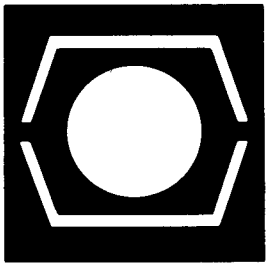

DECUS PROGRAM LIBRARY CATALOG

FOR

PDP-8, FOCAL8

JULY 1973
DIGITAL EQUIPMENT COMPUTER USERS SOCIETY
MAYNARD, MASSACHUSETTS 01754 TEL. AC 617, 897-5111

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When users find it necessary to call the DECUS Program Library for information, it helps to have the name of a specific person with whom they can speak. For your information we have compiled the following list:

Accounting or Pricing Information - Karen King X2447

PDP-10, PDP-12, PDP-15 and LINC orders and information - Cheryl Barber X2524

PDP-8 library orders and information - Jackie Page X2524

PDP-11, FOCAL and Educational Application orders and information - Stacia Taylor X2524

New or proposed library submissions, changes, etc., general library contents - Ferne Halley or Pat Davies X2524

I. PROGRAMMING LANGUAGE, MONITOR, PROGRAMMING SYSTEM

I. PROGRAMMING LANGUAGE, MONITOR, PROGRAMMING SYSTEM

DECUS NO.	TITLE
FOCAL8-3	DISK FOCAL
FOCAL8-8	Magtape FOCAL
FOCAL8-11	EAE Routines for FOCAL
FOCAL8-17	FOCAL: How to Write New Subroutines and Use Internal Routines
FOCAL8-32	Translation Table - French
FOCAL8-43	A Collection of FOCAL Patches
FOCAL8-52a	FOCAL 5/69
FOCAL8-53	JMPFOCAL: FOCAL as a LINC-8 Subroutine
FOCAL8-110a	SWAP - FOCAL Disk Data Overlay
FOCAL8-116	KV8FT
FOCAL8-123	LOAD Command for FOCAL-1969
FOCAL8-132	CIG-8 MARK II
FOCAL8-135	MODV - Choice
FOCAL8-136	FOCAL - Amity
FOCAL8-139	Universal Input/Output for FOCAL
FOCAL8-141	Spanish Language FOCAL
FOCAL8-144	FOCALJ -- DECtape FOCAL-69
FOCAL8-145	FOCAL for Disk and DECtape with Program Chaining
FOCAL8-148	FOCL.S, An Expanded Language for Small Computers, Based on FOCAL
FOCAL8-153	Two Overlays for FOCAL '69, FEXP-X-P and FLOG
FOCAL8-157	Modifications to TSS/8 FOCAL
FOCAL8-164	Four New Functions for FOCAL 5/69
FOCAL8-177	PS/8 FOCAL, 1971
FOCAL8-187	Display FOCAL
FOCAL8-188	Generating Random Numbers with FOCAL
FOCAL8-189	8K Overlay Patch for FOCAL 5/69 (DECUS NO. FOCAL8-52a)
FOCAL8-190	Patch to Add LABEL Feature to FOCAL 5/69 (DECUS NO. FOCAL8-52a)
FOCAL8-211	WEST-KY Four-User FOCAL
FOCAL8-212	Automated Terminal Usage Accounting for Four-User FOCAL
FOCAL8-218	FOCAL Overlay CHAIN
FOCAL8-223	FOCLX, 1972
FOCAL8-227	FOCL/F-An Extended Version of 8K FOCAL'69
FOCAL8-230	CALCOMP Plotter FNEW PLOTX
FOCAL8-256	OPTION $
FOCAL8-269	4K FOCAL '69 Speed-Up Patches
FOCAL8-271	Modification of FOCL/F for Data Acquisition and Control

DECUS NO.	TITLE
12-10	FOCAL Library (LINCtape FOCAL for the PDP-12
12-40	PDP-8 Disk Monitor - LAP6-DIAL Interface
12-45	FOCALP-FOCALPE
12-48	PS/8 FORTRAN Library Routines
12-54	QUIP - Quick Assembler for the PDP-12
12-61	Generating Random Numbers with FOCAL
12-67	PPG FOCAL
12-77	PAL12A Assembler
12-80	FOCAL - RT
12-101	OS/8 SKED
12-108	FPPNEW - Replacing the DIAL-MS-Assembler by an Improved Version of the FPP Assembler
12-109A,B,C	QNANSWER, QANDATTY, SUPRSHUF
12-110	DIAL-MS for 1600 Blocks
12-120	DUAL
12-124	FR, FDIS and FADC for PDP-12 Input/Output
L-7	Modifications to PROGOFOP, Version 2
L-17	LOAD - Extended Load Sequence for LINC-8
L-20	A Monitor for Automatic Sequential Operation of Programs on the LINC-8
L-21	FORTRAN Macros for the LINC-8: "LINC-TRAN"
L-31	SNAP (Simplified Numerical Analysis Program)
L-54	LES - A Library Executive System for the LINC-8
L-60	FORTRAN With LINCtape
L-76	Modifications to PROGOFOP II
L-108	PROFPP
L-109	MAXILIST and MAXIMETA
L-110	LINFOC or LINC-8 FOCAL
L-111	RNPL Disk Library
L-120	PROGOFOP-7C
L-122	LINC-8 PS/8
L-124A	DATAFILE

II. TEXT EDITING, TEXT MANIPULATION

DECUS NO.	TITLE
8-52	Tiny Tape Editor
8-66	Editor Modified for DECtape (552 Control)
8-170	FORTRAN Source Conversion Program
8-176	PAL CHOP
8-184	Page Routine
8-185	Modifications to Symbolic Editor and Symbolic Tape Format Generator
8-197	Overlay for Standard Editor and PAL III Assembler
8-209	Editor-With-View
8-239	PAL III/Editor 8K Link Patch
8-247	HELP: A Disk/DECtape Dialogue Program
8-255	SCED: Scope Editor for the AXØ8
8-257	UCONN-EAP, Editor-Assembler
8-266	IBM Editor
8-334	KVEDIT
8-345	EDIT - PAL
8-369	Tri-Data CartriFile DEC Editor
8-381	Cardreader Subroutine for Disk Editor
8-382	Readable High Speed Punch Copier
8-384	BLOK
8-385	Mixed ASCII Formatting and Outputting Technique
8-386	Multiple Field Loader
8-390	PALEDCO (PAL Assembler and Editor Combined)
8-397	8K Editor
8-402	Resequence
8-407	Patch to Editor (DISK) DEC-D8-ESAD-PB
8-408	Disk Utility Program
8-413	GROPE III/A and BINLOC
8-423	Disk Editor With View for LAB-8
8-424	Morse Code
8-427b	MEMO II - A Text Formatting Program
8-449B	LPTQUE - A PTØ8 to A.B. Dick Line Printer Utility Program
8-450	PS/8 Editor With Display for KV8/I (Overlay)
8-454	Radio Teletype to ASCII
8-460	TT89 - Tape Transfer PDP-8 to PDP-9
8-461	COPY1Ø - PDP-10 DECtape Program for the PDP-8
8-466A	RL Monitor System (WCFMPG Version) P?S-08-1.1A
8-466C	Listing Utility Programs P?S-08-1.1C
8-475	PIPQ
8-486	SEGAR 7: A Seven Segment Array for Alphanumeric Character Generation
8-496	UTR7: A 7-track Magnetic Tape Reading Utility
8-497A	8BAL - PDP-8 Macro Language
8-497B	8BAL Source Documentation
8-507	EEPP (Editor Even Parity Punch)
8-515	Program to Mate PAL III With Symbolic Editor
8-518	PS/8 FORTRAN Alphabetical Sort
8-519	MACRO-8 Pass 3 Output Format Patch
8-522	'PAGEIT'
8-541	Cassette Utility Program and PALC
8-546	DETEF - DECtape File-Handling System
8-552	Storage Display Device Handler
8-573	EDITS - A PS/8 Editor for Non-storage Scope Display
8-595	UPDATE, A Program to Make Corrections to File Containing Records of Variable Length
8-597	N.I.H. OS/8 Package
8-601	OASIS
8-606	PIP11
8-611	SLED - Source and Listing Editor
FOCAL8-202	Code Generator
FOCAL8-248	FOCTXT - Text Input-Output Patch to FOCAL 1969
12-6	ANDIP - Analog Digital Interchange Program
12-39	QUANAT 1
12-50	EDIT-12
12-66	ADDINDX (LAP6-DIAL-MS Index Manipulator)
12-82	LAP6-DIAL to PS/8 Source File Converter
12-96 A&B	SCOPE and CNGMWA
12-100	MEMO III
L-51	TAGSWAP
L-103	RNPL SEARCH System

III. DEBUGGING, DISASSEMBLY, SIMULATION, TRACE, DUMP

DECUS NO.	TITLE
5/8-2.1a	OPAK - An On-Line Debugging Package
5-4	Octal Typeout of Memory Area with Format Option
5/8-18A	BIN Tape Disassembly Program for PDP-5/8
5/8-18C	Disassembler with Symbols
8-19a	DDT-UP Octal - Symbolic Debugging Program
5/8-33	Tape to Memory Comparator
5-41	Break Point
5/8-55	PALEX - An On-Line Debugging Program for PDP-5 and PDP-8 Computers
8-56	Fixed Point Trace No. 1
8-57	Fixed Point Trace No. 2
8-78	DIAGNOSE: A Versatile Trace Routine for PDP-8 and EAE
5/8-83A&B	Octal Debugging Program (With or Without Floating Point)
8-89	XOD - Extended Octal Debugging Program
8-91	MICRO-8: An On-Line Assembler
8-95	TRACE for EAE
8-97	GOOF
8-105	D-BUG
8-111	DISKLOOK
8-127	XDDT Extended Octal-Symbolic Debugging Program
8-149	Core Window
8-150	PTOD8 High and PTOD8 Low
8-156	HEPTRACE
8-172	Octal Systems Edit
8-178	Reverse Assembler
8-179	EAE Modifications for Binary Disassembler with Symbols
8-182	Memory Compare
8-233	An Octal Housekeeping and Debugging Package for PDP-8 (PDP-8/I) with EAE and Disk
8-245	Dynamic Octal Disk Debugger
8-253	Disk Dump on Scope
8-259	Symbolic from Pass 3
8-276	Core Editor
8-286	Two Patches for Disassembler with Symbols
8-296	Edit Routine
8-297	TRACE
8-298	OCTMON - An Octal Monitor for the PDP-8 Computer
8-315	Block-Modify
8-349	Octal Debugging Technique with View
8-372	ML Editor (Machine Language Editor)
8-380	WATSNU
8-384	BLOK
8-400	Execute Slow
8-402	Resequence
8-404	Octal MEM Dump - Extended Memory
8-405	SOOT
8-412	MRS X
8-417	XCORE
8-425	Block-Modify for PS/8
8-436	EAE - Simulator
8-440	PIPL
8-444	COREMAP
8-445	FYLHLP - PS/8 File Utility Program
8-448	CORDMP - Formatted Octal Dump
8-457	DTFIX
8-466E	DECtape Utility Programs P?S-08-1.1E
8-467a	BINREAD (Revised Version)
8-470	ODT-11 (High) Modified
8-479	PDP-8/E Instruction Simulators for other PDP-8s
8-487	Revised Octal Memory Dump
8-490	Tape Alteration Program
8-500	DUMP8
8-508	TSUTIL - A Utility-Diagnostic Program for TSS-8
8-513	DEBUG 8
8-523	MDT - A Mini Debugging Technique
8-527	XDDT8E
8-531A&B	'TRIPLE'-36 Bit PDP-8/E Simulator and 'TRIPEL' 8 BAL Macros
8-532	OPDDT (One Page DDT)
8-533	"WHERE"
8-541	Cassette Utility Program and PALC
8-543	TS8REV - Reverse Assembler for TSS/8
8-544	CHECK and CHANGE-D
8-585	FAC HANDLER
8-588	PEEK, A User Program to Look at the TSS/8 Monitor
8-597	N.I.H. OS/8 Package
8-601	OASIS
8-608	FUTIL - OS/8 File Utility
8-609	OCOMP - Octal Compare and Dump
FOCAL8-2	XOD Modification for use with FOCAL
FOCAL8-268	FX Function for Random Access Files
12-11	ODTAPE (Octal Debugger for PDP-12 LINCtape)
12-21	Modified MAGSPY
12-30	TDUMP
12-76	TAPELOOK; CORELOOK; SEARCH
12-91	OCTPUNCH
12-124	FR, FDIS and FADC for PDP-12 Input/Output
L-34	LINC-DDT
L-37	BINLAP6 (Binary-to-LAP6 Disassembler)
L-38	Linc Tape Dump

IV. BINARY LOADING, BINARY PUNCHING

DECUS NO.	TITLE
5/8-1.1a	BPAK - A Binary Input/Output Package for the PDP-5
8-26A	Compressed Binary Loader
8-26B.1	BN2CBL and CBL2BN BIN to CBL Format Tape Converter
8-26C	Extended Compressed Binary Loader
8-26D	XCBL Punch Program
5/8-27 and 5/8-27a	Bootstrap Loader and Absolute Memory Clear
8-47	ALBIN - A PDP-8 Loader for Relocatable Binary Programs
5/8-48	Modified Binary Loader MK IV
8-81	A BIN or RIM Format Data or Program Tape Generator
8-85	Set Memory Equal to Anything
8-120	DISK/DECtape FAILSAFE
8-130A	REBIL8 - Relocating Binary Loader
8-130B	RELCON - Binary to Relocatable Binary Tape Converter
8-142	Binary Punch - Extended Memory
8-160	FASTLOAD
8-180	Editor and Assembler for 57A Magnetic Tape System (UCRL-50534)
8-181	Automatic Binary Loader and Duplicator-Coder for Auto Bin
8-183	The WANG Loader
8-187	Keyboard Controlled Binary Punch
8-204a	PATCH - A PDP-8 Binary Paper Tape Patch Program
8-205	MTSAFE
8-227	PDP-10/8 - Loader
8-228	A One-Pass Paper Tape Loader for PDP-8 Disk System (OPLOAD)
8-234	SYS/LOAD PUNCH
8-236	System and User Files Read and Punch Program (LEES)
8-241	BUZZTAPE READER/WRITER
8-244	BINSAVE
8-256	Binary to RIM Format Converter
8-268	Miniloader and Miniloader Punch
8-281a	Binary Tape Splicer ASR 33/75A
8-290	Skinny BIN Loader
8-295	COMBIN
8-306	LDR - A One Pass Transparent Loader
8-338	BIN and CBL Loader
8-344	Toledo Extended Memory Binary Punch
8-348	Mini Binary Punch
8-351	ComBIN Loader
8-352	Parity Hi-Lo Loader
8-366	Modified Readable Punch
8-374	Binary to RIM Consolidator
8-382	Readable High Speed Punch Copier
8-386	Multiple Field Loader
8-408	Disk Utility Program
8-409	Card Loader
8-413	GROPE III/A and BINLOC
8-421	Chain Load
8-422	Binary Punch
8-448	CORDMP - Formatted Octal Dump
8-449C	TALK1Ø - A PDP-8/PDP-10 Utility-Loader
8-466B	RL Monitor Subsystems P?S-08-1.1B
8-466D	RL Monitor System Utilities P?S-08-1.1D
8-477	RIBIER - A Program for the PDP-8/I Enabling the Transition from the PS/8 System to the Paper Tape System
8-481a	MERGE
8-488	NEWPAGE
8-492	BINLOAD, BINTAPE and SEARCH
8-502	Interrupt Duplicator for Binary Object Tapes
8-505	BIN-CBL Extended Memory Loader
8-506	Load Areas
8-512	Modified Binary Loader
8-516	Self-Starting PS/8 Loader
8-523	MDT - A Mini Debugging Technique
8-527	XDDT8E
8-534	DUAL BINARY LOADER
8-535	BINARY PUNCH FOR PDP-8/E with 2 TTY's (or with high speed punch)
8-539	TD8E 4K Loader
8-541	Cassette Utility Program and PALC
8-561	Revised HELP Loader for High Speed Reader and New BIN Loader
8-570	BIN4SV
8-589	BOOTST, Universal OS/8 (PS/8) Bootstrap
8-601	OASIS
8-605	ADUMP8
FOCAL8-98	FOCAL PUNCH OVERLAY
FOCAL8-215	FOCAL 1969 Octyl Loader
FOCAL8-219	Keyboard Controlled High Speed Punch Routine for FOCAL 1969
FOCAL8-259	High Speed Punch, High Speed Write, and FRAN Overlays to FOCAL 69
12-17	DIALRFØ8
12-20	FORMATXT
L-61	Alternative Binary Loader for LINC-8 Library
L-111	RNPL Disk Library

V. DUPLICATION, VERIFICATION

DECUS NO.	TITLE
5/8-33	Tape to Memory Comparator
8-190	PATCH Utility Program
8-226	FAILSAFE for DECtape Library System
8-265	Teletype Parity Conversion Program
8-282	C528: Paper Tape Conversion 5 Track (SIRIUS) to 8 Track (A.S.C.I.I.)
8-291	Tape to Memory Comparator (6-channel)
8-311	Card to Tape Conversion with Diagnostics
8-360	ASCII to Friden (EIA)
8-374	Binary to RIM Consolidator
8-408	Disk Utility Program
8-415	Multiple Unit DECtape Copier
8-438	DF-32/Sykes Swap
8-439	MOVE
8-440	PIPL
8-471	Verify Paper Tape (12K)
8-481a	MERGE
8-488	NEWPAGE
8-541	Cassette Utility Program and PALC
8-572	Combination Lettering and Duplication-Coder Program
8-577	Tape Duplicator (P.D.T.)
8-600	EXPIP (Extensions PIP)
8-606	PIP11
12-18	"FAILSAFE"
12-32	COMPAR12
L-55	COMPAREM
L-95a	FAILDIS (Revised)

VI. NUMERICAL FUNCTION, NUMERICAL INPUT-OUTPUT

DECUS NO.	TITLE
5/8-7	Decimal to Binary Conversion by Radix Deflation and Accelerated Radix Deflation
5/8-21	Triple Precision Arithmetic Package
5/8-35	BCD to Binary Conversion Subroutine and Binary to BCD Conversion Subroutine (Double Precision)
5/8-38	FType-Fractional Type
5/8-39	DSdprint, DDtype - Double Precision Signed Decimal Input-Output
5/8-43	Unsigned Octal - Decimal Fraction Conversion
8-44	Modifications to the Fixed Point Output in the PDP-8 Floating Point Package (Digital-8-5-S)
8-60	Square Root Function by Subtraction Reduction (Uses EAE)
8-61	Improvement to Digital-8-9-F Square Root
5/8-69	LESQ29 and LESQ11
8-70	EAE Routines for FORTRAN Operating System (DEC-Ø8-CFA3)
8-72	Matrix Inversion - Real Numbers
8-73	Matrix Inversion - Complex Numbers
8-74	Solution of System of Linear Equations: AX= B, by Inverting Matrix A, then Multiplying the Inverse by Vector B
8-75	Matrix Multiplication - Including Conforming Rectangular Matrices
8-80	Determination of Real Eigenvalues of a Real Matrix
8-93	CHEW - Convert Any BCD to Binary, Double Precision
8-96	J Bessel Function (FORTRAN)
8-100	Double Precision BCD Arithmetic Package (Incomplete)
8-103A	Four Word Floating Point Routines - Function Package
8-103B	Four Word Floating Point Routines - Rudimentary Calculator
8-103C	Four Word Floating Point Output Controller with Rounding
8-103D	Additional Instructions for use with Four Word Floating Point Package
8-114a	Decimal Output Routine for PDP-8 FORTRAN
8-115a	Double Precision Interpretive Package
8-134	LSQ (Least Squares Subroutine)
8-136	Fourier Transform Program
8-143	FFTS-R - A Fast Fourier Transform Subroutine for Real Valued Functions
8-144	FFTS-C - A Fast Fourier Transform Subroutine for Complex Data
8-157	Square Root Patch
8-186	EAE FORTRAN Patch for the PDP-8
8-188	Extended Memory Patch for 4 Word Floating Point Package (DEC-08-FMHA-8B)
8-199	Accessing Data Arrays and Teletype Text Input/Output
8-207	Cube Root Subroutine
8-211	Matrix Manipulation System (MMS) for Real Numbers
8-214	DECI: A Subroutine to Type Outputs in Decimal
8-218	Interpreter of Constitution of Coding Tables
8-220	FRACPT and TRANS
8-221	IFIX/FLOAT
8-248	SABR - Coded Fast Fourier Transform Subroutine
8-250	Fast Fourier Transform (FFT)
8-271	LIP, LOGICAL "If" Package
8-278	Single Length Floating Point Package
8-288	GRAYCONV (Gray Code to Binary Code Converter)
8-302	Overlay Modifications to the Floating-Point System Packages, DEC-08-YQYA
8-303	Alterations of the Basic Floating-Point Package and Additional Subroutines
8-304	Pseudo-Noise (P-N) Sequence Test
8-350	Wilcoxon-White Two Sample Rank Test
8-363	DATOUT: A Simple Routine for Printing Sequential Data as an Array
8-364	Extended Memory Patch to the 3-word Floating Point Arithmetic Interpreter
8-371	Teletype Control of ND 50/50 Memory Unit (TYPED)
8-375A	3 Page Floating Point Package
8-375B	3 Page Floating Point Package with Floating Output
8-379a	Double Precision and Floating Point Interchanger
8-399	8K FORTRAN Bit Manipulation Subroutines
8-410	Pseudo-Random Number Generator, EAE Version
8-426	Prime Number Generator
8-428A	EAE - Modification to DECUS NO. 8-143, FFTS-R
8-428B	EAE - Modification to DECUS NO. 8-144, FFTS-C
8-432	Triple Precision Integer Package
8-436	EAE - Simulator
8-446	A Patch to FFTS-R for Use Without the EAE
8-447	Roots of a Polynomial by Muller's Method
8-449D	Buffered I/O Subroutine for the PDP-8
8-452	ANSAM (Analog Sampling)
8-453	Rapid Alert Program (RAP)
8-480a	Two Subroutines for 8K FORTRAN 1. INPUT 2. RANDU and GAUSS
8-483	GRFIT, A Simple Least Squares Routine
8-485	Geometric Data Truncation for Fourier Transform Programs
8-491	Indexed Floating Point Math Subroutines for PDP-8/E
8-504C	ESI Demonstration Programs
8-511	FPAK-4 Interrupting Floating Point Package
8-538	Integer IOH for FORTRAN Library
8-550	Modified Matrix Inversion - Real Numbers
8-571	INPUT, OS/8 Version
8-575	EAE Overlay for Four-Word Floating Point Package Multiply
8-580	Decimal to Floating Point Conversion
8-582	Random Number Generator Adapted for 8K FORTRAN/SABR

VI. NUMERICAL FUNCTION, NUMERICAL INPUT-OUTPUT

DECUS NO.	TITLE
8-590	Matrix Inversion
8-594	FP8 - Floating Point Arithmetic Software for DEC PDP-8 Series Computers
8-596	Multilength Routines
8-597	N.I.H. OS/8 Package
8-607	CALCU1
8-615	EAE Multiplication for 8K FORTRAN

VI. NUMERICAL FUNCTION, NUMERICAL INPUT-OUTPUT

DECUS NO.	TITLE
FOCAL8-1	A Pseudo Random Number Generator for the PDP-8 for use with FOCAL
FOCAL8-11	EAE Routines for FOCAL
FOCAL8-18	T-ASK
FOCAL8-33	Square Matrix Multiple; Prime Number Generator; Least Common Multiple; Base to Base Integer Conversion; Repeating Decimal
FOCAL8-34	Simultaneous Equations; Abbreviated Simultaneous Equations; Curve Fittings
FOCAL8-39	Rectangular to Polar Conversion; Polar to Rectangular Conversion
FOCAL8-47	Fourier Synthesis of a Square Wave
FOCAL8-49	Constantine's Function
FOCAL8-64	Newton-Raphson Method for Determination of Polynomial Roots
FOCAL8-68	Determination of Roots of a Polynomial
FOCAL8-73	Real Matrix Inversion
FOCAL8-74	Linear Least Squares Fit
FOCAL8-82	Physical Sine Curve Programs
FOCAL8-89	The Recursive Evaluation of Functions
FOCAL8-91	Multiplication of Rectangular Matrices
FOCAL8-100	Additions to FOCAL W
FOCAL8-106	FOCAL Traveling-Wave Sketches
FOCAL8-109	Newton's Method of Approximating Real Roots of P(x)=Ø, Where the Degree of P(x) is 4 or less
FOCAL8-118	Three Mathematical Routines 1. To Raise A+B*1 to the N Power 2. Complex Roots of Real Interpreters 3. Cube Root Finder
FOCAL8-120	PFI - Product Form of the Inverse
FOCAL8-142	Successive Powers of a Matrix
FOCAL8-143	Repeated Matrix Multiplication
FOCAL8-151	Fast Matrix Inversion for Real Numbers
FOCAL8-159A	Computer Programs in Use in the Water Qualities Division, Vol. 1
FOCAL8-159B	Computer Programs in Use in the Water Qualities Division, Vol. 2
FOCAL8-159C	Computer Programs in Use in the Water Quality Division, Vol. 3
FOCAL8-172	XPON
FOCAL8-174	SYNDIV 5
FOCAL8-182	First Order Differential Equation: Initial Value Problem
FOCAL8-194	Rectangular to Polar Coordination (German)
FOCAL8-200	SIMEQR-20 Simultaneous Equations in 8K FOCAL
FOCAL8-205	Random Walk/Array
FOCAL8-209	GRFIT, A Simple Least Squares Routine
FOCAL8-213	FOCAL Random Number Generator
FOCAL8-216	FARRAY, A FOCAL FNEW for Two Dimensional Arrays in 8K FOCAL
FOCAL8-231	Extended Precision Sine and Cosine for 4-word FOCAL
FOCAL8-232	Roots by Inverse Interpolation
FOCAL8-239	DIV - Program for Division
FOCAL8-253	Solution to Any Equation Involving One Variable
FOCAL8-255	Repeating Decimal
FOCAL8-259	High Speed Punch, High Speed Write, and FRAN Overlays to FOCAL 1969
FOCAL8-260	Arithmetic and Geometric Progressions
FOCAL8-263	ROOTS, A Polynomial Root Finder

DECUS NO.	TITLE
12-7	DBLFLT - Double Float Mathematical Routines
12-14	MUL-2REG
12-25	Three Subroutines for QANDA - FRACUS, SCRMBL, QANDA-C
12-34	STAP-12
12-41	BLOOPD - Blood Pressure Display Program
12-64	Walsh Transform Subroutines, PWALSH and LWALSH
12-67	PPG FOCAL
12-68	A PDP-8 Floating Point Software Package Simulator Using a FPP-12 Floating Point Processor
12-88	OCTALFPP
12-89	BUTFLTR
12-90	REPRSNT
12-109A,B,C	QNANSWER, QANDATYY, SUPRSHUF
12-116	FPP-12/FOCAL-12 Reduction of Auto Analyzer Data for Pharmaceuticals
L-29	DEC-BI
L-35A&B	DF.INOUT; I.O. TAGS
L-49	BINOC
L-50	BINDEC
L-68	DBLFLT 2 - A Multibank Configuration of DBLFLT
L-93	INTERP
L-98A&B	REDROOT and REDROOTM
L-101	MUL-2REG
L-114	Pseudo-Random Number Generator, EAE Version (See 8-410)
L-121B	FREC

VII. UTILITY

DECUS NO.	TITLE
5/8-32a	A Program to Relocate and Pack Programs in Binary Format
5-37	Transfer II
8-68a	LABEL Program
8-85	Set Memory Equal to Anything
8-87	XMAP
8-106	Readable Punch
8-110	Directory Print (DIREC) for the DEC PDP-8 Disk System
8-120	DISK/DECtape FAILSAFE
8-135	DNHELP, A Directory Assistor Program
8-141	SYSLUK
8-153	Tape/Disk Transfer Programs
8-154	SWAP
8-172	Octal Systems Edit
8-177	COPY
8-189	LKDN: Look into the Directory Name Block
8-190	PATCH Utility Program
8-198	SYSHLP - Monitor System Utility Program
8-204a	PATCH - A PDP-8 Binary Paper Tape Patch Program
8-205	MTSAFE
8-206	DUMP
8-210	A Real-Time Multiple Task Executive Program with Built-in Console Utility Package for PDP-8/S and PDP-8 Computers
8-217A	PALR
8-217B	PALM
8-217C	UTIL
8-232	TP1Ø
8-235	Octal Tape Dump for PDP-8/9/10 DECtapes
8-239	PAL III/Editor 8K Link Patch
8-240	END
8-244	BINSAVE
8-245	Dynamic Octal Disk Debugger
8-247	HELP: A Disk/DECtape Dialogue Program
8-252	PEEP - A Directory Search Program
8-270a	Disk-DECtape Utility Program
8-272	IOPACK - A Message and Number I-O Utility Package
8-294	Lettering Program
8-301	STOR: A Store Instruction for the PDP-8 Disk Monitor
8-309	Patches and a Utility Program for LAB-8
8-310	BIN Punch for Extended Memory
8-356	Page Printer
8-357	ISOMER - Interactive Study of Organic Molecules by Educational Reinforcement
8-358	Card Reader Patch
8-365	CARD
8-366	Modified Readable Punch
8-370A	FBUILD
8-370B	DISK
8-373	LISP Disk Array
8-378	Map Directory Information on KV8/I
8-393	Queing TCØ1/TU55 DECtape Routines
8-398	IMAGE
8-413	GROPE III/A and BINLOC
8-414	LIST
8-435	RECOVER
8-436	EAE - Simulator
8-438	DF-32/Sykes Swap
8-439	MOVE
8-440	PIPL
8-441	DELETE
8-444	COREMAP
8-449B	LPTQUE - A PTØ8 to A. B. Dick Line Printer Utility Program
8-449C	TALK1Ø-A PDP-8/PDP-10 Utility-Loader
8-449D	Buffered I/O Subroutines for the PDP-8
8-460	TT89 - Tape Transfer PDP-8 to PDP-9
8-461	COPY1Ø - PDP-10 DECtape Program for the PDP-8
8-466D	RL Monitor System Utilities P?S-08-1.1D
8-466E	DECtape Utility Programs P?S-08-1.1E
8-473	Three Utility Routines for PS/8 1. DTA and DECLAB 2. CHANGE and REMOVE 3. LIST
8-474	EXIT PS/8
8-475	PIPQ
8-477	RIBIER - A Program for the PDP-8/I Enabling the Transition from the PS/8 System to the Paper Tape System
8-482	Patch to High ODT (DEC-08-COC2-PB)
8-484	REStore for the RKØ8
8-496	UTR7: A 7-track Magnetic Tape Reading Utility
8-506	Load Areas
8-508	TSUTIL - A Utility-Diagnostic Program for TSS-8
8-522	'PAGEIT'
8-540B	BPRINT
8-541	Cassette Utility Program and PALC
8-545	PIF (Program Interrupt Facility for 3 TTY/s)
8-551	COMBO
8-563	TAPE
8-565	RENUM - Renumbering Program for BASIC Tapes
8-579	LISTIT
8-584	PRECIS, A Program to Scan a Binary Tape
8-586	XDIREC, OS/8-PS/8 Selective Directory Listing
8-588	PEEK, A User Program to Look at the TSS-8 Monitor
8-589	BOOTST, Universal OS/8 (PS/8) Bootstrap
8-597	N.I.H. OS/8 Package
8-599	DIBILD.; Directory Rebuilder for PS/8 or OS/8
8-600	EXPIP (Extensions PIP)
8-602 A&B	The PDP-8 Cookbook, Volume 1 & 2
8-608	FUTIL - OS/8 File Utility
8-609	OCOMP - Octal Compare and Dump

VII. UTILITY

DECUS NO.	TITLE
FOCAL8-10	Patch to FOCAL W for LINC-8 A-D Converter
FOCAL8-44	Magtape Analyser Using I/O FOCAL
FOCAL8-51	FOCAL "WRITE" Patch
FOCAL8-59	FOCAL Overlay Common Area for 4K Core Memory
FOCAL8-100	Additions to FOCAL W
FOCAL8-105A	LAB-8 Extended Functions for FOCAL (4K)
FOCAL8-105B	LAB-8 Extended Functions for FOCAL (8K)
FOCAL8-125a	Magtape Formatter for MTA Handler
FOCAL8-129	FOCAL Readable Punch
FOCAL8-150	FRAN8
FOCAL8-191	Reverse Overlay for FOCAL, 1969
FOCAL8-192	Echo Change for FOCAL, 1969
FOCAL8-194	Rectangular to Polar Coordination (German)
FOCAL8-195	All Purpose Graphing Program
FOCAL8-201	FOCAL Patch for Function FP, Mod 4B
FOCAL8-203	Graph Sketching
FOCAL8-204	Acid-Base Equilibria
FOCAL8-206	FOCAL Generates Binary Patches
FOCAL8-210	CHAIN and FCOM
FOCAL8-214	FDSK, An Overlay for FOCAL to Read Data-Or-Program-Files from the PS/8 Systems Device
FOCAL8-216	FARRAY, A FOCAL FNEW for Two Dimensional Arrays in 8K FOCAL
FOCAL8-245	Executive and Utility Routines for FOCLX, 1972
FOCAL8-247	FNEWS Overlay to Use High Speed Punch with FOCAL Program
FOCAL8-252	12K Overlay for FOCAL
FOCAL8-254	Patch to Allow Computed Line Numbers in FOCAL 1969
FOCAL8-265	LISTAL

DECUS NO.	TITLE
12-2	PDP-12 Utility and Data Reduction Programs
12-8	Teletype Conversion Routines
12-9	SLOWCREF
12-13	RDPEC: PEC Synchronous Tape Read Program
12-21	Modified MAGSPY
12-24	Overlays to FOCAL-12
12-31	DCON-1Ø
12-56	QANDA+ - Modified QANDA Subroutine
12-57	SPY+ - Modified MAGSPY
12-58	FIFOCON
12-66	ADDINDX (LAP6-DIAL-MS Index Manipulator)
12-79	Modified ADTAPE
12-81	VR12 SCOPE HANDLER FOR OS/8
12-87	ONDISK-OFFDISK
12-89	BUTFLTR
12-92	PDP8TO12
12-93	TRANS
12-95	PDP-12 PS/8 Utility Programs
12-107	AVUPTO8, AVUPTO8S
12-109A,B,C	QNANSWER, QANDATTY, SUPRSHUF
12-111	ADFILE
12-112	IDXRDD
12-113	IDXWT
12-117	TAPEDIT, A PDP-12 LINCTAPE EDITOR
12-118	Average Transient Advanced Programs
12-119	Neurone Spike Train Analysis Programs
12-122	PDP-12 User's Monitor Command
12-123	OS/8 VR12 Handler

L-36	PRINTMSS
L-56	FIDDLEX
L-59	INDEX L4
L-67	TAPEIN
L-79	MARK L8A (Adapted MARK L8)
L-88	TAPE
L-94	*TAPMARK
L-115	MARK1600
L-118	ECHO Keyboard Subroutine
L-119	Keyboard Subroutine
L-124B	LOADBIN
L-124C	DXCREATE

VIII. DISPLAY

DECUS NO.	TITLE
5/8-23A	PDP-5/8 Oscilloscope Symbol Generator (4X6 Matrix)
5/8-23B	PDP-5/8 Oscilloscope Symbol Generator (5X7 Matrix)
8-98	3D Draw for 338 Display
8-99A	Kaleidoscope
8-99B	Kaleidoscope - 338 Display
8-107	CHESSBOARD
8-108	Increment Mode Compiler (INCMOD)
8-109	SEETXT Subroutine
8-128	PDP-8 Oscilloscope Display of Mathematical Functions
8-131	SRCD, Software Rapid Character Display
8-132	STRIP, A Data Display and Analysis Program for the PDP-8, 8/I
8-149	Core Window
8-158	AX-Ø8 Symbol Generator
8-162	Demonstration Programs for the PDP-8
8-167	CIRCUITS
5/8-173	TIC 5/8
5/8-174	MEDIUM
8-175	Post Stimulus Interval Histogram for AX-Ø8
8-191	Fields
8-193	DISP
8-209	Editor-With-View
8-249	Oscilloscope Vector Generator
8-255	SCED: Scope Editor for the AXØ8
5-277	ICBM
8-289	"ULKA" The Ultimate Kaleidoscope
8-334	KVEDIT
8-373	LISP Disk Array
8-383A	Scan and Analysis Program
8-383B	Core Display Program
8-383C	Drawing Applications Program
8-411	Mongoose Display System
8-418A&B	VEKSEL and PAPT
8-423	Disk Editor With View for LAB-8
8-442	"The BYU Boob Tube"
8-450	PS/8 Editor with Display for KV8/I (Overlay)
8-451	PS/8 Handler for KV/8 Vector Display
8-455	CRTPAC
8-486	SEGAR 7: A Seven Segment Array for Alphanumeric Character Generation
8-514	Alpha-Numeric Display Program
8-547	Advanced Averager Program (Rotterdam Version)
8-552	Storage Display Device Handler
8-573	EDITS - A PS/8 Editor for Non-storage Scope Display
8-598	CRT: An OS/8 Handler for Tektronix 611 Storage Scope
8-614	Clock Calibration

DECUS NO.	TITLE
FOCAL8-6	FOCAL-8 Patch for LINC-8 Display
FOCAL8-7	STRIP FOCAL: Storage of Data Arrays in FOCAL
FOCAL8-57	FOCAL Display on a 338
FOCAL8-58	A Patch to FOCAL W to use the LINC-8 Display
FOCAL8-154	8K FOCAL Display
FOCAL8-187	Display FOCAL
FOCAL8-264	MEMORY, A Children's Game

12-6	ANDIP - Analog Digital Interchange Program
12-21	Modified MAGSPY
12-33	KWANDA
12-37	ODCAD (Octal to Decimal Conversion and Display)
12-39	QUANAT 1
12-41	BLOOPD - Blood Pressure Display Program
12-51	MAGSPYD
12-57	SPY+ - Modified MAGSPY
12-71	Snoopy Display Program
12-76	TAPELOOK; CORELOOK; SEARCH
12-103	$HAPPY
12-109A,B,C	QNANSWER, QANDATTY, SUPRSHUF
12-115	PLOT3D, Pseudo 3-Dimensional Perspective Display for the PDP-12
12-123	OS/8 VR12 Handler
12-125	Waveform Analysis
12-126	WAVEFORM: Evoked Potential Analysis

