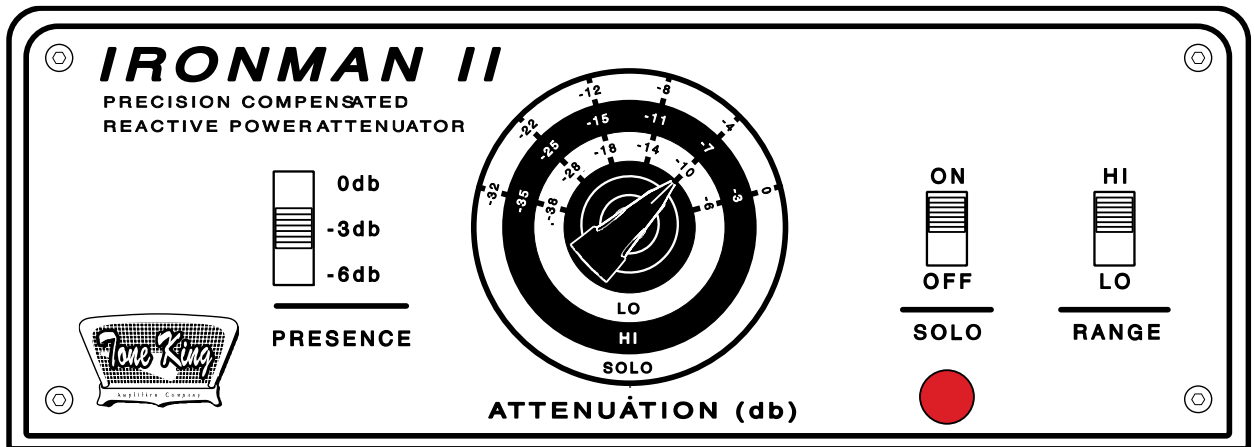


Tone King



IRONMAN II

**PRECISION COMPENSATED
REACTIVE POWER ATTENUATOR**

User's Manual

Note from the Builder

Thank you for choosing Tone King's Ironman II precision power attenuator. The Ironman II is a new generation of power attenuator, with a sophisticated design that preserves the tone and feel of your amplifier quite well, while reducing the volume level at the speakers.

There are two important components to the Ironman II design that make it unique and particularly effective - the tuned reactive load and the transformer coupled power division circuitry.

The idea was that the load seen by the amplifier should always have the appropriate complex impedance curve so that it responds as it does to a real speaker load. A real speaker load varies greatly with frequency. For example, the impedance of a typical "8 ohm" speaker may rise to 60 ohms or more at its resonant frequency (usually around 60-80Hz), and then rise again to many tens of ohms at high frequencies. An amplifier responds a lot differently when driving a complex load like this, compared to a simple resistive load (as is used in most attenuators). We developed the Ironman II's reactive load circuit by matching the results of impedance curve measurements we ran on an actual speaker in typical cabinet. The resulting design was then tweaked through empirical methods, to create a load circuit that is most effective at preserving the tone and feel of your amplifier.

The second part of the equation is the circuitry that divides the power from your amplifier between the speaker and the load. In other attenuators, this is often done with a resistor ladder. There are two problems with this approach - first, the resistor ladder itself can become part of the load, which means that the amplifier sees a simple resistive load. Second, in dividing the power this way, a voltage divider is effectively formed between the dividing network and the speaker. Since the speaker has a complex impedance that varies with frequency, the result is that the frequency response at the speaker is altered, usually dulling the top end, and muddying the sound.

The scheme we chose involves 100% transformer coupling, using a set of custom transformers, so that the connection between the amplifier to load, and between the amplifier to speaker, is purely transformer coupled at every step of the attenuation dial. This is an expensive and elaborate design (each step of the dial requires its own tap on one of the custom transformers) but is significantly more effective at preserving the tone and feel of your amplifier more than other methods.

In this new Iron Man II design, we added an analog speaker cabinet simulation for DI purposes (balanced XLR). Included is a level switch (line and microphone inputs), an option to select between speaker center or edge micing and a ground-lift to avoid ground loops in conjunction with other equipment.

Safety Instructions (Important!)

