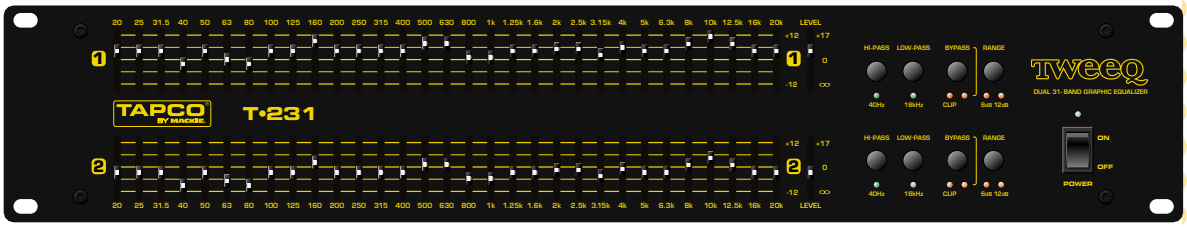
Tweeq

owner's manual

T•231



TAPCO® by MACKIE®

CAUTION AVIS

RISK OF ELECTRIC SHOCK
DO NOT OPEN
RISQUE DE CHOC ELECTRIQUE
NE PAS OUVRIR

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK
DO NOT REMOVE COVER (OR BACK)
NO USER-SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED PERSONNEL

ATTENTION: POUR EVITER LES RISQUES DE CHOC ELECTRIQUE, NE PAS ENLEVER LE COUVERCLE. AUCUN ENTRETIEN DE PIECES INTERIEURES PAR L'USAGER. CONFIER L'ENTRETIEN AU PERSONNEL QUALIFIE.
AVIS: POUR EVITER LES RISQUES D'INCENDIE OU D'ELECTROCUTION, N'EXPOSEZ PAS CET ARTICLE A LA PLUIE OU A L'HUMIDITE

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
Le symbole éclair avec point de flèche à l'intérieur d'un triangle équilatéral est utilisé pour alerter l'utilisateur de la présence à l'intérieur du coffret de "voltage dangereux" non isolé d'ampleur suffisante pour constituer un risque d'éléctrocution.

The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.
Le point d'exclamation à l'intérieur d'un triangle équilatéral est employé pour alerter les utilisateurs de la présence d'instructions importantes pour le fonctionnement et l'entretien (service) dans le livret d'instruction accompagnant l'appareil.

SAFETY INSTRUCTIONS

1. Read Instructions — All the safety and operation instructions should be read before this product is operated.
2. Retain Instructions — The safety and operating instructions should be kept for future reference.
3. Heed Warnings — All warnings on this product and in these operating instructions should be followed.
4. Follow Instructions — All operating and other instructions should be followed.
5. Water and Moisture — This product should not be used near water – for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, near a swimming pool, etc.
6. Cleaning — Clean only with a dry cloth.
7. Ventilation — This product should be situated so that its location or position does not interfere with its proper ventilation. For example, the Component should not be situated on a bed, sofa, rug, or similar surface that may block any ventilation openings, or placed in a built-in installation such as a bookcase or cabinet that may impede the flow of air through ventilation openings.
8. Heat — This product should be situated away from heat sources such as radiators, or other devices which produce heat.
9. Power Sources — This product should be connected to a power supply only of the type described in these operation instructions or as marked on this product.
10. Power Cord Protection — Power supply cords should be routed so that they are not likely to be walked upon or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit this product.
11. Object and Liquid Entry — Care should be taken so that objects do not fall on, and liquids are not spilled into, this product.
12. Damage Requiring Service — This product should be serviced only by qualified service personnel when:
    - **A.** The power-supply cord or the plug has been damaged; or
    - **B.** Objects have fallen, or liquid has spilled into this product; or
    - **C.** This product has been exposed to rain; or
    - **D.** This product does not appear to operate normally or exhibits a marked change in performance; or
    - **E.** This product has been dropped, or its chassis damaged.
13. Servicing — The user should not attempt to service this product beyond those means described in this operating manual. All other servicing should be referred to the Tapco Service Department.
14. To prevent electric shock, do not use this polarized plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure.

Pour préevenir les chocs électriques ne pas utiliser cette fiche polariseé avec un prolongateur, un prise de courant ou une autre sortie de courant, sauf si les lames peuvent être insérées à fond sans laisser aucune pariie à découvert.

15. Grounding or Polarization — Precautions should be taken so that the grounding or polarization means of this product is not defeated.
16. Power Precaution — Unplug this product during lightning storms or when unused for long periods of time.
17. This apparatus does not exceed the Class A/Class B (whichever is applicable) limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

ATTENTION —Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant las limites applicables aux appareils numériques de class A/de class B (selon le cas) prescrites dans le règlement sur le brouillage radioélectrique édicté par les ministere des communications du Canada.

PORTABLE CART WARNING

Carts and stands - The Component should be used only with a cart or stand that is recommended by the manufacturer.
A Component and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the Component and cart combination to overturn.

WARNING — To reduce the risk of fire or electric shock, do not expose this appliance to rain or moisture.

18. Exposure to extremely high noise levels may cause permanent hearing loss. Individuals vary considerably in susceptibility to noise-induced hearing loss, but nearly everyone will lose some hearing if exposed to sufficiently intense noise for a period of time. The U.S. Government's Occupational Safety and Health Administration (OSHA) has specified the permissible noise level exposures shown in the following chart.

According to OSHA, any exposure in excess of these permissible limits could result in some hearing loss. To ensure against potentially dangerous exposure to high sound pressure levels, it is recommended that all persons exposed to equipment capable of producing high sound pressure levels use hearing protectors while the equipment is in operation. Ear plugs or protectors in the ear canals or over the ears must be worn when operating the equipment in order to prevent permanent hearing loss if exposure is in excess of the limits set forth here.

Duration Per Day In Hours	Sound Level dBA, Slow Response	Typical Example
8	90	Packed garage concert
6	92	
4	95	VW Bus Peace Train
3	97	
2	100	Cranked psychedelic tunes
1.5	102	
1	105	High speed chase on C.H.I.P.s
0.5	110	
0.25 or less	115	Loudest parts at a Heavy Metal concert

What me, read a manual?

Before you begin, please make sure you read the Safety Instructions on page 2 and Getting Started on page 4.

Your new TAPCO® T•231 is designed to set up quickly and operate easily. We know it's often seen as a sign of weakness to read a manual, along with asking for directions when lost, but maybe you can read the rest when nobody is looking.

It is important to keep your receipt in a safe place, and not a bad idea to write your product information here for future reference (i.e., insurance claims, tech support, return authorization, etc.).

Product Serial #:

Purchased at:

Date of purchase:

Part No. 0009427 Rev. A 1/04

Getting Started

The following steps will help you set up your T•231, and get the levels just right.

