
Subject: Challenger part

Posted by [cassent5150](#) on Sun, 12 Dec 2010 23:02:59 GMT

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I see a lot of comments on locating these ICs. Did anyone find them or figure a solution or substitute. I'm working on one at the moment and so far I believe I have isolated it to that point. I have signal at pin #2 on I3 "SE540L" (non inverted input but has a little tremolo effect in it) and the output transistors are testing good. I checked them out of the amp and reinstalled them. I'm just not getting any signal output from this SE540L. I see one instance where a C540H was used, is that correct? How about the availability of that one. If I'm not mistaken it was chicagobill that got that guy headed in the right direction in that area. This unit still has those white diodes with the red band on, how important is changing them out with either the 1N4007 or 1N4005. Also I have a note on the schematic to add one of these diodes from pins 8 to 9, any idea what direction that would be or maybe the necessity of this? Anyone have any thoughts they could share other than making this an end table or night stand. Thanks Steve C

PS: Still waiting on the chassis for the Franky I'm restoring. I'll keep ya'll posted on the outcome.

Subject: Re: Challenger part

Posted by [chicagobill](#) on Mon, 13 Dec 2010 16:39:25 GMT

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Yes, I used to have a few of the C540H chips that I had used to repair these, but I doubt that I have any left.

The C540H has worked fine for me as a replacement in the past as long as it is well heatsinked.

My schematic doesn't say anything about the diodes.

Subject: Re: Challenger part

Posted by [steven](#) on Mon, 13 Dec 2010 17:09:59 GMT

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Diode wise use can choose to leave them in if they test ok like a good diode should, but if you have some new diodes on hand and since you are into the amp anyway you might as well change them out.

Subject: Re: Challenger part

Posted by [pleat](#) on Mon, 13 Dec 2010 22:36:33 GMT

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ChicagoBill, Bob Brinkman from Kustom is who told me to change out all white diodes with red bands to 1N007 diodes. This was a note I added on my schematic back in the 70's. Can't remember why kustom made the change in the field, but that is where the update came from. Bob

was the head tech at Kustom from just about the beginning of Kustom.
pleat

Subject: Re: Challenger part
Posted by [chicagobill](#) on Mon, 13 Dec 2010 23:19:36 GMT
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Good to know. Thanks Pleat

I know that Pleat know this, but Bob Brinkman is also one of the originators of the Legend Amp line.

Subject: Re: Challenger part
Posted by [cassent5150](#) on Tue, 14 Dec 2010 03:21:04 GMT
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Yea, I got the schematic from Don and he confirmed the importance of changing them out. Theirs also a note to add a diode between pins 8 and 9. Cant do that till I find out the direction. I have some of those 10 pin ICs I found in a misc. bin. They have the same package with the S like icon on it. I have models 8402/8418/8421/8426/8427/8428 and 8429. They all have #s 733W21 and under that all have 46L1. I was told these were all suitable for 540 replacement so I tried one out. This baby is up and running but I cant turn the tremolo off. Not even with the footswitch wire. Its the same as I mentioned in the last comment when I tested pin 2 for input signal. I had signal at pin 2 with a light tremolo effect. So, now I have to figure out how to correct that. Other than that reverb, volume and tones all function good. From the schematic it looks as though the tremolo circuit is completely separate and connected at the depth control. I just did some more testing and there is a fast gain in volume between 0 and 3 and it will start clipping at 4. When the reverb is turned up the volume also increases somewhat. That does it for tonight I got that work thing at 2:45 AM so I'm off to bed. Any comments welcome. Thanks Steve C

Subject: Re: Challenger part
Posted by [cassent5150](#) on Tue, 14 Dec 2010 03:30:19 GMT
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They are working good far as I can tell I checked they under load and there is 26 to 27 volts plus or minus on one side and all are 0 on the other. I dont have the diodes in hand to change them yet. I've got to correct the tremolo effect thats getting into the signal path. The 540 type chip I'm using may be the NE and not the SE. this may be too much voltage for it, but so far its loud and clear. Steve C

Subject: Re: Challenger part
Posted by [cassent5150](#) on Tue, 14 Dec 2010 04:01:45 GMT

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Your right about the heatsink. The one I put in gets pretty warm so I have one of those wrap around star looking heatsinks on it. Hope that works. Steve C

Subject: Re: Challenger part
Posted by [chicagobill](#) on Tue, 14 Dec 2010 16:44:13 GMT
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Is it actually the tremolo circuit that is causing the volume fluctuation or is it something else just causing the volume to pulsate? Does the speed change when you turn the speed control?

