



**Acoustic Telephone Interface EC/ES**

OPERATIONS MANUAL

**GENTNER**

Gentner Teleconferencing Systems  
1825 Research Way  
Salt Lake City, Utah 84119

Acoustic Telephone Interface Operations Manual

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## ***Introduction***

Thank you for your purchase of an Acoustic Telephone Interface (ATI)! To receive the full benefit of the ATI, we recommend that you read this manual in its entirety before beginning installation.

There are a number of factors that will affect the sound of your audio conference. The ATI was not designed for just one application or one type of room. The ATI was designed to work in almost any acoustical environment using almost any kind of peripheral equipment.

The purpose of this manual is to make you aware of the factors involved in maximizing the effectiveness of your audio conference. We welcome and encourage your comments so that we can improve this product. Please call or write us at the location noted below.

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## ***Features***

- Full Duplex Conversations
- Acoustic Echo Cancellation
- Acoustic Echo Suppression
- 100% Digital Audio Processing
- Digital Gain Processing
- Auto Answer / Auto Disconnect
- Easy to Use Hand Held Remote Control
- Privacy Button for Private Conversations
- Dial-up Two-wire or Dedicated Four-wire Connections

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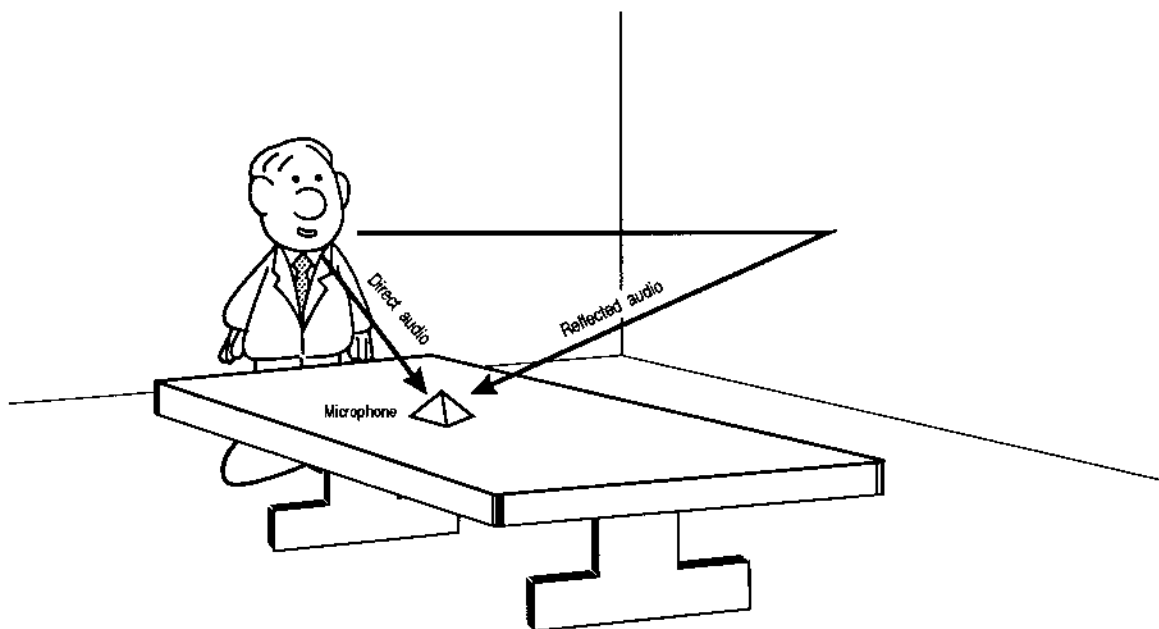
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## Conference Room Planning

Before installing your ATI, we recommend that you carefully plan your conferencing installation to ensure that you achieve the best possible results. Although you don't need to become an expert in acoustics, you will need to understand some basics to maximize the effectiveness of your room.

**Acoustics** Each room has a different acoustic "make-up". Most rooms have four bare walls and an occasional picture or window. These types of rooms are typically very "live". When you speak, your voice is reflected off each of the four walls. This kind of room is said to be *highly reverberant* and audio becomes less understandable or intelligible. Why? As reflected audio is mixed with your direct audio, the direct audio becomes distorted and less understandable.



The best ways to reduce reverberated audio in your conference room are to:

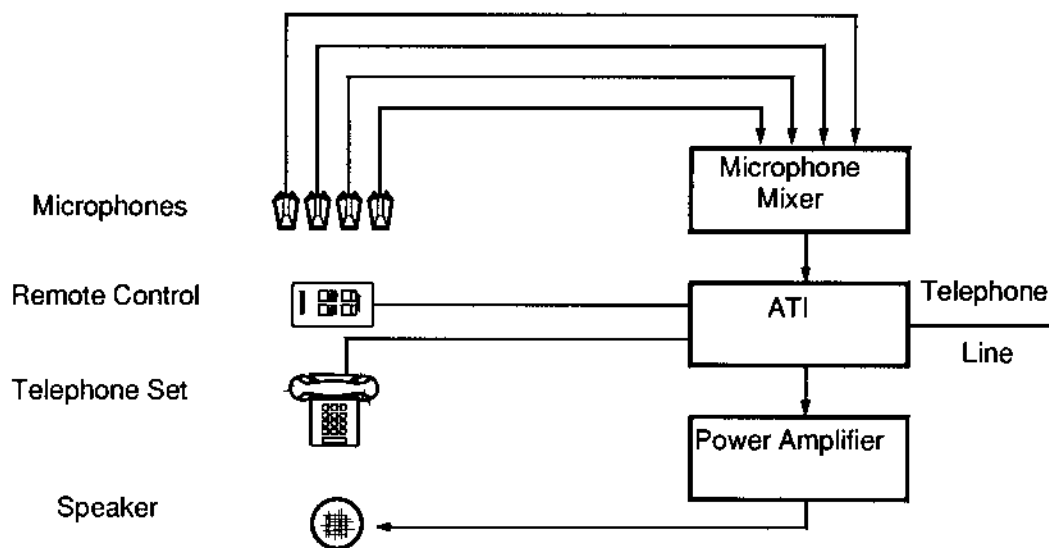
1. Install acoustic panels in the room. There are a variety of sizes, shapes, and colors available. Contact your dealer or Gentner Teleconferencing for more information.
2. Install as much sound absorbing material as possible. Items such as drapes, wall fabrics, and carpet can help reduce reflected audio in the room.
3. Install an Automatic Microphone Mixer.

You may also decide to contact an acoustic consultant to advise you or your contractor on the best treatment for your room.

Keep in mind that you don't need to turn your audio conferencing room into a sound recording studio. Often times, too much acoustic treatment makes the room uncomfortable for "non-teleconferencing" meetings. Simple acoustic treatment is all that is required to greatly improve the sound of your conference facility. The ATI is designed to work in all installations, even those that have a large amount of reflected audio. Decreasing the amount of reflected audio will simply improve the sound quality of your audio conference.

### Conference Room Layout

The diagram below shows a block diagram of a basic audio conferencing installation using the ATI. A telephone line or four-wire connection is used to carry audio from one location to another. Audio from the microphones is mixed and delivered to the ATI where it is ultimately delivered to the remote conference room. Audio from the remote conference room is routed to the power amplifier and to the speaker within the room. A wired remote control is provided with the ATI to connect the conference call, adjust speaker volume, and mute outgoing audio to the remote site. A standard telephone set is used to place calls to the remote conference room.



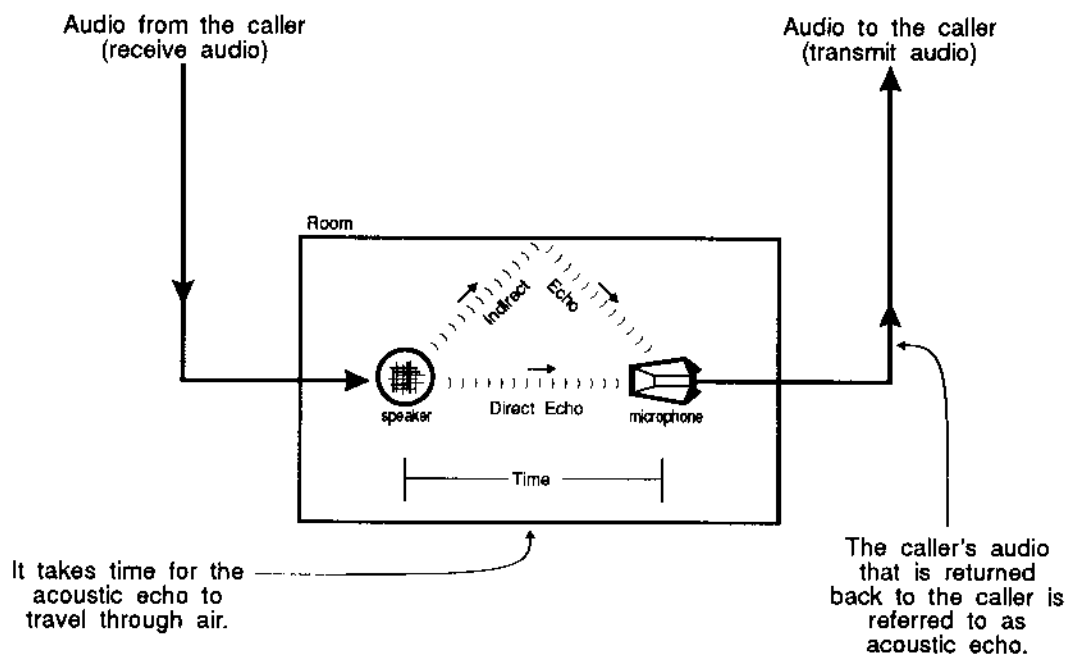


## Acoustic Echo

The diagram below illustrates what is known as acoustic echo. Acoustic echo occurs whenever audio from the speaker is picked up by the microphone. In other words, the remote location hears their own voice echoed back to them through the speakers and microphones at the opposite location. Acoustic echo can be the result of both **direct** and **indirect** audio reaching the microphone. Since both types of audio are traveling through air, it takes a finite amount of time to reach the microphone before it can travel back to the caller. This delay is sometimes referred to as **tail time**.

