TIF-102 Telephone Interface
Installation and Use

ACI-AppliCAD, Inc.

Version 1.3   1/1/16

Applies to serial # 110270100001 & above
(Also applies substantially to # 096610100001 & above)

www.aci-applicad.com

Table of Contents

Introduction

The *TIF-102 Telephone Interface* extends listening to, and participating in, any meeting over regular phone lines.   Microprocessor control provides easy operation. The *TIF-102* appears as an ordinary telephone set to your phone line, thus it's as easy to install as a telephone. Your Telephone Interface can make a real difference for a participant who cannot be present, and it's built to last.

Features and Benefits

TIF-102 Feature	What It Does	User Benefit
Two-Way Operation	The remote party can make comments over their phone	Allows for remote participation as well as listening
Recognition Request *with relay output*	The remote user can get the chairperson's attention by pressing their phone's **#** key.	***Phone comments need not be arranged in advance!***
Phone Line Release	Disconnects if the caller hangs up, the connection drops, or after a selectable three or 12 hours' elapsed time.	Won't needlessly tie up your phone line and/or your conference service. If your party gets disconnected, they can call back.
Dual-Processor Control System	Replaces seven individual ICs, monitors all functions	Reliable operation and smart, simple operating features.
LED Indicators	Show telephone line status and audio level.	You *know* when audio is transferring OK.
Compression	Manages your sound level, both ways.	Provides comfortable listening.
Compress Output *for external FM Transmitter*	Outputs a limited-level, 10mS digital-delayed version of your program.	Synchronized, consistent sound for those listening with headphones.
New! 18 Pole, 3.8 KHz Digital Filter	s/n 110270100001 & above (previously 11-pole, 3.5 KHz)	Our best sound quality possible over a phone line.
FCC Approval	Tested to comply with FCC Rules, Parts 15 & 68.	Approved and registered for use on the telephone network.
Phone Line Surge Protection	Protects against common surges (No protector is 100% effective)	Reliable operation and long life. External protector not required.
Receive-only mode	Provides phone reception from an off-site program.	Your audience can hear a program originating from another location.

What's in the Box?
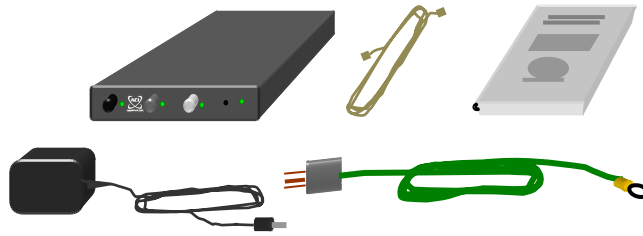
- *TIF-102* Telephone Interface
- AC **Power Adapter**
- **Telephone Cord**
- Green **Grounding Cord**
- This **Manual**

Anything missing?

If an item listed above appears damaged or missing, please call us at ACI-AppliCAD instead of your vendor, as we are better able to respond to your needs. Find our phone number in the *Service and Warranty* section of this manual.

Please read and follow our instructions!

Installation is relatively simple but differs from other telephone products you may have used or installed. Please do not assume your new Telephone Interface hooks up the same way as others. In particular, *do not* connect any speaker line (4-8 ohm or 25/70V) to any jack on this unit. All audio inputs and outputs are "preamp" level RCA jacks (see pages 12, 14, 20).

Power Requirements

Your Telephone Interface operates on 120 VAC 60 Hz AC power (as supplied throughout the United States), using the included AC adapter. Please do not attempt to use another power source.

About Teleconferencing Services

Since your *TIF-102* appears as an ordinary telephone set to your phone lines, it's compatible with teleconferencing services. However, not all such services allow use of your Telephone Interface to full advantage. For example, they may not pass the DTMF (Touch-tone®) sound through when a participant presses their "**#**" key, preventing use of the *TIF-102's* **recognition request** feature. Thus we suggest that before committing to a particular service, you thoroughly investigate its operation. The *TIF-102* features an automatic timer that disconnects the phone line after three or twelve hours' continuous use (see page 7 to select the twelve hour option). This feature minimizes unnecessary toll or conference service charges.

FCC Information

FCC Part 15 – The *TIF-102* generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. This equipment has been tested and found to comply with the limits for a Class B digital device as applicable, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in both residential and commercial installations. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the affected receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Part 68 – This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. Its product identifier in the format US:8T5BR07BTIF102 appears on the unit's rear panel. If requested, this number must be provided to the telephone company.

If ordering new service from your telephone company, provide these codes upon request:
Facility Interface Code: 02LS2   Service Order Code: 9.0Y   USOC code: RJ-11C

A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular RJ-11C jack that is also compliant. See installation instructions (Page 13) for details.

Ringer Equivalence – The *TIF-102's* Ringer Equivalence Number (**REN**) is **0.7**. The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. The Ringer Equivalence Number also appears (without its decimal point) in the product identifier – US:8T5BR**07B**TIF102.

If your *TIF-102* should cause harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify you as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice so you can make necessary modifications to maintain uninterrupted service.

In case of trouble with your *TIF-102,* first follow the troubleshooting steps given in page 17 of this manual. For repair or warranty information, see Page 21 in this manual, call Applicad Inc at (732) 751-2555, or visit www.aci-applicad.com. If the *TIF-102* is causing harm to the telephone network, the telephone company may request that you disconnect it until the problem is resolved.

