Series 3700A

System Switch/Multimeter and Plug-In Cards



- **Six slot system switch mainframe with optional high performance multimeter**
- **Multi-processor architecture optimized for high throughput scanning and pattern switching applications**
- **Remote PC control via Ethernet, USB, and GPIB interfaces**
- **Up to 576 two-wire or 720 one-wire multiplexer channels in one mainframe**
- **Up to 2,688 one-pole matrix crosspoints in one mainframe**
- **Embedded Test Script Processor (TSP®) offering unparalleled system automation, throughput, and flexibility**
- **TSP-Link® master/slave connection provides easy system expansion and seamless connection to Series 2600 and 2600A SourceMeter® instruments**
- **Capable of over 14,000 readings per second to memory with optional high performance multimeter**
- **LXI Class B Version 2 with embedded Web browser interface for test setup, maintenance, and basic application control**

The Series 3700A offers scalable, instrument grade switching and multi-channel measurement solutions that are optimized for automated testing of electronic products and components. The Series 3700A includes four versions of the Model 3706A system switch mainframe along with a growing family of plug-in switch and control cards. When the Model 3706A mainframe is ordered with the high performance multimeter, you receive a tightly integrated switch and measurement system that can meet the demanding application requirements in a functional test system or provide the flexibility needed in stand-alone data acquisition and measurement applications.

Maximizes system control and flexibility

To provide users with greater versatility when designing test systems, the Series 3700A mainframes are equipped with many standard features. For example, easy connectivity is supported with three remote interfaces: LXI/Ethernet, General Purpose Interface Bus (GPIB), and Universal Serial Bus (USB). Fourteen digital I/O lines are also included, which are programmable and can be used to control external devices such as component handlers or other instruments. Additionally, system control can be greatly enhanced by using our Test Script Processor (TSP) technology. This technology provides "smart" instruments with the ability to perform distributed processing and control at the instrument level versus a central PC.

High quality switching at a value price

The Series 3700A builds upon Keithley's tradition of producing innovative, high quality, precise signal switching. This series offers a growing family of high density and general purpose plug-in cards that accommodates a broad range of signals at very competitive pricing. The Series 3700A supports applications as diverse as design validation, accelerated stress testing, data acquisition, and functional testing.

Model 3706A mainframe

The Series 3700A includes the base Model 3706A system switch/multimeter mainframe with three options for added flexibility. This mainframe contains six slots for plug-in cards in a compact 2U high (3.5 inches/89mm) enclosure that easily accommodates the needs of medium to high channel count applications. When fully loaded, a mainframe can support up to 576 two-wire multiplexer channels or 2,688 one-pole matrix crosspoints for unrivaled density and economical per channel costs.

High performance, 7½-digit multimeter (DMM)

The high performance multimeter option provides up to 7½-digit measurements, offering 26-bit resolution to support your ever-increasing test accuracy requirements. This flexible resolution supplies a DC reading rate from >14,000 readings/second at 3½ digits to 60 readings/second at 7½ digits to accommodate a greater span of applications. The multimeter does not use a card slot, so you maintain all six slots in your mainframe. In addition, the multimeter is wired to the mainframe's analog backplane, ensuring a high quality signal path from each card channel to the multimeter.

Single Channel Reading Rates

NPLC	DCV/ 2 Wire Ohms	4 Wire Ohms
1.0	60	29
0.2	295	120
0.06	935	285
0.006	6,200	580
0.0005	14,100	650

The multimeter supports 13 built-in measurement functions, including: DCV, ACV, DCI, ACI, frequency, period, two-wire ohms, four-wire ohms, three-wire RTD temperature, four-wire RTD temperature, thermocouple temperature, thermistor temperature, and continuity. In addition, the multimeter offers extended low ohms (1Ω) and low current (10μA) ranges. In-rack calibration is supported, which reduces both maintenance and calibration time.

Series 3700A

System Switch/Multimeter and Plug-In Cards

Ordering Information

Mainframes

3706A Six-slot system switch with high performance DMM

3706A-NFP Six-slot system switch with high performance DMM, without front panel display and keypad

3706A-S Six-slot system switch

3706A-SNFP Six-slot system switch, without front panel display and keypad

Plug-in Cards

3720 Dual 1×30 multiplexer card (auto CJC when used with 3720-ST)

3721 Dual 1×20 multiplexer card (auto CJC when used with 3721-ST)

3722 Dual 1×48, high density, multiplexer card

3723 Dual 1×30, high speed, reed relay multiplexer card

3724 Dual 1×30 FET multiplexer card

3730 6×16, high density, matrix card

3731 6×16 high speed, reed relay matrix card

3732 Quad 4×28, ultra-high density, reed relay matrix card

3740 32 channel isolated switch card

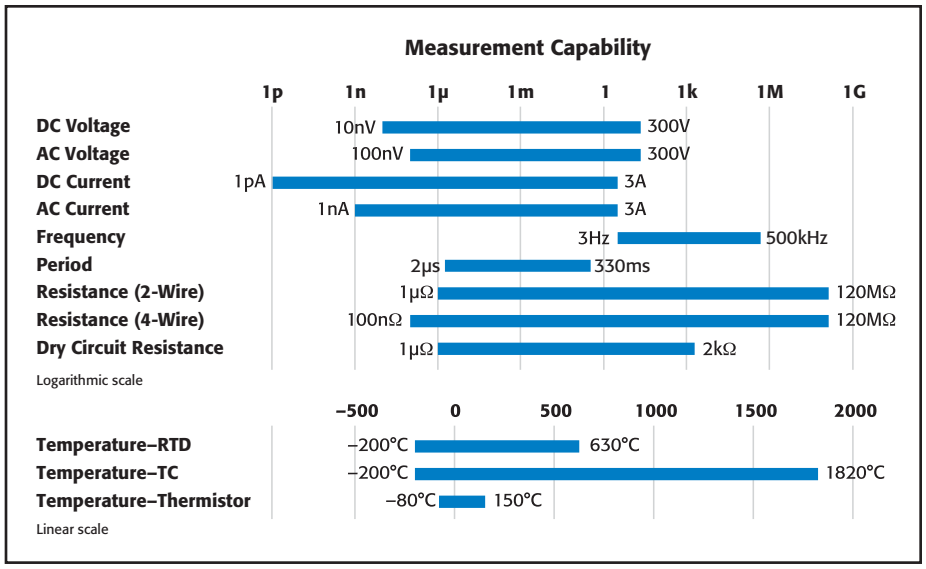
3750 Multifunction control card

Accessories Supplied

Test Script Builder Software Suite CD

Ethernet Crossover Cable (CA-180-3A)

Series 3700A Product CD (includes LabVIEW®, IVI C, and IVI.COM drivers)



Measurement capabilities of the high performance multimeter

ACCESSORIES AVAILABLE

GPIB INTERFACES AND CABLES

7007-1	Shielded GPIB Cable, 1m (3.5ft)
7007-2	Shielded GPIB Cable, 2m (6.6ft)
KPCI-488LPA	IEEE-488 Interface/Controller for the PCI Bus
KUSB-488B	IEEE-488 USB-to-GPIB Interface Adapter

DIGITAL I/O, TRIGGER LINK, AND TSP-LINK

2600-TLINK	Trigger I/O to Trigger Link Interface Cable, 1m (3.3 ft)
CA-126-1	Digital I/O and Trigger Cable, 1.5m (4.9 ft)
CA-180-3A	CAT5 Crossover Cable for TSP-Link

MULTIMETER CONNECTORS

3706-BAN	DMM Adapter Cable, 15-pin D-sub to banana jacks, 1.4m (4.6 ft)
3706-BKPL	Analog Backplane Extender Board, 15-pin D-sub to terminal block
3706-TLK	Test Lead Kit, includes 3706-BAN and plug-in test lead accessories
8620	Shorting Plug

RACK MOUNT KIT

4288-10	Fixed Rear Rack Mount Kit

SERVICES AVAILABLE

Mainframe Models 3706A and 3706A-NFP

3706A-3Y-EW	1 Year Factory Warranty Extended to 3 Years
3706A-5Y-EW	1 Year Factory Warranty Extended to 5 Years
C/3706A-3Y-STD	Calibration Contract, 3 Years, Standard Calibration*
C/3706A-3Y-DATA	Calibration Contract, 3 Years, Z540 Compliant Calibration with Data*
C/3706A-3Y-ISO	Calibration Contract, 3 Years, ISO 17025 Accredited Calibration*
C/3706A-5Y-STD	Calibration Contract, 5 Years, Standard Calibration*
C/3706A-5Y-DATA	Calibration Contract, 5 Years, Z540 Compliant Calibration with Data*
C/3706A-5Y-ISO	Calibration Contract, 5 Years, ISO 17025 Accredited Calibration*

Mainframe Models 3706A-S and 3706A-SNFP

3706A-S-3Y-EW	1 Year Factory Warranty Extended to 3 Years
3706A-S-5Y-EW	1 Year Factory Warranty Extended to 5 Years

SOFTWARE SERVICES
SYSTEM DEVELOPMENT OR IMPLEMENTATION

Other service contracts are available; please contact us for details.

