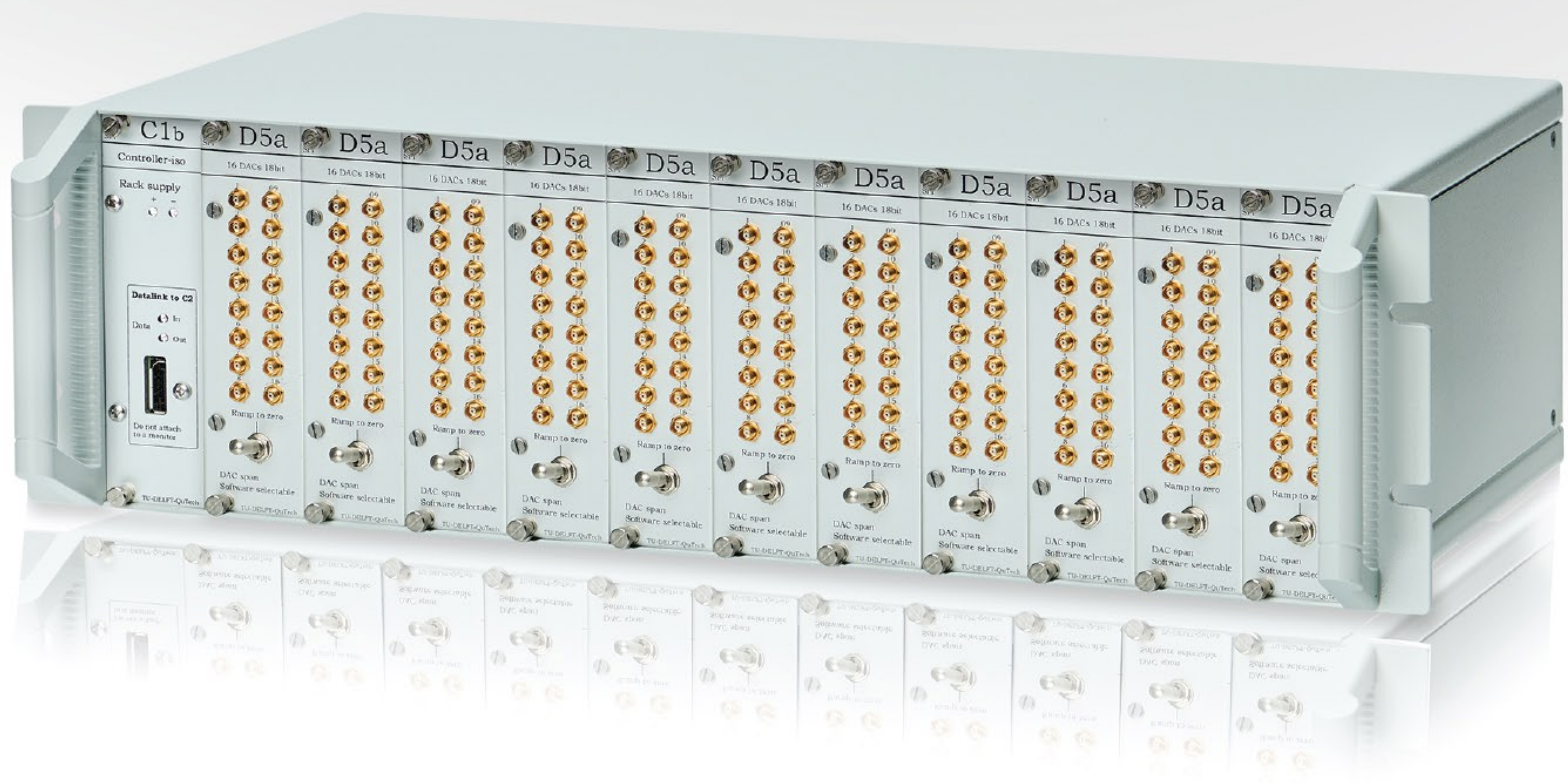




EXCELLENCE IN ISOLATION!