SETTINGS:

1. Be sure the T•231's POWER switch is off.
2. Set all the sliders to their center positions and all the switches out.

CONNECTIONS:

1. Using balanced or unbalanced cables, connect your mixer's main outputs to the T•231's inputs, and the T•231's outputs to your amplifer's (or powered speakers') inputs.

   If you are using the T•231 in a channel's insert, connect your mixer's channel inserts to your T•231's INPUTs and OUTPUTs.

   Note: The T•231 31-Band Graphic Equalizer is designed to be inserted "in-line" with the signal as a serial device. This means that the entire signal is routed through the processor, in contrast to a parallel device where the processed signal is mixed back with the unprocessed signal, like a reverb or echo.
2. Connect the cables using either XLR or 1/4" TRS connectors (balanced), or 1/4" TS or RCA connectors (unbalanced).

   • The XLR, TRS, and RCA inputs for each channel are wired in parallel. Use only one input per channel.

   • The XLR, TRS, and RCA outputs for each channel are wired in parallel.

   • The balanced XLR connectors are wired as follows:

   Pin 1 = shield (ground)
   Pin 2 = hot (+)
   Pin 3 = cold (–)

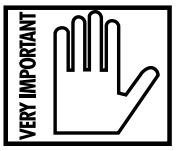
   • The 1/4" TRS connectors are wired as follows:

   Tip = hot (+)
   Ring = cold (–)
   Sleeve = shield (ground)
3. Plug all the sound system components into suitable AC outlets, properly grounded and capable of delivering adequate current.
4. Turn all the equipment on. If you are monitoring the signal through speakers, turn the power amplifier on last to avoid getting any pops or thumps through your speakers.

SET THE CONTROLS:

1. Make sure your signal source is turned up and delivering signal to the T•231. The signal should pass through the T•231 unaffected because the CHAN 1 and 2 BYPASS buttons are out and the signal processing circuitry is bypassed.
2. Push in the CHAN 1 and 2 BYPASS buttons to enable the graphic equalizer circuits.
3. You can turn up and down each individual slider and hear how it affects the sound.
4. You can turn up and down the input LEVEL controls to make it louder or softer. When the LEVEL control is at the center detent, it is at unity gain (it doesn't boost or cut the signal).

Things To Remember:



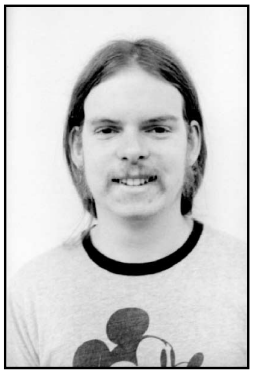
• When you shut down your equipment, turn off the amplifiers first. When powering up, turn on the amplifiers last.

• Save the shipping box and packing material! You may need it someday.

Contents

Don't forget to visit our website at www.tapcogear.com
for more information about this and other TAPCO products.

Introduction



TAPCO version of Greg

Thank you for choosing a TAPCO® Tweeq™ 31-band graphic equalizer by Mackie®. The TAPCO product line hails back to the days of TAPCO Corporation, Greg Mackie's first company. TAPCO revolutionized the audio industry back in 1969 with the very first 6-channel mixer specifically designed for keyboards and rock 'N' roll PA.

In essence, TAPCO redefined the price performance ratio and made high-quality professional audio mixers accessible to virtually anyone. Today, TAPCO is reborn with the same ideals and is backed by the world-class engineering and manufacturing horsepower of Mackie. The TAPCO T•231 is the first graphic equalizer in the TAPCO by Mackie® family.

About Graphic Equalizers

The tone controls on your home stereo system typically have a bass and treble control, and sometimes a midrange control, that you use to boost or cut a broad band of frequencies. When you leave the controls in the center position, they do nothing.

A graphic equalizer works in much the same way, except that it has many more controls that operate over much narrower frequency bands. The T•231 has 31 controls that boost or cut different frequencies, each centered on ISO standard frequencies ranging from 20 Hz to 20 kHz and affecting 1/3 of an octave.

Constant Q Design

The T•231 is designed with constant Q filters. The Q of a filter refers to its quality. A filter with a low Q affects a broader band of frequencies than a filter with a high Q ($Q=f_C/BW$, for you technoids!). Constant Q means that, as a slider is boosted or cut, the bandwidth of the filter (the "skirt" of the affected frequencies) remains the same. Lower quality proportional Q filters have a broader bandwidth as the filter is boosted or cut, which can extend out to an octave or more.

Whazzit Used For?

There are a number of uses for graphic equalizers in a sound system. They can be used to correct the frequency response of a loudspeaker, or to adjust for resonant peaks and dips in a room. Sometimes they are used to simply bring out the characteristics of a voice or instrument to improve the intelligibility and articulation of the sound.

In any case, please remember that a graphic equalizer is a tool that can be used to improve the overall sound, but it cannot make up for frequency response deficiencies caused by poor system design or poor acoustics. Try and get the best possible sound from the system before attempting to use equalization by paying attention to proper gain structure and loudspeaker placement. Often times just moving a loudspeaker to a different position can have a dramatic effect on the overall sound in the room.

Probably the most common use of a graphic equalizer is placing it in-line between the mixing board's main outputs and the power amplifier inputs (see hookup diagram on page 8). When used with a real-time analyzer and pink noise generator, it can be used to fine tune the acoustic frequency response and get it as flat as possible in a room.

TAPCO van (a.k.a. micro bus)

However, often times a perfectly flat frequency response is not what you want in a live sound application. For example, if the low-frequency response of the loudspeakers only extends to 50 Hz, there is no need to amplify the frequencies in the lowest octave of the audio frequency range, 20 Hz to 40 Hz. You can use the T•231 to roll off these frequencies, which reduces the drain on the amplifier and provides more power to amplify the higher, more useful frequencies.

You might want to boost the higher frequencies a bit to add brightness and sizzle to the sound. If the sound system is for the speaking voice, boosting the mid frequencies around 2-4 kHz can improve the intelligibility of the voice. Boosting 125 Hz, 250 Hz, and 16 kHz can improve a vocal. Try as you might to eliminate it, there may still be a residual 60-cycle hum in the speakers. You can use the 63 Hz slider to notch down the hum (the 125 Hz slider can help eliminate residual buzz).

A graphic equalizer can be used to reduce feedback. If you don't have a real-time analyzer to identify the peaks that cause the feedback, you can do a fairly good job by ear using the following procedure.

1. Set all the sliders on the T•231 to the center position (zero).
2. Slowly turn up the master volume on the mixer until feedback just begins to occur. You can usually hear a soft ringing sound that gradually increases in volume. BUT BE CAREFUL! Feedback can occur quickly and become very LOUD, very fast.
3. Cut the appropriate slider, corresponding to the feedback frequency, until feedback stops. It may take some practice to identify the frequency where the feedback is occurring, but your accuracy will improve the more familiar you become with it.
4. Repeat until you can't isolate a specific frequency in the feedback.

