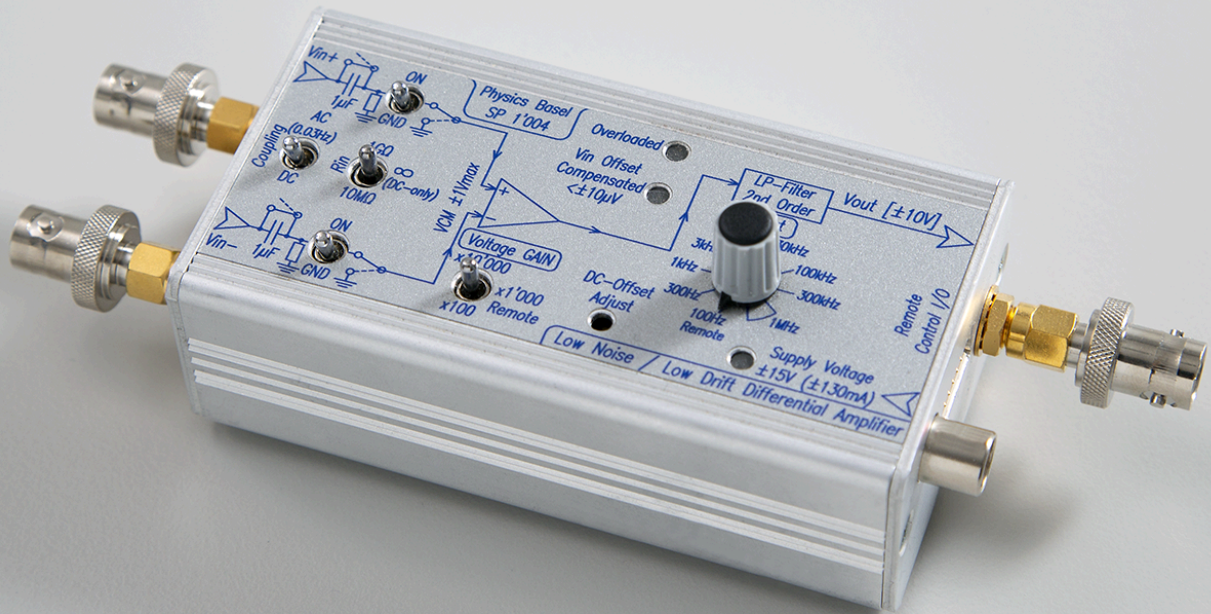




Low-Noise Low Drift Differential Amplifier

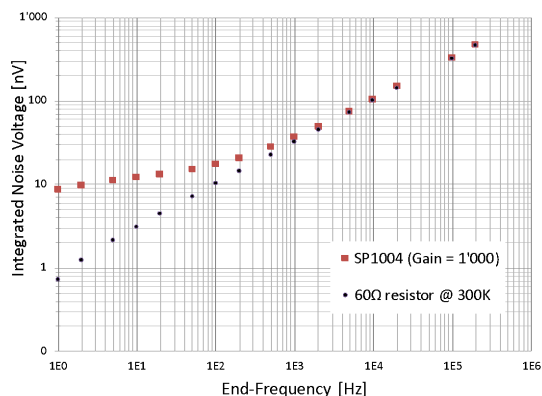
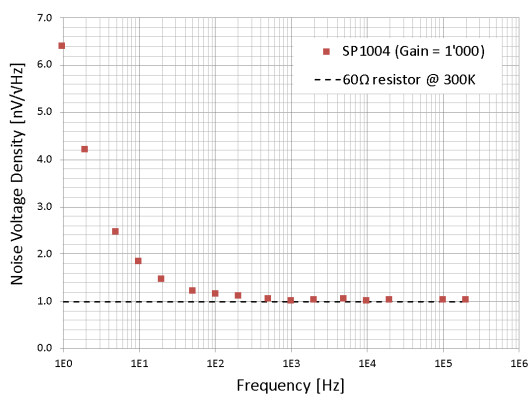
- Ultra-low voltage noise: $1 \text{ nV}/\sqrt{\text{Hz}}$ @ 1 kHz
- Ultra-low current noise: $6 \text{ fA}/\sqrt{\text{Hz}}$ @ 10 Hz
- The only available differential amplifier with actively stabilized input voltage: drift $< 0.3 \text{ } \mu\text{V}/^\circ\text{C}$
- A floating instrument: avoids ground loops
- Small and light for mounting directly on the breakout box
- Adjustable low-pass filter from 100 Hz to 1 MHz
- Variable gain: from 100 to 10,000

Applications:

- Sensitive voltage measurements at cryogenic temperatures
- Low-drift DC differential voltage measurements
- Precise DC and AC current measurements using a shunt resistor
- Differential voltage measurements on high-impedance loads

