## Analog Input

The analog input to the HMCAD series of A/D Converters is a switched capacitor track and hold amplifier optimized for differential applications. Operation at common mode voltages at mid supply is recommended even if performance will be good for the ranges specified. The CM_EXT or VCM pin provides a voltage suitable as a common mode reference. The internal buffer for the voltage pin can be switched off and driving capabilities can be changed by register or control input.
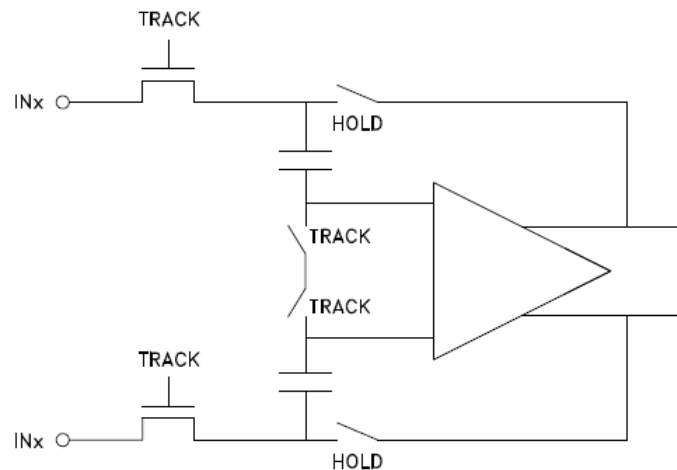
The figure above shows a simplified drawing of the input network. The signal source must have sufficiently low output impedance to charge the sampling capacitors within one clock cycle. A small external resistor in series with each input is recommended to reduce transient circuits and dampen ringing behavior. A small differential shunt capacitor at the chip side of the resistors may be used to provide dynamic charging currents and improve performance.
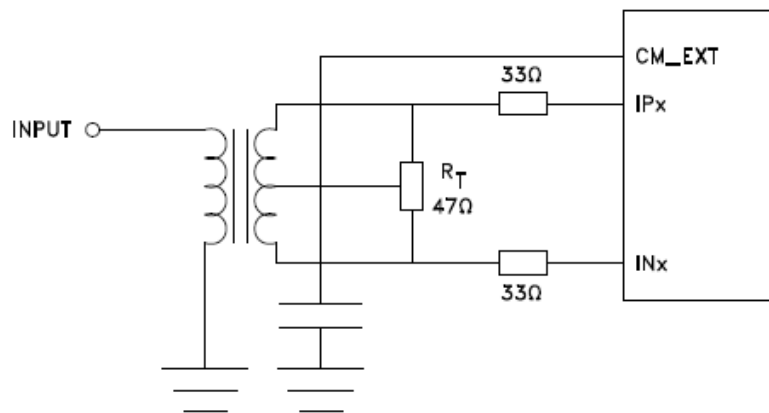
DC-Coupling

The figure below shows a recommended configuration for DC coupling.
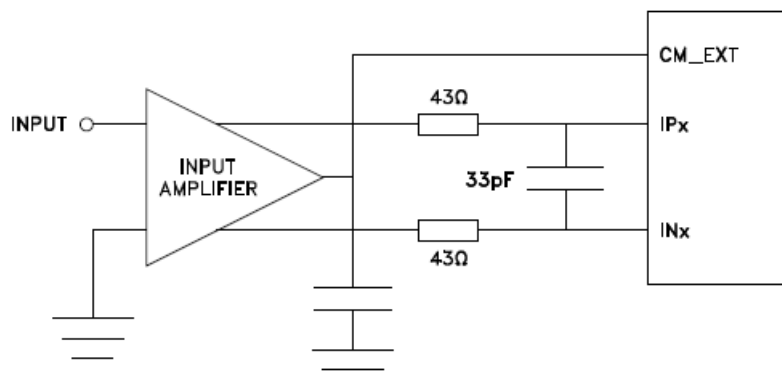
The input amplifier could be inside a companion chip or it could be a dedicated amplifier. Several suitable single ended to differential drivers exist in the market.

