RAM 285

Reference Amplifier Model 285

OWNER'S MANUAL

Thank You!

"I personally wish to thank you for choosing my RAM 285 amplifier. It has truly been a labor of love, incorporating many of the sonic improvements I developed for the Silver Seven 900 and Crimson/Raven 350, as well as those from previous designs. Along with the help of my wonderful staff, we believe that we have created both a sonic masterpiece and an excellent value.

"It's time to start enjoying years of musical enjoyment! But first, please take the time to read through this brief manual to get the most from your RAM 285"

Bob Carver

Why we're so proud of the RAM 285!!!

The Reference Amplifier Model 285 represents the pinnacle of Hi fidelity performance achieved by vacuum tube amplification to date.

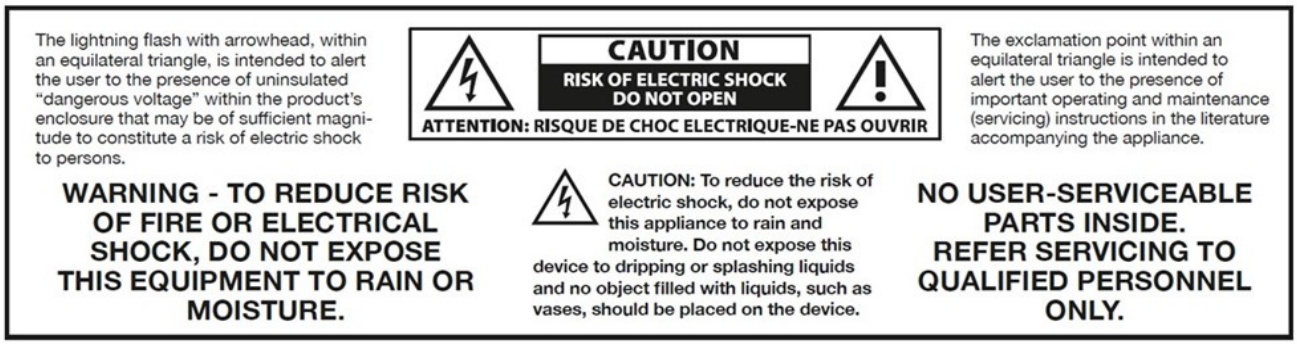
The RAM 285 is the accumulation of decades of research and development by physicist and world famous audio electronics designer Robert W. (Bob) Carver.

The DC Restorer Circuit, provides a dynamic bias supply, allowing for cooler operating temps and uncompromising vacuum tube performance. This design provides tube life of decades before degradation begins. The RAM 285 DC Restorer is the latest and fastest acting design using the 6AL5 vacuum tube diodes.

The 'listening to the room' current feedback loop, uses back EMF from the loudspeakers acting as microphones to sense the room. This processed information is fed back to the amplifiers input stage to provide consistent, realistic scale and soundstage details of the performance, in spite of less than perfect room shapes and acoustic characteristics of most listening locations.

Premium construction - The RAM 285 is an amplifier designed to last a life time and the component parts have been carefully selected for outstanding performance for the long haul.

We believe the RAM 285 is the finest in its class at any price. We look forward to hearing about your experience with this excitingly musical amplifier design. Enjoy!



IMPORTANT SAFETY INSTRUCTIONS! PLEASE READ THEM BEFORE OPERATING THIS EQUIPMENT.

