

Subject: RF Concepts/Alpha Amplifiers Monthly newsletter

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Conversation: RF Concepts/Alpha Amplifiers Monthly newsletter

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ALPHA NEWSLETTER

March
Newsletter

March 8, 2010

Congratulations to Paul Kruzel K9PLK, who won the key last month! This month it's Quote month! Log on to our website, go to the 'contact us' page, and send us a quote we can use in our communications and advertising. If we use yours, we'll send you a 4-1000A tube clock. Nice.

Featured Product



The Alpha 9500 is our Flagship Product. It's an Autotuning, Full Legal Limit, 3CX1500A7 based Linear Amplifier that delivers key down performance in all modes with NO time limit.

Letter from the President



I'm thrilled to report our progress here at RF Concepts. Sales are strong, we're producing more amps than ever before, and customers seem to be happy with the service we're providing. It's a process of continual improvement and there's no lack of things to do around here. From digging through stacks of old hand drawn vellums so we can produce legacy sheet metal, to serious work on new products to add to our existing offerings, there's never a dull moment!

Recent band openings on 15 & 10 have prompted more people to call about new amplifiers. How great is that!? Three cheers for an upswing in the new sunspot cycle. May it last forever - or at least another 11 years!

Something good must be happening in the economy. We're seeing THE leading indicator, lead times on factory parts orders, move out. It now takes longer to receive parts from manufacturers than it did a few short months ago. Until recently we've pretty much ordered what we needed, when we needed it, and our distributors have had the parts in stock and shipped. Now our suppliers are quoting lead time along with prices instead of just quoting prices. This means more pressure on our factory to plan our parts delivery. Although our existing suppliers are eager to work with us, they're feeling the same pressure. So far, so good - they know we're picky, and they continue to provide us with the highest quality parts - both standard and custom. Great thanks to them for their help!

Hold on to your hats - this COULD BE THE MONTH that we catch up on our wattmeter and dummy load orders. We're building enough, so that even when we ship this backlog, we should end up with shelf stock! Boards are IN, and they look good. What a process. They're great products and deserve to be on the shelf ready to go. Think about it - buy a Bird and you end up spending hundreds for the meter, and then hundreds for the slugs. Our wattmeter is autoranging, accurate, and wideband. No slugs - just push a button. We'll have an article on the wattmeter AFTER we actually get to "in stock" status.

Featured Product



The Alpha 8410 is our Legal Limit, Manual Tune amplifier whose tube complement is TWO 4CX1000 tetrodes for a total plate dissipation capability of 2KW. It delivers key down performance in all modes with NO time limit.

Speaking of holding on to your hats - you'll soon be able to do just that. Hats are on the way! We've hired a local hat company to produce and personalize the Alpha hats we promised to all those who responded to our survey and sent us a request. The hat company is busy stitching away. They will start sending hats during the first week in March. We think it's going to take about three weeks for them to fulfill our order.

One of our initial internal projects was an automated test and alignment system that could help us speed up the repetitive initial alignment process on the 9500. In September 2009, this process took about 4 hours per amplifier. To us, this was 'low hanging fruit'. Jeff Battin (NR4DX) wired together a PC, an ICOM radio, one of our Alpha Wattmeters, a 9500 (under test), and a dummy load, and started writing code. We are transitioning from hand calibration to bringing up our amplifiers on a new automated test and alignment system that will yield better results and will also allow us to ship faster than ever before. Additionally, it will log all of the results to our servers which will offer computer copies of the results thus giving us statistical data. Our recent firmware code version that appears on our website reflects changes for diagnostics and alignment. An additional byproduct of this work will be the publication of the software interface specification for the Alpha 9500. The people that have been waiting for this spec won't be waiting much longer!

Our full color 9500 manual is finished and is shipping to all past 9500 owners free of charge as well as with all new amplifiers. The feedback we've received so far is extremely positive and helpful, and we're very pleased with the results. If you purchased a 9500, and haven't yet received your manual, go to the contact page of our website and drop us a note.

Speaking of the contact page - please use it to communicate with the company. Soon we're going to turn off the 'info', 'service', and 'sales' @rfconcepts.com email addresses, and ask everyone to use the internal system. It keeps track of your requests, assigns case numbers, and lets us make sure nothing slips out of the system - or drops off Molly's desk, hi, hi! The electronic form is posted in the "Contact US" section of our website.

