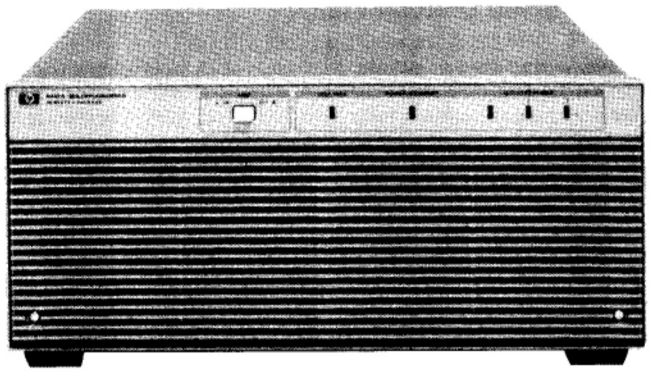
DATA ACQUISITION, TEST & CONTROL SYSTEMS

Multiprogrammer: Versatile Data Acquisition and Control

Model 6942A

- Action-Oriented Instructions
- Isolated Analog Inputs and Outputs
- Built-in Self Test
- Overlapped Input and Output
- Internal or External Pacing
- Easy to Configure



DESIGNED FOR HP-IB SYSTEMS

6942A

The Multiprogrammer Performs Operations in Parallel

With this one instrument you can control several processes at once. And, while you are controlling the processes, the Multiprogrammer can also be watching for interrupt conditions. The internal microprocessor manages all the parallel operations and monitors the alarm lines; when the operations have completed or if an alarm condition occurs, the Multiprogrammer interrupts the controller.

How does the 6942A Connect With Your Controller?

The 6942A Multiprogrammer interfaces with your controller (desktop or minicomputer) using the HP-IB, Hewlett-Packard's implementation of IEEE Standard 488 and the identical ANSI Standard MC1.1. Data and status readback make use of the extended bus addressing features of the HP-IB.

Documentation Package

The complete documentation package supplied with each mainframe includes a User's Guide, with programming examples for all the desktop computer controllers, a utility program tape, operating and service manuals, and a binder to hold all this material.

Programming Flexibility

Mnemonic, action-oriented instructions make the 6942A Multiprogrammer simple to learn and use. For instance, the output instruction "OP" works with all output cards. When you send an instruction, the internal microprocessor checks which type of card you are addressing and automatically converts the data to the proper format for that card. You select the units with which you want to program each card. Whether you want to use volts, millivolts, amps, degrees, feet, or any other units, the Multiprogrammer does the converting for you.

Mainframe Memory Unburdens The Controller

The mainframe memory of the 6942A will accept up to 76 instructions from the controller at one time. This leaves your controller free for other processing activities while the Multiprogrammer works on the I/O operations. This mainframe memory may also be used to collect up to 1440 data readings and hold them until the controller is free to take them. For even more data storage, 4K Memory Cards, 69790A, may be used to store 4096 16-bit words of input or output data.

Real Time Clock

Built-in real-time clock gives you time-of-day readings and pacing of measurements. The clock detects which power line frequency you are using, 50 Hz, or 60 Hz, and automatically synchronizes itself to this frequency. The range of the clock is 65,534 days, with resolution to a tenth of a second.

Accessories

14700A extender kit: This kit contains the transmission boards which go into the master mainframe (6942A) and the last extender mainframe in the chain.

14701A intermediate extender kit: When more than two mainframes are in a chain, the card in this kit must be used in each intermediate extender mainframe.

14702A chaining cable: This is the cable which chains together the master and extender mainframes. One cable is required for each extender mainframe.

14703A card edge connector: Extra connectors for the I/O cards may be ordered in addition to the one supplied with each I/O card.

Which is the Right Multiprogrammer For You?

The 6942A is the right choice when you require the easiest to program solution and can sacrifice programming speed to achieve this. While the 6942A is far from slow, it cannot match the 20,000 words per second throughput rate of the 6940B. In applications where only bursts of high speed are required, the Memory card, 69790A may be used with he 6942A to obtain high speeds (up to 33,000 words per second) for limited amounts of data (up to 4096 readings).

