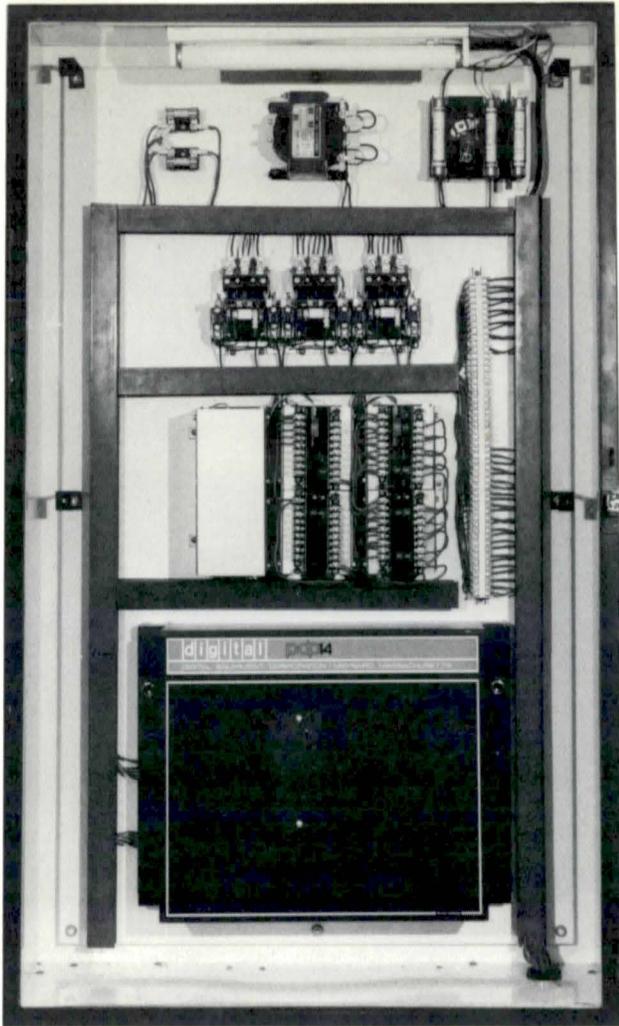


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THE PDP-14 PROGRAMMABLE CONTROLLER

DIGITAL EQUIPMENT CORPORATION Industrial Control Products

machine tool control
welding control
transfer line grinding
assembly machine
batch mixing machine
conveyor control
balancing machine



WHAT IS THE PDP-14?

The PDP-14 is a solid-state programmable controller for repetitive manufacturing operations. It accepts inputs from two-state devices such as limit switches, push buttons or pressure switches and, in accordance with input conditions and a predetermined control sequence, turns on or off devices such as solenoids and motor starters. To assure reliable operation, this control sequence is stored in a braided-wire Read Only Memory that is impervious to external electrical interference.

WHY THE PDP-14?

The PDP-14 is Truly General Purpose—It can control almost any type of machinery.

The PDP-14 Allows Control System Standardization—One basic system satisfies all control requirements. Only the memory element changes from system to system.

The PDP-14 Is Designed For Industrial Environments—It is mounted in a standard NEMA-12 enclosure and requires no cooling.

The PDP-14 Is Not Affected By Electrical Noise—Electrical interference is minimized by electromechanical design techniques and a wired memory.

The PDP-14 Has No Moving Parts—It is immune to the mechanical failures that plague electrical, mechanical and fluid systems.

The PDP-14 Is Easy To Install And Operate—No specialized knowledge of solid-state electronics or computer programming is needed.

The PDP-14 is Easy To Maintain—When an engineer or maintenance mechanic has become familiar with one PDP-14, he can repair and maintain all PDP-14 systems.

The PDP-14 Is Computer Compatible—Coupled with a PDP-8 or PDP-11, the PDP-14 can provide interactive computer control, monitoring, or both.

HARDWARE

Control Unit:

- Tests inputs and sets outputs as instructed by memory.
- Checks on or off state of every output 50 times each second (in a typical application).
- Communicates with PDP-8 or PDP-11 family computers for monitoring and control.

Read Only Memory:

- Basic controller contains 1,024 (1K) 12-bit memory words.
- Easily alterable in the field.
- Memory can be increased in increments of 1K up to 4K 12-bit words.

Interface Boxes:

- Input boxes—Modular input box accepts either thirty-two standard 60 Hz 120 VAC or thirty-two 10-55 VDC inputs. Each PDP-14 will accept a maximum of 8 boxes (256 inputs).
- Noise-immune K-Series modules are used for voltage conditioning. Each input circuit is equipped with an indicator lamp. Each input circuit also provides a reactive load to clean switch contacts.
- Output boxes—Modular output box provides either 16 standard 60 Hz 120 VAC or sixteen 10-250 VDC outputs. Each PDP-14 will control 16 output boxes (a total of 255 outputs). Outputs use noise-immune K-Series modules which act as switches turned on or off by PDP-14 control. Each output circuit is equipped with an indicator lamp. Input boxes can be substituted for output boxes giving a total of 512 inputs.
- Storage modules—Provide 16 storage functions (flip-flop) for counting, shifting, and other incremental operations.
- Accessory box—Allows incorporation of time delays and retentive memories.

