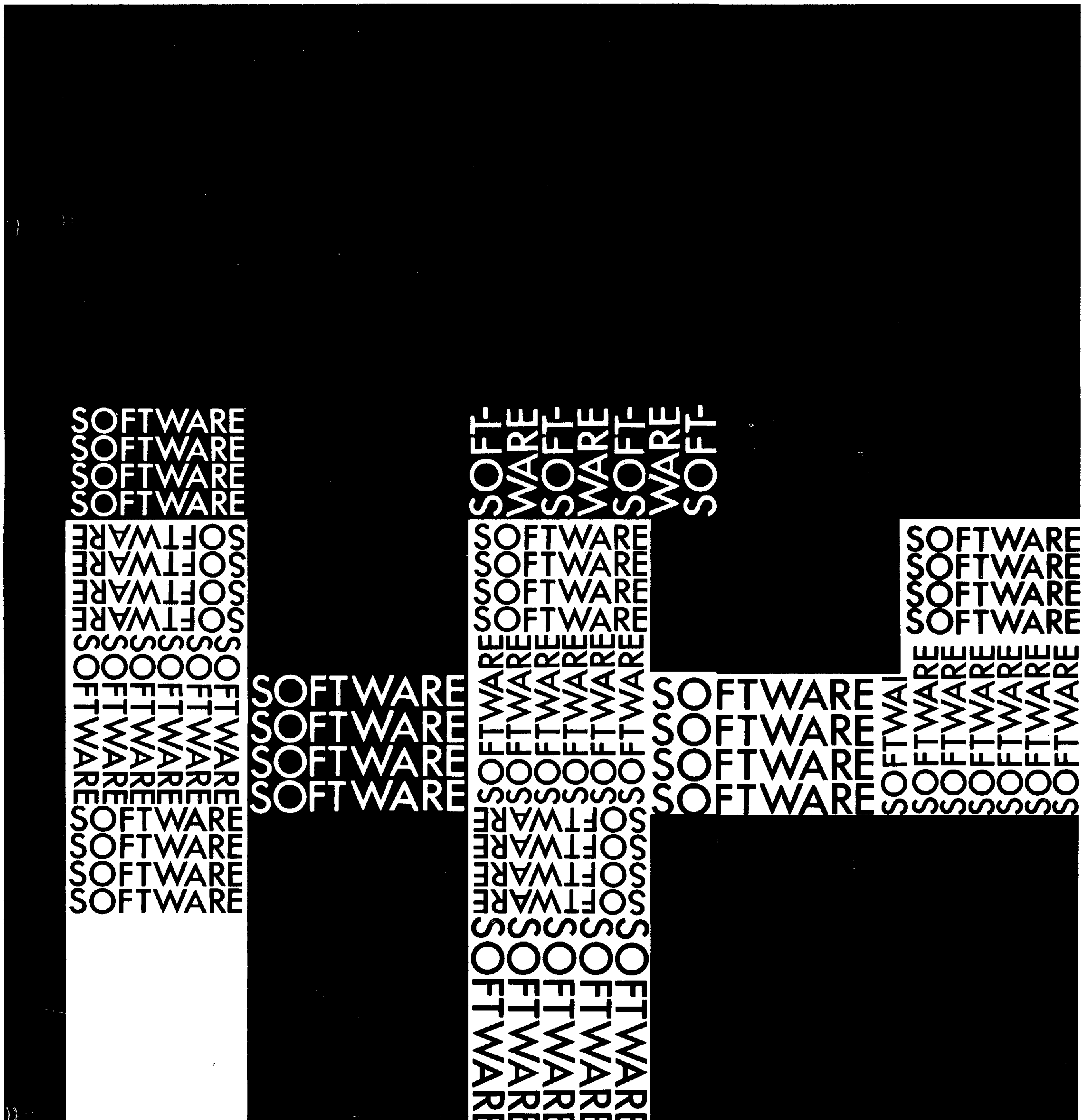
HEWLETT PACKARD

program catalog



AUGUST 1972

HEWLETT-PACKARD SOFTWARE CENTER
USERS' LIBRARY SUBSCRIPTION SERVICE
CPU PROGRAM CATALOG

The Hewlett-Packard Software Center Subscription Service provides a simple and inexpensive way to order contributed programs. The Subscription Service, available with the release of August 1972 CPU Catalog, supersedes the April 1972 subscription offer.

To subscribe, mail Hewlett-Packard a check for $125 (plus applicable state and local taxes). Use the form at the bottom of this page. The Software Center will send you a booklet containing 25 pre-addressed and stamped coupons. You use the coupons to order 22000 series contributed programs including documentation; select the programs from those listed in the current Hewlett-Packard PROGRAM CATALOG or PROGRAM CATALOG SUPPLEMENT. Use the coupons when you want to — there is no time limit restricting their use. However, only one program option (K01*, B01 or L00) can be ordered per coupon. Check the catalog price list to ensure that the option you desire is available.

* Paper tapes (option K01), including documentation, ordered through the HP Subscription Service are discounted as follows: (Check Section IV, Ordering Information, to determine normal program price.)

Normal Program Price	Coupons Required (K01 only)
$ 10 to $ 40	1
50 to 90	2
100 to 140	3
150 to 190	4
200 to 240	5

NOTE: The Subscription Service is available only to users in the North American countries.

ADDRESS

Enclosed is a check for $125 (plus applicable state and local taxes) for one subscription to the Users' Library Subscription Service, Program Catalog. Send the coupon booklet to:

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NOTE: The Subscription Service is available only to users in the North American countries.

INSTRUCTIONS

Make check payable to Hewlett-Packard.

Mail check, and this form, to:

HEWLETT-PACKARD SOFTWARE CENTER
DISTRIBUTION SECTION
11000 WOLFE ROAD
CUPERTINO, CALIFORNIA 95014

Hewlett-Packard program catalog

HP SOFTWARE CENTER
11000 WOLFE ROAD
CUPERTINO, CALIFORNIA
95014

HP5950-9226
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AUGUST 1972

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introduction

The HP Program Catalog is presented to you as a reference to all Assembly, FORTRAN and ALGOL programs currently available from the Hewlett-Packard Software Center. These programs apply to a wide range of systems based on HP 2100 Series Computers. Systems can range from a CPU and Teleprinter up to a large disc-based system with various computer peripherals and/or digital input/output instrumentation. System designers and programmers will find this catalog a convenient source for selecting HP software. Potential users will find the technical descriptions valuable in evaluating HP supporting software and other HP software products. Hewlett-Packard BASIC language programs are maintained in a separate library. For further information, refer to the Index to HP BASIC Program Library (5952-4369) available from your local HP field sales-office.

About the HP Software Catalog

Overall, the catalog is divided into five parts — introduction, software abstracts, cross-reference index, summary and ordering information. The introduction contains information on how to order software, new program contributions, about Hewlett-Packard, software publications and periodicals, data centers, and customer training and support.

The software abstracts provide a brief description of each software product, the source language used and any special hardware requirements. When searching for a particular piece of software by name, the cross-reference index is the first place to check. It contains an alphabetic list of words and phrases related to computer software. Each program in the catalog is listed under all words or phrases that apply to it. As a further aid to software identification, the abstracts are organized into ten classifications. Each classification is subdivided into application areas. Refer to the introduction to the abstracts section for a listing of classification codes. The summary gives a complete listing of all contributed and HP supported programs in classification code and order number sequence.

SOFTWARE CATEGORIES

Programs contained in the HP Program Catalog are classified into two categories — supported and contributed. Supported software consists of all programs developed by Hewlett-Packard for operation and support of HP computers and HP computer systems. These programs are fully backed by Hewlett-Packard, and the originating division assumes responsibility for testing and maintenance.

In the case of contributed software, HP does not assume any responsibility for program testing and maintenance. The catalog serves only as a reference for these programs. Program maintenance is the responsibility of the person submitting the program because he is more knowledgeable on his own entry. The Hewlett-Packard Software Center does assume responsibility for collecting and forwarding any updating information on contributed software. For full details on how to submit programs to the users library, refer to page iii.

HOW TO ORDER

The fastest and easiest way to order software is to call or write the Hewlett-Packard field-office or distributor in your area. Although HP products are manufactured in plants located throughout the United States and other parts of the world, your local office is best equipped to expedite your order. The HP field office is also staffed to advise you concerning any special equipment you may need to operate certain software. A complete list of HP Sales and Service offices is given at the rear of this manual.

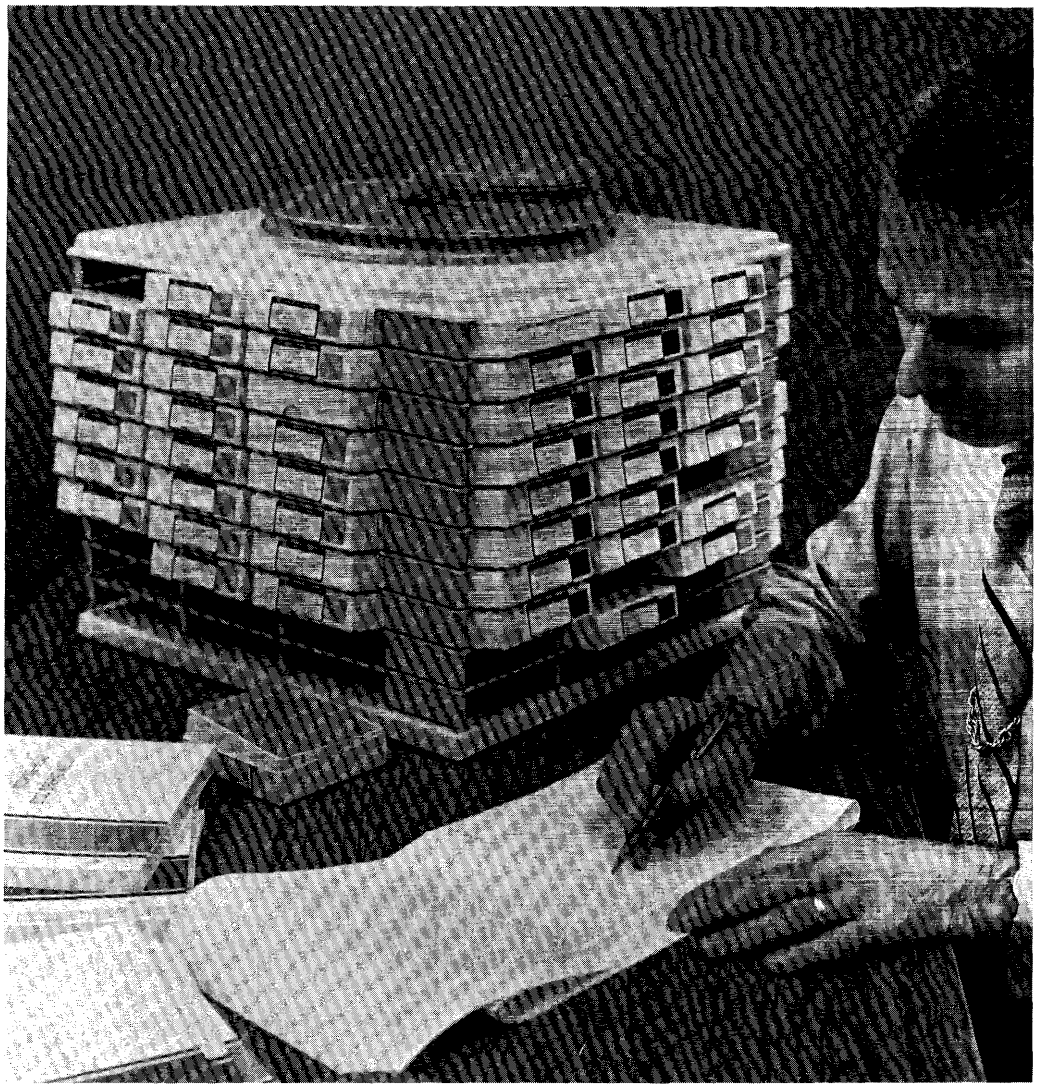
When you order, please specify the product number as well as the option codes desired and prices. For example, if it was desired to order the FORTRAN II Compiler binary paper tape plus the listing, the following information should appear on the order:

20548A	B01	$25
20548A	L00	$30

An explanation of the option codes is given at the beginning of the ordering information section.

The software information in the catalog was as up to date as possible at the time of printing. However, in order to offer the best software possible, Hewlett-Packard reserves the right to change specifications or prices without notice. Two catalog supplements are issued each year to provide users with the most current software information possible.

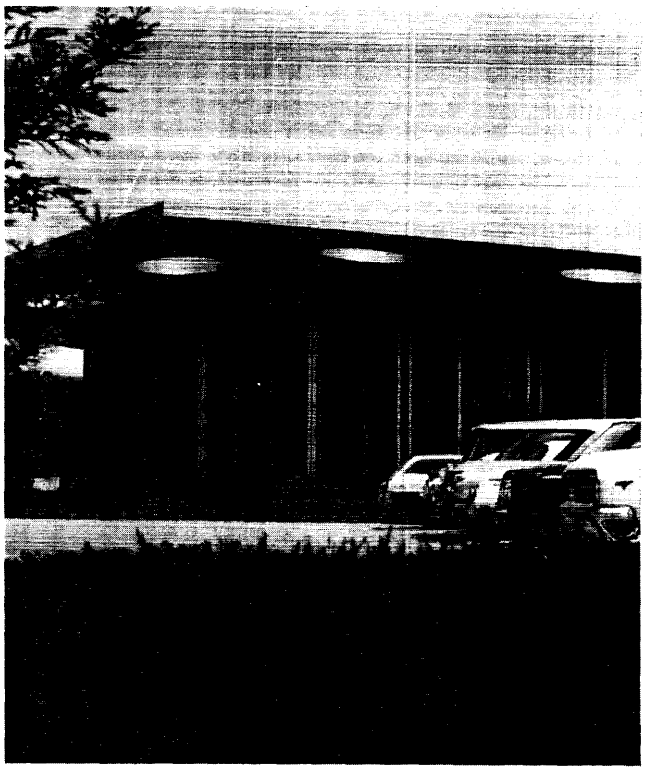
Contributed programs may be ordered using the HP Software Center Subscription Service. This service (available only in North American Countries) permits users to order 22000 series contributed programs via mail at a reduced cost. A handy order form for this service is included at the front of this manual. Additional order forms are available from the Software Center.



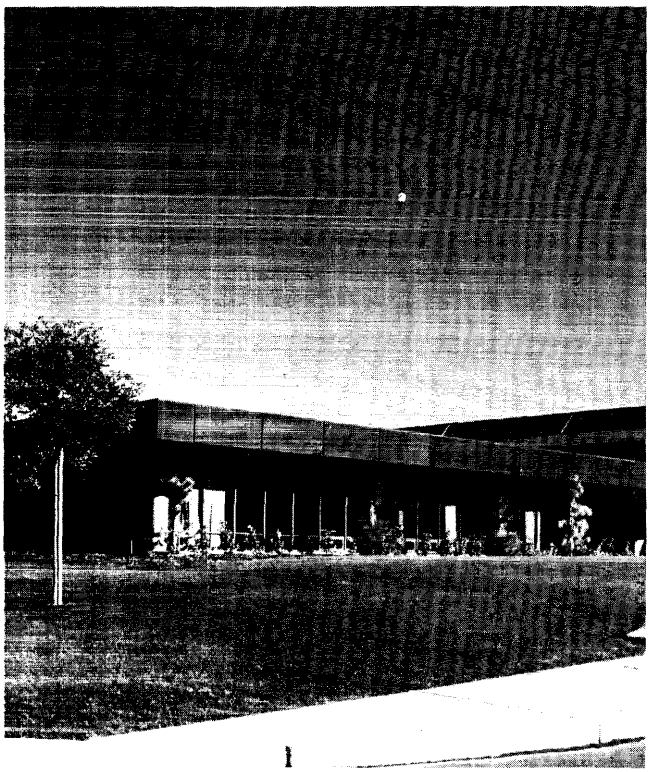
PROGRAM SUBMITTAL

The Hewlett-Packard Software Center Users Library was established to advance the effective use of HP and user-contributed software for HP computers. The Software Center encourages HP computer users to submit their programs. Forms and information for submitting programs may be obtained from any sales office or by writing HP directly. A special Contributor's Guide (Literature No. 5952-4372) has been printed to facilitate submittal. Catalog users are informed of new software by means of special catalog supplements or catalog reprintings. Incentives are offered to encourage program contributions. A handsome plaque engraved with the contributor's name and title of his program, and the choice of any other contributed program from the current catalog is awarded to each contributor.

Any user may submit a program he or she feels will be of use to others. The Software Center evaluates contributed programs to insure they are complete and properly documented. However, the Software Center is not responsible for contributed program errors or for their correction. A software report form is available for reporting errors in a program or its documentation. Users are encouraged to take the time to report errors to the Software Center. In this way, the quality of contributed programs can be maintained as high as possible.



Hewlett-Packard, Corporate Offices, Palo Alto, California



Hewlett-Packard, Cupertino Division, Cupertino, California

ABOUT HEWLETT-PACKARD

The Hewlett-Packard Company specializes in the manufacture of instruments and systems to satisfy measurement needs of all kinds in science and industry. Today, Hewlett-Packard provides over 2000 different electronic products for measurement, analysis, and computation applications.

Since its founding in Palo Alto, California, almost thirty years ago, Hewlett-Packard has grown from a two-man operation into a world-wide organization of more than 15,000 people, with an annual sales volume exceeding $300 million. The company and its affiliates now have more than a dozen manufacturing plants, including two in Western Europe and one in Japan. Sales and service offices are located in nearly every major city in the free world.

Hewlett-Packard's Entry into the Computer Field

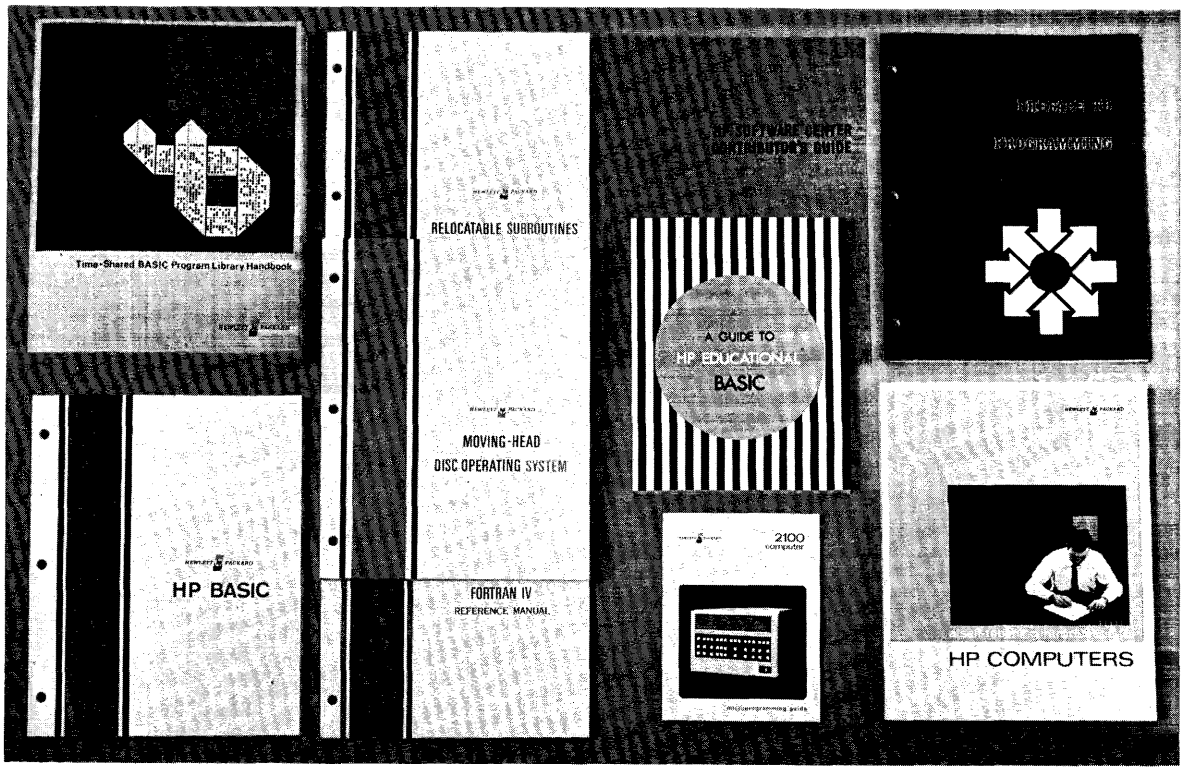
The original Hewlett-Packard products were electronic measuring instruments. With growth, these products increased in scope and sophistication, and spread into other fields, principally those of medical and chemical instrumentation. As the complexity of the measurement tasks undertaken in all areas increased, the need became evident for computational capability integrated into the instrumentation systems to provide more complete solutions to overall measurement problems.

The key to involvement by Hewlett-Packard in any field of interest is contribution, and this was true of Hewlett-Packard's introduction (in 1966) of the HP 2116A, a general- purpose digital computer designed from the ground up to provide ease of interface, both in hardware and software, with a broad variety of measuring instruments as well as traditional computer peripherals.

The 2116A was replaced by the 2116B and in 1970 the 2116C that permitted four times the internal memory capacity of the 2116A. Two smaller, lower-cost computers, the HP 2114 and the HP 2115, were also introduced during this period.

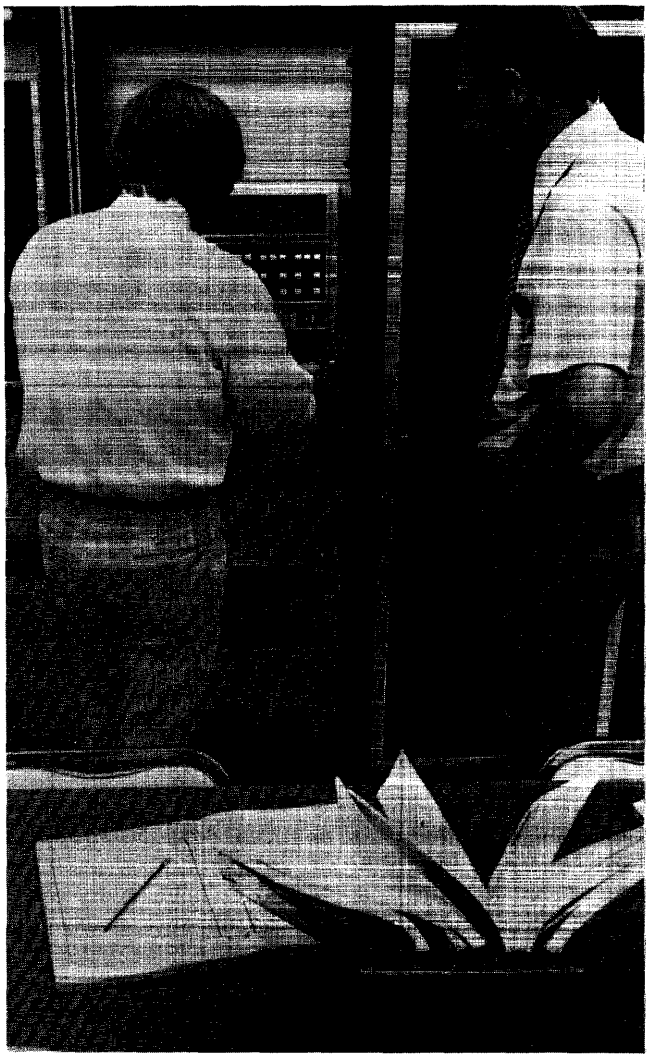
These three computers have been replaced by the HP 2100A, introduced in the spring of 1971. The 2100A provides significantly greater performance at less cost than the 2116C. From 4K to 32K of memory and 14 input/output channels are available in a compact 12-inch package. Complete software compatability is retained between the 2100A and all earlier models.

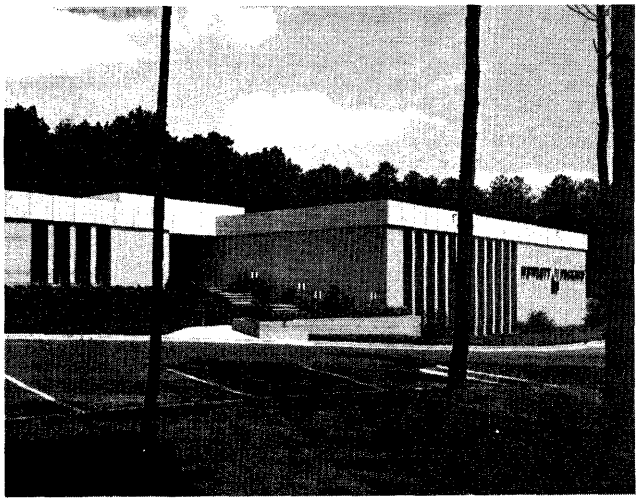
Along with the development of central processors, HP has constantly expanded its line of computer peripherals and software systems. Standard software packages include FORTRAN II and IV, Assembly Language, BASIC, ALGOL, Symbolic Editor, Relocatable Subroutine Library, System Input/Output and hardware diagnostics. Operating systems consist of a Basic Control System, Magnetic Tape System, Disc Operating Systems (fixed or movable-head disc), Time- Sharing Systems and Real-Time Executive System. All computers and software have been designed to provide the user maximum efficiency and convenience in solving his problems.

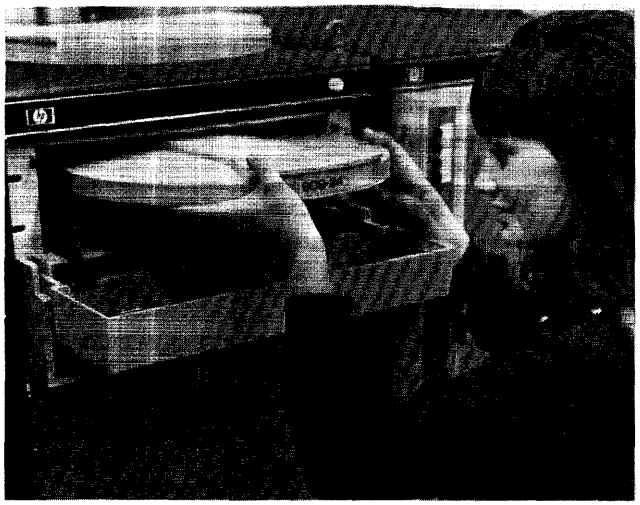


SOFTWARE PUBLICATIONS AND PERIODICALS

A comprehensive range of standard software is available for all HP Computer models. This software is supported by various publications and periodicals to make your HP computer or computer system as useful and easy to operate as possible. Software publications include programmer's reference manuals, operator's manuals, small programs manuals and diagnostic manuals. Several tutorial handbooks and pocket reference guides are also made available to supplement the information presented in other software publications. Complete information on BASIC programs is supplied in the Index to the HP BASIC Program Library published every February, June, and October. Complimentary copies of this Index (Literature No. 5952-4369) are available from your local HP Sales and Service Office. The Index lists titles of over 400 BASIC programs, specifies the Handbook in which each is documented, and flags new, revised, and HP supported programs. Using the Index you can contribute your own BASIC programs, report any software bugs, and learn how the BASIC library serves as an exchange forum for the Educational Users Group.

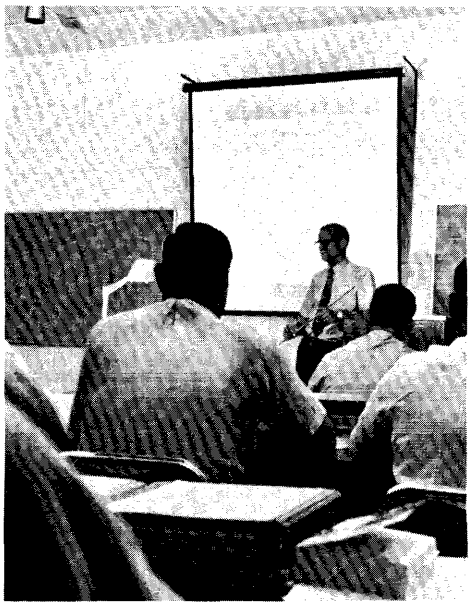


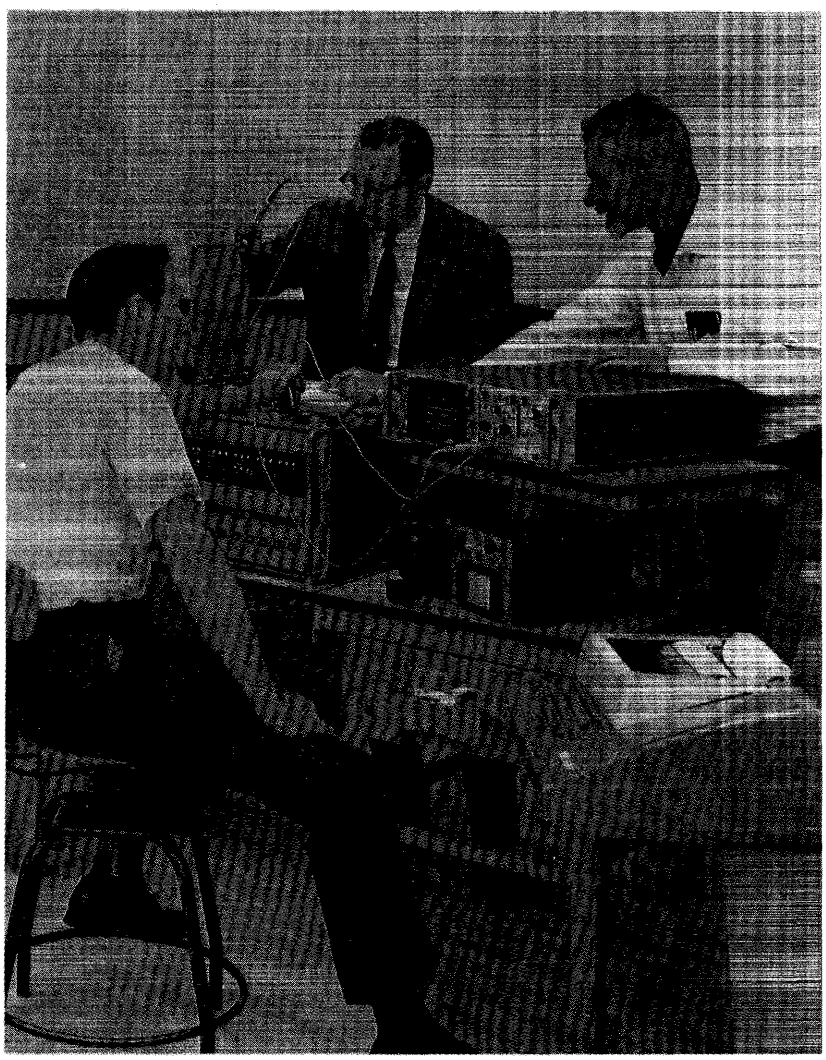




DATA CENTERS

At Hewlett-Packard, customer support is the full-time concern of more than 2000 people. In order to bring this support as close to you as possible, Hewlett-Packard has established regional Data Centers in the U. S. (5), Canada (1), Europe (4), and Australia (1). These Data Centers form the hub of support for the surrounding area. Each location is staffed with experienced system analysts to provide efficient solutions to even the most complex software problems. A complete complement of HP computer systems is also available at every Data Center. This equipment is utilized for customer training, to work up application software for equipment on order or to develop software for equipment that has already been acquired. It also serves as a back up to your system in case of equipment failure at a critical time. By establishing data products support as close to you as possible, the solution to your computer support problems can be made as efficient and cost-effective as possible.



