Enhancement Presentation

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Enhancement Presentation

- Summary
  - The analogical mezzanine prototype
    - Ideas
    - Schematics
    - Physical dimensions
    - Connectors
  - Discrete OP Amp simulations
    - Previous problems
    - Calculations
    - Results

The analogical mezzanine prototype

- Ideas to discuss
  - About noise and grounding
    - Different strategies with grounding
  - About connectivity
    - Flexibility to test any analog architecture
  - About delay evaluation
    - Flexibility to evaluate all possible delay scenarios

The analogical mezzanine prototype

- Noise and grounding
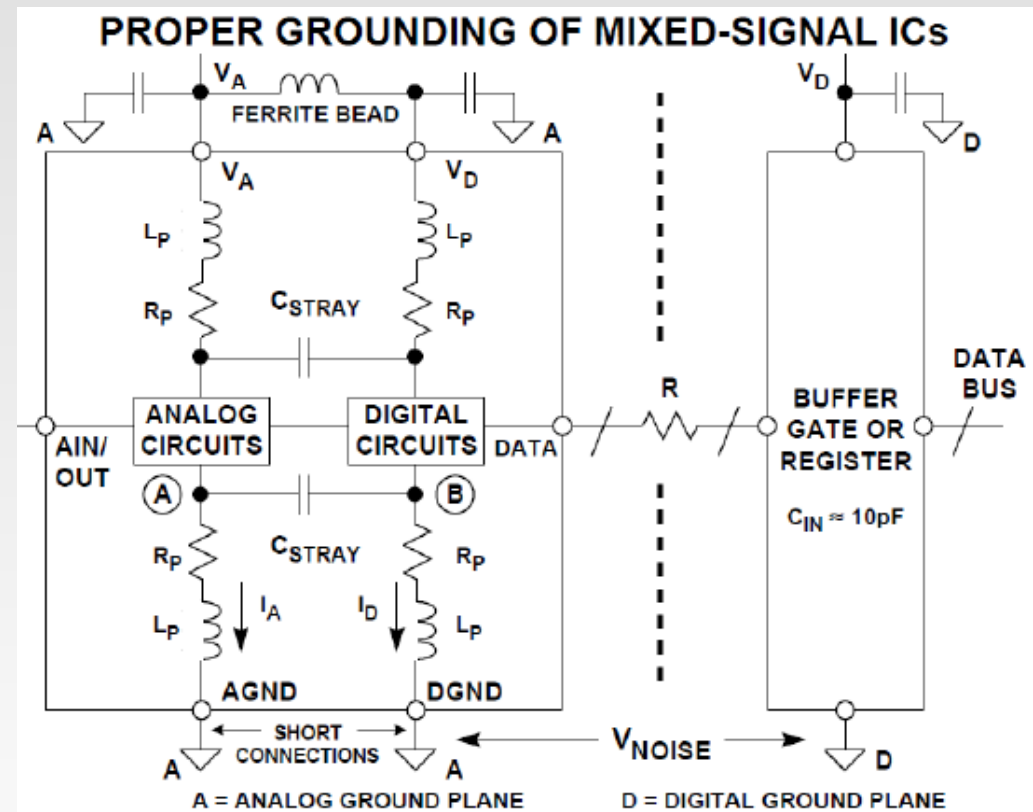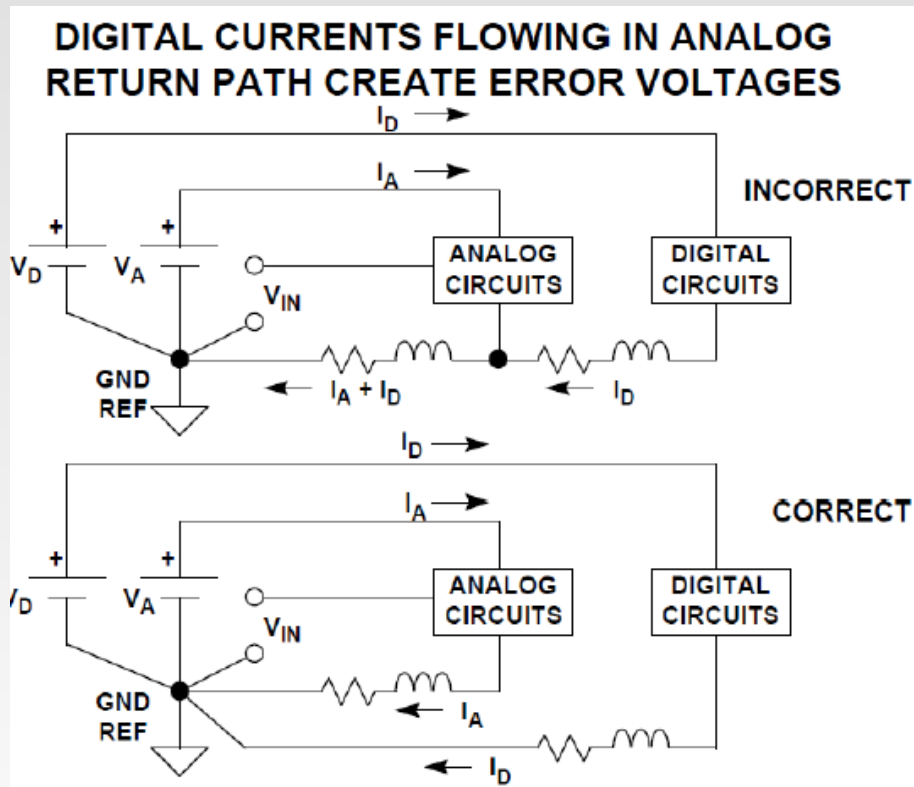
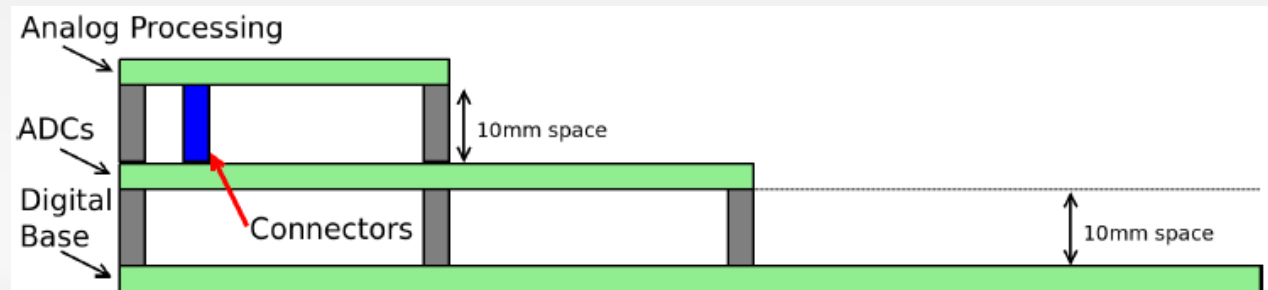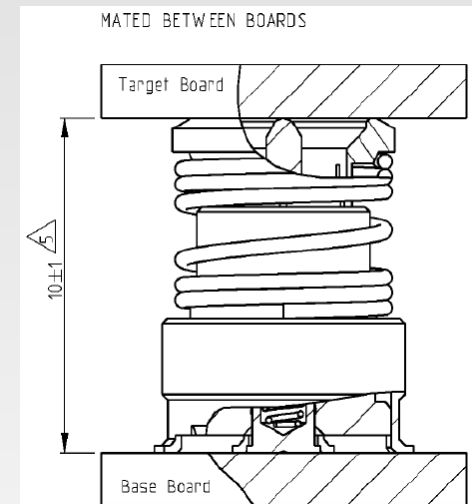# The analogical mezzanine prototype

