

IRVING
amplification

Blues and Jazz 35

Guitar Amplifier

User Manual

Important Safety Information

1. Valve circuits contain dangerously high voltages. Any servicing, modifications or repairs should only be undertaken by suitably qualified personnel. Dangerously high voltages may be present even when the amplifier is disconnected from the supply (due to charge stored in capacitors).
2. Do not operate in wet outdoor conditions.
3. Valve equipment operates at high temperatures. Do not leave the equipment unattended while it is powered on.
4. Do not allow liquids to be spilled on the equipment
5. If the rear-panel-mounted fuse blows, replace it with a 1A (slow-blow type). If the new fuse blows seek expert servicing – never bypass the fuse. (The fuse is there to prevent fire risk.)
6. The mains plug fuse should be a low rating (e.g. 3 Amps).
7. Always operate the equipment via a mains supply including a residual current device (RCD) rated at 30mA, or if the mains supply is not equipped with RCD include a residual current breaker adapter at the mains socket.
8. The amplifier has been independently safety-tested at the post-production stage. (See accompanying documentation.) Regular portable appliance testing (PAT) should be undertaken during the working lifetime of the amplifier.

Product Description

Blues and Jazz 35

- 35 Watt Combo amplifier, 1 x 12" speaker, open-back cabinet in black Levant with 'Bluesbreaker' grille cloth.
- UK hand-made Tayden speaker (Retro 55 – 16 Ohm)
- Controls: Gain, Bass, Middle, Treble, Volume
- single input jack, main switch, standby switch, fuse holder, indicator lamp
- Valves: 3 x ECC83 (JJ), 4 x EL84 (TAD), solid state rectification.
- Characteristics: optimised for a 'warm' clean sound, little pre-amp overdrive, very low background noise, Middle control is 'independent' of Treble and Bass, 8 Ohm and 16 Ohm speaker outputs, UK mains input.
- Technical: Parallel triode input stage is followed by the Middle and Gain controls, second stage is again parallel triode (giving a warm tone and reduced background noise), long tailed pair phase inverter, push-pull output stage (independent non-bypassed cathode-bias on push and pull sides), solid state rectification (to allow a large reservoir capacitor to further reduce background noise and hum).
- Applications: A very warm-sounding amplifier with good clean headroom, particularly suitable for Jazz or Blues. Low background noise makes it very suitable for recording. The relatively low gain and pedal-friendly input stage also makes this a great amplifier to use with a pedal board for other musical styles. In particular, a boost pedal can be used at the input to overdrive the preamp stages if more distortion is required.

The B & J 35 is a hand-wired, valve guitar amplifier producing 35Watts audio output. The output valves (4 x EL84) operate in Class AB push-pull, with cathode-bias and without global negative feedback. The output stage operates in pure Class A up to moderate output levels and moves into class AB when fully driven. The circuit is a unique design, developed in house. The design, together with the use of the highest quality components and meticulous build, ensures the best possible tone.

The amplifier has low noise and hum levels and is suited to professional recording studio applications, or use at home, but at the same time the 35W output, combined with highly efficient loudspeaker(s), is sufficient to compete with a loud drummer in a live performance. As a general rule, for larger venues, when the drums need to be miked-up then the amplifier would also need to be miked.

Operation

Please ensure that a loudspeaker, or loudspeakers, of suitable impedance (8 Ohms or 16 Ohms) are connected before attempting to play through the amplifier. Attempted operation without a loudspeaker may damage the output valves. The output of the amplifier is 35W continuous sine-wave. Power output can reach higher levels in overdrive conditions. We would therefore recommend a loudspeaker system rated at 50W or higher.

The amplifier is fitted with a standby-switch. There is still controversy among experts about whether these are necessary to increasing valve longevity. We would recommend switching mains power on and wait for about 15 seconds before switching standby on. For any intermission in playing switch standby off but leave power on (ready for a quick restart). At final shut down switch standby off and then switch power off (no delay required).

