



***Conrad-Johnson Owner's Manual:  
TEA2 Phono Preamplifier***

**conrad-johnson** It just sounds right.

*Thank you* for selecting the conrad-johnson TEA2 triode equalization amplifier as the phono stage for your audio system. The TEA2 is capable of remarkably faithful recreation of the dynamics, textures, tonalities, and ambience of live musical performances. We believe that you will experience the excitement of discovery in hearing more from your favorite LPs than ever before.

At conrad-johnson, we expect our products to be a source of satisfaction and of pride to their owners for many years to come. Accordingly, circuit designs, parts and materials for all conrad-johnson products are selected with a view to maintaining optimal performance over the years. Our reputation for producing among the industry's most reliable components is a natural consequence of this engineering approach.

Please take a few minutes to read the manual to better understand the features and capabilities of your TEA2. Note that the TEA2 is available in two different versions – High Gain and Low Gain. See the first section of this manual, "The TEA2 Family of Phono Stages" for guidance in choosing the correct version for your application.

In closing, we'd like to welcome you to the family of conrad-johnson owners. We want you to enjoy your conrad-johnson product to the fullest. To this end, our staff stands ready to answer any questions you may have about the function and application of your TEA2, and to provide any needed service both during, and after the warranty period. Our goal is to heighten your enjoyment of recorded music.

## ***T***he TEA2 Family of Phono Stages

The TEA2 is available in High Gain and Low Gain versions. Both versions share a common circuit approach featuring a zero loop feedback circuit with passive RIAA equalization. Gain is provided by two single ended triode stages in both versions. Both use a pair of 12AX7s for the input stage (with the two triode sections connected in parallel to minimize noise). The high gain version uses a third 12AX7 for the second gain stage, while the low gain version uses a 12AU7. Because these tubes are quite different, the two versions also have different resistors associated with these tubes.

### ***Choosing the Correct TEA2 for Your Application***

With 55 dB of gain, the TEA2HG high gain version is well suited to cartridges with rated output of 1.0 mV (1000 micro Volts) or below. It is not recommended for use with higher output cartridges, as they may overload the circuits resulting in excessive distortion. For cartridges with rated output above 1.0 mV, choose the low gain TEA2LG (gain of 40 dB).

A TEA2 can be changed from HG to LG configuration and *vice versa* at the factory. The change will entail replacing resistors and the phono stage tubes. There will be a charge for parts, labor, and return shipping for this service.

## **L**imited Warranty For Conrad-Johnson Components

Conrad-Johnson Design, Inc. will provide service under warranty to the original owner on products sold new in the United States for the lesser period of three years from the date of purchase by the original purchaser, or five years from the date of shipment to the authorized conrad-johnson dealer. During the warranty period, conrad-johnson will repair defective units without charge for labor or parts (with the exception of vacuum tubes and batteries).

Exclusions. The following are not covered under this warranty:

- a) Units which have been damaged by misuse, abuse, or accident.
- b) Units which have been modified, altered, or improperly repaired by anyone not specifically authorized by conrad-johnson design, inc.
- c) Units not purchased from an authorized conrad-johnson dealer in the United States for use in the United States.
- d) Normal wear
- e) Incidental or consequential damages are not covered under this warranty. Some states do not allow the exclusion of incidental or consequential damages, so this exclusion may not apply to you.

Obtaining Warranty Service: To obtain warranty service, the unit must be shipped, along with evidence of purchase, in factory packing to conrad-johnson design (or designated service center) with freight and insurance prepaid by the owner. After repair, the unit will be returned with freight and insurance prepaid by conrad-johnson design to any destination in the United States.

All implied warranties, including merchantability and fitness for a particular purpose are limited in duration to the duration of this express warranty. Some states do not allow limitations on the duration of implied warranties so the above limitations may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Conrad-Johnson products purchased outside the United States are covered by warranty terms of the importing distributor in the country in which the product was originally purchased, which may differ from the terms set out herein. Importing distributors are not obligated to provide warranty service for products originally purchased outside their country. Conrad-Johnson will provide warranty service for products outside the United States, but in these cases, the customer must pay all shipping, handling and customs costs both to and from our Service Department.

Questions about this warranty should be addressed to:

Service Department  
conrad-johnson design, inc.  
2733 Merrilee Drive  
Fairfax, VA 22031

The conrad-johnson service department can also be reached by e-mail at [service@conradjohnson.com](mailto:service@conradjohnson.com), by phone at 703-698-8581, or by fax at 703-560-5360.