This procedure helps to minimize the resonant peaks in the room. It's a little more difficult to identify and adjust for dips in the room response. This is best done from experience listening for gaps in the sound of particular instruments or voices. Once you've identified them, boost the slider for that particular frequency range by 3 to 6 dB to help smooth the frequency response.

Another application for a graphic equalizer is patching it into a channel insert to enhance the sound or change the tonal characteristics of a vocal or instrument (see hookup diagram). The Sound Frequency chart on page 18 is a good reference to locate the frequency ranges of particular voices and instrument.

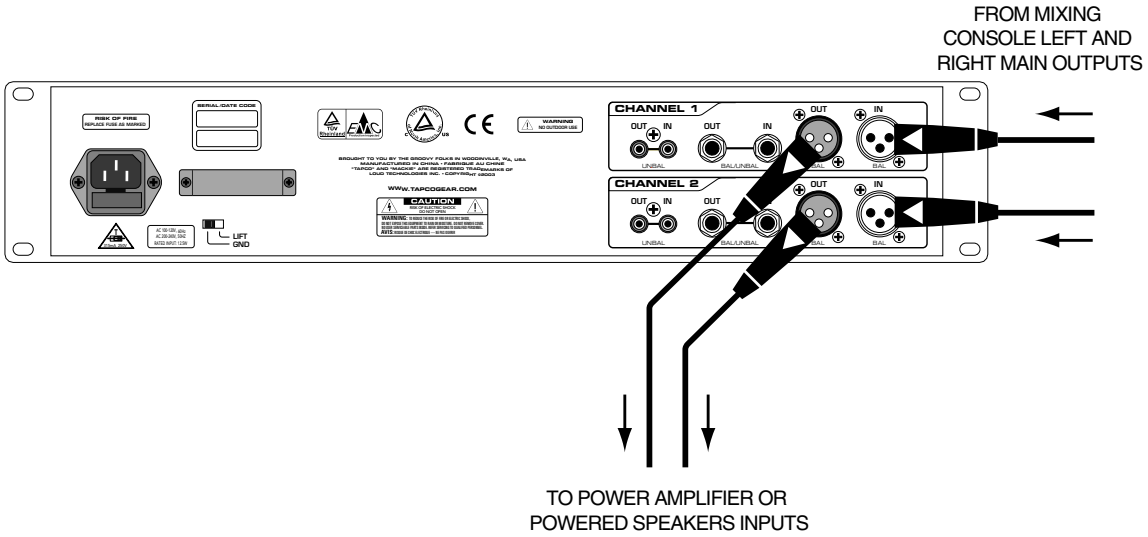
The Tweeq Series™ of processors are powerful and tough. They are designed to withstand the punishing rigors of the road and continue to perform day after day, year after year.

Here's a quick glance at the features packed into the T•231:

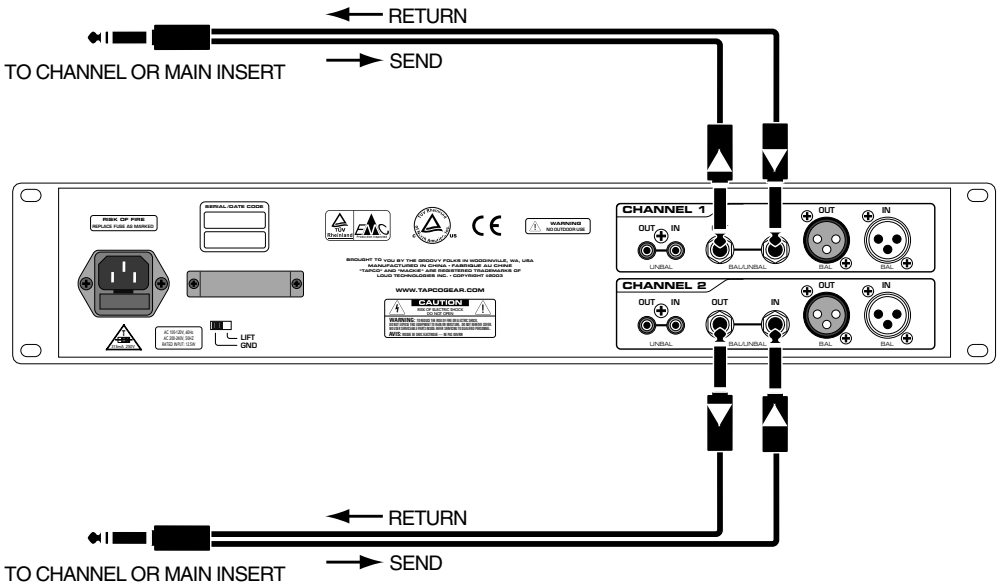
- 2-channel 31-band graphic equalizer with constant Q circuitry and great sound quality
- Switchable 6 and 12 dB control range for wide or fine tweaking
- High-pass filter @ 40 Hz to remove unwanted low frequencies
- Low-pass filter @ 16 kHz to remove unwanted high frequencies
- Bypass switch allows quick A/B comparisons
- Independent signal clip indicators on each channel
- Input gain control for EQ signal compensation
- Balanced 1/4" TRS and XLR, and unbalanced RCA input and output jacks
- Selectable line voltage

Hookup Diagrams

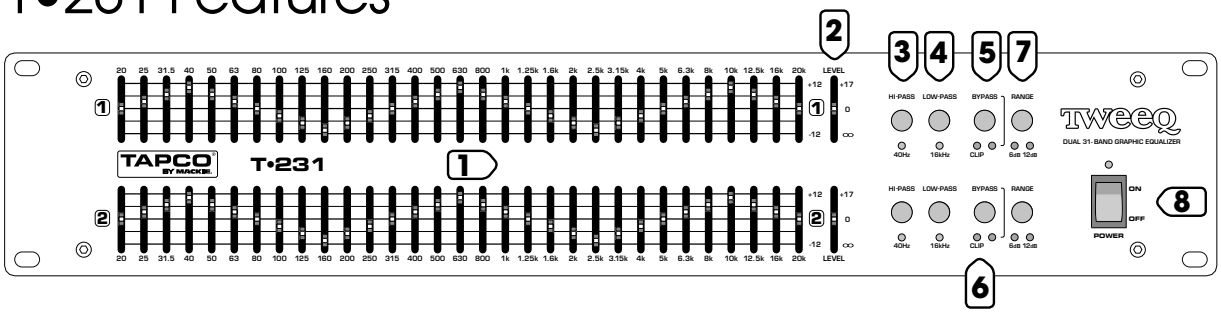
Typical Hookup:
In-line with Main Outputs



Alternate Hookup:
Individual Channel or Main Inserts



T•231 Features



FRONT PANEL FEATURES

The controls for Channels 1 and 2 are the same, so these descriptions apply to both channels.