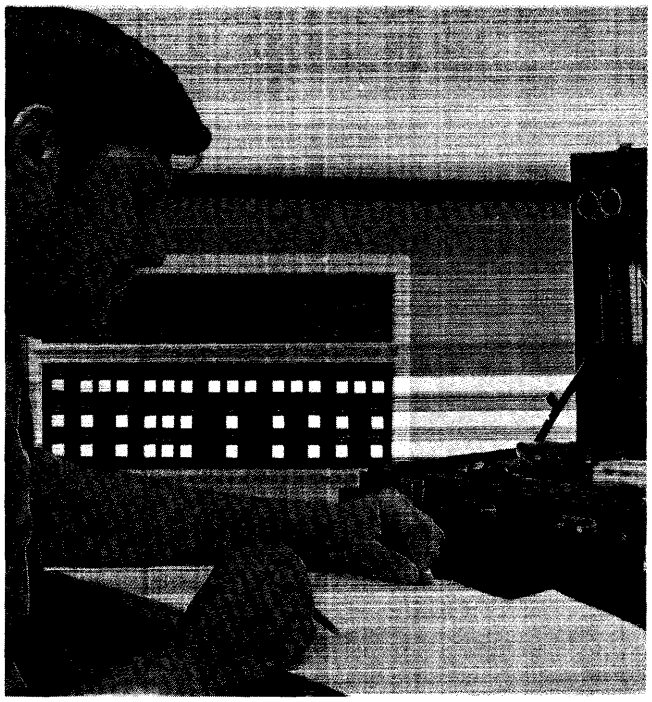


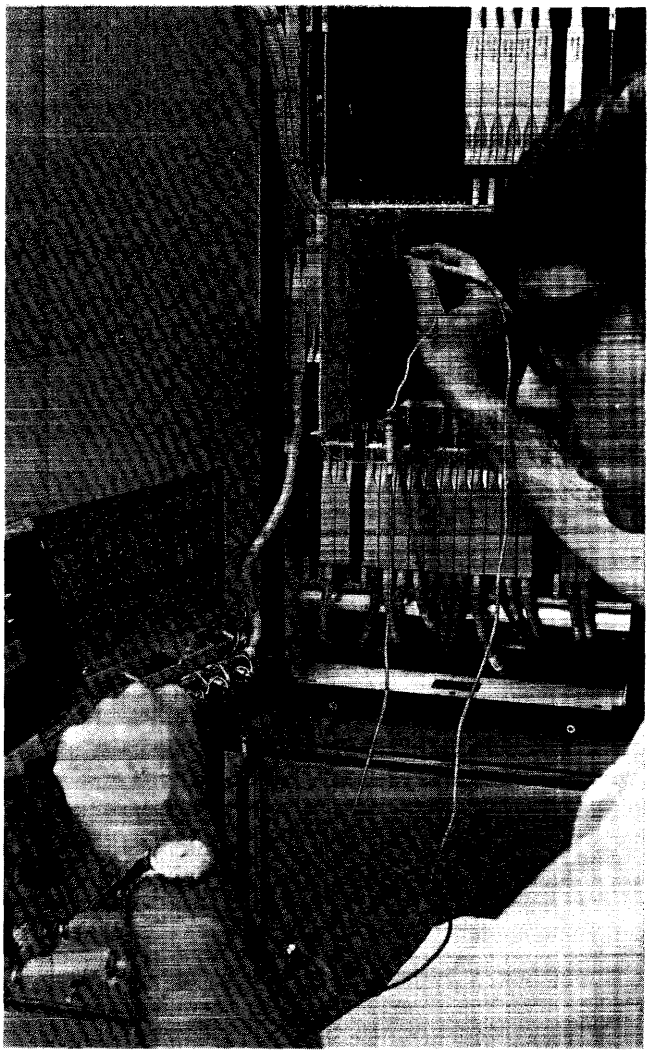
HP TRAINING

Full utilization of computer systems depends on an orderly flow of information between the manufacturer and the user. Recognizing the training needs of its customers, Hewlett-Packard offers a full range of hardware and software training courses. Most of these courses are periodically offered at HP Data Centers located throughout the United States and Europe. At these data centers, key customer personnel receive intensive training on the operation and maintenance of computer equipment. From experience gained in these classes your people can effectively plan for staffing, further training, equipment utilization, maintenance, and development of special-purpose software. Your local HP representative can provide the latest information on data products courses, registration, and availability.

HP SYSTEMS ANALYST SUPPORT

If further assistance is required to solve a particular hardware or software problem, HP systems analysts, strategically located throughout the world, can perform problem definition, system configuration and special-purpose software support. Prior to delivery of your HP system, you can depend on the assistance of an HP Systems Analyst. He'll consult with you on site preparation, training your people on the system and in general trying to make sure your system goes on-line as soon after delivery as possible. In addition to specific systems analyst support, specialists in such areas as instrumentation, medical electronics, communications, data acquisition, time-sharing and educational systems can be called on to assist you. Many of these specialists represent the most experienced engineers and analysts in the data products industry. This service is matched by few, if any, other data products producers.





REPAIR SERVICE

Help in maintaining your Hewlett-Packard equipment in first-rate operating condition is as close as your telephone. Service and parts assistance are available from over 140 HP field-offices throughout the free world. Local service facilities are backed up by Regional Service Centers. Major parts warehouses are located in Mountain View, California, and Rockaway, New Jersey. Board exchange programs for computers and other equipment enable systems to be returned to normal operation with minimal downtime.

If justified by the type of service required, customer service agreements are available to provide on-site preventive maintenance and repair. Assistance can range from 5-day service during normal working hours, to 7-day all hours backup. By letting HP perform your maintenance, you can gain a number of important benefits. Contact your nearby HP field office for details.

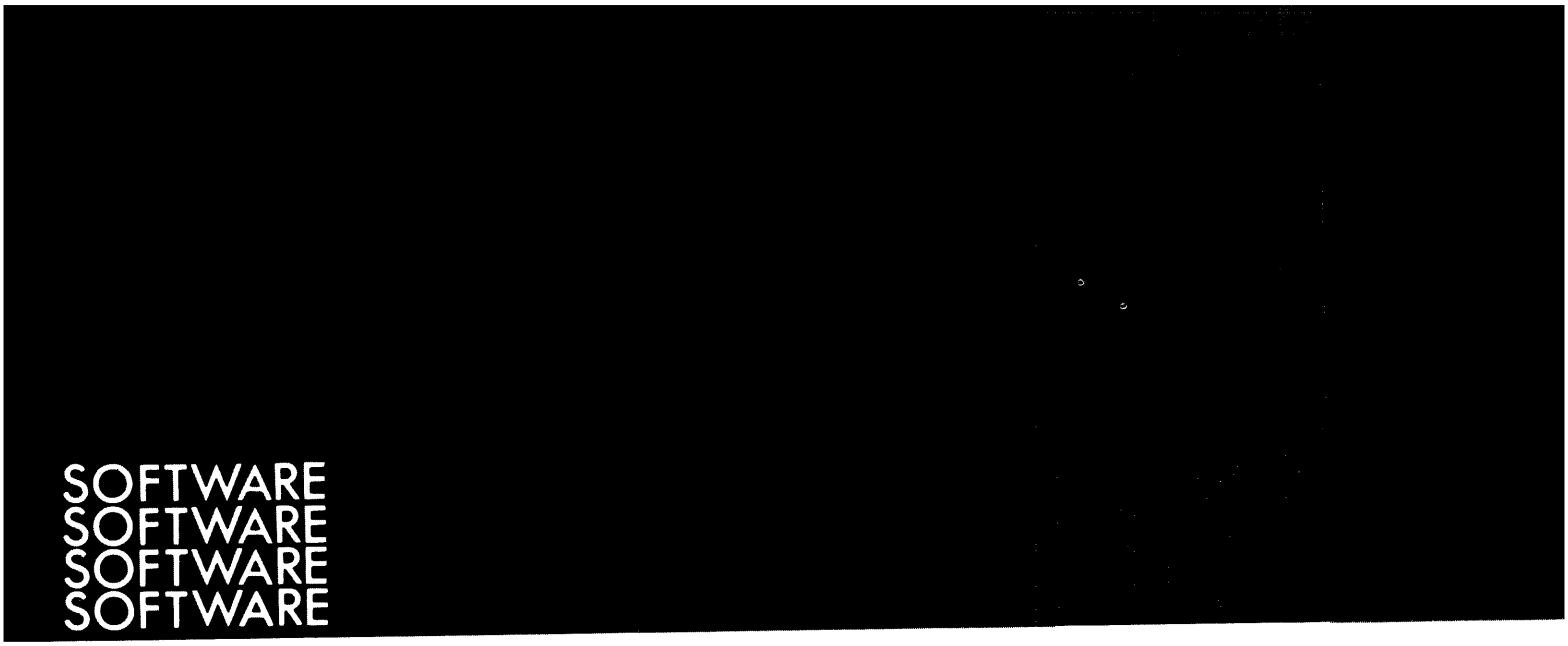

SOFTWARE
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TABLE 1-1. CLASSIFICATION CODES - SUBJECT LISTING

A000	**OPERATING AND PROGRAMMING SYSTEMS**
001	Time-Shared Operating Systems
002	I/O, Telecommunications
003	I/O, Special Device
004	I/O, Status Processing
005	Report Generators
006	I/O, Instrument
007	Disc Operating Systems
008	Preparation of Systems
009	I/O, Paper Tape
010	I/O, Punch Card
011	I/O, Printer
012	Data Acquisition Systems
013	I/O, A/D - D/A
014	I/O, Graphic
015	I/O, Disc/Drum
016	I/O, Magnetic Tape
017	Loaders
018	Translators, Language
019	External Interrupt Processing
020	Real Time Systems
021	System Libraries
022	System Utilities
A100	**DATA HANDLING**
101	Editing
102	Information Storage and Retrieval
103	Table Handling
104	Character/Symbol Manipulation
105	Code/Radix Conversion
106	Duplication
107	Sorting and Merging
108	Data Handling Utilities
109	Media Conversion
110	File Management
112	Special Format Data Transfer
A200	**TESTING, DEBUGGING AND PROGRAMMING AIDS**
201	Tracing
202	Instrument Test
203	Disc/Drum Equipment Test
204	Magnetic Tape Equipment Test
205	Graphic Equipment Test
206	Memory Search and Display
207	Dumping
208	Core Storage Test
209	Central Processing Unit Test
210	Break Points
211	Debugging Aids
212	Programming Aids
213	Paper Tape Equipment Test
214	Punch Card Equipment Test
215	Printer Equipment Test
216	A/D - D/A Equipment Test
217	Telecommunications Equipment Test
218	Special Device Equipment Test
219	Data Acquisition Systems Test
A300	**MATH AND NUMERICAL ANALYSIS**
301	Mathematics, General
302	Extended-Precision Arithmetic
303	Complex Arithmetic
304	BCD/ASCII Arithmetic
305	Boolean Algebra
306	Functions, Computation of
307	Interpolation/Extrapolation
309	Curve Fitting
310	Numerical Integration
311	Polynomials and Polynomial Equations
312	Matrix Operations
313	Eigenvalues and Eigenvectors
314	Systems of Linear Equations
315	Systems of Non-Linear Equations
316	Integral Transforms
317	Numerical Differentiation
318	Ordinary Differential Equations
319	Partial Differential Equations
A400	**PROBABILITY AND STATISTICS**
401	Univariate and Multivariate Parametric Statistics
402	Time Series Analysis
403	Discriminant Analysis
404	Regression Analysis
405	Random Number Generators
406	Probability Distribution Sampling
407	Non-Parametric Statisc
408	Statistics, General
409	Correlation Analysis
410	Analysis of Variance and Covariance
411	Factor Analysis
412	Scaling
413	General Probability
A500	**SCIENTIFIC AND ENGINEERING APPLICATIONS**
501	Social and Behavioral Sciences
502	Geophysics
503	Geology
504	Oceanography
505	Physics
506	Medical Sciences
507	Chemistry
508	Biology
509	Astronomy and Celestial Navigation
510	Petroleum Engineering
511	Hydraulic Engineering
512	Nuclear Engineering
513	Electrical Engineering
514	Mechanical Engineering
515	Civil Engineering
516	Chemical Engineering
517	Aeronautical Engineering
518	Structural Engineering
519	System Theory
A600	**MANAGEMENT SCIENCES AND OPERATIONS RESEARCH**
602	Pert
603	Critical Path Analysis
604	Optimization Programs
605	Linear Programming
606	Discrete Systems Simulation
607	Continuous Systems Simulation
608	Forecasting Techniques
610	Dynamic Programming
A700	**BUSINESS AND MANUFACTURING APPLICATIONS**
701	Job Reporting
702	Quality Assurance Performance Analysis
703	Quality Assurance Testing
704	Numerical Control
705	Bill of Materials
706	Payroll Accounting
707	Work-in-process Control
708	Inventory Analysis
709	Accounts Payable
710	Sales Forecasting
711	Accounts Receivable
712	Financial Analysis
713	Investment Analysis
714	Economic Analysis
716	Budgeting Programs
717	Business Information Systems
718	Business Services
720	Educational Administration
A800	**EDUCATION**
801	Mathematics
810	Programming and Computer Science
820	Engineering
830	Economics
833	Science
850	Fine Arts
860	Social Science
863	History
870	English
871	Foreign Languages
872	Reading
880	Business
890	Vocational
A900	**UNCLASSIFIED**
901	Demonstrations
903	Games
904	Plotting Routines

section I
abstracts

INTRODUCTION

This section of the Program Catalog provides a brief description of computer programs (and routines) offered for use with the Hewlett-Packard 2114, 2115, 2116, and 2100 series of computers. As far as possible, the abstracts are written in a nontechnical manner. In some instances, however, it has been necessary to use terminology from the fields of instrumentation or mathematics to adequately describe a program. Since these particular software products are of interest only to those concerned with instrumentation or mathematics, the technical terms will not be a hindrance to the catalog user. Many of the abstracts also employ terminology relating to computer programming. These terms are of two types — terms in general use, and those which have been developed to suit the needs of Hewlett-Packard computers and programming techniques. For an explanation of both types of programming terminology, the publication *Preface to Programming* is recommended. This handbook may be ordered at nominal cost from any Hewlett-Packard Sales and Service Office; the HP order number is 5951-1354.

For the convenience of the reader, the programming terms most likely to cause difficulty are defined below.

a. A "driver" is an input/output (I/O) routine. More specifically, it is a short program for transferring information in either direction between the computer and a recording device. A driver is also used for transferring data from a measuring instrument to the computer.

b. A "dedicated" computer has a specific and limited use, with all programs and equipment accessories oriented toward this use.

c. "FORTRAN", "ALGOL", and "BASIC", are created languages used for writing computer programs. Hewlett-Packard uses two versions of the first of these — FORTRAN II and FORTRAN IV. Unless otherwise stated, in HP documentation the term "FORTRAN" refers to FORTRAN II.

d. An "operating system" is a set of programs, and a computer with specified equipment accessories. The operating system may be used either for general computing and data processing tasks, or it may be dedicated to a specialized function. The programs of an operating system exert a control and organizing function only, the actual tasks performed being handled by "user" programs which are not part of the operating system. As well as signifying a set of programs and a group of computer equipment, the term "operating system" may refer to the set of programs only, or it may signify only the computer equipment used. Where this ambiguity could result in confusion, the catalog uses the term "program system" to identify the program portion of an operating system. Hewlett-Packard makes available six types of general purpose operating system, each with its own advantages. These operating systems are as follows:

   (1) Basic Control System (BCS).

   (2) Magnetic Tape System (MTS).

   (3) Real-Time Executive System (RTE).

   (4) Disc Operating System (DOS).

   (5) Moving-Head Disc Operating System (DOS-M).

   (6) Time-Shared BASIC System (TBS).

e. A "computer system" is a computer and its equipment accessories.

f. An "independent" program is one which does not function under control of an operating system. Independent programs are also known as "stand alone" or "self contained" programs.

g. When a program is "configured" it is adapted to the characteristics of a particular computer system.

h. An "absolute" program is one which is assigned a fixed location in the core storage unit of a computer.

j. In a "relocatable" program, the location of the program in the computer core storage unit depends on the particular computer system. Assignment of the core storage location is part of the configuration process.

ADDITIONAL PROGRAMS

In addition to the software listed in this catalog, numerous other programs are supplied for the HP 2114, 2115, 2116, and 2100 computers. These programs are of two types: those written in BASIC programming language, and those intended for dedicated computer systems. The BASIC

language programs are listed in the pamphlet *Index to HP BASIC Program Library*, HP order no. 5952-4639 (22), and are described fully in the publication *HP BASIC Program Library Handbook* (HP order no. 36000-90001. Among the dedicated computer systems are the following:

a. HP 9500 series Automatic Test Systems.

b. HP 8540 series Automatic Network Analyzers.

c. HP 8580 series Automatic Spectrum Analyzers.

d. HP 5450 series Fourier Analyzer Systems.

e. HP 5405 series Nuclear Single-Parameter and Multiple-Parameter Analyzer Systems.

Further information on the dedicated computer systems, and the programs for them, may be obtained from any Hewlett-Packard Sales and Service Office.

PROGRAM SUPPORT

The programs in this catalog are of two types: HP supported and contributed. The HP supported software is developed and quality-tested by the Hewlett-Packard Company, and correction or updating is performed as required after the programs are issued. The support function is a mandatory requirement on the HP Division assigned responsibility for the program or routine.

Contributed programs are donated by users of HP computers. These users may be HP customers, or they may be individuals in HP Divisions. The contributors are requested to support their software, but enforcement of this task is not possible. Hewlett-Packard does not assume responsibility for correcting contributed software that is not properly supported. If serious uncorrected problems exist, the program or routine is withdrawn.

An additional difference between HP supported software and contributed software is that contributed programs are usually developed for a specific purpose, while HP supported software is prepared with the needs of various users in mind. Contributed software therefore is sometimes not as flexible as HP supported software.

PROGRAM REVISIONS

Each program is identified by a 5-digit number, followed by a letter of the alphabet. A new program is assigned the suffix letter "A". If, for debugging or other purposes, the program is later revised in a manner which changes none of its intended functions, the letter is changed to "B". Subsequent revisions are identified as "C", "D", "E", etc. Thus, if a program has a suffix letter other than the one given in this catalog, the functions of the program remain the same as described in the abstract.

If a program is revised in such a manner that its functions change, a new number is assigned, together with the letter "A".

STAT-PACK ROUTINES.

Some of the routines listed in this catalog are identified as part of the Stat-Pack group. This is a collection of mathematical routines based on routines initially prepared by the Goddard Computer Science Institute, a division of the Wadley Institute of Molecular Medicine, Dallas, Texas.

CONFIGURATION AIDS

As an aid to configuration of an operating system, a configuration-identification code is assigned to certain routines. This code is included in the title of the routine, and appears in parentheses at the end of the title. Examples of these codes are "D.56", "D.20", and "DVR22".

PROGRAM CONTRIBUTIONS

Programs contributed by users are a valuable asset to other users. The Hewlett-Packard Company requests all who wish to do so to submit their programs for inclusion in this catalog. A plaque is awarded to the contributor of each program accepted. For information on submitting programs, request the booklet *HP Software Center Contributor's Guide* (HP order number 5952-4372), obtainable without cost from any Hewlett-Packard Sales and Service Office.

SOFTWARE PRODUCTS AVAILABLE

Some or all of the following products are available for each program listed in this catalog.

a. Punched paper tape, punched metallized-mylar tape, punched cards, 7-track magnetic tape, or 9-track magnetic tape, each containing the program or routine in binary form.

b. Punched paper tape, punched metallized-mylar tape, punched cards, 7-track magnetic tape, or 9-track magnetic tape, each containing the program in source-language form.

c. A program listing, showing in printed form each instruction in the program or routine.

d. Program documentation, describing the program, explaining any special operating procedures that may be required, and providing other pertinent information on the program or routine. For programs which operate under the BCS, MTS, RTE, DOS, or DOS-M Operating System, operating procedures are relatively brief because standard procedures applicable to the operating system are usually employed.

Punched paper tape, containing the program in source language form, is available for all contributed programs. This tape allows easy modification of the program or routine to suit the user's needs. (As noted earlier, contributed software is usually designed for the specific needs of a single user, and may not have the flexibility of HP supported software.)

Section 4 of this catalog provides a list of the tapes and other materials which can be ordered for each program.

USE OF PROGRAMS BY OPERATING SYSTEMS

Some of the software products listed in this catalog are furnished in absolute-address form. These products function as independent programs. The remaining software products are provided in relocatable form. These products are either operating systems or programs intended for use with operating systems. When an abstract does not specify a particular operating system or systems for a relocatable program, the program can be used with the BCS, MTS, RTE, DOS, or DOS-M Operating System.

EQUIPMENT REQUIRED

Unless otherwise stated in the applicable abstract, the software products listed in this catalog can be employed with any computer in the HP 2114, 2115, 2116, or 2100 series, provided the computer system includes the accessories listed in the abstract. A teleprinter is a necessary item for some programs, but since a teleprinter is included in every HP computer system, this accessory is not listed as a required item.

Equipment requirements are not stated for the five program systems which constitute the BCS, MTS, RTE, DOS, and DOS-M Operating Systems. When a computer system is intended for use with one of these operating systems, at least the minimum amount of equipment required by the operating system is supplied at the time of site installation. In the case of user programs intended for an operating system, only equipment which is beyond the minimum requirements of the operating system is listed.

When the amount of core storage required by a program is not stated in an abstract, 4K (4,096 16-bit words) is sufficient. This is the minimum amount of core storage available in HP computers.

Included in this catalog are numerous drivers for Hewlett-Packard instrumentation devices. Information on these devices is provided in the HP Instrument Catalog.

CLASSIFICATION OF PROGRAMS

The software products listed in this catalog are classified in accordance with the type of operation performed. There are ten major classification groups, each divided into a number of minor groups. Table 1-1 lists the major and minor groups, and indicates the classification code associated with each group. For some categories in table 1-1, no programs are presently available from Hewlett-Packard.

THE ABSTRACTS

The abstracts are furnished after table 1-1. To find a particular abstract when the classification code is known, it is merely necessary to examine the classification code number at the top of each page; the code numbers are in numerical sequence. The programs themselves are arranged numerically, by program number, within each classification group.

To find an abstract when only the program number is known, refer to Section III of the catalog, where all programs are listed in sequence by program number. Section III gives the classification code for each program, permitting the abstract to be found.

When seeking a program to perform a particular function, make reference to Section II, where programs are listed under key words and phrases applicable to the program.

A000, OPERATING AND PROGRAMMING SYSTEMS

A001, TIME-SHARED OPERATING SYSTEMS

20596F, HP 2000A TIME-SHARED BASIC SYSTEM

This software product is a program system which permits up to 16 persons to use the computer and its associated I/O devices. Each user employs a teleprinter to communicate with the central processor and to receive pre-programmed messages. Because of program interleaving, each user receives immediate response from the central processor, and is unaware of the presence of other users. Additionally, each user not only has access to programs which are available to other users, he also has his own program library and data storage area. The teleprinters can be situated up to one mile (1.5 kilometers) from the central processor when simple wire connections are employed. Alternatively, by using suitable coupling equipment in conjunction with voice-grade telephone circuits, the teleprinters can be situated in any part of the world.

Some typical business uses of the program system are the following:

a. Engineering and research: all types of technical computation.

b. Manufacturing: master scheduling, line scheduling, decisions on new processes, cost analysis.

c. Finance: Monthly and yearly budgets, financial statements, modeling and planning, investment decision making.

d. Quality assurance: Test control and statistical analysis.

e. Marketing: Forecasting, profit analysis, product status reports, product planning, market analysis.

f. Inventory: Inventory control, reordering, usage analysis.

g. Field Service: Service contract generation, parts information, frequency-of-failure analysis.

Further information on the program system is provided in the publications *2000A: A Guide to Time-Shared BASIC* (HP order no. 0200-90002) and *2000A: Time-Shared BASIC System Operator's Guide* (HP order no. 02000-90001).

The 20596 program system must be used in the 2000A Time-Shared System, which consists of the program system, an HP 2116 computer, and additional components as specified in the aforementioned Operator's Guide.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

22403A, HP 2870/7900 EIGHT CHANNEL DISC TIME SHARE BASIC SYSTEM

This system is a modification of HP 2000B Time Share BASIC to provide users with a small low cost disc based time sharing system. The HP 2870/7900 moving head disc drive helped to achieve this cost objective.

Since the HP 2870/7900 discs are much slower than the fixed head disc, a number of compromises had to be made. The number of ports was limited to eight, and the number of disc data files accessible in a single program was four. These modifications significantly decreased the number of disc accesses and the memory required, but each user has a working area of approximately 2730 computer words.

Minimum hardware requirements include an HP 2116B with 16K core, 2 channels DMA, EAU, Power Fail/Auto Restart, photoreader, Time Base Generator, an HP 2754 teleprinter, up to eight HP 2752 teleprinters, an HP 2870A and 7900A Disc Drive with controller and interface, and an HP 2881A Power Supply.

Assembly language, absolute.

Contributed:
Kile Baker, John Shema, Nick Schrauger
Montana State University

24230B, HP 2000C TIME-SHARED BASIC SYSTEM

The most recent addition to the family of HP time-sharing systems, the 2000C system uses two computers—one for actual computation and the other for controlling access to the main computer. The system supports up to 32 terminals; programs can be entered through the terminal keyboard or through the paper tape reader.

Each user has access to three libraries—a public library, his own private library that cannot be accessed by anyone else, and the intermediate library available to a group of users.

Compared to the HP 2000A and 2000B time-sharing systems, the 2000C offers the following advancements in system features and further extensions to the BASIC language:

a. Moving-head discs are a key feature of the system. Up to eight discs are allowed and provide greatly increased storage capaicty for programs and files.

b. Special system commands permit the operator to store selected user programs and files on the fixed-head drum for rapid access.

c. The language processor now features formatted output, providing more precise control of printing and extending line length beyond the usual limit of 72 characters per line through use of PRINT USING and IMAGE statements.

d. A magnetic tape transport allows the system operator to load and dump the entire system or selected user programs and files. With the mag. tape transport feature, the computer and peripheral equipment can be used easily for other applications such as batch processing.

e. Length of a single program has been extended to over 10,000 (16-bit) words—about 1000 BASIC statements per program.

f. For larger programs, the CHAIN and COMMON statements allow virtually unlimited program lengths, with variables common to all programs.

g. File size has been increased to 16 million characters—over 8 million 16-bit words.

h. A program may reference many files, limited only by available disc storage space.

Further information on the system is provided in the publications *2000C: A Guide to Time-Shared BASIC* (HP order no. 02000-90016) and *2000C: Time-Shared BASIC Operator's Guide* (HP order no. 02000-90017).

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24231A, HP 2000B/C TIME-SHARED BASIC COMMUNICATIONS PROCESSOR

The HP 2000B Time-Shared BASIC System has been separated into modules to facilitate future updates and sharing of modules between the HP 2000B System and other similar systems. This is the terminal multiplexing module for the 2000B and 2000C Systems. This and other 2000B TSB modules obsolete the HP 2000B System, HP Order Number 20877.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24232B, HP 2000C TIME-SHARED BASIC LOADER (HP 2883 DISC)

This program is used with an HP 2000C Time-Shared BASIC system that contains HP 2883 and HP 2884 disc files. The loader provides system loading and dumping (backup) on HP 3030 or HP 7970 magnetic tape drives.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24233B, HP 2000C TIME-SHARED BASIC LOADER (HP 2870 DISC)

This program is used with an HP 2000C Time-Shared BASIC system with an HP 2870 disc. The loader provides system loading and dumping (backup) on HP 3030 or HP 7970 magnetic tape drives.

Assembly language, absolute.

HP supported:
Data System Development Division (Cupertino)

24234B, HP 2000B TO HP 2000C CONVERSION (HP 2883 DISC)

This program is used when a HP 2000B TSB system is being upgraded to a 2000C TSB with HP 2883 disc and it is desired to retain user programs and/or files on the new system. HP

2000A systems which are being updated to 2000C TSB systems must be converted to 2000B systems as an intermediate step, requiring complete 2000B software.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24235B, HP 2000B TO HP 2000C CONVERSION (HP 2870 DISC)

This program is used when a 2000B TSB system is being upgraded to an HP 2000C TSB with HP 2870 disc and it is desired to retain user programs and/or files on the new system. HP 2000A systems which are being updated to 2000C TSB systems must be converted to 2000B TSB systems as an intermediate step, requiring 2000B software.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24238B, HP 2000C TIME-SHARED BASIC LOADER

The HP 2000B Time-Shared BASIC System has been separated into modules to facilitate future updates and sharing of modules between the HP 2000B System and other similar systems. This is the loader module, and it has been corrected to verify file marks correctly on the HP 7970 magnetic tape. This and other HP 2000B TSB modules obsolete the HP 2000B System, HP Order Number 20877.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24239B, HP 2000B TIME-SHARED BASIC SYSTEM

The HP 2000B Time-Shared BASIC System has been separated into modules to facilitate future updates and sharing of modules between the HP 2000B Systems and other similar systems. This is the system module, and it includes the following corrections:

a. Blanks are now stripped from commands.

b. ENTER accepts plus (+) and minus (-) when inputting a number.

c. ENTER does *not* strip off leading blanks.

d. DELETE does *not* allow parameters 9999.

e. KILLID removes directory entries properly when the last track contains only the ending pseudo entry.

f. An attempt to print a string greater than 72 characters is flagged as an error.

g. A simple variable appearing in COMMON more than once is flagged as an error.

h. All lower case characters are converted to upper case, except in quoted strings and string inputs to INPUT and ENTER statements.

i. Appending a program after scratching another program which had at least one variable in common will not cause an error.

j. Possible loss of a program previously stored by a CSAVE has been eliminated.

k. Aborting a program which has just filled the output buffer will not cause a buffer wrap-around.

l. SLEEP is no longer aborted if a key on the teleprinter is pressed while SLEEP is logging off the users.

m. The problem that erroneously caused the message NAM-XXX-ONLY 6 CHARS ACCEPTED has been eliminated.

This and other HP 2000B TSB modules obsolete the HP 2000B System, HP order number 20877.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24253B, HP 2000C TIME-SHARED BASIC LOADER (HP 7900 DISC)

This program is used with an HP 2000C Time-shared BASIC system with an HP 7900 disc. The loader provides system

loading and dumping (backup) on HP 3030 or HP 7970 magnetic tape drives.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24254B, HP 2000B TO HP 2000C CONVERSION (HP 7900 DISC)

This program is used when a 2000B TSB system is being upgraded to a 2000C TSB with 7900 disc and it is desired to retain user programs and/or files on the new system. 2000A systems which are being updated to 2000C TSB systems must be converted to 2000B TSB systems as an intermediate step, requiring 2000B software.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20017C, BCS TELEPRINTER DRIVER D.00

This BCS driver controls teleprinter I/O operations.

Equipment required is one HP 2752 or 2754 Teleprinter, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20322A, 4K SIO BUFFERED TELEPRINTER DRIVER

Used by 4K computers, this SIO driver controls teleprinter I/O operations.

Equipment required is one HP 2752 or 2754 Teleprinter, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20323A, 8K SIO BUFFERED TELEPRINTER DRIVER

Used by 8K computers, this SIO driver controls teleprinter I/O operations.

Equipment required is one HP 2752 or 2754 Teleprinter, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20329A, 12K SIO BUFFERED TELEPRINTER DRIVER

Used by 12K computers, this SIO driver controls teleprinter I/O operations.

Equipment required is one HP 2752 or 2754 Teleprinter, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20330B, 16K SIO BUFFERED TELEPRINTER DRIVER

Used by 16K computers, this SIO driver controls teleprinter I/O operations.

Equipment required is one HP 2752 or 2754 Teleprinter, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20741D, RTE TELEPRINTER DRIVER (DVR00)

This RTE driver controls teleprinter I/O operations.

Equipment required is one HP 2752 or 2754 Teleprinter, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20985D, DOS TELEPRINTER DRIVER (DVR00)

This DOS and DOS-M driver controls teleprinter I/O operations.

Equipment required is one HP 2752 or 2754 Teleprinter, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

22237C, TELEPRINTER/LINEPRINTER OUTPUT SELECTOR FOR HP BASIC

This routine, which operates under the 20392A BASIC Operating System, allows an operator to transfer teleprinter I/O operations to either of two teleprinters. One or both of the teleprinters can be at a remote site, connected to the computer by a telephone data-link system. Transfer from one teleprinter to the other is accomplished in any of the following ways:

a. The word "BYE" is typed (or read from punched tape) on the teleprinter currently recognized by the program.

b. When the computer is halted, a number is entered into the switch register. The transfer takes place when the computer is started.

c. The program calls a transfer routine.

When the transfer takes place, the teleprinter which will be recognized by the program types "READY."