This unit contains no user-serviceable parts; please refer any repairs to Applicad (see page 21).

Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.
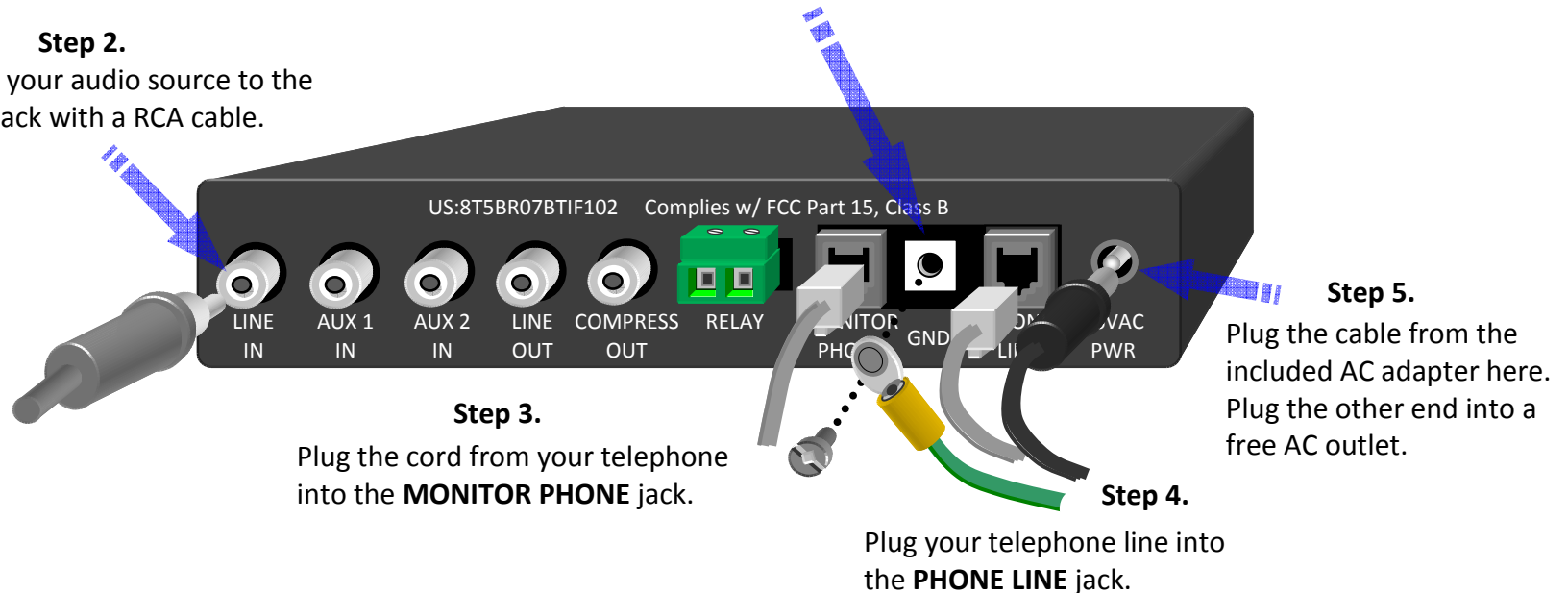
If your building has specially wired alarm equipment connected to the telephone line, ensure the installation of your Telephone Interface does not disable your alarm equipment. If you have questions about what would disable alarm equipment, consult your telephone company or a qualified installer.

Quick Start Guide – Rear Panel Hookup

The best way to get familiar with your Telephone Interface is to put it to use. This **Quick Start Guide** takes you through the simple connections, and then shows how to operate its features. If desired, you can skip ahead to the **Installation Guide** (page 12), then turn to Page 7 for operating instructions. To set up your *TIF-102* for this run-through, you'll need a standard desk telephone, a live phone jack, two telephone cords, some AC outlets, and a line-level audio source (CD or MP3 player, etc.). A screwdriver is the only tool needed.

Step 1.   Attach the supplied green cord to the **GND** terminal. Plug the other end into a grounded AC outlet.

Step 2.
Connect your audio source to the
LINE IN jack with a RCA cable.

LINE IN   AUX 1 IN   AUX 2 IN   LINE OUT   COMPRESS OUT   RELAY   MONITOR PHONE   GND   PHONE LINE   VAC PWR

US:8T5BR07BTIF102   Complies w/ FCC Part 15, Class B

Step 3.
Plug the cord from your telephone
into the **MONITOR PHONE** jack.

Step 4.
Plug your telephone line into
the **PHONE LINE** jack.

Step 5.
Plug the cable from the
included AC adapter here.
Plug the other end into a
free AC outlet.

Now you're ready to try out your Telephone Interface (next page)

Quick Start Guide – Basic Operation

Press to connect your call.

RED – Ringing
GREEN -Connected

POWER   CONNECT RING   COMMENT   LEVEL
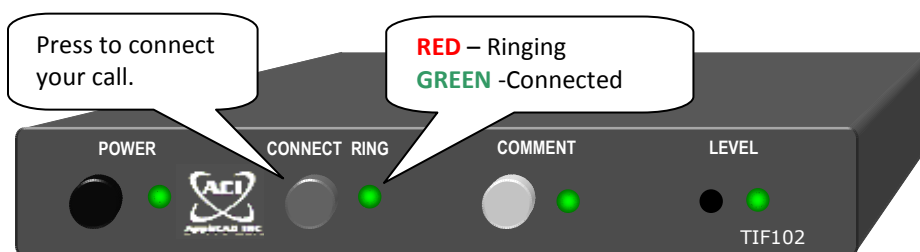
TIF102

Power Up – When the *TIF-102*'s adapter is connected and plugged in, it "wakes up" switched ON. This way, you can plug the adapter into a power strip along with the rest of your sound equipment, so that everything powers up together.   Press the black button to manually switch the unit OFF and ON. The **POWER** LED glows **green** when the unit is ready to operate.