*Not available in all countries.

Series 3700A

System Switch/Multimeter and Plug-In Cards

TSP distributed control increases test speed and lowers test cost

TSP technology enhances instrument control by allowing users the choice of using standard PC control or of creating embedded test scripts that are executed on microprocessors within the instrument. By using TSP test scripts instead of a PC for instrument control, you avoid communication delays between the PC controller and instrument, which results in improved test throughput. Test scripts can contain math and decision-making rules that further reduce the interaction between a host PC and the instrument.

This form of distributed control supports the autonomous operation of individual instruments or groups of instruments and can possibly remove the need for a high level PC controller, which lowers test and ownership costs. This is the same proven TSP technology found in our innovative Series 2600A System SourceMeter instruments.

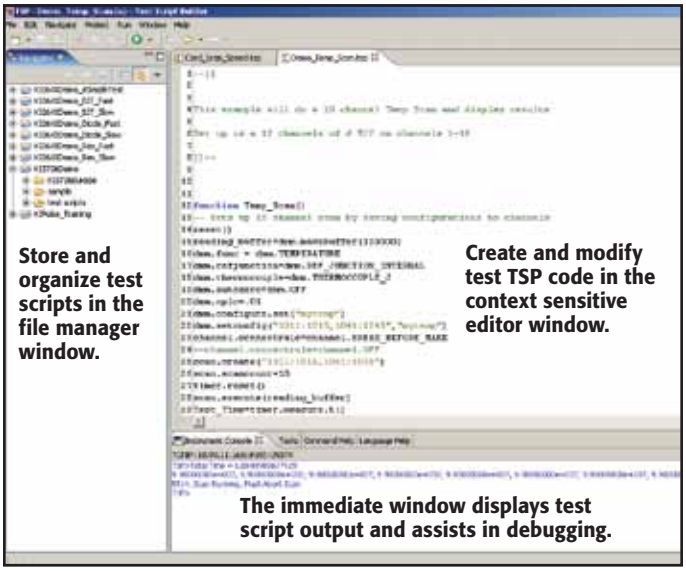
TSP-Link technology for easy and seamless system coordination and expansion

If your channel density requirements grow or if you need to process more signal types, use TSP-Link technology to expand your system. The TSP-Link master/slave connection offers easy system expansion between Series 3700A mainframes. You can also use TSP-Link technology to connect to other TSP-Link enabled instruments such as Series 2600A SourceMeter instruments. Everything connected with TSP-Link can be controlled by the master unit, just as if they were all housed in the same chassis.

This high speed system expansion interface lets users avoid the complex and time consuming task of expanding their remote interfaces to another mainframe. There is no need to add external triggers and remote communication cables to individual instruments, since all TSP-Link connected devices can be controlled from a single master unit.

Test Script Builder software suite

Test Script Builder is a software tool that is provided with all Series 3700A instruments to help users easily create, modify, debug, and store TSP test scripts. It supplies a project/file manager window to store and organize test scripts, a text-sensitive program editor to create and modify test TSP code, and an immediate instrument control window to send Ethernet, GPIB, and USB commands and to receive data from the instrument. The immediate window also allows users to see the output of a given test script and simplifies debugging.



Test Script Builder Software Suite

LXI Class B Version 2

Series 3700A mainframes are LXI Class B Version 2 compliant instruments. The features include a 10/100M Base-T Ethernet connection, graphical Web server, LAN based instrument triggering, and IEEE 1588 precision time protocol (PTP) synchronization. PTP time synchronization provides a standard method to synchronize devices on an Ethernet network with microsecond precision for time/event based programming.

Transportable memory, USB 2.0 device port

All Model 3706A mainframes contain a USB device port for easy transfer of readings, configurations, and test scripts to memory sticks. This port, which is located on the front panel, provides you with easy access to and portability of measurement results. Simply plug in a memory stick and, with a few simple keystrokes, gain access to virtually unlimited memory storage. Additional capabilities include: saving and recalling system configurations and storage for TSP scripts.

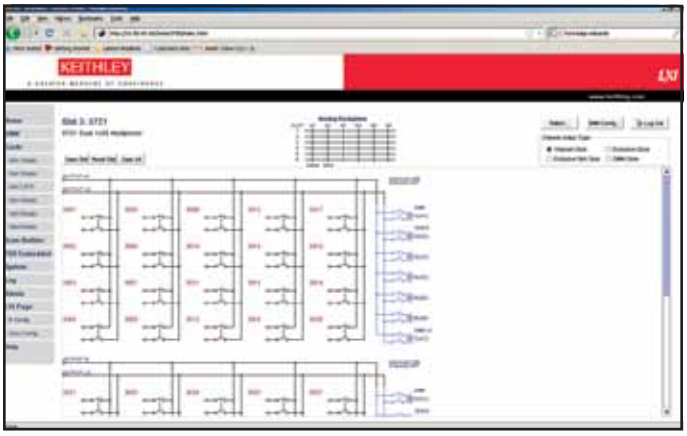
Series 3700A

System Switch/Multimeter and Plug-In Cards

Embedded Web server

The built-in Web interface offers a quick and easy method to control and analyze measurement results. Interactive schematics of each card in the mainframe support point-and-click control for opening and closing switches. A scan list builder is provided to guide users through the requirements of a scan list (such as trigger and looping definitions) for more advanced applications. When the mainframe is ordered with the multimeter, additional Web pages are included for measurement configuration and viewing, including a graphing toolkit.

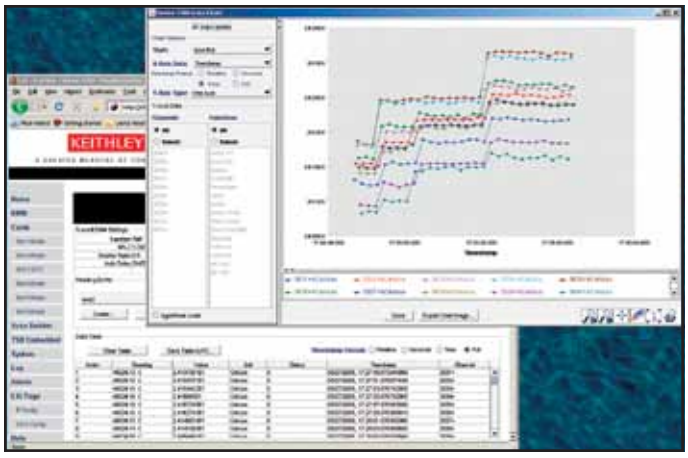
Built-in Web server interface



1. Configure your switch channels and measurement functions. Configure the DMM to make your measurements at the desired speed, resolution, etc. and assign them to the desired channels.



2. Build and run your automated scan list. The toolkit makes it easy to build and execute an automated sequence of channel-open and channel-close commands and triggered multimeter measurements.



3. Analyze your data. View your results in real-time or historical mode with point-and-click simplicity. Data can be exported directly to your PC in either numerical or graphical formats for presentation or other applications.



Model 3706A front panel



Model 3706A-S front panel



Model 3706A-NFP and Model 3706A-SNFP front panel



Model 3706A rear panel

Series 3700A

System Switch/Multimeter and Plug-In Cards

High Performance Multimeter Specifications (Rev. A)

DC Specifications

CONDITIONS: 1 PLC or 5 PLC.

For <1PLC, add appropriate "ppm of range" adder from "RMS Noise" table.
Includes rear panel Analog Backplane connector and transducer conversion. Refer to DC Notes for additional card uncertainties.

