



Boulder 866 Integrated Amplifier

Baby Boulder

Steven Stone

When I first moved to Boulder, Colorado, in 1991, one of the first people that J. Gordon Holt introduced me to was Jeff Nelson, the owner of Boulder Amplifiers and the chief designer. Gordon and I would, during the mid-Nineties, visit Jeff's listening room to "see how we did" with our freshly minted live recordings of the Boulder Philharmonic. Jeff had his electronics hooked up to big Westlake monitors in a well-damped room. It was the most revealing system that Gordon and I had access to in the Denver area. About the same time, I had a reference system consisting of a Boulder L5AE preamplifier and a pair of 500AE power amps. They were my references for several years, successfully mated with the original Apogee Full-Range and Dunlavy SC-VI loudspeakers.

When this first generation of Boulder electronics components was finally discontinued after a long successful run, I sold the L5AE and the 500AEs to make way for more current-production components. I had planned to eventually revisit Boulder's offerings, but as with many plans, it never happened as its gear soon became bigger and way beefier than my own personal comfort zone would accommodate. Reviewing a Boulder component remained a distant hope until the announcement of the new 866 integrated amplifier. With a price between \$13,450 and \$14,950 (depending on configuration) and a weight of only 54 pounds,

the 866 emerged as a new entry-level option from Boulder, replacing the 865, which was released in 2007. The question was whether this new "Baby Boulder" could deliver an even greater level of sonic satisfaction. Let's find out.

Tech Tour

Reading through the promo sheet that was sent along with the amplifier, it was immediately clear that the 866 is not a refresh of Boulder's 865. "Over a period of nearly two years, every aspect of the 866's build and manufacturing was analyzed. From the number of operations necessary to cut and finish the metalwork down to the very color of the circuit board masking, any detail that could reduce costs without reducing performance was sought

out. As a result, the equivalent all-analog version of the 866 is actually less expensive than the 865 integrated amplifier that it replaces." In this age of spiraling upward prices, that alone is special.

The 866 serves as proof that trickle-down technology is real. Beginning with the digital side, the 866 has inherited its systematic technology from Boulder's 2120 DAC. All streamed digital sources come in through a specially configured Raspberry Pi, where they are oversampled to 352.8kHz. Why 352.8? Because that is the maximum throughput available from the Pi's single data channel. From the Pi the signal goes to an ASRC (asynchronous sample-rate converter), which reclocks all incoming digital signals to the 866's own internal master clock. Data from the ASRC is transferred to the DAC itself via a differential connection that does not reference to ground (and thereby avoids noise issues associated with a system that has both digital and analog ground planes).

Electronics Focus Boulder 866 Integrated Amplifier

Specs & Pricing

Type: Integrated amplifier with built in DAC and network capabilities

Power output: 200Wpc into 8 ohms (RMS), 250Wpc into 8 ohms (peak)

Analog inputs: Three balanced XLR

Digital inputs: Ethernet, 4x USB, TosLink, AES/EBU

Input impedance: 100k ohms balanced

Dimensions: 16.7" x 17" x 7.25"

Weight: 54 lbs.

Price: \$13,450 without DAC and \$14,950 with built-in DAC (DAC board available for \$2300)

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The DAC output's current is then converted into voltage before being processed by a 3-pole analog Bessel filter.

The 866's volume control is digitally controlled analog, with a series of CMOS switches controlling the resistor-ladder attenuator. This scheme ensures extremely low distortion coupled with an absence of switching noise. All three analog inputs are balanced differential XLRs, and the signal path remains balanced up to the power amplifier, which is a single-ended-output design. Before the signal arrives at the Class AB power amplifier, it goes through input-selection relays and a buffer stage. One of the "secrets" of the 866's design (and that of other Boulder amplifiers) is that the power amplifier only needs to supply 10dB of gain because the circuitry ahead of the amplifier supplies such a robust signal. The analog signal chain can deliver a maximum gain of a whopping 40.4dB!

Although the 866 has a rated output of "only" 200 watts into 8 ohms, it can deliver 250 watts of peak power into 8 ohms and 700 watts peak into 2 ohms. The higher peak current is a result of the 866's sophisticated protection circuitry, which can detect a short then reset after a three-second delay, once the short is eliminated. This allows for a higher maximum output without risking damage to the power amplifier's circuitry.

