IDENTIFICATION

Product Code: DEC-08-BA1A-D

Product Name: PDP-8 Program Abstracts

Date Created: October 11, 1966

Maintainer: Software Services Group - Program Library

The PDP-8 is delivered to the user complete with an extensive selection of system programs and routines making the full data processing capability of the new computer immediately available to each user, eliminating many commonly experienced initial programming delays.

The programs described in these abstracts come from two sources, past programming effort on the PDP-5 computer, and present and continuing programming effort on the PDP-8. Thus the PDP-8 programming system takes advantage of the many man-years of program development and field testing by PDP-5 users.

Although in many cases PDP-8 programs originated as PDP-5 programs, all utility and functional program documentation is issued in a new, recursive format introduced with the PDP-8. Programs written by users of either the PDP-5 or the PDP-8 and submitted to the DECUS library (DECUS – Digital Equipment Corporation Users' Society) are immediately available to PDP-8 users. Consequently, users of either computer can take advantage of the continuing program developments for the other.

SYSTEM PROGRAMS

Digital-8-1-S   Symbolic Editor

The Symbolic Editor program generates, edits, corrects, and updates symbolic program tapes using the tape teleprinter. With the editor in memory, the user reads in portions of his symbolic tape, removes, changes, or adds instructions or operands, and gets back a new, complete, symbolic tape with errors removed. He can work through the program instruction by instruction, spot check it, or concentrate on new sections. The tape can contain symbolic machine language, FORTRAN source statements, data, or text information. This program is available for use with either the ASR 33 Reader/Punch or the high speed reader/punch.

Digital-8-2-S   FORTRAN System

The one-pass FORTRAN compiler and operating system compiles FORTRAN source language statements into an object program tape. The operating system executes the program. This system contains the interpreter, arithmetic function subroutines, and input/output packages.

Digital-8-3-S   PAL III

Symbolic machine language assembler. Converts programs coded in symbolic machine language to binary machine language. The basic process performed by the assembler is the substitution of numeric values for symbols, according to associations defined in the symbol table. In addition, the user may request that the assembler itself assign values to the user's own symbols at assembly time. These symbols are normally used to name memory locations, which may then be referenced by name. An assembly listing may be produced.

Digital-8-4-S   DDT-8

Dynamic Debugging Tape provides a means for on-line program debugging at the symbolic or mnemonic level. By typing commands on the console teleprinter, memory locations can be examined and changed, program tapes can be inserted, selected portions of the program can be run, and the updated program can be punched.

Digital-8-5-S   Floating-Point System

Includes Floating-Point Interpreter and I/O subsystems. Allows the programmer to code his problem in floating-point machine language.

Floating-point operations automatically align the binary points of operands, retaining the maximum precision available by discarding leading 0s. In addition to increasing accuracy, floating-point operations relieve the programmer of scaling problems common in fixed-point operations. This system includes elementary function subroutines programmed in floating-point. These subroutines are sine, cosine, square root, logarithm, arctan, and exponential functions. Data being processed in floating-point is maintained in three words of memory (12-bit exponent, 24-bit mantissa). An accuracy of seven decimal places is maintained.

Digital-8-6-S   Symbol Print

Loaded over the FORTRAN Compiler, this program lists the variables used and where they will be located in core. It also indicates the section of core not used by the compiled program and data.

Digital-8-7-S   DECtape Library System (Type 552 and TC01)

The PDP-8 DECtape Library System is loaded by a 17_{10}-instruction bootstrap routine that starts at 7600_8. This loader calls a larger program into the last memory page. The function of the larger program is to preserve on tape the contents of memory from 6000_8-7577_8, and then to load the INDEX program and the directory into these same locations. Since the information in this area of memory has been preserved, it can be restored when operations have been completed. The skeleton system tape contains the following programs:

INDEX   Typing this causes the names of all programs currently on file to
                be typed out.

UPDATE   Allows the user to add a new program to the files. UPDATE
                queries the operator about the program's name, its starting
                address, and its location in core memory.

GETSYS   Generates a skeleton library tape on a specified DECtape unit.

