



Building guide

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Krell KSA-50 Building Wiki

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Chapter 1: History of the Thread

Once upon a time...

[\[Original Thread, Post #1\]](#)

Well it all started when user "bra" posted this [\[Schematic\]](#) and said he would like to make a Krell KSA-50.

Threads from 2004: KSA 50 Board Research And Development.

[\[Post #5\]](#) - Our main man Jan then stepped up to the plate and said "I can make the PCB-layout".

[\[Post #7\]](#) - Luke sorta requested the board be single sided and Jan in [\[Post #9\]](#) agreed that it would be easier for DIY'ers to make their own if it were.

[\[Post #31\]](#) - Jan publishes his schematic for thread review, quick work in my opinion.

[\[Post #38\]](#) - Pavel suggested and Jan agreed that the project remain a Krell Klone and not be an "improved version".

[\[Post # 55\]](#) - Jan requests last minute updates before making the PCB layout.

[\[Post #264\]](#) - Rabstg has taken on a group buy for the boards designed by Jan, and posts preliminary information on the boards.

Threads from 2005: Boards (More Boards) and Building.

[\[Post #399-400\]](#) A Krell [\[Group Buy #1 \(Jan's Boards\) Wiki\]](#) is created, edited, and eventually by 14 January 2005, 112 boards are ordered.

[\[Post #403\]](#) Jan, designer of the 1st PCB board set, posts the following remarks:

Amazing that this thread should reach more then 400 replies

There must be some interest for this project

Turns out to be quite the understatement.

[\[Post #690\]](#) The PCB Boards from the first group buy are shipped.

[\[Mike W's KSA 50\]](#) is posted in a separate thread March 3, 2005.

[\[Post #1114\]](#) NUTTR has his Krell Clone working on March 5, 2005. Pics in [\[Post #1131\]](#), [\[Post #1232\]](#), [\[Post #1256\]](#).

[\[Post #1116-17\]](#) Mark A. Gulbrandsen posts a pic of his KSA 50 (not in chassis) with data indicating that his build is working as of March 5, 2005. See also [\[Post #1234\]](#), [\[Post #1142\]](#), [\[Post #1298\]](#), [\[Post #1377\]](#)

[\[Post #1142\]](#) Links to the original KSA 50/100 soft start circuit schematics.

[\[Post #1164\]](#) Pics of Algar_emi's hardware for use in the Krell Clone.

[\[Post #1325\]](#) Mark makes the following statement:

If you have studied many amplifiers like I have over the last 25 years you will find that the circuit really is nothing very special and its very simple. And thats what I like. The result is one of the best sounding Krell amplifiers ever designed and it is considered one of the top ten amps ever designed and still used by many reviewers today as their refrence amp..... Thats also what I like.

[\[Post #1326\]](#) Stuart responds:

No-one in this group is building the KSA50 because we think they are the best at any cost (I hope), most of us aren't even fooling ourselves that they are the best for the costs we are incurring...

Basically we are building them for a lot reasons including but not wholly limited to...

They are cool,

Can be built easily,

have soul,

Sound 'good enough',

set a standard in their time,

won't involve litigation,

and are in their original form a minor work of art...

[\[Post #1387\]](#) A pic of the Pinkmouse output stage.

[\[Post #1400-1405\]](#) Pictures of Wim's KSA 50 are posted March 24, 2005.

[\[Post #1423\]](#) This "BUILD" Wiki page is created with a blank page.

[\[Post #1426\]](#) K-Amps posts his "Class A Spreadsheet" in a Zip file.

[\[Post #1502\]](#) Pinkmouse is designing a new board, schematic shown in this post. Board in [\[Post #1517\]](#). People immediately show an interest in ordering these boards.