> **12 Hour Option** – Normally your TIF-102 "times out" and releases your phone line after three hours' continuous connection. Unusually long meetings may require more time. To select a 12 hour time limit, perform these steps:
> - If the unit is already ON, press the **POWER** button to switch it OFF.
> - Press and *hold* the **CONNECT** button, press **POWER**, then release both buttons.
> - The **CONNECT** light blinks several times to confirm the 12 hour selection.
> - The **CONNECT** button also connected the phone line, so press **CONNECT** again to disconnect it. The 12 hour setting lasts until the unit is powered down.

Answering a call – Have an assistant call from a "remote phone" (on another line). You can try this yourself with a cell phone. The **CONNECT** LED lights **red** to indicate an incoming call. Simply pick up your telephone's receiver to answer.

Next, you'll connect the caller to your audio source. Please start the source playing, and then continue:

Connecting the caller – Press the **CONNECT** button. This connects the phone line to the audio from your source. The **CONNECT** LED lights **green**, and you'll hear your source playing through both your phone and the remote phone.

Cradle your phone, and your party remains connected to the program.

Line Release – Hang up the remote phone. After a few seconds, the **CONNECT** light goes out. The line is now available for another call.

Quick Start Guide – Serving your Remote Participant(s)
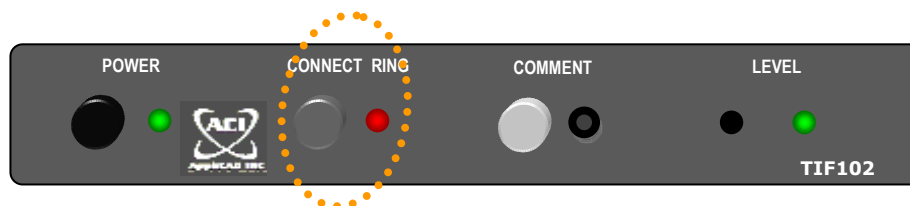
Using A Teleconferencing Service – Dial out to the service on your phone. Follow the service's instructions to establish the conference. Then press **CONNECT** to begin sending your program there. You may now cradle your phone. After the program ends: Pick up your phone if necessary, press **CONNECT** again to disconnect the *TIF-102*, and follow the conference service's instructions (if any) to end the conference.

If you forget to disconnect your *TIF-102*, it will disconnect automatically after three hours. This feature limits unnecessary conference charges. Removing power also makes the *TIF-102* disconnect from the phone line.

Serving A Single Caller – You can also have your *Phone Interface* bring your program directly to one party. Two-way operation works best this way. Have them call your number, answer your phone and then press CONNECT to begin transmitting the program.

> **Conversing with your caller** – To check on your caller, just pick up your phone. To silence the program, press the **CONNECT** button. To resume the program, press it again *before* cradling your phone.
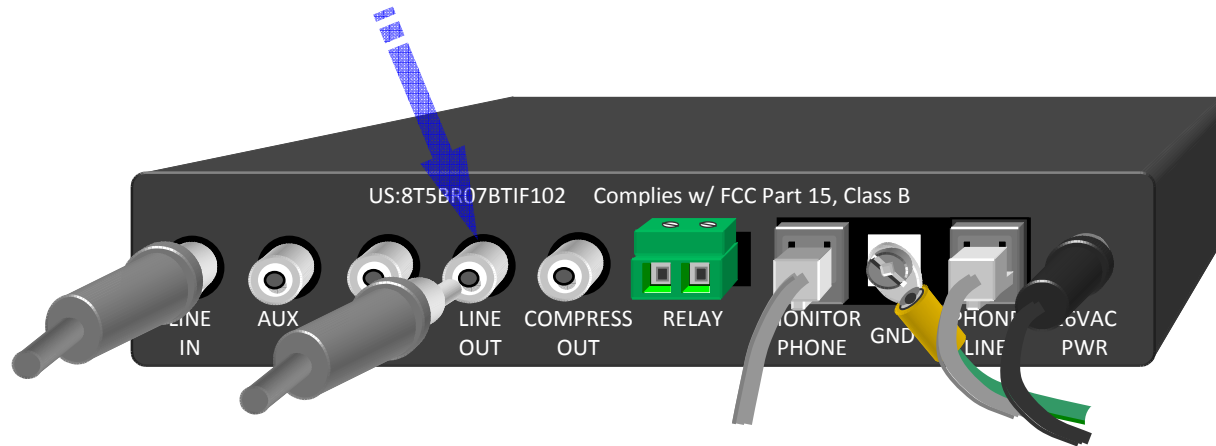
> **To keep your party on the line** – Keep them connected to the program and/or have them on your phone. The **CONNECT** function and your phone act like "extensions" on your line -- as long as one is active, the call stays alive.