Function	Range[1]	Resolution	Test Current or Burden Voltage	Input Resistance or Open Circuit Voltage[2]	Accuracy: ±(ppm of reading + ppm of range) (ppm = parts per million) (e.g., 10ppm = 0.001%) 24 Hour[3] 23°C ± 1°C	90 Day 23°C ± 5°C	1 Year 23°C ± 5°C	Temperature Coefficient 0°–18°C and 28°–50°C
Voltage[4]	100.00000 mV[19]	0.01 µV		>10 GΩ or 10 MΩ ±1%	10 + 9	25 + 9	30 + 9	(1 + 5)/°C
	1.0000000 V[19]	0.1 µV		>10 GΩ or 10 MΩ ±1%	7 + 2	25 + 2	30 + 2	(1 + 1)/°C
	10.000000 V	1 µV		>10 GΩ or 10 MΩ ±1%	7 + 2	20 + 2	25 + 2	(1 + 1)/°C
	100.00000 V	10 µV		10 MΩ ±1%	15 + 6	35 + 6	40 + 6	(5 + 1)/°C
	300.00000 V	100 µV		10 MΩ ±1%	20 + 6	35 + 6	40 + 6	(5 + 1)/°C
Resistance[4, 5, 6, 7]	1.0000000 Ω	0.1 µΩ	10 mA	8.2 V	15 + 80	40 + 80	60 + 80	(8 + 1)/°C
	10.000000 Ω	1 µΩ	10 mA	8.2 V	15 + 9	40 + 9	60 + 9	(8 + 1)/°C
	100.00000 Ω	10 µΩ	1 mA	13.9 V	15 + 9	45 + 9	65 + 9	(8 + 1)/°C
	1.0000000 kΩ	100 µΩ	1 mA	13.9 V	20 + 4	45 + 4	65 + 4	(8 + 1)/°C
	10.000000 kΩ	1 mΩ	100 µA	9.1 V	15 + 4	40 + 4	60 + 4	(8 + 1)/°C
	100.00000 kΩ	10 mΩ	10 µA	14.7 V	20 + 4	45 + 5	65 + 5	(8 + 1)/°C
	1.0000000 MΩ	100 mΩ	10 µA	14.7 V	25 + 4	50 + 5	70 + 5	(8 + 1)/°C
	10.000000 MΩ	1 Ω	0.64 µA//10 MΩ	6.4 V	150 + 6	200 + 10	400 + 10	(70 + 1)/°C
	100.00000 MΩ	10 Ω	0.64 µA//10 MΩ	6.4 V	800 + 30	2000 + 30	2000 + 30	(385 + 1)/°C
Dry Circuit Resistance[6, 8]	1.0000000 Ω	1 µΩ	10 mA	27 mV	25 + 80	50 + 80	70 + 80	(8 + 1)/°C
	10.000000 Ω	10 µΩ	1 mA	20 mV	25 + 80	50 + 80	70 + 80	(8 + 1)/°C
	100.00000 Ω	100 µΩ	100 µA	20 mV	25 + 80	90 + 80	140 + 80	(8 + 1)/°C
	1.0000000 kΩ	1 mΩ	10 µA	20 mV	25 + 80	180 + 80	400 + 80	(8 + 1)/°C
	2.0000000 kΩ	10 mΩ	5 µA	20 mV	25 + 80	320 + 80	800 + 80	(8 + 1)/°C
Continuity (2W)	1.000 kΩ	100 mΩ	1 mA	13.9 V	40 + 100	100 + 100	100 + 100	(8 + 1)/°C
Current[9]	10.000000 µA	1 pA	<61 mV		40 + 50	300 + 50	500 + 50	(35 + 9)/°C
	100.00000 µA	10 pA	<105 mV		50 + 9	300 + 30	500 + 30	(50 + 5)/°C
	1.0000000 mA	100 pA	<130 mV		50 + 9	300 + 30	500 + 30	(50 + 5)/°C
	10.000000 mA	1 nA	<150 mV		50 + 9	300 + 30	500 + 30	(50 + 5)/°C
	100.00000 mA	10 nA	<0.4 V		50 + 9	300 + 30	500 + 30	(50 + 5)/°C
	1.0000000 A	100 nA	<0.6 V		200 + 60	500 + 60	800 + 60	(50 + 10)/°C
	3.0000000 A	1 µA	<1.8 V		1000 + 75	1200 + 75	1200 + 75	(50 + 10)/°C

TEMPERATURE

(Displayed in °C, °F, or K. Exclusive of probes errors.)

THERMOCOUPLES (Accuracy based on ITS-90):

Type	Range	Resolution	90 Day/1 Year, 23°C ± 5°C Simulated reference junction	90 Day/1 Year, 23°C ± 5°C Using 3720, 3721, or 3724 Cards	Range	90 Day/1 Year, 23°C ± 5°C Using 3720, 3721, or 3724 Cards	Temperature Coefficient 0°–18°C and 28°–50°C
J	–150 to + 760°C	0.001°C	0.2°C	1.0°C	–200 to –150°C	1.5°C	0.03°C/°C
K	–150 to +1372°C	0.001°C	0.2°C	1.0°C	–200 to –150°C	1.5°C	0.03°C/°C
N	–100 to +1300°C	0.001°C	0.2°C	1.0°C	–200 to –100°C	1.5°C	0.03°C/°C
T	–100 to +400°C	0.001°C	0.2°C	1.0°C	–200 to –100°C	1.5°C	0.03°C/°C
E	–150 to +1000°C	0.001°C	0.2°C	1.0°C	–200 to –150°C	1.5°C	0.03°C/°C
R	+400 to +1768°C	0.1°C	0.6°C	1.8°C	0 to +400°C	2.3°C	0.03°C/°C
S	+400 to +1768°C	0.1°C	0.6°C	1.8°C	0 to +400°C	2.3°C	0.03°C/°C
B	+1100 to +1820°C	0.1°C	0.6°C	1.8°C	+350 to +1100°C	2.8°C	0.03°C/°C

4-WIRE RTD OR 3-WIRE RTD (100Ω platinum [PT100], D100, F100, PT385, PT3916, or user 0Ω to 10kΩ) (Selectable Offset compensation On or Off):
For 3-wire RTD, dmm.connect=dmm.CONNECT_FOUR_WIRE, ≤0.1Ω lead resistance mismatching in Input HI and LO. Add 0.25°C/0.1Ω of lead resistance mismatch.

4-Wire RTD	–200 to +630°C	0.01°C	0.06°C				0.003°C/°C
3-Wire RTD	–200 to +630°C	0.01°C	0.75°C				0.003°C/°C

THERMISTOR: 2.2kΩ, 5kΩ, and 10kΩ. Not recommended with Model 3724 card. See Model 3724 manual for "Measurement Considerations."

	–80 to +150°C	0.01°C	0.08°C				0.002°C/°C

Series 3700A

System Switch/Multimeter and Plug-In Cards

DC SPEEDS vs. RMS NOISE

Single Channel, 60Hz (50Hz) Operation.

1PLC and 5PLC RMS noise are included in DC specifications.