[Post #1601] Pinkmouse prototype board is shown. Hardware shown in followup postings.
 [Post #1602] Assesears shows a pic of his krell hardware being tested.
 [Post #1640-47] Pinkmouse shows oscilloscope square wave measurements of his prototype with different capacitances on Q107/108 (C105 & C106). See also [Post #1669] and 1674.
 [Post #1693] Pinkmouse schematic for Pinkmouse board as tested and working, parts list in #1694.
 [Post #1762] "Final" Pinkmouse boards, see up to #1780.
 [Post #1827] Coloumb posts a pic of his chassis.
 [Post #1848] Stuart gets a new girlfriend (congrats!) but more importantly (for us) begins work on a very high power version of the Krell clone.
 [Post #1859] NUTTR realizes that the Krell clone is heating up his room by quite a bit.
 [Post #1860] Stuart posts a pic of his basic output stage.
 [Post #1875] Stuart has a bunch of non-inductive output resistors and people start buying them from him.
 [Post #1995] Link to temp calculator on Analog Devices website.
 [Post #2420] KMJ posts the following observation:
Damn you guys can keep a conversation goin, I'm without internet for 2 days and already theres so much to read. My mothers sewingcircle doesn't have a thing on you.
 [Post #3485] Mark posts a prototype of boards for the 2nd Group Buy.
 [Post #3502] Terry's amp is up and running. Looks nice.
 [Post #3609] LGreen's amp is up and running. Looks good.
 [Post #4371] Mark has shipped all the boards for the 2nd Group Buy.
 [Post #4612-15] neychi posts pictures of his Krell style chassis.
 [Post #4814] Mark G orders another 100 boards, for a *third* group buy of Krell KSA 50 clone PCBs.
 [Post #4886] Mark and Lyndon have successfully operated a new Krell clone, not yet in a chassis, using Mark's boards.
 [Post #4902] Luke finishes his clone and puts up some pics. Hopefully a chassis is in the works.
Posts From 2006. Boards are Available and Amp Building Resumes.
 [Post #5260] Happy New Year!
 [Post#6011] Bra, who started this whole thing (3/27/04), has finally built a Krell clone (3/18/06). Two years and 6000+ posts, go figure.
Posts From 2007. Building continues...
 [Post#7180] and [Post#7186] Happy New Year!
 [Post#7185] Once again, a discussion of fans and how to keep things quiet.

Chapter 2: References and Corrections

Shortcuts and References

1. Jan's Board-- the 1st Group Buy
 Jan's web page for the Krell Klone : <http://www.delta-audio.com/Krell-Clone.htm>
 - [Schematic (pdf)]
 - [Corrections to the Board (pdf)]
 - [Parts List (pdf)]
2. Pinkmouse Board-- the 2nd Group Buy
 - [Parts List/BOM Post #4237]
 - **Important:** For those using the Pinkmouse PCBs, some transistors used in the Pinkmouse PCB have a different pin-out than those used in Jan's boards. Use the devices listed in Pinkmouse BOM.
3. Issues with parts
 - issues with wattage of zener diodes [Post #4246]

Build Options and Issues

Protection Circuitry

- To build this amplifier without the voltage-current limiting protection circuitry (like the original), omit the following components-

D301, D302
 Q301, Q302
 D303, D304, D305, D306
 C301, C302
 R301, R302
 RVI1, RVI2, RVI3, etc...

Note- the parts list omits values for D305 and D306.

It is assumed that these are the same as D303 and D304.

I'm not sure this is correct, can someone verify this and then delete this line?

R124

Issues regarding R124. The value of R124 is not shown on the schematic.

R124 should be 4.7k, as seen in original schematics and verified through independant calcs and measurements

C105 and C106

The schematic lists the values of C105 and C106 as 390 pF. Good results were obtained with 47 pF.

See this link: [Post 2440]

See this link: [Post 1019] Suggests using 33, 47, or 68 pF. Not 330 pF. And not 22 and 33 pF (post 1020).

It appears that there might be a slight difference of opinion on this.

Normal/low bias Construction Options

The board has options for normal (R126) and low bias (R144).

It is not shown is how to switch between these or how they are connected.

My guess-- A switch can be connected to short/open circuit the low/high bias pads, so, when the switch is flipped, the pads are shorted making R126 parallel to R144. This gives a lower resistance and increases bias. As such the board is mislabeled. This setup will have R126 as stand-alone for low bias, and the combination of R144 and R126 in parallel is high bias. Thus, first set R126 for low bias, and leave it alone; then flip to high bias and set R144 for the desired high bias current. Because the low bias resistor is 5K, the parallel resistor I chose for R144 is 25K, so that there is a wider range of tuning rather than having 5K in parallel with 5K (which gives a max setting of only 2.5K). This setup is shown in [\[Post #3532\]](#). It was suggested less than 5K would be ok to put in parallel but 25K has been tested and works.