1. Read these instructions.
2. Keep these instructions
3. Heed all warnings
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Install in accordance with the Bob Carver Company instructions.
8. Do not install in close proximity to heat sources such as radiators, heat registers, stoves, fireplaces, or other apparatus (including other amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the power amplifier.
11. Only use attachments/accessories specified by Bob Carver Company.
12. Use only with the cart, stand, tripod, bracket, or table recommended by Bob Carver Company. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. Do not expose this equipment to dripping or splashing liquids, and ensure that no objects filled with liquids, such as vases, are placed on the equipment.
16. To completely disconnect this equipment from the AC mains, disconnect the power supply cord plug from the AC receptacle.
17. The mains plug of the power supply cord shall remain readily operable.
18. Connect mains power supply cord only to a mains socket outlet with a protective grounding connection.
19. If possible, save the shipping carton that contained your RAM 285, as well as the individual tube boxes

Quick Start Guide

1. Locate the nine vacuum tube boxes, four large and five small.
2. Place the RAM according to the ventilation suggestions on page 5 of this manual.
3. Carefully insert the tubes into their sockets following the diagram at right and the further details on page 5 of this manual.
4. Connect the outputs of your preamplifier/DAC to the RCA inputs of the RAM 285. Make sure that the gain/volume control on your preamplifier/ DAC is turned down. See page 8 for more hook-up instructions.
5. Connect the output terminals of the RAM 285 to your loudspeakers. See page 8 for more details.
6. Connect the IEC power cable between the RAM 285 power socket and the wall receptacle.
7. Power up your preamplifier/DAC.
8. Flip the RAM 285 rear panel POWER switch to ON.
9. Rotate the power selector switch to the On position or go pass to the meter light position.
10. Wait two minutes for the tubes to warm up.
11. Activate your music source and slowly advance the volume control on your preamplifier/DAC.
12. Enjoy! If you don't hear any sound, turn off your preamp/DAC and RAM 285, and re-check your connections, or contact Bob Carver LLC at

Bob Carver LLC
4563 Hydraulic Rd. Rockford, IL 61109
email: Jim@bobcarvercorp.com

Placement and Cooling

Cool air is drawn from under the chassis by the heat from the tubes acting as an air pump, and exhausting the warm air out the chassis through the vents.

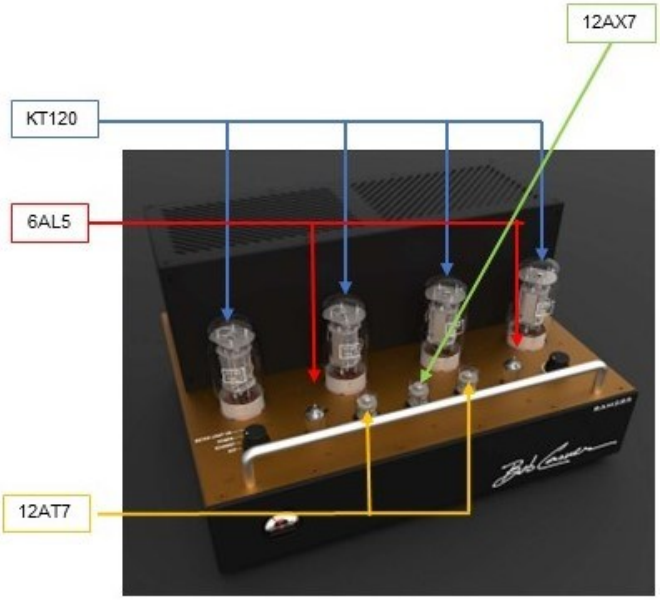
Place the amp on a hard surface. Do not place the amplifier on a carpet without something hard for it to sit on like a piece of nice glass cut to the same size as the unit. This will allow the feet to do their job by keeping the bottom raised, allowing unimpeded airflow.

A glass shop can make such a base plate and in colors if you wish. A nice dark gray, smoke or opaque black looks beautiful. It should be at least a half inch thick.

We also don't recommend placing the RAM 285 in a tightly-enclosed cabinet without sufficient ventilation. Allow at least 15 inches of free space above the amplifier

Inserting the Vacuum Tubes

The RAM 285 comes with five small and four large vacuum tubes: Two 6AL5, Two 12AT7's, one 12AX7, and four KT-120 output tubes. The tubes come installed in your RAM285.



