APPENDIX A

PDP-10 Equipment List

Processor and Processor Options

KA10 ARITHMETIC PROCESSOR: central processing unit for all PDP-10 systems with floating point and byte manipulation instructions and including:
- 300 character/second photoelectric paper tape reader
- 50 cps paper tape punch
- 10 cps console teleprinter, LT35A (LT37 furnished when available)
- functional operator console
- multiplexed Input/Output Processor (IOP) with seven levels of priority interrupt
- real time clock

KM10 FAST REGISTERS: sixteen 36-bit integrated circuit registers used as multiple accumulators and/or index registers and for highly iterative program loops. Replaces the first 16 locations of main core memory.

KT10A DUAL MEMORY PROTECTION & RELOCATION REGISTERS: provide multiprogramming hardware for automatic protection and relocation of reentrant and non-reentrant code. (Required for time-sharing.)

Core Memory

Core memories are available in various sizes and speeds. Each memory stores 36 data bits plus a parity bit and each operates asynchronously with respect to the central processor and channel, establishing its own independent timing cycle.

MA10 CORE MEMORY: 16,384 words, 1.00 μs cycle time. Each is supplied with one memory port with cables. Up to three MC10 Additional Memory Access Ports may be added, allowing access to a total of four processors and/or channels.

MA10A CORE MEMORY: 8,192 words, 1.00 μs cycle time. Each is supplied with one memory port with cables. Up to three MC10 Additional Memory Access Ports may be added, allowing access to a total of four processors and/or channels.

MC10 ADDITIONAL MEMORY ACCESS PORT: provides the additional cables and logic to connect an additional processor/channel to a MA10, MA10A, or MB10 memory port.

MD10 CORE MEMORY: 32,768 words, 1.80 μs cycle time. Supplied with four memory access ports and a memory cable set for one of these ports. Up to three additional BS10A memory cable sets are optional.

MD10E CORE MEMORY EXPANSION MODULE: 32,768 words, 1.80 μs cycle time. Up to three may be added to each MD10.

BS10A ADDITIONAL MEMORY CABLE SETS: for the MD10.

DF10 DATA CHANNEL: permits data transfers between high speed devices and core memory. It will service up to eight high speed devices such as RC10, RB10, and RP10.

Disk Systems

RC10 SWAPPING DISK CONTROL: provides control for up to 4 RD10 disk files. It connects to the DF10 data channel which provides a direct path to memory and requires at least one RD10.

RD10 SWAPPING DISK FILE: stores 512,000 36-bit words. Average latency time, 17 ms. Transfer rate is 13.3 μs per 36-bit word.
The RD10 provides high speed swapping of programs directly in and out of core memory in timesharing systems. The RD10 can also be used for user file storage. Up to 4 RD10's can be connected to one RC10 disk control unit.

RB10A STORAGE DISK FILE (dual positioning): stores from 20,971,520 to 104,857,600 36-bit words in multiples of 8,388,608 words. Average access time is 190 ms. Transfer rate ranges from 22.5 μs to 72 μs per word depending on zone being accessed. Dual head positioning arms permit overlapping of data transfer and seek operations. Basic unit includes six disks and RA10 Disk Control.

RB10C ADDITIONAL DISK: a maximum of 20 disks (each with a capacity of 4,194,304 words) can be added to the basic RB10. (Please specify in even multiples of two RB10C's.)

RP10 DISK PACK CONTROL: provides control of up to eight RP02 Disk Pack Drives. Requires the DF10 data channel which provides a direct path to memory. Also requires at least one RP02.

RP02 DISK PACK DRIVE: The RP02 provides storage for up to 5,196,800 36-bit words on interchangeable disk packs. Average access time is 62.5 ms, including 12.5 ms average rotational latency. Transfer rate is 15 μs/word. Requires RP10 Control. Includes one RP02P pack.

RP02P DISK PACK: Pack for RP02 Disk Pack Drive.

Magnetic Tape Systems

TD10 DECtape CONTROL: provides control for up to eight TU55 DECtape transports. Requires at least two TU55 transports. (One TD10 control is required with every PDP-10 system.)

TU55 DECtape UNIT: reads and writes magnetic tape at a 15K characters/second rate. (Tapes are 3½ in. diameter, 260 ft. long and ¾ in. wide.) Tape units are bi-directional and redundantly recorded. Each tape has a directory, allowing random access to user files. (Two DECtape units are required per PDP-10 system.)

TM10A MAGNETIC TAPE CONTROL: controls up to eight tape transports. Permits reading either 7 or 9 channel (or combination of both) industry standard tape.† Requires at least one DEC magnetic tape unit of the types shown below. Magnetic tape unit types may be intermixed on a single control.

TM10B MAGNETIC TAPE CONTROL: same as TM10A but provides for data channel operation. Requires a DF10 data channel.

TM10C TM10B MODIFICATION KIT: provides necessary components for converting a TM10A Magnetic Tape Control to a TM10B.

TU20A MAGNETIC TAPE UNIT: reads and writes 9-channel USASI standard† magnetic tape at 45 inches/second and a density of 800 bits/inch.

TU20B MAGNETIC TAPE UNIT: reads and writes 7-channel industry standard tape at 45 inches/second and densities of 200, 556, and 800 bits/inch (36K characters/second).

TU30A MAGNETIC TAPE UNIT: reads and writes 9-channel USASI standard† magnetic tape at 75 inches/second and density of 800 bits/inch (60K characters/second).

TU30B MAGNETIC TAPE UNIT: reads and writes 7-channel industry standard tape at 75 inches/second, and densities of 200, 556 and 800 bits/inch (60K characters/second).

Input/Output Devices

Punched Card Equipment

CR10A CARD READER: reads 80-column punched cards at 1,000 cards/min (800 cards/min in systems using 50 Hz power). Card Hopper and stacker capacities are 1,000 cards.

†USASI X3.22-1968 Recorded Magnetic Tape for Information Interchange.

CP10A CARD PUNCH: punches cards at a rate of 200 cards/min when punching in all 80 columns. A maximum rate of 365 cards/min is possible when only the first 16 columns are punched. Card Hopper and stacker capacities are 1,000 cards.

Line Printers

		Characters	Lines/ Minute	Columns/ Line
LP10A	LINE PRINTER	64	300	132
LP10C	LINE PRINTER	64	1,000	132
LP10D	LINE PRINTER	96	600	132
LP10E	LINE PRINTER	128	500	132

Plotters

XY10 PLOTTER CONTROL: interface for CalComp 500 and 600 series digital incremental plotters.

XY10A PLOTTER AND CONTROL

Cal Comp Plotter Model	Step Size	Speed (Steps/ Minute)	Width (Inches) Paper
XY10(565)	0.01 inches	18,000	12
	0.005 inches	18,000	
	0.1 mm.	18,000	

XY10B PLOTTER AND CONTROL

XY10(563)	0.01 inches	12,000	31
	0.005 inches	18,000	
	0.1 mm.	18,000	

Data Communication Equipment

Data Line Scanner

Data Line Scanner provides on-line servicing of up to 64 communication lines. Accommodates any device which uses eight level serial teletype code at speeds up to 100 kilobaud. Full duplex with local copy, and half duplex data modes are available on each line serviced.

DC10A CONTROL UNIT: the scanner and control unit for the DC10 communication controller provides 4 units of cabinet space and power supplies for various combinations of line equipment.

DC10B 8-LINE GROUP UNIT: provides teletype interface for up to 8 local lines, full duplex. May be used with duplex or full duplex with local copy data sets. When used with data sets, communications must be established, maintained, and terminated manually, unless DC10E Expanded Data Set Control Units are provided. Requires one unit of cabinet space in a DC10A or DC10F.

DC10C 8-LINE TELEGRAPH RELAY ASSEMBLY: provides conversion from local to long lines using full or half-duplex facilities. Requires two units of cabinet space in a DC10A or DC10F.

DC10D TELEGRAPH POWER SUPPLY: the standard line voltage supply used with DC10C (120V dc at 2 amperes). No additional cabinet space required.

DC10E EXPANDED DATA SET CONTROL: provides expanded control of eight data sets in the DC10 system. Requires two units of cabinet space in a DC10A or DC10F.

DC10F EXPANDER CABINET: provides eight units of cabinet space and power supplies for expansion beyond capacity of DC10A.

680/I Data Communication System

680/I Data Communication System provides on-line servicing of up to 63 communication lines. System handles 8 level serial teletype code at speeds of 110, 150, or 300 baud. Terminals may be local or remote via modems (data sets). To configure a 680/I system, determine the number of lines, both local and data set. Add to the basic communication system enough M750 dual serial line adapters for the total line capacity. (The maximum number of lines is 63.) A 680/I system must include one DC68A. If there are any local teletypes, a DC08B is required. If there are more than 48 local teletypes, a second DC08B is required. Each data set line requires one 689LM. If there are 1 to 32 data set lines, one 689AG is required. If there are more than 32 data set lines, a second 689AG is required.

DC68A BASIC COMMUNICATION SYSTEM: includes hardware common to any 680/I system for PDP-10 use. Additional options listed below are required to implement a specific number of local or data set lines. The DC68A basic system includes one DA10 PDP-8/PDP-10 interface, one PDP-8/I-D computer (rack mounted with 4K of memory with MP8/I parity option, and an ASR33 teleprinter), one DW08A negative bus adapter, one DL8/I serial line adapter, one DC08A serial line multiplexor, and DC08Y clocks for 110, 150, and 300 baud.

M750 DUAL SERIAL LINE ADAPTER: implements two full duplex channels in the basic communication system. One unit is required for every two local or data set lines.

DC08B LOCAL LINE PANEL: accommodates up to 48 local terminals suitable for direct 680/I connection.

689AG MODEM INTERFACE: provides control interface and mounting space for up to 32 689LM's.

689LM MODEM INTERFACE AND CONTROL: provides complete interfacing to and control of one BELL 100 series modem (data set) or equivalent.

Teletypes and Terminals

For Local DC10 Use

LT33A TELEPRINTER: 33TS machine (KSR33, friction feed).

LT33B TELEPRINTER: 33TY machine (ASR33, sprocket feed, automatic reader control XON/XOFF feature).

LT35A TELEPRINTER: VSL312HF machine (KSR35, sprocket feed).

LT37AC TELEPRINTER: KSR37, sprocket feed, 60 Hz Operation only. Also suitable for use with Bell System 103-type data set or equivalent.

For Local 680/I Use

LT33C TELEPRINTER: 33TS machine (KSR33, friction feed).

LT33H TELEPRINTER: 33TY machine (ASR33, sprocket feed, automatic reader control XON/XOFF feature).

LT35C TELEPRINTER: VSL312HF machine (KSR35, sprocket feed).

Display Systems

346/340B PRECISION INCREMENTAL CRT DISPLAY: plots points, lines, vectors, and characters on a 9⅜ in. square raster of 1,024 points along each axis. 1½ μs is required per point in vector, increment, and character modes. Random point plotting rate of 35μs. A 370 high-speed Light Pen is included.