- ## Connectivity

  - ### Flexibility to test any analogical architecture

Tyco 619134-1

Char. Imp. 50 Ohms
Freq. Range Up to 6 GHz
Return Loss –20dB min.
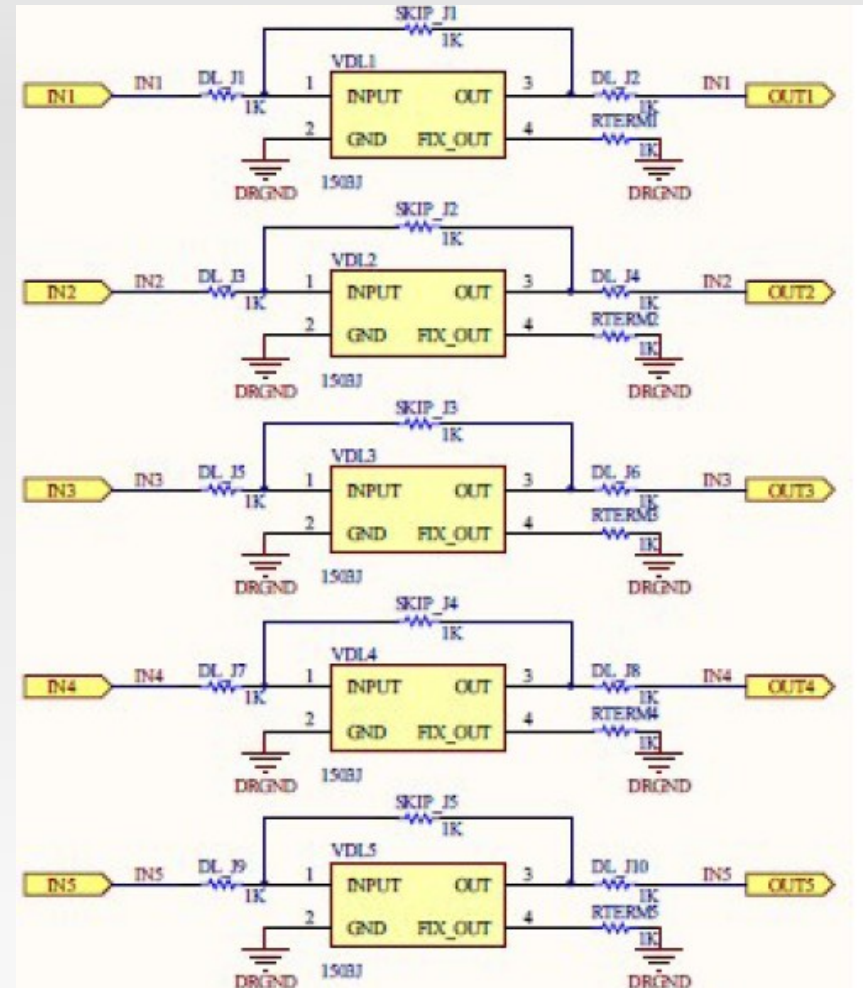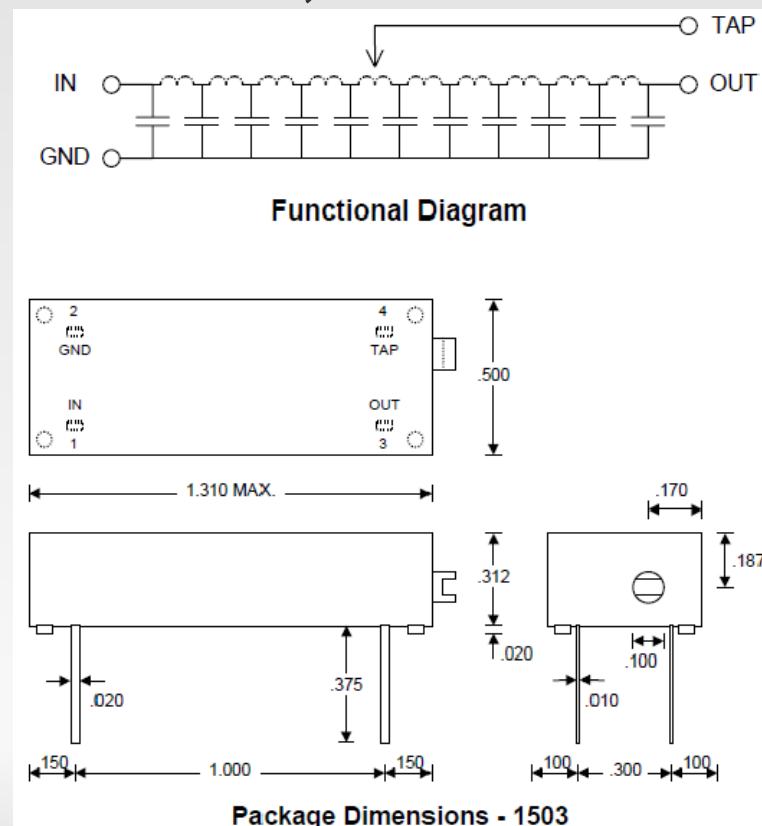Shield Effect. –60 dB min.
Resistance < 70 mOhm

