

Adam's APD Daughterboard setup procedure

Adam Orin

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TP3, TP2 = APD

TP5, TP1 = Dummy

TP1, TP2 = comparator inputs

TP3, TP5 = voltage applied to APD and dummy

1. Insert card into slot. Do not plug the APD or dummy cables into the card.
2. Power on the ± 12 V, ± 18 V, -32 V power supplies, and send in gate requests. Make sure that APDBias voltage being output to the copper block is at an acceptable level (below 24 V).
3. Check and make sure off/on voltages in the card are at the reasonable levels. Check TP4, TP3, and TP5.
4. Power down.
5. Plug 2 dummy caps into the card.
6. Power on, and send in gate requests.
7. Set APDbias and V0_APD to reverse-bias APD at desired voltage. Remember, the voltage the APD will see from the daughterboard is NOT the same as the voltage that is directly sent into the daughterboard from the motherboard. Use the scope and look at the voltages at TP3/5 when it is gated on to confirm what voltage will be output to the APD. Keep $(V_{bias} + V_b) \leq 30V!!$
8. If your card has a pot on the transistor base, set the offset trimmer and the base transistor so that $(TP1 - TP2) = 0$ throughout the whole gate.
9. Power down.
10. Plug APD into TP3.
11. Power on, and send in gate requests.

12. Check to make sure the APD is reverse-biased at the desired voltage (look at TP3). The APD should be avalanching and you should see the voltage drop on the com
13. Put the scope probes on TP3/5 (output to APD and dummy). Adjust the 2 trimmers such that the gate comes on as early as possible, and such that the 2 signals follow each other well.
14. Power down.
15. Put scope probes on TP1/2 (comparator inputs) and on the ECL out. The ECL output is readily available on the motherboard, on the 34-pin connector.
16. Power on, and send in gate requests.
17. By adjusting R6, set the offset between TP3/5 to around 25 mV. You can measure the DC offset between TP3/5 with a voltmeter. The APD signal should be above the dummy signal before the APD avalanches. (TP2 ; TP1 means comparator output is 0).
18. Move the trimmers such that the two inputs to the comparator follow each other well. The comparator will fire when $APD - DUMMY < 0$. Watch the ECL out, and make sure the comparator isn't triggering on noise or ringing.
19. Unplug the scope probes from TP1/2, and look at the comparator ECL output. Make sure it is still operating properly.
20. Increase the offset between TP1/2 if necessary.
21. The active probes on TP1/2 do have an effect on the signal. Take the active probes off of TP1/2 and only look at the ECL output of the comparator. Adjust the dummy capacitor to minimize any false triggering. You might also have to adjust the two trimmers as well. If you do, re-check TP1/2.