DELETE   Causes a named file to be deleted from the tape.

Starting with the skeleton library tape, the user can build up a complete file of his active programs and continuously update it.

Digital-8-8-S   MACRO-8

The MACRO-8 Symbolic Assembler accepts source programs written in symbolic language and translates them into binary form in two passes. MACRO-8 produces an object program tape (binary), a symbol table (for use with DDT), octal symbolic assembly listing, and useful diagnostic messages. MACRO-8 is compatible with PAL III, and has the following additional features: user-defined macros; double precision integers, floating-point constants, arithmetic and Boolean operators, literals, text facilities, and automatic link generation.

Digital-8-10-S   Calculator

Calculator is an equation evaluation routine. It differs from FORTRAN in that the function to be evaluated is entered via the keyboard and calculated immediately upon termination of entry. Format control is provided so that computed results may be conveniently tabulated. Expressions causing the calling of common function subroutines are included.

Digital-8-11-S   DATAK

The DATAK system permits a complex, program-controlled data acquisition system to be adapted to a particular experimental environment through use of a sophisticated and concise pseudo code. In addition to data-acquisition applications, DATAK furnishes the experimenter with a means of calibrating transducers and is a powerful aid in troubleshooting a complex data-gathering system. Paper tape output produced is acceptable as FORTRAN input.

Digital-8-12-S   ODT-II

ODT-II (Octal Debugging Tape) aids in debugging a PDP-8 program by facilitating communication with the program being run via the ASR 33 Teletypewriter. ODT-II features include register examinations and modification, control transfer, word searching, octal dumping, and instruction traps.

Digital-8-13-S   One-Dimensional Display and Analysis

The one-dimensional pulse-height analysis program is used to read in and analyze 1024-channel energy spectra data. The program receives and executes commands from the keyboard. These commands start and stop data taking and determine into which data region it goes, display the data with markers, allow areas of interest on the display screen to be expanded, integrate between markers, write out data, punch out data, and control background subtraction.

Digital-8-14-S   Multiparameter Display and Analysis

The two-dimensional pulse-height analysis program reads in and analyzes two-parameter energy and spectra data. The program receives and executes commands from the keyboard. These commands start and stop data taking, control the displays, and control writing and punching of data. The displays available are: isometric, vertical and horizontal slicing, differential and integral contours, and "twinkle box." The program is flexible with respect to the dimensions of the data matrix.

Digital-8-15-S   Oceanographic Analysis

This program represents the basic accepted physical oceanography method for the reduction of data concerning depth, temperature, and salinity measurements of the water column.

This program allows the field oceanographer a rapid means of immediately calculating Sigma-T, anomaly of specific volume, and sound velocity following a Nansen cast whereby he may examine results in detail to determine the structure of the environment he has just sampled and to check the validity of his measurements.

The program also contains an interpolation routine as well as a depth integration of the anomaly of specific volume.

Digital-8-16-S   Master Tape Duplicator

The tape duplicator for the PDP-8 is a single-buffered read and punch program, utilizing the program interrupt. It computes a character count and checksum for each tape and compares with checks at the end of the tape.

Digital-8-35-S-A 680 5-Bit Character Assembly Subroutines
-B 680 8-Bit Character Assembly Subroutines

These subroutines concentrate Teletype data by assembling serial-bit data into 5-bit (8-35-S-A) or 8-bit (8-35-S-B) characters and presenting the user with line number and character data. They also add start and stop bits and transmit characters serially. Full-duplex lines are assumed, but the subroutines will work with half-duplex if the user handles the expected echo.

ELEMENTARY FUNCTION ROUTINES

Digital-8-9-F   Square Root Subroutine - Single Precision

Forms the square root of a single-precision number. An attempt to take the square root of a negative number gives 0 for a result.

Digital-8-11-F   Signed Multiply Subroutine - Single Precision

Forms a 22-bit signed product from 11-bit signed multiplier and multiplicand.

Digital-8-12-F   Signed Divide Subroutine - Single Precision

This routine divides a signed 11-bit divisor into a signed 23-bit dividend giving a signed 11-bit quotient and a remainder of 11 bits with the sign of the dividend.