L-4.1	IN HISTO
L-11	DATUM8
L-27	Q & A Subroutine (Modification for LAP6 Characters)
L-66	LAP6DISP
L-69	GRAPHAS
L-87a	SNOOPY Display Program for the LINC-8
L-99A & B	CON2PTS/TSTCON
L-102	OCDISMEM
L-112	FSUPLOT: X-Y Plotter Routine for GRAPHA
L-113	PDIS - A PDP-8 Routine to Access the LINCscope
L-125	Patch to OS/8 TECO for LINC-8 Display

IX. DATA MANAGEMENT, SYMBOL MANIPULATION, SORTING

DECUS NO.	TITLE
5/8-51	Character Packing and Unpacking Routine
8-117	A PDP-8 Interface for a Charged Particle Nuclear Physics Experiment
8-137a	Programs for Storage, Manipulation and Calculation of Data Using DECtape
8-224	PALT: Patch for Improved Text Handling for PAL-D
8-267	DARIC - Data Reduction in Columns
8-280	General Sorting Program
8-284	ASCO - Numerical Sort in Ascending Order
8-416a	Bibliographical Handling
8-418A&B	VEKSEL and PAPT
8-427 a	MEMO II - A Text Formatting Program
8-435	RECOVER
8-440	PIPL
8-441	DELETE
8-445	FYLHLP - PS/8 File Utility Program
8-449D	Buffered I/O Subroutines for the PDP-8
8-454	Radio Teletype to ASCII
8-457	DTFIX
8-460	TT89 - Tape Transfer PDP-8 to PDP-9
8-461	COPY1Ø - PDP-10 DECtape Program for the PDP-8
8-469	Top Secret
8-472	PS8IN, PS8OUT
8-484	RESTore for the RKØ8
8-485	Geometric Data Truncation for Fourier Transform Programs
8-488	NEWPAGE
8-493	Line to Block Conversion
8-495	CORRELATION ANALYSIS
8-496	UTR7: A 7-track Magnetic Tape Reading Utility
8-519	MACRO-8 Pass 3 Output Format Patch
8-547	Advanced Averager Program (Rotterdam Version)
8-550	Modified Matrix Inversion - Real Numbers
8-562	DISORT
8-595	UPDATE, A Program to Make Corrections to a File Containing Records of Variable Length
8-597	N.I.H. OS/8 Package
8-608	FUTIL - OS/8 File Utility
8-610	INVENT-8
8-611	SLED - Source and Listing Editor
8-612	ELAN - Elementary Linguistic Analysis
8-613	Interconversion Between A/D Floating Point and D/A Formats
FOCAL8-7	STRIP FOCAL: Storage of Data Arrays in FOCAL
FOCAL8-180	FOCAL-SORT
FOCAL8-210	CHAIN and FCOM
FOCAL8-234	Action Indicator Calculator
12-12	8TO12 File Converter
12-34	STAP-12
12-46	STRINGS
12-47	PIP-16ØØ
12-80	FOCAL - RT
12-105	DATAFILE and DFUPDATE
12-109A,B,C	QNANSWER, QANDATTY, SUPRSHUF
12-111	ADFILE
12-112	IDXRDD
12-113	IDXWT
L-53a	FIND 1
L-105	INVEN: Creation and Storage of an Inventory

X. PROBABILITY, STATISTICS, CURVE-FITTING

DECUS NO.	TITLE
5/8-9	Analysis of Variance - PDP-5/8
5-25	A Pseudo Random Number Generator for the PDP-5 Computer
5/8-69	LESQ29 and LESQ11
8-118	General Linear Regression
5/8-126	Cumulative Gaussian Distribution Curve Fitting
8-134	LSQ: Least Squares Subroutine
8-137a	Programs for Storage, Manipulation and Calculation of Data Using DECtape
8-243	Amplitude Distribution
8-283	A.V.S.C. (Analysis of Variance, Single Classification)
8-300	Noise Generator
8-316	CORR (Compute Correlation Matrix)
8-317	EIG (Compute Eigenvalues and Eigenvectors)
8-318	PART (Partitioning of Treatment Sums of Squares)
8-319	RAND (Computation of Random Fractions)
8-320	MMMS (Calculation of Minimum, Mean, Maximum and Standard Deviation)
8-321	REG-2 (Curvilinear Regression) REG-4 (Linear Regression)
8-322	CCMP (Correlation of Components and CVAL (Computes Values of Principal Components)
8-324	TSP - Trend Surface Plotting
8-327	CLAN (Cluster Analysis) and GRMN (Calculate Group Means)
8-328	NNAN (Nearest Neighbor Analysis) - OREG (Orthogonalized Regression Analysis) - OREH (Additional Orthogonal Regression Coefficients)
8-387	Grade Point Correlation
8-406	STATPAC Revisions for PDP-8/I and TSS/8
8-410	Pseudo-Random Number Generator, EAE Version
8-429	Intercorrelation 37
8-431	8/I LAB Data System
8-434	Data System for Magnetic Scanning Mass Spectrometers
8-434.1	SCAN (DC34) Data Acquisition Routine
8-434.2	STD (TM36) Automatic Reference Identification Routine
8-434.3	CONV (IR18) Interpolation (Time to Mass) Title
8-434.4	TIC (TI26) Total Ion Current Plot
8-434.5	TAB (PR33) Tabular Listing of Spectra
8-434.6	HIST (DP35) Histogram Plot of Spectra
8-434.7	TUNE (TU1) Tuning Routine
8-493	Line to Block Conversion
8-495	CORRELATION ANALYSIS
8-504C	ESI Demonstration Programs
8-520	PEST/WALD/PINIT: Adaptive Psychophysics Testing Package
8-547	Advanced Averager Program (Rotterdam Version)
8-549	Polynomial Least Squares Fit
8-554	ANOVA and DUNCAN
8-555	MULTC Multiple Correlation Program
8-556	CHISQ Chi Square Program
8-557	CLUSTR Cluster Analysis Program
8-558	CORREL Correlation Program and PCOMP-VARMX Factor Analysis Program
8-564	A Statistical System in PS/8
8-603	PATPST: Patch for DEC-LAB-8/E Post-Stimulus-Time-Histogram Program

DECUS NO.	TITLE
FOCAL8-14	Least Squares Fit to a Straight Line
FOCAL8-15	Least Squares Fit to a Cubic Polynomial
FOCAL8-16	One-Sample Statistics: Two-Sample Statistics: Welch Procedure; One-Way Analysis of Variance; Sheffe's Contrast Between Means
FOCAL8-19	Least Squares Fit to an Exponential
FOCAL8-20	MULTIPULSE
FOCAL8-21	MULTIPULSE-2
FOCAL8-26	Curve Fitting
FOCAL8-28	Column Width; Traverse; Least Square "Linear Fit;" Weight Flow; Filter Design; Ohm's Law
FOCAL8-34	Simultaneous Equations; Abbreviated Simultaneous Equations; Curve Fittings
FOCAL8-37	N-th Degree Polynomial Data Point Fitting Routine; N-th Degree Polynomial Data Point Fitting Routine with RMS Error
FOCAL8-40	Simple Chi-Square Test
FOCAL8-61	Least Square Fit to a Polynomial
FOCAL8-63	CURFIT
FOCAL8-65	Kruskal-Wallis One-Way Analysis of Variance by Ranks
FOCAL8-66	"Quick Scan" - Using Scheffe's Calculation
FOCAL8-67	T-Test
FOCAL8-69	Analysis of Variance
FOCAL8-70	Analysis of Variance Randomized Block "F" Test
FOCAL8-72	General Least Squares Fit
FOCAL8-76	Screening Regression
FOCAL8-93	Dose-Response Routine
FOCAL8-96	Statistics - Standard Deviation
FOCAL8-108	Analysis of Variance for Two-Dimensional Material
FOCAL8-109	Newton's Method of Approximating Real Roots of $P(x)=\emptyset$, Where the Degree of $P(x)$ is 4 or Less

X. PROBABILITY, STATISTICS, CURVE FITTING

DECUS NO.	TITLE
FOCAL8-115	Short Programs for Statistical Analysis Using FOCAL
FOCAL8-117	ED-50
FOCAL8-124	Analysis of Variance Package
FOCAL8-128	Probability (2P); From t ("Student") Distribution
FOCAL8-130	FLHSTO
FOCAL8-131	ZAREA
FOCAL8-137	General Nth Order Regression
FOCAL8-138	WCXT: The Wilcoxon Matched-Pairs Signed-Ranks Test for Non Parametric Data
FOCAL8-160	Non-Parametrics: The Mann-Whitney U Test and the Wilcoxon Matched-Pairs Sign-Ranks Test
FOCAL8-165	F- (Variance Ratio) Distribution Probability
FOCAL8-166A & 166B	First and Second Order Partial Correlations
FOCAL8-167	Five Statistical Programs for the PDP-8 or PDP-12
FOCAL8-170	Saint Peter's College Statistical Package
FOCAL8-171	Minnesota Sociology Statistics Programs
FOCAL8-193	Anova, 2-way, Unsymmetrical
FOCAL8-196	Fisher's Exact Text
FOCAL8-208	A Normally Distributed Random Number Generator in FOCAL
FOCAL8-221	LSQ Stern-Volmer: Least Squares Treatment of the General Stern-Volmer Equation
FOCAL8-236	Polynomial Curve Fitting (Streamlined Programs)
FOCAL8-243	Analysis of Variance for One-Two-and Three-Treatment Designs for a PDP-8
FOCAL8-250	Six Curves: GMS037
FOCAL8-261	Chi Square Utility Package, CHISQR
FOCAL8-266	STATPACK, An Interactive Statistical Package

DECUS NO.	TITLE
12-34	STAP-12
12-38A	Histogram and One-Factor Analysis of Variance
12-38B	Histogram and Two-Factor Analysis of Variance
12-74	*REGRES - Multiple Linear Regression
12-83	$ANOVARM - ONE WAY ANALYSIS OF VARIANCE FOR REPEATED MEASURES DESIGN
12-99	A Set of Spectral Programs
12-109A,B,C	QNANSWER, QANDATTY, SUPRSHUF
12-118	Average Transient Advanced Programs
12-119	Neurone Spike Train Alanysis Programs
L-13	AVPROG
L-14	MEAN
L-64	A Pseudo Random Number Generator for the LINC-8 Computer
L-114	Pseudo-Random Number Generator, EAE Version

XI. SCIENTIFIC APPLICATION, ENGINEERING APPLICATION

DECUS NO.	TITLE
8-49	Relativistic Dynamics
8-65	A Programmed Associative Multichannel Analyser
8-90	Histogram on Teletype Subroutine
8-92	Analysis of Pulse-Height Analyzer Test
8-117	A PDP-8 Interface for a Charged Particle Nuclear Physics Experiment
8-118	General Linear Regression
8-133	First Order Kinetics
8-145	Time-of-Flight Analyzer
8-161	EXPO - A Flexible PDP-8 Data Acquisition Program
8-167	CIRCUITS
8-169	Physical Oceanography Data Reduction Programs for the PDP-8 (11 Parts - See abstract)
8-171	Real-Time System for Behavioral Science Experiments
8-175	Post Stimulus Interval Histogram for AX-Ø8
8-194	NMR Simulator
8-208	Evaluating Determinants (from 2-17)
8-223	Power Spectrum
8-237	MADCAP IV, A Multiplex ADC and Analog Plotting Program
8-238	EPRSIM, An Electron Paramagnetic Resonance Simulator
8-254	Vector Algebra Package
8-258	NMRCAT-29: A Simplified Signal Averager Program
8-260	TOFAST - Fast Direct and Inverse Discrete Fourier Transform Routines
8-279	Bar Chart Plotting Subroutine
8-292	Fast Fourier Transform and Fast Walsh-Fourier Transform
8-293	Atomic Coordinate Program
8-299	Latency Histogram and Calculation
8-323	CRC (Convert Peak Heights on an Auto-Analyzer Chart to PPM and Percentage)
8-325	SBSM - Calculation of Duplicate Sub-Samples from Primary Data
8-326	MLWI - Malawi Land Use Survey Analysis
8-339A	PST (Post Stimulus Time) and Latency Histogram for the LAB-8
8-339B	Time Interval Histogram Program
8-340	The Auto and Cross-Correlation Program for the LAB-8
8-342	STAP-8; Spike Train Analysis Program
8-347	DUBAVG
8-371	Teletype Control of ND 50/50 Memory Unit (TYPED)
8-396	MTS-6/70 (Millisecond Time-Sharing System)
8-419	Nmr-Pulse for the Lab-8/I
8-420	LOGSIM-8
8-424	Morse Code
8-431	8/I LAB Data System
8-434	Data System for Magnetic Scanning Mass Spectrometers
8-434.1	SCAN (DC34) Data Acquisition Routine
8-434.2	STD (TM36) Automatic Reference Identification Routine
8-434.3	CONV (IR18) Interpolation (Time To Mass) Title
8-434.4	TIC(TI26) Total Ion Current Plot
8-434.5	TAB (PR33) Tabular Listing of Spectra
8-434.6	HIST (DP35) Histogram Plot of Spectra
8-434.7	TUNE (TU1) Tuning Routine
8-446	A Patch to FFTS-R for Use Without the EAE
8-447	Roots of a Polynomial by Muller's Method
8-453	Rapid Alert Program (RAP)
8-459	TAYEX - Taylor Expansion Equation Solver
8-468	DIPDUB, A Dual-Independent Parameter, Double-Precision Pulse-Height Analysis Code
8-483	GRFIT, A Simple Least Squares Routine
8-501	Galactic Coordinates
8-514	Alpha-Numeric Display Program
8-520	PEST/WALD/PINIT: Adaptive Psychophysics Testing Package
8-524	GRNDYE 1970 - A Program to Estimate Cardiac Output Off-line from an Indicator Dilution Curve
8-525	DAFFT/PAFFT/DAQUAN(EAE)
8-529	OSCAR: An Operating System for Computerized Animal Research
8-536	Advanced Averager Improvement
8-542	Radioactive Decay
8-547	Advanced Averager Program (Rotterdam Version)
8-559	CUBIC
8-566	PARTL
8-567	EXPO
8-568	CFI - Continued Fraction Inversion
8-578	Chromaticity Diagram
8-591	Pulmonary Resistance
8-603	PATPST: Patch for DEC-LAB-8/E Post-Stimulus-Time-Histogram Program
8-143	FFTS-R - A Fast Fourier Transform Subroutine for Real Valued Functions
8-144	FFTS-C - A Fast Fourier Transform Subroutine for Complex Data

XI. SCIENTIFIC APPLICATION, ENGINEERING APPLICATION

DECUS NO.	TITLE
FOCAL8-20	MULTIPULSE
FOCAL8-21	MULTIPULSE-2
FOCAL8-22	Monte Carlo Solution to Neutron Penetration Problem
FOCAL8-23	Seismic Refraction Sloping Layer Program
FOCAL8-24	GRADE: A Grade Averaging and Display Program
FOCAL8-27	Δ -Y Complex; Y - Δ Complex; Series Resonant Circuit Analysis
FOCAL8-28	Column Width; Traverse; Least Square "Linear Fit," Nozzle Weight Flow; Filter Design; Ohm's Law
FOCAL8-29	Second Order Differential Equation
FOCAL8-30	One Line Routines; X^3 and Circle; Superposition; Circle
FOCAL8-31	Sines; Factors; Figure Eight; Right Triangle Solutions
FOCAL8-35	Rootfinder Program
FOCAL8-36	Determinot Program
FOCAL8-38	Magic Square Generator
FOCAL8-48	A FOCAL Program to Determine Low-Frequency Loudspeaker Parameters Experimentally
FOCAL8-50	FOCAL Version of RC Active Filter
FOCAL8-54	Channel Information and Inverted Histogram Plot
FOCAL8-55	Multichannel Analyzer
FOCAL8-62	THE FOCAL TGH Clinical Package
FOCAL8-64	Newton-Raphson Method for Determination of Polynomial Roots
FOCAL8-68	Determination of Roots of a Polynomial
FOCAL8-83	Gas Law Programs
FOCAL8-86	KCF Temperature Conversion Table
FOCAL8-88	Atomic and Molecular Transition Probabilities in FOCAL
FOCAL8-93	Dose-Response Routine
FOCAL8-94	Multidimensional Integration by Gaussian Quadrature
FOCAL8-102	Solution of Quadratic Equations with Complex Coefficients
FOCAL8-113	Acid-Base Titration Curves
FOCAL8-114	Liquid Scintillation Data Processing Program
FOCAL8-119	CHEMS LAB 5
FOCAL8-132	CIG-8 MARK II
FOCAL8-147	Interaction Analysis
FOCAL8-152	Surface Plate Auto-Collimation
FOCAL8-162	Transistor H-Parameter Conversions
FOCAL8-163	Erlang C Blocking Probability Programs
FOCAL8-175	Modifications and Supplement to FOCAL8-50 RC Filter Design and Plot and 3-Pole Butterworth Filters
FOCAL8-176	Program for Producing Histograms from Clinical Data on Teletype
FOCAL8-181	Filter Design
FOCAL8-198	Michaelis-Menten Kinetics
FOCAL8-204	Acid-Base Equilibria
FOCAL8-207	EAI/ASCII Converter and 'SLO-SYN' NC Program and Tape Generator
FOCAL8-209	GRFIT, A Simple Least Squares Routine
FOCAL8-217	Hamming Algorithm to Solve Two Coupled Ordinary First Order Differential Equations With Given Initial Conditions
FOCAL8-220	Individual Tablet Assay
FOCAL8-221	LSQ Stern-Volmer: Least Squares Treatment of the General Stern-Volmer Equation
FOCAL8-222	Center of Gravity Calculations
FOCAL8-226	Frequency Transformation Program
FOCAL8-227	FOCL/F-An Extended Version of 8K FOCAL'69
FOCAL8-228	Great Circle Distance Between 2 Points
FOCAL8-229	H-800 Wiring Diagrams
FOCAL8-233	A FOCAL-Correlation Program for the LAB-8 System 1. Auto- and Cross-Correlation Program 2. Auto-Correlation Program
FOCAL8-235	MPS Radiation Pattern Program
FOCAL8-238	Millikan Oil Drop Experiment
FOCAL8-241	Satellite Orbital Parameters
FOCAL8-242	Solution of Linear Equation Systems With Symmetrically Matrix
FOCAL8-258	Hearing Loss Simulator
FOCAL8-262	Protein Binding: PROBON 1 - Fraction Bound, PROBON 2 - Total Drug
FOCAL8-263	ROOTS, A Polynomial Root Finder

12-1	EEG Data Collection (BNI Series)
12-4	IRDA
12-15	HISTO12
12-22	PLOTFFT
12-23	CFFT
12-34	STAP-12
12-35	Bioelectric Signal Sorter (JULIA)
12-41	BLOOPD - Blood Pressure Display Program
12-43	PLOT3D
12-44	AVERDT
12-53	Liquid Scintillation Counting: Conversion of CPM to DPM in Double-label Experiments
12-55	FFAESIM
12-62	RUFUS
12-63	OLFFT1 and FETCHFFT
12-65	PISH - Poststimulus Time and Interspike-Interval Histogram
12-69	An On-Line FOCAL-12 Program for Auto-Analyzers
12-72	Four-Point Smoothing with FPP-12
12-73	8-Point Quadratic Smooth with FPP-12
12-80	FOCAL - RT
12-89	BUTFLTR
12-94	DATAN
12-97	An Off-Line FOCAL-12 Program for Auto Analyzers by TWX

XI. SCIENTIFIC APPLICATION, ENGINEERING APPLICATION

DECUS NO.	TITLE
12-98	HERALD - Analog-Digital Average and Standard Error Program
12-101	OS/8 SKED
12-104	CORDATFP
12-107	AVUPTO8, AVUPTO8S
12-109A,B,C	QNANSWER, QANDATTY, SUPRSHUF
12-116	FPP-12/FOCAL-12 Reduction of Auto Analyzer Data for Pharmaceuticals
12-118	Average Transient Advanced Programs
12-119	Neurone Spike Train Analysis Programs
12-121	Arrhythmia Detection and Categorization
12-125	Waveform Analysis
12-126	WAVEFORM: Evoked Potential Analysis
L-4.1	IN HISTO
L-10	LINC-8 Multianalyzer
L-11	DATUM8
L-25	LINC Spectrum Program
L-33	On-Line LABCOM System (Version 4)
L-40	Averager System for the Classic LINC
L-82	Root Solver - Real Coefficients
L-84	SEPAN/Sequential Pattern Analysis
L-89	ECGAV8
L-90	TDIST
L-91	PROG 2
L-92	SPKDET
L-96	SIGAVE1, SIGAVE2, SIGAVE3, SIGAVE4 and EVRANA
L-104A	JIH (Joint Interval Histogram)
L-104B	JIHE - Joint Interval Histogram (English Version)
L-113	PDIS - A PDP-8 Routine to Access the LINCscope

XII. HARDWARE CONTROL

DECUS NO.	TITLE
8-58	One-Page DECtape Routine
8-77	PDP-8 Dual Process System
8-82	Library System for 580 Magnetic Tape (Preliminary Version)
8-104	Card Reader Subroutine for the PDP-8 FORTRAN Compiler
8-121	DECtape Handler
8-201	DECSW
8-224	PALT: Patch for Improved Text Handling for PAL-D
8-225	CR8/I Overlay for PAL III Assembler
8-229	Card III Overlay
8-246	DF32 Disk Routines
8-258	NMRCAT-29: A Simplified Signal Averager Program
8-264	CLOK - AXØ8 RC Clock or External Clock Frequency or Period Measurement
8-285	Teletype Input-Output Package
8-287	A PDP-8 Program to Provide Teletype Entry into the IBM JET System
8-312	DECtape Emulator
8-343	Radial Interface Including Interrupt Mask for the PDP-8 or LINC-8
8-381	Cardreader Subroutine for Disk Editor
8-424	Morse Code
8-434	Data System for Magnetic Scanning Mass Spectrometers
8-434.1	SCAN (DC34) Data Acquisition Routine
8-434.2	STD (TM36) Automatic Reference Identification Routine
8-434.3	CONV (IR18) Interpolation (Time To Mass) Title
8-434.4	TIC (TI26) Total Ion Current Plot
8-434.5	TAB (PR33) Tabular Listing of Spectra
8-434.6	HIST (DP35) Histogram Plot of Spectra
8-434.7	TUNE (TU1) Tuning Routine
8-449A	A Magtape Handler for the PDP-8/TU20
8-449B	LPTQUE - A PTØ8 to A. B. Dick Line Printer Utility Program
8-450	PS/8 Editor With Display for KV8/I (Overlay)
8-451	PS/8 Handler for KV/8 Vector Display
8-452	ANSAM (Analog Sampling)
8-455	CRTPAC
8-457	DTFIX
8-458	VW - Field Independent I/O Handler for Disk and TTY
8-464	TRØ2 Magnetic Tape Device Handler for PS/8
8-490	Tape Alteration Program
8-496	UTR7: A 7-track Magnetic Tape Reading Utility
8-498	Unencoded Incremental Plotter Subroutine
8-499	High-Speed Reader Patch for Lo-Speed Macro-8
8-509	INTERRUPT - TEST
8-537	Talking Eights
8-552	Storage Display Device Handler
8-573	EDITS - A PS/8 Editor for Non-storage Scope Display
8-574	TD8E System Handler for 8K PS/8
8-592	Printer Test Program
8-597	N.I.H. OS/8 Package
8-598	CRT: An OS/8 Handler for Tektronix 611 Storage Scope
8-614	Clock Calibration
FOCAL8-44	Magtape Analyser Using I/O FOCAL
FOCAL8-45	Universal I/O Handler for FOCAL
FOCAL8-80	Using the High Speed Punch with FOCAL
FOCAL8-224	SPASTIC - A System for Programming Angles, Scaler, and Timer by Internal Counting
FOCAL8-227	FOCL/F-An Extended Version of 8K FOCAL'69
FOCAL8-230	CALCOMP Plotter FNEW PLOTX
12-29	LINC-10
12-75	FORTRAN Subroutines for the PDP-12
12-114	FOCAL-PL
L-6	TRIGGR
L-18	BUFFER - Fully Buffered Teletype I/O
L-23	Control to Designate Left or Right LINC-8 Tape Transports as Unit Zero
L-70	A LINC-8 Program to Provide for Entry Into the IBM JET System
L-85	DPT-1 Real-Time Clock
L-106	Radial Interface Including Interrupt Mask for the PDP-8 or LINC-8
L-113	PDIS - A PDP-8 Routine to Access the LINCscope
L-116	TEXTOUT Subroutine
L-118	ECHO Keyboard Subroutine
L-119	Keyboard Subroutine

XIII. GAME, DEMONSTRATION

DECUS NO.	TITLE
5/8-14	Dice Game for the PDP-5/8
5/8-15	ATEPO (Auto Test in Elementary Programming and Operation of a PDP-5 Computer)
5/8-54	TIC-TAC-TOE Learning Program - T3
8-71	Perpetual Calendar
8-79	TIC-TAC-TOE (Trinity College)
8-94A	BLACKJACK
8-94B	BLACKJACK "Overlays"
8-98	3D Draw for 338 Display
8-99A	Kaleidoscope
8-99B	Kaleidoscope - 338 Display
8-107	CHESSBOARD
8-108	Increment Mode Compiler (INCMOD)
8-112	Sentence Generator
8-119	Off-Line TIC-TAC-TOE Program for the PDP-8 Computer
8-151	On-Line TIC TAC TOE
8-152a	PDP-8 Music Programs
8-162	Demonstration Programs for the PDP-8
5/8-173	TIC 5/8
5/8-174	MEDIUM
8-191	Fields
8-196	DET - Detect Key Words
8-215	Hexapawn
8-219	LISS
8-261	QUBIC
8-269	Morse Code Trainer
8-275	Grade Compiler
5-277	ICBM
8-289	"ULKA" The Ultimate Kaleidoscope
8-308	PDP-8 Morse Code Sender
8-331	Roulette
8-332	The Civil War Game
8-346	Pollution Game
8-353	Disk Monitor Patch for BLACKJACK
8-359	Hi-Q Game Playing Program
8-361	Game of Chance
8-388	CALENDAR
8-394	BASIC MOO
8-395	Space War
8-401	Dice Game and TIC-TAC-TOE
8-424	Morse Code
8-426	Prime Number Generator
8-430	DECK: A Random Deck of Cards
8-437	Computer Dating Game
8-442	"The BYU Boob Tube"
8-462	INSTIN
8-463	Perpetual Calendar (BASIC Version)
8-469	Top Secret
8-494	Translate Arabic Into Roman Numerals
8-504C	ESI Demonstration Programs
8-517	Bowling League Results, Standings and Averages Program
8-521	A CLOCK
8-528	TIC-TAC-TOE: Modifications to TIC 5/8, DECUS NO. 8-173
8-537	Talking Eights
8-545	PIF (Program Interrupt Facility for3 TTY's)
8-560	SAM-1
8-563	TAPE

DECUS NO.	TITLE
FOCAL8-5	The Sumer Game
FOCAL8-9	Hexapawn
FOCAL8-38	Magic Square Generator
FOCAL8-41	FRAN THE BARMAID
FOCAL8-42	The Hangman Game
FOCAL8-46	4-DIGIT, 12-Bit Word Practice
FOCAL8-71	FOCAL Golf Program for the PDP-8 (8K) Computer
FOCAL8-75	Blackjack
FOCAL8-77	MARX: A Grading Program
FOCAL8-78	RACK-O
FOCAL8-79	The Carnival Game
FOCAL8-81	FOCAL Lunar Landing Simulation (APOLLO)
FOCAL8-92	FOCAL Horserace for the PDP-8 (8K) Computer
FOCAL8-95	One-Armed Bandit
FOCAL8-99	3 Dimensional TIC TAC TOE (3X3X3)
FOCAL8-101	"HORSERACE"
FOCAL8-103	TEACH
FOCAL8-104	The Towers of Hanoi
FOCAL8-107	NIM
FOCAL8-111	Battle of Numbers Game (Newberry College Version)
FOCAL8-112	TIC-TAC-TOE (FOCAL)
FOCAL8-121	Play Golf With Arnold Palmer
FOCAL8-122	Charge Account
FOCAL8-127	FOCAL - SLOT
FOCAL8-134	1-20 Counting Game
FOCAL8-146	Zeller's Congruence/Day of the Week
FOCAL8-149	Checkers
FOCAL8-156	Blackjack for FOCAL
FOCAL8-158	Mileage Program
FOCAL8-168	One-Armed Bandit - PDP-8 Style
FOCAL8-169	FOCAL Version of the GE Basic Artillery Game
FOCAL8-173	APOLLO II
FOCAL8-183	DARTS
FOCAL8-185	LIFE
FOCAL8-186	SUMER (FRENCH)
FOCAL8-197	Self-Teaching Program for FOCAL
FOCAL8-199	Stock Market Game
FOCAL8-228	Great Circle Distance Between 2 Points
FOCAL8-229	H-800 Wiring Diagrams
FOCAL8-240	Science Fiction Quiz
FOCAL8-244	HANGMAN IV
FOCAL8-246	Undefeatable FOCAL TIC-TAC-TOE
FOCAL8-251	12K Overlay for FOCAL
FOCAL8-257	LIMERICK GENERATOR; RANDOM SENTENCE GENERATOR; LIFE SPAN SIMULATION PROGRAM
FOCAL8-264	MEMORY, A Children's Game
FOCAL8-267	BLACKJACK for FOCAL, 1969
FOCAL8-270	MONOPOLY

XIII. GAME, DEMONSTRATION

DECUS NO.	TITLE
12-21	Modified MAGSPY
12-36	Hangman for PDP-12
12-60	SUMER (French)
12-71	Snoopy Display Program
12-85	APOLLO 12
12-86	ORGAN-AA and ORGAN+BA
12-103	$HAPPY

L-2.1	Clock 1 for LINC; Clock 8 for LINC-8
L-39	SPCWAR
L-74	NIM
L-87a	SNOOPY Display Program for the LINC-8
L-121A	HISTOG
L-123	Towers of Hanoi

XIV. PLOTTING

DECUS NO.	TITLE
5-30	GENPLOT - General Plotting Subroutine
5-31a	FORPLOT
8-147	Incremental Plotter Printout Subroutine
8-148	Plotter System
8-168	CalComp Plotting Package
8-202	PLOT
8-203	ALPHA
8-263	XYPLOT - A Versatile Plot Routine for the D/A Converter
8-279	Bar Chart Plotting Subroutine
8-367	Digital 8-12-U Modified
8-498	Unencoded Incremental Plotter Subroutine
12-42	CALCO12
12-59	FOCPLOT
12-70	COMPLT
12-78	PUBPLOT
12-84	AVERAGER
12-106	$PLOT
12-107	AVUPTO8, AVUPTO8S
12-114	FOCAL-PL
FOCAL8-4	PRIME PLOTS
FOCAL8-12	QUIP1 - Quick Plot in Quadrant 1
FOCAL8-13	3D PLOTTER
FOCAL8-84	2D Plotter for Serial Experimental Data
FOCAL8-90	X-Y Plotter for FOCAL '69
FOCAL8-97	Multiple Equation Graphing on a Teletype
FOCAL8-126	PLOTTER
FOCAL8-195	All Purpose Graphing Program
L-9a	LINC-CalComp Plot Subroutine Package
L-24	PLTKBD - Plotkeyboard
L-77	Extended PROGOFOP to Drive An Inexpensive X-Y Plotter
L-78	XY Plotter Maintenance Programs, XYSET and XYTEST
L-81	FOCDAT
L-107	Digital 8-12-U Modified
L-112	FSUPLOT: X-Y Plotter Routine for GRAPHA
L-121A	HISTOG

XV. DESK CALCULATOR, BUSINESS APPLICATION

DECUS NO.	TITLE
5-5	Expanded Adding Machine
8-122A	SNAP (Simplified Numerical Analysis) Without EAE
8-122B	SNAP (Simplified Numerical Analysis) With EAE
8-155	HEP
8-192	T.A.L.C.: Taylor's Algebraic Linear Calculator
8-231	Data Processing on the PDP-8/S
8-251	A System for Production of Problem Sets with Individualized Data
8-275	Grade Compiler
8-453	Rapid Alert Program (RAP)
8-504A	ESI (Engineering and Scientific Interpreter)
8-504B	ESIX - Extended ESI
8-595	UPDATE, A Program to Make Corrections to a File Containing Records of Variable Length
8-607	CALCUl
8-610	INVENT-8

DECUS NO.	TITLE
L-105	INVEN: Creation and Storage of an Inventory

FOCAL8-25	Payroll Calculations (California, 1968)
FOCAL8-56	Merchandise Price Tags
FOCAL8-60	A System for Production of Problem Sets with Individualized Data
FOCAL8-122	Charge Account
FOCAL8-184	Manpower
FOCAL8-225	Loan Amortization Schedule
FOCAL8-227	FOCL/F-An Extended Version of 8K FOCAL'69
FOCAL8-234	Action Indicator Calculator
FOCAL8-237	Bond Computations
FOCAL8-249	Payroll Listings and Totals

XVI. MAINTENANCE

DECUS NO.	TITLE
5-10	Paper Tape Reader Tester
8-222	Disk Memory Retention Test
8-443	Keyboard Test Tape for Hot Metal Linecaster with TTS
8-444	COREMAP
8-509	INTERRUPT - TEST
8-608	FUTIL - OS/8 File Utility
8-614	Clock Calibration
12-16	MODCLK
L-26	RELTS8-1C

XVII. MISCELLANEOUS

DECUS NO.	TITLE
8-362	IOFMAG
8-403	Stereo - A 2 Channel Music Program
8-443	Keyboard Test Tape for Hot Metal Linecaster with TTS
8-472	PS8IN, PS8OUT
8-540A	BRAILLE-8
8-540B	BPRINT
8-548	Links to Page Routine
8-561	Revised HELP Loader for High Speed Reader and New BIN Loader
8-602 A&B	The PDP-8 Cookbook, Volume 1 & 2
FOCAL8-85	Program Replication
FOCAL8-87	Keyboard Readable Punch
FOCAL8-155	FACTORS
FOCAL8-161	Wilmot Grading Program
FOCAL8-178	Motion Picture Package
FOCAL8-179	Depth of Field Program for Still Camera Lenses
FOCAL8-254	Patch to Allow Computed Line Numbers in FOCAL 1969
FOCAL8-258	Hearing Loss Simulator
12-5	SERCHPRO
12-40	PDP-8 Disk Monitor - LAP6-DIAL Interface
12-49	Cold Start DR32 Disk Formatter for PS/8 on a PDP-12
12-52	Student Test Analysis
12-102	A Manual for the PDP-12 Operator
L-27	Q & A Subroutine (Modification for LAP6 Characters)
L-100	LEAP or 8-Library Index Printer
L-113	PDIS - A PDP-8 Routine to Access the LINCscope
L-117	SEARCH Bibliography System
L-121C	FRACDISP
L-121D	KBDPNCH

FUTURE SUBMISSIONS AND ANNOUNCEMENTS SHOULD BE CATEGORIZED USING THIS LIST

DECUS PROGRAM LIBRARY CATEGORY CODES*

00. Utility (External) Programs

- 0 Unclassified
- 1 Multiple Utility
- 2 Flowcharting
- 3 Magnetic Tape Handling
- 4 Paper Tape Handling
- 5 Disk Handling
- 6 Drum and Direct Data Devices
- 7 Graphic Display Devices
- 8 Remote Data Acquiaition

01. Utility (Internal) Programs

- 0 Unclassified
- 1 Loading
- 2 Clear/Reset Memory
- 3 Check Sum Accumulative and Correction
- 4 Internal Housekeeping
- 5 Dump to Reload/Restore Operations
- 6 File Organization
- 7 Self Checking Digit
- 8 Packed Data Handlers
- 9 Duplicators/Verifiers

02. Diagnostics

- 0 Unclassified
- 1 Status Recorders
- 2 Hardware Maintenance

03. Programming Systems

- 0 Unclassified
- 1 Assemblers
- 2 Compilers
- 3 Interpretive Systems
- 4 Input/Output Control
- 5 Report Generators
- 6 Preprocessing and Editing
- 7 Macros and Macro Generators
- 8 Functions and Subroutines
- 9 Desk Calculators

04. Testing and Debugging

- 0 Unclassified
- 1 Dumping
- 2 Tracing
- 3 Test Data Preparation
- 4 Testing Systems
- 5 Break Point Printing
- 6 Memory Verification and Searching
- 7 On-Line (DDT Type) Debuggers

05. Executive Routines

- 0 Unclassified
- 1 Monitor
- 2 Supervisors
- 3 Disassembly and Derelativizing
- 4 Relativizing
- 5 Relocation

06. Data Handling

- 0 Unclassified
- 1 Sorts
- 2 Merges
- 3 Data Transmission
- 4 Table Operation
- 5 Conversion and/or Scaling
- 6 Character and Symbol Manipulation
- 7 Information Classification, Storage, and Retrieval
- 8 List Processing
- 9 Typesetting

07. Input/Output

- 0 Unclassified
- 1 Binary
- 2 Octal
- 3 Decimal
- 4 BCD
- 5 Hexadecimal
- 6 Composite
- 7 ASCII
- 8 Plotting
- 9 Display

10. Systems Analysis

- 0 Unclassified
- 1 Network Design
- 2 File and Core Requirement
- 3 System Design
- 4 Configuration

11. Simulation of Computers and Components

- 0 Unclassified
- 1 Computers
- 2 Peripheral Equipment
- 3 System Component or Feature
- 4 Pseudo-Computer

12. Conversion of Programs and Data

- 0 Unclassified
- 1 Data Conversion
- 2 Computer Language Translators

*These category (classification) codes have been adopted directly from those established by JUG (Joint User Group)

September 1972

13. Statistical

0 Unclassified
1 Descriptive
2 Univariant and Multivariant Parametric
3 Non-Parametric
4 Time Series and Auto Correlation
5 Probability Distribution Sampling and Random Number Generators
6 Correlation and Regression Analysis
7 Analysis of Variance and Covariance
8 Sequential Analysis
9 Discriminant Analysis

15. Management Science/Operations Research

0 Unclassified
1 Simulations
2 Linear Programming
3 Non-Linear Programming
4 Scheduling/Critical Path/PERT/LESS
5 Games, Game-like Models and Game Theory
6 General Problem Solvers
7 Inventory Control

16. Engineering

0 Unclassified
1 Aeronautical
2 Civil
3 Chemical
4 Electrical
5 Mechanical and Hydraulic
6 Petroleum
7 Nuclear
8 General
9 Simulation

17. Sciences and Mathematics

0 Unclassified
1 General
2 Nuclear Physics
3 Chemistry
4 Geology, Oceanography, Oceanology and Geophysics
5 Biology
6 Social and Behavior
7 Astronomy and Celestial Navigation
8 Simulation
9 Pure Mathematics