Model	SP1004
Input Voltage	stable, low drift and low noise input voltage offset compensated noise: 6.5 nV/√Hz @ 1 Hz 1.8 nV/√Hz @ 10 Hz 1.0 nV/√Hz @ f > 1 kHz feedback stabilized drift 0.3 μV/K @25°C
Input current	stable and low input current noise noise: 6 fA/√Hz @10 Hz & ∞ input resistor 12 fA/√Hz @1 kHz & ∞ input resistor
Gain	three decades 10 ² to 10 ⁴ - remote controllable
Filtering	integrated low-pass filter 100 Hz to 1 MHz - remote controllable
Bandwidth	1 MHz maximum
Input Coupling	DC or AC (0.03 Hz)
Input Resistor	selectable: 10 MΩ, 1 GΩ or ∞ (DC only)
Common-Mode	±1 V input common-mode voltage range high common-mode rejection ratio: > 100 dB @100 Hz
Dimensions and weight	small size, low weight, mountable directly on breakout box 122 × 55 × 35 mm, 290 gr

Table shows typical specs





Multichannel Remote Controller

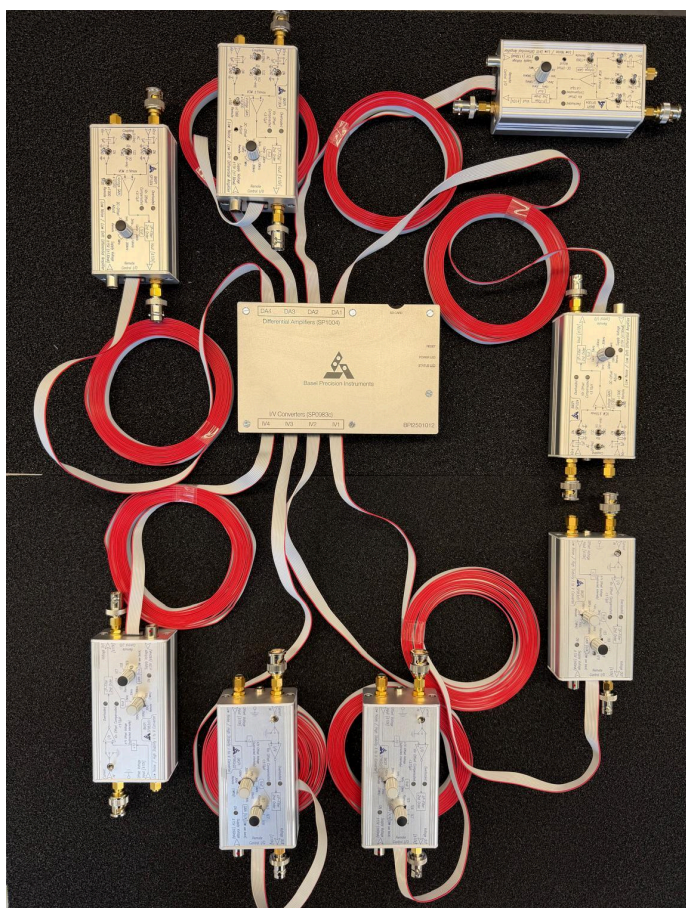
for SP1004 Differential Amplifiers and SP983c I to V Converters

- Centralised remote control of gain and low-pass filter cutoff frequency
- Monitoring device status
- Parallel control of up to four SP1004 differential amplifiers and four SP983c I to V converters
- 4-meter flat cables for connection to the I to V converters and differential amplifiers
- Web interface (GUI) and a Python/QCoDeS driver

Applications:

- Remote control of the I to V converters and differential amplifiers positioned close to the setup or in hard-to-reach places
- Remote control of multiple amplifiers in parallel
- Simple observation and detailed logging of device status via the web interface

Model	BPI2501
Number of controllable units	Four SP983c I/V converters and four SP1004 differential amplifiers in parallel
Configurable parameters	Gain and low-pass cutoff frequency
Readable parameters	Device overload, gain, low-pass cutoff frequency (SP983c & SP1004) Input voltage compensation status (SP1004 only)
Communication and control	TCP/IP (Ethernet) web interface (GUI) command-line interface QCoDeS driver included
Grounding/Noise performance	Ground is galvanically isolated from the amplifier units - no ground loops No deterioration of the superior noise performance of SP1004 and SP983c amplifiers
System operation via web interface	Event log with time stamps Visual and acoustic overload warning Network configuration
Dimensions and weight	147 × 95 × 28 mm, 1 kg



The figure shows the multi-channel remote controller connected to four I to V converters and four differential amplifiers. The grey-red flat cables provided with the remote controller are 4 meters long, allowing for a large distance between the I to V converters, differential amplifiers and the remote control unit.