Our PCB board manufacturing is transitioning to a fully automated placement and test process. We're having it done on state of the art SMT equipment. This provides a more effective method of placing all those surface mounted parts on our circuit boards. Instead of building these boards up from scratch in our factory, we've found a couple of contract manufacturers with their factories full of the latest pick and place equipment, and they're looking for work. Perfect. We get a better product, and they get business.

Our Website Link

Have you been to our website lately? We keep adding content! We no longer charge for old manuals - just

We are in the process of hiring more assembly and repair people. Even with this transition from internal circuit board construction to outside manufacturing, there is still much to do. Our factory will continue to build the amplifiers by hand while increasingly using built and tested circuit boards. The employment listings are on our website <http://www.rfconcepts.com>. With all of this growth we are running out of space and will most likely be moving in the next year to facilities that better meet our needs.

Thanks to all of you that have sent in pictures of your stations. We recently went from processing and posting pictures on our website

download them from the website in .pdf format. Looking for legacy equipment parts? We've got a whole section. Recently we posted the bills of materials for every legacy amp we could find.

If you don't see what you want, drop us a note. If we have it, we'll post it.

Anyone want to write articles for the website? Send Steve a note and tell him what you're thinking.

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It's better, and continues to go in the right direction. The Alpha 9500 and the Alpha 8410 lead times are down to less than a month.

That's not good enough for us, and we keep working to get it down to "IN STOCK". We want to run an ad one day soon that says: Order by noon and you'll be 599 tomorrow.

It's our goal.

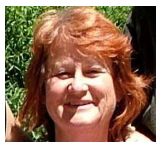
[How's our Repair Department Doing?](#)

by hand, to a system where we can send the picture page an email and the pictures get automatically sized and posted. I've seen pictures go up minutes after an email from you. If you haven't sent us pictures of your station or don't see your picture posted, please send an email to sales@rfconcepts.com.

We're having a great time building our company. As always, if there are any comments, please feel free to drop me a note any time or just say hi at stevef@rfconcepts.com. Over the last few months, I've met some of the nicest hams. It's a wonderful hobby, isn't it?

73's from the hams at RF Concepts - WA2NFR AA6DY AE0Q K0HM KX0R NR4DX W0MOM W0RUN

Letter from the Vice President of Sales



WOW - How time flies when you're having fun! February 2010 has been a whirlwind at the Alpha factory. As you can read elsewhere in the newsletter we're moving faster on all fronts now and that makes my job truly more interesting, busy and fun.

Gordon, W0RUN, and I had a great time in Orlando in mid-February (despite weather that rivaled Colorado for cold!). It was very rewarding to be able to hand out the new 9500 Manual to those owners who stopped by the booth to say hello. I enjoyed talking to so many of you at the booth, old friends, existing owners of Alpha equipment and also meeting many new prospective owners and future Alpha friends. I was impressed with the attendance at the show - in spite of the weather, hi, hi.

As many of you know, much of my time during the week is spent on the phone - talking about new amplifiers, helping to solve problems with existing amplifiers, taking parts orders and sometimes initiating a remote session onto a customer's computer to reset their 87A or download new firmware onto an amplifier. My favorite and busiest days are the Mondays after a contest - a few weeks ago after the ARRL DX CW competition the phones didn't stop ringing until sometime Wednesday by which time my hair was standing straight up! We really enjoy being able to provide excellent service to our customers and plan to keep our phone lines open for your new orders as well as your technical questions. Sometimes the Fridays *before* the competition starts are also a blur of ringing phones - this past week for example I took a call from a remote Caribbean Island where the operators had encountered a last minute problem with one of their 91b amplifiers.

Thank you all for your continued support and watch this space for more news in another month. Please continue to keep in touch with your calls and emails - we want to hear about your experiences with our products and your ideas for where we should be going next. For those of you planning on attending the DX Convention in Visalia please come and talk to us there. RF Concepts is proud to be participating in the special events station at Visalia as well as donating an Alpha 8410 as a prize for the DX Banquet at that event.

73 de W0MOM

Letter from the Vice President of Engineering and Chief DXPedition attender.

**Today, Gordon answers that age old question:
What is the right wire gauge for my AC line? (sit down for this one)**



In preparing your shack for a linear, it is critical to make sure that the ac supply is adequate for the job. While this seems straightforward, there are some subtle points that need to be born in mind. In the US, we recommend getting a single-phase 240V line installed. An amplifier putting out the legal limit, 1.5kW will draw somewhat less than 3kW. But let's use this number for an example. The RMS current corresponding to this power and voltage would be expected to be 12.5A. This current is why Alpha amps are shipped with 20A fuses in the line. But this is only part of the story. The above analysis assumes that both the voltage and current are sine-waves. This is not the case. To see why, we have modeled the amplifier using a circuit simulation program known as Spice. We model the important part of the power supply, ignoring most of the components, and referring everything back to the primary side of the transformer for simplicity. This model and the waveforms predicted for it are shown in the accompanying graphic.