1. EQ Sliders

When the EQ sliders are in the center position, they have no effect on the signal. Move a slider up or down to boost or cut a particular frequency by up to ±12 dB (±6 dB when the RANGE switch is set to 6 dB).

2. Input LEVEL

Use the Input LEVEL control to adjust the gain of the signal as it passes through the T•231. When the Input LEVEL control is in the center position, it provides no gain (unity gain). When the slider is all the way down the signal is off (-∞), and all the way up provides 17 dB of gain.

3. HI-PASS

This button is used to roll-off the frequencies below 40 Hz. The LED below the button lights to indicate when the HI-PASS filter is turned on.

This is useful to reduce stage rumble (low-frequency noise from footsteps picked up by microphones on stage) and microphone-handling noise.

If the T•231 is used with monitor speakers, turning on this button can reduce the muddiness caused by the lows from the stage monitors feeding back into the main output through the microphones.

4. LOW-PASS

Use this button to roll-off the frequencies above 16 kHz. The LED below the button lights to indicate when the LOW-PASS filter is turned on.

This is useful to remove hiss and high-frequency noise from the signal.

5. BYPASS

This button effectively disables the EQ circuits. You can use this button to compare the EQ'd signal to the unprocessed signal. When the BYPASS button is pushed in, the LED below the BYPASS button lights.

6. CLIP

This LED lights when the output signal is within 5 dB of clipping. It is okay if the CLIP LED blinks occasionally, but if it blinks frequently or stays lit all the time, turn down either the LEVEL control or the output signal from the mixer or other device immediately preceding the T•231.

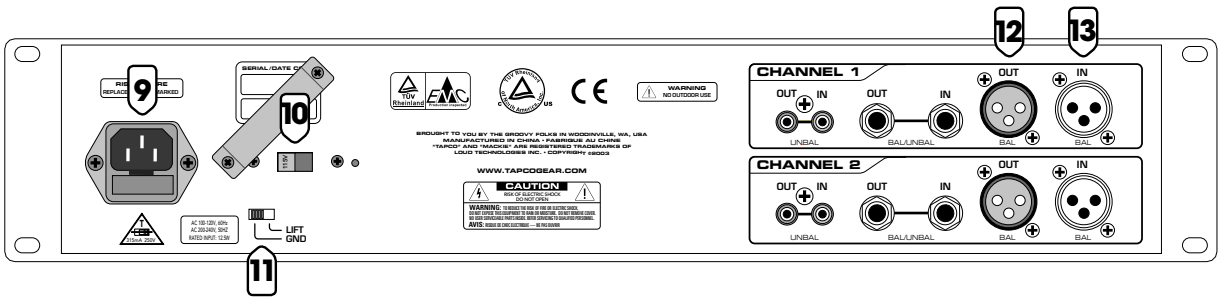
7. RANGE

This determines the maximum boost and cut of the EQ sliders, either ±12 dB or ± 6 dB (pushed in). The corresponding LED below the RANGE button indicates the setting.

The 12 dB setting provides more boost and cut if it is needed for more drastic EQ requirements. The 6 dB setting provides less boost and cut, but allows you to fine tune the controls with more precision.

8. POWER

Use this switch to turn the T•231 on and off. The LED above the switch lights when the power is on.



REAR PANEL FEATURES

9. Line Cord Socket and Fuse

Here is where you connect the detachable line cord that came in the box with your T•231. Plug the other end of the line cord into an AC outlet properly configured with the voltage required for your particular model (see AC Select Switch next).

The fuse is located behind the fuse cover, at the bottom of the IEC socket. See the "Troubleshooting" section on page 12 for information about replacing the fuse.

10. AC Select Switch

Set this switch to the correct voltage setting for the country you are in, 115 VAC or 230 VAC.

Note: The T•231 is shipped with the AC Select switch set to the 230 VAC position. If you are in a country that uses 100-120 VAC, remove the cover plate with a phillips-head screwdriver and set the switch to the 115 VAC position. A 315 mA fuse is used for both voltages (115V/230V). See the "Troubleshooting" section on page 12 for instructions on replacing the fuse.

11. GND LIFT Switch

When the switch is in the GND position, the audio ground is electrically connected to the chassis "safety" ground. Normally, this is how the switch is set.

However, occasionally a ground loop can be created in a system where the signal ground is connected to chassis ground, which can cause a hum or buzz to appear in the audio signal. If this is the case, try moving the switch to the LIFT position to eliminate the hum or buzz.

12. OUTPUTS

Three types of connectors are provided for the outputs — balanced male XLR and 1/4" TRS (Tip-Ring-Sleeve), and unbalanced RCA. These balanced outputs are in parallel, and provide exactly the same signal on all three outputs, regardless of which input jack is used. You can connect either a balanced TRS connector or an unbalanced TS connector to the 1/4" output jack.

13. INPUTS

Three types of connectors are provided for the inputs — balanced female XLR and 1/4" TRS (Tip-Ring-Sleeve), and unbalanced RCA. These inputs are in parallel, so do not connect more than one signal at a time to the input jacks for each channel. You can connect either a balanced or an unbalanced signal to the 1/4" input jack.

See "Appendix B: Connections" on page 14 for information on input and output connection wiring.

GENERAL PRECAUTIONS AND CONSIDERATIONS

Rack Mounting

The T•231 is designed to be mounted in a standard rack. It requires two rack spaces (2U = 3.5"). It also requires 7.5" depth inside the rack, not counting the rear connectors. When designing your rack, put the heavier items at the bottom and the lighter items toward the top.

Secure the front panel of the T•231 to the front of the rack using four screws with soft washers to prevent scratching the panel.

Thermal Considerations

Avoid mounting the T•231 directly over devices that produce heat, such as power amplifiers. As with all electronic components, it is best to provide cool air circulation around the T•231 to avoid overheating. The ambient temperature should not exceed 113˚ F (45˚ C).

AC Power Considerations

Be sure the T•231 is plugged into an AC outlet that is able to supply the specified voltage, and the AC Select switch is set to the correct voltage.

Be sure the AC outlet can supply enough current to allow full power operation of all the components plugged into it, especially if there are power amplifiers plugged in. The outlet should be a three-prong socket that matches the power cord.

WARNING: Bypassing the plug's safety ground pin can be dangerous. **Don't do it!**

Appendix A: Service Information

Warranty Service

Details concerning Warranty Service are spelled out in the Warranty section on page 19.

If you think your T•231 has a problem, please do everything you can to confirm it before calling for service. Doing so might save you from the deprivation of your equalizer and the associated suffering.

These may sound obvious to you, but here are some things you can check. Read on.

