

# EAP03

Earphone Audio Processor  
User Manual



The Ultimate Accessory for Your Earphones.

TENSION™  
LABS

# EAP03 Earphone Audio Processor User Manual

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## Safety and Precautions

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**CAUTION** Use this device only as directed in this user manual. Read this manual in its entirety before using this device.



**CAUTION** Hearing levels and times indicated are based on the user having entered the correct earphone sensitivity. The depth of earphone insertion into the ear canal can cause differences in the levels produced. Variations due to earphone specification and user earphone insertion may cause a discrepancy in the level reading versus actual levels encountered. Do not use this device to listen to levels beyond what is safe. See the index of this manual for a guide to *Protecting Your Hearing*.



**CAUTION** This device uses a lithium-polymer battery, which is not user replaceable. Please consult the factory for replacement. To reduce the risk of fire or burns, do not disassemble, crush, puncture, or dispose of in fire or water.



**CAUTION** This device contains no user-serviceable parts. Contact the factory for authorized service locations. Opening this instrument will void the warranty.



**PLEASE CONSULT** your local officials for proper disposal guidelines.

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**PLEASE NOTE** This user manual has been written to help you safely and efficiently maximize your earphone listening experience. The EAP03 offers a number of new and unique features to help you do so. Before operating this unit, please read this manual thoroughly. For additional information on the EAP03 see our website at [www.tensionlabs.com](http://www.tensionlabs.com).

# Welcome!

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Thank you for purchasing Tension Labs' EAP03, the world's first digital earphone audio processor! The EAP03 uses dual 24-bit stereo multi-bit sigma-delta codecs along with a 48-bit digital audio processor to provide the ultimate accessory for your earphones.

## Some of the EAP03's Unique Features:

### Power Amplifier

Increased drive capability for greater headroom.

### Three-Band Equalizer

Digitally-adjustable three-band parametric equalizer.

### Overload Detection

Display indicates overload/clipping conditions.

### Sound Level Meter

Integrated processing provides an A-weighted sound level meter.

### Integrated Microphone

Provides ambient sound feed into the audio stream.

### Hearing Safety Monitor

Measures exposure levels and indicates safe listening time.

PATENT PENDING

MADE IN THE USA

## Unpacking the Contents

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You will find the following items contained within the package. Please check to see that you have each item shown below.

Personal Digital Processor



Interconnect Cable



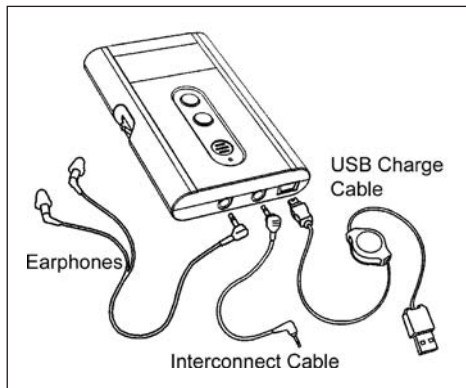
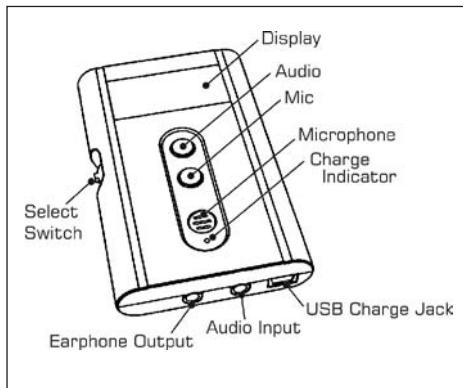
USB Charge Cable



Velcro



## Connections and Controls



**Display** Indicates status and function of unit.

**Audio** The blue button can be used to turn the unit on/off and controls the audio functions.

**Mic** The red button can be used to turn the internal microphone on/off. It also controls the audio functions.

**Microphone** Allows the monitoring of environmental sounds into the unit.

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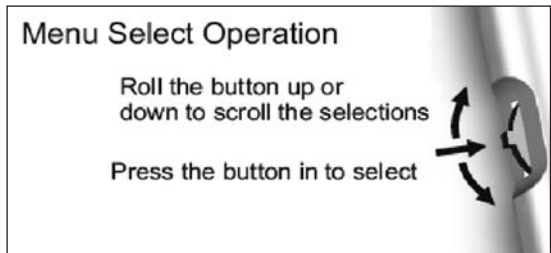
**Charge Indicator** Indicates unit is being charged.

