Address 1 Column

The **MAC Address 1** column displays the MAC Address of the active master controller in the ADAM/ADAM-M frame.

IP Address 2 Column

The **IP Address 2** column displays the IP Address of the standby master controller, if available, in the ADAM/ADAM-M frame.

MAC Address 2 Column

The **MAC Address 2** column displays the MAC Address of the standby master controller, if available, in the ADAM/ADAM-M frame.

OK Button

The **OK** button is used to accept the selections made and close the window.

Cancel Button

The **Cancel** button is used to reject the selections made and close the window.

TBX-2 Links Status Window

The **TBX-2 Links Status** window, shown in Figure 17, is used to check the status of the TBX-2 card status. From this window, you can also download firmware. For more information, see “Firmware Upgrades” on page 61.

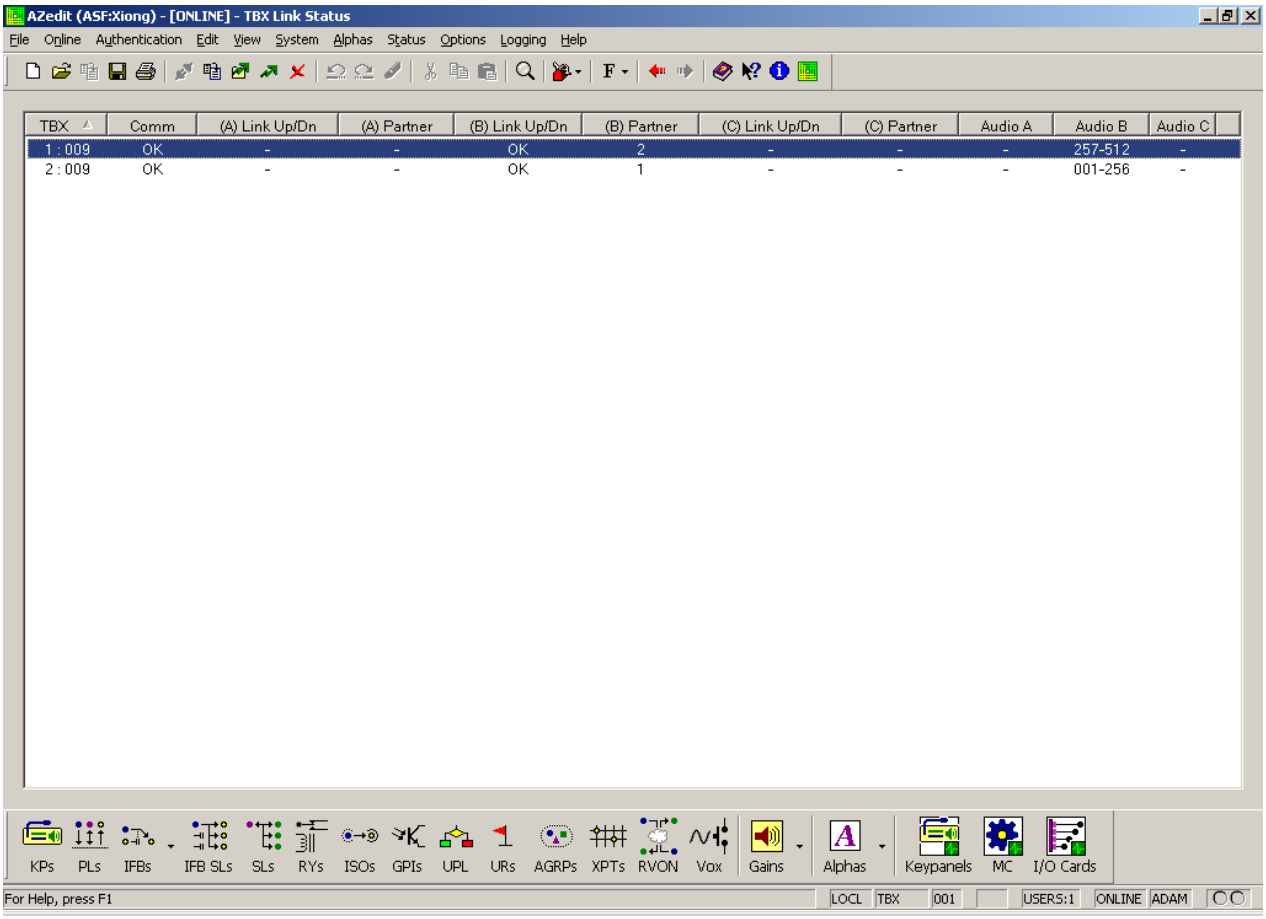


FIGURE 17. TBX-2 Links Status Window

TBX-2 Column

The **TBX-2** column displays TBX-2 cards listed by frame and slot number.

EXAMPLE: **2:009** indicates the TBX-2 card is in Frame 2 and occupying slot 9.

Comm Column

The **Comm** column displays the communications status of the TBX-2 card.

(A) Link Up/Dn Column

The **(A) Link Up/Dn** column displays the status of the links on the TBX-2 port A.

Any of the following indicators may appear:

"—"	The link is down.
OK	The link is up for # hops.

(A) Partner Column

The **(A) Partner** column displays frame number of the TBX-2 card to which the connection is made. For example, if Frame 1's A connector is connected to Frame 2, a *2* appears under the (A) Partner column.

NOTE: If there are multiple TBX-2 cards in a frame, use the slot number to determine the card connection being used.

(B) Link Up/Dn Column

The **(B) Link Up/Dn** column displays the status of the links on the TBX-2 port B.

Any of the following indicators may appear:

"—"	The link is disabled.
OK	The link is active for # hops.

(B) Partner Column

The **(B) Partner** column displays frame number of the TBX-2 card to which the connection is made. For example, if Frame 1's B connector is connected to Frame 2, a *2* appears under the (B) Partner column.

NOTE: If there are multiple TBX-2 cards in a frame, use the slot number to determine the card connection being used.

(C) Link Up/Dn Column

The **(C) Link Up/Dn** column displays the status of the links on the TBX-2 port C.

Any of the following indicators may appear:

"—"	The link is disabled. If this is seen, the intercom ports were not configured correctly. See "Configuration" on page 30 to read how to configure the ports.
OK	The link is active for # hops.

(C) Partner Column

The **(C) Partner** column displays frame number of the TBX-2 card to which the connection is made. For example, if Frame 1's C connector is connected to Frame 2, a *2* appears under the (C) Partner column.

NOTE: If there are multiple TBX-2 cards in a frame, use the slot number to determine the card connection being used.

Audio A Column

The **Audio A** column displays the ports assigned to the Audio A link.

Audio B Column

The **Audio B** column displays the ports assigned to the Audio B link.

Audio C Column

The **Audio C** column displays the ports assigned to the Audio C link.

Intercom Alarms

The **Intercom Alarms** window, shown in Figure 18, displays alarms that occur in the intercom and an indication of whether they have been resolved or not. If an alarm has not been resolved, it is highlighted in yellow on the status bar (see Figure 18). Once an alarm has been resolved, it is automatically deleted out of the list after five (5) minutes.