Ratings
- Voltage: 125 volts AC
- DC Current: 4.8 A max.
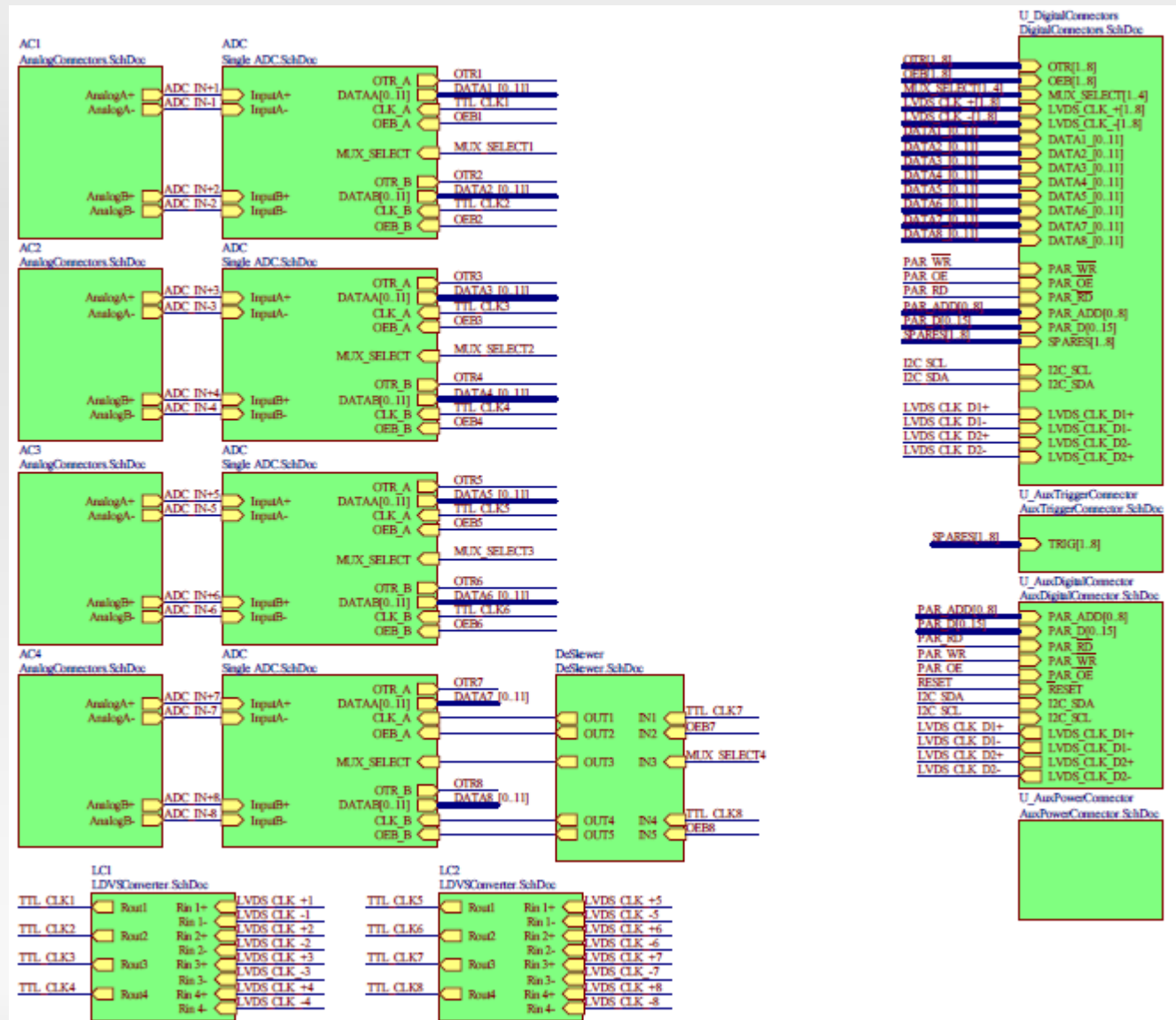
The analogical mezzanine prototype