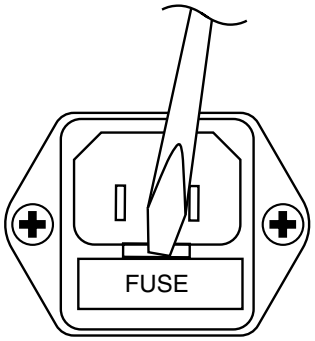
Troubleshooting

No Power

- Our favorite question: Is it plugged in? Make sure the AC outlet is live (check with a tester or lamp).
- Our next favorite question: Is the POWER switch on? If not, try turning it on.
- Is the red LED above to the POWER switch illuminated? If not, make sure the AC outlet is live. If so, refer to "No Sound" below.
- Is the fuse blown? If the POWER LED on the front panel is not illuminated and you are certain that the AC outlet is live, if is possible the fuse has blown.

To remove and replace the fuse:

1. Disconnect the line cord from the IEC socket.
2. Remove the fuse drawer by prying it open with a small screwdriver. It will slide all the way out.



3. Remove the fuse and replace it with an equivalent-type fuse:
   315 milliamp slo-blo (T315 A/250 V)
   Note: The same fuse is used for both 115 VAC and 230 VAC operation.
4. Replace the fuse drawer by pushing it all the way back into the IEC socket.
5. Reconnect the line cord and turn the POWER switch on.

   If two fuses blow in a row, then something is wrong. See the "Repair" section on the next page to find out what to do.

No Sound

- Is the signal source turned up? Make sure the signal level from the mixing console (or whatever device immediately precedes the T•231) is high enough to produce sound through the system.
- Are you using the T•231 with an insert plug in an insert jack? Make sure that you are using an insert cable, and not a mono Y-cable.

Poor sound

- Is it loud and distorted? Turn down the signal coming from the mixer or signal source.
- Is the input connector plugged completely into the jack? Make sure all connections are good and sound.
- Switch the BYPASS switch in and out to compare the sound with the equalizer in the signal path and out of the signal path. This can help determine if the problem is with the T•231 or elsewhere in the system.

Noise/Hum

- Check the signal cable between the mixer and the T•231. Make sure all connections are good and sound.
- Make sure the signal cable is not routed near AC cables, power transformers, or other EMI-inducing devices.
- Is there a light dimmer or other SCR-based device on the same AC circuit as the T•231? Use an AC line filter, or plug the T•231 into a different AC circuit.

Repair

Service for TAPCO products is available from one of our authorized domestic service centers or at our factory, located in sunny Woodinville, Washington. Service for TAPCO products living outside the United States can be obtained through local dealers or distributors.

If your T•231 needs service, follow these instructions:

1. Review the preceding troubleshooting suggestions. Please.
2. Call Tech Support at 1-877-827-2669, 7 am to 5 pm PST, to explain the problem and request an RA (Return Authorization) number. Have your T•231's serial number ready. You must have an RA number before you can obtain warranty service at the factory or an authorized service center.
3. Keep this owner's manual and the detachable line cord. We don't need them to repair the T•231.
4. Pack the T•231 in its original package, including endcaps and box. This is very important. When you call for the RA number, please let Tech Support know if you need new packaging. You can order new packaging through our parts department. LOUD Technologies is not responsible for any damage that occurs due to non-factory packaging.
5. Include a legible note stating your name, shipping address (no P.O. boxes), daytime phone number, RA number, and a detailed description of the problem, including how we can duplicate it.
6. Write the RA number in BIG PRINT on top of the box. Units sent to us without the RA number will be refused.
7. Ship the T•231 to us. We suggest insurance for all forms of cartage. Ship to this address:

   TAPCO
   SERVICE DEPARTMENT
   16220 Wood-Red Road NE
   Woodinville, WA 98072

8. We'll try to fix the T•231 within five business days. Ask Tech Support for the latest turn-around times when you call for your RA number. The T•231 must be packaged in its original packing box, and must have the RA number on the box. Once it's repaired, we'll ship it back the same way in which it was received. This paragraph does not necessarily apply to non-warranty repair.

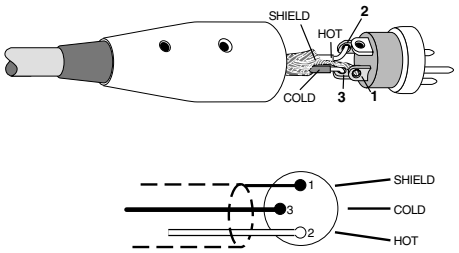
Lonely? Looking for that special someone? Do you have a question about your TAPCO product?

Please call our Technical Support folks at **1-877-827-2669**, Monday to Friday, from 7 am to 5 pm PST. After hours, visit www.tapcogear.com and look under **Support**, or e-mail us at techmail@tapcogear.com

Appendix B: Connections

XLR Connectors

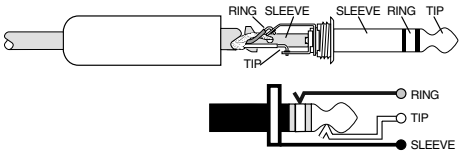
The inputs and outputs use 3-pin male and female XLR connectors. They are wired as follows, according to standards specified by the AES (Audio Engineering Society).



XLR Balanced Wiring
Pin 1 = Shield
Pin 2 = Hot (+)
Pin 3 = Cold (–)

1/4" TRS Phone Plugs and Jacks

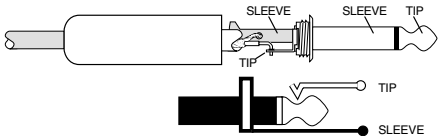
"TRS" stands for Tip-Ring-Sleeve, the three connection points available on a stereo 1/4" or balanced phone jack or plug. TRS jacks and plugs are used for balanced signals.



1/4" TRS Balanced Wiring:
Sleeve = Shield
Tip = Hot (+)
Ring = Cold (–)

1/4" TS Phone Plugs and Jacks

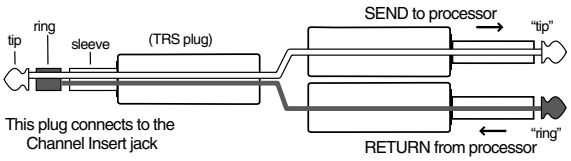
"TS" stands for Tip-Sleeve, the two connection points available on a mono 1/4" phone jack or plug. They are used for unbalanced signals.



1/4" TS Unbalanced Wiring:
Sleeve = Shield
Tip = Hot (+)

1/4" TRS Insert Plugs and Jacks

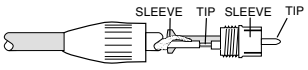
When patching the T•231 into a channel's insert jack, you may need to use a special 1/4" TRS connector that uses the tip to send the signal to the T•231, and the ring to return the signal to the channel. The sleeve is the common ground (earth) for both signals. These are both unbalanced signals.