RMS Noise[16], PPM of Range

RMS Noise Calculator:
Add 2.5 × "RMS Noise" to "ppm of range"
(e.g., 10V @ 0.006 PLC)
"ppm of range" = 2.5 × 7.0 ppm + 2 ppm

Function	NPLC	Aperture (ms)	Digits	100mV	1V	10V	100V	300V	Measurements into Buffer (rdgs/s)[13] Azero On	Azero Off	Measurement to PC (ms/rdg) Azero Off[13] Ethernet	GPIB	USB
	5[14]	83.3 (100)	7½	1.0	0.07	0.05	0.7	0.2	9.5 (8)	12 (10)	86.3 (104)	86.1 (102.8)	86.3 (103.1)
	1[14]	16.7 (20)	7½	0.9	0.12	0.1	0.8	0.35	42 (33)	59.8 (49.5)	19.4 (22.7)	19.5 (22.8)	19.9 (23.2)
	0.2[12, 14]	3.33 (4.0)	6½	2.5	0.32	0.3	2.5	1.0	50 (40)	60 (50)	19.4 (22.7)	19.5 (22.8)	19.9 (23.2)
DCV	0.2[14]	3.33 (4.0)	6½	3.5	1.7	0.7	3.5	1.5	120 (100)	295 (235)	7.6 (8.3)	6.2 (6.8)	6.4 (7.0)
	0.06[15]	1.0 (1.2)	5½	12	3.0	1.5	8.0	3.5	205 (165)	935 (750)	1.40 (1.80)	1.50 (1.80)	1.60 (2.30)
	0.006[15]	0.100 (0.120)	4½	55	15	7.0	70	35	218 (215)	6,200 (5,500)	0.55 (0.57)	0.65 (0.67)	0.75 (0.77)
	0.0005[15]	0.0083 (0.001)	3½	325	95	95	900	410	270 (270)	14,600 (14,250)	0.50 (0.5)	0.60 (0.60)	0.70 (0.70)
				10–100Ω	**1kΩ**	**10kΩ**							
	5[14]	83.3 (100)	7½	2.0	0.5	0.4	—	—	9.5 (8)	12 (10)	87.0 (105)	86.1 (103)	86.5 (104)
	1[14]	16.7 (20)	7½	3.5	0.8	0.6	—	—	42 (33)	59.8 (49.5)	21.0 (24.3)	19.5 (22.8)	19.9 (23.2)
2WΩ	0.2[12, 14]	3.33 (4.0)	6½	6.5	1.7	1.5	—	—	50 (40)	60 (50)	21.0 (24.3)	19.5 (22.8)	19.9 (23.2)
(≤10kΩ)	0.2[14]	3.33 (4.0)	6½	8.0	4.5	5.5	—	—	120 (100)	295 (235)	7.6 (8.3)	6.2 (6.8)	6.4 (7.0)
	0.06[15]	1.0 (1.2)	5½	15	6	6.5	—	—	205 (165)	935 (750)	1.40 (1.80)	1.50 (1.80)	1.60 (2.30)
	0.006[15]	0.100 (0.120)	4½	60	15	15	—	—	218 (215)	6,200 (5,500)	0.55 (0.57)	0.65 (0.67)	0.75 (0.77)
	0.0005[15]	0.0083 (0.001)	3½	190	190	190	—	—	270 (270)	14,100 (13,700)	0.50 (0.5)	0.60 (0.60)	0.70 (0.70)
				10µA	**100µA**	**1mA–100mA**	**1A**	**3A**					
	5[14]	83.3 (100)	7½	3.5	1.6	1.6	2.9	2.0	9.5 (8)	12 (10)	88 (103)	86.1 (102.8)	86.3 (103.1)
	1[14]	16.7 (20)	6½	3.5	1.1	1.1	2.2	1.8	42 (33)	59.8 (49.5)	21.0 (22.7)	19.5 (22.8)	19.8 (23.1)
	0.2[12, 14]	3.33 (4.0)	5½	50	5.0	3.0	4.0	8.0	50 (40)	60 (50)	19.4 (22.7)	19.5 (22.8)	19.8 (23.1)
DCI	0.2[14]	3.33 (4.0)	4½	100	35	12	4.0	8.0	120 (100)	295 (235)	7.6 (8.3)	6.2 (6.8)	6.4 (7.0)
	0.06[15]	1.0 (1.2)	4½	350	35	20	8.0	20	205 (165)	935 (750)	1.40 (1.80)	1.50 (1.80)	1.60 (2.30)
	0.006[15]	0.100 (0.120)	4½	400	200	40	50	100	218 (215)	6,200 (5,500)	0.55 (0.57)	0.65 (0.67)	0.75 (0.77)
	0.0005[15]	0.0083 (0.001)	3½	2500	450	250	325	750	270 (270)	14,100 (13,700)	0.50 (0.5)	0.60 (0.60)	0.70 (0.70)
				1Ω	**10–100Ω**	**1kΩ**	**10kΩ**						
	5[14]	83.3 (100)	7½	5.5	0.8	0.5	0.5	—	5 (4)	5.9 (4.7)	173 (206)	173 (206)	173 (206)
	1[14]	16.7 (20)	7½	15	1.4	0.5	0.7	—	23.5 (18.5)	29 (23)	39 (46)	39 (46)	39 (46)
4WΩ	0.2[12, 14]	3.33 (4.0)	5½	100	30	10	50	—	26.5 (21)	30 (24)	39 (46)	39 (46)	39 (46)
	0.2[14]	3.33 (4.0)	5½	300	50	10	63	—	80 (60)	120 (95)	12.3 (14.5)	11.3 (13.3)	11.7 (13.7)
	0.06[15]	1.0 (1.2)	4½	500	50	15	70	—	140 (110)	285 (225)	6.2 (7.2)	6.3 (7.3)	6.5 (7.6)
	0.006[15]	0.100 (0.120)	4½	750	75	30	100	—	200 (195)	580 (565)	4.2 (4.4)	4.3 (4.5)	4.6 (4.8)
	0.0005[15]	0.0083 (0.001)	3½	3500	450	250	250	—	210 (205)	650 (645)	4.2 (4.4)	4.3 (4.5)	4.6 (4.8)
				1Ω	**10–100Ω**	**1kΩ**	**10kΩ**						
	5[14]	83.3 (100)	7½	5.5	0.8	0.5	0.5	—	2.5 (2.0)	2.9 (2.3)	343 (427)	341 (425)	342 (426)
4WΩ	1[14]	16.7 (20)	7½	16	1.5	0.7	1.5	—	12.7 (10)	14 (11.2)	77 (95)	74 (92)	75 (93)
OCOMP	0.2[12, 14]	3.33 (4.0)	6½	45	4.5	2.1	3.5	—	14 (11.2)	15 (12)	70 (86.5)	70 (86.5)	70 (86.5)
	0.2[14]	3.33 (4.0)	5½	500	50	13	30	—	46.5 (37)	56 (44)	22.7 (25)	20.5 (23)	21.1 (24)
	0.0005[15]	0.0083 (0.001)	3½	4500	650	400	400	—	129 (125)	215 (210)	6.7 (6.7)	6.8 (6.8)	7 (7)
				1–10Ω	**100Ω**	**1kΩ**	**2kΩ**						
	5[14]	83.3 (100)	6½	8.0	10	10	8.0	—	2.5 (2.0)	2.9 (2.3)	347 (430)	345 (428)	346 (429)
Dry-CktΩ	1[14]	16.7 (20)	5½	17	22	25	28	—	12 (9.5)	13 (10)	80 (99)	77 (95)	78 (97)
OCOMP	0.2[12, 14]	3.33 (4.0)	4½	50	50	50	50	—	14 (11.2)	15 (12)	70 (86.5)	70 (86.5)	70 (86.5)
	0.2[14]	3.33 (4.0)	3½	500	1000	1000	1500	—	35 (30)	45 (36)	27 (33)	25 (31)	26 (32)
	0.0005[15]	0.0083 (0.001)	2½	8500	8500	8500	8500	—	84 (84)	115 (110)	10.7 (10.7)	10.7 (10.7)	11 (11)

RTD SPEEDS vs. NOISE

1 PLC and 5 PLC Noise are included in RTD Specifications.

Function	NPLC	Aperture (ms)	Digits	Add °C to Reading[16] 4-Wire	3-Wire	Measurements into Buffer[13] (rdg/s) Azero On	Azero Off	Measurement to PC[13] (ms/rdg) Azero Off Ethernet	GPIB	USB
		Single Channel, 60Hz (50Hz) Operation								
	5[14]	83.3 (100)	7½	0	0	5 (4)	5.9 (4.7)	173 (206)	173 (206)	173 (206)
	1[14]	16.7 (20)	7½	0	0	23.5 (18.5)	29 (23)	39 (46)	39 (46)	39 (46)
	0.2[12, 14]	3.33 (4.0)	5½	0.01	0.01	26.5 (21)	30 (24)	39 (46)	39 (46)	39 (46)
OCOMP OFF	0.2[14]	3.33 (4.0)	5½	0.18	0.18	80 (60)	120 (95)	12.3 (14.5)	11.3 (13.3)	11.7 (13.7)
	0.06[15]	1.0 (1.2)	4½	0.24	0.24	140 (110)	285 (225)	6.2 (7.2)	6.3 (7.3)	6.5 (7.6)
	0.006[15]	0.100 (0.120)	4½	0.37	0.37	200 (195)	580 (565)	4.2 (4.4)	4.3 (4.5)	4.6 (4.8)
	0.0005[15]	0.0083 (0.001)	3½	3.10	3.10	209 (205)	650 (645)	4.2 (4.4)	4.3 (4.5)	4.6 (4.8)
	5[14]	83.3 (100)	7½	0	0	2.5 (2.0)	2.9 (2.3)	343 (427)	341 (425)	342 (426)
	1[14]	16.7 (20)	7½	0	0	12.7 (10)	14 (11.2)	77 (95)	74 (92)	75 (93)
OCOMP ON	0.2[12, 14]	3.33 (4.0)	6½	0.02	0.02	14 (11.2)	15 (12)	70 (86.5)	70 (86.5)	70 (86.5)
	0.2[14]	3.33 (4.0)	5½	0.38	0.38	46.0 (37)	56 (44)	22.7 (25)	20.5 (23)	21.1 (24)
	0.0005[15]	0.0083 (0.001)	3½	4.67	4.67	128 (125)	215 (210)	6.7 (6.7)	6.8 (6.8)	7 (7)

