

# An Entirely Subjective Review of The Parasound Halo A21 Two Channel Amplifier and the Parasound Halo A52+ Five Channel Amplifier



**Halo A21**



**Halo A52+**

## Published Specs and Features;

### Parasound Halo A21 – 2 Channel Amplifier

#### Features:

- Circuitry designed by legendary John Curl
- THX Ultra2 certified
- High bias Class A/AB operation
- Balanced inputs with discrete circuits and XLR connectors
- Direct Coupled - no capacitors or inductors in signal path
- Complementary MOSFET driver stage and JFET input stage
- 16 beta-matched 15 amp, 60 MHz bipolar output transistors
- 1.2 kVA encapsulated toroid power transformer with independent secondary windings for each channel
- 100,000  $\mu\text{F}$  power supply filter capacitance
- DC Servo and relay protection circuits
- AC present, channel status, high temperature indicators
- Heavy-duty 24k gold-plated 5-way speaker terminals
- Gold-plated RCA input jacks; ground lift switch
- Auto turn-on by 12v trigger or audio signal, 12v trigger out
- 4u Chassis, carry handles, rack mounting adapter included

#### Specifications:

##### Continuous power output:

250 watts RMS x 2, 20 Hz - 20 kHz, 8  $\Omega$ , all channels driven  
400 watts RMS x 2, 20 Hz - 20 kHz, 4  $\Omega$ , all channels driven  
750 watts RMS x 1, 20 Hz - 20 kHz, 8  $\Omega$  – Bridged Mono Mode

**Current capacity:** 60 amperes peak per channel

**Power bandwidth:** 5 Hz - 100 kHz, +0/-3 dB at 1 watt

**Total harmonic distortion:** < 0.2 % at full power

**IM distortion:** balanced 16 V rms < 0.04 %

**Slew rate:** > 130 V/ $\mu\text{second}$

**Dynamic headroom:** > 1.5 dB

##### Interchannel crosstalk:

> 80 dB at 1 kHz;

> 63 dB at 20 kHz

**Input sensitivity:** 1 V for 28.28 V, THX Reference Level

**Input impedance:** 33 k  $\Omega$  unbalanced; 66 k  $\Omega$  balanced

**S/N ratio:** 112 dB, input shorted, IHF A-weighted

**Damping factor:** > 1100 at 20 Hz

**Voltage:** 110V - 120V

**Dimensions:** 17-1/2" w x 7-5/8" h x 20" d, 7" h without feet

**Net weight:** 60 lb.

### Parasound A52+ - 5 Channel Amplifier

#### Features:

- 180 watts RMS x 5 @ 8  $\Omega$
- 255 watts RMS x 5 @ 4  $\Omega$
- 225 watts RMS x 2 @ 8  $\Omega$

- 350 watts RMS x 2 @ 4  $\Omega$
- Class A/AB circuitry designed by the legendary John Curl
- Direct coupled - no capacitors or inductors in audio path ensures the cleanest signal
- Balanced XLR inputs with discrete circuits
- Full power is rated all the way down to 5Hz for unrestricted low-end bass
- Custom 1.5 kVA encapsulated toroid power transformer with independent secondary windings for each channel
- Hand-matched JFETs for input stage
- Hand-matched MOSFETs for driver stage
- Beta-matched 15 amp, 60 MHz bipolar output transistors (3 pairs per channel)
- 100,000  $\mu$ F power supply filter capacitance
- DC Servo and relay protection circuits
- Auto turn on by audio signal or 12V trigger
- Heavy-duty 24k gold-plated, 5-way speaker terminals
- 3U chassis with updated cosmetics, rack mountable with HRA3 (sold separately)

**Specifications:**

**Power Output - All 5 Channels Driven**

180 watts x 5, 8  $\Omega$

255 watts x 5, 4  $\Omega$

**Power Output - 2 Channels Driven**

225 watts x 2, 8  $\Omega$

350 watts x 2, 4  $\Omega$

**Power measurements parameters with 120VAC**

0.05% THD, RMS continuous power,  
full audio band (20 Hz - 20 kHz)

