



TI7200

Teleconferencing Interface

INSTALLATION AND OPERATIONS MANUAL

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TELECONFERENCING INTERFACE INSTALLATION AND OPERATIONS MANUAL

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Features

- Superior Acoustic Echo Cancellation
- 100% Digital Audio Processing
- Full Duplex Operation
- Digital Gain Processing
- Auto Answer / Auto Disconnect
- Compliment of options available to customize your system
- Easy to use optional hand-held Remote Control
- Privacy button for private conversations
- Operates in either Telephone or 4 Wire/Video operations
- Sleek design for "In the Room" or "Rack" installation

Benefits

- **Digital Echo Cancellation**—The TI digitally subtracts acoustic echo (caller's voice) from the audio being returned to the caller. The TI digitally eliminates both direct and indirect acoustic echoes, making the conference much more intelligible.
- **Full Duplex Operation**—Both locations can speak simultaneously without interruption, because the TI does not use switching to cut off either the transmit or receive audio signals. This produces full duplex operation.
- **Digital Gain Processing**—The TI uses special digital gain processing techniques to maintain consistent audio levels within the room. Receive volume levels are maintained consistently, even when changes occur in the distant room, or telephone line conditions change.
- **Video Teleconferencing Applications**—The TI7200 can be connected with most video conferencing systems, to provide the best audio quality available with your video application.
- Highly reliable operation and setup integrity.

Introduction

Thank you for purchasing Gentner's Teleconferencing Interface. The latest digital technology has been incorporated into the development of this outstanding product. The TI7200 supports video *and* audio teleconferencing applications. It operates with an echo cancellation span of 192 milliseconds with a bandwidth of 7.0 kHz (the bandwidth of most video systems.) This higher bandwidth translates to higher audio quality. Your TI system will meet the growing needs of any organization—from small to large.

The TI was designed to work in almost any acoustic environment using most kinds of peripheral equipment. Although many acoustic factors come into play in the design and layout of conference facilities, superior acoustic cancellation features have been built into the TI. This enables you to have the most trouble-free acoustically pleasing teleconference possible.

This manual is designed to walk you through installation, setup and operation of your TI system.

If you need information on how to plan for your TI installation, improve the acoustics in your facility, or learn more about echo suppression and cancellation, contact Gentner Teleconferencing Products at the number shown below.

To receive the full benefit of the Gentner Teleconferencing Interface system, we recommend that you read this manual thoroughly before beginning installation.

We welcome and encourage your comments so that we can continue to improve our products. Please call, fax or write us at the location noted below.

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Product Description

Model TI7200	Gentner's TI7200 Teleconferencing Interface contains superior digital echo cancellation circuitry for both video and audio applications. The TI7200 operates with a 7.0 kHz bandwidth for higher audio quality.
Adjustable Settings	The TI7200 contains Transmit and Receive adjustment level pots for matching your room and network equipment levels. The system also contains a simple setup procedure and switches for Echo Cancellation and Echo Suppression that can be individually set to accommodate your specific room's needs.
Echo Elimination	Front panel Acoustic Echo Canceller and Acoustic Echo Suppressor LEDs flash green/red, graphically indicating whether Echo Cancellation and/or Echo Suppression controls are working adequately. The TI7200 operates with a 192 millisecond acoustic echo cancellation span.
Noise Filtering	Internal filters remove unwanted noise below 50 Hz and above 7.0 kHz in 4 Wire/Video mode, and below 300 Hz and above 3.4 kHz in Telephone mode.
Telephone and 4 Wire/Video Modes	The TI7200 operates in either (2-wire) Telephone or 4 Wire/Video modes. The front panel contains Telephone and 4 Wire/Video push-on/push-off buttons with LED indicator lights, showing which mode is active. The TI7200 can be used to provide the audio in video applications, assuming your video equipment supports it.
Using Microphones and Speakers	The TI will require connection to a mixer/power amplifier, such as Gentner's MPA. The Gentner MPA not only provides the connections to your microphones and speakers, but is a programmable six-channel automatic mixer with a two-channel 15 watt power amp.
Accessories	The TI7200 can be accessorized with an optional Remote Control, speakers, and microphones, and all cabling required for setup. An interconnection kit is also available to simplify installation and connection of system components. See Accessories on page 26 of this manual for a complete listing of accessories and their Gentner part numbers. Contact Gentner for information and availability.

Pre-Installation Site Preparation

The following information will give you a head-start on your site preparations prior to installing your new TI system.

Acoustic Treatment

Simple conference room treatment is generally all that is required to improve the operation of your teleconferencing system. Contact Gentner or your Audio/Visual contractor for more information, if required.

Power Requirements

The TI will automatically accommodate voltage requirements in the range between 85 and 240 VAC, 50/60 Hz power. No switching is required.

Telephone Line Requirements

For normal telephone audio teleconferencing operation, your TI 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-11C jack where you want to install your TI, call your telephone company for installation.

If you are connecting your TI to a private branch exchange (PBX) system, contact your telephone equipment manufacturer or service representative. Some PBX systems will not work with your TI. Your TI works with the same type of telephone line that a facsimile machine or modem uses.

If you are using your TI for 4 Wire/Video teleconferencing, the line you need to order from your local telephone company will be specified by the CODEC, or other transceiver manufacturer whose equipment you have purchased.

Telephone

In most instances, a single-line telephone set will be required at the time of installation, and for use during operation, to initiate telephone calls.

