# Input π Filter Frequency Response Calculation

The input section of the power and RF filtering circuit includes a π (pi) filter that provides high-frequency noise suppression. The filter consists of two shunt capacitors (C100 and C101) with a series inductor (L100) between them.

This filter’s role is to reduce high-frequency noise and electromagnetic interference (EMI) that may enter the system through the power supply line.

Assuming typical values for these components:

- C100 = C101 = 100 nF

- L100 = 1 µH

The cutoff frequency of the π filter is calculated using the formula:

f\_c = 1 / (2π √(L·C))

where:

- L is the series inductor (1 µH),

- C is the capacitance of either shunt capacitor (100 nF).

Substituting these values:

√(L·C) = √(1 × 10⁻⁶ × 1 × 10⁻⁷) = 3.16 × 10⁻⁷

f\_c = 1 / (2π × 3.16 × 10⁻⁷) ≈ 500 kHz

Thus, the cutoff frequency of the π filter is approximately 500 kHz. This frequency ensures that most high-frequency noise above 500 kHz is significantly attenuated, while allowing lower frequency signals (such as power line DC and low-frequency variations) to pass through with minimal attenuation.

This π filter is crucial in maintaining power integrity for the analog and digital sections of the circuit by reducing conducted EMI and providing a cleaner DC supply to sensitive components.