Please keep this instruction manual for future reference and for the duration of owning this Tone King product. Please carefully read and understand the instructions inside this user's manual before attempting to operate your new amp. This instruction manual includes essential safety information regarding the use and maintenance of the amplifier. Take special care to heed all warning symbols and signs inside this manual and those printed on the amplifier itself.



WARNING!

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THE AMPLIFIER TO WATER OR MOISTURE. DO NOT OPERATE NEAR ANY WATER SOURCE



WHAT'S THE MEANING OF THIS?

The lightning flash with an arrow triangular symbol is intended to alert the user to the presence of non-insulated "dangerous voltage" within the products enclosure, and may be of sufficient magnitude to constitute a risk of electric shock



WHAT'S THE MEANING OF THIS?

The exclamation point triangular symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the user manual accompanying this amplifier!

1. Read Instructions – All the safety and operating instructions should be read before this product is operated.
2. Retain Instructions – The safety and operating instructions should be retained for future reference.
3. Heed Warnings – All warnings on the amplifier and in the operating instructions should be adhered to.
4. Follow Instructions – All operating and use instructions should be followed.
5. Water and Moisture – The amplifier should not be used near water – for example, a bathtub, washbowl, kitchen sink, laundry tub, wet basement, or near a swimming pool, and the like.
6. Heat – Amplifier should be situated away from heat sources such as radiators, heat registers, stoves, or other amplifier (including amplifiers) that produce heat.
7. Power Sources – This product should be operated only from the type of power source indicated on the rating label.

If you are not sure of the type of power supply to your home, consult your product dealer or local power company.

8. Grounding or Polarization

– This product may be equipped with a polarized alternation-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.

9. Power-Cord Protection

– Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to the cord

in correspondence of plugs, convenience receptacles, and the point where they exit from the amplifier.

10. Cleaning – The amplifier should be cleaned only as recommended by the manufacturer. Clean by wiping with a cloth slightly damp with water. Avoid getting water inside the amplifier.

11. Non-use Periods – The power cord of the amplifier should be unplugged from the outlet when left unused for a long period of time.

12. Object and Liquid Entry

– Care should be taken so that objects do not fall, and liquids are not spilled into the enclosure through openings.

13. Damage Requiring Service

– The amplifier should be serviced by qualified service personnel when:

A. The power-supply cord or the plug has been damaged; or

B. Objects have fallen, or liquid has been spilled into the amplifier; or

C. The power attenuator has been exposed to rain; or

D. The power attenuator does not appear to operate normally or exhibits a marked change in performance; or

E. The power attenuator has been dropped, or the enclosure damaged.

F. The power attenuator needs tube replacement or biasing

14. Servicing – The user should not attempt any service to the power attenuator beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

15. Ventilation – Slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the product and to protect it from overheating, and these openings must not be blocked or covered.

16. Attachments – do not use attachments not recommended by the product manufacturer as they may cause hazards.

17. Accessories – Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious injury to a child or adult, and serious damage to the product. Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the product.

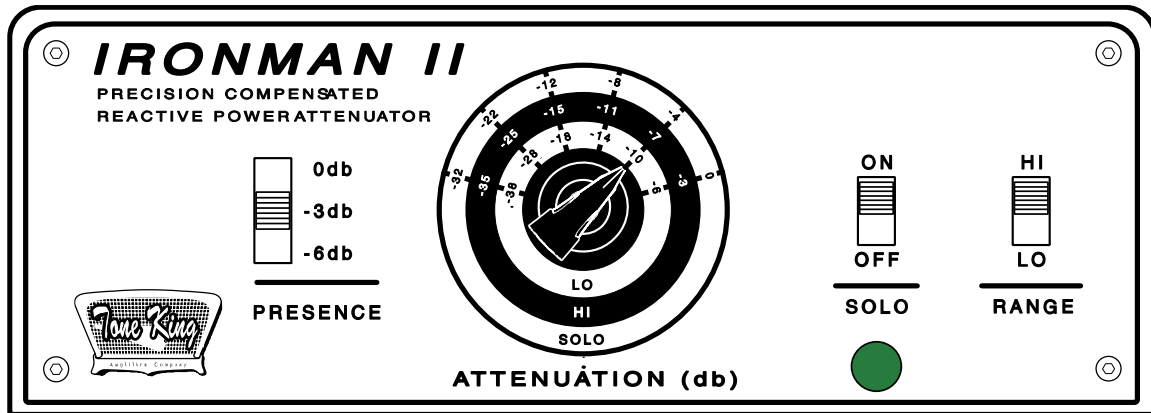
18. Lightning – For added protection for this product before a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet. This will prevent damage to the product due to lightning and power line surges.