342B CHARACTER GENERATOR for 346/340B

348/VR30 PRECISION POINT PLOTTING DISPLAY: operates at a maximum plotting rate of 20 KC or one point every 50 μs on a 9⅜ in. x 9⅜ in. display area. Number of addressable points along each axis is 1024. A 370 high-speed Light Pen is included.

VP10 POINT PLOTTING DISPLAY CONTROL: operates at either of two maximum plotting rates. Low rate is 10 KC (one point every 100 μs). High rate is 50 KC (one point every 20 μs). Number of addressable points along each axis is 1024. Control interfaces to a customer supplied oscilloscope (Tektronix Type RM503 or equivalent) or to a CRT display.

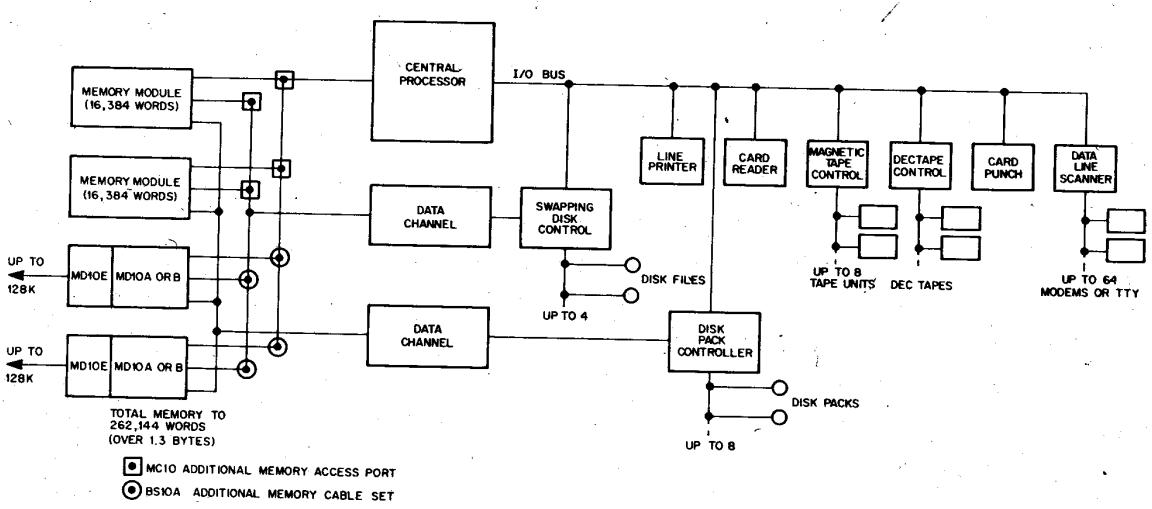
370 HIGH SPEED LIGHT PEN: for use with VP10.

Miscellaneous

DA10 PDP-8 or PDP-9 to PDP-10 INTERFACE

DK10 PROGRAMMABLE REAL TIME CLOCK: unit is supplied with a crystal oscillator which provides a resolution of 10 μs.

GP10 GENERAL PURPOSE INTERFACE TO PDP-10 I/O BUS: includes cabinet, two 728 power supplies, one 844 power control, indicators, end panels, fan, convenience outlet with fans, and BS10A/15 ft. cable set. Logic provides a status register, device decoding, read-in gating and line buffering.



TYPICAL PDP-10 SYSTEM CONFIGURATION

Appendix B
PDP-10 Software

Table B-1 shows the DEC-supplied system software (CUSPs) currently available to PDP-10 users.

Table B-1

PDP-10 Software

Name of CUSP	Comment
AID	See description in PDP-10 User's Bookshelf in Appendix C.
BASIC	See PDP-10 User's Bookshelf in Appendix C.
BATCH	See PDP-10 User's Bookshelf in Appendix C.
BINCOM	Documented in this handbook.
*CHKPNT	Saves current charge file and initiates a new one.
CODE	See PDP-10 User's Bookshelf (supplementary documents) in Appendix C.
*COMPIL	Documented in this handbook.
COPY	See PDP-10 User's Bookshelf (supplementary documents) in Appendix C.
CREF	Documented in this handbook.
*DDl0	Loads system to disk from DECtape.
DDT	Documented in this handbook.
*DSKLST	Snapshot of disk.
EDITOR	Documented in this handbook.
*FAILSAFE	Saves the contents of disk on magtape and later restores these contents back onto the disk.

Table B-1 (cont)
PDP-10 Software

Name of CUSP	Comment
*FILDDT	Debugging aid for the Monitor.
FORTRAN IV (F40)	See PDP-10 User's Bookshelf in Appendix C.
FUDGE2	Documented in this handbook.
GLOB	Documented in this handbook.
*LINED	Documented in this handbook.
LOADER	Documented in this handbook.
*LOGIN	Documented in this handbook.
*LOGOUT	Documented in this handbook.
MACRO	Documented in this handbook.
*MONEY	Lists charges of computer users.
PIP	Documented in this handbook.
PIP1	Documented in this handbook.
*PRINT	Queues files for LPT.
*PRINTR	Prints selected system files.
*REACT	Alters system accounting file (login numbers and codes).
SRCCOM	Documented in this handbook.
*STACK	See PDP-10 User's Bookshelf in Appendix C.
*SYSTAT	Snapshot of time-sharing system.
TECO	Documented in this handbook.
TENDMP	Documented in this handbook.

*Currently available in disk systems only

pdp10 user's bookshelf

A Bibliography of PDP-10 Programming Documents

OCTOBER, 1969

Software documents in this bibliography can be obtained from Digital Sales Offices or by sending a written request (with check or money order) to *Program Library, Digital Equipment Corporation, Maynard, Massachusetts 01754.* The following key, which indicates the current status of software manuals and their relationship to preceding editions, is designed to help the reader determine whether the present content of a given manual meets his needs.

(1) *New* signifies that the manual is being published for the first time (designated by a box).

(2) *Major Revision* signifies that new capabilities and/or changed procedures have been incorporated in the manual (designated by an asterisk).

(3) *Minor Revision* signifies that the manual remains essentially the same as its predecessor.

(4) Manuals that are unchanged since the last bibliography are shown with only the date of publication after the title.

PDP-10 System Reference Manual **Minor Revision August, 1969**

An indexed programmer's handbook that describes the PDP-10 processor and the basic instruction repertoire. Following an introduction to the PDP-10's central processor structure, general word format, memory characteristics, and assembler source-programming conventions, this manual presents the specific instruction format, mnemonic and octal op codes, functions, timing formulas, and examples of each of the basic instructions. Several helpful appendices, including mnemonic op code tables, algorithms and timing charts, complete the manual.

Order No. DEC-10-HGAC-D $5.00

***Time-Sharing Monitors:**
Multiprogramming Monitor (10/40) **Major Revision**
Swapping Monitor (10/50) **August, 1969**

A complete guide to the use of the PDP-10's two powerful, real-time, multiprogramming, time-sharing Monitors. Both Monitors schedule multiple-user time sharing of the system, allocate facilities to programs, accept input from and direct output to all system I/O devices, and relocate and protect user programs in storage. This manual details user interaction with the Monitors, from both a programming and operating viewpoint, and contains several quick-reference tables of commonly used Monitor commands and parameters, as well as examples of user coding.

Order No. DEC-T9-MTZA-D $3.00

AID (Algebraic Interpretive Dialogue) **October, 1968**

A 'hands-on' guide to the use of AID at the Teletype console. AID, a PDP-10 version of JOSS [1], is an on-line system which provides each user with a personal computing service utilizing a conversational algebraic language. This manual describes the use of the Teletype, the syntax and general rules governing the AID language, and each of the AID commands, with appropriate examples.

Order No. DEC-10-AJBO-D $3.00

[1]JOSS is a trademark and service mark of the RAND Corporation for its computer program and services using that program.

Single-User Monitor Systems **November, 1968**

A complete guide to the use of the Single-User Monitor, which performs fast job-to-job sequencing, provides I/O service for all standard devices, and is upward compatible with the Time-Sharing systems. This manual contains the same type of helpful information as the Time-Sharing manual described above.

Order No. DEC-10-MKDO-D $2.00

Batch Processor (Batch) and Job Stacker (Stack) **May, 1969**

An indexed manual containing all information required to prepare and run user jobs under control of the Batch Processor in either a single-user or time-sharing environment. Batch supervises the sequential execution of a series of jobs with a minimum of operator attention, yet allows the operator to interrupt, skip, repeat, or prematurely terminate one or more of the jobs in the series at any time. Job Stacker is used in conjunction with Batch to (1) transfer job files to the Batch input device and stack them there for subsequent input to Batch, (2) transfer Batch output job files from the Batch output device to some other device, (3) list job file directories, (4) delete job files, and (5) list directories with selective file deletion or transfer.

Order No. DEC-10-MBAC-D $1.00

***System User's Guide** **Major Revision, Available August, 1969**

A fact-filled operations guide designed for handy reference at the user's Teletype console. Contains the basics of Teletype usage and complete operating procedures for all Commonly Used Service Programs (CUSP'S). Includes complete write-ups on DECtape Editor, Advanced BASIC, LINED, CCL (Concise Command Language), and Linking Loader. A typical chapter includes a brief description of the program, its operating environment, initialization procedures, command string formats, special switches, diagnostic messages, and in-depth examples. The manual is tab-indexed for the user's convenience.

Order No. DEC-10-NGCC-D $10.00

COBOL LANGUAGE **August, 1969**

A reference manual designed to aid the user in writing COBOL programs for the PDP-10. Each COBOL language element is accorded a detailed treatment that explains and demonstrates its use in a variety of programming contexts. The four major divisions of a COBOL program and their conventional formats are clearly described and effectively illustrated. Other subjects given extended coverage in this manual are the COBOL library, COBOL reserved words, and the CALL procedure. Each chapter contains numerous examples of the efficient use of the components of a COBOL program. Indexed.

