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The schematic diagram illustrates the internal circuitry of the AD8051-based programmable gain amplifier. It is divided into three main functional blocks:

- Programmable Gain Amp:** This block features an AD8051 op-amp configured as a non-inverting amplifier. The non-inverting input (+) is connected to a voltage divider consisting of a 5k resistor (R1) and a 500 resistor (R2) connected to +5V and GND, respectively. The inverting input (-) is connected to the output. The op-amp is powered by +5V and GND. A 100nF capacitor (C6) is connected between the +5V supply and GND. The output is labeled H_PGA and is connected to pin J8.
- Digital Pot:** This block uses an MCP41010 digital potentiometer (U3). It is powered by +5V and GND. The wiper (pin 6) is connected to the output of the Programmable Gain Amp (H_PGA). The SCK (pin 3) and CS (pin 4) pins are connected to the digital control lines. The VDD (pin 8) and VSS (pin 4) pins are connected to +5V and GND, respectively. The PA0 (pin 2) and PB0 (pin 7) pins are connected to the digital control lines.
- DDS:** This block uses an AD9833xRM DDS IC (U5). It is powered by +5V and GND. The SCLK (pin 7) and FSYNC (pin 8) pins are connected to the digital control lines. The MCLK (pin 5) pin is connected to the digital control lines. The VDD (pin 2) and AGND (pin 9) pins are connected to +5V and GND, respectively. The CAP (pin 3) is connected to a 10μF capacitor (C7). The COMP (pin 1) and VOUT (pin 10) pins are connected to the output of the DDS. The output is labeled H_VOUT_DDS and is connected to pin J10. A 100nF capacitor (C8) is connected between the +5V supply and GND. A 10nF capacitor (C11) is connected between the COMP pin and GND. A 20pF capacitor (C12) is connected between the VOUT pin and GND.

Additional components and connections include:

- A 100nF capacitor (C10) connected between the +5V supply and GND.
- A 100nF capacitor (C9) connected between the +5V supply and GND.
- A 10μF capacitor (C7) connected between the +5V supply and GND.
- A 10μF capacitor (C8) connected between the +5V supply and GND.
- A 10μF capacitor (C11) connected between the COMP pin and GND.
- A 20pF capacitor (C12) connected between the VOUT pin and GND.
- A 10μF capacitor (C9) connected between the +5V supply and GND.
- A 10μF capacitor (C7) connected between the +5V supply and GND.
- A 10μF capacitor (C8) connected between the +5V supply and GND.
- A 10μF capacitor (C11) connected between the COMP pin and GND.
- A 20pF capacitor (C12) connected between the VOUT pin and GND.