> **Disconnecting your call** – After you say "Goodbye" to a caller who's *not* connected to the program, simply cradle your phone.
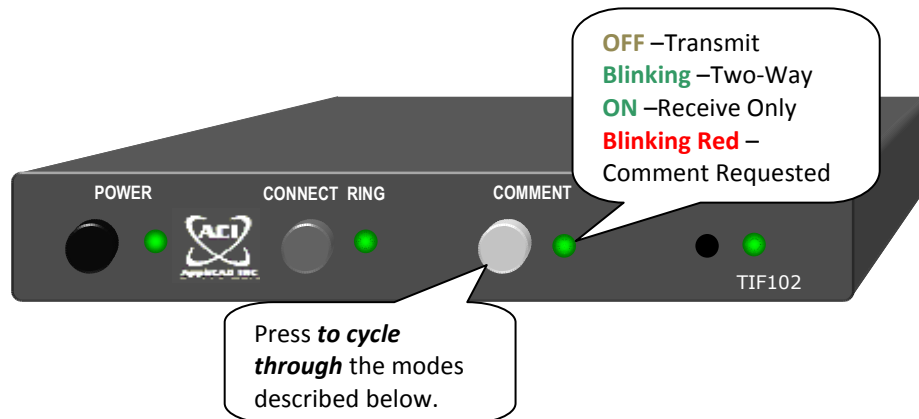
Quick Start Guide – Two-Way Operation

To try a two-way conversation with your Telephone Interface, make the additional connection to your sound system shown below:

Connect the LINE OUT jack to an available line-level input on your sound system's mixer.

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LINE IN   AUX   LINE OUT   COMPRESS OUT   RELAY   MONITOR PHONE   GND   PHONE LINE   16VAC PWR

Quick Start Guide – Two-way Operation

With the LINE OUT jack wired to your sound system, you can try having a conversation with a remote caller:

OFF –Transmit
Blinking –Two-Way
ON –Receive Only
Blinking Red – Comment Requested

Press **to cycle through** the modes described below.

Preparation – Have a mic from your sound system handy, and turn up that channel just enough so you can hear yourself when you speak into it. Find the mixer input to which you connected the *TIF-102's* LINE OUT, and set its control to a low level. Have an assistant call into your line, and press **CONNECT** to connect this caller as you did before. The **CONNECT** LED lights **green**.

Comment Request – Have your assistant press the "#" button on their phone's keypad. Your Telephone Interface's **COMMENT** LED blinks **red** in response. This is how your remote caller signals that they have something to say.

Enable a Comment – Press the **COMMENT** button once. The **CONNECT** LED now blinks **green**. Your system is now in two-way mode, and you can now have a conversation with your assistant. Slowly turn up the appropriate channels on your sound system's mixer (your mic input, and your line input from the Telephone Interface) until both of you can hear each other. The **LEVEL** LED shows the sound direction – **green** from the sound system, **red** from the remote phone. Any "feedback" you hear during this test won't happen normally, when your remote caller is *outside* your auditorium.

Receive Only mode – Press the **COMMENT** button again. The **COMMENT** LED now lights steady **green**. You can hear your assistant as they speak into their phone, but they cannot hear *you.* The **LEVEL** LED lights **red** to indicate receive mode. This mode is useful for receiving a complete program from another location. Press the **COMMENT** button *twice* to go directly from comment mode to normal transmit mode.

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Directions for Those Calling In

Follow this simple advice for best results when participating via telephone:

- **Extensions** – Choose which telephone you'll use and hang up all other extensions. Additional phones may result in weak or distorted sound.
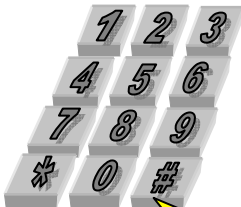
- **Speakerphone** – A quality speakerphone makes listening easier. Adjust volume so you can hear well, yet clearly. Keep things quiet on your end – excessive noise may interrupt your listening. To prevent this, use your speakerphone's "mute" button (if available).

Telephone Number & PIN (if used):	

- **Getting Connected** – Dial the provided number and speak with the sound system operator. They will connect you to the meeting. If your Hall uses a conference service, dial that number and follow the system prompts.

- **Making a Comment** – To request a comment, press *and hold* the **#** button on your phone for 1-2 seconds, then release it (like raising your hand at a meeting). When you're asked for your comment, speak clearly into the mouthpiece.

Press the **#** button to request your comment.

- **Emergency Call** – If someone at your location needs to make a phone call, hang up all your phones and wait five seconds. Your line should now be free.

- **Cell Phone** – Listening by cellular phone (especially with "free" minutes) is a convenient option. Due to noise and echo, however, we don't recommend two-way participation via cell phone. If your call drops, wait about 10 seconds and then reconnect as before. Remember that the battery in many cell phones (and cordless phones as well) may not last through the entire program.