- Delay evaluation
- 2xClock, 2x Output Enable, Mux Select

Functional Diagram

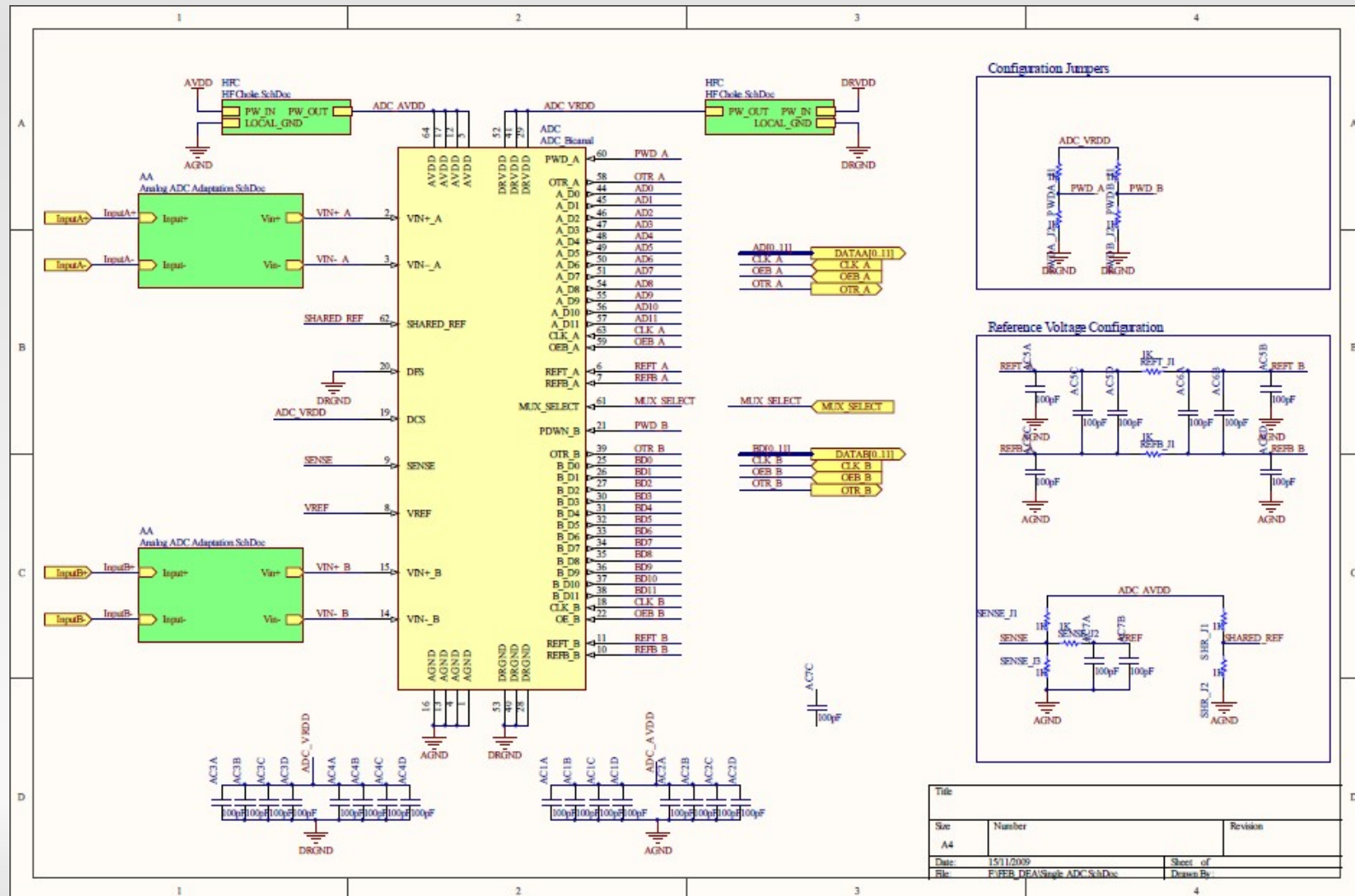Package Dimensions - 1503

The analogical mezzanine prototype

Schematics

- 4 Instances of 2 channels each
- 1 With Delay Control
- Clock Conversion to single ended
- Digital Connector
- Analogical Connector
- Auxiliary Connectors

The analogical mezzanine prototype

- Schematics: ADC

The analogical mezzanine prototype

- Schematics: Connector

The analogical mezzanine prototype

- Schematics: Right Connector

The analogical mezzanine prototype

- Schematics: Left Connector

The analogical mezzanine prototype

- Physical Dimensions

    - Mounting Holes for their use if needed.

    - Digital connectors must be placed, not already agreed on exact position and direction.

All Mounting Holes have 4mm diametre
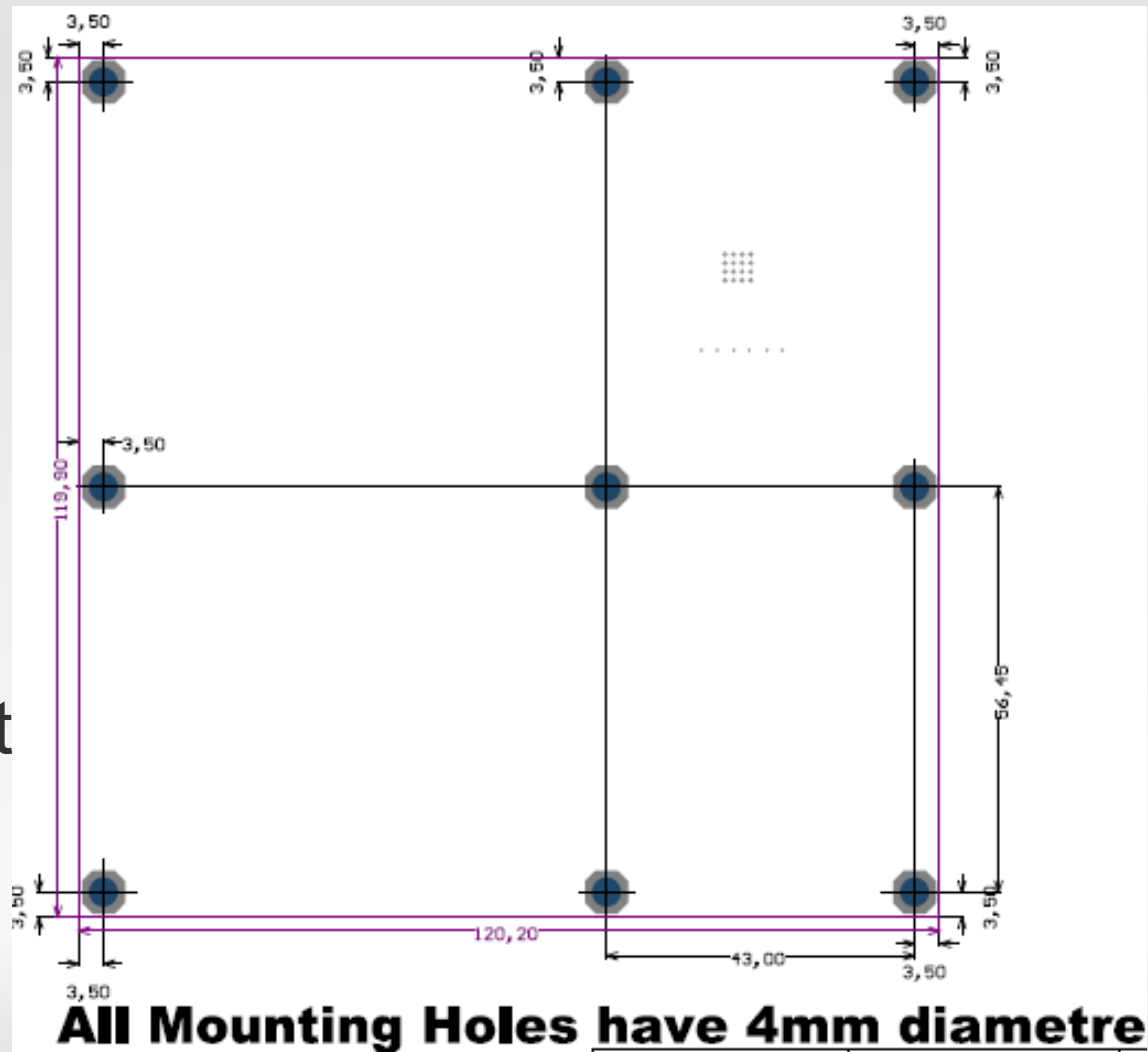
The analogical mezzanine prototype