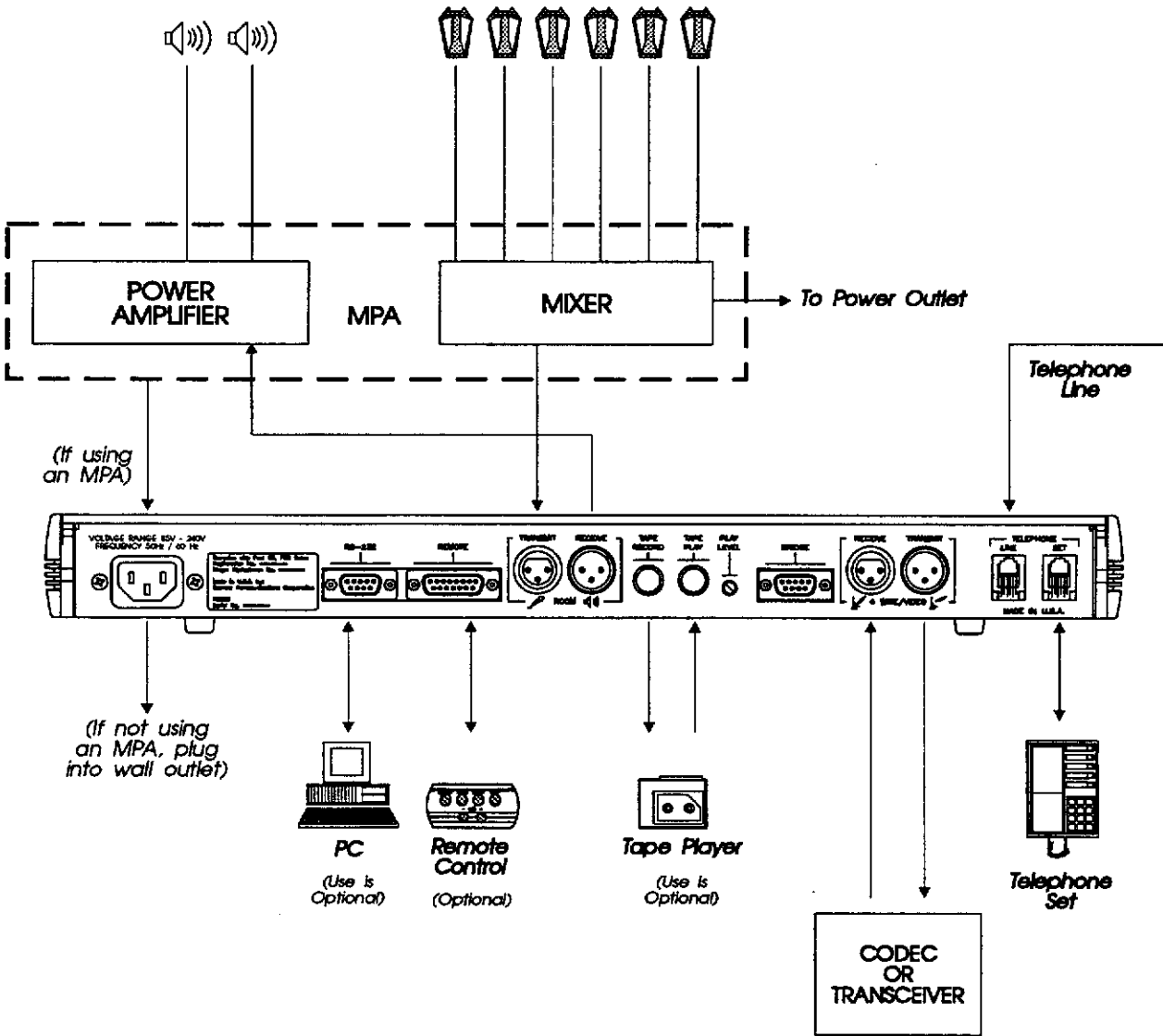
Video CODEC

CAUTION! *Gentner strongly advises using a qualified sound contractor or audio/video specialist when installing equipment and circuitry for video teleconferencing.*

If you will be using the TI in 4 Wire/Video mode, a video circuit must be supplied by the user. This device, such as a video CODEC uses special lines for handling transmission and reception of video and audio signals. Your video equipment must match the audio input and output requirements of the TI; i.e., Transmit Output and Receive Input. Check Specifications on page 25 of this manual for this information.

The 4 Wire/Video audio from the TI is compatible with most popular CODECs, satellite transceivers, fiber optic transceivers, or dedicated 4 wire telephone interfaces, regardless of transceiver or network delays. The 4 Wire/Video connections are not capable of plugging directly into two telephone lines. A 4 wire telephone interface is required.

- Auxiliary Equipment** Any auxiliary equipment you will be using with the TI, such as Gentner's Mixer/Power Amplifier, microphones, speakers, recording equipment, etc., should be available at time of installation.
- Mounting** The TI can be placed on a cart or table in the conference room or other nearby location (up to 1,000 feet from the conference room). The TI's cabinet is attractively designed for office or conference room display. Rubber "feet" are included to protect your table surface.
- Your unit comes equipped for placement on the table top or conference room table. If your application requires mounting the unit in a 19" equipment rack, rack mount ears are supplied with each TI. Instructions for installing the rack ears are addressed on page 8.
- Connectors/Cables** The power cable is provided with your TI to connect the unit to an electrical outlet.
- When the TI is purchased as part of a system (which includes the MPA, Remote Control, and your choice of microphones and speakers), all required cables and connectors are supplied by Gentner. The System 7200 includes the TI7200 and all of the above named components.
- Environmental Requirements** The TI can be safely operated in a room with varying temperatures between 32° and 100° Fahrenheit.
- Tools Required for Installation**
- Small flat-blade screwdriver (for fine-tuning adjustment pots)
 - Medium phillips screwdriver (if rack mounting)



Complete System Diagram

Installation

This section details the installation procedures for your new TI unit. General informational text is included to help you understand each procedure, where required.

A system diagram is provided on page 6 for overall system and component planning and installation.

Unpack and Check Components

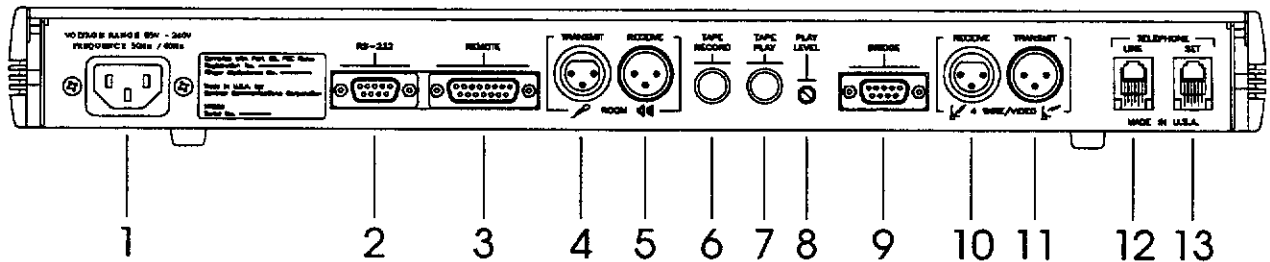
Gentner is not responsible for product damage incurred during shipment. You must make claims directly with the carrier. Inspect your shipment carefully for obvious signs of damage. When the shipment appears undamaged, but equipment appears to be damaged, retain the original boxes and packing material for inspection by the carrier. Contact your carrier immediately.

Inspect Your Shipment

Your TI unit comes in one box containing cables, manuals, etc. Check off each item indicated on the Master Packing List to ensure that all listed items were received.

The Back Panel Drawing

Refer to the drawing below for a description and placement of each of the connections you will be making, as described in this section. Each connection is numbered for easy identification, and is referred to by number, in the description.



Back Panel Connections

Equipment Placement

Your TI is shipped for desk top or cabinet placement. Rack mount ears are included in the shipment for converting to a rack-mountable unit, if desired.

- Place the TI in a convenient place in the conference room, on a table, or in a cabinet.

Converting to Rack Mount

Rack ears are supplied with each TI. If you are placing the TI in a rack, proceed as follows:

- Remove the two screws from the side panels and retain for later use.
- Remove the decorative end caps from the side panels.
- Place the rack ears on the sides of the TI unit, with the "ears" facing out.
- Using the screws retained above, secure the rack ears to the side panels.
- The rubber feet on the bottom of the TI can be removed, if necessary.
- Mount the unit in a standard 19" equipment rack using the screws provided. Do not block any ventilation holes.

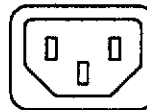
Make Connections

- Power** If using an MPA, make the connection between the TI power module (1) and the power amplifier's AUXILIARY POWER connector. If purchased as a system, this cord is supplied. (Speakers and microphones must be connected to the mixer.)

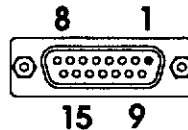
OR,

- If an MPA is not used, plug the supplied standard power cord directly into the outlet. This power module will operate at any level in the range between 85 and 240 VAC; 50-60 Hz.

