

# PDP-8

THE \$18,000 DIGITAL COMPUTER



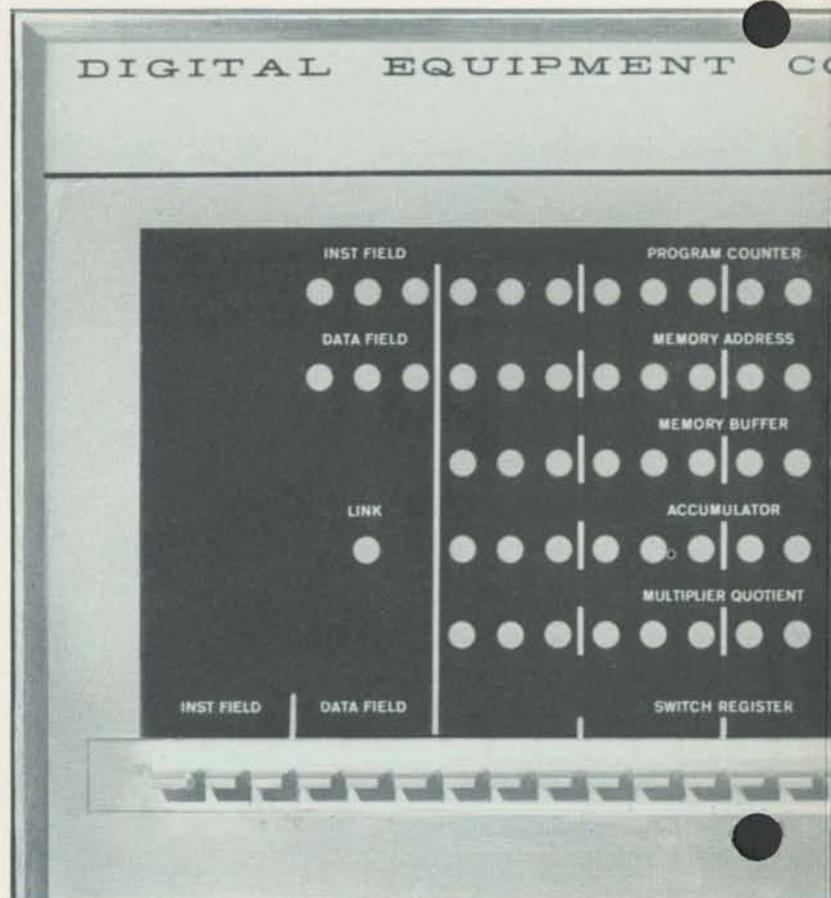
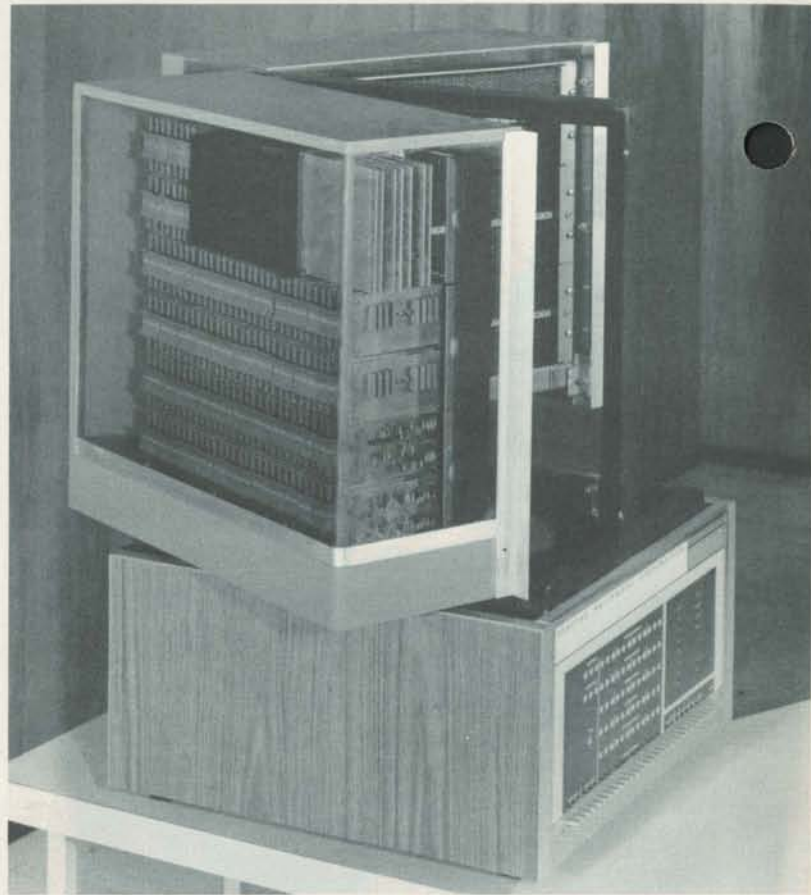