**USB Charge Jack** Used for charging the internal battery. Use only with the supplied charging cable.

**Audio Input** Jack for connecting the *Interconnect Cable* to audio source (MP3, CD, etc.)

**Earphone Output** Jack to connect your earphones.

**Select Switch** Press the button in to select and roll the button up or down to scroll through the selections.



## Quick Guide

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### Step

- 1 Unpack the EAP03 from its box.
- 2 Charge the unit by plugging in the USB cable into the USB charge jack on the EAP03 and then into any computer USB port or USB charging unit. The red charge indicator light will illuminate below the microphone opening indicating that it is charging. Before initial use, the unit must be charged for two hours. When the EAP03 is completely charged, the red light will turn off. The battery status can be checked on the display screen.
- 3 Connect one end of the supplied interconnect cable into the audio input connection of the EAP03 and connect the other end into the audio player headphone jack.
- 4 Connect your earphones to the earphone jack on the EAP03.
- 5 You are now ready to listen!

### To

### Do This

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Turn on EAP03

Press any button

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Turn on the audio

Press the audio (blue) button

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Turn on the microphone

Press the mic (red) button

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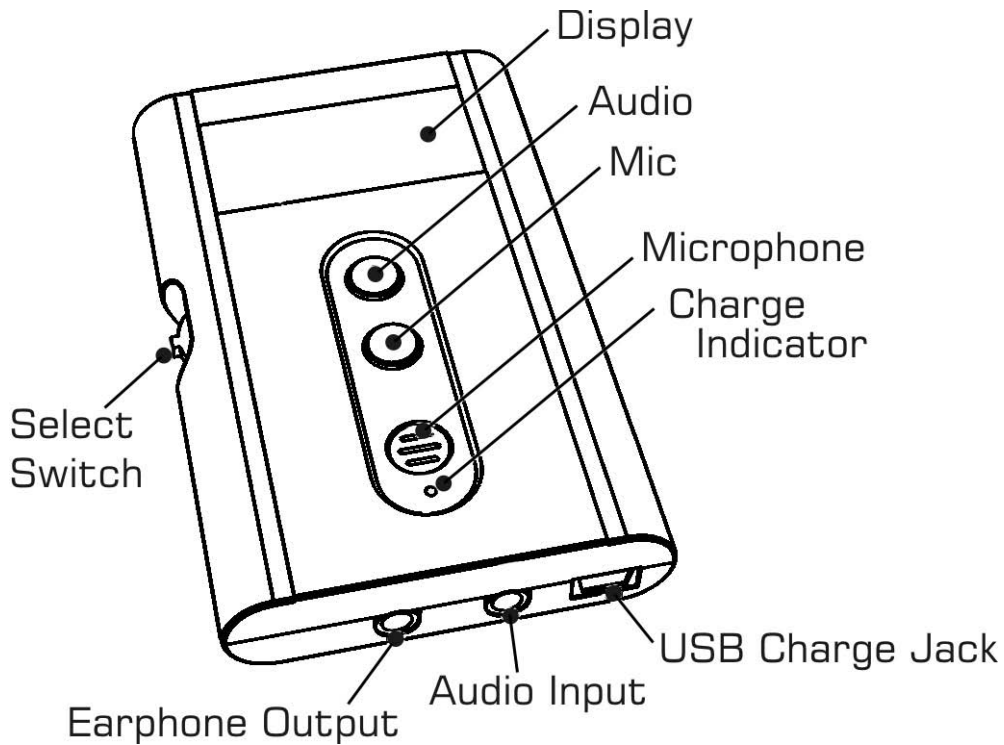
Turn off the EAP03