Order No. DEC-10-KC1A-D $6.00

TECO (Text Editor and Corrector) **Minor Revision, August, 1969**
This programmer's reference manual describes the powerful context editor for the PDP-10. Editing is done on a character, line or variable character string basis. Describes more than 30 commands for inserting, deleting, appending, searching for, and displaying text.
Order No. DEC-10-ETEC-D $1.50

FORTRAN IV **September, 1968**
This manual describes statements and features of FORTRAN IV on the PDP-10. Includes descriptions of library functions, calling library subroutines from the Science Library, and the FORTRAN IV operating System. An appendix contains language differences for those using the small (5.5K) PDP-10 FORTRAN Compiler.
Order No. DEC-10-AFCO-D $2.00

ADVANCED BASIC **Minor Revision, August, 1969**
A valuable guide to the BASIC® commands needed for a more efficient expression of scientific, business, and educational problems. The manual contains complete tutorial explanations of these additional features: (1) matrix computations; (2) alphanumeric information handling; (3) program control and storage facilities; (4) program editing capabilities; (5) formatting of Teletype output; and (6) documentation and debugging aids.
Order No. DEC-10-KJZB-D $3.50

PIP (Peripheral Interchange Program) **November, 1968**
Explains how PIP is used to transfer data files between standard peripheral devices. Shows how command strings are written, describes switches available for optional functions, techniques for handling file directories, error messages and other features.
Order No. DEC-10-PPCO-D $1.00

Science Library and Fortran Utility Subprograms **October, 1968**
A general reference manual covering Science Library arithmetic function and utility subprograms and FORTRAN IV nonmathematical utility subprograms (e.g., CHAIN, PDUMP, DATE, TIME). A functional description followed by the calling sequence, list of external subprograms called, entry points, and subprogram length, is given for each subprogram. In addition, the type of argument(s) and result, a description of the algorithm used, and a discussion of the accuracy of the algorithm are given for each function. Appendices contain information on error analyses, double-precision format and input conversion, a bibliography, and average run times.
Order No. DEC-10-SFLC-D $4.00

MACRO-10 Assembler **Minor Revision, October, 1969**
The programmer's reference manual for the PDP-10 assembly system. Explains format of statements, use of pseudo-operations, and coding of macro instructions which make MACRO-10 one of the most powerful assemblers available.
Order No. DEC-10-AMZA-D $3.00

PDP-10 Reference Card **May, 1968**
A handy pocket-sized guide to instruction mnemonics, hardware and software (Monitor system) word formats, and instruction codes.
Order No. DEC-10-J 00 A-D $0.25

PDP-10 Interface Manual **May, 1968**
A complete guide to the process of interfacing any type of experimental apparatus, special purpose I/O devices, or other user-constructed items to the PDP-10 system. This manual details user time-sharing, I/O bus, console, memory bus, and channel bus requirements and provides other information useful to both the novice experimenter and the advanced logic designer.
Order No. DEC-10-HIFB-D $10.00

DDT-10 (Dynamic Debugging Technique) **Minor Revision, April 1969**
This reference manual describes the dynamic debugging program used for on-line checkout and testing of MACRO-10 and FORTRAN programs. The commands of DDT are grouped so that they can be used easily and effectively by both the uninitiated user and the experienced programmer. Included in the appendices is an informative summary of all DDT functions.
Order No. DEC-10-CDDC-D $1.00

The following supplementary documents are also available from the Program Library.

Concise Command Language (CCL) for the PDP-10 Time-Sharing Monitors	DEC-10-RWDA-D	$1.00
CHAIN (Reads CHAIN Files into Core and Links Them to Resident Programs)	DEC-10-LOVB-D	1.00
PDP-10 ASCII/BCD Code Conversion Program (CODE)	DEC-10-YNZA-D	1.00
PDP-10 DECtape Copy Program (COPY)	DEC-10-RPTA-D	1.00
FAILSAFE—Disk Save and Restore Program	DEC-10-YPDA-D	1.00
FORTRAN IV Software Maintenance Memos	DEC-10-KF1A-D	1.00
GLOB (Global Symbol Cross-Reference List)	DEC-10-YRZA-D	1.00
LINED—A Line Editor for PDP-10 Disk Files	DEC-10-EZDA-D	1.00
Linking Loader V.27	DEC-10-LLZA-D	1.00
MACRO V.24 Addendum (Supplements MACRO-10 Assembler Manual)	DEC-10-AMBO-DN	No Charge
FORTRAN IV Utility Subprograms (RELEAS, MAGDEN, BUFFER, IFILE, and OFILE)	DEC-10-FIYB-D	1.00
TENDUMP—DECtape Utility Program	DEC-10-LZYC-D	1.00
PDP-8 Scan 680 for PDP-10	DEC-10-RSCB-D	1.00
DCO8A/689AG Data Line Scanner for PDP-10	DEC-10-RWVA-D	1.00
Software Manual Update, August 1969 (Insert Pages for Updating PDP-10 Software Documents)	(No Order No.)	1.00

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MASTER INDEX/GLOSSARY

Page numbers are those which appear in boldface at the top center of each page.

Absolute address:
An address that is permanently assigned by the machine designer to a storage location. See Monitor 354.
Absolute binary programs, 250
Absolute coding:
Coding that uses machine instructions with absolute addresses.
AC, 20
Access:
See random access, remote access, serial access.
Access time:
(1) The time interval between the instant at which data are called for from a storage device and the instant delivery is started.
(2) The time interval between the instant at which data are requested to be stored and the instant at which storage is started.
(3) See page 15
Accumulator, 9, 15, 354
ADD, 17, 45
Address:
(1) An identification, as represented by a name, label, or number, for a register, location in storage, or any other data source or destination such as the location of a station in a communication network.
(2) Loosely, any part of an instruction that specifies the location of an operand for the instruction.
Address assignments, 205-207
indexing, 206
indirect, 206
literals, 206
location counter, 205,361
Address break, 98, 106, 107
Address format:
The arrangement of the address parts of an instruction.
Address mode,
absolute, 211
relocatable, 211
Addressing, 9, 48
AID, 635
Algorithm:
A prescribed set of well-defined rules or processes for the solution of a problem in a finite number of steps, e.g., a full statement of an arithmetic procedure for evaluating SINX to a stated precision. Contrast with heuristic.
(1) fixed point, 176-181
(2) floating point, 181-186
Allocation:
See storage allocation.
Allocation of devices, 315
Alphabet:
(1) An ordered set of all the letters and associated marks used in a language.
(2) An ordered set of letters used in a language, e.g., the 128 characters of the USASCII alphabet.
Alphanumeric:
Pertaining to a character set that contains both letters and digits and usually other characters such as punctuation marks. Synonymous with alphameric.
AND, 38
ANDCA, 38
ANDCB, 39
ANDCM, 38
AOBJN, 59
AOBJP, 59
AOJ, 62
AOS, 63
APR, 91, 97, 101
AR (address register), 8
Argument:
An independent variable, e.g., in looking up a quantity in a table, the number, or any of the numbers that identifies the location of the desired value.
Arithmetic and logical operations, 203
shift, 44, 49
testing, 59-64
Arithmetic testing, 59-64
Array:
An arrangement of elements in one or more dimensions.
AS (address switch register), 7, 8
ASCII:
Same as USASCII.
Standard, 220, 240
ASCIZ, 220
ASH, 42, 59
ASHC, 42, 50
Assemble:

To prepare a machine language program from a symbolic language program by substituting absolute operation codes for symbolic operation codes and absolute or relocatable addresses for symbolic addresses. See MACRO-10.
Assembler:
(1) A computer program which accepts symbolic code and translates it into machine instructions, item for item. See MACRO-10.
(2) evaluation of statements and expressions, 267
(3) interpretation of macros, 271
Assembler statements, 211
allocation of storage, 224
control statements, 227
processing, 223
Assembling TENDMP, 625
Assembly
listing, 247
output, 247
ASSIGN command, 316, 348
ASSIGN SYS command, 348, 425
Asynchronous:
The PDP-10 hardware does not rely on an internal clock to indicate by signal that one operation has been executed before beginning a second operation.
ATTACH command, 345, 348

B operator (binary shift), 202
Background Job Control Monitor Commands
ATTACH job, 345
CCONT, 344
CSTART, 344
DETACH, 344
PJOB, 344
Background processing:
The automatic execution of lower priority computer programs when higher priority programs are not using the system resources.
Base:
(1) A reference value.
(2) A number that is multiplied by itself as many times as indicated by an exponent.
(3) Same as radix.
Base address:
A given address from which an absolute address is derived by combination with a relative address. See memory protect, virtual memory.
BASIC (Advanced), 636
Batch, 635
Batch processing:
Pertaining to the technique of executing a set of computer programs such that each is completed before the next program of the set is started.
Loosely, the execution of computer programs serially.
Bell character:
A communication control character intended for use when there is a need to call for human attention. It may activate alarm or other attention devices. Abbreviated BELL.
Benchmark problem:
A problem used to evaluate the performance of computers relative to each other.
Binary:
(1) Pertaining to a characteristic or property involving a selection, choice, or condition in which there are two possibilities.
(2) Pertaining to the numeration system with a radix of two.
(3) See 89, 111, 112, 116
(4) arithmetic, see 10.
Binary code:
A code that makes use of exactly two distinct characters, usually 0 and 1.
Binary-coded decimal notation:
Positional notation in which the individual decimal digits expressing a number in decimal notation are each represented by a binary numeral, e.g., the number twenty-three is represented by 0010 0011 in the 8-4-2-1 type of binary-coded decimal notation and by 10111 in binary notation. Synonymous with BCD.

Binary Compare, 618-620
commands, 618-619
diagnostic messages, 619-620
initialization, 618
on CUSP, 634
requirements, 618
Binary digit:
In binary notation, either of the characters, 0 or 1. Abbreviated bit.
Binary program output
absolute, 247, 250
relocatable, 248
Binary shifting, 201
BINCOM, see binary compare
Bit:
(1) A binary digit.
(2) See parity bit.
(3) Position determination, see 200.
Bits, file status, 398
BLK1, 88, 190, 193
BLK0, 88, 193
BLOCK, 221
Block:
(1) A set of things, such as words, characters, or digits

handled as a unit.
(2) A collection of contiguous records recorded as a unit. Blocks are separated by interblock gaps and each block may contain one or more records.
(3) A group of bits, or binary digits, transmitted as a unit over which an encoding procedure is generally applied for error-control purposes.
Block gap:
An area on a data medium used to indicate the end of a block or record. Synonymous with interblock gap.
Block I/O, 88
Block length:
A measure of the size of a block, usually specified in units such as records, words, computer words, or characters.
Block transfer:
The process of transmitting one or more blocks of data where the data are organized in such blocks. See 28.
Block types, 249-251
BLT, 28
Boolean, 35
Bootstrap:
A technique or device designed to bring itself into a desired state by means of its own action, e.g., a machine routine whose first instructions are sufficient to bring the rest of itself into the computer from an input device. See 15.
BR (buffer register), 9
Branch:
(1) A set of instructions that are executed between two succesive decision instructions.
(2) To select a branch as in (1).
(3) A direct path joining two nodes of a network or graph.
(4) Loosely, a conditional jump.
Branchpoint:
A place in a routine where a branch is selected.
Breakpoint:
A place in a routine specified by an instruction, instruction digit, or other condition, where the routine may be interrupted by external intervention or by a monitor routine. See DDT-10 for use of breakpoints in debugging.
Buffer:
A routine or storage device used to compensate for a difference in rate of flow of data, or time of occurrence of events, when transmitting data from one device to another. See 127, 128.
Buffer header, 401
Buffer structure, 396
Buffers
Monitor generated, 402
user generated, 403
Bug:
A mistake or malfunction.
Busy (I/O), 89, 112, 116, 117, 119, 128, 134, 140, 142
BYTE, 217
Byte:
(1) An aggregate of bits whose size lies between that of a word and that of a single bit. On the PDP-10 the byte size is controlled by the programmer.
(2) manipulation, 33-35
(3) size, altering, 217
size manipulation, 218
(4) pointer, 33
(5) unpacking subroutine, 257
Byte interrupt, 73, 75, 104