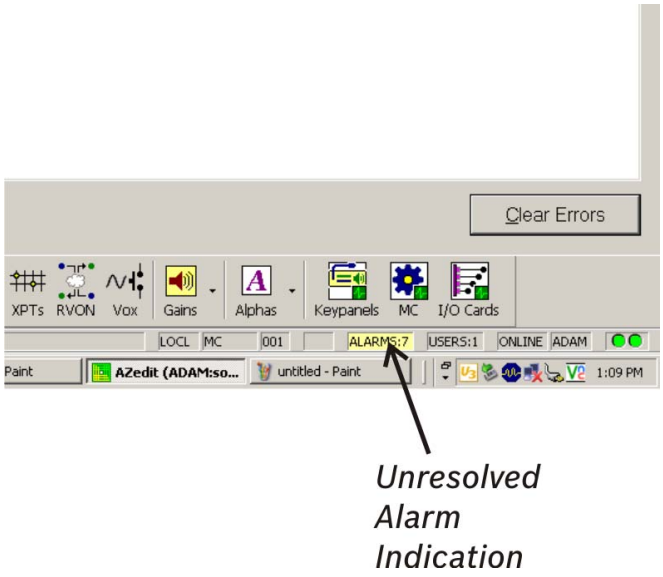
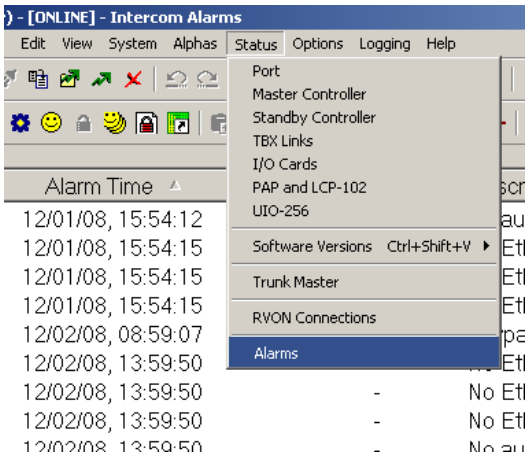


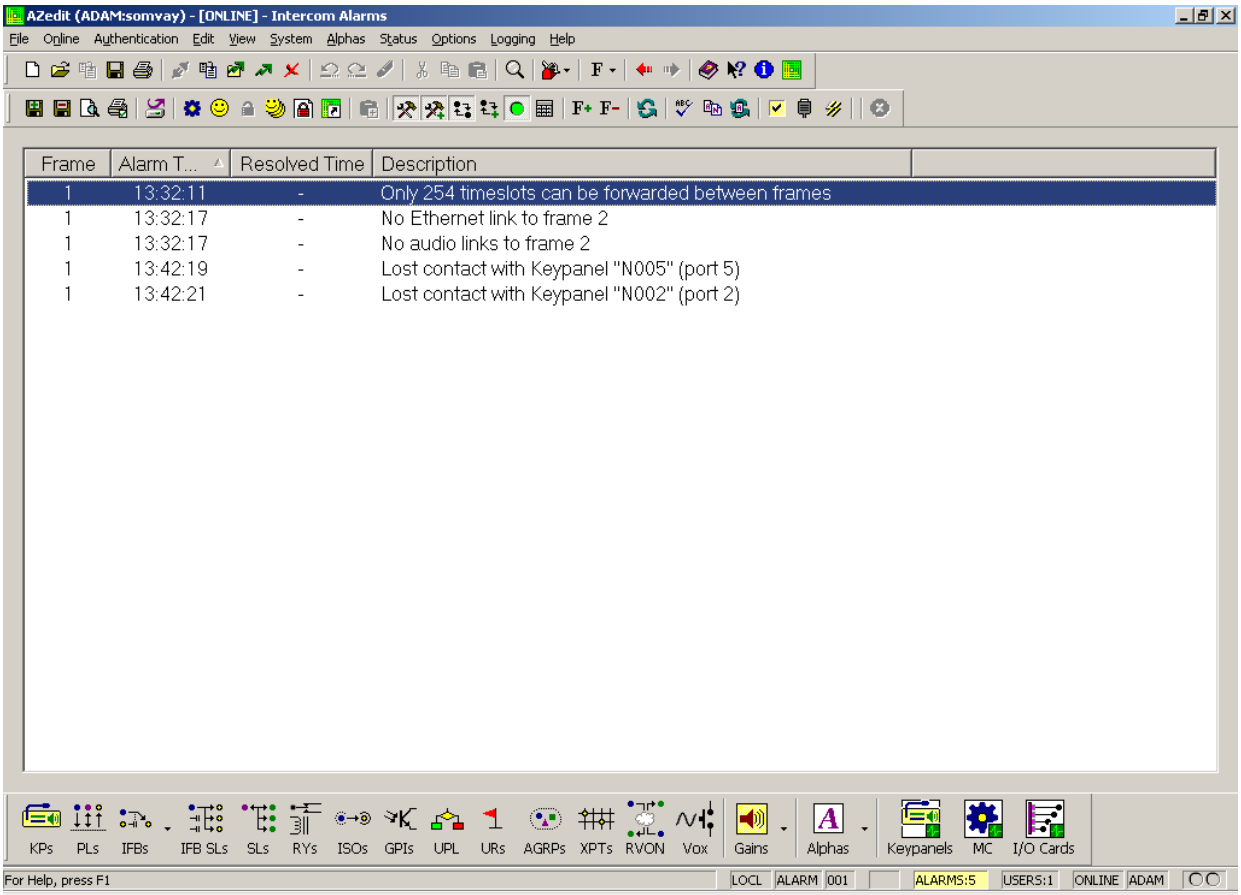
FIGURE 18. Intercom Alarm Indication

To **open the Intercom Alarms window**, do the following:

1. Double-click the **yellow highlighted alarm** in the status bar.
   OR
   From the Status menu, select **Alarms**.



The Intercom Alarms window appears.



Frame Column

The **Frame** column displays the frame affected by the warning or alarm.

Alarm Time Column

The **Alarm Time** column displays the date and time (in 24-hour clock time) the alarm or warning occurred.

Resolved Time Column

The **Resolved Time** column displays the date and time (in 24-hour clock time) the alarm or warning was resolved.

Description Column

The **Description** column displays a description of the alarm or warning.

Hiding and Clearing Alarms

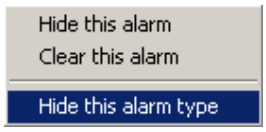
Some alarms can be cleared, as shown in the example below. Other alarms, such as loss of the backplane clock, can be hidden but cannot be cleared. The only way to clear these alarms from the window is to resolve them.

EXAMPLE: Lost communications with the Trunk Master. In this case, the alarm is not regenerated unless the alarm condition is resolved, and then recurs. This means the Master Controller starts communicating with the Trunk Master again, and then loses communications again.

NOTE: You can also hide certain alarm type by selecting Hide this alarm type, if desired.

To **hide or clear alarms/alarm types out of the Intercom Alarms window**, do the following:

1. Right-click the **alarm** you want to clear.
   A popup menu appears.From the popup menu, select **Hide this alarm**, **Clear this alarm** or **Hide this alarm type**.



Logging Window

The AZedit **Logging** window, shown in Figure 19, displays the log messages about the events that have occurred in the cluster. The log messages are kept locally on each frame. These normally are identical, with the exception of when the frames are re-synchronizing, across the intercom cluster.

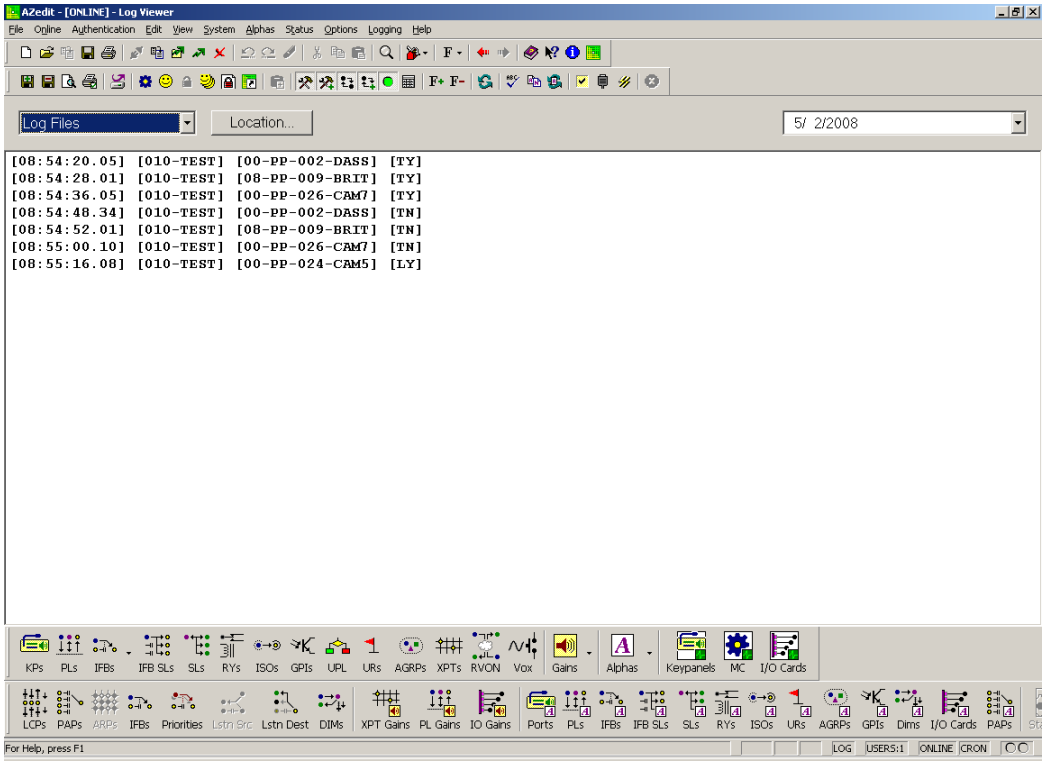


FIGURE 19. Log Viewer Window

Configure Logging Window

The **Configure Logging** window, shown in Figure 20, is used to configure the connection type of the AZedit session where log messages are sent when the Log to File option is selected. The Configure Logging window is only accessible when connected to AZedit using the J1 serial connection or using the start AZedit session.