Although acoustic room treatment will help reduce acoustic echo and increase audio intelligibility, it will not completely remove all acoustic echo. Using the ATI, you can completely remove the residual acoustic echo.

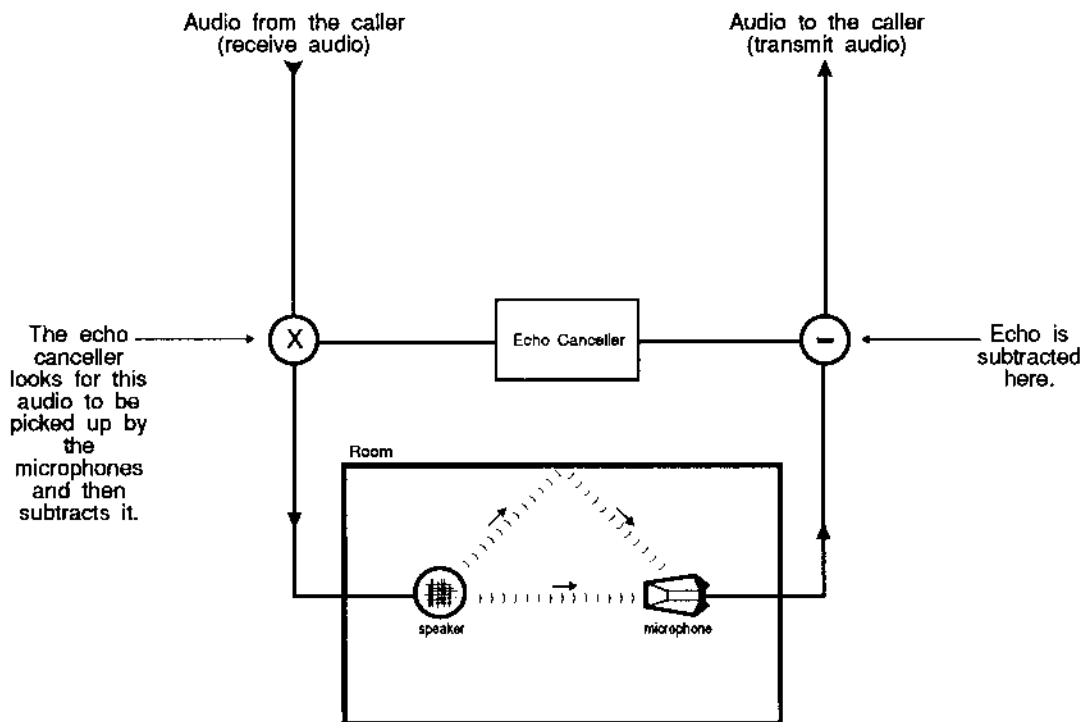
*Please note: The ATI model EC has both echo cancellation and echo suppression capabilities, while the ATI model ES has only echo suppression capabilities. Both echo eliminators can be switched in or out of their corresponding modes to adapt to your particular conference room.*



**ATI/EC - Digital Echo Canceller**

The ATI/EC electronically subtracts acoustic echo from the audio being returned to the caller. It does this by comparing the receive audio with the audio being sent to the caller. If any of the receive audio is picked up by the microphone, the echo canceller recognizes it as acoustic echo and prevents it from returning to the caller. Using high speed numeric processors known as digital signal processors (DSPs), the ATI/EC electronically eliminates both direct and indirect acoustic echoes, making the conference much more intelligible.

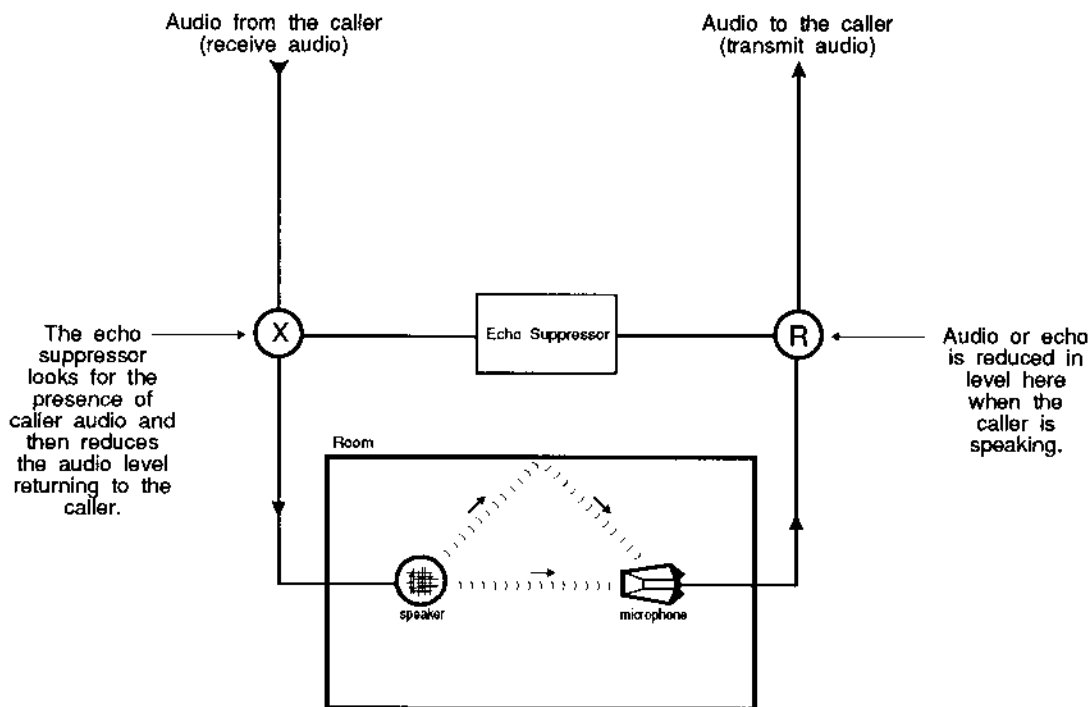
Because the ATI does not use switching to cut-off either the transmit or receive audio signals, **both locations can speak simultaneously without interruption** (commonly referred to as full duplex conferencing).



### ATI/ES - Digital Echo Suppressor

Both the ATI/EC and ATI/ES utilize the most common form of echo elimination - echo suppression. In the echo suppression mode, the ATI does not actually eliminate the echo, it suppresses it. Note that this drawing looks very similar to the diagram on page 5, which illustrates the echo canceller. The echo suppressor monitors the audio coming from the caller. When the caller's audio level reaches a specified level, the ATI digitally reduces (or suppresses) the audio returning to the caller. Again, no switching is used that would normally cut-off one side of the conversation.

In the echo suppression mode you may conduct a **virtual** two-way conversation without the annoying cut-offs found in traditional speaker phones. Normally, the caller cannot tell that the echo suppressor is working. It is possible to hear the suppressor working if the caller is talking while someone is simultaneously talking into the microphone. This condition is known as **double talk**. When double talk occurs, the caller's receive audio level is slightly reduced. But, because both sites are talking at the same time, the caller's ability to perceive a level change is reduced. Thus, the caller perceives that the conversation is fully interactive.



**Using Digital Echo Cancellation and Suppression in Combination**

The ATI model EC can be used in both echo cancellation and echo suppression modes simultaneously. When echo cancellation and echo suppression are used in combination, the amount of residual echo is almost completely eliminated while maintaining an apparent, or virtual duplex, two-way conversation. This allows you to maintain a higher level of speaker volume. This combination is usually reserved for highly reverberent or "live" rooms, but can be used in any environment.

