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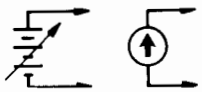
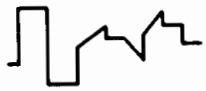
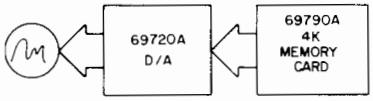
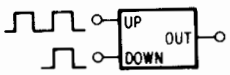
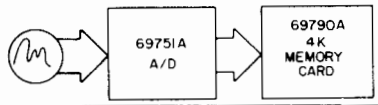
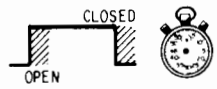
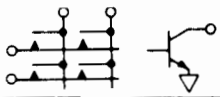
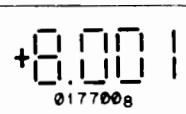
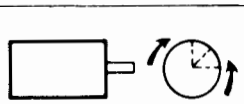
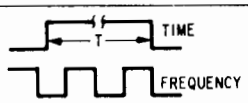
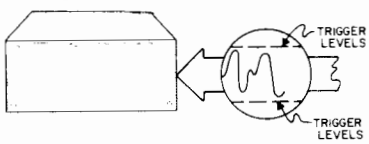
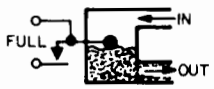
DATA ACQUISITION, CONTROL & TEST

Multiprogrammer Series II I/O Cards

Models 69700A–69793A

Multiprogrammer Series II I/O Cards for the 6942A, 6942S, and 6901S

For a complete description of the Multiprogrammer Series II I/O Cards, ask for publication 5952-4090.

	Functions		Applications	Cards Used
STIMULUS		Programmable DC Voltage and Current	The output voltage (up to 250V) and current (up to 1000A) of forty different HP power supplies can be programmed to provide bias in automatic test systems or control of electromechanical process equipment.	Resistance Output, 69700A-69706A; Power Supply Control, 69709A.
		Digital-to-Analog Conversion	Twelve-bit voltage DAC's provide outputs for strip chart, x-y, and analog tape recorders as well as control of analog programmable instruments and stimulus of units under test. Control process equipment with 4–20 mA output.	Voltage DAC, 69720A; Current DAC, 69721A.
		Analog Waveform Synthesis	The Memory card can continually supply pre-loaded data to the D/A card at rates of up to 100 kHz. Special waveforms may be loaded into the Memory card from the computer and used as stimuli for test and processes.	Memory card, 69790B; Voltage DAC, 69720A; or Current DAC, 69721A.
MEASUREMENT		Voltage, Current, and Resistance Measurements	A/D converters may be used to measure voltages from ±50μV to ±100 V in the presence of 250 V of common-mode noise. Connecting a resistor across the input permits current measurements for 4–20 mA current loops used in process control. Combine the A/D with the current DAC for resistance measurements.	High Speed ADC, 69751A.
		Frequency Measurements	The Pulse Counter card accumulates counts over a precise time interval when a Timer card is connected to the enable line of the Counter. The program divides the count by the time interval to measure frequencies from 1 MHz to less than 0.001 Hz.	Counter, 69775A; Timer 69736A.
		Pulse Counting Preset Up/Down	The Counter may be preset to any value within the count range of 0 to 65,535 and can cause an interrupt when it rolls over. The Counter may be enabled and disabled by pulses or levels. The computer may read the count without disturbing the counting process.	Counter, 69775A.
		Offline Analog Acquisition	Differential or single-ended signals may be digitized at rates up to 33 kHz by the A/D, and stored on the Memory card. Each Memory card can store up to 4096 Readings. The digitizing process can take place independent of other Multiprogrammer activity.	High Speed ADC, 69751A; Memory card, 69790B.
		Time Interval Measurement	Elapsed time between two events can be measured in the range of 10 μs to 65,000 days. The Counter card counts a known frequency over the unknown interval. This count is divided by the known frequency to determine the interval. For resolution of .1 sec, the built-in real time clock alone may be used. This real time clock provides time-of-day readings.	Counter 69775A; Timer/Pacer, 69736A.
CONTROL		Digital Output and Switching	Sixteen-bits of data in TTL, open collector, or SPST relay-contact form provide digital control of instruments and indicators. AC power, up to 6 Amps, can be switched to 12 loads with a 69731B, and 14570A AC Power Controller.	Digital Output, 69731B; Relay Output, 69730A; AC Power Controller, 14570A.
		Digital Input	Digital input cards accept 16-bits of data from digital measuring instruments, push-buttons, switches, relays, and other digital devices in the form of logic levels or contact closures. Digital data sources with more than 16-bits of data use several digital input cards.	Digital Input, 69771A; Isolated Digital Input, 69770A.
		Stepping Motor Control	The Stepping Motor card can produce from 1 to 32767 pulses at either of two outputs (CW or CCW) to control motor translators. Output pulses are also used for pulse-train update of supervisory control stations. The pulse rate (motor speed) is also programmable.	Pulse Train/Stepping Motor, 69735A.
		Time and Frequency Reference	Crystal controlled timing pulses, programmable from 1 μs to 18 hours, may be used as a time-base reference for control, measurement, and data acquisition. Period, duty cycle, and number of pulses are all programmable.	Timer, 69736A or Pulse Train, 69735A.
ALARM		Level Detecting	When signals cross preset levels, the Digital Input card can trigger the interrupt card to interrupt the computer. The alarm trigger levels can be programmed with the D/A or fixed with resistors.	Digital Input 69771A; Interrupt card, 69776A.
		Event Sensing	A digital word may be used to trigger quick computer response with the interrupt card. The computer responds to the interrupt with a software routine. The interrupt may also cause immediate local response by triggering a preloaded output card.	Interrupt card, 69776A.