**Current Capacity:** 45 amperes peak, per channel

**Dynamic Headroom:** >1.5dB

**Slew Rate** > 130 volts per microsecond

**Frequency Response**

5 Hz - 100 kHz, +0/-3 dB

20 Hz - 20 kHz, +0/-0.3 dB

**Total Harmonic Distortion (THD)**

< 0.05 % at full power

< 0.03 % at typical listening levels

**IM Distortion:** < 0.04 %

**TIM:** Unmeasurable

**Interchannel Crosstalk**

> 78 dB at 1 kHz

> 63 dB at 20 kHz

**Input Impedance**

Unbalanced: 47 k $\Omega$

Balanced: 94 k $\Omega$ , 47 k $\Omega$  per leg

**Input Sensitivity for 28.28 V Output into 8  $\Omega$**

Unbalanced: 1 V

Balanced: 1 V per leg

Total Gain: 29 dB

**S/N Ratio**

> 112 dB, input shorted, IHF A-weighted

> 102 dB, input shorted, unweighted

**Damping Factor:** > 1100 at 20 Hz

**DC Trigger Requirements:** +9 Vdc to +12 Vdc, 5 mA

**Audio Trigger Requirements:** 2 mV - 10 mV

**XLR Pin Identification**

1 = Ground (Shield)

2 = Positive

3 = Negative (Return)

**Dimensions:** Width: 17-1/4" (437 mm), Height without feet: 5-1/4" (133 mm), Height with feet: 5-7/8" (149 mm), Depth: 20" (508 mm), Depth with cables: 21-1/4" (540 mm)

**Net Weight:** 55 lb. (25 kg)

**Shipping Weight:** 69 lb. (31.3 kg)

**Power Requirements:** Standby: 1 Watt, Idle: 125 Watts, Maximum: 1500 Watts

This is a purely subjective review from the aspect that it is based entirely upon my subjective opinions garnered not through clinical measurements, but instead as determined by touching, feeling, and listening to, the product itself. Parasound has been in business long enough and has such a reputation that I will trust their published specifications as being the whole truth and nothing but the truth.

The two channel A21 has been reviewed many times since it's inception way back in 2003. What is that in "electronics years"? Somewhere around 150 I think! A proven product without a doubt!

I **usually** have a set goal in all of my upgrades and this time it was no different. The goal this time around was to elevate/improve the quality of the signal that I was sending to all my speakers and to, hopefully, provide an improvement in sound that I could hear and appreciate.

I have owned and evaluated many systems, and parts of systems, for myself, other folks and businesses over the years... from all-in-one record playing systems as a teen (60's), to modest home stereo systems (ah, the 70's!) for myself and as a "Hi-Fi salesman, to full blown 24 track recording studio systems (also the 70's ☺), to ever more elaborate and higher end systems in the 80's and 90's leading into the home theater systems of today.

A very brief experience history;

- 60's – Discovered music made a difference in my life :-)
- 70's – Graduated from electronics school – Worked in a color television factory as a technician (Admiral) - Ran sound for some local bands – Co-Owner/Operator 24 track recording studio (ANALOG BABY!) – **Worked in a "Hi-Fi" store** – Technician in the telecommunications industry (GTE)
- 80's – Technician, Manager telecommunications industry (NEC) – Manager Test, Repair, Manufacture of Electronic Typewriter and FAX machine Modular upgrades (EMI)
- 90's – 2002 – Manager of test and repair in industrial computer industry (DTI)
- 2000's - independent video acquisition and editing – IT and technology in Medical Academia (UTSW)
- 2014 – Retired from the University of Texas Southwestern Medical School

Throughout it all I have always kept my hand in the AV side of things by designing, buying and installing systems for myself, friends and other "clients".