Subject: Re: Challenger part
Posted by [Kustom_Bart](#) on Tue, 14 Dec 2010 18:25:30 GMT
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I had a similar issue where my Challenger would hang after a really low not, E or G and it a Trem effect to it. What they found is the main power to the boards is supposed to be at least 24V and mine was only 18V this was messing with the over all performance of the amp when you made it work the pilot light would dim and then get brighter when you where not using it heavily. Remember this is a 12V+ and 12V- system. They found the resistors were incorrect (to high of a value) and swapped them out. I also had the white with red stripe diodes changed as well. It cost me 40.00 to get it fixed and it is better than new now.

Good luck and I hope this helps.

Subject: Re: Challenger part
Posted by [pleat](#) on Tue, 14 Dec 2010 22:01:28 GMT
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ChicagoBill, not sure if everyone knows that Bob Brinkman also designed for Westerman amps that produced Electric String Piano down the road from Chanute. Guess they only made about 100 of them. He and Bud got Road amps going, designed the legend amps, designed amps for Dean Markley, Krossroads, Birdview Sattelites with Bud, and did some design work for Gibson. He was a wonderful guy. When I was in retail selling Kustoms, it seems that I spoke with him at least twice a week. First time I was at the factory he gave me the grand tour. He could talk you thru a problem over the phone in just a few minutes.
pleat

Subject: Re: Challenger part
Posted by [cassent5150](#) on Wed, 15 Dec 2010 03:47:27 GMT
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I wish that was the problem, but I have 26.5 to 27.1 volts. Think I might look in to it though cause it may work both ways. Not enough voltage and too much voltage may do the same thing and took out the SE540L chip!! Thanks Steve C

Subject: Re: Challenger part

Posted by [cassent5150](#) on Wed, 15 Dec 2010 04:00:26 GMT

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Yes the tremolo funtions, speed and intensity both work. I just cant get rid of it, pulsate is a good word to discribe it. The power light is pulsating with the sound. Steve

Subject: Re: Challenger part

Posted by [Kustom_Bart](#) on Wed, 15 Dec 2010 06:28:30 GMT

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Mine did the same thing and you could hear the trem. sound even when you weren't playing. It had the Kustom hum, but the hum had trem. if you get what I mean. It has a bad resistor or a loose soldier joint. I would touch up all of the joints on the boards. I did that on mine as well.

Subject: Re: Challenger part

Posted by [chicagobill](#) on Wed, 15 Dec 2010 16:58:43 GMT

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Steve C:

The question that I asked was meant to figure out where the pulsation was coming from. If the pulsing changes in time with the speed control, then the problem lies in the trem circuit.

If the pulsation is independent of the trem controls, then the problem is somewhere else, like bad caps, etc.

Subject: Re: Challenger part

Posted by [cassent5150](#) on Wed, 15 Dec 2010 19:41:18 GMT

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I thought the speed changed from slow to fast with the speed control and got more intense as I turned the intensity control up. I'll hook it up and check it out again. Steve C

Subject: Re: Challenger part

Posted by [cassent5150](#) on Wed, 15 Dec 2010 20:45:44 GMT

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Yes and no on the answer!!! Well I fired it up volume at barely 1 and everything works as it should. I turned up the volume and at 2 the volume spikes and is pulsing and tremolo is working properly. I turned it up to 5 on the intensity and brought the speed up and the signal has tremolo effect plus pulsing going on. I back the volume off and the pulsing quit but the tremolo was unchanged and working. Just the pulsing decreased as I drop the volume off. Hope this helps. I did notice that 1 orange cap (.01 10% 100 DC) has a little swelling on top and humms if you touch it, also one leg of that cap goes strait to the center pin on the volume control. Steve C

Subject: Re: Challenger part

Posted by [Kustom_Bart](#) on Wed, 15 Dec 2010 20:47:04 GMT

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You are correct in a way. The problem is that the Trem circuit is not getting enough Volts. It could be the trem circuit or any circuit prior to the term that provides power to the trem circuit. That is how the guy who repaired mine explained it to me. I am not a tech, but i can test and change out parts without a problem. I know enough to be dangerous. With my Challenger having the same problem recently, I thought that the info from my experience may help you figure yours out. Try shorting the trem (1/4" jack to ground) and see if the problem stops, mine didn't and now you can short it and there is no trem function (that is how it should work).