Series 3700A

System Switch/Multimeter and Plug-In Cards

SYSTEM PERFORMANCE [13, 14]

3½-Digit Mode, Azero off, nPLC = 0.0005. Time includes function change from either DCV or 2WΩ to listed function.

Function	Function Change (ms)	Range Change (ms)	Auto-range (ms)
DCV or 2WΩ (<10kΩ)	10	10	10
4WΩ (<10kΩ)	20	20	20
DCI	10	10	10
Frequency or Period [17]	110	10	—
ACV or ACI [17]	20	85	300

Buffer Transfer Speed	Ethernet	GPIB	USB
Average for 1000 readings	2450/s	2000/s	1800/s
Average for 1000 readings with timestamp	2300/s	1800/s	1600/s

Card	Command	Single Command Excecution Time (ms) Ethernet	GPIB	USB
3720, 3721, 3722, 3730	channel.close (ch_list) or channel.open (ch_list)	5.7	5.8	6.1
3723, 3724 3731, 3732 [18]	channel.close (ch_list) or channel.open (ch_list)	2.3	2.4	2.7
3740	channel.close (ch_list 1-28) or channel.open (ch_list 1-28)	10.7	10.8	11.1
	channel.close (ch_list 29-32) or channel.open (ch_list 29-32)	22.7	22.8	23.1

DC MEASUREMENT CHARACTERISTICS

DC VOLTS

A-D LINEARITY: 1.0ppm of reading + 2.0 ppm of range.

INPUT IMPEDANCE: 100mV–10V Ranges: Selectable >10GΩ // <400pF or 10MΩ ±1%.
100V–300V Ranges: 10MΩ ±1%.

INPUT BIAS CURRENT: <50pA at 23°C with dmm.autozero=dmm.OFF or dmm.inputdivider=dmm.ON.

COMMON MODE CURRENT: <500nA p-p for ≤1MHz.

AUTOZERO OFF ERROR: For DCV ±1°C and ≤10 minutes, add ±(8ppm of reading + 5μV).

INPUT PROTECTION: 300V all ranges.

COMMON MODE VOLTAGE: 300V DC or 300Vrms (425V peak for AC waveforms) between any terminal and chassis.

RESISTANCE

MAX. 4WΩ LEAD RESISTANCE: 5Ω per lead for 1Ω range; 10% of range per lead for 10Ω–1kΩ ranges; 1kΩ per lead for all other ranges.

MAX. 4WΩ LEAD RESISTANCE (DRY CKT): 0.5Ω per lead for 1Ω range; 10% of range per lead for 10Ω–100Ω ranges; 50Ω per lead for 1kΩ–2kΩ ranges.

INPUT IMPEDANCE: 1Ω–10Ω Ranges: 99kΩ ±1% // <1μF.
100Ω–2kΩ Ranges: 10MΩ ±1% // <0.015μF.

OFFSET COMPENSATION: Selectable on 4WΩ 1Ω–10kΩ ranges.

OPEN LEAD DETECTOR: Selectable per channel. 1.5μA, ±20% sink current per DMM SHI and SLO lead. Default on.

CONTINUITY THRESHOLD: Adjustable 1 to 1000Ω.

AUTOZERO OFF ERROR: For 2WΩ ±1°C and ≤10 minutes, add ±(8ppm of reading + 0.5mΩ) for 10Ω and 5mΩ for all other ranges.

INPUT PROTECTION: 300V all ranges.

DC MEASUREMENT CHARACTERISTICS (continued)

DC CURRENT

AUTOZERO OFF ERROR: For ±1°C and ≤10 minutes, add ±(8ppm of reading + range error). Refer to table below.

Range	3 A	1 A	100 mA	10 mA	1 mA	100 μA	10 μA
Shunt Resistance guaranteed by design	0.05 Ω	0.05 Ω	1 Ω	10 Ω	100 Ω	1 kΩ	6 kΩ
Burden Voltage	<1.75 V	<0.55 V	<0.4 V	<150 mV	<130 mV	<105 mV	<61 mV
Burden Voltage with 3721 card	<2.35 V	<1.15 V	<0.4 V	<150 mV	<130 mV	<105 mV	<61 mV
Autozero OFF "of range" Error	100 μA	100 μA	5 μA	0.5 μA	50 nA	5 nA	0.85 nA
For each additional amp after ±1.5A input, add the following to ppm of range:	—	120	60	60	60	60	95

INPUT PROTECTION: 3A, 250V fuse.

THERMOCOUPLES

CONVERSION: ITS-90.

REFERENCE JUNCTION: Internal, External, or Simulated (Fixed).

OPEN LEAD DETECTOR: Selectable per channel. Open >1.15kΩ ±50Ω. Default on.

COMMON MODE ISOLATION: 300V DC or 300Vrms (425V peak for AC waveforms), >10GΩ and <350pF any terminal to chassis.

DC NOTES

1. 20% overrange on DC functions except 1% on 300V range and 3.33% on 3A range.
2. ±5% (measured with 10MΩ input resistance DMM, >10GΩ DMM on 10MΩ and 100MΩ ranges). Refer to table for other 2W/4W configurations. For Dry Circuit, +20%, <1mV with dmm.offsetcompensation=ON for 100Ω–2kΩ ranges.

Range	2W	4W	4W–Kelvin	Ocomp 4W	Ocomp 4W–Kelvin
1, 10Ω	8.2 V	8.2 V	8.2 V	12.1 V	12.1 V
100, 1kΩ	13.9 V	14.1 V	13.9 V	15.0 V	12.7 V
10kΩ	9.1 V	9.1 V	9.1 V	0.0 V	0.0 V
100k, 1MΩ	12.7 V	14.7 V	12.7 V	—	—
10M, 100MΩ	6.4 V	6.4 V	6.4 V	—	—

3. Relative to calibration accuracy.
4. Add the following additional uncertainty with -ST accessory:

Card	±(ppm of range) 100 mV	1 V	10 V	±(ppm of reading + ppm of range) 100 kΩ	1 MΩ	10 MΩ	100 MΩ
3720, 3721, 3722, and 3730	45	4.5	–	8 + 5	8 + 0.5	—	—
3723	60	6.0	–	8 + 6	8 + 0.5	—	—
3724	45	4.5	–	8 + 5	80 + 0.5	250 + 1	5000 + 1
3731	800	80	8	8 + 80	40 + 8	0 + 25	0 + 15
3732 (Quad 4×28)	200	20	2	8 + 20	40 + 2	0 + 7	0 + 4

5. Specifications are for 4-wire Ω, 1Ω–1kΩ with offset compensation on. For Series 3700A plug-in cards, L_{SYNC} and offset compensation on. 1Ω range is 4-wire only. Model 3724 card: 1kΩ–100MΩ ranges only. Model 3731 card: 100Ω–100MΩ ranges only.
   For 2-wire Ω specifications, add the following to "ppm of range" uncertainty:

DMM Connect Relays	Rel Enable	Rear Panel Connector or 3700 Card	3724 Card	3731 Card
CONNECT_ALL	ON	100 mΩ	500 mΩ	900 mΩ
CONNECT_ALL	OFF	1.5 Ω	64 Ω	2.3 Ω
CONNECT_TWO_WIRE	ON	700 mΩ	1.2 Ω	1.5 Ω
CONNECT_TWO_WIRE	OFF	1.5 Ω	64 Ω	2.3 Ω

6. Test current with dmm.offsetcompensation=OFF, ±5%.
7. Add the following to "ppm of reading" uncertainty when using Series 3700A Plug-in Cards in Operating Environment ≥50%RH.