19. Replacement Parts – When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.

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1. Front Panel Controls



Presence Switch

The Presence switch provides subtle control of brightness and compression. It allows you to tailor the response to match your acoustic environment, and to correct for an overly bright amplifier. Three settings are provided: 0db (brightest setting), -3db, and -6db (darkest setting).

Attenuate / Bypass Switch

There is no Bypass switch. The “Bypass” mode, which is in fact not called ‘bypass’ is the far right setting of the attenuation knob (0dB) in the Solo mode

This switch (see above) allows you to completely bypass the attenuator. In Attenuate mode, the attenuator is active, and in Bypass mode, the attenuator is disabled. Because of this, the impedance matching switches (on the back panel) have no effect in Bypass mode.

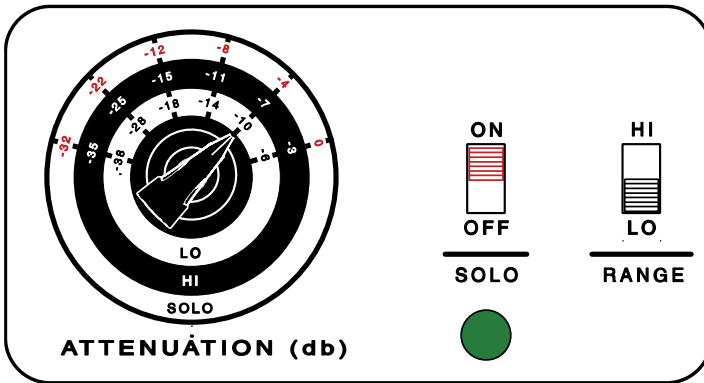
Important - do not toggle the Attenuate/Bypass switch while playing through your amplifier. Dampen the strings of the guitar while toggling this switch.

Attenuation Knob & Range Switch

The Attenuation knob determines the amount of power sent to the speaker. At 0db, the signal is not attenuated, and all the power from the amplifier is sent to the speaker. The maximum possible attenuation is -38db. At this setting, nearly all the power from the amplifier is dissipated in the Ironman II, and very little is sent to the speaker. At this setting, you can safely unplug the speaker, and use the Ironman II as a dummy load.

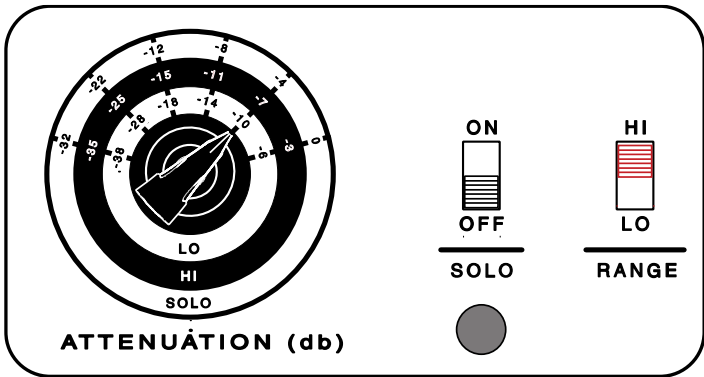
Important - do not adjust the Range or Attenuation controls while playing through your amplifier. Dampen the strings of the guitar while adjusting these controls.