Assembly language, absolute.

Contributed:
Roy Jacobus
Westinghouse Electric Co.

22243A, BCS TELECOMMUNICATIONS DRIVER D.50

This BCS driver, functioning under the requirements of IBM Binary Synchronous Line Control, transfers data to or from telecommunication devices. Use of the driver requires an understanding of the information in *IBM System Reference Library Manual – General Information – Binary Synchronous Communications* (GA27-3004-1). The driver is used in conjunction with the BCS Buffered Teleprinter Driver (D.00), program 20017.

The BCS Telecommunications Driver (D.50) recognizes three character codes: ASCII, EBDIC, and 6-BIT TRANSCODE. In addition, transparent mode is provided, in which data-link control characters may be transmitted without taking on control functions as would be the case in the transmission of binary data. Also provided is conversational mode, in which the two terminals alternately send and receive data.

The driver can be used only with asynchronous data transfer devices. Either standard or buffered I/O control can be used.

Equipment required is one telecommunications I/O device with interconnecting cable, one HP 12539 Time Base Generator Interface Kit, and one HP 12587 Asynchronous Data Set Interface Kit.

Assembly language, relocatable.

Contributed:
Bill Alexander
HP, Midwest Sales Region

22244B, 16K BINARY SYNCHRONOUS CONTROLLED DATA COMMUNICATIONS PROGRAM

This program provides data communications capability between two Hewlett-Packard 2100 series computers. This utility is designed to be used in conjunction with D.50, 22328, a BCS Telecommunications Driver. Interactive commands and messages allow the operator to specify the transmission code, ASCII, EBCDIC, or 6-bit TRANSCODE through a system console teleprinter. The user may also specify the direction of transmission, the source or destination peripheral device, the mode of transmission, and various other functions. All data transmitted is compressed before transmission and expanded upon reception in blocked or unblocked mode.

Equipment required includes 16K core, an HP 2752 or 2754 teleprinter, a BELL 202C Modem, and an HP 12539 Time Base Generator.

Assembly language, relocatable.

Contributed:
Bill Alexander
HP, Midwest Sales Region

22245A, USER INTERFACE TO BCS TELECOMMUNICATIONS DRIVER D.50

Identified as BSCIN, this routine serves as a user's interface with program 22243A, BCS Telecommunications Driver (D.50). BSCIN relieves the programmer of such housekeep-

ing tasks as handshaking with a remote terminal, auto-answering, initializing the time base generator, adding control characters to messages, etc. As a result, telecommunications I/O operations are performed in a fashion similar to I/O operations with peripheral units at the local computer. More specifically, for a telecommunications operation the programmer simply codes a subroutine call to BSCIN, and furnishes a parameter list. The call can be made either from Assembly Language, FORTRAN, or ALGOL.

Equipment required is one HP 12539A Time Base Generator Interface Kit, and one HP 12587A Asynchronous Data Set Interface Kit.

Assembly language, relocatable.

Contributed:
Bill Alexander
HP, Midwest Sales Region

22246A, DOS-M REMOTE TAPE READER DRIVER (DVR00, DVR07)

This DOS-M routine consists of two teleprinter drivers which replace the standard driver (routine 20985), and permit the use of a remote system-control teleprinter. Communication between the teleprinter and the computer is furnished by a telephone data-link system.

One driver in this routine, with entry point DVR07, controls I/O operations with the punch tape reader in the remote teleprinter. The second driver, with entry point DVR00, controls the remaining teleprinter functions (keyboard input, type output, and punch output). A lockout between the two drivers prevents their being used simultaneously.

The separate driver for the tape reader is necessitated by the use of an HP 2749 Teleprinter as the remote teleprinter, rather than the Model 2752 or 2754 which is employed for local use. The 2749 offers the advantage that the tape reader is started and stopped by control characters furnished on the data line. The 2752 or 2754 requires a separate wire for this purpose, which in remote operation would necessitate an additional communication channel between the computer and the teleprinter.

In the tape reader portion of the routine, an ASCII DC1 (device control 1) character starts tape motion, and an ASCII DC3 character stops the tape. The remaining teleprinter functions in the same manner as for a 2752 or 2754 Teleprinter.

This program functions under the DOS-M Operating System. It will not operate under DOS or other program systems without modification.

Equipment required is a computer with at least 12K storage capacity, one HP 2749 Teleprinter, and one data-link system with interface kit.

Assembly language, relocatable.

Contributed:
Denis Winn
HP, Data Systems

22311A, BCS POWER FAIL TELEPRINTER DRIVER WITH AUTORESTART OPTION

This BCS teleprinter driver incorporates a power fail routine for any HP 21XX computer with power fail. It saves and restores all the registers including the switch register. If the autorestart option is available, this driver will restart the program at the interrupted point and restore the teleprinter to its previous status.

If the full capability of this routine is used to drive a complete paper tape system including photoreader and high-speed punch, then this driver alone will revive the complete paper tape system after autorestart.

Equipment required is any 4K HP computer with power fail, an HP 2752A or 2754 teleprinter, and optionally, autorestart.

Assembly language relocatable.

Contributed:
Enrico P. Mariani
HP, Italy/Milan

22328A, BCS TELECOMMUNICATIONS DRIVER FOR SYNCHRONOUS AND ASYNCHRONOUS DEVICES

D.50 is designed to interface telecommunication synchronous or asynchronous devices using IBM's Binary Synchronous Control line discipline. The driver may be used for data communications between two 2100 series computers, a 2100 series computer and an IBM computer with a

telecommunications adapter, or a 2100 series and any terminal (or other computer) operating under BSC line discipline (as an IBM 2780). The synchronous mode of the driver is required with most IBM equipment.

All requests to D.50 must be a standard formatted request to .IOC, buffered or unbuffered. The function processors in D.50 services requests to CLEAR, READ, WRITE, HAND-SHAKE, AUTO-ANSWER, RECEIVE TO SEND, SEND END OF FILE, and EXTENDED STATUS.

D.50 will support three different character codes — ASCII, EBCDIC, and 6-bit TRANSCODE. In addition, transparent mode is provided where data link control characters may be transmitted as data without taking on control meaning as would be required in the transmission of binary data. Conversational mode is also provided where both terminals alternately send and then receive data.

Coupled with HP's 12621A and 12622A synchronous interface boards or 12587A Asynchronous Data Set Interface Kit, 12539A Time Base Generator, and an appropriate modem, this driver will allow an HP 2100 series computer to communicate directly with an IBM or BSC terminal. The calling program initiates the appropriate function calls to carry out data transmissions. Included with this driver is a calling program which makes a 2100 computer simulate an IBM 2780 terminal. Also, this driver will interface directly with contributed programs 22244 and 22245 for 2100 to 2100 series computer communication.

Assembly language, relocatable.

Contributed:
Rich Nielsen
HP, Palo Alto

22367A, 8K BINARY SYNCHRONOUS CONTROLLED DATA COMMUNICATIONS PROGRAM

This program provides data communications capability between two Hewlett-Packard 2100 series computers. This utility is designed to be used in conjunction with D.50, 22328, a BCS Telecommunications Driver. Interactive commands and messages allow the operator to specify the transmission code, ASCII or EBCDIC, through a system console teleprinter. The user may also specify the direction of transmission, the source or destination peripheral device, the mode of transmission, and various other functions. All data transmitted is compressed before transmission and expanded upon reception in blocked or unblocked mode.

Equipment required included 8K core, an HP 2752 or 2754 teleprinter, a BELL 202C modem, and an HP 12539 Time Base Generator.

Assembly language, relocatable.

Contributed:
Bill Alexander
HP, Midwest Sales Region

22372A, HP 2100 REMOTE BATCH TERMINAL TO A UNIVAC 1108

This program allows an HP 2100 series computer to operate as a remote batch terminal to a Univac 1108. The HP 2100 series computer simulates the operation of a Univac 1004 as a remote batch terminal to a Univac 1108 via standard telecommunications techniques. The program conforms to Univac specifications for the 1108 operating systems, EXEC 11 and EXEC 8.

Basically this program operates by sending and receiving control information and data buffers. This program handles only the communications logic; it relies on external subroutines for assembly of data buffers, compression, and code conversion. Data buffers sent and received consist of 320 or 330 characters of compressed or uncompressed data. All data sent and received is in excess-three code, XS-3 (Univac's 1004 standard). The supporting documentation details Univac's communication techniques, compression techniques, and XS-3 code.

This program operates under BCS in an 8K 2100 series computer using a 12618A Synchronous Data Set Interface and a 201A3 Bell Data Set (200 Baud Synchronous).

Assembly language, relocatable.

Contributed:
Jerry Reaugh
Data Systems

22374A, A BCS ASYNCHRONOUS DATA SET INTERFACE DRIVER

This driver establishes data communications between HP 2100 series computers and the TC-380 Olivetti buffered terminal. It allows the HP computer to input or output control signals with the following features; half-duplex transmission, 1200 bits/sec., even parity, 8-bit characters, 1 start bit, and 1 stop bit. The driver also initiates, continues, and completes all data transmission or reception commands via an HP 12587 Interface Board.

On read requests, the driver receives character per character one Olivetti formatted buffer with a maximum of 230 ISO coded characters. It translates these characters into an ASCII packed buffer or an XS-3 buffer properly formatted for communication with a Univac 1108 computer. On write requests, the driver translates into ISO code and sends one ASCII packed buffer or one formatted XS-3 buffer character per character to the Olivetti terminal.

The communication procedures are selecting and polling. One useful application of this driver is in the environment where an HP minicomputer handles I/O for a Univac 1108 computer.

Assembly language, relocatable.

Contributed:
Elizabeth Caloyannis
HP, France/Orsay

22387A, D.70 REVERSE CHANNEL TELECOMMUNICATIONS DRIVER

D.70 is an input/output driver, written in the form of a subroutine, designed to operate in an interrupt controlled BCS environment. It interfaces HP 2100 series computers to telecommunication devices under an ARQ (Automatic Request for Resend) line discipline. Reverse channel is used as the request for resend medium. The driver supports HP's asynchronous I/O boards coupled to any appropriate modem with reverse channel feature (as a BELL 202C).

The ARQ method used by this driver can considerably increase throughput rates, especially for short data blocks. In effect, it simulates a pseudo full-duplex line on a half-duplex circuit.

Equipment required includes 8K core, an HP 12539 Time Base Generator, an HP 12587A Asynchronous Data Set Interface Kit, and an appropriate modem with the reverse channel feature, BELL 202C.

Assembly language, relocatable.

Contributed:
Rich Nielsen
HP, Corporate

22394A, CORE-SAVING TELEPRINTER I/O DRIVER AND CODE CONVERSION ROUTINE

This driver allows a FORTRAN compiled program to bypass the formatter, .IOC., and standard BCS drivers for conversational ASCII text and real data input/output on a single teleprinter. It is a completely self-contained relocatable I/O system with ASCII and real code conversion routines using only 600_{10} words. Thus core amounting to $800_{(10)}$ + .IOC. + drivers are saved over the usual formatted read/write. In a 4K machine, this results in the user having an extra 1K available for raw FORTRAN code.

All relocatable binary code including this driver and the library must be loaded and punched onto an absolute tape without .IOC., the formatter, or the BCS drivers by using the contributed Offline Relocating Loader, HP 22297.

Assembly language, relocatable.

Contributed:
Don Mactaggart
Canadian Marconi Company

24123A, 4K SIO TELEPRINTER DRIVER, LP-COMPAT

Used by 4K computers, this SIO driver controls teleprinter I/O operations. If a line printer is also used, the line printer driver overlays the print and punch portions of the teleprinter driver; as a result, all print outputs are forwarded to

the line printer. If tape punching is required when the teleprinter driver is overlaid, a separate tape punch is used, with its own driver. If no line printer is configured, teleprinter print outputs are forwarded to the teleprinter.

Equipment required is one HP 2752 or 2754 Teleprinter, with interface kit. An optional I/O device is an HP 2767 or 2778 Line Printer, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24125A, 8K SIO TELEPRINTER DRIVER, LP-COMPAT

Used by 8K computers, this SIO driver controls teleprinter I/O operations. If a line printer is also used, the line printer driver overlays the print and punch portions of the teleprinter driver; as a result, all print outputs are forwarded to the line printer. If tape punching is required when the teleprinter driver is overlaid, a separate tape punch is used, with its own driver. If no line printer is configured, teleprinter print outputs are forwarded to the teleprinter.

Equipment required is one HP 2752 or 2754 Teleprinter, with interface kit. An optional I/O device using this routine is an HP 2767 or 2778 Line Printer, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24127A, 16K SIO TELEPRINTER DRIVER, LP-COMPAT

Used by 16K or larger computers, this SIO driver controls teleprinter I/O operations. If a line printer is also used, the line printer driver overlays the print and punch portions of the teleprinter driver; as a result, all print outputs are forwarded to the line printer. If tape punching is required when the teleprinter driver is overlaid, a separate tape punch is used, with its own driver. If no line printer is configured, teleprinter print outputs are forwarded to the teleprinter.

Equipment required is one HP 2752 or 2754 Teleprinter, with interface kit. An optional I/O device is an HP 2767 or 2778 Line Printer, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24157B, DOS-M SYSTEM TELEPRINTER DRIVER (DVR05)

This DOS-M driver controls keyboard input and typewriter output operations for the teleprinter. The driver is core resident, and to conserve storage space the means for reading or punching tape at the teleprinter is not provided. If teleprinter tape reading and tape punching are required, program 20985 is used.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20098C, BCS 40 BIT OUTPUT REGISTER DRIVER D.54

This driver forwards up to 40 bits in a single output operation to an HP 562AR or 5050A/B Digital Recorder. The driver can also be used with two 40-bit output register interface kits to permit employment of all 18 columns of an HP 5050A/B Digital Recorder. As a further use, this driver can furnish 40 bits to an HP 2759A Frequency Synthesizer Programmer or other suitable I/O device.

Equipment required is one or two HP 40-bit output register interface kit, and a suitable output device.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

20502B, TIME BASE GENERATOR DRIVER (D.43)

This routine serves as a time-of-day clock for the Data Acquisition and Control Executive (DACE) Operating System.

Equipment required is one HP time base generator interface kit.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

22002A, TIME-OF-DAY CLOCK

After initially being set to the correct time, this routine furnishes the time of day on demand. Units are hours, minutes and seconds. As an additional feature, elapsed time can be measured without interfering with the time-of-day function. The clock stops when the computer halts.

One HP 12539 Time Base Generator is required.

Assembly language, relocatable.

Contributed.

22071A, HP 12539A TIME BASE GENERATOR DRIVER — FORTRAN CALLABLE

This routine provides a means for measuring the time of day. Elapsed time can also be measured. The time-of-day and elapsed time functions may be used simultaneously without restrictions.

When time-of-day is read out, the units are hours, minutes, and seconds, each expressed as a floating point number. Elapsed time is indicated in hundredths of seconds, expressed as a single floating point number.

For time-of-day use, the routine must be initiated with the current time. In either use, the routine causes a program interrupt every 10 milliseconds; the time-of-day and elapsed time counts are then incremented if necessary. When the program halts, the time-of-day and elapsed time counts stop.

Equipment required is one HP 12539A Time Base Generator Interface Kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22112A, HP 12539A TIME BASE GENERATOR DRIVER — BASIC CALLABLE

This routine provides a means for measuring the time of day. Elapsed time can also be measured. The time-of-day and elapsed time functions can be used simultaneously without restrictions.

When time-of-day is read out, the units are hours, minutes, and seconds, each expressed as a floating point number. Elapsed time is indicated in hundredths of a second, expressed as a single floating point number.

For time-of-day, the routine must be initialized with the current time. In either use, the routine causes a program interrupt every 10 milliseconds; the time-of-day and elapsed time counts are then incremented if necessary. When the program halts, the time-of-day and elapsed time counts stop. The routine operates under the 20392A BASIC Operating System.

Equipment required is one HP 12539A Time Base Generator Interface Kit.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22170A, SYNCHRONOUS HIGH SPEED DATA ACQUISITION PROGRAM

Intended for use with any high speed data source furnishing 16-bit words at a regular rate, this program transfers data to an HP 2770A Disc Memory. For a disc memory operating from a 50-Hertz power source, data transfer rates as high as 137,000 words per second can be achieved. For a 60-Hertz power source, throughput rates up to 164,000 words per second are possible.

Equipment required is one HP 2770A Disc Memory with interface kit, and the Direct Memory Access option for the computer.

Assembly language, absolute.

Contributed:
Vittorio Baldini
HP, Italy/Milan

22195A, PROGRAM EXECUTION TIMER

The purpose of this routine is to accurately measure program execution time. Correction is made for the time taken to service interrupts. The execution time is printed out in seconds, correct to four decimal places. The maximum time which can be measured is 32,768 seconds (9 hours, 6 minutes, and 8 seconds).

Equipment required is one HP 12539 Time Base Generator.

Assembly language, relocatable.

Contributed:
Warren Nelson
HP, Canada/Ottawa

22229B, HP 12551A/B RELAY REGISTER INTERFACE DRIVER — FORTRAN CALLABLE

Used with the HP 12551A or 12551B Relay Output Register, this routine opens or closes any specified relay contact, In addition, all relay contacts can be opened simultaneously. After contact opening or closure, the routine remains in a waiting loop for approximately 300 milliseconds to allow time for relay contacts to settle.

Equipment required is one HP 12551A or a 12551B Relay Output Register, with interface kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22271B, ZEISS DMC 25 COLORIMETER DRIVER — FORTRAN CALLABLE

This driver measures the remission of a material which is irradiated with light between 380 nm and 725 nm wavelength from the Zeiss DMC 25 Colorimeter. These values in steps of 5 nm are the base from which to calculate color contents and color differences of materials with subjective equal colors. FORTRAN callable.

Equipment required is one HP 2752A teleprinter, an 8K computer, an HP Data Source Interface card, and the Zeiss DMC 25 Colorimeter.

Assembly language, relocatable.

Contributed:
Klaus Stamer
HP, Germany/Frankfurt

22275B, ZEISS DMC 25 COLORIMETER DRIVER — BASIC CALLABLE

This driver measures the remission of a material which is irradiated with light between 380 nm and 725 nm wavelength from the Zeiss DMC 25 Colorimeter. These values in

steps of 5 nm are the base from which to calculate color contents and color differences of materials with subjective equal colors. It is used with the HP 20392A BASIC operating system.

Equipment required is one HP 2752A teleprinter, an 8K computer, an HP Data Source Interface card, and the Zeiss DMC 25 Colorimeter.

Assembly language, absolute.

Contributed:
Klaus Stamer
HP Germany/Frankfurt

22313A, HP 12551B RELAY REGISTER INTERFACE DRIVER — BASIC CALLABLE

The absolute modification to the HP 20392A BASIC System opens or closes relay contacts on the HP 12551B Relay Register. It checks the range and processes the contact number. The driver waits in a loop to allow the contacts to settle before returning to the calling program.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22382B, SYNCHRONOUS DATA COMMUNICATIONS DRIVERS FOR BCS, D.60 AND D.61

BCS drivers D.60 and D.61 represent an extension of the hardware capabilities of Synchronous Data Communication Interfaces for HP Computers in a BCS software environment. They are control character free and procedure (control character sequences) free.

Both drivers call a user written routine that uses up to 8 modes of transmissions or different sets of control characters consistent with selected disciplines for synchronized transmission of binary-coded data.

Communication procedure (control character sequences) is completely under the responsibility of the program that calls the drivers D.60 and D.61 via .IOC.

These two drivers allow simple, half-duplex and full duplex communication.

Equipment required includes any HP 2100 computer, an HP 12618A Synchronous Data Set or HP 12621A Synchronous Data Set, an HP 12622A Synchronous Data Set, and a Synchronous Modem or Data Set compatible with the hardware specifications of the Interface Kit.

Assembly language, relocatable.

Contributed:
Ferdinando Longoni
HP, Germany/Boblingen

29001A, COMPUTER SERIAL INTERFACE RTE DRIVER DVR65

DVR66 is a relocatable assembly language driver that interfaces the HP 12665 Computer Serial Interface Card to the HP 2005 RTE system. The HP 12665 card provides a means of communication between two computers. DVR65 is capable of communicating with any number of HP 12665 cards in the RTE system. DVR65 can communicate with either another RTE DVR65 driver or a BCS D.65 driver.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

29002A, COMPUTER SERIAL INTERFACE BCS DRIVER D.65

D.65 is a relocatable assembly language driver for the HP 12665 Computer Serial Interface Card. The HP 12665 Interface provides a means of communications between two computers, each computer having its own HP 12665 Interface and driver.

D.65 can communicate with either another BCS D.65 Driver or a RTE DVR.65 Driver. FORTRAN/ALGOL READ or WRITE Statements are not allowed with D.65.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

29003A, COUPLER SERIAL INTERFACE RTE DRIVER DVR66

DVR66 is a relocatable assembly language driver that transfers data between the HP 2570A/2575A Coupler/Controller (interfaced with a HP 12813) card and the HP 2005 RTE systems (operating in a HP 2100 family computer interfaced with a HP 12665 card. Any number of HP 2570A/2575A Coupler/Controllers can be controlled by DVR66.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

A004, I/O, STATUS PROCESSING

22236A, FORTRAN I/O STATUS FUNCTION

This routine uses a variable calling sequence to provide status information on selected unit reference numbers. Use of the routine obviates waiting in the .DTA loop in the formatter. Additionally, a variable length calling sequence permits requests for transmission log and hardware status.

Assembly language, relocatable.

Contributed:
Stroud Custer
HP, Eastern Sales Region

14900B, BCS 6936A MULTIPROGRAMMER DRIVER (D.61)

This BCS driver transfers control data from the calling program to a device controlled by an HP 6936A Multiprogrammer Data Distribution System. The 6936A is an equipment item which provides the means for controlling up to 240 devices. These devices can vary widely in nature, but typically they are such things as programmable power supplies, attenuators, filters, modulators, function generators, CRT display units, X-Y or strip-chart recorders, servos, stepping motors, valves, solenoids, alarm systems, or memory testing systems. The routine performs the output operations by the non-interrupt method, and it checks legality and provides formatting for the 6936A Multiprogrammer.

Equipment required is one HP 6936A Multiprogrammer Data Distribution System with interface kit, and controlled devices.

Assembly language, relocatable.

HP supported:
New Jersey and Berkeley Heights Division

14904A, HP 6940A/6941A BCS DRIVER, D.61

This driver controls HP 6940A/6941A Multiprogrammer systems under the basic control system (BCS). The driver performs most general purpose software functions required for efficient HP 6940A/6941A operation.

The functions are: (1) Normal read (with initial write). (2) Read direct with no input gate. (3) Read direct with input gate. (4) Read operator data. (5) Poll to first interrupter, (6) Roll all. (7) Normal write. (8) Write with handshake. (9) Clear.

These functions are classified as reads, writes, or clear. The driver is not callable from high-level languages.

Assembly language, relocatable.

HP supported:
New Jersey Division

14909A, HP 6940A DRIVER FOR 20392A BASIC

This program establishes a 24000 BASIC subroutine which controls a 6940A bi-directional multiprogrammer. The subroutine overlays the BASIC matrix routines.

The calling sequence is

NNNN CALL (1,M,A,S,D,F)

where NNNN = the statement number, 1 identifies the driver subroutine, M = mode of I/O transfer, A = decimal select code, S = slot address, D = data value, and F = flag returned by the driver (giving varying information depending upon the CALL and the 6940A response).

Assembly language, absolute

HP supported:
New Jersey Division

20008B, BCS 8-4-2-1 DATA SOURCE INTERFACE DRIVER (D.40)

This BCS driver acquires measurements from any of the following:

a. HP 2401C Integrating Digital Voltmeter
b. HP 2402A Integrating Digital Voltmeter
c. HP 3440A Digital Voltmeter
d. HP 3450A Multi-Function Meter
e. HP 3460A or 3460B Digital Voltmeter
f. Most HP counters with 8-4-2-1 or 4-2-2-1 BCD output

Meter function (type of measurement), meter range, and other measurement conditions must be established prior to execution of the routine. This can be done either manually or by programming means. Automatic range selection can be employed if the meter is equipped with this feature. The measurement acquired is furnished to the calling program either in the BCD form in which it is acquired from the measuring instrument (8-4-2-1 or 4-2-2-1), or the reading can be converted to ASCII digits if it is in 8-4-2-1 form. As well as supplying the measured value to the calling program, the routine furnishes an additional word to indicate the type of measurement, and measurement range, for which the meter is set.

This driver is identical with routine 20011, except that it does not offer conversion of 4-2-2-1 BCD data to ASCII form.

Equipment required is one of the meters listed above, with data source interface kit and interconnecting cable. The meter can supply either 8-4-2-1 or 4-2-2-1 BCD data.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20009B, BCS DIGITAL VOLTMETER PROGRAM DRIVER (D.41)

This BCS driver establishes measurement conditions in any of the following devices:

a. HP 2401C Integrating Digital Voltmeter

b. HP 2402A Integrating Digital Voltmeter

c. HP 3450A Multi-Function Meter

The measurement conditions, established by means of control words, consist of those of the following parameters applicable to the device used:

a. Meter function (type of measurement)

b. Sample time

c. Mode (measurement or calibration check)

d. Meter range

e. Delay (HP 3450A Multi-Function Meter only)

The routine does not acquire the measurement itself. This function is reserved for routine 20008B or 20011B. Alternatively, a visual reading can be made, or the data can be recorded on an external instrument.

Equipment required is one of the measuring devices listed above, with interface kit.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20010C, BCS 8-4-2-1 SCANNER CONTROL DRIVER (D.42)

This BCS driver controls an HP 2911 Guarded Crossbar Scanner. Control words, furnished by the calling program, establish the data channel to be sampled, delay before the measurement is taken, and type of measurement (voltage, resistance, or frequency).

The driver does not acquire the measurement itself. This function is reserved for routine 200008B or 20011B. Alternatively, a visual reading can be made, or the data can be recorded on an external instrument.

Equipment required is one HP 2911 Guarded Crossbar Scanner, with interface kit and measuring instrument.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20011B, BCS 8-4-2-1/4-2-2-1 DATA SOURCE INTERFACE DRIVER (D.40A)

This BCS driver acquires measurements from any of the following:

a. HP 2401C Integrating Digital Voltmeter

b. HP 2402A Integrating Digital Voltmeter

c. HP 3440A Digital Voltmeter

d. HP 3450A Multi-Function Meter

e. HP 3460A or 3460B Digital Voltmeter

Meter function (type of measurement), meter range, and other measurement conditions must be established prior to execution of the routine. This can be done either manually or by programming means. Automatic range selection can be employed if the meter is equipped with this feature. The measurement acquired is furnished to the calling program either in the BCD form in which it is acquired from the measuring instrument (8-4-2-1 or 4-2-2-1), or the reading can be converted to ASCII digits. As well as supplying the measured value to the calling program, the routine furnishes an additional word to indicate the type of measurement, for which the meter is set, if this information is available as a BCD meter output.

This driver is identical with routine 20008B except that it also offers 4-2-2-1 BCD capability, though at the cost of a greater core storage requirement for the routine.

Equipment required is one of the meters listed above, with data source interface kit and interconnecting cable. The meter can supply either 8-4-2-1 or 4-2-2-1 BCD data.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20012C, BCS 8-4-2-1/4-2-2-1 SCANNER CONTROL DRIVER (D.42A)

This BCS driver controls an HP 2911 Guarded Crossbar Scanner. Control words, furnished by the calling program, establish the data channel to be sampled, delay, and type of measurement (dc volts, ac volts, resistance, or frequency).

The driver does not acquire the measurement itself. This function is reserved for routine 20008B or 20011B. Alternatively, a visual reading can be taken, or the data can be recorded on an external instrument.

This routine is the identical with routine 20010C except that it offers 4-2-2-1 digit capability, though at the cost of a greater core storage requirement for the routine.

Equipment required is one HP 2911 Guarded Crossbar Scanner, with interface kit and measuring instrument.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20024A, BCS DIGITAL VOLTMETER PROGRAM DRIVER (D.41B)

This BCS driver establishes measurement conditions in an HP 2402A Integrating Digital Voltmeter. To accomplish this, a control word from the calling program specifies the type of measurement, meter range (automatic range selection can be programmed if desired), and mode (measurement or calibration check).

The driver does not acquire the measurement itself. This function is reserved for routine 20008B or 20011B. Alternatively, a visual reading can be taken, or the data can be recorded on an external instrument.

Equipment required is one HP 2402A Integrating Digital Voltmeter including option 011 (computer control capability), and a programmer interface card.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20025A, BCS HP 2912 SCANNER CONTROL DRIVER (D.42B)

This BCS driver controls an HP 2912A-001 Reed Scanner. A control word, furnished by the calling program, establishes the data channel to be sampled and the delay. To provide time for channel selection, the routine remains in a waiting loop until the specified delay has elapsed.

The driver does not acquire the measurement itself. This function is reserved for routine 20008B or 20011B. Alternatively, a visual reading can be taken, or the data can be logged on an external recording device.

Equipment required is one HP 2912A-001 Reed Scanner with scanner program interface card, and one measuring instrument with interface card or cards.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20295A, RTE HP 12604B DATA SOURCE INTERFACE DRIVER (DVR40)

This RTE driver acquires 8-4-2-1 BCD measurements from an HP 2401C or 2402A Integrating Digital Voltmeter, or

from other measuring devices that use the HP 12604B Data Source Interface Kit. Meter function (type of measurement), meter range, and other measurement conditions must be established prior to execution of this routine. This can be done either manually or by programming means. Automatic range selection can be employed if the meter is equipped with this optional feature. As well as supplying the measured value to the calling program in 8-4-2-1 BCD form, the routine furnishes an additional word which indicates the type of measurement for which the meter is set. Program 20288A can be used to convert the BCD measurement to floating point form.

Equipment required is one HP 2401C or 2402A Integrating Digital Voltmeter or other measuring instrument with 8-4-2-1 BCD output, with HP 12604B Data Source Interface Kit and interconnecting cable.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20430B, HP 2402A PROGRAMMER/DATE INTERFERENCE DIAGNOSTIC

This routine tests the HP 2402A Integrating Digital Voltmeter and the associated interface kit.

Assembly language, absolute.

HP supported:
Automatic Measurement Div.

22001A, HP 2911A/B CROSSBAR SCANNER DRIVER — FORTRAN CALLABLE

This routine controls an HP 2911 Guarded Crossbar Scanner. The scanner samples the data channel designated, and forwards the sample to a meter or external recording device. Control words from the calling program specify the data channel, delay, and type of measurement (dc volts, ac volts, resistance, or frequency).

Equipment required is one HP 2911 Guarded Crossbar Scanner, with programming interface kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22003A, HP 2402A DIGITAL VOLTMETER DRIVER — FORTRAN CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 2402A Integrating Digital Voltmeter. Meter calibration can also be checked. A control word from the calling program specifies the meter function (type of measurement), mode (measurement or calibration check), and meter range. The BCD measurement is converted to floating-point binary form and forwarded to the calling program.

Equipment required is one HP 2402A Integrating Digital Voltmeter (8-4-2-1 BCD output), with programming interface kit and data source interface kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region.

22004A, COUNTER DATA SOURCE INTERFACE DRIVER — FORTRAN CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 5-to-8 digit counter. The BCD measurements is converted to floating point form and forwarded to the calling program.

Equipment required is an 8-4-2-1 digital counter of a type suited to one of the following data source interface kits: HP 12604B, 12544A, 12545A, 12546A, or 12547A.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22005B, HP 2401C DIGITAL VOLTMETER DRIVER — FORTRAN CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 2401C Integrating Digital Voltmeter. A control word from the calling program specifies the meter function (type of measurement), sampling time, and meter range. If an HP 2411A Guarded Data Amplifier is used in conjunction with the meter, either X1 or X10 voltage amplification can be specified by the control word. The measurement acquired is converted to floating point binary form and forwarded to the calling program.

Equipment required is one HP 2401C Integrating Digital Voltmeter (8-4-2-1 BCD output), with programming interface kit and data source interface kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22006A, HP 2401C DATA SOURCE INTERFACE DRIVER — FORTRAN CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 2401C Integrating Digital Voltmeter. Meter function (type of measurement), sampling time, and meter range are selected manually at the meter. Automatic range selection can be employed if the meter is equipped with this optional feature. As well as supplying the measured value to the calling program in floating point binary form, the routine furnishes an additional word to indicate the type of measurement for which the meter is set.