New Multiprogrammer plug-in cards are being developed. Ask your HP Field Sales Engineer for the latest technical data describing all Multiprogrammer products.

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NEW

69752A 64 Channel FET Scanner Card
Scans 64 single-ended channels (± 10.24 V input signal range) at up to 25,000 readings per second. Cards cascadable to 960 channels in a single mainframe.

69755A 16 Channel FET Scanner Card
Same as 69752A, except scans 16 channels.

69754A 32 Channel Relay Scanner Card
Scans 32 single-ended (16 double-ended) channels with a ± 100 V input signal range at speeds up to 1000 readings per second (625 readings double-ended). Switches currents up to 50 mA.

69750A Scan Control/Pacer Card
Provides all pacing and control functions for the scanner cards listed above. One required for each group of scanner cards (maximum of 15 cards—see data sheet for further clarification).

69709A Power Supply Control Card
Used for full system control of 6024A and 6012A Autoranging Power Supplies.

14728A Buffered A/D Cable
Used to connect 69751A and 69790B in a buffered A/D configuration.

69700A-69706A Resistance output cards: the output of each of these cards is a programmable resistance value. Twelve mercury wetted relay contacts close across binary weighted precision resistors in a series string. The cards are designed to program the voltage or current output of an HP power supply with option 040.

69720A D/A voltage converter card: provides a high speed, bipolar output voltage programmable from −10.240 V to +10.235 V up to 5 mA load current.

69721A D/A current converter card: provides a bipolar −20.480 mA to +20.475 mA current output.

69730A Relay output card: provides sixteen independent, normally open, mercury wetted relay contacts. Contacts rated at 100 Vdc; or 1 Amp; and 28 VA.

69731B Digital output card: provides sixteen TTL or CMOS compatible outputs, or sixteen 100 mA open-collector switches.

69735A Pulse train output/stepping motor control card: generates up to 32767 pulses at a programmable frequency.

69736A Timer/pacer card: outputs a programmable pulse from one microsecond to eighteen hours or a programmable square wave.

69751A A/D converter card: this card measures bipolar dc voltages in one of four ranges, ± 100 mV, ± 1 V, ± 10 V, or ± 100 V, with 12 bit resolution at up to 33,000 readings per second.

69770A Isolated digital input card: breaks the path of potential ground loops with an optically coupled isolator in each of the sixteen digital input lines.

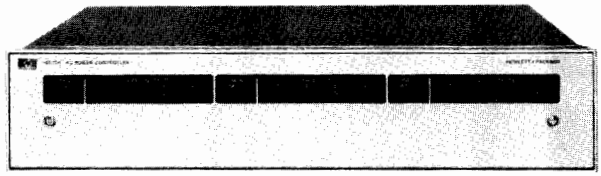
69771A Digital input/analog comparator card: monitors up to sixteen contact closures, switches, TTL signals, CMOS signals, or analog signals. The switching threshold can be set to any value between ± 9.5 volts by a screwdriver-adjustable potentiometer on the card or may be externally programmed.

