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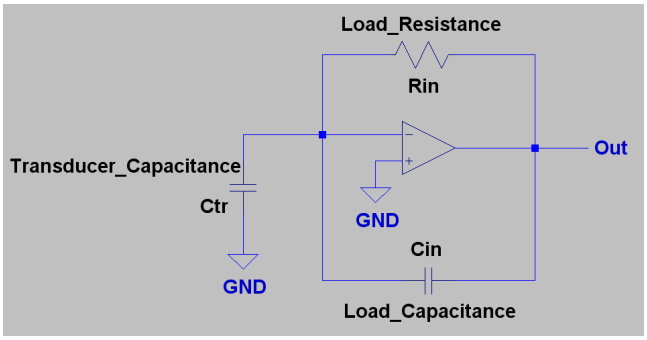
1. EC6067- CCA1000 Conditioning Charge Amplifier

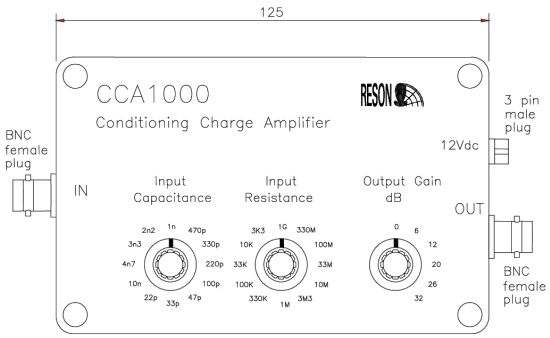
The EC6067 or any other charge amplifier doesn't really amplify the charge – a charge amplifier it is just an amplifier that creates a voltage that is equivalent to the charge on the ceramic. A very simplified block diagram of the EC6067 is shown below.

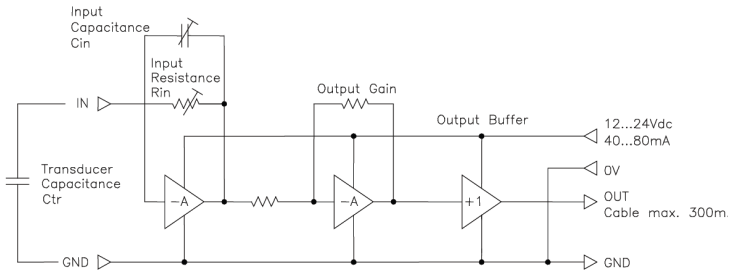
- Input Capacitance (C_{in}) or Load Capacitance basically control gain in the ratio:
  20log(C hydrophone including cable / Input capacitance).
  C_{tr} = C hydrophone including cable
- R_{in} controls low frequency filtering:
  Low freq. limit (Hz @ -3dB) = $1/(2*Pi*R_{in}*C_{tr})$
  Input resistance = transducer load resistance (R_{in}).
  Input capacitance = transducer load capacitance (C_{in}).
- C_{in} and R_{in} combined controls high frequency limit. The high freq. filtering is not influenced by hydrophone capacitance:
  High freq. limit (Hz @ -3dB) = $1/(2*Pi*R_{in}*C_{in})$
  Filter slopes are 6dB/octave.



Simplified block diagram for EC6067

The user interface of EC6067 is shown below together with schematics:





Schematics of EC6067 – CCA1000.

The Input Capacitance (C_{in}) is to add gain 20log(C_{tr}/C_{in}) - is not a matter of conditioning.
Output gain is to add additional gain 6 levels between 0 and 32dB.
Input resistance R_{in} controls low frequency filtering

The input capacitance range of EC6067/CCA1000 was selected during design phase such that midpoint of the 12 values from 22pF to 10nF (330pF) combined with a TC4034-1 (3.3nF) will make an input gain equal to a factor of 10 (20dB).

Is it possible to use CCA1000 together with hydrophones with much higher capacitance (piezoelectric sensor and cable combined) than 10nF?

- Sure - that will only add additional gain, the additional gain will in fact be an advantage from a signal to noise point of view. A 100nF hydrophone with C_{in} set to 10nF will amplify input by a factor 10 (20dB).

See also data sheet for EC6067/CCA1000 on www.reson.com