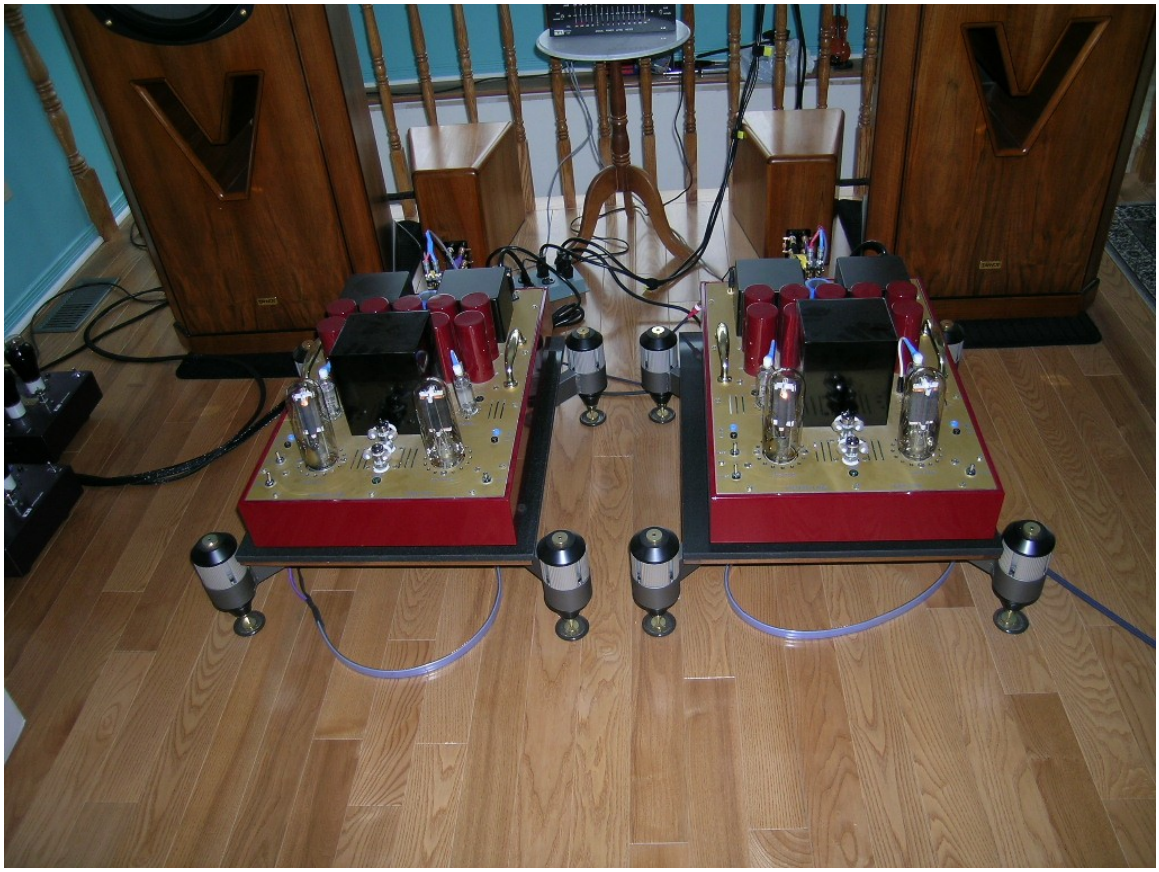
WYETECH LABS

Owner's Manual

Ruby XP 211

Reference single ended triode (SET)
monoblock amplifier



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Introduction

The Ruby series of products is a culmination of my experience and knowledge gathered over the last 20 years resulting from my insatiable desire to reach as close to perfection as possible.

For our reference products we want the best possible components that can be obtained at a worthwhile price. So don't expect us to use, as an example, pure gold wiring, even though we know that it is indestructible, because it's price performance does not fit our objectives.

The second very important thing to understand is that using the best parts that money can buy does not guarantee good sound. You must first start with an exceptional circuit and power supply design that will allow as close to perfection of sound as possible.

Installation

Unpacking

1. Remove top cover foam from box.
2. Grab the Ruby monoblock by the two brass handles and pull out from box
3. Leave remaining foam in place to facilitate repackaging if necessary.
4. Place the top foam back in container and save the packaging.
5. Follow these procedures in reverse order if you need to ship this unit.

Installing The Tubes

9-pin 5687WB & 12B4A tubes

Line up the tube pins to the socket and gently push while slightly rocking in a circular fashion until fully seated (pins are no longer visible). Note: these sockets are very tight and take considerably pressure to insert. You must be very careful so as not to bend the pins or crack the glass. If pins get bent you must straighten using needle nose pliers.

211 Output tubes

The 211 tubes use a four pin socket. Place the pins over the sockets. Wiggle slightly until you feel the pins mating properly. Then place pressure on top of tube and press straight down to seat.

Removing the tubes

Grab the tube from the bottom near the tube socket and gently wiggle & pull straight up to remove from socket. **DO NOT PULL ON THE GLASS ENVELOPE.**

Burn-in procedure for new output tubes

The tubes supplied with the unit will have already been tested in a system for at least 10 to 20 hours. Things will improve over time and should reach nominal performance level after about 200 hours. On power up it will take about 15 minutes to reach optimum performance.