Equipment required is one HP 2401C Integrating Digital Voltmeter (8-4-2-1 BCD output), with data source interface kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22007A, HP 3440A DATA SOURCE INTERFACE DRIVER — FORTRAN CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 3440A Digital Voltmeter. Meter range and polarity are selected manually at the meter. As well as supplying the measured value to the calling program in floating binary form, the routine furnishes an additional word which indicates the polarity for which the meter is set.

Equipment required is one HP 3440A Digital Voltmeter (8-4-2-1 BCD output), with data source interface kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22008A, HP 3460A DIGITAL VOLTMETER DRIVER — FORTRAN CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 3460A Digital Voltmeter. A control word from the calling program specifies the meter function (type of measurement), sampling time, and meter range. Automatic range selection, a standard feature of the meter, can be employed if desired. The measurement acquired is converted to floating point binary form and forwarded to the calling program.

Equipment required is one HP 3460A Digital Voltmeter (8-4-2-1 BCD output), with programming interface kit and data source interface kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22048A, HP 2402A DATA SOURCE INTERFACE DRIVER — FORTRAN CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 2402A Integrating Digital Voltmeter. Meter function (type of measurement), mode (measurement or calibration check), and meter range, are selected manually at the meter. Automatic range selection can be employed if the meter is equipped with this optional feature. As well as supplying the measured value to the calling program in floating point form, the routine furnishes an additional word which indicates the type of measurement for which the meter is set.

Equipment required is one HP 2402A Integrating Digital Voltmeter (8-4-2-1 BCD output), with data source interface kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22053B, HP 3450A DATA SOURCE INTERFACE DRIVER — FORTRAN CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 3450A Digital Multi-Function Meter. Meter function (type of measurement) and range are selected manually at the meter. Automatic range selection, a standard feature of the meter, can be employed if desired. As well as supplying the measured value to the calling program in floating point form, the routine furnishes an additional word which indicates the type of measurement for which the meter is set.

Equipment required is one HP 3450A Digital Multi-Function Meter (8-4-2-1 BCD output), with digital output option and data source interface kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22055A, HP 3460A/B DATA SOURCE INTERFACE DRIVER — FORTRAN CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 3460A or 3460B Digital Voltmeter. Meter function (type of measurement) and meter range are selected manually at the meter. Automatic range selection, a standard feature of the meter, can be employed if desired. As well as supplying the measured value to the calling program in floating point form, the routine furnishes an additional word which indicates the type of measurement for which the meter is set.

Equipment required is one HP 3460A or 3460B Digital Voltmeter (8-4-2-1 BCD output), with data source interface kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22057A, HP 2801A DATA SOURCE INTERFACE DRIVER — FORTRAN CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 2801A Quartz Thermometer. As well as supplying the measured value to the calling program in floating point form, the routine furnishes an additional word which indicates the measurement mode (temperature of probe T1, temperature of probe T2, or the difference between the two temperatures).

Equipment required is one HP 2801A Quartz Thermometer, with data source interface kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22059A, HP 2912A REED SCANNER DRIVER — FORTRAN CALLABLE

This routine controls an HP 2912A Reed Scanner. The reed scanner samples a designated data channel, and forwards the sample to a meter or recording device. Control words from the calling program specify the data channel required and designate the delay.

Equipment required is one HP 2912A Reed Scanner, with programming interface kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22061A, HP 2320 LOW SPEED A-TO-D SUBSYSTEM DRIVER — FORTRAN CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 2320A Low-Speed Data Acquisition Subsystem. Control words from the calling program specify the data channel to be sampled, meter function (type of measurement), meter mode (measurement or calibration check), delay, and meter range. Automatic range selection can be employed if the meter is equipped with this optional feature. The measurements acquired are converted to floating point form and forwarded to the calling program.

Equipment required is one HP 2320A Low-Speed Data Acquisition Subsystem (8-4-2-1 BCD output).

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22062A, HP 2322A LOW SPEED A-TO-D SUBSYSTEM DRIVER — FORTRAN CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 2322A Low-Speed Data Acquisition Subsystem. Control words from the calling program specify the data channel to be sampled, meter function (type of measurement), sampling period, delay, and meter range. Automatic range selection can be employed if the meter is equipped with this optional feature. The measurement acquired is converted to floating point form and forwarded to the calling program.

Equipment required is one HP 2322A Low-Speed Data Acquisition Subsystem (8-4-2-1 BCD output).

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22066B, HP 6130B DIGITAL VOLTAGE SOURCE DRIVER — FORTRAN CALLABLE

This routine establishes the output voltage and current-limiting point for an HP 6130B Digital Voltage Source. Up to eight of these voltage sources can be controlled, each with its own operating conditions. Voltages from +50 to −50 can be programmed, and any of eight current-limiting points between 20 and 1,000 milliamps can be specified.

As an additional program feature, any time after operating conditions have been established the routine can check the current-limit status of the digital voltage source. If current limiting is taking place, an error indication is furnished to the calling program.

Equipment required is one to eight HP 6130B Digital Voltage Sources, with one interface kit and interconnecting cables.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22068A, HP 3450A DIGITAL VOLTMETER DRIVER — FORTRAN CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 3450A Digital Multi-Function Meter. A control word from the calling program specifies the meter function (type of measurement), and mode (normal, 100-millisecond delay, 100-megohm input, 1/60-second gate, or any combination of the last three). Meter range is also specified by the control word; alternatively, automatic range selection, a standard feature of the meter, can be employed if desired. The measurement acquired is converted to floating point form and forwarded to the calling program.

Equipment required is one HP 3450A Digital Multi-Function Meter (8-4-2-1 BCD output), with digital output option, remote control option, duplex register interface kit, and data source interface kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22069A, HP 2323A LOW SPEED A-TO-D SUBSYSTEM DRIVER — FORTRAN CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 2323A Low Speed Data System. Calibration of the measur-

ing instrument employed in the system can also be checked. Control words from the calling program specify the data channel to be sampled, meter function (type of measurement), meter mode (measurement or calibration check), delay, and meter range. Automatic range selection can be employed if the meter is equipped with this optional feature. The measurement acquired is converted to floating point form and forwarded to the calling program.

Equipment required is one HP 2323A Low Speed Data System (8-4-2-1 BCD output), with data source interface kit, digital voltmeter program interface kit, and reed scanner program interface kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22075A, HP 5100B FREQUENCY SYNTHESIZER DRIVER — FORTRAN CALLABLE

This routine controls an HP 5100B Frequency Synthesizer. Two control words, furnished by the calling program, designate the frequency required. Any frequency from dc to 50 MHz can be specified with change increments as small as 0.01 hertz. Typically, the frequency changes 20 microseconds after the control words are supplied.

Equipment required is one HP 5100B Frequency Synthesizer, one HP 5110B Synthesizer Driver, one HP 2759B Synthesizer Programmer, and one 40-bit output interface card.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22076A, HP 5105A FREQUENCY SYNTHESIZER DRIVER — FORTRAN CALLABLE

This routine controls an HP 5105A Frequency Synthesizer. Two control words, furnished by the calling program, designate the frequency required. Any frequency from 0.1 MHz to 500 MHz can be specified, with change increments as small as 0.1 hertz. Typically, the frequency changes 20 microseconds after the control words are supplied.

Equipment required is one HP 5105A Frequency Synthesizer, one HP 5110B Synthesizer Driver, one HP 2759B Synthesizer Programmer, and one 40-bit output interface card.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22098A, HP 2323A LOW SPEED A-TO-D SUBSYSTEM DRIVER — BASIC CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 2323A Low-Speed Data Acquisition subsystem. A control word from the calling program specifies the data channel to be sampled, meter function (type of measurement), mode (measurement or calibration check), and meter range. Automatic range selection can be employed if the meter is equipped with this optional feature. The measurement acquired is converted to floating point form and forwarded to the calling program. The routine operates under the 20392 BASIC System.

Equipment required is one HP 2323A Low-Speed Data Acquisition Subsystem (8-4-2-1 BCD output).

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22101B, HP 2911A/B CROSSBAR SCANNER DRIVER — BASIC CALLABLE

This routine controls an HP 2911 Guarded Crossbar Scanner. The scanner samples the data channel designated, and forwards the sample to a meter or external recording device. Control words from the calling program specify the data channel, delay, and type of measurement (dc volts, ac volts, resistance, or frequency). The routine operates under the 20392A BASIC Operating System.

Equipment required is one HP 2911 Guarded Crossbar Scanner, with programming interface kit.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22102B, HP 3460A/B DATA SOURCE INTERFACE DRIVER — BASIC CALLABLE

This driver acquires 8-4-2-1 measurements from an HP 3460A or 3460B Digital Voltmeter. Meter function (type of measurement) and meter range are selected manually at the meter. Automatic range selection, a standard feature of the meter, can be employed if desired. As well as supplying the measured value to the calling program in floating point form, the routine furnishes an additional word which indicates the type of measurement for which the meter is set. The routine operates under the 20392A BASIC Operating System.

Equipment required is one HP 3460A or 3460B Digital Voltmeter (8-4-2-1 BCD output), with data source interface kit.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22103B, HP 2401C DATA SOURCE INTERFACE DRIVER — BASIC CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 2401C Integrating Digital Voltmeter. Meter function (type of measurement) and sampling time are selected manually at the meter. Automatic range selection can be employed if the meter is equipped with this optional feature in floating point form, the routine furnishes an additional word which indicates the type of measurement for which the meter is set. The routine operates under the 20392A BASIC Operating System.

Equipment required is one HP 2401C Integrating Digital Voltmeter (8-4-2-1 BCD output), with data source interface kit.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22104B, HP 2402A DATA SOURCE INTERFACE DRIVER — BASIC CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 2402A Integrating Digital Voltmeter. Meter function (type of measurement), mode (measurement or calibration check), and meter range, are selected manually at the meter. Automatic range selection can be employed if the meter is equipped with this optional feature. As well as supplying the measured value to the calling program in floating point form, the routine furnishes an additional word which indicates the type of measurement for which the meter is set. The routine operates under the 20392A BASIC Operating System.

Equipment required is one HP 2402A Integrating Digital Voltmeter (8-4-2-1 BCD output), with data source interface kit.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22106B, COUNTER DATA SOURCE INTERFACE DRIVER — BASIC CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 5-to-8 digit counter. The measurements are converted to floating point decimal form and furnished to the calling program. The routine operates under the 20392A BASIC Operating System.

Equipment required is an 8-4-2-1 digital counter of a type suited to one of the following data source interface cards: HP 12544A, 12545A, 12546A, or 12547A.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22107B, HP 2912A REED SCANNER DRIVER — BASIC CALLABLE

This routine controls an HP 2912A Reed Scanner. The reed scanner samples a designated data channel, and forwards the sample to a meter or external recording device. Control words from the calling program specify the data channel required and designate the delay. This routine operates under the 20392A BASIC Operating System.

Equipment required is one HP 2912A Reed Scanner, with programming interface kit.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22108C, HP 3450A DATA SOURCE INTERFACE DRIVER — BASIC CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 3450A Digital Multi-Function Meter. Meter function (type of measurement) and range are selected manually at the meter. Automatic range selection, a standard feature of the meter, can be employed if desired. As well as supplying the measured value to the calling program in floating point form, the routine furnishes an additional word which indicates the type of measurement for which the meter is set. The routine operates under the HP 20392A BASIC Operating System.

Equipment required is one HP 3450A Digital Multi-Function Meter (8-4-2-1 BCD output), with digital output option and data source interface kit.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22109B, HP 3440A DATA SOURCE INTERFACE DRIVER — BASIC CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 3440A Digital Voltmeter. Meter range and input polarity are selected manually at the meter. As well as supplying the measured value to the calling program in floating point form, the routine furnishes an additional word which indicates the polarity for which the meter is set. The routine operates under the 20392A BASIC Operating System.

Equipment required is one HP 3440A Digital Voltmeter (8-4-2-1 BCD output), with data source interface kit.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22200A, WAVETEK BASIC DRIVER

This driver permits remote programming of all functions of the Wavetek Model 150 or Model 155 Signal Generator. Control words program one to five of these signal generators, each with its own operating conditions. The control words establish the frequency (0.01 Hz to 1 MHz), amplitude (10 millivolts to 10 volts), and waveform (sine, triangular, or square). The control words also specify either continuous or triggered operation. The routine operates under the 20392A BASIC Operating System

Equipment required is one to five Wavetek Model 150 or 155 Signal Generators, each with an HP 12556B 40-Bit Output Register Interface Kit and interconnecting cable. Instructions for connecting the cable to the signal generator are furnished in the program documentation.

Assembly language, absolute.

Contributed:
M. H. Kendall III
Wyle Laboratories

22210A, HP 2322A LOW SPEED A-TO-D SUBSYSTEM DRIVER — BASIC CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 2322A Low-Speed Data Acquisition Subsystem. Control words from the calling program specify the data channel to be sampled, meter function (type of measurement), sampling period, delay, and meter range. Automatic range selection can be employed if the meter is equipped with this optional feature. The measurement acquired is converted to

floating point form and forwarded to the calling program. The routine operates under the 20392 BASIC Operating System.

Assembly language, absolute.

Contributed
Steven A. Stark
HP, Eastern Sales Region

22211A, HP 5100B FREQUENCY SYNTHESIZER DRIVER — BASIC CALLABLE

This routine controls an HP 5100B Frequency Synthesizer. Two control words, furnished by the calling program, designate the frequency required. Any frequency from dc to 50 MHz can be specified, with change increments as small as 0.01 hertz. Typically, the frequency changes 20 microseconds after the control words are supplied. The routine operates under the 20392A BASIC Operating System.

Equipment required is one HP 5100B Frequency Synthesizer, one HP 5110B Synthesizer Driver, one HP 2759B Synthesizer Programmer, and one 40-bit output interface card.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22212A, HP 2320A LOW SPEED A-TO-D SUBSYSTEM DRIVER — BASIC CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 2320A Low-Speed Data Acquisition Subsystem. Control words from the calling program specify the data channel to be sampled, meter function (type of measurement), meter mode (measurement or calibration check), delay, and meter range. Automatic range selection can be employed if the meter is equipped with this optional feature. The measurement acquired is converted to floating point form and forwarded to the calling program. The routine operates under the 20392 BASIC Operating System.

Equipment required is one HP 2320A Low-Speed Data Acquisition Subsystem (8-4-2-1 BCD output).

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22213A, HP 5105A FREQUENCY SYNTHESIZER DRIVER — BASIC CALLABLE

This routine controls an HP 5105A Frequency Synthesizer. Two control words, furnished by the calling program, designate the frequency required. Any frequency from 0.1 MHz to 500 MHz can be specified, with change increments as small as 0.1 hertz. Typically, the frequency changes 20 microseconds after the control words are supplied. The routine operates under the 20392A BASIC Operating System.

Equipment required is one HP 5105A Frequency Synthesizer, one HP 5110B Synthesizer Driver, one HP 2759B Synthesizer Programmer, and one 40-bit output interface card.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22215A, HP 3480A/B DIGITAL VOLTMETER DRIVER — BASIC CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 3480A or 3480B Digital Voltmeter. A control word from the calling program specifies the meter function (type of measurement), use of an ac-noise filter (if the meter is equipped with this optional feature), delay, and meter range. Automatic range selection, a standard feature of the meter, can be employed if desired. The measurement acquired is converted to floating point form and forwarded to the calling program. The routine operates under the 20392 BASIC Operating System. Matrix operations are deleted.

Equipment required is one HP 3480A or 3480B Digital Voltmeter (8-4-2-1 BCD output), with interface kit.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22224A, HP 6130B DIGITAL VOLTAGE SOURCE DRIVER — BASIC CALLABLE

This routine establishes the output voltage and current-limiting point for an HP 6130B Digital Voltage Source. Up to eight of these voltage sources can be controlled, each with its own operating conditions. Voltages from +50 to -50 can be programmed, and any of eight current-limiting points between 20 and 1,000 milliamps can be specified.

As an additional program feature, any time after operating conditions have been established the routine can check the current-limit status of the digital voltage source. If current limiting is taking place, an error indication is furnished to the calling program.

The routine operates under the 20392A BASIC Operating System.

Equipment required is one to eight HP 6130B Digital Voltage Sources, with one interface kit and interconnecting cables.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22226B, HP 3480A/B DIGITAL VOLTMETER DRIVER — FORTRAN CALLABLE

This driver acquires 8-4-2-1 BCD measurements from an HP 3480A or 3480B Digital Voltmeter. A control word from the calling program specifies the meter function (type of measurement), use of an ac-noise filter (if the meter is equipped with this optional feature), delay, and meter range, Automatic range selection, a standard feature of the meter, can be employed if desired. The measurement acquired is converted to floating point form and forwarded to the calling program.

Equipment required is one HP 3480A or 3480B Digital Voltmeter (8-4-2-1 BCD output), with interface kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22227A, HP 6131B DIGITAL VOLTAGE SOURCE DRIVER — FORTRAN CALLABLE

This routine establishes the output voltage and current-limiting point for an HP 6131B Digital Voltage Source. Up to eight of these voltage sources can be controlled, each with its own operating conditions. Voltages from +100 to -100 can be programmed, and any of six current-limiting points between 20 and 500 milliamps can be specified.

As an additional program feature, any time after operating conditions have been established the routine can check the current-limit status of the digital voltage source. If current limiting is taking place, an error indication is furnished to the calling program.

Equipment required is one to eight HP 6131B Digital Voltage Sources, with interface kit and interconnecting cables.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22228A, HP 6131B DIGITAL VOLTAGE SOURCE DRIVER — BASIC CALLABLE

This routine establishes the output voltage and current-limiting point for an HP 6131B Digital Voltage Source. Up to eight of these voltage sources can be controlled, each with its own operating conditions. Voltages from +100 to -100 can be programmed, and any of six current-limiting points between 20 and 500 milliamps can be specified.

As an additional program feature, any time after operating conditions have been established the routine can check the

current-limit status of the digital voltage source. If current limiting is taking place, an error indication is furnished to the calling program.

The routine operates under the 20392A BASIC Operating System.

Equipment required is one to eight HP 6131B Digital Voltage Sources, with one interface kit and interconnecting cables.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22276A, RTE CROSSBAR SCANNER DRIVER & CHANNEL CODE CONVERSION

DVR42 operates under the I/O control module of the RTE to control the HP 2911 Crossbar Scanner. This driver is responsible for controlling output to any number of scanner cards simultaneously. It accepts binary write and clear requests. FORTRAN callable.

Assembly language, relocatable.

Contributed:
M.H. Kendall III
Wyle Laboratories

22294A, DOS/DOS-M/RTE 3480 DVM DRIVER AND BCD CONVERSION

This driver inputs BCD data from the HP 3480 DVM, and "BCD" converts it to floating point. The initiator will test for the correct calling sequence and then start the measurement. The continuator returns the raw data into a two-word array where the conversion routine converts it to floating point format. FORTRAN callable.

Assembly language, relocatable.

Contributed:
Dieter Schmidtke
HP, Germany/Frankfurt

22305A, HP 2402A DIGITAL VOLTMETER DRIVER — BASIC CALLABLE

This driver processes and outputs the program control word to the DVM, programming it for range, function and mode for HP 20392 BASIC. Then the driver accepts the BCD data measured by the DVM, converts it to floating point and returns to the calling program. Error returns are provided for overload or incompleted calls.

Equipment required includes 8K, HP 2402A Digital Voltmeter, HP 12567A DVM Programming Interface Kit, and an HP 12604B Data Source Interface Kit.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22317A, RTE HP 2310 ANALOG-TO-DIGITAL CONVERTER DISC STORAGE ROUTINE

This FORTRAN callable subroutine allows RTE to use most of memory as a buffer to input data from the HP 2310 analog to digital converter and output it to the disc at the full speed of the multiverter with no break in data. All samples are evenly spaced and the number of data points taken is limited only by the size of the disc. The maximum possible throughput rate is 80 kHz.

Equipment required is a minimum RTE system, an HP 2310 analog to digital converter, and an HP 2770 60 Hz or 50 Hz disc.

Assembly language, relocatable.

Contributed:
M.H. Kendall III
Wyle Laboratories

22336A, HP 1900 PROGRAMMABLE PULSE GENERATOR — FORTRAN CALLABLE

This BCS non-IOC driver for the HP 1900 Pulse Generator allows the user to program any number of units in the 1900 family — 1905, 1908, or 1917. Nine additional words of core are required for each unit.

Equipment required includes 4K and an HP 2752A Tele-

printer, HP 14542A I/O Kit, and HP 1900/6936S Programmable Pulse Generator.

Assembly language, relocatable.

Contributed:
Gordon A. Greenley
HP, Colorado Springs Division

22337A, HP 1900 PROGRAMMABLE PULSE GENERATOR DRIVER — BASIC CALLABLE

This absolute modification to HP BASIC 20392A allows the user to program any number of HP 1900 Pulse Generators — 1905, 1908, 1917. Nine additional words are required for each generator.

Equipment required includes an HP 12566A Interface Kit, 8K, an HP 2752A teleprinter, and an HP 1900/6936S Programmable Pulse Generator.

Assembly language, relocatable.

Contributed:
Gordon Greenley
HP, Colorado Springs Division

22339A, DOS HP 2320A LOW SPEED ANALOG-TO-DIGITAL SUBSYSTEM DRIVER

This FORTRAN callable driver for the HP 2320A Low Speed Analog-to-Digital Subsystem is self-configuring and operates on a minimum DOS. Through calls to the EXEC, the driver processes the channel number, converts it from binary to BCD and outputs it to the Scanner. The driver then takes a DVM measurement and returns to the EXEC.

Equipment required is an HP 2402A DVM, HP 2911A/B Crossbar Scanner, HP 12604B DSI, HP 12576B-01 DVM Program Interface, and an HP 12535A Scanner Program Interface.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22407A, HP 3360A GAS CHROMATOGRAPH SYSTEM DRIVER — BASIC CALLABLE

These instrument system drivers modify HP BASIC 20392A to work with the HP 3360A Gas Chromatograph and add some special features. The compiler can be restarted with or without scratching the stored program, the switch register can be read from BASIC enabling the user to control the program, a driver controls up to 8 integrators, HP 3370/1A/B and reads data from them through the HP 18980A Multiplexor, data acquisition is performed in interrupt mode, and an 8, 16, or 40 bit output register can be used to control any device or signal lamp.

Assembly language, absolute.

Contributed:
Hans R. Biesel
HP, Germany/Boeblingen

22410A, RTE MULTIPROGRAMMER DRIVER (DVR61)

DVR61 is an RTE driver to operate the HP 3936A multiprogrammer. The driver performs three separate functions. A reset will reset all cards in the 6936 system. Reading from the device will input a word from the switch register of the 6936 to the calling program. This allows remote control of the users system. Finally, the write routine will output control and data words for control of devices connected to the HP 6936A. FORTRAN callable.

Assembly language, relocatable.

Contributed:
Michael Naughton
HP, Midwest Sales Region

20597B, DISC OPERATING SYSTEM (HP 2770 SERIES DISC/DRUM)

The Disc Operating System (DOS) has two processing modes: batch and keyboard. In batch mode users compose a batch-processing job deck consisting of system directives, data, and source programs. DOS processes each job step according to the directives included in the job deck, automatically transferring system modules and user programs from disc to core storage as required. Keyboard mode is similar to batch mode, except that system directives are entered at the teleprinter.

The DOS Operating System has a particularly effective and versatile file system. User files, containing source statements, relocatable and loader-generated object programs, and ASCII or binary data, are referenced by symbolic addresses rather than disc addresses. Therefore, the user need not know where files are located on the disc. Files can be edited, purged, searched, and listed by user directives, and the files can be referenced by user programs.

Unlike the Real Time Executive (RTE) Operating System, I/O drivers, except for disc and system teleprinter, need not be core-resident in DOS operations. Instead, these routines are stored on the disc, and are loaded into core storage as they are required. After use, the core locations are available for other purposes. Using the time base generator in the computer, the DOS system can keep an account of the time required for each job performed. As in other HP operating systems, an extensive library of mathematical and utility routines is available in DOS. Multiprogramming, however, cannot be performed.

By using suitable hardware options and memory sizes, and by selecting appropriate program modules and making them either core-resident or disc-resident, versions of DOS can readily be developed to meet almost any batch processing need. A drum recording unit can be substituted for the disc unit.

The DOS Operating System differs from DOS-M (program 24154) in that the disc unit used with DOS has a single fixed-head disc, while DOS-M requires a 2-disc unit with movable heads. Because of the fixed-head feature, disc access time for DOS is somewhat faster than for DOS-M.

Full information on DOS is provided in the publication *Disc Operating System* (HP order no. 02116-91748).

Assembly language, relocatable, except for system generator which is absolute.

HP supported:
Data Systems Development Division (Cupertino)

24225D, MOVING-HEAD DISC OPERATING SYSTEM

The Moving Head Disc Operating System (DOS-M) has two processing modes: batch and keyboard. In batch mode users compose a batch-processing job deck consisting of system directives, data, and source programs. DOS-M processes each job step according to the directives included in the job deck, automatically transferring system modules and user programs from disc to core storage as required. Keyboard mode is similar to batch mode, except that system directives are entered at the teleprinter.

The DOS-M Operating System has a particularly effective and versatile file system. User files, containing source statements, relocatable and loader-generated object programs, and ASCII or binary data, are referenced by symbolic addresses rather than disc addresses. Therefore the user need not know where files are located on the disc. Files can be edited, purged, searched, and listed by user directives, and the files can be referenced by user programs.

Unlike the Real Time Executive (RTE) Operating System, I/O drivers, except for disc and system teleprinter, need not be core-resident in DOS-M operations. Instead, these routines are stored on the disc, and are loaded into core storage as they are required. After use, the core locations are available for other purposes. Using the time base generator in the computer, the DOS-M system can keep an account of the time required for each job performed. As in other HP operating systems, an extensive library of mathematical and utility routines is available in DOS-M. Multiprogramming, however, cannot be performed.

By using suitable hardware options and memory sizes, and by selecting appropriate program modules and making them either core-resident or disc-resident, versions of DOS-M can readily be developed to meet almost any batch processing need.

The DOS-M Operating System differs from DOS (program 20597) in that DOS-M uses a moving-head unit with two discs. One of the two discs is in a readily removable plug-in unit. A large store of data and user programs thus can be maintained, ready for use simply by plugging in the appropriate disc. If desired, data on the plug-in disc can be transferred to the fixed disc, allowing a second plug-in disc to be installed.

Because of the moving-head feature in the disc unit, disc access time for DOS-M is somewhat slower than for DOS.

Full information on DOS-M is provided in the publication *Moving-Head Disc Operating System* (HP order no. 02116-91779).

Assembly language, relocatable, except for system generator which is absolute

HP supported:
Data Systems Development Division (Cupertino)

20021C, PREPARE CONTROL SYSTEM

This program prepares the Basic Control System (BCS) from the BCS loader and IOC subroutine. The loader loads and links the relocatable programs, creates indirect addressing when necessary, and selects the loads library routines. The IOC subroutine processes I/O requests. The Prepare Control System also establishes the relationship among the I/O channel numbers, drivers, driver interrupt entry points, and unit reference numbers.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20301B, 4K SIO SYSTEM DUMP

Used by 4K computers, this routine adapts SIO drivers to the I/O select codes used by a particular computer system. The routine produces a punched object-tape (absolute address) which, optionally, may include a standard 4K software system (compilers, assemblers) or user's absolute programs.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20313B, 8K SIO SYSTEM DUMP

Used by 8K computers, this routine adapts SIO drivers to the I/O select codes used by a particular computer system. The routine produces a punched object-tape (absolute address) which, optionally, may include a standard 8K software system (compilers, assemblers) or user's absolute programs.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20335A, 16K SIO SYSTEM DUMP

Used by 16K or larger computers, this routine adapts SIO drivers to the I/O select codes used by a particular computer system. The routine produces a punched object-tape (absolute address) which, optionally, may include a standard 16K software system (compilers, assemblers) or user's absolute programs.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20594A, 8K MAGNETIC TAPE SYSTEM

This program is one of the major operating systems used by the HP 2100 computer series. Magnetic tape is the principal mass storage medium; disc storage is not used. The program is designed for 8K computers.

The Magnetic Tape System (MTS) offers greater ease of use than does the Basic Control System (BCS). Specifically, MTS requires much less manual handling of punched tape. This results in part from the fact that assembler and compiler programs normally pre-exist on the magnetic tape, and are sought automatically at the appropriate points in a program. MTS also stores intermediate output information on magnetic tape, and again this data is sought automatically when required by the program. An additional advantage offered by MTS is that magnetic tape is written and read much faster than punched tape, resulting in faster program execution times.

The Magnetic Tape System, as compared with the Disc Operating System, has the disadvantage that magnetic tape I/O operations are considerably slower than disc I/O operations. MTS, furthermore, does not have the real-time capabilities of the Real Time Executive System.

Full information on MTS is provided in the handbook *Magnetic Tape System* (HP order no. 02116-91752).

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20595A, 16K MAGNETIC TAPE SYSTEM

This program is one of the major operations systems used by the HP 2100 computer series. Magnetic tape is the principal mass storage medium; disc storage is not used. The program is designed for 16K computers.

The Magnetic Tape System (MTS) offers greater ease of use than does the Basic Control System (BCS). Specifically, MTS requires much less manual handling of punched tape. This results in part from the fact that assembler and compiler programs normally pre-exist on the magnetic tape, and are sought automatically at the appropriate points in a program. MTS also stores intermediate output information on magnetic tape, and again this data is sought automatically when required by the program. An additional advantage offered by MTS is that magnetic tape is written and read much faster than punched tape, resulting in faster program execution times.

The Magnetic Tape System, as compared with the Disc Operating System, has the disadvantage that magnetic tape I/O operations are considerably slower than disc I/O operations. MTS, furthermore, does not have the real-time capabilities of the Real Time Executive System.

Full information on MTS is provided in the handbook *Magnetic Tape System* (HP order no. 02116-91752).

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20802C, SYSTEM DUMP

System Dump, SDUMP, is an independent utility program which copies disc program-systems onto magnetic tape or punched tape. The SDUMP program is also used to transfer these programs back to the disc. System Dump is intended for use with the DOS and RTE Operating Systems.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20878B, HP 2000A TO HP 2000B CONVERSION

This program converts user 2000A Time Share BASIC programs for 2000B use. After conversion, the 20878 program is not used again unless additional 2000A programs require conversion.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

22042C, AN HP 2116-FAMILY SIMULATOR FOR THE IBM 360

This program is run on an IBM 360 computer, and it simulates the operation of instructions written for any HP computer in the 2114, 2115, 2116, or 2100 series. The simulator program furnishes a means for compiling, assembling, debugging, and executing HP programs without the use of an HP computer. The simulator program can be used for any of the following computer languages or operating systems: HP ALGOL, HP FORTRAN, HP Assembler, BCS, and MTS.

The program simulates the functions of the following HP I/O devices: teleprinter, 7- or 9-track magnetic tape unit, tape punch, and punched tape reader. Teleprinter outputs appear on an IBM line printer exactly as they would appear if furnished by an HP teleprinter. The IBM line printer also prints out the information on all simulator control cards, lists all halts in the HP program, and (if desired) lists each HP instruction in the sequence in which it is executed. The simulated output of the HP tape punch is provided in the form of punched cards or as card images on magnetic tape.

The input medium for the IBM computer is punched cards, and the output is furnished on a line printer and magnetic tape. Simulation of a 4K HP computer requires an IBM 360-30 computer (or larger), using the IBM DOS program system, and with a minimum core storage capacity of 32K bytes. An OS version of the simulator program, requiring a core storage capacity of 131K bytes, simulates the operation of a 16K HP computer.

Equipment required is an IBM 360 computer, with punched card reader and line printer. If the HP program includes magnetic tape I/O operations, the IBM system must include a magnetic tape unit with the same number of tracks as the HP tape unit.

System 360 Bal Assembly Language

Contributed.

22338A, DISC BASIC EXECUTIVE

This absolute program operates in conjunction with HP BASIC 20392A to provide the added capability of user program storage and retrieval in a single terminal BASIC environment. This Disc Basic Executive is intended as a substitute for the standard Prepare Basic System. It is comprised of a system generator, I/O drivers, and a simple executive.