To change tubes, press the tubes into the bases (sockets) gently so that you don't bend the pins. Note the missing pin on each of the small tubes and its alignment with the missing hole in each socket. A very slight wiggle while inserting the tube will help to engage the socket.

The bases for all five small tubes are identical, so take care to make sure that the 12AX7 is in the ***middle*** socket.

KT120 Tung-Sol in their infinite wisdom has configured their tubes black, central base hole to be slightly different than our conventional tube bases. Look carefully so that the "key", the raised portion of the tube's central base, is aligned with the "key way" on the tube socket. If you rotate the tube gently you will feel the tube drop-in when the key and keyway align.

Why we can offer a 5-year warranty on RAM 285 tubes

There is a meter on the front of the amplifier which can indicate the health of the tubes—get a bad reading, get free tubes!

As with our more expensive amplifiers, Bob employs his unique twist on a DC restorer circuit which has two main benefits —lower distortion without dissonant side effects and extended tube and amplifier life.

Our amplifiers simply do not run hot. Like their more expensive siblings, they are the coolest running tube type amplifiers ever, allowing you to actually touch the tops of the output tubes and never be burned!

The internal temperature of our amplifiers is a bit warmer than the inside of your mouth resulting in an extremely long lifespan.

Due to the unique design, all the components in the amplifier undergo much less stress than in conventional designs.

And, due to the efficiency of the concept, you may expect our amplifiers to outlive any other brand, and our extended warranties underscore that fact.

We warrant the RAM 285 for a **full five years**; that's the amplifier *and* the tubes! We love the fact that our finest competitors warrant their tubes for three months. It's all about economics. If your tubes tend to fail, limit the warranty. A manufacturer has no option; they must. Since our tubes last for years, it costs us nothing to be heroic.

Perhaps even more importantly, not only do the tubes no longer fail every two or three years, they do not degrade sonically as all tubes must when boiling away in every one of our competitors amplifiers — a truly remarkable accomplishment and typical for Bob Carver, Absolute Sound Magazine Hall of Fame designer.

General Operation

Bob has intentionally made the Ram 285 extremely simple to operate. Volume (gain) is determined by your preamplifier or DAC.

Tube biasing, using the top panel control, is optional and will be covered on page 10 of this manual.

That's all there is…except for connecting your sound source, loudspeakers and line cord.

Speaker Connections

It is very important to use speaker cables of the correct diameter in order to reduce power loss. It is not within the scope of this manual to discuss all of the esoteric cables available. #14 is suitable for 10 feet or less, for longer lengths #12 is preferred

The RAM 285 speaker terminals will accept spade lugs, banana plugs or bare wire.