Ergonomics

The 866 can be configured at the factory in two ways. The basic version is analog only, with three balanced XLR analog inputs. The digital version has a built-in DAC with SPDIF, TosLink, and AES/EBU inputs, as well as a Raspberry Pi/Ethernet streaming connection so it will support Roon, Tidal, Qobuz, and other streaming sources. The version sent to me for review was the digital version with full streaming capabilities. The only digital input the 866 lacks is USB. It has provisions for multiple USB drives to be attached, but not a USB-connected computer.

Setup was as simple as connecting a pair of Audience AU24

SX speaker cables to the 866's speaker outputs. As an external analog/digital source, I employed the GoldNote DS-10+. Hooking up a subwoofer would have been equally easy, except for the fact that the 866 lacks a line-level output, so that any subwoofer you intend to use with the 866 must have "high-level" or "speaker-level" inputs. For most audiophiles this will be no big deal, but for those like myself who have a JL Fathom subwoofer, which has no speaker-level inputs, a converter to go from speaker-level to line-level will be necessary. Fortunately, JL Audio makes just such a converter as part of its mobile audio line. I borrowed one from JL, and it worked fine. But it does not accept spade lugs or banana plugs, so I had to re-terminate some older cables to bare wire to make them fit.

During the time that I was waiting for the JL Audio high-level-to-line-level converter, I used the 866 purely as a power amplifier. How did I do this? It was easy. Any integrated amplifier can be used as a basic power amplifier—just turn it up to full, or nearly full output, and control the levels with a preamplifier connected to one of its inputs. To get the right balance with my two JL Audio Fathom f112 subwoofers, I set the Boulder's volume control to 97 (out of 100).

The 866 has two levels of turn-on activation. There's an on/off switch on the back, which, when switched on, can thereafter be disregarded, since the front panel has a second power button (as well as one on the remote) that will handle the day-to-day use. The reason for the double-switch system is that the 866 keeps some low-power

parts of its circuitry on continuously, even when the unit is switched "off" from the front panel. The difference in current draw is obvious: When the 866 is in standby mode, the top is cool to the touch; when the amp is operational, the top becomes quite warm.

I used the 866 connected via Ethernet and Wi-Fi in different setups. The Wi-Fi install was far more user-friendly than most I've experienced. It even worked on the first try! Wi-Fi install does involve mandatory use of Boulder's app, called appropriately the "Boulder App." After downloading it from the Apple Store (I use an OSX device), it guided me through the set-up steps. After installing the Wi-Fi internet connection, I used Roon for most of my listening, but since the 866 is UPnP-aware and discoverable, I could have used mControl, mConnect, or other UPnP applications if Roon were not available. On my primary desktop Mac, Audirvana also recognized and could send music files to the 866.

The 866 does not come with a dedicated remote. Boulder can supply one for a small additional charge. The reason for this is that most users will most likely use either Roon or the Boulder App via their smartphone or tablet to control the 866. The remote supplied was nothing fancy—not made from a solid billet of aluminum or festooned with zircon encrustations. It's merely a long black plastic rectangle hosting a complete set of control buttons. Some are redundant, such as two ways to adjust the volume. The red microphone button doesn't seem to do anything at all, and since it is a generic

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remote it may never do anything, but as Boulder expects to do regular software/firmware updates, who knows?

Using Roon as my primary source worked flawlessly except for one small glitch—if you pause a selection via the 866’s touch front panel, it will not begin to play again when you try to start it via Boulder’s front panel. It will flash play for a moment before reverting to pause. To get the 866 to play the current selection you must use a Roon Remote control to take it out of pause mode. [Boulder reports that a software update has corrected this problem. —RH]

The digital version of the 866 lacks one feature that you may require: a provision to play a USB digital file emanating from a computer. The 866 has USB connections, but they are intended for external drives, not for the USB signal output from a computer. That surprised me as USB DACs are so ubiquitous these days. However, for most 866 users this should not be a problem, since the 866 has an internal DAC to decode digital files sent via your network, so anything on your network is discoverable and playable. Since it’s on a removable circuit board, the 866 internal DAC can be replaced or updated when it gets long of tooth, in, say, five years.