The LED blue meters monitor the bias voltage. The reading should be around 90-95 Volts DC (usable range 85V to 105 V).

If either leg of the 211 tubes go out of that range the red LED L & R fault light will come on suggesting that this tubes should be replaced. The left tube fault light is designated FL and the right tube is designated FR.

Warning

Do not use this amplifier in the presence of small children unless it is beyond their reach. They will cause burns to any hands that touch them when turned on!

Installing the AC Power Cable

An Analysis Plus 6 foot Power cable comes with each monoblock and is a 10 gage 600 Volts CL2 UL approved. This is a very well constructed cable quality engineered.

Place Power Switch in the "OFF" position. Plug in the power cord into the amp before inserting the AC plug in to the wall socket.

Power Up

To power up place MASTER power switch in the on position and then push the momentary RESET switch either forward or backward and hold that position for 3 seconds until you see the blue LED meters light up. At this point the automatic sequence begins and 30 seconds later the green LED [ready] turns on.

Output Load Impedance Selector Switches

These switches allow selection between 4, 8 and 16 ohm speakers. Using a lower setting than the rating of the speakers increases the damping factor which may increase the performance depending on the speaker being used. In general the best overall setting is usually what the speaker is rated for. To set the proper impedance you need to insure both switches are in their proper position. Each switch setting shows two possible impedance's. The numbers that match from both switch positions tell you what impedance is selected.

Periodic Maintenance

NOTE: A cloth made of soft cotton flannel is supplied with unit.

Cleaning The Surfaces

A soft lint free 100% cotton flannel should only be used to wipe off surfaces. For finger prints or grease use only a soft cloth with a mild liquid hand soap and water, followed by a dry soft cloth to dry.

Front end tubes (5687WB & 12B4A)

To remove tubes pull straight up while wiggling somewhat.

Output tubes (211)

To remove pull straight up while holding the tube from its base.

To install use a gentle push on top of tube should seat it firmly in place. If not you likely have not aligned the tube pins to the socket properly.

Input Power Selector Switch

Their is an internal AC input selector switch that can be set for 115/230 Volt 50/60 Hz operation. It will normally be set for 115 Volt 60 Hz at the factory. So if you are running on 230 Volt make sure you select the 230 V. Damage caused by incorrect setting will VOID THE WARRANTY. The switch is labeled in RED and will display the voltage it is set for in the window. To change setting use small flat screwdriver to operate slide.

Fuse Rating

Replace fuse with 5 amp AGC for 115 V operation or 2.5 Amp AGC for 230 Volt operation. Spare fuses are included with unit. If you have not received the correct values consult your dealer for replacement.

Circuit Description

Tube Complement

(per monoblock)

[1] 5687WB JAN NOS Phillips USA - voltage stage - T1

[1] 12B4A JAN NOS GE USA - DRIVER STAGE - T2

[2] Svetlana 6D22S high current high voltage rectifier - slow 30 second turn on.

[2] GE NOS VT4-C 211

Voltage Stage

This stage operates in pure class "A1" single ended plate loaded and automatic self-biasing circuitry.

Driver Stage

This stage also operates in pure class "A1" single ended plate loaded with automatic self-biasing circuitry. This stage operates with high bias current and high voltages needed to drive the output tubes and do so without driving the grids positive to insure no grid current drive is required. The AC signal is coupled to the 211 grids via 2 independent metalized high voltage, high capacitance Teflon signal capacitors with self healing ability and 1300 Volt DC rating.

211 Output Stage

Both 211 output tubes also operate in pure class "A1" single ended self-biased isolated circuitry and transformer coupled for 8 Ohm speaker output. Built with special custom output transformers from Alum Rock.

Other Features

Dual female jacks to monitor the bias of each tube. Use a Volt meter on 100 Volt range

A front mounted gain switch is used to select high and low gain as required.

The 211 filaments, which also act as the cathode for each triode, require isolated pure 10 volt DC power supplies. Each of the two supplies have a separate AC secondary winding connected to a full wave 25 Amp bridge rectifier followed by a 120,000uf filter capacitor to reduce the ripple below audibility.

Two 211's are used in parallel by tying the top plates of each to drive the primary of the output transformer. Each tube is independently self - biased.

We are using only pure capacitors and inductors to filter the dual high voltage power supplies. Because of this it took a large chassis with each monoblock measuring 16.5" x 24" to hold and accommodate the parts needed to implement this type of pure power supply.

The output transformer reacts to this configuration in such a way that it thinks it has only one tube with two times the power rating of one 211 driving it. Because of this the impedance ratio (5000 ohms) of the output transformer is halve of that required with only one tube.

A single 8 ohm output winding in the transformer was implemented to obtain the exact winding turns without any taps to maintain the most linear frequency output possible with one continuous copper winding.

A comparator circuit monitors each output tube. If the bias goes out of the acceptable range it turns on it's corresponding red LED fault light. In this case it's normally time to change this tube.