VOLTAGE RANGE 85V - 240V
FREQUENCY 50Hz / 60Hz



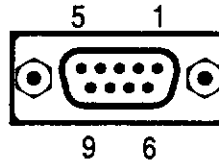
- Remote Control** If using Gentner's optional Remote Control, plug it into the DB-15 connector (3) labeled REMOTE.



REMOTE CONTROL DB-15 CONNECTOR PIN OUTS			
PIN NO.	CONTROL	PIN NO.	CONTROL
1	Ground	9	Ground
2	2 Wire Audio Switch	10	2 Wire Lamp
3	4 Wire Audio Switch	11	4 Wire Lamp
4	Privacy Switch	12	Privacy Lamp
5	Phone Add Switch	13	Phone Add Lamp
6	Volume Up	14	Not used
7	Volume Down	15	Not used
8	4 Wire Mode		

OR,

- If using another manufacturer's Remote Control, plug it into *either* the DB-15 REMOTE connector (3), or into the RS-232 connector (2), depending on the manufacturer's connector requirements. The detailed RS-232 protocol is included in this manual beginning on page 29.



RS-232 DB-9 PIN OUTS			
PIN NO.	CONTROL	PIN NO.	CONTROL
1	DCD	6	DSR
*2	Transmit	7	No connection
*3	Receive	8	CTS
4	DTR	9	No connection
*5	Ground		

*Required for Computer or Remote Control

Mixer Audio

- Connect the MASTER OUTPUT of the microphone mixer to the ROOM TRANSMIT input female XLR socket (4). This audio is sent to the remote conference site (output of microphone mixer).



- Connect the ROOM RECEIVE output male XLR plug (5) of the TI to the Power Amplifier Input (PA IN on the MPA). This is balanced line level audio (audio from the other location). This audio will be amplified and sent to the speakers.



Auxiliary Equipment

- If an audio tape or video recorder is to be used to record both sides of the teleconference, connect a cable between the "Record In" or "Audio In" of your recording device and the TAPE RECORD jack (6) of the TI.
- To allow for audio playback if you want to play a recorded tape to both locations, plug in the RCA "AUDIO OUT" or "LINE OUT" connector from your VCR or audio tape device into the TAPE PLAY jack (7). The audio is mixed with the receive audio for playback in the local room and it is also sent to the remote location. If you are in Telephone mode, it will be sent down the telephone line. If you are in 4 Wire/Video, it will be sent out the 4 Wire/Video Transmit.

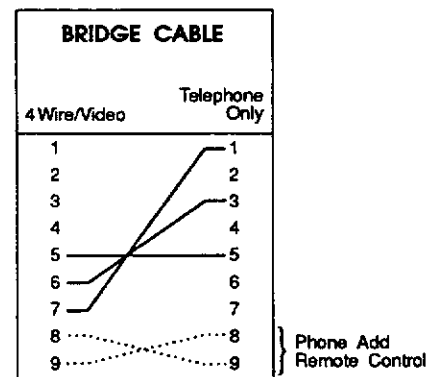
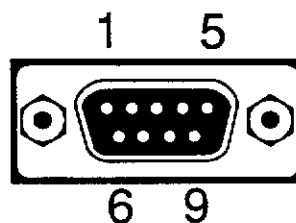


- If an audio tape player or VCR is connected to the TI for audio transmission to the other site, turn the audio source on and adjust the PLAY LEVEL adjustment (8) on the back panel of the TI. This volume control will adjust the audio level in and out of the room.

Bridge Connector

The BRIDGE DB-9 female connector (9) is used for adding additional telephone interface equipment or other audio equipment to the system. If you are operating in dedicated 4 Wire/Video mode and need to add a 2 wire telephone line, a second TI is required. The additional telephone line and set is plugged into the second TI. This configuration allows you to conference in 4 wire/video to one site and include a second site via 2 wire/telephone ("Phone Add").

- To link the two TI's together, connect the BRIDGE connectors (9) on both units as shown below. Refer to the Phone Add drawing on page 22. For more detailed information on the Bridge connector, including a pin out chart, refer to page 28.



4 Wire/Video Connections

- When connecting your TI to 4 Wire/Video equipment, connect the female XLR connector from the 4 WIRE/VIDEO RECEIVE input (10) to the audio output of your transceiver or CODEC. Check your equipment manufacturer's documentation to verify proper connector assignment and specifications.

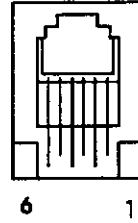


- Check Specifications on page 25 for proper level and impedance.
- Connect the male XLR connector from the 4 WIRE/VIDEO TRANSMIT output connector (11) to the input of the transceiver or CODEC. Check your equipment manufacturer's documentation to verify proper connector assignment and specifications.



- Check Specifications on page 25 for proper level and impedance.

- Connect Telephone** Plug your telephone line into the RJ-11C LINE jack (12).
 Plug your telephone set into the RJ-11C SET jack (13).



TELEPHONE SET AND LINE CONNECTIONS			
TELEPHONE SET		TELEPHONE LINE	
1	No connection	1	No connection
2	A-Lead closure	2	A-Lead closure
3	Ring	3	Tip
4	Tip	4	Ring
5	A-Lead closure	5	A-Lead closure
6	No connection	6	No connection

Connections are now complete. Proceed to Calibration and Setup.

Calibration and Setup

The following information will help you decide what settings and adjustments to make in order to optimize your system performance.

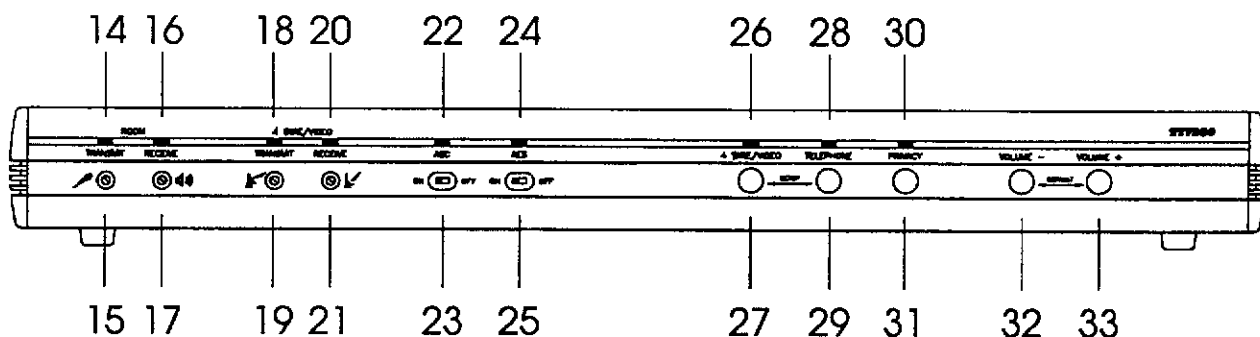
Verify that all components, (including microphones and speakers, mixer/power amplifier, CODEC, bridged and auxiliary equipment, etc.) and all connections are made as shown in the connection diagram on page 6. Make certain proper power is supplied to the TI.