Card	10 kΩ	100 kΩ	1 MΩ	10 MΩ	100 MΩ
3720, 3721, 3724, 3730, 3731, 3732 (Quad 4×28) with MTC D-Shell connector	1 ppm	10 ppm	0.01%	0.1%	1%
3720, 3721, 3724, 3730, 3731, 3732 (Quad 4×28) with -ST screw terminal module	10 ppm	100 ppm	0.1%	1%	10%
3722 and 3723	10 ppm	100 ppm	0.1%	1%	10%

Series 3700A Plug-in Cards Operating Environment: Specified for 0° to 50°C, ≤70%RH at 35°C.

8. Dry-Ckt Ω is 4-wire only. Specifications with offset compensation and L_{SYNC} on.

Card	Ranges
3720, 3721, and 3730	1 Ω – 2 kΩ
3722, 3723, and 3732	10 Ω – 2 kΩ
3724	1 kΩ – 2 kΩ
3731	100 Ω – 2 kΩ

Series 3700A System Switch/Multimeter and Plug-In Cards

DC NOTES (continued)

9. Includes Analog Backplane 15-pin rear panel connector. For 3721, refer to DC Current table for additional uncertainties.
10. For L_{SYNC} On, line frequency ±0.1%.

	nPLC	5	1	<0.2	<0.01
L_{SYNC} On	NMRR	110 dB	90 dB	45 dB	—
L_{SYNC} Off	NMRR	60 dB, ±2 dB	60 dB, ±2 dB	—	—

11. For 1kΩ unbalance in LO lead. AC CMRR is 70dB.

nPLC	5	1	0.2 [12]	≤0.2
CMRR	140 dB	140 dB	120 dB	80 dB

12. For L_{SYNC} On.
13. Reading rates are for 60Hz (50Hz) operation using factory defaults operating conditions dmm.reset("all"), Autorange off, dmm.autodelay=dmm.OFF, dmm.opendetector=dmm.OFF, format.data.=format.SREAL. Ranges as follows: DCV = 10V, 2WΩ/4WΩ = 1kΩ, DCI = 1mA, Dry-Ckt Ω = 10Ω, ACI = 1mA, and ACV = 1V. For Dry-Ckt Ω with Offset Comp OFF 2kΩ, 60 rdg/s max. Dry-Ckt Ω with Offset Comp ON 2kΩ, 29.5 rdg/s max. For temperature reading rates use DCV for T/C and 2WΩ for Thermistor. Speeds are typical and include measurements and data transfer out the Ethernet, GPIB, or USB.
14. DMM configured for single reading, dmm.measurecount=1, and print(dmm.measure()). May require additional settling delays for full accuracy, depending on measurement configuration.
15. DMM configured for multisample readings and single buffer transfer, dmm.measurecount=1000, buf=dmm.makebuffer(1000), dmm.measure(buf), and printbuffer(1,1000,buf).
16. dmm.autozero=dmm.ON. RMS noise using low thermal short for DCV, 2WΩ, 4WΩ, and Dry-Ckt Ω. For DCI, dmm.connect=dmm.CONNECT_NONE or 0. For RTD, noise using low thermal 190Ω precision resistor. Includes Model 3721 card accuracies. RMS noise values are typical.
17. For DCV or 2WΩ to Frequency or Period, dmm.nplc=0.2 and dmm.aperture=0.01 sec. For ACI or ACV, dmm.detectorbandwidth=300. For ACI or ACV with dmm.autodelay=dmm.ON, best speed is 65ms.
18. Speeds are within same multiplexer bank. Add an additional 8ms when changing banks or slots.
19. When properly zeroed using REL function.

AC Specifications

Function	Range[1]	Resolution	Calibration Cycle	Accuracy: ±(% of reading + % of range) 23°C ± 5°C					
				3 Hz–5 Hz	5 Hz–10 Hz	10 Hz –20 kHz	20 kHz–50 kHz	50 kHz–100 kHz	100 kHz–300 kHz
Voltage[2]	100.0000 mV	0.1 μV	90 Day (100mV–100V)	1.0 + 0.03	0.30 + 0.03	0.05 + 0.03	0.11 + 0.05	0.6 + 0.08	4.0 + 0.5
	1.000000 V	1 μV							
	10.00000 V	10 μV	1 Year (100mV–100V)	1.0 + 0.03	0.30 + 0.03	0.06 + 0.03	0.12 + 0.05	0.6 + 0.08	4.0 + 0.5
	100.0000 V	100 μV							
	300.0000 V	1 mV	90 Day	1.0 + 0.05	0.30 + 0.05	0.05 + 0.05	0.11 + 0.08	0.6 + 0.11	4.0 + 0.8
	300.0000 V	1 mV	1 Year	1.0 + 0.05	0.30 + 0.05	0.06 + 0.05	0.12 + 0.08	0.6 + 0.11	4.0 + 0.8
			Temp. Coeff. /°C[3] (all ranges)	0.010 + 0.003	0.030 + 0.003	0.005 + 0.003	0.006 + 0.005	0.01 + 0.006	0.03 + 0.01

				3 Hz–5 Hz	5 Hz–10 Hz	10Hz –2 kHz	2 kHz –5 kHz	5 kHz –10 kHz
Current[2]	1.000000 mA[7]	1 nA	90 Day/1 Year	1.0 + 0.04	0.30 + 0.04	0.08 + 0.03	0.09 + 0.03	0.09 + 0.03
	10.00000 mA	10 nA		1.0 + 0.04	0.30 + 0.04	0.08 + 0.03	0.09 + 0.03	0.09 + 0.03
	100.0000 mA	100 nA		1.0 + 0.04	0.30 + 0.04	0.08 + 0.03	0.09 + 0.03	0.09 + 0.03
	1.000000 A	1 μA		1.0 + 0.04	0.30 + 0.04	0.20 + 0.04	0. 88 + 0.04	2.0 + 0.04
	3.000000 A	10 μA		1.0 + 0.05	0.30 + 0.05	0.20 + 0.05	0. 88 + 0.05	2.0 + 0.05
			Temp. Coeff. /°C[3] (all ranges)	0.10 + 0.004	0.030 + 0.004	0.005 + 0.003	0.006 + 0.005	0.006 + 0.005

				Accuracy: ±(ppm of reading + offset ppm)		
				3 Hz–500 kHz	3 Hz–500 kHz	333 ms–2 μs
Frequency[4] and Period	100.0000 mV to 300.0000 V	0.333 ppm	90 Day/1 Year (all ranges)	80 + 0.333	80 + 0.333	(0.25 s gate)
		3.33 ppm		80 + 3.33	80 + 3.33	(100 ms gate)
		33.3 ppm		80 + 33.3	80 + 33.3	(10 ms gate)

ADDITIONAL UNCERTAINTY ±(% of reading)

Low Frequency Uncertainty	Detector Bandwidth		
	3 (3 Hz–300 kHz)	30 (30 Hz–300 kHz)	300 (300 Hz–300 kHz)
20 Hz–30 Hz	0	0.3	–
30 Hz–50 Hz	0	0	–
50 Hz–100 Hz	0	0	4.0
100 Hz–200 Hz	0	0	0.72
200 Hz–300 Hz	0	0	0.18
300 Hz–500 Hz	0	0	0.07
>500 Hz	0	0	0

Additional Uncertainty ±(% of reading)	Detector Bandwidth	Crest Factor[5] Maximum Crest Factor: 5 at full-scale			
		1–2	2–3	3–4	4–5
5 Hz–10 Hz	3	0.50	1.20	1.30	1.40
10 Hz–30 Hz	3	0.20	0.30	0.60	0.90
30 Hz–100 Hz	3 or 30	0.20	0.30	0.60	0.90
>100 Hz	3 or 30	0.05	0.15	0.30	0.40
300 Hz–500 Hz	300 only	0.50	1.20	1.30	1.40
≥500 Hz	300 only	0.05	0.15	0.30	0.40