#### **The changes that are driving my recent upgrade decisions include;**

**(2017) Marantz AV7703 Pre/Proc** -> Replacing an Integra DHC-9.9 (replacing Denon Receiver -> replacing Yamaha DSPA-3070 and so on :-)

**(2018) OPPO UDP-203** -> (replaced OPPO BDP-103-> replacing Pioneer Elite DVD player-> replacing an early Sony DVD, and so on...)

**(2018) Addition of ATMOS** using a Parasound ZoneMaster 450 and 4 Polk CS-6 Ceiling speakers

**(2017) JVC DLA-RS600U** Projector -> (Replaced my Panasonic PT-AE8000U – that replaced my Panasonic PT-AE700U and so on back through rear projection TV's and CRT's :-)

Having looked hard at my current system, and those upgrades done in the recent past, I plotted several new things on the upgrade path. One of those upgrades would be my Amps....

Very recently (October 2018), I made the decision to complete one of my planned upgrades to my existing amps. A Parasound NewClassic 2250 2 channel and a Parasound NewClassic 5250 5 channel were replaced with a Parasound Halo A21 and Parasound A52+ respectively. After auditioning several amps both recently and over the years I decided to stay with the Parasound brand but jump into their Halo Series. The reasons for this decision were based on several different factors;

1. Positive reviews by both leading audio reviewers and customers alike
2. Familiarity with the product and manufacturer
3. Actual time spent with the Parasound products in my own system (NC2250 and NC5250) and a friends system (Halo JC1 , A51, A21, ZoneMaster 650)
4. Circuit design by John Curl (look up his creds :-)
5. Complementary MOSFET driver stage and JFET input stage
6. 16 beta-matched 15 amp, 60 MHz bipolar output transistors
7. Class A – AB operation (first ten watts are Class A)

8. Direct coupled throughout
9. Very high current capabilities (60 amperes peak per channel)
10. Cosmetics and build quality
11. U.S. based company with a sterling reputation
12. Reasonably priced considering performance

While the Halo A21 is no longer in the line (leaving about the time I made my purchase), I received such a deal and incentive from my long time dealer that I still opted for the A21 even knowing it was being discontinued. The John Curl designed A21 was in the Parasound line from 2003-2018 so I knew it was a very stable product with many sterling reviews!!

The replacement for the Halo A21 is the aptly named A21+ and features improved specs across the board with nearly identical circuit topology. A side-by-side comparison of the innards show more similarity than differences.



Halo A21 Innards



Halo A21+ Innards

**The Halo A52+ (five Channel)** is a brand new model that is a lower wattage that sets just below the still current big five channel amp, the Halo A51 (the A52+, features 180 watts into 8 ohms per channel vs 250 watts per channel into 8 ohms on the A51). While this was a drop in power from my old NC 5250 I had judged this to be fine for the center and surround channels in my system with the gains in the sound QUALITY expected (hoped for).



The amps happened to arrive just after a rain storm and were delivered by UPS. I cringed as I opened the front door to see the UPS driver place them on his hand truck in the middle of the gutter swollen with the recent rain. Before I could run out and ask him to please not submerge my new amplifiers he had already tilted the hand truck back and was headed for the door. When they arrived on the threshold he was nice enough to lift them over and give them a push. One of the boxes was wet and had a tear in the sidewall. I asked him to make a note of that and told him it was electronic goods in the boxes. He made his note, collected my signature and departed.

I immediately opened the boxes to find they were only an external wrapper with another heavy duty box floating box on eight, closed cell foam, corner spacers. To my relief the water never got close to the interior boxes and neither internal box was touched or damaged in any way. *Side note....* The wet cardboard, of course, dried and the tear in the sidewall was made worse in my anxious mind than it really was :-)

Opening the inside boxes I found the amps packaged in the traditional fashion for heavy electronics sandwiched between two molded, closed cell, foam inserts. The amps themselves were wrapped in “no scratch” foam sheeting and enclosed in plastic bags. Accessories were in a separate cardboard box (power cord and 12V trigger cables) and tucked-in and resting in the top foam insert. All in all the packaging was well thought out and more than appropriate for the job at hand. Manuals were lying on top of the accessory boxes. I had also ordered the rack ears for the A52+ and they came in a separate box. The rack ears for the A21 were included and were in the accessories box.