Turn off the audio and microphone

---

Change device options  
Select options/make option changes

Push the menu selection switch in  
Roll the menu selection switch up or down  
Press the audio and mic button to increase  
or decrease



## Using Your Earphone Audio Processor (EAP03)

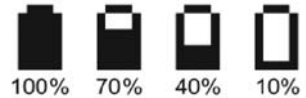
### MAIN SCREEN

Pressing any button will turn on the processor. The main screen will appear on the display as shown at right. The main screen shows the battery condition, the audio level in dB SPL and a graphical display of the audio level.



### Battery Indication

The battery condition indicator is shown in the upper left of the display. The approximate amount of battery life is indicated as 100% (fully-charged), 70%, 40%, or 10% (requiring recharge).



### Audio Level Indicators

The number on the top right of the display indicates the audio level being reproduced by the earphones. This number will indicate the level of the audio from the audio input and/or the integrated microphone, depending on which source(s) are active. On the lower portion of the display is a bar graph that moves from left to right, indicating the listening level in dB SPL in 3dB steps. If the bar graph reaches the far right a '+' sign appears indicating that the output is at or near clipping. The audio level indications will only represent the actual levels produced by the earphones if the earphone sensitivity is correctly entered. See *Earphone Sensitivity*.

### OPERATION

The audio (blue) button enables the audio input, the mic (red) button enables the microphone input. Either or both may be selected at any time, If neither input is selected the EAP03 will turn off.

**AUDIO INPUT** – The audio input is preset to provide a gain of +6dB, this may be adjusted in the settings menu. See *Amplifier Gain* for more information. The desired volume level for the audio output should be set on the attached audio device. The audio input is processed through the equalizer and 3DX soundfield enhancement circuits, if enabled.

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**MIC INPUT** – When the mic input is enabled, the microphone level can be adjusted by rolling up or down on the select switch on the side of the unit. The microphone output is processed through an A-weighting filter.

**AUTO POWER OFF** – The EAP03 will automatically turn off if no audio is present for two minutes.

## **SOUND LEVEL METER MODE**

When the integrated mic is on and the audio channel is off, the display will show the sound level in the environment as measured by the microphone. This built-in sound level meter can be used to monitor your environment. The levels are shown in dBA SPL (A-weighted sound pressure level in dB). Please note that this sound level meter function does not meet IEC or ANSI standards and should only be used as a reference of general audio levels.

## **CHARGING THE BATTERY**

The EAP03 uses a lithium-polymer rechargeable battery. The battery may be recharged anytime using the supplied USB charge cable. Plug the cable into the USB jack on the EAP03 and connect the other end into a standard USB connection on a computer. The EAP03 can be used during the charging cycle, but this will increase the charging time. The red charge indicator light will illuminate when the charge cycle begins and will extinguish when the charge cycle is complete. A complete charge will require approximately two to three hours.

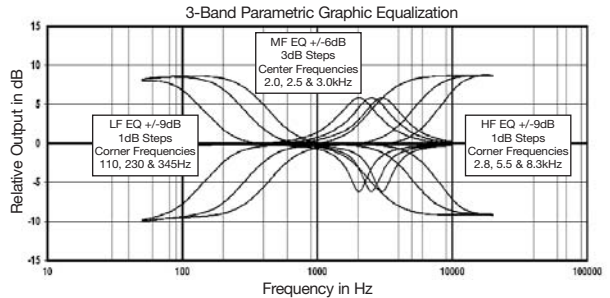
## **ADJUSTING THE SETTINGS**

There are several user-adjustable settings in the EAP03. These can be accessed by pressing the menu select switch directly inward. Once the menu is accessed, you may scroll through the selections by rolling upward or downward on the select switch. On any of the menu screens, the setting may be changed using the audio and mic buttons on the front of the unit. When you're finished making changes to a setting, rolling upward or downward on the select switch moves to the next setting. The settings are saved in memory as soon as a change is made. To exit the settings menu you can either wait for three seconds or push in on the select switch.