AC SPEEDS Single Channel, 60Hz (50Hz) Operation

Function	Detector Bandwidth	NPLC	Aperture (ms)	Measurements into Buffer[9] (rdg/s) Digits	Azero On	Azero Off	Measurement to PC[9] (ms/rdg) Ethernet	GPIB	USB
ACI / ACV	3	N/A	N/A	6½	0.45 (0.45)	N/A	2150 (2150)	2150 (2150)	2150 (2150)
	30	N/A	N/A	6½	2.5 (2.5)	N/A	400 (400)	400 (400)	400 (400)
	300	1.0[10]	16.67 (20)	6½	42 (33)	59.5 (50)	19.4 (22.7)	19.5 (22.8)	19.8 (23.1)
	300	0.2[10]	3.33 (4.0)	6½	120 (100)	295 (235)	7.6 (8.3)	6.2 (6.8)	6.4 (7.0)
	300	0.06[11]	1.0 (1.2)	5½	170 (165)	935 (750)	1.40 (1.80)	1.50 (1.80)	1.60 (2.30)
	300	0.006[11]	0.100 (0.120)	4½	218 (215)	6,200 (5,500)	0.55 (0.57)	0.65 (0.67)	0.75 (0.77)
	300	0.0005[11]	0.0083 (0.001)	3½	218 (215)	14,600 (14,250)	0.50 (0.5)	0.60 (0.60)	0.70 (0.70)
Frequency/Period	N/A	N/A	10–273	N/A	2× input period + gate time	N/A	2× input period + gate time + 2.7ms	2× input period + gate time + 2.8ms	2× input period + gate time + 3.1ms

AC MEASUREMENT CHARACTERISTICS

AC VOLTS

MEASUREMENT METHOD: AC-coupled, True RMS.

INPUT IMPEDANCE: 1MΩ ±2% // by <150pF.

INPUT PROTECTION: 300VDC or 300Vrms rear inputs or 37xx cards.

AC CURRENT

MEASUREMENT METHOD: AC-coupled, True RMS.

Range	3 A	1 A	100 mA	10 mA	1 mA
Shunt Resistance guaranteed by design	0.05 Ω	0.05 Ω	1.0 Ω	10 Ω	100 Ω
Burden Voltage Rear Panel	<1.75 V rms	<0.55 V rms	<0.4 V rms	<150 mV rms	<125 mV rms
Burden Voltage 3721 Card	<2.4 V rms	<1.0 V rms	<0.6 V rms	<200 mV rms	<130 mV rms

INPUT PROTECTION: 3A, 250V fuse.

FREQUENCY AND PERIOD

MEASUREMENT METHOD: Reciprocal Counting technique.

GATE TIME: dmm.aperture=0.273→0.01. Default 0.01s.

AC GENERAL

AC CMRR[6]: 70dB.

VOLT·HERTZ PRODUCT: ≤8×10^7 Volt·Hz (guaranteed by design), ≤2.1×10^7 Volt·Hz verified. Input frequency verified for ≤3×10^5 Hz.

AC NOTES

1. 20% overrange on AC functions except 1% on 300V and 3.33% on 3A. Default resolution is 5½ digits, maximum useable resolution is 6½ with 7½ digits programmable.
2. Specification are for Detector Bandwidth 3 and sinewave inputs >5% of range. Detector Bandwidth 3 and 30 are multi-sample A/D conversions. Detector bandwidth 300 is a single A/D conversion, programmable from 0.0005PLC to 15PLC. Default condition set to 1PLC.
3. Applies to 0°–18°C and 28°–50°C.
4. Specified for square wave inputs. Input signal must be >10% of ACV range. If input is <20mV on the 100mV range then the frequency must be >10Hz. For sinewave inputs, frequency must be >100Hz.
5. Applies to non-sinewave inputs 5Hz–>10kHz, and DC content ≤3% of range..
6. For 1kΩ unbalance in LO lead.
7. For Model 3721, 1mA ACI, add 0.05% to "of reading" uncertainty from 250Hz → 10kHz.
8. Shunt resistance guaranteed by design.
9. Reading rates are for 60Hz (50Hz) operation using factory defaults operating conditions dmm.reset("all"), Autorange off, dmm.autodelay=dmm.OFF, dmm.opendetector=dmm.OFF, format.data.=format.SREAL. Ranges as follows: DCV = 10V, 2WΩ/4WΩ = 1kΩ, DCI = 1mA, Dry-Ckt Ω = 10Ω, ACI = 1mA, and ACV = 1V. For Dry-Ckt Ω with Offset Comp OFF 2kΩ, 60 rdg/s max. Dry-Ckt Ω with Offset Comp ON 2kΩ, 29.5 rdg/s max. For temperature reading rates use DCV for T/C and 2WΩ for Thermistor. Speeds are typical and include measurements and data transfer out the Ethernet, GPIB, or USB.
10. DMM configured for single reading, dmm.measurecount=1, and print(dmm.measure()). May require additional settling delays for full accuracy, depending on measurement configuration.
11. DMM configured for multisample readings and single buffer transfer, dmm.measurecount=1000, buf=dmm.makebuffer(1000), dmm.measure(buf), and printbuffer(1,1000,buf).

Series 3700A

System Switch/Multimeter and Plug-In Cards

GENERAL

EXPANSION SLOTS: 6.

POWER LINE: Universal, 100V to 240V.

LINE FREQUENCY: 50Hz and 60Hz, automatically sensed at power-up.

POWER CONSUMPTION: 28VA with DMM and display, up to 140VA with six 37xx cards.

REAL TIME CLOCK: Battery backed, 10 years typical life.

EMC: Conforms to European Union EMC Directive.

SAFETY: Conforms to European Union Low Voltage Directive.

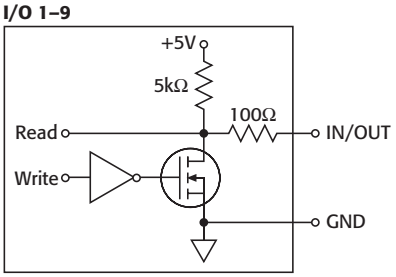
VIBRATION: MIL-PRF-28800F Class 3, Random.

WARM-UP: 2 hours to rated accuracy.

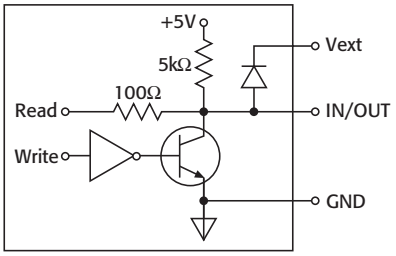
DIGITAL I/O: 25-pin female D-shell.

	I/O 1–9	I/O 10–14	Vext
I_{SINK}, max.	5 mA	250 mA	—
Absolute V_{IN}	5.25 V to –0.25 V	5.25 V to –0.25 V	5 V to 33 V
V_{IH} min	2.2 V	2.2 V	—
V_{IL} max	0.7 V	0.7 V	—
V_{OL} max at 5mA I_{sink}	0.7 V	0.7 V	—
V_{OL} max at I_{sink} max	—	2.3 V	—
V_{OH} min, 0.4mA source	2.7 V	2.4 V	—
Min V_{IN} pulse	2 µs	10 µs	—
Min V_O pulse	1 µs	50 µs	—

I/O 1–9



I/O 10–14



TRIGGERING AND MEMORY:

Window Filter Sensitivity: 0.01%, 0.1%, 1%, 10%, or full-scale of range (none).

Trigger Delay: 0 to 99 hrs. (10µs step size).

External Trigger Delay: <10µs.

Memory: Up to 650,000 time-stamped readings with Web page disabled. Additional memory available with external "thumb drive."

Non-volatile Memory: Single user save setup, with up to 75 DMM configurations and ≥600 channel patterns (dependent on name length, DMM function and configuration, and pattern image size). Additional memory available with external "thumb drive."

MATH FUNCTIONS: Rel, dB, Limit Test, %, 1/x, and mX+b with user defined displayed.

REMOTE INTERFACE:

Ethernet: RJ-45 connector, LXI Class B Version 2, 10/100BT, no auto MDIX.

GPIB: IEEE-488.1 compliant. Supports IEEE-488.2 common commands and status model topology.

USB Device (rear panel, type B): Full speed, USBTMC compliant.