MEMORY DEVELOPMENT

The memory development technique of the PDP-14 is designed for control engineers, not computer programmers. The memory aids CRT-14, SET-14, BOOL-14 and SIM-14 are program tapes written for the control engineer and are provided with every PDP-14 system. These operate on a PDP-8 family computer and teletype and enable the control engineer to convert his sequence of operations into the Read Only Memory without using computer programming techniques. The control engineer merely uses either English statements, Boolean equations or relay ladder diagrams.

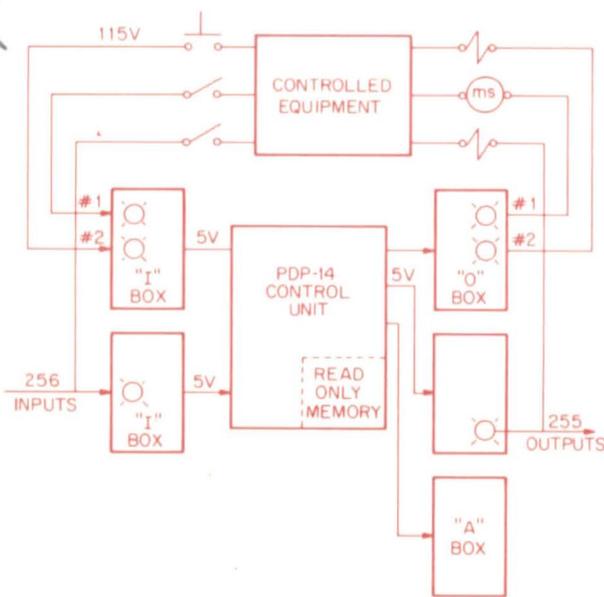
- **CRT-14**—Allows the user to program a PDP-14 from ladder diagrams with complete editing capability. He can display the result and generate hard copy in ladder diagram form. The CRT-14 provides the tape from which the memory is made.
- **SET-14 & BOOL-14**—Translate English statements into PDP-14 control statements and automatically write all the necessary instructions. System documentation and hard copy used in debugging the control sequence are also generated.
- **SIM-14**—Checks out the control sequence before it becomes operative (SIM off-line). Enables the control sequence to operate the production equipment before the memory element is finalized and inserted in the control unit (SIM on-line). Provides the debugged paper tape from which the Read Only Memory is prepared.

SELF-MAINTENANCE

- Lamps on each input and output indicate the presence of voltage from the AC or DC field devices. This allows quick isolation of a failure in either the control system or the controlled equipment.
- The I/O Interrogator Box (BT14-A) tests the current state of PDP-14 inputs and outputs as seen by the control unit. Allows maintenance of the PDP-14 without a computer.

DIAGNOSTIC MAINTENANCE

Computer-based (PDP-8) diagnostics are provided to completely diagnose input boxes, output boxes, memory, control unit, and accessories.

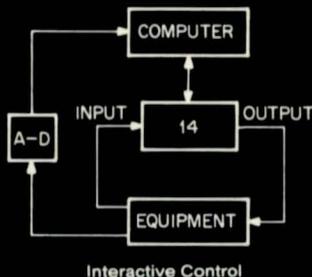
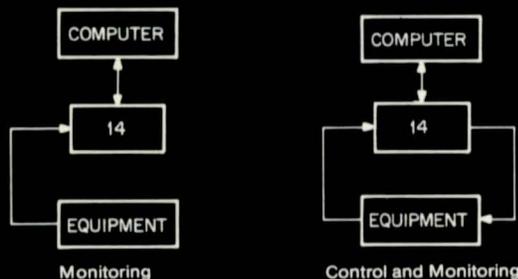


Basic PDP-14 System

How? What type memory will we get? We must be able to program to interface. Must have a read/write and power fail.

COMPUTERS AND THE PDP-14

In addition to stand-alone operation, the PDP-14 can be adapted to a computer for interactive control, monitoring or both, as shown in the diagrams below. Standard interfaces are available for DEC's PDP-8 and PDP-11 computers.



PDP-14L CONTROL SYSTEM

The PDP-14L control system is a smaller version of the PDP-14. It offers all the basic features and advantages of the PDP-14 but is limited in expandability. The basic PDP-14 and PDP-14L systems are identical: each has 32 inputs, 16 outputs, and 1K of memory. The PDP-14L can be expanded to accommodate up to 64 inputs and 64 outputs. By comparison, the PDP-14 can be expanded to handle a maximum of 256 inputs and 255 outputs. Also, the PDP-14L memory is limited to the basic 1000 word configuration, compared to a maximum capacity of 4000 words in the PDP-14.

PDP-14 and 14L SPECIFICATIONS

Dimensions:

PDP-14 Control Unit: 24" w x 17-5/8" h x 8" d

PDP-14L Control Unit: 14-3/4" w x 20-1/8" h x 9" d

Interface Boxes (I, O, A): 4-3/8" w x 10-7/16" h x 7-1/8" d

Ambient Temperature:

0° to 70° C.

Electrical: Meets J.I.C. Electrical Standards for mass production equipment (EMP-1-1967).

Line Voltage: 105-125, 210-240 VAC single phase

Line Frequency: 47-500 Hz

Input Box: AC: Reactive load, nominal 1.5 VA per input

DC: 10-55 VDC (above with external resistor)

Output Box: AC: 4000 VA to its combined 120 VAC loads (individual output circuits can supply up to 500 VA).

DC: 10-250 VDC (1 amp per output switched to ground).

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