CAI, 60
CAL, 229
Calculating the logarithm of a complex argument, 256
Call:
(1) To transfer control to a specified closed subroutine.
(2) In communications, the action performed by the calling party, or the operations necessary in making a call, or the effective use made of a connection between two stations.
(3) Synonymous with cue.
CALL and CALLI Monitor operations, 372
Calling sequence:
A specified arrangement of instructions and data necessary to set up and call a given subroutine.
Calls, macro (see macro calls)
CAM, 61
Card codes, 162
Card in punch, 141
Card punch, 140-144,442
codes, 162-164
data modes, 442
interrupts, 141, 142
operation, 144
timing, 143
Card reader, 136-140, 441
card codes, 443
codes, 162-164
data modes, 441
interrupts, 137, 138
operation, 139
timing, 138
Carries, 44
Carry 0, 44, 63, 64, 73
Carry 1 44, 63, 64, 73
CCONT command, 344, 375, 376
CDP (card punch), 140-142

Central processing unit:
A unit of a computer that includes the circuits controlling the interpretation and execution of instructions. Synonymous with main frame.
Central processor, 102-109
indicators, 102
operating keys, 105
operating switches, 107
CHAIN, 636
Chained list:
A list in which the items may be dispersed but in which each item contains an identifier for locating the next item to be considered.
Chaining search:
A search technique in which each item contains an identifier for locating the next item to be considered.
Changing the local radix, 215
Channel:
(1) A path along which signals can be sent, e.g., data channel, output channel.
(2) A partially autonomous portion of the PDP-10 which can overlap I/O transmission while computations proceed simultaneously.
Character:
A letter, digit, or other symbol that is used as part of the organization, control or representation of data. A character is often in the form of a spatial arrangement or adjacent or connected strokes.
Character(s) (MACRO-10)
interpretations, 265
strings, 198
Character codes, 48
Character handling in macros, 271
Character string:
A string consisting solely of characters.
Check bit:
A binary check digit, e.g., a parity bit.
Check character:
A character used for the purpose of performing a check.
Check sum, 114, 115
CHKPNT, 634
CLEAR (see SETZ), 36
Clear:
To place one or more storage locations into a prescribed state, usually zero or the space character. Contrast with set.
Clock:
(1) A device that generates periodic signals used for synchronization.
(2) A device that measures and indicates time.
(3) A register whose content changes at regular intervals in such a way as to measure time.
(4) See 98, 107 (interrupt)
Clock - hardware option programmable, 632
CLOG (sample MACRO program), 256
CLOSE programmed operator, 418
Closed subroutine:
A subroutine that can be stored at one place and can be connected to a routine by linkages at one or more locations. Contrast with open subroutine.
COBOL (COmmon Business Oriented Language):
A business data processing language.
COBOL language
manual, 635
CODE, ASCII-BCD conversion program, 636
Code:
(1) A set of unambiguous rules specifying the way in which data may be represented, e.g., the set of correspondences in the standard code for information interchange.
(2) To represent data or a computer program in a symbolic form that can be accepted by a data processor.
Code set:
A finite and complete set of representations defined by a code.
Codes
error, 241
text, 269
Collating sequence:
An ordering assigned to a set of items, such that any two sets in that assigned order can be collated.
Command execution, 313
Command format
command arguments, 311
command names, 311
Command language:
A source language consisting primarily of procedural operators, each capable of involing a function to be executed.
Commands, DDT
breakpoints, 544-545, 559-563
changing output radix, 557
defining symbols, 566
deleting symbols, 567
miscellaneous, 564-565
modify storage, 542, 549-551
searches, 563-564
typein, 554
typeouts, 552, 557-558
Commands, TECO
conditional, 514, 517
delete text, 510
editing, 507

insert text, 510
I/O, 506
iteration, 514, 517
macro, 514, 517
magnetic tape positioning, 505
numeric values and arguments, 515
opening an I/O file, 509
output data, 510
pointer positioning, 510
Q-Register, 513, 517, 518
read a page, 509
search, 512,513, 517
select I/O device, 503- 04
termination, 517
typing text, 511
Commands, TENDMP, 626
Comments field, 17, 197
COMMON (Subroutine), 380
Communication hardware options
control unit, 630
data line scanner, 630
expanded cabinet, 631
expanded data set control, 631
telegraph power supply, 631
telegraph relay, 631
Communications system model 680/I
basic system, 631
dual serial line adapter, 631
local line panel, 631
modem interface, 631
Communication with Monitors, 210
COMPIL, 335, 634
Compile:
To prepare a machine language program from a computer program written in another programming language by making use of the overall logic structure of the program, or generating more than one machine instruction for each symbolic statement, or both, as well as performing the function of an assembler.
Compiler:
A computer program more powerful than an assembler. A compiler accepts symbolic code which it then translates and expands. Examples in PDP-10 systems: FORTRAN and COBOL.
COMPILE command, 324
Compile switches, 329
Complement, 10, 37, 38, 39, 40
Concatenation:
(1) The joining of two strings of characters to produce a longer string often used to create symbols in macro defining. See 237
(2) of macros, 272
Conditional assembly, 222
Conditional jump:
A jump that occurs if specified criteria are met.
Configuration Table entries, 381
Configuration for PDP-10, 632
CONI, 87, 88, 89, 376
CONO, 86, 89, 90, 92
Conservation
memory, 217
storage, 220
CONSO, 88
Console,
data transfers, 91
user's, 309
CONSZ, 87, 88
CONT
command, 339, 375, 376
instruction, 105
Context switching:
The saving of key registers prior to switching between jobs, as in in time sharing.
Control characters, 430
Control count, 27, 31
COPY, 636
CORE command, 317
Core control, 420
Core memory hardware options
additional access port, 629
cable sets, 629
data channel, 629
expansion module, 629
Core storage check, 312
Counter:
A device such as a register or storage location used to represent the number of occurrences of an event.
CPA (see APR), 97
CPU:
Central Processing Unit
CR (card reader), 136-138
Create:
A file is created when it has been opened for writing, written upon, and closed for the first time. Only one user may be creating the file at a time. A segment is created by the CORE or REMAP UUO. Logically, GET, R, and RUN commands also do core UUO's.
CREATE command, 321
Created symbols, 235
CREF command, 324
CREF, see cross reference listing
CRE.TMP, 336
Cross reference listing, 604-608
commands, 605-606
diagnostic messages, 607
initialization, 605
monitor commands, 608
requirements, 605
switches, 606-607
CRT display:
Cathode ray tube display.
CSTART command, 344
CTEST command, 348
Current address, 17
CUSP (Commonly Used Systems Programs, e.g., FORTRAN, PIP, etc.)
CUSP command level, 303, 304

CUSP I/O level, 303, 304
Cylinder:
A disk can be considered to be a set of cylinders with one cylinder corresponding to each position of the disk arms.

D command, 340
D switch, 364
Data bank:
A comprehensive collection of libraries of data. For example, one line of an invoice may form an item, a complete invoice may form a record, a complete set of such records may form a file, the collection of inventory control files may form a library, and the libraries used by an organization are known as its data bank. Synonymous with data base.
Data blocks, 252
Data channel, 400
DATAI, 87, 88, 90
Data missed, 136, 137, 138
Data modes
buffered, 394, 413
unbuffered, 394, 413
DATAO, 87-90
Data ready, 136-138
Data request, 140-143
Data transmission, 412
DAYTIME command, 346
DDT (Dynamic Debugging Technique):
A program used for on-line testing and debugging of object programs, 304
command, 339
submode, 432
DDT-10, 537-582
assembly, 567
breakpoints 544-545, 559-563
commands, see commands, DDT
defining symbols, 566
deleting symbols, 566
deleting typing errors, 546, 555
EDDT, 579
entering and leaving, 581
error messages 547, 555
expressions, 544
field separators, 568, 569
learning to use, 539
loading and saving, 582
loading procedure, 539
paper tape control, 570
proceed counter, 562
special character functions, 551, 569
starting the program, 546,552
storage map, 580
symbols, 543, 552, 566-569
type in modes, 543, 553
type out modes, 541, 552
upper and lower case, 551
DD10, 633
DEASSIGN command, 316
Debug:
To detect, locate, and remove mistakes from a routine or malfunctions from a computer. Synonymous with troubleshoot. See 224
DEBUG, Monitor command, 325
Debugging CUSPs, 342
DEC, Macro-10 pseudo-op, 215
Decimal print routine, 83
Decision table:
A table of all contingencies that are to be considered in the description of a problem, together with the actions to be taken. Decision tables are sometimes used in place of flowcharts for problem description and documentation.
Decode:
To apply a set of unambiguous rules specifying the way in which data may be restored to a previous representation, i.e., to reverse some previous encoding.
DECtape:
A DEC development of convenient, pocket-sized reels of random access magnetic tape.
block format, 446
compatibility between DEC computers, 481
data modes, 445
directory format, 446
file format, 448
programmed operators, 449

DECtape control, 630
DECtape Editor, 493-497
commands, 493-495
diagnostic messages, 497
examples, 495
initialization, 493
requirements, 493
DECtape unit, 630
DEFINE, 233
Defined symbol, 197
deletion, 224
Defining and calling macros, 271
DELETE command, 324
Deleted symbols, 199
Deleting file from tape, 624
DEPHASE, 213
DEPOSIT, 106
DEPOSIT NEXT, 106
DETACH command, 344
DETACH dev command, 344, 348
Device code, 17
Device dependent functions, 427
Device names
logical, 315, 318
physical, 315, 318
redefining, 229
Device requirements (MACRO-10), 195
Device summary, 427
Devices

directory, 393
non-directory, 393
Devices, allocation of, 315
DFN, 55
Direct addressing, 13, 16
Direct assignment statements, 199
DIRECT command, 323
Directory device:
A storage retrieval device such as disk or DECtape which contains a file describing the layout of stored data (programs and other files).
Directory name:
(1) "Project-programmer number" pair which uniquely identifies a directory.
(2) The device name in the case of DECtape or magtape.
Directory, zeroing a, 623
Disk, 461
data modes, 461
structure of files, 462
user programming, 468
Disk hardware options
additional disk, 629
disk pack control, drive, 629
storage file, 629
swapping control, 629
swapping file, 629
Dismissing an interrupt, 93
Display system hardware options
character generator, 631
high-speed light pen, 475, 476, 631
precision incremental CRT, 631
precision point plotting, 631
DIV, 47
Done (I/O), 89, 112, 116, 119, 121, 128, 134
Dormant segment:
Description of a sharable high segment kept on swapping space and possibly core which is in no user's addressing space.
Double equal sign, 199
Double length numbers, 11
Double precision:
(1) Pertaining to the use of two computer words to represent a number.
(2) floating point, 85
DPB, 34, 218
DS (register), 7
DSKLST, 634
Dump:
A listing of all variables and their values or a listing of the values of all locations in core.
Dumping program onto tape, 623