- Physical Dimensions
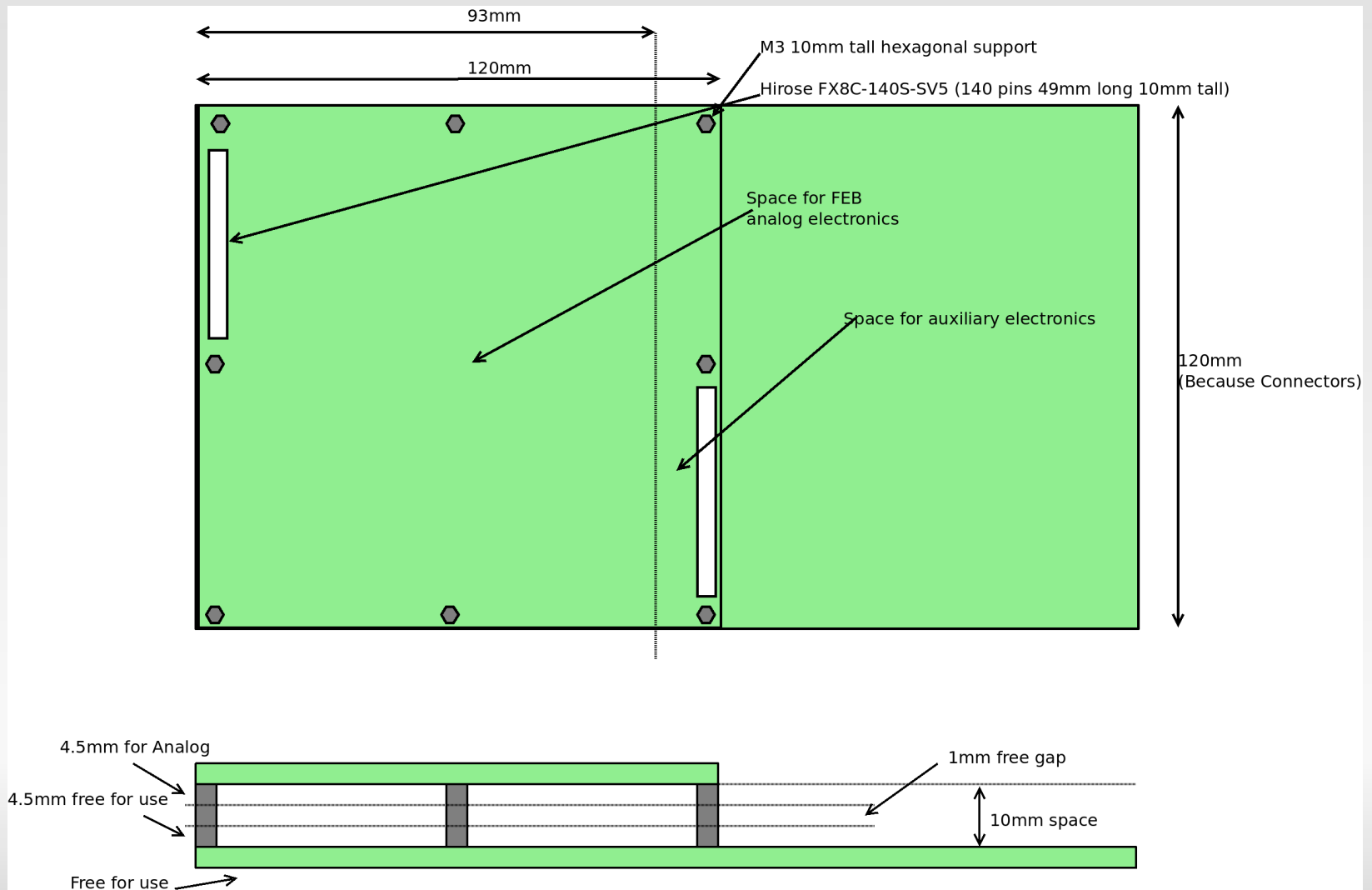
The analogical mezzanine prototype

- Connectors
  - Hirose FX8C-140S-SV5
  - 10 mm tall
  - 49 mm long
  - 140 pins
  - Male and female, not yet agreed on which to use on the digital motherboard and which on the analogical mezzanine.

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The analogical mezzanine prototype

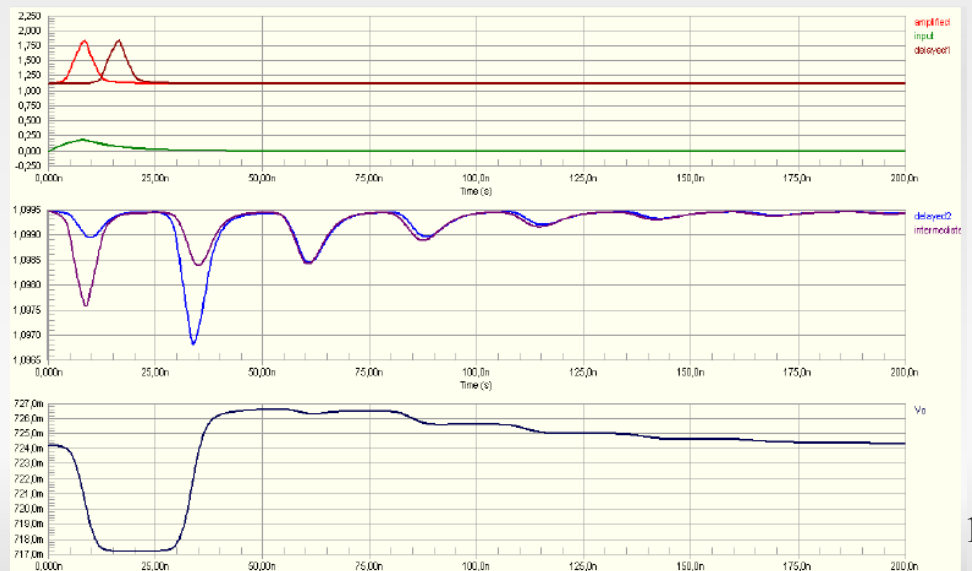- Discrete Op Amp: Previous Problems
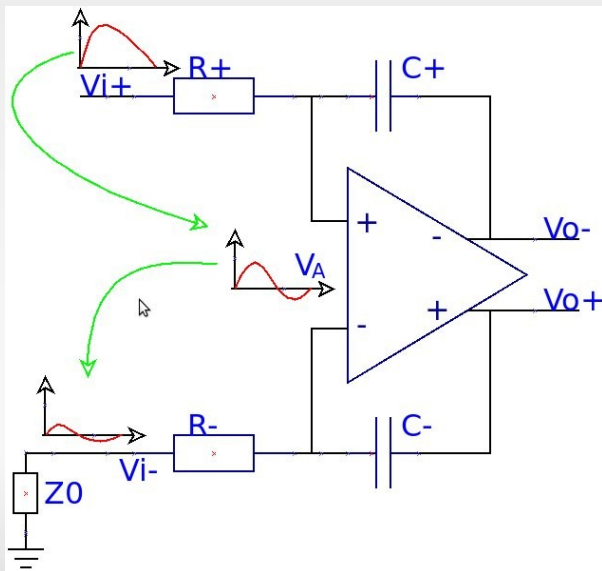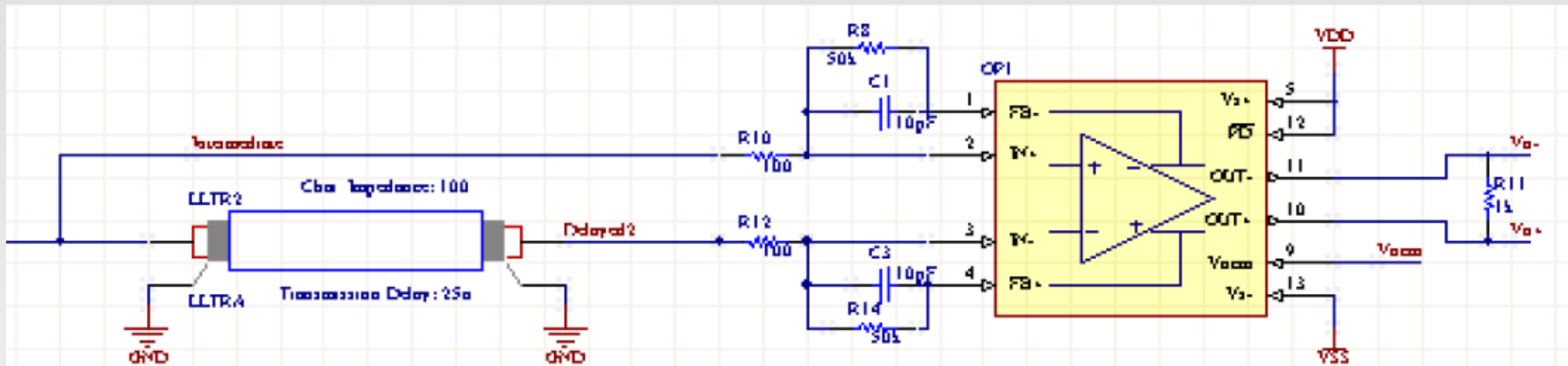
The analogical mezzanine prototype