I closed the boxes and one-by-one hauled them upstairs on my little baby hand truck to my media room. In anticipation of delivery I had already removed my older amps from the rack that morning so it was clear sailing onward....

The Parasound Halo line is available in both black or a very nice silver finish (with the exception of the BLACK ONLY A52+). I went with the black finish on the A21 as it fit in with everything else in my rack. I have seen plenty of the Halo in silver and I do admit that it is quite elegant and even beautiful. If in a music listening only environment I very well might have opted for the silver finish :-). The A52+ is the one Halo Model that is available ONLY in black.



Black Vs. Silver Finishes

Grunting, I pulled the A21 from the box (60lbs) and looked it over... The fit and finish were perfect...flawless. The curved aluminum front panel is imposing, but elegant and tasteful with only one button. The small backlite on-off button, two channel status LEDs, an over temperature LED, and a backlit Parasound logo top center are the only breaks in the front panel making it sleek and elegant.

The back panels of the amps are all business as well. Both amps feature Balanced (XLR) and unbalanced (RCA) inputs with a selection switch to optimize signal level for either.

Power on/off management in the form of three selections:

1. Manual – Using the front panel switch to turn the unit on and off
2. Auto Turn On – Amp will auto turn on or off with signal to the inputs (or lack of signal). There is a threshold adjustment for this option.
3. 12V Trigger – Trigger in and loop out for daisy-chaining triggers to other devices.

Three-Way Heavy-Duty Binding post for all speaker connections.

The A21 also features a Ground Lift switch and Level Controls and unbalanced Loop Out for both channels (missing from the A52+).

The A52+ has a master power switch on the rear panel not present on the A21. Both units are fused (power supply) on the rear panel as well.

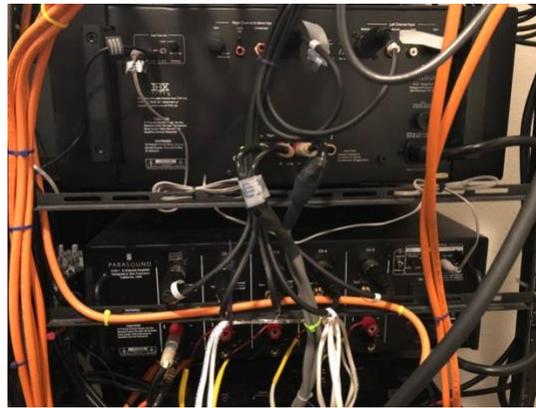


I had a plan (I usually do...for better or worse :-)) for mounting and connecting the amp. I would first remove the isolation feet included and set the amp on a “test platform” before attempting to rack mount it. My “test platform” consisted of an inverted 3U rack shelf installed in my rack about chest height (just below the area where the 3U NC 2250 was installed previous). This shelf provides enough depth and support to comfortably hold any amp and provide a stable platform for attaching the amp by the rack ears later... *Note: If you are using the inverted shelf method be sure to cover the metal shelf with a cloth that can slide with the amp and prevent any direct contact to the bottom of the amp to prevent scratching the finish.*

This amp is heavy at 60 lbs., so if you don’t have much upper body strength, and I don’t particularly, please note this should be a two person job. Not necessarily very heavy, but still, a large awkward piece. As I had, on occasion, moved my old amps including the slightly heavier NC5250 in and out of the rack without issue I felt superman enough that I thought I would just toss it up into its niche. So, I took a stab at it only to fail on the first try! I got it up there OK but it didn’t seem to fit my 19” rack. I set it back on the floor and measured the top of the amp and the rack opening to find that with this amp the clearance was only about 1/8” on each side of the protruding heatsinks! I boosted it back up and made sure that it was aligned perfectly and it slid right in.... Whew! Both amps do have sturdy handles on the BACK PANEL OF THE AMP to help with muscling it around and that certainly helps!