Digital-8-13-F   Double-Precision Multiply Subroutine - Signed

This subroutine multiplies a 23-bit signed multiplicand by a 23-bit signed multiplier and returns a 46-bit signed product.

Digital-8-14-F   Double-Precision Divide Subroutine - Signed

This routine divides a 23-bit signed divisor into a 47-bit signed dividend and returns with a 23-bit signed quotient and a remainder of 23 bits with the sign of the dividend.

Digital-8-16-F   Sine Routine - Double Precision

The Double-Precision Sine Subroutine evaluates the function $\sin(x)$ for $-4 < x < 4$ (x is in radians). The argument is a double-precision word, 2 bits representing the integer part and 21 bits representing the fractional part. The result is a 23-bit signed fraction $-1 < \sin(x) < 1$.

Digital-8-18-F   Cosine Routine - Double Precision

This subroutine forms the cosine of a double-precision argument (in radians). The input range is $-4 < x < 4$.

Digital-8-20-F   Four-Word Floating-Point Package

This is a basic floating-point package that carries data as three words of mantissa and one word of exponent. Common arithmetic operations are included as well as basic input/output control. No functions are included.

Digital-8-21-F   Signed Multiply (Uses EAE Type 182) Single Precision

This subroutine forms a 22-bit signed product from an 11-bit signed multiplier and multiplicand using the Extended Arithmetic Element Type 182. It occupies less storage and takes less time to execute than its non-EAE counterpart, Digital-8-11-F-Sym, and it has the same calling sequence.

Digital-8-22-F   Signed Divide (Uses EAE Type 182) Single Precision

This subroutine divides a double-precision signed 22-bit dividend by a signed 11-bit divisor, producing a signed 11-bit quotient and a remainder of 11 bits having the sign of the dividend.

It makes use of the Extended Arithmetic Element Type 182 instruction set and occupies less storage and takes less time to execute than its non-EAE counterpart, Digital-8-12-F. It has the same calling sequence except that the subroutine name is changed from DIVIDE to SPDIV.

Digital-8-23-F   Signed Multiply (Uses EAE Type 182) Double Precision

This subroutine multiplies a 23-bit, signed, 2's complement, binary number by a 23-bit, signed, 2's complement, binary number, giving a 46-bit product with two signs on the higher order end. It makes use of the Extended Arithmetic Element Type 182 instruction set and, because of this, occupies less storage and takes less time to execute than its non-EAE counterpart, Digital-8-13-F. Its calling sequence is compatible with the non-EAE version.

Digital-8-25-F   EAE Floating-Point Package

These packages perform the same tasks as the Floating-Point Packages, Digital-8-5-S-A,-B, -C,-D except that certain routines have been accelerated by the use of the Extended Arithmetic Element Type 182.

For a detailed description of PDP-8 floating-point arithmetic and the Interpretive Floating-Point Packages, the reader is referred to Digital-8-5-S.

UTILITY PROGRAMS

Digital-8-1-U   Read-In-Mode Loader

The RIM Loader is a minimum-sized routine for reading and storing the information in read-in-mode coded tapes via the ASR 33 Perforated Tape Reader.

Digital-8-2-U   Binary Loader (ASR 33, 750, 183 Memory Extension)

The Binary Loader is a short routine for reading and storing information in binary-coded tapes via the ASR 33 Perforated Tape Reader or the Type 750 High-Speed Perforated Tape Reader.

Digital-8-3-U   DECtape Library System Loader

The use of the DECtape Library System Loader is discussed. Certain conventions with respect to last page storage are established for this loader as well as for the Read-In-Mode and Binary Loaders.

Digital-8-4-U-RIM   Read-In-Mode Punch ASR 33

This program provides a means of punching out the information in selected blocks of core memory as RIM-coded tape via the ASR 33 Perforated Tape Reader.

Digital-8-5-U   Binary Punch 33/75A

This program provides a means of punching out the information in selected blocks of core memory as binary-coded tape via the ASR 33 Perforated Tape Punch or via the High-Speed Punch 75A.