You'll notice that the Attenuation dial is split into three ranges at the right side of the knob. The Range switch selects between these two ranges, as follows:



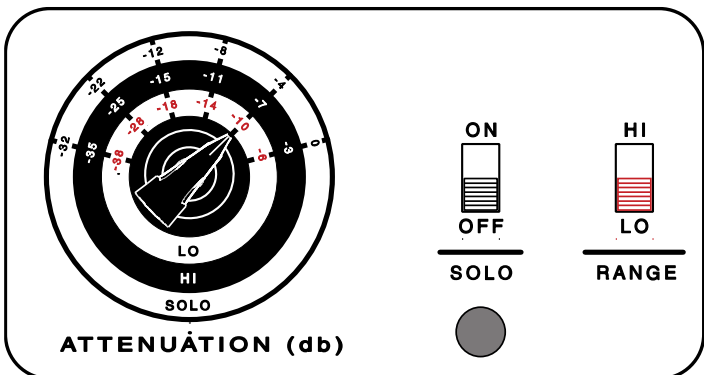
Solo Switch ON: 0-32db setting

The attenuation values shown at left in red are available when the Range switch is in the 0-32db position.



Range Switch HI: -3-35db setting (Solo Switch OFF)

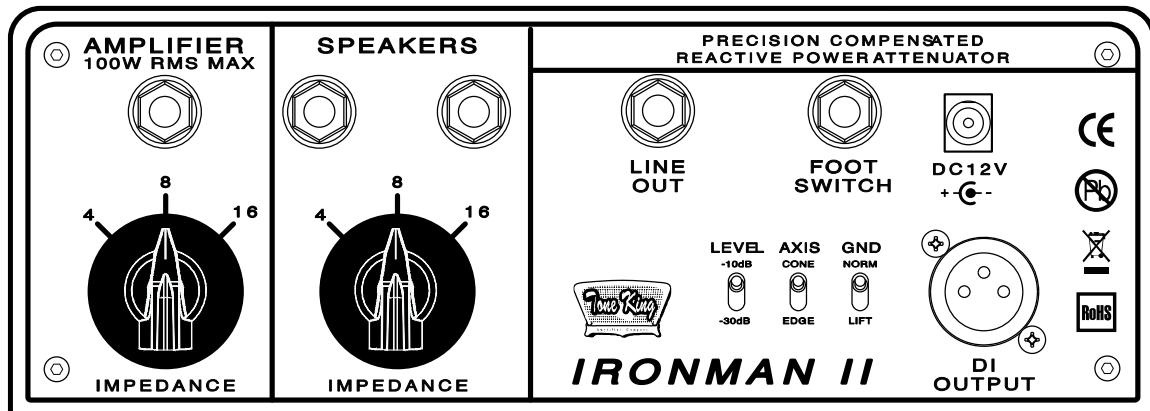
The attenuation values shown in red are available when the Range switch is in the -3-35db position.



Range Switch LO: -6-38db setting (Solo Switch OFF)

The attenuation values shown in red are available when the Range switch is in the -6-38db position.

2. Back Panel Controls



Amplifier Input

The amplifier should be connected to the Ironman II's Amplifier input with a standard 1/4" speaker cable. The Amplifier Impedance switch should be set to match the impedance of the amplifier.

For a proper Wattage matching set the Ironman II's Amplifier Impedance switch to match the impedance selected on your amplifier.

Speaker Connections

Two speaker jacks are provided for connecting speakers to the Ironman II. Both speaker jacks are wired in parallel. If you are only connecting one speaker to the Ironman II, you can use either jack.

The Speaker Impedance switch should be set to match the total combined impedance of the speaker(s) connected to the Ironman II. If you are connecting a single speaker to the Ironman, simply set the Speaker Impedance switch to match that speaker's impedance.

If you are connecting two speakers to the Ironman II, it is best to use two speakers with the same impedance. If you do this, then the total combined impedance will be 1/2 of each speaker's impedance. Here are a few examples of how to set the Ironman when using two speakers:

- If you are connecting TWO 8-ohm speakers to the Ironman II, using the two Speaker jacks provided, then you should set the Speaker Impedance switch to 4 Ohms.
- If you are connecting TWO 16-ohm speakers to the Ironman II, using the two Speaker jacks provided, then you should set the Speaker Impedance switch to 8 Ohms.