The 6940B offers maximum continuous throughput especially important in certain real-time control applications. For the less complex application, the 6940B also offers the lower hardware cost. Either way, there is no wrong choice when you choose a Multiprogrammer as your interface.

6942A/6943A Specifications

Plug-in I/O card positions: maximum of 16 plug-in output or input cards per mainframe. Removable rear cover provides access to card slots.

Computer interface (6942A only): the Multiprogrammer is connected to a controller via the Hewlett-Packard Interface Bus (HP-IB), Hewlett-Packard's implementation of IEEE Std. 488.

Real time clock (6942A only): the built-in real time clock is automatically synchronized with the 50/60 Hz ac power line frequency. The clock is read and set with data in the form of days, hours, minutes and seconds with a resolution of 0.1 seconds.

Extender interface kits (6943A only): each 6943A Extender requires one 14700A or 14701A Interface Kit and one 14702A Chaining Cable for operation with the 6942A.

Maximum number of mainframes per chain: up to seven 6943A Multiprogrammer Extenders may be placed in a chain with one 6942A Multiprogrammer.

Maximum chain length: a chain of mainframes can be up to 152 meters (500 feet) long. This maximum length is the sum of the lengths of all 14702A Chaining Cables used in one chain.

Power supplies: all power supplies for up to 16 I/O cards are built-in including three ±18 V supplies isolated from each other and from the ground.

Cooling: built-in forced air cooling draws air in through the front panel and exhausts air through the ventilated rear cover.

Front panel indicators: five light emitting diodes on the front panel indicate power supply and self-test status.

Operating temperature range: 0°C to 55°C.

Power: 100/120/220/240 VAC (selectable), +5%, −10%, 47 to 63 Hz, 600 VA.

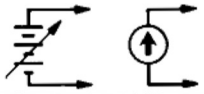
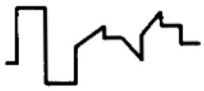
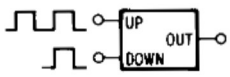
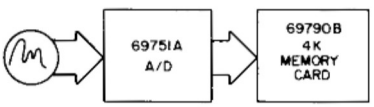
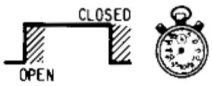
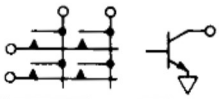
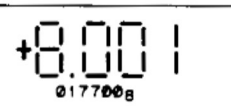
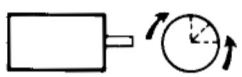
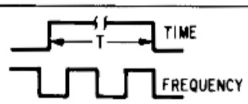
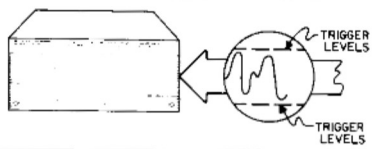
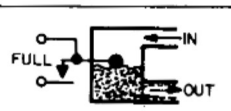
Dimensions: 177.0 mm high x 425.5 wide x 597.0 mm deep, (6.969 in. high x 16.250 in. wide x 23.500 in. deep).

Weight (without I/O cards): net, 20 kg. (45 lbs); shipping, 27 kg. (60 lbs).

Accessories furnished: PC board Extender Card (HP Part No. 5060-2792).

6942A I/O Card Functions

For a complete description of the 6942A Multiprogrammer, ask for publication 5952-4034

	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.
		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 4-20mA outputs.	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 100kHz. Special waveforms may be loaded into the Memory card form 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 ± 100V in the presence of 250V of common-mode noise. Connecting a resistor across the input permits current measurements for 4-20mA 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 0.001Hz.	Counter, 69775A; Timer, 69736A.
		Pulse Counting Preset and 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 disable 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 33KHz 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 10μs 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, indicators, and solid-state AC relays.	Digital Output, 69731A; Relay Output, 69730A
		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