Slide the Plexiglas on the front panel to the right or left to expose adjustment pots and switches indicated in the instructions below.

NOTE: Some echo and ringing may be heard while calibrating the TI. Disregard it and continue with calibration until the end of the procedure. The echo and ringing will disappear.

The Front Panel Drawing

The Front Panel drawing below shows each front panel adjustment pot and button by number, for easy identification, as needed.



Front Panel Controls

Telephone Operation

Set Room Levels Using Telephone Lines

The TELEPHONE and 4 WIRE/VIDEO buttons (27, 29) "push-on/push-off", activating and deactivating the respective modes. The TI will not allow simultaneous operation of Telephone and 4 Wire/Video. To activate one, the other must be deactivated.

- Place the AEC (23) switch in the ON position and the AES (25) switch in the OFF position.

- Check trim pots (15, 17, 19, 21). Each adjustment level should be in the (nominal) factory default position (approximately 1/4 open).
- Initiate a call using the telephone set. Wait for an answer, then press the TELEPHONE button (29) to place the call into the TI. The TELEPHONE LED (28) will light. (Once the button is pressed, you may hang up the handset.)

Transmit

- Someone in the local room should speak into a microphone at a normal level and distance from the microphone. The party at the other location should not talk during the Transmit adjustment.
- Adjust the microphone mixer to produce a nominal output.
- Adjust the ROOM TRANSMIT trim pot (15) while monitoring the LED (14). The LED should flash about 90-95% green and 5-10% red.

Receive

- With someone talking at a normal level from the other location, first adjust the ROOM RECEIVE (17) trim pot, then adjust the power amplifier level for a comfortable level on the speaker.
- Monitor the ROOM RECEIVE LED (16). Optimum levels will generally be found at about 90-95% green and 5-10% red.
- Terminate the telephone call by pressing the TELEPHONE (29) button again. The LED (28) will extinguish.
- Once the above settings have been made, they should not need to be changed again.

Set 4 Wire/Video Levels

If your system will be used for video teleconferencing, this section must be completed next. If video teleconferencing is *not* to be utilized, skip this section and proceed directly to Automatic Setup.

- With the TELEPHONE LED (28) off, establish connection to the 4 wire/video equipment by pressing the 4 WIRE/VIDEO front panel switch (27).
- Place the AEC (23) switch in the ON position and the AES (25) switch in the OFF position.

Transmit

- With someone talking at a normal level in the room at this location, adjust the 4 WIRE/VIDEO TRANSMIT trim pot (19) to match the input level of your 4 wire/video equipment. Check nominal output levels.

Receive

NOTE: *Gentner recommends using a Gentner TI at both locations to achieve full audio benefit; however, other manufacturer's equipment can be used.*

- Send a nominal level from the remote location and adjust the 4 WIRE/VIDEO RECEIVE trim pot (21) until the associated LED (20) flashes 5-10% red and 90-95% green.
- If your teleconferencing unit at the distant location is a Gentner TI, make all calibration settings, as described beginning on page 14, before proceeding to Automatic Setup.

Automatic Setup

Once the above settings and adjustments have been completed, the Setup routine must be initiated. For best results, neither the party at the other location or anyone in the room should speak during the noise burst of the setup routine. (It will sound like static.) The AES switch (25) should be off; the AEC switch (24) should be on.

- Momentarily press the TELEPHONE and the 4 WIRE/VIDEO buttons (27 and 29) simultaneously. This will transmit a (static) noise burst over the speakers for 25 seconds, or until the TI cancels echo up to 12 dB, whichever comes first. This allows the system to make necessary internal adjustments for maximum echo cancellation.
- During normal conversation levels, if the AEC LED (22) stays green, no further adjustment to the AES/AEC switches need to be made.
- During normal conversation, it is normal for the AEC LED (22) to occasionally flash red. If the AEC LED turns solid red while the calling party is speaking at normal levels, turn the AES (25) switch on.
- If the AES or AEC LED (22, 24) flashes red when both switches are on, either a mic/speaker, or level adjustment, or an additional Automatic Setup routine is recommended.

IMPORTANT! *If you make any additional adjustments or changes on the front panel, or if any mics or speakers are moved after setup has been completed, initiating the automatic setup routine is recommended before operating the TI.*

Volume – and Volume +

These front panel controls (32, 33) should not be adjusted during Calibration. Their use will be described in the Operation section of this manual.

Front Panel Security

Now that your system has been properly installed, adjusted and calibrated, and setup has been completed, your level settings can be hidden from tampering by sliding the front-panel cover to the left-most position.

Operation

When Not in Use When the TI is not in use, the red PRIVACY LED (30) will remain lit, and the green TELEPHONE and 4 WIRE/VIDEO LEDs (26, 28) will be off. (See also Auto-Answer/Auto-Disconnect mode below.) Power should be maintained to the unit at all times. *Do not unplug the unit when not in use.*

Establishing a Video Teleconference Video teleconferencing systems and networks vary, and can be as diverse as there are different manufacturers and types of networks used. Your audio/video installer/specialist should provide the information necessary to establish your video teleconference using the type of network your equipment utilizes.

Once your teleconference connection is established through your network, the TI will be engaged and audio will be sent to and received from the other room by pressing the 4 WIRE/VIDEO button (27) on the front panel of the TI. The associated green LED (26) will light when in use. The audio for your video teleconference will be processed through the TI, using the digital signal processing to provide the clearest audio possible along with your video transmission.

Your TI can be programmed to remain in 4 wire connect mode by connecting pins 8 and 9 together on the REMOTE connector (3). Refer to page 9 for the Remote Control DB-15 Connector Pin Out chart.

Terminating a Video Teleconference When the video conference is concluded, press the 4 WIRE/VIDEO button (27) again. The green LED (26) will extinguish, indicating the connection is terminated.

Your audio/video installer/specialist should provide the information necessary to properly terminate your video transmission, depending on the type of equipment you are using.

Answering a Call An incoming call will ring on the telephone set (the Telephone LED (28) will flash rapidly during each ring). Answer the call by pressing the TELEPHONE button (29) on either the front panel or the Remote Control pad. The green TELEPHONE LED (28) will turn on and the red PRIVACY LED (30) will turn off. The call may also be answered on the telephone set and then routed to the TI by pressing the TELEPHONE button (29). (See also Auto-Answer/Auto-Disconnect on page 18.)

Making a Call Using your telephone set, dial the phone number of the party you wish to call. After the other party has answered, press the TELEPHONE button (29). The TELEPHONE LED (28) will light and the PRIVACY LED (30) will turn off. The TI takes control of the call and disables the telephone set. You should now hang up the handset.

Disconnecting a Call

When you are finished with the call, press the TELEPHONE button (29) again. The TELEPHONE LED (28) will turn off and the PRIVACY LED (30) will turn on.

**Auto-Answer/
Auto-Disconnect
Mode**

In the Auto-Answer mode, the TI will automatically answer telephone calls after one complete ring.

To put the TI in Auto-Answer mode, make sure that a call is not currently connected. (The red PRIVACY LED [30] will be lit and the green TELEPHONE and 4 WIRE/VIDEO LEDs [26, 28] will be off). Press and hold the TELEPHONE button (29). When the associated LED (28) begins blinking at a slow, steady rate, release the TELEPHONE button. As long as the LED is blinking, the TI will remain in Auto-Answer/Auto-Disconnect mode. The PRIVACY LED (30) will remain lit.