Once the Amp was safely resting on my “test platform” I connected the speakers, inputs and AC power (supplied power cord is a 14/3 standard IEC grounded power cable) and fired it up. The first indication that it was “live” was the soft blue glow around the front panel power switch increased in intensity (from the amp

standby lighting level) , the two channel status indicator LEDs lit in a soft blue, and the Parasound logo softly lit in red. Very classy and of sufficiently low intensity that it should not be an issue even in fully darkened rooms if your rack happens to be near the screen as mine is.



Background was dead silent with no input. I played a bit from a random disk and there was sound so I turned off the amp and moved on to actually rack mounting the A21. I usually isolate my equipment when rack mounting with rubber grommets and spacers or use a product called HumFrees to minimize the possibility of “rack hash” and ground loops and did the same with this install. In this case I used the HumFrees Rack Isolation Tabs and mounting went fine. When secured I removed the inverted shelf that I was using for support and proceeded to the install and quick test of the 3U A52+.

Unpacking the five channel Halo A52+ went much the same way and as the A21 with the same “fit and finish” impressions logged. There are very minor exceptions/differences with the cosmetics of the A52+. There is no backlite logo and the “creases” in the front panel are highlighted with a subtle red piping. Still very classy...

The Halo A52+ was installed with the same inverted shelf style “test platform” as I used with the Halo A21. I connected the center channel and side and rear surrounds and performed the same quick test as before (sound = working). I then proceeded to rack mount the A52+. Same Isolation technique using the HumFrees tabs was used.

I use the 12V triggering to turn my Amps on and off. I did try both the manual and the Auto On and those options work as the should on both amps

Upon turn on I noticed a bit of what I call “rack hash” on the center channel and surrounds. “Rack Hash” as I define it is a bit of 60Hz hum mixed with a higher frequency “Buzz” and a little even higher frequency “garbage”. I traced the noise back to two the two Yung subwoofer plate amps that I am using on my Earthquake Q10B Tactile Transducers. The Yung’s were meant as a quick fix when my Earthquake XJ-600 amplifier went belly-up but they worked well enough that I left them in the rack in lieu of repairing the much more expensive XJ-600 amp. The noise was low level and disappeared completely when I disconnected the inputs to the Yung amps, so that is exactly what I did, saving the Yung problem for another day.

### **Listening**

I had lived with my previous Parasound amps through almost eight years and three preamps so my “aural memory” of the amps was pretty well ingrained into my brain.

I devised a listening plan. That plan was to include mostly music in stereo with some in 5.1 surround sound (SACD and Blu-Ray Audio) thrown in for reference. For at least the first part of the listening experiment I would turn-off the subwoofers and run front Right/Left channel speakers full range in the Marantz “Pure Direct” mode. Any multi-channel later would be run with the Audyssey corrected room EQ engaged. I seldom (read never) use the Audyssey Dynamic EQ. Personally I find the Dynamic EQ sucks the life from music and pumps up the bass in movies so I just don’t use it. To me it removes the “air” from the upper end while making the emphasized low end sound a bit blah... even “cardboardy”. It’s probably just me, or my room so

I'm certainly not faulting or criticizing anyone who uses the Dynamic EQ or thinks that it improves the sound. I much prefer just turning it up a bit to improve the dynamics and overall sound (it is the aging "rocker" in me I guess!). Back "in the day" I never used the "Loudness" button either. And, certainly there was no such thing on the mixing consoles or playback systems we used in the studio.

I gathered some material I am very familiar with and started listening.