1/4" TRS Insert Wiring:
Sleeve = Ground
Tip = Send
Ring = Return

RCA Plugs and Jacks

RCA-type plugs (also known as phono plugs) and jacks are often used in home stereo and video equipment and in many other applications. They are unbalanced and electrically equivalent to a 1/4" TS phone plug.



RCA Unbalanced Wiring:
Sleeve = Shield
Tip = Hot

Appendix C: Technical Info

T•231 Specifications

Frequency Response

20 Hz to 20 kHz (+0, –1 dB)
20 Hz to 50 kHz (+0, –3 dB)

Audio Input

Type:	Active balanced XLR and 1/4" jacks Unbalanced RCA jack
Impedance:	20 kΩ balanced 15 kΩ unbalanced
Maximum Input Level:	+21 dBu balanced and unbalanced

Audio Output

Type:	Active balanced XLR and 1/4" jacks Unbalanced RCA jack
Impedance:	<600 Ω
Maximum Output Level:	+18 dBu
THD+N @ 1 kHz, +4 dBu:	0.02% @ 1 kHz (all sliders at center position)
Noise and Hum, unity gain:	< –93 dBu
Crosstalk @ 1 kHz:	< –103 dBu
Common Mode Rejection:	> 60 dB

Graphic EQ

Type:	1/3-octave Constant Q
Frequency Range:	20 Hz to 20 kHz in 31 third-octave bands (ISO center frequencies)
Sliders:	20 mm with center detent
Level:	Off (∞) to +17 dB
Hi-Pass:	40 Hz @ 12 dB/octave
Low-Pass:	16 kHz @ 12 dB/octave
Bypass:	Bypasses the graphic equalizer, Hi-Pass, and Low-Pass filter sections
Range:	±6 dB or ±12 dB

Indicators

HI-PASS LED
LOW-PASS LED
CLIP LED
BYPASS LED
6 dB/12 dB Range LEDs
POWER LED

AC Power and Current Requirements

Power Consumption:	12.5 watts
AC Operating Voltages:	
U.S.	120 VAC, 60 Hz
Europe	240 VAC, 50 Hz
Japan	100 VAC, 50/60 Hz
Korea	220 VAC, 60 Hz
Fuse:	315 mA @ 100-240 VAC

Physical Dimensions and Weight

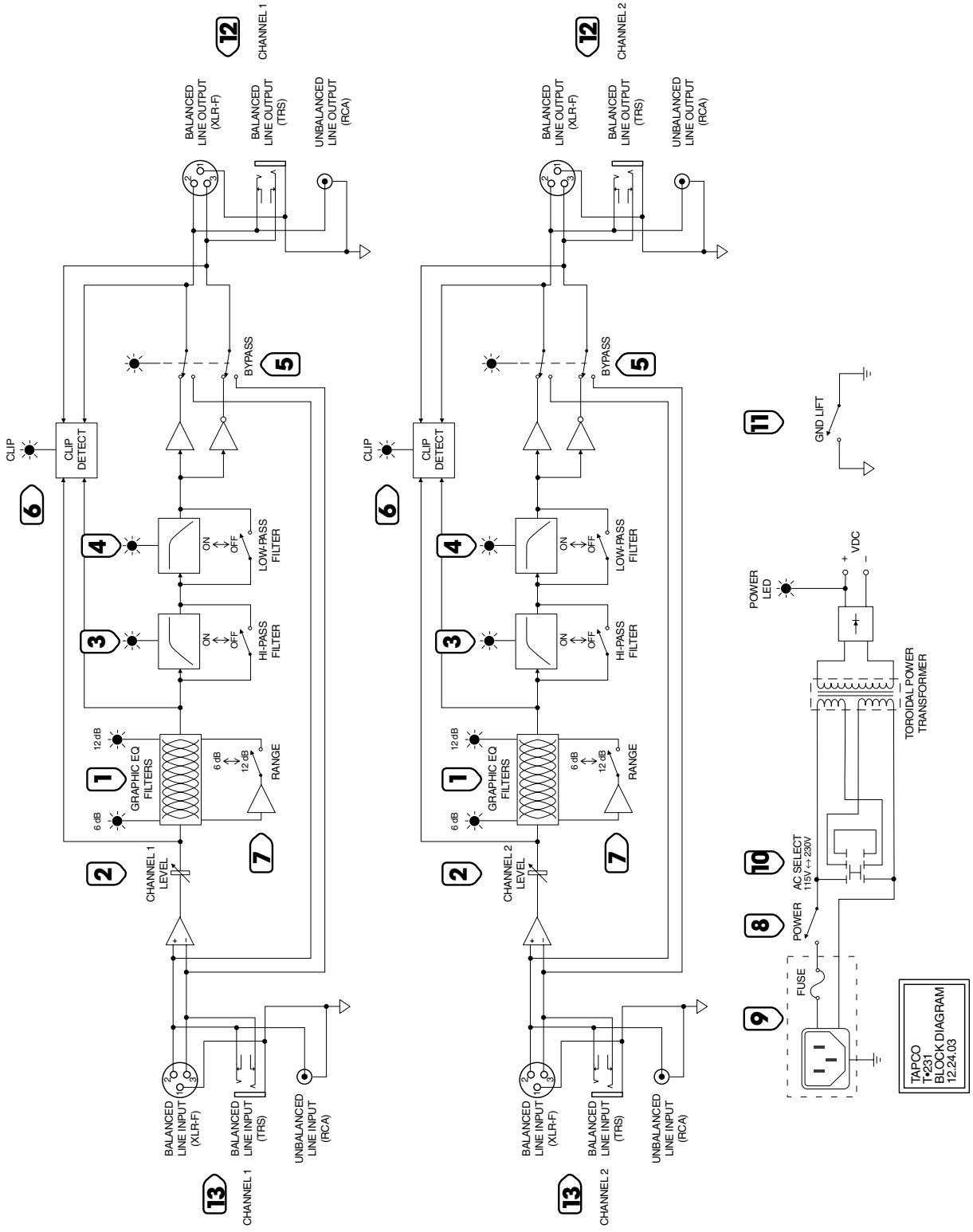
Height:	3.5 in/89 mm
Width:	19.0 in/483 mm
Depth:	8.7 in/220 mm
Weight:	9.5 lb/4.3 kg