Installation Guide – Rear Panel Diagram
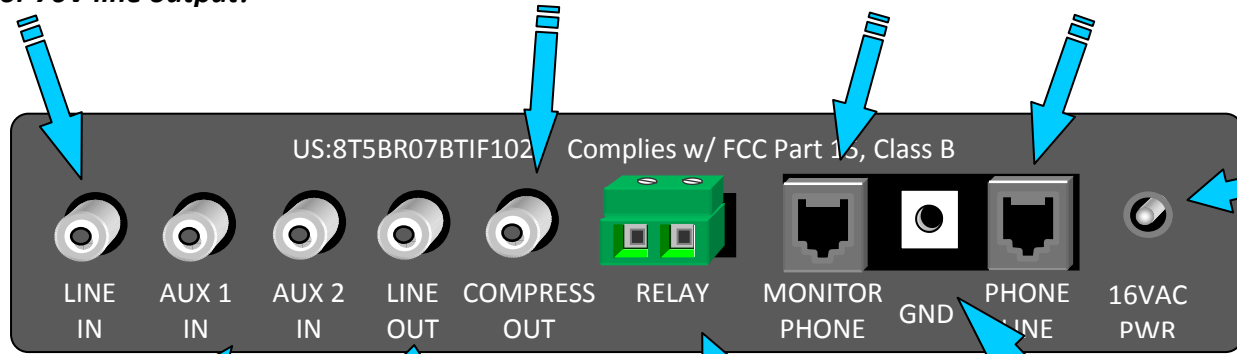
Line Input

Receives program pickup from your sound system. Connect to an unbalanced, line level feed from your mixer. ***Do not connect to a speaker or 70V line output!***

Compress Output

This jack provides a level-compressed version of your program. Feed a FM transmitter or recorder from this output. *Don't connect this output to your mixer or amplifier (feedback would result).*

Phone Jacks

Connect the **PHONE LINE** jack to your telephone line, and the **MONITOR PHONE** jack to your nearby telephone. These jacks are interchangeable.

US:8T5BR07BTIF102 Complies w/ FCC Part 15, Class B

LINE IN   AUX 1 IN   AUX 2 IN   LINE OUT   COMPRESS OUT   RELAY   MONITOR PHONE   GND   PHONE LINE   16VAC PWR

Power Jack

Plug in the AC adapter (included).

Aux Inputs

A line-level source you connect here passes through to the LINE OUTPUT. This can save a channel on your mixer.

Line Output

Connect this output to an available line-level input on your mixer. Remote sound appears at this output.

Relay Output

These contacts close when your remote participant requests a comment. Max power handling 28V, 0.5A.

GND Terminal

Provides telephone line surge protection. Use the included green cord to connect to a grounded AC outlet.

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Installation Guide – Telephone Jack

Your Telephone Interface connects to one standard phone line. This line can be shared with phones, however we recommend you keep one of your building's lines free for emergency calls. Don't connect that line to your Telephone Interface. If your line already has a RJ-11 phone jack, simply plug in your Telephone Interface using the supplied phone cord. If you need to install a jack, find one at a hardware store or home center. They're not difficult to install.

Caution: To reduce the risk of electric shock, either unplug the affected phone line at the building's network interface (if equipped), or leave a telephone on this line "off hook" while wiring the jack.

If your wiring uses two-pair cables, its four colors should be red, green, yellow, and black. Wire your jack as shown below. If your cable has only one pair, connect its wires (regardless of color) to the **red** and **green** terminals of the jack:
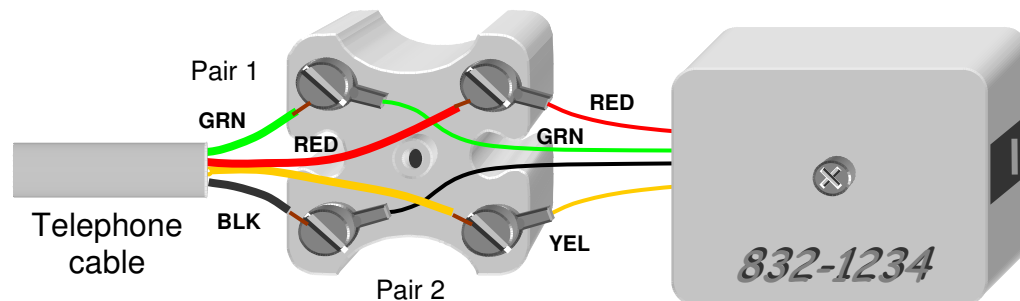
Tip – After wiring your phone jack, plug in a telephone and check for dial tone. Then use that phone to call a nearby cell phone -- its Caller ID display identifies your line's telephone number. Label your jack with its number as shown.

If with a four-wire cable you find that your jack is dead or on the wrong line, try interchanging the green / red pair of wires with the black / yellow pair (in other words, swap green with black, and separately swap red with yellow).

Mounting –Place your Telephone Interface where the operator can access it, as well as away from heat-generating gear such as power amplifiers. For 19" rack mounting, use our *TIF-102RMK* rack-mount kit (purchased separately). Please **save** the original front panel and hardware when rack-mounting, so you can revert if needed.

Installation Guide – Making Rear Panel Connections

Power – Locate the included AC Adapter. Plug its cord into the Telephone Interface's **POWER** jack. Plug the adapter into a 120 VAC outlet or power strip.

Ground – Your Telephone Interface includes phone line surge protection. Any effective surge protection must provide an alternative path for surge currents. You provide this path by connecting the included green cord between the **GROUND** terminal on your Telephone Interface and a grounded AC outlet. Use either a nearby wall outlet or an outlet on the power strip feeding your sound gear.

Telephone Line – Connect your line to the **PHONE LINE** jack. If the line includes DSL Internet service, install a DSL filter ahead of the Telephone Interface.

Monitor Phone – Connect any standard telephone set to the **MONITOR PHONE** jack using a phone cord. You'll use this phone to dial out and/or answer calls.