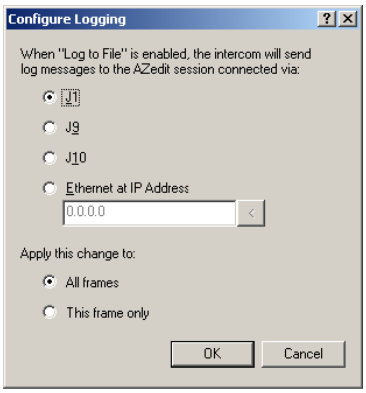


FIGURE 20. Configure Logging Window

J1 Radio Button

The **J1** radio button indicates log messages are sent to another AZedit session connected serially over the J1 port.

NOTE: The only AZedit session allowed to configure the log destinations is the session currently configured as the start destination for log messages or the main serial connection connected to J1 of the ADAM/ADAM-M MC breakout panel. Restrictions can be set up for the AZedit destination session to restrict access to the Configure Logging window.

J9 Radio Button

The **J9** radio button indicates log messages are sent to another AZedit session connected serially over the J9 port.

J10 Radio Button

The **J10** radio button indicates log messages are sent to another AZedit session connected serially over the J10 port.

Ethernet Radio Button

The **Ethernet** radio button indicates log messages are sent to another AZedit session connected over Ethernet.

IP Address Field

The **IP Address** field is used to enter the IP Address of the computer running the AZedit session you want to send log messages to over Ethernet.

All Frames Radio Button

The **All Frames** radio button is used to apply all changes made to the Log Configuration to all frames connected to this frame.

This Frame Only Radio Button

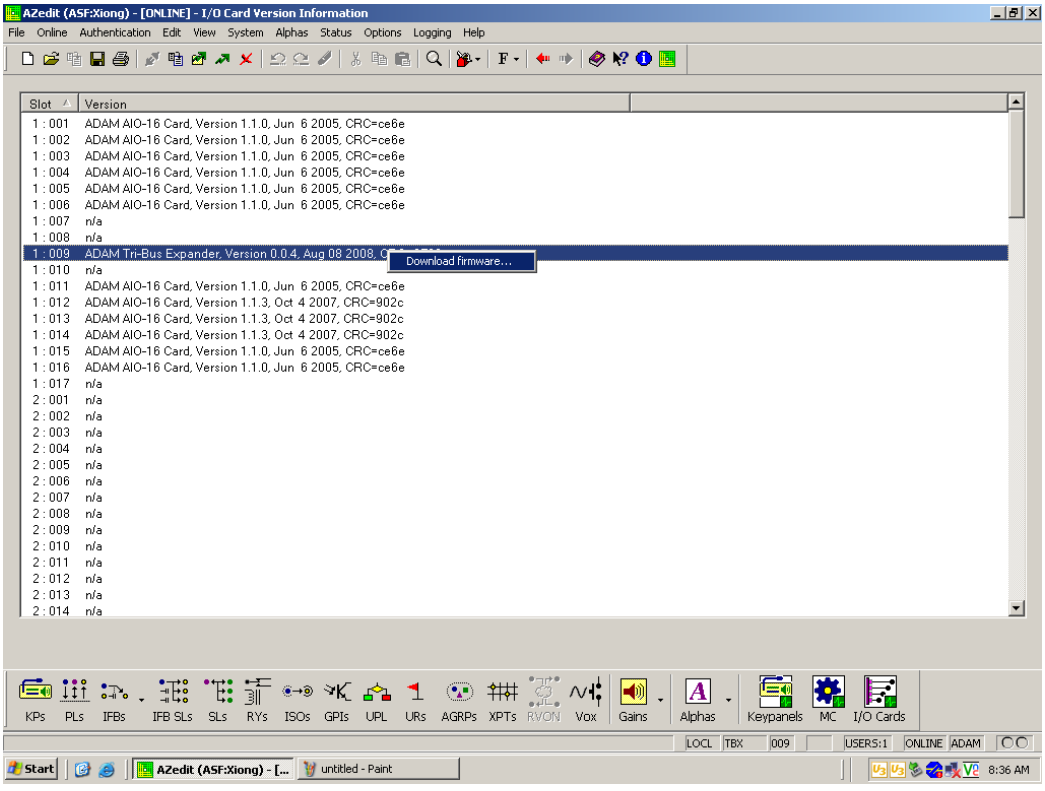
The **This Frame Only** radio button is used to allow the log destination for each frame to be different.

NOTE: The overall log status (enabled or disabled) applies to all frames.

Download Firmware to the TBX-2 Card

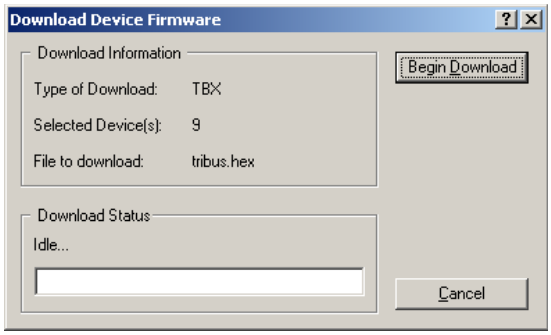
To **download firmware to the TBX-2 card**, do the following:

1. From the Status menu in AZedit, select **Software Versions**.
   A flyout menu appears.
2. From the flyout menu, select **IO Cards**.
   The I/O Card Version Information Window appears.

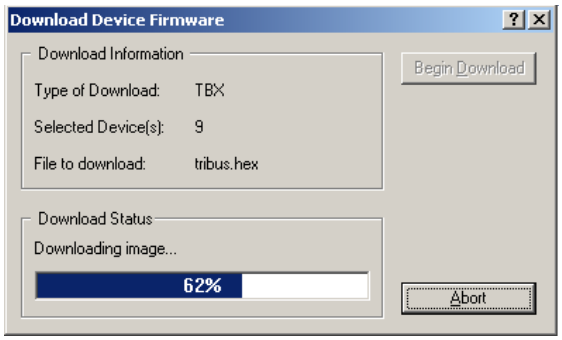


3. Right-click on the **TBX-2 card** you want to download the firmware update to.
   A popup menu appears.
4. From the popup menu, select **Download firmware...**.
   The Firmware Download window appears.