See also [\[Post #2530\]](#).

Power supply info: Transformers, Capacitors etc

The original KSA-50 (and KSA100) were both true dual mono amplifiers all the way back to the line cord. In the original Krell it was ~37.5 VDC, bias ~1.9A per channel, ~60w/8ohm class A, ~75w/8ohm class AB. People have built these unmodified with 39VDC

Transformers:

Krell used a 400va transformer per channel, ie two per stereo chassis. In the course of production they used both toroids and EI transformers so no big deal there.

A normal KSA50 channel has ~37v rails. This requires 2 secondaries at ~26v AC, or 52v center tapped. A minimal transformer for two channels would be about 400va, you'd want more for driving low impedance loads.

Capacitors:

Each transformer was rectified then smoothed by a pair of 40000uF caps, so 2 x 40000 caps per channel, 4 per stereo chassis. A fine alternative: the 68000/50v 'computer grade' parts that seem quite readily and inexpensively available, check with Steve at apexjr.

Resistor Wattage Rating

The design specifies .5 watt resistors. It has been stated that most resistors can be 1/4 watt (from [\[Post#2626\]](#)): Actually my KSA-50s all have 1/4 watt resistors except for the ones in series with the zeners, the ones at the pre-drivers, and the drivers emitter resistors themselves. Those 4 are 1/2 watt and the drivers get 2 watt. I get my Metal films surplus for 5 cents each so 1/4 watt will suffice at that price. Its also ok at 37 volt rails according to Stuart Easson.

Emitter Resistors

The schematic indicates .5 ohm emitter resistors, RE1, RE2, RE3. These should be rated for at least 5w, in the event very low impedance loads are driven a larger fraction of the considerable output power will be dissipated in these resistors...

Other values may be used and affect the amount of class A bias and ultimate power delivery.

Actually the 'normal' range of values of the emitter resistors (0.22-1ohm) doesnt really affect the 8ohm power much. For >2ohm loads I'd go with 0.5ohm or greater for better bias stability. If driving <2ohm loads to full power the resistors will need to be seriously high power, and here lower values will minimize losses...

With the original power supply of 37.5 VDC and .5 ohm resistors, the result will be ~55 watts of Class A power, and ~75 watts of class AB power into 8 ohms.

HEAT SINKING

Plenty of heatsinking should be provided for this amp. Since this is a true class A design its going to dissipate right around 150 watts of heat per channel when biased for 50 watts class A power level. Air tunnels are recommended for this and can be easily accomplished by placing two flat back sinks face to face and installing a pair of 4" fans below them. Arrange the fans so they blow up and out the top of the tunnel. The fans can be run at half speed or less but don't allow sink temperature to get over 60 C. or device reliability may be short. A temperature servo could also be an effective addition keeping fans at just enough speed to keep the sinks at about 55 C. or lower.

The use of a 60 deg.c to 65 deg.c Clixon thermostatic switch mounted to each heat sink and wired back to the transformer primary is recommended as a safety precaution to shut down the amp and to save the output devices in case of excessively high temperature or should a cooling fan fail or stall. These switches are inexpensive insurance, or be sure your home owners policy is up to date! As an alternative each Clixon Switch could be wired to drastically lower the bias of the overheating channel when it is activated by too high of temperature.

A graph of temperatures of such a fan cooled heatsink over 3 hours of elapsed time is posted at [\[Post #4375\]](#). The 4 graphs are for a fan cooled output stage (2 channels), a convection cooled driver stage (1 channel), and a convection cooled voltage regulator (for driving the fans, softstart etc...).

Suitable convection heatsinks will need to be extremely large. See [\[Post #4469\]](#) for how to compute the thermal resistance of a heatsink that can dissipate the heat sufficiently.

User 'geezer1944' in [\[Post #4475\]](#) has provided a [\[link\]](#) to a website with additional heat sink calculations.

Mounting the driver devices and the bias sense device an inch or so apart on the main sink for each channel will aid in keeping the driver devices at a reasonable operating temperature. In fact if done this way they should not exceed the operating temp. of the amp. This method also provides excellent thermal tracking. This was one of the main reasons for Pink Mouse's board re-design... to easily allow both drivers and the bias device to be mounted on the main heat sink.