18. Nuclear Codes

0 Unclassified

19. Financial

0 Unclassified
1 Inverting and Borrowing
2 Capital Stock
3 Taxes
4 Cash Custody and Forecasting
5 General Accounting
6 Auditing
7 Banking Operations

20. Cost Accounting

0 Unclassified
1 Material Only
2 Labor Only
3 Work in Progress

21. Payroll and Benefits

0 Unclassified
1 Payroll
2 Employee Benefits
3 Profit Sharing
4 Retirement
5 Insurance
6 Credit Union

22. Personnel

0 Unclassified
1 Recruiting and Hiring
2 Inventorying Employees
3 Training
4 Performance Review
5 Administering Wages and Salaries

23. Manufacturing

0 Unclassified
1 Scheduling/Loading
2 Job Reporting
3 Bill of Materials Processors
4 Numerical Control
5 Control Systems

24. Quality Assurance/Reliability

0 Unclassified
1 Testing
2 Performance Analysis

25. Inventory

0 Unclassified
1 Stocking and Issuing
2 Inventory Analysis
3 Equipment and Tool Inventory and Maintenance

26. Purchasing

0 Unclassified
1 Preparing Purchase Orders
2 Matching Invoices
3 Accounts Payable
4 Purchase Analysis

27. Marketing

0 Unclassified
1 Sales and Billings Forecasting
2 Promotion and Advertising
3 Bid or Request Analysis
4 Distribution or Territory Analysis

28. Sales Entered and Billed

0 Unclassified
1 Order Entry and Scheduling
2 Invoicing
3 Accounts Receivable
4 Sales and Billing Analysis
5 Backlog Reporting

29. General Business Services

0 Unclassified
1 Records Retention
2 Forms Management
3 Transportation
4 Printing and Reproduction

30. Demonstrations and Games

0 Unclassified
1 Display
2 Participation

40. Arithmetic Routines

0 Unclassified
1 Real Numbers
2 Complex Numbers
3 Decimal
4 Floating Point

41. Elementary Functions

0 Unclassified
1 Trigonometric
2 Hyperbolic
3 Exponential and Logarithmic
4 Roots and Powers
5 Geometry
6 Logical and Rounded

42. Polynomials and Special Functions

0 Unclassified
1 Evaluation of Polynomials
2 Roots of Polynomials
3 Evaluation of Special Functions
4 Simultaneous Non-Linear Algebraic Equations
5 Simultaneous Transcendental Equations

43. Operations on Functions and Solutions of Differential Equations

0 Unclassified
1 Numerical Integrations
2 Numerical Solutions of Ordinary Differential Equations
3 Numerical Solutions of Partial Differential Equations
4 Numerical Differentiation

44. Interpolation and Approximations

0 Unclassified
1 Table Look-up and Interpolation
2 Curve Fitting
3 Smoothing

45. Operations on Matrices, Vectors and Simultaneous Linear Equations

0 Unclassified
1 Matrix Operations
2 Eigenvalues and Eigenvectors
3 Determinates
4 Simultaneous Linear Equations
5 Vector Analysis

50. Insurance

0 Unclassified
1 Life
2 Fire
3 Pension and Welfare

61. Education

0 Unclassified
1 Demonstrations
2 Problem Solving
3 Record Keeping

62. Literary Data Processing

0 Unclassified
1 General
2 Language and Literature
3 Linguistics
4 Language Translation
5 Concordances
6 Content Analysis
7 Text Editing
8 Bibliographic Analysis
9 Text Manipulation

63. Humanities

0 Unclassified
1 General
2 Music
3 History
4 Art

71. Hybrid Computing

0 Unclassified
1 Analog/Digital, Digital/Analog Conversion
2 Real Time Computing
3 Simulation

72. Time Sharing

0 Unclassified

99. Miscellaneous

0 Unclassified

DECUS NO.	TITLE
8-334	KVEDIT
8-370A	FBUILD
8-370B	DISK
8-391a	7 or 9 Track MTA for PS-8 with TC-58/TU-20
8-398	IMAGE
8-421	Chain Load
8-425	Block-Modify for PS/8
8-427a	MEMO 11 - A Text Formatting Program
8-439	MOVE
8-440	PIPL
8-441	DELETE
8-445	FYLHLP - PS/8 File Utility Program
8-450	PS/8 Editor with Display for KV8/I (Overlay)
8-451	PS/8 Handler for KV/8 Vector Display
8-464	TRØ2 Magnetic Tape Device Handler for PS/8
8-472	PS8IN, PS8OUT
8-473	Three Utility Routines for PS/8 1. DTA and DECLAB 2. CHANGE and REMOVE 3. LIST
8-474	EXIT PS/8
8-475	PIPQ
8-476	Obsolete
8-477	RIBIER - A Program for the PDP-8/I Enabling the Transition from the PS/8 System to the Paper Tape System
8-478	Monitor Command Extensions in PS/8
8-497A.1	8BAL - PDP-8 Macro Language
8-497B	8BAL Source Documentation
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8-517	Bowling League Results, Standings and Averages Program
8-518	PS/8 FORTRAN Alphabetical Sort
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8-549	Polynomial Least Squares Fit
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8-554	ANOVA and DUNCAN
8-555	MULTC Multiple Correlation Program
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8-564	A Statistical System in PS/8
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8-574	TD8E System Handler for 8K PS/8
8-576	LOCAL PAL8: LPAL8.SV
8-585	FAC HANDLER
8-586	XDIREC, OS/8-PS/8 Selective Directory Listing
8-589	BOOTST, Universal OS/8 (PS/8) Bootstrap
8-591	Pulmonary Resistance

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8-595	UPDATE, A Program to Make Corrections to a File Containing Records of Variable Length
8-597	N.I.H. OS/8 Package
8-598	CRT: An OS/8 Handler for Tektronix 611 Storage Scope
8-599	DIBILD.; Directory Rebuilder for PS/8 or OS/8
8-600	EXPIP (Extensions PIP)
8-606	PIP11
8-607	CALCU1
8-608	FUTIL - OS/8 File Utility
8-609	OCOMP - Octal Compare and Dump
8-610	INVENT-8

DECUS NO.	TITLE
FOCAL8-125a	MTA Formatter for TC-58/TU-20 with PS/8
FOCAL8-148	FOCL.S - An Expanded Language for Small Computers, Based on FOCAL
FOCAL8-227	FOCL/F - An Extended Version of 8K FOCAL 69
FOCAL8-265	LISTAL
FOCAL8-266	STATPACK, An Interactive Statistical Package
FOCAL8-268	FX Function for Random Access Files
FOCAL8-269	4K FOCAL '69 Speed-Up Patches
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12-124	FR, FDIS and FADC for PDP-12 Input/Output

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8-65	A Programmed Associative Multichannel Analyser
8-66	Editor Modified for DECtape (552 Control)
8-67	PAL Modified for DECtape Input (Uses EAE)
8-68a	LABEL Program
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8-70	EAE Routines for FORTRAN Operating System (DEC-Ø8-CFA3)
8-71	Perpetual Calendar
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8-74	Solution of System of Linear Equations: AX=B, by Inverting Matrix A, then Multiplying the Inverse by Vector B
8-75	Matrix Multiplication - Including Conforming Rectangular Matrices
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8-78	DIAGNOSE: A Versatile Trace Routine for PDP-8 and EAE
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8-84	One Pass PAL III
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8-86	Obsolete
8-87	XMAP
8-88	Obsolete
8-89	XOD - Extended Octal Debugging Program
8-90	Histogram on Teletype Subroutine
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8-92	Analysis of Pulse-Height Analyzer Test Data with a Small Computer
8-93	CHEW - Convert Any BCD to Binary, Double Precision
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8-99A	Kaleidoscope
8-99B	Kaleidoscope - 338 Display
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8-129	Magnetic Tape Program Library System
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8-191	Fields
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8-247	HELP: A Disk/DECtape Dialogue Program
8-248	SABR - Coded Fast Fourier Transform Subroutine
8-249	Oscilloscope Vector Generator
8-250	Fast Fourier Transform (FFT)
8-251	A System for Production of Problem Sets with Individualized Data
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8-253	Disk Dump on Scope
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8-255	SCED: Scope Editor for the AXØ8
8-256	Binary to RIM Format Converter
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8-262	Character Overflow Change to PDP-8 PAL 3
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8-285	Teletype Input-Output Package
8-286	Two Patches for Disassembler with Symbols
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8-291	Tape to Memory Comparator (6-channel)
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8-319	RAND (Computation of Random Fractions)
8-320	MMMS (Calculation of Minimum, Mean, Maximum and Standard Deviation)
8-321	REG-2 (Curvilinear Regression) REG-4 (Linear Regression)
8-322	CCMP (Correlation of Components) and CVAL (Computes Values of Principal Components)
8-323	CRC (Convert Peak Heights on an Auto-Analyzer Chart to PPM and Percentage)
8-324	TSP - Trend Surface Plotting
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8-330	TSS/8 ALGOL
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8-333	8K PAL-D Assembler for 4K Disk Monitor System
8-334	KVEDIT
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8-339B	Time Interval Histogram Program
8-340	The Auto and Cross-Correlation Program for the LAB-8
8-341	LISP-8
8-342	STAP-8; Spike Train Analysis Program
8-343	Radial Interface Including Interrupt Mask for the PDP-8 or LINC-8
8-344	Toledo Extended Memory Binary Punch
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8-346	Pollution Game
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8-348	Mini Binary Punch
8-349	Octal Debugging Technique with View
8-350	Wilcoxon-White Two Sample Rank Test
8-351	ComBIN Loader
8-352	Parity Hi-Lo Loader
8-353	Disk Monitor Patch for BLACKJACK
8-354	Pass 3 ASR 33 Format Overlay
8-355	PAL III.75
8-356	Page Printer
8-357	ISOMER - Interactive Study of Organic Molecules by Educational Reinforcement
8-358	Card Reader Patch
8-359	Hi-Q Game Playing Program
8-360	ASCII to Friden (EIA)
8-361	Game of Chance
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8-363	DATOUT: A Simple Routine for Printing Sequential Data as an Array
8-364	Extended Memory Patch to the 3-Word Floating Point Arithmetic Interpreter
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8-366	Modified Readable Punch
8-367	Digital 8-12-U Modified
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8-369	Tri-Data CartriFile DEC Editor
8-370A	FBUILD
8-370B	DISK
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8-372	ML Editor (Machine Language Editor)
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8-382	Readable High Speed Punch Copier
8-383A	Scan and Analysis Program
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8-384	BLOK
8-385	Mixed ASCII Formatting and Outputting Technique
8-386	Multiple Field Loader
8-387	Grade Point Correlation
8-388	CALENDAR
8-389	Mini-Monitor, A Secondary Disk Monitor for the PDP-8
8-390	PALEDCO (PAL Assembler and Editor Combined)
8-391a	7 or 9-Track MTA for PS-8 with TC-58/TU-20
8-392	Vector-8
8-393	Queing TCØ1/TU55 DECtape Routines
8-394	BASIC MOO
8-395	Space War
8-396	MTS-6/70 (Millisecond Time-Sharing System)
8-397	8K Editor

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8-401	Dice Game and TIC-TAC-TOE
8-402	Resequence
8-403	Stereo - A 2 Channel Music Program
8-404	Octal MEM Dump - Extended Memory
8-405	SOOT
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8-431	8/I LAB Data System
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8-443	Keyboard Test Tape for Hot Metal Linecaster with TTS
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8-465	The SKED Software System
8-466A	RL Monitor System (WCFMPG Version) P?S-08-1.1A
8-466B	RL Monitor Subsystems P?S-08-1.1B
8-466C	Listing Utility Programs P?S-08-1.1C

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8-466F	PAL III Modified for RL Monitor
8-466G	POLY SNOBOL P?S-08-1.1G
8-466H	POLY LISP P?S-08-1.1H
8-466I	FOCAL Modified for RL Monitor
8-467a	BINREAD (Revised Version)
8-468	DIPDUB, A Dual-Independent Parameter, Double-Precision Pulse-Height Analysis Code
8-469	Top Secret
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8-472	PS8IN, PS8OUT
8-473	Three Utility Routines for PS/8 1. DTA and DECLAB 2. CHANGE and REMOVE 3. LIST
8-474	EXIT PS/8
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8-477	RIBIER - A Program for the PDP-8/I Enabling the Transition from the PS/8 System to the Paper Tape System
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8-483	GRFIT, A Simple Least Squares Routine
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8-485	Geometric Data Truncation for Fourier Transform Programs
8-486	SEGAR 7 : A Seven Segment Array for Alphanumeric Character Generation
8-487	Revised Octal Memory Dump
8-488	NEWPAGE
8-489	SUBSET, Integer Compiler and Operating System
8-490	Tape Alteration Program
8-491	Indexed Floating Point Math Subroutines for PDP-8/E
8-492	BINLOAD, BINTAPE and SEARCH
8-493	Line to Block Conversion
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8-495	CORRELATION ANALYSIS
8-496	UTR7: A 7-track Magnetic Tape Reading Utility
8-497A	8BAL - PDP-8 Macro Language
8-497B	8BAL Source Documentation
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8-499	High-Speed Reader Patch for Lo-Speed Macro-8
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8-503	MACRO-8X: 8K Extended MACRO-8 Assembler
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8-505	BIN-CBL Extended Memory Loader
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8-507	EEPP (Editor Even Parity Punch)
8-508	TSUTIL - A Utility-Diagnostic Program for TSS-8
8-509	INTERRUPT - TEST
8-510	P8COR - Overlay for 8K PAL-D Assembler for 4K Disk Monitor System (DECUS NO. 8-333)
8-511	FPAK-4 Interrupting Floating Point Package
8-512	Modified Binary Loader
8-513	DEBUG 8
8-514	Alpha-Numeric Display Program
8-515	Program to Mate PAL III With Symbolic Editor
8-516	Self-Starting PS/8 Loader
8-517	Bowling League Results, Standings and Averages Program
8-518	PS/8 FORTRAN Alphabetical Sort
8-519	MACRO-8 Pass 3 Output Format Patch
8-520	PEST/WALD/PINIT: Adaptive Psychophysics Testing Package
8-521	A Clock
8-522	'PAGEIT'
8-523	MDT - A Mini Debugging Technique

DECUS NO.	TITLE
8-524	GRNDYE 1970 - A Program to Estimate Cardiac Output Off-line from an Indicator Dilution Curve
8-525	DAFFT/PAFFT/DAQUAN (EAE)
8-526	PROCAL 10/71
8-527	XDDT8E
8-528	TIC-TAC-TOE: Modifications to TIC 5/8, DECUS NO. 8-173
8-529	OSCAR: An Operating System for Computerized Animal Research
8-530	8BALIB - 8BAL Macro Library Generator
8-531A&B	'TRIPLE' - 36 Bit PDP-8/E Simulator and 'TRIPLE' 8BAL Macros
8-532	OPDDT (One Page DDT)
8-533	"WHERE"
8-534	DUAL BINARY LOADER
8-535	BINARY PUNCH FOR PDP 8/E with 2 TTY's (or with high speed punch)
8-536	Advanced Averager Improvement
8-537	Talking Eights
8-538	Integer IOH for FORTRAN Library
8-539	TD8E 4K Loader
8-540A	BRAILLE-8
8-540B	BPRINT
8-541	Cassette Utility Program and PALC
8-542	Radioactive Decay
8-543	TS8REV - Reverse Assembler for TSS/8
8-544	CHECK and CHANGE-D
8-545	PIF (Program Interrupt Facility for 3 TTY's)
8-546	DETEF - DECtape File-Handling System
8-547	Advanced Averager Program (Rotterdam Version)
8-548	Links to Page Routine
8-549	Polynomial Least Squares Fit
8-550	Modified Matrix Inversion - Real Numbers
8-551	COMBO
8-552	Storage Display Device Handler
8-553	Big Brother II
8-554	ANOVA and DUNCAN
8-555	MULTC Multiple Correlation Program
8-556	CHISQ Chi Square Program
8-557	CLUSTR Cluster Analysis Program
8-558	CORREL Correlation Program and PCOMP-VARMX Factor Analysis Program
8-559	CUBIC - A Digital Program for On-Line Differentiation of Sample Analog Signals
8-560	SAM-1
8-561	Revised HELP Loader for High-Speed Reader and New BIN Loader
8-562	DISORT
8-563	TAPE
8-564	A Statistical System in PS/8
8-565	RENUM - Renumbering Program for BASIC Tapes
8-566	PARTL
8-567	EXPO
8-568	CFI - Continued Fraction Inversion
8-569	FLIT Assembler
8-570	BIN4SV
8-571	INPUT, OS/8 Version
8-572	Combination Lettering and Duplicator-Coder Program
8-573	EDITS - A PS/8 Editor for Non-storage Scope Display
8-574	TD8E System Handler for 8K PS/8
8-575	EAE Overlay for Four-Word Floating Point Package Multiply
8-576	LOCAL PAL8: LPAL8.SV
8-577	Tape Duplicator (P.D.T.)
8-578	Chromaticity Diagram
8-579	LISTIT
8-580	Decimal to Floating Point Conversion
8-581	Obsolete
8-582	Random Number Generator Adapted for 8K FORTRAN/SABR
8-583	BASOVR - 8K BASIC Overlay for PDP-8/S
8-584	PRECIS, A Program to Scan a Binary Tape
8-585	FAC HANDLER
8-586	XDIREC, OS/8-PS/8 Selective Directory Listing
8-587	FORTRAN-D 4K Overlayings to Chain Programs
8-588	PEEK, A User Program to Look at the TSS-8 Monitor
8-589	BOOTST, Universal OS/8 (PS/8) Bootstrap
8-590	Matrix Inversion
8-591	Pulmonary Resistance
8-592	Printer Test Program
8-593	Tri-Data Paper Tape PAL III Assembler
8-594	FP8 - Floating Point Arithmetic Software for DEC PDP-8 Series Computers
8-595	UPDATE, A Program to Make Corrections to a File Containing Records of Variable Length
8-596	Multilength Routines
8-597	N.I.H. OS/8 Package
8-598	CRT; An OS/8 Handler for Tektronix 611 Storage Scope
8-599	DIBILD.; Directory Rebuilder for PS/8 or OS/8
8-600	EXPIP (Extensions PIP)
8-601	OASIS
8-602 A&B	The PDP-8 Cookbook, Volume 1 & 2
8-603	PATPST: Patch for DEC-LAB-8/E Post-Stimulus-Time-Histogram Program
8-604	'GET' Command for the Disk/DECtape Monitor System
8-605	ADUMP8
8-606	PIP11
8-607	CALCU1

DECUS NO.	TITLE
8-608	FUTIL - OS/8 File Utility
8-609	OCOMP - Octal Compare and Dump
8-610	INVENT-8
8-611	SLED - Source and Listing Editor
8-612	ELAN - Elementary Linguistic Analysis
8-613	Interconversion Between A/D Floating Point and D/A Formats
8-614	Clock Calibration
8-615	EAE Multiplication for 8K FORTRAN

DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
5/8-1.1a	NC	$1.	$	$ NC	$	$	$	$	$	$	
5/8-2.1a	NC	1.		NC							
5-4	NC			NC							
5-5	NC			NC							
5/8-7	NC			NC							
5/8-9	NC	1.		NC							
5-10	NC	1.		NA							
5/8-14	NC	1.		NA							
5/8-15	NC	1.		NA							
5/8-18A	NC	1.		NC							
5/8-18C	NC	1.	5.	5.							
8-19a	NC	1.		5.							
5/8-20	NC	1.	5.	NC							
5/8-21	NC	1.	5.	NC							
5/8-23A	NC	1.		NC							
5/8-23B	NC	1.	5.	NC							
5-25	NC	1.		NC							
8-26A	NC	1.		NC							
8-26B.1	NC	1.		5.							
8-26C	NC	1.		NC							
8-26D	NC	1.		5.							
5/8-27	NC	1.		NC							
5/8-27a	NC	1.		NC							
5/8-28a	NC	1.		NA							
5-30	NC	1.		NA							
5-31a	NC	1.	5.	NA							
5/8-32a	NC	1.		NC							
5/8-33	NC		5.	NC							
5/8-35	NC		5.	NC							

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
D/S - DECUS Supplied Tape

For information not contained on this sheet see General Information at end of this section

DECUS SERVICE CHARGES

DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
5/8-1.1a	NC	$1.	$	$ NC	$	$	$	$	$	$	
5/8-2.1a	NC	1.		NC							
5-4	NC			NC							
5-5	NC			NC							
5/8-7	NC			NC							
5/8-9	NC	1.		NC							
5-10	NC	1.		NA							
5/8-14	NC	1.		NA							
5/8-15	NC	1.		NA							
5/8-18A	NC	1.		NC							
5/8-18C	NC	1.	5.	5.							
8-19a	NC	1.		5.							
5/8-20	NC	1.	5.	NC							
5/8-21	NC	1.	5.	NC							
5/8-23A	NC	1.		NC							
5/8-23B	NC	1.	5.	NC							
5-25	NC	1.		NC							
8-26A	NC	1.		NC							
8-26B.1	NC	1.		5.							
8-26C	NC	1.		NC							
8-26D	NC	1.		5.							
5/8-27	NC	1.		NC							
5/8-27a	NC	1.		NC							
5/8-28a	NC	1.		NA							
5-30	NC	1.		NA							
5-31a	NC	1.	5.	NA							
5/8-32a	NC	1.		NC							
5/8-33	NC		5.	NC							
5/8-35	NC		5.	NC							

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
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DECUS NO.	WRITE-UP	PAPER TAPE BIN	PAPER TAPE ASCII	LISTING	DECTAPE U/S	DECTAPE D/S	LINCTAPE U/S	LINCTAPE D/S	MAGTAPE U/S	MAGTAPE D/S	OTHER INFORMATION
8-73	NC	$ 1.	$ 5.	$ NC	$	$	$	$	$	$	
8-74	NC	1.	5.	NC							
8-75	NC	1.	5.	NC							
8-77	NC	1.	5.	5.							
8-78	NC	1.	5.	5.							
8-79	NC	1.	5.	NC							
8-80	NC	1.	5.	NC							
8-81	NC	1.	5.	NC							
8-82	NC	1.	5.	5.							
5/8-83A&B	NC	1.	5.	NC							
8-84	NC	1.	5.	NC							
8-85	NC			NC							
8-87	NC	1.	5.	NC	5.	17.					On 1 DECtape
8-89	NC	1.	5.	5.							
8-90	NC		5.	NC							
8-91	NC	1.		5.							
8-92	NC	1.		NC							
8-93	NC		5.	NC							
8-94A	NC	1.	5.	NC							
8-94B	NC	1.	5.	NC							
8-95	NC	1.	5.	NC							
8-96	NC	1.	5.	NC							
8-97	NC		5.	NC							
8-98	NC	1.	5.	NA							
8-99A	NC	1.	5.	NC							
8-99B	NC	1.		NA							
8-100	NC		5.	NC							
8-102a	NC	1.		NA							
8-103A	NC	1.	5.	NC							

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
D/S - DECUS Supplied Tape

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DECUS SERVICE CHARGES

DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-103B	NC	$ 1.	$ 5.	$ NC	$	$	$	$	$	$	
8-103C	NC	1.	5.	NC							
8-103D	NC	1.	5.	NC							
8-104	NC	1.	5.	NC							
8-105	NC	1.	5.	NC							
8-106	NC	1.	5.	NC							
8-107	NC	1.		5.							
8-108	NC	1.		5.							
8-109	NC	1.		5.							
8-110	NC	1.		5.							
8-111	NC	1.		5.							
8-112	NC	1.	5.	NC							
8-114a	NC	1.		NC							
8-115a	NC	1.	5.	NC							
8-117	NC			NC							
8-118	NC		5.	NC							
8-119	NC	1.	5.	5.							
8-120	NC	1.	5.	5.							
8-121	NC	1.	5.	NC							
8-122A	NC	1.		NA							
8-122B	NC	1.		NA							
8-123	NC			5.							Card Deck - $20.
8-124a	NC			5.							Card Deck - $20.
8-125	NC			NA							Card Deck - $20.
5/8-126	NC		5.	NC							
8-127	NC	1.		5.							
8-128	NC		5.	NC							
8-129	NC	1.	5.	NC							
8-130A	NC	1.	5.	NC							

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
D/S - DECUS Supplied Tape

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DEC 7-(369)1112A-R1172

DECUS SERVICE CHARGES

DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-130B	NC	$ 1.	$ 5.	$ NC	$	$	$	$	$	$	
8-131	NC			NA							
8-132	NC	1.		NC							
8-133	NC	1.	5.	NC							
8-134	NC	1.	5.	NC							
8-135	NC	1.		5.							
8-136	NC		5.	NC							
8-137a	NC		1.*	NC	5.	17.					*Example Control Tape
8-141	NC	1.		5.							
8-142	NC	1.	5.	NC							
8-143	NC	1.		5.	5.	17.					On same (1) DECtape
8-144	NC	1.		5.	5.	17.					DECtape-PDP-10 Format
8-145	NC	1.		NC							
8-146	NC		5.	NC							
8-147	NC	1.	5.	NC							
8-148	NC	1.		NA							
8-149	NC	1.	5.	NC							
8-150	NC	1.		NC							
8-151	NC	1.	5.	NA							
8-152a	NC	1.	5.	NC							
8-153	NC			NC	10.	34.					On 2 DECtapes
8-154	NC	1.		5.							
8-155	NC	1.		NA							
8-156	NC	1.		NA							
8-157	NC	1.	5.	NC							
8-158	NC	1.	5.	NC							
8-159	NC	1.		NA							
8-160	NC	1.		NC							
8-161	NC	1.		5.							

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
D/S - DECUS Supplied Tape

For information not contained on this sheet see General Information at end of this section

DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-162	NC	$ 1.	$	$ NA	$	$	$	$	$	$	
8-166	NC			NA							
8-167	NC	1.	5.	5.							
8-168	NC			NC	5.	17.	5.	15.			On 1 DECtape; LINCtape
8-169A	NC	1.	5.	NC							
8-169B	NC	1.	5.	NC							
8-169C	NC	1.	5.	NC							
8-169D	NC	1.	5.	NC							
8-169E	NC	1.	5.	NC							
8-169F	NC	1.	5.	NC							
8-169G	NC	1.	5.	NC							
8-169H	NC	1.	5.	NC							
8-169I	NC	1.	5.	NC							
8-169J	NC	1.	5.	NC							
8-169K	NC	1.	5.	NC							
8-170	NC	1.	5.	NC							
8-171	NC			5.							
8-172	NC	1.	5.	5.							
5/8-173	NC	1.		NA							
5/8-174	NC	1.		NA							
8-175	NC	1.		5.							
8-176	NC	1.	5.	NC							
8-177	NC	1.	5.	5.							
8-178	NC	1.	5.	5.							
8-179	NC	1.	5.	NC							
8-180	NC		5.	5.							
8-181	NC	1.	5.	5.							
8-182	NC	1.	5.	NC							
8-183	NC	1.		NC							

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
D/S - DECUS Supplied Tape

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DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-184	NC	$ 1.	$ 5.	$ NC	$	$	$	$	$	$	
8-185	NC	1.		NC							
8-186	NC	1.		NC							
8-187	NC	1.	5.	NC							
8-188	NC	1.		NC							
8-189	NC	1.		NA							
8-190	NC	1.		5.							
8-191	NC	1.		5.							
8-192	NC	1.		NA							
8-193	NC	1.	5.	NC							
8-194	NC	1.	5.	5.							
8-195	NC	1.		5.							
8-196	NC	1.		NC							
8-197	NC			NC							
8-198	NC	1.		5.							
8-199	NC		5.	NA							
8-200A	NC	1.		NC							
8-200B	NC	1.		NA							
8-201	NC	1.	5.	NC							
8-202	NC	1.	5.	5.							
8-203	NC	1.	5.	5.							
8-204a	NC	1.	5.	5.							
8-205	NC	1.	5.	5.							
8-206	NC	1.	5.	NA							
8-207	NC	1.	5.	NC							
8-208	NC			NC							
8-209	NC	1.		NA							
8-210	NC	1.		5.							
8-211	NC	1.		NA							

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N/A - Not Available

U/S - User Supplied Tape
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DECUS SERVICE CHARGES

DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-212b	NC	$ 1.	$ 5.	$ NC	$	$	$	$	$	$	
8-213	NC	1.		NA	5.	17.					On 1 DECtape - 10 Format
8-214	NC	1.	5.	NC							
8-215	NC	1.		5.	5.	17.					On 1 DECtape
8-216	NC	1.	5.	NC							
8-217A	NC	1.	5.	NC							
8-217B	NC	1.	5.	NC							
8-217C	NC	1.	5.	NC							
8-218	NC	1.		NC							
8-219	NC	1.		NA							
8-220	NC	1.	5.	NC							
8-221	NC		5.	NC							
8-222	NC	1.		NC							
8-223	NC	1.	5.	5.							
8-224	NC	1.		NC							
8-225	NC	1.	5.	NC							
8-226	NC	1.	5.	NC							
8-227	NC	1.	5.	NC							
8-228	NC	1.	5.	NA							
8-229	NC	1.	5.	NC							
8-230	NC		5.	NC							
8-231	NC										
8-232	NC	1.	5.	NC							
8-233	NC	1.	5.	5.							
8-234	NC	1.	5.	NC							
8-235	NC	1.	5.	5.							
8-236	NC	1.	5.	NA							
8-237	NC	1.	5.	5.	5.	17.					On 1 DECtape - 10 Format
8-238	NC	1.		5.							

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
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DECUS SERVICE CHARGES

DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-239	NC	$1.	$ 5.	$ NC	$	$	$	$	$	$	
8-240	NC	1.	5.	NC							
8-241	NC	1.	5.	NC							
8-242	NC	1.	5.	NA							
8-243	NC	1.	5.	NC							
8-244	NC	1.	5.	NC							
8-245	NC	1.		NC							
8-246	NC		5.	NA							
8-247	NC	1.	5.	NC							
8-248	NC	1.	5.	NC							
8-249	NC	1.	5.	NC							
8-250	NC	1.	5.	5.							
8-251	NC	1.	5.	NC							
8-252	NC	1.	5.	NC							
8-253	NC	1.	5.	NC							
8-254	NC	1.	5.	NC							
8-255	NC	1.	5.	NA							
8-256	NC	1.	5.	NC							
8-257	NC	1.		NA							
8-258	NC	1.	5.	5.							
8-259	NC	1.	5.	NC							
8-260	NC	1.	5.	NC							
8-261	NC	1.	5.	NC							
8-262	NC			NC							
8-263	NC		5.	NC							
8-264	NC	1.	5.	NC							
8-265	NC	1.	5.	NC							
8-266	NC	1.		NC							
8-267	NC	1.	5.	NC							

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N/A - Not Available

U/S - User Supplied Tape
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DECUS SERVICE CHARGES

DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-268	NC	$ 1.	$ 5.	$ NC	$	$	$	$	$	$	
8-269	NC	1.	5.	5.							
8-270a	NC	1.	5.	5.							
8-271	NC	1.	5.	NC							
8-272	NC		5.	NC							
8-273	NC	1.		NC							
8-274	NC	1.		NC							
8-275	NC	1.		NC							
8-276	NC	1.	5.	NC							
5-277	NC	1.	5.	NC							
8-278	NC	1.	5.	NC							
8-279	NC		5.	NC							
8-280	NC	1.	5.	NC							
8-281a	NC	1.	5.	NC							
8-282	NC		5.	NC							
8-283	NC		5.	NC							
8-284	NC		5.	NC							
8-285	NC		5.	NC							
8-286	NC	1.	5.	NC							
8-287	NC	1.	5.	NC							
8-288	NC		5.	NC							
8-289	NC	1.		NC							
8-290	NC	1.	5.	NA							
8-291	NC	1.	5.	NC							
8-292	NC	1.	5.	5.							
8-293	NC	1.		5.							
8-294	NC	1.	5.	NC							
8-295	NC	1.	5.	NC							
8-296	NC	1.		NC							

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N/A - Not Available

U/S - User Supplied Tape
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DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-297	NC	$ 1.	$	$ 5.	$	$	$	$	$	$	
8-298	NC	1.	5.	5.							
8-299	NC	1.	5.	5.							
8-300	NC		5.	NC							
8-301	NC	1.		NC							
8-302	NC	1.		NC							
8-303	NC			NC							
8-304	NC	1.	5.	NC							
8-305	NC	1.	5.	NC							
8-306	NC		5.	NA							
8-308	NC	1.	5.	NC							
8-309	NC	1.	5.	NC							
8-310	NC			NC							
8-311	NC	1.	5.	NC							
8-312	NC	1.	5.	NC							
8-314	NC	1.	5.	5.							
8-315	NC	1.	5.	NC							
8-316	NC		5.	NC							
8-317	NC		5.	NC							
8-318	NC		5.	NC							
8-319	NC		5.	NC							
8-320	NC		5.	NC							
8-321	NC		5.	NC							
8-322	NC		5.	NC							
8-323	NC		5.	NC							
8-324	NC		5.	NC							
8-325	NC		5.	NC							
8-326	NC		5.	NC							
8-327	NC		5.	NC							

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
D/S - DECUS Supplied Tape

For information not contained on this sheet see General Information at end of this section

DECUS SERVICE CHARGES

DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-328	NC	$	$ 5.	$ NC	$	$	$	$	$	$	
8-329	NC	1.		NA							
8-330	NC	1.		NA							
8-331	NC		5.	NC							
8-332	NC	1.		NC							
8-333	NC	1.	5.	5.							
8-334	NC	1.		5.							
8-335	NC	1.		5.	5.	17.					On 1 DECtape - 10 Format
8-336	NC		5.	NA	5.	17.					On 1 DECtape
8-338	NC	1.	5.	NC							
8-339A	NC	1.		5.	5.	17.					On same (1) DECtape
8-339B	NC	1.		5.	5.	17.					DECtape - PDP-10 Format
8-340	NC	1.		5.	5.	17.					On 1 DECtape - 10 Format
8-341	NC	1.	5.	5.							
8-342	NC	1.		NA							
8-343	NC			NA							
8-344	NC	1.	5.	NC							
8-345	NC	1.	5.	NC							
8-346	NC		5.	NC							
8-347	NC		5.	NC							
8-348	NC			NC							
8-349	NC	1.	5.	5.							
8-350	NC	1.	5.	NC							
8-351	NC	1.	5.	NC							
8-352	NC	1.	5.	NC							
8-353	NC	1.	5.	NC							
8-354	NC	1.	5.	NC							
8-355	NC	1.	5.	NC							
8-356	NC	1.	5.	NC							

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
D/S - DECUS Supplied Tape

For information not contained on this sheet see General Information at end of this section

DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-357	NC	$1.	$ 5.	$ 5.	$	$	$	$	$	$	
8-358	NC		5.	NC							
8-359	NC	1.		NC							
8-360	NC	1.		NC							
8-361	NC			NC							
8-362	NC		5.	NC							
8-363	NC	1.	5.	NC							
8-364	NC	1.	5.	NC							
8-365	NC		5.	5.							
8-366	NC	1.	5.	5.							
8-367	NC		5.	NC							
8-368	NC		5.	5.							
8-369	NC	1.	5.	NC							
8-370A&B	NC		5.	5.							
8-371	NC	1.		NC							
8-372	NC	1.	5.	NC							
8-373	NC			NC							
8-374	NC	1.	5.	5.							
8-375A	NC	1.	5.	5.							
8-375B	NC	1.	5.	5.							
8-376A	NC	1.	5.	NC							
8-376B	NC	1.	5.	NC							
8-377	NC	1.		NA							
8-378	NC	1.	5.	5.							
8-379a	NC	1.	5.	NC							
8-380	NC	1.	5.	NC							
8-381	NC			NC							
8-382	NC	1.	5.	NC							
8-383A	NC	1.		NA							

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
D/S - DECUS Supplied Tape

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DECUS SERVICE CHARGES

DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-383B	NC	$1.	$	$ NA	$	$	$	$	$	$	
8-383C	NC	1.		NA							
8-384	NC	1.	5.	NC							
8-385	NC			NC							
8-386	NC			NC							
8-387	NC	1.	5.	5.							
8-388	NC	1.	5.	5.							
8-389	NC	1.	5.	5.							
8-390	NC	1.		NA							
8-391a	NC		5.	NC							
8-392	NC	1.		NA	5.	17.					On 1 DECtape - 10 Format
8-393	NC			NC	5.	17.					On 1 DECtape
8-394	NC			NC							
8-395	NC	1.		5.	5.	17.					On 1 DECtape
8-396	NC	1.	5.	5.							
8-397	NC	1.		NA							
8-398a	NC	1.	5.	NC							
8-399	NC	1.	5.	5.							
8-400	NC	1.		NA							
8-401	NC			NC							
8-402	NC		5.	NC							
8-403	NC	1.	5.	5.							
8-404	NC	1.	5.	NA							
8-405	NC	1.	5.	NA							
8-406	NC			NC							
8-407	NC	1.	5.	NC							
8-408	NC	1.	5.	5.							
8-409	NC			5.							Cards - $20.
8-410	NC			NC							

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
D/S - DECUS Supplied Tape

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DECUS SERVICE CHARGES

DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-411	NC	$1.	$5.	$ 5.	$	$	$	$	$	$	
8-412	NC	1.	5.	NA							
8-413	NC	1.	5.	NA							
8-414	NC	1.		NC							
8-415	NC	1.	5.	5.							
8-416a	NC	1.		NA							
8-417	NC			NA	5.	17.					On 1 DECtape
8-418A	NC	1.	5.	NC							
8-418B	NC	1.	5.	NC							
8-419	NC	1.	5.	5.							
8-420	NC	1.		NA							
8-421	NC		5.	NA							
8-422	NC	1.	5.	NC							
8-423	NC	1.	5.	5.							
8-424	NC	1.	5.	NC							
8-425	NC	1.	5.	NC							
8-426	NA	1.		NA							
8-427b	NC			5.	5.	17.					
8-428A	NC	1.	5.	NC							
8-428B	NC	1.	5.	NC							
8-429	NC	1.	5.	5.							
8-430	NC		5.	NC							
8-431	NC	1.		NA							
8-432	NC		5.	NA							
8-433	NC		5.	5.							
8-434.1	NC	1.	5.	5.							
8-434.2	NC	1.	5.	5.							
8-434.3	NC	1.	5.	5.							
8-434.4	NC	1.	5.	5.							