## Using Your Earphone Audio Processor (EAP03) (cont.)

### FREQUENCY FILTERS

The EAP03 includes a three-band parametric equalizer which can be used to provide a customized frequency response. The adjustable bands include a low-frequency (bass), mid-frequency, and high-frequency (treble) setting. These filters may be adjusted as to frequency and level for each band.



**Low Gain**  
[ +9 dB ]

**Low Freq**  
[ 345 Hz ]

The low gain setting adjusts the gain of the low frequency band of the equalizer. It is adjustable from +9 to -9dB in 1dB steps. The low frequency setting adjusts the corner point of the low-frequency filter. The frequency options are 110Hz, 220Hz, and 345Hz.

**Mid Gain**  
[ +6 dB ]

**Mid Freq**  
[ 3.0kHz ]

The mid gain setting adjusts the gain of the mid frequency band of the equalizer. It is adjustable from +6 to -6dB in 3dB steps. The mid frequency setting adjusts the mid point of the mid-frequency filter. The frequency options are 2.0kHz, 2.5kHz, and 3.0kHz.

**HighGain**  
[ +9 dB ]

**HighFreq**  
[ 8.3kHz ]

The high gain feature adjusts the gain of the high frequency band of the equalizer. It's adjustable from +9 to -9dB in 1dB steps. The high frequency setting adjusts the corner point of the high-frequency filter. The frequency options are 2.8kHz, 5.5kHz, and 8.3kHz.

**Earphone**  
[ 100dBV ]

### EARPHONE SENSITIVITY

The earphone sensitivity setting indicates the value that corresponds to the earphone you are using with the EAP03. This setting must be adjusted to match

the sensitivity of your earphones for the indicated levels to be correct, see *Earphone Sensitivity Chart* to determine the appropriate setting for your earphones.

### 3DX SOUNDFIELD EXPANSION MODE

The 3DX soundfield expansion mode provides an enhanced listening environment, simulating the environment of listening to music through a pair of stereo speakers. When in a typical listening environment, in front of a pair of stereo speakers, both ears will hear the sound from both speakers. However, with earphones you lose this ability and only the signal coming from that earphone is heard in that ear. Earphones cause the normal ‘crossfeed’ to be lost, the 3DX feature attempts to recreate the experience of listening to your music as if you were in front of a pair of speakers.

A rectangular display box with a black border containing the text "3DX Mode" on the top line and "[ on ]" on the bottom line.

### AMPLIFIER GAIN ADJUSTMENT

The voltage gain of the audio channel can be adjusted from -20dB to +20dB. The default setting is +6dB. For higher sensitivity earphones (>120dB/V) a gain setting of 0 or less is recommended. As the gain setting is increased, the occurrence of clipping can increase, thus a lower setting is recommended.

A rectangular display box with a black border containing the text "Amp Gain" on the top line and "[ +6 dB ]" on the bottom line.

### HEARING SAFETY MONITOR

The display setting toggles between displaying the sound level in your ear and an estimate of the length of time you could listen at this level before risking hearing damage due to the intensity of the sound. When this setting is on ‘time’ the display will indicate the number of minutes that it is ‘safe’ to listen at this sound level in a 24 hour period based on NIOSH established workplace limits. See the *Protecting Your Hearing* section in this user manual for further information.

A rectangular display box with a black border containing the text "Display" on the top line and "[ level ]" on the bottom line.

A rectangular display box with a black border containing the text "Display" on the top line and "[ time ]" on the bottom line.

A rectangular display box with a black border containing the text "SN010203" on the top line and "FW 1.0" on the bottom line.

### SERIAL NUMBER AND FIRMWARE VERSION

This screen indicates the devices serial number and the version number of the firmware installed.