**Digital Gain Processing**

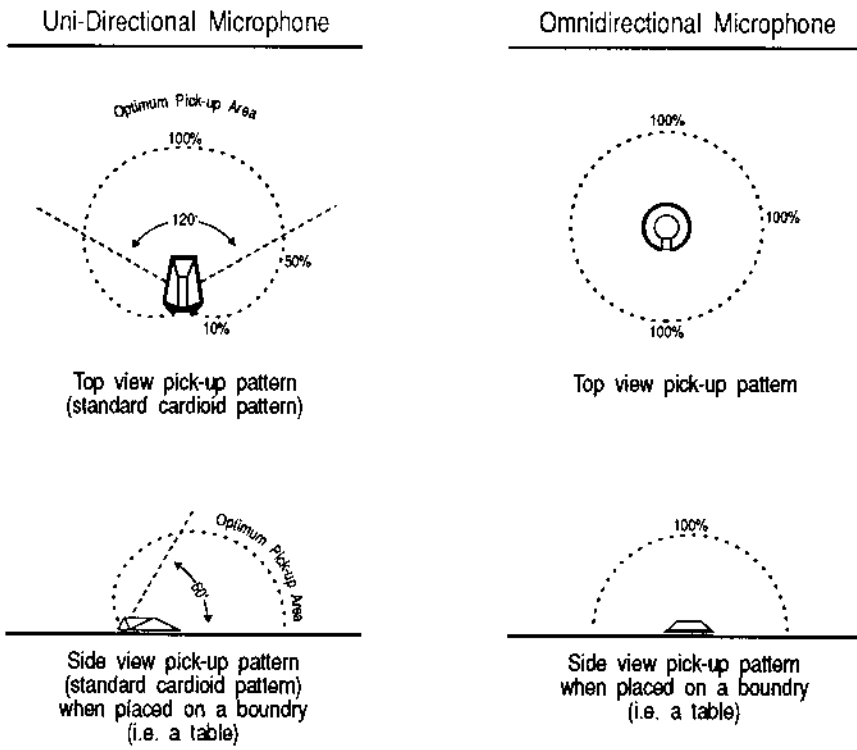
Both models of the ATI use special digital gain processing techniques to ensure that audio levels are consistent within the conference room. This reduces the need to constantly change volume levels during a conference or when telephone line conditions change.

**Using Gated and Non-Gated Microphone Mixers**

There is a great controversy as to whether audio conferencing facilities should use gated or non-gated microphone mixers. Gated microphone mixers only activate the microphones in which audio is present. Non-gated microphone mixers keep all microphone channels open at all times. Both ATI models are designed to work with all types of mixers.

### Positioning the Microphones and Speakers

Another simple yet effective way to reduce acoustic echo is to position the speakers and microphones so that you achieve the maximum amount of acoustic isolation (isolation between speaker audio and microphone audio). This can easily be accomplished by using uni-directional microphones and placing the speaker out of the optimum pick-up area (see diagram below).



### The Trade-offs

Because every audio conferencing room is different, you will need to make the necessary equipment and acoustical decisions to maximize the effectiveness of your particular room. The ATI is designed to work in almost any type of acoustical environment and to be interfaced with most types of equipment. All installations share a common set of trade-offs. These trade-offs are illustrated in the comparison chart found on pages 9 and 10.

## Audio Conferencing Trade-offs

Conference Room Choices	Effect Upon:				
	Major Disadvantages	Major Advantages	Acoustic Intelligibility	Perceived Noise Level	Microphone Coverage
<b>No Acoustic Treatment in a "live" room</b>	Low intelligibility & poor acoustic stability	No planning or cost involved	Very poor due to reverberations	High	Good, but can degrade intelligibility
<b>Reasonable Acoustic Treatment in a "live" room</b>	None	Improves intelligibility and increases stability	Good	Low	Very good
<b>Ceiling Mounted Microphones</b>	Low levels from mics; minimal volume adjustment	Mics are removed from table	Can be poor, unless room is acoustically optimized	High—mics pick up everything	Good
<b>Table Mounted Microphones</b>	Can get in the way	Allows the mics to be very close in proximity	Very good because of mic proximity	Low—mics are closer to participants	Excellent
<b>Non-directional Microphones</b>	Mics pick up everything, including noise	Fewer mics needed; wide pick up area	Can be poor due to ambient noise and reverberations	Moderate, mics pick up everything	Very good
<b>Directional Microphones</b>	Dead zones can occur	Only picks up the audio that is needed	Very good due to gating mics	Low—mics only pick up in specified area	Very good, but dead zones may occur
<b>Non-gated Mixer</b>	Can decrease intelligibility and increase noise	Less expensive and works well with echo cancellers	Fair, all mics are on	Moderate	Excellent
<b>Gated Mixer</b>	Can gate off in low levels; affects echo canceller	Greatly improves intelligibility and decreases noise	Very good	Very low	Good, but can have dead spots depending on mic type
<b>Echo Canceller</b>	May be unstable with some gated mics	Provides absolute two-way communication	Improved—superior echo elimination	Low	Good—allows higher mixer level
<b>Echo Suppressor</b>	Levels will drop during double talk.	Works well in most situations	Improved—removes echo	Low	Good—allows higher mixer level
<b>Gain Processing</b>	Can cause fatigue or instability if not performed correctly	Reduces the need to adjust levels	Good	High and low as processor adjusts	Good

### Definitions:

**Acoustic Intelligibility:** Understandability of room audio. When reverberant audio is mixed with direct audio, the ability to understand the combined audio is reduced. This problem can be improved by using a gated mixer.

**Perceived Noise Level:** The amount of noise that the participants in the conference "perceive" they are hearing. The actual noise level can be much higher.

**Microphone Coverage:** How well the microphones pick up room sound. Mic coverage is dependant on the number of mics, their type, and their placement.

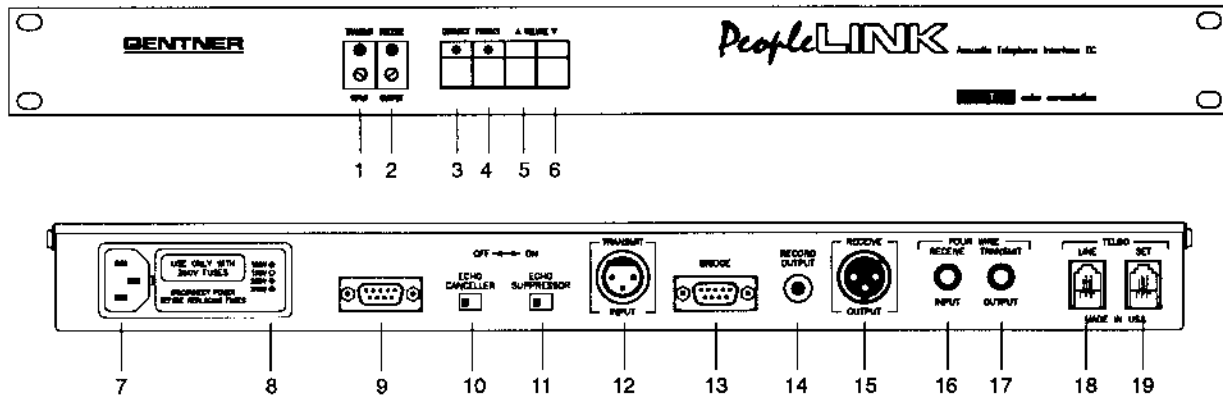
**Acoustic Stability:** How sensitive the audio conference is to feedback. The total acoustic gain of the room determines this stability, and is affected by almost all room conditions and equipment.

Conference Room Choices	Effect Upon:					
	Acoustic Stability	Speaker Loudness	User Volume Adjustments	Apparent Interaction	Participant Fatigue	Room Aesthetics
No Acoustic Treatment in a "live" room	Decreased substantially	Low	Allows minimal adjustments	Decreased	Very high	No Change
Reasonable Acoustic Treatment in a "live" room	Improved significantly	Moderate to high	Allows some adjustment	Improved	Low	Can be affected
Ceiling Mounted Microphones	OK if installed properly	Low, unless room is acoustically optimized	Allows minimal adjustment	No effect	Can be high	Conference system is not visible
Table Mounted Microphones	Good if speakers are isolated	High	Moderate adjustment	No effect	Low	Conference system becomes visible
Non-directional Microphones	Poor due to no speaker isolation	Moderate	Allows some adjustment	Very good	Low—noise can be a problem	See above
Directional Microphones	Very good	High	Allows for more adjustment	Good, but dead zones can occur	Low	See above
Non-gated Mixer	Can be substantially decreased	Low to moderate	Allows some adjustment	Very good—all mics are on	Low	N/A
Gated Mixer	Very good	High	Allows for more adjustment	Good, but mixer can gate off	Low	N/A
Echo Canceller	Good, but can drift with gated mixer	Moderate to high	Allows for more adjustment	Very good—full two-way interaction	Very low	N/A
Echo Suppressor	Very good in most applications	High	Allows for much more adjustment	Reduced if not performed correctly	Moderate	N/A
Gain Processing	Degrades as gain changes occur	Moderate to high	Little adjustment	No effect	Low	N/A

### Definitions:

- Speaker Loudness:** Amount of speaker volume allowable. Typically, as the speaker gets louder, the system gets closer to feedback.
- User Volume Adjustments:** The degree to which the user can control the room volume or loudness. If the system is close to feedback, no adjustment can be made.
- Apparent Interaction:** The capability of the system to provide full two-way interaction as perceived by the participants.
- Participant Fatigue:** The participants ability to listen for an extended amount of time.
- Room Aesthetics:** Appearance or "look" of the conference room.