- Discrete Op Amp: Previous Problems

  - The previous OP Amp must also be differential in order to cut the feedback. The same happends to the previous stage.

The analogical mezzanine prototype

- Discrete Op Amp: Calculations

- Zb=Z0; Same contribution of both outputs;
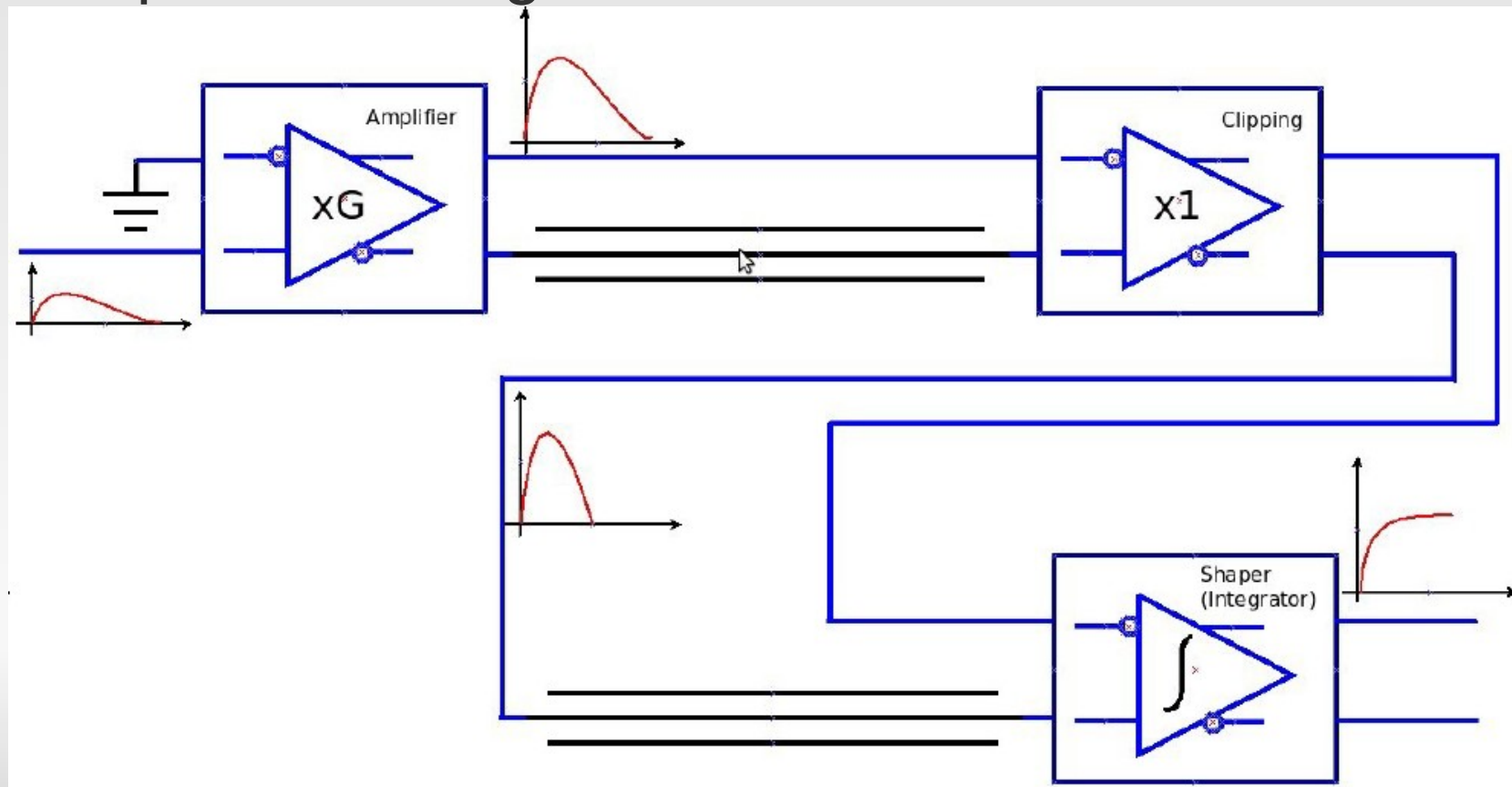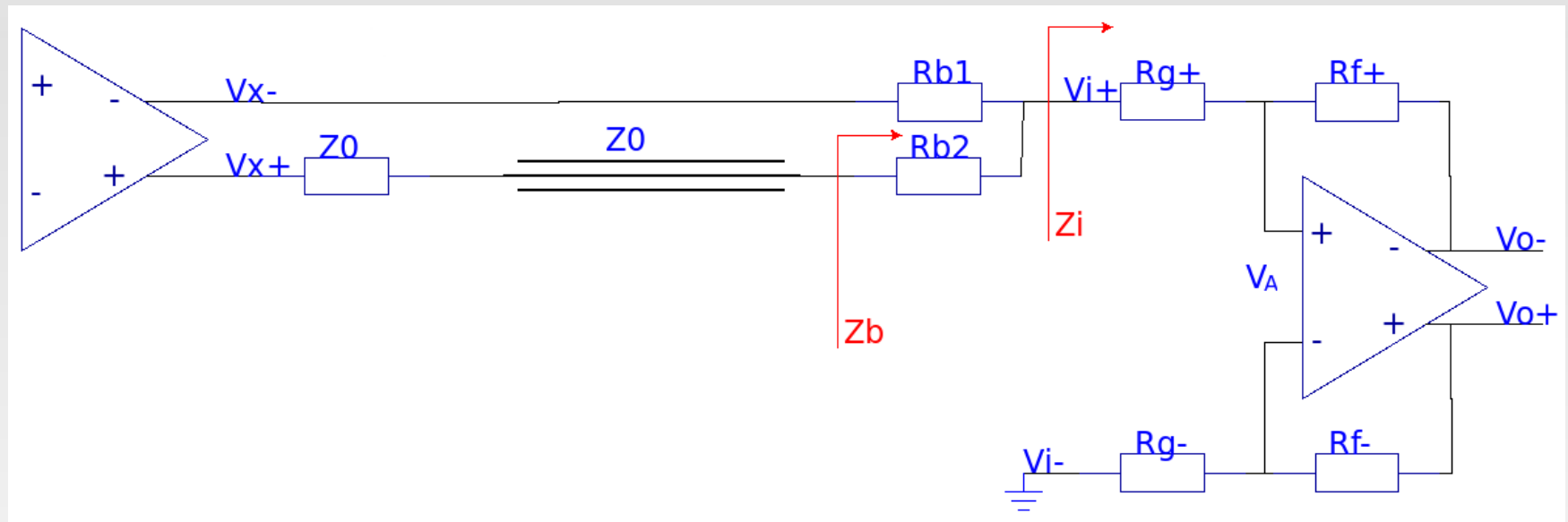
$$Vi == V1 * \frac{Par[(R2 + Z0), Zi]}{Par[(R2 + Z0), Zi] + R1} + V2 * \frac{Par[R1, Zi]}{2 * Z0};$$