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
D/S - DECUS Supplied Tape

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DECUS SERVICE CHARGES

DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-434.5	NC	$ 1.	$ 5.	$ 5.	$	$	$	$	$	$	
8-434.6	NC	1.	5.	5.							
8-434.7	NC	1.	5.	NC							
8-435	NC	1.	5.	5.							
8-436	NC	1.	5.	NC							
8-437	NC			NC							
8-438	NC	1.	5.	NC							
8-439	NC	1.	5.	NA							
8-440	NC	1.	5.	NA							
8-441	NC	1.	5.	NC							
8-442	NC		5.	NC							
8-443	NC	1.	5.	NC							
8-444	NC	1.	5.	NA							
8-445	NC			5.	5.	17.					On 1 DECtape
8-446	NC	1.	5.	NC							
8-447	NC		5.	NC							
8-448	NC	1.	5.	NC							
8-449A	NC			NC	5.	17.					On 1 DECtape
8-449B	NC			NC	5.	17.					DECtape PDP-10 Format
8-449C	NC			NC	5.	17.					
8-449D	NC			NC	5.	17.					
8-450	NC	1.	5.	5.							
8-451	NC		5.	NA							
8-452	NC	1.	5.	NC							
8-453	NC	1.	5.	NA							
8-454	NC	1.	5.	NC							
8-455	NC	1.	5.	5.							
8-456A	NC	1.		5.	5.	17.					On 1 DECtape
8-456B	NC	1.		5.	5.	17.					

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
D/S - DECUS Supplied Tape

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DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-457	NC	$ 1.	$ 5.	$ 5.	$	$	$	$	$	$	
8-458	NC	1.	5.	NC							
8-459	NC	1.	5.	NC							
8-460	NC	1.	5.	NA							
8-461	NC	1.	5.	NA							
8-462	NC		5.	NC							
8-463	NC		5.	NC							
8-464	NC	1.	5.	NC							
8-465	NC	1.	10.	10.							
8-466A	NC			NA							
8-466B	NC			NA							
8-466C	NC			NA							
8-466D	NC			NA							
8-466E	NC			NA							
8-466F	NC			NA							
8-466G	NC			NA							
8-466H	NC			NA							
8-466I	NC			NA							
8-466UØ	NA			NA	5.	17.					On 1 DECtape
8-467a	NC	1.		NC							
8-468	NC	1.		5.							
8-469	NC	1.		NC							
8-470	NC	A-1.		NA							Tape A for KSR33
	NC	B-1.		NA							Tape B for KSR35
8-471	NC	1.		NA							
8-472	NC		5.	5.							
8-473	NC			NA	5.	17.					On 1 DECtape
8-474	NC			NA	5.	17.					On 1 DECtape
8-475	NC		5.	NA							

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
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DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-477	NC	$ 1.	$ 5.	$ NC	$	$	$	$	$	$	
8-478	NC	1.	5.	NA							
8-479	NC			NA							
8-480a	NC	1.	5.	NA							
8-481a	NC	1.		NC							
8-482	NC	1.		NC							
8-483	NC	1.	5.	NC							
8-484	NC	1.	5.	NC							
8-485	NC	1.	5.	NC							
8-486	NC	1.	5.	NC							
8-487	NC	1.	5.	NC							
8-488	NC	1.		NC							
8-489	NC	1.		NC							
8-490	NC	1.	5.	NC							
8-491	NC		5.	5.							
8-492	NC	1.	5.	NC							
8-493	NC	1.	5.	NC							
8-494	NC		5.	NC							
8-495	NC	1.	5.	5.							
8-496	NC	1.	5.	5.							
8-497A	NC			NA	5.	17.					On 1 DECtape
8-497B	NC			NA							
8-498	NC		5.	NA							
8-499	NC	1.	5.	NC							
8-500	NC	1.	5.	NA	5.	17.					On 1 DECtape
8-501	NC		5.	NC							
8-502	NC	1.		NC							
8-503	NC	1.		NA							
8-504A	NC	1.		NA							

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
D/S - DECUS Supplied Tape

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DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-504B	NC	$ 1.	$	$ NA	$	$	$	$	$	$	
8-504C	NA		5.	NA							
8-505	NC	1.	5.	NC							
8-506	NC	1.	5.	5.							
8-507	NC	1.	5.	NC							
8-508	NC		5.	NA							
8-509	NC	1.	5.	5.							
8-510	NC	1.	5.	NC							
8-511	NC	1.		5.							
8-512	NC	1.		NC							
8-513	NC	1.	5.	NC							
8-514	NC		5.	NC							
8-515	NC	1.		NC							
8-516	NC		5.	NA							
8-517	NC			NC	5.	17.					On 1 DECtape
8-518	NC			NC							
8-519	NC	1.		NC							
8-520	NC	1.	5.	NC							
8-521	NC	1.	5.	NC							
8-522	NC	1.	5.	NC							
8-523	NC	1.	5.	NA							
8-524	NC	1.	5.	NA							
8-525	NC	1.	5.	NA							
8-526	NC	1.		5.							
8-527	NC	1.		5.							
8-528	NC	1.	5.	NC							
8-529	NC	1.	5.	NA							
8-530	NC			NA	5.	17.					On 1 DECtape
8-531A&B	NC			NC	5.	17.					Also includes 8-497, 4

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
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DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-532	NC	$	$ 5.	$ NC	$	$	$	$	$	$	
8-533	NC	1.		NC							
8-534	NC	1.		NC							
8-535	NC	1.		NC							
8-536	NC	1.	5.	NC							
8-537	NC	1.	5.	NC							
8-538	NC	1.	5.	NC							
8-539	NC	1.	5.	NC							
8-540A	NC		5.	NC							
8-540B	NC		5.	NC							
8-541	NC			NA							
8-542	NC	1.	5.	NC							
8-543	NC	1.		NA							
8-544	NC	1.		NA							
8-545	NC	1.	5.	NA							
8-546	NC	1.		25.	5.	17.					On 1 DECtape
8-547	NC	1.	5.	5.							
8-548	NC	1.	5.	NC							
8-549	NC			NA	5.	17.					On 1 DECtape
8-550	NC		5.	NC							
8-551	NC	1.	5.	NC							
8-552	NC		5.	NC							
8-553	NC	1.	5.	5.							
8-554	NC		5.	NA							
8-555	NC		5.	NA							
8-556	NC		5.	NA							
8-557	NC		5.	NA							
8-558	NC		5.	NA							

N/C - No Charge
N/A - Not Available

U/S - User Supplied Tape
D/S - DECUS Supplied Tape

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DECUS SERVICE CHARGES

DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-559	NC	$1.	$	$ 5.	$	$	$	$	$	$	
8-560	NC	1.		NA							
8-561	NC	1.		NC							
8-562	NC	1.	5.	NA							
8-563	NC	1.	5.	NC							
8-564	NC		10.	5.							
8-565	NC	1.		NC							
8-566	NC	1.		NC							
8-567	NC	1.		NC							
8-568	NC	1.		NC							
8-569	NC	1.	5.	5.							
8-570	NC	1.	5.	NC							
8-571	NC	1.	5.	NC							
8-572	NC	1.	5.	NC							
8-573	NC			NA	5.	17.					Image & ASCII DECtape
8-574	NC	1.		NC							
8-575	NC	1.	5.	NC							
8-576	NC	1.		NC							
8-577	NC	1.		NC							
8-578	NC	1.	5.	NA							
8-579	NC	1.		NC							
8-580	NC	1.	5.	NC							
8-582	NC	1.	5.	NC							
8-583	NC	1.		NC							
8-584	NC	1.	5.	NC							
8-585	NC	1.	5.	NC							
8-586	NC		5.	NA							
8-587	NC	1.	5.	NC							
8-588	NC		5.	NA							

N/C - No Charge
N/A - Not Available

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DECUS SERVICE CHARGES

DECUS NO.	WRITE-UP	PAPER TAPE		LISTING	DECTAPE		LINCTAPE		MAGTAPE		OTHER INFORMATION
		BIN	ASCII		U/S	D/S	U/S	D/S	U/S	D/S	
8-589	NC	$1.	$	$ NC	$	$	$	$	$	$	
8-590	NC	1.	5.	NC							
8-591	NC	1.	10.	10.							
8-592	NC	1.	5.	NC							
8-593	NC	1.	5.	5.							
8-594	NC	1.	5.	NC							
8-595	NC	1.	5.	5.							
8-596	NC	1.		NC							
8-597	NC			5.	10.	34.					1 obj. 1 src. DECtape
8-598	NC		5.	NC							
8-599	NC	1.	5.	NA							
8-600	NC	1.	5.	NC							
8-601	NC	1.		NA							
8-602	NC		5.	NC							
8-602B	NC		5.	NC							
8-603	NC	1.	5.	NC							
8-604	NC	1.	5.	NC							
8-605	NC	1.	5.	NC							
8-606	NC		5.	NA							
8-607	NC	1.	5.	NC	5.	17.					Paper Tape OR DTA
8-608	NC			NA	5.	17.					Tape Includes 8-608,
8-609	NC			NA	5.	17.					8-609 & FOCAL8-269
8-610	NC			NA	5.	17.					B/S DECtape
8-611	NC	1.	5.	NC							
8-612	NC	1.	5.	5.							
8-613	NC	1.	5.	NC							
8-614	NC	1.	5.	NC							
8-615	NC	1.	5.	NC							

N/C - No Charge
N/A - Not Available

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GENERAL INFORMATION

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Payment for DECUS Coupons must be made in advance. Purchase Orders for coupons must be paid before coupons can be issued.

All charges are in U. S. dollars, and are subject to change without notice.

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A complete set of all current PDP-8 write-ups is available for a service charge of $60.00

DECUS NO. 5/8-1.1a

BPAK - A Binary Input/Output Package for the PDP-5

P. T. Brady, Bell Laboratories, Holmdel, New Jersey

BPAK incorporates DEC's binary loader with a binary punch-out program. It is designed to fit on the last page of the PDP-8 memory, thus allowing memory-protected storage of a punchout program as well as a read-in program. It has been revised to allow reading into or punching out of any 4K field of memory; the previous version was limited to a 4K machine. BPAK reads and punches tapes in standard DEC binary format.

Source Language: PAL

DECUS NO. 5/8-2.1a

OPAK - An On-Line Debugging Program

P. T. Brady, Bell Laboratories, Holmdel, New Jersey

The new version of OPAK (octal package) is a revision of a debugging program originally conceived in 1964 by A. D. Hause of Bell Laboratories. OPAK enables the user to perform standard debugging operations with special emphasis on ease of typing and typing error correction. Debugging features include register examination and loading, block memory transfer, jamming sections of memory with any constant, an interpretive breakpoint with ability to execute it more than once before control returns to user, word search with mask, octal dump of blocks of memory, and a symbolic dump which recognizes seven groups of in/out devices (selected by user) and supplies the effective address of all indirect instructions and "AND" instructions.

DECUS NO. 5-3

Obsolete

DECUS NO. 5-4

Octal Typeout of Memory Area with Format Option

Donald V. Weaver, New York, New York

(Write-up consists of listing only)

DECUS NO. 5-5

Expanded Adding Machine

Donald V. Weaver, New York, New York

Expanded Adding Machine is a minimum-space version of Expensive Adding Machine (DEC-5-43-D) using a table look-up method including an error space facility. This is a basic version to which additional control functions can easily be added. Optional vertical or horizontal format, optional storage of intermediate result without reentry fixed-point output of results within reason, and other features that can be had in little additional space under switch register control.

DECUS NO. 5-6

Obsolete

DECUS NO. 5/8-7

Decimal to Binary Conversion by Radix Deflation and Accelerated Radix Deflation

Donald V. Weaver, New York, New York

These are typical programs by the improved method of regular and accelerated radix deflation.

DECUS NO. 5-8

Obsolete

DECUS NO. 5/8-9

Analysis of Variance - PDP-5/8

H. Burkhardt

An analysis of variance program for the standard PDP-5/8 configuration. The output consists of:

A. For each sample: 1) sample number, 2) sample size, 3) sample mean, 4) sample variance, 5) sample standard deviation.

B. The grand mean

C. Analysis of Variance Table: 1) the grand mean, 2) the weighted sum of squares of class means about the grand means, 3) the degrees of freedom between samples, 4) the variance between samples, 5) the pooled sum of squares of individual values about the means of their respective classes, 6) the degrees of freedom within samples, 7) the variance within samples, 8) the total sum of squares of deviations from the grand mean, 9) the degrees of freedom, 10) the total variance, 11) the ratio of the variance between samples to the variance with samples.

This is the standard analysis of variance table that can be used with the F test to determine the significance, if any, of the differences between sample means. The output is also useful as a first description of the data.

Other Programs Needed: Floating Point Interpretive Package (DEC-8-5-S)

DECUS NO. 5-10

Paper Tape Reader Tester

Tony Schaeffer, Lawrence Radiation Laboratory, Berkeley, California

A test tape can be produced and will be continously read as an endless tape. Five kinds of errors will be detected and printed out. The Read routine is in 6033-6040.

Storage Requirement: Locations 10, 11, 40-67 (save 63, 64), and 6000-7777.

DECUS NO. 5-11 through 5-13

Obsolete

DECUS NO. 5/8-14

Dice Game for the PDP-5/8

Edward Steinberger, Digital Equipment Corporation, Maynard, Massachusetts

Enables a user to play the game DICE on either the PDP-5 or PDP-8.

Storage Requirement: 1 to 1677
Source Language: PAL

DECUS NO. 5/8-15

ATEPO (Auto Test in Elementary Programming and Operation of a PDP-5/8 Computer)

Submitted by: Rutgers University, Electrical Engineering Department, New Brunswick, New Jersey

The program will type questions or instructions to be performed by the operator of a 4K PDP-5/8. The program will check to see if the operator has answered the questions correctly. If this is the case, it will type the next question or instruction.

DECUS NO. 5-16 and 5/8-17

Obsolete

DECUS NO. 5/8-18A

BIN Tape Disassembly Program for PDP-5/8

John W. McClure, University of California, Lawrence Radiation Laboratory, Livermore, California

Disassembles a PDP-5 or 8 program, which is on tape in BIN format. It prints the margin setting, address, octal contents, mnemonic interpretation (PAL) of the octal contents. A normal program or a program which uses Floating Point may be disassembled.

Minimum Hardware: 4K PDP-5/8, ASR33
Storage Requirement: $16\text{-}1377_8$

DECUS NO. 5/8-18B

Obsolete

DECUS NO. 5/8-18C

Disassembler with Symbols

Eberhard Werner, University of California, Marine Physical Laboratory of the Scripps Institution of Oceanography, San Diego, California

This disassembler accepts a binary tape of standard format and produces a listing of the tape in PAL III mnemonics, and a cross-reference table of all addresses referenced by any memory-reference instruction. A symbol table may be entered to produce a listing similar to a PAL III Pass 3 listing. A patch to produce only a cross reference table is included. See DECUS NO. 8-179.

Minimum Hardware: PDP-8 with 4K, ASR-33 High Speed Reader, EAE
Storage Requirement: $20\text{-}1773_8$ for program, $1774\text{-}7577_8$ for scratch
Source Language: PAL

DECUS NO. 8-19a

DDT-UP Octal-Symbolic Debugging Program

Michael S. Wolfberg, Massachusetts Computer Associates, Wakefield, Massachusetts and Robb N. Russell, The Moore School of Electrical Engineering, University of Pennsylvania, Philadelphia, Pennsylvania

DDT-UP is an octal-symbolic debugging program for a 4K PDP-8 which occupies locations 5600-7667. The mnemonics for the eight basic instructions are defined internal to this area. Other symbols are stored, four locations per symbol, from 5577 down towards 0000. The mnemonics for the standard OPR and IOT group instructions are initially defined in this area. Thus, the highest location initially available to the user is 5363. Beginning at this location the user may define symbols one at a time using the comma (,) operator.

From the Teletype, the user can symbolically examine and modify the contents of any memory location. DDT-UP allows the user to punch a corrected program in CBL format.

DDT-UP has a breakpoint facility to help the user run sections of his program. When this facility is used the debugger also uses location 0005.

Other Programs Needed: DECUS NO. 8-26A or DECUS NO. 8-26C

DECUS NO. 5/8-20

Remote Operated FORTRAN System

James Miller, Dow Badische, Freeport, Texas

Program modification and instructions to make the FORTRAN OTS version dated 2/12/65 operate from remote stations.

DECUS NO. 5/8-21

Triple Precision Arithmetic Package

Joseph A. Rodnite, Information Control System, Ann Arbor, Michigan

An arithmetic package to operate on 36-bit signed integers. The operations are add, subtract, multiply, divide, input conversion, and output conversion. The largest integer which may be represented is $2^{35}-1$ or 10 decimal digits. The routines simulate a 36-bit (3 word) accumulator in core locations 40, 41 and 42 and a 36-bit multiplier quotient register in core locations 43, 44 and 45. Aside from the few locations in page 0, the routines use less core storage space than the equivalent double precision routines.

DECUS NO. 5-22

Obsolete

DECUS NO. 5/8-23A

PDP-5/8 Oscilloscope Symbol Generator (4 x 6 Matrix)

Norman Weissman and John Kiraly, NASA-Ames, Moffett Field, California

The subroutine may be called to write a string of characters, a pair of characters, or a single character on an oscilloscope. Seventy (octal) symbols in ASCII Trimmed Code and four special "formal" commands are acceptable to this routine. The program is operated in a fashion similar to the DEC Teletype Output Package.

DECUS NO. 5/8-23B

PDP-5/8 Oscilloscope Symbol Generator (5 x 7 Matrix)

Larry T. Gell, Center for Visual Science, University of Rochester, Rochester, New York

This subroutine may be called to write a string of characters, a pair of characters, or a single character on a 34D Oscilloscope. Twenty-six alphabetic characters and 0-9 numeric characters are acceptable. However, there is space available to include any symbol the user desires. The program is operated in a fashion similar to the DEC Teletype Output Package (Digital 8-19-U).

Storage Requirement: 200_8-777_8 registers
Source Language: MACRO-8

DECUS NO. 5-24

Obsolete

DECUS NO. 5-25

A Pseudo Random Number Generator for the PDP-5 Computer

Paul T. Brady, Bell Laboratories, Holmdel, New Jersey

The random number generator subroutine, when called repeatedly, will return a sequence of 12-bit numbers which, though deterministic, appears to be drawn from a random sequence uniform over the interval 0000_8 to 7777_8. Successive numbers will be found statistically uncorrelated. The sequence will not repeat itself until it has been called over 4 billion times. (See DECUS NO. FOCAL8-1.)

DECUS NO. 8-26A

Compressed Binary Loader

Michael S. Wolfberg, Massachusetts Computer Associates, Wakefield, Massachusetts

The CBL (Compressed Binary Loader) format in contrast to BIN format utilizes all eight information channels of the tape, thus achieving nearly 25% in time savings.

As BIN tapes include only one checksum at the end of the tape, CBL tapes are divided into many independent blocks, each of which includes its own checksum. Each block has an initial loading address for the block and a word count of the number of words to be loaded.

Storage Requirement: 7700-7777

DECUS NO. 8-26B.1

BN2CBL and CBL2BN BIN to CBL Format Tape Converter

David M. Kristol, University of Pennsylvania, Philadelphia, Pennsylvania

CBL2BN is a short utility program which converts paper tape in CBL format to BIN and BN2CBL converts paper tape from BIN to CBL format. It offers high or low speed I/O and proper punching of field characters.

Storage Requirement: 300_8 and 200_8 Buffer; 400_8 and 200_8 Buffer
Source Language: PDPMAP - (DECUS NO. 8-166)

DECUS NO. 8-26C

Extended Compressed Binary Loader

Michael S. Wolfberg, Massachusetts Computer Associates, Wakefield, Massachusetts

XCBL is used to load binary tapes punched in CBL format into a PDP-8 with more than standard 4K memory. This loader occupies locations 7670 through 7777 of any memory field.

DECUS NO. 8-26D

XCBL Punch Program

Michael S. Wolfberg, Moore School of Electrical Engineering, University of Pennsylvania, Philadelphia, Pennsylvania

This program permits a user to prepare an XCBL tape of portions of a PDP-8 extended memory through the control of the keyboard of the on-line Teletype.

The program is loaded by the BIN Loader.

There are two versions of the program so that any section of memory may be punched: LOW XCBL occupies 00000-00377 and its starting address is 00000; HIGH XCBL occupies 17200-17577 and its starting address is 17200.

Source Language: PAL

DECUS NO. 5/8-27 and 5/8-27a

Bootstrap Loader and Absolute Memory Clear

J. E. Gorman, Western Electric Company, Princeton, New Jersey

Bootstrap Loader inserts a bootstrap loading program in page 0 from a minimum of toggled instructions.

Absolute Memory Clear leaves the machine in an absolutely clear state and, therefore, cycling around memory obeying an AND instruction with location zero. Should not be used unless one plans to reinsert the loader program.

DECUS NO. 5/8-28a

Phoenix Assembler - PAL III Modifications

Terrel L. Miedaner, Space Astronomy Laboratory, Madison, Wisconsin

This modification of the PAL III Assembler speeds up assembly on the ASR-33/35 and operates only with this I/O device. Operation is essentially the same as PAL III, except that an additional pass has been added, Pass 0. This pass, started in the usual manner, but with the switches set to zero, reads the symbolic tape into a core buffer area. Subsequent passes then read the tape image from storage instead of from the Teletype.

DECUS NO. 5/8-29

Obsolete

DECUS NO. 5-30

GENPLOT - General Plotting Subroutine

M. Adamowicz, Department of Electrical Engineering, New York University, New York City, New York

This self-contained subroutine is for the PDP-5 with a 4K memory and a CalComp incremental plotter. The subroutine can move (with the pen in the up position) to locations (x,y,), make an "x" at this location, draw a line from this present position to location (x,y) and initialize the plotter location counters.

DECUS NO. 5-31a

FORPLOT

Jerome Feder, Department of Electrical Engineering, New York University, New York City, New York

FORPLOT is a general-purpose plotting program for the PDP-5 computer in conjunction with the CalComp 560 Plotter. It is self-contained and occupies memory locations 0000_8 up to 4177_8. FORPLOT accepts decimal data inputted on paper tape in either fixed or floating point formats. Formats can be mixed at will. PDP-5 FORTRAN output tapes are acceptable directly and any comment on these are filtered out. An overlay has been added which allows it to be used by those who have neither a high speed reader nor a card reader.

Storage Requirement: $0000\text{-}4177_8$

DECUS NO. 5/8-32a

A Program to Relocate and Pack Programs in Binary Format

J. W. Bowman, Atomic Energy of Canada Ltd., Chalk River, Ontario, Canada

This program provides a means to shuffle machine language programs around in memory to make the most efficient use of computer store.

DECUS NO. 5/8-33

Tape to Memory Comparator

Milton Collins, Teradyne, Boston, Massachusetts

Tape to Memory Comparator is a debugging program which allows comparison of the computer memory with a binary tape. It is particularly useful for detecting reader problems, or during stages of debugging a new program. Presently uses high-speed reader, but may be modified for TTY reader.

DECUS NO. 5-34

Obsolete

DECUS NO. 5/8-35

BCD to Binary Conversion Subroutine and Binary to BCD Conversion Subroutine (Double Precision)

Selene H. C. Wise, Bermuda Press Ltd., Hamilton, Bermuda

This program consists of a pair of relatively simple and straightforward double precision conversions.

DECUS NO. 5-36

Obsolete

DECUS NO. 5-37

Transfer II

Paul Hammond, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts

For users who have more than one memory bank attached to the PDP-5/8, Transfer II may prove valuable in moving information from one field to another. When debugging, Transfer II enables a programmer to make a few changes in a new program and test it without reading in the original program again. Transfer II enables more extensive use of memory banks.

DECUS NO. 5/8-38

FType - Fractional Type

P. T. Brady, Bell Laboratories, Holmdel, New Jersey

Enables a user to type fractions of the form: .582, - .73, etc., which will be interpreted as sign plus 11 bits (e.g., $0.5=2000_8$). Subroutine reads into 300-3177 and is easily relocated, as it will work on any page without modifications.

DECUS NO. 5/8-39

DSdprint, DDtype - Double Precision Signed Decimal Input-Output

P. T. Brady, Bell Laboratories, Holmdel, New Jersey

DSdprint, when given a signed 24-bit integer, types a space or minus sign, and then a 7-digit decimal number in the range -8388608 to +8388607. DDtype enables a user to type in a signed decimal number in either single or double precision. These routines are already separately available, but the present subroutine package occupies only one menory page and allows for more efficient memory allocation. Located in 3000-3177, but will work on any page.

DECUS NO. 5-40

Obsolete

DECUS NO. 5-41

Break Point

Arthur R. Miller, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts

This debugging routine has been reduced to a minimum operation. It is a mobile routine which can operate around any program that leaves an extra 30 cells of memory space.

Its function is to insert break points in any given location of the program being debugged, and to hold the contents of AC and Link. The programmer may examine any locations desired and then continue to the next break point. It is presently located in 140_8 - 170_8, but may be easily relocated.

Storage Requirement: 140_8 - 170_8

DECUS NO. 5-42

Obsolete

DECUS NO. 5/8-43

Unsigned Octal - Decimal Fraction Conversion

Frank Ollie, Defence Research Telecommunications Establishment, Ottawa, Ontario, Canada

This routine accepts a four-digit octal fraction in the accumulator and prints it out as an N-digit decimal fraction where N=12 unless otherwise specified. After N digits, the fraction is truncated. Programs are included for use on the PDP-5 with Type 153 Automatic Multiply-Divide and the PDP-8 with Type 182 Extended Arithmetic Element.

Storage Requirement: 55_8 locations for the PDP-5; 47_8 locations for the PDP-8

DECUS NO. 8-44

Modifications to the Fixed Point Output in the PDP-8 Floating Point Package (Digital 8-5-S)

A. R. McKenzie, Data Systems Division, Standard Telephone & Cables, Ltd., England

This version of the Output Controller is in the form of patches to the Floating Output with an additional page of coding. It does not increase the size of the Floating Point Package. A summary of this version follows:

1. The number output is automatically rounded off to the last digit printed, or the sixth significant digit, whichever is reached first. Floating point output is rounded off to six significant figures since the seventh is usually meaningless.

2. A number less than one is printed with a zero preceding the decimal point (e.g., "+0.5" instead of "+.5").

3. A zero result, after rounding off, is printed as "+0" instead of "+".

4. The basic Floating Point Package includes the facility to specify a carriage return/line feed after the number using location 55 as a flag for this purpose. The patches for the Output Controller caused this facility to be lost. This version restores this facility.

DECUS NO. 5/8-45

PDP-5/8 Remote and Time Shared II System

James Miller, Dow Badische Chemical Company, Freeport, Texas

A time-shared programming system which allows remote stations immediate access to the computer and a wide selection of programs.

DECUS NO. 8-46b

The Utility Programs

Edward Della Torre, American-Standard, Princeton, New Jersey

Consists of seven programs (listed below) each of which may be selected via the Teletypewriter. When the program is started, either by a self-starting binary loader or by manually starting the computer in address 200_8, it is in its executive mode. In this mode, it will respond only to eight keys and perform the following functions:

B - go to BIN to QK Converter Program
E - go to Editor Program
F - FORTRAN Tape formatter
L - type a section of leader and stay in executive
N - go to Editor program without typing leader
P - go to Page Format Program
T - Assembly language tape formatter
Q - go to QK to BIN Converter Program

DECUS NO. 8-47

ALBIN - A PDP-8 Loader for Relocatable Binary Programs

J. L. Visschers, P. U. ten Kate and M. A. A. Sonnemans, Institut Voar Kernphysisch Onderzoek (IKO), Amsterdam, The Netherlands

ALBIN is a simple method for constructing relocatable binary formatted programs, using the PAL III Assembler. Allocation of these programs can be varied in units of one memory page (128_{10} registers). When loading an ALBIN program, the actual absolute addresses of indicated program elements (e.g., the keypoint of subroutines) are noted down in fixed program-specified location on page zero. In order to make a DEC symbolic program suitable for translation into its relocatable binary equivalent, minor changes are required which, however, do not influence the length of the program. Due to its similarity to the standard DEC BIN loader, the ALBIN loader is also able to read-in normal DEC binary tapes. ALBIN requires 122_{10} locations, RIM loader included. Piling-up in core memory of ALBIN programs stored on conventional or DECtape can be achieved using the same method with some modifications.

DECUS NO. 5/8-48

Modified Binary Loader MK IV

R. Ward, American-Standard Research Division, New Brunswick, New Jersey

The Mark IV Loader was developed to accomplish four objectives: 1) Incorporate the self-starting format described in DECUS NO. 5/8-27, Bootstrap Loader; 2) Select the reader in use, automatically, without switch register settings; 3) Enable a newly-prepared binary tape to be checked prior to loading by calculating the checksum; 4) Reduce the storage requirements for the loader so that a special program would fit on the last page of memory with it.

DECUS NO. 8-49

Relativistic Dynamics

G. Sharman, Southampton University, Southampton, England

Prints tables for relativistic particle collisions and decay in the same format as the Oxford Kinematic Tables. It can be used in two ways:

1. Two-particle Collisions - Given the masses of incident, target, and emitted particles, the incident energy and centre-of-mass angles, the program calculates angles and energies of the emitted particles in the Lab frame. If the process is forbidden energetically, program outputs "E" allowing the threshold energy to be found.

2. Single-Particle Decays - By specifying M2=0 (target), the problem will be treated as a decay, and similar tables to the above will be printed.

DECUS NO. 5/8-50

Obsolete

DECUS NO. 5/8-51

Character Packing and Unpacking Routine

Richard Merrill, Digital Equipment Corporation, Maynard, Massachusetts

ASCII characters may be packed two to a word and recovered. Control characters are also packable but are preceded by a 37 before being packed into the buffer.

Storage Requirement: 63_{10} words

DECUS NO. 8-52

Tiny Tape Editor

Richard Merrill, Digital Equipment Corporation, Maynard, Massachusetts

This Tiny Tape Character Editor fits in core at the same time as the PAL III or MACRO-8 assemblers. A tape may be duplicated at three speeds and stopped at any character for insertion or deletion. The toggle switches control the speed and the functions desired.

Storage Requirement: 72_{10} registers

DECUS NO. 5/8-53

Obsolete

DECUS NO. 5/8-54

TIC-TAC-TOE Learning Program - T3

Michael Green, Stevens Institute of Technology, Hoboken, New Jersey

This program plays TIC-TAC-TOE basing its moves on stored

DECUS NO. 5/8-54 (Continued)

descriptions of previously lost games. The main program is written in FORTRAN. There is a short subroutine written in PAL II used to print out the TIC-TAC-TOE board. The program comes already educated with about 32 lost games stored.

Other Programs Needed: FORTRAN Object Time System

DECUS NO. 5/8-55

PALEX - An On-Line Debugging Program for the PDP-5 and PDP-8 Computers

Robert Berger, Bell Telephone Laboratories, New York, New York

One problem with programs written in Program Assembly Language (PAL) for operation on a PDP-5/8 computer is the danger of an untested program being self-destructive, running wild, destroying other programs residing in memory such as loading programs. PALEX prevents any of the above unwanted operations from occurring while it gives the operator-programmer valuable debugging information and enables him to make changes in his program and try out the modified program. Once running, PALEX connot be destroyed by any program or instruction in memory, the operator need not touch any manual console controls, and all required information is printed in easy-to-read format on the Teletype console.

DECUS NO. 8-56

Fixed Point Trace No. 1

B. J. Biavati, Columbia University, New York, New York

A minimum size monitor program which executes the users' program one instruction at a time and reports the contents of the program counter, the octal instruction, the contents of the accumulator and link and the contents of the effective address by means of the ASR-33 Teletype. (See DECUS NO. 8-57)

Storage Requirement: Two pages

DECUS NO. 8-57

Fixed Point Trace No. 2

B. J. Biavati, Columbia University, New York, New York

Similar to Fixed Point Trace No. 1 (DECUS NO. 8-56) except that the symbolic tape provided has a single origin setting instruction of 6000. Any four consecutive memory pages can be used, with the exception of page zero, by changing this one instruction.

DECUS NO. 8-58

One-Page DECtape Routine

George Friedman, Massachusetts Institute of Technology, Cambridge, Massachusetts

A general-purpose program for reading, writing, and searching of magnetic tape. This program was written for the Type 552 Control. It has many advantages over both the standard DEC routines. The routines are one page long and can be operated with the interrupt on or off. The DEC program delays the calling program while waiting for the unit and movement delays to time-out. This routine returns control to the calling program. This saves 1/4 second every time the tape searches forward and half that time when it reverses. In addition, it will read and write block 0. This program is an advantage over the previous one-page routines in that it allows interrupt operations, does not overflow by one location, interprets the end zone correctly and not as an error, and provides a calling sequence identical to the DEC program.

DECUS NO. 8-59

Obsolete

DECUS NO. 8-60

Square Root Function by Subtraction Reduction (Uses EAE)

George Friedman, Massachusetts Institute of Technology, Cambridge, Massachusetts

A single precision square root routine using EAE. This routine is usually faster than the DEC routine and can easily be modified for double precision calculation at only twice the computation time.

DECUS NO 8-61

Improvement to Digital 8-9-F Square Root

George Friedman, Massachusetts Institute of Technology, Cambridge, Massachusetts

An improved version of the DEC Single Precision Square Root Routine (without EAE). Saves a few words of storage and execution is speeded up 12 percent.

DECUS NO. 8-62a and 5-63

Obsolete

DECUS NO. 8-64a

4K and 8K DECtape Programming System

James Crapuchettes, Stanford Electronics Laboratories, Stanford, California

This programming system is a complete revision and expansion of the DECtape Library System (written by DEC) and the DECtape Programming System (DECUS NO. 8-64). The System will allow editing, assembling and debugging of programs using one or more DECtape units (TU55) and 4K or 8K of memory on PDP-8 Family computers. The strong points of the

DECUS NO. 8-64a (Continued)
System are speed with DECtapes (much faster than Disk/ DECtape Monitor System) and complete teletype control of all System programs. The file system is completely compatible with the System that it replaces (DECUS NO. 8-64), and all of the System programs except XEDIT, XPAL, XPAL8, XLOAD and XSYS are compatible with the old System. These 5 programs must be used with the new System only.

Note: TCØ1 version only. Tapes no longer available for 552 version.

Minimum Hardware: PDP-8, TCØ1(TCØ8), TU55(TU56), 1 DECtape unit required but 2 are preferable.
Source Language: PAL III

DECUS NO. 8-65

A Programmed Associative Multichannel Analyzer

G. C. Best, Atomic Energy Research Establishment, Harwell, England

The program describes the use of a small computer as an associative analyzer with special reference to the PDP-8. The advantages and limitations of the method are discussed in the write-up, and general program algorithms are presented.

DECUS NO. 8-66

Editor Modified for DECtape (552 Control)

Robin Wadleigh, Johns Hopkins University, Baltimore, Maryland

This program consists of modifications to the Digital 8-1-S Symbolic Editor to enable reading and writing on DECtape. This results in considerable time savings in assembling PAL programs since PAL has also been modified to accept the symbolic program directly from DECtape. The DECtape compatibility is also useful for storing text for later use and for regaining Editor memory space lost due to delete and change commands. In addition, the overflow detection routine is now foolproof and results in a HALT.

Minimum Hardware: PDP-8 with EAE, ASR-33, DECtape
Other Programs Needed: DECUS NO. 8-67
Storage Requirement: Editor: <Ø, 1502>
Modifications: <1462, 1502>
<6376, 7177>
DECtape Routines: <7200, 7577>

DECUS NO. 8-67

PAL Modified for DECtape Input (Uses EAE)

Robin B. Wadleigh, Johns Hopkins University, Baltimore, Maryland

This program is a modification to the Digital 8-3L-S PAL Assembly Program enabling PAL to obtain the symbolic program from DECtape (in addition to paper tape), and outputting the assembled program in the usual manner. (The symbolic program is written onto DECtape by use of the "Editor Modified for DECtape" Program.) This modification also makes it possible to assemble sections or commands from the keyboard with those from DECtape. The resulting assembly is limited in speed mainly by the punching of the assembled program during Pass 2; and Pass 1 is speeded considerably. Also included is a tabulator interpreter, providing Pass 3 listings in tabulated format.

Minimum Hardware: PDP-8 with EAE, ASR-33, DECtape (552)
Other Programs Needed: DECUS NO. 8-66
Storage Requirement: PAL III: <Ø, 3561> plus symbol table
Modifications: <6555, 7177>
DECtape Routines: <7200, 7577>

DECUS NO. 8-68a

LABEL Program

Michael S. Wolfberg, Massachusetts Computer Associates, Wakefield, Massachusetts

The LABEL Program punches labels for paper tapes on the Teletype punch. When a key on the Teletype keyboard is depressed, no echo is performed, but a few characters of tape are punched which form the outline of the character associated with the key. Outlines are punched for all characters whose code is between 240 and 337. (Reference DECUS NO. 8-106).

Storage Requirement: Locations 200-677 of any memory field. 400-677 of Readable Punch

DECUS NO. 5/8-69

LESQ29 and LESQ11

Michael W. King, Phillips Petroleum Company, Idaho Falls, Idaho

The purpose of the program is to fit the best sequences of parabolas to a given 400 point data curve in order to remove extraneous noise; rather than rely on a single 400 point parabola least squares fit to approximate a given data curve. Approximately 400 individual parabolas are computed as follows:

LESQ29 performs a second order least squares fit using a 29 point smooth interval.

LESQ11 is identical to LESQ29 except that an 11 rather than a 29 point smooth interval is used. LESQ11 will preserve higher frequency data than LESQ29 for a given data curve with constant time between data points.

Minimum Hardware: 4K PDP-5 or PDP-8, Teletypewriter (plotter, DECtape optional)
Other Programs Needed: Floating Point Interpretive Package (Digital 8-5-S) and appropriate data handling routines
Storage Requirement: LESQ11: 400-564; 700-716
LESQ29: 400-564; 700-751
Restrictions: Positive integer data $<3777_8$; time between data points constant

DECUS NO. 8-70

EAE Routines for FORTRAN Operating System (DEC-08-CFA3)

Russell B. Ham, U. S. Public Health Service, Winchester, Massachusetts

These are two binary patches to the FORTRAN Operating System which utilizes the Type 182 EAE hardware for single precision multiplication and normalization, replacing the software routines in FOSSIL (the operating system). The binary tape is loaded by the BIN Loader after FOSSIL has been loaded. Execution time of a Gauss-Jordan matrix inversion is reduced by approximately 30%.

Minimum Hardware:	PDP-8 with Type 182 EAE
Other Programs Needed:	FORTRAN Operating System DEC-08-CFA3-PB dated March 2, 1967

DECUS NO. 8-71

Perpetual Calendar

E. Singer, McGill University, Montreal, Quebec, Canada

The program is designed as a computer demonstration. When a valid date is fed into the computer, the corresponding day of the week is typed out. The program is based on the Gregorian Calendar and is limited to years between 1500 and 4095.

