

Re: PCB layout for ADC

Source: <http://sci.tech-archive.net/Archive/sci.electronics.design/2006-07/msg00008.html>

- *From:* "Andrew Holme" <andrew@xxxxxxxxxx>
 - *Date:* Fri, 30 Jun 2006 23:53:46 +0100
-

<tschoepflin@xxxxxxxxxx> wrote in message
news:1151690444.451029.201920@xx

Hi everyone

I recently joined a (small) company that has a very high end A/D system using four 16-bit A/D channels. Two of the channels have a gain of 128 or even more so they can be quite sensitive.

We were using the Burr-Brown DSP102's but they are terribly obsolete so we are forced to design a "daughterboard" to plug into the through-hole pins until we finish redesigning the board. We chose the Analog Devices AD977A as the replacement.

I did not design the original PCB's and that's not my expertise, so I have a couple of key questions:

1. When connecting the power rails (+5V, -5V, and GND) of the daughterboard to the main board, should we use only a single pin or multiple pins? My instincts tell me that we should treat it as a "star" grounding system and not introduce any loops, so we should only use 1 pin for each of these nodes. But any thoughts are very welcome.
2. We are doing a 4-layer board with GND on layer 2 and the power on layer 3. For power, we're thinking to do a pour of +5V_analog and then run thick traces for +5_digital and -5V as necessary. Is this okay or should we try to do more of a "plane" style with larger areas for the "minor" rails? BTW, the -5V is not for the A/D, but for an op-amp buffer that maintains the voltage reference.
3. Any thoughts on doing GND copper pours for the top & bottom layers? The previous design did not use any copper pours for the routing layers.
4. The main board already provides "bulk" 10 uF caps for the power rails. Should we add 10uF caps onto the daughterboard as well or just not worry about it?

FYI—we have a single discontinuous clock line running AFTER conversion

Re: PCB layout for ADC

at 10 MHz. There is also a CONVST pulse (0.1us wide) to start conversion. The analog signals range from 30–450 kHz.

We already bought Howard Johnson's "High Speed Digital Design" which is supposedly the end-all & be-all of PCB layout, but I would say that PCB layout for A/D's is one of the trickier topics and it's not clear how to apply those principles to "low speed analog design" :-).

Cheers,
Todd

Linear Technology have an interesting application note AN71 entitled "The care and feeding of high performance ADCs: Get all the bits you paid for" which addresses the issues you mentioned. Google for: linear technology an71