## Troubleshooting

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### Problem

### Solution

Unit does not turn on

- Battery needs charging, plug unit in and charge for at least two hours.
- Reset the unit. Roll upwards on the select switch and push the mic button at the same time and then release.

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Cannot enter menu

- Push and release the select switch, do not hold the switch in.
  - Push the button straight inwards.
- 

### Using the USB Charge Cable

To extend the cable always pull both ends at the same time. To retract the cable, pull both ends out until it clicks and then release slowly. Never pull just one end of the cable, as it will become tangled in the center. To fix this problem, pull both ends all the way out and release. If the cable is pulled out incorrectly, it may not retract evenly, leaving one end hanging. To re-center the cable fully pull out both ends. Then slightly push the spool towards the end that does not retract fully. Again retract the cable to see if it is centered. If not, repeat the last step until the cable retracts correctly.

## Protecting Your Hearing

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According to the National Institutes of Health approximately 28 million Americans have a hearing impairment. Hearing loss covers an age span of approximately 17 in 1,000 children under age 18 and approximately 314 in 1,000 adults over age 65 having hearing loss. This indicates that the incidence increases with age. In addition, ten million Americans have suffered irreversible noise-induced hearing loss, and 30 million more are exposed to dangerous noise levels each day.

## Protecting Your Hearing (cont.)

Noise-induced hearing loss is preventable. The chart below is adapted from the NIOSH 98-126 noise exposure standard. This chart should be used as a guideline for maximum listening times at certain intensity levels during any 24-hour period. The EAP03 provides the information necessary for you to make safe choices about the level and the amount of time at which you listen. Once you have set your earphone sensitivity in the EAP03, both the levels and time shown on the display are based on the actual levels being produced in your ears (within the tolerances of the earphone sensitivity specification as determined by the earphone manufacturer).

| Recommended Maximum Exposure Time |                    |
|-----------------------------------|--------------------|
| SPL dBA                           | TIME               |
| 85                                | 8 Hours (480 Min.) |
| 88                                | 4 Hours (240 Min.) |
| 91                                | 2 Hours (120 Min.) |
| 94                                | 1 Hour (60 Min.)   |
| 97                                | 30 Minutes         |
| 100                               | 15 Minutes         |
| 103                               | 7.5 Minutes        |
| 106                               | 3.75 Minutes       |

## Specifications

|                              |  |
|------------------------------|--|
| Model                        | EAP03-01S  |
| Weight                       | 55 grams (2.0 oz.)                                 |
| Size                         | 82.5mm (L) x 52.0mm (W) x 13.0mm (T)               |
| Battery                      | Lithium-Polymer 950 mAH 3.7V                       |
| Battery Life                 | 7-8 Hours per full charge (min. 500 charge cycles) |
| Frequency Response           | 20Hz to 20kHz                                      |
| Harmonic Distortion          | 0.03% THD Typical                                  |
| Hearing Monitoring Functions | Based on NIOSH 98-196 Noise Exposure Standard      |

## Earphone Sensitivity Chart

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Listed below are the sensitivities for commonly available earphones. Find the earphones you are using and enter the sensitivity into the EAP03 as described earlier in this manual. If your earphone is not listed below, check our website at [www.tensionlabs.com](http://www.tensionlabs.com) for a more comprehensive listing of earphone sensitivities. The sensitivity is indicated in dB/V at 1kHz.

| <b>Manufacturer</b> | <b>Model</b>  | <b>Sensitivity</b> |
|---------------------|---------------|--------------------|
| Etymotic Research   | ER-4S         | 108                |
|                     | ER-4P         | 120                |
|                     | ER-6i         | 126                |
| Shure               | E2C           | 123                |
|                     | E3C           | 129                |
|                     | E4C           | 124                |
|                     | E5C           | 132                |
|                     | E500          | 133                |
| Ultimate Ears       | Super.fi3     | 134                |
|                     | Super.fi5 Pro | 136                |
|                     | Super.fi5 EB  | 139                |

## Maintaining Your EAP03

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- Taking good care of your EAP03 will ensure trouble-free operation and reduce the risk of damage to your device.
- Keep your EAP03 away from excessive moisture and extreme temperatures. Avoid exposing your device to direct sunlight or strong ultraviolet light for extended periods of time.
- Never clean your EAP03 with it powered on. Use a soft, lint-free cloth moistened with water to wipe the screen and exterior of the device.