Minimum Hardware:	PDP-8 with an ASR-33 Teletype
Storage Requirement:	20-1333

DECUS NO. 8-72

Matrix Inversion - Real Numbers

A. E. Sapego, Trinity College, Hartford, Connecticut

The program inverts a matrix, up to size 12 x 12, of real numbers. The algorithm used is the Gauss-Jordan method. A unit vector of appropriate size is generated internally at each stage. Following the Gauss sweep-out, the matrix is shifted in storage, another unit vector is generated and the calculation proceeds.

Other Programs Needed:	FORTRAN Compiler and FORTRAN Operating System
Storage Requirement:	Uses all of core not used by the FORTRAN Operating System

DECUS NO. 8-73

Matrix Inversion - Complex Numbers

A. E. Sapega, Trinity College, Hartford, Connecticut

The program inverts a matrix, up to size 6 x 6 of complex numbers. The algorithm used is the Gauss-Jordan method, programmed to carry out complex number calculations. A unit-vector of appropriate size is generated internally. Following the Gauss sweep-out, the matrix is shifted, another unit vector is generated, and the calculation proceeds.

Other Programs Needed:	FORTRAN Compiler and FORTRAN Operating System
Storage Requirement:	Uses essentially all core not used by the FORTRAN Operating System

DECUS NO. 8-74

Solution of System of Linear Equations: AX=B, by Inverting Matrix A, Then Multiplying the Inverse by Vector B

A. E. Sapega, Trinity College, Hartford, Connecticut

This program solves the set of linear algebraic equations AX=B by inverting matrix A using a Gauss-Jordan method. When the inverse matrix has been calculated, it is printed out. At that point, the program requests the B-vector entries. After read-in of the B-vector, the product is computed and printed out. The program then loops back to request another B-vector, allowing the system to solve many sets of B-vectors without the need to invert matrix A again. Maximum size is 8 x 8.

Other Programs Needed:	FORTRAN Compiler and FORTRAN Operating System
Storage Requirement:	Uses essentially all of core not used by the FORTRAN Operating System

DECUS NO. 8-75

Matrix Multiplication - Including Conforming Rectangular Matrices

A. E. Sapega and Chester Sic, Trinity College, Hartford, Connecticut

This program multiplies two matrices, not necessarily square but which conform for multiplication.

Other Programs Needed:	FORTRAN Operating System and FORTRAN Compiler

DECUS NO. 8-76

Obsolete

DECUS NO. 8-77

PDP-8 Dual Process System

Richard M. Merrill, Digital Equipment Corporation, Maynard, Massachusetts

The purpose of this system is to expedite the programming of multiprocessing problems on the PDP-8 and PDP-8/S. It maximizes both the input speed and the portion of real time actually used for calculations by allowing the program to run during the intervals between issuing I/O commands and the raising of the device flag to signal completion of the command. The technique also allows queuing of input data or commands so that the user need not wait while his last line is being processed, and so that each line of input may be processed as fast as possible regardless of its length. The system uses the interrupt facilities and has less than 3% overhead on the PDP-8/S (about 0.1% on the PDP-8).

DECUS NO. 8-77 (Continued)

This method is especially useful for a slower machine where the problem may easily be calculation limited but would, without such a system, become I/O bound.

The program may also be easily extended to handle input from an A/D converter. Here, the input would be buffered by groups of readings terminated either arbitrarily in groups of N or by zero crossings.

This program can increase the I/O to computation efficiency of some programs by 100%. It can do this even for single Teletype. Each user will probably want to tailor the program to his individual needs.

Storage Requirement: 600_8 registers for two TTY's plus buffer space. (Several device configurations are possible.)

DECUS NO. 8-78

DIAGNOSE: A Versatile Trace Routine for PDP-8 and EAE

Keith B. Oldham, North American Aviation Science Center, Thousand Oaks, California

This relocatable trace routine will track down logical errors in a program (the "sick" program). Starting at any convenient location in the "sick" program, instructions are executed one at a time, and a record of all operations is printed out via the Teletype. To avoid tracing proven subroutines, an option is provided to omit subroutine tracing. The present routine is significantly more versatile than two other trace routines in the DECUS Library (DECUS NO. 8-56 and 8-57) for the PDP-8 in that it is able to trace "sick" programs containing floating point, extended arithmetic and a variety of input/output instructions. DIAGNOSE is, however, at a disadvantage compared with DECUS NO. 8-56 in requiring more memory space (five pages as opposed to two); and compared with DECUS NO. 8-57 in not possessing the trace-suppression features of the latter. The mode of operation of DIAGNOSE is quite different from the other trace routines.

Other Programs Needed: Floating Point Package needed for floating point tracing (DEC-8-5-S)

DECUS NO. 8-79

TIC-TAC-TOE (Trinity College)

Gunnar Walmet, Trinity College, Hartford, Connecticut

This TIC-TAC-TOE game is programmed, using internal logic, so that the computer will either win or stalemate, but not lose a game. At the termination of a game, the program restarts for the next game.

DECUS NO. 8-80

Determination of Real Eigenvalues of a Real Matrix

A. E. Sapega, Trinity College, Hartford, Connecticut

This is a two-part program for determining the real eigenvalues of a real-valued matrix. The matrix does not have to be symmetric. Part I uses the power method of iterating on an eigenvector to determine the largest eigenvalue of the matrix. Part II then deflates the matrix using the results of Part I so as to produce a matrix of order one less than that solved for in Part I. Part I can then be reloaded, and the next eigenvalue in line may be calculated. In this, all the real eigenvalues may be computed in order.

Minimum Hardware: PDP-8; ASR-33
Other Programs Needed: FORTRAN Systems
Source Language: FORTRAN

DECUS NO. 8-81

A BIN or RIM Format Data or Program Tape Generator

R. F. Templeman, The Physical Laboratories, The University, Manchester, England

This program enables a PDP-8 operator to generate tapes under Teletype control in RIM or PAL BIN format without formal assembly, assuming the operator knows the octal codes corresponding to each instruction. This is particularly useful when one is dealing with small programs for testing interface equipment or when making small modifications to larger programs saving reassembling time. Tapes generated using this program can be appended to existing BIN or RIM tapes and can then be loaded with the original tape into core with the appropriate loader. Another use of this program is in the preparation of data tapes in RIM or BIN format so that data can be loaded directly into PDP-8 core via the usual loaders. The program also generates leader/trailer code and a checksum under program control.

Storage Requirement: Locations 6000-6077
Source Language: PAL III

DECUS NO. 8-82

Library System for 580 Magnetic Tape (Preliminary Version)

G. Sharman, University of Southampton, Southampton, England

The system provides for storing program files (or other files) on the 580 Magnetic Tape with PDP-8, and recalling them at will without altering the state of the rest of the computer. In general principle, it is similar to the DECtape Library System, and the only effective storage requirement is the last page of memory.

As written, the system consists of three programs known as BOOTSTRAP 1, BOOTSTRAP 2, and the LIBRARY Routines.

DECUS NO. 5/8-83A&B

Octal Debugging Package (With and without Floating Point)

James Rothman

This program is an on-line debugger which will communicate with the operator through the ASR-33 Teletype. It allows register examination and modification, octal dumping, binary punching, multiple and simultaneous breakpoints, starting a program, and running at a particular location with preset AC and link. ODP is completely relocatable at the beginning of all pages except page zero, and is compatible with the PDP-5, the PDP-8 and the PDP-8/S.

Storage Requirement: The high version of ODP requires locations 7000-7577. The low version requires locations 0200-0777. All versions will require three pages. Also, location 0002 is used for a breakpoint pointer to ODP

DECUS NO. 8-84

One Pass PAL III

Krause and Riedl, Siemens, Erlangen, Germany

This is a modification to Digital 8-3L-S, for use on an 8K PDP-8 with ASR-33. The principle of the modification is to store the incoming characters during Pass 1 into the memory extension and taking them from there during Pass 2 and 3. Source programs must be limited to 4095 characters. This modification can save about 40% of assembly time.

Operation of the program is the same as for PAL III except that the reading of the source program for Pass 2 and 3 need not be repeated. For these passes, one simply presses CONTINUE after setting the correct switches.

Restrictions: The program does not work with high speed reader and punch

DECUS NO. 8-85

Set Memory Equal to Anything

Roy S. Taylor, Department of Defense, Fort George G. Meade, Maryland

This program will preset all locations to any desired settings, thus combining a memory clear, set memory equal to HALT, etc. into a single program. The program is loaded via the switch registers into core.

DECUS NO. 8-86

Obsolete

DECUS NO. 8-87

XMAP

Curtis Jansky and Robert Brown, Communications Systems, Inc., Paramus, New Jersey

This program types out the contents of the DECtape directory on TTY keyboard. The list includes the name of the program, its initial block number, the amount of blocks used, the starting address and the location(s) of the program in core. The above restriction is only a format restriction due to the line length on the TTY unit. At present, this program is operational only with the TCØ1 control; however, the symbolic version may be modified for use with the 552 control.

Storage Requirement: 0000-1232, 6000-6577 (directory)

Restrictions: Each program on tape is assumed to occupy no more than three successive sequences of memory pages

DECUS NO. 8-88

Obsolete

DECUS NO. 8-89

XOD - Extended Octal Debugging Program

Michael S. Wolfberg, Massachusetts Computer Associates, Wakefield, Massachusetts

XOD is an octal debugging program for a PDP-8 with extended memory which preserves the status of program interrupt system at breakpoint. The program occupies locations 6430 through 7577 of any memory field.

XOD includes an elaborate breakpoint facility to help the user run sections of his program. When this facility is used, the debugger also uses locations 0005, 0006 and 0007 of every memory field. (See DECUS NO. FOCAL8-2.)

Restrictions: The ability to punch binary tapes is not included in XOD

DECUS NO. 8-90

Histogram on Teletype Subroutine

J. B. Levin, University of Arizona, Tucson, Arizona

This routine plots histograms on the Teletype when there is no CRT display available or a means of making a permanent copy of a CRT display. Input to the routine consists of a vertical scaling factor, the size of the table to be plotted (limited only by the size of the Teletype print line), the starting address of two core areas: one containing the data to be plotted, and one for use as temporary storage by the machine.

Storage Requirement: 128_{10} words plus tables

Source Language: PAL III

DECUS NO. 8-91

MICRO-8: An On-Line Assembler

K. F. Kinsey, State University of New York, Geneseo, New York

M. E. Nordbert, Jr., Cornell University, Ithaca, New York

MICRO-8 is a short assembler program for the PDP-8 that translates typed mnemonic instructions into the appropriate binary code and places them in specified memory locations immediately ready to function. It processes the typed instructions by a table-lookup procedure.

It is especially useful for programs of less than one page which are to be run immediately. Only octal (not symbolic) addresses may be specified, but the user has control of the zero page and indirect addressing bits. An octal typeout routine permits examination of any memory location.

Storage Requirement: 3200 to 4200
Restrictions: MICRO-8 is quite capable of modifying itself

DECUS NO. 8-92

Analysis of Pulse-Height Analyzer Test Data with a Small Computer

E. McDaniel and J. W. Woody, Jr., Oak Ridge National Laboratory, Oak Ridge, Tennessee

This PDP-8 computer program is used in the evaluation of test data for multichannel pulse-height analyzers. The program determines integral and differential nonlinearities and examines smooth spectra of radioactive decay.

DECUS NO. 8-93

CHEW - Convert Any BCD to Binary, Double Precision

Louis O. Cropp, Sandia Corporation, Albuquerque, New Mexico

This subroutine converts a double precision (6-digit) unsigned-integral binary-coded decimal (BCD) number with bit values of 4, 2, 2 and 1 to its integral-positive-binary equivalent in two computer words. It is possible to change the bit values to any desired values and thereby convert any BCD number to binary.

Storage Requirement: 0109_{10}

DECUS NO. 8-94A

BLACKJACK

Dennis J. Frailey, Ford Motor Company, Dearborn, Michigan

This program enables a person to play BLACKJACK with the computer. The computer acts as dealer and keeps track of bets, cards played, etc.

Minimum Hardware: PDP-8 with EAE
Storage Requirement: $0\text{-}3777_8$

DECUS NO. 8-94B

BLACKJACK "Overlays"

Steven L. Bard, U. S. Army Nuclear Defense Laboratory, Edgewood Arsenal, Maryland

This patch contains two overlays for BLACKJACK (DECUS NO. 8-94A). The first eliminates the need for the EAE hardware, the second allows one to "double down" on any two cards with the instruction "D" (Ø response to "HIT?" is made invalid).

Minimum Hardware: PDP-8, 8/S or 8/I
Other Programs Needed: DECUS NO. 8-94A

DECUS NO. 8-95

TRACE for EAE

Eberhard Werner, Scripps Institution of Oceanography, University of California, San Diego, California

TRACE interpretively executes a PDP-8 program. At the same time a printout is provided of the contents of the program counter, the instruction, the link, accumulator, and multiplier-quotient registers, and where applicable the effective address and the contents of the effective address. This printout may be for all or a selected type of instruction within selected memory bounds. The program is capable of handling any PDP-8 instruction including IOT, two-word EAE, and interrupt instructions. TRACE cannot be destroyed by the program being traced while TRACE is in control.

Minimum Hardware: PDP-8 with Type 182 EAE, ASR-33 Teletype
Storage Requirement: 400_8 or 500_8 locations

DECUS NO. 8-96

J Bessel Function (FORTRAN)

J. A. Crawford, Communications Systems, Inc., Paramus, New Jersey

This program computes the J Bessel Function for a given argument and order. It is a complete PDP-8 FORTRAN program that operates in a conversational mode.

Other Programs Needed: FORTRAN Compiler/Operating System

DECUS NO. 8-97

GOOF

Peter Andrews and Charles Wagner, Fairchild R & D, Palo Alto, California

A one-page program which allows insertion of instruction (xxxx) in location (nnnn) by means of the TTY keyboard. A

DECUS NO. 8-97 (Continued)

feature of automatically incrementing the current address permits rapid insertion of blocks of data or instructions. Typing "RUB-OUT" reinitializes the program.

Storage Requirement: 175_8 locations (1 page)

DECUS NO. 8-98

3D Draw for 338 Display

Barry Wessler

This program is a demonstration of the capabilities of the 338 system. The program allows the user to sketch three dimensional objects on the scope and rotate them in real time.

Minimum Hardware: PDP-8 with 338 Display
Source Language: MACRO-8

DECUS NO. 8-99A

Kaleidoscope

The program creates pictures on the PDP-8 or PDP-8/S with 34D Display. They are varied by manipulating the sense switches (within the range 0000-0007). The program was submitted without comments by an anonymous donor.

DECUS NO. 8-99B

Kaleidoscope - 338 Display

Michael S. Wolfberg, Massachusetts Computer Associates, Wakefield, Massachusetts

The program creates varied pictures by manipulating the buttons of the 338 Display pushbutton bank.

Storage Requirement: $200_8 - 274_8$

DECUS NO. 8-100

Double Precision BCD Arithmetic Package (Incomplete)

Richard M. Merrill, Digital Equipment Corporation, Maynard, Massachusetts

Consists of the following routines:

BCDADD - The single precision BCD addition routine is the basic component of the BCD arithmetic package. This routine functions simply by masking out and adding together corresponding BCD digits (i.e., four bits) and checking for carry (i.e., when the sum of two four-bit numbers is greater than 9 (1001)).

MPYBCD - This routine multiplies a single precision (three digit) number times a double precision one to produce another double precision number. Overflow is indicated in the link; the arguments are not affected.

SUBBCD - One double precision BCD number is subtracted from a second by this routine. It uses a 9's complement routine and the double precision add routine.

DOLOUT - Special formats: ("$XXXX.YY "). ("XXXXXX "); (3 nonprinting data codes); ("XXX ").

DECUS NO. 8-101

Obsolete

DECUS NO. 8-102a

A LISP Interpreter for the PDP-8

Dr. G. van der Mey and Dr. W. L. van der Poel, Technical University of Delft, The Netherlands

LISP is a programming language for list manipulation. The system is particularly suitable for conversational use and teaching. There are very few restrictions to the language apart from the total storage space. More than half of the storage is used as list space.

Minimum Hardware: 4K PDP-8 and ASR-33
High Speed Reader

DECUS NO. 8-103A

Four Word Floating Point Routines - Function Package

D. A. Dalby, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada

This program package, written for use with Digital's Four Word Floating Point Package (DEC-08-FMHA-PB), includes subroutines to evaluate square, square root, sine cosine, arctangent, natural logarithm, and exponential functions.

DECUS NO. 8-103B

Four Word Floating Point Routines - Rudimentary Calculator

D. E. Wells, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada

This is a minimum space program to perform calculations with the 10.5 decimal place precision of Digital's Four Word Floating Point Package (DEC-08-FMHA-PB), and uses the Four Word Floating Point Function Package (DECUS NO. 8-103A). Operations are performed in the sequence in which they are entered. One storage register is provided. Up to five user-defined operation routines may be called.

DECUS NO. 8-103C

Four Word Floating Point Output Controller with Rounding

C. K. Ross, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada

This subprogram is almost identical to the output controller for the Three Word Floating Point Package (Digital 8-5-S) with the rounding addition (DECUS NO. 8-44) except that the Four Word Floating Point Package (DEC-08-FMHA-PB) is used.

DECUS NO. 8-103D

Additional Instructions for use with Four Word Floating Point Package

C. K. Ross, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada

These subroutines allow the Four Word Floating Point Interpreter to perform the operations: read a floating point number, skip positive floating point accumulator, skip zero floating point accumulator, no operation, unconditional jump, negate floating point accumulator, and halt. The two skip instructions and the jump instruction allow forward or backward jumping up to 15 locations from the location of the instruction.

DECUS NO. 8-104

Card Reader Subroutine for the PDP-8 FORTRAN Compiler

Steven Sullivan, Oregon State University, Corvalis, Oregon

Modifications and additions which allow the PDP-8 FORTRAN Compiler to read source programs from cards. The standard FORTRAN card format is used with only minor modifications.

Minimum Hardware: 8K PDP-8 and a Type CR01-C Card Reader
Source Language: PAL III

DECUS NO. 8-105

D-BUG

F. K. Williamson, Solartron Electronic Group Ltd., Farnbrough, Hampshire, England

D-BUG is an aid used in debugging PDP-8 programs by facilitating communication with the program being run. Communication between operator and program is via the ASR-33 Teletype. D-BUG is similar to DEC's program ODT II (DEC-08-COA1-PB); however, it uses the DEC Floating Point Interpreter (Digital 8-5-S).

Two modes of operation are possible, fixed and floating point. D-BUG features include register examination and modification, control transfer, octal dumping and instruction trap-outs to D-BUG control. Registers containing floating point numbers may also be examined, and break-traps can be inserted in floating point programs.

Source Language: PAL

DECUS NO. 8-106

Readable Punch

A. M. Lane-Nott, Letchworth College of Technology, England

This program enables the user to type a character on the keyboard and produce the character in readable form on paper tape. The program uses the high speed punch. The readable characters on tape are produced by means of a table which contains the format of a 6 x 5 matrix using three words of storage per character to be punched. In addition, channel 8 is punched throughout. The program is terminated by typing a carriage return which generates 6 inches of tape. (Reference DECUS NO. 8-68a)

DECUS NO. 8-107

CHESSBOARD

Michael S. Wolfberg, Massachusetts Computer Associates, Wakefield, Massachusetts

This program displays a chessboard on the screen of a DEC 338 Display with all thirty-two chessmen set up on their initial board positions. There is no provision to move them about the board; it is just a demonstration picture.

Storage Requirement: $03000 - 04230_8$

DECUS NO. 8-108

Increment Mode Compiler (INCMOD)

Michael S. Wolfberg, Massachusetts Computer Associates, Wakefield, Massachusetts

The INCMOD program for the DEC 338 Display allows the user to build a display subroutine composed of increments only. The user inputs information by pointing with the light pen. The program displays the figure he is constructing in each of the four available scale settings. The program is of value as a demonstration and may be of help for maintenance purposes. It occupies locations 00000-01231 and builds the increment mode display file beginning at location 01232.

Storage Requirement: $0000-1231_8$

DECUS NO. 8-109

SEETXT Subroutine

Michael S. Wolfberg, Massachusetts Computer Associates, Wakefield, Massachusetts

SEETXT is a subroutine for the DEC 338 Display which can be called instead of the normal typeout subroutine. In addition to typing, it displays all printed characters on the screen corresponding to the last twenty lines which have been typed out.

The program includes the option of suppressing the typing so that output can occur at a much higher rate than ten characters per second. The user has the option of controlling the length of a delay loop in the subroutine so that output rate may range from nearly immediate to Teletype rate.

The maximum number of lines displayed, the scale, and intensity may be altered at any time. There is also the option of clearing the screen or displaying a blinking marker at the current typing position.

Source Language: PDPMAP Assembler

DECUS NO. 8-110

Directory Print (DIREC) for the DEC PDP-8 Disk System

Michael S. Wolfberg, Massachusetts Computer Associates, Wakefield, Massachusetts

This program lists an index of the file directory for the disk on the on-line Teletype. The user has the option of seeing the index to system files or user files, or both.

DIREC can also be used in conjunction with the SEETXT Subroutine for the 338 Display (DECUS NO. 8-109) to obtain a listing of the directory on the display screen.

Other Programs Needed: Disk Monitor System

DECUS NO. 8-111

DISKLOOK

Michael S. Wolfberg, Massachusetts Computer Associates, Wakefield, Massachusetts

DISKLOOK is a small utility program for a PDP-8 with a 32K DF 32 Disk. Using the on-line Teletype, the user may examine and alter any location (in octal) on the disk. Masked searches are also available.

Storage Requirement: $200\text{-}777_8$

DECUS NO. 8-112

Sentence Generator

D. Dyment, Digital Equipment of Canada Ltd., Carleton Place, Ontario, Canada

This program generates random English language sentences, using a dictionary (provided by the user) of ten basic word groups (A-J). The dictionary is used in conjunction with a random number generator and a syntactical algorithm to provide an output of randomly constructed English language sentences.

The program is an excellent vehicle for computer demonstration purposes. It may also be used in English teaching programs to aid students in perceiving sentence structure and errors in the use of words.

DECUS NO. 8-113

Obsolete

DECUS NO. 8-114a

Decimal Output Routine for PDP-8 FORTRAN

G. R. Hervey, University of Leeds, England

The program loads over the PDP-8 FORTRAN Operating System (DEC-08-AFA3-PB) and provides output in conventional decimal form: rounded, aligned, and with plus sign, leading zeros (other than one, in the case of fractional numbers), and trailing decimal point replaced by spaces. The FORTRAN trigonometrical routines are over-written. The source program must begin with two statements assigning integer variables representing, respectively, the numbers of digits required to the right of the decimal point, and the total number of digits (these can be reassigned, by program or manually). Output is called in the normal way, i.e., by TYPE statements referring to FORMAT statements containing the symbol E. If output of a number is not possible in the format requested, the decimal point is shifted to the right in the field; if formatted output is still impossible, or if zero or negative total digits were requested, output reverts to "E" format.

Restrictions: FORTRAN source language programs must begin with two special statements defining format required

DECUS NO. 115a

Double Precision Interpretive Package

Roger E. Anderson, Lawrence Radiation Laboratory, Livermore, California

This program is similar in operation to the Floating Point Package (Digital 8-5-S). It consists of addition, subtraction, multiplication, division, load, store, jump and branch subroutines coupled to an interpreter. It allows direct and indirect addressing in the normal assembly language manner. The operation is faster and more compact than the collected individual double precision subroutines.

Minimum Hardware: PDP-8, 8/S, or 8/I
Storage Requirement: 14 words in page 0 and on additional 2 pages of memory

DECUS NO. 8-116

Obsolete

DECUS NO. 8-117

A PDP-8 Interface for a Charged Particle Nuclear Physics Experiment

W. R. Burrus, E. Madden, C. O. McNew, and R. W. Peelle

Documentation (only) describing an interface constructed to use a PDP-8 computer with a charged-particle detector system employing three solid-state detectors and flight-time analysis. Up to 48 bits from each randomly-occurring event are transferred through the data (break) channel to a hardware-selected buffer region in the core of a PDP-8 computer. Designed for use as a magnetic tape analyzer for the most complex cases, the system assumes that the 48 bits originate in flag bits set by fast logic and in (presently four) amplitude digitizers, all of which are assumed to contain information for the same event. The system includes some limited capability for controlling the course of the experiment, and provides for read-out through the computer of a series of external fast counters. The report summarizes the design concepts, shows schematic flow diagrams, defines the computer instructions associated with the interface system, and gives simple model programs to illustrate methods of applications.

DECUS NO. 8-118

General Linear Regression

Ian E. Bush, Cybertek, Inc., Plainview, L. I., New York

The major section of this program is the "Main Arithmetic IX" which consists of four initializing statements; an input section; a weighting section; a section which cumulates means, sums of squares, etc.; a section which calculates the relevant regression coefficients, etc.; and a section which calculates confidence limits as variances.

The section which calculates the relevant regression coefficients allows for both cases of linear regression, and in the computation of standard error of the intercept, uses (N-2) degrees of freedom to provide a better estimate for small values of N while providing negligible differences from conventional calculation when N is larger.

The section which calculates confidence limits as variances provides a calculation of the variance of the error of the estimate of the dependent variable again using (N-2) degrees of freedom for the general case. This calculation is fully corrected for both random variance within the tested population of data and for the difference between the independent variable and the mean of the independent variable for the population of data.

DECUS NO. 8-119

Off-Line TIC-TAC-TOE Program for the PDP-8 Computer

Dave Hawkins, The Foxboro Company, Foxboro, Massachusetts

TIC-TAC-TOE is a self-learning program which will improve its game as it plays. Whenever its human opponent wins, the program changes its strategy such that it can never be beaten again in the same way. Thus, the program gains "experience" every time it loses. The program will punch its experience on paper tape in binary format on request. This experience tape can be reread by the program at any time and will reset the program to the level of experience it had when the tape was punched. The program will notify the operator if any error is made in reading the experience tape and gets very upset if the player tries to cheat.

Minimum Hardware:	PDP-8, ASR-33, or high speed reader and punch
Storage Requirement:	Locations 10-4000 (approximately) and will operate with low or high speed tape input/output equipment
Source Language:	PAL

DECUS NO. 8-120

Disk/DECtape FAILSAFE

Charles Conley, Digital Equipment Corporation, Maynard, Massachusetts

This program will punch the contents of the disk (or DECtape) onto paper tape which can be loaded back onto the disk using the same program. The paper tape is punched in 200_8 word blocks in binary format, with a checksum for each block. FAILSAFE simplifies and speeds the process of rebuilding the Disk System Monitor after running disk tests.

Minimum Hardware:	PDP-8, 8/S, 8/I, with 32K Disk or DECtape
Other Programs Needed:	PDP-8 Disk System Builder (DEC-Ø8-SBAB-PB)
Storage Requirement:	Ø-1177
Source Language:	PAL-D or MACRO-8

DECUS NO. 8-121

DECtape Handler

B. Eiben, Digital Equipment Corporation

This program allows quick, controlled data-block transfers between the PDP-8 and DECtape (552 control). It reads, writes and searches in minimum time (interrupt mode), requires minimum space (overlay with last page BIN, RIM, DECSYS Loaders) and occupies only two blocks on tape (block Ø = System, block 1 = Return-System). It is protected against destruction and gives, after the transfer, the status levels for testing purposes. It is usable as a Switch Register controlled program or as a subroutine with or without interrupt, giving the possibility of quick data storage, program shuffling and overlay technique with PDP-8 and DECtape.

DECUS NO. 8-122 A & B

SNAP (Simplified Numerical Analysis)

Developed at Harvard Medical School, Boston, Massachusett under an NIH grant

SNAP is a computer language for real-time interactive computation which can be learned in less than one hour. It is particularly useful in teaching programming to beginners.

A unique feature of SNAP is its ability to interact on-line with other laboratory instruments. SNAP can accept electical inputs directly and can read inputs from a real-time clock. Both of these functions are incorporated in a single SNAP instruction.

Another feature particularly useful for biological problems is Table Instructions. A list of 100 numbers may be entered from the keyboard or from punched paper tape.

When ordering tape, please state whether you wish SNAP without EAE, DECUS NO. 8-122A or SNAP with EAE, DECUS NO. 8-122B.

DECUS NO. 8-123

UNIDEC Assembler

C. Stephen Carr, University of Utah, Salt Lake City, Utah

The UNIDEC Assembler runs on the Univac 1108 and passes assembled PDP-8 code over the electronic link between the 1108 and PDP-8. The source statements are punched on

DECUS NO. 8-123 (Continued)

cards for input into the 1108 in a format nearly identical to that of MACRO-8. A printed listing and object code are produced as fast as the cards can be read.

DECUS NO 8-124a

PDP-8 Assembler for IBM 360/50 and above

V. Michael Powers, University of Michigan, Ann Arbor, Michigan

Modifications by Frank K. Bennett, Princeton University

The 360/PDP-8 Assembler is a collection of programs written mostly in FORTRAN IV (G) which operates on the IBM 360/50 and above. It assembles programs for PDP-5 and PDP-8 computers. Once a program has been assembled, it may be punched on cards, saved in a file, or transmitted through the Data Concentrator over data lines. It is also possible to obtain binary paper tapes by use of the Data Concentrator.

The Assembler follows the PAL III operation code and addressing conventions. The input format and program listing conventions are slightly different from those of PAL III, because it is organized around a line format, while PAL III is organized around a paper tape format.

Note: Certain routines called are on the Michigan Terminal System and are not included with the card deck.

DECUS NO. 8-125

PDP-8 Relocatable Assembler for IBM 360/50 and above

D. L. Mills and V. Michael Powers, University of Michigan, Ann Arbor, Michigan

The documentation available describes a method of segmenting PDP-8 programs for the purpose of facilitating program maintenance and residence in MTS (Michigan Terminal System) files. The method provides for program storage on a page-relocatable basis with relocation information contiguous to but not necessarily integral with text information. Linkages between separately assembled program segments are provided in a form very similar to those used in IBM System/360 systems.

Currently available utilities within MTS provides assembly and link-editing facilities, using programs stored either as punched card decks or in MTS files. Utilities are also included for the purpose of paper tape transcription either in PAL-compatible format or in a special format useful for dynamic loading via a data link to a remote machine. In addition to these MTS utilities, two relocating PDP-8 loaders are available which operate using the special dynamic-loading format. Each of these programs occupy one dedicated page of PDP-8 memory and operates in a multicore-bank environment. One of these programs is designed to operate as a stand-alone utility, while the other is designed to operate within the RAMP system.

DECUS NO. 5/8-126

Cumulative Gaussian Distribution Curve Fitting

Gerald E. Zajac
Submitted by: Howard A. Sholl, University of Connecticut, Storrs, Connecticut

This is a curve fitting program that will take a set of any number of points with any spacing describing a cumulative Gaussian distribution and determine the mean and standard deviation by an iterative least squares differential-correction technique. The mean square error of the final fitted curve is also computed.

Minimum Hardware:	4K PDP-8 with Teletype
Other Programs Needed:	FORTRAN Compiler and Operating System
Source Language:	PDP-5/8 FORTRAN

DECUS NO. 8-127

XDDT Extended Octal-Symbolic Debugging Program

Michael S. Wolfberg, Massachusetts Computer Associates, Wakefield, Massachusetts and Robb N. Russell

XDDT, the result of merging the features of the DDT-UP (DECUS NO. 8-19a) and XOD (DECUS NO. 8-89), is an octal-symbolic debugging program for extended memory which preserves the status of the program interrupt system at breakpoints and includes many improvements over its predecessors.

From the Teletype, the user can symbolically examine and modify the contents of any memory location in a variety of formats. Positive and negative block searches with a mask may also be performed.

XDDT includes an elaborate single-breakpoint facility to help the user run sections of his program.

The ability to punch binary tapes is not included in XDDT.

Minimum Hardware:	8K PDP-8
Storage Requirement:	With initial symbol table, 4200-7577 of any memory field
Source Language:	PDPMAP (DECUS NO. 8-166)

DECUS NO. 8-128

PDP-8 Oscilloscope Display of Mathematical Functions

A. E. Sapega and S. G. Wellcome, Trinity College, Hartford, Connecticut

This is a general-purpose FORTRAN program for oscilloscope display of single-valued functions, $y = f(x)$. The FORTRAN statement of the function can be changed by the user so as to display specific functions of interest to the user. The user must specify a range for the independent variable. Scaling of the function for an appropriate display is carried out automatically by the program. The user may then interrupt the display to respecify the range of either independent or dependent variable. The display will be flicker free on a conventional (nonstore) oscilloscope.

DECUS NO. 8-128 (Continued)

Minimum Hardware:	4K PDP-8, Type 34D Display Unit
Other Programs Needed:	FORTRAN Compiler and Operating System, PAL Assembler
Source Language:	FORTRAN (main program), PAL (subroutine)

DECUS NO. 8-129

Magnetic Tape Program Library System

Donald C. Uber, Lawrence Radiation Laboratory, University of California, Livermore, California

Programs may be written on and called off IBM-compatible tape by name from the Teletype. BIN and RIM loaders may also be called in from the Teletype. Only the last page of core is used. Library programs may be corrected, modified, or added to at any time. When called in, programs may be relocated in core. It is possible to subdivide programs as they are written on tape and then individually relocate each portion as it is loaded in.

Minimum Hardware:	4K PDP-8, ASR-33, 57A Tape Control with transport
Storage Requirement:	7600-7777
Source Language:	MACRO-8

DECUS NO. 8-130A

REBIL8 - Relocating Binary Loader

R. F. LaFontaine, CSIRO, Division of Mechanical Engineering, Victoria, Australia

Sections of the DEC-08-LBAA-LA Binary Loader have been rewritten to extend its duties to loading of suitably prepared relocatable binary program tapes as well as address and data modifications. Requirements are the same as the standard DEC loader, and REBIL8 will load standard DEC binary tapes.

Minimum Hardware:	PDP-8/S and ASR-33
Source Language:	MACRO-8

DECUS NO. 8-130B

RELCON - Binary to Relocatable Binary Tape Converter

R. F. LaFontaine, CSIRO, Division of Mechanical Engineering, Victoria, Australia

RELCON is used to tag data, used by memory reference instructions for indirect addressing, with the Data Modification Mark (376 Code). It may also be used to adjust addresses so that the relocatable version begins loading memory at page 0 if no address modification is specified. This does not mean that the program will operate in this area of memory but serves to simplify address specification at load time.

Minimum Hardware:	PDP-8/S and ASR-33
Source Language:	MACRO-8

DECUS NO. 8-131

SRCD, Software Rapid Character Display

David M. Kristol

SRCD (Software Rapid Character Display) is not a program but a method for quick display of a maximum number of text characters. A listing of increment-mode command words is supplied for the sixty-four characters on the Teletype keyboard. Each character is drawn within a 5 x 7 dot matrix followed by two blank points to provide spacing. It is mostly useful for displaying buffers of text, such as for editing programs or in utilization of the display as a satellite processor in time-sharing systems. In these applications, the PDP-8 is frequently sitting in a loop, "listening" for keyboard characters, or simply doing nothing. With SRCD, the main frame is constantly engaged in background work, helping to display characters, and I/O is handled by interrupt servicing routines.

Minimum Hardware:	4K PDP-8, 338 Display

DECUS NO. 8-132

STRIP, A Data Display and Analysis Program for the PDP-8, 8/I

John C. Alderman, Jr., Applied Data Research, Atlanta, Georgia

This program accepts paper tape data listings and displays the result on the display unit. Some elementary computations are made on the data and are also displayed. The program is deliberately designed to be open ended, and most users will want to add features peculiar to their own problem. Almost all functions are carried out in subroutine form, and these subroutines can be called either from the keyboard or within another subroutine.

DECUS NO. 8-133

First Order Kinetics

Kenneth B. Wiberg, Yale University, New Haven, Connecticut

First order kinetic processes are common in chemistry and in other areas. The program accepts up to 42 data points, calculates the rate constant and intercept by the method of least squares, and gives the rms deviation, the correlation coefficient, and an estimate of the error in slope. It permits graphical (CRT) examination of deviations from the least squares line and iteration to a "best" infinity value. It also provides options for plotting the deviation between observed and calculated quantities on a CRT and may be used in other cases in which one wishes to correlate the natural logarithm of one quantity with another, as in linear free energy relationships.

Storage Requirement:	Occupies essentially all of core
Source Language:	MACRO-8

DECUS NO. 8-134

LSQ (Least Squares Subroutine)

Kenneth B. Wiberg, Yale University, New Haven, Connecticut

The subroutine calculates the slope and intercept for the equation $y_i=mx_i+b$ by the method of least squares. It also returns the rms deviation of y, the correlation coefficient and an estimate of the error in the slope. The calculated values of y and the differences between the given and calculated values are also available on return from the subroutine.

Other Programs Needed:	FLOAT, floating point interpreter "C" -(Digital-08-YQYA); Loading Routine
Storage Requirement:	1.5 pages plus page 0 locations
Source Language:	MACRO-8

DECUS NO. 8-135

DNHELP, A Directory Assistor Program

David M. Kristol

DNHELP is a four-page disk utility program that may reside in core with DIREC (DECUS NO. 8-110) and DISKLOOK (DECUS NO. 8-111). It is designed to assist programmers in investigating the contents of the DN and SAM blocks on the disk under the DEC Disk Monitor System.

Minimum Hardware:	PDP-8 with DF-32 Disk, or TCØ1 DECtape
Other Programs Needed:	System Monitor Head (DEC Disk (Tape) Monitor System) and SYSIO
Storage Requirement:	5000-5777, Biffer from 7400-7577

Note: This program has also been combined with SYSLUK, DECUS NO. 8-141, in SYSHLP, DECUS NO. 8-198.

DECUS NO. 8-136

Fourier Transform Program

W. D. Strecker, Carnegie-Mellon University, Pittsburgh, Pennsylvania

The program, written in PDP-8 FORTRAN II, performs the discrete Fourier Transform of a function defined over N($N\leq 200$) evenly spaced points. I/O is via the ASR-33. The program requests the number of function points, then that number of function values, and then prints out the values of the sine and cosine components of the function at each defined harmonic. A conventional (not Cooley-Tukey) algorithm is used since I/O time relative to computing time is significant

DECUS NO. 8-137a

Programs for Storage, Manipulation and Calculation of Data Using DECtape

D. Eugene Hokanson, Veterans Administration Hospital, Seattle, Washington

These programs use DECtape for the storage of data files. Once data has been stored on DECtape, the statistical or calculation programs will operate on particular parts of it selected by the user. All programs are conversant. They ask questions regarding execution and accept answers via the Teletype.