Hope this helps,

Bart

Subject: Re: Challenger part

Posted by [cassent5150](#) on Wed, 15 Dec 2010 20:49:08 GMT

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Yea that would be a good idea. I'll do that and see what I got then. Steve C

Subject: Re: Challenger part

Posted by [cassent5150](#) on Wed, 15 Dec 2010 21:53:53 GMT

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Thats what mine is doing at the moment. I power it up and you can see the power light pulse. The tremolo is working and I can here it come on and off when I switch it on and off cause they're different speeds. I can hear the intensity of the tremolo go in and out when I turn the intensity up or down. Steve C

Subject: Re: Challenger part

Posted by [stevem](#) on Thu, 16 Dec 2010 12:23:09 GMT

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If you do not mind spending the time, unsolder and swap two of those ICs around to see if the problem changes.

Subject: Re: Challenger part

Posted by [cassent5150](#) on Thu, 16 Dec 2010 16:16:00 GMT

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Did you get your hands on the schematic? I show 2 power resistors rated at 200 ohms 5 watt between the 2 zenear diodes and supply source. The schematic is saying 125 ohm 5 watt. I do notice that there is suppose to be 12 volts = and -. I dont have but 10 or 11. whats your take on this. Steve C

PS: Are the IC your talking about IC 1A and IC 1B? I believe they are the only ones that are the same.

Subject: Re: Challenger part

Posted by [chicagobill](#) on Thu, 16 Dec 2010 17:24:27 GMT

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Steve M probably hasn't gotten the schematic yet, as there are no chips that can be swapped in this amp. IC1a and IC1b are both in the same chip.

The 12 volt supplies are not going to be exactly 12 volts. It also could be your meter that is slightly off.

Have you replaced any filter caps yet?

Subject: Re: Challenger part

Posted by [stevem](#) on Thu, 16 Dec 2010 17:27:38 GMT

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No I do not have a schematic, but what ever the schematic calls for is what should be used/in place.

10 volts is too low and could be what is throwing the conduction of that IC off.

Subject: Re: Challenger part

Posted by [cassent5150](#) on Thu, 16 Dec 2010 22:19:04 GMT

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No I haven't changed any caps other than a .01 cap that looked swelled at the top and would make a humm sound when I would touch it. How do know which ones are filter caps or is that just how its used? What ones should I replace first? It pulses the minute I flip the switch on you can

hear it in the speakers and the power light is pulsing with it. What about the different resistor values (125 Ohm on schematic, but 200 in the amp supply circuit? I have 2 digital meters and they both read the same, so that should be pretty close as to the voltages I'm getting. Steve C

Subject: Re: Challenger part

Posted by [cassent5150](#) on Thu, 16 Dec 2010 22:31:04 GMT

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I think your right stevem. I got a response about the same issue and he said the repair place had to replace some resistors they found to be too high valued. I'm going to replace those 200 ohm resistors to 125 ohm like the schematic calls for and see what that does. Steve C

Subject: Re: Challenger part

Posted by [chicagobill](#) on Thu, 16 Dec 2010 23:26:36 GMT

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The two main filter caps are the large 1900uF/40v caps, C1 and C2. The two caps that stabilize the voltage from the Zener diodes C31 and C32, 47uF/15v would also be suspect.

For that matter any electrolytic or tantalum caps would be suspect due to age.

Subject: Re: Challenger part

Posted by [stevem](#) on Fri, 17 Dec 2010 00:27:37 GMT

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The hum you hear when you touch some componets in a circuit is normal when their is gain happening thru that componet, its just like putting your finger on the end of your plugged in cord when the volume is up.

some orange drop type caps do have a epoxy pimple left on top from the dipping process, the caps I would be more in question of would be all the other small caps.