E, effective address, 13, 19
Monitor command, 339
EDDT, see Dynamic Debugging Technique
EDIT command, 321
EDITOR, see DECtape Editor
EDS.TMP, 336
EDT.TMP, 337
Effective address:
(1) The actual address used, that is the specified address as modified by any indexing or indirect addressing rules.
(2) see 13, 43, 49, 51, 72, 79, 86, 96
(3) MACRO-10, 206
END, 223, 252
End block, 250
End of card, 136-143
End of file, 137
End of transmission block character (ETB)
A communication control character used to indicate the end of a block of data where data are divided into blocks for transmission purposes.
Entering data, 214
changing local radix, 215
two half words, 219
under prevailing radix, 214
ENTER programmed operator, 403
ENTER (UUO), 318
ENTRY, 231
Entry block, 249
EOT:
The end of transmission character.
EQV, 41
Error codes (MACRO-10), 241
A, D, E, L, 241
M, N, O, P, 242
Q, R, S, U, V, 243
Error detection, 241
Error message:
An indication that an error has been detected. See 127, 129
ETX:
The end of text character.
EXAMINE NEXT, 105
EXAMINE THIS, 106
Excess 128 code, 11
EXCH, 27
EXECUTE command, 325
Executive mode, 365
EXP, 216
Exponent overflow, underflow, 53-59
Expressions, 203
evaluating, 204
nested, 204
priority of operations, 204
relocatable, 245
Extended instructions, 229
EXTERN, 231
External symbol, 230

Facility allocation Monitor commands
ASSIGN, 316
CORE, 317
DEASSIGN, 316
FINISH, 317
REASSIGN, 316

RESOURCES, 318
TALK, 317
FAD, 56
FADR, 53
FAILSAFE, 634, 636
Fast memory, 9
FDV, 58
FDVR, 54
Field:
In a record, a specified area used for a particular category of data, e.g., a group of card columns used to represent a wage rate or a set of bit locations in a computer word used to express the address of the operand.
FILDDT, 634
File:
A collection of related records treated as a unit. In the PDP-10, a named or unnamed collection of 36 bit words (instructions and/or data). Length is not restricted by size of core. One of the uses of files is to initialize segments when they are created with instructions and/or data. See 392
owner, 408
protection, 408
protection key, 409
selection, 403
status bits, 398
File extension:
1 to 3 alphanumeric characters usually chosen by the program to describe the class of information in file.
extensions, 319
list of, 320
File manipulation Monitor commands
COMPILE, 324
CREF, 324
DEBUG, 325
DELETE, 324
DIRECT, 323
EXECUTE, 325
LIST, 323
LOAD, 325
RENAME, 324
TYPE, 323
File, Monitor handling of
comparison with segments, 307
created, 306
names, 306
superseded, 307
updated, 307
Filename:
1 to 6 alphanumeric characters chosen by the user to identify the file. See 319
File structured device:
A device on which data is given names and arranged into files; the device also contains directories of these names.
File update generator, 597, 603
commands, 598-599
diagnostic messages, 602-603
initialization, 597
requirements, 597
switches, 601
Files (temporary)
CRE,TMP, 336
EDS.TMP, 336
EDT.TMP, 337
FOR.TMP, 336
MAC.TMP, 336
PIP.TMP, 336
SVC. TMP, 335
FINISH command, 317
Fixed point, 10
arithmetic, 44-50, 64
decimal numbers, 202
double length, 44
Flag:
(1) Any of various types of indicators used for identification.
(2) A character that signals the occurrence of some condition, such as the end of a word.
(3) restoration, 77
Flags, 71, 75, 77, 95, 97, 104, 105, 115
address break, 98, 106, 107
binary, 89, 111, 112, 116
busy (I/O), 89, 112, 116, 117, 119, 128, 134, 140, 142
byte interrupt, 73, 75, 104
card in punch, 141
carry 0, 44, 63, 64, 73
carry 1, 44, 63, 64, 73
clock, 98, 107
data missed, 136, 137, 138
data ready, 136, 137, 138
data request, 140-143
done (I/O), 89, 112, 116, 119, 121, 128, 134
end of card, 136, 143
end of file, 137
error, 127, 129
floating overflow, 51-58
floating underflow, 51, 52, 53, 56, 74, 104
interrupt enables, 136
memory protection, 98, 100
no divide, 51, 54, 58, 74, 104
nonexistent memory, 98, 106, 108
overflow, 44, 49, 51, 52, 53, 54, 56, 58, 63, 64, 72, 98
parity error, 94, 95, 97, 107
power failure, 97
punch on, 140, 142, 143
pushdown overflow, 31, 80, 81, 98, 104
reading card, 136, 138
ready to read, 136-138
stop, 137
tape, 112-114
trap offset, 98
trouble, 136, 137, 140, 141

user, 73, 101
user in-out, 74, 86, 96, 98, 104
Floating overflow, c.51-58, 73, 98
Floating point representation,
(1) A numeration system in which each number, as represented by a pair of numerals, equals one of those numerals times a power of an implicit fixed positive integer base where the power is equal to the implicit base raised to the exponent represented by the other numeral. See 11
(2) arithmetic, 50-59, 64
(3) decimal numbers, 202
(4) double length, 12, 85
Floating underflow, 51-56, 74, 104
FMP, 58
FMPR, 54
Foreground processing:
The automatic execution of high priority programs that have been designed to preempt the use of the computing facilities.
Formats, 167
Format characters, rules for handling, 327
FOR.TMP, 336
FORTRAN
(FORmula TRANslating system):
A language primarily used to express computer programs by arithmetic formulas.
FORTRAN IV source programs
creating or modifying, 493, 497
FSB, 57
FSBR, 53
FSC, 52
FUDGE2, see File Update Generator
Full duplex software, 429
Full word data transmission, 27-32
Functions, device dependent, 427
Functions (TENDMP), 621

GET command, 338
GLOB, see global symbol cross reference list
Global request:
Request to the Loader to link a global symbol to a program. A global request points to the last reference in the program at which the global symbol was used. Each reference in the program points to the previous reference to the requested global. Such a chain is terminated by a non-relocatable zero address in the program. Chained globals are restricted to references appearing in the address part of a storage word. Symbolic references to the AC or index fields cannot be chained. Locations containing global symbol references must not be loaded into twice, as unpredictable loader actions may result.
Global symbol:
Any symbol accessible to other programs. See 230
Global symbol cross reference list:
609-612
commands, 609, 610
diagnostic messages, 612
initialization, 609
requirements, 609
switches, 610, 611

Half word data transmission, 20=27
HALT, instruction, 77, 100, 230
HALT command, 339, 370
Handling bytes, 218
Hardcopy equipment, 123-144
Hardware:
Physical equipment, as opposed to the computer program or method of use, e.g., mechanical, magnetic, electrical, or electronic devices Contrast with software (2).
Heuristic:
Pertaining to exploratory methods of problem solving in which solutions are discovered by evaluation of the progress made toward the final result. Contrast with algorithm.
High segment:
(1) In the PDP-10 that segment of the user's core which generally contains pure code and which can be shared by other jobs; usually write protected. (e.g., FORTRAN compiler).
(2) Block load into, 249
HISEG pseudo-op, 312
HISEG statements, 232
HLL, 20, 21
HLLE, 22
HLLO, 22
HLLZ, 21
HLR, 20, 25
HLRE, 26
HLRO, 26
HLRZ, 26
Hollerith:
Pertaining to a particular type of code or punched card utilizing 12 rows per column and usually 80 columns per card.
HRL, 20, 22
HRLE, 23
HRLO, 23
HRLZ, 23
HRR, 20, 24
HRRE, 25
HRRO, 25
HRRZ, 24

H switch (Loader), 361

I, 13
IBP, 34, 218
Identification, 378
IDIV, 47
Idle segment:
A sharable high segment which no users in core are using, however, at least one swapped-out user is using, else it would be a dormant segment.
IDPB, 34, 219
IF, 222
IFDIF, 222
IFIDN, 222
ILDB, 34, 218
Immediate mode addressing:
Process through which the right half of a word gives the operand and not the address.
Impure code:
That code which is modified during the course of a run, e.g., data tables.
Impure segment, 99
IMUL, 46
Indefinite repeat, 237
Indexing, 206, 208
Index registers, 9, 13, 14, 15, 16, 27, 79
Indicators, 102
MEMORY STOP, 104
PI ON, 104
PROGRAM STOP, 104
RUN, 103
USER MODE, 104
Indicator panels, 172
Indirect address:
A single instruction address that is at once the address of another address. The second address is the specific address of the data to be processed. If the second address is also an indirect address, it is known as second-level indirect addressing, and so on to other levels.
Indirect addressing, 3,14,16,49,51,77,206
Information retrieval:
The methods and procedures for recovering specific information from stored data.
INIT (UUO), 368
Initialization,
Buffer, 402
Device, 400, 411
Job, 399
Initialize:
To set counters, switches, and addresses to zero or other starting values at the beginning of, or at prescribed points in, a computer routine.
In-out bit assignments, 170
In-out devices, 156, 170
Input-output, see I/O
Input data word formatting, 217
INPUT (UUO), 368
Instruction:
A statement that specifies an operation and the values or locations of its operands. In this context, the term instruction is preferable to the terms command or order which are sometimes used synonymously.
instructions (illegal), 370
Instructions,
arithmetic testing, 59
byte, 34
fixed point, 45
floating point, 52
without rounding, 55
with rounding, 53
full word, 27
half word, 21
in-out, 86
jump, 74
logic, 36
logical testing, 66
move, 29
pushdown, 31, 80
shift, 43, 49
rotate, 43
Instruction flow, 106
Instruction formats, 12-14, 207
input-output, 209
primary, 210
Instruction times, 19
Interactive time-sharing:
Denotes response between the computer system such as the PDP-10 time-sharing system in which many users at Teletypes can develop and execute programs simultaneously.
Interface, hardware options,
to PDP-10 interface, 632
to PDP-10 I/O bus, 632
Interleaving:
To insert segments of one program into another program so that the two programs can, in effect, be executed simultaneously; e.g., a technique used in multi-programming.
Interlock, 64
INTERN, 231
Internal request, 250
Internal symbol:
A symbol generating a global definition which can be used to satisfy all global requests for that symbol. See 230
Interpreter:
A routine such as a Command String Interpreter that translates and stores each source language statement before translating and storing the next one.
Interpretive compiler:
A routine which, as the computation progresses, translates a stored

program expressed in some machine-like pseudo code into machine code and performs the indicated operations, by means of subroutines, as they are translated. (e.g., AID)
Interrupt, 91, 96
(1) A temporary disruption of the normal operation of a routine by a special signal from the computer, e.g., for I/O purposes.
(2) channel, 117
(3) dismissing, 93
(4) instructions, 94
(5) requests, 92
(6) starting, 92
Interrupt enabled, 136
I/O device hardware options,
card punch, 630
card reader, 630
line printer, 630
plotter, 630
I/O (Input/Output),
(1) Input or output or both.
(2) See 78, 86-91
(3) codes, 157-169
(4) instruction format, 209
I/O instructions, 369
IOR, 39
IOWD, 219
IR (index register), 8
IRP, 237
IRPC, 238
example, 258

JCRY, 75, 230
JCRYO, 75, 230
JCRY1, 75, 230
JEN, 77, 230
JFCL, 75
JFFO, 74
JFOV, 75, 230
Job:
A specified group of tasks prescribed as a unit of work for a computer. By extension a job usually includes all necessary computer programs, linkages, files and instructions to the Monitor.
See 299, 309
attached mode, 309
detached mode, 309
number check, 312
termination Monitor command, KJOB, 345
Job data area:
The first 140 octal locations of a user's core area. This area provides storage for items used by both the Monitor and the user program. See page 356
JOBAPR, 358, 376
JOBBLT, 357
JOBCHN, 358
JOBCN6, 357
JOBCNI, 358, 376
JOBCOR, 358
JOBDA, 359
JOBDDT, 357
JOBERR, 356
JOB41, 356
JOBFF, 358
JOBHRL, 357
JOBOPC, 358
JOBREL, 356
JOBREN, 358
JOBSA, 358
JOBSYM, 357
JOBTPC, 358, 376
JOBUSY, 357
JOBUUO, 356
JOBVER, 358
JOV, 75, 230
JRA, 79
JRST, 76, 77, 230
JSA, 79
JSP, 76, 78
JSR, 75, 78
JUMP, 61
Jump:
A departure from the normal sequence of executing instructions, synonymous with transfer (1).
Justify:
(1) To adjust the printing positions of characters on a page so that the lines have the desired length and that both the left and right hand margins are regular.
(2) By extension, to shift the contents of a register so that the most or the least significant digit is at some specified position in the register. Contrast with normalize.