## Controls And Connectors

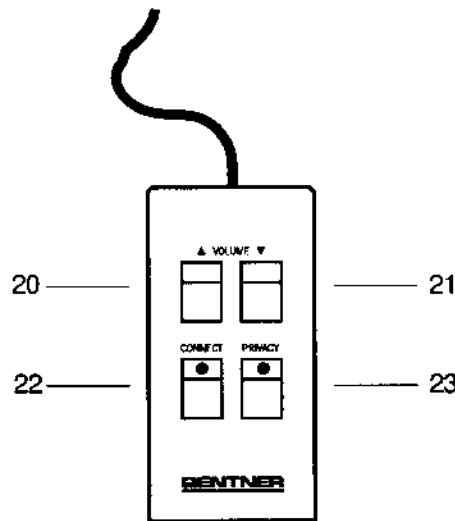


- 1. TRANSMIT INPUT Level Control**  
 Use this control to adjust the level of the audio being transmitted to the caller. The LED lights green to indicate presence of audio and lights red to indicate audio peaks.
- 2. RECEIVE OUTPUT Level Control**  
 Use this control to adjust the level of the audio being received from the caller. The LED lights green to indicate presence of audio and lights red to indicate audio peaks.
- 3. CONNECT**  
 Push to connect the ATI to the telephone line or four-wire circuit. Press again to disconnect. Press and hold for two seconds to enable/disable the auto-answer mode.
- 4. PRIVACY**  
 Press to mute the TRANSMIT INPUT audio. Press again to return to normal operation. Use this to temporarily stop the caller from hearing your conversation.
- 5. VOLUME UP**  
 Press and hold this button to increase the listening level of the RECEIVE OUTPUT audio. Press both the VOLUME UP and the VOLUME DOWN button simultaneously to return the listening level to normal.



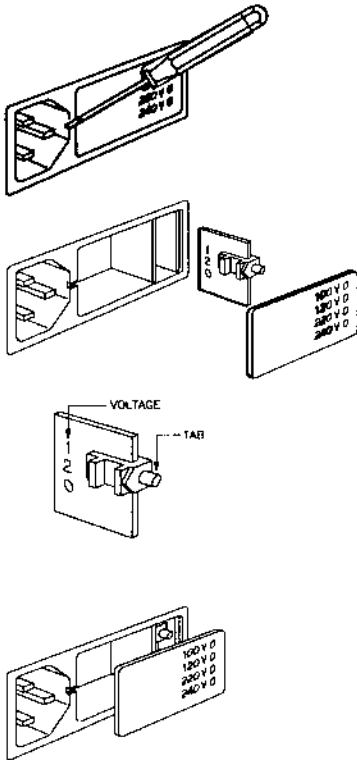
- 6. VOLUME DOWN**  
Press and hold this button to decrease the listening level of the RECEIVE OUTPUT audio.
- 7. AC Power Cord Connector**  
Connect a power cord between this connector and the line voltage source.
- 8. Line Voltage Select**  
Select the line voltage input as 100V, 120V, 220V, or 240V. See "Electrical Requirements" on page 14 for instructions on selecting the correct voltage.
- 9. REMOTE**  
Connect the Remote Control here.
- 10. ECHO CANCELLER Switch**  
Use to activate (ON) or de-activate (OFF) echo cancellation.
- 11. ECHO SUPPRESSOR Switch**  
Use to activate (ON) or de-activate (OFF) echo suppression.
- 12. TRANSMIT INPUT**  
Connect the output of your microphone mixer here.
- 13. BRIDGE**  
Provides the input and output audio connections to cross-feed up to three additional telephone interfaces.
- 14. RECORD OUTPUT**  
Connect a tape recorder to this jack to record conferences. Provides a mix of the TRANSMIT INPUT audio and the RECEIVE OUTPUT audio.
- 15. RECEIVE OUTPUT**  
Connect to your power amplifier or self-powered speakers.
- 16. FOUR-WIRE RECEIVE INPUT**  
Connect to the output of a dedicated four-wire circuit or a video codec. This receives audio from the other party. Four-wire and telephone connections may not be used at the same time. Note: Both jacks must be plugged in to put the ATI into four-wire mode.
- 17. FOUR-WIRE TRANSMIT OUTPUT**  
Connect to the input of a dedicated four-wire circuit or a video codec. This sends echo cancelled/suppressed (model EC) or echo suppressed (model ES) audio to the caller. Four-wire and telephone connections may not be used at the same time. Note: Both jacks must be plugged in to put the ATI into four-wire mode.
- 18. TELCO LINE**  
Connect a telephone line here.

- 19. TELCO SET**  
 Connect a telephone set here. Use this for dialing phone numbers or for having private conversations when not using the ATI.
- 20. Remote VOLUME UP**  
 Same function as VOLUME UP (5). Press and hold this button to increase the listening level of the RECEIVE OUTPUT audio. Press both the VOLUME UP and the VOLUME DOWN button simultaneously to return the listening level to normal.
- 21. Remote VOLUME DOWN**  
 Same function as VOLUME DOWN (6). Press and hold this button to decrease the listening level of the RECEIVE OUTPUT audio.
- 22. Remote CONNECT**  
 Same function as CONNECT (3). Push to connect the ATI to the telephone line or four-wire circuit. Press again to disconnect. Press and hold for two seconds to enable/disable the auto-answer mode.
- 23. Remote PRIVACY**  
 Same function as PRIVACY (4). Press to mute the TRANSMIT INPUT audio. Press again to return to normal operation. Use this to temporarily stop the caller from hearing your conversation.



## Operating Requirements

### Electrical Requirements



Your ATI was shipped to you ready to use with a 120 VAC 50/60 Hz power source. To change the AC Line Voltage input to accept a different power input, follow the procedure below.

- DISCONNECT THE UNIT FROM AC POWER.** Unplug the electrical power cable from the rear panel.
- Using a small screw-driver, remove the cover from the line-voltage module.
- Using long-nosed pliers, remove the square jumper board by pulling on the nylon tab that is on the right side of the module.
- Rotate the nylon tab until the tab is opposite the desired voltage. The four possible voltages are: 100, 120, 220, and 240.
- Re-insert the jumper board into the module with the nylon tab facing out.
- Replace the fuse with the proper value as indicated below:
  - For 100-120 VAC, the fuse should be 1/4 amp Slo-Blo.
  - For 220-240 VAC, the fuse should be 1/8 amp Slo-Blo.
- Replace the cover and verify that the nylon tab is at the correct voltage position.

### Telephone Line Requirements

Your ATI works on standard telephone lines and connects to the telephone system with a standard RJ-11C modular jack. If you do not have an RJ-11 jack where you want to install your ATI, call your telephone company for information on installation.

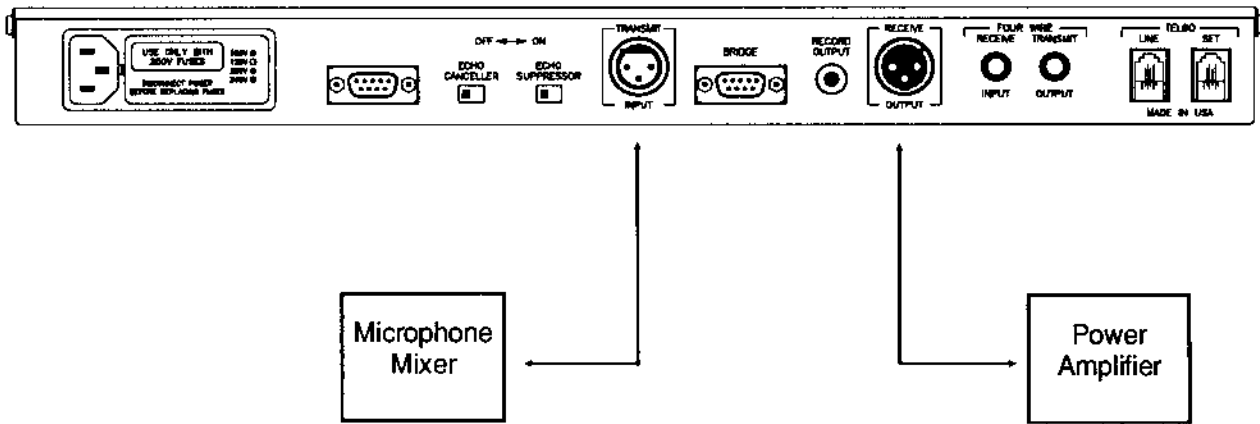
If you are connecting your ATI to a private branch exchange (PBX) system, contact your system manufacturer or service representative. Some PBX systems will not work with your ATI. Your ATI will work with the same type of telephone line that a fax machine would use.

### Optimizing Your Environment

Mount your ATI in a 19" equipment rack. Be careful not to block any of the ventilation holes. Gentner recommends an operating environment between 32 and 110 degrees Fahrenheit.

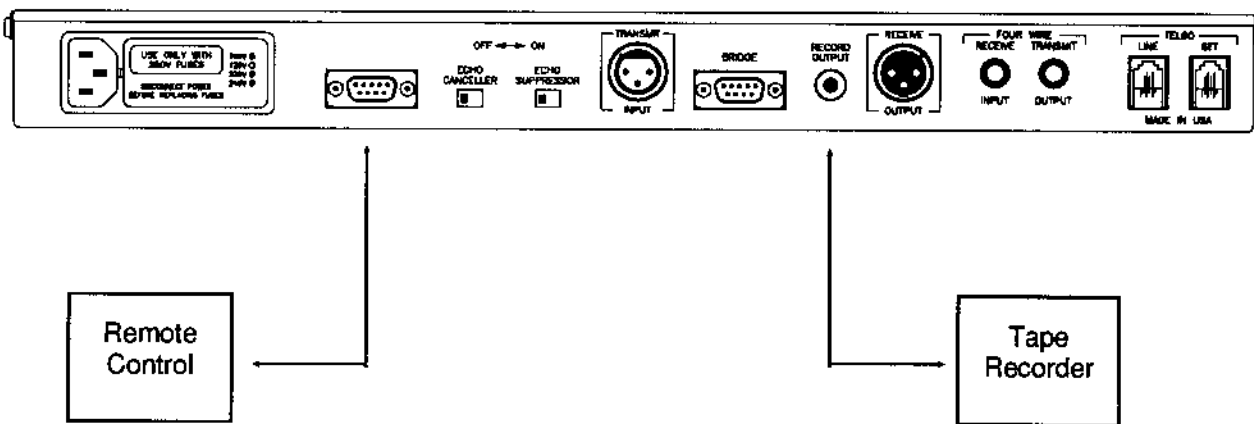
## Installation

- Audio Connections**
- Connect audio from the output of the microphone mixer to the TRANSMIT INPUT connector of the ATI. This is balanced line level audio.
  - Connect audio from the RECEIVE OUTPUT connector of the ATI to the input of the power amplifier. This is balanced line level audio.