SPI RACK

ULTRALOW NOISE, DRIFT AND INTERFERENCE

DC VOLTAGE SOURCE

D5a



Ultra-stable DC voltage source

- 16 channels / 18 bit resolution
- Software-selectable range: ± 4 , ± 2 , $+4$ V (extensible to ± 8 V)
- Linear: $\text{INL } \pm 0.5 \text{ LSB}$, $\text{DNL} = \pm 0.2 \text{ LSB}$
- Low drift: $0.7 \text{ ppm}/^\circ\text{C}$ of range + $1.5 \text{ ppm}/^\circ\text{C}$ of output
- Low noise: $< 0.5 \mu\text{V}_{\text{rms}}$
(0.1 to 10 Hz integrated bandwidth)
 $< 70 \text{ nV}/\sqrt{\text{Hz}}$ @ 2 Hz
 $< 30 \text{ nV}/\sqrt{\text{Hz}}$ @ 100 Hz

GALVANICALLY ISOLATED CONTROL C1b

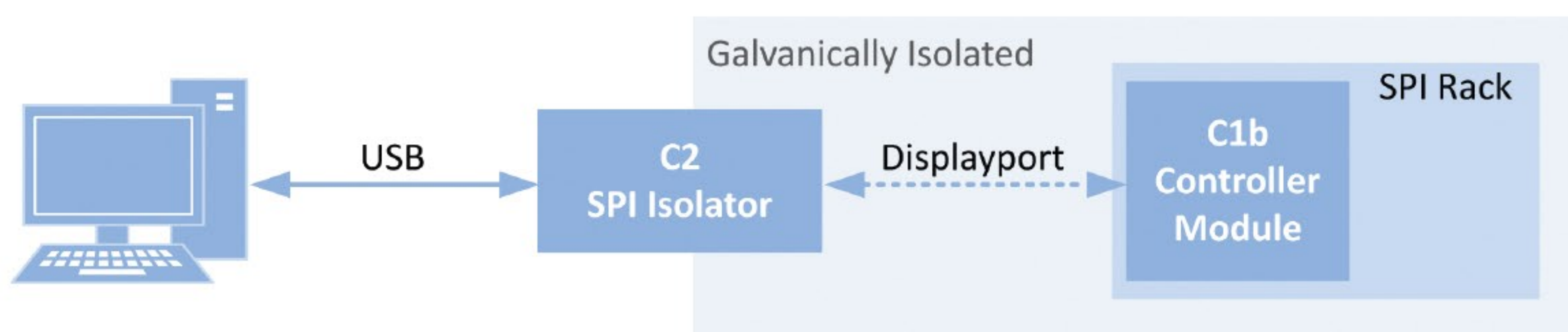


Isolated controller

Galvanic isolation from host pc to avoid interference and ground loops

Connects to host pc via USB

Drivers available for Python and QCoDeS



DC CURRENT SOURCE

S4g

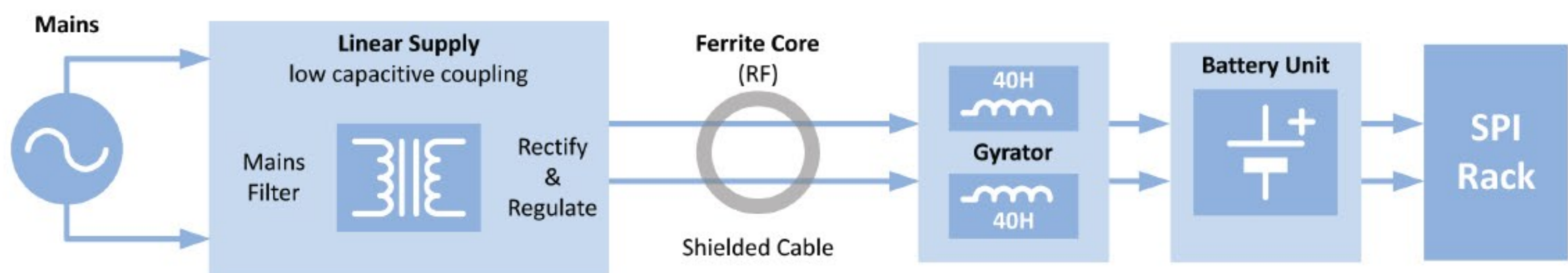


Ultra-stable DC current source

- 4 channels / 18 bit resolution + output monitor for each channel
- Software-selectable range: ± 50 mA, ± 25 mA, $+50$ mA
- Compliance voltage: ± 3.5 V
- Linear: INL ± 0.5 LSB, DNL = ± 0.2 LSB
- Low drift: < 2.5 ppm/ $^{\circ}\text{C}$ of full scale
(measured @ $+50$ mA into $50\ \Omega$ with ± 50 mA range)
- Low noise: < 2.5 nA/ $\sqrt{\text{Hz}}$ @ 10 Hz
 < 0.8 nA/ $\sqrt{\text{Hz}}$ @ 1 kHz
(measured @ $+50$ mA into $50\ \Omega$ with ± 50 mA range)

ISOLATED POWER SUPPLY

Filtered power supply with gyrator
(typically used with quantum dot setups)

