

Date: Wed, 16 Apr 2003 14:23:04  
From: "darkboneus"  
**Subject: DEG 2a voltage output increase**

Does anyone know what would need to be done to the dual envelope generator 2a to increase it's output voltage? Aside from increasing the power supply voltage from +-12v to +- 15v, I don't really know what I should do. Any help would be appreciated.

-Rob Currier

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Date: Thu, 17 Apr 2003 21:32:16  
From: male man  
**Subject: Re: DEG 2a voltage output increase**

well since no one has answered...

try putting a resistor in the feedback loop over the output opamp (U2a in the schematic). you will have to cut the trace and replace it with a resistor.  
good luck, and let us know how it turns out

skot

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Date: Sat, 19 Apr 2003 11:00:01  
From: "Tim Stinchcombe"  
**Subject: Re: DEG 2a voltage output increase**

Looking at the schematic on the website, another possibility would be to add a resistor from pin 3 (resp. pin 11 for EG no.2) to the positive supply. Internally the 555/556 has 3 5k resistors dividing the supply to give the references for the trigger level (pin 6 (8)) and threshold level (pin 2 (12)) - with pin 3 (11) open you get 1/3 Vcc and 2/3 Vcc respectively. A resistor from 3 (11) to supply will be in parallel with the top resistor in the chain, so for example if you use 5k, the top resistor becomes 2.5k, so the ratios are now 1:2:2 (and not 1:1:1), so for 15V supply say, the threshold would now be  $\frac{4}{5} * 15 = 12V$  (and not 10V). HOWEVER, since this also affects the trigger level too, the 'dynamics' of the EG may change (I've not made the module, so this is conjecture, but I'm surprised that there is no resistor shunting Q3 base to ground - maybe the schemo on the web isn't the latest...). Also you may need to adjust R8 (R13) so that the sustain level can be higher too. Experimentation is the order of the day I guess!

Tim

Date: Sat, 19 Apr 2003 11:41:10  
From: "Tim Stinchcombe"  
**Subject: Re: DEG 2a voltage output increase**

Hi Skot,

Actually, I've had a bit more of a think about this, and I'm not so sure it will do what you expect. On the (usual) assumption that the op amp inputs draw little or no current, there will be no current through the resistor and hence no voltage drop across it, therefore the output will just continue to follow the positive input as before... (i.e no chance of any gain).

Tim

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Date: Sat, 19 Apr 2003 11:50:40  
From: "Tim Stinchcombe"  
**Subject: Re: DEG 2a voltage output increase**

> Hi Skot, <snip > (i.e no chance of any gain).

Ooops! Sorry, I take that all back - I was assuming that R12 and R17 and the LEDs were being left out, as recommended. If the resistors are left in place, then adding a resistor to the feedback gives the standard non-inverting op amp config, so gain \*is\* possible. My mistake, bad boy!

Tim

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Date: Wed, 23 Apr 2003 03:44:32  
From: "darkboneus"  
**Subject: Re: DEG 2a voltage output increase**

I tried putting a resistor in the feedback loop and it DID work. However, the envelope functions changed along with it. The decay actually goes longer with the new resistor in the feedback loop, however the sustain also affects the decay time. What happens is that even if the decay time is set to 0, turning the sustain level from 0 moving up actually causes more decay until about 3/4 of the way. I guess this won't work unless I feel like really researching this and finding a way to fix the new problems too. Let me know if you have any other good ideas though. I'm always willing to try 'em out.---

Date: Wed, 23 Apr 2003 12:16:46

From: "Tim Stinchcombe"

**Subject: Re: DEG 2a voltage output increase**

This surprises me. How are you measuring such things as 'decay goes longer' - do you have a scope, or are you doing it aurally, e.g. feeding the envelope output into a VCO so you can hear pitch changes?

I was sufficiently intrigued by various aspects of this circuit to actually enter half of it (one envelope's worth) into my simulation program. If you supply me with some info, I can do some more runs and perhaps answer some of the above questions:

1. What value are you using for resistor R12(R17), and the new feedback resistor?
2. Do you have the LEDs in the circuit?
3. Are you running it from 12V or 15V supplies?
4. Are there any other component value changes from what's shown on the web page?
5. Whats the exact make and type of your 556 chip? (Not critical to answer this one, but it may help me check the suitability of the 555 model I'm using.)