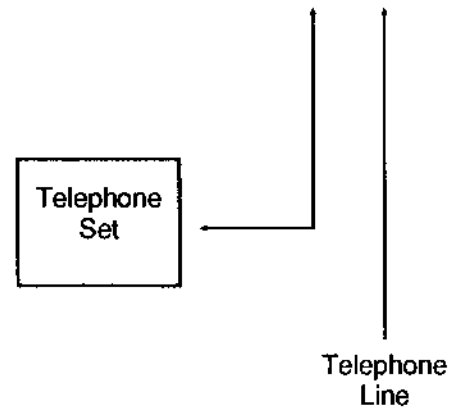
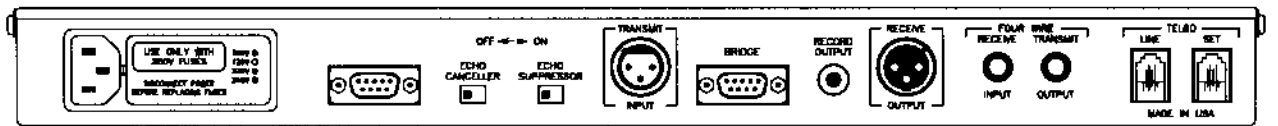
**Auxiliary Connections**

- To record conversations, connect a tape recorder to the RECORD OUTPUT output of the ATI.
  
- Connect the DB-9 connector of the Remote Control to the REMOTE connector of the ATI.



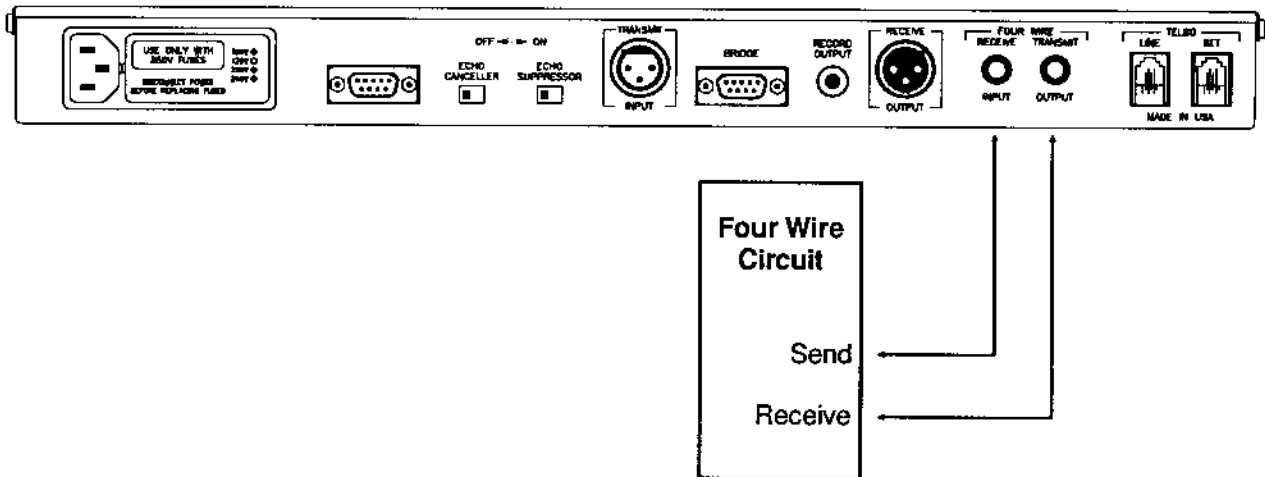
**Telephone Connections**

- Connect a standard telephone set to the SET telephone jack on the ATI.
  
- Connect a standard telephone line to the LINE telephone jack on the ATI.



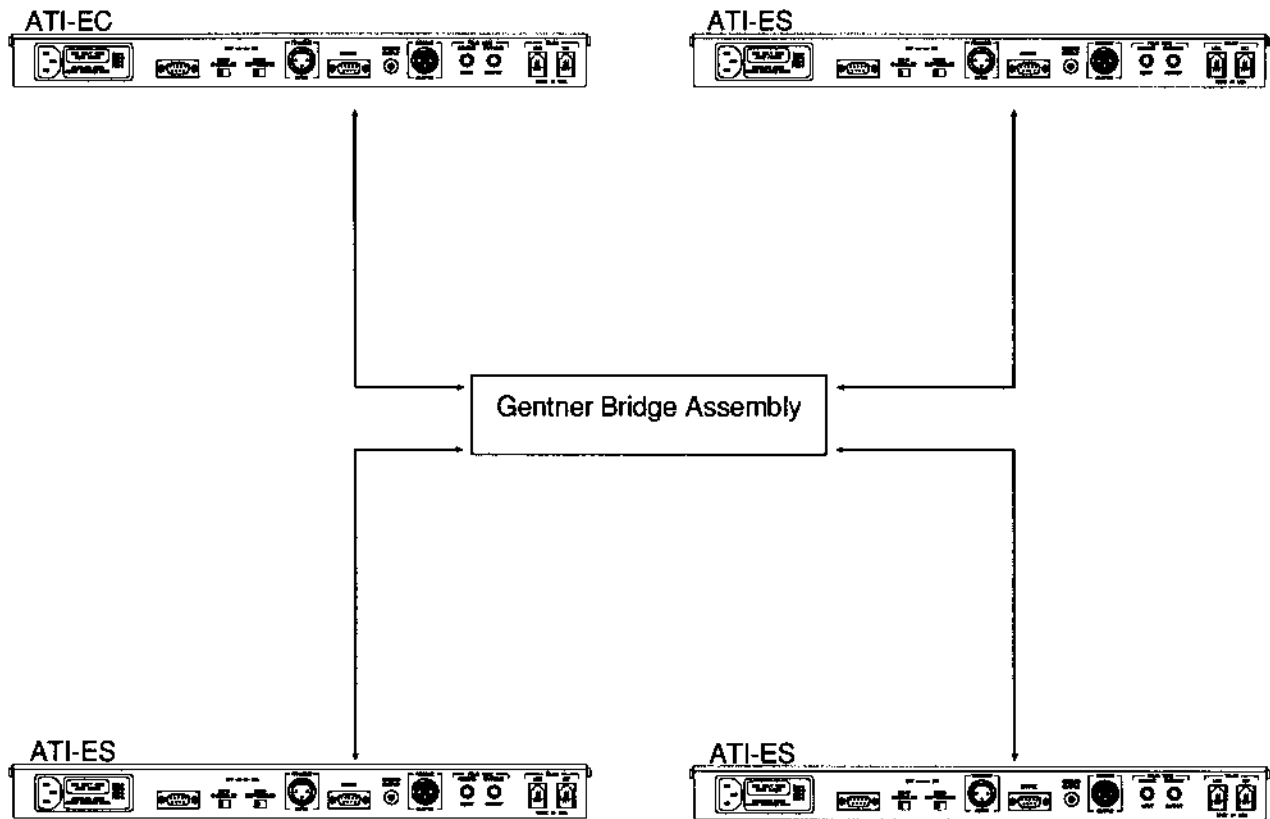
**Four-wire Connections**

- When using a four-wire circuit, connect audio from the output of the four-wire circuit to the RECEIVE INPUT connector. Connect audio from the TRANSMIT OUTPUT connector to the input of the four-wire circuit. This is balanced line level audio.



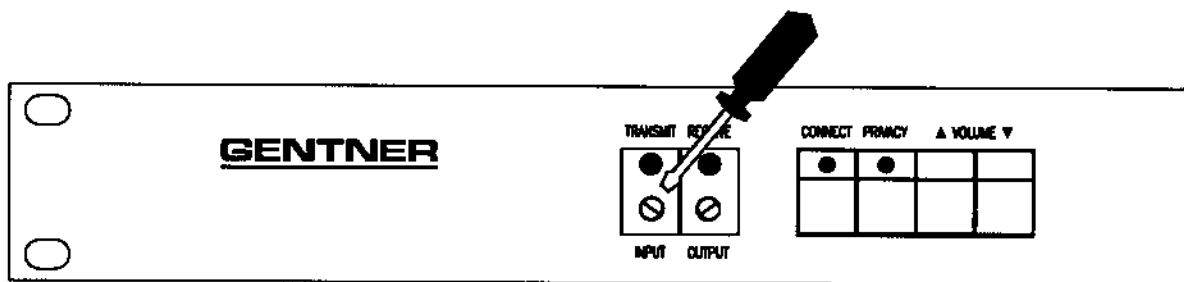
**Bridge Connections**

- Connect up to four ATI's together using the Gentner bridge assembly. This allows you to hold a conference with up to four separate locations using four ATI's and four telephone lines. Contact Gentner to order the bridge assembly.