When I inquired about the absence of a USB input on the digital version or of a line-level output for subwoofers that only take line-level signal, Boulder replied, “Since the 866 was designed to meet a price point... Each feature and connection does come with a price, so there were features/options we had to leave out to meet our goals. Doing market research and asking our dealers and distributors their opinions on essential features and connections are how we determined what the 866 would and would not have. Our biggest goal was to create something that was more obtainable to a wider audience without sacrificing performance or build-quality.”

Sound

The first time I heard the 866 was in Boulder’s own dedicated listening room, powering a pair of Focal Grande Utopia EM loudspeakers. On Glenn Gould’s justly famous final version of Bach’s *Goldberg Variations*, the system took a recording I know well and delivered a greater degree of space and separation between Gould’s piano and his vocalizations than I’ve heard through other

systems. This level of illumination of inner details without an artificial, thin, or overly analytical balance was special. The 866/Focal combination was relaxed and musical, while providing all the detail and resolution this pair of ears and brain could process. The listening session certainly cemented my desire to hear the Boulder in more familiar surroundings.

While I was waiting for a review sample, a friend and regular listening buddy purchased an analog version of 866 to be the centerpiece of his new Elac Concerto S 509 loudspeaker system. In his large, well-damped space, the 866 had no problem driving the Elacs to well past my upper volume limits. The combination was more than a little impressive. The system had a wonderful sense of calm. And while this room was not quite as quiet in terms of background noise levels (it was 3dB higher in noise level than Boulder’s listening room) the system’s silence when music was not playing was indicative of the lack of low-level noise in the 866. Even on especially busy musical selections, such as Bleacher’s “How Dare You Want More?” from *Live at Electric Ladyland*, the 866

never sounded stressed or confused—even at borderline ear-bleed SPLs. The 866’s ability to preserve all the subtle musical details with no homogenization or obscurations or micro-details made listening deep into the mix easy.

It took several months before Boulder could release an 866 into my hands. After the initial setup, where I replaced my main listening room amplifier, a Pass Labs 150.8, with the 866, my listening began. At first, I used the 866 strictly as a power amp, with the Gold Note DS-10+ as a DAC and preamplifier. My initial impression was that the 866 produced a level of sonic quality similar to that of the Pass, though there were definite differences between their two presentations. The Pass 150.8 had a slightly warmer harmonic balance, with a bit more energy in the upper bass and lower midrange. This could be attributed to damping-factor differences. Both amplifiers were equally quiet at idle, with only the slightest hiss when my ears were right next to the Spatial X-2 tweeters. Both amplifiers also produced extremely similar imaging and soundstaging perspectives. On my own live concert recordings, the players were in the same locations, which were spatially correct.

After several months in my main system, I moved the 866 to my nearfield desktop setup, where it replaced an LSA Warp One power amplifier and Tortuga Audio LDR 300x V3 passive preamplifier. I attached a Topping D90SE to the first of the 866’s analog inputs via Kimber KCAG XLR cabling. Loudspeakers were the Audience 1+1, ATC SC7 II, Sound Artist LS3/5A, and Omega Mini

Boulder 866 Integrated Amplifier **Electronic Focus**

Me monitors, connected via Audience AU24 X speaker cable. Finally, a Velodyne DD 10+ subwoofer was attached via its speaker-level connections. Replacing the LSA Warp One and Tortuga Audio LDR300X, but still employing the Topping D90Se, I noticed similar soundstage and spatial presentations, but the 866 had slightly a slightly more “meat and potatoes” sound that was harmonically more complex, with a sonic character I usually associate with a Class A power amplifier.

I was hoping to do a direct, real-time A/B between the digital section of the 866 and the Topping D90SE DAC using Roon’s “Group” function, which allows the same signal to be sent to more than one DAC, but the 866 always defaulted to its internal DAC, even when I selected the Topping from Roon’s pull-down menu of available DACs. So, I had to ungroup and resort to manually switching between the two sources. Going back and forth “old school,” which required changing input selection and DAC endpoints in Roon, took about 15 seconds to complete. Even so, I noticed far more similarities than differences. Soundstaging and inner detail were indistinguishable from each other. With their volume levels matched (part of the 15-second operation) I couldn’t identify any sonic tells that distinguished one DAC from the other.