Line In – Your callers hear the audio you provide at the **LINE IN** jack. Connect a feed of your program, usually available as an "Auxiliary Output" at your sound system's mic mixer. If your sound system has an integrated amplifier or powered mixer, examine its rear panel for a suitable output. If there's an RCA jack labeled "Aux Output", "To Tape Recorder", etc., this should work fine. If not, your amplifier may have an "EQ or Effects Loop" – a pair of jacks possibly labeled "Mixer Out" and "Power Amp In". You'll find these jacks either jumpered together or wired to your equalizer if equipped. Insert a Y-adapter here to tap your program feed for the Telephone Interface. If you can't find a suitable output, please call us for help. ***Don't use a speaker or 70 volt line feed*** – *this would damage your Telephone Interface*.

Line Out – Connect to a line-level input on your mixer. This jack outputs the voice of callers making comments, as well as anything you optionally connect to the **AUX IN 1** and **AUX IN 2** jacks.

Compress Out (Optional) – This jack provides a compressed version of your program. If you have a FM transmitter for use with headphones, connect its input here.   The **COMPRESS** output's consistent level is easier on your listeners than the house feed. In addition, its built-in 10mS digital delay synchronizes headphone sound with that arriving from your speakers, improving clarity.
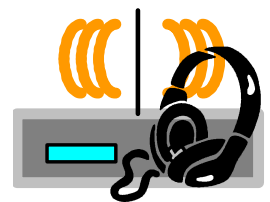
> **Caution** – Because this output is the compressed program feed from your mixer (supplied to the **LINE IN** jack), never run it back into your mixer! Feedback would result.

Installation Guide – Wiring Relay Contacts

The Request **RELAY** contacts allow your Telephone Interface to operate a remote signaling device whenever a caller makes a request. The **RELAY** contacts click on and off (like a turn signal) for ten seconds when the *TIF-102* gets a comment request. Here's how to connect this feature:
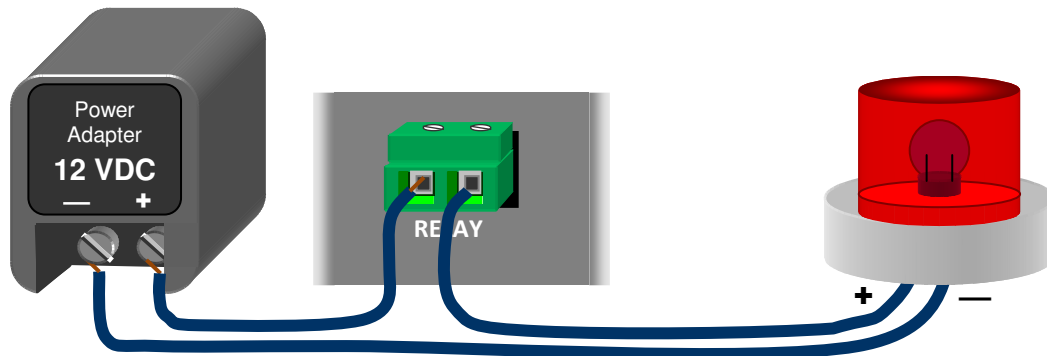

Wire the relay contacts directly in series with a **low voltage** power source and a signaling device, as shown above. The green connector unplugs from the Telephone Interface should you prefer to wire it separately. Pull straight out to unplug.

For power, use a "bell transformer" or any "wall-wart" power cube rated up to 28 volts AC or DC. You can find power adaptors at electronics or surplus supply stores.

You can operate a lamp or other device with the same voltage rating as the power source, using up to 0.5 ampere current (or the rating of the power source if less). Be sure to observe polarity for DC devices. A 12 volt DC LED light bar, such as the *Wolo* model *LTB10* (JC Whitney #ZX157504X, or at many auto stores) makes a good visual signal. This uses approx. 400mA at 12VDC.

# Installation Guide – Using A Gated Microphone Mixer

A gated mixer automatically shuts off unused microphones, reducing background noise and feedback. We highly recommend using one. However, we also suggest leaving one microphone ON at all times for the benefit of your telephone listeners. Most gated mixers can accommodate both these goals by selecting an available setting:

Mic gated ON
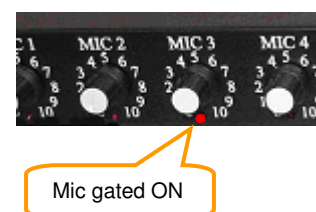
- **"Force ON"** (disable gating of) the microphone channel that's used the most (typically the "main" or "chairman's" mic)
- Set the mixer (if not by default) for **"Last mic ON"** -- the previously active channel remains live until sound triggers a new channel

Installation Guide – Adjusting Gain

The gain is factory set to accept a normal level at the **LINE IN** jack. Adjust it if needed to accommodate the level of your sound system. Correctly adjusted, incoming sound reaches the colored *input ranges* shown on the graph below. Then the *TIF-102* maintains its *ideal output range* as shown.   The **LEVEL** LED responds to sounds within this range, helping you find a good setting. Make the adjustment at the front panel, using a fine slot screwdriver.