## ***Service***

If your conrad-johnson audio component requires service, repack it using the original box and packing material and ship to the Service Department address above. Boxes and packing materials can be purchased through our service department if you no longer have yours. Include with the unit a note describing the problem you are having in as much detail as possible. It is especially important for our technician to know if the problem is intermittent. If you want an estimate of cost for out of warranty service, be sure to request it in this note. Be aware that requesting an estimate will delay service to your unit, as we will have to contact you for approval before commencing service.

## ***Registering The Warranty***

Please return the enclosed card to the factory within 30 days of purchase to register the warranty.

# **I** *nstallation*

## **Set Up**

To maintain proper ventilation, mount the TEA2 horizontally on a flat, hard surface, and take care that the ventilation holes in the bottom are unobstructed. Allow at least two inches of clearance above the unit and keep the cabinet or shelf open at the back.

All TEA2s sold in the United States are configured for operation on a 60Hz ac power line producing between 108 and 126 volts. Export versions of the TEA2 will have the correct operating voltage and frequency clearly marked on the back panel of the unit, near the ac power cord. In all cases, the actual line voltage should be within +5/-10% of the nominal rated voltage.

## **Electromagnetic Interference (EMI)**

Considerable care has been taken in the design of the TEA2 to minimize its susceptibility to radio frequency interference and other forms of EMI. Choice of materials, physical layout, grounding practice, and power supply design have all been specified with a view to reducing the impact of electromagnetic fields on the performance of this unit. Our primary goal, however, is the accurate reproduction of recorded music in the normal home environment, and we have elected not to compromise this objective by the application of heavy-handed RFI filters. This approach has worked extremely well, resulting in few instances of EMI problems which can be treated locally as needed, rather than compromising performance in the 99.9% of installations where EMI is not a problem.

Care in installation can often avoid EMI induced problems. The following practices should generally be observed in any application, and will be especially important where EMI may be a problem.

Interconnect cables should be kept as short as possible (3 meters or less), and shielded cable should be used (cable which has two center conductors, and a separate external shield connected at only one end).

Physical location and cable "dress" can be an important factor in minimizing hum pickup. The installation should situate the TEA2 well away from the power amplifier, and power (ac mains) cords should be dressed to remain at least 4" (100mm) away from input/output cables.

# **C**onnection and control

## **Connections**

**Input:** Connect the cables from your tone-arm to these inputs. Note that the input impedance can be adjusted from 100 Ohms to 47 kOhms via dual-inline switches mounted on the pc board.

**OUTPUT:** Connect to a line-level input of your preamplifier, integrated amplifier, or receiver.

## **Controls**

**<power>:** Move the toggle switch labeled *power* to the up position to switch the phono preamplifier on. A time delay auto-muting circuit is incorporated into the TEA2 to suppress turn-on/turn-off transients. All outputs are grounded via relays for approximately 2 minutes after the unit is turned on in order to suppress warm-up transient noises. The muting relay also grounds the outputs immediately at turn-off or in the event of any power line interruption.

## Cartridge Loading

The TEA2 has provision for adjusting resistive loading on the input. Loading is adjusted by the settings on a pair (one for each channel) of dual-inline (DIP) switches mounted on the pc board near the input connectors. Be sure to unplug the unit from the ac mains before removing cover to access these switches. The switches are numbered from 1 to 4 with switch 1 being the left-most (viewed from the back). The TEA2 is delivered preset at the factory for an input impedance of 47 kOhms. Loading can be adjusted as follows:

### Cartridge Loading Settings on LOW GAIN Input

Resistive Load	switch #			
	1	2	3	4
47 kOhms	o	o	o	o
9.6 kOhms	x	o	o	o
1.9 kOhms	o	x	o	o
500 Ohms	o	o	x	o
400 Ohms	o	x	x	o
200 Ohms	o	o	o	x
130 Ohms	x	x	x	x

x indicates switch in "on" position

o indicates switch in "off" position

note: the off position is indicated by an arrow on the body of the switch array.

Be sure to use the same switch settings for both channels.