One of my favorite often-played audiophile listening games is “What could be better?” Anyone can play, with any track of music. When I play this game using the 866 the answer has been invariably “There’s nothing I’m not getting, and maybe I should turn it up a bit more to make sure...” While the 866 sounds just fine when played at moderate volume levels, when the SPLs begin to peak at 95dB and above, the 866 really comes into its own and turns into the closest thing to a “straight wire with gain” that I’ve heard in the last decade.

Looking back on ancient listening notes from the days when the Boulder 500AE power amplifier was in my systems, I can see that the 866 shares certain design characteristics, especially as regards reliability and bullet-proof construction, but to my ears the 866 is more neutral and more musical. One could argue that back in the 500AE’s day the sources, both analog and digital, were the reason that the system sounded as it did, but without a 500AE to compare the 866 to this is pure surmising on my part.

Summary

The ergonomic beauty of the Boulder 866 is that with one chassis you can accomplish everything required (except transducers, a turntable system, and a couple of cables) to assemble a complete high-performance audio system. You can have a fully functional state-of-the-art audio system that does not entail large metal boxes on the floor tethered via cables to a phalanx of chassis on racks. For audiophiles with smaller rooms and space restrictions, the Boul-

der 866 has the capability to produce superb sonics in limited spaces at a level that can equal that of a multiplicity of separate boxes in a larger dedicated room.

If you’ve been a fan of Boulder’s sonics and build-quality but have been unable to field the space for their generously sized components, the new 866 could be the component of your dreams made into reality.

HARMONIC TECHNOLOGY

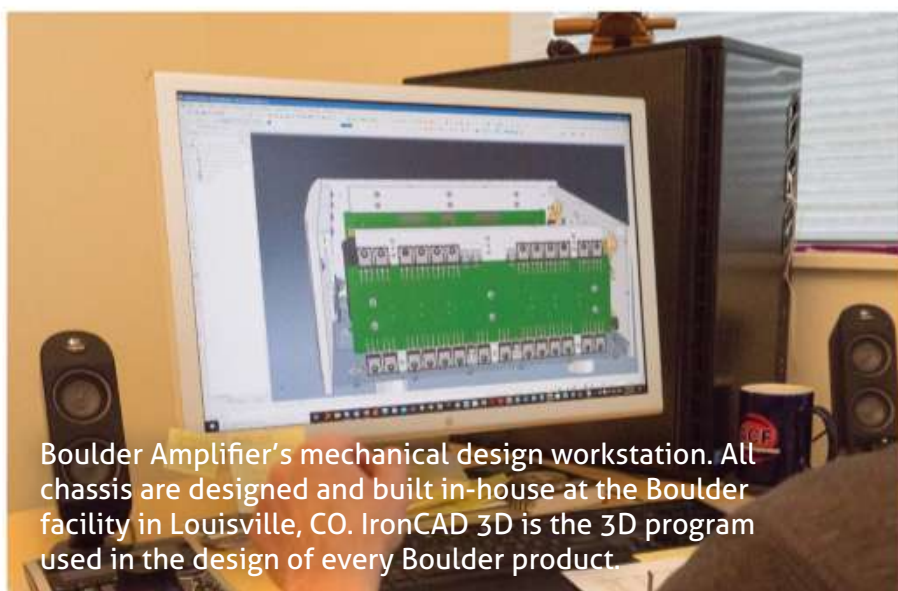
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Factory Tour

Boulder 866 Integrated Amplifier



Boulder Amplifier's mechanical design workstation. All chassis are designed and built in-house at the Boulder facility in Louisville, CO. IronCAD 3D is the 3D program used in the design of every Boulder product.