Input sound before Compression
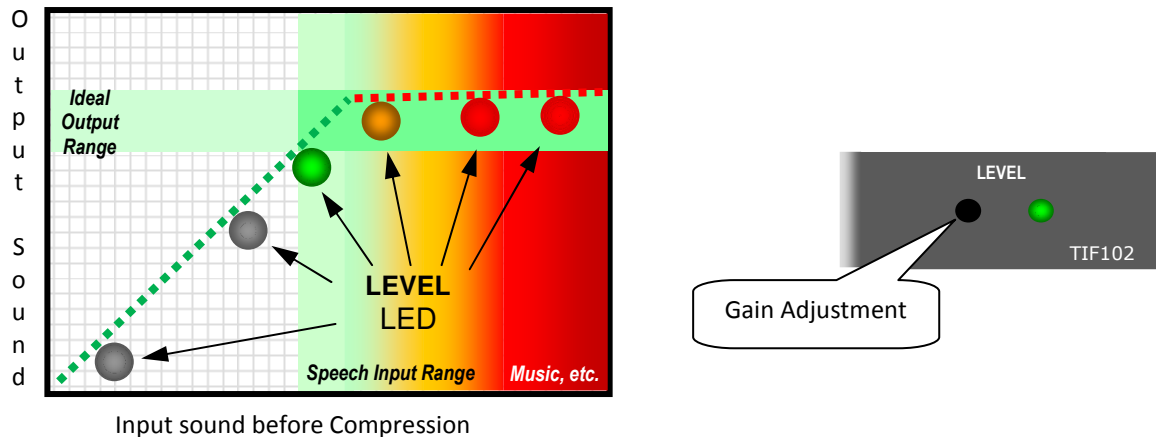
To Adjust – Set up your sound system with its most-used microphone. While someone speaks into this mic (reading a book works well), adjust your sound system's volume for good auditorium listening. Then, watch the **LEVEL** LED at your Telephone Interface:

- If the **LED remains dark**, increase the gain by turning the screw clockwise. The LED should illuminate **green** and blink **orange** with program peaks when your auditorium level is comfortable. *Note: It's OK for the **LEVEL** LED to light **red** continuously when playing music, etc. at levels higher than normal speech. Adjust gain for normal speech.*

- If the **LED frequently lights** for background noise levels in your auditorium, reduce the gain by turning the adjustment counterclockwise.

- During **two-way operation**, the **LEVEL** LED works differently. Instead of showing transmit level, it indicates the two-way direction (**green** for transmit and **red** for receive).

Reference – Troubleshooting

If you experience any difficulty with your Telephone Interface, please use the following suggestions to *work the problem* and find out what's wrong:

Power – <u>Is all your equipment powered ON</u>? Someone may have inadvertently switched OFF a component. Test outlets with a lamp or voltmeter. Should your Phone Interface appear unresponsive, unplug its AC adapter (at either end), wait five seconds, and reconnect. If the *TIF-102's* **POWER** LED doesn't light even though power is supplied, or if it blinks ON and OFF -- please see *Service and Warranty*, Page 21.

Sound – <u>Watch the **LEVEL** LED</u> while your participants speak. If it remains dark, the Telephone Interface is not finding enough sound at its input. Continue below to resolve this problem:
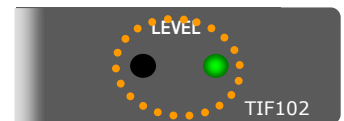
- **Input** –<u>Check that the *TIF-102'S* LINE input is getting sound from</u> the AUX output of your sound system's mixer. Be sure that this cable is fully inserted at both ends.

- **Gain Adjustment** – <u>Are callers having difficulty hearing the program</u>? If only one caller is affected, it could be their telephone or line. Otherwise, adjust the gain according to the procedure on page 16. Note that if this adjustments is inadvertently set to zero (fully counterclockwise), no sound will transmit.

- **Comment Requests** – <u>Keep your auditorium reasonably quiet</u> while waiting for comments. Too much noise may cause your Telephone Interface to miss comment requests.

- **Two-Way Switching** – During two-way conversations the **COMMENT** LED blinks **green**, while the **LEVEL** LED lights **green** for transmit and **red** for receive. Use the **LEVEL** LED indication to troubleshoot any two-way problems. If it shows audio flowing the wrong way, the party speaking at that time is not speaking loud enough to trigger the automatic switching.

Phone Line – The *TIF-102* automatically tests your phone wiring. <u>If the **CONNECT** LED doesn't remain illuminated</u> upon connecting, likely your line is either unplugged or out of order. Test the line with a standard telephone set. If you plug this phone into the TIF102's **MONITOR PHONE** jack, your test includes both phone line cords.

Conferencing – To <u>diagnose any difficulties with your conference service</u>, test it using only regular telephones. Test your *TIF-102* separately (see pages 6 – 10).

If ***all*** your tests point to your Telephone Interface as causing the problem, please see *Service and Warranty*, Page 21.

Reference – How It Works

If you have questions about how sound travels between the input and output jacks of this equipment, the diagram below may help answer them. The diagram also shows how your Telephone Interface, though simple on the outside, is sophisticated inside.

Rear Panel Jacks & Connectors

Telephone Jacks	Relay	Compress Out	Line Out	Aux 2 In	Aux 1 In	Line In

Internal blocks shown: Surge Protector, Loop Sw & Isolation, Line Amps, Relay Logic, PIC micro-controller (T-R Logic, DSP Boot & Control, Timers, UI), 50 MIPS AD DSP (Boot, D/A, SW, # Decode, Delay, 3.8 KHz LP filter, A/D, Limiter, Level LED Sense, Two-way Voice Activity Detection), Mixer, Gain Adjust, A/D, Limiter, Transmit Audio, Receive Audio, Front Panel – Buttons & LEDs

- **Isolation** – This simply means there's no direct connection from the phone line jacks to the unit's electronics. Isolation maintains the integrity of the telephone network and the safety of users. The *TIF-102* isolates using a high-fidelity, gapped-core "wet" transformer and solid-state optical couplers.

