

3765 Hall Effect Card



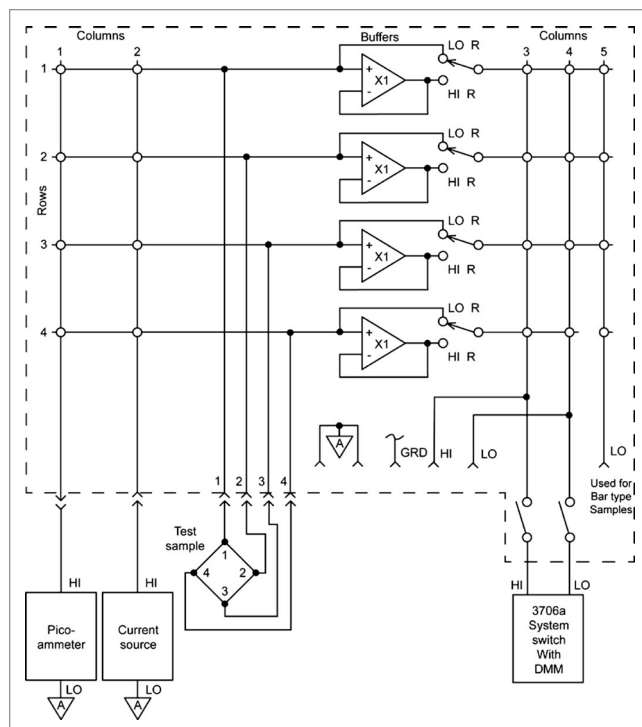
KEITHLEY
A Tektronix Company

The 3765 Hall Effect Card is intended for those who want to assemble their own economical Hall test systems. It can also form the foundation of a full Hall Effect system. Used along with the free software, the Keithley Hall Effect Test Suite (KHETS), the 3765 is easily paired with Keithley DMMs, current sources, and ammeters. The card and KHETS software take advantage of the built-in DMM in the 3706A so that an external voltmeter is not required for measurements.

The 3765 is a signal conditioning card designed to buffer test signals from the Hall sample to the measurement instrumentation and to switch current from a source to the Hall sample. When used with Keithley's 3706A mainframe, the 3765 provides the switching capability to measure Hall voltages as low as 50 nV and sample resistances in excess of $10^{12} \Omega$.

All accessories needed to connect the sample holder, scanner, instruments, and controller are included, greatly simplifying connections and reducing setup time. The 3765 is connected directly to the sample, and all instruments are connected via GPIB to the controller. The KHETS software for making resistivity and Hall measurements is available on our website.

The 3765 can be operated in either low resistivity or high resistivity mode. In the high resistivity mode, input impedance is greater than $100 T\Omega$, input bias current is less than 50 fA, and output resistance is 10 k Ω . Input voltage ranges in both operating modes is -8 V to +8 V. If higher voltage is desired, Keithley recommends using a 6221/6517B system. Cabling and sample connections must be carefully designed to make full use of the capabilities of the 3765. Refer to Keithley's *Low Level Measurements* handbook for guidance in designing these connections.



Specifications

High Resistivity Mode

Input Voltage Operating Range	-8 V to +8 V
Input Impedance	>100 T Ω in parallel with less than 3 pF
Input Bias Current	<50 fA at 23°C. Doubles approximately every 10°C rise in ambient room temperature.
Input Voltage Noise	<10 μ V p-p, 0.1 to 10 Hz bandwidth.
Output Resistance	10 k Ω

Low Resistivity Mode

Input Voltage Operating Range	-8 V to +8 V
Input Impedance	>10 G Ω in parallel with less than 420 pF
Input Bias Current	<100 pA
Input Voltage Noise	<50 nV p-p, 0.1 to 10 Hz bandwidth
Input To Output Resistance	<30 Ω

General

Maximum Common Mode Voltage (analog ground to earth ground)	30 V peak, DC to 60 Hz bandwidth
Isolation (analog ground to earth ground)	>1 G Ω in parallel with 150 pF
Warm-Up Time	1 hour for rated specifications
Operating Environment	0° to 50° C, 70% relative humidity up to 35° C.
Storage Environment	-25° to 65° C