K
(1) An abbreviation for the prefix file, i.e., 1000 in decimal notation.
(2) In automatic data processing, loosely, two to the tenth power, 1024 in decimal notation.
Keys, 105
KJOB command, 345
K switch, 364

Labels, 196, 197
LALL, 226
Latency:
The time delay while waiting for a rotating memory to reach a given location as desired by the user. The average latency is one half the revolution time.
LDB, 34, 218
Leader:
The blank section of tape at the

beginning of a reel or fanfold of tape.
Least significant bit, 48
Library subroutines, 231
search mode, 248
Line Editor for Disk, 499-500
commands, 499
diagnostic messages, 499
initialization, 499
Monitor commands, 500
LINED
See Line Editor for Disk
Line printer:
A device that prints all characters of a line as a unit. Contrast with character printer.
Line printer, 123-131
data modes, 440
instructions, 125
operation, 129
output format, 124
printing speed, 125
LINK, 248
Linking Loader:
This routine loads programs into the user's area of memory, properly relocating each one and adjusting addresses to compensate for relocation. It also links (i.e., provides the main program with the correct address of each referenced subprogram, etc.) internal and external symbols to provide communication between independently assembled programs. It also loads subroutines in library search mode. See 245, 248, 526
chain feature, 533
commands, 527-530
diagnostic messages, 534
initialization, 527
Monitor commands, 536
requirements, 526
switches, 530-533
Linking subroutines, 230
LIST, 226, 247
LIST command, 323
List:
(1) An ordered set of items.
(2) See chained list, pushdown list, pushup list.
(3) To printout a listing on the line printer or Teletype.
Listing control, 225, 226
suppression, 225
List processing:
A method of processing data in the form of lists. Usually, chained lists are used so that the logical order of items can be changed without altering their physical locations.
LIT, 224
Literals, 206
multilined, 207
nested, 206
Load:
In programming, to enter data into storage or working registers.
LOAD command, 325
Loader:
Program which attaches pieces of programs together which may have been created separately previous to the run. See Linking Loader, 360
completion of loading, 363
H switch, 361
loading user programs, 356
reentrant, 361
switches, 334
Loading User Programs, 356
LOC, 211
Local radix, 215
changing, 215
Location counter, 205, 208, 311
Logarithm of a complex argument, 256
Logic, 35
Logical device name:
The name used in ASSIGN commands, 315
Logical operations, 35-44, 72, 201
Logical shift, 43, 49, 50
Logical testing and modification, 65-72
Logic operator:
A logic operator each of whose operands and whose result have one of two values.
Login:
The number and the process with which a user identifies himself to a system. It then accepts him as a valid user and assigns him appropriate system resources.
LOGIN, 635. See inside front cover.
Login check, 312
LOGIN command, 314
LOGIN CUSP, 378
LOGOUT CUSP, 635, 375
LOGOUT UUO, 375
LOOKUP (UUO), 368, 403
Loop:
A sequence of instructions that is executed repeatedly until a terminal condition prevails.
Low segment:
In the PDP-10 that segment of core containing the job data area and I/O buffers, unique and accessible to the user. It is often used to contain the program, but will be used only for data tables, etc. if the user is working with a shared program, such as a system CUSP.
LPT (line printer), 123, 126
LSH, 42, 43
LSHC, 42, 43

MA (memory address), 8
Machine language:
A language that is used directly by a machine.
Machine Mnemonics, 260
Macro calls, 234, 271
format, 234
nested, 239
Macro:
An instruction in a source language which is equivalent to a specified sequence of machine instructions.
Macros
calls, 234, 271
concatenation, 272
created symbols, 235
definition, 233, 271
format, 234
indefinite repeat, 237
nesting, 239
redefining, 239
MACRO-10
creating or modifying programs, 493, 497
diagnostics, 278, 279
error codes, 280-281
operating instructions, 273
MACRO-10 assembler, 196
definition, 195
device requirements, 195
MACRO-10, entering data, 213
changing local radix, 215
under prevailing radix, 214
MACRO-10 statements, 195
assembler, 196
comments, 197
elements, 195
error codes, 241-243
format, 195
labels, 196
operands, 196
operators, 196
relocatable program, 245
Teletype error messages, 244
MACRO-10, symbols
addresses, 197
deleted, 199
operators, 198
operands, 198
table, 198
MAC.TMP, 336
Magnetic Tape, 453, 457
backspace file, 457
data modes, 453
format, 454
MTAPE, 455
9-channel Magtape, 458
Magnetic Tape Hardware Options
control, 630
modification kit, 630
units, 630
MAKE command, 321
Marginal check:
(1) A preventive maintenance procedure in which certain operating conditions, such as supply voltage or frequency, are varied about their nominal values in order to detect and locate incipient defective parts.
(2) Panel, 103
Mask:
(1) A pattern of characters that is used to control the retention or elimination of portions of another pattern of characters.
(2) A filter.
(3) 14, C.65-71, 83, 86
Mass storage:
Secondary storage with a large capacity. On a PDP-10, usually a large disk.
Matrix:
(1) In mathematics, a two-dimensional rectangular array of quantities. Matrices are manipulated in accordance with the rules of matrix algebra.
(2) In computers, a logic network in the form of an array of input leads and output leads with logic elements connected at some of their intersections.
(3) By extension, an array of any number of dimensions.
Meddling, 423
Memory, 14-15
Memory access time, 15
Memory allocation, 15
Memory conservation, 217
Memory protection:
An arrangement for preventing access to certain areas of storage, e.g., Monitor, for purposes of reading or writing. See 97-100
and allocation, 353
flag, 354
MEMORY STOP, 104
Merge:
To combine items from two or more similarly ordered sets into one set that is arranged in the same order,
Message:
An arbitrary amount of information whose beginning and end are defined or implied
MI (Memory Indicators), 8
Mnemonic symbol:
(1) A symbol chosen to assist the human memory, e.g., an abbreviation such as "mpy" for "multiply". See 16, 147
(2) Alphabetic, 152
(3) Derivation, 148
(4) Device, 156
(5) Numeric, 149

Mode:
(1) A method of operation, e.g., binary mode, interpretive mode, alphanumeric mode.
(2) The characteristic of a quantity being suitable for integer or for floating point computation.
(3) Method of card reading and punching, i.e., Hollerith code, which interprets each column as a six-bit alphanumeric character or transcription mode, which interprets each punch as a binary one (1) and each non-punch as a binary zero (0).
Modem (MOdulator-DEModulator):
A device that modulates and demodulates signals transmitted over communication facilities.
Modes, 19
arithmetic testing, 59, 60
fixed point, 45
floating point, 50, 52, 56
half word, 21
logic, 35, 36, 41
logical testing, 65
move, 29
paper tape punch, 89, 115
readin, 90, 114
user, 99
MONEY, 635
Monitor:
The specific program which schedules and controls the operation of several related or unrelated routines, performs overlapped I/O and allocates resources so that the computer's time is efficiently used. Also provides context switching in 9 time-shared environment. See 99, 101
Monitor command diagnostic messages, 321, 349
Monitor command interpreter, 311
Monitor commands
extended
<> construction, 328
= construction, 328
+ construction, 327
@ file, 326
functions, 298
interpreter, 302, 304
level, 302, 304
summary, 259
(see inside back cover of this handbook)
Monitor locations, examining, 390
Monitor mode, 310
Monitor operation codes, 371
Monitor UUO's, 367
restriction in reentrant programs, 368
Move instructions, 28
MOVE, 29, 32
MOVM, 30
MOVN, 29
MOVS, 29
MQ (multiplier-quotient register), 9
MUL, 46
Multiline literals, 207
Multiprocessing:
Pertaining to the simultaneous execution of two or more computer programs or sequences of instructions by a computer or computer network. Loosely, parallel processing.
Multiprogramming:
(1) A technique which allows scheduling in such a way that more than one job is in an executable state at one time.
(2) Disk Monitor, 295
(3) Non-disk Monitor, 295, 483

Name block, 250
Negative fixed point numbers, 203
Nesting:
(1) Including a routine or block of data within a larger routine or block of data.
(2) Macros, 239, 257
(3) Subroutines, 80
New symbol, 199
No-Divide, 51, 54, 58, 74, 104
Non-Directory device:
A device such as mag tape or paper tape which does not contain a file describing the layout of stored data (programs and other files).
Nonexistent memory, 98, 106, 108
Non-Reentrant program
one segment, 306
two segment, 306, 353
Non-Reentrant system, 296
Non-Sharable segment:
A segment for which each user has his own copy. Non-sharable segments never have names even if initialized from a file; they may be created by CORE or REMAP UUO.
No-Op:
(1) An instruction that specifically instructs the computer to do nothing, except to proceed to the next instruction in sequence.
(2) 65, 66, 68, 70, 72
Normalization:
(1) This term refers to the positioning of data, left justified with respect to the binary point.
(2) 51, 53, 57, 59, 61
NOSYM, 226
Null character:
A control character that serves to accomplish media fill or time fill e.g., in USASCII the all zeroes character (not numeric zero).