The two big main filters and all the ornage drop types would be last on my list of problem componets.

Subject: Re: Challenger part

Posted by [cassent5150](#) on Fri, 17 Dec 2010 01:05:42 GMT

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OK I'm going to get some power caps and power resistors for this thing (2 of the 1900uf 40V and both R58 and R59 resistor with the correct 125 ohm ones. I just replaced C31 and C32 with the electrolitic type caps. Pulsing decreaced considerably but if I connect the reverb wires it goes back to the pulsing like it was doing before. Ran a check on the supply voltage and we got 11 + and 11.3 -. I think stevem is on to something in his last comment on insufficient supply to the ICs.

I'll pick up the parts I need tomorrow and get back with ya'll with the results. Steve C

Subject: Re: Challenger part

Posted by [cassent5150](#) on Fri, 17 Dec 2010 02:08:47 GMT

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OK I couldn't wait till tomorrow so I grabed some 50 ohm 5 watt resistors, tied 2 together to get 100 ohms, soldered one set into each side of the supply section in place of those 200 ohm. I have 12.5 volts plus and 12.3 volts minus and no more pulse even when the reverb is connected. I dont have the original reverb tank for this and the one I have hooked up may be too low ohm cause you can barely turn up the control and the reverb gets thick and deep quick!! Well!!! Bart and Stevem are the proud winners on this one for now, but thanks to chicagobill and anyone else that were so wonderful to give me help with this whole process. Steve C

PS I'm still waiting on the Frankie chassis I got off ebay to get here. I got a K200 I'm working on at the moment. It quit last weekend at the gig. I'll start another thread on that.

Subject: Re: Challenger part

Posted by [stevem](#) on Fri, 17 Dec 2010 11:58:22 GMT

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It would seem then that your main problem then was the low volatge due to the wrong/higher value resistors.

The two zener diodes did not have enough volatge across them to keep conducting.

Subject: Re: Challenger part

Posted by [chicagobill](#) on Fri, 17 Dec 2010 16:51:40 GMT

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I didn't know this was a contest. What prize do they win?

Subject: Re: Challenger part

Posted by [cassent5150](#) on Sat, 18 Dec 2010 01:15:35 GMT

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Yes I believe so. Some of that is over my head but I'm still learning as I go. I got a hand full of those 540 ICs If any of you want a couple for your own use or to help someone like me I will send it to ya'll. My thanks to YOU, Bart, Chicagoboll, Don and anyone else that has helped me on this site!!! My thanks to all of you. This challenger has a reverb issue I need to address. You cant turn it up, its driving way too hard and when I swop the wires the reverb control acts like a volume or gain knob. I even tried a new hammond tank with High resistance and it still drives way too hard. Any thoughts? Steve C

Subject: Re: Challenger part
Posted by [pleat](#) on Sat, 18 Dec 2010 12:34:51 GMT
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Steve, the K250 slant face amps used a reverb tank that the impedance is 25 ohm and 200 ohm. I can't remember which was input and output. I think I did a post on the tank years ago, but maybe the input was 25 ohms input. You can do a search.

The older plexi amps used a 200 ohm input and output.

It's always hard when you have a 35 or 40 year old amp to know what may have been done to it before you got it. You may just have a amp with the wrong reverb tank installed. The last challenger I owned, used a short two spring tank, about 10" long.

pleat

Subject: Re: Challenger part
Posted by [cassent5150](#) on Sat, 18 Dec 2010 14:27:07 GMT
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NO!!! not really, you all are winners in my book, you have been enormous help too many times to count. the last thread applies to you tooooo. I do enjoy tinkering with this stuff. I need to slow down on the projects though. When ever I run across a kustom I dont have I'll grab it and its kind of like getting a new model car for Christmas, I just got to put it together. Maybe with some of the parts and obsolete ICs I have laying around I can be as helpful as all of you some day. I'm just a kid at this, but I'm growing!!!! Thanks a bunch. Steve C

Subject: Re: Challenger part
Posted by [Kustom_Bart](#) on Sat, 18 Dec 2010 20:05:50 GMT
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Glad that I could help Steve. I love my Challenger and it is my new Giggig rig.