DATRIT is a program to write data on DECtape directly from the ASR-33. Numerical data is stored on DECtape in floating point format.

EDATA is a program to edit data files created on DECtape by DATRIT.

SDT is a program to calculate Mean and Standard Deviation from data files stored on DECtape.

FORT calculates an analysis of variance table similar to DECUS NO. 5/8-9 using data files stored on DECtape.

COVAR calculates the necessary values for an analysis of covariance from data files stored on DECtape. The paired input consists of matching files of x and y data.

LCOVAR is a semi-logarithmic version of COVAR. y values are converted to log y before calculation so that each "Y" in the output format means log y. This program is useful for semi-logarithmic regression analysis.

TPAIR performs a paired T test on data files stored on DECtape. The input consists of paired files x and y data.

BCALC enables the user to do calculations using data files on DECtape as variables in the calculation. Results of calculation are stored on DECtape. BCALC is a master program for handling the data files. The user must supply a floating point program, which is called by BCALC as a subroutine, for each specific calculation.

LCALC enables the user to do calculations from data stored on DECtape using specific lines of a file as variables in the calculation. The result of the calculation may be stored on one line of the same file or a different file. LCALC is similar to BCALC.

SUBS is a package of four subroutines used by most of these programs. SUBS contains six pointers on page zero and subroutines in the area from 4000 to 7577.

These subroutines are: MESSAGE, Type packed text; UNFLOAT, Unfloat floating point numbers; RWTAPE, Read and write DECtape; FPOINT, Floating point output controller.

FLEX is an extended version of Floating Point which lacks the Output Controller. It is used to overlay the FPOINT section of SUBS in the program which use extended Floating Point.

DECUS NO. 8-137a (Continued)

Minimum Hardware: PDP-8, ASR-33, Two DECtape TU 55 Transports, EAE

NOTE: Binary and Source files for this program are on DECtape. The ASCII paper tape offered is an EXAMPLE CONTROL TAPE for Auto Processing.

DECUS NO. 8-138A, B & C

PAL III.5

James C. Kilbane, Belmont, Massachusetts

Withdrawn at the request of the author 2/16/72

DECUS NO. 8-139

Editor

James C. Kilbane, Belmont, Massachusetts

Withdrawn at the request of the author 2/16/72

DECUS NO. 8-140

Binary Tape Consolidator

James C. Kilbane, Belmont, Massachusetts

Withdrawn at the request of the author 2/16/72

DECUS NO. 8-141

SYSLUK

David M. Kristol

SYSLUK is a four-page utility program for examining and modifying blocks on the system I/O device, i.e., DF32 Disk or TCØ1 DECtape. Its operation is independent of which monitor head is resident, provided either is there. The user has the facility to examine and modify locations and to perform masked searches.

Minimum Hardware:	4K PDP-8 with DF32 Disk or TCØ1 DECtape
Other Programs Needed:	SYSIO - "system device" routine for DEC Disk (Tape) Monitor System
Storage Requirement:	200-1177 (buffer from 7377-7577)
Source Language:	MACRO-8

Note: This program has also been combined with DECUS NO. 8-135, DNHELP, in SYSHLP, DECUS NO. 8-198.

DECUS NO. 8-142

Binary Punch - Extended Memory

W. L. Lord, Argonne National Laboratory, Argonne, Illinois

This program is a revision of Digital 8-5-U Binary Punch which allows for extended memory. Tapes produced may be loaded by Digital 8-2-U Binary Loader.

Storage Requirement:	7600-7730
Source Language:	MACRO-8

DECUS NO. 8-143

FFTS-R - A Fast Fourier Transform Subroutine for Real Valued Functions

James E. Rothman

This subroutine computes the Fast Fourier Transform (FFT) or its inverse of a data sequence which has been stored in core. It will accommodate up to 2048 time samples and will transform that number in under 5 seconds.

Minimum Hardware:	PDP-8 or 8/I with EAE
Storage Requirement:	3-7, 20-107, 400-6401
Source Language:	PAL

Note: When ordering tape and/or listing please specify whether regular or AXØ8 version is required.

DECUS NO. 8-446 enables this program to be used on machines without EAE.

DECUS NO. 8-144

FFTS-C - Fast Fourier Transform Subroutine for Complex Data

James E. Rothman

FFTS-C enables computation of the Discrete Fourier Transformation in a minimum amount of time. By using the Cooley-Tukey algorithm, up to 1024 points may be transformed in only 4.5 seconds, introducing a reduction of 99 percent in computation time.

Minimum Hardware:	PDP-8 or PDP-8/I with EAE
Storage Requirement:	3-7, 20-55, 400-5777
Source Language:	PAL III

DECUS NO. 8-145

Time-of-Flight Analyzer

H. J. Metzdorf, CCR- Euratom Ispra/Varese, Italy

This program enables the computer to interact with the TOF-converter and to generate spectrum displays on an oscilloscop The TOF Converter provides the computer with digital information about the time a neutron takes to travel from the scattering sample to a detector (up to 12 detectors can be accommodated) and which detector was involved.

DECUS NO. 8-145 (Continued)

The TOF analyzer for which this program was written is in use with a double chopper facility installed at the ISPRA-1 reactor. It consists of a PDP-8 on-line computer with 4K memory, the automatic restart option, and a display unit; a TOF Converter; and conventional counting electronics.

Source Language: MACRO-8

DECUS NO. 8-146

High Speed Executive for the PDP-8, PDP-8/I

R. L. Steel, University of Saskatchewan, Saskatoon, Saskatchewan, Canada

These routines are designed to handle the priority scheduling of up to 12 interruptable devices. Each I/O device is assigned a priority level, and upon receipt of an interrupt from that device, execution of its routine is initiated. If the priority of an I/O device "x" is less than that of an I/O device "y" which is currently being serviced, device "x" will be queued until "y" has been serviced. These routines allow a user to prohibit interrupts on any (or all) levels.

Minimum Hardware: PDP-8 with EAE
Storage Requirement: Three memory pages
Source Language: MACRO-8

DECUS NO. 8-147

Incremental Plotter Printout Subroutines

Michael P. Stryker and Phillip J. Best, University of Michigan, Ann Arbor, Michigan

A group of subroutines providing character-output facilities for the incremental plotter is presented as a package. Virtually all the ASCII characters may be printed in any of 8 formats and 63 sizes. One routine sets a control code to determine the size and orientation of the characters and the direction the line is to run, another prints out a string of characters according to this code, a third prints just one character held in AC 6-11, and a fourth routine prints the signed decimal equivalent of the contents of the accumulator.

Minimum Hardware: PDP-8, Type 350 Plotter and Control
Other Programs Needed: Digital 8-12-U "Incremental Plotter Subroutine"
Storage Requirement: Five memory pages (1177 locations)

DECUS NO. 8-148

Plotter System

Bruce J. Biavati, Computer Applications, Inc., New York, New York

This is a generalized plotting system for the CalComp Plotter allowing "plot time" modification on the data. The main program tape accepts all plotting commands and data from the Teletype. Patch tape #1 modifies the system to a high speed reader. Patch tape #2 modifies all input through the high speed reader.

Minimum Hardware: 4K PDP-8, CalComp Plotter and High Speed Reader
Source Language: MACRO-8

DECUS NO. 8-149

Core Window

Donald C. Uber, Lawrence Radiation Laboratory, University of California, Livermore, California

The 34D Scope displays the octal contents of any 64 consecutive core locations, beginning at the address set in the Switch Register and Data Field switches (if Extended Memory is used). There are 16 lines, each with an address plus four memory words. A special character generator program refreshes the display 11 times per second.

Minimum Hardware: PDP-8, 34D Scope
Storage Requirement: 15; 7240_8 - 7573_8
Source Language: MACRO-8

DECUS NO. 8-150

PTOD8 High and PTOD8 Low

R. A. Gruenewald, Dr. Neher Laboratory, Netherlands Postal and Telecommunications Service, Leidschendam, Netherlands

PTOD8 (PTT Trace and Octal On-Line Debugging Program for the PDP-8), is a means to debug a running user's program. It features: register examination and modification, multiple breakpoints (traps), memory protection of a chosen block, word search (masked or not masked), tracing a running users program (gives a full printout of consequently executed instructions), is interrupt proof, and also features binary tape punching (automatic leader-trailer code and checksum).

Storage Requirement: PTOD8 requires 1343_8 registers
PTOD8 HIGH: 6200_8 - 7543_8
PTOD8 LOW: 200_8 - 1543_8

DECUS NO. 8-151

On-Line TIC-TAC-TOE

Richard B. Rothman, Groton School, Groton, Connecticut

This program plays the game of TIC-TAC-TOE with the user. By means of a previously stored algorithm, it selects the best move for any given situation. Conversation and ultimate defeat is via the Teletype.

Source Language: PAL

DECUS NO. 8-152a

PDP-8 Music Programs

R. G. Smith and D. J. Harrison, Carleton University, Ottawa, Canada

The coding program allows the user to type a song on the Teletype and produce a coded binary tape of that song. It accepts musical information in a form more compatible with ordinary sheet music and converts it to a coding scheme.

The playing program plays the song "Penny Lane" via the coding program with the use of a power amplifier and speaker.

A list of additional songs is available upon request.

Minimum Hardware:	PDP-8 with D/A Converter, power amplifier and speaker
Restrictions:	6577_8 notes
Source Language:	PAL III

DECUS NO. 8-153

Tape/Disk Transfer Programs

Daniel Parrish, Veterans Administration Hospital, Seattle, Washington

This series of programs was written to create and recall disk images on magnetic tape. They were written initially to facilitate rebuilding the disk system in the event of an accidental or deliberate wipeout. The usefulness of the DF-32 was significantly enhanced by the ability to store and easily recall a number of different disk images. A single reel of DECtape can hold up to five complete images, each of which occupies 400_8 blocks.

Minimum Hardware:	PDP-8 with DF-32 Disk and TCØ1 DECtape
Other Programs Needed:	Tape Read-Write Subroutine
Source Language:	PAL III

DECUS NO. 8-154

SWAP

David M. Kristol

Using self-contained I/O, SWAP may be employed to load the disk from or dump the disk onto DECtape. It is faster and more versatile than the Disk to DECtape FAILSAFE.

Minimum Hardware:	PDP-8 with DF-32 and TCØ1 DECtape or RS-08
Storage Requirement:	600_8 + 4200_8 buffer
Source Language:	PDP-MAP (DECUS NO. 8-166)

DECUS NO. 8-155

HEP

Dr. A. K. Head, C.S.I.R.O., University of Melbourne, Parkville, Victoria, Australia

HEP is a program which gives calculating machine type operation and stored program operation. It is based on Floating Point Package (DEC-8-5-S-D) and Floating Point Controller (DECUS NO. 8-44). Calculations have an accuracy of just over six decimal digits and printout is rounded to six decimal digits. It includes facilities for format control, program control and tests, subroutines, and an array of variables. Although it was designed mainly for quick results from small calculations, it also has facilities and space for quite large and elaborate programs. Note, HEPTRACE, DECUS NO. 8-156.

Minimum Hardware:	4K PDP-8 with Teleprinter
Storage Requirement:	0003_8 - 7577_8

DECUS NO. 8-156

HEPTRACE

A. K. Head, C.S.I.R.O., University of Melbourne, Parkville, Victoria, Australia

This program is used in conjunction with HEP (DECUS NO. 8-155) to give trace and one shot facility during the execution of HEP programs.

DECUS NO. 8-157

Square Root Patch

A. K. Head, C.S.I.R.O., University of Melbourne, Parkville, Victoria, Australia

This program is a patch to standard SQRT routine (DEC-8-5-S). It is a shorter and faster way of giving exact roots of exact squares.

Storage Requirement:	6656_8 - 6747_8

DECUS NO. 8-158

AX-Ø8 Symbol Generator

D. Dyment, Digital Equipment of Canada, Ltd., Carleton Place, Ontario, Canada

This subroutine may be called to display single characters or a string of characters on the oscilloscope of an AX-Ø8 (LAB-8) system. Sixty different symbols, in addition to four special "format" codes, are provided by the routine. Software control of character scaling and "margins" on the display is provided.

Minimum Hardware:	LAB-8 with oscilloscope
Storage Requirement:	223_{10} locations
Source Language:	PAL

DECUS NO. 8-159

CINET-BASIC

Bud Pembroke and David Gillette, Computer Instruction NETWORK, Salem, Oregon

This interpretive compiler was patterned after Dartmouth's BASIC. It was built by modifying DEC's FOCAL, and uses many of the same subroutines and/or methods. Error messages are given in terms of an error number and line number.

Minimum Hardware: PDP-8 with 4K and an ASR-33
Storage Requirement: Main program locations 0000-3252 and 4600-7600 and user's code from 3252 on.

DECUS NO. 8-160

FASTLOAD

D. Dyment, Digital Equipment of Canada, Ltd., Carleton Place, Ontario, Canada

FASTLOAD is a minimal bootstrap loader for the PDP-8, requiring only eight instructions to load in the upper page of memory.

DECUS NO. 8-161

EXPO - A Flexible PDP-8 Data Acquisition Program

Bruce Arne Sherwood, California Institute of Technology, Pasadena, California

EXPO is a PDP-8 program which reads various kinds of data from experimental apparatus, optionally logs data on magnetic tape, and accumulates one-or two-dimensional histograms of selected variables. These histograms may be displayed on the Teletype or scope, simultaneously with data-acquisition. From the keyboard the user defines what variables are to be histogrammed and under what conditions; variable names are symbolic and numerical parameters are decimal. Also from the keyboard, the user may call for Teletype or scope output with some control of format. Because of its flexible user-oriented input-output, EXPO has proven to be very useful in debugging and utilizing complex apparatus in a high-energy physics experiment; it is likely to be useful in similar experimental situations in science or engineering. The write-up includes a useful general discussion of interrupt handling on the PDP-8.

Minimum Hardware: 4K PDP-8 with EAE, Magtape, Scope Display, and Plotter optional
Storage Requirement: 0-7177 if all options used

DECUS NO. 8-162

Demonstration Programs for the PDP-8

1. PDP-8 Music; 2. Night Watchman's Clock (338 Display); 3. World War I - Snoopy (338 Display); 4. Matching Pennies.

DECUS NO. 8-163 through 8-165

Obsolete

DECUS NO. 8-166

Interim Technical Report, The PDPMAP Assembly System

Michael S. Wolfberg, Massachusetts Computer Associates, Wakefield, Massachusetts and Thomas H. Johnson

This report describes the PDPMAP Assembly System which is used to assemble symbolic programs written for a PDP-8 or DEC-338 with up to 16K memory locations. The system is implemented at the University of Pennsylvania on an IBM 7040 and DEC PDP-8 connected by a high speed data channel (IBM 7904 and DEC DM03). The PDPMAP System uses the powerful assembler of a large computer (IBM 7040 MAP Assembler) to quickly assemble programs for a small computer.

Report only available.

DECUS NO. 8-167

CIRCUITS

D. Whiteley, International Computers, Ltd., Kidsgrove, Stoke-on-Trent, Staffordshire, United Kingdom

CIRCUITS is a program which enables Electronic Circuits to be drawn using the DEC-338 Display system. The complete circuit can be stored on paper tape and read in for future modifications.

Minimum Hardware: 8K PDP-8 with 338 Display, Teletype, High Speed Reader and Punch and character generator

DECUS NO. 8-168

CalComp Plotting Package

John W. Fitzgerald, Stanford Medical School, Stanford University, Stanford, California

This package is a series of subroutines designed to be used with the CalComp and PDP-8. The subroutines are: PLOTX - a modified 8-12-U, general move routine; ALPHA - alpha-numeric packed string plotting; DLTR - an 8-bit ASCII letter drawer; AXIS - an axis drawing routine; NUMBER - a signed 11-bit binary number output routine; DSYM - centered symbol drawing routine and LINE - vector plotting routine.

This package is issued only on DECtape and was compiled using the Fitzgerald Programming System which differs from DEC distributed programming systems. DECUS can offer no assistance in getting the program off the DECtape.

There is a LINCtape available for PDP-12 users.
Paper tape of PLOT routine only is available on special request.

DECUS NO. 8-168 (Continued)

Minimum Hardware: A PDP-8 computer with DECtape 350B Interface and CalComp Model 565 digital plotter with a step size of 0.01 inches.

DECUS NO. 8-169

Physical Oceanography Data Reduction Programs for the PDP-8

C. K. Ross, R. Reiniger and A. B. Grant
Submitted by: Joann E. Gavan, Department of Energy, Mines and Resources, Marine Sciences Branch, Dartmouth, Nova Scotia, Canada

This package presents an oceanographic data processing system for use at sea on a small computer with a basic configuration of 4K memory, ASR-33 Teletype, high speed paper tape reader/punch and a 31 inch CalComp Plotter. It is capable of accepting pressure, temperature, salinity, oxygen and silicate as measured parameters.

The following routines may be ordered as separate write-ups and tapes. Please specify whether you are ordering the complete or partial package:

A. Temperature Formatting
B. Pack Thermometer Calibration
C. Thermometer Correction
D. Pressure Curve Fit
E. Final Pass
F. PNUM
G. PLOPRM
H. Distance and Bearing
I. Formatting of Chemistry
J. Department PLOTCO
K. Additions to Floating Point Package

DECUS NO. 8-170

FORTRAN Source Conversion Program

Charles Conley
Submitted by: Richard Palmer, Digital Equipment Corporation, Maynard, Massachusetts

This program will allow the user to convert FORTRAN source programs written for DEC-08-AFC1 (FORTRAN Compiler, Old Version) to the new format, FORTRAN (DEC-08-AFC1-PB).

DECUS NO. 8-171

Real-Time System for Behavioral Science Experiments

Robert H. Tedford

This document describes a program which controls the operations of ten behavioral chambers using four classical experimental designs; Punishment Discrimination (PD), Nondiscriminated Avoidance (NDA), Fixed Ratio (FR), and Differential Rate of Low Response (DRL). Besides controlling the experiments, certain statistics are accumulated during the experiments for printout at the end of each test run.

Minimum Hardware: PDP-8 with an ASR-33, Requires a special interface between computer and behavioral equipment
Storage Requirement: 4K

DECUS NO. 8-172

Octal Systems Edit

Edward A. Taft III, St. Mark's School, Southboro, Massachusetts

Octal Systems Edit allows advanced users to perform direct octal editing of the information on their systems device. It makes block format compatible with system blocks. All editing is via the Teletype; commands allow reading, writing, and moving blocks; listing, changing, and punching individual words in a block.

Minimum Hardware: PDP-8, 8/I, 8/S with DF-32 or TCØ1/TU55
Other Programs Needed: Disk/DECtape monitor (DEC-D8-SBAC-PB)
Storage Requirement: 200_8-1177_8 (may be reassembled into any 4^8 pages)
Restrictions: Requires that Monitor Head be present in 7600_8-7777_8
Source Language: PAL-D

DECUS NO. 5/8-173

TIC 5/8

James A. Gillespie, Lawrence Radiation Laboratory, Berkeley, California

TIC 5/8 plays a master game of TIC-TAC-TOE on the display scope. The program can be reset to a learning configuration by hitting two keys on the Teletype, and will begin to learn winning strategies from each game it loses until it has become a master player again. The program makes use of the program interrupt facility and makes necessary changes for a PDP-5 or PDP-8.

Minimum Hardware: PDP-5/8 family and 34D scope
Storage Requirement: 1-3 and 41-3000
Restrictions: Should not be copied after use. Execution time excludes use on PDP-8/S. All program interrupt flags must be cleared for use (room is provided)
Source Language: LRL PDP Assembly Language

DECUS NO 5/8-174

MEDIUM

Lance A. Carnes
Submitted by: James A. Gillespie, Lawrence Radiation Laboratory, Berkeley, California

MEDIUM is a demonstration program for use on the PDP-5 or PDP-8 family. Messages typed on the Teletype are displayed on the scope, advancing across the screen from right to left similar to the Times Square News Sign.

Minimum Hardware:	PDP-5 or PDP-8 family with 34D or VC8/I Scope
Storage Requirement:	41_8-1500_8
Source Language:	LRL PDP-5 Assembly Language

DECUS NO. 8-175

Post Stimulus Interval Histogram for AX-Ø8

Peter Goldstern, Digital Equipment Corporation

This program, using the Schmitt triggers, generates a post stimulus interval histogram for one channel.

Minimum Hardware:	LAB-8
Other Programs Needed:	LAB-8 compiler
Restrictions:	Maximum count per interval is 4095_{10}. Maximum number of epochs is 4095_{10}. Maximum number of intervals is 3456_{10}

DECUS NO. 8-176

PAL CHOP

Edward A. Taft III, St. Mark's School, Southboro, Massachusetts

PAL CHOP produces minimum-length copies of PAL source tapes by removing all comments, tabs, multiple spaces, and multiple carriage-return/line-feeds. It is especially useful in facilitating the handling and storage of sections of extremely large programs which have been debugged.

Minimum Hardware:	PDP-8, 8/I, 8/L and ASR-33. High Speed Reader and Punch optional
Storage Requirement:	Program occupies 10_8-366_8; uses 400_8-1177_8 as buffer
Execution Time	I/O limited
Source Language:	PAL-D

DECUS NO. 8-177

COPY

Alexander Smythe
Submitted by: Theodore Green, Taft School, Waterbury, Connecticut

COPY is an extension of PIP. Its purpose is to copy disk files onto paper tape and vice-versa. COPY's major advantage is that it saves time in putting files on and off the disk. This can be very useful for those with one disk and limited space.

Minimum Hardware:	PDP-8, 8/I or 8/S with disk and Teletype
Other Programs Needed:	Disk Monitor I/O routine in core and command decoder stored on disk starting in block 15
Storage Requirement:	0-2777_8; only 0-1474_8 for program - rest buffers
Source Language:	PAL-D

DECUS NO. 8-178

Reverse Assembler

Henry G. duPont, St. George's School, Newport, Rhode Island

The Reverse Assembler accepts a paper tape in binary format and produces either a printed listing or a paper tape that is acceptable to the PAL Assembler as a symbolic tape. It produces the mnemonics for almost all input-output devices as well as PAL III and Floating Point instructions.

Minimum Hardware:	PDP-8 with ASR-33
Storage Requirement:	0-5400_8
Source Language:	PAL III

DECUS NO. 8-179

EAE Modifications for Binary Disassembler with Symbols

Alec Smythe
Submitted by: Theodore Green, The Taft School, Waterbury, Connecticut

This patch permits use of the Binary Disassembler with Symbols, (DECUS NO. 5/8-18C) by users without EAE. The patch shortens the space for the cross reference table by approximately one page, and changes all EAE instructions to JMS's to routines which take their place. The patch also changes the octal type routine to make space for links on page zero.

Minimum Hardware:	4K PDP-8, ASR-33, High Speed Reader
Other Programs Needed:	Binary Disassembler with Symbols (DECUS NO. 5/8-18C)

DECUS NO. 8-180

Editor and Assembler for 57A Magnetic Tape System (UCRL-50534)

Donald C. Uber, Lawrence Radiation Laboratory, Livermore, California

The Symbolic Editor and MACRO-8 Assembler have been modified to replace paper tape with IBM-compatible magnetic tape for more rapid and convenient program development.

The Editor reads and writes ASCII text in a file on magnetic tape. Text is stored in "pages" which may be individually accessed by Teletype commands. All the original operations are retained, including paper tape I/O.

MACRO-8 assembles the text file, completing all three passes before halting. Binary output is on high or low speed paper tape. The symbol table and Pass 3 listing may be on Teletype or written in a second tape file for listing on a line printer.

A third program moves pages of text from one area of tape to another whenever re-editing and reassembly are necessary.

Minimum Hardware:	PDP-8, 8K memory, ASR-33, 57A Magnetic Tape Control with one transport
Other Programs Needed:	Symbolic Editor (DEC-08-ESAB) High Speed MACRO-8 (DEC-8-8-S)
Storage Requirement:	Fields 0 and 1; locations 0-7577
Restrictions:	The 57A needs modification for Extended Memory operations
Source Language:	MACRO-8

DECUS NO. 8-181

Automatic Binary Loader and Duplicator-Coder for Auto Bin

Michael A. Robinton, National Semiconductor, Santa Clara, California

Automatic Binary Loader will automatically start tapes it has loaded into core in any memory field.

The Duplicator-Coder for Auto Bin computes checksums and notifies the operator of an error. It will select the correct input/output devices to be used. It can also be used to format the tapes for the Automatic Binary Loader.

Minimum Hardware:	Basic PDP-8
Storage Requirement:	Automatic Binary Loader 7600_8-7754_8; Duplicator-Coder for Auto Bin 0010_8 - 0431_8
Restrictions:	These programs will not load tapes formatted for automatic, memory extension control. (i.e., channel 8-punched); both programs will indicate a checksum error
Source Language:	PAL

DECUS NO. 8-182

Memory Compare

Ray H. Jones, Digital Equipment Company, Ltd., Reading, England

Memory Compare resides in page 36_8 of either field. It compares contents of similar addresses in pages 0-35_8 of both fields and outputs any differences detected.

Minimum Hardware:	PDP-8 with extended memory
Storage Requirement:	1 page
Source Language:	PAL-D

DECUS NO. 8-183

The WANG Loader

L. C. Wang
Submitted by: Richard E. Hummer, University of Maryland, College Park, Maryland

The WANG Loader will load any program that ends at location 7777. The program consists of 8 instructions that are loaded via the toggle switches, and a tape that will boot-in the BIN and RIM loaders.

Minimum Hardware:	PDP-8 with ASR-33

DECUS NO. 8-184

Page Routine

F. Weil, Automatic Control Engineering, Ltd., Kent, England

This program will arrange listings in page lengths and sequentially number the pages.

Minimum Hardware:	PDP-8 with ASR-33
Storage Requirement:	Approximately 200_8 words
Restrictions:	Maximum of 99 pages per listing
Source Language:	PAL III

DECUS NO. 8-185

Modifications to Symbolic Editor and Symbolic Tape Format Generator

G. R. Hervey, University of Leeds, The School of Medicine, Leeds, England

The modifications to Symbolic Editor (DEC-08-ESAB) are: 200_8 code becomes a valid character which can be stored or generated; T and F output 200_8 code; all three (3) punching commands, T, F and P, are followed by halts to enable the punch to be turned on; T also halts after punching trailer. These changes simplify editing of tapes which contain sections of text or data separated by lengths of leader/trailer.

The modified Format Generator produces a symbolic format which saves tape, editor buffer space and Teletype time.

Minimum Hardware:	PDP-8

DECUS NO. 8-185 (Continued)

Other Programs Needed: Symbolic Editor (DEC-08-ESAB) and Symbolic Tape Format Generator (Digital 8-21)
Source Language: PAL III

DECUS NO. 8-186

EAE FORTRAN Patch for the PDP-8

P. D. Siemens, Lawrence Radiation Laboratory, University of California, Livermore, California

This patch to the PDP-8 FORTRAN Operating System utilizes the extended arithmetic unit option (Type 182 EAE). Four arithmetic routines were rewritten-alignment, normalize, multiply and divide. The reduction in execution time is rather significant.

Another improvement besides the faster execution time was gained with EAE FORTRAN. Since the multiply routine calculates a full 48-bit product and rounds instead of truncates to 24-bits, an increase in significance of the product was noted.

These modifications work with the FORTRAN Operating System of March 2, 1967. They have not been tested with any other version, but would "probably" work. No changes must be made in operating procedure or any other portion of the program, as this modification loads the regular arithmetic subroutines.

Minimum Hardware: PDP-8 with Type 182 EAE
Other Programs Needed: FORTRAN Operating System (DEC-08-AFCO)
Source Language: FORTRAN

DECUS NO. 8-187

Keyboard Controlled Binary Punch

Edward A. Taft III, St. Mark's School, Southboro, Massachusetts

This program makes binary tape copies of selected areas of core. It is entirely keyboard controlled, and has provisions for punching leader, data, checksum and field marks for extended memory programming.

Minimum Hardware: PDP-8, High Speed Punch and Extended Memory (optional)
Storage Requirement: 1 page (versions included occupy 1, 36 and 37)
Source Language: PAL-D

DECUS NO. 8-188

Extended Memory Patch for 4 Word Floating Point Package (DEC-08-FMHA-8B)

Peter Goldstern, Digital Equipment Corporation

This patch will allow the DEC Floating Point Package to be entered from any memory bank if the arguments and operands processed by the Floating Point Routine all reside in the same memory bank that the package is called from. The patch only uses free locations within the package.

Other Programs Needed: Floating Point Package (DEC-08-FMHA-8B)

DECUS NO. 8-189

LKDN: Look Into the Directory Name Block

Barbara M. Rollman, Educational Testing Service, Princeton, New Jersey

LKDN will find the appropriate directory name entry when given a file name. It will decode and type out the contents of the entry. The output gives the disk location of the directory entry (in xxx.yyy form, see DISKLOOK, DECUS NO. 8-111) and, optionally, the disk block locations for each core page stored.

Minimum Hardware: PDP-8 with DF32 Disk
Other Programs Needed: Disk Operating System (DEC-08-SDAA)
Storage Requirement: Program - location 12_8 and 20_8 - 1377_8, Buffer - locations 1400_8 - 1777_8. If stored on disk, the program requires 6 blocks; it can be saved with the command "SAVE LKDN ! 0-1377;200"
Source Language: PAL-D

DECUS NO. 8-190

PATCH Utility Program

James A. McDonough, Concord Control, Boston, Massachusetts

This program, a utility routine, allows duplicating and updating of a DECtape file of any PDP-8 TCØ1 format. It is derived from a combination of ODT (DEC-08-COBO-D) and 4K and 8K DECtape Programming System (DECUS NO. 8 - 64a). The user should be familiar with the operation of both of these programs.

Minimum Hardware: PDP-8 with TCØ1 Control

DECUS NO. 8-191

Fields

D. Whiteley, International Computers Limited, Kidsgrove, Stoke-on-Trent, England

Fields, a demonstration program, calculates and displays the surface potential of a given boundary conditional plane. Each output facility is called by a 338 Display pushbutton giving a numerical and/or pictorial result.

Minimum Hardware: PDP-8 with High Speed Punch ASR-33 Teletype and 338 Display

DECUS NO. 8-191 (Continued)

Storage Requirement: 8K
Source Language: PAL III

DECUS NO. 8-192

T.A.L.C.:Taylor's Algebraic Linear Calculator
Bruce J. Taylor
Submitted by: Theodore Green, The Taft School, Waterbury, Connecticut

T.A.L.C. is a general-purpose calculator designed to evaluate a general algebraic equation, given all quantities involved in the equation. In effect, T.A.L.C. turns any of the family-of-eight computers into a powerful desk calculator capable of evaluating complex algebraic, trigonometric and logarithmic functions. In addition, it utilizes the concept of "idiot-proofing" to virtually eliminate the possibility of an operator error invalidating the equation. The program is easy to use and presents unlimited possibilities in any field where fast and accurate calculations are required.

Minimum Hardware: 4K PDP-8, High Speed Reader, DF32 Disk File and ASR-33/35
Other Programs Needed: Floating Point Package (Digital 8-5-S)
Storage Requirement: 4K
Source Language: PAL III

DECUS NO. 8-193

DISP

S. G. Wellcome, Digital Equipment Corporation, Maynard, Massachusetts

DISP provides a simple means of using the 34D Display with FORTRAN-D. It allows the operator to display varying numbers of points with movable X and Y axes.

Minimum Hardware: 4K PDP-8 with DF32 Disk
Other Programs Needed: FORTRAN-D Compiler (DEC-08-AFCO)
Storage Requirement: $600\text{-}777_8$, $7400\text{-}7577_8$
Restrictions: Destroys FORTRAN-D disk read/write option (e.g., Read 3, 10)
Source Language: PAL-D

DECUS NO. 8-194

NMR Simulator

D. F. Juers, R. J. Boettcher, V. J. Hull and H. E. Zimmerman, University of Wisconsin, Madison, Wisconsin

NMR Simulator is designed to calculate the theoretical spectrum of compounds containing hydrogen, florine, carbon-13 and other nuclei of spin 1/2. The calculated theoretical spectrum is displayed on an oscilloscope.

Options for punched and typewritten output, change in X-axis offset (sweep offset) and spectrum resolution are available. Chemical shifts and coupling constant parameters may be varied successively until the displayed spectrum matches that obtained experimentally. Redisplay of a "library" of theoretical spectra is possible by retaining punched output tapes.

Minimum Hardware: 8K PDP-8 Oscilloscope and High Speed Reader/Punch
Storage Requirement: 8K
Execution Time: 1 second to 15 minutes
Source Language: PAL III

DECUS NO. 8-195

POLY BASIC

L. Elekman and Richard Lary, Digital Equipment Corporation

POLY BASIC is a compiler and operating stand-alone system designed for the PDP-8 family. It has a total user program storage of 32K characters in which the disk is utilized. Some of the features of the compiler are:

a. It has all BASIC system commands
b. It has all BASIC operations
c. It contains all built-in functions except TAN
d. Its accuracy is 1 part in 2^{23} rather than 1 part in 2^{35}, because of word size difference
e. Maximum program size is 6144 characters as in regular (Dartmouth) BASIC
f. Maximum usable statement number 4095 rather than 99999
g. Maximum array space is 3600 characters, and maximum number of statements is 330; however, these can be traded off against one another at the rate of 25 array elements per statement
h. There are no matrix operations
i. The argument "EDIT resequence" is implemented and the command "EDIT" renumbers the user file from line number 100 in steps of 10
j. There is a set of error messages to signal compilation errors and a set for execution errors

Minimum Hardware: PDP-8 with ASR-33 Teletype and DF32 Disk
Restrictions: Will not run on PDP-5 or PDP-8/S

DECUS NO. 8-196

DET - Detect Key Words

S. G. Cannon, UNIVAC, Salt Lake City, Utah

DET will detect a key word or words from any sentence that is typed via the Teletype. Other words in the sentence will not be affected so that any arrangement of words can be used.

A basic "conversation" type routine called "SPELL" is included to demonstrate the program operation.

DECUS NO. 8-197

Overlay for Standard Editor and PAL III Assembler

John Knox, International Controls Corporation, Houston, Texas

This overlay enables the user of Editor (DEC-08-ESAB) and PAL III Assembler (DEC-08-ASAC) to save approximately half the time required when using the ASR-33/35. This patch has proven to be a great time saver when debugging was necessary.

Minimum Hardware:	PDP-8 with 8K
Other Programs Needed:	Editor (DEC-08-ESAB) and PAL III (DEC-08-ASAC)

DECUS NO. 8-198

SYSHLP - Monitor System Utility Program

David M. Kristol

SYSHLP is a combined version of DNHELP (DECUS NO. 8-135) and SYSLUK (DECUS NO. 8-141). Besides more convenient alternation between the two programs, SYSHLP features improved search coding in the SYSLUK portion.

Minimum Hardware:	PDP-8 with DF32 or TCØ1
Other Programs Needed:	System Monitor Head (DEC-D8-SDAA)
Storage Requirement:	200_8 - 2177_8
Source Language:	PDPMAP (DECUS NO. 8-166)

DECUS NO. 8-199

Accessing Data Arrays and Teletype Input/Output

David G. Frutchey, Beckman Instruments, Inc., Fullerton, California

These two subroutines provide the user with a powerful, yet concise, programming methodology when used with the Floating Point Package (DEC-08-FMHA).

The array accessing subroutine permits the user to access both fixed and floating point data located anywhere in the first 2K words of core storage regardless of page overlap. Both data storage and retrieval can be performed on terms analogous to single variable, subscripted FORTRAN array terms such as "ARRAY (a*J±b)."

The second subroutine, TTY Text I/O, provides a concise facility for text output (63 characters), character input, line spacing and page tabulation.

Other Programs Needed:	Floating Point Package (DEC-08-FMHA)
Storage Requirement:	Array Accessing - 119_{10} words; Teletype Text I/O - 56_{10} words
Source Language:	PAL III

DECUS NO. 8-200A

BOSS

Dr. A. S. French

Submitted by: Dr. R. B. Stein, University of Alberta, Edmonton, Alberta, Canada

This disk version of BOSS allows a series of system programs to be brought into core and executed in either one or any number of runs without keyboard input, other than the initial listing of programs and a single decision input at the end of each run.

Minimum Hardware:	PDP-8 with DF32 Disk
Other Programs Needed:	Disk Monitor System (DEC-08-SDAA)
Storage Requirement:	Disk - 2 blocks
Restrictions:	File name must begin with a letter
Source Language:	PAL III

DECUS NO. 8-200B

DECtape Boss for PDP-8 Computers

A. S. French, University of Alberta, Edmonton, Canada

DECtape Boss is substantially different from the disk version (DECUS NO. 8-200A) although it operates on the same basic principles and appears identical to the user once it is loaded.

Minimum Hardware:	PDP-8 with DECtape
Other Programs Needed:	Disk Monitor System (DEC-08-SDAA)
Storage Requirement:	3 pages
Source Language:	PAL III

DECUS NO. 8-201

DECSW

Kenneth B. Wiberg, Yale University, New Haven, Connecticut

DECSW is a subroutine which accepts the contents of decimal switches at a remote location and converts the number into the following forms:

1. As an insert into a BCD string which may be typed out or displayed on CRT screen.

2. As a floating point number in the floating point accumulator.

3. As the binary equivalent in the accumulator, if the number was an integer.

Minimum Hardware:	PDP-8 with digital switches
Other Programs Needed:	Floating Point Interpreter
Source Language:	MACRO-8

DECUS NO. 8-202

PLOT

J. J. Spruit and L. R. Davila, Fels Research Institute, Yellow Springs, Ohio

PLOT will plot data points on a graph; calculate and plot a linear, least squares regression line and print out the coefficient of correlation, the equation of the regression line and other pertinent parameters.

Minimum Hardware:	4K PDP-8 with a Houston Instrument Complot Plotter Model 6650, DP-1-1 or equivalent
Other Programs Needed:	Floating Point Package (Digital 8-5C-S), ALPHA (DECUS NO. 8-203), requiring extended memory if used
Storage Requirement:	Page Ø, 200-2453, 4650-4751
Restrictions:	Maximum number of data points is 190

DECUS NO. 8-203

ALPHA

J. J. Spruit and L. R. Davila, Fels Research Institute, Yellow Springs, Ohio

ALPHA is used for titling graphs on the plotter. It can be used in conjunction with PLOT (DECUS NO. 8-202).