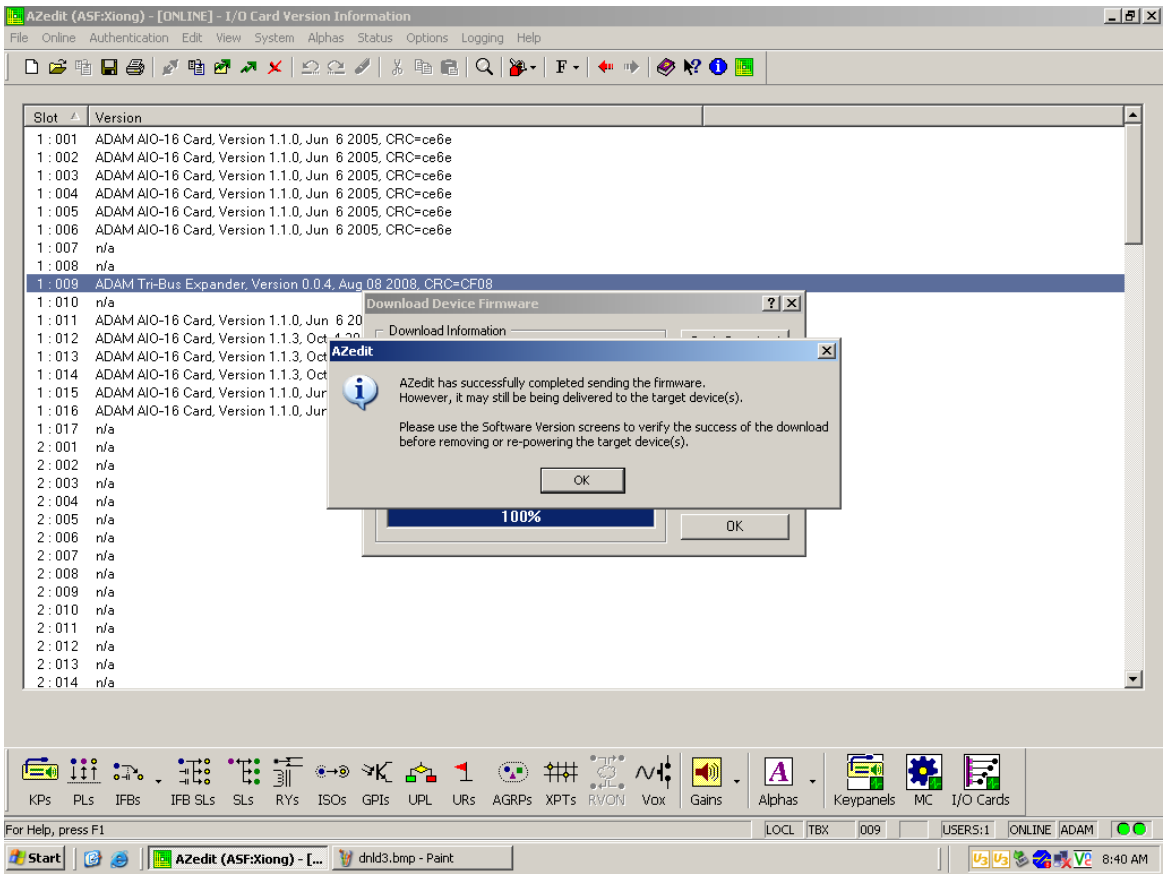
5. Using the Look in: drop down menu, navigate to the **folder where the firmware is located**.
6. Click **Open**.
   The Download Device Firmware window appears.



7. Click **Begin Download**.
   The download begins. This takes a minute or two to occur.



8. When the download is finished, click **OK**.
   The TBX-2 card firmware download is complete and a Success message appears.



9. Click **OK**.
   The success message and Download Device Firmware window closes.
10. From the Status menu, select **I/O Cards**.
    The IO Card Status window appears.
11. Verify the **TBX-2 card firmware has been updated**.

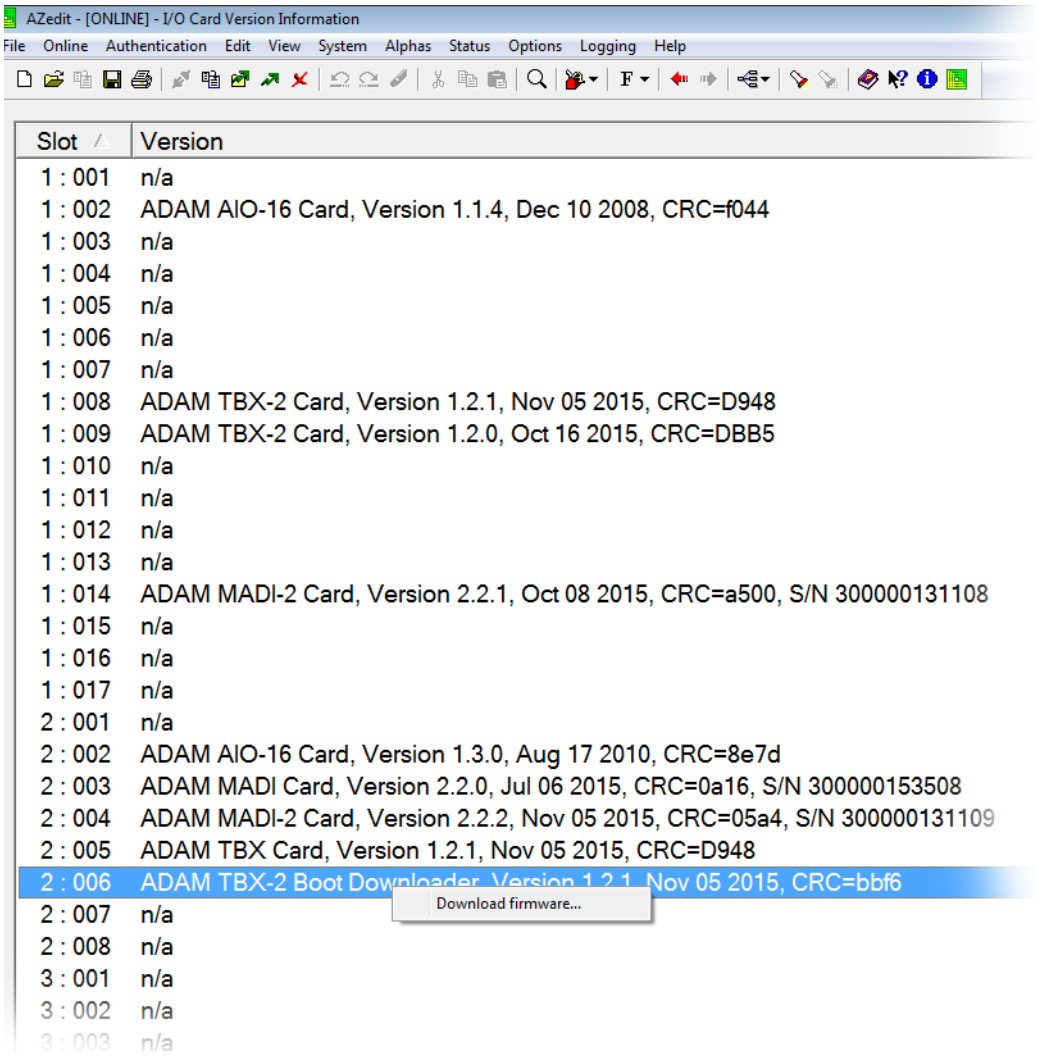
CAUTION: Do not power down the frame or remove the TBX-2 card from the frame until you have verified the new version information from AZedit. If the card loses power during download, undesirable results may occur.

Download the Bootloader File to the TBX-2 Card

To **download the bootloader file to the TBX-2 Card**, do the following:

1. On the TBX-2 front card, press and hold the **Reset button**, and then press and hold both the **1** and **2 front-panel buttons**.
2. While still holding the 1 and 2 front-panel buttons, release the **Reset button**.
3. Wait for 1second, and then **release the 1 and 2 front-panel buttons**.
   CPU remains in boot loader mode. Boot loader allows either the boot loader or the client code to be downloaded.

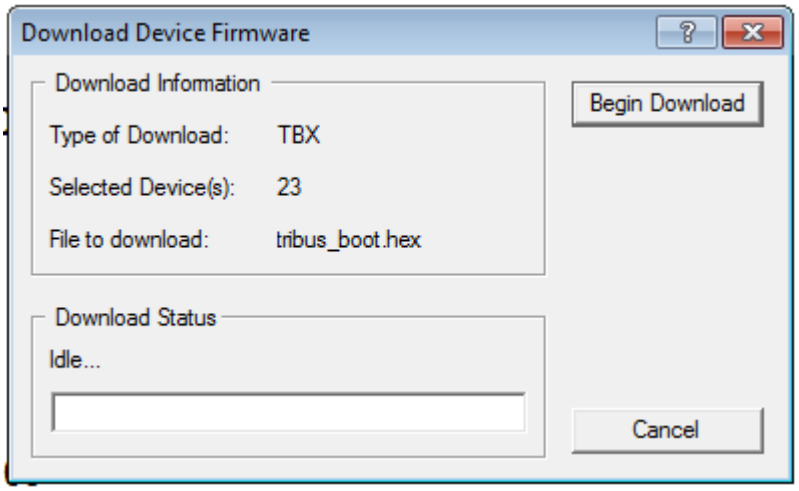
4. From the AZedit menu bar, select **Status|Software Version| I/O Card**.
The I/O Card Version window appears.