Tim

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Date: Thu, 24 Apr 2003 14:48:22

From: "darkboneus"

**Subject: Re: DEG 2a voltage output increase**

I just did it aurally. I ran the output into a filter. Basically, adding the resistor causes some strange interplay between the sustain and decay knobs.

R12 and 17 are both 1k. I do have the LEDs in the circuit, I'm running it from 12v. There aren't any component changes.

I can't get at the 556 right now but if you really need that info, I can check it out. Thanks for the help. I appreciate your enthusiasm! Let me know what happens.

-Rob

Date: Thu, 24 Apr 2003 19:10:20  
From: "Tim Stinchcombe"  
**Subject: Re: DEG 2a voltage output increase**

Hi Rob,

Because the diode connected to the sustain wiper in reality doesn't suddenly stop conducting, the change-over between decay and sustain is hard to define anyway. Looking at the graphical output from the simulation for various levels of sustain shows that the point where the envelope levels off does depend on the sustain level, and it is quite noticeable at fast decay rates (but is quite subjective!). A quick experiment with an extra transistor in there seemed to improve things in that area. However...

...that you left the LEDs in when placing the new resistor in the feedback path is bad news - I suspect this will cause some kind of non-linearity in the gain of the op amp, so heavens knows what the envelope would then look like. I'll build something similar into the model to see what happens. You also didn't say what the value was you used for the feedback resistor - either that value or the desired max output voltage of the envelope would help me (just so that I don't run into saturation problems with the op amp output etc.)

Cheers, Tim

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Date: Fri, 25 Apr 2003 12:30:49  
From: "darkboneus"  
**Subject: Re: DEG 2a voltage output increase**

Sorry about that. The value for the first try was 1k and the second try was 10k. Both had that weird effect on the relationship between the decay and sustain knobs.

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Date: Fri, 25 Apr 2003 15:44:28  
From: "Tim Stinchcombe"  
**Subject: Re: DEG 2a voltage output increase**

Hi Rob,

Unfortunately both of these are way too big, and will cause the op amp to saturate, so your envelope will have a decidedly 'flat top' to it! If we call the new resistor in the feedback of U2  $R_f$ , the input  $V_{in}$ , and the output  $V_o$ , then after a little bit of maths (not too hard, you should find it in just about any book that covers basic op amp circuits) you get  $V_o = V_{in} \cdot (1 + R_f/R_{12})$ . Without the new resistor, the envelope goes up to about 8V (=  $V_{in}$ ), thus say you now want 10V out, stick these values in the above expression and you get the ratio of  $R_f$  to  $R_{12}$  as 0.2. Thus with  $R_{12}$  as 1k, make  $R_f$  220 ohms say. Before with 1k for  $R_f$ , the gain is 2; when the envelope in gets to about 5.5V, the output is  $2 \cdot 5.5 = 11V$ , approx the max of what the op amp can give with 12V supplies, and stays there until at some point in decay, depending on sustain setting also, the envelope drops below 5.5 again!

Having the LED in the circuit didn't have as much effect as I thought: any effect it has on the overall gain is seen through 'R12' in the above expression, and since this only affects the 'fractional part' of the gain (i.e. the '0.2' bit), it's effect isn't worth worrying about: you might just lose half a volt off the envelope.

Try these new values out, and hopefully you'll notice a difference to what you had before (if you have a VCO try feeding the envelope into that, it might be easier to follow what the envelope is doing to the pitch rather than the filter cut-off, which is what I assume you were doing before(?)). If you still think the sustain level is having too much of an impact on the decay, you could try inserting a pnp transistor (2N3906 say) between pot P1 wiper and diode D3: emitter to diode (cathode); base to wiper; collector grounded. This will make the decay happen a little quicker, sharpening the 'knee' where decay becomes sustain.

Keep us posted on how it turns out.

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Date: Sat, 26 Apr 2003 22:00:47  
From: "darkboneus"  
Subject: Re: DEG 2a voltage output increase

I tried the 220 Ohm resistor and it works like a charm. Thanks for the advice and the lesson in op amps. Take care.  
-Rob

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Date: Sat, 26 Apr 2003 20:58:44  
From: jwbarlow@aol.com  
Subject: Re: Re: DEG 2a voltage output increase

I've been watching this thread since I have built a couple of these PCBs but haven't yet tested or installed them in anything. Since I've been starting to think about a front panel, I did want to ask if this module is in fact a dual ADSR.