Minimum Hardware:	PDP-8 with 8K memory and a Houston Instrument Complot Plotter Model 6650, DP-1-1 or equivalent
Storage Requirement:	Page Ø, 200-4374
Restrictions:	When used in conjunction with PLOT (DECUS NO. 8-202) extended memory is required

DECUS NO. 8-204a

PATCH - A PDP-8 Binary Paper Tape Patch Program

Charles McComas, Digital Equipment Corporation, Maynard, Massachusetts

PATCH provides a simple, convenient means for making changes to PDP-8 binary format paper tapes, and for creating short binary tapes. Single binary tapes may be patched or merely copied. Several tapes may be combined, with or without changes being made. Additions to tapes may be created. Whole pages of code may be moved or deleted. In certain cases binary words may be inserted within existing binary data. Field expressions may be inserted, changed or deleted.

Changes and creations are made via the Teletype keyboard using simple commands. Data is typed in octal.

NOTE: The DECtape available for this program is in PDP-10 format.

Minimum Hardware:	4K PDP-8, Teletype, or high speed reader/punch

DECUS NO. 8-205

MTSAFE

John Alderman, Applied Data Research, Atlanta, Georgia

MTSAFE is a TC-58 version of Disk/DECtape FAILSAFE (DECUS NO. 8-120). If is fairly self-explanatory and incorporates additional messages for the operator to service the magtape.

Minimum Hardware:	PDP-8 with TC-58 Magtape
Other Programs Needed:	Disk Monitor System (DEC-D8-SDAA)
Storage Requirement:	SA-0200; occupies $100\text{-}1377_8$ and uses $1400\text{-}2177_8$ as buffer

DECUS NO. 8-206

DUMP

Barbara M. Rollman, Educational Testing Service, Princeton, New Jersey

DUMP types out the octal contents of any 128-word block on tape or disk. The link (129th) word will be printed and identified. The typeout may be halted in the middle to proceed to the next block on the same device, to switch to a different block and/or device, or to return to the monitor.

Minimum Hardware:	4K PDP-8 with DF32 Disk or TCØ1 DECtape
Other Programs Needed:	DECtape Operating System (DEC-08-SOBO) or Disk Operating System (DEC-08-SDAA)
Storage Requirement:	Location 0-1177; starting address is 1000; 2000-2200 is used as buffer
Source Language:	PAL-D

DECUS NO. 8-207

Cube Root Subroutine

James Kelly, Digital Equipment Corporation, Maynard, Massachusetts

The Cube Root Subroutine is called with an effective "JMS CUBE" with the argument in the accumulator. The subroutine returns to the memory location following "JMS CUBE" with the result in the accumulator and the remainder in MAGIC. The algorithm makes use of the fact that the third order difference of any list of consecutive cubes is always equal to 6 (six).

Storage Requirement:	27_{10} locations
Source Language:	PAL

DECUS NO. 8-208

Evaluating Determinants (from 2-17)

A. Moses, Computer Application Engineering Co., El Paso, Texas

Evaluates determinants with the order in the range from 2 through 17.

Other Programs Needed:	FORTRAN Compiler and Operating System (DEC-08-AFCD)
Storage Requirement:	4K
Source Language:	FORTRAN

DECUS NO. 8-209

Editor-With-View

John C. Alderman, Applied Data Research, Atlanta, Georgia

Editor-With-View is the same as the library distributed version of the Disk Editor (DEC-D8-ESAB) with the exception of the V(View) command addition. This command is exactly like the L command for the TTY, except that results are displayed on a storage scope via the software character generator, and the VD8/I or 34D scope controller. The ALT MODE key will display the next line of the text buffer.

Minimum Hardware:	8K PDP-8 with VD8/I or 34D Scope

DECUS NO 8-210

A Real Time Multiple Task Executive Program with Built-In Console Utility Package for PDP-8/S and PDP-8 Computers

C. D. Martin, Jr. and R. L. Simpson, Oak Ridge National Laboratory, Oak Ridge, Tennessee

This routine schedules process control tasks in a real-time and establishes operating priorities. The program occupies about one-third of a 4096-word memory block and accommodates eight major control tasks.

Minimum Hardware:	PDP-8 or 8/S with a real-time interrupt
Source Language:	PAL III

DECUS NO. 8-211

Matrix Manipulation System (MMS) for Real Numbers

Hudai Dirilten
Submitted by: Professor Dr. Yakup Paker, Middle East Technical University, Electrical Engineering Department, Ankara, Turkey

The following matrix operations can be performed by the MMS program: inversion, calculating the determinant, transpose multiplication (any combination of rectangular arrays) of two or more matrices, multiplication of matrices by constants, addition and subtraction. The method used for inversion and computing the determinant is gaussion elimination process; for inversion a unity matrix of adequate size is generated; all other operations are entry by entry arithmetic computations.

Minimum Hardware:	4K PDP-8; ASR-33
Storage Requirement:	600_8 locations for each tape
Source Language:	PAL III

DECUS NO. 8-212 and 8-212a

Obsolete

DECUS NO. 8-212b

PALH (Modified)

Michael Schwabe, Institut Fur Ergonomie, Munich, Germany
Submitted by: Kay Hoke, Straub Medical Research Institute, Honolulu, Hawaii

This is a modification of the March 2, 1970 version of PALH which will modify PAL-D in order to accelerate assemblies from DECtape. It will: 1) number pages during the listing, 2) use a row of dots for pagination, 3) permit pagination both on-line and off-line and 4) run under either DECtape monitor or Disk Monitor System.

Minimum Hardware:	8K PDP-8 with DECtape or disk
Source Language:	PAL-D

DECUS NO. 8-213

4K ALGOL

University of Grenoble
Submitted by: Charles Conley, Digital Equipment Corporation, Maynard, Massachusetts

ALGOL is an algebraic programming language suitable for a wide variety of scientific and other computer programming applications. With certain restrictions and limitations this 4K ALGOL for the PDP-8 includes all routines necessary to compile, load and execute programs written in a subset of the ALGOL language.

Minimum Hardware:	4K PDP-8; high speed reader/ punch is optional
Source Language:	ALGOL

DECUS NO. 8-214

DECI: A Subroutine to Type Outputs in Decimal

John M. Martin, University of California, Psychobiology Department, Irvine, California

This routine will type the decimal equivalent of the octal number in the accumulator on the Teletype from -2048 to +2047 with zero suppression.

Minimum Hardware:	PDP-8; ASR-33
Storage Requirement:	92_{10}
Source Language:	PAL III

DECUS NO. 8-215

Hexapawn

Ralph Mayer, Lexington High School, Lexington, Massachusetts

This version of Hexapawn is similar to that of DECUS NO. FOCAL8-9 with the exception of additional bells and whistles and a smaller storage space requirement.

Minimum Hardware: 4K PDP-8
Source Language: PAL-D

DECUS NO. 8-216

PAL-D Patch

Edward A. Taft III, Saint Mark's School, Southborough, Massachusetts

PAL-D Patch is designed to provide the following added features that are present in field one. It will store excess symbols in field one; ignore rubout characters in input from the high speed reader; and provide formatting of 3rd pass output onto 11-inch long pages. Two known bugs in PAL-D are also corrected.

Minimum Hardware: 8K PDP-8
Other Programs Needed: PAL-D (DEC-D8-ASAA-PB)
Source Language: PAL-D

DECUS NO. 8-217A

PALR

Matthew Simon, Computer Applications, Inc., New York, New York

PALR will determine whether or not the output from the Teletype is an error message. If no error occurs, the output is directed to a TU-2Ø magnetic tape. Symbols are extended into bank one, not on the disk.

Minimum Hardware: PDP-8 with two banks of core storage, DF-32 Disk, TU-2Ø magnetic tape drive
Other Programs Needed: PAL-D

DECUS NO. 8-217B

PALM

Matthew Simon, Computer Applications, Inc., New York, New York

PALM is a bank Ø modification to PAL-D whose purpose is to direct output that usually goes to an ASR-33/35 to PALR (DECUS NO. 8-217A).

Minimum Hardware: PDP-8 with two banks of core storage, DF-32 Disk, TU-2Ø magnetic tape drive
Other Programs Needed: PAL-D

DECUS NO. 8-217C

UTIL

Matthew Simon, Computer Applications, Inc., New York, New York

UTIL enables manipulation of the assembled files that are output on the TU-2Ø by DECUS NO. 8-217A and 8-217B.

Minimum Hardware: PDP-8 with two banks of core storage, DF-32 Disk, TU-2Ø magnetic tape drive
Other Programs Needed: PALM and PALR (DECUS NO. 8-217A and 8-217B)
Source Language: PAL-D

DECUS NO. 8-218

Interpreter of Constitution of Coding Tables

Sahut d'Izan, C.E.R.C.I., Paris, France

This program enables the user to code constants which will be used by a specific program of the problem, for non-numerical purpose. Octal representation is the only usable form.

Source Language: PAL

DECUS NO. 8-219

LISS

Andrew S. French, Department of Physiology, University of Alberta, Edmonton, Canada

LISS demonstrates the figures produced by the orthogonal addition of sine and other wave forms. It has the facility to control phase angles in fixed and continuous modes.

Minimum Hardware: LAB-8 with display
Storage Requirement: 8 core pages
Source Language: PAL-D

DECUS NO. 8-220

FRACPT and TRANS

Kenneth B. Wibert, Department of Chemistry, Yale University, New Haven, Connecticut

In treating data collected using an analog-to-digital converter it is frequently convenient to shift the number one unit to the right and consider it as a fraction having the form: S.XXXXX-XXXXXX, where bit zero indicates the sign and the decimal point is placed between bits 0 and 1. Thus, full scale of the converter would correspond to 0.999_{10} FRACPT and TRANS are two similar routines which output a number in storage as a BCD decimal fraction. FRACPT leads to the number being typed on the Teletype, whereas TRANS inserts the BCD representation into a BCD string (two characters per word) which may be typed out or displayed on a CRT screen.

Minimum Hardware: 4K PDP-8

DECUS NO. 8-220 (Continued)

Storage Requirement: One page
Source Language: MACRO-8

DECUS NO. 8-221

IFIX/FLOAT

Garth Peterson, Institute of Atmospheric Sciences, South Dakota School of Mines and Technology, Rapid City, South Dakota

IFIX/FLOAT uses the Floating Point Package (DEC-08-YQYA) to convert floating point numbers to signed 12-bit integers or vice versa. It has been written to produce asethetically desirable results rather than to minimize coding.

Other Programs Needed: DEC Floating Point Package (DEC-08-YQYA)
Storage Requirement: 79 words
Source Language: PAL-D

DECUS NO. 8-222

Disk Memory Retention Test

Edward A. Taft III, St. Mark's School, Southborough, Massachusetts

The DF32 Disk can sometimes drop bits in data written on it and left for a long period of time. There is currently no MAINDEC available that will allow a test pattern to be written and checked at a later time (after the computer has been off for a while, for example, or when the computer has been moved). The Disk Memory Retention Test is designed to allow this test to be made.

Minimum Hardware: PDP-8, 8/I and 8/L with a DF-32 Disk
Storage Requirement: Ø2ØØ - Ø777
Source Language: PAL-D

DECUS NO. 8-223

Power Spectrum

H. D. Schenk, Deutsche Forschungs-und Versuchsanstalt fur Luft und Raumfahrt E. V., Flughafen, Germany

This program is a routine to calculate the correlation function and the power spectrum of a set of points given on tape. The output is via two D/A converters to draw the function or in digital form by punching the values on the high speed punch.

Minimum Hardware: 4K PDP-8 with PCØ1
Other Programs Needed: Floating Point #3 (DEC-8-5-S)
Source Language: MACRO-8

Note: Works only with older version of FPP.

DECUS NO. 8-224

PALT: Patch for Improved Text Handling for PAL-D

Frank Battat, Liberty Gold Fruit Co., Inc., San Francisco, California

This patch eliminates the use of stripped ASCII code for packing, instead the logic subtracts the number 237_8 from each ASCII code. This allows ASCII codes 240_8 through 336_8 to be packed two per word but allows for a more efficient unpacking routine.

Minimum Hardware: PDP-8 with Disk or DECtape
Other Programs Needed: PAL-D (DEC-D8-ASAB-PB)
Source Language: PAL-D

DECUS NO. 8-225

CR8/I Overlay for PAL III Assembler

Robert A. Lammert, Digital Equipment Corporation, Northbrook, Illinois

This overlay allows source input for the PAL III Assembler to come from the CR8/I card reader. The overlay precludes input from either High Speed paper tape reader or TTY.

Minimum Hardware: PDP-8, KSR-33 and CR8/I card reader
Other Programs Needed: PAL III
Source Language: PAL III

DECUS NO. 8-226

FAILSAFE for DECtape Library System

Robert A. Lammert, Digital Equipment Corporation, Northbrook, Illinois

This program provides a means of dumping and restoring the DECtape Library System when the user has only one DECtape transport.

Minimum Hardware: 8K PDP-8, High Speed Reader and Punch, DECtape transport
Other Programs Needed: Disk/DECtape Monitor Head for DECtape system. (DEC-D8-SDAA)
Source Language: PAL III

DECUS NO. 8-227 and 10-23

PDP-10/8 Loader

Allan B. Wilson, Max Planck Institut fuer Kohlen forschung Muelheim, Germany

This interactive set of programs when used in conjunction with a special interface between the PDP-8 and PDP-10 allows the following:

1. The PDP-8 console Teletype to be used as a regular PDP-10 time-sharing station; and

DECUS NO. 8-227 and 10-23 (Continued)

2. By means of commands to the PDP-10 Time-Sharing Monitor, PDP-8 binary programs are stored on a PDP-10 device and sent to the PDP-8 and loaded. This eliminates the need for paper tape or other program storage means on the PDP-8.

Minimum Hardware:	PDP-10 with linescanner and a PDP 8 with special interface to PDP-10 linescanner
Storage Requirement:	One page of PDP-8, about 250_8 in PDP-10
Source Language:	PAL-10 and MACRO-10

DECUS NO. 8-228

A One-Pass Paper Tape Loader for PDP-8 Disk System (OPLOAD)

H. E. Barreveld, Delft University of Technology, Delft, Netherlands
Submitted by: E. Dow, Digital Equipment Corporation, Maynard, Massachusetts

This program is a one-pass binary loader used with the PDP-8 Disk System. The program may load output of PAL-D or LEES (DECUS NO. 8-236).

Minimum Hardware:	4K PDP-8 with DF-32; High Speed Reader and Punch
Other Programs Needed:	Disk Monitor System (DEC-D8-SDAA)
Source Language:	PAL-D

DECUS NO. 8-229

Card III Overlay

Roger L. Bachand, MITRE Corporation, Bedford, Massachusetts

This program makes PAL III available for input from the card reader option (CR8/I) for reading IBM-026 source cards. The user punches on each card one PAL III line of text using the same symbol and operation as in compiling on ASCII source tape. Operation is the same as PAL III.

Minimum Hardware:	4K PDP-8, ASR-33, CR8/I card reader
Other Programs Needed:	PAL III
Source Language:	PAL III

DECUS NO. 8-230

Foreground/Background/8 Now

John Alderman, Applied Data Research, Atlanta, Georgia

The Foreground/Background/8 Now system is now in operation. The Disk/DECtape monitor is used as a background program, and there is a successful emulation of the interrupt system for the background user. Most of the standard software will run in the background mode unchanged, (e.g. FOCAL, EDIT, PAL-D). The Executive is transparent to the casual user who thinks that he has a 4K PDP-8 with single DF-32 Disk, and high speed paper tape.

Minimum Hardware:	8K PDP-8, 2 surface DF-32s
Other Programs Needed:	Disk/DECtape Monitor (as Background)
Source Language:	PAL-D

DECUS NO. 8-231

Data Processing on the PDP-8/S

Frederick W. Holzwarth, George Washington High School, Philadelphia, Pennsylvania

Data Processing on the PDP-8/S is a text which was supplemented by the FORTRAN Programming Manual from Digital Equipment Corporation, the FOCAL Manual and the standard McCrachen text in FORTRAN II. It was designed for use as a course outline for 5 one-hour sessions per week.

DECUS NO. 8-232

TP1Ø

Juergen D. Klauske, Digital Equipment GmbH, Koeln, Germany

TP1Ø copies ASCII files from a PDP-10 format DECtape to the Teletype or high speed punch of a PDP-8.

Minimum Hardware:	4K PDP-8 with TCØ1, TU55, ASR-33 or High Speed Punch
Source Language:	PAL-D

DECUS NO. 8-233

An Octal Housekeeping and Debugging Package for PDP-8 (PDP-8/I) with EAE and Disk

George Lauer, Science Center, North American Rockwell Corporation, Thousand Oaks, California

This system was developed to complement the DEC system monitor, not supplant it. It allows the programmer to use the disk as a true random access memory, without regard to block storage, etc. The system is not file oriented. The routines have been written to assure that they do not touch the user program except when commanded to do so. Also, it allows the user to enter floating point constants or change floating point variables in decimal notation.

Minimum Hardware:	PDP-8 with EAE, DF-32 Disk and High Speed Punch
Other Programs Needed:	SYS/LOAD PUNCH (DECUS NO. 8-234)
Source Language:	PAL-D

DECUS NO. 8-234

SYS/LOAD PUNCH

George Lauer, Science Center, North American Rockwell Corporation, Thousand Oaks, California

This program is used to punch out all programs currently listed in the directory name (DN) block. The tape which is generated can be used to reload the DEC Monitor System

DECUS NO. 8-234 (Continued)

Minimum Hardware: PDP-8 with EAE, DF-32 Disk and High Speed Punch
Source Language: PAL-D

DECUS NO. 8-235

Octal Tape Dump for PDP-8/9/10 DECtapes

Frank J. Nagy, Carnegie-Mellon University, Pittsburgh, Pennsylvania

This program allows the user to dump blocks of PDP-8/9/10 DECtapes as octal numbers. The user is asked for the device (DECtape and unit or disk) and the block number. The block is read in and printed as 12, 18 or 36 bit numbers in octal.

Minimum Hardware: PDP-8 with TCØ1 DECtape control (DF-32 Disk optional)
Other Programs Needed: Disk/DECtape Monitor System (DEC-D8-ASAA)

DECUS NO. 8-236

System and User Files Read and Punch Program (LEES)

H. E. Barreveld, Delft University of Technology, Delft, Netherlands

This program is designed to allow the user to punch and restore either user files or system files from one DF-32 Disk while using the Disk System supplied by Digital Equipment.

Minimum Hardware: PDP-8 with DF-32 Disk; High Speed Reader and Punch
Other Programs Needed: A One-Pass Paper Tape Loader PDP-8 Disk System (OPLOAD) (DECUS NO. 8-228) and Disk System (DEC-D8-ASAA)
Source Language: PAL-D

DECUS NO. 8-237

MADCAP IV, A Multiplexed ADC and Analog Plotting Program

Gerald W. Dulaney, Digital Equipment Corporation, Maynard, Massachusetts

MADCAP IV allows the LAB-8 user more complete exploitation of his hardware environment by supplying a program matrix into which he can readily insert assembly language routines to perform a specific data acquisition and/or analysis task. Floating point arithmetic, scope display, analog plotting, and both analog and digital data input can be performed by the Basic Package. Additional routines are supplied to perform interactive data treatment (including simulation spectrum stripping, smoothing, integration, etal), slow scan signal averaging, acquisition from a photoelectric curve follower, and to perform mass spectral ionization efficiency measurements.

The program can be adapted by the interested user to work with a different hardware configuration.

Minimum Hardware: LAB-8, i.e., PDP-8/I with AXØ8 Lab peripheral, X-Y analog plotter, ASR-33, High Speed Reader

DECUS NO. 8-238

EPRSIM, An Electron Paramagnetic Resonance Simulator

Philip D. Morse, III and James S. Vincent, University of California at Davis, Davis, California

An electron paramagnetic resonance (EPR) spectrum simulation program coded in MACRO-8 for the LAB-8 Computer. The program will display spectra derived from either a Gaussian or Lorentzian derivative line shape. The horizontal length of the display is 512 locations and is adequate for many simulation problems. A spectrum may either be displayed on an oscilloscope or an x-y recorder.

Minimum Hardware: LAB-8 and oscilloscope or x-y reader

DECUS NO. 8-239

PAL III/Editor 8K Link Patch

Charles Schultz, Jr., Schultz Instruments, Inc., Gainesville, Florida

This patch allows the Editor in lower core to communicate directly with PAL III in upper core, thereby effectively producing zero-pass assembler. Five-to-one assembly time reductions may easily be experienced. Both programs continue to behave normally in regard to the low speed reader and punch.

Minimum Hardware: 8K PDP-8
Other Programs Needed: PAL III, August, 1965 or later; PDP-8 Editor, August, 1967 or later
Restrictions: Prevents use of high speed punch for Editor and high speed reader for PAL III
Miscellaneous: Reverses the action of switches Ø and 1 for the Editor; switch 1Ø establishes link to PAL III
Source Language: PAL III

DECUS NO. 8-240

END

Elmer J. Bourque, New Brunswick Research and Productivity Council, Fredericton, New Brunswick, Canada

"END" is a termination program stored on Library System and/or Monitor Unit #8 DECtape, which leaves the memory in a state which allows access to all necessary loaders. Designed primarily for the PDP-8 with TCØ1 and high speed reader, it may be modified for any configuration using DECtape. Loaders in memory after execution of "END" are as

DECUS NO. 8-240 (Continued)

follows: The Monitor Bootstrap, the TCØ1 Library System Bootstrap, the High Speed RIM Loader and the Binary Loader.

Minimum Hardware:	PDP-8 with Teletype and TCØ1
Other Programs Needed:	TCØ1 Library System and/or "Monitor"
Storage Requirement:	200_8-577_8 and 16_8-17_8
Source Language:	PAL III

DECUS NO. 8-241

BUZZTAPE READER/WRITER

Evan Suits
Submitted by: Robert L. Isaacson, University of Florida, Department of Psychology, Gainesville, Florida

The BUZZTAPE READER and WRITER programs can be used to build an inexpensive magnetic tape system for storage and retrieval of data or programs. Both the READER and WRITER occupy locations normally containing BIN. Transfer rate is about 4 msec per 12 bit word, or about 15 seconds for 4K.

Minimum Hardware:	AX08, XR option, stereo tape recorder
Other Programs Needed:	RIM Loader
Storage Requirement:	Reader 7625-7736, Writer 7625-7717
Source Language:	PAL III

DECUS NO. 8-242

DĀTAK I

Digital Equipment Corporation
Submitted by: J. B. Pearce, University of Colorado, Boulder, Colorado

DĀTAK is a single core load interpretive compiler programming system designed for facile manipulation of PDP-5/8 peripherals and data. The program was written by DEC prior to 1965 and is no longer maintained by them. They have replaced DĀTAK, conceptually at least, by their new disk based system INDAC. For the installation not possessing a disk, however, DĀTAK is a valuable tool.

Minimum Hardware:	PDP-5 or PDP-8 Family, Teletype, Simple Homemade Clock (See DĀTAK Manual)
Maximum Hardware:	Original minimum plus 34D Display oscilloscope and a parallel and serial interface
Source Language:	PAL

DECUS NO. 8-243

Amplitude Distribution

H.-D. Schenk, Deutsche Forschungs und Versuchsanstalt fur Luft und Raumfahrt E. V., Flughafen, Germany

This program calculates the amplitude distribution of a set of points which are given on tape or are typed on the teletype. The output is via two D/A Converters. The mean, the variance and the standard deviation are typed on the teleprinter.

Minimum Hardware:	4K PDP-8, ASR-33, PC01, 2 D/A Converters (No. 55, 56)
Other Programs Needed:	Floating Point Package No. 3 (DEC-8-5-S)
Source Language:	MACRO-8

DECUS NO. 8-244

BINSAVE

Michael H. Craven, Digital Equipment Corporation, Maynard, Massachusetts

BINSAVE will punch a specified system or user saved file in binary format. A four instruction patch will allow output to the ASR-33 teletype punch.

Minimum Hardware:	Disk or DECtape
Other Programs Needed:	Disk Monitor System (I/O Routine)
Storage Requirement:	0-2500
Source Language:	PAL-D

DECUS NO. 8-245

Dynamic Octal Disk Debugger

Andrew S. French, Department of Physiology, University of Alberta, Alberta, Canada

This program allows fast efficient inspection and modification of any location on the disk using a visual output. Printout of all locations in a block and listing of directory, contents plus program type, number and starting SAM blocks are available. The program is entirely selfcontained and does not need MONITOR.

Minimum Hardware:	LAB-8 and a DF32 Disk
Storage Requirement:	9 Core Pages
Source Language:	PAL-D

DECUS NO. 8-246

DF32 Disk Routines

Garth Peterson, Institute of Atmospheric Sciences, South Dakota School of Mines and Technology, Rapid City, South Dakota

DCIO and DCNI are DF32 disk input-output subroutines which operate with the interrupt facility enabled and disabled respectively. Error checking is fairly thorough and includes address checks before each disk operation and write-lock

DECUS NO. 8-246 (Continued)

checks at the beginning and end of each disk write operation. Loading and calling of DCIO are limited to Field 0; loading and calling of DCNI may be in any field, but it must be the same field.

Minimum Hardware:	PDP-8 or 8/I with DF-32 Disk
Storage Requirement:	1 page, each routine
Source Language:	PAL-D

DECUS NO. 8-247

HELP: A Disk/DECtape Dialogue Program

David P. Weaver, Georgia Institute of Technology, Atlanta, Georgia

This program allows any message typed on the teleprinter to be SAVED and printed upon calling HELP.

Minimum Hardware:	PDP-8, ASR-33
Storage Requirement:	118_{10} locations
Source Language:	PAL-D

DECUS NO. 8-248

SABR - Coded Fast Fourier Transform Subroutine

Gerald N. Cederquist, Cooley Electronics Laboratory, University of Michigan, Ann Arbor, Michigan

Using the Fast Fourier Transform algorithm, this subroutine computes in situ either the direct or inverse discrete Fourier transform of a pure-power-of-two number of complex points. Written for use with the DEC 8K FORTRAN system, it runs in less time and takes less core space than the same algorithm coded in FORTRAN. It has been extensively tested and checked; for example, the subroutine will do a direct followed by an inverse transform of 128 points in 47 seconds with a round trip root mean square error of 1.23 parts per million.

Minimum Hardware:	8K PDP-8
Other Programs Needed:	DEC 8K FORTRAN System
Storage Requirement:	5 pages plus 17 locations on page zero
Source Language:	FORTRAN

DECUS NO. 8-249

Oscilloscope Vector Generator

J. H. Boardman, South Dakota School of Mines and Technology, Rapid City, South Dakota

This is a subroutine requiring exactly one page (128 words) of memory. Its purpose is to draw a linear vector from any point on an oscilloscope display to any other point. There are 5 arguments in the subroutine calling sequence which specify the starting point (X_1, Y_1), the ending point (X_2, Y_2) and a stepsize. The stepsize (range 1 to 7) determines the point density along the vector.

The ASCII tapes which are offered are with or without comments. Please specify which tape you wish. The binary tape is a program which demonstrates the use of the oscilloscope Vector Generator Subroutine.

Minimum Hardware:	PDP-8, EAE, Type 34-D Display
Other Programs Needed:	User written main program
Storage Requirement:	128 words (1 page)
Source Language:	PAL-D

DECUS NO. 8-250

Fast Fourier Transform (FFT)

Kenneth G. Pavel, Trinity College, Hartford, Connecticut

This program uses the Cooley-Tukey algorithm to perform a Discrete Fourier Transform on up to 1024 data points. Input is through a selected A-D channel. The sampling rate is either 0.01 seconds or on every clock pulse, depending on the switch register. The input waveform is displayed in a scaled manner, and then transformed. The final spectrum is viewed through a variable window which is under the control of A-D channels 34-36, and the switch register.

Minimum Hardware:	LAB-8 or PDP-8 with AXØ8 and scope display
Storage Requirement:	Approximately 3K of core
Source Language:	PAL-D

DECUS NO. 8-251 and FOCAL8-60

A System for Production of Problem Sets with Individualized Data

H. Bradford Thompson, Department of Chemistry, University of Toledo, Toledo, Ohio

This system produces problem sets for use in science and mathematics instruction, in which input data are changed for each student. Two programs are involved, (1) a FOCAL program into which the instructor inserts the algebra required to perform the calculations, and (2) a program which accepts a text with data positions marked, and then inserts individualized data from the FOCAL program (without the answers) and prints the copies. The system will work on any family-of-8 machine for which FOCAL is available.

Minimum Hardware:	PDP-8/I with ASR-33
Other Programs Needed:	FOCAL (Any version)
Storage Requirement:	4K
Source Language:	PAL III, FOCAL

DECUS NO. 8-252

PEEP - A Directory Search Program

J. M. Dickson, Rutherford High Energy Laboratory, Chilton, nr. Didcot, Berkshire, England

This program supplements the LIST option in the DEC PIP program. All the information contained in the DN and SAM blocks of a Disk or DECtape system can be accessed and typed out on the teletype as a complete list, or file-by-file as required. Other features are 1) a count of free blocks and

free files, 2) a dump of the contents of SAM blocks (in an 8 x 16 matrix), and 3) a 'halt' option, which allows the user to change the starting address (entry point) of a file to 7636. The program uses the Disk/DECtape Monitor System SYSIO to read and write on the system device.

Minimum Hardware:	Disk(s) (32K) or DECtape
Other Programs Needed:	Disk/DECtape Monitor System
Storage Requirement:	4K
Restrictions:	Operates in Field Ø, and accesses the system device only
Source Language:	PAL-D

DECUS NO. 8-253

Disk Dump on Scope

Brian Underhill, University of Colorado Medical Center, Denver, Colorado

This program displays disk data on the scope screen, a block at a time, in octal. A fast plot routine allows a refresh time of 52 milliseconds or less for minimum flicker. Other functions are available, including searches for strings of words, modification of single words or links on the disk, and hard copy on the teletype.

Minimum Hardware:	PDP-8, 34-D Scope Display, DF-32 Disk (Any size)
Other Programs Needed:	PDP-8 Disk Monitor System, System I/O Routine
Storage Requirement:	Program 0-1377, Buffers 1400-7577
Source Language:	PAL-D

DECUS NO. 8-254

Vector Algebra Package

Bryan D. Young, Department of Medical Cardiology, Glasgow Royal Infirmary, Glasgow, Scotland

This package is designed to operate with the Basic Three Word Floating Point Package (Digital 8-5-S) and enables the user to label three dimensional vectors (i.e. three consecutive three-word floating point numbers) by a single symbol. Its use is similar to that of the Floating Point Package in that vector operations can be initiated by a single instruction. The operation of addition, subtraction, dot product, cross product and modulus of vectors can be simply programmed and full input and output facilities for vectors are available.

Minimum Hardware:	PDP-8, ASR-33
Other Programs Needed:	Basic Three-Word Floating Point Package (Digital 8-5-S)
Storage Requirement:	Loc: 2-4, 64-74, 5200-5577
Source Language:	PAL

DECUS NO. 8-255

SCED: Scope Editor for the AXØ8

R. H. S. Carpenter, Physiology Laboratory, University of Cambridge, England

This scope editor for the LAB-8, offers fast and convenient editing of symbolic text. Lines may be selected by reference to their initial character, and a movable marker may be used to select particular portions of a selected line.

Minimum Hardware:	PDP-8, AXØ8, High Speed Punch and Reader
Other Programs Needed:	AXØ8 Symbol Generator (DECUS NO. 8-158)
Source Language:	PAL III

DECUS NO. 8-256

Binary to RIM Format Converter

Paul Masson, Picker Nuclear, Montreal, Canada

In some cases it may be necessary to use memory locations between 7600 and 7755. The user program overlays the binary loader, and assembler output is in binary format. The binary to RIM Converter takes as input the assembled tape and produces a copy which can be loaded with the RIM loader.

Minimum Hardware:	PDP-8 with High Speed Reader/ Punch
Storage Requirement:	78 Memory Locations
Source Language:	PAL-D

DECUS NO. 8-257

UCONN-EAP, Editor-Assembler

Gerald E. Zajac
Submitted by: Howard A. Sholl, University of Connecticut, Storrs, Connecticut

This program combines the functions of editor and assembler in one program so that the user can edit and assemble a source program in one operation. The assembler is compatible with PAL III and will also accept literals. The editor is similar to the PDP-8 Editors.

Minimum Hardware:	PDP-5 or PDP-8 with Teletype, High Speed Reader is optional
Storage Requirement:	4K
Restrictions:	Length of user's source program is two pages
Source Language:	MACRO-8

DECUS NO. 8-258

NMRCAT-29: A Simplified Signal Averager Program

James W. Cooper, Department of Chemistry, State University of New York at Buffalo, Buffalo, New York

This is a time averaging program for the PDP-8/I computer

DECUS NO. 8-258 (Continued)

specifically designed for use with the HA-60 nmr spectrometer equipped with a digital frequency synthesizer. It generates a linear sawtooth sweep voltage which is used to drive the frequency synthesizer. The synthesizer then sweeps through a preset range at a rate controlled by the computer. The program also contains display, printout, plot, integration and calibration routines for examining the accumulated average.

Minimum Hardware:	4K PDP-8; ASR-33; AX08 Peripheral; nmr spectrometer and digital frequency synthesizer
Storage Requirement:	0-3, 20-127, 200-3115 and 4000-6777
Source Language:	PAL III

DECUS NO. 8-259

Symbolic from Pass 3

M. T. Franklin, The Plessey Co., P. A. Laboratories, Titchfield, Fareham Hants, England

This is a program to produce a modified PAL III symbolic program tape from a previous pass 3 tape using the high speed input-output facilities of the computer. A list of changes, deletions and insertions are read into core store, then the pass 3 tape of the symbolic program to be modified is read on the photo-electric reader and a new symbolic tape is produced at the high speed punch.

Minimum Hardware:	PDP-8, ASR-33, High Speed Reader and Punch
Storage Requirement:	1-11/21-1551
Miscellaneous:	With some exceptions may also be used with MACRO-8
Source Language:	PAL III

DECUS NO. 8-260

TOFAST - Fast Direct and Inverse Discrete Fourier Transform Routines

Peter L. Walton
Submitted by: Dr. William S. Yamamoto, School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania

TOFAST is capable of calculating in place either the discrete Fourier transform (DFT) of real series $\{y_j\}$, $j = 0,1,\ldots,N-1$, where $N = 2^M$ and $M = 3,4,\ldots,10$, or the inverse discrete Fourier transform (DFT^{-1}) of the Fourier cosine and sine coefficients, a_k, $k = 0,1,\ldots,n$, and b_k, $k = 1,2,\ldots,n-1$, respectively, where $n = N/2$. Output of the DFT is the Fourier cosine and sine coefficients; output of the DFT^{-1} is the real series. Several modifications are possible which allow for input and/or output to be complex-valued.

Minimum Hardware:	8K PDP-8, (EAE optional, depending on Floating Point Package version)
Other Programs Needed:	Early version of DEC's FPP
Storage Requirement:	Field 0: 20-37, 64-77, 200-277, 400-1377; Field 1: data array (200-)
Restrictions:	Data array must have size 2^M, M=3,4,...,10
Source Language:	MACRO-8

DECUS NO. 8-261

QUBIC

Tim Yeager, William Tennent High School, Warminster, Pennsylvania

'QUBIC' plays 3 dimensional Tic-Tac-Toe on an order-4 cube. The program is conversational and uses the Teletype for all I/O. Moves are typed in as 3 coordinates, and outputted using both coordinates and a Teletype printout of the playing board. The strategies employed in playing the game have been found to be extremely good, but the program can be beaten.

Minimum Hardware:	4K PDP-8, ASR-33
Storage Requirement:	Locations 10 through 3143_8
Source Language:	PAL III

DECUS NO. 8-262

Character Overflow Change to PDP-8 PAL 3

A. G. Price
Submitted by: Mrs. J. Manwaring, Documentation Processing Centre, Quay House, Manchester, England

During pass 3 of PAL 3 assembly listing, input text is accumulated a line at a time in high core. If more than 86 characters are contained on one line, overflow will occur into the area reserved for Binary Loader, since there is no check on the number of characters per line. This revision will inhibit storage of characters after the first 86.

Minimum Hardware:	4K PDP-8, ASR-33
Other Programs Needed:	PAL III
Source Language:	PAL III

DECUS NO. 8-263

XYPLOT - A Versatile Plot Routine for the D/A Converter

Eugene E. Wells, Jr., U. S. Army Electronics Command, Fort Monmouth, New Jersey

XYPLOT is a one page subroutine which scales, offsets, and simultaneously plots two integer arrays from any two data fields, using the D/A converter and a conventional x-y recorder. Incorporation of a programmed pen lift makes available to those users having the necessary additional hardware a point plot capability, selectable by properly setting bit zero of the variable PENFLG in the calling sequence. Loading of the additional 41 (octal) memory location program GENX, and setting of bit one of PENFLG allows a y-data array to be plotted versus locally generated, equispaced x-data, with the spacing interval user specified.

DECUS NO. 8-263 (Continued)

Minimum Hardware: PDP-8 with D/A Converter
Other Programs Needed: Floating Point Package III (DEC-Ø8-YQ3A-PB)
Storage Requirement: 1 page, plus 41_8 locations
Source Language: PAL-D

DECUS NO. 8-264

CLOK - AXØ8 RC Clock or External Clock Frequency or Period Measurement

Andre Laviron, INSERM, Hospital Neurologique, Lyon, France

By option of the switch register this program will allow either Frequency or Period measurement, normal RC clock rate, RC clock slowed by 8, RC clock or External clock. Frequencey or Period is typed on the ASR33 every 2 seconds. Precision: 1/8000.

Minimum Hardware: PDP-8/I, AXØ8, ASR33
Other Programs Needed: Floating Point Package #2
Source Language: PAL

DECUS NO. 8-265

Teletype Parity Conversion Program

R. Lee, University of Kent at Canterbury, Canterbury, Kent, England

This tape contains two programs. The first will convert a symbolic tape in ASCII code with parity into one in ASCII code without parity. The second converts a tape in ASCII code without parity into one in ASCII code with parity. Using these programs on-line while typing a symbolic tape will cause a teletype without parity to punch a tape in parity code or vice versa. The programs may easily be converted for use with a high speed reader and punch.

Minimum Hardware: 4K PDP-8, ASR33
Storage Requirement: 2ØØ-267
Source Language: PAL III

DECUS NO. 8-266

IBM Editor

Ted Glattke, Stanford University School of Medicine, Stanford, California

This program provides editing service and 3000_{10} character storage for text from an IBM 2741 terminal. In the present version, it also provides for punched paper tape storage of materials to be listed on the 2741.

The program permits the following operations: (1) correction of text by backspacing over the error and entering the correct character; (2) correction of a line of text by calling back the line; (3) an unlimited number of listings of text stored in the buffer; (4) paper tape output.

Pecularities of the 2741 terminal, including time delays for data control transfer and carriage travel after tabulation and carriage return have been accommodated in the program.