Equipment required includes 8K CPU, HP 2752A teleprinter, an HP 2870 moving head disc, and an HP 12578A or HP 12607A Direct Memory Access.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

24016A, PREPARE TAPE SYSTEM

This SIO program can serve either of two purposes. First, it can produce the configured library required for the MTS Operating System. Secondly, it can store relocatable object programs for the generation of DOS, DOS-M, and RTE Operating Systems. The Prepare Tape System program requires any one of the following SIO drivers: HP 2020 or 3030 Magnetic Tape Unit, or the disc/drum driver.

Equipment required is one of the following:

a. One HP 2020 or 3030 Magnetic Tape Unit, with interface kit. If the 3030 Magnetic Tape Unit is used, the DMA option is also required.

b. One HP 2770 or 2771 Disc Memory with power supply and interface kit, and the Direct Memory Access option for the computer.

c. One HP 2773, 2774, or 2775 Drum Memory with power supply and interface kit, and the Direct Memory Access option for the computer.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24172A, BCS INPUT/OUTPUT CONTROL, BUFFERED

This BCS routine controls I/O drivers for which the program system is configured. The routine, referred to as IOC, interprets each I/O request, directs the request to the appropriate driver, and services drivers as I/O interrupts occur. The routine maintains control of simultaneous operations taking place at different I/O devices.

In addition, this routine queues I/O requests, and services them on a first in, first out, basis. However, priority requests are handled immediately.

The IOC routine replaces program 20015B, the former buffered IOC routine, and offers the following advantages over the superseded routine:

a. An illegal-request reject from a driver (for other than control requests) is forwarded to entry point IOERR. Formerly, endless looping took place between the user program and IOC.

b. IOC now handles several EQT entries from the same driver and makes provisions for busy reject handling from drivers.

c. IOERR is defined as 76B, and is followed by a jump to HALT to permit MTS operations to continue.

d. If core storage space cannot be allocated for buffer use, a 75B halt takes place. Execution resumes on a suspended I/O basis when the RUN switch is pressed and the halt condition is cleared for future requests, the halt having served to warn the user.

e. Priority read requests allow inputs to be received from an I/O device that has output requests waiting.

f. A test is made for a SQT ordinal of zero; if true, the program proceeds to IOERR.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24173A, BCS INPUT/OUTPUT CONTROL

This BCS routine controls I/O drivers for which the program system is configured. The routine, referred to as IOC, interprets each I/O request, directs the request to the appropriate driver, and services drivers as I/O interrupts occur. The routine maintains control of simultaneous operations taking place at different I/O devices.

The IOC routine replaces program 20000A, the former IOC routine, and offers the following advantages over the superseded routine:

a. An illegal-request reject from a driver (for other than control requests) is forwarded to entry point IOERR. Formerly, endless looping took place between the user program and IOC.

b. Dynamic status requests are referenced to the driver even when the driver is busy. Previously, the request was rejected.

c. The IOERR halt number is defined as 76B instead of zero.

d. IOC returns to entry point HALT after an IOERR abort, to allow MTS to continue operations.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

29014B, RTE GENERATOR, MH-RTGEN

The Real-Time Generator (RTGEN) converts relocatable software modules and user programs into a configured real-time system in absolute binary format, and stores the binary code on the Moving Head System Disc.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

29015B, RTE GENERATOR, FH-RTGEN

The Real-Time Generator (RTGEN) converts relocatable software modules and user programs into a configured real-time system in absolute binary format, and stores the binary code on the Fixed Head System Disc.

Assembly language, absolute.

HP supported:
Automatic Measurement Division

20005B, BCS TAPE READER DRIVER (D.01)

This BCS driver controls punch-tape reader I/O operations.

Equipment required is one HP 2737, 2748, or 2758 Punch Tape Reader, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20006B, BCS TAPE PUNCH DRIVER (D.02)

This BCS driver controls tape punch I/O operations.

Equipment required is one HP 2753 Tape Punch, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20016A, BCS TAPE PUNCH DRIVER, IBM 8-LEVEL, (D.02A)

This BCS driver controls tape punch I/O operations. IBM 8-level code is used.

Equipment required is one HP 2753 Tape Punch, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20303A, 4K SIO TAPE READER DRIVER

Used by 4K computers, this SIO driver controls punch-tape reader I/O operations.

Equipment required is one HP 2737, 2748, or 2758 Punch Tape Reader, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20304A, 4K SIO TAPE PUNCH DRIVER

Used by 4K computers, this SIO driver controls tape punch I/O operations.

Equipment required is one HP 2753 Tape Punch, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20306A, 8K SIO TAPE READER DRIVER

Used by 8K computers, this SIO driver controls punch-tape reader I/O operations.

Equipment required is one HP 2737, 2748, or 2758 Punch Tape Reader, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20307A, 8K SIO TAPE PUNCH DRIVER

Used by 8K computers, this SIO driver controls tape punch I/O operations.

Equipment required is one HP 2753 Tape Punch, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20316A, 8K SIO TAPE PUNCH DRIVER, IBM 8-LEVEL

Used by 8K computers, this driver controls tape punch I/O operations. IBM 8-level code is used.

Equipment required is one HP 2753 Tape Punch, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20317A, 4K SIO TAPE PUNCH DRIVER, IBM 8-LEVEL

Used by 4K computers, this driver controls tape punch I/O operations. IBM 8-level code is used.

Equipment required is one HP 2753 Tape Punch, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20319A, 16K SIO TAPE READER DRIVER

Used by 16K or larger computers, this SIO driver controls punch-tape reader I/O operations.

Equipment required is one HP 2737, 2748, or 2758 Punch Tape Reader, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20320A, 16K SIO TAPE PUNCH DRIVER

Used by 16K or larger computers, this SIO driver controls tape punch I/O operations.

Equipment required is one HP 2753 Tape Punch, with interface kit.

Assembly language absolute.

HP supported:
Data Systems Development Division (Cupertino)

20327A, 12K SIO TAPE READER DRIVER

Used by 12K computers, this SIO driver controls punch-tape reader I/O operations.

Equipment required is one HP 2737, 2748, or 2758 Punch Tape Reader, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20328A, 12K SIO TAPE PUNCH DRIVER

Used by 12K computers, this SIO driver controls tape punch I/O operations.

Equipment required is one HP 2753 Tape Punch, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20743D, RTE TAPE READER DRIVER (DVR01)

This RTE driver controls punch-tape reader I/O operations.

Equipment required is one HP 2737, 2748, or 2758 Punch Tape Reader, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20745B, RTE HIGH SPEED PUNCH DRIVER (DVR02)

This RTE driver controls tape punch I/O operations.

Equipment required is one HP 2753 Tape Punch, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20987C, DOS TAPE READER DRIVER (DVR01)

This DOS and DOS-M driver controls punch-tape reader I/O operations.

Equipment required is one HP 2737, 2748, or 2758 Punch Tape Reader, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20989A, DOS HIGH SPEED PUNCH DRIVER (DVR02)

This DOS and DOS-M driver controls tape punch I/O operations.

Equipment required is one HP 2753 Tape Punch, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

22044B, RUN-TIME DATA INPUT FOR BASIC

This routine, termed SCANR, allows a programmer to furnish free-field data to a running BASIC program through a photoreader or teleprinter, employing the normal BASIC I/O drivers. Any number of data items are transferred into an array specified by the user program.

The SCANR routine, an assembly language modification of the 20392A BASIC Operating System, changes the routine normally used to scan a data statement so that the values are read from the photoreader or teleprinter.

After the values are passed to the user program, SCANR restores the BASIC Operating System to its original state.

Assembly language, absolute.

Contributed:
David R. McClellan
HP, Southern Sales Region

22078B, HIGH SPEED PUNCH DRIVER — BASIC CALLABLE

Providing a means for logging data or storing intermediate results, this driver furnishes a punched tape output from a running BASIC program. The routine operates under the 20392A BASIC Operating System.

Equipment required is one HP 2753 Tape Punch, with interface kit.

Assembly language, absolute.

Contributed:
David R. McClellan
HP, Southern Sales Region

22082B, BASIC PHOTO READER DATA INPUT

This routine allows a programmer to furnish free-field data to a running BASIC program by means of a photoreader. The user requests input data by means of an INPUT statement. If the photoreader is ready when the statement is executed, data is furnished to the program from the punched tape in the photoreader. If the photoreader is not ready (i.e.; no tape installed or gate down), the teleprinter types a question mark and data is then entered in the normal manner from the keyboard. The routine is an absolute-address modification of the 20392A BASIC Operating System.

Equipment required is at least 8K core storage, and a photoreader with interface kit.

Assembly language, absolute.

Contributed:
Stephen M. Curry
Department of Physics
Stanford University

22176A, HP 2754A PUNCH/LIST IN KT MODE

This BCS routine allows users with an HP 2754 Teleprinter and no high-speed punch to select by programming means whether printing or punching will be performed.

Equipment required is one HP 2754 Teleprinter, with interface kit.

Assembly language, relocatable.

Contributed:
Steven M. Rosen
HP, Eastern Sales Region

22247B, FAST DOS/DOS-M PHOTOREADER DRIVER

This DOS and DOS-M driver controls tape reader I/O operations. The routine is similar to routine 20987C, except that it is three times as fast and includes a subroutine to ensure that interrupts from the time base generator are not missed. The driver operates by the non-interrupt method.

Equipment required is one HP 2737, 2748, or 2758 Punch Tape Reader, with interface kit. For DOS, revision B of the DOS minimum software configuration is required. For DOS-M revision A of the DOS-M minimum software configuration is used.

Assembly language, relocatable.

Contributed:
Fritz Joern
HP, Germany/Frankfurt

22264B, TELEX TO ASCII PHOTOREADER DRIVER

This driver reads five-level TELEX tapes and converts the code to ASCII. It replaces BCS driver D.01, HP 20005A, and can only be used with a modified HP 2737A photoreader. The call to the driver is identical to other IOC calls for ASCII operation.

Assembly language, relocatable.

Contributed:
Bjoern Lindberg
HP, Sweden/Stockholm

22353A, DOS/DOS-M PHOTOREADER DRIVER TO READ ABSOLUTE BINARY TAPES

This special DOS-M photoreader driver can read absolute binary format tapes as well as normal relocatable and source formats. The read is accomplished in FORTRAN through a special CALL EXEC. The tape is read into a user buffer area. To store the absolute binary into a user file, use HP 22354, "DOS-M Store Absolutes." This driver is particularly useful for reproducing absolute tapes.

Assembly language, relocatable.

Contributed:
Thomas J. Winker
HP, Neely Sales Region

20019C, BCS CARD READER DRIVER (D.11)

This BCS driver controls HP 2779A Card Reader I/O operations. Hollerith-to-ASCII conversion is performed.

Equipment required is one HP 2779A Card Reader, with 12558A interface kit.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20324B, 8K SIO CARD READER DRIVER

Used by 8K computers, this SIO driver controls HP 2779A Card Reader I/O operations. The routine reads in sequence each column on the card, converts the data in the column from Hollerith Code to ASCII Code, and packs the characters into the user's buffer.

Equipment required is one HP 2779A Card Reader, with 12558A interface kit.

Assembly language, absolute.

HP supported:
Automatic Measurement Div.

20332A, 16K SIO CARD READER DRIVER

Used by 16K computers, this SIO driver controls HP 2779A Card Reader I/O operations. The routine reads in sequence each column on the card, converts the data in the column from Hollerith Code to ASCII Code, and packs the characters into the user's buffer.

Equipment required is one HP 2779A Card Reader, with 12558A interface kit.

Assembly language, absolute.

HP supported:
Automatic Measurement Div.

20520C, 4K SIO MARK SENSE CARD READER DRIVER

Used by 4K computers, this driver acquires data from an HP 2761A-007 Optical Mark Reader used with an HP 12602A interface kit. The driver overlays the core area normally occupied by the 4K SIO tape reader driver; therefore, a high-speed punch tape reader cannot be used while in the SIO mode.

Equipment required is one HP 2761A-007 Optical Mark Reader, with HP 12602A interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20521C, 8K SIO MARK SENSE CARD READER DRIVER

Used by 8K computers, this driver acquires data from an HP 2761A-007 Optical Mark Reader used with an HP 12602A interface kit. The driver overlays the core area normally occupied by the 8K SIO tape reader driver; therefore, a high-speed puch tape reader cannot be used while in the SIO mode.

Equipment required is one HP 2761A-007 Optical Mark Reader, with HP 12602A interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20522C, 16K SIO MARK SENSE CARD READER DRIVER

Used by 16K or larger computers, this driver acquires data from an HP 2761A-007 Optical Mark Reader used with an HP 12602A interface kit. The driver overlays the core area normally occupied by the 16K SIO tape reader driver; therefore, a high-speed punch tape reader cannot be used while in the SIO mode.

Equipment required is one HP 2761A-007 Optical Mark Reader, with HP 12602A interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20817A, BCS MARK SENSE DRIVER, KIT HP 12602A, (D.15)

This BCS driver acquires data from an HP 2761A-007 Optical Mark Reader used with the HP 12602A interface kit. The routine performs any of three types of conversion on the data acquired. These conversion functions are Hollerith-to-ASCII, column-image binary, and packed binary. The packed binary conversion is used when reading assembler-produced or compiler-produced cards in relocatable binary format.

Equipment required is one HP 2761A-007 Optical Mark Reader, with HP 12602A interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20819C, BCS MARK SENSE DRIVER, KIT HP 12602B, (D.15)

This BCS driver acquires data from an HP 2761A-007 Optical Mark Reader used with the HP 12602B interface kit. The routine performs any of three types of conversion on the data acquired. These conversion functions are Hollerith-to-ASCII, column-image binary, and packed binary. The packed binary conversion is used when reading assembler-produced or compiler-produced cards in relocatable binary format. The driver operates either with the Direct Memory Access option or without it.

Equipment required is one HP 2761A-007 Optical Mark Reader, with HP 12602B interface kit. The Direct Memory access option can also be used, if desired.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20821B, RTE MARK SENSE DRIVER, KIT HP 12602B, (DVR15)

This RTE driver acquires data from an HP 2761A-007 Optical Mark Reader used with the HP 12602B interface kit. The routine performs any of three types of conversion on the data acquired. These conversion functions are Hollerith to ASCII, column-image binary, and packed binary.

Equipment required is one HP 2761A-007 Optical Mark Reader, with HP 12602B interface kit, and the Direct Memory Access option.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20823C, DOS MARK SENSE DRIVER, KIT HP 12602B, (DVR15)

This DOS driver acquires data from an HP 2761A-007 Optical Mark Reader used with the HP 12602B interface kit. The routine performs any of three types of conversion on the data acquired. These conversion functions are Hollerith to ASCII, column-image binary, and packed binary.

This driver can control only one optical mark reader at a time.

Equipment required is one HP 2761A-007 Optical Mark Reader, with HP 12602B interface kit, and the Direct Memory Access option.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24178A, 4K SIO HP 2891A CARD READER DRIVER

This driver processes requests for input from the HP 2891A Card Reader. The driver is unbuffered, non-interrupt, and is used on 2114-15-16 with 4K of memory. The 12882 Card Reader Interface is required.

Assembly Language

HP supported:
Data Systems Development Division (Cupertino)

24179A, 8K SIO HP 2891A CARD READER DRIVER

This driver processes requests for input from the HP 2891A Card Reader (with 12882 Card Reader Interface). The driver is unbuffered, non-interrupt, and is used on 2114-15-16 with 8K of memory.

Assembly language

HP supported:
Data Systems Development Division (Cupertino)

24180A, 16K SIO HP 2891A CARD READER DRIVER

The driver processes requests for input from the 2891A Card Reader (with 12882 Card Reader Interface). The driver is unbuffered, non-interrupt, and is used on 2114-16 with at least 16K of memory.

Assembly language

HP supported:
Data Systems Development Division (Cupertino)

24181A, BCS HP 2891A CARD READER DRIVER (D.11)

The BCS driver processes requests for input from the HP 2891A Card Reader (with 12882 Card Reader Interface) under interrupt or DMA control.

Assembly language

HP supported:
Data Systems Development Division (Cupertino)

24182A, DOS HP 2891A CARD READER DRIVER (DVR11)

This DOS/DOS-M driver processes requests for input from the HP 2891A Card Reader (with 12882 Card Reader Interface).

Assembly language

HP supported:
Data Systems Development Division (Cupertino)

24224A, RTE HP 2891A CARD READER DRIVER (DVR11)

Provides input/output capabilities for the HP 2891A Card Reader under the Real-Time Executive. The HP 12882 Card Reader Interface is required.

Assembly language

HP supported:
Data Systems Development Division (Cupertino)

20527B, 4K SIO HP 2778A LINE PRINTER DRIVER

Used by 4K computers, this SIO driver controls I/O operations with an HP 2778 or 2778-001 Line Printer.

Equipment required is one HP 2778 or 2778-001 Line Printer, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20528A, 8K SIO HP 2778A LINE PRINTER DRIVER

Used by 8K computers, this SIO driver controls I/O operations with an HP 2778 or 2778-001 Line Printer.

Equipment required is one HP 2778 or 2778-001 Line Printer, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20529A, 16K SIO HP 2778A LINE PRINTER DRIVER

Used by 16K or larger computers, this SIO driver controls I/O operations with an HP 2778 or 2778-001 Line Printer.

Equipment required is one HP 2778 or 2778-001 Line Printer, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20800C, RTE HP 2778A LINE PRINTER DRIVER (DVR12)

Used with an HP 2778 or 2778-001 Line Printer, this RTE driver controls computer output operations.

Equipment required is one HP 2778 or 2778-001 Line Printer, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20991C, DOS HP 2778A LINE PRINTER DRIVER (DVR12)

Used with an HP 2778 or 2778-001 Line Printer, this DOS and DOS-M driver controls computer output operations.

Equipment required is one HP 2778 or 2778-001 Line Printer, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

22092B, 4K, 8K, OR 16K SIO OLIVETTI SV40 DRIVER

This SIO driver, which can be adapted to 4K, 8K or 16K computers by the appropriate control statement, overlays the list portion of the teleprinter driver to permit printing on an Olivetti SV40 serial printer.

Equipment required is one Olivetti SV40 serial printer, with interface card.

Assembly language, absolute.

Contributed:
Bernd Palmer
HP, Germany/Boblingen

22095A, BASIC HP 2778A LINE PRINTER DRIVER

This BASIC driver overlays a portion of the 20392A BASIC Operating System, causing output data to be listed either on the line printer or the teleprinter, depending on switch register settings.

Equipment required is one Line Printer and one 2752 or 2754 Teleprinter, each with interface kit.

Assembly language, absolute.

Contributed:
Matthew Simon
HP, Eastern Sales Region

22258A, HP 2767 LINE PRINTER BASIC DRIVER

This driver adds high speed printout capabilities to HP BASIC 20392. Programs may be listed, or data may be output from a running BASIC program using the normal LIST or PRINT commands. A switch register setting controls the optional line printer or teleprinter output.

Assembly language, absolute

Contributed:
Bjoern Lindberg
HP, Sweden/Stockholm

22399A, HP 2778/2767 LINE PRINTER PATCH FOR EDUCATIONAL BASIC

This patch provides line printer capability for the HP 2007 Educational BASIC system (HP 24160-60001 rev A). Two versions of the patch permit using either the HP 2767A or HP 2778A line printer. Requests for STOP message, READY message, line feeds, question mark (input statement) and "/" (escape) are routed to both the teletype and the line printer. In addition the CR/LF associated with system commands and input statements are changed to line feed only in order that these appear on both TTY and printer. The SCRATCH system command, when issued in batch mode (CARD), causes a page eject in order to provide list output separation. All other data is printed only on the line printer (i.e., PRINT statements). When switch 15 is "OFF", all output is directed to the teletype.

Assembly language, absolute.

Contributed:
David R. McClellan
HP, Southern Sales Region

22408A, BASIC CALLABLE LINE PRINTER DRIVER

This routine provides the HP BASIC System 20392A with a line printer capability for the HP 2778A. A special technique of line printer buffering allows the HP 2778A to operate at maximum speed and utilize the full line printer carriage width.

Assembly language, absolute.

Contributed:
Ed Doust
HP, Corporate

22409A, EDUCATIONAL BASIC HP 2767 LINE PRINTER DRIVER

This modification to Educational Basic allows the Hewlett-Packard 2767A Line Printer to be used as the list device on the Hewlett-Packard 2007A Educational System.

Optionally, the line printer or teleprinter may be chosen as the list output device through a Switch register setting. Complete compatibility with Educational BASIC is maintained including flexibility for core specification. With this modification the throughput of Educational BASIC in the batch mode is significantly increased and is limited only by the speed of the card reader.

Assembly language, absolute.

Contributed:
Warren Nelson
HP, Canada/North Burnaby

22411A, A.B. DICK VIDEOJET SIO LINE PRINTER DRIVER

This SIO driver is designed to operate the A.B. Dick 9600 Videojet Printer. It interfaces HP 2114, 2115, 2116 Series computers using the HP 12566 micro-circuit interface card with positive true logic.

This driver is designed to operate only with the line printer compatible teleprinter driver. The punch portion of the teleprinter driver is overlaid by the Videojet driver. Hence, a punch driver must also be present in the software configuration with this driver when punching is required.

Equipment required includes an A.B. Dick 9600 Videojet line printer and an HP 12566 microcircuit interface card.

Assembly language, absolute.

Contributed:
Bill Alexander
HP, Midwest Sales Region

24164B, 4K SIO HP 2767 LINE PRINTER DRIVER

Used by 4K computers, this SIO driver controls output operations for an HP 2767 Line Printer.

Equipment required is one HP 2767 Line Printer, with interface kit.

Assembly language, absolute

HP supported:
Data Systems Development Division (Cupertino)

24165B, 8K SIO HP 2767 LINE PRINTER DRIVER

Used by 8K computers, this SIO driver controls output operations for an HP 2767 Line Printer.

Equipment required is one HP 2767 Line Printer, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24166B, 16K SIO HP 2767 LINE PRINTER DRIVER

Used by 16K or larger computers, this SIO driver controls output operations for an HP 2767 Line Printer.

Equipment required is one HP 2767 Line Printer, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24167B, BCS HP 2767 LINE PRINTER DRIVER (D.16)

This BCS driver controls output operations for an HP 2767 Line Printer.

Equipment required is one HP 2767 Line Printer, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24168B, DOS HP 2767 LINE PRINTER DRIVER (DVR12)

This DOS and DOS-M driver controls output operations for the HP 2767 Line Printer. Features include line spacing, paging, and status checking.

Equipment required is one HP 2767 Line Printer, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24169A, RTE HP 2767 LINE PRINTER DRIVER (DVR12)

This RTE driver controls output operations for the HP 2767 Line Printer.

Equipment required is one HP 2767 Line Printer, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24171B, BCS HP 2778A LINE PRINTER DRIVER (D.12)

This BCS driver controls output operations for the HP 2778 or 2778-001 Line Printer.

Equipment required is one HP 2778 Line Printer, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20028B, BCS HP 2323A SUBSYSTEM DRIVER ANALOG SCAN SCN-12 (D.77)

This BCS driver acquires 8-4-2-1 BCD measurements from an HP 2323A Low-Speed Data Acquisition Subsystem. Control words from the calling program establish the data channel to be sampled, delay, meter function (type of measurement), meter range, and mode (measurement or calibration check). Upon acquiring a measurement, the 8-4-2-1 BCD form. Routine 20210 can be used to convert the BCD data to floating point binary form.

Equipment required is one HP 2323A Low-Speed Data Acquisition Subsystem (8-4-2-1 BCD output).

Assembly language, relocatable.

HP supported
Automatic Measurement Div.

20076A, BCS HP 2312A DRIVER (D.55)

This BCS driver acquires measurements from an HP 2312A High-Speed Low-Level Data Acquisition Subsystem. A control word specifies the data channel and measurement range, and the measurement acquired is forwarded in binary form to the calling program. Routine 20078A is used for calling this driver from FORTRAN or ALGOL.

Equipment required is one HP 2312A High-Speed Low-Level Data Acquisition Subsystem.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

20235A, RTE HP 2323A SUBSYSTEM DRIVER (DVR77)

This RTE driver acquires 8-4-2-1 BCD measurements from an HP 2323A Low-Speed Data Acquisition Subsystem. Control words from the calling program establish the data channel to be sampled, delay, meter function (type of measurement), meter range, and mode (measurement or calibration check). As well as supplying the measured value to the calling program in 8-4-2-1 BCD form, the routine furnishes an additional word which indicates the type of measurement for which the meter is set. Program 20288A can be used to convert the BCD measurement to floating point form.

Equipment required is one HP 2323A Low-Speed Data Acquisition Subsystem (8-4-2-1 BCD output).

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20236A, RTE HP 2320A/2322A SUBSYSTEM DRIVER (DVR76)

This RTE driver acquires 8-4-2-1 or 4-2-2-1 BCD measurements from an HP 2320A or 2322A Low-Speed Data Acquisition Subsystem. Control words from the calling program establish the data channel to be sampled, delay, meter function (type of measurement), meter range, and mode (measurement or calibration check). Upon acquiring a measurement, the routine furnishes it to the calling program in BCD form. The measurement can be converted to floating point form by routine 20288.

Equipment required is one HP 2320A or 2322A Low-Speed Data Acquisition Subsystem (8-4-2-1 or 4-2-2-1 BCD output).

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20398A, RTE HP 2312A DRIVER (DVR55)

This RTE driver acquires measurements from an HP 2312A High-Speed Low-Level Data Acquisition Subsystem. A control word establishes the data channel to be sampled, and the measurement acquired is forwarded in binary form to the calling program. The routine takes advantage of the privileged interrupt capability of the RTE Operating System, and measurements can be taken at a maximum rate of approximately 5 KHz.

Equipment required is one HP 2312A High-Speed Low-Level Data Acquisition Subsystem, and one HP 12620A Special I/O card.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20501E, BCS SCN-ANALOG 8-4-2-1 SCAN ROUTINE (D.77)

This BCS driver acquires 8-4-2-1 BCD measurements from an HP 2320A or 2322A Low-Level Data Acquisition Subsystem. The measurements are forwarded in 8-4-2-1 form to the calling program. Control words establish the data channel to be sampled, delay, type of measurement, sample time, mode (measurement or calibration check), and meter range. Automatic range selection can be programmed if the measuring instrument has this optional feature.

The 8-4-2-1 measurements acquired can be converted to floating-point form by program 20210.

Equipment required is one HP 2320A or 2322A Low-Speed Data Acquisition Subsystem (8-4-2-1 BCD output).

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20517C, BCS SCN-ANALOG 4-2-2-1 SCAN ROUTINE (D.77)

This BCS driver acquires 4-2-2-1 BCD measurements from an HP 2322A Low-Speed Data Acquisition Subsystem. The measurements are converted to 8-4-2-1 form and forwarded to the calling program. Control words establish the data channel to be sampled, delay, and type of measurement. Automatic range selection can be used if the measuring instrument has this optional feature.

The 8-4-2-1 measurements provided by the routine can be converted to floating-point form by program 20210.

Equipment required is one HP 2322A Low-Speed Data Acquisition Subsystem (4-2-2-1 BCD output).

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20532A, BCS HP 2321A SUBSYSTEM (HP 3450/2911A) SCAN ROUTINE SCN 34 (D.77)

This driver acquires 8-4-2-1 BCD measurements from an HP 2321A Low-Speed Data Acquisition Subsystem. Control words from the calling program establish the data channel to be sampled, scanner delay, meter function (type of measurement), and mode (normal, 100-millisecond meter delay, 100-megohm input, 1/60-second gate, or any combination of the last three). Meter range is specified by a control word; alternatively, automatic range selection, a standard feature of the meter, can be employed if desired. As well as supplying the measured value to the calling program in BCD form, the routine furnishes an additional word which indicates the type of measurement for which the meter is set. Program 20533A can be used to convert the BCD measurement to floating point form.

Equipment required is one HP 2321A Low-Speed Acquisition Subsystem (8-4-2-1 BCD output).

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

22199A, BASIC LANGUAGE DATA ACQUISITION SYSTEM

The GOL1 program, named after its originator, is a sophisticated and versatile data acquisition program. Providing 24-hour, 7-day per week data monitoring capabilities, the program virtually eliminates the human factor, and the possibility for human error, from the data collection process. The program permits close control of all phases of the measurement and data-conversion operation. If a plotter is included in the equipment used, graphs may be prepared from the values measured.

The principal features of the program are listed below.

a. Program control from the computer switch register.

b. Detection of response failure in the measuring system.

c. Maintenance of a time-of-day clock in the computer.

d. 200 channels of analog input, with a sample time of 0.1 second per channel, and a dynamic range from 1 microvolt to 1500 volts per channel.

e. 16 channels of high speed analog-to-digital conversion, at a rate of up to 100,000 data samples per second.

f. 100 channels for thermocouple monitoring.

g. Perkin-Elmer Laser input.

h. 16-bit digital input or output.

i. 2 channels of analog output, 0 to +10 volts, suitable for an X-Y plotter.

j. An output capability for closing any combination of 1 to 16 relays.

k. An IBM-compatible magnetic tape system, with a transfer rate of approximately 30,000 characters per second.

While the data collection system uses an HP 3450A Digital Multi-Function Meter as the measuring instrument, the program can easily be altered to permit the use of many other models of HP digital voltmeter.

The program functions under the 20392A BASIC Program System, and requires a 16K, 24K, or 32K computer.

Full information on the program is furnished in the handbook *Computerized Data Acquisition Operating Instruction Manual.* This manual is included in the documentation package for the program.

Equipment required is one each of the following:

a. HP 3450A Digital Multi-Function Meter.

b. HP 2911B Crossbar Scanner.

c. HP 5610A Analog-to-Digital Converter.

d. HP 12555A Digital-to-Analog Converter.

e. HP 12551B Relay Output Register.

f. HP 12539A Time Base Generator Interface Kit.

g. HP 12554A General Purpose Duplex Register.

h. Datum/PEC 35 inch-per-second, 800 bits-per-inch, 9-track Magnetic Tape Unit; or HP 2020 Magnetic Tape Unit; or HP 3030 Magnetic Tape Unit.

Assembly language, absolute.

Contributed:
Gene Olig
Research and Development Department
Giddings & Lewis Machine Tool Company

22361A, DOS-M BINARY FILE DATA ACQUISITION

This program provides continuous analog data acquisition from a multiplexed ADC to a DOS-M Binary File. Six channels of analog information are sampled with the HP 2310B Multiverter under control of the HP 12539A time base generator using sampling intervals of one millisecond or greater. The digitized information obtained at up to 6000 samples per second may be fed continuously to a CRT display or to a DOS-M binary file on a 2870A disc store.

The main Fortran program interfaces the operator obtaining disc labels, file name and sampling intervals — before calling the Assembly language subroutine which handles the continuous analog data acquisition and display or storage.

Equipment required includes 16K core, an HP 2870 disc, an HP 2310B/12554A-M2 multi-channel analog to digital converter, an HP 12539A time base generator, and an HP 12555 dual digital to analog converter.

FORTRAN IV/Assembly language, relocatable.

Contributed:
Neal Kelly
HP, Eastern Sales Region

22380A, HP BASIC DRIVER SYSTEM WITH BINARY DATA I/O

The BASIC Driver System with binary data I/O enables the user to control the HP 80501B Audio Data Processor by means of conversational Hewlett-Packard BASIC language. It modifies standard HP BASIC 20392 and adds the following features: The compiler can be restarted with or without deleting the stored program; the switch register can be read from BASIC language level enabling the user to control the actions of the program; the teletype interrupt mode can be switched off or on from BASIC enabling the teletype to read data from paper tape because the jump to the STOP-READY point is inhibited; binary data on paper tape can be read or punched from BASIC language level.

BASIC callable drivers for the following devices or interfaces are included: HP 12539A Time base generator (providing "elapsed time" and/or "time-of-day"); HP 12555A D-to-A converter (with 8 service routines for X-Y display); HP 12551B Relay output register; HP 12564A A-to-D Converter; HP 8064A Real Time Analyzer with or without HP 8065A extension (controlling the analyzer and reading spectra). The BASIC Driver System includes a configurator that can change the configuration or delete

routines that are not required. Exhaustive diagnostic messages are printed in case of hardware trouble or programming errors.