SPECIFICATION CONDITIONS

This document contains specifications and supplemental information for the Model 3765 Hall Effect Card. Specifications are the standards against which the Model 3765 is tested. Upon leaving the factory, the Model 3765 meets these specifications. Supplemental, typical, and characteristic values are nonwarranted, apply at 23 °C (73 °F), and are provided solely for informational purposes. Measurement accuracies are specified under these conditions: 23 °C ±5 °C, 5 percent to 70 percent relative humidity, non-condensing.

CONFIGURATION

Input characteristics and output are matrix-configurable for Van der Pauw or Hall Bar measurements. Input characteristics are selectable for either low resistivity or high resistivity samples.

BACKPLANE

Voltage measurements can be made by connecting the a digital multimeter via internal backplane relays. The card can be isolated from the backplane using relays allowing external nanovoltmeter connections.

HIGH RESISTIVITY MODE

Category	Specification
Input voltage operating range	+8 V to -8 V
Input impedance	>100 TΩ in parallel with less than 3 pF
Input bias current	50 fA at 23 °C. Doubles approximately every 10 °C rise in ambient room temperature.
Input voltage noise	<10 μV peak to peak, 0.1 to 10 Hz bandwidth
Output resistance	10 KΩ

LOW RESISTIVITY MODE

Category	Specification
Input voltage operating range	+8 V to -8 V
Input impedance	>10 GΩ in parallel with less than 420 pf
Input bias current	<100 pA
Input voltage noise	<50 nV peak to peak, 0.1 to 10 Hz bandwidth
Input to output resistance	<30 Ω

Model 3765 Hall Effect Card Hall Effect Card Specifications

Category	Specification
Matrix configuration	Four rows by five columns single pole
Contact configuration	Form A
Current source input	Three-lug female triaxial; input high to low clamped at ± 12 V; maximum input 100 mA
Sample inputs	Four three-lug female triaxial. Outer shell is analog ground Maximum input overload: ± 12 V HI to analog ground or guard to analog ground
Current monitor output	Insulated female BNC
Measurement outputs	Spring-loaded terminals; accepts AWG. No. 18 to No. 24 wire; maximum load: 1 mA
Maximum common mode voltage	Analog ground to earth ground: $30 V_{PEAK}$, DC to 60 Hz sine wave

Category	General specification	
Warmup	One hour to rated accuracies	
Isolation	Analog ground to earth ground; greater than $10^9 \Omega$ in parallel with 150 pF	
Actuation time	Low current	1 μ s
	Voltage	60 ms
	LO R bypass	10 ms
Relay type	Low current	Reed
	Voltage	Optically coupled FET
	LO R bypass	Latching electromechanical
Relay drive current	Low current	16 mA
	Voltage	5 mA
	LO R bypass	56 mA
Relay drive scheme	Low current	Direct
	Voltage	Direct
	LO R bypass	Latching electromechanical
Environment	<p>Indoor use only</p> <p>Temperature range: Operating: 0 °C to 50 °C (32 °F to 122 °F), up to 35 °C (92 °F) at 70% relative humidity. Derate 3% relative humidity per degree Celsius from 35 °C to 50 °C (95 °F to 122 °F)</p> <p>Storage: -25 °C to 65 °C (23 °F to 149 °F)</p> <p>Altitude: 0 to 2000 m (0 to 6562 feet) above sea level</p> <p>Pollution degree: 2</p>	
Dimensions	25.40 mm high \times 166.12 mm wide \times 263.40 mm long (1.00 in. \times 6.54 in. \times 10.37 in.)	
Weight	1.32 kg (2.90 lbs)	
Safety	NRTL listed to UL61010-1 and CAN/CSA C22.2 NO. 61010-1-12; UL 61010-2-030 and CAN/CSA-22.2 NO.61010-2-030-12. Conforms with European Union Low Voltage Directive	
EMC	Conforms to European Union EMC Directive	