While it seems like a stupid question, I've seen a front panel layout which Tom did and it had strange labels for the knobs. I think they were: Attack, Slope, Break Point, Decay, Sustain (odd that there were five labels even though they were four knobs).

So do the four knobs do the ADSR functions?

Thanks! JB

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Date: Sat, 26 Apr 2003 18:14:36  
From: male man  
Subject: Re: Re: DEG 2a voltage output increase

look again: <http://ele4music.com/deg2a/deg2a.html>

Date: Sat, 26 Apr 2003 21:37:20  
From: jwbarlow@aol.com  
**Subject: Re: Re: DEG 2a voltage output increase**

In a message dated 4/26/2003 6:15:08 PM Pacific Daylight Time, flanger\_man writes:

> <http://ele4music.com/deg2a/deg2a.html>

Thanks!

That's different from the other one I saw (I think on EFMSupport).

JB

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Date: Thu, 22 May 2003 13:35:41  
From: "darkboneus"  
**Subject: More DEG problems**

Hello.

Just when I thought everything was finally ok with my synth, I noticed that my DEG2a is still having weird issues with the decay and sustain pots. I have it wired exactly as it says in the schematic. Basically what is happening is that the sustain pot acts as a sustain/decay pot. The decay pot behaves normally though. If I turn the sustain pot up from 0, the sustain level increases but the decay time does too. I don't think that the envelope always did that. Could it be a bad 556? I can't see anything else that would cause this. Any insight would help. Thanks.

-Rob

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Date: Thu, 22 May 2003 16:57:21  
From: "toneboy22"  
**Subject: Re: More DEG problems**

Hey,

looking at the schemo...hmmm...cmos switches to route timing.... noticed pin5 of 555 is blank. maybe the 555 is false-triggering, confusing itself. all 555 circuits i've seen have .1mfd bypass cap on pin5. give it a try...add ,1mfd from pin5 to gnd.

tb

Date: Thu, 22 May 2003 18:21:56  
From: "Tim Stinchcombe"  
**Subject: Re: More DEG problems**

Hi Rob,

From my simulation of the circuit I think this is likely to be a facet of the design. In the 'files' section I will post a file ('DEG2\_sim') showing the output from my simulation, with traces 'before' and 'after' adding a pnp transistor at the sustain pot wiper, as I suggested back in post #3075. I doubt it will completely remove the problem (the traces are with the decay at its fastest, which emphasises the improvement - it is harder to see at slower decay settings!), but it could be a step in the right direction! (I should stress I have not tried this in reality, but the traces may help to show the difficulty in saying when decay stops and sustain starts.)

Tim

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unknown

I dragged my old modular from 1976 out and have a dead dual ADSR. My Aries/CFR TAU based system uses 10 volt control voltages. Does your ADSR go to 10, or is it 5 like most others these days? Adjustable? My CFR TAU Moog Style Filter sucks with only 5 volts using my Thomas Henry Polyphony ADSR. Your stuff looks great. I will probably pick up a Pro MIDI CV and ADSR to rejuvenate my old modular, or who knows maybe build a whole new one from your stuff...

Thanxs

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From Tom  
Posted 01/13/2004

It is possible to add a level shifter on the output to get a 10V range but as you suspected, they reset at about 5V.

Tom

mmcmannon

Posted - 02/16/2005 : 11:47:18 AM

I built the DEG2A, added op amp buffers for the LEDs, and it works great. At 15 volts power I get 9+ volt output levels. My keyboard has both a gate and trigger output, can I add a trigger input as well to allow ARP style retriggering?

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yusson

Posted - 02/16/2005 : 1:44:44 PM

Yes you can but you will have to use a small perfboard for that. You need to add a single transistor and a few resistors. Check my web page dedicated to ADSR you will find a schematic very similar to that of DEG2A but with a trigger input as well !

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mmcmannon

Posted - 03/09/2005 : 11:12:18 AM

I used your trigger circuit exactly from your ADSR and fed to pins 6 and 8 of the 556. Works great for retrigger. Thank you!