$$R2 \rightarrow Z0 - \frac{R1\ Zi}{R1 + Zi}$$
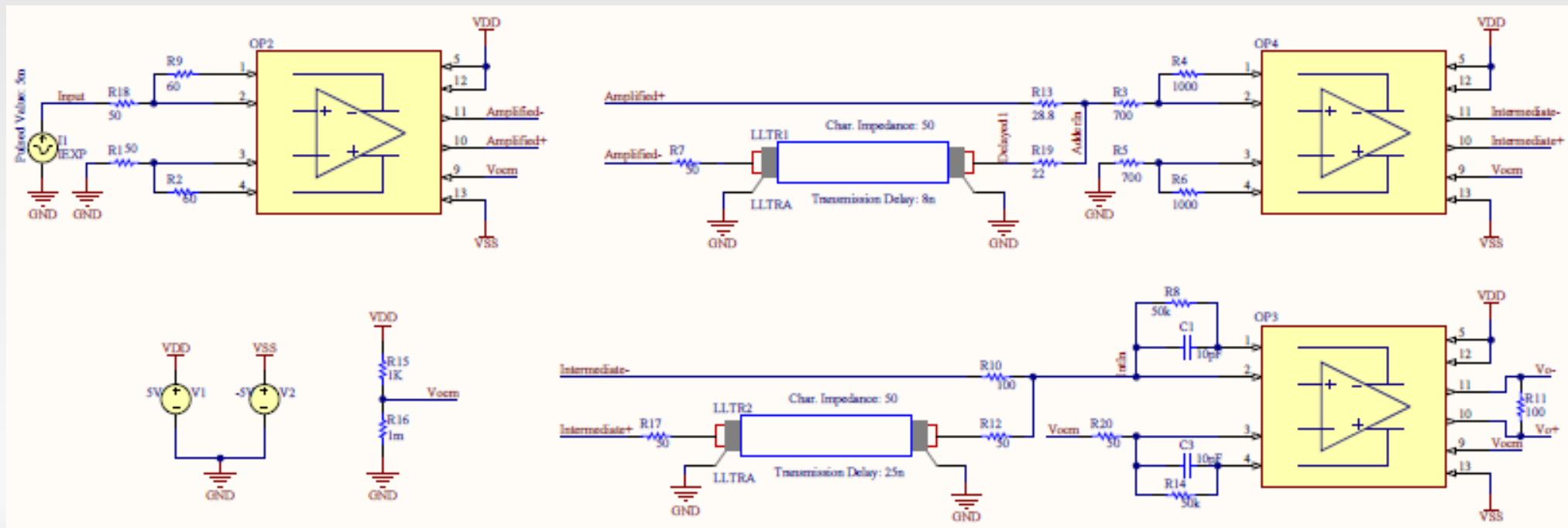
$$\frac{\frac{Par[R1, Zi]}{2 * Z0}}{\frac{Par[(R2+Z0), Zi]}{Par[(R2+Z0), Zi]+R1}} == G;$$