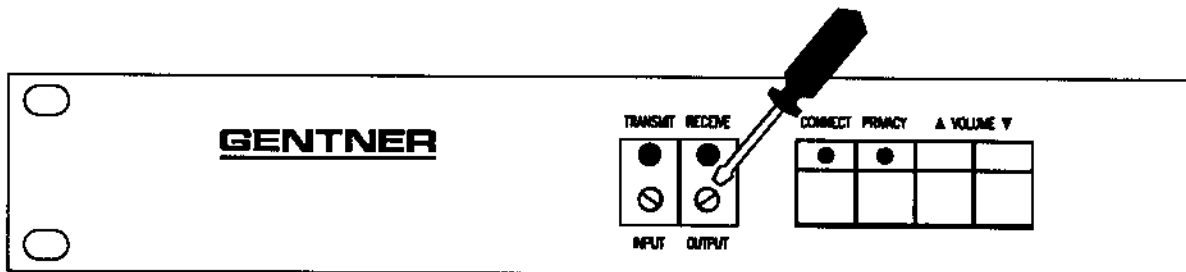




- Calibration**
- Establish a phone call by dialing a number on the telephone and pressing the CONNECT button.
  - Adjust each microphone level control for normal level. Now adjust the output of the microphone mixer for normal level.
  - Using a small screwdriver, adjust the TRANSMIT INPUT level control. The level indicating LED should glow green with normal audio and peak red occasionally. EXPERIMENT WITH DIFFERENT TRANSMIT LEVELS TO REACH AN OPTIMUM LEVEL FOR YOUR APPLICATION.



- Using a small screwdriver, adjust the RECEIVE OUTPUT level for a proper level going to your power amplifier. Note that this level adjustment does not affect the RECEIVE OUTPUT LED. The RECEIVE OUTPUT LED monitors the level of audio being received from the telephone line, not the level going to your power amplifier.



## Setting the ATI/EC Rear Panel Switches

*Before establishing switch settings, please read the section on "Conference Room Planning." This will help you better understand how to setup your ATI and obtain the full benefits the unit has to offer.*

- Turn both the ECHO SUPPRESSOR and ECHO CANCELLER switches to the OFF position.
- From a location outside of the conference room, call into the system. Have someone press the CONNECT button to put the call in conference mode.
- Talk into the telephone to confirm your audio is being received. You should hear your voice "echo" or "return" to you.
- Turn the ECHO CANCELLER switch to the ON position. You should notice a dramatic decrease in echo return.
- Turn the ECHO CANCELLER switch to the OFF position in order to test the echo suppressor.
- Confirm that echo has returned.
- Now turn the ECHO SUPPRESSOR switch to the ON position. You should notice a dramatic decrease in echo return.
- Return the ECHO CANCELLER switch to the ON position. You will notice yet another reduction in the total amount of echo returned.
- Both the ECHO CANCELLER and ECHO SUPPRESSOR switches should now be in the ON position.
- Your system is now ready for use.

After trying various combinations of switch settings, you will be able to determine which combination of echo elimination is best for your application. The following guidelines will help you decide which combination to use:

### **Echo Canceller ON, Echo Suppressor ON:**

- Combines echo cancellation with echo suppression to provide the *greatest* amount of echo elimination possible
- Provides very good apparent interaction between conference sites
- Allows maximum amount of speaker volume

**Echo Canceller ON, Echo Suppressor OFF:**

- Best possible interaction between conference sites—fully interactive two-way conversations.
- Listener fatigue is at its lowest
- Speaker volume cannot be as high as when both the echo canceller and the echo suppressor are turned on.

**Echo Suppressor ON, Echo Canceller OFF:**

- Works well in most acoustical environments, regardless of acoustic room treatment.
- Speaker volume can be turned up to approximately the same level as it can be if used with echo cancellation only
- Allows virtual two-way communication (The caller may or may not be able to detect some reduction in your TRANSMIT audio while *both* of you are speaking simultaneously)

**Echo Canceller OFF, Echo Suppressor OFF:**

- Used to confirm the echo canceller and echo suppressor are both working (Echo should be heard when both the echo canceller and echo suppressor are turned off)
- Not to be used as a mode of operation

**Setting the ATI/ES  
Rear Panel Switch**

- Turn the ECHO SUPPRESSOR switch to the OFF position.
- From a location outside of the conference room, call into the system. Have someone press the CONNECT button to put the call in conference mode.
- Talk into the telephone to confirm your audio is being received. You should hear your voice "echo" or "return" to you.
- Turn the ECHO SUPPRESSOR switch to the ON position. You should notice a dramatic decrease in echo return.
- Your system is now ready for use.

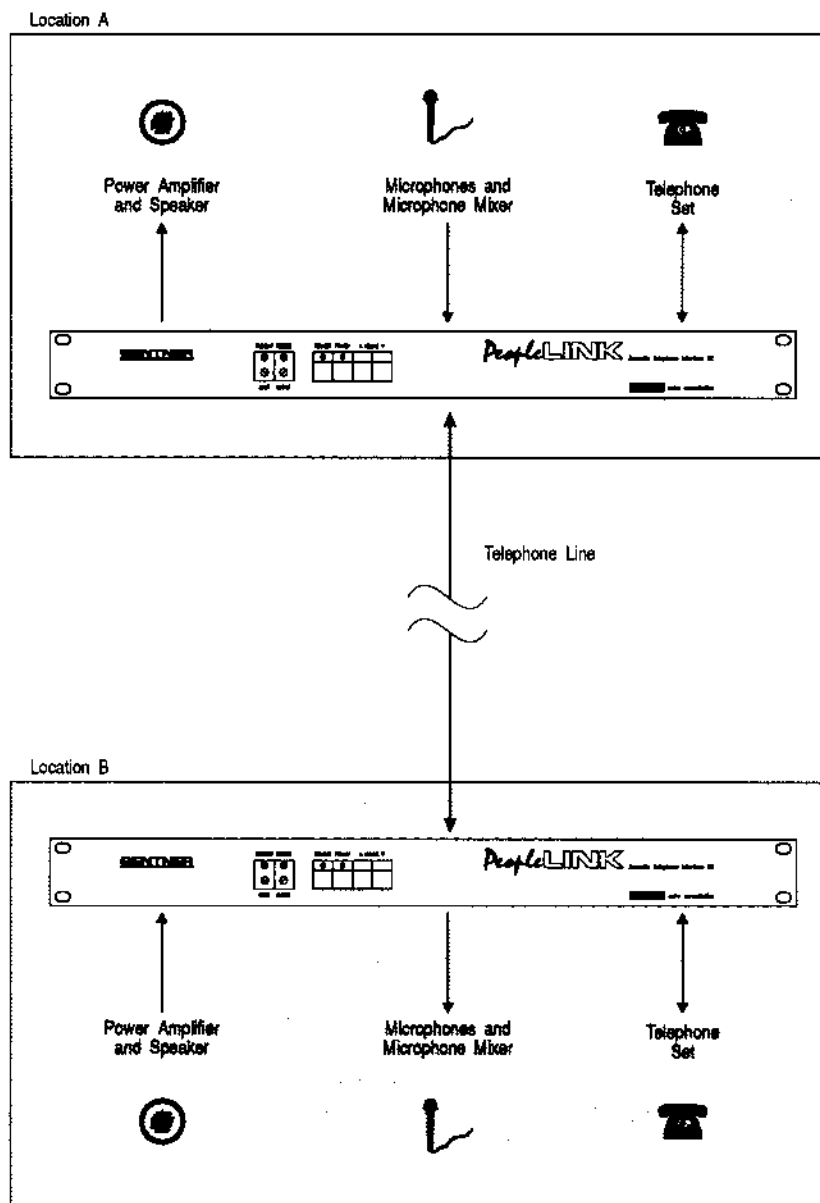
## Operation

- Answering a Call** An incoming call will ring on the telephone set. Answer the call by pressing the CONNECT button on either the front panel or the Remote pad. The connect light will turn on and the privacy light will turn off. The call may also be answered on the telephone set and then given to the ATI by pressing the CONNECT button.
- Making a Call** Dial the phone number on the telephone set. After the other party has answered the call, press the CONNECT button. The connect light will turn on and the privacy light will turn off. The ATI takes control of the call and disables the telephone set.
- Disconnecting a Call** When you are finished with the call, press the CONNECT button. The connect light will turn off and the privacy light will turn on.
- Increasing Listening Volume** If the caller is not loud enough, press and hold the VOLUME UP button until the desired listening level is reached. This **does not** adjust the level of the audio that the caller hears.
- Decreasing Listening Volume** If the caller is too loud, press and hold the VOLUME DOWN button until the desired listening level is reached. This **does not** adjust the level of the audio that the caller hears.
- Having a Private Discussion During a Conference** If you wish to mute your conversation so that the caller cannot hear you, press the PRIVACY button. The privacy light will turn on indicating that the caller cannot hear your conversation. After the private conversation, press the PRIVACY button again. The privacy light will turn off indicating that the caller can hear your conversation.
- Auto Answer Mode** In the auto-answer mode, the ATI will automatically answer telephone calls after one complete ring.
- To put the ATI in auto answer mode, make sure that the ATI is not connected (indicated by the privacy light turned on and the connect light turned off). Press and hold the CONNECT button. After about two seconds the connect light will begin flashing at a slow steady rate, indicating that the ATI is in auto answer mode.
- When the ATI is in auto answer mode, the ATI will automatically disconnect if the other party hangs up.
- To take the ATI out of auto answer mode, make sure that the ATI is not connected (indicated by the privacy light turned on and the connect light flashing slowly). Press and hold the CONNECT button. After about two seconds the connect light will stop flashing, indicating that the ATI is not in auto answer mode.