1. Harlequin (1985) – Dave Grusin and Lee Ritenour – CD - Harlequin is a great collaboration between pianist Dave Grusin and guitarist Lee Ritenour. One of the things that sets Harlequin apart was the recording process was 100% digital (between the microphones and the speakers of course :-)) there is a great balanced sound and some nice "air" around all instruments. A great example of a digital recording done right!
2. A Decade of Steely Dan (compilation) – Steely Dan – CD – Long time, reference quality studio sound source!
3. Let It Roll (1988) – Little Feat – CD – A very well recorded album of Little Feat proving these were a very talented group of musicians who were still putting out great music well after the death of Lowell George.
4. Another Mind (2003) – Hiromi – SACD – Debut studio album of powerhouse "Jazz" pianist Hiromi Uehara. Lots of range and fantastic support players.
5. The Raven That Refused To Sing (2013) - Steven Wilson – Blu-Ray Audio – Steven Wilson as the driving force behind Porcupine Tree, or other bands/collaborations, and as a solo musician is always interesting! He is also a studio wizard who has been the "go-to" mixer/engineer/producer for classic updates and remixes into 5.1 surround. The list of his work and accomplishments is long.... WAY TOO LONG to list here! If interested check it out here....  
[https://en.wikipedia.org/wiki/Steven\\_Wilson\\_discography](https://en.wikipedia.org/wiki/Steven_Wilson_discography)  
I have the greatest respect for his studio prowess!

For this review I won't get into the nuances of each piece or track played giving you only some overall impressions or where I noticed a difference, if any, between old and new amps.

I started my listening in stereo using the A21 with the subwoofers turned off and the BG 520i's running full range with the Marantz AV7703 in "Pure Direct" Mode bypassing any EQ, bass management, or crossover points.

My main speakers, the BG Radia 520i's, have two 6.5" conventional Kevlar woofers in each and don't dig particularly deep into the bass registers but do have some convincing output down to around 30Hz if not pushed very hard.

I started with Harlequin and listened at a low volume gradually increasing the volume until quite loud. The speakers played quite convincingly at all volumes and I was hearing a definition and solid bass that I had never heard from these speakers before. In the past I had tried listening to my system using the Marantz "Pure Direct" mode but had always fallen back to the "Direct" or "Stereo" because either of those modes use the subwoofers in the mix. The biggest shortcoming of the BG 520i, I had thought, was the low end. But here I was listening to a solid, substantial, and articulate bass with no subs in the mix. I proceeded to my other music selections and found that the seemingly lost bass appeared to have been found. All selections were much more listenable. With my old amps the bass always seemed not only absent, but "Boxy" or even "cardboardy" and the bass was not well defined. Definitely not the case with the new Halo A21!

And it wasn't just the bass.... The high end was the same smooth extended high end that I remembered and expected from my older amps, but more.... More perceived "Air" and at the same time more body across the midrange and the high end. The sound stage seemed deeper and more extended to the sides as well without ever losing the center anchor or the distinct positioning and separation of the instruments.

In fact, the more I listened the more instruments presented themselves to me. And the subtle nuances of some of those instruments were now audible. An example came from material I have listened to many times, on many different systems, over the years.... Steely Dan's Babylon Sister and Bodhisattva and others revealed subtle percussion touches that I had never heard before. I could clearly hear now a Cabasa being played and the subtle high-hat work became much more clear. Donald Fagen's electric piano had a pronounced tremolo that had gone unheard over many listening's throughout the years and was now clearly audible.

I couldn't quite believe it so I kept adding new material to the mix.... Picture Book from Simply Red, George Thorogood and the Destroyers, Yes, Three Dog Night, King Crimson, Sade, Led Zeppelin, Rod Argent and Colin Blunstone... each play by each different artist revealed something I had not heard before.

I turned the subs back on and listened again, and yes, the subs improved the sound by digging deeper and providing that firm foundation for the music to build on and increasing both the richness and dynamic impact of the sound in every case. But new to this scenario as it played out was the fact that the subs did not have to be on to enjoy the music!

When I finally got to the SACD and Blu-Ray Audio material I did a quick listen with subwoofer/no subwoofer and found that the 520i's continued to supply a surprisingly good overall sound even without the subs engaged. Surround sound was very detailed with the discs that featured 5.1 mixes.