Assembly language, absolute.

Contributed:
Hans Biesel
HP, Germany/Boeblingen

29000A, RTE HP 2321A SUBSYSTEM DRIVER (DVR74)

This FORTRAN callable driver, used by the RTE Operating System, acquires 8-4-2-1 BCD measurements from an HP 2321A Low-Speed Data Acquisition Subsystem. Control words from the calling program specify the data channel to be sampled, scanner delay, meter function (type of measurement), and mode (normal, 100-millisecond meter delay, 100-megohm input, 1/60-second gate, or any combination of the last three). Meter range also is specified by a control word; alternatively, automatic range selection, a standard feature of the meter, can be employed if desired. As well as supplying the measured value to the calling program, the routine furnishes an additional word which indicates the type of measurement for which the meter is set. The measurement can be supplied to the calling program either in floating point form or in 8-4-2-1 BCD form.

Equipment required is the one HP 2321A Low-Speed Data Acquisition Subsystem, and the Extended Arithmetic Unit option for the computer.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

29004A, COUPLER SERIAL INTERFACE BCS DRIVER (D.66)

D.66 is a relocatable assembly language driver that transfers data between the HP 2570A/2575A Coupler/Controller interfaced with a HP 12813 card and a HP 2100 family computer interfaced with a HP 12665 card. Any number of HP 2570A/2575A Coupler/Controllers can be controlled by D.66. FORTRAN/ALGOL READ or WRITE statements can be used.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

14902A, BCS DIGITAL VOLTAGE SOURCE POWER SUPPLY DRIVER D.70

This BCS Driver requires HP 12661 DVS interface. D.70 processes clear, control write, and read requests. Power supplies are programmed by writes; reads return status information on DVS operation. Up to 8 DVSs may be chained to one interface card and be programmed by D.70. D.70 also does data conversion and formatting.

D.70 can handle both "timing" and "alarm" interrupts, but not at the same time. "Timing" mode interrupts are effective during write processing, "Alarm" mode interrupts are handled after writing has terminated. An external user routine, ALARM, can be called when an "Alarm" interrupt occurs, if the user sets the driver in this feature (otherwise only the DVS EQT status words are effected). The user can set and reset this feature at run time.

Assembly language, relocatable.

HP supported:
New Jersey Division

20073C, BCS HP 5610A ANALOG-TO-DIGITAL DRIVER, NON-DMA (D.56)

This BCS driver acquires measurements from an HP 2311A High-Speed Data Acquisition Subsystem. Data is acquired in the form of 10-bit words at a rate up to 48 kHz (for 2114- or 2115-series computers), or up to 60 kHz (for 2116-series computers). The routine operates in either of two ways: single-channel monitor, or sequential scan of 2 to 16 data channels. Program 20074A is used for furnishing parameters to the driver from FORTRAN or ALGOL programs. The 10-bit words acquired are forwarded unchanged to the calling program. The faster, DMA version of this routine is program 20093.

Equipment required is one HP 2311A High-Speed Data Acquisition Subsystem.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

20074A, FORTRAN/ALGOL INTERFACE ROUTINE (L5610)

This routine provides the interface between FORTRAN or ALGOL compiler programs and the drivers for the HP 2311A High-Speed Data Acquisition Subsystem. (These drivers are programs 20073 and 20093.) The routine allows the correct transfer of measurement parameters to the driver.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

20093C, BCS HP 5610A ANALOG-TO-DIGITAL DRIVER, DMA (D.56A)

This BCS driver acquires measurements from an HP 2311A High-Speed Data Acquisition Subsystem. Data is acquired in the form of 10-bit words at a rate up to 100 kHz. The routine operates in either of two ways: single-channel monitor, or sequential scan of 2 to 16 data channels. Program 20074A is used for furnishing parameters to the driver from FORTRAN or ALGOL programs. The 10-bit words acquired are forwarded unchanged to the calling program. The non-DMA version of this routine is program 20073.

Equipment required is the Direct Memory Access option for the computer, and one HP 2311A High-Speed Data Acquisition Subsystem.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

20094B, MULTI/MINIVERTER SCAN ROUTINE SCNMV (D.76)

This BCS driver acquires measurements from an HP 2310A, 2310B, or 2310C High-Speed Data Acquisition Subsystem. A control word program specifies the data channel to be sampled, and the measurement acquired is forwarded in binary form to the calling program.

Equipment required is one HP 2310A, 2310B, or 2310C High-Speed Data Acquisition Subsystem, and the Direct Memory Access option for the computer.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

20297D, RTE HP 2310/2311 SUBSYSTEM DRIVER (DVR56)

This RTE driver acquires measurements from an HP 2310A A/D Converter, 2310B Multiverter, 2310C Miniverter System, or 2311A High-Speed Data Acquisition Subsystem. A control word from the calling program specifies the data channel or channels to be sampled.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

20396A, RTE HP 12564A 10-BIT ANALOG-TO-DIGITAL CARD DRIVER (DVR57)

This RTE driver acquires measurements from an HP 12564A Analog-to-Digital Converter Interface Kit. The range of analog voltage furnished to the converter kit is ±1 volt or ±10 volts, depending on a jumper connection in the kit. Conversion (aperture) time is 17.6 microseconds. The digital output is furnished in the form of a 10-bit floating-point number.

Equipment required is one HP 12564A Analog-to-Digital Converter Interface Kit, with analog data source and connecting cables.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

22281A, MINIVERTER DRIVER

This program acquires data from analog signals through the Hewlett-Packard HP2310C Miniverter system. The system has a capacity of 128 multiplexed input channels which time-share an analog-to-digital converter. The output of the ADC is stored in a buffer which can be read into memory. A possible sampling rate of 20 Khz can be achieved in monitor mode. It differs from D.76 and MCONV in that it is loaded as a subroutine at run time, requires half as much storage, and controls the sampling speed.

Assembly language, relocatable.

Contributed:
Joseph L. Lau
Airesearch Manufacturing Co.

22304A, HP 5610A ANALOG-TO-DIGITAL DRIVER — FORTRAN CALLABLE

There are three routines in this package; two drivers and a Time Base Generator subroutine which delays execution of a program in the BCS environment. The first driver is designed to command a single reading from the A-D converter and return to the calling program. The second driver is designed to command readings from a number of different channels where the rate is controlled by the time base generator.

Assembly language, relocatable.

Contributed:
Kile Baker
Montana State University

22331A, DOS HP 2322A LOW SPEED ANALOG-TO-DIGITAL SUBSYSTEM DRIVER

This FORTRAN callable HP 2322 A-D Subsystem Driver is self-configuring and operates under a minimum DOS system. Through calls to the EXEC it processes the channel number converting binary to BCD, and outputs it to the scanner. A DVM measurement is taken and control is returned to the EXEC.

Equipment required is an HP 2401C DVM, HP 2911A/B Crossbar Scanner, and HP 12604B DSI, an HP 12533A DVM Program Interface, and an HP 12535A Scanner Program Interface.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

20014A, BCS PLOTTER DRIVER (D.10)

This BCS driver controls I/O operations with a Calcomp Model 565 Plotter.

Equipment required is one Calcomp Model 565 Digital Incremental Plotter, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20581A, DOS PLOTTER DRIVER (DVR10)

This DOS and DOS-M driver controls I/O operations with a Calcomp Model 565 Plotter.

Equipment required is one Calcomp Model 565 Digital Incremental Plotter, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20808B, RTE PLOTTER DRIVER (DVR10)

This RTE driver controls output operations with a Calcomp Model 565 Plotter.

Equipment required is one Calcomp Model 565 Digital Incremental Plotter, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

22077B, CALCOMP PLOTTER DRIVER — BASIC CALLABLE

This driver, used with the 20392 BASIC Operating System, controls I/O operations with a Calcomp Model 565 Plotter. The routine plots points and straight lines. Movement, in increments of 0.01 inch (0.254 millimeter), takes place in any of eight directions. User subroutines can be written to permit plotting complex figures.

Equipment required is one Calcomp Model 565 Digital Incremental Plotter, with interface kit.

Assembly language, absolute.

Contributed:
David R. McClellan
HP, Southern Sales Region

22080A, HP 2331A X-Y DISPLAY SUBSYSTEM DRIVER — FORTRAN CALLABLE

This driver sets up CRT displays on an HP 1300A Large Screen Display. The X and Y axes are plotted, if desired.

Equipment required is one HP 2331A X-Y Display Subsystem, consisting of an HP 1300 X-Y Large Screen Display and a dual D/A converter interface kit.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22217B, HP 2331A X-Y DISPLAY SUBSYSTEM DRIVER — BASIC CALLABLE

This driver, used by the HP 20392 BASIC Operating System, sets up CRT displays on an HP 1300A Large Screen Display. The X and Y axes are plotted, if desired.

Equipment required is one HP 2331A X-Y Display Subsystem, consisting of an HP 1300 X-Y Large Screen Display and a dual D/A converter interface kit.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22219A, HIGH SPEED CONTINUOUS LINE PLOTTER FOR HP 7004B

By providing controlled pen-carriage acceleration, this routine allows an HP 7591A Point Plotting System to be used as a high speed continuous-line plotter. (The HP 7591A System employs an HP 7004 X-Y Recorder for plotting points.) When the point plotting system employs the standard driver to draw a straight line, the line is drawn with a slight curvature because of the differing inertias of the X-axis and Y-axis carriages. The lighter carriage accelerates more rapidly than the other carriage, giving rise to the curvature in the line. The CS1 subroutine overcomes this problem by incrementally increasing the value of the coordinate furnished to the lighter carriage as the carriage accelerates, until the full value of the coordinate is reached. The heavier carriage receives the full value of its coordinate without delay. An increment-size factor allows rough fast plotting, or accurate slower plotting.

When the carriage is moved with the pen off the paper, the full values of both coordinates are furnished without delay to both carriages, resulting in maximum operating speed. Additionally, all pen-up functions use the interrupt I/O method, allowing the computer to be used for other purposes while the interrupt is awaited.

The subroutine, which is named after its contributor, is FORTRAN and ALGOL callable.

Equipment required is one HP 7591A Point Plotting System with two HP 17171A DC Preamplifiers, two J20-6130BR or J20-6933AR D-A Converters, one HP 14535A Multiplex Interface Kit, and one HP 12554A 16-Bit Duplex Register. (If 8-bit resolution is sufficient, an HP 12555A Dual D-A Converter can be substituted for the D-A converters listed.)

Assembly language, relocatable.

Contributed:
C.M. Schade
Information Systems Laboratory
Stanford University

22242A, X-Y PLOTTING ROUTINE

This FORTRAN callable routine, named after its contributor, draws graphs on an X-Y plotter. A maximum of 255 points can be plotted. The X and Y coordinates can both be specified for each point; or, alternatively, only the Y ordinate need be furnished, in which case the abscissa is incremented by a fixed amount for each successive data point. If desired, a square, an X, or a + sign can be centered at each data point, or the points can be connected by a straight line. The point of origin can either be specified by the calling program or it can be selected by the routine to suit the quadrant or quadrants in which the data points lie. Similarly, the scale can either be specified, or it can be selected by the routine to suit the magnitude of the largest ordinate and abscissa supplied. The coordinates must be furnished as floating point arrays.

Equipment required is one X-Y plotter capable of receiving pairs of analog inputs ranging from 0 volts to +10 volts, one HP 12555 Digital-to-Analog Converter, and one HP 12551 Relay Register with Interrupt Interface Kit.

Assembly language, relocatable.

Contributed:
Bob R. Walker
General Dynamics Corp., Convair Aerospace Div.

22253A, OSCILLOSCOPE PLOTTING SUBROUTINE

This routine allows use of a standard oscilloscope for displaying data. A set of X, Y axes is displayed on each plot and an accompanying message is on the teleprinter indicating the value of the origin and the scope scale factor in user units per division. Scaling information can be included in the call or it can be computed in the subroutine. FORTRAN-callable.

Assembly language, relocatable.

Contributed:
John R. Lorch
Naval Weapons Center

22263A, PLOT, RELAY, WAIT

These routines provide point or line plotting capability to an X-Y Recorder. PLOT controls the analog recorder, RELAY controls the pen by opening and closing relays, or outputting the number of the switch to be changed to the relay register (this can affect any or all of the switches in the relay register), while WAIT provides necessary time delays. FORTRAN callable.

Equipment required includes an HP Analog X-Y Recorder modified to provide external pen lowering and raising, a

dual channel 8-bit digital-to-analog interface card, and a 16-bit relay register card (non-interrupt or interrupt).

Assembly language, relocatable.

Contributed:
Kile Baker
Montana State University

22279A, BASIC PLOT SUBROUTINES

This series of absolute assembly language subroutines operate under the HP 20392A BASIC operating system to control a simple X-Y recording system. The six subroutines are accessed through a CALL statement to initialize channel numbers for the dual D-A board and relay output register board, set X-scale or Y-scale values, plot an (X,Y) coordinate by either a straight line or point plot, raise or lower the plotter pen, and generate a delay while the controls on the X-Y recorder are being adjusted.

Equipment required is one HP 2752A teleprinter, an HP 12555A Dual Channel D-A Converter, an HP 12554A 16-bit Relay Register Interface Card, and an HP X-Y Analog Recorder.

Assembly language, absolute.

Contributed:
John S. Shema
Montana State University

22291B, DOS/DOS-M HP 2331 X-Y SCOPE DISPLAY

When called from FORTRAN or Assembler user programs, this set of routines operates the HP 2331 subsystem under DOS or DOS-M. SCOPE routines control the X-Y display, CHAR routines generate and display ASCII characters, and GRAPH routines display a set of data values. A user-defined buffer provides for image refresh every 20 milliseconds. Calls are compatible with BCS HP 2331 software.

FORTRAN II/Assembly language, relocatable.

Contributed:
Fritz Joern
HP, Germany/Frankfurt

22315A, CONTINUOUS DISPLAY OF ARRAY DATA ON ANALOG X-Y SCOPE

This FORTRAN callable I/O subroutine enables the continuous display of a data array onto an X-Y oscilloscope via a dual 8-bit digital-to-analog converter. Up to 2000 points can be refreshed every 20 μs under interrupt control.

Equipment required is 8K core, an HP 12555A dual digital to analog converter, and an HP X-Y oscilloscope and interconnection cable.

Assembly language, relocatable.

Contributed:
John Nosler
University of Oregon

22316A, VARIABLE DISPLAY OF ARRAY DATA ON ANALOG X-Y SCOPE

This FORTRAN callable I/O subroutine displays array data via a dual 8-bit digital to analog converter onto an X-Y oscilloscope under interrupt control. 256 points of a buffered array are displayed consecutively. Calling parameters allow the programmer to pan across the data, specify the channel of a vertical cursor, and turn off the cursor.

Equipment required is 4K core, an HP 12555A dual digital to analog converter, and an HP X-Y oscilloscope and interconnection cable.

Assembly language, relocatable.

Contributed:
John Nosler
University of Oregon

22318A, HP 1331C STORAGE SCOPE DRIVER — BASIC CALLABLE

This routine operates with the HP BASIC system 20392A to display data on the HP 1331C Storage Scope. The MAT statement has been replaced by DISP for 'display.' DISP is used like PRINT. A CALL statement erases the screen.

Equipment required includes an HP 12555A dual digital to analog converter.

Assembly language, absolute.

Contributed:
Bjoern Lindberg
HP, Sweden/Stockholm

22379A, SIO LIST OUTPUT TO A STORAGE SCOPE

This driver will provide list output to a storage scope or teleprinter using standard SIO modules. It may be used in an 8K or 16K environment by assembling with an N or Z option respectively.

Equipment required includes an HP 12555A Dual D/A Converter Output Card, and a Storage Scope with remote Z-axis and erase control.

Assembly language, absolute.

Contributed:
James L. Miller
HP, Medical Electronics Division

22390A, HP 7004 X-Y RECORDER LIBRARY

This set of routines displays points, straight lines, or arcs of a circle or parabola by interpolating between points on an HP 7004 X-Y Recorder. Characters or numbers are displayed in integer or floating point format. Any program which RUNs in the HP 2331A subsystem environment will RUN without modification in the HP 7004 environment using this library.

These subroutines are FORTRAN or assembler callable and can be used with any standard Hewlett Packard relocatable library.

FORTRAN II/Assembly language, relocatable.

Contributed:
Professor Sergio Marsich
Istituto di Costruzioni Navali
Universita di Genova

22391A, HP 1331C SIO SCOPE DISPLAY DRIVER

This driver routine replaces the TTY SIO Driver when an HP 1331C X-Y Display is available. It provides faster output than the TTY when hard copy is not necessary.

Equipment required includes 8K or 16K core, an HP 1331C option 016 X-Y Display, and an HP 12555A D/A Interface Card.

Assembly language, absolute.

Contributed:
Robert O. Smith
University of Mississippi Medical Center

23900A, DOS STORAGE SCOPE DRIVER (DVR46, $EX50)

This driver for a DOS or DOS-M system writes alphanumeric characters on a storage type oscilloscope or scan converter. It is called by a standard write request.

Hardware required is an HP 5661A Display Subsystem or an HP 1331C Storage Scope with remote erase capability and an HP 12555A D/A Interface card.

HP supported:
Medical Electronics Division

20079A, 8K SIO DISC/DRUM DRIVER

Used by 8K computers, this SIO driver simulates magnetic tape unit operation by transferring data to or from a disc or drum memory unit. The routine overlays the core storage locations used by the 8K magnetic tape SIO driver; a magnetic tape unit therefore cannot be used when this routine is employed.

Equipment required is the Direct Memory Access option for the computer; and one HP 2770 or 2771 Disc Memory or one HP 2773, 2774, or 2775 Drum Memory. An interface kit and a power supply are required for the disc or drum memory.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20081A, 16K SIO DISC/DRUM DRIVER

Used by 16K or larger computers, this SIO driver simulates magnetic tape unit operation by transferring data to or from a disc or drum. The routine overlays the core storage locations used by the 16K magnetic tape SIO driver; a magnetic tape unit therefore cannot be used when this routine is employed.

Equipment required is the Direct Memory Access option for the computer; and one HP 2770 or 2771 Disc Memory or one HP 2773, 2774, or 2775 Drum Memory. An interface kit and a power supply are required for the disc or drum memory.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20747C, RTE DISC/DRUM DRIVER (DVR30)

This RTE driver controls disc or drum I/O operations. Both system and user I/O requests are recognized.

Equipment required is the Direct Memory Access option for the computer; and one HP 2770 or 2771 Disc Memory or one HP 2773, 2774, or 2775 Drum Memory. An interface kit and a power supply are required for the disc or drum memory.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20995B, DOS DISC/DRUM DRIVER (DVR30)

This DOS driver controls disc or drum I/O operations. Both system and user I/O requests are recognized.

Equipment required is the Direct Memory Access option for the computer; and one HP 2770 or 2771 Disc Memory or one HP 2773, 2774, or 2775 Drum Memory. An interface kit and power supply are required for the disc or drum memory.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

22063A, HP 2770A/2771A DISC DRIVER — FORTRAN CALLABLE

This driver controls disc I/O operations. The routine accepts separate floating-point track and sector addresses, and assembles them into complete address words.

Equipment required is the Direct Memory Access option for the computer, and one HP 2770 or 2771 Disc Memory with interface kit and power supply.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22070A, HP 2773A/74A/75A DRUM DRIVER — FORTRAN CALLABLE

This driver controls drum I/O operations. The routine accepts separate floating-point track and sector addresses, and assembles them to form complete address words.

Equipment required is the Direct Memory Access option for the computer, and one HP 2773A, 2774A, or 2775A Drum Memory with interface kit and power supply.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22110B, HP 2773A/74A/75A DRUM DRIVER — BASIC CALLABLE

This driver controls drum I/O operations. The routine accepts separate floating-point track and sector addresses, and assembles them to form complete address words. The routine runs under the 20392 BASIC Operating System.

Equipment required is the Direct Memory Access option for the computer, and one HP 2773, 2774, or 2775 Drum Memory with interface kit and power supply.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22111C, HP 2770A/2771A DISC DRIVER — BASIC CALLABLE

This driver controls disc I/O operations. The routine accepts separate floating-point track and sector addresses, and assembles them to form complete address words. The routine runs under the 20392 BASIC Operating System.

Equipment required is the Direct Memory Access option for the computer, and one HP 2770 or 2771 Disc Memory with interface kit and power supply.

Assembly Language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22216B, HP 2870A CARTRIDGE DISC DRIVER — BASIC CALLABLE

This driver, used with the HP 20392 BASIC Operating System, controls I/O operations with an HP 2870A Moving Head Disc Unit.

Equipment required is the Direct Memory Access option for the computer, and one HP 2870A Moving Head Disc Unit with interface kit, disc controller, power supply, and cabinet.

Assembly language, absolute.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22225B, HP 2870A CARTRIDGE DISC DRIVER — FORTRAN CALLABLE

This driver controls I/O operations with an HP 2870A Moving Head Disc Unit.

Equipment required is the Direct Memory Access option for the computer, and one HP 2870A Moving Head Disc Unit with interface kit, disc controller, power supply, and cabinet.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22233A, DOS-M PRIVILEGED DISC I/O ROUTINES

This program, used by the DOS-M Operating System, greatly improves the access time to user file data. Execution-time improvement of about 8 to 1 can be achieved. Error checking is performed to protect the data base. The program achieves its greatest usefulness in 8K computers.

Assembly language, relocatable.

Contributed:
David R. McClellan
HP, Southern Sales Region

22301A, HP 2870A CARTRIDGE DISC MEMORY DRIVER — FORTRAN CALLABLE

This FORTRAN callable driver accepts requests to perform read, write, initialize data, check data, clear, and status operations on the HP 2870A Cartridge Disc Memory in a BCS environment. The driver is written so as to permit concurrent I/O operations by utilizing the interrupt system. DMA channel assignments are dynamic, but I/O select codes are assigned at assembly time. The driver operates multiple drives on a single controller by accepting a physical unit number as a parameter in the calling sequence.

Assembly language, relocatable.

Contributed:
Dave McClellan
HP, Southern Sales Region

22312A, BCS HP 2774/2771 DRUM DRIVER

This drum driver allows the user to configure BCS for use with the HP 2774/2771 drum. It must be loaded as an external driver at load time to make its three entry points available to the programmer. It is FORTRAN or Assembler callable.

Assembly language, relocatable.

Contributed:
Enrico Mariani
HP, Italy/Milan

24156C, DOS-M HP 2870/7900 DISC DRIVE (DVR31)

This DOS-M driver controls I/O operations with the HP 2870A Moving Head Disc Unit.

Equipment required is the Direct Memory Access option for the computer, and one HP 2870A Moving Head Disc Unit with interface kit, disc controller, power supply, and cabinet.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24226C, DOS-M HP 2883 DISC DRIVER (DVR31)

This DOS-M driver controls I/O operations with the HP 2883 Disc Memory.

Equipment required is one HP 2883 Disc Memory.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

29013B, RTE MOVING HEAD DISC DRIVER (DVR31)

This driver is used in the HP 2005C Real-Time Executive System to operate the moving head disc.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

13021B, 8K SIO HP 7970 MAGNETIC TAPE DRIVER

Used by 8K computers, this SIO driver controls I/O operations for up to four HP 7970 9-Track Magnetic Tape Units.

Equipment required is HP 7970 Magnetic Tape drive and 13181 interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Mountain View)

13022B, 16K SIO HP 7970 MAGNETIC TAPE DRIVER

Used by 16K computers, this SIO driver controls I/O operations for up to four HP 7970 9-Track Magnetic Tape Units.

Equipment required is HP 7970 Magnetic Tape drive and 13181 interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Mountain View)

13023B, BCS MAGNETIC TAPE DRIVER

This BCS driver controls I/O operations for up to four HP 7970 Magnetic Tape Units.

Equipment required is one to four HP 7970 Magnetic Tape Units with interface kit. If the computer is of the HP 2114 series, or if the magnetic tape unit has the 45 inch-per-second option, the Direct Memory Access option for the computer is also required.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Mountain View)

13024A, DOS HP 7970 MAGNETIC TAPE DRIVER (DVR23)

This DOS and DOS-M driver controls I/O operations for up to four HP 7970 Magnetic Tape Units.

Equipment required is one HP 7970 Magnetic Tape Unit with interface kit, and the Direct Memory Access option for the computer.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Mt. View)

13025A, RTE HP 7970 MAGNETIC TAPE DRIVER (DVR 23)

This RTE driver controls I/O operations for one HP 7970 Magnetic Tape Unit.

Equipment required is one HP 7970 Magnetic Tape Unit with interface kit, and the Direct Memory Access option for the computer.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Mt. View)

13026B, BCS 7-TRACK DRIVER WITHOUT DMA

This BCS driver controls I/O operations for up to four HP 7970 7-Track Magnetic Tape Units.

Equipment required is one-to-four HP 7970 7-track tape units with interface kit 13182A. Direct memory access is not available.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Mountain View)

13027B, BCS MAGNETIC TAPE DRIVER 7-TRACK DMA

This BCS driver controls I/O operations for up to four HP 7970 7-Track Magnetic Tape Units.

Equipment required is one-to-four HP 7970 7-track tape units with interface kit 13182A. Direct memory access is required for tape speed greater than 37.5 ips.

Assembly language, relocatable.

HP supported
Data Systems Development Division (Mountain View)

13029A, 8K SIO MAGNETIC TAPE DRIVER 7-TRACK

Used by 8K computers, this SIO driver controls I/O operations for up to four HP 7970 Magnetic Tape Units.

Equipment required is one to four HP 7970 Magnetic Tape Units, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Mountain View)

13030A, 16K SIO MAGNETIC TAPE DRIVER 7-TRACK

Used by 16K computers, this SIO driver controls I/O operations for up to four HP 7970 Magnetic Tape Units.

Equipment required is one to four HP 7970 Magnetic Tape Units, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Mountain View)

20007A, BCS INCREMENTAL MAGNETIC TAPE DRIVER (D.20)

This BCS driver controls I/O operations with a Kennedy 1406 or 1506 (write only) Incremental Magnetic Tape Transport.

Equipment required is one Kennedy 1406 or 1506 Incremental Magnetic Tape Transport, with HP 12537A interface kit.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20013E, BCS HP 2020 MAGNETIC TAPE DRIVER (D.21)

This BCS driver controls I/O operations with an HP 2020 Magnetic Tape Unit.

Equipment required is one HP 2020 Magnetic Tape Unit, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20022E, BCS HP 3030 MAGNETIC TAPE DRIVER (D.22)

This BCS driver controls I/O operations for an HP 3030 Magnetic Tape Unit.

Equipment required is one HP 3030 Magnetic Tape Unit with interface kit, and the Direct Memory Access option for the computer.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20314D, 8K SIO HP 2020 MAGNETIC TAPE DRIVER

Used by 8K computers, this SIO driver controls I/O operations for an HP 2020 Magnetic Tape Unit.

Equipment required is one HP 2020 Magnetic Tape Unit, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20315C, 4K SIO HP 2020 MAGNETIC TAPE DRIVER

Used by 4K computers, this SIO driver controls I/O operations with an HP 2020 Magnetic Tape Unit.

Equipment required is one HP 2020 Magnetic Tape Unit, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20321C, 16K SIO HP 2020 MAGNETIC TAPE DRIVER

Used by 16K or larger computers, this SIO driver controls I/O operations with an HP 2020 Magnetic Tape Unit.

Equipment required is one HP 2020 Magnetic Tape Unit, with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20331C, 8K SIO HP 3030 MAGNETIC TAPE DRIVER

Used by 8K computers of the HP 2115 or 2116 series, this SIO driver controls I/O operations with an HP 3030 Magnetic Tape Unit.

Equipment required is one HP 3030 Magnetic Tape Unit, with interface kit, and the Direct Memory Access option for the computer.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20334C, 16K SIO HP 3030 MAGNETIC TAPE DRIVER

Used by 16K computers of the HP 2115 or 2116 series, this SIO driver controls I/O operations with an HP 3030 Magnetic Tape Unit.

Equipment required is one HP 3030 Magnetic Tape Unit with interface kit, and the Direct Memory Access option for the computer.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20336B, 4K SIO HP 3030 MAGNETIC TAPE DRIVER

Used with 4K computers of the HP 2115 or 2116 series, this SIO driver controls I/O operations with an HP 3030 Magnetic Tape Unit.

Equipment required is one HP 3030 Magnetic Tape Unit with interface kit, and the Direct Memory Access option for the computer.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20806C, RTE HP 3030 MAGNETIC TAPE DRIVER (DVR22)

This RTE driver, used with computers of the HP 2115 or 2116 series, controls I/O operations with an HP 3030 Magnetic Tape Unit.

Equipment required is one HP 3030 Magnetic Tape Unit with interface kit, and the Direct Memory Access option for the computer.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20997B, DOS HP 3030 MAGNETIC TAPE DRIVER (DVR22)

This DOS and DOS-M driver, used with computers of the HP 2115 or 2116 series, controls I/O operations with an HP 3030 Magnetic Tape Unit.

Equipment required is one HP 3030 Magnetic Tape Unit with interface kit, and the Direct Memory Access option for the computer.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

22100A, FILE THREE INPUT FOR MTS ALGOL

ALMAG is an absolute MTS program which allows the ALGOL compiler to use as its source Magnetic Tape File Three rather than a punched tape reader. This serves as an aid to program editing. The program overlays part of the photoreader driver, and for that reason imposes no added storage requirement.

Equipment required is one HP 2020, 3030, or 7970 Magnetic Tape Unit, with interface kit.

Assembly language, absolute.

Contributed:
James D. Reed
Hughes Aircraft Co.

22181A, RTE HP 2020 MAGNETIC TAPE DRIVER

This RTE driver controls I/O operations with the HP 2020 Magnetic Tape Unit. When writing on tape, the routine converts ASCII data to alphanumeric BCD form; the routine then records the BCD characters on tape with even parity. When reading tape, the routine acquires alphanumeric BCD characters with even parity, and converts the characters to ASCII. No provision is made for writing or reading without ASCII-BCD conversion.

Equipment required is one HP 2020 Magnetic Tape Unit with interface kit, and the Direct Memory Access option for the computer.

Assembly language, relocatable.

Contributed:
David F. Denman
HP, Eastern Sales Region

22208A, HP 3030G MAGNETIC TAPE DRIVER — FORTRAN CALLABLE

This FORTRAN callable driver controls I/O operations with the HP 3030G Magnetic Tape Unit. When reading records, the driver returns a word count to the calling program.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22239A, HP 7970 MAGNETIC TAPE DRIVER — BASIC CALLABLE

This driver performs three functions on the 7970 through separate CALLs from HP BASIC 20392A. One call performs a binary write of a given length on a particular magnetic tape unit, 0 through 3. The second call does a binary read and the third positions the tape, writes an EOF or an EOR gap.

Assembly language, absolute.

Contributed:
Michael Naughton
HP, Midwest Sales Region

22270C, ALGOL OPERATING SYSTEM FOR MTS

These two routines enable the ALGOL user to compile, load, and execute ALGOL programs entered through any standard device without having to punch object code on paper tape under MTS. If the source program is entered from a keyboard device using MTS overlay program ONLINE, then punching tape, marking cards, etc. can be eliminated entirely. By using switch register options, simultaneous compilation and source/assembly listings can be obtained. Loading and execution of the compiled program is accomplished through standard MTS directives.

Assembly language, absolute.

Contributed:
Henry Gibbs-Rogers
Computing, Etc.

22319A, DOS/DOS-M HP 2020 MAGNETIC TAPE DRIVER

This HP 2020 Magnetic Tape driver operates under a standard DOS or DOS-M system to handle input/output transfers and special control functions. All communication with the driver is through calls to EXEC. They are identical to HP 3030 calls except that binary transfer requests are rejected by the driver.

Assembly language, relocatable.

Contributed:
Dennis I. Smith
Montana State University

22414A, NON-DMA BCS HP 3030 DRIVER

This is a modified version of the HP 3030 BCS driver. It does not use DMA and it turns off the interrupt system during all data transfers. It allows the HP 3030 to be used in a BCS or MTS environment with the HP 2100. The driver initiates, continues, and completes any tape operations initiated through Input/Output Control, (.IOC.).

