Notes on Input Protection for ABCD

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23-Sep-03

One case was reported in which an ABCD was killed during module testing.

> **It is believed that one input channel of the IC was shorted to the HV bias supply.**
>
> **A subsequent test was conducted which connected the HV supply directly to an ABCD input. The single channel was killed after turning the HV on to some low value even with the current limit set to 100μA.**

The ABCD has a spec on input protection stated as:

> **"Must sustain voltage step of 450 V of either polarity with a cumulative charge of 5 nC in 25 ns."**
>
> > **This is to guard against a sudden voltage impulse as from a large amount of radiation dumped into the detector module.**
> >
> > **The spec was simulated in the ABCD design and was found to be met. It appears now that it was not actually tested with a fabricated chip. Major oversight in the FDR.**
>
> **There is no spec on DC voltage or current into the front-end. The estimate is that it could be as low as 1 mA.**

It is not clear why the accident of shorting the HV to an input channel killed an entire chip rather not just one channel. Apparently, some global circuit was damaged.

Neither the accidental nor the intentional shorting of the HV to an input channel measures the effectiveness of the input protection against the expected impulse voltage.

The input protection against an impulse of HV should still be tested to confirm that it works as designed.