Minimum Hardware: PDP-8, PTØ8, IBM2741 Terminal pl
options to change data transfer rate and logic levels from PTØ8 (Options X and F)
Storage Requirement: $ØØØØ$-$Ø777_8$ plus $1ØØØ_8$-6777_8 for buffer
Source Language: PAL III

DECUS NO. 8-267

DARIC - Data Reduction in Columns

J. J. Antal, Army Materials and Mechanics Research Center, Watertown, Massachusetts

DARIC is a formatting and computational program which provides for the reduction of one to six columns of data entered at the ASR keyboard as a function of a single variable. Computation is via the Digital floating point system through a user's data reduction program, the writing rules for which are simplified and standardized by DARIC.

Minimum Hardware: 4K PDP-8, ASR33
Other Programs Needed: Floating Point System (Version D) and user's data reduction program
Storage Requirement: All but last page of memory
Source Language: PAL III

DECUS NO. 8-268

Miniloader and Miniloader Punch

G. J. Flanagan, The University of Newcastle Upon Tyne, Newcastle Upon Tyne, England

This is a program which is designed to be loaded as easily as possible from the switch register. Once loaded, the program is capable of loading and starting any other program punched in the correct form, though because of the lack of any checking facility it would normally load a standard binary loader. The miniloader format is such that, if the program is to be loaded at the high-numbered end of the field, the length of the tape is just over half the length of the same program punched in RIM format.

Source Language: PAL

DECUS NO. 8-269

Morse Code Trainer

Jack Harvey, National Data Systems, Inc., Montvale, New Jersey

This program will generate International Morse Code signals as tones in the output to a digital to analog converter. (A DAC is not required. Any flip-flop register program loadable from the AC can be used.) It operates in three modes: 1) Generate random five letter groups, 2) Send characters

typed on keyboard, 3) Send random characters and wait for correct response on keyboard. Speed, character spacing and character set are controlled from the keyboard.

Minimum Hardware: 4K PDP-8 plus flip-flop
Source Language: PAL III

DECUS NO. 8-270a

Disk-DECtape Utility Program

Garth Peterson, South Dakota School of Mines and Technology, Rapid City, South Dakota

The major functions of the Disk-DECtape Utility Program are to save and recover DF32 disk images on DECtape and to build a simple disk 0 to memory field 0 swapping system which allows user-written programs and data to share a single disk. Minor functions include establishing binary loaders, disk and DECtape bootstraps, and a RIM loader in core; depositing and examining messages on DECtape which identify disk images; and clearing DECtapes to all zeroes. Extended memory is desirable.

Minimum Hardware: PDP-8, TC01 DECtape, DF32 Disk
Storage Requirement: 1-3357 (instructions) 1-7577 (total)
Source Language: PAL-D

DECUS NO. 8-271

LIP - Logical "IF" Package

Bryan D. Young, University Department of Medical Cardiology, Royal Infirmary, Glasgow, Scotland

LIP enables "IF" statements involving floating point variables to be written in a conventional manner within assembly language programs. The logical relations available are: GT(>), GE(≥), EQ(=), LE(≤), LT(<), NE(≠), logical AND, logical OR.

Minimum Hardware: PDP-8
Other Programs Needed: 3 word Floating Point Package (Digital 8-5-S)
Storage Requirement: 4, 5400-5577
Source Language: PAL-D

DECUS NO. 8-272

IOPACK - A Message and Number I-O Utility Package

Brian Barton and Kurt Metzger, University of Michigan, Ann Arbor, Michigan

IOPACK is one page long and contains: MESAGE for printing messages, OCTIN and DECIN for inputting unsigned octal or decimal numbers; OCTOUT and DECOUT for outputting unsigned octal or decimal numbers.

Minimum Hardware: PDP-8 with Teletype
Other Programs Needed: Teletype printing and reading routines
Storage Requirement: 200_8 locations
Source Language: MACRO-8

DECUS NO. 8-273

Algonquin Assembler

John Kiss, Algonquin College Technical Centre, Ottawa, Ontario, Canada

The purpose of this is to modify the Phoenix Assembler so that it will accept symbolic programs from the card reader, do all three passes automatically, load automatically after assembly, and execute automatically provided no error is found in assembly. No binary tape is punched.

In general the system is supposed to operate without human intervention.

Minimum Hardware: PDP-8, ASR33, Mark Sense Card Reader (HP2761A)
Other Programs Needed: Phoenix Assembler (DECUS NO. 5/8-28a)
Source Language: PAL III

DECUS NO. 8-274

Card Reader Patch to Phoenix Assembler

John Kiss, Algonquin College Technical Centre, Ottawa, Ontario, Canada

This patch, if added to the Phoenix Assembler (DECUS NO. 5/8-28a), will enable the user to enter symbolic programs on mark sense cards on the Hewlett-Packard 2761A Optical Mark Reader.

Minimum Hardware: Mark Sense Card Reader with serial ASCII code output, PDP-8 with ASR33
Other Programs Needed: Phoenix Assembler (DECUS NO. 5/8-28a)
Storage Requirement: 7402-7437
Source Language: PAL III

DECUS NO. 8-275

Grade Compiler

Mark H. Linehan
Submitted by: C. Hamblet, Governor Dummer Academy, Byfield, Massachusetts

The "Grade Compiler" is designed to handle the individual grades of a class of students. It performs the functions of calculating individual averages from typed-in data, storing the final averages and the two-letter code names, typing in alphabetical or rank order all the code names and their corresponding averages, making individual deletions, typing individual averages on demand, calculating the class average, and deleting all the stored data. It will handle up to two hundred and seventy code names and averages in a basic 4K PDP-8 system.

Minimum Hardware: PDP-8 with Teletype
Other Programs Needed: Floating Point Package #2
Source Language: PAL III

DECUS NO. 8-276

Core Editor

Anthony Bolton, Scribner Hill Road, Wilton, Connecticut

This program enables the user to debug his program in core and then get a binary write-out of the program by a simple command. The user can also write a program directly into core by using the insert command which increments the location referenced by typing a space. It has six other commands.

Minimum Hardware: 4K PDP-8, ASR33
Source Language: PAL III

DECUS NO. 5-277

ICBM

Leonard K. Berger, Washington University, St. Louis, Missouri

This is a game program which displays a flying saucer moving across the scope (at a speed which the user sets) and then a rocket is fired to try and shoot down the flying saucer. At any time during the display the program may be restarted by hitting the Return key. The program also has an exit at 7600_8 by hitting the Rubout key. This will go to the DECtape system if available,

Minimum Hardware: 4K PDP-5, ASR33, Type 34 Scope Display
Source Language: PAL III

DECUS NO. 8-278

Single Length Floating Point Package

R. J. Bedding and C. A. Charlesworth, Bath University of Technology, Claverton Down, Bath, Somerset, England

This Single Length Floating Point Package consists of a modified version of DEC-Ø8-YQ1A-PB and is intended as an alternative where input and output accuracy is adequately served by single length working. Entry points and commands are identical with the standard double length version.

The program was developed for on-line calculation employing ADC's and DAC's and is meritorious for its increased speed of calculation.

Minimum Hardware: PDP-8/I and Teletype
Source Language: PAL III

DECUS NO. 8-279

Bar Chart Plotting Subroutine

G. L. Kermez and W. G. Peters, Texas Instruments Limited, Bedford, England

This program was written as part of the main operating program of a power transistor test system produced by the authors. The chart requires 7 constants for its construction. The table can be as large as required. Many charts can be plotted from one table because the table is not altered in any way by the subroutine. This allows the drawing of a family of charts of one set of readings for different classes and numbers.

Minimum Hardware: 4K PDP-8/L, ASR-33
Source Language: MACRO-8

DECUS NO. 8-280

General Sorting Program

M. J. Raymond, Mullards, Southampton, Hampshire, England

This program will sort alpha-numeric records into ascending order. The user specifies the number of characters in each record and the number of records to be sorted on. Input/Output is via High Speed Paper Tape peripherals on the ASR33 Teletype.

Minimum Hardware: 4K PDP-8, ASR33
Source Language: PAL III

DECUS NO. 8-281a

Binary Tape Splicer ASR 33/75A

Ion Grove-White, University of Aberdeen, Aberdeen, Scotland
Revision by: P. Galen Lenhert, Vanderbilt University, Nashville, Tennessee

This utility program punches a length of leader tape and halts. It then transcribes binary tapes as they are fed in, without interruption on the output tape. It finishes by punching a new checksum and a length of trailer tape. Splicer tapes can be read into memory using the binary loader.

Minimum Hardware: PDP-8, ASR33 or 75A High Speed Punch and Reader
Source Language: PAL

DECUS NO. 8-282

C52B: Paper Tape Conversion 5 Track (SIRIUS) to 8 Track (A.S.C.I.I.)

A. J. P. Gore, The Nature Conservancy, Merlewood Research Station, Grange-over-Sands, Lancashire, England

5 track paper tape is translated into 8 track paper tape by inverting the 5 track tape to make the 3 tracks and sprocket holes coincide with the corresponding facilities of the 8 track tape readers of the PDP-8.

Minimum Hardware: 4K PDP-8/I, DF32 Disk, HSR/P
Other Programs Needed: Disk systems programs
Source Language: PAL-D

DECUS NO. 8-283

A.V.S.C. (Analysis of Variance, Single Classification)

J. N. R. Jeffers

Submitted by: A. J. P. Gore, The Nature Conservancy, Merlewood Research Station, Grange-over-Sands, Lancashire, England

This program computes the means, between-groups sum of squares and mean square, and within-groups sum of squares, mean square, and standard error for univariate data. Versions of the program are available for carrying out transformations on the data on input.

Minimum Hardware:	4K PDP-8/I, DF32 Disk, H.S.R.
Other Programs Needed:	FORTRAN D disk systems programs
Source Language:	FORTRAN D

DECUS NO. 8-284

ASCO - Numerical Sort in Ascending Order

J. M. Sykes
Submitted by: A. J. P. Gore, The Nature Conservancy, Merlewood Research Station, Grange-over-Sands, Lancashire, England

This program sorts data into ascending numerical order.

Minimum Hardware:	4K PDP-8/I, DF32 Disk, HSR
Source Language:	FORTRAN D

DECUS NO. 8-285

Teletype Input-Output Package

Garth Peterson, Institute of Atmospheric Sciences, South Dakota School of Mines and Technology, Rapid City, South Dakota

This is a teletype control package containing subroutines for single-character input and output and for output of packed and open text. These subroutines are Single-field oriented, but provide for interrupt-enabled and disabled operation.

Minimum Hardware:	PDP-8 with Teletype
Storage Requirement:	One memory page
Restrictions:	Modification required for PDP-8/S (Described in write-up)
Source Language:	PAL-D

DECUS NO. 8-286

Two Patches for Disassembler with Symbols

Gary Coleman, The Taft School, Watertown, Connecticut

The first patch for DECUS NO. 5/8-18C (Disassembler With Symbols) allows the user to get a cross reference table of addresses which have been defined on the symbol table. It provides the user with the capability to trace a single address (or several addresses) through a program without having to sift through many pages of other addresses. The second patch allows the disassembler to run on a PDP-8/S by replacing the illegal operate instructions with a legal instruction. This permits a PDP-8/S to accept 6 lettered symbols as opposed to 2 lettered symbols without this patch.

Minimum Hardware:	PDP-8/S, ASR33, High Speed Reader
Other Programs Needed:	DECUS NO. 5/8-18C and DECUS NO. 8-179
Source Language:	PAL III

DECUS NO. 8-287

A PDP-8 Program to Provide Teletype Entry Into the IBM JET System

E. G. Baxa, Jr., Duke University, Department of Electrical Engineering, Durham, North Carolina

This program in effect uses the PDP-8 to simulate a teletype machine which is equipped with X-OFF, X-ON, and EOT features to accomplish entry into an IBM 360 computer with the Job Entry Teletype (JET) interface. Minimal requirements included as peripheral equipment to the basic PDP-8 are an alternate teletype with FORTRAN keyboard and a standard Dataphone Set. The program provides for teletype entry into the Jet System from the keyboard or paper tape reader. A teletype page print and/or tape punch record of the transmission is obtained.

Other Programs Needed:	TUCC
Source Language:	PAL

DECUS NO 8-288

GRAYCONV (Gray Code to Binary Code Converter)

Kees Bruin, Digital Equipment Corporation, The Hague, Holland

GRAYCONV converts a binary word in gray code from 1 to 12 bits to an equivalent binary word.

DECUS NO. 8-289

"ULKA" The Ultimate Kaleidoscope

Dr. A. S. French, University of Alberta, Edmonton, Alberta, Canada

"ULKA" is a true kaleidoscope program for use on the LAB-8 computer. Unlike other kaleidoscope programs "ULKA" is completely automatic. No user interaction is required to produce a dazzling array of patterns.

Minimum Hardware:	LAB-8
Source Language:	PAL-D

DECUS NO. 8-290

Skinny BIN Loader

Garth Peterson, Institute for Atmospheric Sciences, South Dakota School of Mines and Technology, Rapid City, South Dakota

This is a condensed paper tape binary loader, designed to avoid conflict with the TC01 DECtape Library bootstrap or with the disk data break.

Minimum Hardware:	PDP-8 with Teletype, High Speed Reader is desirable
Other Programs Needed:	RIM Loader
Source Language:	PAL-D

DECUS NO. 8-291

Tape to Memory Comparitor (6-channel)

T. D. Brenig-Jones, Digital Equipment Co., Ltd., Reading, England

This program compares the contents of a 6-channel binary format tape with those of core memory, and prints any differences detected.

Minimum Hardware:	4K PDP-8, ASR33, High Speed Reader
Storage Requirement:	1 page, locations 74ØØ to 7577
Source Language:	PAL III

DECUS NO. 8-292

Fast Fourier Transform and Fast Walsh-Fourier Transform

R. G. Smith, Carleton University, Ottawa, Ontario, Canada

Program 1 (FFT) computes the 512 point energy density spectra of two real signals using the Fast Fourier Transform algorithm. The FFT of a single complex signal may also be computed with minor modifications to the program. Program 2 (FWFT) computes the 512 point Fast Walsh-Fourier Transform of a real signal. Fixed point arithmetic is used throughout both programs for all computations. A hardware bit-inverter is employed for speed, and auto-ranging is used to decrease roundoff error.

Minimum Hardware:	PDP-8 with EAE, A/D converter (at least 2 channels), Display System, External Interrupt and Hardware Bit-Inverter
Storage Requirement:	0-4177
Source Language:	PAL

DECUS NO. 8-293

Atomic Coordinate Program

Kenneth B. Wiberg, Yale University, New Haven, Connecticut

This program facilitates the development of the atomic coordinates of a molecule with bond lengths and angles as the input data. It contains facilities for rotating, translating and modifying coordinates, and will automatically insert secondary and tertiary hydrogens on a carbon skeleton. The resulting data may be punched on tape in a form which may be read back in at a later time.

Minimum Hardware:	4K PDP-8
Source Language:	MACRO-8

DECUS NO. 8-294

Lettering Program

Peter L. Barnett and Joseph B. Scrandis, Computer Applications, Incorporated, New York, New York

This program produces large, easily read lettering on paper tape using either the high or low speed punch. All printed teletype characters are included, and non-printing characters are ignored. The letters are eight columns high and proportional in width. If used with the disk monitor system, the program will return to it if a Control/C is typed.

Minimum Hardware:	PDP-8/I with either high or low speed (teletype) punch
Storage Requirement:	200-1423
Source Language:	PAL

DECUS NO. 8-295

COMBIN

A. Moses, Computer Application Engineering Company, El Paso, Texas

COMBIN is a combined loader for BIN and CBL paper tapes. The CBL format tapes described in DECUS NO. 8-26 can be loaded in about 75% of the time required to load equivalent BIN tapes. Therefore, many installations now have most of their tapes converted into CBL format. The problem was to have both a BIN and a CBL loader on the last page of memory so that they could be protected. As a sacrifice, the RIM loader is no longer on the protected last page of memory.

Minimum Hardware:	PDP-8/L, 4K
Storage Requirement:	7600-7772
Restrictions:	No High Speed Reader
Source Language:	PAL

DECUS NO. 8-296

Edit Routine

J. Russell Lemon, United States Air Force, Rome Air Development Center, Rome, New York

This is a minimum length (slightly over 3 pages) edit routine capable of editing, reading into, reading out of and jumping to any core location. It accepts only valid inputs (octal only). Program input can be either ASCII, binary or RIM. Output can be ASCII, binary or RIM tape. The program can edit itself and is a useful tool for programming in machine language.

DECUS NO. 8-296 (Continued)

Minimum Hardware: PDP-8 and Teletype
Storage Requirement: 6760-7577
Source Language: Machine Language

DECUS NO. 8-297

TRACE

Kenneth B. Wiberg, Yale University, New Haven, Connecticut

TRACE resides in field 1 and operates in an interpretive fashion on programs in field Ø. It combines many of the features of PALEX (DECUS NO. 5/8-55) and DDT as well as handling instructions to the floating point interpreter. Provisions are made for examining and modifying single word and also floating point entries. Locations and single word entries may be given symbolically or in octal form. TRACE gives a complete record of any desired portion of the user's program and will simulate the entire program including IOT's.

Minimum Hardware: 8K PDP-8
Storage Requirement: All of one field (normally Field 1)
Source Language: PAL-D

DECUS NO. 8-298

OCTMON - An Octal Monitor for the PDP-8 Computer

Peter Lemkin, National Institute of Health, Bethesda, Maryland

OCTMON is an octal debugging monitor for the PDP-8 that facilitates debugging for machines with several memory fields. It is relocatable within a field, and may be put in any field. It uses 1400 (octal) locations and 13 (octal) locations in page 0 of its resident field. It also uses 11 (octal) locations of any other field in which there is a breakpoint. Only one restorable breakpoint is allowed at any time and may be in any field. There are options to dump out sections of memory, punch and read bin tapes, enter octal numbers into memory, start the program being tested, and enter a number into the MQ. The monitor will work without EAE, extended memory and without DECTAPE/DISK systems.

Minimum Hardware: PDP-8
Source Language: MACRO

DECUS NO. 8-299

Latency Histogram and Calculation

Eugene S. Boyd, University of Rochester Medical Center, Rochester, New York

This program plots a histogram of, and calculates the mean and SD of the latency of a variable phenomenon, such as an evoked response. It finds either the maximun or minimum value within a defined region of the curve and measures latency from beginning of the sweep or some point of interest, such as a shock artifact. Groups of points, as in bimodal distributions, may be handled separately.

Minimum Hardware: LAB-8/I
Other Programs Needed: (DEC-08-YQ2A-PB and DECUS NO. 5/8-23B are incorporated in binary tape)
Storage Requirement: 4K
Source Language: PAL III

DECUS NO. 8-300

Noise Generator

H. -D. Schenk, Deutsche Forschungs - und Versuchsanstalt fur Luft - und Raumfahrt EV, Flughafen, Germany

This program, which is written as a subroutine, creates a pseudo-random voltage with a gaussian probability density function. Also the appropriate binary noise is available. The bandwidth can be selected by the programmer.

Minimum Hardware: 4K PDP-8, D/A Converter (#55), Digital Output Register (#30)
Storage Requirement: One page of memory
Source Language: MACRO-8

DECUS NO. 8-301

STOR: A Store Instruction for the PDP-8 Disk Monitor

Joseph Green, University of Alberta, Edmonton, Alberta, Canada

STOR provides a method for storing the disk monitor system on magnetic tape (unit 8) at the end of the working session, and for restarting the disk monitor at the beginning of a new session on the PDP-8.

Minimum Hardware: 4K PDP-8, DF32 Disk File, 32K, DECtape Drive
Source Language: PAL-D

DECUS NO. 8-302

Overlay Modifications to the Floating Point System Packages, DEC-08-YQYA

Peter L. Walton
Submitted by: Dr. William S. Yamamoto, School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania

This is an expansion of the present 4 floating-point packages into 24 different packages having capabilities of basic functions, extended functions, output controller, output formatter with 4 I/O functions, extended memory referencing ability and EAE utilization. Also an error in the present normalization routine is corrected.

Minimum Hardware: 8K PDP-8, EAE
Other Programs Needed: DEC-08-YQYA
Source Language: MACRO-8

DECUS NO. 8-303

Alterations of the Basic Floating-Point Package and Additional Subroutines

W. Roos, Philips Research Laboratories, Eindhoven, Netherlands

Using the basic floating-point package DEC-08-YQ1B, or the other existing versions, this package can only be called from instruction - and data field zero. For a PDP-8/I with extended memory it becomes necessary for additional subroutines to overcome this drawback.

Restrictions:	Data and instruction fields must be the same. Addresses of additional subroutines must be locations 5, 6 and 7 of page zero
Source Language:	PAL

DECUS NO. 8-304

Pseudo-Noise (P-N) Sequence Test

R. G. Smith, Carleton University, Ottawa, Ontario, Canada

This program can be used to determine the statistical characteristics of a pseudo-random sequence generator. The probability density function can be studied with the aid of an amplitude histogram, and measures of the "randomness" can be determined with correlation diagrams, sample function displays, and scattergrams. All diagrams are displayed on the CRT.

Minimum Hardware:	PDP-8 with EAE, A/D Converter, CRT display
Storage Requirement:	Program: 0-776; Data: 2001-5776; Axis points: 1001-2000
Source Language:	PAL

DECUS NO. 8-305

PAL III Assembler Overlay for Card Reader Input

B. J. Little, Sandia Corporation, Livermore, California

This overlay replaces high speed reader input with card reader input. Character validity and data loss check is made on input cards. Error diagnostics allow recovery from most read and hardware error halts.

Minimum Hardware:	PDP-8/I, ASR-33, CR-8/I. High Speed Punch optional
Other Programs Needed:	PAL III Assembler (DEC-08-ASB1-PB)
Restrictions:	Card input to be in Hollerith code
Source Language:	PAL III

DECUS NO. 8-306

LDR - A One Pass Transparent Loader

Douglas Henry, Physics-Astronomy Department, Vanderbilt University, Nashville, Tennessee

LDR replaces standard Disk Monitor loader but never requires a second pass and is completely transparent. It is in two files: LDR, which is called by the user to start the load and .LDR, which does most of the work.

Minimum Hardware:	4K PDP-8, DF32, Teletype
Other Programs Needed:	Disk Monitor head must be in core
Restrictions:	Requires blocks 367-375 for scratch
Source Language:	PAL-D

DECUS NO. 8-308

PDP-8 Morse Code Sender

Wayne L. Dohnal
Submitted by: Dr. William C. Orthwein, Southern Illinois University, School of Technology, Carbondale, Illinois

The program reads input from ASR keyboard or tape reader and translates all valid characters into Morse Code. Output in the form of a square audio wave is taken from D to A Converter #1 and fed into an audio amplifier. Invalid input characters are ignored by the program.

Minimum Hardware:	4K PDP-8, D/A Converter, audio amplifier with speaker
Restrictions:	No input buffer in program - Keyboard input cannot be faster than code output
Source Language:	PAL III

DECUS NO. 8-309

Patches and a Utility Program for LAB-8

Charles P. Merrill, Digital Equipment Corporation, Maynard, Massachusetts

This is a patch for the Basic Averager to allow the high speed punch to dump the ASCII values which are received after a T command in the first section.

Minimum Hardware:	PDP-8/I or 8/L with AXØ8 (LAB-8)
Other Programs Needed:	LAB-8 Basic Averager and Advanced Averager
Storage Requirement:	4K
Source Language:	PAL III

DECUS NO. 8-310

BIN Punch for Extended Memory

Rainer Schongar, Siemens, Munich, Germany

This program is useful for simple loading of tested FORTRAN programs via the Binary Loader. The field instructions for the Binary Loader are automatically generated by this program.

DECUS NO. 8-310 (Continued)

In one field the Binary punch for extended memory shares the core memory with the Binary loader.

Source Language: PAL

DECUS NO. 8-311

Card to Tape Conversion with Diagnostics

B. J. Little, Sandia Corporation, Livermore, California

Converts cards punched in Hollerith code to paper tape punched in ASCII code on either high or low speed punch. I/O devices are operated at maximum speed. Character validity and data loss checks are made on input cards. Error diagnostics allow recovery from most conversion halts.

Minimum Hardware: PDP-8/I, ASR33, CR-8/I
Storage Requirement: Program: 0000-0600, Buffer: 0600-7600
Source Language: PAL III

DECUS NO. 8-312

DECtape Emulator

John Alderman, Applied Data Research, Atlanta, Georgia

This pair of patches to the Disk/DECtape Monitor Builder, and PIP, together with the FOCAL program for tape generation, will allow the TC-58/TU20 IBM-Compatible- Magtape unit to emulate a non-systems device DECtape for operation with the monitor. The coding also serves as a coding example for both interrupt and non-interrupt magtape handlers. The "Block" format is exactly that used by David Custer in "A Disk Simulator Using a Single Industry Standard Magnetic Tape Unit" published in DECUS Fall 1969 Symposium.

Minimum Hardware: 8K PDP-8, TC-58, TU20
Other Programs Needed: Disk Monitor System Builder and DF32 Disk System PIP, UIOF
Source Language: PAL-D

DECUS NO. 8-313

Obsolete

DECUS NO. 8-314

8K FORTRAN Library CR8/I Card Reader Input Routine

Rainer Schongar, Fa. Siemens AG, Munich, West Germany

This routine reads 12 row, 80 column punched cards by a simple FORTRAN statement (i.e., READ (3,10).....where 3 is the card reader Device Number) as well as by input from the teletype.

Minimum Hardware: 8K PDP-8/I, CR-8/I
Other Programs Needed: 8K FORTRAN System with modified Part 1 of Tape 1 (IOH with extended system transfer table)
Storage Requirement: 3 pages
Restrictions: A "CALL ECARD" is necessary to initialize the routine before the first use in a FORTRAN program
Source Language: SABR

DECUS NO. 8-315

Block-Modify

Rudi Stange, Digital Equipment GmbH, Muncih, West Germany

This routine allows examination and modification of specified Disk (DECtape) block contents. Input and Output is compact and space saving.

Minimum Hardware: 4K PDP-8, Disk or DECtape
Other Programs Needed: Disk Monitor
Storage Requirement: 2 pages plus one for buffer space
Source Language: PAL-D

DECUS NO. 8-316

CORR (Compute Correlation Matrix)

J. N. R. Jeffers
Submitted by: A. J. P. Gore, The Nature Conservancy, Lancashire, England

This program computes the means and standard deviations and the matrix of correlation of coefficients, for multivariate data. A separate version of the program transforms the data to their common logarithms before computing means, sums of squares, etc.

Minimum Hardware: 4K PDP-8/I, DF32 Disk, High Speed Reader
Other Programs Needed: FORTRAN D Disk Systems Programs
Source Language: FORTRAN D

DECUS NO. 8-317

EIG (Compute Eigenvalues and Eigenvectors)

J. N. R. Jeffers
Submitted by: A. J. P. Gore, The Nature Conservancy, Lancashire, England

The extraction of eigenvalues and eigenvectors is carried out by means of a group of programs, the intermediate stages of the computations being stored on the disk. The eigenvalues, and the associated eigenvectors, are extracted one by one, starting with the largest eigenvalue, and the process can be terminated as soon as sufficient eigenvalues have been extracted from the basic data matrix. The programs were designed to enable principal component and canonical variate analyses to be carried out.

Minimum Hardware: 4K PDP-8/I, DF32 Disk, High Speed Reader
Other Programs Needed: FORTRAN D Disk Systems Programs
Source Language: FORTRAN D

DECUS NO. 8-318

PART (Partitioning of Treatment Sums of Squares)

J. N. R. Jeffers
Submitted by: A. J. P. Gore, The Nature Conservancy, Lancashire, England

PART is designed to enable the treatment sum of squares from an experimental design to be partitioned into any desirable set of orthogonal or non-orthogonal comparisons. The treatment effect, and the variance ratio are also computed for each comparison.

Minimum Hardware:	4K PDP-8/I, DF32 Disk, High Speed Reader
Other Programs Needed:	FORTRAN D Disk Systems Programs
Source Language:	FORTRAN D

DECUS NO. 8-319

RAND (Computation of Random Fractions)

J. N. R. Jeffers
Submitted by: A. J. P. Gore, The Nature Conservancy, Lancashire, England

This program computes a designated number of random fractions in the range 0.0000 to 0.9999. The computed fractions represent a sample from a uniform distribution.

Minimum Hardware:	4K PDP-8/I, DF32 Disk, High Speed Reader
Other Programs Needed:	FORTRAN D Disk Systems Programs
Source Language:	FORTRAN D

DECUS NO. 8-320

MMMS (Calculation of Minimum, Mean, Maximum and Standard Deviation)

J. N. R. Jeffers
Submitted by: A. J. P. Gore, The Nature Conservancy, Lancashire, England

This program calculates the minimum, arithmetic mean, maximum and standard deviation of any number of sets of up to 20 variables, presented in a standard order. It is intended as a simple method of summarizing multi-variate data, and is used as an auxiliary program for other multivariate programs, for example, the CCMP program.

Minimum Hardware:	4K PDP-8/I, DF32 Disk, High Speed Reader
Other Programs Needed:	FORTRAN D Disk Systems Programs
Source Language:	FORTRAN D

DECUS NO 8-321

REG-2 (Curvilinear Regression) REG-4 (Linear Regression)

Submitted by: A. J. P. Gore, The Nature Conservancy, Grange-over-Sands, Lancashire, England

REG-2 - This program computes the values a, b and c for a second degree polynomial equation of the form: $Y=a+bX+cX^2$ where X and Y can represent any number of values.

REG-4 - Linear regression for simple linear, exponential and hyperbolic relationships.

Minimum Hardware:	4K PDP-8/I, DF32 Disk, High Speed Reader
Other Programs Needed:	FORTRAN D Disk Systems Programs
Source Language:	FORTRAN D

DECUS NO. 8-322

CCMP (Correlation of Components) and CVAL (Computes Values of Principal Components)

J. N. R. Jeffers
Submitted by: A. J. P. Gore, The Nature Conservancy, Grange-over-Sands, Lancashire, England

CCMP calculates the correlation between two sets of components to produce a rectangular matrix of correlation coefficients. It can also be used to correlate two sets of variables for which the correlations within each set have already been calculated or are of no interest.

CVAL computes the values of the first n principal components for each of the original data points of the data matrix. It may also be used to compute the values of canonical variates.

Minimum Hardware:	4K PDP-8/I, DF32 Disk, High Speed Reader
Other Programs Needed:	FORTRAN D Disk Systems Programs
Source Language:	FORTRAN D

DECUS NO. 8-323

CRC (Convert Peak Heights on an Auto-Analyzer Chart to PPM and Percentage)

Pat E. Hodgson
Submitted by: A. J. P. Gore, The Nature Conservancy, Grange-over-Sands, Lancashire, England

1) Converts standard peak heights to optical density; 2) Computes linear regression y=a+bx; 3) Converts sample peak heights (ppm concentration) to optical density and ppm; 4) Subtracts blank values, if any, from the samples; 5) Calculates percentage concentration.

Minimum Hardware:	4K PDP-8/I, DF32 Disk, High Speed Reader
Other Programs Needed:	FORTRAN D Disk Systems Programs
Source Language:	FORTRAN D

DECUS NO. 8-324

TSP - Trend Surface Plotting

J. N. R. Jeffers
Submitted by: A. J. P. Gore, The Nature Conservancy, Grange-over-Sands, Lancashire, England

This program consists of a group of segments for which the output of one segment is the input of the next. It enables the significance of linear, quadratic, and cubic trend surfaces to be determined for each of a number of variables on the coordinates of their distribution in two-dimensional space. The significance of the various surfaces having been determined, the fitted surface can be plotted by means of a contour map on the teletype.

Minimum Hardware:	4K PDP-8/I, DF32 Disk, High Speed Reader
Other Programs Needed:	FORTRAN D Disk Systems Programs
Source Language:	FORTRAN D

DECUS NO. 8-325

SBSM - Calculation of Duplicate Sub-Samples from Primary Data

A. J. P. Gore, The Nature Conservancy, Lancashire, England

This program is designed for use following a standard sub-sampling routine. Such a routine takes duplicate sub-samples of materials which would be too laborious to sort completely. It specifically refers to mixed vegetation cropped from quadrats of given size but could be applied to any analogous sampling situation. A sub-sub-sampling procedure is incorporated to allow for materials within the sub-samples which are still too laborious to sort, in this specific instance, live and dead plant parts. The output data can be used in an analysis of variance to test for effects of both sampling and sub-sampling.

Minimum Hardware:	4K PDP-8/I, DF32 Disk, High Speed Reader
Other Programs Needed:	FORTRAN D Disk Systems Programs
Source Language:	FORTRAN D

DECUS NO. 8-326

MLWI - Malawi Land Use Survey Analysis

J. N. R. Jeffers
Submitted by: A. J. P. Gore, The Nature Conservancy, Lancashire, England

This program was developed to undertake the analysis of the data from the Malawi Land Use Survey. It calculates the proportions and areas of land in each of 15 land-use classes, together with their standard errors. The proportions and areas in the broad classes of "cultivated," "uncultivated," and "uncultivable" are also computed, with the standard errors.

Minimum Hardware:	4K PDP-8/I, DF32 Disk, High Speed Reader
Other Programs Needed:	FORTRAN D Disk Systems Programs
Source Language:	FORTRAN D

DECUS NO. 8-327

CLAN (Cluster Analysis) and GRMN (Calculate Group Means)

J. N. R. Jeffers
Submitted by: A. J. P. Gore, The Nature Conservancy, Grange-over-Sands, Lancashire, England

CLAN performs a cluster analysis on data for which the nearest neighbor to each individual point has been calculated. The Algorithm groups the points into clusters which contain a pair of mutually nearest points and all points which refer to points already included in the groups as their nearest neighbors.

GRMN calculates the means of groups of points selected from a larger matrix of points and variables. It is intended for the calculation of means of multivariate data which have previously been subjected to cluster analysis, so as to prepare the data for the next stage of the clustering process.

Minimum Hardware:	4K PDP-8/I, DF32 Disk, High Speed Reader
Other Programs Needed:	FORTRAN D Disk Systems Programs
Source Language:	FORTRAN D

DECUS NO. 8-328

NNAN (Nearest Neighbor Analysis) - OREG (Orthogonalized Regression Analysis) - OREH (Additional Orthogonal Regression Coefficients)

J. N. R. Jeffers
Submitted by: A. J. P. Gore, The Nature Conservancy, Grange-over-Sands, Lancashire, England

NNAN computes, for each set of points, the nearest neighbor in n-dimensional space, and the distance to this neighbor.

OREG calculates the orthogonalized regression of one or more dependent variables on the principal components of up to 20 regression variables.

OREH, an auxiliary program to OREG, adds the corresponding orthogonalized regression coefficients for nominated components to give a single vector of standardized regression coefficients.

Minimum Hardware:	4K PDP-8/I, DF32 Disk, High Speed Reader
Other Programs Needed:	FORTRAN D Disk Systems Programs
Source Language:	FORTRAN D

DECUS NO. 8-329

TSS/8 FOCARL

Ted Emigh
Submitted by: Mark Bramhall, Digital Equipment Corporation, Maynard, Massachusetts

FOCARL is an adaptation of FOCAL for use on TSS/8 systems. It offers all the power of FOCAL, plus several extra features, plus the ability to write long programs.

DECUS NO. 8-329 (Continued)

Minimum Hardware: TSS/8
Storage Requirement: 4K Disk file

DECUS NO. 8-330

TSS/8 ALGOL

University of Grenoble
Submitted by: James D. Bailey, Digital Equipment Corporation, Maynard, Massachusetts

TSS/8 ALGOL is 4K ALGOL (DECUS NO. 8-213) adapted for TSS/8. It is a compile and go system which, like 4K ALGOL, permits most of the features of subset ALGOL 6Ø.

Minimum Hardware: TSS/8
Other Programs Needed: TSS/8 EDIT for source program preparation, also DECUS NO. 8-213
Storage Requirement: 8K Disk file

DECUS NO. 8-331

Roulette

Ronald Servi and Leslie Servi, Lexington High School, Lexington, Massachusetts

This program plays a game of roulette. The user has 100 chips to start, with which he can bet on any number from 0 to 20. Three bets are allowed for every spin of the wheel on 1, 2 or 4 numbers.

Minimum Hardware: PDP-8
Other Programs Needed: CINET-BASIC (DECUS NO. 8-159)
Source Language: CINET-BASIC

DECUS NO. 8-332

The Civil War Game

Ronald Servi, Lexington High School, Lexington, Massachusetts

This program, created to fulfill a U. S. History assignment, presents a three month picture of the Civil War in the form of a report to the commander-in-chief of the Union Army. The player decides which strategy, amount of weapons, men and money are necessary. The computer, in addition to playing for the South, also determines what action takes place during the war.

Minimum Hardware: PDP-8
Other Programs Needed: CINET-BASIC (DECUS NO. 8-159)
Source Language: CINET-BASIC

DECUS NO. 8-333

8K PAL-D Assembler for 4K Disk Monitor System

Charles H. Conley, Digital Equipment Corporation, Maynard, Massachusetts

This 8K version of the PAL-D Assembler will assemble large programs much more quickly than the 4K version.

Minimum Hardware: 8K PDP-8, DF32 or RF08 disk, of DECtape
Storage Requirement: 8K
Source Language: PAL-D

DECUS NO. 8-334

KVEDIT

Edward Friedman and Evan Suits, Digital Equipment Corporation, Maynard, Massachusetts

KVEDIT is the standard PS/8 Text Editor modified for scope display. All normal editing commands are available as well as three additional commands for display control.

Minimum Hardware: 8K PDP-8, DECtape or Disk, KV8/I Graphics
Other Programs Needed: PS/8 Operating System
Source Language: PAL8

DECUS NO. 8-335

COLPAC

Mark Bramhall
Submitted by: Paul Scriven and Mark Bramhall, Digital Equipment Corporation, Maynard, Massachusetts

COLPAC is an 8K to 12K version of FOCAL with many extended and added instructions and routines. COLPAC is short for Carleton On-line Language for Plotting and Arithmetic Calculations.

Minimum Hardware: 8K PDP-8/I, KV8I, 8K PDP-8/L BAO8 KV8L
Storage Requirement: 8K or 12K
Source Language: PAL

DECUS NO. 8-336

DECtape Library System Modifications

William Leal
Submitted by: Ernest Hayden, Speech Communications Research Laboratory, Santa Barbara, California

The tapes and documents provided permit the PDP-8 user running under the DEC-Ø8-SUA1-LA DECtape Library System to call in one program from another, and the ability to write programs which may be executed, and, when completed, leav storage undisturbed, much like the system programs. These programs are called phantom programs. Users running under DIGITAL-8-7-S Rev 7/25/66 may make use of the phantom