AC-Coupling

A signal transformer or series capacitors can be used to make an AC-coupled input network as shown below.

Ensure that a transformer with sufficient linearity is selected and that the bandwidth exceeds the sampling rate of the ADC with at least a factor of 10. It is also important to minimize phase mismatch between the differential ADC inputs for good HD2 performance. This type of transformer coupled input is the preferred configuration for high frequency signals as most differential amplifiers do not have adequate performance at high frequencies.

If the input signal has a long distance to travel and the kick-backs from the ADC are a problem at the signal source, the input network below can be used.
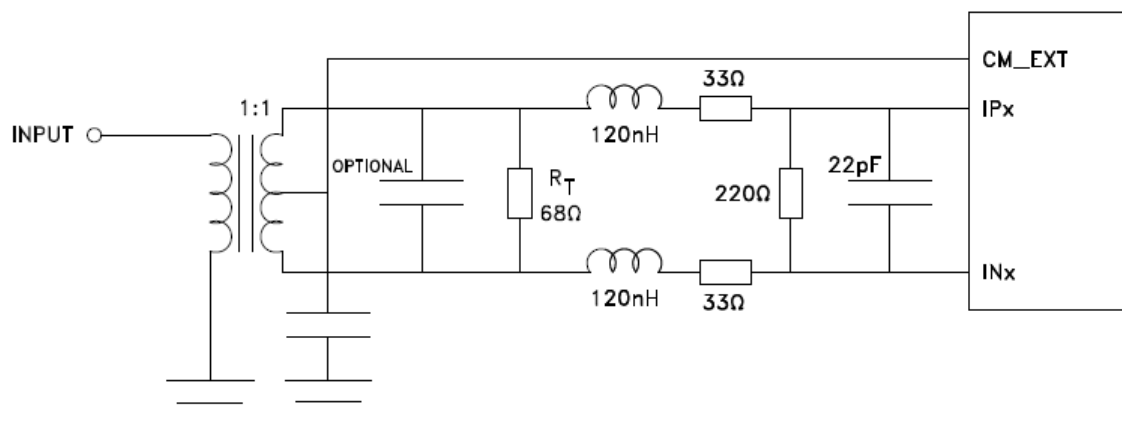
Values of the series inductor will depend on the board design and conversion rate. In some instances a shunt capacitor (ex. 33pf) in parallel with the termination resistor may improve performance further.

EasyBoard Input Networks

The input networks of the EasyBoard evaluation board are configured with a transformer. The networks are similar with the exception of a few component values.
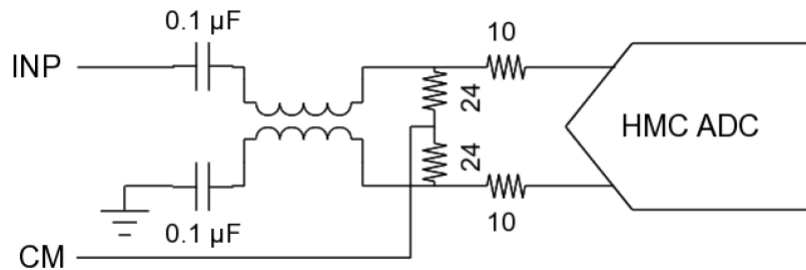
HMCAD15xx EasyBoard input network
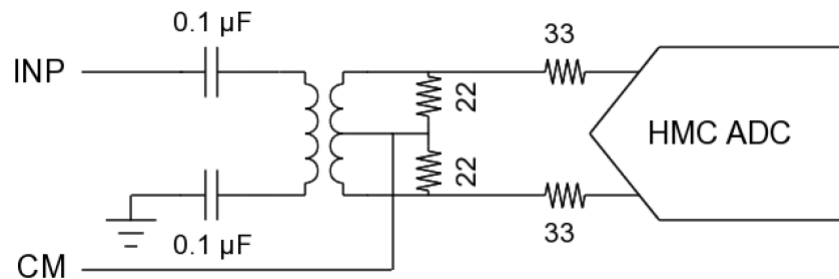
HMCAD10xx and 110x EasyBoard input network