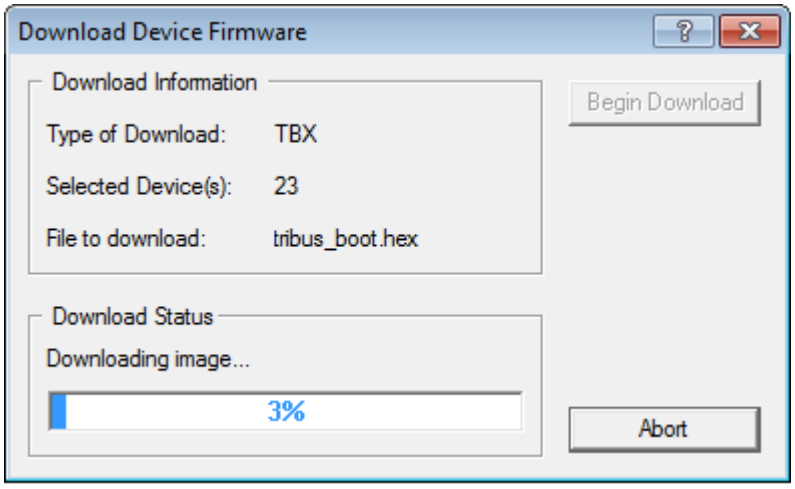
5. Right-click the **TBX-2 card you want to update**.
A Download Firmware... fly-out menu appears.

6. Click **Download Firmware...** .
A Windows Explorer folder appears.

7. Click **Open**.
The Download Device Firmware window appears.



8. Click **Begin Download**.
The file begins to download to the TBX-2 card. A progression bar displays the progress of the download. Once the bootloader file is completely downloaded, the card automatically reboots. This can take up to 1.5 minutes.



IMPORTANT: Multiple cards can be update at once. Take care to set all TBX-2 cards in bootloader mode before downloading the file (steps 1–3)

APPENDIX A

Ring Architecture

Requirements

- MCII-e version 2.8.0 or higher.
- AZedit version 4.4.0 or higher.
- TBX-2 version 1.1.0 or higher.

IMPORTANT: Each frame in the system must have two (2) TBX-2 cards installed.
In ADAM, TBX-2 cards are in slots 8 and 9.
In ADAM-M, TBX-2 cards are in slots 5 and 6.

Ring Architecture Overview

In a ring-wiring architecture, each frame has TBX-2 links to two (2) other frames. Multiple links are used to pass multiple frames' timeslots from one frame to the next. It is not uncommon for timeslots to be forwarded across multiple links. The links in the Ring Architecture are bi-directional, meaning audio is passed two (2) different ways; thus, the system can be viewed as having two (2) separate, unidirectional rings. In one ring, timeslots are sent clockwise from frame to frame, and in the other ring, the timeslots are sent counterclockwise.

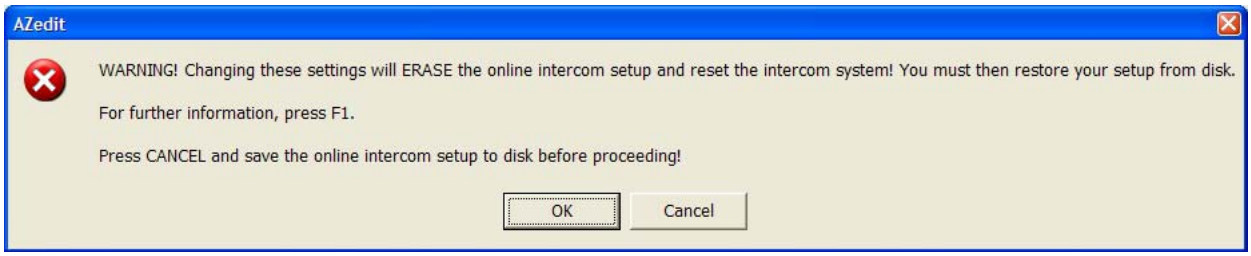
EXAMPLE: In a five (5) frame system, timeslots generated in frame one (1) are forwarded clockwise through frames two (2) to five (5). Frame five (5) does not forward the timeslots to frame one (1) because this is where the timeslots originated. Alternately, the timeslots generated in frame one (1) are also forwarded counterclockwise through frames five (5) to two (2).

To **configure your intercom matrix for ring architecture**, do the following:

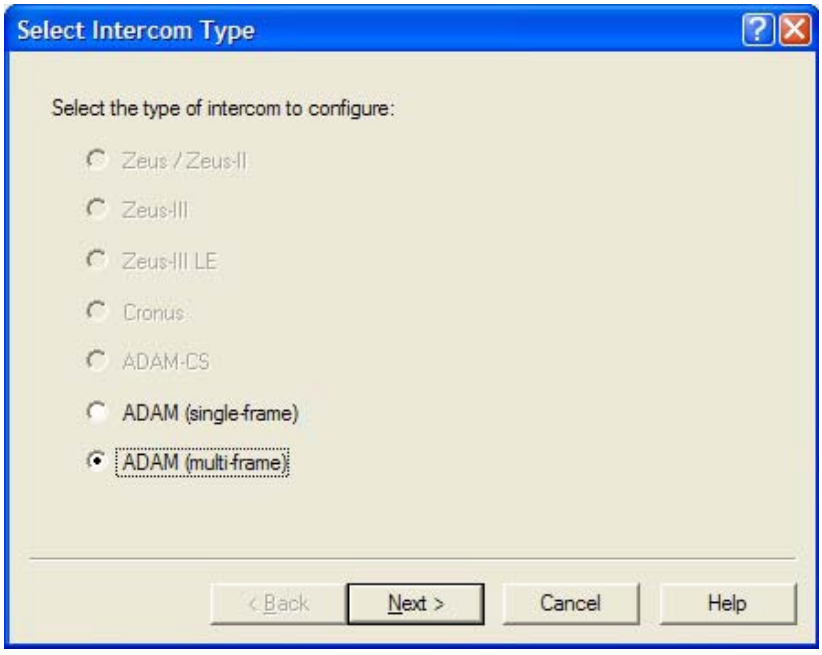
1. Using figure 21 through figure 27, cable your system for the number of frames you are using.

   NOTE: The maximum number of frames allowed in a ring architecture is nine (9), with the possibility of 880 ports available.

2. Open **AZedit**.
3. From the Options menu, select **Intercom Configuration**.
   A warning appears.

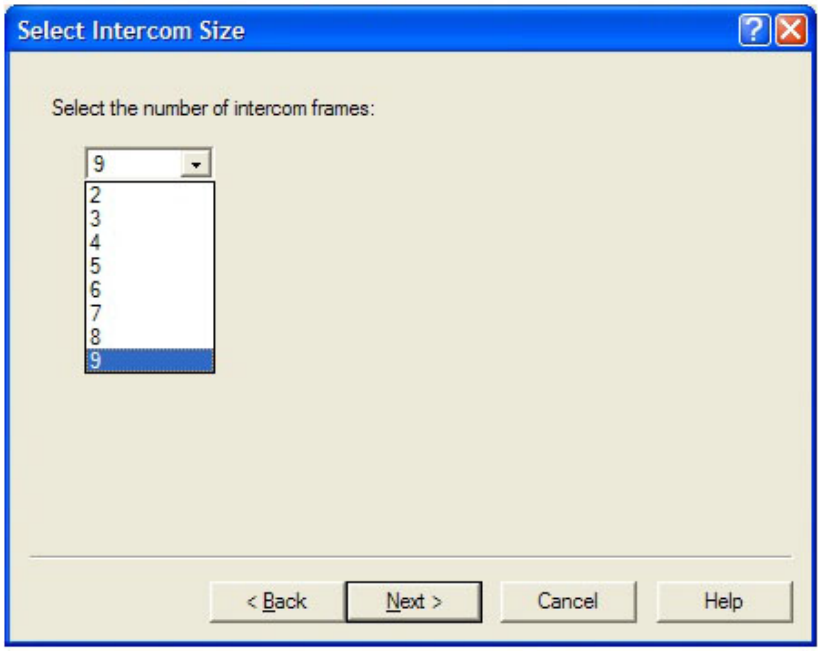


4. Click **OK**.
   The Intercom Configuration window appears.
5. Click **Intercom Sizing Wizard**.
   The Intercom Sizing Wizard appears.
6. Select **ADAM (multi-frame)**.

