Analog Computer : Annabella

The basic goal is to build a machine comparable to the basic analog computers used (occasionally) in education, with enough functionality to be able to model some 'standard' systems:

- damped mass on spring
- bouncing ball in a box
- Lorenz Attractor

Metering with be done externally. (maybe a later unit containing meter + speaker + Arduino-based 'scope).

My plan is to use an A4 plate as the front panel, which gives a nice physical limit on what is possible. This form-factor I believe should also work as a good alternative to finer-grained modular setups such as those based on Euroracks. Connectors will be 2mm banana plugs/sockets.

Standard analog chips will be used inside (probably mostly TL072 op amps), powered at +/- 15v, using +/- 10v as the value range.

I'm not aiming for high precision, but may have a bit of trimming for things like offset on the pots. etc.

Proposed Functionality

Control Unit

- Power switch & LED
- Set initial conditions
- Run
- …

Modules

Component	Quantity	Control	Inputs	Outputs	Tot. I+O
Voltage Ref.	8	-	-	8	8
Coefficients	6	pot	1	1	12
Free pots	2	pot	3	-	6
Summers	4	-	4	2	24
Inverters	4	-	1	2	12
Integrators	4	Switch	3	2	24
Multipliers	2	-	3	2	10

(89 connectors there…maybe 12x8 = 96 available)

TBD

- log
- exp
- comparator(s)
- rectifiers(s)
- function generators(s) (transfer function)
- function generator (sig. gen.)
- clock

Voltage Reference

4 x 10v
4 x 1v

Coefficients

6 x potentiometers with one terminal grounded, feeding unity gain buffers

Free pots

2 x pots, all terminals exposed

Summers

4 x op amps in **inverting** configuration

- 3 x1 inputs
- 1 x10 input
- 2 outputs

TBD Should the virtual ground point be exposed?

Inverters

4 x unity gain op amp inverters, 1 input, 1 output

Integrators

4 x op amps in **inverting** configuration, with switched capacitor for time constant, with analog switches handling initial conditions/run

Multipliers

2 x AD633