Digital-8-6-U   Octal Memory Dump

This routine reads the console switches to obtain the upper and lower limits of an area of memory, then types on the Teletype an absolute address plus the octal contents of the first four words specified and repeats this until the block is exhausted, at which time the user may repeat the operation.

Digital-8-7-U   Logical Subroutines

Subroutines for performing the logical operations of inclusive and exclusive OR are presented as a package.

<u>Digital-8-8-U   Shift Right, Shift Left Subroutines (Single and Double Precision)</u>

Four basic subroutines, shift right and shift left, each at both single and double precision, are presented as a package.

<u>Digital-8-9-U   Logical Shift Subroutines</u>

Two basic subroutines, shift right at both single and double precision, are presented as a package. The shifts are logical in nature.

<u>Digital-8-10-U   Binary-Coded-Decimal to Binary Conversion Subroutine</u>

This basic subroutine converts unsigned binary-coded-decimal numbers to their equivalent binary values.

<u>Digital-8-11-U   Double Precision BCD-to-Binary by Radix Deflation</u>

This subroutine converts a 6-digit BCD number to its equivalent binary value contained in two computer words.

<u>Digital-8-12-U   Incremental Plotter Subroutine</u>

This subroutine moves the pen of an incremental plotter to a new position along the best straight line. The pen may be raised or lowered during the motion.

<u>Digital-8-14-U   Binary to Binary-Coded-Decimal Conversion</u>

This subroutine provides the basic means of converting binary data to binary-coded-decimal (BCD) data for typeout, magnetic tape recording, etc.

<u>Digital-8-15-U   Binary-to-Binary-Coded-Decimal Conversion (Four Digit)</u>

This subroutine extends the method used in Digital-8-14-U so that binary integers from 0 to 4095 in a single computer word may be converted to four binary-coded-decimal characters packed in two computer words.

<u>Digital-8-17-U   EAE (Type 182) Instruction Set Simulator</u>

This routine permits the automatic multiply-divide hardware option to be simulated on a basic PDP-8.

Digital-8-18-U   Subroutine for Alphanumeric Message Typeout

This is a basic subroutine to type messages packed in computer words. Two 6-bit characters are packed internally in a single word. All ASR 33 codes from 301 to 337 and from 240 to 277 (excepting 243 and 245) can be typed. The typing of line feed (code 212) and carriage return (code 215) are made possible by arbitrarily assigning internal codes of 43 and 45, respectively, to represent these characters, thus preventing the output of ASCII codes 243 (#) and 245 (%).

Digital-8-19-U   Teletype Output Subroutines

A group of subroutines useful in controlling ASR 33 output is presented as a package. Provision is made for simulation of tabulation stops. The user can control the distance "tabbed." Characters whose ASR 33 codes are in the groups 241 through 277, inclusive, and 300 through 337, inclusive, are legal. Space, carriage return-line feed, and tabulation are provided via subroutines.

Digital-8-20-U   Character String Typeout Subroutine

This basic subroutine types messages stored internally as a "string" of coded characters. All ASR 33 characters are legal.

Digital-8-21-U   Symbolic Tape Format Generator

The Format Generator allows the user to create PDP-8 symbolic tapes with formatting. It may be used to condense tapes with spaces by inserting tabs, or merely to align tabs, instructions, and comments.

Digital-8-22-U   Unsigned Decimal Print

This subroutine permits the typeout of the contents of a computer word as a 4-digit, positive, decimal integer.

Digital-8-23-U   Signed Decimal Print - Single Precision

This subroutine permits the typeout of a contents of a computer word as a signed 2's complement number. If bit 0 of the computer word is a 1, the remaining bits represent a negative integer in 2's complement form; if bit 0 equals 0, the remaining bits represent a positive integer. If the number is negative, a minus sign is printed; if positive, a space.

Digital-8-24-U   Unsigned Decimal Print – Double Precision

This subroutine permits the typeout of a double–precision integer stored in the usual convention for double-precision numbers, (see Digital-8-13-F-Sym). The one exception is that all 24 bits are interpreted as magnitude bits; i.e., bit 0 of the high-order word is not a sign bit. The typeout is in the form of a 7-digit, positive, decimal integer.