Doing:



Not well. We are running behind. We estimate we have four weeks of amplifiers in our repair department.

Last week, in one day alone, we received nine legacy amplifiers to fix. Our guys have been doing these repairs for years, but we're having a difficult time getting caught up and ahead of this.

We've put an ad on our website and are looking for technicians. WE WILL GET THIS FIXED!

**TOTALLY
TUBULAR TUBE
SALE**



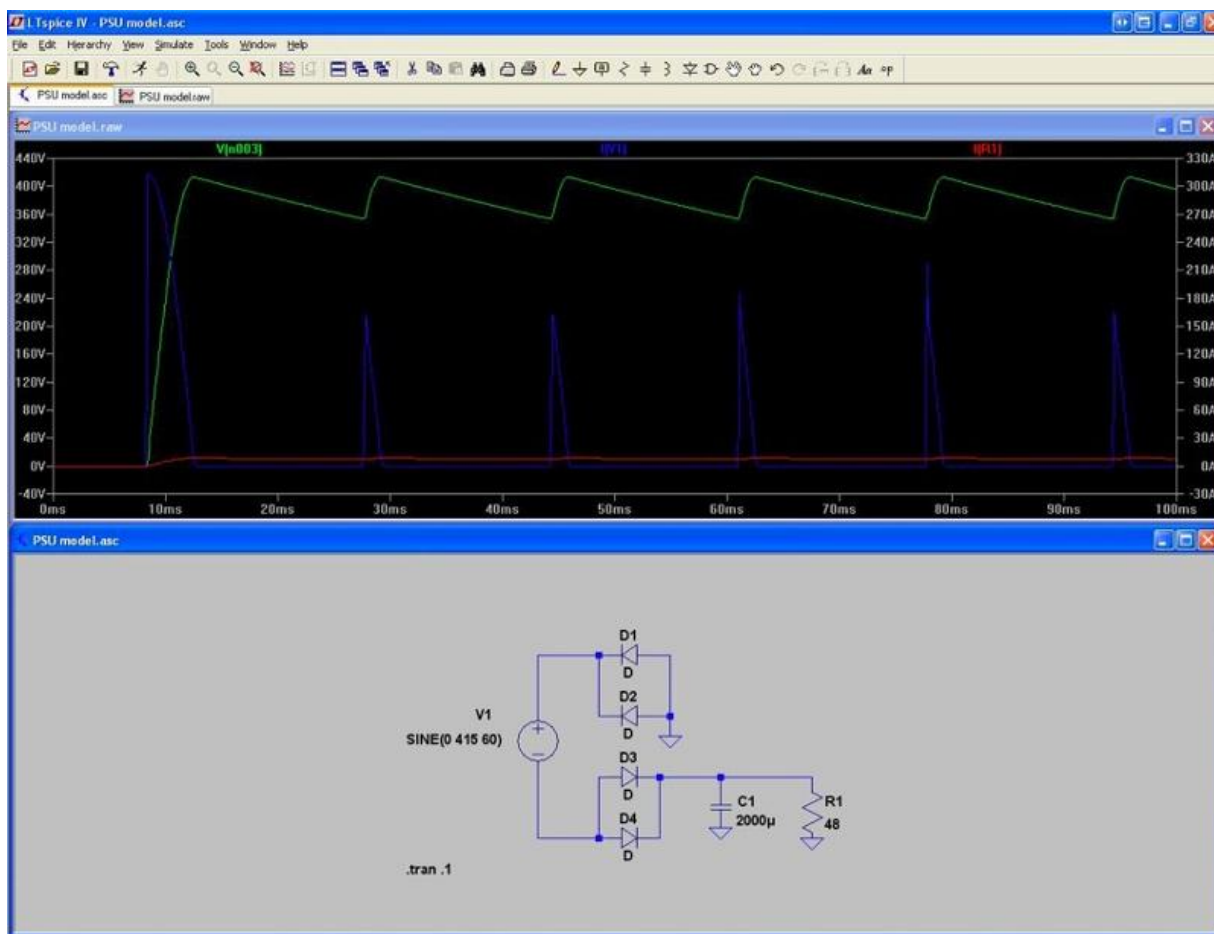
We're having a totally tubular tube sale! (if you were a surfer, you'd know exactly what I'm talking about, but if not, know it's way cool). For the month of March we've reduced the prices on these popular tubes. If you're looking for a set of spares, this is the time to buy!