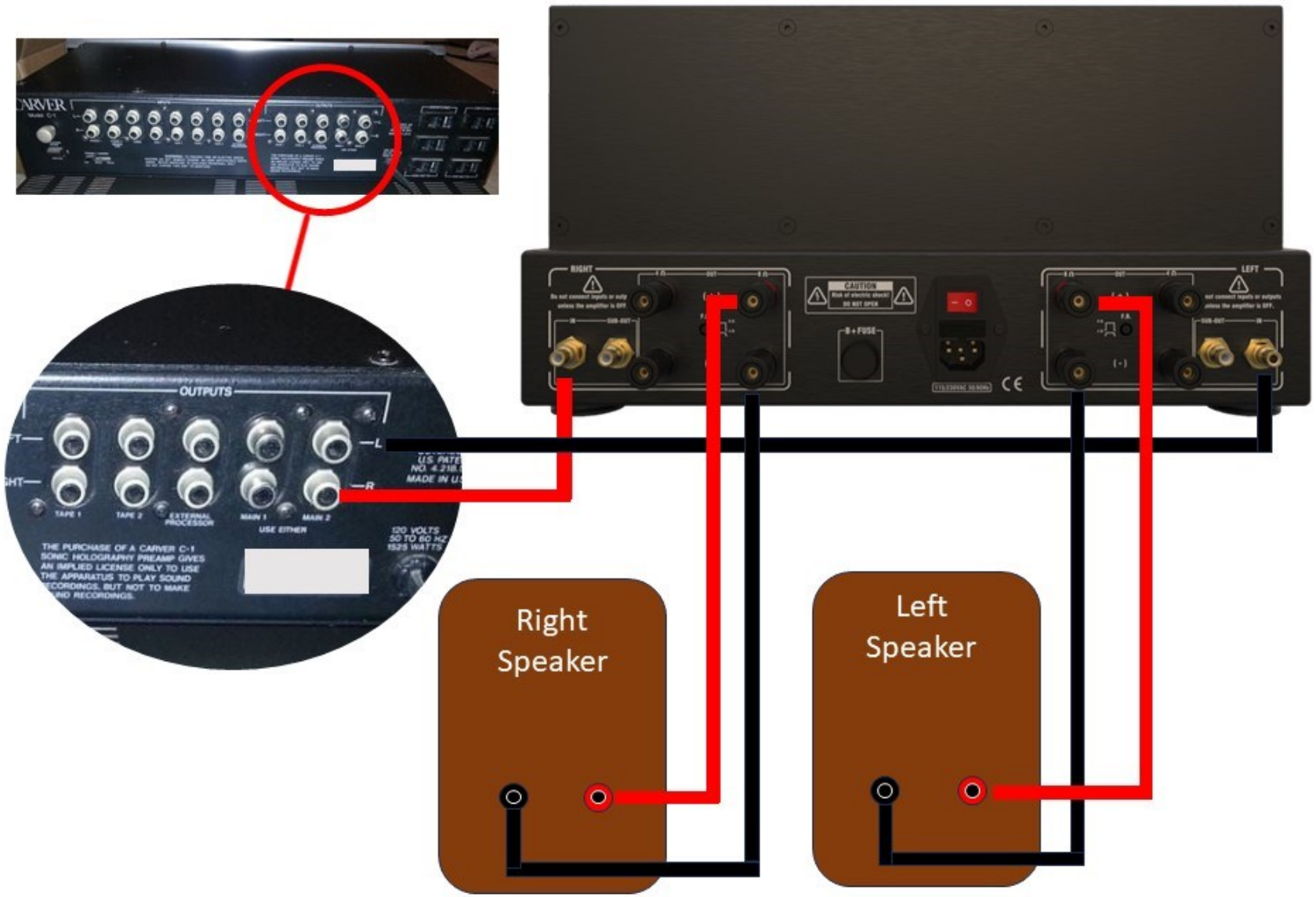
If using bare wire, remove half an inch of insulation and tightly twist the wire strands together. They may also be “tinned” with solder before insertion into the center hole in the speaker terminal.

From the rear view: There are two pairs of speaker binding post per channel. Use the pair marked 8 ohms for loudspeakers rated at 8 ohms or more. Use the pair marked 4 ohms for speakers rated at less than 8 ohms.

Feedback selection—Each channel has a feedback selector switch. Select the correct feedback position for the speaker impedance being used. When using 4 ohm loudspeakers the feedback buttons should be in the depressed position.

Sub Out—Two RCA subwoofer output jacks are provided. These jacks can be used to feed your subwoofer the variable level, full range output from your preamplifier. These jacks are buffered so driving your subwoofer presents no addition load to your preamplifier, while allowing shorter interconnect cables to reach your subwoofer.

See Illustration Next Page


OUTPUTS
L
R
TAPE 1
TAPE 2
EXTERNAL PROCESSOR
MAIN 1
MAIN 2
USE EITHER
THE PURCHASE OF A CARVER C-1 SONIC HOLOGRAPHY PREAMP GIVES AN IMPLIED LICENSE ONLY TO USE THE APPARATUS TO PLAY SOUND
RIGHT
LEFT
CAUTION
Right Speaker
Left Speaker

Input Connections

The red RCA-type input is for the right channel; black is for the left channel. As with speaker cables, you have many esoteric options as well as “conventional” connection cables. At the very least, use high quality RCA cables with gold plating and durable cable-to-plug connections. Cheap cables can fail and lead to frustrating trouble-shooting — who would ever suspect their connection cables?