Digital-8-25-U   Signed Decimal Print – Double Precision

This subroutine permits the typeout of the contents of two consecutive computer words as one signed, double-precision, 2's complement number. If bit 0 of the high order word is a 1, the remaining 23 bits represent a negative integer in 2's complement form; if bit 0 equals 0, the remaining bits represent a positive integer. If the number is negative, a minus sign is printed; if positive, a space.

Digital-8-27-U   DECtape Subroutines

This series of subroutines allows the programmer to read, write, or search DECtape using pre-written and tested subroutines. The subroutines will read or write any number of DECtape blocks, read any number of 129-word blocks as 128 words (or one memory page), or search for any block (used by read and write, or to position the tape). These programs are assembled with the user program and are called by a jump to subroutine instruction. The program interrupt detects the setting of the DECtape (DT) flag, allowing the main program to proceed while the DECtape operation is being completed. A program flag is set when the operation is completed. The program thus effectively allows concurrent operation of several input/output devices with the DECtape.

Digital-8-29-U   Double Precision Decimal-to-Binary Conversion
and Input (ASR 33, Signed or Unsigned)

This routine accepts a string of up to eight decimal digits (double-precision for the PDP-8) from the Teletype keyboard and converts it to the corresponding 2's complement binary number.

The string may contain as legal characters a sign (+, −, or space) and the digits 0-9. If the first legal character is not a sign, the conversion is unsigned. A "back-arrow" (←) at any point in the string erases the current string and allows the operator to reenter the value. Any character after the first, other than another digit or "back-arrow," causes the conversion to terminate and is found in location "DIDSAV" within the subroutine.

Digital-8-31-U   TC01 DECtape Subroutines

These subroutines provide the user with the ability to read, write, and search using the TC01 tape system. The read and write subroutines transfer 128_{10} (one memory page) of the specified block (or blocks) although the standard block length is 129_{10} 12-bit words. Successive blocks are read (written) from (into) successive 128-word blocks of core. Provision is made for transfers to and from extended memories.

Digital-8-33-U   5/8 TOG (DECtape Formatter)

This program is designed to write timing tracks, mark tracks, and block numbers onto a reel of DECtape providing the tape with the basic skeletal format necessary for its inclusion in any programmed DECtape system. The Formatter program also performs preliminary read-data and write-data checks to assure the user that the tape produced can be reliably included in such an environment.

Digital-8-34-U   DECEX DECtape Exerciser

This program provides complete certification of the DECtape format produced.

MAINTENANCE PROGRAMS

Maindec 801-1   PDP-8 Instruction Test Part 1

This program is a minimal test of memory reference instructions, operate instructions, interrupt mode, and the keyboard printer. This test should be used when the state of the processor prevents readin of more advanced diagnostic programs. It is simply a "go-no go" test of the instructions and is not intended to be diagnostic.

Maindec 801-2A   PDP-8 Instruction Test Part 2A

This program tests memory reference instructions, operate instructions, and interrupt mode. An attempt is made to detect and isolate errors to their most basic faults and to the minimum number of logic cards.

Maindec 801-2B   PDP-8 Instruction Test Part 2B

This program is a test of TWO'S ADD (TAD) and ROTATE logic (RAL, RTL, RAR, RTR). Random numbers are used in the TWO'S ADD portion of the test, and sequential numbers are used in the ROTATE portion. Program control depends on operator manipulation of four switches in the SWITCH REGISTER (bits 0, 1, 2, 3). Error information is normally printed out on the keyboard printer.

Maindec 801-2C   PDP-8 JMS and JMP Test

This program tests the JMP and JMS instructions by doing a JMP and JMS to locations 177-4000. The program also tests the JMS return address for accuracy.

Maindec 801-3A   PDP-8 Instruction Test (EAE Type 182) Part 3A

This program tests the Extended Arithmetic Element Type 182. The following instructions are tested: MQL, MQA, SHL, LSR, ASR, NMI, and SCA. An attempt is made to detect and isolate errors to their most basic faults and to the minimum number of logic cards. Maindec 801-3B tests multiply and divide.