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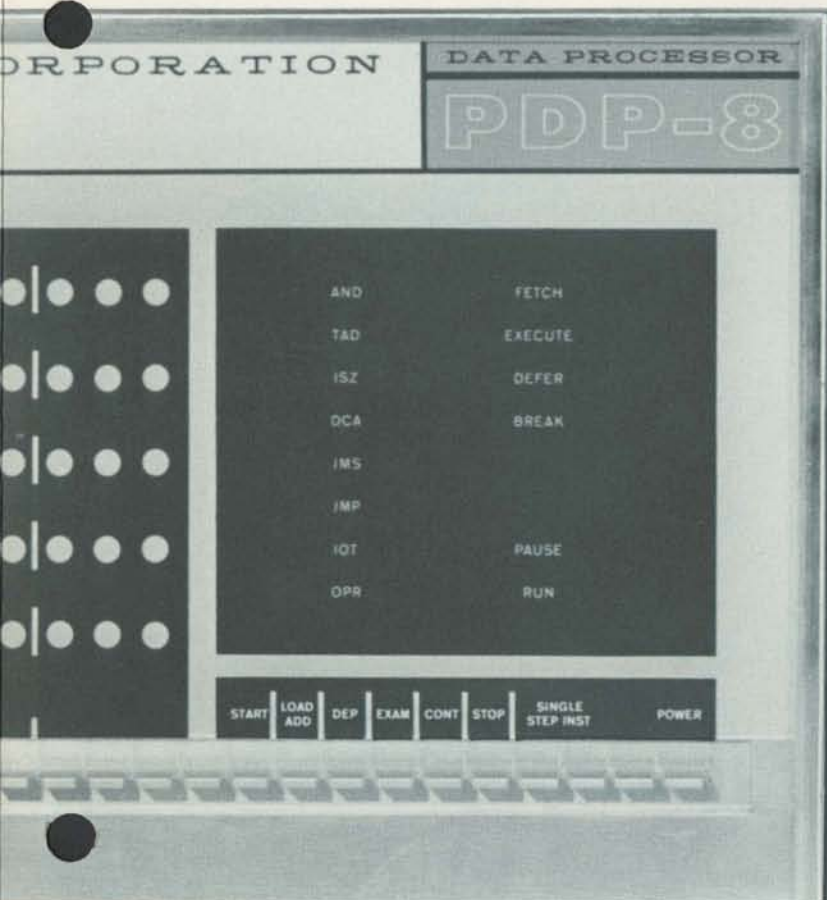
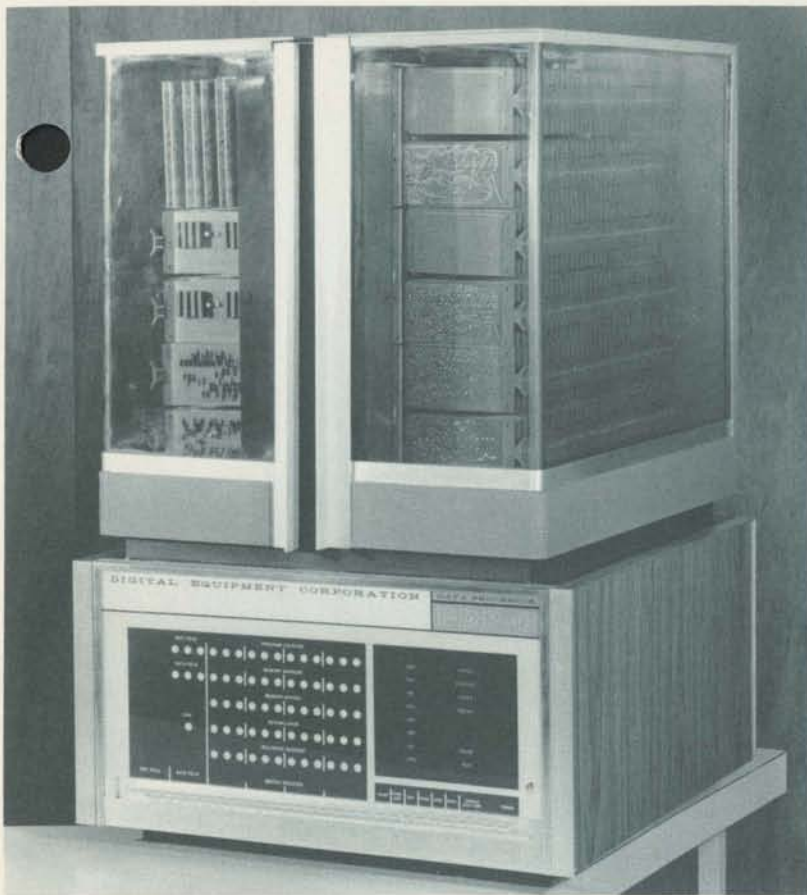
# PDP-8