- **Surge Protection** – Built-in protection uses PTC thermistors to limit surge currents, and Sidactors® (solid-state triggered switches) to shunt surges to ground. You supply a reliable ground point by connecting the supplied green cord from the **GROUND** terminal to a grounded AC outlet.

- **Line Sensing** – About ten seconds after a call concludes, your phone company momentarily drops the DC power ("loop current"). This is called **CPC** (**C**alling **P**arty **C**ontrol). The *TIF-102* senses this to determine that a call has ended. Then it disconnects and frees the line. Most telephone exchanges also drop loop current when they quit sending dial tone after a phone has been left "off hook".   Thus, a needlessly connected line often disconnects automatically.

- **Comment (Two-Way) Operation –** If you've used a simple speakerphone, you know how they usually allow sound to pass only one way at a time ("half-duplex operation"). The speakerphone measures sound at both sides of the conversation, switching the direction according to who is talking. Your Telephone Interface handles two-way operation in a similar manner. The needed "send-receive" decisions are handled by its microcontroller and digital signal processor. Together these implement a **V**oice **A**ctivity **D**etector, which continuously samples the incoming and outgoing sound. It averages their levels to find the "noise floor" at each location, while detecting possible voices at each end with an advanced non-linear algorithm. By comparing these levels, it decides which way sound should flow at each moment. The result is perceived transparency approaching that of a full-duplex system, without its complexity. With this system, echo cancellation is not needed.

- **Compression / Limiting** – Transmit compression is set to limit excessively loud sounds without unduly amplifying background noise. Whenever the LEVEL LED is illuminated, transmission is at the maximum permitted by FCC regulations. The gain adjustment does not affect this maximum level, but rather helps the *TIF-102* distinguish between room noise and useful sound. The compressed sound is available at the COMPRESS output jack, which also includes a 10mS digital delay. This helps headphone users by matching their headphone sound with the reverberated auditorium sound.

   Receive compression also limits loud sounds, but in addition it brings weak sound from the remote location up toward normal level. Receive compression needs no adjustments.

- **Dual-Processor System** – An internal microcontroller keeps track of all operations, providing for correct sequence and timing. By making decisions on its own, it allows for simple pushbutton control of all functions. It also supervises the second processor, a DSP chip that handles the audio filtering, compression, voice activity detection, and DTMF decoding.

Reference – Specifications

Audio Connections:

All are RCA jacks, unbalanced
LINE input
(2) AUX pass-through inputs
LINE output
COMPRESS output

Phone Line Connections:

(2) parallel RJ-11 line jacks:
      Phone Line
      Monitor Phone
Isolation – Transformer & Optical Couplers
Surge Protection – PTCs and Sidactor®
Two Way Operation – Half Duplex w/digital VAD
      (Voice Activity Detection)
Loop Sensing – Nominal 15 mA
Off-Hook Impedance –   AC: Nominal 600 Ohms
                         DC: Nominal 400 Ohms
FCC ID # – US:8T5BR07BTIF102

Power:

3 Watts from 16VAC wall adapter.

Audio Specs:

COMPRESS Output Level: approx. 0dBv
LINE Input Level: Max +10dBv (recommended 0dBv)
Total Harmonic Distortion: < 0.9%
OUTPUT level to telephone lines: (-9) dBv max. per FCC regulations.
Delay at **COMPRESS** output: Fixed 10mS with 48 KHz / 28 bit digital delay
Frequency response: (to phone line) 80 Hz – 3.8 KHz (-29 dB @ 4 KHz per FCC)
                                         via an 18-pole digital filter
                (from phone line) 100 Hz – 8 KHz
                (**LINE** input to **COMPRESS** output) 80 Hz – 20 KHz
                (**AUX** input(s) to **LINE** output) 20 Hz – 20 KHz

Sidactor® is a registered trademark of Teccor Corporation.

Reference – Service & Warranty

We hope you won't need the following information, but please be assured that should your Telephone Interface malfunction, we're here to help. Of course, we do recommend reviewing the *Installation* and/or *Troubleshooting* sections of this manual before calling. Often an installation or operation issue is behind apparent defects.

For the best service, be with your TIF-102 and have this manual at hand when you call. You may call ACI-AppliCAD at **(732) 751-2555** during normal business hours (Eastern Time) to get help with installing, using, or troubleshooting your Telephone Interface. If it appears that your Telephone Interface is defective, we'll issue a **RMA** (**R**eturn **M**aterial **A**uthorization) number for expert factory service. Please note that this product uses surface mount technology extensively. We don't recommend you attempt internal repairs yourself, even if you're comfortable around electronics. Firmware source code is not available to customers.

Your limited warranty is one year from date of purchase. Out of warranty, our current repair charge is a flat rate of $75 plus shipping (subject to change). Whether your Telephone Interface is in or out of warranty, you'll receive fast, courteous service. Like the *TIF-102* itself, we are devoted to solving problems in sound communication.

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