Maindec 801-3B   PDP-8 Instruction Test (EAE Type 182) Part 3B

This program tests divide overflow detection hardware and divide and multiply hardware by using a pseudo random-number generator to produce the parameters for each test. Software simulated divide and multiply routines test the results of the hardware divide and multiply.

Maindec 802   Memory Checkerboard Test

Maindec 802 tests memory for core failure on half-selected lines under the worst possible conditions for reading and writing. It primarily tests operation of memory at marginal voltages.

There are two versions of Maindec 802. The Low End program occupies registers $0003-0111_8$ and tests memory from $0112-7777_8$. The High End program occupies registers $7450-7555_8$ and tests memory from $0000-7447_8$.

Maindec 803   PDP-8 Memory Address Test

Maindec 803 provides rough inspection of the performance of the memory address register and the decoder network which selects a given memory cell. It primarily detects errors arising from open or shorted selection lines.

Maindec 810   PDP-8 Teletype Reader Test

Maindec 810 tests performance of the Teletype Model 33 Perforated Tape Reader using the reader to scan a closed-loop test tape punched with alternating groups of character codes 000 and 377.

The program tests each character for bits dropped or gained while reading; it checks each group of characters for characters missed entirely or read more than once.

Maindec 811   PDP-8 High Speed Reader Test

This program tests performance of the Type 750 High Speed Perforated Tape Reader and Control by scanning a closed-loop test tape for transmission accuracy. The reader control is tested for correct operation with the PDP-8 interrupt system.

Maindec 812   PDP-8 Teletype Punch Test

Maindec 812 punches a test tape in a predetermined pattern. The tape passes directly from the Teletype punch to the Teletype reader, which checks the pattern for accuracy.

Maindec 814   PDP-8 Teleprinter Test

The PDP-8 Teleprinter Test tests performance of the Teletype 33 Keyboard Printer. There are two parts to the test, selectable by the operator. The first part tests keyboard input by immediately causing the character typed to be printed for comparison. The second part tests continuous operation of the teleprinter by causing a line consisting of the ASCII character set to be repeatedly printed. The latter also tests for correct functioning of the interrupt after a character has been printed.

Maindec 817   PDP-8 High Speed Punch Test

This program consists of two separate tests. The first causes the High Speed Punch Type 75E to produce a tape containing a sequence of "pseudo-random" character codes. This tape is checked for accuracy using either the high-speed or Teletype reader.

In the second test, the character code represented by the setting of SR_{4-11} is punched repeatedly. The switch setting may be changed while the test is running.

Maindec 820-1   Extended Memory Control Part 1

This program exercises and tests Extended Memory Type 183 instructions CDF, CIF, RDF, RIF, RMF, and RIB for proper operation. Basically, this program tests the control section of the Type 183 Memory. Maindecs 802 and 820-2 test the data.

Maindec 820-2   Extended Memory Checkerboard Part 2

Maindec 820-2 is a preliminary test for core memory failures on half-selected lines under worst-case conditions of reading and writing. It tests memory module X while running the program in memory module Y.

Maindec 825   680 Static Test

The 680 Static Test verifies correct operation of the 681 and 685 circuits associated with the 680 Data Communication System, in a static state. That is, the program does not actually transmit characters, but tests only the logical operation of the hardware. Hardware malfunctions detected by the program result in a processor halt.

Maindec 826-A   680 8-Bit Character Exerciser
        -B   680 5-Bit Character Exerciser

The 680 Character Exerciser Program further verifies correct operation of the 680 Data Communication System. This test assumes that the Teletype lines are full duplex. However, if the line outputs are jumpered to the line inputs, the test does verify that the input characters are received as transmitted.

Maindec 827   580 Utility Routines and Compiler

This program exercises the 580 Tape System. The test routines are called from a small compiler and are under control of a pseudo language, which may be stored on paper tape for daily maintenance, or typed on-line for debugging and observing malfunctions of the 580 Tape System.