The latest addition to the Programmed Data Processor line is a small, high speed, general purpose digital computer designed for real time applications. As the successor to the popular PDP-5, it has all the desirable features of the 5 plus faster operating speed and more compact packaging at a much lower cost. These improvements result from the use of Digital's new integrated circuit silicon FLIP CHIP Modules.

A single address, 12-bit, fixed word-length machine, the PDP-8 uses 2's complement binary arithmetic with a "Link Bit" to assist multiple precision. It has an expandable random-access magnetic core memory with a complete cycle time of 1.6 microseconds and a maximum computation rate of 314,000 additions per second. The complete software package, which includes a FORTRAN compiler and an on-line debugging routine, has been fully field tested in over 70 computer installations.

**digital**





## BASIC \$18,000 CONFIGURATION INCLUDES

### CENTRAL PROCESSOR

registers, information handling elements and operator console in table-top cabinet or rack-mounted

### COMPLETE SOFTWARE PACKAGE

including FORTRAN compiler, symbolic assembler, DDT on-line debugging routine, SED on-line symbolic tape editor, floating point arithmetic, and utility routines

### 4096-WORD RANDOM ACCESS CORE MEMORY

expandable to 32,768 words

### FULL DUPLEX TTY MODEL ASR-33

provides keyboard, pageprinter, paper tape punch, and paper tape reader facilities

### CHOICE OF PACKAGING

for table-top operation or panel mounting at no difference in price.

### AUTO-INDEX REGISTERS

eight separate index locations for address modification

### WIRED-IN A/D CONVERTER

can be implemented economically by addition of required modules

### LIBERAL WARRANTY

on standard equipment and options

### FREE PROGRAMMING SCHOOL

includes basic maintenance instruction

### USERS GROUP MEMBERSHIP

offers opportunity to share in supplementary software development by hundreds of PDP users

## FEATURES

### CUSTOMER TESTED SOFTWARE

already used in over 70 PDP-5 installations

### ONE-PASS FORTRAN COMPILER

now ready and working (includes Dynamic Error Correcting mode for tape modification without recompiling)

### INTEGRATED ALL-SILICON CIRCUITS

from Digital's popular new FLIP CHIP™ Module line

### 1.6 $\mu$ sec CYCLE TIME

gives the PDP-8 an add time of 3.2  $\mu$ sec for a maximum computation rate of 314,000 additions per second

### FAST THROUGHPUT

with an input-output transfer rate of 625,000 words or 7½ million bits per second

### FULLY PARALLEL ARITHMETIC OPERATION

simplifies maintenance and increases reliability

### CONTINUOUS DISPLAY OF ACTIVE REGISTERS

including memory address and memory buffer registers, accumulator register and Link, instruction register, program counter, and optional multiply/divide register