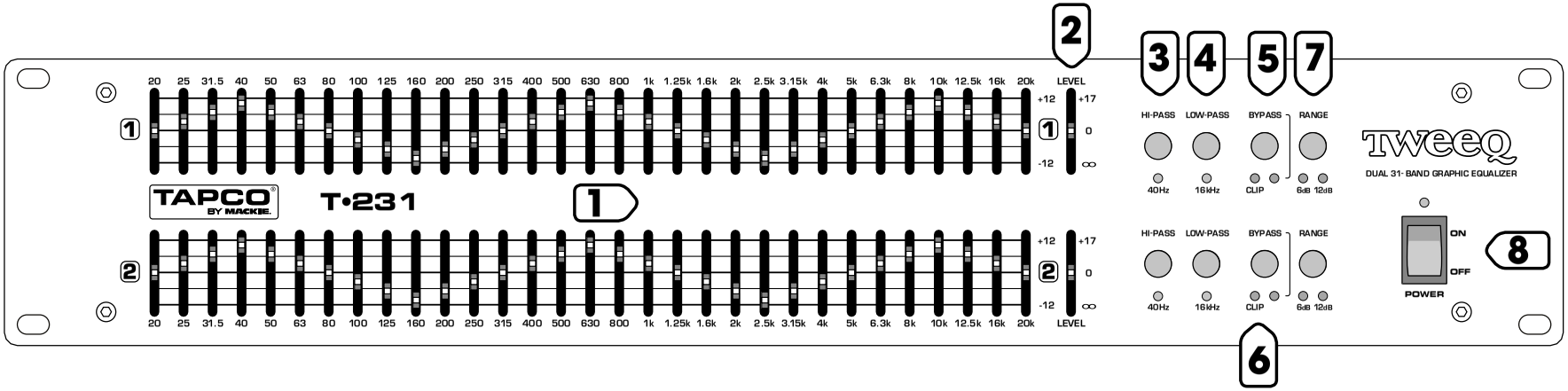
Disclaimer

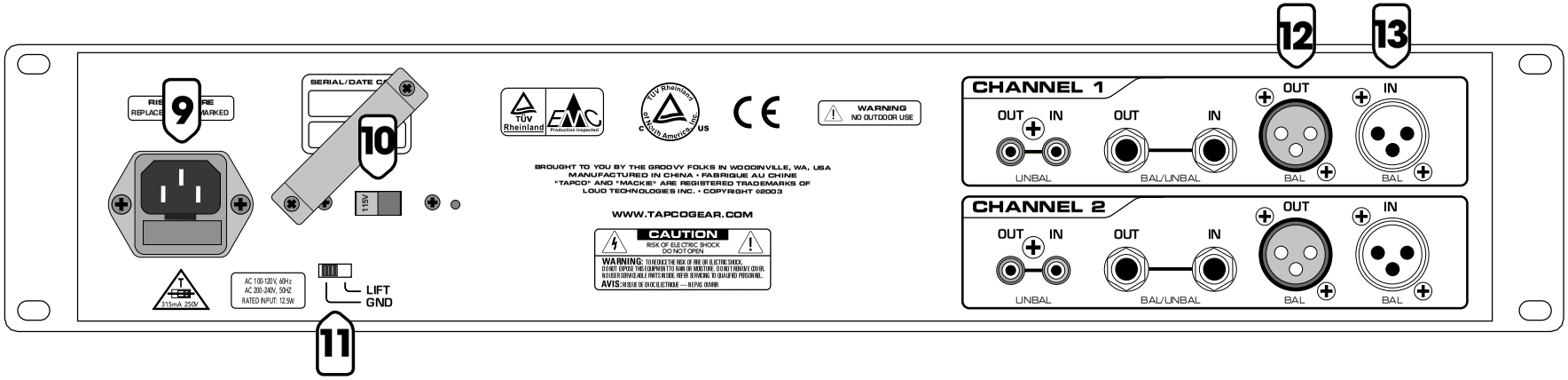
Since we are always striving to make our products better by incorporating new and improved materials, components, and manufacturing methods, we reserve the right to change these specifications at any time without notice.

T•231 Block Diagram

This outlines the signal flow inside the T•231.

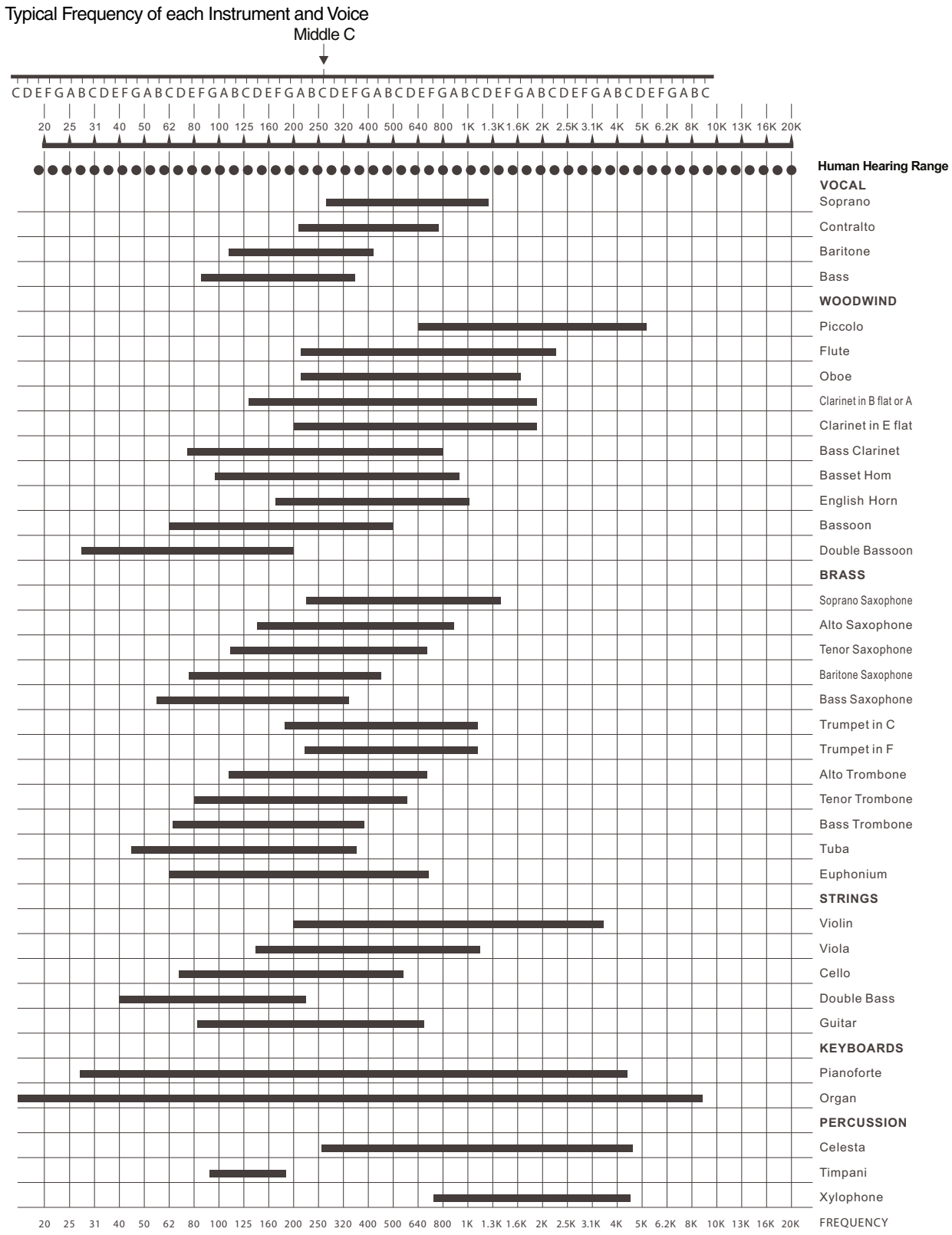






Frequency Chart

This chart shows the frequency range covered by various instruments and voices.