Maindec 827-U   Magnetic Tape Type 580 Utility Routines

These subroutines allow the user to operate the 580 Magnetic Tape System by providing most commands associated with a more sophisticated (hardware) tape system.

Maindec 828   PDP-8 LT08 Teleprinter Test

The LT08 Teleprinter Test verifies correct operation of the LT08 Control Line hardware and any configuration of from one to five teleprinters. Hardware malfunctions detected by the program result in a processor halt. The test includes a Concurrent Output Routine, a Concurrent Input Routine, an Output Scope Loop, and a WRU Test which verifies that none of the teleprinters associated with the LT08 respond to a WRU (who are you) code.

Maindec 829   PDP-8 Memory Power On/Off Test

This program tests memory for bit dropout and pickup after a simulated power failure.

Maindec 830   Type 30G Symbol Generator Exerciser

This program exercises symbol generator logic by using selected character patterns.

Maindec 831   PDP-5/8 DECtape Maintenance Package

The PDP-5/8 DECtape Maintenance Package is a collection of routines designed to be used by maintenance personnel as aids in debugging hardware troubles and as periodic confidence checks on correct operation of the device. Routines provided test IOT instructions, delays, control registers, timing, and basic modes of operation. Other routines included allow the operator to adjust the device more efficiently and exercise different modes of operation pursuant to "scoping" machine functions. The package also contains routines to obtain octal dumps of core memory and routines to write varying bit patterns in core.

Maindec 832   Real-Time Clock Test

This program tests the real-time clock IOT logic, and crystal oscillator specifications.

Maindec 833   Lots of Little Pictures on the Eight

This program contains twelve individual 338 Buffered Display routines. The routines were selected to enable adjustment and validation of CRT analog/digital hardware.

Maindec 834   Type 338 Display PJMP Test

This program tests the PJMP instruction. On the 338 Display analyses of the pushdown pointer, display address counter, status, push jump destination and return addresses are printed upon detection of an error in these areas.

Maindec 835   Type 338 Display POP Test

This program tests the POP instruction. On the 338 Display analyses of the display address counter and pushdown pointer are printed upon error detection.

Maindec 839   PDP-8 Memory Parity Option

This program exercises and detects memory parity control and data errors on the PDP-8.

Maindec 841   CALCOMP Plotter Test

This program tests the CALCOMP Plotter and its control. All control and plotting functions are tested.

Maindec 843   Type 30 N, G, Display Exerciser

The Type 30 N, G, Display Exerciser tests operation of the deflection circuits, decoder network, coordinate buffer, and phosphor coating of the CRT. The state of these parameters is determined by the operator's interpretation of the various patterns which the program produces on command.

The program produces fixed pin cushion, hysteresis, vertical, horizontal, and diagonal lines as well as two segmented sweep patterns. The sweep patterns illuminate any or all nine overlapping sectors of the screen according to the settings of the switches, sweeping either vertically or horizontally. A utility routine is included with the program which allows the operator to plot and illuminate any point on either axis.

Maindec 844   Monroe Printer Test (MC 4000)

This is a test of the Monroe printer and its associated control. Control failures are provided for by error halts for operator notification. Data failures are detected by visual analysis of the printer output.

Maindec 845   PDP-8 A/D Converter

The A/D Converter Test for the 138E/139E and 189 Converters is a set of routines designed for maintenance personnel to aid in debugging hardware troubles, and as a periodic confidence check for data flags, interrupts, monotonicity, steady state accuracy, multiplexer selection, and incrementation ability of the multiplexer.

DOCUMENTS

DEC-00-BSlA-D   Classifying and Documenting Standard for Software Products

These documenting standards will supersede 8-0 starting November, 1966.

Digital-8-0   Format for PDP-8 Program Documentation

With the advent of the PDP-8, Digital Equipment Corporation introduced a new, recursive format for program documentation. This format is used for routines and subroutines, such as utility and functional, but not necessarily for system programs.

This format and its use are described in this document.

APPLICATION NOTES

801   Scaling for Fixed-Point, Two's Complement Arithmetic

803   Matrix Inversion

804   Throughput to IBM-Compatible Magnetic Tape