### ECONOMICAL DECTape SYSTEM

plus IBM-compatible tape system and magnetic drum system for easy memory expansion

### FLEXIBLE MECHANICAL DESIGN

allows table-top operation or mounting in any 19-inch rack

### SIMPLIFIED I/O DEVICE CONNECTION

through an input/output bus system without changes to the processor

### MICRO-PROGRAMMABLE INSTRUCTIONS

include 49 operate instructions plus input/output commands and automatic multiply/divide instructions

### INDIRECT ADDRESSING

simplifies subroutine linkage

### AUTO-INDEXING

facilitates program searching, multiple input/output list processing, and sorting operations

### SINGLE STEP INSTRUCTION MODES

permit machine state to be examined at each step of the program

### PROGRAM INTERRUPT

permits an input/output device to interrupt an operating program

### HIGH SPEED DATA INTERRUPT

enables transfer of 12-bit words to or from memory at 1.6  $\mu$ sec per word

### BUFFERED INPUT/OUTPUT

allows input/output devices to operate simultaneously at their maximum speed (central processor does not wait for device to complete its cycle)

## FIELD PROVEN STANDARD OPTIONS

Automatic Multiply/Divide

Real-time Clock

DECTape System

IBM-compatible Magnetic Tape System

Drum Systems

Cathode Ray Tube Displays

Oscilloscope Displays

Incremental Plotters

Light Pen

High Speed Paper Tape Punch and Reader

Card Punch and Reader

Line Printers

A/D and D/A Converters

Analog Multiplexers

# INSTRUCTIONS

Mnemonic	Code	Operation	Cycles
<b>BASIC INSTRUCTIONS</b>			
AND	0000	logical AND	2
TAD	1000	2's complement add	2
ISZ	2000	index and skip if zero	2
DCA	3000	deposit and clear AC	2
JMS	4000	jump to subroutine	2
JMP	5000	jump	1
IOT	6000	in-out transfer	(3.75 $\mu$ sec.)
OPR	7000	operate	1

### GROUP 1 OPERATE MICROINSTRUCTIONS

NOP	7000	no operation	1
CLA	7200	clear AC	1
CLL	7100	clear link	1
CMA	7040	complement AC	1
CML	7020	complement link	1
RAR	7010	rotate AC and link right one	1
RAL	7004	rotate AC and link left one	1
RTR	7012	rotate AC and link right two	1
RTL	7006	rotate AC and link left two	1
IAC	7001	index AC	1

### GROUP 2 OPERATE MICROINSTRUCTIONS

SMA	7500	skip on minus AC	1
SZA	7440	skip on zero AC	1
SPA	7510	skip on plus AC	1
SNA	7450	skip on non-zero AC	1
SNL	7420	skip on non-zero link	1
SZL	7430	skip on zero link	1
SKP	7410	skip unconditionally	1
OSR	7404	inclusive OR, switch register with AC	1
HLT	7402	halts the computer	1

### COMBINED OPERATE MICROINSTRUCTIONS

CIA	7041	complement and index AC	1
LAS	7604	load AC with switch register	1
STL	7120	set link (to 1)	1
GLK	7204	get link (put link in AC bit 11)	1
CLA CLL	7300	clear AC and link	1
CLA IAC	7201	set AC=1	1
CLA CMA	7240	set AC=-1	1
CLL RAR	7110	shift positive number one right	1
CLL RAL	7104	shift positive number one left	1
CLL RTL	7106	clear link, rotate 2 left	1
CLL RTR	7112	clear link, rotate 2 right	1
SZA CLA	7640	skip if AC=0, then clear AC	1
SZA SNL	7460	skip if AC=0 or link is 1, or both	1
SNA CLA	7650	skip if AC $\neq$ 0, then clear AC	1
SMA CLA	7700	skip if AC<0, then clear AC	1
SMA SZA	7540	skip if AC $\leq$ 0	1
SMA SNL	7520	skip if AC<0 or link is 1, or both	1
SPA SNA	7550	skip if AC>0	1
SPA SZL	7530	skip if AC>0, and if the link is 0	1
SPA CLA	7710	skip if AC>0, then clear AC	1
SNA SZL	7470	skip if AC $\neq$ 0 and link=0	1