However, it was stated in [\[Post #2448\]](#) that the driver Transistors need not be on the output heatsink for thermal tracking, but the bias transistor should be mounted in some way to track the output device heat:

The Vbe multiplier, q111 has to track the temp of the outputs. The drivers are not required to track any particular temp, they just have to be kept at a safe temp.

As q111 gets hotter the bias voltage will decrease in proportion to the temp. As the drivers and outputs get hot, the bias current increases in proportion to the temp. In a perfect world the reduction in voltage keeps the bias current pretty much the same...

The drivers dissipate power at a fairly constant fraction of the output stage proper ($\sim 1/40$). So if you choose a separate sink for them and attach q111 to it, I think you achieve a good approximation of the necessary thermal tracking, but the size of sink you choose needs to keep the temp of the drivers and q111 in the same ballpark as your outputs.

Wire Thickness

Don't know what thickness wire to use?

Wire thickness can be computed using the link provided in [\[Post #2677\]](#). Here is the [\[link\]](#).

Driving the Output to Clipping.

To calculate at what voltage the input will cause the output to clip, see [\[Post #2831\]](#), which states: output voltage depends on your +-Vrail and gain.

Assuming you have +-38Vdc and the losses from rail to max output voltage are 4v then you have 34Vpk to drive your load.

Divide by $\sqrt{2} = 1.4142$ to give rms output = 24.04Vac (72w into 8R)

The gain of amp = $r_{130}/r_{129} + 1 = 22/1.5 + 1 = 15.67$

Input required to produce 24.04V = $24.04/15.67 = 1535\text{mV}$

From this you can insert any gain resistor values and max output voltage to determine the maximum input voltage.

Ground Loop problems?

I had a problem with a ground loop at the inputs. Whenever both inputs were connected there was a 60 cycle hum present. I tried many different things until pooge posted this in [\[Post #3635\]](#). I followed those instructions and now the amp is dead quiet.

Chapter 3: How To Build With Examples

The following comments are hints from people who have built up one of these boards.

Soft Start Circuit

Many have suggested that a "soft start" type of circuit will be necessary to avoid a large surge upon power on. There are a number of threads that relate to soft start circuits.

[\[First thread\]](#) See circuit in post #7

[\[Second thread\]](#) A circuit based in Rod Elliot's Project 39, Figure 2 (finally working in the later posts, final version [\[here\]](#))

Also See [\[Elliot Project 39\]](#).

[\[Third thread\]](#) How to wire a soft start with the power supply.

[\[Fourth thread\]](#) A recent article on inrush limiting.

[\[Post#4323\]](#) Indicates that Algar Emi has a soft start circuit up for a group buy on this [\[Fifth thread\]](#).

Comment- The use of a CL-60 thermistor (such as Digikey part no. KC006L-ND) in-line with the big transformer primary works fine for inrush limiting. Use one per channel assuming dual mono. This is the same thermistor used in the Pass amps. The thermistor will get hot during operation so leave room for and account for this. Also, because the thermistor will be hot during operation, this technique offers no protection to a on...(long time)...off...(short time)...on cycle because it needs time to cool in order to get its resistance back up.

If no method is inrush limiting is utilized one will definately blow the bridge rectifier!

Testing The Driver Board

You don't need outputs to test the board. The drivers are loaded by their emitter resistors which need to be present...the bias should be set to give about 1.2v across each of the resistors.

The gain of the amp is set by r130 divided by r129, or about 14.6. So you will need a little over 2v to get it to full output. The KSA100 had higher gain in proportion to it's higher output voltage potential.

If your front end is working like mine you will get the following voltages:

r103, r107 (rail-0.6v)

r108, r109 (rail-27v)

r112, r113, r116, r117 $\sim 2.2\text{v}$

r120, r121 $\sim 1.59\text{v}$

r122, r123 $\sim 1\text{v}$

(voltages measured across the identified resistor)

Obviously the junction of the driver emitter resistors should be somewhat close to 0v, but may need some trimming

with r105

Resistor tolerances can make all of these vary some, but probably not more than + -25%, or at least if component tolerances are far enough out to make the voltages vary more, consider selecting other components...

