

**Preamp:**

- \* Relay-controlled gain settings are the parallel combination of both the switched and hardwired R's & C's. The amplifier is never open-loop.
- \* Guard ring surrounds the input connector to reduce errors due to PCB leakages.
- \* Maximum photocurrent capability is 5mA
- \* Photodiode must not see any parasitic electrical connections through its mounts.

**Reed Relays:**

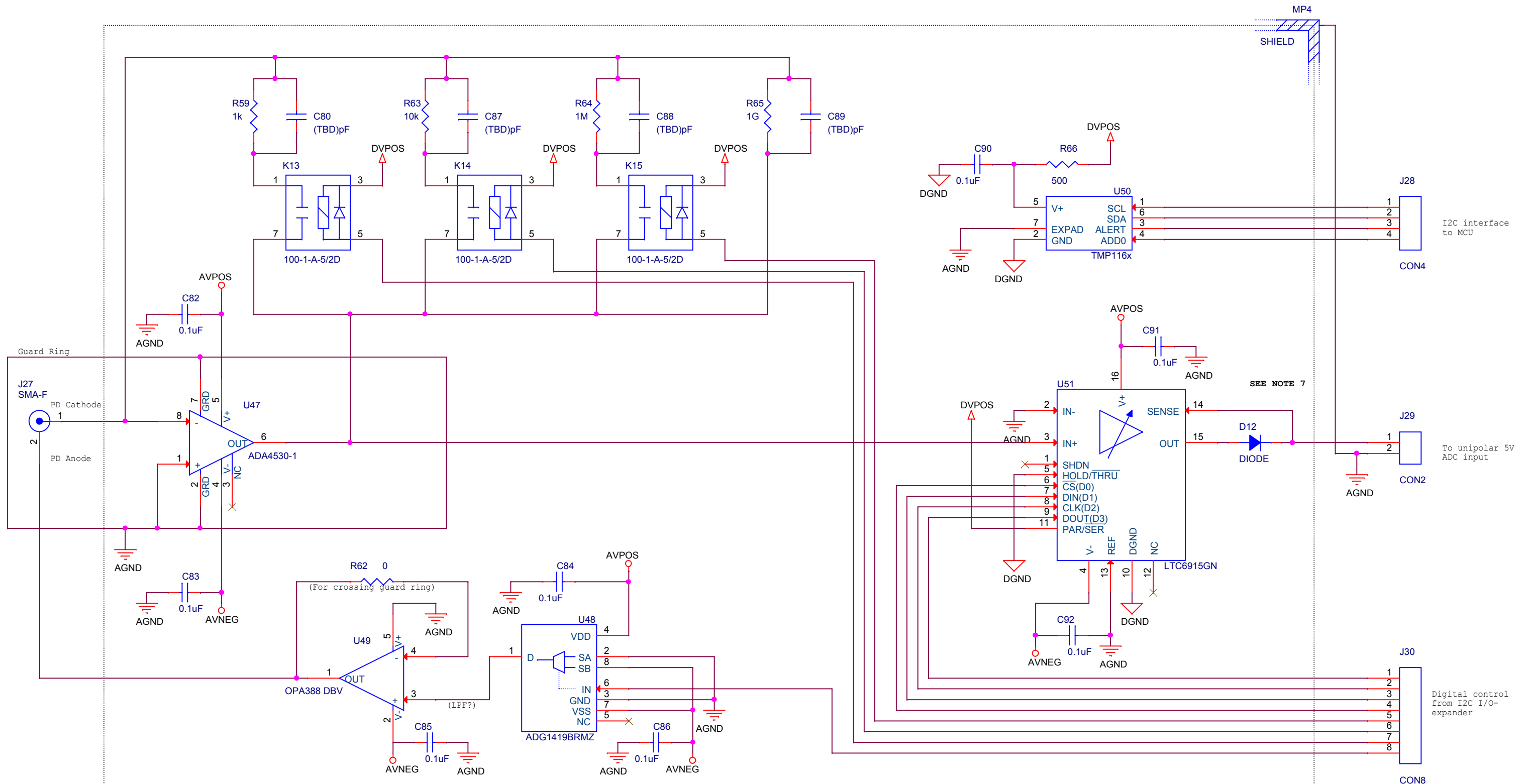
- \* 1T0hm isolation min., low thermal EMF
- \* Drive current is ~2mA @ 5V. Any thermal EMF will produce a drifting offset as the relay slowly self-heats.
- \* Contact pins must be placed INSIDE guard ring
- \* Coil pins must be placed OUTSIDE guard ring

**Gain Stage:**

- \* For each of the 1k, 10k, 1M and 1G transimpedance gain ranges, the PGA provides gains of 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, and 4096. The total number of gain settings is 52.
- \* The ideal-diode output protects ADC from under-range output voltages.
- \* Rail-to-rail input and output.

**I2C Temperature Sensor:**

- \* Useful if PD measurements are found to require temperature-compensation.
- \* Placed in good thermal contact with analog ground plane for monitoring board temperature.



**Reverse-Bias Control:**

- \* Meant to improve linearity at high photocurrents
- \* When bias is not applied, the anode potential must be equal to AGND to maintain the integrity of the guard ring for low-level photocurrents. The OPA388's upper-rail input & output capability and ultra-low offset help ensure this.
- \* Bias puts -5V on coaxial diode connections, so insulation and fusing is required!!!
- \* Connector shield must not be in contact with circuit shield!!!

**Power Supply:**

- \* Analog supply rails are +5V and -5V, created using a battery-powered isolated switcher feeding two high-performance LDO's. Digitally-controlled shutdown may be implemented to save power.
- \* Digital supply rail is +5V and also implemented onboard.
- \* Analog and digital grounds tied at one point

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Title <b>Proposed Photodiode Analog Frontend V5</b>		
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