Valve Replacement

The lifetime of the valves depends on how often the amplifier is used and for how long. Musicians performing frequently, may feel the need to change at least the output valves every year or two. The output valves (EL84) usually need to be replaced more often than the pre-amp and phase-inverter valves (ECC83).

Typical symptoms that one or more valves need replacing are: loss of volume, unpleasant tone, crackling sounds, discolouration inside the valve, visible arcing (flashes) inside the valves, and excessive microphony (tapping an ECC83 may cause a 'ping' in the speaker – which is OK, but any loud ringing or acoustic feedback via the valve are problematic).

The USA designation 12AX7 is an exact equivalent of an ECC83 and can always be used. If less overdrive capability is required, it is fine to replace ECC83 valves with a lower-gain equivalent (e.g. 5751; ECC81, 12AT7; ECC82, 12AU7; etc.). Higher grade ECC83 equivalents, such as E83CC, may also be used. However, as the B & J 35 has relatively low overall gain, too much further gain reduction may result in not being able to fully drive the output stage. This would not lead to any technical problem but would mean that the full 35 Watt output might not be achieved.

The amplifier has a 'cathode-biased' output stage. This means that the amplifier establishes the bias voltage adaptively and the valves can be changed without any need for re-biasing. This means you can change the valves yourself (if you want to). Once the valve is cool, rock the valve gently in a circular motion while pulling it out of the valve socket (or when pushing the new one in). It is unlikely that the glass would break, but to be safe use a suitable protective glove.

Expert opinion varies on how important it is to use a selected (balanced) double triode (ECC83 or compatible) for the phase inverter (the ECC83 which is closest to the EL84s) and to use a matched output quartet of EL84 pentodes. Generally, some unbalance in either of these stages will result in slightly more distortion (increased even harmonics in particular) which some guitarists may actually prefer. (We are talking about the very subtle distortion here, not the big fuzzy kind.) Nevertheless, for the highest possible clean headroom, good balance is desirable. We would recommend obtaining

a matched quartet of EL84 valves and a selected (balanced triodes) ECC83 for the phase inverter if you wish, but do not be afraid to try unbalanced valves and see what you think of the sound. The valves are numbered in sequence from the first pre-amp valve (nearest the guitar input), so the four EL84 valves are V4, V5, V6 and V7. If you wish to replace just two of the EL84s with a matched pair, then the pair should be V4 and V7 (or V5 and V6). (In the push-pull configuration V4 and V5 are pushing, while V6 and V7 are pulling.)

Servicing

The amplifier can be serviced by any suitably qualified electronics technician with experience and knowledge of valve circuits.

New products from **IRVING amplification** include a free warranty for one year (parts and labour) excluding the valves (which are warranted for 90 days).

Test Results

Any electronic/electrical testing of the amplifier should only be performed by a suitable qualified person.

Post-production bench test results for the amplifier are provided in an accompanying document.

Results from similar tests during the lifetime of the amplifier will vary as the valves age and also with any (normal) variations in mains voltage. However, the test readings obtained should be within about 5% of the post-production test figures.

FAQs

Q1. What is the circuit configuration used in the 'B & J 35'?

A. The circuit configuration can be described stage-by-stage, as follows:

V1A/B - cathode-biased parallel triode gain stage, centre-biased, partially by-passed,
Middle control followed by Gain control with 'bright boost',

V2A/B - cathode-biased parallel triode gain stage, cooler bias, fully bypassed,
Bass, Treble and Master Volume controls,

V3A/B - Long Tail Pair phase inverter,

V4, V5, V6 and V7 - Class AB push-pull pentode quartet, cathode biased, independent bias on 'push' and 'pull' sides (no global negative feedback is applied)

Q2. Why do we want a 'Gain' and 'Master Volume' when there is not much pre-amp overdrive available?

A. With the 'Gain' set low and the 'Master' set high there is a brighter tone, with 'Gain' high and 'Master' low there is a warmer tone. Also, if a boost pedal is applied at the input, the 'Gain' can be set high to allow the pedal to overdrive the pre-amp.

Q3. Why does a simple circuit give the best tone?