Output Transistor Choice

in [\[Post 6725\]](#) Stuart Easson writes:

The specific choice of transistors for the output is not without some controversy. Here's my synopsis of the threads 'findings':

mj15003/4: The original amp used a pair each of these, per channel. Very rugged, but sort of slow, technically there are now better transistors. Not available in the plastic packages, so you need to be good at drilling or have pre-drilled heatsinks. With transformers in the 300-400va per channel 2x of each are more or less bulletproof. Bigger transformers would suggest more paralleled transistors, since the rails won't collapse as low impedance loads are driven and the transistors would be at risk...

mj21193/4: The closest 'modern' transistor to the originals, much better gain linearity, more package options, easier to use. In the TO3 form can be substituted pretty much 1-1, in plastic package the ratio is probably better kept at 2-3. Since they are not much faster than the originals instability is not likely any more of a problem.

mj4302/4381: Very much faster, technically a much better transistor, AFAIK not available in TO3, so more are needed for an equally bulletproof output stage, 3 pairs per channel for instance. These transistors are very much faster than the originals and I'd exercise care in the output stage wiring, better to be safe than sorry.

The other transistors you mention (2SA1943 /2SC5200) are more or less unavailable, but there are a lot of fakes on the market, so the consensus seems to be avoid them and use the modern equivalents.

I have tried the mj15003/4 and the 21193/4 and they both sound excellent to me...I think the amp is probably 'better' into low impedance loads with the 21193/4 because of the better gain at high currents loads the drivers less, and it's easy to use more of the plastic outputs.

Transistor DC Measurements

Mark measured the DC components of his board in [\[Post #3067\]](#). They are with reference to ground and keep in mind the rail voltage is +/- 39 volts DC

Q-101	E .745	B 142.9 mv	C +36.07
Q-102	E .442	B 143 mv	C - 35.6
Q-103	E .617	B 0	C +35.9
Q-104	E .320	B 0	C -35.75
Q-105	E +36.5	B 35.95	C 0
Q-106	E -36.32	B -35.7	C 0
Q-107	E +37.05	B +36.5	C +1.29
Q-108	E -36.8	B -36.33	C -1.288
Q-109	E +.728	B +1.296	C +38
Q-110	E -.733	B -1.296	C -37.88
Q-111	E -1.06	B -.563	C +1.296
+ side OP device	E 120 mv	B +.728	C +38.09
- Side OP Device	E 140 mv	B -.733	C -37.89

Setting the bias

From Post #2508. [\[here\]](#)

Setting the bias is easy...turn the pot so the DC you measure across both the driver emitter resistors is at a minimum. Connect the driver board to the outputs, then if you can, slowly apply power to the whole shooting match, monitoring current draw, anything more than a few 10's of milliamps is bad, you'd want to turn everything off and check your wiring.....If you can't do it slowly, then just turn it on...from a distance?

Anyway once you have all the parts connected, power applied and no smoke issuing from anything, attach a meter to measure the voltage across one of the 0r68 output emitter resistors (say Re1), and another to measure the output voltage relative to ground, and if you have 3 meters (and who doesn't?) attach another one to measure the total voltage across the driver emitter resistors r127/128...

Slowly turn the bias pot to increase the output idle current, you can also measure this as the voltage across the 25ohm driver emitter resistors, nothing happens at first, basically until the board output voltage reaches about 1.2v across r127 & 128, then the outputs start to turn on and you will read a voltage across Re1...keep increasing until you have about 0.2 volts across Re1...with 3 output pairs this corresponds to ~1A total idle current, you'd probably want to allow this to sit for a little while check temps, make sure the voltages across all the output emitter resistors are nearly the same, any big discrepancy should be investigated. Once you are satisfied that everything is OK, start increasing the bias until you see ~0.4v on Re1...as the temperatures on the sinks change this is going to move around, once it seems to have settled, adjust the other pot to reduce the DC offset to the lowest possible value (<50mv was easy to achive on all the boards I've made). This will wander as the temps change, so repeat the process a few times over the course of an hour or two...

(NOTE- .4v across Re1 is only valid with .68 emitter resistors, do not attempt this with lower value resistors-- compute the class A power you will get separately. With 4 output device pairs and .499 ohm emitter resistors 50 W class A into 8 ohms is about .22 V across the emitter resistors, into 4 its about .32V).