NOTE: This mode may not work as described, with some PBX systems. The difficulty with the auto-answer mode may be caused by ring timing. Problems with auto-disconnect may be caused by lack of loop drop or loop reversal. Contact your telephone company for information on providing the proper signaling.

**Terminating
Auto-Answer/
Auto-Disconnect
Mode**

To take the TI out of Auto-Answer/Auto-Disconnect mode, make sure that the TI is not currently on a call (the PRIVACY LED [30] should be lit and the TELEPHONE LED [28] should be blinking slowly). Press and hold the TELEPHONE button (29). Release when the TELEPHONE LED (28) turns off.

Privacy / Hold Mode

If you wish to place a call on *hold* (mutes your conversation so that the caller cannot hear you), press the PRIVACY button (31). The red PRIVACY LED (30) will turn on indicating that the caller cannot hear your conversation; however, you will still be able to hear the other location. When you want to resume two-way communication with the other party, press the PRIVACY button (31) again. The PRIVACY LED (30) will turn off, re-establishing two-way communication with your party.

**Decreasing Listening
Volume**

If the audio on the speakers is too loud, press and hold the VOLUME – button (32) until the desired listening level is reached. This does *not* adjust the level of the audio that the other location hears.

**Increasing Listening
Volume**

If the audio on the speakers is not loud enough, press and hold the VOLUME + button (33) until the desired listening level is reached. This does *not* adjust the level of the audio that the other location hears.

**Restore Listening
Volume to Default**

Press the VOLUME – and VOLUME + buttons (32, 33) simultaneously for a moment. This restores the volume level to a mid-range setting.

At the conclusion of each call, the volume levels are automatically restored to the mid-range setting.

Phone Add To use the Phone Add feature, a second TI (with separate telephone line and telephone set) must be added to the system. The two TI's are connected together through the Bridge connector that combines the audio of both units into the conference. The Phone Add feature is used when the first TI is in 4 Wire/Video mode and an additional site is added to the conference using the telephone connection of the second TI. Make or receive a call from the second TI, then press either the Telephone button on the second TI or the Phone Add button on the Remote Control.

Remote Control The optional Gentner Remote Control contains six essential operational buttons: 4 Wire/Video, Telephone, Privacy, Phone Add, Volume – and Volume +. The 4 Wire/Video, Telephone and Privacy buttons operate in exactly the same manner as their respective buttons on the front panel of the TI. The Phone Add feature is activated by pressing the Phone Add button on the Remote Control or the Telephone button on the second TI. (On TI systems not set up for Phone Add operation, the Phone Add button on the Remote Control remains non-operational.) The 4 Wire/Video, Telephone, Privacy and Phone Add buttons each contain their respective LED to graphically indicate the current mode of operation. These four buttons are push-on/push-off in operation.

The Volume – and Volume + buttons will incrementally decrease/increase the volume level of the caller, in the same manner as using the respective buttons on the TI front panel.

If using the TI in a Phone Add configuration, the Bridge connector contains ON/OFF control for the second TI. These are connected directly to the second TI Bridge connector (Phone Add On, Phone Add Off). This allows control of both units with one remote device. (See page 28 for additional information on the Bridge connector and the DB-9 Connector Pin Out chart.)

Emergency Restoration Your system will maintain all information the TI has "learned" about your room environment, as long as power is maintained.

Following a power failure, the TI7200 will reset itself to factory default settings. On first connection of Telephone or 4 Wire/Video, a 3-second white noise burst will automatically be emitted to quickly "read" the room and make internal settings for echo-elimination—all without technical assistance.

In the event that the system is unstable or echo is present, a full setup routine should be initiated to set the system to optimal operation. Momentarily press the Telephone and the 4 Wire/Video buttons (27 and 29) simultaneously. AEC/AES switches should be kept in the position set prior to the outage. The receive volume level will reset to nominal levels. Telephone or 4 Wire/Video operation will need to be reinitiated by pressing the required button (LED will light). The telephone call will need to be redialed, when using the Telephone mode.

(If you are using a Gentner MPA with your TI, note that following a power failure, the MPA will retain all special programming, and resume operation without re-programming.)

Telephone Audio Teleconferencing

The TI provides all of the connections necessary to perform point-to-point audio teleconferencing over a standard telephone line. When open microphones and speakers are used at each location, two TI's should be used; one at each location, to achieve maximum audio quality. The two locations may be either in the same building or at distant sites. One TI is all that is required when the distant location is using only a handset or speaker phone. If you are teleconferencing room-to-room, and you want to maintain full duplex, you must use one TI in each location. (Gentner's TI is compatible with most other manufacturer's teleconferencing equipment; however, systems with full duplex capability should be preferred.)

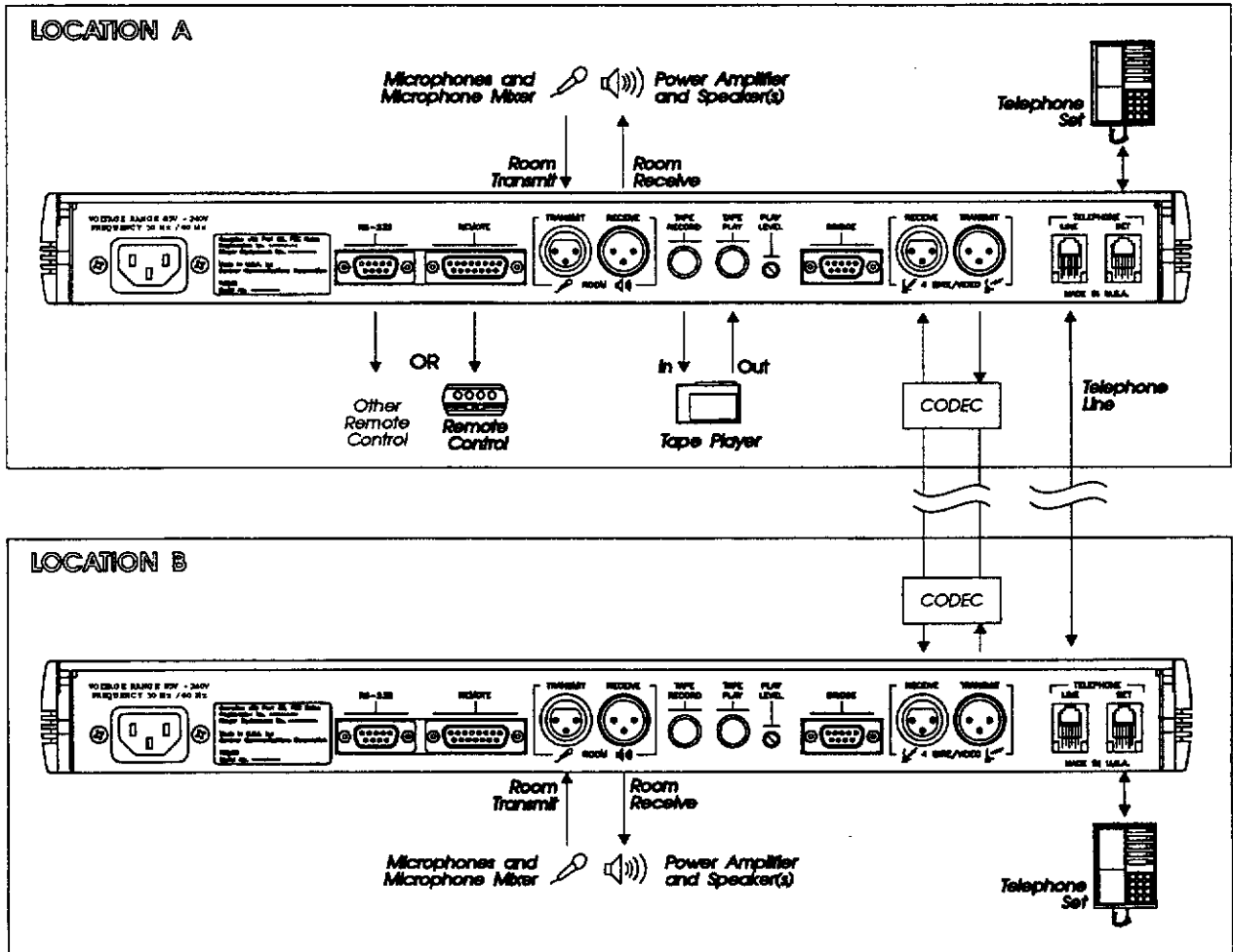
If your application requires linking multiple sites, Gentner offers conference call services that will link your site to as many sites as required. Contact Gentner Conference Call at (800) 945-7730 for information. This bridge service offers Gentner's guarantee of reliable and clear connections for your multiple site calls.