Double-check that “left goes to left”, “right goes to right”, “plus (red) goes to plus (red)”, and minus (black) goes to minus (black)”.

Line Voltage

This amplifier may be configured for operation with 120 volts or 240 volts, 50 / 60 Hz. The changeover must be performed by qualified personnel. It is a standard switch setting under the bottom cover.

Fuses

The rear panel B+ fuse is 1000v 1A fast-blow type, and should be replaced with the same type and rating if it ever needs replacing. *Do not, under any circumstances, use a “slow-blow” fuse here.*

The main fuse is contained in a drawer just above the power cord socket and just below the main power switch. To open, remove the power cord and pull outward on the tab- from within the cord socket opening. This is a 250 volt 10 amp fast blow fuse. Use only the same rating and type.

Normally, a 1.0 ampere fuse will be perfect for music because the peak-to-average power ratio of speech and music is about 10:1. If you find that the 1.0 amp fuse blows with music, you may replace it with a 1.25 ampere fuse.

Power Switch

The main power switch is located on the rear panel. It is illuminated when in the on position.

Power Selector

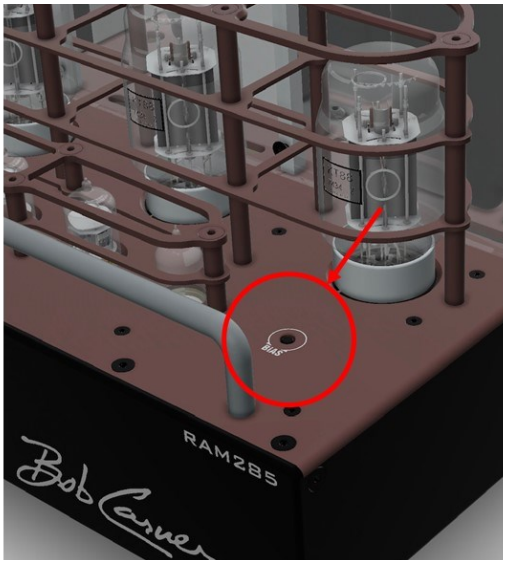
On the top panel left, you will find the 4 position power selector knob and a corresponding LED indicator light.

1) SLEEP — Red light. Main power is on, but high and low voltage power supplies are off.
2) STAND BY — Green light. High voltage remains off. Low voltage to tube filaments/ heaters are on. Tubes are warm and ready.
3) ON — Blue light. High voltage and low voltage supplies are on. Bias meter is active. Allow 2 minutes for the bias meter climb to normal and Enjoy!
4) LIGHT—Power meter light is on

Adjusting the Output Bias

The front panel incorporates a tube bias meter. IMPORTANT: Turn your preamp volume control all the way down while performing bias adjustments. Note: Playing music you will notice the bias meter bouncing dynamically, as the DC Restorer increases bias current in response to loads. This is normal. When the needle is bouncing, just reaching its travel limit indicates 25 watt or about 25% of the RAMs capability. At high output levels the bias meter may stay pegged the majority of the time. This is also normal.

Use a small flat screwdriver and adjust the BIAS control (located on the top right of the amplifier) for 100 mA, after the unit has warmed up for about 10 minutes. The normal range to use is from 60 mA to 120 mA, and changes here will vary the damping factor of the amplifier slightly. More current increases the damping factor, whereas less current provides a softer more tube-like sound. The design center is 100 mA, and that should be your starting point if you want to experiment. It will vary from speaker to speaker, and most importantly with your taste.



The meter reads the combined current for all four output tubes, and it is normal for this current to vary slightly with changes in power line voltage

Tube Substitution

The output tubes do not need to be matched, as the sound of the amp does not at all depend on matched output tubes. That's because the DC restorer circuit eliminates the need to match tubes. The only caveat here is that the output tubes should all be the same type and vintage.