## Maintaining Your EAP03 (cont.)

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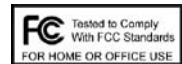
- Do not subject your EAP03 to sudden and severe temperature changes. This could cause moisture condensation inside the unit, which could damage your device. In the event of moisture condensation, allow the device to dry out completely before use.
- The screen surface can easily be scratched. Avoid touching it with sharp objects.
- Never attempt to disassemble, repair, or make any modifications to your EAP03. Disassembly, modification, or any attempt at repair could cause damage to your device and even bodily injury or property damage and will void any warranty.
- Do not charge the EAP03 in a high moisture environment. Allow adequate ventilation around the instrument when charging the battery.
- Do not use the USB charge cable if the cord becomes damaged. Use the specified charging cable approved by the manufacturer. Connect the charging cable only to a standard USB port that will supply the indicated power requirements.

## Regulatory Statements

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### FCC Class B Regulations

USA Federal Communications Commission Radio Frequency Interference Statement



This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment 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. 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 receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

## Regulatory Statements (cont.)

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- Consult the dealer or an experienced radio/TV technician for help. Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

**PLEASE NOTE** In order to comply with the FCC regulation for which this product is certified, only use a shielded interface cable such as that supplied with this product.

**CANADA Canadian Department Of Communications Radio Interference Regulations Class B Compliance Notice** This Class B digital apparatus meets all requirements of the Canada Interference-Causing equipment regulations.

Cet appareil numérique de Classe B respecte toutes les exigences du Règlement Canadien sur le matériel brouilleur.

## Warranty and Service

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### Warranty

Tension Labs, Inc. warrants to the original purchaser that the product shall be free from defects in material and workmanship for twelve months from the date of purchase. If a defect covered by this warranty occurs during this warranty period, Tension Labs will repair the defective product or component, free of charge. The original purchaser is entitled to this warranty only if the date of purchase is registered at point of sale or the consumer can demonstrate, to Tension Labs' satisfaction, that the product was purchased within the last twelve months.

### Warranty Limitations

This warranty shall not apply if this product is modified or tampered with, is damaged by negligence, accident, unreasonable use, or by other causes unrelated to defective materials or workmanship, or has had the serial number altered, defaced or removed. Any applicable implied warranties or merchantability and fitness for a particular purpose, are hereby limited in duration to the warranty periods described above. In no event shall Tension Labs be liable for consequential or incidental damages resulting from the breach of any implied or express warranties. Some states do not allow limitations on how long an implied or warranty lasts or exclusion of consequential or incidental damages, so the above limitations may not apply to you.

This warranty gives you specific legal rights. You may also have other rights, which vary from state to state or province to province. This warranty is only valid in the United States and Canada.

## Warranty and Service

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### Service

Before returning a product for repair, please review the troubleshooting procedures found in this user guide and on the Tension Labs website: [www.tensionlabs.com](http://www.tensionlabs.com).

To obtain authorization to return a product for repair, please call Tension Labs at (847)348-1055. The product should be returned in the original packaging or packaged in a way to prevent damage in shipping. Tension Labs, Inc. will not be liable for any damage caused by shipping the product to Tension Labs. The product should be sent prepaid to:

**TENSION LABS INC. • SERVICE DEPARTMENT  
860 FREEMAN RD. • HOFFMAN ESTATES, IL 60192**

**For Your Protection** In the event of theft or loss of this product, please fill in the information listed below for your own personal records.

**Date of Purchase** \_\_\_\_\_

**Serial No.** \_\_\_\_\_

**Place of Purchase** \_\_\_\_\_

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