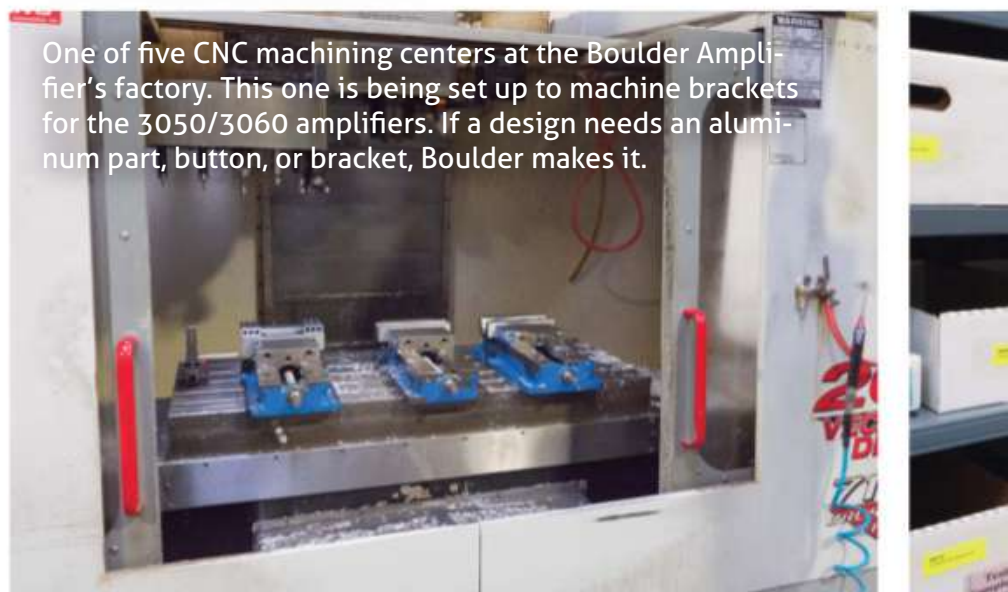
Steven Stone Visits the Boulder Factory

Steven Stone

The first time I set foot in a Boulder Amplifier "factory" it was in a large, rambling, soon-to-be-scheduled-for-demolition house in Louisville, Colorado. Since then, Boulder Amplifiers has had several factory locations, with the last one actually within the city limits of Boulder, Colorado. But six years ago Boulder founder Jeff Nelson decided that Boulder Amplifiers needed more space if it was to grow to the next level. He began developing a plan for an ambitious new facility that was realized in the Fall of 2016. Fortunately, the new space is large enough that Boulder was able to keep the facility fully operational during the pandemic, even with distancing precautions in place. On May 20, 2021, Boulder amplifiers had its first outside visitor in over a year. That would be me, serving as audiophile wingman for a friend. The new facility is as impressive as the amazing audio devices created within. What follows is a brief look into the place where Boulder products come to life. **tas**



A dedicated Boulder 866 Integrated assembly station. Each chassis is attached to its own movable platform, which makes assembly easier. This is where the first steps of a new batch of units occurs.



One of five CNC machining centers at the Boulder Amplifier's factory. This one is being set up to machine brackets for the 3050/3060 amplifiers. If a design needs an aluminum part, button, or bracket, Boulder makes it.



A 3050/3060 power transformer assembly. This assembly weighs over 100 pounds alone. It contains four custom American-made toroid transformers that are fully insulated and then potted in a special epoxy compound.



A Boulder 866 Integrated amplifier on a testing cart in the sound room for final listening tests. Boulder 3050 mono power amps and a 3060 Stereo power amp also shown.



Raw slabs of aluminum ready to be machined into amplifier bases for the 3050/3060.



A view of Boulder's inventory of assorted power transformers ready to be tested and placed into potted enclosures.



Shelves filled with parts.



Boulder's largest sound room, which is sonically isolated from the rest of the factory (28.5 dB SPL base level room noise as measured via an iPhone app), is used for listening to new units coming out of testing. Every single unit that Boulder builds gets auditioned in one of its sound rooms. This listening room was set up with Focal Grande Utopia speakers (\$280,000/pr.) driven by the Boulder 866 Integrated amplifier. Speaker cables from Westlake Audio.



812 DAC PREAMPLIFIER

Boulder



Headphone Amplifier:

New Boulder circuit uses a cascaded transistor array to drive a wide range of old and new headphones.



Roon Ready DAC:

Comprehensive set of formats, interfaces and streaming capabilities. Boulder app controls and customization.



Balanced Preamplifier:

Whether listening to the DAC or analog inputs, the 812 continues Boulder's time-proven design and sound.

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