The bias resistors (R144, R126) are setup such that:
Lower R = Higher Bias/ Higher R = Lower bias.
See [\[Post ##2527-28\]](#)

Or, according to [\[Post #2531\]](#):
If you are not sure about the bias and need to begin at the low bias point and are not sure which way to turn the trimpot to reduce bias, here is a foolproof trick that has helped me over the years.

Disconnect the driver's emitter to the output's base (saving the outputs from being driven). Then measure the voltage across the B and E of the driver, less than 0.6vdc and you are ok to go ahead with initial biasing, (This is class AB territory) above 0.6vdc and you are in high bias/ Class-A territory and you need to lower the bias to 0.5 before you connect the driver to the output stage. This method is a quick test of verification and not extremely accurate but very practical if you are not sure which way the trimpot should be.

Class-AB amps need to have about 0.50 to 0.55 vdc across the BE of the output devices as a quick test.

Another quick test I do it use a 100-200 watts lamp in series with the amplifier, then turn the amp on and set the trimpots such that the lamp goes down to a dull amber... this is low bias setting. Then remove the lamp and set the bias correctly using the voltage readings off the OP device's emmitter resistors as others have explained.

Setting your particular bias to a certain number of Class A watts is described in [\[Post #3094\]](#) and [\[Post #3106\]](#)

Chapter 4: Krell Facts and Reviews

According to Krell's web site, the KSA-50 was in production from 1981 through 1987.

[Krell Archive]

Here is a web site showing pics of Krell amps: [\[Krell Amps Fan Site\]](#)

Link to [\[Macleans Krell KSA-50 cleaning/refurb page\]](#)

Link to [(Original) KSA 50 Photo Album] from [Post #491]

Link to [\[Krell Fan Site\]](#) From [\[Post #5437\]](#)

Chapter 5: Upping the Power

There are requests for this board to be used with higher rails. In the order of +/-100vdc, or 500 watts RMS into 8 ohms. Stuart Easson is working on the prototype. He has designed a CCS for the input differential allowing the amplifier to be run from 20 to 120 volts. He has so far successfully tested the prototype into 4 ohms but needs a larger power supply.:

Also if you need more power there is the KSA-100 clone project, whose wiki can be found [\[here\]](#)

Appendix - Krell-O-Tracker

This is to keep track of variations on this project, and give others guidance on what was used. If you have one in-progress, feel free to enter the info on the parts you are using or plan on using. Feel free to enter notes, links, pics, comments and such in the last col.

[illegible]