## **V**acuum Tube Replacement

The TEA2 circuit employs three twin-triode vacuum tubes – three type 12AX7 (V1, V2 and V3) for the TEA2HG and two 12AX7s (V1 and V2) and one 12AU7 (V3) for the TEA2LG. The brands of tubes we supply have been chosen by first selecting those brands which are known to be most reliable, then by extensive auditioning of these acceptable brands with the final choices being made solely on the basis of sonic performance. We know of no vacuum tubes available which will improve the sonic performance of your TEA2. The tubes in your preamplifier have been tempered by a controlled burn-in procedure that permits them to perform for a greatly extended period without sonic degradation, and then selected for minimum residual noise. Replacement tubes are prepared and selected in the same way. Therefore, we highly recommend that you purchase replacement tube sets from conrad-johnson design.

We anticipate tube life to accommodate two to three years of operation without degradation in normal use - if the preamplifier is switched off when not in use. If the preamplifier is left on at all times, tube life can be exhausted in a matter of a few months.

## **G**etting The Most From Your TEA2

In a system of commensurate high quality components, the conrad-johnson TEA2 offers an unparalleled level of sophistication and refinement in music reproduction. To get the best performance out of any audio system, there are a number of important details that must be attended to.

### **Absolute Phase**

Musical notes are heard through the ear's response to waves of alternating rise and fall of air pressure. Musical transients are almost exclusively positive: that is, the initial effect is a rise in pressure. The ear is capable of distinguishing these positive transients from the musically unnatural alternative of a negative transient (an initial fall in air pressure). In terms of your stereo system, these transients are created by your loudspeakers. If the speakers respond to musical transients by first moving out, they are creating a rise in pressure, and the system is said to be phase correct. If they respond by moving in, they create a fall in pressure and the system is said to be phase inverting. Each component in the stereo system either preserves the phase of the incoming signal, and is said to be phase correct, or inverts the phase and is said to be phase inverting. It is unimportant whether an individual component is phase correct or phase inverting, as long as the system as a whole is phase correct. This will be the case if the number of phase inversions is even (or zero).

The TEA2 is phase correct (non-inverting). If your system has an odd number of inversions then you must add one phase inversion. This is conveniently done by reversing the positive and negative connections to your speakers (be sure to reverse both channels). If you are not sure about the phase of every piece in your system, you can establish correct absolute phase by careful listening. When the system is in correct phase, transients will be noticeably cleaner and more sharply defined. The effect is especially apparent on plucked string sounds. A final warning - not all recordings are phase correct (including some "audiophile" recordings), so listen to several before concluding your investigation of absolute phase.

### **The Importance Of Wires**

Interconnect and speaker wires are an important element in your stereo system. Interconnects are available which will permit a ref-

erence quality system to blossom and fulfill its promise of musical reality. Others will strangle the system to the point where it becomes little better than average. To complicate matters, our experience suggests that the choice of interconnects will be system dependent - those that are top ranked on one system may be a poor choice for a different system. Consult your conrad-johnson dealer for recommendations for your specific system.

### ***Performance Tip***

Warm up the TEA2 before listening: The sonic performance of the TEA2 improves noticeably as the unit warms up. The midrange becomes more lucid, the highs smoother, and the soundstage expands. The warm up period can be expected to last about fifteen minutes.

**Questions:** If you have questions about the installation or function of your TEA2 do not hesitate to call Customer Service at (703) 698-8581.

# **S**pecifications

**Gain TEA2HG:** 55 dB  
**Gain TEA2LG:** 40 dB  
**Overload TEA2HG:** 50 mV  
**Overload TEA2LG:** 175 mV  
**Hum and Noise TEA2HG:** 80 dB below 10 mV input  
**Hum and Noise TEA2LG:** 80 dB below 10 mV input  
**Phase:** phase correct  
**Output Impedance:** below 200 ohms

## **Mechanical**

**Dimensions:** 13.625"D x 19"W x 3.625"H  
**Net Weight:** 14 lb net

## **Fuses**

The TEA2 power transformer is protected by a fuse located in a tray in the ac power inlet on the back of the chassis. To access the fuse, first unplug the unit from the wall outlet, then remove the ac power cord to reveal the pull out tray in the inlet. A failure of this fuse is a symptom of a more serious problem, and a competent service technician should be consulted. In no event should a fuse be replaced with a value or type different than that originally supplied. Correct fuse values are:

If configured for 100 or 120V:

F1 20 mm T400mA

If configured for 220 or 240V:

F1 20 mm T200mA