## Telephone Audio Conferencing

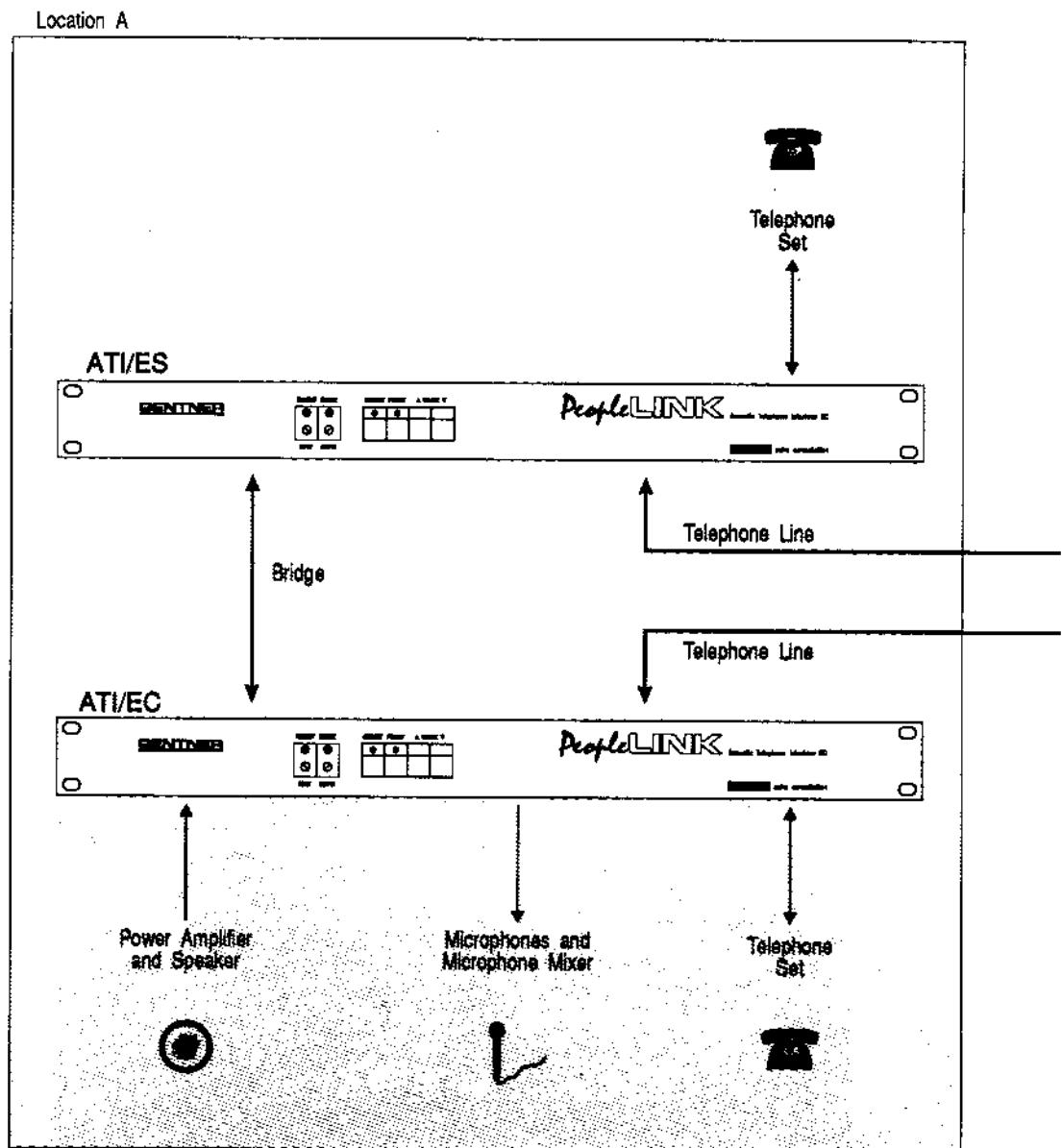
Both ATI models provide all of the connections necessary to perform point to point audio conferencing over a standard telephone line. When open microphones and speakers are used at each location, two ATI's are required, one at each location. The two locations may either be in the same building or at distant sites. One ATI is all that is required when the distant location is using only a handset or speaker phone.

A telephone bridge service may be used to conference multiple sites together and direct them to one ATI. The number of distant locations that can be conferenced together is dependent upon the telephone bridge service used.



## Additional Telephone Lines

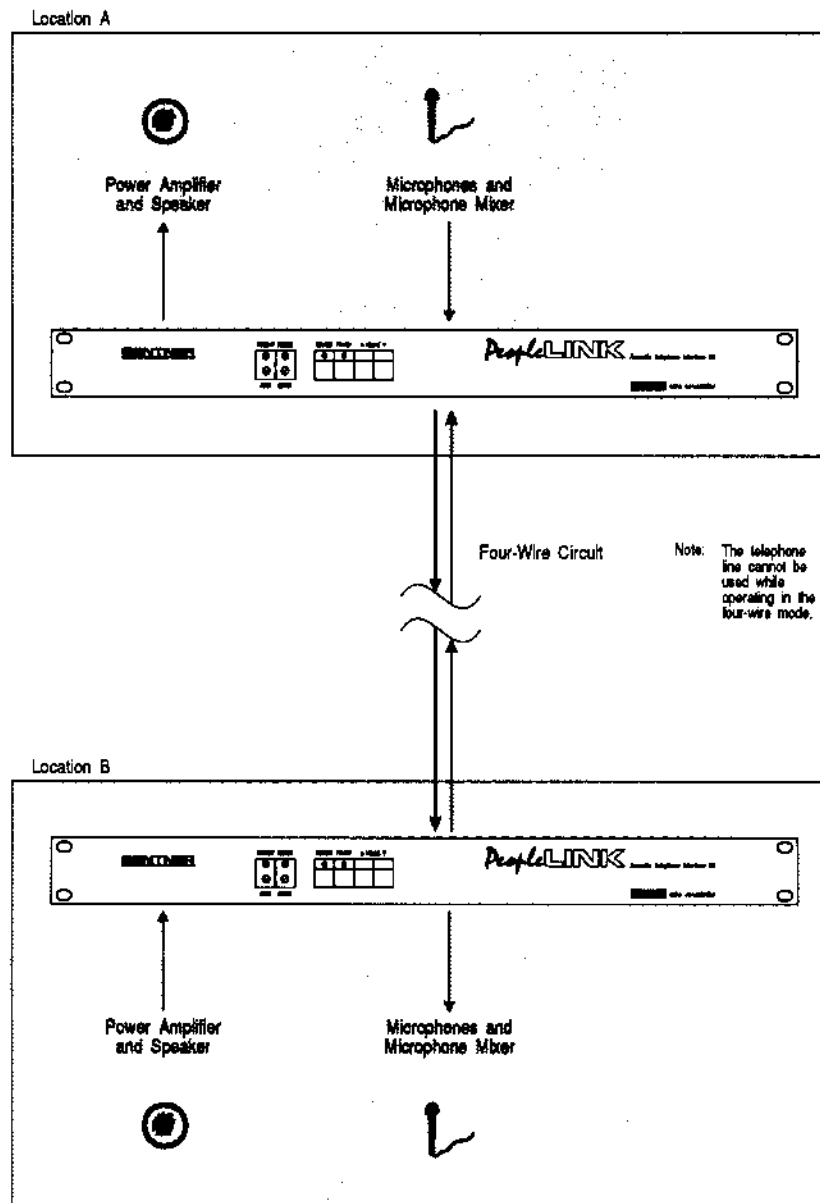
Up to three additional telephone lines can be added to an audio conferencing system for a total of four distant conferencing sites connected to location A. The first telephone line is connected to an **ATI/EC**. Each additional phone line is connected to an **ATI/ES**. The ATI/EC is connected to subsequent ATI/ES models through the bridge connection. Refer to page 19 for more information on the Gentner Bridge assembly.



## Four-wire Audio Conferencing

Both ATI models provide the necessary connections to perform point to point audio conferencing using a four-wire circuit. Two ATI's are required, one at each location, when using the four-wire connections. The two locations may either be in the same building or at distant sites.