Null characters may be inserted into or removed from a sequence of characters without affecting the meaning of the sequence, but control of equipment or the format may be affected. Abbreviated NUL.
Numbers, 200-205
arithmetic and logical operations, 203
binary shifting, 201
evaluating expressions, 204
fixed-point decimal, 202
floating-point decimal, 202
terms, 204
Number system, 10-12
Numeric terms, 204
NXM STOP, 108

Object code:
(1) Output from a compiler or assembler which is itself executable machine code or is suitable for processing to produce executable machine code.
Object program:
(1) The program which is the output of an automatic coding system, usually in machine language ready for execution.
OCT, 215
Octal codes, 260
Octal-to-Decimal conversion, 83
Offset:
(1) The number of locations toward zero a program must be moved before it can be executed. (See LDRBLT description in the Monitor manual.) See 361, 363
One's complement:
In the binary number system this complement is formed by setting each bit to the opposite value. See 10

On-Line:
(1) Pertaining to equipment or devices under direct control of the central processing unit.
(2) Pertaining to a user's ability to interact with a computer.
OP codes, 259
OPDEF, 228
Open subroutine:
A subroutine that must be relocated and inserted into a routine at each place it is used. Synonymous with direct insert subroutine. Contrast with closed subroutine.
OPEN (UUO), 368
Operand:
That which is operated upon. An operand is usually identified by an address part of an instruction. See 196
Operating keys, 105
CONT, 105
DEPOSIT NEXT, 106
DEPOST, 106
EXAMINE NEXT, 106
EXAMINE THIS, 106
READ IN, 105
RESET, 105
XCT, 106
START, 105
STOP, 105
Operating instructions (MACRO-10), 273
procedures, 210
Operating switches, 107
FM ENB, 102, 109
FP TRP, 109
MA TRP OFFSET, 109
MI PROG DIS, 108
NXM STOP, 108
PAR STOP, 108
REPT, 108
REPT BYP, 108
SHIFT CNTR MAINT, 109
SING CYCLE, 107
SING INST, 107
Operation
card reader, 139
line printer, 129
plotter, 135
processor, 103
punch, 115
reader, 111
Teletype, 117
Operation codes, illegal, 369
Operator:
(1) In the description of a process, that which indicates the action to be performed on operands.
(2) See unimplemented user operator (UUO), programmed operator.
(3) User defined, 228
OR (See IOR), 39
ORCA, 39
ORCB, 40
ORCM, 40
Order of expression evaluation, 267
(TECO), 516
OUTPUT (UUO), 368
Overflow:
That portion of the result of an operation that exceeds the capacity of the intended unit of storage. See 44, 49, 51, 63, 64 72, 98
Overlay:
The technique of repeatedly using the same blocks of internal storage during different stages of a program. When one routine is no longer needed in storage, another routine can replace all or part of it.

Pack:
To compress data in a storage medium by taking advantage of known characteristics of the data in such a way that the original data can be recovered, e.g., to compress data in a storage medium by making use of bit or byte locations that would otherwise go unused.
PAGE, 226
Paper tape punch, 115-117, 439
data modes, 439
operation, 116
timing, 116
Paper tape reader, 111-115, 438
data modes, 438
operation, 113
readin mode, 114
timing, 112
Parentheses, 206, 233
Parity bit:
A binary digit appended to an array of bits to make the sum of all the bits always odd or always even.
Parity check:
(1) A check that tests whether the number of ones (or zeroes) in an array of binary digits is odd or even. Synonymous with odd-even check. See 48, 49, 118
Parity error, 94, 107
PAR STOP, 108
Pass:
One cycle of processing a body of data.
PASS2, 224
Password, 313
Patch:
To modify a routine in a rough or expedient way.
PC (program counter), 7, 72
Peripheral equipment:
In a data processing system, any unit of equipment, distinct from the central processing unit, which may provide the system with outside communication.
Peripheral Interchange Program, 585-598
commands, 586
diagnostic messages 592, 593
initialization, 585
Monitor commands, 596
requirements, 585
switches, 586-591
Permanent symbols, redefining, 229
PHASE, 213
PI, 91-94, 95, 97
PI ON, 104
PIP, See Peripheral Interchange Program
PIP.TMP, 336
PJOB command, 344
Plotter, 131-135, 474
data modes, 474
instructions, 133
operation, 135
timing, 134
PLT (Plotter), 133, 134
POINT, 218
Pointer:
The location containing an address rather than data and which the user plans to use to implement indirect addressing.
(2) Byte, 35
(3) I/O block, 88
POP, 31, 32
POPJ, 81
Postmortem dump:
A static dump used for debugging purposes; performed at the end of a machine run.
Power failure, 97
Powers of two, 174
Prevailing radix, 214
Primary instruction statement, 208
PRINT, 635
Printer, see "line printer".
PRINTR, 635
PRINTX, 227
Priority interrupt:
The interrupt that usurps control of the computer program or system and jumps the sequencing to another device, program, program step, or to the device that generates the interrupt signal. See 15, 28, 33, 35, 51, 86, 88, 113
conditions, 94
dismissing an interrupt, 93
interrupt requests, 92
starting an interrupt, 92
timing, 95
Priority of operations, 204
Processor conditions, 96-98
Processor hardware options
arithmetic processor, 629
dual memory protection, 629
fast registers, 629
relocation registers, 629
Processor modes, 365
Processor (standard), 330
Processor switches, 333
Program:
(1) A series of actions proposed in order to achieve a certain result.
(2) To design, write and test a program as in (1).
Program break:
The length of a program; the first location not used by a program (before relocation); the relocation constant for the following

program (after relocation). See 247
Program control, 72-81
Program library:
A collection of available computer programs and routines.
Programmed operators (UUO's):
PDP-10 instructions which instead of doing computation, cause a jump into the Monitor system at a predetermined point. The Monitor interprets these entries as commands from the user to perform specified operations. See 210,366
DECtape, 449
Programming conventions, 16
Program origin:
The location assigned by the Loader to relocatable zero of a program. See 361, 363
Program starting, 369
PROGRAM STOP, 104
Project members, 408
Project-Programmer numbers, 313
Protected location:
A storage location reserved for special purposes in which data cannot be stored without undergoing a screening procedure to establish suitability for storage therein. See 99
Protection address, 353, 355
Protection register, 305,354
Pseudo code:
A code that requires further translation prior to execution.
Pseudo-Op:
(1) An operation that is not part of the computer's operation repertoire as realized by hardware; hence an extension of the set of machine operations.
(2) In MACRO-10, directions for assembly operations.
(3) See 211, 259, 261
PTP (paper tape punch), 115, 116
PTR (paper tape reader), 111,112
Punch on, 140-143
Pure code:
Code which is never modified in the process of execution. Hence it is possible to let many users share the same copy of a program. This technique is used by many of the CUSP's. See 99
PURGE, 224
PUSH, 31, 32
Pushdown list:
(1) A list that is constructed and maintained so that the item to be retrieved is the most recently stored item in the list, i.e., last in, first out. See 30, 31
(2) Subroutines containing, 81,84
Pushdown overflow, 31, 80, 81, 98, 104
PUSHJ, 80, 81
Pushup list:
A list that is constructed and maintained so that the next item to be retrieved and removed is the oldest item still in the list, i.e., first in, first out.

Quantum time, 300
Queue:
An ordered line waiting for service. See 299

Radix:
In positional representation, that integer, if it exists, by which the significance of the digit place must be multiplied to give the significance of the next higher digit place. For example, in decimal notation, the radix of each place is ten; Synonymous with base. See 200,213
RADIX, 213
RADIX Statement, 213
RADIX50 statement, 216
Representation, 270
Random access:
A device in which the access time is effectively independent of the location of the data. Synonymous with direct access device.
R Command, 338
REACT, 635
READ IN key, 105
Read-in feature, 25D
Reading Card, 136, 138
Readin mode, 90, 114
Ready to read, 136, 138
Real time:
(1) Pertaining to the actual time during which a physical process transpires.
(2) Pertaining to the performance of a computation during the actual time that the related physical process transpires in order that results of the computation can be used in guiding the physical process.
REASSIGN command, 316
Record:
A collection of related items of data, treated as a unit.
Redefining macros, 239
REENTER command, 339
Reentrant code:
See pure code.
Re-entrant program:
A two-segment program composed of a sharable and non-sharable segment. See 296, 305, 353, 487
Reentrant System, 296, 361
Register, 49

Relative address:
The number that specifies the difference between the absolute address and the base address.
RELEASE programmed operator, 419
RELOC, 211
Relocatable object program, 245, 248
block formats, 249
conventions, 246
Relocate:
In computer programming to move a routine from one portion of storage to another and to adjust the necessary address references so that the routine, in its new location, can be executed. See 99
Relocation address, 353, 355
Relocation before execution, 213
Relocation constant:
The number added to every relocatable reference within a program. The relocation constant is the relocated breakpoint of the previous program. See 246
Relocation Register, 296, 305, 354
REMARK, 227
Remote access:
Pertaining to communication with a date processing facility by one or more stations that are distant from that facility.
Remote station or terminal:
Data terminal equipment for communicating with a data processing system from a location that is time, space, or electrically distant.
RENAME command, 324
RENAME (UUO), 368
REPEAT, 227
Reserving storage, 221
blocks, 221
single location, 221
Response time:
The time which elapses between generation of an inquiry at a terminal and the receipt of a response at the terminal.
Restore, 77
REPT, 108
REPT BYP, 108
RESET, 105
RESOURCES command, 318
Result, 50
RIM format, 252
RIM10 format, 251
RIM10B format, 250, 253, 254
ROT, 42, 43
Rotate, 42
ROTC, 42, 44
Rounding, 52, 59
RSW (See DATAI APR), 91, 230
RUN command, 338
Run control Monitor commands,
CONT, 339
D, 340
DDT, 339
E, 339
GET, 338
HALT, 339
R, 338
REENTER, 339
RUN, 338
SAVE, 340
SSAVE, 341
START, 339
RUN instruction, 103

SAVE command, 340, 341, 368
Scaling, 51
SCHEDULE command, 348
Scheduler:
A section of the Time-Sharing Monitor which determines the sequence of time allotments to users.
Science Library and FORTRAN Utility Subprograms, 636
Serial access:
(1) Pertaining to the sequential or consecutive transmission of data to or from storage.
(2) Pertaining to the process of obtaining data from, or placing data into, storage where the time required for such access is dependent upon the location of the data most recently obtained or placed in storage. Contrast with random access.
Service routine:
A routine in general support of the operation of a computer, e.g., an input-output, diagnostic, tracing, or monitoring routine. Synonymous with utility routine.
SETA, 36
SETCA, 37
SETCM, 37
SETM, 37
SETO, 36
SETZ, 36
Sharable segment:
A segment which can be used by several users at the same time.
Shared code:
Pure code residing in the high segment of user's core.
Shift:
A movement of data to the right or left.
Shift and rotate, 42, 44, 50, 201
Shuffling, 301
Sign bit:
A binary digit occupying the sign position. See 10,49
Significance, 51
Simulate:
(1) To represent certain features of