6. August 8, 2005	LGreen	700VA x 2	128,000 uF	37 VDC	.499 ohms	MJ21193/4 (4 each) TO-3	option switches from 20 WPC Class A to 50 WPC Class A at 8 ohms, fan cooled; 70 lbs/ 32Kg. Discussion and Pics- (a) [Post #3609] (b) [Personal Web Page]
7. in progress	Mark G. #2	---	112000 mfd	---	0.68 ohms	MJL 21193/4 (3 each)	Proto test of WIKI boards
8.	NUTTTR	800VAx3	272,000uf/ch	38v DC	0.68ohm	MJ21193/4 (5 pairs/ch)	Not yet...
9. March 2006	JoeyDD?	500VA x 2	80000uF/ch	36VDC	0.68ohm	MJL21193/4 (3 pairs/ch)	2 monoblocks, passive cooling, [Pictures]
10.	jacco vermeulen	300VAx8	CLC,78000uF _{x6} ,2.5mH _{x2} aircoils/ch	35VDC	0.68Ohms	2SA1216/2SC2922(12/ch)	4 discrete voltage regulators for main and driver board with 9VAC/27VA step-up toroidals/ch,80x80mm Papst fansx6/ch,7 amps bias?
11. November 26, 2005	LuckyLyndy	500VA X 2	112,000 Per Chan.	+/- 40	F. .68	6 Ea MJL21193/4 Chan.	DC Variable Speed 15 vdc Fans Running at 6.5 V.
12. November 28, 2005	Luke	25V@7.5A	CRC 96,000uF	36 VDC	0.4 ohms	MJL4281, MJL4302 (3 each) TO-3	(don't know)
13. A week or so left	KMJ	2x540VA	132k uF / Ch	38VDC	F. Re	MJ15003/4 (3 each) TO-3	Fancontrolled cooling and monitoring done
14. February 27,2006	Mark A. Gulbrandsen	2 kva dual secondaries	56,000 per rail	+/- 38 volts	MJ21193/94	3 each TO-3	Dual fans at half speed. Final version for me
15. In-Progress	Googler	2KVA Bel Canto Dual Pri/Sec	searching	+/- 40VDC	?	6 x MJL21193/4 -chnl	Heatsinks are 12Lx5Wx5H w/ 14 ribbed fins. Boards Stuffed!! Need PSU CAPS
16. In progress	niles	2x500VA	56,000 per rail	~41V DC	0.68R	3 Ea MJ21195/6 per Chan.	Building matched pair as bridged monoblocks using authentic Pass A2 sinks with custom machined chassis fittings
17. Collecting parts	bikehorn	1x 1250 VA xformer with 2x 39-0-39 sec'ys	ESP capacitance multiplier	39 VDC	0.5 ohm	MJL21193/4 TO-3P, 5 pairs/ch	will include VU meters
18. June 27, 2006	zlast	2KVA 28X2	120000 uf Rail	+/-40 V	0.47 ohm	3 pair MJL21193/94 per channel	4 channels/ redesigned boards so outputs transistor on board /50WPC Class A. [Pics/ Post #6747]
19. July 3, 2006	Farl	1X500 VA	66,000 uf per rail	+/-41V	.68R	3 pairs MJL21193/94	Maybe 50W Class A [Pics/ Post# 6774]
20. in progress	Andrew T.	30+30Vac 750VA	60mF per rail	+ - 42Vdc	Re=0r333	6pr 2sa1943/c5200 passive cooling 3off 8"*8"*2" sinks/ch	100W ClassA? into 6r, Iq=3A, twin drivers 2sb649/d669, + - 42Vreg frontend
21. In progress	Harry3	Two 500VA 25+25Vac	56000uF per rail plus 1000uF & 0.1uF caps next to O/P transistors	+ - 35Vdc	0R5	6pr 2SA1943/2SC5200	2x80VA trans. for front end-will regulate. Two Semikron heatsinks 300x200mm - 80mm fins plus 2 fans
22. In Progress	Harry3	Two 500VA? 30+30Vac	60000uf per rail plus 1000uF & 0.1uF caps next to O/P transistors	+ - 42Vdc	0R68	6pr 2SA1943/2SC5200	Two 12Volt fans running at 7 Volts, very low noise.
23. In Progress	XaQ?	1.6KVA 28x2	68000 uf/rail	+/-40 V	.68R	3 pair mjl21193/4	2 stereo amps 4 passive heatsinks 15.5"L 5.5"W 6"H 46 fins ea.

24. September 17. 2007	Steenoe	2 pcs 500VA 26x2	90.000uF per channel	E. 35V	0,68r 6W	MJW1302A/MJW3281A 3 pairs per channel	Passive cooling, weight 42 Kg
25. Jan 01 2008 / IP	B. Jack Richards	C. 2 X 500VA	D. 44000uF/chan/rail	E. 38 V	F. Re=0.5	G. # 4xMJ21194	H. Bought fake trans from ebay (HonestCard?) ended up buying from OnSemi?. Now sounds fantastic
26. February, 2008	john65b	1240VA	2 x 56,000uf/rail uF	37 VDC	Re R68 biased @ .65mv	3pr 2SA1943/2SC5200	Sounds EXCELLENT. Bests my UCD400 by quite a bit
27. December 22. 2008	neychi	2 x 400VA	2 x 47000uF per channel	38 VDC	Re 0.5R	3 pairs MJL21193/21194	Passive cooling, 55W class A
28. Date/ IP	B. Name	C. XFMR	D. uF	E. DC V	F. Re	G. # Dev/Pack	H. Notes, links,etc...
29. Date/ IP	B. Name	C. XFMR	D. uF	E. DC V	F. Re	G. # Dev/Pack	H. Notes, links,etc...
30. Date/ IP	B. Name	C. XFMR	D. uF	E. DC V	F. Re	G. # Dev/Pack	H. Notes, links,etc...

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