### **Parasound Halo A52+ Testing**

**To test the Parasound Halo A52+ I disconnected the A21 and made the first two channels of the A52+ the right and left channel and replayed most of the stereo material again. I'm happy and content to report that I heard absolutely no difference between the two amps even when pushed to extreme volume levels... Even though the A52+ has a lower wattage rating than the A21. (255 watts per channel into 4 ohms on the A52+ vs. 400 watts per channel into 4 ohms on the A21) the sound was consistently good with either amp taking over the duties of the main Right/Left channels.**

I did play some movie content but I don't feel that is as revealing a test as music. My feeling on this is the visuals tend to draw your attention away from the sound (as they should). My main criteria with movies is the sound matches the video and dynamics and environment is convincingly portrayed.

I attribute the changes I heard to a couple of the published specs and differences between the old and new amplifiers and possibly even an outside factor or two.

1. I was probably (subconsciously) hoping to justify the change and listening more critically and carefully than usual :- ) (*there I said it!*)
2. The ability of the A21 and the A52+ to better render the bass content most likely comes from two things. Higher current reserves, and vastly different DAMPING FACTORS (>1100:1 Vs. >150:1 on the older amps) and allows the A21 and A52+ to seize control of the woofers and drive them as they should be driven.
3. The increased "Air" and better presentation of the soundstage... better definition, increased ability to hear separate instruments in the mix...that sweeter sound, all this I believe comes from the combination of better design, better components, faster slew rates, direct coupling in the signal path.... and those first ten watts of pure class A power at lower volumes.

### **Summary**

I truly believe that I hear, and continue to hear, a discernable difference and IMPROVEMENT in the sound between the old and the new amplifiers. This is particularly true when playing musical selections. With movies I don't notice much difference if any. If I noticed anything the center channel may have a bit more clarity/definition with the new A52+.

The issue with a movie or even music video is, of course, that you are concentrating on the visual story as opposed to details in the sound. The experience if you will!

If you only watch movies or television movies then very possibly amps or separates like these are probably over-kill. My suggestion would be to look at a less expensive solution in amplifiers or a decent receiver....

All-in-all happiness reigns and I judge this upgrade a good return on my investment.

When I have a bit more time I'm going to switch my little Parasound ZoneMaster 450, 50 watts x 4 Channel (or 100 watts bridged x 2) Class D Amplifier and/or my 75 watt per channel Sony receiver from the living room to drive the front channels to see if the much lower power amps will drive the woofers in the 520i's in the same way as the A21 and A52+. That might tell me if I was just kidding myself! But for now I'm happy to just listen and enjoy!!

Thanks again for reading through to the bitter end! I'm still hoping to see some other reviews pop up here soon.

Happy Listening!!

#### **Equipment and Cabling Used for Evaluation**

##### **Sources**

Marantz AV7703 Pre/Processor  
OPPO UDP-203 (using HDMI)  
MacBook Pro (2013) (Using HDMI)  
Apple TV 4K (HDMI)

##### **Cables**

Balanced - (Pre/Proc to Amps) - 2' balanced Mogami 3080 with Amphenol XLRs - ***World's Best Cables***  
HDMI - ***Blue Jeans Cable*** - Series One or Tartan 24  
Analog - ***Belden*** 1505 cable with Rean connectors - ***assembled by me***

##### **LCR Speaker Wire**

LCR - Belden 10ga 5T00UP - With locking (expansion type) banana plugs  
Surrounds (sides and rear) - 14ga - bare wire connections

##### **Speakers - All Speakers Nominal Impedance 4 ohms**

LR - B&G Radia 520i - Two way with 50" Planar Folded Ribbon Mid/Tweeter and (2) 6.5" woofers  
Center - B&G Radia 220i - Three way with (1) 3" Planar Folded Ribbon Tweeter, (2) 5" Planar Folded Ribbon Midranges and (2) 6.5" woofers  
Surrounds (Sides and Rears) - BG Radia SA320i In-walls - Three way with (1) 3" Planar Folded Ribbon Tweeter, (2) " Planar Folded Ribbon Midranges and (2) 5.25" woofers  
Subs - (2) Rythmik F18