The drawing on page 21 shows the optional connections such as the Remote Control and the auxiliary connection to a tape recorder.

Video Teleconferencing

The TI can be used to provide full duplex audio for video teleconferencing applications. One TI is required to interface to a Video CODEC or transceiver system at each location.

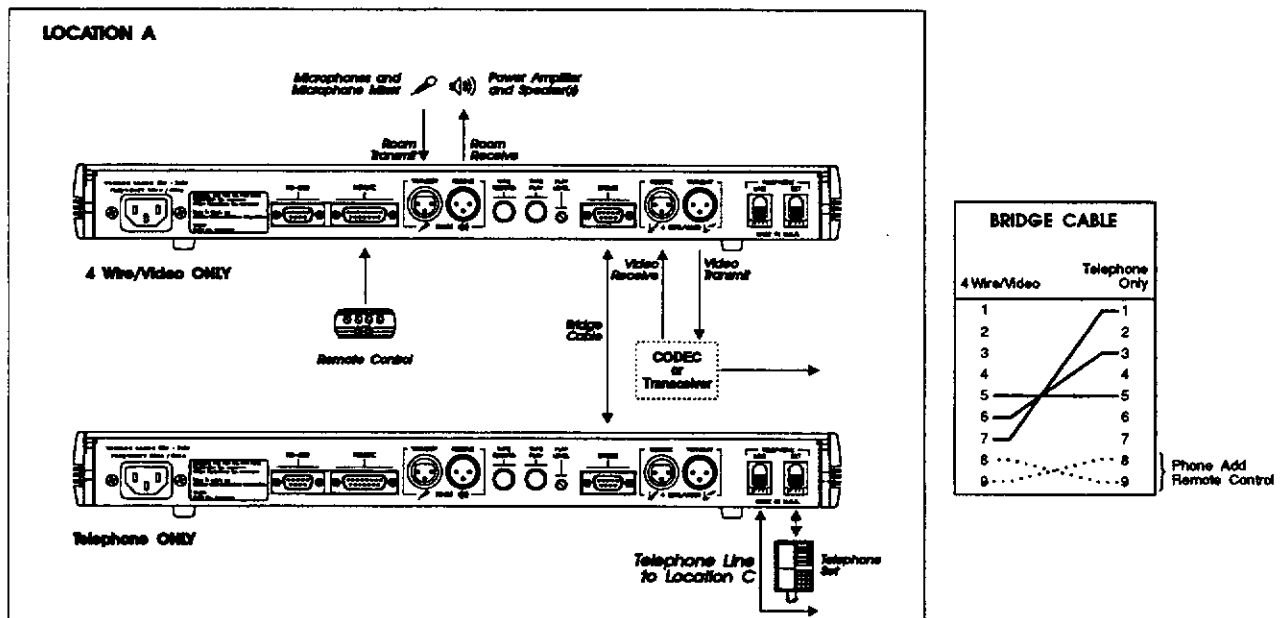
The drawing on page 21 depicts connections for telephone teleconferencing and 4 wire/video teleconferencing. If using the TI for telephone teleconferences, disregard the CODEC/Transceiver connections and make only those connections for telephone applications. If your application uses video teleconferencing some of the time and telephone teleconferencing at other times, make all connections shown. When you use the TI for telephone teleconferences, activate the TELEPHONE button to connect your call. When using the TI for video teleconferencing, activate the 4 WIRE/VIDEO button. See page 17 in this manual for both teleconferencing modes, for more complete information.



Video Teleconferencing with an Additional Telephone Line

It is possible to add a telephone call into the video teleconference to or from another location. This is accomplished with an additional TI unit linked to the first TI via the Bridge connector. The Bridge connection enables the audio from both on-site systems to be sent simultaneously to the distant sites. An incoming telephone line and set is connected to the second TI. The call is placed into the teleconference by pressing the Telephone button on the second TI, or by pressing the Phone Add button on the Remote Control connected to the first TI. When two TI units are bridged, it is not possible to operate both units in telephone mode simultaneously. (For additional information, see Phone Add and Remote Control on page 19. Refer to the Bridge cable information in the drawing below, and to the Bridge Connector section on page 11.)

An *audio only* teleconference can be conducted over the telephone line from the second TI. The 4 Wire/Video button must be activated with the LED on, even though your CODEC or transceiver is off. The first TI can be configured to operate in a dedicated 4 Wire/Video mode by connecting pins 8 and 9 on the Remote connector. Then, make or receive your telephone call, and place the call into the TI by pressing the Telephone button on the second TI (or the Phone Add button on the Remote Control).



Bridging Multiple Calls

Telephone bridge services are available to connect multiple remote sites to your TI teleconference. The teleconference can be set up to connect all callers together then direct them to one TI. The number of distant locations that can be conferenced together is dependent upon the telephone bridge service used. Contact Gentner Conference Call at (800) 945-7730 for more information. Gentner's bridge service offers the best audio quality possible when bridging your sites together.

Warranty

GENTNER COMMUNICATIONS 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 one year from the date of the original purchase, provided the owner returns the equipment to the Manufacturer at the address set forth below. No charge will be made for parts or labor during this period;

B. 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 an 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's products.