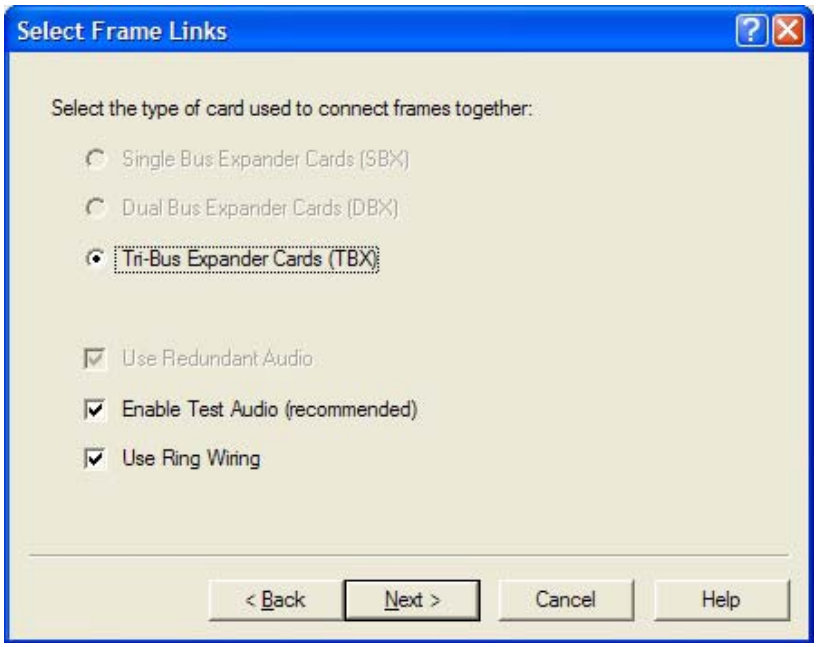


7. Click **Next**.
8. Select the **number of frames in your system** (2 – 9).

NOTE: When you have 2–8 frames, ring configuration is an option. However, when you have nine (9) frames, ring configuration is mandatory.

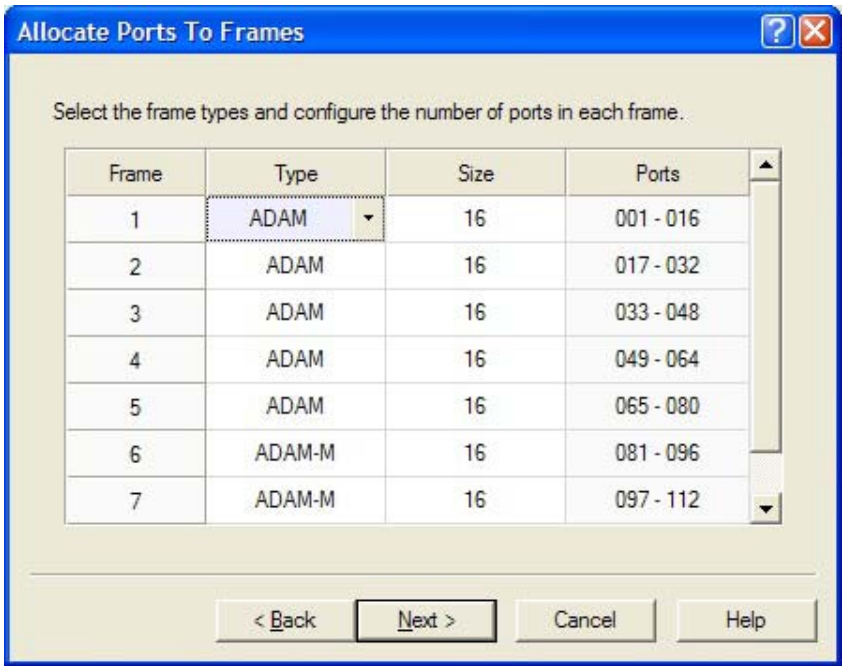


9. Click **Next**.
10. Select the **Ring** check box.



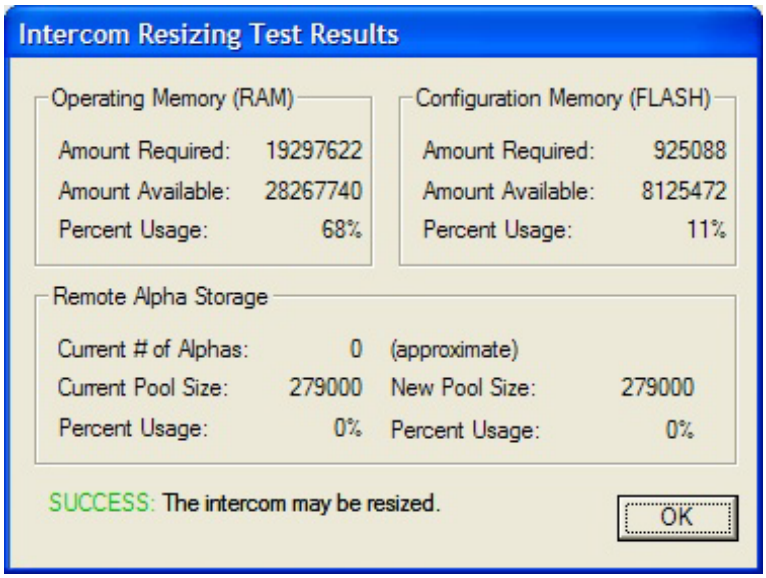
11. Click **Next**.