Foot Switch

Connect the provided footswitch to the "FOOTSWITCH" jack to toggle the Solo option on and off. According to page 3 the Solo function selects between the Solo and Lo/Hi range setting and therewith provides the possibility to play with 2 different volume levels. This is useful for giving the guitar that extra volume kick needed for a Solo to cut out in the mix, but it can also be handy to simply have 2 rhythm volume settings.

DC-12V

Connect the provided 12V (1.5A; 2.1mm; minus center) or any other power supply which meets this specs here.

Line Out

The Ironman II's Line-Out jack provides a line-level signal that can be used to drive another amplifier, mixing board, computer sound input, or any other line level input. The specs for this output signal are as follows:

- Output Level: approx. 0 - 1V p/p level controlled indirectly through the level of the amplifier
- Impedance: 10K Ohms
- Interface: Unbalanced, mono 1/4" connection

The adjustable level control allows you to control the level of the line-out signal. This is useful if the Line-Out is being used to drive another guitar amplifier, where you need to reduce the level to avoid overdriving the guitar amplifier.

The line-out signal is generated from the amplifier input and does not change as you vary the attenuation knob. The line-out signal will be present even when the attenuator is bypassed.

The line-out signal is a non speaker simulated output.

DI Output

In this new design Iron Man II design, we included a cab-simulated (OP amp driven) balanced XLR output. Comparing this analog circuit to some of the most intricate computer-based IRs, we achieved a great sounding output you can send to front of house or use in the studio. The XLR output includes a ground-lift, level, and center/edge of speaker cone simulation switches.

GROUND SWITCH: The ground lift switch lifts Pin 1 of the XLR output jack from the Iron Man's ground to avoid ground loops when connected to equipment such as an audio interface or mixing desk. Start with placing in LIFT position.

AXIS SWITCH: Simulates MIC placement on the center of the speaker or the cone/edge, whereas cone offers more top end than edge. Adjust to your liking.

LEVEL SWITCH: the level switch provides either -10 or -30dB for a proper level matching with an external audio interface or mixing desk.

3. Using the Ironman II

Purpose

The Ironman II precision attenuator allows you to reduce the volume level at the speaker(s) while allowing the amplifier to operate at full output power, for natural power tube overdrive and distortion. The Ironman II allows you to select the amount of the amplifier's output power that is sent to the speakers, with the rest of the power being dissipated within the Ironman II.

Impedance Matching

One unique feature of the Ironman II is its dual Impedance controls - one for the amplifier input, and one for the speaker output. These dual impedance controls allow you to match your speaker to your amplifier, even if the speaker impedance differs from the amplifiers' output impedance. You can even perform this matching without attenuating. To do this, simply set the attenuation knob to 0db, and make sure the Attenuate/Bypass switch is in the Attenuate setting. Then, set the Amplifier Impedance switch and the Speaker Impedance switch as appropriate to match the speaker to the amplifier.

Adjusting the Controls

When adjusting any of the front or back panel controls, it's best to dampen the strings of your guitar, so that no significant amount of signal is being generated by the amplifier.

Use as a Dummy Load

The Ironman II may be used as a dummy load, to provide a proper load for your amplifier, with no speakers attached. This is typically done in recording, where the Ironman II's Line-Out will be used to drive a mixing board, or when an amplifier is being "slaved" to a larger amp (with the Line-Out signal driving another amplifier).

Here's how to set the Ironman II when using it as a dummy load:

- Attenuation Control: -38db
- Solo Switch: OFF
- Range Switch: LO
- Amplifier Impedance Switch: set to match amplifier output impedance
- Speaker Impedance Switch: setting doesn't matter
- Nothing plugged into the Speaker jacks

What to Expect When Attenuating

Although the Ironman II attenuator does an excellent job of reducing output power without changing the tone of the amp's circuitry, there are other variables in play at lower volume which do result in some apparent tone change. Here are a few factors that you should be aware of:

Speaker breakup and compression is a big part of the tone and feel of the amp when played at high volume. At low power settings, the speaker responds differently, and does not break up and compress as it does at high power.

The ear's natural response curve varies at different volume levels, which changes the way you perceive sounds at different volume levels. Quieter sounds tend to give the impression of having less bass content.