the behavior of a physical or abstract system by the behavior of another system.
(2) To represent the functioning of a device, system, or computer program by another, e.g., to represent one computer by another, to represent the behavior of a physical system by the execution of a computer program, to represent a biological system by a mathematical model.
SIXBIT, 220
SKIP, 62
Software:
A set of computer programs, procedures, rules, and associated documentation concerned with the operation of a data processing system e.g., compilers, monitors, editors, utility programs. Contrast with hardware.
SOT, 63
SOS, 64
Source Compare, 613, 617
commands, 614
diagnostic messages, 617
initialization, 613
requirements, 613
switches, 615
Source language:
The language from which a statement is translated.
Source preparation monitor commands
CREATE, 321
EDIT, 321
MAKE, 321
TECO, 321
Source program:
A program written in a symbolic or algebraic language designed for ease of expression.
Source word, 20
Square brackets, 206
SQUOZE, 216
See RADIX50
SRCCOM
See Source Compare
SSAVE command, 341, 368
Stack, 635
START command, 339
START instruction, 105
Starting address, 250
Static dump:
A dump that is performed at a particular point in time with respect to a machine run, frequently at the end of a run.
Status bits
(See entry for individual devices)
Status checking and setting, 416
STATUS (UUO), 368
STOP, 37
STOP, 105
STOPI, 238
Storage device:
The PDP-10 device used to store named files by the GET, R, or RUN commands. If the file is marked as sharable (extension= "SHR"), the Monitor will give the segment the same name as the file. This is the only way that a segment can be shared.
Storage
conserving, 217, 220
reserving, 221
Storage allocation (TENDMP), 625
Storage I/O channel, 297
SUB, 45
Subroutines, 78
entry point, 78
frequently used, 213
library, 231
linking, 230
multiple entry, 79, 81
nesting, 81
non-reentrant, 78, 100
two byte unpacking, 257
SUBTTL, 225
SVC.TMP, 335
Swapping:
The movement of program sections between core and secondary storage.
I/O channel, 297
Monitor, 295, 485
Space, 301
Storage, 297, 301
Swapping device:
Secondary storage suitable for swapping usually a high speed drum or disk.
Switches, 107
for compilation listings, 329
for forced compilation, 332
for library searches, 332
for loader maps, 333
Switches used with monitor commands
Compile switches, 329
Loader switches, -34
Processor switches, 333
Symbol, 197, 200
created, 235
external, 230
format for block, 249
global, 230
internal, 230
Symbol table, 198, 208
(1) A dictionary of names used in a program. For example, see MACRO-10.
(2) direct assignment, 199
Symbolic address, 197
(1) An address expressed in symbols convenient to the programmer.
(2) data reference, 206
(3) expressions, 216
(4) operands, 198
(5) operators, 198
Symbolic location name, 17
SYN, 229
Syntax:

(1) The structure of expressions in a language.
(2) The rules governing the structure of a language.
SYS (Device), 387
SYSTAT command, 348
SYSTAT CUSP, 380, 635
System access monitor command
LOGIN, 314
System administration monitor commands
ASSIGN SYS, 348
ATTACH dev, 348
CTEST, 348
DETACH dev, 348
SCHEDULE, 348
SYSTAT, 348
System configuration, 632
System timing monitor commands
DAYTIME, 346
TIME, 346

Table:
(1) A collection of data in which each item is uniquely identified by a label, by its position relative to the other items, or by some other means.
(2) Search technique, 84.
Table numbers (RH of AC), 380
Tag:
One or more characters attached to an item or record for the purpose of identification.
TALK command, 317
TAPE, 226
Tape, 112, 114
TDC, 69
TDN, 68
TDO, 69
TDZ, 69
TECO,
See Text Editor and Corrector
TECO command, 321
Teletype, 117, 122
codes, 158, 161
input, 119
output, 119
timing, 119
Teletype error messages, 244
Teletype model 37, 197
Teletypes and terminals hardware options
DC10 Teleprinters, 631
680I Teleprinters, 631
TENDMP
assembling, 625
calling TENDMP as a subroutine, 626
command summary, 626
definition, 621
diagnostic messages, 624
functions, 621
self-starting, 8
storage allocation, 625
versions, 624
Testing macros, 224
Text codes, 269
Text Editor and Corrector, 501
commands, see commands, TECO
debugging aids, 522
diagnostic messages, 520-522
initialization, 502
monitor commands, 523
order of operator evaluation, 516
Text input, 220
entering characters, 220
TIME command, 346
Time quantum:
That portion of time given to a specific time shared user.
Timing,
card reader, 138
control, 377
interrupt, 95
line printer, 125
plotter, 134
punch, 143
reader, 112
Teletype, 119
TITLE, 225
TLC, 68
TLN, 67
TLO, 68
TLZ, 67
Track:
The portion of a moving storage medium, such as a drum, tape, or disk, that is accessible to a given reading head position.

Transfer block, 251
Trap:
An unprogrammed conditional jump to a known location, automatically activated by hardware with the location from which the jump occurrence recorded. See 15
Trap offset, 98
TRC, 66
TRN, 66
Trapping, 375
console-initiated traps, 376
TRO, 67
Trouble, 136, 137, 140, 141
TRPSET call, 384
TRZ, 66
TSC, 70
TSN, 70
TSO, 71
TSZ, 70
TTCALL UUO, 433
TTY (teletype), 117, 119
Two byte unpacking subroutines, 257
Two's complement arithmetic:
Subtraction is performed by means of adding the two's complement of one number to the number it is to be subtracted from. Two's complement is formed by adding one to the one's complement of the given binary number. See 10, 55, 83, 201
TYPE command, 323

UFA, 55
Unary operators, 201
Underflow:
Pertaining to the condition that arises when a machine computation yields a nonzero result that is smaller that the smallest nonzero quantity that the intended unit of storage is capable of storing. Contrast with overflow.
Unimplemented operations, 15, 82
Update:
A file is updated when opened for reading and writing, one or more blocks are rewritten in place, and the file closed. Only one user may be updating the file at a time.
USASCII (USA Standard Code for Information Interchange:)
The standard code, using a coded character set consisting of 7-bit coded characters (* bits including parity check), used for information interchange among data processing communication systems, and associated equipment. The USASCII set consists of control characters and graphic characters. Synonymous with ASCII.
User, 73, 101
User defined operator, 228
User facilities, 1-8, 302
User I/O Mode, 365, 383
User In-out, 74, 86, 96, 98, 100, 101, 104
User Mode:
A hardware defined state of the PDP-10 computed during which all instructions executed normally except that all IO and HALT instructions cause immediate jumps into the Monitor. This makes it possible to prevent the user from interfering with any other user or with the operation of the Monitor. Memory protection and relocation are in effect so that the user can modify only his own area of core. See 104, 310, 353, 365.
User program:
All of the code running under control of the Monitor in an addressing space of its own.
programming, see 100
UUO:
Unimplemented User Operator. See program operator.
Monitor, 367
User, 366
See 15, 82, 304

VAR, 224
Vestigial job data area:
The first 10 octal locations of the high segment used to contain data for initializing certain locations in the job data area. See 362, 343
Virtual core:
That amount of core space which the user appears to be able to use. Usually handled by a program which allows the currently referenced parts of the program to be in core at one time, with additional information being brought off storage as needed. See 302

Word formats, 167
Write protect, 99

X, 13
XALL, 226
XCT, 74, 106, 107
XLIST, 226
XOR, 40
XWD, 219

Y, 13

Z, 216

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[redacted] ..... TIME-SHARING MONITORS
..... Contents
[redacted] ..... Introduction
..... *System Overview*
[redacted] ..... Monitor Commands
..... SYSTEM REFERENCE MANUAL
[redacted] ..... Loading User Programs
..... Central Processor
[redacted] ..... User Programming
..... Basic I/O Equipment
[redacted] ..... Device Dependent Functions
..... Hardcopy Equipment
[redacted] ..... EDITOR
..... Instruction and Device Mnemonics
[redacted] ..... LINED
..... I/O Codes
[redacted] ..... TECO
..... MACRO-10 ASSEMBLER
[redacted] ..... LOADER
..... Statements
[redacted] ..... DDT
..... Pseudo-Ops
[redacted] ..... PIP
..... Macros
[redacted] FUDGE2
..... Error Detection
[redacted] ..... CREF
..... Relocation
[redacted] ..... GLOB
..... Assembler Output
[redacted] ..... SRCCOM, BINCOM
..... Summary of Machine Mnemonics, Assembler Pseudo-ops, Monitor UUO's
[redacted] ..... TENDMP
..... Operating Procedures

[redacted] ..... Appendices
A. Equipment List
B. List of Systems Programs
C. Bookshelf
[redacted] ..... Index/Glossary

MONITOR COMMANDS

NAME	ABBREVIATION	ARGUMENTS				
		1	2	3	4	5
ASSIGN	AS	dev	ldev			
ASSIGN SYS		dev				
ATTACH	AT	dev				
ATTACH	AT	job	proj prog			
CCONT	CC					
COMPILE	COM	list				
CONT	CON	lh	rh	adr		
CORE	COR					
CREATE	CREA					
CREF	CREF	dev				
CSTART	CS	list				
CTEST		list				
D(deposit)	D	dev				
DAYTIME	DA	dev				
DDT	DD	adr				
DEASSIGN	DEA	file	ext			
DEBUG	DEB	list				
DELETE	DEL	dev				
DETACH	DET	dev	file	ext	proj prog	core
DIRECT	DI					
E(examine)	E					
EDIT	ED	list				
EXECUTE	EX	list				
FINISH	F					
GET	G	file	ext			
HALT	↑C					
KJOB	K	file	ext	core		
LIST	LI	dev	job			
LOAD	LOA					
LOGIN	LOG	arg				
MAKE	M					
PJOB	P	dev	file	ext	proj prog	core
R	R	dev	file	ext	core	
REASSIGN	REA	n				
REENTER	REE	dev	file	ext	core	
RENAME	REN	adr				
RESOURCES	RES					
RUN	RU	core				
SAVE	SA	file	ext			
SCHEDULE	SCH					
SSAVE	SS					
START	ST					
SYSTAT	SYS					
TALK	TA	dev				
TECO	TE	file	ext			
TIME	TI	job				
TYPE	TY	list				

Key:

adr	octal address	lh rh	octal value of left and right half words
core	decimal number of 1K blocks	proj prog	project-programmer numbers
dev	physical device name	list	a single file specification or a string of file specifications
ldev	logical device name		
ext	filename extension	arg	a pair of file specifications or a string of pairs of file specifications
file	filename		
job	job number assigned by Monitor	n	scheduled use of the system.

See Book 3, Chapter 2 for further explanation of commands.

These abbreviations are accurate and unique as of now, but their accuracy and uniqueness may be changed in the future by the addition of new commands.

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CREF	CREF	dev				
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CTEST		list				
D(deposit)	D	dev				
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DDT	DD	adr				
DEASSIGN	DEA	file	ext			
DEBUG	DEB	list				
DELETE	DEL	dev				
DETACH	DET	dev	file	ext	proj prog	core
DIRECT	DI					
E(examine)	E					
EDIT	ED	list				
EXECUTE	EX	list				
FINISH	F					
GET	G	file	ext			
HALT	↑C					
KJOB	K	file	ext	core		
LIST	LI	dev	job			
LOAD	LOA					
LOGIN	LOG	arg				
MAKE	M					
PJOB	P	dev	file	ext	proj prog	core
R	R	dev	file	ext	core	
REASSIGN	REA	n				
REENTER	REE	dev	file	ext	core	
RENAME	REN	adr				
RESOURCES	RES					
RUN	RU	core				
SAVE	SA	file	ext			
SCHEDULE	SCH					
SSAVE	SS					
START	ST					
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