Looking at the amplifier from the front, from left to right: the first tube is a 6AL5 followed by 12AT7, then a 12AX7 in the middle, and finally a second 12AT7 and the final 6AL5. The output tubes are KT120. Bias adjustment may be required when changing tubes.

Tube Troubleshooting

Once the idling current has been set, it will normally not need to be adjusted for several years unless you want to **a)** experiment for different sound; **b)** if you install different output tubes, or **c)** the amplifier suddenly starts to sound funny. If you hear a POP and see a flash, yet the amp continues to play, you should first check the current (bias meter) and then the output tube fuse.

If the fuse blows, the output current will drop to zero. First replace it WITHOUT replacing any tubes.

Turn the amp on and monitor the current. If it climbs to within the range you had set, and if the amp sounds good, all is well.

Often, an output tube has a speck of dust-like impurity, which comes into contact with an internal element, shorting the element, and is vaporized into gaseous oblivion. The getter, the mirror-like shiny plating on the inside of the tube does its job, absorbs the vaporized material and the tube is new again. All it takes is a new fuse.

If you install a new fuse and it blows again, you will need to determine which tube is the culprit.

Proceed as follows:

- Remove all output tubes and turn the preamp volume control all the way down.
- Turn the amp on and leave it on.
- While monitoring the current, put a pair of tubes into sockets Number One and Number Two. Allow one minute on the clock for the two tubes to warm up.
- If the current comes up to about half the normal amount, both those tubes are good.
- Remove those tubes and install another pair, also in sockets one and two. Continue on until a fuse blows, or the tubes won't bias up.
- Then buy or borrow a known good tube (remember, if it is actually bad, we'll pay for the replacement), and using it as a mate, use the process of elimination to figure out which of the tubes is bad by substituting the good tube. At this point, if you get lucky, only one trial will be needed. If you are not lucky, then it will take two trials.
- Now you can turn the amp off.

You will be able to install and remove the tubes with your bare fingers if you do it within about a minute or so of installing each fresh set. That's because it takes substantially longer than a minute for the tubes to get too hot to hold.

Matching Output Tubes

Matching output tubes is not necessary, thanks to the DC restorer.

New Amplifier Smell

Like a brand new car, this amplifier possesses a "new amplifier smell," even though it has been built from new parts. When powered up for the first time, the fresh paint and recent oils on the tubes will create a new, hot amp smell. I find it sort of pleasant, but you may not. It will dissipate with use, usually requiring about two weeks of normal operation.

Circuit Description

The input stage consists of a 12AX7 current sourced long-tailed class A amplifier, which is direct coupled to a long-tailed balanced pair comprised of a 12AT7. The 12AT7 drives the grids of the KT 120 output tubes through a pair of coupling capacitors that provide low frequency loop-gain stability. A vacuum tube diode DC restorer ensures that the bias voltage remains correct over the entire audio signal cycle.

The output tubes are arranged in push-pull parallel, four in all. The screen grids are operated at approximately 340 Volts provided by a separate power supply formed by one- half of a voltage doubler supplying the plates with 685 Volts.

The power supply consists of a large power transformer, with energy storage that is far greater than necessary. AC filament voltage is biased to approximately 60 volts. Multiple decoupling filter sections are used with load regulation obtained through constant current loading.

Bias voltage adjustment by a bias control, and bias current is measured by a meter that simultaneously senses current for all four output tubes. A tube fuse is mounted on the rear apron and provides protection for the output section in the event of a catastrophic vacuum tube failure.