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 matters 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 Communications Corporation, 1825 Research Way, Salt Lake City, Utah 84119-2348

Specifications

Physical

Dimensions	19" W x 1.75" H x 10" D (48.3 W x 4.45 H x 25.4 D cm)
Weight	10 lbs. (4.5 kg) dry weight 13 lbs. (5.9 kg) shipping weight

Connectors

Power	Auto-adjusting power module
Remote	DB-15 female
Room Transmit Input	3-pin female XLR Balanced, Bridging >20k Ω input impedance +4 dBu nominal level, adjustable
Room Receive Output	3-pin male XLR Balanced 50 Ω output impedance (Designed to drive $\geq 600 \Omega$ inputs) +4 dBm nominal level, adjustable
4 Wire Transmit Output	3-pin male XLR Balanced 50 Ω output impedance (Designed to drive $\geq 600 \Omega$ inputs) -10 dBm nominal level, adjustable
4 Wire Receive Input	3-pin female XLR Balanced, Bridging >20k Ω input impedance -10 dBu nominal level, adjustable
Record Output	Phono connector Unbalanced 1k Ω output impedance (Designed to drive $\geq 10k \Omega$ inputs) -10 dBu nominal level
Playback Input	Phono connector >10k Ω input impedance -10 dBu nominal, adjustable
Bridge	DB-9 male
RS-232	DB-9 female

Telco Line/Set

RJ-11C

Electrical/Performance

Power

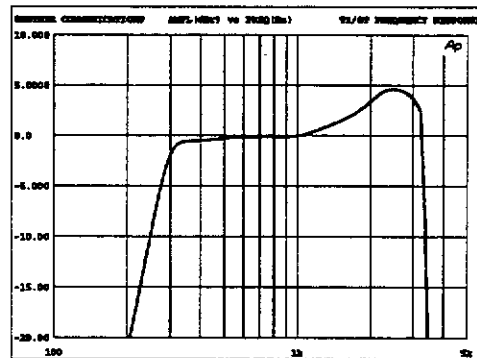
85 to 240 VAC; 50/60 Hz

Fuse

2 amp 250 VAC, Slo Blo type

Frequency Response

50 Hz to 7.0 kHz ± 1 dB in 4 Wire/Video mode
 300 to 3.4 kHz ± 1 dB with 6 dB pre-emphasis on Transmit in Telephone mode



Telephone Transmit Pre-emphasis

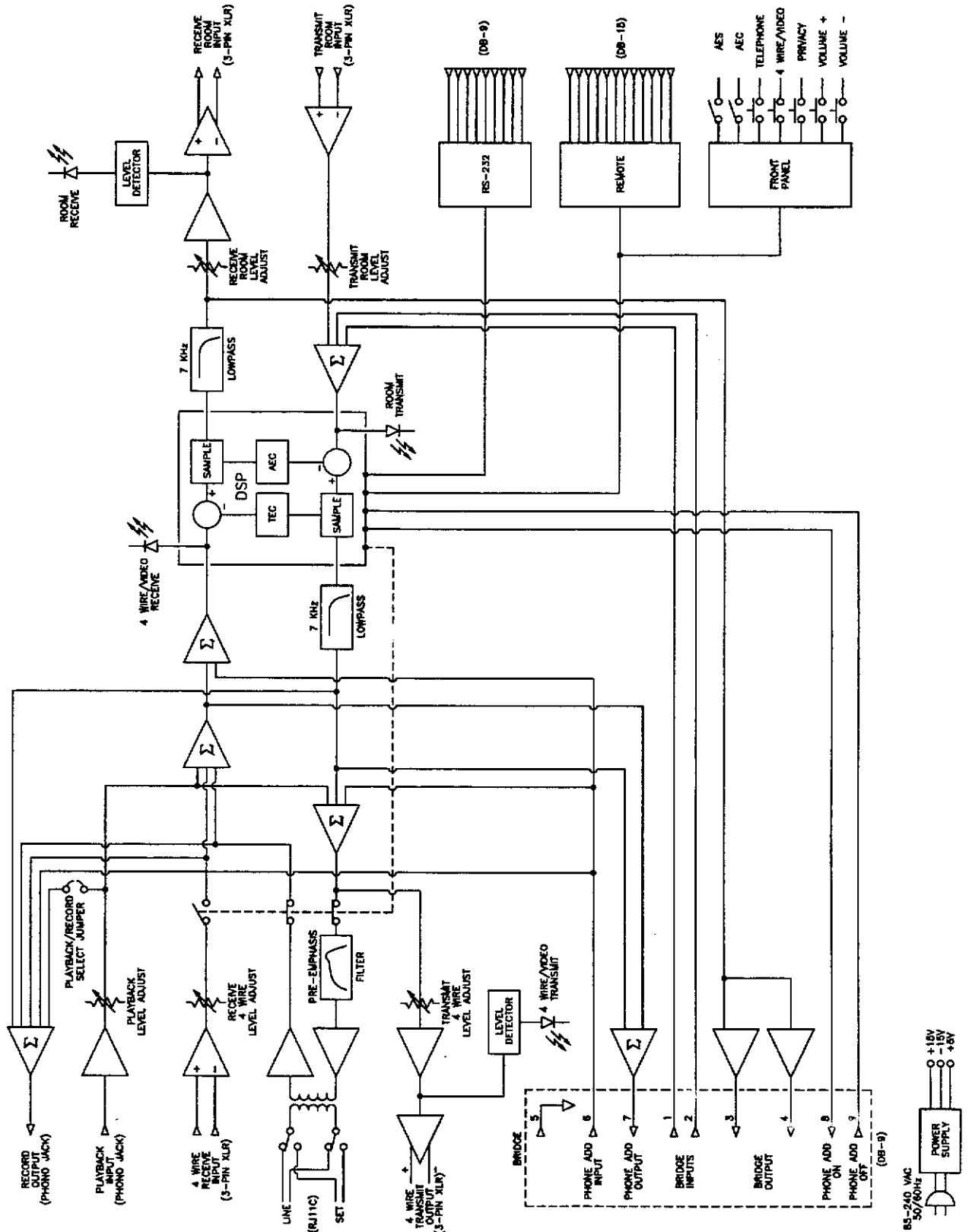
Environment

32° to 100° F Operating Temperature

Specifications are subject to change without notice.

Available Options

Table Top Omni Microphone	P/N 910-103-148
Table Top Uni-Directional Microphone	P/N 910-103-158
Delta Microphone	P/N 910-103-333
Round Speaker	P/N 910-103-008
Wall Mount Speaker	P/N 910-103-010
Mixer/Power Amplifier	P/N 910-101-001
Remote Control	P/N 910-110-700
Interconnection Kit	P/N 910-103-001



TI7200 Block Diagram

Bridge Connector—Technical Description

Refer to the Block Diagram on page 27 for reference.

- Transmit In 1 & 2** Transmit 1 and 2 are unbalanced inputs summed with the ROOM TRANSMIT XLR.
- Receive Out 1 & 2** Receive Out 1 & 2 are unbalanced outputs derived from the ROOM RECEIVE XLR.
- Phone Add Audio In** Phone Add Audio In is an input that is mixed with the RECEIVE INPUT XLR (for local speakers) and the TRANSMIT OUTPUT XLR (for remote speakers).
- Phone Add Audio Out** Phone Add Audio Out is an output that is derived from the TRANSMIT OUTPUT XLR (local room microphones) and the RECEIVE INPUT XLR (remote room microphones).
- Phone Add ON** The Phone Add ON is the control/status output to communicate with the phone add unit.
- Phone Add OFF** The Phone Add OFF is the input for status of the phone add unit.