A. Every time an analogue audio signal passes through a component or stage there is some loss of fidelity of the signal (e.g. the noise level may increase, the signal may be distorted, the equalisation or frequency response may be disturbed, or the dynamic range of the signal may be changed). Many guitarists may have tried passing a signal through a chain of effects pedals and will have noticed that the end result can be a severe loss of tone quality in the guitar signal (sometimes even when the pedals are switched out and even with 'true bypass'). This is one reason why many guitarists keep coming back to the sound produced by 'guitar + high quality cable + amp'.

The same phenomena can easily occur inside an amplifier, especially where channel switching and solid-state effects loop drivers, etc. are involved. Even in an all-valve amplifier, too many valve stages, extra 'tweak' switches and tone modifying circuits can slightly compromise the overall tone.

We keep the circuit as simple and uncompromising as possible. With use of high quality components and meticulous hand-wiring and with simple controls, we hope you will find the tone you are looking for.

Nevertheless, our amplifiers will benefit from the subtle use of studio-quality effects, such as digital reverb, and are also very 'pedal-friendly' for live performance.

Q4. What does 'pedal-friendly' actually mean?

An amplifier which sounds good, and does not misbehave, when various pedals are used at the input. Technically this implies: a sufficiently high input impedance (even when the pedal produces enough voltage boost to drive V1 into grid conduction), not too much gain in the pre-amp (otherwise things can start to sound like two distortion pedals in series – which can rapidly get out of control), a not too 'peaky' frequency response curve (so that subtle tones introduced by the pedal are not swamped).

Q5. Can 'hand-wired' give a better tone?

A. In any electronic circuit the spacing and orientation of components and connections causes additional capacitance and mutual inductance among the elements of the circuit. These effects are called 'parasitic' or 'stray' because they are generally not beneficial to the performance of the circuit. In valve circuits, stray capacitance can be particularly problematic – it can even cause an amplifier to oscillate. In a printed-circuit design, with components machine loaded, the designer has to be careful to avoid problems, but is limited in the spacing of the components and connections by the

two-dimensional nature of the PC-board. In a hand-wired amplifier, the components and wiring are generally more widely spaced (reducing stray capacitance) and a skilled designer/builder can adjust the orientation and spacing to good effect.

The beneficial effect of hand-wiring on sound quality is often noticeable at the higher and middle harmonic frequencies of the guitar tone, and is perceived as an 'authenticity' of tone – it sounds like you are hearing the guitar transparently through the amp. In other words you are hearing what your guitar actually sounds like. If you have spent a lot of money on a hand-made guitar, built using the highest quality wood and other components, does it make any sense to run it through a cheap mass-produced amplifier where the components, design and build have been chosen to minimise cost?

Q6. Are IRVING amps clones?

No, we design the circuits and component layouts ourselves. Some 'classic' circuit configurations are used of course, but we also introduce some unique elements and adopt some modern improvements where appropriate.

Q7. Will I be able to change the valves myself and would I need to re-bias.

A. Yes you can, and no bias adjustment is required. (See 'Valve Replacement' section above for further details.)

Q8. How long will an amplifier last and how often should it be serviced?

A. Our amplifiers are designed and built to give good service for many years. Valves do 'age' and will need to be replaced periodically. Other components should give good service for many years, even decades. All parts and labour are covered by the first year warranty. After the first year we would recommend that you should have the amplifier checked periodically by a qualified technician.

Q9. **IRVING amplification** is a small company – tell me more about it.

A. Yes, we are just a 'cottage industry'. Company founder Malcolm Irving is a fully qualified electronics engineer (B.Eng., Ph.D.) and amateur guitarist. After taking early-retirement from a Professorship in Electrical Engineering, he started the company to design and build classic vintage-style guitar amplifiers. Every amplifier we build is treated as an individual project (that is why this manual is accompanied by the specific test results for your particular amplifier). We keep a record of every amp we build and would like to keep in touch with the amplifier's owner over the long term. We are very customer-friendly. You can e-mail us at any time and we are always happy to answer questions about our products. See our website www.irvingamplification.co.uk for contact details.