Bart

Subject: Re: Challenger part
Posted by [cassent5150](#) on Sat, 18 Dec 2010 23:10:35 GMT
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I forgot I did remove a short black reverb tank screwed to the bottom of the cabinet. I tried it and it doesn't work. I have a kustom tank measuring 183 ohm at input and output it worked but like I said "you can barly turn up the reverb and its way over driven!!! I'm talking like 2 on the control and its super hall with a little distortion. I'm thinking I have a curcuitry problem still. I do notice even the volume control is touchy also. Its like 0 to full throttle at around 3 or so and goes into distortion by 4. This was the case even before I solved the pulsing problem. Steve C

Subject: Re: Challenger part
Posted by [pleat](#) on Sun, 19 Dec 2010 00:24:58 GMT
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Steve, you do have the wrong reverb tank with those measuments. The challenger has most of it's gain from 0 to around 9 o'clock when viewing the volume knob like the face of a clock. Above that, then the amps starts to overdrive. So I'm not sure you still have a problem with the amp, but then, I haven't heard it.

pleat

Subject: Re: Challenger part
Posted by [cassent5150](#) on Sun, 19 Dec 2010 01:50:22 GMT
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I do have the reverb unit for this and it is 200 ohm on one side and the other is open. Do you know where I might get a tranformer for this reverb unit? I noticed that the ground is lifted on the reverb pan input and is grounded on the pan output. The other tanks I tried all are gronded on both. The Hammond type 4 sounds good but you cant get to about 4 on the reverb control and she'll start to howling. Other than that I just gave the whole amp a go around with my Honer Blondie guitar on my frankie 3X15 at 3.8 ohms and it sounded great from Garth Brooks stuff to Edgar Winters Band stuff. Long as I keep the gain down on those humbuckers it will get pretty loud and still be fairly clean. As with most my Kustom equipment, specially the slant face ones" the distortion is a little imbarasing. I do have the exception of a K100-7 I put together a while back and a K200-1 I replaced all the se4002 transistors to TO-105 2N3565 low noise in the bright channel (That sounded as good as my JAPAN Boss SD-1). I will no doubt be doing the same to the K200-1 I'm working on now if I can get the regulator putting out 8 volts on each side instead of .1- and 35.4+ !! Steve C

Subject: Re: Challenger part
Posted by [cassent5150](#) on Sun, 19 Dec 2010 02:29:21 GMT
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Check out my last posting . I can see why. It wouldn't replace my K50-2 or anything but it is a pretty neet little amp. I like the line out part. I wonder if a person could tap into the solder trace for pin 2 of that 540I chip and create a line in and out to loop effects. That would be a nice option. Maybe its just me but it seemed over driven with an effects box in front of the preamp. I'll admit the Tremolo is sweet on this thing. Steve C

Subject: Re: Challenger part
Posted by [cassent5150](#) on Sun, 19 Dec 2010 02:37:38 GMT
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It will stat clipping at around 3 1/2 to four if I turn the humbuckers full open. It could be just hot pickups cause the amp really does sound fine as long as you keep the throttle down on the guitar.

The reverb tank for this needs a transformer for the input side on the tank. The one that's in it is blown. The Hammond IV is working fine but it will howl at you if you turn her up around four or five. It's a longer tank and sounds good. Thanks Steve C

Subject: Re: Challenger part

Posted by [stevem](#) on Mon, 20 Dec 2010 15:10:16 GMT

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If you use the bottom input on the K50 you will knock 3 db off the input signal level and not clip the input so fast.

It's also possible to mod the preamp stage on the little bugger to drop out some gain.

I do not know that I would set the amp of a effects loop type of set up without some added circuitry to buffer the input and output of the loop.

Subject: Re: Challenger part

Posted by [cassent5150](#) on Mon, 20 Dec 2010 19:28:57 GMT

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Thanks stevem, I think I'll leave well enough alone. I was talking about putting a effects loop in the challenger. It has a line out, but effects seem to overdrive the preamp somewhat. I thought a loop would sound better on that amp, but I scrapped that idea after thinking how fragile that 540 chip is. The K50 doesn't have a line out, so I was thinking of coming off the speaker output and dampen the line jack with a resistor like Kustom did on some of the other amps. I got a line out jack from a Kasino U100PA with the resistor still on it. I thought that might work. Steve C
