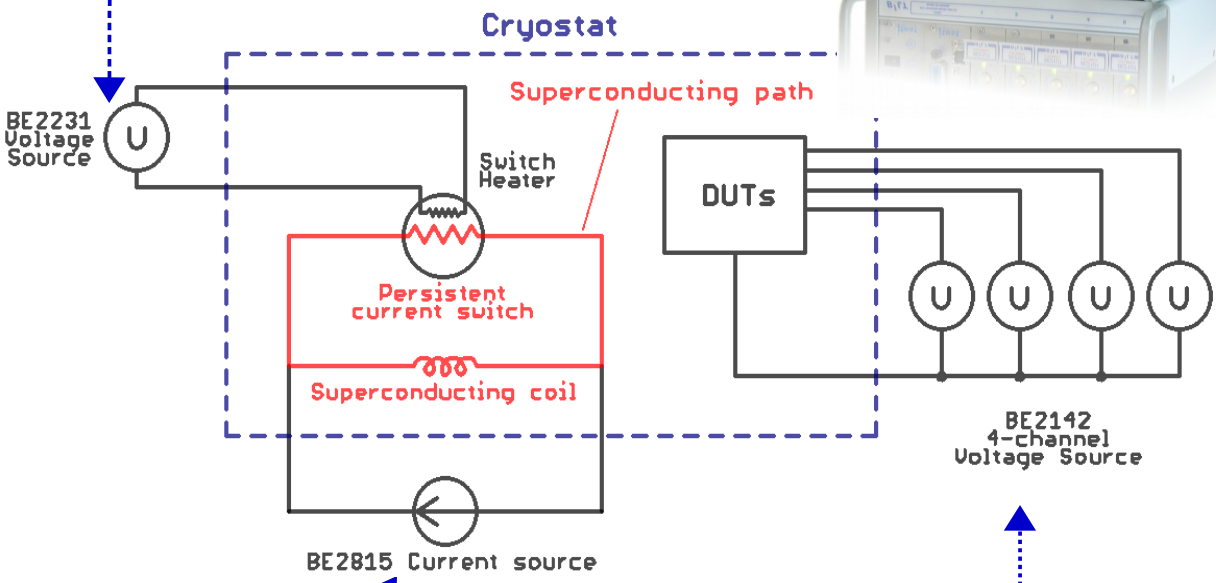
Application Note

Very low noise sources for physics applications requiring a superconducting magnet

Unrivaled noise and stability performances using iTest source modules

- ✔ *BE2142 for noise sensitive component biasing and monitoring*
- ✔ *BE2815 to supply a superconducting magnet*
- ✔ *BE2231 to supply a switch heater*
- ✔ *All in a small, cost effective chassis*

Low cost general purpose voltage source:
- ► Up to ±50V 500mA
- ► 2 voltage ranges: ±5V and ±50V
- ► Voltage and current read-back
- ► Noise down to 100µVp-p



Superconducting magnet power supply
- ► Current to ±5A, magnet up to 10H
- ► Very low noise (10ppm) and high stability (<15ppm/°C) for coils with no persistent mode
- ► 19-bit source resolution helps generate low magnetic field
- ► Controlled ramp
- ► Fail safe
- ► ±15A version on demand

High stability voltage sources:
- ► 4 voltage sources in a single module
- ► 21-bit source resolution
- ► Up to ±12V 15mA
- ► 2 voltage ranges: ±1,2V and ±12V
- ► Voltage and current read-back
- ► Ultra low noise down to 5µVp-p
- ► High stability: a few ppm within 24 hrs
- ► 200mA 1-channel model available

Application note: very low noise sources for cryostat applications

Focus on the BE2142 high stability voltage source module:

World's lowest noise power supply.
No more than the output noise of a very low-noise operational amplifier without additional filtering.

Widely used for:

- Polarization of nanostructures, nanotube, graphene, quantum devices, 2D high conductivity gases…
- Battery replacement for ultra-low noise application

Range	Resolution	Settling time		Noise		Voltage noise density	
		To 99%	To 21 bit	0,1Hz-10Hz	10Hz-100kHz	1kHz	10kHz
± 12V	12µV	45ms	<200ms	<30µVp-p	37µVp-p	7nV/√Hz	<3nV/√Hz
± 1,2V	1,2µV	45ms	<200ms	<3,5µVp-p	5µVp-p	<3nV/√Hz	<3nV/√Hz

All source model features:

- ➔ No voltage transient when powering on/off or switching on/off
- ➔ Short-circuited output when source is switched off
- ➔ Synchronization and triggering functions
- ➔ Voltage and current memories and plotting
- ➔ User programmable thresholds to automatically stop the test
- ➔ NI Labview® driver provided
- ➔ Custom versions on demand

Empty 5-slot BE103 BILT chassis

Chassis features:

- ➔ Ethernet, USB, GPIB
- ➔ 5 slots for modules (13-slot chassis available)
- ➔ Complete software package provided, including a turnkey PC software
- ➔ Many other module models available: voltmeters, power sources and so on...

Product summary		
BN103	5-slot chassis, USB, Ethernet, 100-230V power line, 250Watts	
BE2141 BE2142	±12V 15mA	DC Voltage source module, 4 independent channels Ultra low noise, very low drift, 21-bit, down to 1µV resolution
BE2101 BE2102	±12V 200mA	DC Voltage source module, 1 channel Ultra low noise, very low drift, 21-bit, down to 1µV resolution
BE2231	±50V 500mA	DC Voltage source module, 1 channel Very low noise, low drift, 19-bit
BE2815	±5A 18V	DC Current source module, 1 channel Very low noise, low drift, 19-bit, up to 10H
BE4082	±50V	4 fully independent 6½-digit voltmeters Low input noise, 24-bit A/D, 100ppm typ. accuracy

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