Assembly language, relocatable.

HP supported:
Neely Sales Region

20001C, 4K BCS RELOCATING LOADER

Used by 4K computers, this BCS loader reads relocatable binary programs from punched tape. The address portion of each memory reference instruction and each jump instruction is converted to an absolute address, and page linkages are established. All instructions are placed in core storage at addresses assigned by the loader. The loader will not operate on binary programs derived from ALGOL.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20018G, BCS RELOCATING LOADER

Used by 8K or larger computers, this BCS loader reads relocatable binary programs from punched tape or magnetic tape. The address portion of each memory reference instruction and each jump instruction is converted to an absolute address, and page linkages are established. All instructions are placed in core storage at addresses assigned by the loader.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20925C, DOS RELOCATING LOADER

This DOS loader, used only by computers of the 2116 series, reads relocatable binary programs from punched tape, magnetic tape, or disc. The input can also be provided by a compiler or assembler. The address portion of each memory reference instruction and each jump instruction is converted to an absolute address, and page linkages are established. All instructions are placed on the disc at addresses assigned by the loader.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

22009B, BOOTSTRAP LOADER GENERATOR

This program produces a punched tape containing computer instructions constituting either a basic binary loader or a basic binary disc loader. Also furnished by the program is a typed set of instructions for using the tape produced. By employing a bootstrap bootstrap, consisting of 11 instructions entered through the switch register, the bootstrap loader tape can be read into the required positions of core storage. Bootstrap loader tapes can be produced for any core storage capacity used in HP computers.

Assembly language, absolute.

Contributed.

22223C, LOADER BOOTSTRAP

This program provides a simple method of entering a basic binary loader or a basic binary disc loader. First, twelve instructions are entered into the switch register. These instructions indicate the configuration of the computer system, and also serve as a driver for acquiring the bootstrap tape. After the tape has been read, the basic binary loader or basic binary disc loader is ready for use in memory. The program includes preparation of a check sum to detect tape reader errors. A test of the loader protect switch is also made.

Assembly language, absolute.

Contributed:
Fritz Joern
HP, Germany/Frankfurt

22297A, OFFLINE RELOCATING LOADER

This relocating loader program runs in a minimum 4K SIO system; it accepts as input relocatable object programs produced by the assembler or compilers and produces as output an absolute binary tape (with external references resolved) for any other specified target computer with memory up to 32K. Lower and upper base page, memory, and upper common bounds may be specified on the teletype at RUN time, and are independent of the executing machine size.

The programmer who normally codes in absolute assembly language and does his own I/O or uses an SIO system will find this offline loader useful. He can code in relocatable format in a page free manner, since the loader will establish his base page linkages. Note, however, that neither the formatter nor .IOC. are contained within this "loader", but they can be loaded, relocated, and linked by the offline loader to produce a complete program. Relocated programs can even be made to work in an SIO environment by substituting OCT 114102 for JSB 102B,I (for example). A FORTRAN program which does I/O without the formatter can thus gain 1 to 1-1/2 K of core space.

Assembly language, absolute.

Contributed:
Don Mactaggart
Canadian Marconi Co.

22342A, DOS-M "HARDWARE" BOOT

This program allows the user to boot up a DOS-M system with an HP 2870 or HP 7900 disc from the hardware protected area of memory. Thus, there is no need to load in the normal paper tape boot. (The paper tape BBL is of course destroyed.)

Assembly language, absolute.

Contributed:
Jerry W. Allen
HP, Neely Sales Region

22344A, "ON-LINE" SYSTEM LOAD FOR MOVING-HEAD RTE

This program allows the user to start up a Moving-Head RTE System from another RTE System (with a Fixed-Head or Moving-Head Disc) within the same hardware configuration without halting the computer and loading a paper tape bootstrap. The I/O channels of the Moving-Head Disc, the subchannel number and the starting track number of the system to be started are specified in the program directive. A typical directive might be "ON,RTEM,22,1,100".

Assembly language, relocatable.

Contributed:
Roland E. Jahn
HP, Medical Electronics Division

22345A, "ON-LINE" MOVING-HEAD RTE BOOTSTRAP FROM DOS-M OR DOS

This program allows the user to start up a Moving-Head RTE System from a DOS or DOS-M System within the same hardware configuration without halting the computer and loading a paper tape bootstrap. The I/O Channels of the Moving-Head Disc, the subchannel number and the starting track number of the system to be started are specified in the program directive. A typical directive might be ":PR,RTEM,22,1,100".

Assembly language, relocatable.

Contributed:
Roland E. Jahn
HP, Medical Electronics Division

22349A, DOS-M BOOTSTRAP PROGRAM FOR DOS-M OR DOS

This program allows the user to start up a DOS-M System from another DOS-M or DOS System within the same hardware configuration without halting the computer and loading a paper tape bootstrap. The I/O channels of the Moving-Head Disc and the subchannel number are specified in the program directive. A typical directive might be ":PR,DOSM,22,1".

This program works in a system with or without memory protect.

Assembly language, relocatable.

Contributed:
Roland E. Jahn
HP, Medical Electronics Division

22350A, DOS-M BOOTSTRAP PROGRAM FROM RTE

This program allows the user to start up a DOS-M System from an RTE System (with a Fixed-Head or Moving-Head Disc) within the same hardware configuration without halting the computer and loading a paper tape bootstrap. The I/O channels of the Moving-Head Disc and the subchannel number are specified in the program directive. A typical directive might be: "ON,DOSM,22,1".

Assembly language, relocatable.

Contributed:
Roland E. Jahn
HP, Medical Electronics Division

22357A, MTS BOOT FROM DOS-M

This program allows a user in the DOS-M environment to boot in the magnetic tape system. Thus, with the DOS-M boot program on magnetic tape he can then switch back to DOS-M. The end result being the elimination of loading paper tape boots and a much smoother operator procedure. Requires 16K core memory (but may be modified for 8K), and HP 22354, DOS-M Store Absolutes.

Assembly language, relocatable.

Contributed:
Jerry W. Allen
HP, Neely Sales Region

24155C, DOS-M RELOCATING LOADER

This DOS-M loader reads from punched tape, magnetic tape, or disc, programs which have been provided by a DOS, DOS-M, or RTE compiler or assembler. The address portion of each memory reference instruction and each jump instruction is converted to an absolute address, and page linkages are established. All instructions are placed on the disc at addresses assigned by the loader. This program cannot be used by the HP 2115A Computer.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

29022A, RTE RELOCATING LOADER

This RTE loader, used only by computers of the HP 2116 series, reads relocatable binary programs from punched tape, magnetic tape, or disc. The input can also be provided by a compiler or assembler. The address portion of each memory reference instruction and each jump instruction is converted to an absolute address, and page linkages are established. All instructions are placed in core storage or on the disc at addresses assigned by the loader.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

20392A, BASIC SYSTEM

This software product is an operating system intended for user programs written in BASIC language. The operating system consists of a BASIC language interpreter, together with additional program modules to permit independent operation. The only I/O device used is one teleprinter; this machine can read or punch paper tape and provide keyboard inputs and printed outputs.

User programs written for this operating system can perform any function within the capabilities of BASIC language, the amount of core storage available, and the I/O device employed. BASIC, the programming language used, was developed by Dartmouth College as an easy-to-learn programming tool intended for nonprofessional computer programmers. BASIC is conversational in nature, and requires only a knowledge of the English language and an understanding of the decimal numbering system. A person can become completely familiar with BASIC after six hours of instruction, and can write simple programs in an hour. While easy to learn, the version of BASIC used can perform such mathematically sophisticated tasks as matrix dimensioning and manipulation. Full information on BASIC language is provided in the publication *HP BASIC* (HP order no. 02116-9077).

This operating system differs from the Educational BASIC System (software product 24160, A018) only in that no punched card/mark sense card reader is used.

Equipment required is 8K of core storage.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20548A, FORTRAN COMPILER

Using SIO drivers, this compiler converts FORTRAN II source programs to relocatable binary form for execution under the BCS Operating System. An assembly language listing is produced, if desired.

Assembly language, absolute

HP supported:
Data Systems Development Division (Cupertino)

20549A, 4K FORTRAN COMPILER

Intended for 4K computers and using SIO drivers, this compiler converts FORTRAN II source programs to relocatable binary form for execution under the BCS Operating System. An assembly language listing is also produced.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20598C, DOS ASSEMBLER

Used by the DOS Operating System, this assembler converts assembly-language source programs to relocatable or absolute binary form. The relocatable binary programs run under the DOS, DOS-M, RTE, or BCS Operating System.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20599C, DOS FORTRAN

Used by the DOS Operating System, this compiler converts FORTRAN II source programs to relocatable binary form. An assembly language listing is also provided. The programs produced run under the DOS, DOS-M, RTE, or BCS Operating System.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20874D, RTE ASSEMBLER

Used by the RTE Operating System, this assembler converts assembly-language source programs to relocatable or absolute binary form. The relocatable binary programs run either under the DOS, DOS-M, RTE, or BCS Operating System.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20875E, RTE FORTRAN

Used by the RTE Operating System, this compiler converts FORTRAN II source programs to relocatable binary form. An assembly language listing is also provided. The programs produced run under the RTE, DOS, DOS-M, or BCS Operating System.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

22013B, INVERSE ASSEMBLER

This program accepts an absolute binary program tape and creates from it an assembly language listing. When the Inverse Assembler is used, the normal photoreader driver is replaced by an equivalent of the basic binary loader.

Assembly language, relocatable.

Contributed:
J. D. Sankey
Canadian National Research Council

22065A, FORTRAN TRANSLATOR, IBM 1800 TO HP FORTRAN II

This translator is designed to assist in changing IBM FORTRAN IV programs to HP FORTRAN II or IV. The translator produces a line-by-line translation of HP IBM 1800 FORTRAN programs. The translator operates with punched tape input and output media; magnetic tape or punched card output can be provided with minor program modifications.

Assembly language, relocatable.

Contributed:
Jim Fearnside
HP, Medical Electronics Div.

22201D, PACIFIC UNION COLLEGE MULTI-TERMINAL HP BASIC SYSTEM

This program system is an interpreter which allows up to eight users to simultaneously employ the facilities of a large subset of HP 20392 BASIC Operating System. As well as permitting multiple-user access, other differences from the HP 20392 program system are as follows:

a. No matrix statements.

b. No WAIT statements.

c. No BYE statements.

d. GOSUB's may be nested to any depth.

e. Syntax error typeouts have no line numbers.

No log-on or log-off procedures are required, and no identity codes are used. Allocation of available core storage can be made to each user at the time of system configuration.

Equipment required is 8K of storage.

Assembly language, absolute.

Contributed:
Dowell Martz and William Tyler
Department of Physics
Pacific Union College

22255D, MSU MULTI-TERMINAL HP BASIC SYSTEM WITH CARD READER CAPABILITY

This multi-terminal HP BASIC system with card reader capability is an expandable low cost "time-share" system requiring an HP 2116B computer with 16K, two to five teleprinters with interface, and a time base generator. The optional card reader (HP 2761-007 Mark-Sense Card Reader for Educational Basic) can be used for input on one of the four user ports.

The system provides 8500 words of memory which can be divided among the four users, automatic logging and accounting of users for unattended operation, and a message command for signalling the computer operator. User code words for sign-on prevent unauthorized use. A RENUMBER command resequences statements, a PTAPE command loads user-developed or system library programs from the photoreader, CALL and WAIT statements are deleted, and all other user commands are identical to those of HP single-terminal BASIC, 20392.

Assembly language, absolute.

Contributed:
N. K. Shrauger
Montana State University

22261A, MINI-BASIC

Subroutine "Long" modifies HP BASIC to allow longer user programs than are normally possible. In addition to deleting Matrix Operations, the SQR, SIN, COS, TAN, and ATN functions are deleted. The remaining library is moved to other locations. The result is a gain of 1050B words available for the User's program over the Matrix deleted version, which is itself a gain over Standard BASIC of 1353B words.

Subroutine "Long" modifies the Syntax Analyzer so that the deleted functions produce error messages if their use is attempted. Square Roots may be found by using the "↑.5" method instead of "SQR".

While Subroutine "Long" may be used with any 8K or longer memory, the greatest value is to the 8K size, where the percentage of User's Program Space gained is the most significant.

Assembly language, absolute.

Contributed:
Roy Jacobus
Westinghouse Electric Corporation

22292B, ABSOLUTE OBJECT DECODER

DECODE is a two-pass ALGOL program designed to produce a pseudo-source listing and/or tape complete with labels; the tape would assemble back to the original absolute. The inverse assembly would be relatively easy to edit into a functional equivalent of the original source. The generation of DEF, ABS, DEC, DEX, BSS, and OCT are not within the scope of this program.

ALGOL/Assembly language, relocatable.

Contributed:
Herb Shear and Ed Doust
HP, Scientific Instruments Division

22295A, BCS INTERPRETER FOR FLOATING POINT OPERATIONS

The interpreter achieves significant core savings for floating point operations at the expense of execution time by replacing all floating point library routines. Under BCS it accepts binary output from the special assembler included in this package which translates the seven additional opcodes required for interpretive floating point arithmetic. The special assembler is an unconfigured absolute binary tape which will operate in a 4K memory. The interpreter is of particular value to users with a minimum configuration.

Assembly language, relocatable.

Contributed:
Michel Virard
Canadian Marconi Company

22326A, DOS-M RELOCATABLE BASIC

Relocatable BASIC for DOS-M is essentially equivalent to Hewlett-Packard's single terminal BASIC system, HP 20392A. Two additional commands have been added to this version; PUNCH for high-speed punch output, and PLIST for line printer output. "LIST" generates output to a teleprinter or CRT. This version is non-EAU and cannot access the disc to SAVE user programs or data files.

Equipment required includes a 16K DOS-M, and optionally, an HP 2767 line printer.

Assembly language, relocatable.

Contributed:
Eugene Dement
Martin-Marietta Corporation

22327C, SNOBOL COMPILER FOR DOS/DOS-M

SNOBOL is a language translater designed for the manipulation of strings. Features of the language include symbolic naming of strings and pattern-matching. In addition to a basic set of primitive string valued functions, the system includes the facility for defining functions. These defined functions facilitate the programming recursive procedures.

Hewlett-Packard France SNOBOL extends the capabilities of SNOBOL3; decimal numbers of unlimited precision are allowed, and arithmetic expressions without parentheses are evaluated according to a hierarchy of operations. Dynamic allocation of the number of decimal digits to represent a number make it a practical business language.

Other applications of Hewlett-Packard France SNOBOL include typesetting, formatting, editing, searching, symbolic mathematics, text preparation, natural language translation, linguistics, and music analysis.

Assembly language, relocatable.

Contributed:
Paul Gavarini, Francois Gaullier, Francoise Mons
HP, Orsay/France

22385A, SYMBOLIC MARCO ASSEMBLER FOR THE HP 2100

This is a symbolic assembler with macro-instructions, generalized literals, extended inter-program linkage, and numerous other useful additions; it is intended to serve as a replacement for existing HP assembly programs. The source language is similar but not identical to that of the standard assembler. It may be assembled using the standard HP assembler.

This assembler functions in a standard SIO environment and requires 8K core.

Assembly language, absolute.

Contributed:
Robert A. Saunders
HP, Automatic Measurement Division

22389A, DOS-M EAU RELOCATABLE BASIC

Relocatable BASIC for DOS-M is essentially equivalent to Hewlett-Packard's single terminal BASIC system, HP 20392A. Two additional commands have been added to this version; PUNCH for high-speed punch output, and PLIST for line printer output. "LIST" generates output to a teleprinter or CRT. This version is EAU and cannot access the disc to SAVE user programs or data files.

A format for adding assembly language subroutines to be referenced by a CALL is included in this documentation.

Assembly language, relocatable.

Contributed:
Eugene Dement
Martin-Marietta Corporation

22396A, AN HP ASSEMBLER FOR THE IBM 360

HPA is a two pass assembler for the HP 2100 symbolic assembly language. It is written in IBM 360 assembly language for execution on the IBM System 360/67 under OS/360. HPA runs in a batch processing mode and can be used to obtain listings, error messages, cross reference tables, and object code for loading into the HP 2100 series computers. The program produces a binary output file to magnetic tape, disc, punched cards, paper tape, or any standard IBM output device.

360 Assembly language.

Contributed:
Dr. Harold Stone, James Peterson, & Ed Porter
Stanford University

22415A, DOS ABSOLUTE OBJECT DECODER

DOS Absolute Object Decoder is a DOS version of HP 22292 BCS Absolute Object Decoder. It is an ALGOL program designed to produce a pseudo-source from an absolute binary tape, complete with labels, which will assemble back to the original absolute. Such a tape would be relatively easy to decipher and edit into a functional equivalent of the original source.

Decoding is by word comparison with the consolidated coding sheet. A programmer may generate a binary word by any of several methods, depending on his purpose. DCODE tries to convert to machine instructions if possible, otherwise to an OCT constant. The generation of DEF, ABS, ASC, DEC, DEX and BSS pseudo instructions, expression operands and OCT other than by default are not within the scope of this program.

ALGOL/FORTAN

Contributed:
Karl Helness
HP, Data Systems

22417A, SUPER BASIC FOR DOS-M

Super BASIC for DOS-M is essentially equivalent to Hewlett-Packard's single terminal BASIC system HP 20392A. Some important differences include three (3) additional commands: PUNCH for high-speed punch tape output, PLIST for line printer output, and LOAD for inputting user programs from DOS-M source files. This program uses the disc work area for temporary storage allowing a total user program and array storage of 32K words. Conditional execution of program functions control output, terminate execution, and delete REMARK statements. Statement numbers range from 1 to 32767. GOTO and GOSUB statements may be followed by arithmetic expressions or line numbers. Requires 16K DOS-M with EAU.

Assembly language, relocatable.

Contributed:
Joel Rubenstein
Martin Marietta Corporation

22438A, DOS-M RELOCATABLE REVERSE ASSEMBLER

This program will reverse assemble (produce an Assembly-type listing) from relocatable object code located in disc files, the JBIN area of the disc, the disc-resident library, magnetic tape, or paper tape. The relocatable object code may have been produced by either the assembler or a compiler using a DOS-M system.

Assembly language, relocatable.

Contributed:
Dennis I. Smith
Montana State University

24031B, EXTENDED ASSEMBLER, NON-EAU

Using SIO drivers, this assembler converts assembly-language source programs to relocatable or absolute binary form for execution by non-EAU computers. The translation is extended to include recognition of literals, to provide a listing of control commands, and to handle conditional or repeated source statements. The programs produced run under the BCS Operating System.

Equipment required is 8K of core storage.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24032B, EXTENDED ASSEMBLER, EAU

Using SIO drivers, this assembler converts assembly-language programs to relocatable or absolute binary form for execution by EAU-equipped computers. The translation is extended to include recognition of literals, to provide a listing of control commands, and to handle conditional or repeated source statements. The programs produced run under the BCS Operating System.

Equipment required is 8K of core storage.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24038B, 4K ASSEMBLER, NON-EAU

Intended for 4K computers and using SIO drivers, this assembler converts assembly-language programs to relocatable or absolute binary form for execution by non-EAU computers. The programs produced run under the BCS Operating System.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24039B, 4K ASSEMBLER, EAU

Intended for 4K computers and using SIO drivers, this assembler converts assembly-language programs to relocatable or absolute binary form for execution by EAU-equipped computers. The programs produced run under the BCS Operating System.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24044B, ALGOL COMPILER

Using SIO drivers, this compiler converts ALGOL programs to relocatable binary form. An assembly language listing is also provided. The programs produced run under the BCS Operating System.

Equipment required is 8K of core storage.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24129B, RTE/DOS ALGOL COMPILER

Used by the RTE, DOS, and DOS-M Operating Systems, this compiler converts ALGOL programs to relocatable binary form. An assembly language listing is also provided.

The programs produced run under the DOS, DOS-M, RTE, or BCS Operating System.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24158B, DOS-M ASSEMBLER

Used by the DOS-M Operating System, this assembler converts assembly-language programs to relocatable or absolute binary form. The relocatable binary programs run under the DOS-M, DOS, RTE, or BCS Operating System.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24159B, DOS-M FORTRAN

Used by the DOS-M Operating System, this compiler converts FORTRAN II programs to relocatable binary form. An assembly language listing is also produced. The programs produced run under the DOS-M, DOS, RTE, or BCS Operating system.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24160A, EDUCATIONAL BASIC SYSTEM

This software product is an operating system intended for user programs written in BASIC language. The operating system consists of a BASIC language interpreter together with additional program modules to permit independent operation. Two I/O devices are used — a teleprinter and a punched card/mark sense card reader. As well as furnishing printed outputs and a means for keyboard inputs, the teleprinter can punch or read paper tape.

User programs written for this operating system can perform any function within the capabilities of BASIC language, the amount of core storage available, and the I/O devices employed. BASIC, the programming language used, was developed by Dartmouth College as an easy-to-learn programming tool intended for nonprofessional computer programmers. BASIC is conversational in nature, and requires only a knowledge of the English language and an understanding of the decimal numbering system. A person can become completely familiar with BASIC after six hours of instruction, and can write simple programs in an hour. While easy to learn, the version of BASIC used can perform such mathematically sophisticated tasks as matrix dimensioning and manipulation. Full information on BASIC langauge is provided in the publication *HP BASIC* (HP order no. 02116-9077).

The Educational BASIC system is intended primarily for classroom instruction, although programs may be written for this operating system to permit a wide variety of other uses. In classroom use, the operating system can be employed in courses ranging from simple arithmetic to such college level subjects as geophysics, econometrics, differential equations, and comparative sociology. Students' programs are usually entered into the computer from mark sense cards; this eliminates the queueing at the teleprinter which has been a disadvantageous feature of other classroom computer systems. An additional advantage is that the mark sense cards can be prepared as homework assignments, and entered into the computer at the next classroom session.

As well as executing student programs, the operating system can be used to provide a printout of student grades. Classroom assignment tasks and other functions pertaining to the educational field also are possible.

This operating system differs from the BASIC System (software product 20392, A018) only in that it uses a punched card/mark sense card reader.

Equipment required is 8K of core storage, and one HP 2761A-007/008 Optical Mark Reader with interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24170C, RTE/DOS FORTRAN IV COMPILER

Used by the RTE, DOS, and DOS-M Operating System, this compiler converts FORTRAN IV programs to relocatable binary form. An assembly language listing is also provided. The programs produced run under the RTE, DOS, DOS-M, or BCS Operating System.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24177B, RTE/DOS FORTRAN IV COMPILER (10K COMPILER AREA)

Used by the RTE, DOS, and DOS-M Operating System, this compiler converts FORTRAN IV programs to relocatable binary form. An assembly language listing is also provided. The programs produced run under the RTE, DOS, DOS-M, or BCS Operating System. The compiler demonstrates a decided increase in speed over program 24170. However, program 24177 requires 10K of core storage, and thus cannot be used by computers with small core-storage capacity. Features of program 24177 include a source program listing with page headings and line numbers, and a symbol listing which includes the name, address, type, usage, and location (local, common, dummy, or external) of all source-program symbols.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24246A, EXTENDED ASSEMBLER FLOATING POINT

Using SIO drivers, this assembler converts assembly-language source programs to relocatable or absolute binary form for execution by HP 2100 computers equipped with floating point hardware. The translation is extended to include recognition of literals, to provide a listing of control commands and to handle conditional or repeated source statements. The programs produced run under BCS control.

Assembly language, relocatable

HP Supported:
Data Systems Development Division (Cupertino)

24247A, 4K ASSEMBLER FLOATING POINT

This assembler, using SIO drivers, converts assembly-language source programs to relocatable or absolute binary form for execution by HP 2100 computers with the floating-point option. The programs produced run under BCS control.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

A019, EXTERNAL INTERRUPT PROCESSING

22235A, FORTRAN POWER FAIL LINK

This routine is a relocatable function which, when called links the power-fail restart interrupt to a FORTRAN program. This permits the program to be restarted without manipulation of panel controls. Simplified restart is extremely useful when a computer without high-speed I/O devices is used by untrained personnel.

Equipment required is the power failure auto-restart option for the computer.

Assembly language, relocatable.

Contributed:
Stroud Custer
HP, Eastern Sales Region

20688D, REAL-TIME EXECUTIVE OPERATING SYSTEM

The Real-Time Executive (RTE) Operating System uses multiprogramming and priorities to schedule real-time and background programs that can be core-resident or disc-resident. RTE controls all I/O and interrupt processing, with the exception of special privileged interrupts, which can circumvent RTE for exceptionally rapid response.

Full information on the RTE Operating System is given in the publication *Real-Time Software* (HP order no. 02116-9139).

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

22401A, RTE SELF SUSPEND ROUTINE

This routine allows a user to "program" a Suspend for a specified length of time in his applications program. If the calling routine was in the time list before suspension, it will be reinstated and rescheduled in the time list.

Assembly language, relocatable.

Contributed:
J.O. Askew
American Telephone & Telegraph Co.

29016C, RTE SYSTEM

The Real-Time Executive (RTE) Operating System uses multiprogramming and priorities to schedule real-time and background programs that can be core-resident or disc-resident. RTE controls all I/O and interrupt processing, with the exception of special privileged interrupts, which can circumvent RTE for exceptionally rapid response.

Full information on the RTE Operating System is given in the publication *Real-Time Executive Software System* (02005-90002).

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

20201C, BCS PLOTTER LIBRARY

Used by the BCS Operating System, these FORTRAN-callable routines perform the following functions, and display the results on a Calcomp Model 565 Plotter:

a. Scale Cartesian coordinates to a specified graph size.

b. Generate scaled X and Y axes for the graph.

c. Generate a curve for the graph, with symbols or data points marked.

Equipment required is one Calcomp Model 565 Digital Incremental Plotter, with interface kit.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

20209C, DACE LIBRARY

This program library provides the standard programs required by the HP 12659A Data Acquisition and Control Executive Operating System.

Equipment required is 8K of core storage, the HP 12659A DACE Operating System, and one HP 12539 Time Base Generator.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

20810B, RTE/DOS PLOTTER LIBRARY

Used by the DOS, DOS-M, and RTE Operating Systems, these FORTRAN-callable routines perform the following functions, and display the results on a Calcomp Model 565 Plotter:

a. Scale Cartesian coordinates to fit a specified graph size.

b. Generate scaled X and Y axes for the graph.

c. Generate a curve for the graph, with symbols or data points marked.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

22329A, SCIENTIFIC SUBROUTINE PACKAGE

This package of 64 scientific subroutines solves problems in polynomial operations, matrices, linear and non-linear equations, fourier analysis, and integration and differentiation. Additionally a uniform and normal random number generator and thirteen special functions are included. All routines are written in FORTRAN II and can be used with any Hewlett Packard 2100 family system. Some were adapted to HP FORTRAN II from existing scientific subroutines (IBM 360) and others were written at Hewlett Packard France.

FORTRAN II.

Contributed:
Paul Gavarini/Jean Arban
HP, France/Orsay

22362A, STACK ROUTINES

This set of subroutines allows an Assembly Language program to perform stack operations. The package contains the following routines: CLRST, PUSH, PULL and RMOVE. CLRST clears the stack by setting the upper limit for the number of items in the stack in the first location of the stack. It also sets the pointer in the second position to point to the first free location in the stack (which is the third word of the stack). The upper limit must be stack length-2. PUSH stores an item onto the stack and increments the pointer. RMOVE removes the top item from the stack by decrementing the pointer. The package serves as a tool for recursive calls of programs.

These subroutines may be configured into the user's system library under DOS or DOS-M. Error exits result in calls to the EXEC.

Assembly language, relocatable.

Contributed:
Erkki Anttila
Technical University of Helsinki/Finland

24145A, BCS RELOCATABLE LIBRARY, EAU

This library contains subroutines which perform a wide variety of mathematical and utility operations. The subroutines are used with the BCS Operating System, and are intended for computers equipped with EAU. The subroutines are called automatically by the assembler or by the FORTRAN or ALGOL compiler, and in many instances they can be called directly by the source program. A full description of each subroutine is furnished in the publication *Relocatable Subroutines* (HP order no. 02116-91780).

Equipment required is 8K of core storage and EAU.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24146A, BCS RELOCATABLE LIBRARY, NON-EAU

This library contains subroutines which perform a wide variety of mathematical and utility operations. The subroutines are used with the BCS Operating System, and are intended for computers not equipped with EAU. The subroutines are called automatically by the assembler or by the FORTRAN or ALGOL compiler, and in many instances they can be called directly by the source program. A full description of each subroutine is furnished in the publication *Relocatable Subroutines* (HP order no. 02116-91780).

Equipment required is 8K of core storage.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24147A, 4K BCS RELOCATABLE LIBRARY, NON-EAU

This library contains subroutines which perform a wide variety of mathematical and utility operations. The subroutines are used with the BCS Operating System, and are intended for 4K computers not equipped with EAU. The subroutines are called automatically by the assembler or by the FORTRAN compiler, and in many instances they can be called directly by the source program. A full description of each subroutine is furnished in the publication *Relocatable Subroutines* (HP order no. 02116-91780).

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24148A, 4K BCS RELOCATABLE LIBRARY, EAU

This library contains subroutines which perform a wide variety of mathematical and utility operations. The subroutines are used with the BCS Operating System, and are intended for 4K computers equipped with EAU. The subroutines are called automatically by the assembler or by the FORTRAN compiler, and in many instances they can be called directly by the source program. A full description of each subroutine is furnished in the publication *Relocatable Subroutines* (HP order no. 02116-91780).

Equipment required is the EAU option.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24149A, BCS FORTRAN IV LIBRARY

This library contains subroutines which perform a wide variety of mathematical and utility operations. The subroutines are used by the BCS Operating System, and are called automatically by the FORTRAN IV compiler when the user program is compiled under the RTE, DOS, or DOS-M Operating System. In many instances the subroutines can also be called directly by the source program. The FORTRAN IV library is used in addition to the appropriate BCS relocatable library. A full description of each subroutine is furnished in the publication *Relocatable Subroutines* (HP order no. 02116-91780).

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24150C, RTE/DOS RELOCATABLE LIBRARY, NON-EAU

This library contains subroutines which perform a wide variety of mathematical and utility operations. The subroutines are used with RTE, DOS, or DOS-M Operating System, and are intended for computers not equipped with EAU. The subroutines are called automatically by the assembler or by the FORTRAN or ALGOL compiler, and in many instances they can be called directly by the source program. A full description of each subroutine is furnished in the publication *Relocatable Subroutines* (HP order no. 02116-91780).

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24151C, RTE/DOS RELOCATABLE LIBRARY, EAU

This library contains subroutines which perform a wide variety of mathematical and utility operations. The subroutines are used with the RTE, DOS, or DOS-M Operating System, and are intended for computers equipped with EAU. The subroutines are called automatically by the assembler or by the FORTRAN or ALGOL compiler, and in many instances they can be called directly by the source program. A full description of each subroutine is furnished in the publication *Relocatable Subroutines* (HP order no. 02116-91780).

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24152A, RTE/DOS FORTRAN IV LIBRARY

This library contains subroutines which perform a wide variety of mathematical and utility operations. The subroutines are used with the RTE, DOS, or DOS-M Operating System. They are called automatically by the FORTRAN IV compiler, and in many instances they can be called directly by the source program. The library is used in addition to the appropriate RTE, DOS, or DOS-M relocatable library. A full description of each subroutine is furnished in the publication *Relocatable Subroutines* (HP order no. 02116-91780).

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24153A, RTE/DOS FORTRAN FORMATTER

This routine interprets formats, performs formatted-data transfers, provides unformatted I/O transfers of binary data, furnishes the means for free-field input, and provides buffer-to-buffer format conversion. The routine is used with the RTE, DOS, or DOS-M Operating System.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24245A, HEWLETT-PACKARD COMMERCIAL SUBROUTINES

The Hewlett-Packard Commercial Subroutines provide solutions to business applications and make FORTRAN an easy and powerful commercial language.

FORTRAN/Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24248A, RTE/DOS RELOCATABLE LIBRARY — FLOATING POINT

This extensive library of mathematical and utility subroutines is used with RTE, DOS or DOS-M and run as an HP 2100A computer equipped with the floating-point option. The subroutines are called automatically by a non-floating point assembler or by the FORTRAN or ALGOL compiler.