$$R1 \rightarrow \frac{1}{2}\left(2\ G\ Z0 - Zi - G\ Zi + \sqrt{8\ G\ Z0\ Zi + (Zi + G\ (-2\ Z0 + Zi))^2}\right)$$
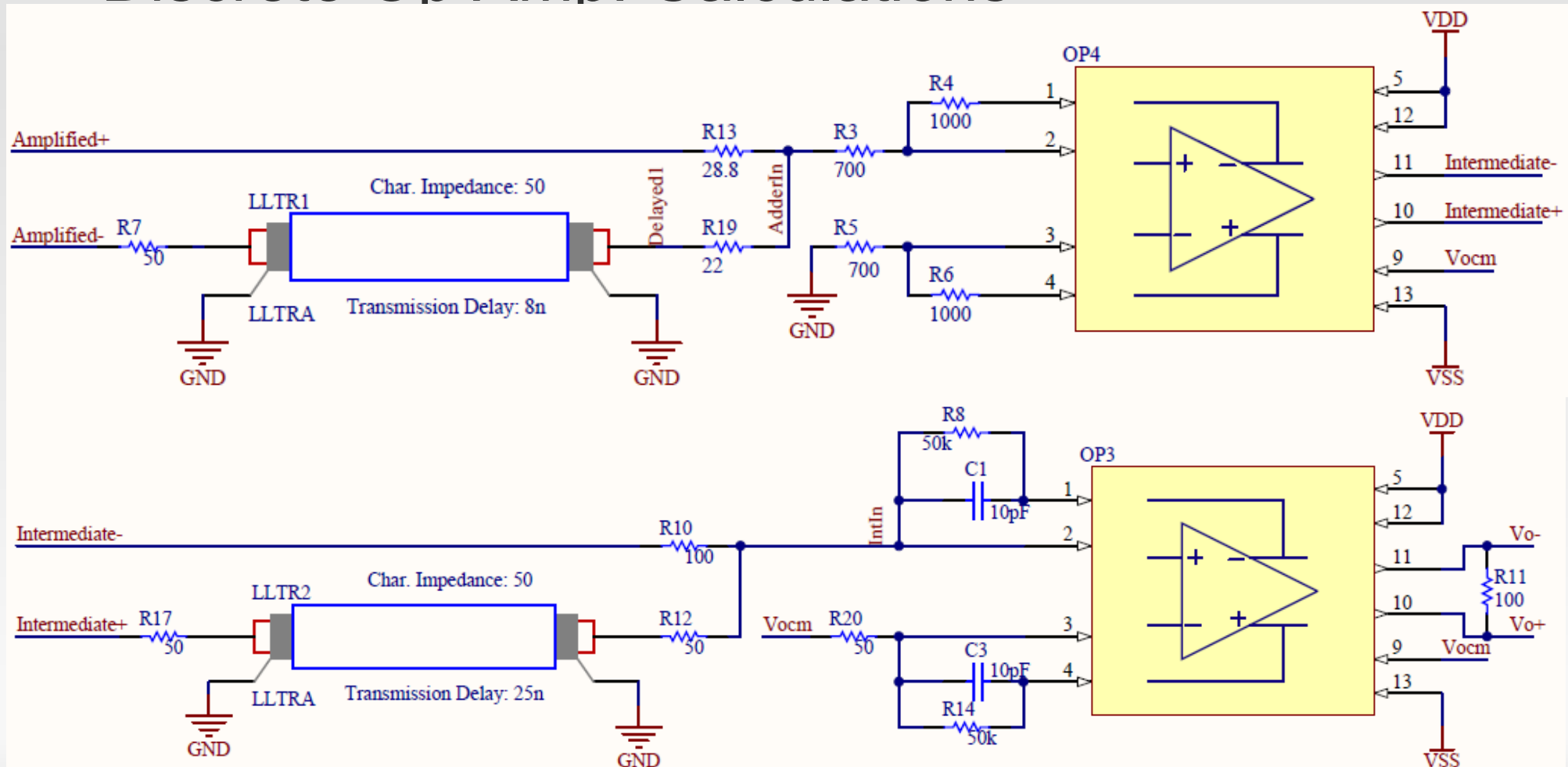
The analogical mezzanine prototype

- Discrete Op Amp: Calculations
  - Also calculations for the integrator:
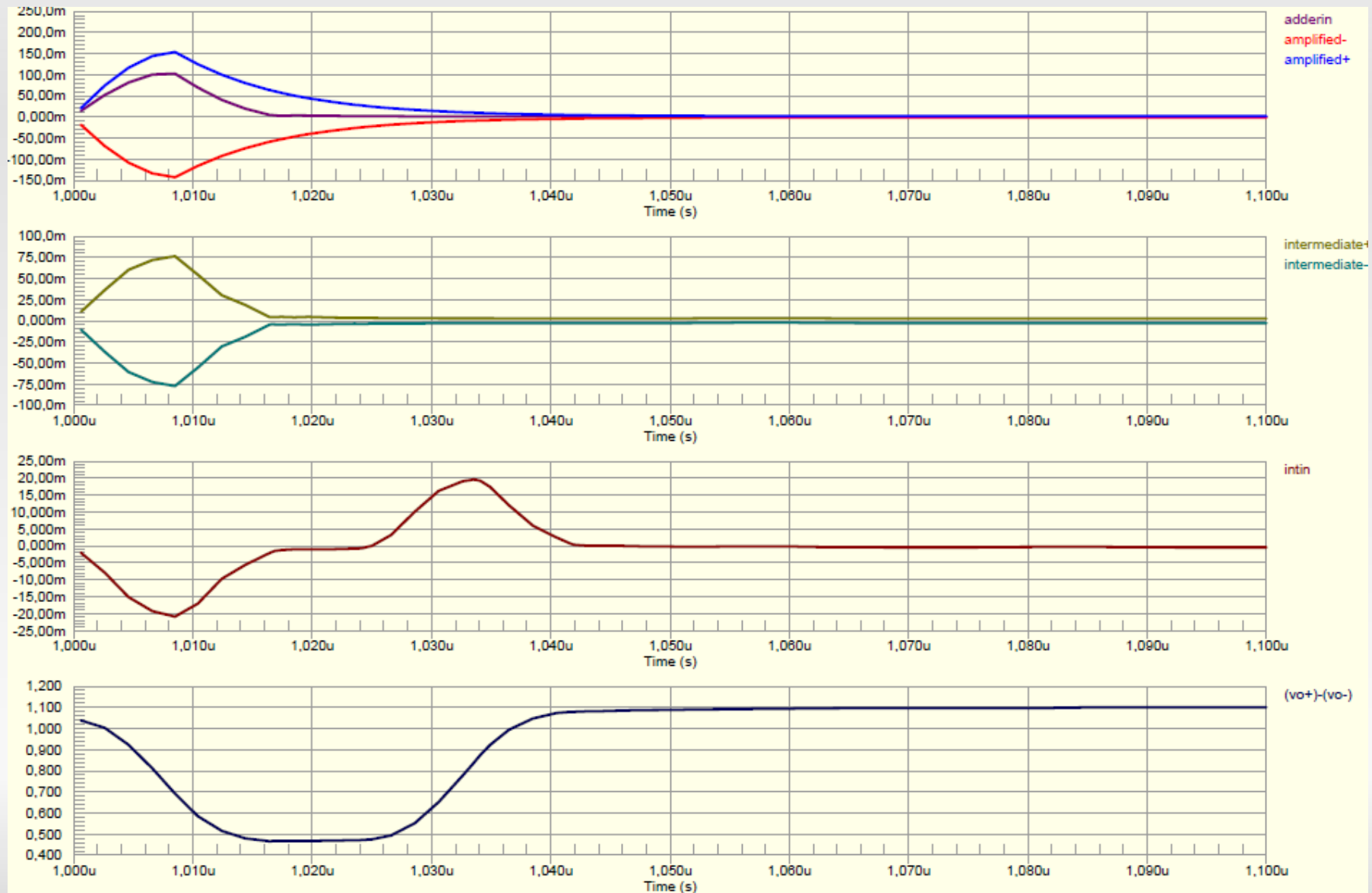   - Same ideas. Adaptation & Same Contribution.

The analogical mezzanine prototype

- Discrete Op Amp: Calculations

Simulation Results

- Discrete Op Amp: Results

Conclusion

- A differential output was needed because of the interface with the ADC

- NOT a differential scheme, only uses differential OP Amps

- Studying the possibility of decreasing power

- Relatively low resistances $\rightarrow$ low noise, possible to decrease them even more, under study

- Needs noise and linearity studies