

Re: Leica laser range finder , someone opened it?

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*Source:* <http://sci.tech--archive.net/Archive/sci.electronics.design/2006-08/msg03991.html>

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  - *Date:* Sat, 19 Aug 2006 00:17:23 GMT
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"Yannick" <[yannick\\_de\\_wit@xxxxxxxxxx](mailto:yannick_de_wit@xxxxxxxxxx)> wrote in message  
[news:1155939418.394606.57840@xx](mailto:news:1155939418.394606.57840@xx)

I'd just increase the apd gain untill your resistor noise gets lost  
below  
the apd noise.

Good idea, but i hope it doesnt really brake down, will first measure  
dc current through it, maximum is 1mA i believe...

.....

That would be strange but who knows...i will try up to 250V , first  
have to check datasheet again but i believe it was 250V, espescially  
the c30902S APD, it can operate in geiger mode, but i only have the E  
type... i also saw some interesting APDs from hammatsu with much less  
noise , less reverse bias voltage and same gain... (S9717 APD). Also  
the C30902S-TC is interesting as it is cooled , but i don't know the  
prize, will be too high probably!

As long as the current is limited to the maximum it will be ok.  
mine has taken quite a bit of abuse and survived.  
too much voltage and it just latches on for a while.

How many times have you accidently touched the hot end of the apd ?  
its good to have <<1ma current limit.

I think the one we are using wil be fine, at least its readily avaiable if  
expensive.

2mh for 455khz wich is quite large, hard to find a well sheilded one.  
10khz becomes unpractical.

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Im probably switching to 6mhz IF so a much smaller inductor and use a TV

IF

sound trap BP filter.

yes but then your amplification will drop... hows your sensitivity, can you measure up to 100 meters...? i am intending to use the DSP blackfin from analog devices to do all the measurements and averaging soo i can easily average out the noise...

I have no optics at all atm, just shining the unfocused laser to the apd from a about a foot away.  
the inductor should keep the same sensitivity even at 6mhz, although it wil end up being more narrowly tuned.

the filtering of the bias frequency happens mostly due to the large gain and GBP , but i was thinking of just adding a capacitor at the input to reject it before... dont know if it is going to make a lot difference...

ah no what I meant was that you need a path for the bias frequency to go through apd and down to ground, otherwise you end up with no bias

frequency

voltage across the APD.

Ofcourse Colin, but i meant at the input of the amplifier, i bias the diode at the other side, with a 56 ohm resistor between the 217V DC voltage and the AC modulation signal (with high voltage smd cap in between).. then the other node of the APD is at the input of my amp with a resistor to gnd... here i am going to put a cap in parrallel with this resistor to filter out the high modulation frequency..( but the other node still has this freq soo the mixing still hapens).I was wondering if i could use a 10Meg resistor then the parasitic cap would be high enough to filter everything out above the IF freq... but then the dc biasing becomes a problem... but still if you could then bias the diode at 500+ voltage and then have a 300 V on this resistor (due to the dc current through the diode) , the S/R ratio would be much higher than now... (if resistor noise is the dominant noise factor ofcourse)

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you need to have a low impedance path to ground at the modulation frequency at the cold end of the APD otherwise you end up with no RF voltage across the apd, its no use to have the modulation voltage at both ends of the apd it needs to be across it.

synchronous demodulation ?

best look it up, its the best way to recover a signal buried well below a noise floor.

you just modulate it with a signal of the same (IF) frequency, the output is then a dc voltage proportional to phase.

the noise reduction arises because you can reduce the bandwidth of the subsequent filter to as low as you want.

(but response time falls)

if you use quadrature demodulation it gives you full 360° and also gives you the signal strength.

Damn, This is a very good idea, its actually the same as a current mirror, were the APD Dc current determines the set point of the transistor and because the input impedance of the common collector (seen from the base) is much higher than the 100K, the Collector current is the same as the APD's DC current... and for AC the gate voltage is 0 ... very good idea...i wonder if it is not better to use a NMOS in stead of the bipolar transistor as the input impedance is much higher and the need for the 1K is not necessary anymore... (hmmm if vds does not decrease too much ofcourse due to signal swing) which improves the noise (no thermal noise of resistor but probably not an issue because it is 100 times smaller)...or am i missing something here?

Its actually more like a very slow voltage clamp I think. ie clamped to  $v_{be}+$  a little bit.

also it actually looks like an inductor.

Winfield Hill has written a bit on lowest noise current sources,... worth reading.

If im not mistaken the 1k resistor reduces the effect of the noise of the transistor, the higher the better although it will still work without it.

with a mosfet the output impedance will actually be lower than a bjt, although the input impedance is higher but mosfet noise is higher too.

100k is quite reasonable, you could of course use a darlington or super beta device.

Of course the common base configuration does away with the base resistor

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altogether.

this circuit may interest you ...

<http://www.imagineeringezine.com/PDF-FILES/40krvr2.pdf#search=%2240krvr2.pdf%22>

My vco goes from 800mhz to 2.2ghz, gets hard to make a simple VCO with such

a wide range above this.

Which VCO ic do you use? Does it have sweep capabilities, i am planning to try FMCW principle also (frequency modulated continuous wave) , then good resolution and sensitivity can even be possible with normal PIN photodiode..

Its a varactor controlled colpits oscillator pushed to the extreme. using mmic and very low capacitance varicaps and the inductor is almost purely parasitic just a very very short arch of flattened wire. VCO=sweepy.

the limit of the APD is not diffusion current limited but RC time

constant

Ah thats possible... but i remember that diffusion current speed is also limited not much above these frequencies...

no AFAIK the bias voltage doesnt rely on diffusion current at all to achieve its effect.

thanks for the good info again!

welcome :)

Colin =^.^=

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