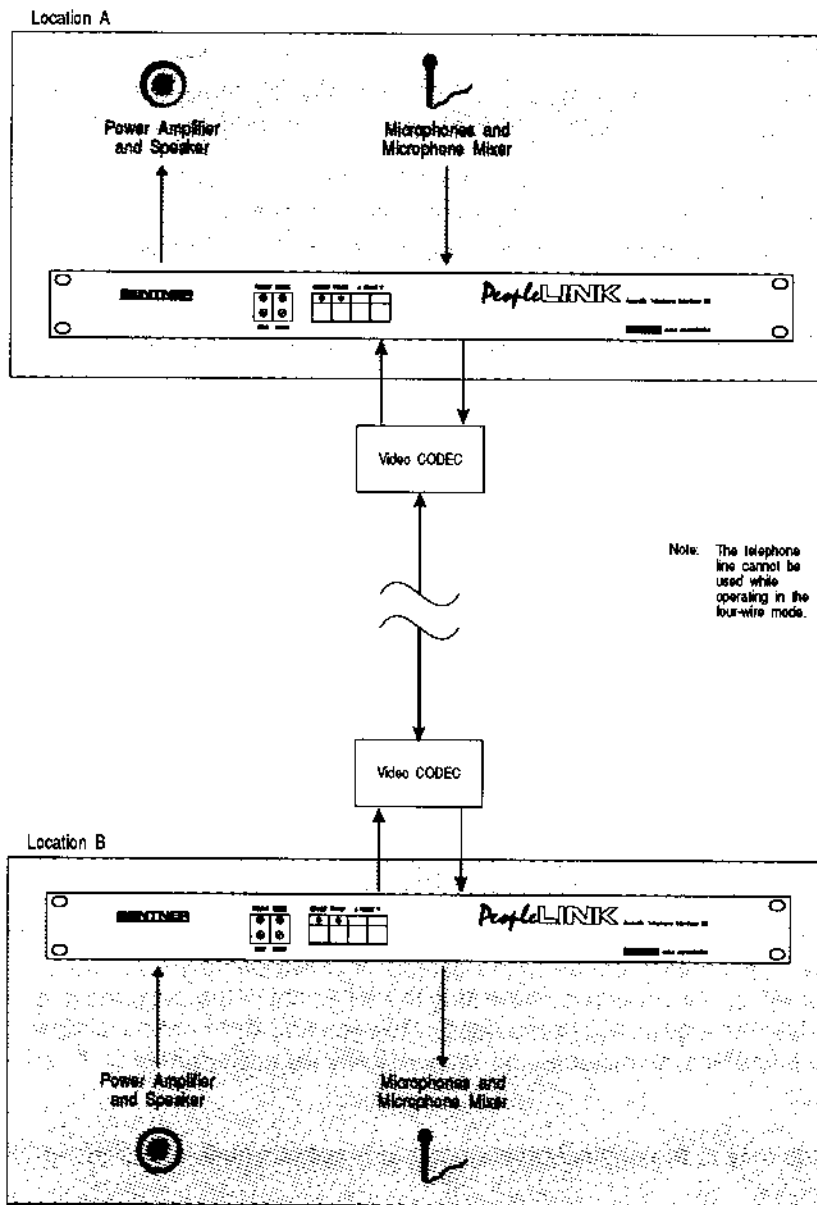
Using a four-wire bridge service, multiple sites may be conferenced together through one ATI. The number of distant locations that can be conferenced together is dependent upon the four-wire bridge service used.





## Video Conferencing

The ATI can be used to provide full-duplex audio for video conferencing applications. Both ATI models supply the four-wire connections needed to interface various video conferencing systems. One ATI is required to interface the video codec system at each location.



## ***One Year Limited Warranty***

GENTNER ELECTRONICS CORPORATION (Manufacturer) warrants that this product is free of defects in both materials and workmanship. Should any part of this equipment be defective, Manufacturer agrees, at its option, to:

A. Repair or replace any defective part free of charge (except transportation charges) for a period of 12 months from the date of the original purchase, provided the owner returns the equipment to Manufacturer at the address set forth below or Manufacturer's Authorized Service Center (contact Manufacturer for locations). No charge will be assessed for parts or labor during this period.

B. Replace or furnish replacement for any defective parts in the equipment for a period of one year from the date of original purchase. Replacement parts shall be furnished without charge except labor and transportation.

This Warranty excludes assembled products not manufactured by Manufacturer whether or not they are incorporated in a Manufacturer product or sold under a Manufacturer part or model number.

THIS WARRANTY IS VOID IF:

A. The equipment has been damaged by negligence, accident, act-of-God or mishandling, or has not been operated in accordance with the procedures described in the operating and technical instructions; or,

B. The equipment has been altered or repaired by other than manufacturer or authorized service representative of Manufacturer; or,

C. Adaptations or accessories other than those manufactured or provided by Manufacturer have been made or attached to the equipment which, in the determination of Manufacturer, shall have affected the performance, safety, or reliability of the equipment; or,

D. The equipment's original serial number has been modified or removed.

NO OTHER WARRANTY EXPRESS OR IMPLIED, INCLUDING WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR USE, APPLIES TO THE EQUIPMENT, nor is any person or company authorized to assume any warranty for Manufacturer or any other liability in connection with the sale of Manufacturer products, except for Manufacturer's Authorized Service Center.

Manufacturer does not assume any responsibility for consequential damages, expenses or loss of revenue or property inconvenience or interruption in operation experienced by the customer due to a malfunction in the purchased equipment. No warranty service performed on any product shall extend the applicable warranty period.

In case of unsatisfactory operation, the purchaser shall promptly notify Manufacturer at the address set forth below, in writing, giving full particulars as to the defects or unsatisfactory operation. Upon receipt of such notice, Manufacturer will give instructions respecting the shipment of the equipment, or such other manners as it elects to honor this warranty as above provided. This warranty does not cover damage to the equipment during shipping and Manufacturer assumes no responsibility for such damage. All shipping costs shall be paid by customer.

This warranty extends only to the original purchaser and is not assignable or transferable.

Gentner Electronics Corporation, 1825 Research Way, Salt Lake City, Utah, 84119-2348.

## Connectors

### Telco Set

- 1. n/c
- 2. A-Lead Closure
- 3. Ring
- 4. Tip
- 5. A-Lead Closure
- 6. n/c

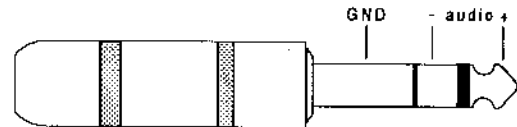


### Telco Line

- 1. n/c
- 2. A-Lead Closure
- 3. Tip
- 4. Ring
- 5. A-Lead Closure
- 6. n/c



### Four-Wire Receive and Transmit (balanced)



### Receive Output XLR (balanced)

- 1. GND
- 2. +audio
- 3. - audio

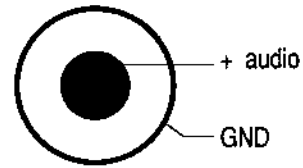


### Transmit Input XLR (balanced)

- 1. GND
- 2. +audio
- 3. - audio

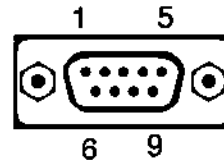


**Record Output  
(unbalanced)**



**Remote**

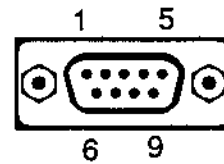
- 1. Digital Ground
- 2. Connect
- 3. Privacy
- 4. Volume Up
- 5. Volume Down
- 6. No connection
- 7. Connect LED
- 8. Privacy LED
- 9. n/c



Connect, Privacy, Volume Up, and Volume Down are activated with a closure to Ground. Connect LED and Privacy LED supply power at 5VDC @ 20 mA.

**Bridge**

- 1. Echo cancelled Transmit
- 2. Receive Out A
- 3. Receive Out B
- 4. Receive Out C
- 5. Transmit In A
- 6. Transmit In B
- 7. Transmit In C
- 8. Transmit In D
- 9. Analog Ground



Echo Cancelled Transmit is derived from the TRANSMIT INPUT audio by removing the acoustic echo. Receive Out A through C are unbalanced outputs of RECEIVE OUTPUT audio. Transmit In A through D are inputs that are summed with the TRANSMIT INPUT.

## Specifications

### Physical

Dimensions	19" (W) X 1.75" (H) X 10" (D) 48.3 (W) X 4.45 (H) X 25.4 (D) mm
Weight	10 lbs (4.5 kg)      dry weight 13 lbs (5.9 kg)      shipping weight
Connectors	
Power	Fused multiple voltage module
Remote	DB-9 female
Remote Cable	25 feet
Input	3-pin female XLR
Output	3-pin male XLR
Four-wire In/Out	1/4" phone stereo
Bridge	DB-9 male
Telco Line/Set	RJ-11C
Mix	phono

### Electrical/Performance

Power	100/120/220/240 VAC; 50/60 Hz
Frequency Response	- 1 dB at 300 and 3300 Hz; transmit and receive
Signal/Noise Ratio	> 60 dB ref. +4 dBm; transmit and receive
THD	< .15% ; transmit and receive
Echo Return Loss	
Telephone	>40 dB
Acoustic Echo Cancellation	>30 dB
Acoustic Echo Suppression	18 dB
Echo Cancellation Span	
Telephone	12 milliseconds
Acoustic Echo Cancellation	179 milliseconds

### Levels

Transmit Input	+4 dBm nominal, adjustable; 20 kohms, bridging; balanced
Receive Output	+4 dBm nominal, adjustable; 600 ohms; balanced
Mix Output	-10 dBm; 600 ohms; unbalanced
Four-Wire Transmit Output	+4 dBm; 600 ohms; balanced
Four-Wire Receive Input	+4 dBm; 20 kohms, bridging; balanced
Telephone Transmit	-15 dBm; 600 ohms
Telephone Receive	-24 dBm; 600 ohms

### Environment

Maximum Room Size	50 ft by 50 ft ( 15.24 m by 15.24 m)
Operating Temperature	32°F to 110°F

Specifications are subject to change without notice