12. Using the Allocation table, configure the **port allocations** for your system.



13. Click **Next**.
The Intercom Configuration Wizard closes.

14. Click **Test**.
The Intercom Resizing Test Results window appears.



15. Click **OK**.

16. Click **Apply**.

Ring Configurations

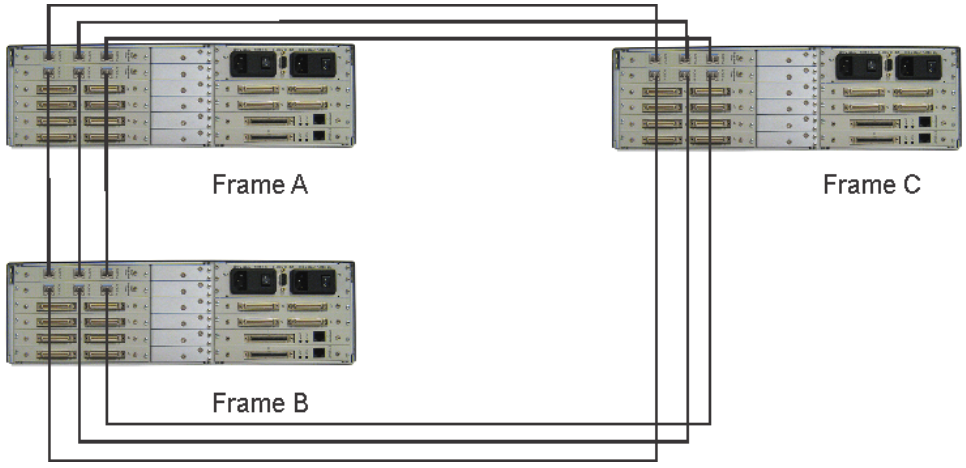


FIGURE 21. Three (3) Frame Ring Configuration

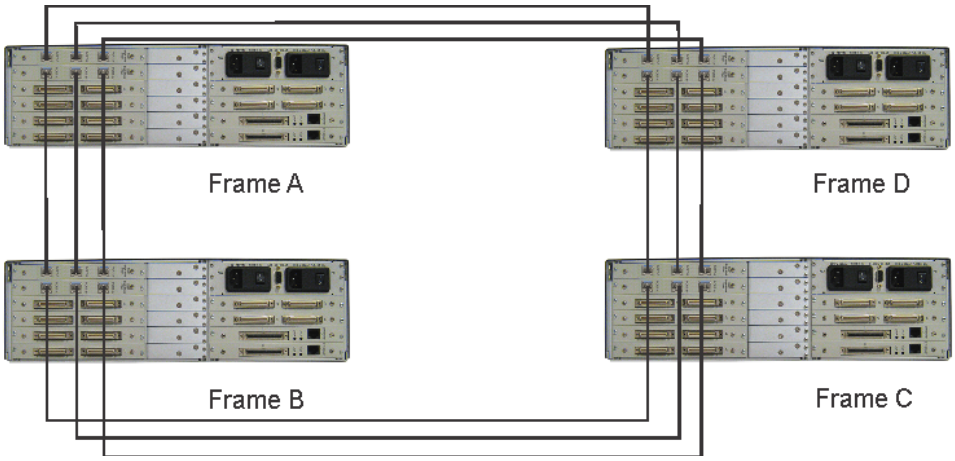


FIGURE 22. Four (4) Frame Ring Configuration