### IOT MICROINSTRUCTIONS

#### PROGRAM INTERRUPT

ION	6001	turn interrupt on
IOF	6002	turn interrupt off

#### TELETYPE KEYBOARD/READER

KSF	6031	skip if keyboard/reader flag=1
KCC	6032	clear AC and keyboard/reader flag
KRS	6034	read keyboard/reader buffer, static
KRB	6036	Clear AC, read keyboard buffer, clear keyboard flag

#### TELETYPE TELEPRINTER/PUNCH

TSF	6041	skip if teleprinter/punch flag=1
TCF	6042	clear teleprinter/punch flag
TPC	6044	load teleprinter/punch buffer, select and print
TLS	6046	load teleprinter/punch buffer, select and print, and clear teleprinter/punch flag

### HIGH SPEED PERFORATED TAPE READER TYPE 750

RSF	6011	skip if reader flag=1
RRB	6012	read reader buffer and clear flag
RFC	6014	clear flag and buffer and fetch character

### HIGH SPEED PERFORATED TAPE PUNCH TYPE 75A

PSF	6021	skip if punch flag=1
PCF	6022	clear flag and buffer
PPC	6024	load buffer and punch character
PLS	6026	clear flag and buffer; load and punch

### OSCILLOSCOPE DISPLAY TYPE 34B

DXL	6053	clear and load x buffer
DYL	6063	clear and load y buffer
DXS	6057	combined dxl and dix
DYS	6067	combined dyl and diy
DIY	6064	intensify point
DIX	6054	intensify point
DCY	6061	clear y buffer
DCX	6051	clear x buffer

### DECTAPE CONTROL TYPE 552

MMLS	6751	load unit select register and clear DECTape flag
MMLM	6752	load motion register and clear DECTape flag
MMLF	6754	load function register
MMSF	6761	skip if DECTape flag=1
MMLC	6766	clear and load memory address counter
MMSC	6771	skip if error flag=1
MMCF	6772	clear error flag and DECTape flag
MMRS	6774	read status bits into AC bits 0-7
MMMM	6756	load motion and function registers and clear DECTape flag
MMMM	6757	load unit select, motion and function registers and clear DECTape flag

### EXTENDED ARITHMETIC ELEMENT TYPE 182

DIV	7407	divide
NMI	7411	normalize
SHL	7413	shift left
ASR	7415	arithmetic shift right
LSR	7417	logical shift right
LMQ	7421	load AC into MQ, clear AC
MUL	7405	multiply
MQA	7501	inclusive OR, MQ with AC
CAM	7621	clear AC and MQ
SCA	7441	read SC into AC

### ANALOG TO DIGITAL CONVERTER TYPE 189

ADC	6004	convert A to D
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### EXTENDED MEMORY TYPE 183

CDF	62n1	change to data field n
CIF	62n2	change to instruction field n
RDF	6214	read data field into AC 6-8
RIF	6224	read instruction field into AC 6-8
RMF	6244	restore memory field
RIB	6234	read interrupt buffer

### ASCII CODE

Character	Code	Character	Code
A	301	!	241
B	302	"	242
C	303	#	243
D	304	\$	244
E	305	%	245
F	306	&	246
G	307	'	247
H	310	(	250
I	311	)	251
J	312	.	252
K	313	+	253
L	314	,	254
M	315	-	255
N	316	.	256
O	317	/	257
P	320	:	272
Q	321	;	273
R	322	<	274
S	323	=	275
T	324	>	276
U	325	?	277
V	326	@	300
W	327	[	333
X	330	]	334
Y	331	]	335
Z	332	↑	336
0	260	→	337
1	261	EOT	205
2	262	WRU	205
3	263	RU	206
4	264	BELL	207
5	265	Line Feed	212
6	266	Return	215
7	267	Space	240
8	270	ACK	374
9	271	ALT MODE	375
		Rub Out	377

Alt Mode & Shift + @ = 200

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