69775A Counter/totalizer card: counts contact closures, TTL or CMOS logic level pulses, or analog waveform transitions in the range of 0 to 65,535.

69776A Interrupt card: compares up to sixteen logic level or contact closure inputs with a sixteen-bit reference word and interrupts for =, ≠, <, > conditions.

69790B Memory card (occupies 2 I/O slots): provides 4096 16-bit words for use with the DAC cards or the ADC cards or for other input/output tasks that need to run independent of other Multiprogrammer or computer tasks. Several Memory cards may be used to implement truly simultaneous operations.

69793A Breadboard card: the generalized grid area on this card may be used for mounting custom circuits.



14570A AC Power Controller
- 12 AC Power Switches
- Switches up to 6 Amps RMS
- Low Noise
- Handles Inductive Loads
- True Zero-Crossing Switching
- Short Circuit Protections
- 115 and 230 Volt AC Outputs
- Rated for 2 Million Operations
- Quick Disconnect AC Plugs
- Designed to Meet UL, IEC & CSA
- 6940B, 6942A or TTL Control
- AC Line Filtering

The 14570A is a high reliability and low EMI alternative to using relays or conventional solid-state switches to control AC power. Up to 12 AC loads can be switched under computer control. Both 115 and 230 Vac loads of up to 6 amps can be controlled from a single unit. Primary uses include switching AC power on and off to instruments, power supplies, motors, and devices under test. It is also useful for burn-in, power cycling, and process control applications.

The AC outputs are organized into three groups of four switches. Each group has a single AC power input of either 115 or 230 Vac, which is distributed to four output connectors. Any switch can control up to 6 Amps, but each group of four switches is limited to a total of 15 Amps.

The unit is controlled by 12 TTL compatible lines, which can be driven by a Multiprogrammer Digital Output Card or a similar data source. Six additional lines allow system control. Each switch consists of a relay and a SCR in parallel. This approach to switching AC power offers a number of benefits over using relays or conventional solid-state switches. It features both the zero-crossing characteristics of a solid-state switch and the low power dissipation of a relay.

Unlike conventional solid-state switches, the 14570A is noise-free while a switch is closed, and it generates less EMI upon opening and closing than either a solid-state switch or relay. It also has a longer lifetime than these devices. The 14570A switches are rated at 2 million operations when switching 6 Amps, and at 10 million operations when switching 2 Amps.

The 14570A can handle most types of loads, including inductive loads such as motors. A complete description is given in the Multiprogrammer Series II I/O Cards data sheet (5952-4090).

Specifications
Line voltage: 115 or 230 Vac, +15%, −22%
Line frequency: 47 to 63 Hz
Isolation voltage: 1500 Vac rms
Maximum current (rms): up to 6 Amps per switch (at any lagging power factor*), with each group of 4 switches limited to 15 Amps.
*Loads with a leading power factor, such as power factor correction capacitors, should not be switched with the 14570A.
Maximum current (peak): 100 Amps per switch for less than 1 ms (non-repetitive). 20 Amps per switch continuously, subject to rms limitations.
Minimum load current: 20 mA
Off-state leakage: 2 mA through the external load
Maximum switching rate: 0.5 Hz
Turn-On delay: 6 to 30 ms. Turns on at zero voltage.
Turn-Off delay: 14 to 34 ms. Turns off at zero current.
Input characteristics: 1 kΩ pull-up resistors to +5 V
Logic High Level (Off) = 3.5 to 5.25 V
Logic Low Level (On) = −0.5 to 1.50 V
Required drive: negative-true, open collector; 5 mA maximum current sink at logic low level
Dimensions: 80 mm x 425 mm x 425 mm (3½" x 16¾" x 16¾")
Weight: 9.5 kg (21 lbs)

14570A Options
040: 69331B card & cable for use with 6940B
042: 69731B card & cable for use with 6942A
050: Unterminated cable for use with other sources

14570A AC Power Controller

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