We've got all the popular tubes in stock:

3CX1500A7/8877-
\$599 ea

4CX1000's
\$375 ea

GU74B's
\$575 a pair, \$290
ea



The ac line is modeled as a sinusoidal voltage source with a peak amplitude of 415V, corresponding to 240V rms. The power dissipated by the amplifier is represented by the 48 Ohm resistor on the right. The diodes and capacitor are a much-simplified model of the power supply. The green waveform shows C1 being charged at the peak of the ac input, and then discharging as it supplies the current to the load for the rest of each half-cycle. The voltage varies between about 360V and a little over 400V with an average value around 380V. The average current in the 48 Ohm resistor is 7.9A, and the power it is dissipating is close to 3kW. This current is shown by the red trace near the bottom of the screen. So far so good- but look at the blue trace. This is the current in the ac source, before it goes into the bridge rectifier diodes. It is extremely "peaky", with the tops of the peaks exceeding 150A! And this is the reason why normal voltage-drop calculations for shack wiring are likely to give results that are not in agreement with what you might measure. House wiring is normally either 14 or 12 gauge (American Wire Gauge or AWG). Imagine that you have 200 feet from your breaker panel to your shack. The loop resistance for 14awg is 0.9 Ohms, and for 12awg around 0.64 Ohms. Using the 12.5 Amps calculated using a sine-wave current, the voltage drop at the shack end of the 14awg would be about 11V for the 14awg, and about 8V for the 14awg, both acceptable numbers, and representing less than 5% drop under load. But, using the 150A peak, the 14awg drop would be 135V and the 12awg drop would be 96V! Now, you would not expect to see quite this much drop for a variety of reasons, such as the inductance of the ac line and so on, which help "smooth" the current peaks a bit- but assuming a peak current of six times the rms would not be unreasonable. The take-home lesson from this is that the wiring for an amplifier should be much heavier gauge than would be calculated using the rms equivalent current. If possible go for 10awg or even 8awg. And, the longer the run to your shack, the thicker the gauge should be. The rule of thumb for AWG is that for three gauge sizes, the resistance changes by a factor of two. So going from 14 to 10 awg, the voltage droop under load would more than cut in half.

A few final notes are in order. The 20A fuses in your amplifier don't blow because they respond to the rms (heating equivalent) current. They have a thermal time-constant longer than the ac waveform, and since they blow based on overheating, they are correctly sized based on the rms current. For those who use their amplifiers off generators, this peaky current can be problematical, and can make it very difficult to get full power even though the generator is apparently rated at sufficient power. The generators' regulator can also have a tough time and not track load variations as well as you would expect. Different generators respond differently, so test your amplifier with the generator before heading off for field day or a dxpedition. Finally, the peaky current is rich in harmonics of the ac line frequency. The current in the conductors produces a magnetic field, which can in turn induce mechanical vibration in the wires and other nearby conductors. That is also why a high quality transformer is used in Alpha amplifiers, as the details of the construction can affect how much "buzz" is audible from the transformer, as the harmonics are much more audible than the fundamental 60Hz. But a buzz may be heard even from wires in a steel conduit! This problem is even worse when running from 110V, and why we recommend using 240V if at all possible. If you must run from 110V, you should probably expect to get more like 1kW. This problem is true for most amplifiers produced today. Even some of the simple switch-mode power supplies that lack active power-factor correction exhibit exactly the same characteristics.

Gordon Hardman
Vice President, Engineering
Chief DXpedition Officer, RF Concepts/Alpha Amplifiers

Svetlana 8874's
\$375 ea (we're
low on these, but
have ordered
more)

We have access
to many, many
different tube
types. If you
need a
transmitting tube,
we can get them
in a day or two.

If you're
interested in one
(or a hundred) of
these, call Molly
at the office and
place your order.

73's from RF
Concepts/Alpha
Amplifiers

Thanks to all of our Alpha customers and enthusiasts.

WE ARE THRILLED YOU'RE ENJOYING OUR PRODUCTS.

Let us know if you have any questions or comments.

73's from the whole group at RF Concepts/Alpha Amplifiers

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