BRIDGE DB-9 CONNECTOR PIN OUTS			
PIN NO.	CONTROL	PIN NO.	CONTROL
1	Transmit In 1	6	Phone Add Audio In
2	Transmit In 2	7	Phone Add Audio Out
3	Receive Out 1	8	Phone Add On
4	Receive Out 2	9	Phone Add Off
5	Ground		

RS-232 Serial Port Commands

The RS-232 Serial Port will accept serial commands. The commands provide the same control as the front panel switches, except that the serial commands will not control either the AEC or the AES (Acoustic Echo Canceller and Acoustic Echo Suppressor) switches.

When the serial port is connected to a computer, the following information will be displayed on the screen on power-up.

```

                                Teleconferencing Interface
                                Gentner Communications Corporation © 1993

Ports Initialized

TI POC vx.x
RAM ..... OK
CODEC..... OK
FIRS ..... OK
Daughterboard ... OK

INTERRUPTS $Revision: x.xx $
INTERRUPT SETUP $Revision: x.xx $
BACKGROUND $Revision: x.xx $
TI MONITOR $Revision: x.xx $

```

The TI is now in the serial command mode. The commands that the TI will take in this mode are shown below. These commands are designed to allow users to control the TI through the serial port.

The basic structure of the serial commands are one or two letters with a digit following the letters. The two letters identify the command type. The digit or lack of a digit tells the TI what to do with the current command.

The following table contains the commands that the TI accepts through its serial port:

Telephone	TE
4 wire/video	4W
Privacy	P
Volume up	L+
Volume down	L-
Auto Answer	AA
Setup	S
Phone Add	PA

NOTE: The <cr> means a "carriage return". Do not include the "less than" and "greater than" characters. The string <cr> means the single character for a carriage return.

Telephone

The TE command has the same function as the 2 wire audio switch. It connects or disconnects the TI in 2 wire mode.

TE1<cr>

connects the TI in 2 wire mode.

The TI responds with TE0<cr>

if not connected or TE1<cr>

if connected in 2 wire

TE0<cr>

disconnects the TI from 2 wire mode.

The TI responds with TE0<cr>

TE<cr>

returns the 2 wire connect state.

The TI responds with TE0<cr>

if not connected or TE1<cr>

if connected in 2 wire

4 wire/video

The 4W command has the same function as the 4 wire video switch. It connects or disconnects the TI in 4 wire mode.

4W1<cr>

connects the TI in 4 wire mode.

The TI responds with 4W0<cr>

if not connected or with 4W1<cr>

if connected in 4 wire

4W0<cr>

disconnects the TI from 4 wire mode.

The TI responds with 4W0<cr>

4W<cr>

returns the 4 wire connect state.

The TI responds with 4W0<cr>

if not connected or with 4W1<cr>

if connected in 4 wire

Privacy

The privacy mode of the TI will only work if the TI is connected to either the telephone lines (2 wire) or the 4 wire interface. To enable the privacy through the serial port send the following characters:

P1<cr>

enable privacy mode.

The TI will respond with P1<cr>

P0<cr>

disable privacy mode.

The TI will respond with P1<cr>

if privacy is enabled or P0<cr>

if privacy is disabled.

P<cr>

returns the current status of privacy.

The TI will respond with P1<cr>

if privacy is enabled or P0<cr>

if privacy is disabled.

Volume up

The volume up command is initiated by sending the following characters through the serial port:

L+<cr>

to increase the volume level.

The TI responds with L+<cr>

Volume down

The volume down command is initiated by sending the following characters through the serial port:

L- <cr>

to decrease the volume level.

The TI responds with L-<cr>

Volume Status

The TI will return the volume status by sending the following characters through the serial port:

L<cr>

returns the current volume level.

The TI responds with: L+1 <cr>

meaning the level is up one decibel or L-3<cr>

meaning the level is down three decibels.

Auto Answer

The TI is put in auto answer mode by the following characters sent through the serial port:

AA1<cr>
to enable Auto Answer.
The TI responds with AA1<cr>

AA0<cr>
to disable Auto Answer.
The TI responds with AA0<cr>

AA<cr>
returns the current Auto Answer state.
The TI responds with AA1<cr>
if auto answer is enabled or AA0<cr>
if auto answer is disabled.

Setup

To put the TI into setup mode send:

S1<cr>
To put the TI into setup mode.
The TI responds with S1<cr>
NOTE: The TI must be connected in 4 Wire or Telephone first.

S0<cr>
To take the TI out of setup mode.
The TI responds with S0<cr>

S<cr>
returns the current status of the setup mode.
The TI responds with S1<cr>
if the TI is in setup mode or S0<cr>
if it isn't in setup mode.

Status

There is a special command that returns the entire status of the TI in one command. The character string for this command is:

ST<cr>
The TI responds with all the current status of the TI.
The status is returned in the following order:
AAx<cr>
Sx<cr>
Lxx<cr>
Px<cr>
PAx<cr>
TEx<cr>
4Wx<cr>

Phone add

To put the TI in phone add mode send:

PA1<cr>

enable phone add.

The TI responds with PA1<cr>

if the phone add is active or PA0<cr>

if the phone add is inactive.

PA0<cr>

disable phone add.

The TI responds with PA0<cr>

PA<cr>

returns the current phone add status.

The TI responds with PA1<cr>

if the phone add is active or PA0<cr>

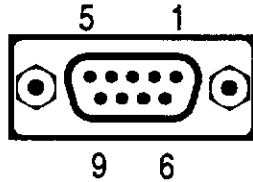
if the phone add is inactive.

Quick Reference

TE<cr>	return 2 wire connect status
TE1<cr>	connect in 2 wire
TE0<cr>	disconnect 2 wire
4W<cr>	return 4 wire connect status
4W1<cr>	connect in 4 wire
4W0<cr>	disconnect 4 wire
P<cr>	return privacy status
P1<cr>	enable privacy
P0<cr>	disable privacy
L<cr>	return current volume level
L+<cr>	increase volume level
L-<cr>	decrease volume level
AA<cr>	return current Auto Answer status
AA1<cr>	enable Auto Answer
AA0<cr>	disable Auto Answer
S<cr>	return current setup status
S1<cr>	enable setup
S0<cr>	disable setup
PA<cr>	return current phone add status
PA1<cr>	enable phone add
PA0<cr>	disable phone add
ST<cr>	return all above status

Pin Out Information

The RS-232 connector is a 9-pin female connector on the rear panel of the TI. This connector is labeled RS-232 and conforms to the DCE pin out. The pin out of the connector is as follows:



RS-232 DB-9 PIN OUTS			
PIN NO.	CONTROL	PIN NO.	CONTROL
1	DCD	6	DSR
*2	Transmit	7	No connection
*3	Receive	8	CTS
4	DTR	9	No connection
*5	Ground		

*Required for Computer or Remote Control

The TI receives data on pin 3 (Transmit Data) and transmits data on pin 2 (Receive Data). Note that all the names of the pins are from the point of view of the DTE (Data Terminal Equipment). If you are trying to send commands to the TI from a 9-pin PC serial port, a straight-through cable is needed.