Power Supplies

Three Toroid power transformers are used in each monoblock with input AC power operation for 115V/230V 50-60 Hz selected via an internal toggle switch.

Separate DC power supply filtering provide total isolation between the INPUT and OUTPUT stages. This consist of a quadruple4 (pi) filter for the 500 Volt front end supply and a quintuple5 (pi) filter for the 1 Kilovolt output stage power supply.

Twin bridge rectifiers rated at 12,000 Volts DC and 0.55 Amps provide the needed voltage & current, that in turn feed the 6D22S [6Kv rating] rectifier tubes that enable the voltage to slowly ramp up due to the 30 second delayed filament.

The use of pure LC filter networks with 10 very large polypropylene in oil capacitors, 3 large polypropylene capacitors and six large chokes provide an unparalleled ripple reduction and purity of design unequaled in tube SET amplifiers.

Rectified, filtered and regulated 12 Volt DC provides the power for the input tube filaments of the 1st and 2nd stage. This provides a very low noise floor that allows a blacker background between notes.

Mechanical Construction

Extremely rugged all welded steel chassis with 4 mm aluminum top and bottom plates provide a solid firm structure by design. Think of a picture frame doubled up and back to back with the flat top and bottom pieces flush mounted and bolted with 28 stainless steel dress machine screws. This reduces any possibility of vibration induced aberrations affecting the operation of the amplifier tubes.

Top panels are CNC machined to a tolerance of 0.01mm (0.0004"). All components and parts are secured to the top panel via CNC threaded holes

Highly polished 6 inch solid brass handles allow for easy handling and accentuate the chassis styling.

Very high quality paint with primer coat and baked on finish to further enhance the beauty of the very symmetrical arrangement of parts.

A deep red & gold colour mix accentuates the cast aluminum satin black finish of the output & power transformers.

Gold plated machined brass holder with 3M rubber feet inserts accentuates the styling and allows proper air flow for the vents under the chassis

Teflon Gold plated machined brass tube pin connectors for 5687and 12B4A sockets for an absolute secure connection and lifetime reliability

Ceramic / Aluminum large 4 pin sockets for the 211 tubes and ceramic sockets for the high voltage 6D22S rectifier tubes.

Circuit Boards

The components are mounted on three printed circuit boards which are made from FR4 glass epoxy with double sided copper traces and plated through holes. Both sides have a protective green solder mask. A silkscreen is printed in white showing the component layout and parts value.

This PCB was designed manually with CAD program in house. It has enlarged power and signal line traces to attain the best analog integrity that automatic CAD routing circuit programs cannot attain.

The final assembly of parts to the PCB is done by hand soldering of all components, which is superior to automated flow-soldering techniques, by allowing more solder on each and every joint.

Wiring to the PCB is attached via screw down crimp terminals to allow for ease of repair or removal.

Auto Power Sequencing

A built in time-delay of about 30 seconds in the 6D22S rectifier tubes allows for a slow smooth increase in final DC voltages to eliminate any noise on power up and also provides extended tube life and proper power sequencing for stabilized circuitry on power up.

Power Switches

Two toggle switches are employed for powering up the unit. The MASTER switch enables the power and the momentary RESET switch engages the power relay to enable the automatic sequencing of operation until the green (ready) LED comes on after the initial time delay.

In case of AC electrical power failure during a storm or other event the unit stays powered down until the RESET switch is again enabled. To use the RESET power switch it is important to hold down the toggle for 3 seconds until you hear a relay turning on before disengaging the switch.

We employ a delayed DC power sequencing that maximizes tube life by preventing cathode emission deterioration.

Low frequency response has been greatly enhanced by using very large signal capacitors and wide bandwidth custom output transformers. These combined attributes reduce overall distortion at higher power levels and give an overall impression of a much more powerful amplifier than what the specifications would suggest.

Power Down Sequence

The master switch is used to power down the unit. On activation of this switch a fixed time delay occurs that drops power to the speaker mute relay thereby shorting the speaker output before dropping the power sequence relay thus ensuring silence on powering down.

Absolute Phase

Non-Inverting

Technical Specifications

Frequency Response	20 Hz to 24 KHz - +/- 0.5 dB
Input Impedance	28K Ohms
Gain	28.5 dB > 0.65 VRMS with 5687 tube
Gain	23.0 dB > 1.2 VRMS with 12B4A tube
Dynamic Headroom	music peaks up to 80 Watts
Absolute Phase	non-inverting
Power Output	36 Watts RMS
Universal Voltage Select	115/230 Volts 50/60 Hz
Power Consumption	385 Watts - 510 VA - each monoblock
Weight (Net):	2 x 80 lbs. (36 kg)
Weight (Shipping):	2 x 90 lbs. (40 kg)
Dimensions:	16.5" W x 24" L x 10" H
	41.91 cm W x 60.96 cm L x 25.4 cm H

Limited Warranty

Components: 5 years parts & labor including front end tubes (5687WB & 12B4A)

Output tubes: 18 months or 2500 hours - whichever comes first

Wyetech Labs warrants to repair or replace any part which proves to be defective through normal use, except external finishes and vacuum tubes, for a period of 5 years from the date of purchase. For tubes see above specifications!