Front end system level description (preliminary)
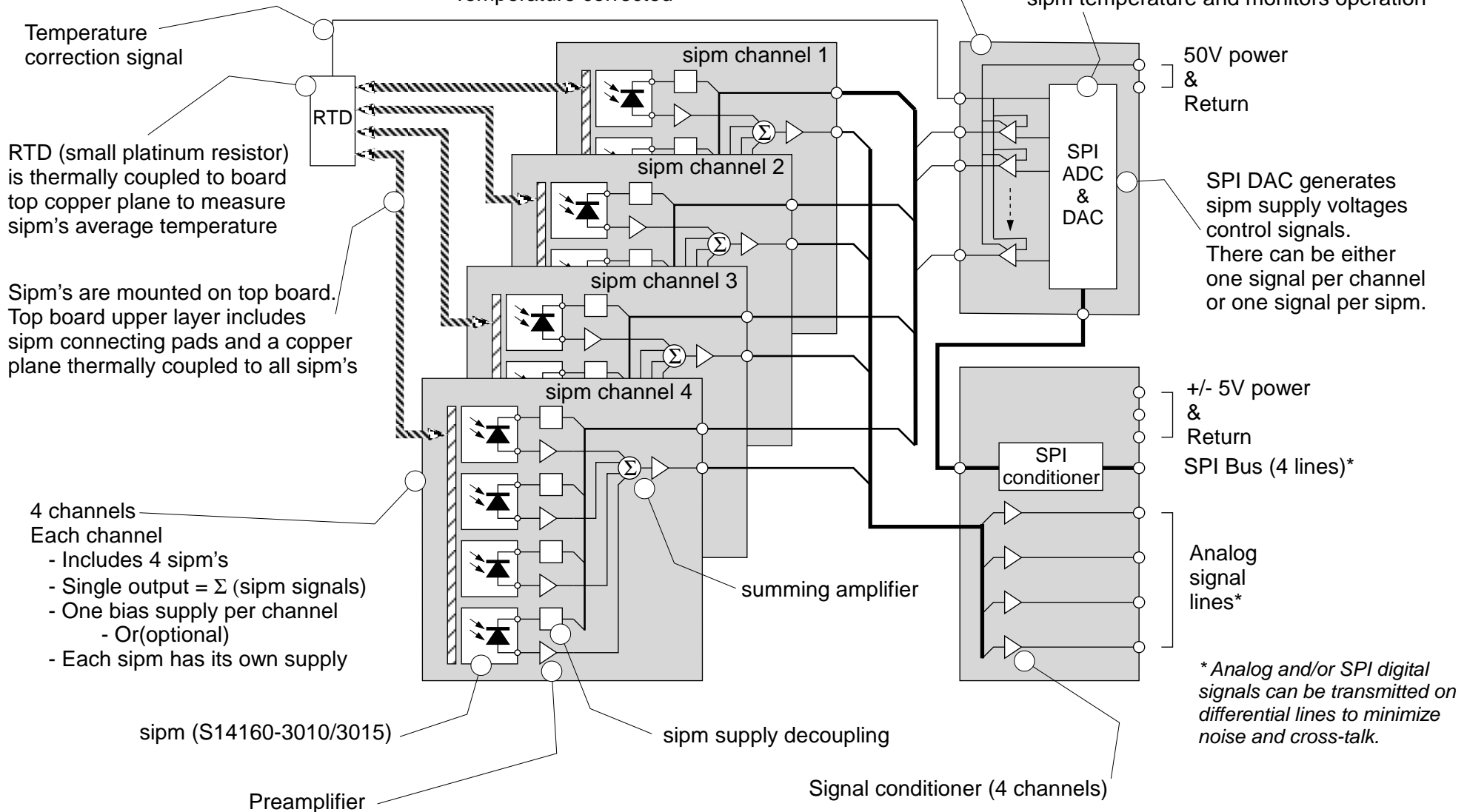

Programmable sipm bias supply
- 4 (16) bias outputs (series pass regulators)
- Each remotely programmable (SPI)
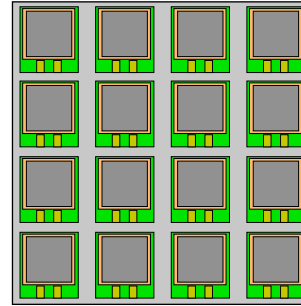- Temperature corrected

SPI ADC (optional) reports
sipm temperature and monitors operation

Temperature
correction signal

RTD (small platinum resistor)
is thermally coupled to board
top copper plane to measure
sipm's average temperature

Sipm's are mounted on top board.
Top board upper layer includes
sipm connecting pads and a copper
plane thermally coupled to all sipm's

RTD

sipm channel 1

sipm channel 2

sipm channel 3

sipm channel 4

SPI
ADC
&
DAC

50V power
&
Return

SPI DAC generates
sipm supply voltages
control signals.
There can be either
one signal per channel
or one signal per sipm.

+/- 5V power
&
Return
SPI Bus (4 lines)*

SPI
conditioner

Analog
signal
lines*

4 channels
Each channel
- Includes 4 sipm's
- Single output = Σ (sipm signals)
- One bias supply per channel
   - Or(optional)
- Each sipm has its own supply

summing amplifier

sipm (S14160-3010/3015)

sipm supply decoupling

*Analog and/or SPI digital
signals can be transmitted on
differential lines to minimize
noise and cross-talk.*

Preamplifier

Signal conditioner (4 channels)

Front end Concept drawing (preliminary)
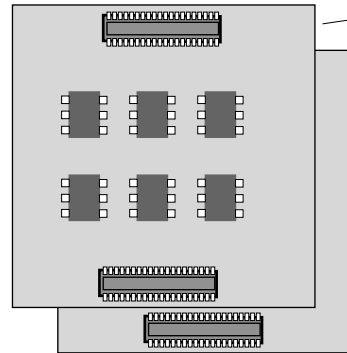## Includes four (five) stacked boards connected through "mezzanine" connectors)

Top Board
- Top side
  -16 sipm's
  -1 RTD
Bottom side
  - Mezzanine connector (surface mounted)
  - Sipm's supplies decoupling

2 Intermediates boards
  - Preamplifiers
  - Summing amplifier
  - Analog signals conditioners
  - Mezzanine connectors (through wired)

Bottom board
  - Sipm's Power supplies (will need 2 boards if 16 power supplies)
  - ADC / DAC
  - SPI conditioner
  - Interface connector (bottom side)
  - Mezzanine connectors(top side)