Specifications

Gain	29 dB
Power	More that 85 Watts Per Channel, both channels driven at eight ohms 20KHz to 20Hz, with no more than .5% Total Harmonic Distortion. Distortion decreases at lower levels
4Ω Power	85 watts 20Khz to 20Hz. 120w @ 1KHz
8Ω Power	85 watts 20Khz to 20Kz. 120w @ 1KHz
16Ω Power	85 watts
Noise	Better than 97 dB below 85 watts, A-weighted
Frequency Response	+ -1dB from 20 Hz to 20 kHz at full rated power.
Distortion	Less than .5%
Source Impedance	1.7 ohms
Input Impedance	100 kΩ
Vacuum Tubes	4- KT120, 1-12AX7, 2 -12AT7, 2 - 6AL5
AC Power	120 Volts, 60 Hz (US) 240 Volts, 50 Hz (EU)
Weight	59 lbs
Color	Satin black, Copper, Chrome
Country of Origin	Designed, tested, serviced in USA. Assembled in China from globally sourced parts.

BOB CARVER COMPANY LIMITED WARRANTY

Bob Carver Company's Ram 285 is covered by a five (5)-Year Limited Warranty on parts and vacuum tubes. This Limited Warranty initiates from the date of purchase, and is limited to the original purchaser, or in the case of demonstration equipment, limited to the balance of warranty remaining.

CONDITIONS

This Warranty is subject to the following conditions and limitations. Only new products purchased through Bob Carver Company are eligible for warranty coverage. The Warranty is void and inapplicable if the product has been used or handled other than in accordance with the instructions in the owner's manual, abused, or misused, damaged by accident or neglect or in being transported, or the defect is due to the product being repaired or tampered with by anyone other than Bob Carver Company or an authorized Bob Carver Company repair center. The product must be packed and returned to Bob Carver Company by the customer at his or her sole expense — only after obtaining a Return Authorization approval. Bob Carver Company will pay return freight of its choice.

A RETURNED PRODUCT MUST BE ACCOMPANIED BY A WRITTEN DESCRIPTION OF THE DEFECT AND A PHOTO-COPY OF THE ORIGINAL PURCHASE RECEIPT.

This receipt must clearly list model and serial number, the date of purchase, the name and address of the purchaser and authorized dealer and the price paid by the purchaser. Bob Carver Company reserves the right to modify the design of any product without obligation to purchasers of previously manufactured products and to change the prices or specifications of any product without notice or obligation to any person.

REMEDY

In the event the above product fails to meet the above Warranty and the above conditions have been met, the purchaser's primary remedy under this Limited Warranty shall be to return the product to Bob Carver Company. The owner should directly contract Bob Carver Company and obtain a Return Authorization approval. Then the defect will be rectified without charge for parts or labor, including vacuum tubes during the 5-year Warranty period.

Warranty is Non-transferable

This Warranty is non-transferable from the original purchaser of the product, due to the inherent risk to electronics during shipping between owners.

DURATION OF WARRANTY

This Warranty expires on the fifth anniversary of the date of purchase .

VACUUM TUBES

Vacuum tubes are warranted for five years from the date of purchase.

MISCELLANEOUS

ANY IMPLIED WARRANTIES RELATING TO THE ABOVE PRODUCT SHALL BE LIMITED TO THE DURATION OF THIS WARRANTY. THE WARRANTY DOES NOT EXTEND TO ANY INCIDENTAL OR CONSEQUENTIAL COSTS OR DAMAGES TO THE PURCHASER.

Some states do not allow limitations on how long an implied warranty lasts or an exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions 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.

This warranty does not cover claims for damage due to abuse, neglect, alteration, or attempted repair by unauthorized personnel and is limited to failures arising during normal use that are due to defects in material or workmanship in the product. Any implied warranties, including implied warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this limited warranty. Bob Carver Company does not warrant compatibility of its products with future operating systems and / or hardware of other manufacturers.

WARRANTOR

Inquiries regarding the above Limited Warranty may be sent to the following address:

Bob Carver, LLC
4563 Hydraulic Rd.
Rockford, IL 61109
ATTN: Customer Service

Rev. B 12/21/23