USB Host (front panel, type A): USB 2.0, support for thumb drives.

LXI COMPLIANCE: LXI Class B Version 2 with IEEE 1588 precision time protocol.

LXI TIMING (applies to scanning) and SPECIFICATION:

Receive LAN[0–7] Event Delay: n/s (not specified) min., 800µs typ., n/s max.

Alarm to Trigger Delay: 25µs min., 50µs typ., n/s max.

Generate LAN[0–7] Event: n/s min., 800µs typ., n/s max. (minimums are probabilistic and represent a 95% confidence factor).

Clock Accuracy: 25ppm.

Synchronization Accuracy: <150ns (probabilistic and represents a 95% confidence factor).

Timestamp Accuracy: 100µs.

Timestamp Resolution: 20ns.

LANGUAGE: Embedded Test Script Processor (TSP) accessible from any host interface. Responds to individual Instrument Control Library (ICL) commands. Responds to high-speed test scripts comprised of ICL commands and Test Script Language (TSL) statements (e.g., branching, looping, math, etc.). Able to execute high-speed test scripts stored in memory without host intervention.

IP CONFIGURATION: Static or DHCP.

PASSWORD PROTECTION: 11 characters

MINIMUM PC HARDWARE: Intel Pentium 3, 800MHz, 512Mbyte RAM, 210Mbyte disk space or better.

OPERATING SYSTEMS/SOFTWARE: Windows® 2000 and XP compatible, supports Web browsers with Java plug-in (requires Java plug-in 1.6 or higher). Web pages served by 3706A.

OPERATING ENVIRONMENT: Specified for 0° to 50°C, ≤80%RH at 35°C, altitude up to 2000 meters.

STORAGE ENVIRONMENT: –40° to 70°C.

DIMENSIONS:

Rack Mounted: 89mm high × 483mm wide × 457mm deep (3.5 in. × 19 in. × 18 in.).

Bench Configuration (includes handle and feet): 104mm high × 483mm wide × 457mm deep (4.125 in. × 19 in. × 18 in.)

SHIPPING WEIGHT: 13kg (28 lbs).

Series 3700A

System Switch/Multimeter and Plug-In Cards

Specifications for Plug-In Cards

Additional Series 3700A cards are currently in development. For a current list of cards and specifications, visit www.keithley.com.

	No. of Channels	Card Configuration	Type of Relay	Contact Configuration	Max. Voltage	Max. Current Switched	Comments
3720	60 (Dual 1×30)	Multiplexer	Latching electromechanical	2 Form A	300 V	1 A	2 independent 1×30 multiplexers. Automatic temperature reference when used with screw terminal accessory (Model 3720-ST)
3721	40 (dual 1×20)	Multiplexer	Latching electromechanical	2 Form A	300 V (ch 1–40), 60 V (ch 41–42)	2 A (ch 1–40), 3 A (ch 41–42)	2 independent 1×20 multiplexers. Automatic temperature reference when used with screw terminal accessory (Model 3721-ST)
3722	96 (dual 1×48)	Multiplexer	Latching electromechanical	2 Form A	300 V	1 A	2 independent 1×48 multiplexers
3723	60 (dual 1×30) or 120 single pole (dual 1×60)	Multiplexer	Dry reed	1 Form A	200 V	1 A	2 independent 1×30 multiplexers
3724	60 (dual 1×30)	Multiplexer	FET solid-state	2 Form A	200 V	0.1 A	2 independent 1×30 multiplexers. Automatic temperature reference when used with screw terminal accessory (Model 3724-ST)
3730	6×16	Matrix	Latching electromechanical	2 Form A	300 V	1 A	Columns can be expanded through the backplane or isolated by relays
3731	6×16	Matrix	Dry reed	2 Form A	200 V	1 A	Relay actuation time of 0.5ms. Columns can be expanded through the backplane or isolated by relays
3732	448 crosspoints (Quad 4×28)	Matrix	Dry reed	1 Form A	200 V	0.75 A	Banks can be connected together via bank configuration relays to create a single 4×112 or dual 4×56 matrix. Analog backplane relays also included for card to card expansion. Row expansion with 3732-ST-R accessory to create a dual 8×28 or single 16×28 matrix.
3740	32	Independent	Latching electromechanical	28 Form C, 4 Form A	300 VDC/250 VAC (Form A)	2 A (Form C), 7 A (Form A)	32 general purpose independent channels.
3750	40 digital I/O, 4 counter/ totalizers, and 2 isolated analog outputs	Independent	N/A	N/A	N/A	N/A	All in one card design. 40 bidirectional I/O. Four 32-bit counter/totalizers. 2 programmable analog (V or I) outputs.

Plug-in Card Accessories

	Cables	Screw Terminal Block	Connector Kits	Tools
3720	3720-MTC-1.5, 3720-MTC-3	3720-ST	3791-KIT78-R	3791-CIT
3721	3721-MTC-1.5, 3721-MTC-3	3721-ST	3790-KIT50-R	
3722	3722-MTC-1.5, 3722-MTC-1.5/MM, 3722-MTC-3, 3722-MTC-3/MM		3792-KIT104-R, 3792-KIT104-R/F	3791-CIT
3723	3720-MTC-1.5, 3720-MTC-3	3723-ST, 3723-ST-1	3791-KIT78-R	3791-CIT
3724	3720-MTC-1.5, 3720-MTC-3	3724-ST	3791-KIT78-R	3791-CIT
3730	3721-MTC-1.5, 3721-MTC-3	3730-ST	3790-KIT50-R	
3731	3721-MTC-1.5, 3721-MTC-3	3731-ST	3790-KIT50-R	
3732	3732-MTC-1.5, 3732-MTC-3	3732-ST-C, 3732-ST-R	3791-KIT78-R	3791-CIT
3740	3721-MTC-1.5, 3721-MTC-3	3740-ST	3790-KIT50-R	
3750	3721-MTC-1.5, 3721-MTC-3	3750-ST	3790-KIT50-R	

SWITCHING AND CONTROL

Specifications are subject to change without notice.
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KEITHLEY

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KEITHLEY INSTRUMENTS, INC. ■ 28775 AURORA RD. ■ CLEVELAND, OH 44139-1891 ■ 440-248-0400 ■ Fax: 440-248-6168 ■ 1-888-KEITHLEY ■ www.keithley.com

BELGIUM
Sint-Pieters-Leeuw
Ph: 02-3630040
Fax: 02-3630064
info@keithley.nl
www.keithley.nl

CHINA
Beijing
Ph: 86-10-8447-5556
Fax: 86-10-8225-5018
china@keithley.com
www.keithley.com.cn

FRANCE
Saint-Aubin
Ph: 01-64532020
Fax: 01-60117726
info@keithley.fr
www.keithley.fr

GERMANY
Germering
Ph: 089-84930740
Fax: 089-84930734
info@keithley.de
www.keithley.de

INDIA
Bangalore
Ph: 080-26771071, -72, -73
Fax: 080-26771076
support_india@keithley.com
www.keithley.com

ITALY
Peschiera Borromeo (Mi)
Ph: 02-5538421
Fax: 02-55384228
info@keithley.it
www.keithley.it

JAPAN
Tokyo
Ph: 81-3-5733-7555
Fax: 81-3-5733-7556
info.jp@keithley.com
www.keithley.jp

KOREA
Seoul
Ph: 82-2-574-7778
Fax: 82-2-574-7838
keithley@keithley.co.kr
www.keithley.co.kr

MALAYSIA
Penang
Ph: 60-4-643-9679
Fax: 60-4-643-3794
sea@keithley.com
www.keithley.com

NETHERLANDS
Son
Ph: 0183-635333
Fax: 0183-630821
info@keithley.nl
www.keithley.nl

SINGAPORE
Singapore
Ph: 65-6747-9077
Fax: 65-6747-2991
sea@keithley.com
www.keithley.com

SWITZERLAND
Zürich
Ph: 044-8219444
Fax: 044-8203081
info@keithley.ch
www.keithley.ch

TAIWAN
Hsinchu
Ph: 886-3-572-9077
Fax: 886-3-572-9031
info_tw@keithley.com
www.keithley.com.tw

UNITED KINGDOM
Theale
Ph: 0118-9297500
Fax: 0118-9297519
info@keithley.co.uk
www.keithley.co.uk

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