TAPCO LIMITED WARRANTY

A. LOUD Technologies Inc. warrants all materials, workmanship and proper operation of this TAPCO product for a period of **one year** from the original date of purchase. If any defects are found in the materials or workmanship, or if the product fails to function properly during the applicable warranty period, LOUD Technologies, at its option, will repair or replace the product. This warranty applies only to equipment sold and delivered within the U.S. by LOUD Technologies or its authorized dealers.

B. Failure to register online or return the product registration card will not void the 1-year warranty.

C. Service and repairs of TAPCO products are to be performed **only** at the factory, OR at a factory-authorized service center. Unauthorized service, repairs, or modification will void this warranty.

D. To obtain service, please follow the instructions found on page 13.

E. LOUD Technologies Inc. and Authorized TAPCO Service Centers reserve the right to inspect any products that may be the subject of any warranty claims before repair or replacement is carried out. LOUD Technologies and Authorized TAPCO Service Centers may, at their option, require proof of the original date of purchase in the form of a dated copy of the original dealer's invoice or sales receipt. Final determination of warranty coverage lies solely with LOUD Technologies Inc. or its Authorized Service Centers.

F. TAPCO products returned to LOUD Technologies and deemed eligible for repair or replacement under the terms of this warranty will be repaired or replaced within thirty days of receipt by LOUD Technologies at our rainforest factory complex. LOUD Technologies may use refurbished parts for repair or replacement of any product. Products returned to LOUD Technologies that do not meet the terms of this Warranty will be repaired and returned C.O.D. with billing for labor, materials, return freight, and insurance. Products repaired under warranty at the factory will be returned freight prepaid by LOUD Technologies to any location within the boundaries of the USA.

G. LOUD Technologies warrants all repairs performed for 90 days or for the remainder of the warranty period. This warranty does not extend to damage resulting from improper installation, misuse, neglect or abuse, or to exterior appearance. This warranty is recognized only if the inspection seals and serial number on the unit have not been defaced or removed.

H. LOUD Technologies assumes no responsibility for the quality or timeliness of repairs performed by TAPCO Authorized Service Centers.

I. This warranty is extended to the original purchaser and to anyone who may subsequently purchase this product within the applicable warranty period.

J. This is your sole warranty. LOUD Technologies Inc. does not authorize any third party, including any dealer or sales representative, to assume any liability on behalf of LOUD Technologies or to make any warranty for LOUD Technologies Inc.

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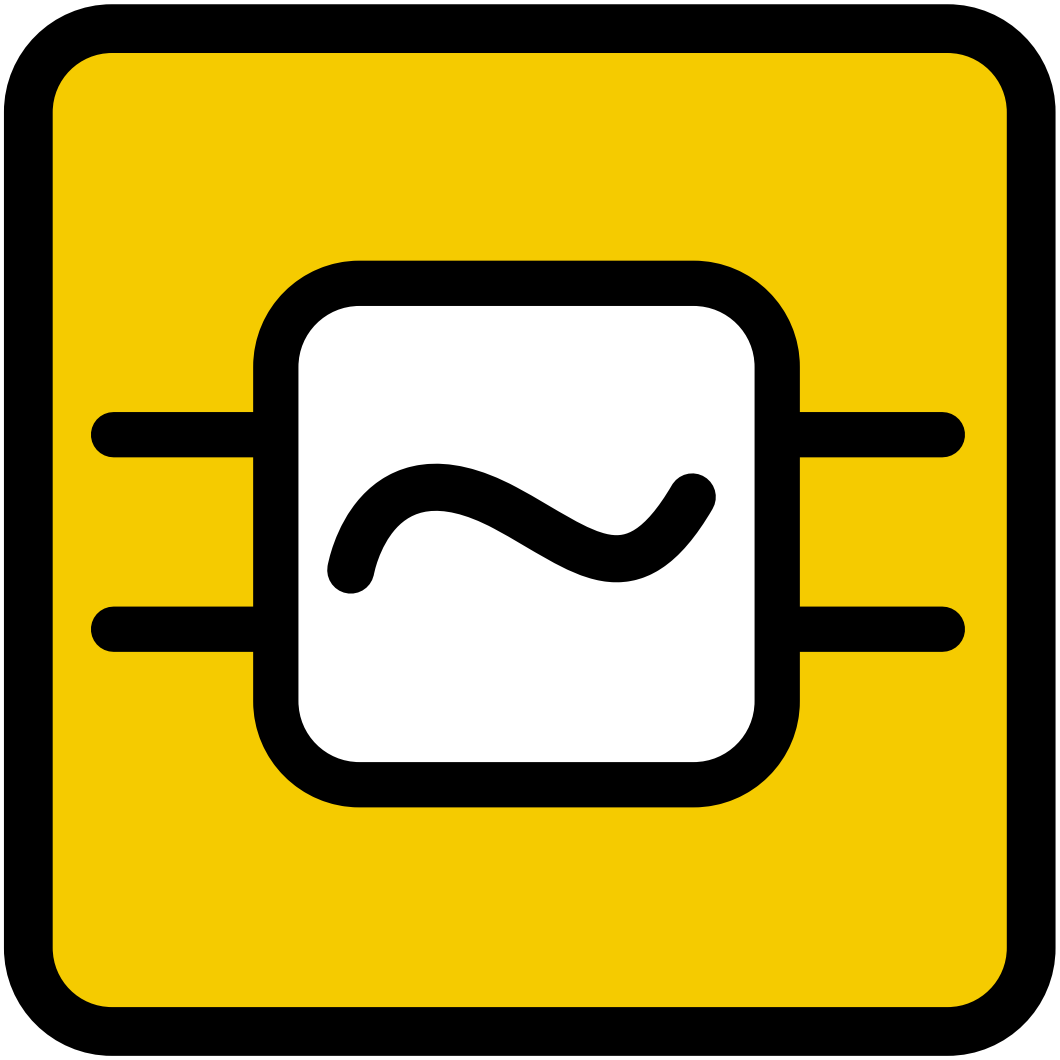
Please keep your sales receipt in a safe place.



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