At lower volume, there is a tendency to hit the guitar strings harder and play more aggressively than you would if the amp were tuned up very loud. It may take some time to get used to maintaining your playing style at reduced volume.

Tone King Limited Warranty

Tone King manufactures some of the world's most reliable hand-wired, all-tube amplifiers, speaker cabinets and power attenuators. Tone King takes great pride in an extremely thorough testing procedure which is implemented on each product prior to shipment. In the unlikely event that you have a problem with your Iron Man II, please refer to warranty below. Tone King stands behind our products like no other and we're here to help you!

Power Attenuators: Tone King offers a 5 Year limited warranty to the original purchaser that a Tone King power attenuator will be free from defects in material and workmanship. A dated sales receipt will establish coverage under this warranty, PLEASE KEEP YOUR PROOF OF PURCHASE TO USE YOUR WARRANTY.

This warranty does not cover service or parts to repair damage caused by accident, neglect, abuse, normal wear and tear, disaster, misuse, abuse, over-powering, negligence, inadequate packing or shipping procedures and service, repair or any modifications to the product which have not been authorized or approved by Tone King in writing. ANY MODIFICATION TO THE POWER ATTENUATOR WILL VOID YOUR WARRANTY. If this product is defective in materials or workmanship as warranted above, your sole remedy shall be repair or replacement by Tone King as provided below.

CAUTION: Do NOT attempt to repair, modify, or service your power attenuator by yourself!!! Please read the instruction manual for all safety notifications, warnings, and instructions. Tone King power attenuators, have extremely high voltages that can cause serious injury or death. Do not remove the chassis from the power attenuator. All repair and service work must be performed by Tone King or an authorized service center of Tone King. ANY UNAUTHORIZED REPAIRS WILL VOID YOUR WARRANTY.

RETURN PROCEDURES: In the unlikely event that a defect occurs, please call us at 323-277-4100. In most cases we can help you diagnose the problem over the phone. If a product must be sent to us, please follow the procedure outlined below.

- Defective products must be shipped, together with proof of purchase, freight pre-paid and insured to the Authorized Tone King Service Center or directly to Tone King.
- If a product must be returned to Tone King for warranty replacement/repair, a Return Authorization Number must be obtained from our Customer Service Department prior to shipping the product.
- Please contact Tone King Customer Service Department for the Authorized Tone King Service Center nearest you.
- Products must be shipped in their original packaging or its equivalent; in any case, the risk of loss or damage in transit is to be borne by the purchaser.
- The Return Authorization Number must appear in large print directly below the shipping address.
- Always include a brief description of the defect, along with your correct return address and telephone number.
- When calling to inquire about a returned product, always refer to the Return Authorization Number.

If Tone King determines that the unit was defective in materials or workmanship at any time during the warranty period, Tone King has the option of repairing or replacing the product at no additional charge, except as set forth below.

- All replaced parts become a property of Tone King. Products replaced or repaired under this warranty will be returned via ground shipping within the United

- States or Canada - freight prepaid.
- Tone King is not responsible for costs associated with expedited shipping, either to Tone King or the return of the product to the customer.

All warranty repairs outside the United States and Canada must be directed to the dealer or distributor from which you purchased the product.

INCIDENTAL OR CONSEQUENTIAL DAMAGE: In no event will Tone King be liable for any incidental or consequential damages arising out of the use or inability to use of any Tone King product, even if a Tone King dealer has been advised of the possibility of such damages, or any other claim by any other party. Some states do not allow the exclusion or limitation of consequential damages, so the above limitation and exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

FOR YOUR PROTECTION: Please complete the warranty registration online at www.toneking.com within (10) ten days of the date of purchase so that we may contact you directly in the event a safety notification issued in accordance with the 1972 Consumer Product Safety Act.

CUSTOMER SUPPORT: Our dedicated and friendly staff is ready to help you with any warranty or product questions you may have. Please call us at 323-277-4100 – Monday – Friday 9AM-4PM (Pacific Standard Time)

Thank you again for choosing Tone King and we look forward to a long relationship!



www.ToneKing.com