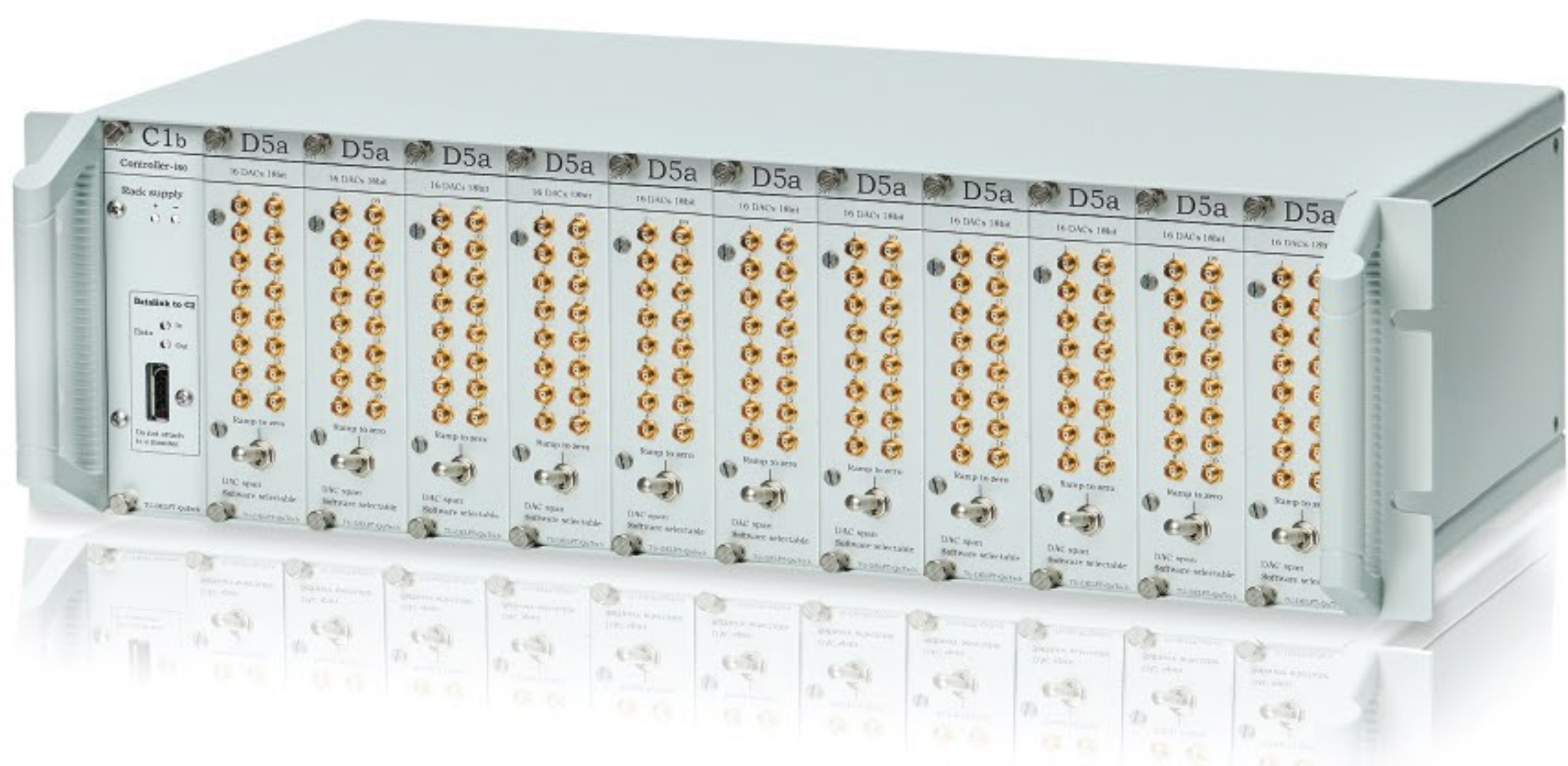


The gyrator circuitry mimics a very large inductor (40 Henry) on every power lead. This prevents interference (like 50 Hz) from getting to the SPI Rack.

Back-up battery prevents sample damage in case of a power outage.

UP TO 11 MODULES PER RACK

11x D5a: 176 voltage sources



11x S4g: 44 current sources



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QBLOX PULSAR SERIES

Ultralow noise - Easy to integrate



Qubit Control Module
4 channels out
1 GSPS / 16 bit

Qubit Readout Module
2 channels out + 2 channels in
1 GSPS / 12 bit

QBLOX CLUSTER SERIES

Ultralow noise - Massively Scalable



1 GSPS
Control and Readout



400 channels / 20 U
Synchronized
Low-latency feedback



ENABLING THE QUANTUM REVOLUTION

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