



**WYETECH
LABS**

Owner's Manual

Ruby XR 300B-XLS

Reference single ended triode (SET)
monoblock amplifier

(Serial number 20 and up)



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Installation

Unpacking

1. Remove top cover foam from box.
2. Grab the Ruby 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.

Output 300B tubes

The 300B tubes use a four pin socket consisting of two large and two smaller ones.

Place the 2 large pins over the large female sockets and the smaller pins over their corresponding smaller sockets. Wiggle slightly until you feel the pins mating properly. Then place pressure on top of tube and press straight down to seat.

Removing 300B 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.**

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 (300B XL-S)

To remove pull straight Up while holding the tube from it's white ceramic which encases the glass envelope.

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

There 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.

Introduction

The Ruby series of products is the culmination of my experience and knowledge gathered over the last 20 years as well as some new insights into circuitry that reduces overall noise levels to unprecedented levels resulting in heightened dynamics to accommodate the ongoing increase in resolution in analog and digital recordings.

Our goal with the Ruby XR monoblocks was to design the best SET amplifier around the most favoured output tube, namely the 300B Western Electric designed, that would be capable of having enough power to drive most speakers from the better high end speaker manufacturers. We also wanted it compatible with all present 300B tube manufacturers presently available to enable plug in and play with our self biased automatic circuits.

Our exclusive 300B gain stage circuit design, never before implemented in a tube output stage, has been the most important factor in bringing to fruition the most refined sound ever from a 300B type amplifier. The result is an output stage that has four times the gain of what a single 300B type tube is capable of. This newly developed output circuitry, having no precedent, raises the bar in state of the art development.

The fact that there are quite a variety of new 300B tubes being manufactured today gives the user a varied choice in selection and voicing of his system, including the EML 300B XLS and the KR 300B XLS with a filament current of 1.5 and 1.8 amps [standard 300B is 1.2 Amps]

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.

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.

[4] EMS 300B-XLS tubes with gold plated pins.

Voltage Stage

This stage operates in pure class "A1" single ended plate loaded with independent automatic biasing circuitry for each triode . Both triodes are wired in quasi parallel to take advantage of the 3 db noise reduction of this configuration.

We have also reduced the gain of this stage by a factor of four resulting in lowering the noise floor by an additional 12 dB.

This results in reducing the noise floor of this stage enormously by 15 dB.

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 four 300B output tubes and do so without driving the 300B grids positive to insure that no grid current drive is required. The AC signal is coupled to the 300B grids via 4 independent metalized high voltage, high capacitance Teflon signal capacitors with self healing capability.

300B Output Stage

All 4 output tubes also operate in pure class "A1" single ended self-biased isolated circuitry and transformer coupled output.

The 300B gain stage circuitry is exclusive, ground-breaking and unique, being only one of its kind ever to be implemented in a tube output stage.

Simply stated it is a serial - parallel single ended configuration that results in increasing the 300B stage gain by a factor of four, unprecedented and unique.

Two legs of two series connected 300B's are used in parallel by tying the top plates of each leg to drive the primary of the output transformer. The two bottom tubes of each leg is referenced to ground while the top tubes have floating biasing and signal drive.

The output transformer reacts to this configuration in such a way that it thinks it has only one tube with four times the power rating of one 300B driving it. In other words this stage uses the same ratio of primary to secondary in the output transformer as would be used in an amplifier with only one 300B output tube.

The current in each leg is displayed using LCD meters and monitored for proper operation. If the current goes above or below the designated operational range it will turn on it's corresponding red LED to tell you it's time to change this pair of tubes.

One of the advantages of this circuit is that it decreases the high voltage supply current by one half, thereby reducing the current requirements for the chokes in the power supply

Because each leg of both tubes have the same current flowing through them they each have equal bias voltage applied which ensures the tubes are working together in harmony to produce the best possible operating conditions and life expectancy for each pair.

The 300B filaments, which also act as the cathode for each triode, require isolated pure 5 volt power supplies. Each of the four supplies have a separate 7 volt AC secondary winding connected to a full wave rectifier followed by a 10,000uf filter capacitor and terminated using a solid state 5 volt regulator chip.

Other Features

Impedance settings of either 4, 8 or 16 ohms is selectable via two toggle switches located on top rear of each chassis.

Dual triple digit LED bias meters read up to 99.9 Volts using a blue readout for constant monitoring.

A LCD hour meter [99,999.9 hours] is now incorporated to keep track of usage, especially important with monitoring the life of output tubes.

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.

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 pair of tubes.

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. Satin black finish of the output transformer and dual power transformers covers to match.

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 tube sockets with machined brass gold plated tube pins for 5687, 12B4A and 300B tubes for an absolute secure connection and lifetime reliability .

Ceramic tube sockets for the high voltage 6D22S rectifier tubes.

Power ON Hour Meter - count to 99,999.9 hours

Dual bias voltage Meters with blue LED readout - 0 - 99.9 Volts DC

Circuit Boards

The components are mounted on three printed circuit boards [PCB] which is 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.

In addition a speaker muting circuit is engaged for 40 seconds on power up and 3 seconds before power down for dead silent operation.

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.

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

Impedance Matching

Triple impedance outputs for selecting which one of the three [4, 8, or 16] impedance's you require by the use of 2 toggle switches. Matching the numbers on both switches to select proper impedance. When the one switch is set to the 16 ohm position, it overrides the other switch [4 & 8 ohm]

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 Volts]

If either leg of the series connected 300B tubes go out of that range the red LED fault light will come on suggesting that these 2 tubes should be replaced. The left 2 tubes fault light is designated FL and the right series connected tubes is designated FR.

Technical Specifications

Frequency Response	20 Hz to 24 KHz
Input Impedance	50K Ohms
Gain	29.5 dB > 0.6 VRMS with 5687 tube
Gain	22.0 dB > 1.4 VRMS with 12B4A tube
Dynamic Headroom	music peaks up to 80 Watts
Absolute Phase	non-inverting
Power Output	38 Watts RMS
Universal Voltage Select	115/230 Volts 50/60 Hz
Power Consumption	385 Watts - 510 VA - each monoblock
Weight (Net):	2 x 68 lbs. (31 kg)
Weight (Shipping):	2 x 77 lbs.(35 kg)
Dimensions:	16.5" W x 24" L x 10" H