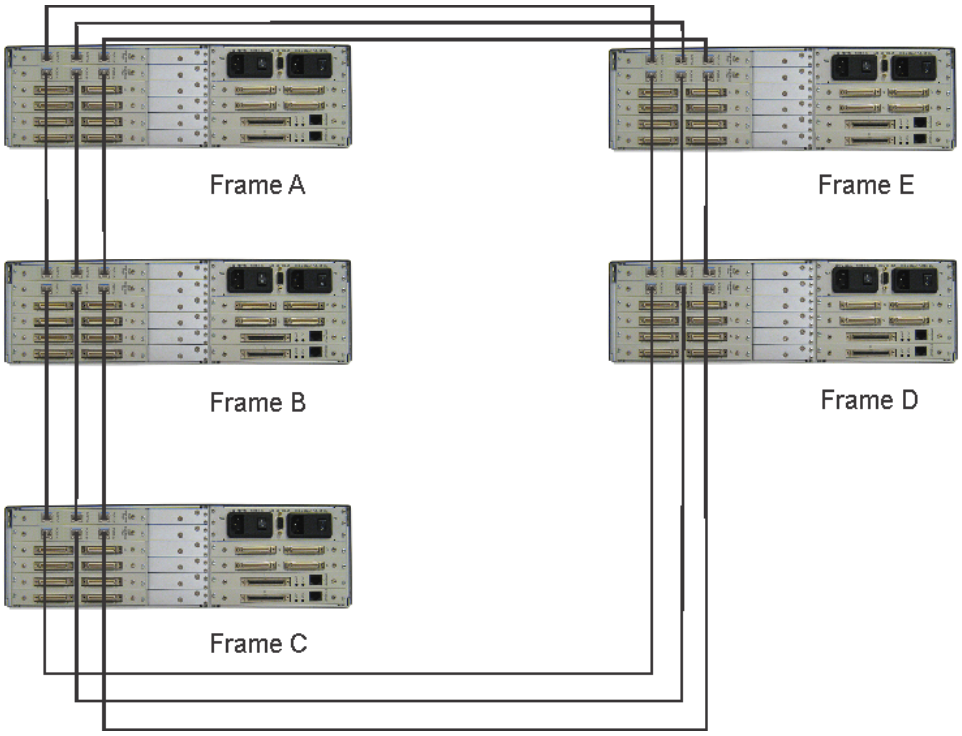


FIGURE 23. Five (5) Frame Ring Configuration

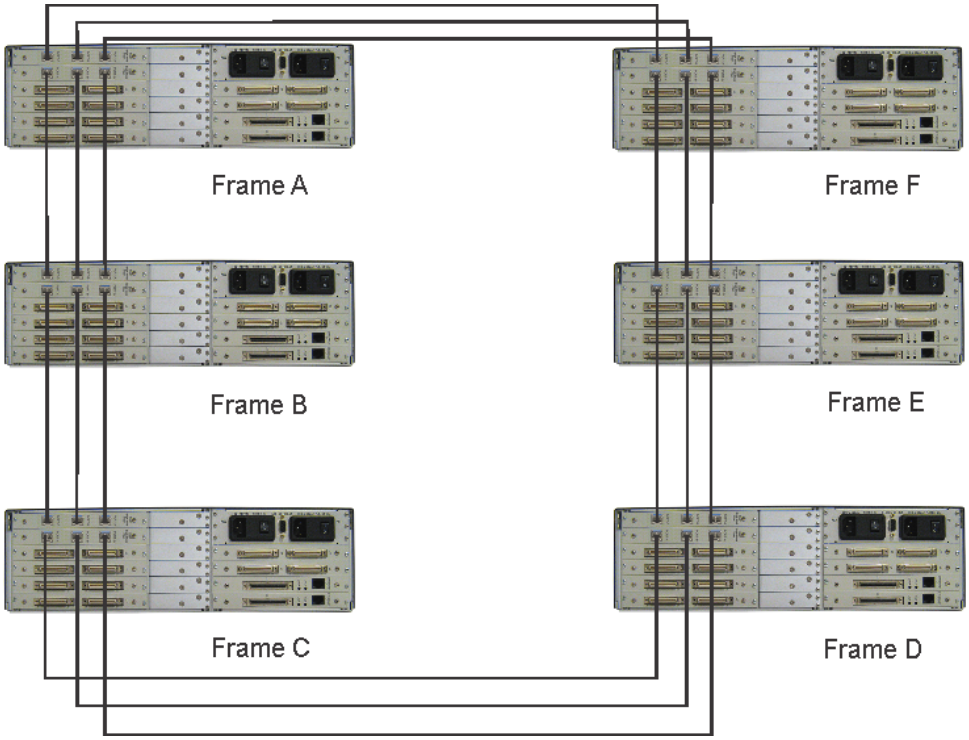


FIGURE 24. Six (6) Frame Ring Configuration

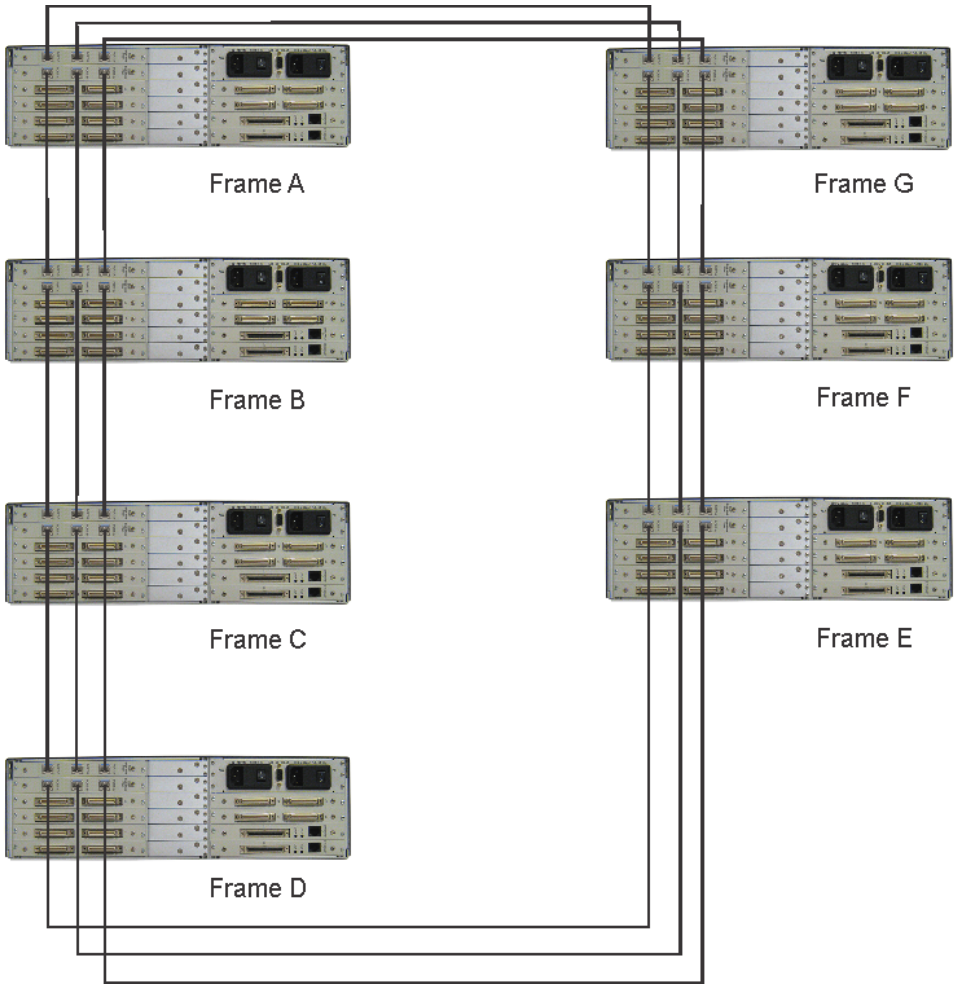


FIGURE 25. Seven (7) Frame Ring Configuration

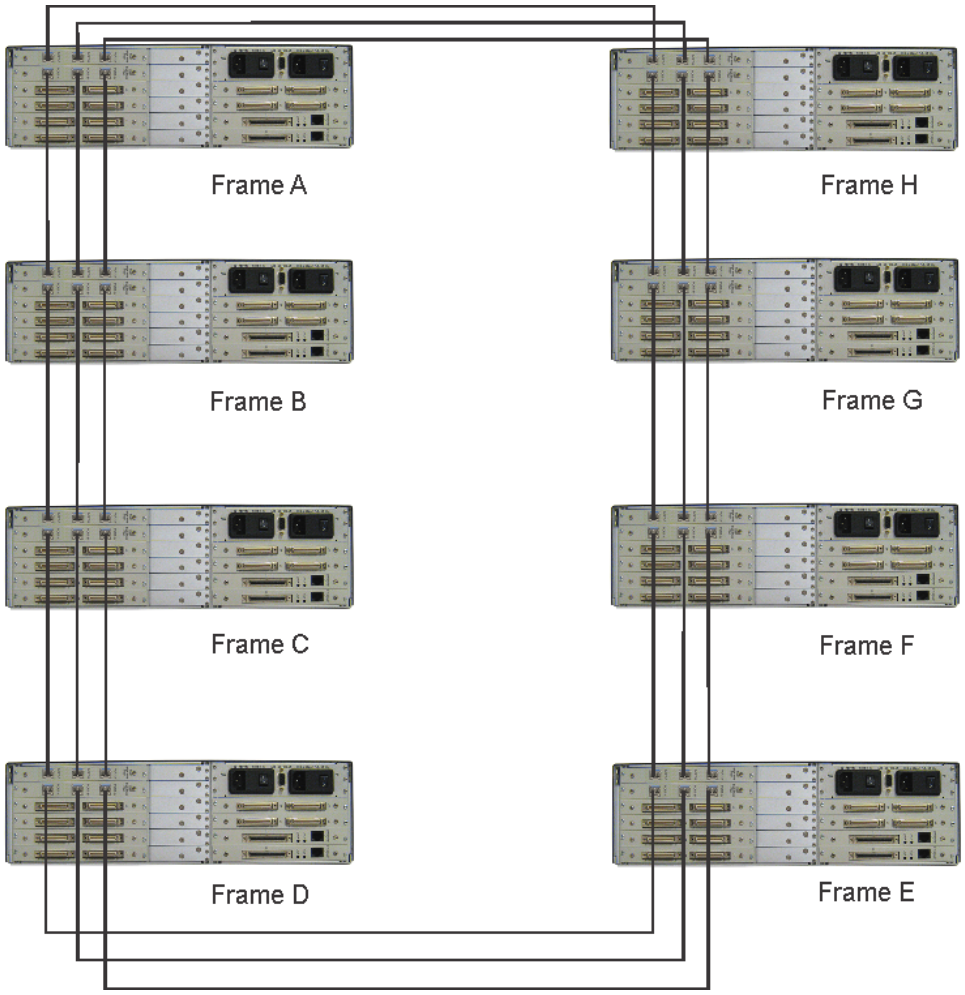


FIGURE 26. Eight (8) Frame Ring Configuration

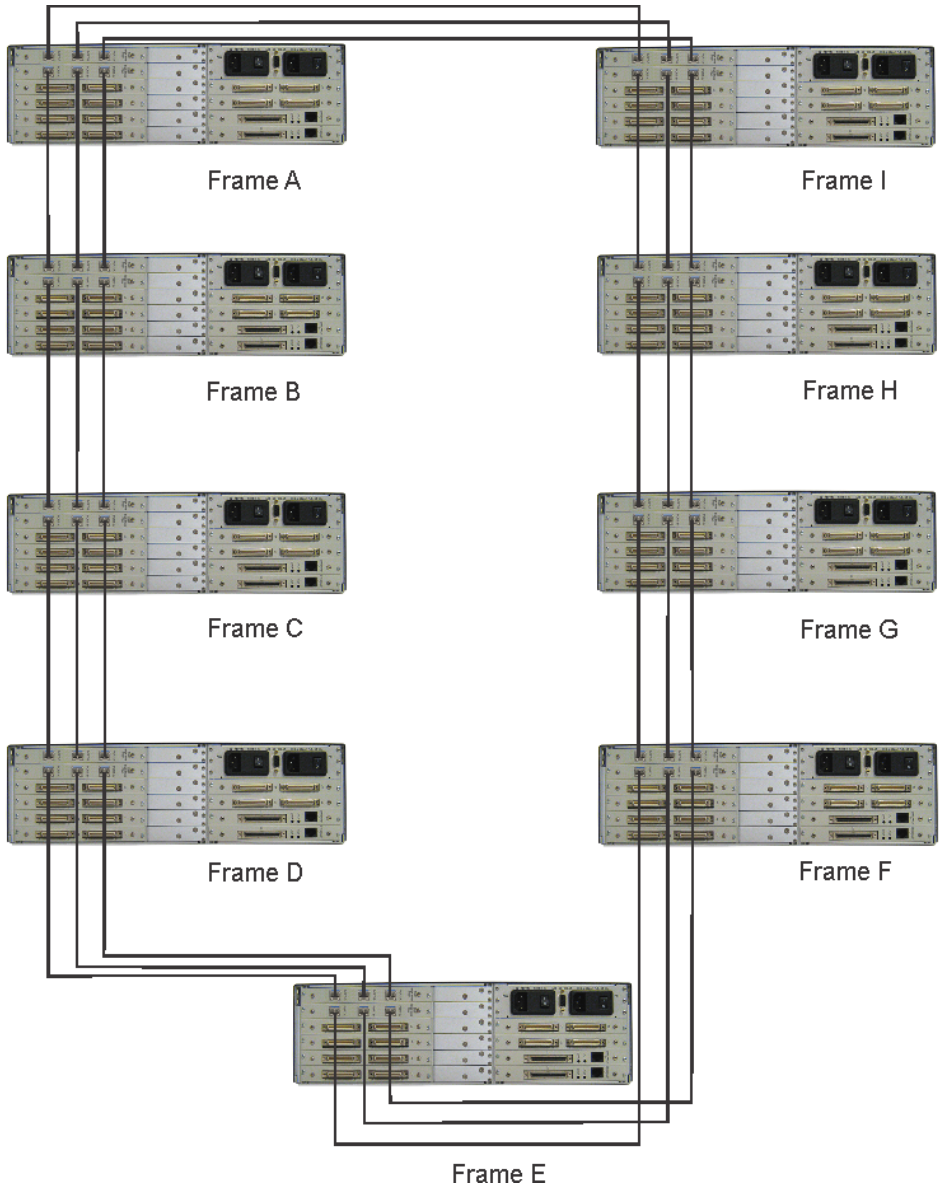


FIGURE 27. Nine (9) Frame Ring Configuration

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