FORTRAN/Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24249A, 4K BCS RELOCATABLE LIBRARY — FLOATING POINT

This extensive library of mathematical and utility subroutines is used with BCS on 4K HP 2100A computers equipped with the floating-point option. The subroutines are called automatically by a non-floating point assembler or the FORTRAN compiler.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24250A, BCS RELOCATABLE LIBRARY — FLOATING POINT

This extensive library of mathematical and utility subroutines is used with BCS on a HP 2100A computer equipped with the floating-point option. The subroutines are called automatically by a non-floating point assembler or by the FORTRAN or ALGOL compiler.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

22273A, CLEAR JOB BINARY AREA IN DOS/DOS-M

This program clears the job binary area in DOS/DOS-M for further compile and load operations in the same job. It is particularly helpful when compilations with errors write rubbish on the job binary area.

Assembly language, relocatable.

Contributed:
Fritz Joern
HP, Germany/Frankfurt

22375A, REMOTE HP 2100 ACCESS TO A 32K DOS

This system allows up to 11 remote HP 2100 computers to access programs stored on a centrally located DOS system. All programs must be stored in absolute binary form. The remote computer may request a program transfer, a data transfer to a previously reserved data file on DOS, and the time of day. All other operations, such as program addition, program deletion, file reservation, etc. are performed by a DOS user program which is part of this package.

Equipment required includes a 32K DOS, an HP 2773A Drum, an I/O Extender, DMA, and EAU as the central computer. Up to eleven 4K remote computers may be interfaced using 2 microcircuit interface cards (HP 12566A), and 36 twisted-pair connecting cables up to 300 feet in length (HP 8120-1283).

FORTRAN IV/Assembly language, relocatable and absolute

Contributed:
Glen Worstell
HP, Loveland Division

22377A, DOS-M DISC INITIALIZE/PROTECT UTILITY

This set of programs, operating as a USER PROGRAM under DOS-M, enables the user to perform the following:

a. DUMP a "protected" copy of current System Disc onto another Subchannel Disc.

b. Initialize any Subchannel Disc other than Current System Subchannel Disc.

c. Protect or Unprotect selected tracks on any given Subchannel Disc.

d. Produce a status report on any given Subchannel Disc, indicating the condition of each track with respect to being flagged Protected, Unprotected, or Defective.

It requires a minimum DOS-M system, version HP 24225C or later and an HP 2870 or HP 7900 disc. It will not work with the HP 2883 disc.

FORTRAN IV/Assembly language, relocatable.

Contributed:
Bill Williams
HP, Data Systems

22398A, RTE JOB CONTROL LANGUAGE FOR BATCH PROCESSING

RTE JOB PROCESSOR is a foreground disc resident routine for the HP 2005A, 2005B, or 2005C Real Time Executive which provides a primitive job control language for controlling the execution of programs from a batch device such as a card reader, mag tape or tape reader. The program accepts directives for job, statement, end job, pause, comment, logical source declaration, load and go assignment, schedule request, and job processor terminate.

Typical uses of this program might include compiling, loading, and executing a FORTRAN or assembly language program in the background of RTE, or running a series of programs to perform a specific task (either foreground or background).

Assembly language, relocatable.

Contributed:
David R. McClellan
HP, Southern Sales Region

22416A, CREATE DOS-M DIRECTORY ENTRY UNDER PROGRAM CONTROL

Subroutine DIREN provides the DOS-M user with a method of establishing directory entries for files created under program control. The user writes data of the appropriate type starting at the beginning of the work area keeping count of the number of sectors used. When data storage is complete, a call to the appropriate entry point of DIREN creates the new directory entry. It is FORTRAN callable.

Assembly language, relocatable.

Contributed:
Tom Winker
HP, Neely Sales Region

20100B, SYMBOLIC EDITOR

This program edits and updates symbolic programs or files. The input is a file to be edited and a file of editing information. The output is an altered symbolic file. The edit file may be entered from the keyboard or from the standard input unit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20805C, RTE EDITOR

This RTE program edits and updates symbolic programs or files. The input is a file to be edited and a file of editing information. The output is an altered symbolic file. The edit file may be entered from the keyboard or from the standard input unit.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

22114A, REPRODUCE/EDIT PAPER TAPE

This program furnishes the means for manually editing punch tape in any of the following formats:

a. Relocatable binary

b. Binary data

c. Absolute binary

d. Source language

e. Time-sharing source language

Records may be added by reading punch tape, or deleted by advancing tape in the tape reader. Separate tapes can be combined into a single tape. Tape from the BASIC Compiler can be formatted for other time-share systems. An express mode gives nonstop copy reproduction.

Assembly language, absolute.

Contributed:
Barry S. Todd
Naval Weapons Center, Corona, Calif

22171A, FORTRAN UNIT REFERENCE NUMBER EDITOR

This FORTRAN II program allows the user to alter the unit reference number of an input/output statement written in FORTRAN II. The program is conversational, and asks for required information on the teleprinter. Written for use with the Stat-Pack program group, this program is not itself a part of Stat-Pack.

FORTRAN II

Contributed:
Roland E. Jahn
HP, Medical Electronics Div.

22285C, CONVERSATIONAL DOS-M DISC FILE EDITOR

This program edits DOS-M user source files by instructions from the system teleprinter or batch device. Files or portions of files can be merged and lines may be deleted, inserted, or modified. All occurrences of a character string such as a label, a variable name, an array, etc. can be replaced by a new string using a single command.

The user is further aided by the flexibility of specifying the destination file if different from the source file, listing the current line or line number while editing, editing in a conversational mode, and the optional rescanning of the destination file.

Assembly language, relocatable.

Contributed:
Michael Sweet
University College of North Wales

22286A D H SYMBOLIC EDITOR

This absolute program is a flexible editor for FORTRAN and Assembler source programs. Operating characteristics are similar to the HP Editor, 20100, but include these special features; edit commands may be entered in any order and are not restricted to the ascending order of source statements affected; selected parts of the source programs may be edited and listed simultaneously; lines to be edited may be specified by label or line number; a hierarchy for performing edit operations is well-defined; and a scheme for editing the current edit file is provided for the non-typist programmer.

Assembly language, absolute.

Contributed:
B. R. Beadle
Giddings & Lewis Machine Tool Company

22371A, QUOTATION MARKS CONVERSION IN DOS/DOS-M FILES

This program changes (') to ('') in DOS/DOS-M files. It requires DOS-M Word Oriented File Access and string lookup routine, HP 22277.

FORTRAN IV/Assembly language, relocatable.

Contributed:
Klaus Stamer
HP, Frankfurt/Germany

22393A, ON-LINE EDITOR

This editor program allows the user to prepare a symbolic file by entering it directly into available memory from the TTY. Alternatively, a file may be prepared off-line on paper tape and loaded into memory with a tape reader. Editing operations are conversational, and are performed on-line using the TTY. The procedures are similar to those used in constructing a "BASIC" program. Available editing operations include deleting, replacing, and inserting lines or series of lines. A limited degree of character editing is possible. The file or portions of it may be listed on the TTY (with or without line numbers), or punched out on either the TTY or a high speed punch. The program is coded in absolute assembly language, resides entirely on base page, and uses its own I/O drivers. One page of memory is reserved for address storage. The remaining available memory is used to store the symbolic file, two ASCII characters per word.

Assembly language, absolute.

Contributed:
Bruce T. Lucas
Naval Weapons Center

22198C, MAGNETIC TAPE STORAGE AND RETRIEVAL PROGRAM

This independent program performs any of the following functions:

a. Records punched tape images on magnetic tape. If additional images are subsequently recorded, the end-of-file mark is removed and a new one is placed after the new material.

b. Under manual control, removes the last record written on magnetic tape.

c. Verifies that data recorded on the magnetic tape is identical with the contents of a specified core storage area.

d. Makes a punched tape duplicating data on the magnetic tape.

e. Lists data from the magnetic tape on a line printer or teleprinter.

f. Reads the magnetic tape and lists on a line printer or teleprinter a directory of programs recorded on the tape.

Program 22209C (classification code A106) performs additional functions using the format of program 22198.

Equipment required is 16K of core storage (limited functions are possible with 8K), the Direct Memory Access option for the computer, one HP 3030G or 7970 Magnetic Tape Unit with interface kit, and one HP 2752 Teleprinter, HP 2754 Teleprinter, or one HP 2600A Terminal, with interface kit.

Assembly language, absolute.

Contributed:
Charles Chernack
HP, Eastern Sales Region

22272A, DISC/DRUM UTILITY

This absolute program under control of the system teleprinter accepts commands to save, restore, and verify information stored on the disc/drum with information stored on magnetic tape. It is useful for creating a disc/drum backup copy on magnetic tape. For efficiency, tape record length is the same as the track length. Selected sectors may also be listed in octal on the teleprinter.

Equipment required includes 16K memory, EAU, DMA, and HP disc or drum, and any HP magnetic tape drive.

Assembly language, absolute

Contributed:
John H. Welsch
HP Laboratories

22284A, DOS-M DUMP/RESTORE PROGRAM

This set of programs enables the user to save the contents of DOS-M subchannels on magnetic tape using either the 2870A (IOMEC), 2883A (ISS), or 7900A (HP) disc. The saved disc contents may later be restored to the same or different subchannels from magnetic tape. A feature is included to verify the magnetic tape file with the contents of the disc sub-channel.

FORTRAN II/Assembly language, relocatable.

Contributed:
Bill Williams
HP, Data Systems

22299A, DOS/DOS-M SOURCE STORAGE AND RETRIEVAL

This program allows the user to store and retrieve source files on magnetic tape under control of DOS or DOS-M. Unlike the :DU command, it writes all necessary end-of-file marks. Additionally, the user may write a file, purge a file, list a directory of files, search for a given file by file name and end execution. The search feature is followed by a return to the disc monitor, "@", so that a user may store ":ST,S" to disc. All files are named and dated. The program is self-configuring and requests all necessary parameters through the system console.

Assembly language, relocatable.

Contributed:
Richard Strauss
HP, Medical Electronics Division

22356A, PACKED MAGNETIC TAPE STORAGE AND RETRIEVAL FOR DOS-M

Two separate programs store and retrieve "packed" source, relocatable, and absolute code on magnetic tape under DOS-M. Each record is packed with a maximum of 2048 words. Approximately 50 source programs can be stored on one 600' reel of tape. Each file contains one program and is labelled at the beginning. Input and output may be cards, paper, or disc.

Assembly language, relocatable.

Contributed:
Thomas J. Winker
HP, Neely Sales Region

24227B, DOS-M EXTENDED FILE MANAGEMENT PACKAGE

The Extended File Management Package (EFMP) extends the file handling capabilities of DOS-M by allowing the user to create and access files with different record lengths, security codes, etc. EFMP consists of a series of EXEC modules and a utility program (UTIL). The prerequisites are DOS-M with 16K core.

Assembly language and FORTRAN IV.

HP supported
Data Systems Development Division (Cupertino)

24228A, DOS-M/HP 2000C TIME-SHARE BASIC FILE HANDLER

The File Handler is used to input files or programs that have been dumped onto magnetic tape by a 2000C TSB system into a DOS-M environment. The program can also be used to dump files onto magnetic tape for input to TSB.

ALGOL and assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

24240A, DOS-M/HP 2000C TIME-SHARED BASIC FILE INTERFACE PACKAGE

This routine accesses files (generated in a DOS-M system by the DOS-M/2000C TSB File Handler program, HP 24228A), records and data items without the need of maintaining relative sector numbers, end-of-file or end-of-record marks.

Assembly language, relocatable.

HP supported:
Data Systems Development Division (Cupertino)

22081A, BIT OPERATIONS (SET, CLEAR, TEST) — FORTRAN CALLABLE

These subroutines set or clear any bit of any specified word. In addition, the status of any bit can be tested by a FORTRAN "IF" statement.

Assembly language, relocatable.

Contributed:
Allan P. Sherman
HP, Medical Electronics Div.

22204A, DATA BLOCK MOVEMENT

This routine moves data from one area of core storage to another. The source and destination areas must each be contiguous.

Assembly language, relocatable.

Contributed:
G. L. Davis
Automatic Electric Labs, Inc.

22207A, CHARACTER AND BIT STRING PROCEDURES FOR ALGOL

These ALGOL-callable code procedures permit integer arrays to be manipulated as character strings and bit strings. The strings may be concatenated or broken into substrings; individual characters or bits may be examined and changed.

ALGOL

Contributed:
John H. Welsch
HP Laboratories

22404A, SPACE SAVING ASCII STORAGE ROUTINES

This routine, used in the assembly language environment, handles ASCII string elements containing 8 characters. Usually such a string is stored in 4 computer words. Since the standard ASCII character set contains only 64 different characters (40 to 137 octal), these 8-bit characters are unnecessary. A string element containing 8 characters can be stored in 3 computer words, thus saving 25% of the memory space originally required.

This program consists of 2 routines. Routine 'COMPR' transfers a string element (8 characters) from a source block (4 words) to a destination block (3 words). Routine 'EXPND' inversely transfers a string element from a source block (3 words) to a destination block (4 words).

The calls to the routines can be easily chained thus transferring strings of character blocks.

Assembly language, relocatable.

Contributed:
Hans R. Biesel
HP, Germany/Boeblingen

20096A, CONVERSION ROUTINE MCONV

This routine is used with the HP 2310 A/D Converter, 2310B Multiverter, or 2310C Miniverter System. Data words of up to 14 bits are acquired from one of these equipment items. The routine converts each binary word from left-justified to right-justified form, then changes the number to integer form.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20210A, CONVERSION ROUTINE ICONV

The ICONV routine converts 8-4-2-1 BCD numbers to floating point form. The floating point value is complemented if the sign is negative. If the number represents frequency or resistance, it is appropriately scaled. The routine is designed for use with the HP 2401C or 2402A Integrating Digital Voltmeter; these measuring instruments are used in the HP 2320A and 2322A Low-Speed Data Acquisition Subsystem.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20288A, RTE CONVERSION ROUTINE CONVERT

This RTE routine converts 8-4-2-1 BCD numbers to floating point form. Each BCD number consists of six digits, a sign, and a decimal point. The routine complements the floating point value if the sign is negative. If the number represents frequency or resistance, it is appropriately scaled. The routine is designed for use with the HP 2401C or 2402A Integrating Digital Voltmeter; these measuring instruments are used in the HP 2320A and 2322A Low-Speed Data Acquisition Subsystems.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

20533A, CONVERSION ROUTINE CONV34

The CON34 routine converts BCD numbers to floating point form. The floating point value is complemented if the sign is negative. The routine is designed for use with the HP 3450A Multi-Function Meter.

Equipment required is at least 8K of core storage.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

22086A, EBCDIC to ASCII TRANSLATOR

This routine reads 80-column card images from 9-track magnetic tape, converts the data acquired from EBCDIC to ASCII code, and furnishes the ASCII characters in one or more of the following ways:

a. List card images.

b. Punch card images.

c. Punch with columns 73-80 blank, and with trailing ASCII "space" characters omitted.

d. Halt when any predefined group of characters is detected.

e. Halt after each card image.

f. Read without output (to advance tape rapidly to a desired area).

Equipment required is one HP 3030 Magnetic Tape Unit, with interface kit.

Assembly language, relocatable.

Contributed:
HP, Medical Electronics Div.

22093A, ASCII/IBM 8-LEVEL CHARACTER CONVERSION ROUTINE

This routine reads IBM 8-level characters from 9-track magnetic tape, converts the characters to ASCII form, and

lists or punches the ASCII characters on the teleprinter. The program also reads ASCII characters from punch cards, converts the characters to IBM 8-level code, and records the 8-level characters on magnetic tape.

Assembly language, relocatable.

Contributed:
Charles Chernack
HP, Eastern Sales Region

22214A, CHARACTER CODE TRANSLATOR

This MTS program translates from ASCII to EBCDIC, and from EBCDIC to ASCII. Each translated character can be placed in the core storage location from which the corresponding untranslated character was acquired Alternatively, the translated character can be placed in a different core storage location. The original characters and the translated characters are packed two characters per 16-bit word.

By preparing different conversion tables for the program, a user can convert any 8-bit (or less) code to any other 8-bit (or less) code.

Assembly language, relocatable

Contributed:
G. L. Davis
Automatic Electric Labs, Inc.

22274A, 4-2-2-1 BCD TO FLOATING POINT CONVERSION FOR RTE

These two routines convert 4-2-2-1 BCD data to binary. The data is read by the supported driver, DVR40 from a DSI card connected to a five-digit counter. Input is five digits, twenty bits, stored in two words; output is a two-word floating point number. The range and function returned by some instruments are ignored. It can be easily modified to convert data from an eight-digit counter. FORTRAN-callable.

Assembly language, relocatable.

Contributed:
M. H. Kendall III
Wyle Laboratories

22433A, ASCII/INTEGER CONVERSION ROUTINE

This FORTRAN callable function converts a substring of ASCII characters into an integer value or vice versa.

Assembly language, relocatable.

Contributed:
Umberto Paolucci
HP, Italy/Milan

20312A, PUNCH/VERIFY ROUTINE

The Punch/Verify Routine reproduces and verifies punched tapes.

Assembly language,

HP supported:
Data Systems Development Division (Cupertino)

22041E, PUNCHED TAPE DUPLICATOR

This independent program furnishes a reliable method for copying punched tapes. Either source-language tapes or binary tapes can be duplicated. As a tape original is read into core storage, the checksum is verified. Verification of a duplicated tape against the tape image in core storage also is possible.

The program can combine two or more punched tapes into a single tape, with or without a four feed-hole separation between data from different tapes. A configured tape can be produced from an unconfigured original. As an additional function, a bootstrap loader tape can be punched, duplicating the loader which is in core storage.

Core storage capacity of the computer can be of any magnitude. However, for duplicating lengthy tapes 16K or more may be required. An error printout is furnished if a tape exceeds the core storage capacity. During the reading of a tape original, a countdown in the B-register illustrates the amount of core storage available for the remainder of the tape image. When punching is taking place, the program halts if end-of-tape is detected.

For reading and punching, either high-speed tape reader and punch units can be employed, or the corresponding units in the teleprinter can be used.

Assembly language, absolute.

Contributed:
Charles Chernack
HP, Eastern Sales Region

22113B, MTS PUNCHED TAPE DUPLICATOR

The MTS Punched Tape Duplicator reads punched tape and stores the data in File No. 3 on magnetic tape. Then, under operator control, duplicates of the punched tape are made at the teleprinter or on a high-speed punch. Finally, each duplicate tape can be read and checked against the source material in File No. 3; an error indication is provided if there is a discrepancy.

Assembly language, absolute.

Contributed:
Bill Swanson
HP, Southern Sales Region

22180C, FAST PUNCH VERIFY

"Fast" Punch/Verify permits rapid duplication, verification, and comparison of paper tapes punched in any format. The tape reader and punch run continuously and simultaneously at maximum rates by utilizing program interrupts. A releasable configuration section allows tailoring the program to any memory size and I/O configuration, while allowing maximum memory space for storing the master in core for verification.

Assembly language, absolute.

Contributed:
David R. McClellan
HP, Southern Sales Region

22197A, SINGLE DRIVE MAGNETIC TAPE COPY PROGRAM

This DOS program copies or reblocks magnetic tapes with a single tape unit in the computer system. The disc is used for intermediate storage. Verification is made between the master tape and the disc, and between the disc and each copy tape. The program is FORTRAN callable.

Equipment required is one HP 7970A or 3030G Magnetic Tape Unit, with interface kit.

Assembly language, relocatable.

Contributed.

22209C, DRUM BASED MAGNETIC TAPE DUPLICATOR

Using source magnetic tapes with the format produced by program 22198 (classification code 102), this independent program performs any of the following functions:

a. The program makes copies of a magnetic tape using a single magnetic tape unit. The drum is used for intermediate storage.

b. The program allows many magnetic tapes to be combined on the drum. A single magnetic tape can then be prepared from the drum files.

c. The program can purge any specified file from the drum.

d. Magnetic tape files on the drum can be sorted by ID number.

e. Selected files on the drum can be recorded on magnetic tape.

f. A directory of programs recorded on magnetic tape can be listed on a line printer or teleprinter.

Because this is an independent program, the magnetic tape format and drum format are not compatible with the formats used in standard HP operating systems. Therefore, the magnetic tapes produced must be transferred to punched tape, using program 22198, before use in an operating system.

Equipment required is 16K of core storage, and the Direct Memory Access and Extended Arithmetic Unit options for the computer. Also required is an HP 2773/4/5 Drum Memory with power supply and interface kit, and an HP 3030 Magnetic Tape Unit with interface kit.

Assembly language, absolute.

Contributed:
Charles Chernack
HP, Eastern Sales Region

22252A, RTE/DOS DUPLICATOR PROGRAM

This RTE and DOS program duplicates punched tapes. The data from the master tape is stored on disc, and one or more copy tapes are then punched from the disc file. Checksum verification is performed, and each copy tape can be reread and compared with the disc file.

Assembly language, relocatable.

Contributed:
Alberto Panni
HP, Italy/Milan

22360A, DOS-M PAPER TAPE REPRODUCER

This paper tape reproducer for DOS-M uses a double buffer to achieve maximum speed on input/output devices. When used with the contributed photoreader driver, HP 22353, absolute binary tapes can be reproduced as well as source and relocatable binary. Checksums are computed on relocatable and absolute binary format tapes.

Assembly language, relocatable.

Contributed:
Thomas J. Winker
HP, Neely Sales Region

22368A, PAPER TAPE COPY

This absolute program punches and verifies paper tapes of any format. It can also copy a file from a magnetic tape or disc via the appropriate SIO driver. Checksums are verified via the photoreader while the punch operation is still in progress. Copy also allows a user to concatenate tapes.

Assembly language, absolute.

Contributed:
George Anzinger
HP, Automatic Measurement Division

20237A, LIBRARIAN

Using SIO drivers, this program modifies library tapes of relocatable routines, arranging the routines in the order specified by the user.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

22079B, NUMERIC STRING SORT FOR ASCII RECORDS

This program reads records of string data. Each record is prefixed by a four-digit numeric code used by the program for sorting the records. Then the numeric code is dropped, and the string records are printed out "in order."

This program reads either punched or marked sense cards or can read from the teletype. The string data may be up to 48 characters in length and is pre-fixed by a four-digit integer in the first four columns. The string begins in column seven. The data is read into the computer in random order. The computer then counts the number of strings and prints each string out in order from the lowest to the highest four-digit integer.

FORTRAN II

Contributed:
Robert Richardson
HP, Eastern Sales Region

22116A, ORDERING A FLOATING POINT ARRAY

This subroutine arranges a floating point single-dimension array in ascending or descending order. The original arrangement of data is destroyed. The subroutine is FORTRAN callable.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22167A, ORDERING A FIXED POINT ARRAY

This subroutine arranges a fixed point single-dimension array in ascending or descending order. The original arrangement of data is destroyed. The subroutine is FORTRAN callable.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22168A, RANKING A FLOATING POINT ARRAY

This subroutine arranges a floating point single-dimension array in ascending or descending order. The original arrangement of data is not destroyed. The subroutine is FORTRAN callable.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22169A, ORDERING A FLOATING POINT ARRAY

This subroutine arranges a floating point single-dimension array in ascending order. The original arrangement of data is destroyed. The subroutine is FORTRAN callable.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22282A, DOS-M LIBRARIAN

The DOS-M Librarian accepts paper or magnetic tape input to shorten, lengthen, or modify relocatable libraries. The user communicates with the librarian by means of commands typed in through the system console. Program input is created by Prepare Tape System (PTS) or the :DU command of DOS-M and output is on punched paper tape.

Assembly language, relocatable.

Contributed:
Thomas J. Winker
HP, Neely Sales Region

22343A FIELDSORT

This ALGOL procedure sorts ASCII or integer data into alphabetic and/or numeric order. The user specifies the number of records to be sorted, the record length, and the field on which the sort is to be performed. The remaining data in each record is carried along unchanged by FIELDSORT. Sorting is conducted "in place" consequently the sorted data replaces the unsorted data in core storage.

ALGOL

Contributed:
Jim Katzman
Amdahl Corporation

22376A, ASCII DISC FILE FIELD SORT

This program generates ASCII files under DOS or DOS-M and allows the user to sort the files according to ASCII hierarchy. The sort is accomplished according to a user specified field containing from 1 to 10 characters. Fields are sorted from left to right. A maximum of 1000 lines may be sorted. The sort is completely core based and requires 16K.

FORTRAN II.

Contributed:
George W. Taylor
HP, Neely Sales Region

22383A, ALPHANUMERIC RECORD SORT

This program performs a very rapid ASCII Code sort in an 8K BCS environment. The program uses two disc or magnetic tape files for scratch area and sorted data output. Optionally the sorted data may be dumped to the line printer, paper tape or a third disc/magnetic tape file with a substantial improvement in execution time.

Up to four separate fields may be selected in order of sorting significance. Each field may range from a single solumn to the entire length of the record.

ALGOL/Assembly language, relocatable.

Contributed:
Marlin Schell
HP, Data Systems

22430A, NUMERIC SORT

There are three subroutines in this package for a fast "in-core" sort of integers, reals, and double precision numbers. It requires a minimum of 8k core, and is FORTRAN IV callable.

FORTRAN IV/Assembly language, relocatable.

Contributed:
Encrico P. Mariani
HP, Italy/Milan

22090A, KEYBOARD TAPE GENERATOR

This program accepts octal data and ASCII commands from the teleprinter keyboard, and generates an absolute-address punched tape suitable for loading by the Basic Binary Loader or for use as a bootstrap loader.

Assembly language, absolute.

Contributed:
Stroud S. Custer
HP, Eastern Sales Region

22165A, CARD TO MAGNETIC TAPE UTILITY

This program creates magnetic tape files from mark sense cards and/or punched cards. Any of a variety of tape formats can be used. The program converts from Hollerith Code to ASCII or EBCDIC Code, and labeled or unlabeled tapes can be produced. The block size (number of cards per record) and logical record size (number of card columns per record) can be specified. Unblocked tape records can be produced, if desired. The program provides 200 card/minute throughput to tape.

Equipment required are the Direct Memory Access and Extended Arithmetic Unit options for the computer, and one HP 2761A-007 Optical Mark Reader with interface kit, and one HP 3030 Magnetic Tape Unit with interface kit.

Assembly language, relocatable.

Contributed:
David R. McClellan
HP, Southern Sales Region

22166A, MAGNETIC TAPE TO PRINT UTILITY PROGRAM

Under teleprinter keyboard control, this program dumps magnetic tape files onto a line printer. The tape records may have any of a variety of formats, and either ASCII or EBCDIC files can be accommodated.

Equipment required is the Direct Memory Access option for the computer, one HP 3030 Magnetic Tape Unit with interface kit, and one line printer with interface kit.

Assembly language, relocatable.

Contributed:
David R. McClellan
HP, Southern Sales Region

22341A, FTN IV CORE SAVER

This subroutine allows the FORTRAN IV program that uses only FORTRAN II I/O functions to use the FORTRAN II formatter and thus save a considerable number of words. The savings in RTE/DOS are a maximum of $1562_8 = 882_{10}$ words. In BCS the savings are a maximum of $1213_8 = 651_{10}$ words.

Assembly language, relocatable.

Contributed:
George Anzinger
HP, Automatic Measurement Division

22347A, DOS/DOS-M SOURCE FILE VERIFY PROGRAM

This program provides the capability of comparing a source program against a source file on DOS or DOS-M. The user provides the logical unit of the input device and the name of the source file. The program reads the tape and compares it with the disc file, record by record. If a line is found that does not agree, the disc and tape version are printed out. A final statement is made that the verify is "Good" or "Not Good."

By using this program with the standard DOS/DOS-M features, ":ST,S" and ":DU", one can duplicate source tapes and verify the read and punch operations.

FORTRAN II/Assembly language, relocatable.

Contributed:
Roland E. Jahn
HP, Medical Electronics Division

22354A, DOS-M STORE ABSOLUTES

This program "STAB" uses the contributed photoreader driver, HP 22353, to read an absolute object tape into a user buffer area and then stores the tape in a disc file of type BD, binary data. This file is created under program control with the corresponding directory entry. STAB allows the user to create disc files of any type under program control along with the corresponding directory entry.

Assembly language, relocatable.

Contributed:
Thomas J. Winker
HP, Neely Sales Region

22355A, DOS-M PAPER TAPE/DISC VERIFY

This program allows a user to verify paper tapes of any format against a disc file under DOS-M. If used in conjunction with the contributed photoreader driver, HP 22353, and the DOS-M Store Absolutes, HP 22354, this program will verify absolute object tapes against a binary data file.

Assembly language, relocatable.

Contributed:
Thomas J. Winker
HP, Neely Sales Region

22358A, EASY MAGNETIC TAPE I/O AND STATUS INFORMATION

This utility is used in a DOS/DOS-M or RTE environment to eliminate the tedious programming required to achieve magnetic tape data transfer or status information. It checks for on line condition, write ring present, end of tape, and CALLs EXEC for data transfers and status. By checking the indicators returned by this routine the user maintains the flexibility of branching in his own program.

Assembly language, relocatable.

Contributed:
Thomas J. Winker
HP, Neely Sales Region

22359A, HANDI-0

This group of nine utility programs allows the DOS-M user to page the line printer, produce leader on the punch, write a ": :" to magnetic tape, rewind magnetic tape, back space magnetic tape file(s), back space magnetic tape record(s), forward space magnetic tape file(s), forward space magnetic tape record(s), and convert card input to paper or magnetic tape eliminating trailing spaces. All necessary calls are performed by the program.

Assembly language, relocatable.

Contributed:
Thomas J. Winker
HP, Neely Sales Region

22381A, RELOCATABLE MODULE LISTER

This program allows a user to selectively list the following records from relocatable tapes; NAM, ENT, EXT, DBL, and END along with their relocatable addresses. The listing may be generated in either symbolic or octal format under BCS, MTS, DOS, or DOS-M. Errors such as checksums, parity, etc. are also listed.

Assembly language, relocatable.

Contributed:
Dave Snyder
HP, Santa Clara Division

22392A, RELOCATABLE OBJECT UTILITY LIBRARIAN

This program reads relocatable object tapes under BCS and optionally lists program length, length of common in octal, names of entry points, and external references. Each program may be selectively punched onto a library tape.

Assembly language, relocatable.

Contributed:
Thad Smith III
National Bureau of Standards

22400A, ZERO

This ALGOL callable routine stores zeroes or ASCII blanks throughout an array. It is most useful when repeated calls to the library "INDEX" routine would tend to slow program execution. It requires 8K core and was written for the BCS environment.

Assembly language, relocatable.

Contributed:
Ed Doust
HP, Corporate

22427A, MEDIA CONVERSION

This program converts ASCII code from one type of storage media to another. Conversion modes allowed are: card to mag tape, card to list and card to paper tape; mag tape to list and mag tape to paper tape; paper tape to list, paper tape to mag tape, and paper tape to paper tape. The program responds to user commands under DOS-M and is compatible with the :STORE and :DUMP directives.

Assembly language, relocatable.

Contributed:
Bjoern Lindberg
HP, Sweden/Stockholm

22277A, DOS-M FILE ACCESS AND STRING LOOKUP

Subroutine DISC provides word-oriented access to serial disc files under DOS-M. The user program specifies only the relative word number within the file and the routine calculates the physical track and sector addresses. It buffers user's requests through a one-sector buffer. User READ requests are performed as logical reads (i.e. if the required sector is already in core, the disc is not physically accessed). No logical WRITE is attempted. A FORTRAN program is included that demonstrates the use of subroutine DISC as a string lookup routine.

Assembly language, relocatable.

Contributed:
Rudolf Beuerlein
HP, Germany/Frankfurt

22330A, PSEUDO REPORT GENERATOR

This program, operating in a DOS-M environment, enables the user to define, construct, edit, and list ASCII data files in selective output formats. Flexible data base definition enables the user to specify how many data fields as well as the number of characters per field up to a maximum logical record length of 256 characters. Key fields may also be specified and later used in selected listings. Considerable flexibility is provided in the type of listing that may be produced from the data in an existing data file. Typical applications are production of mailing lists, personnel lists, etc.

ALGOL.

Contributed:
Bill Williams
HP, Data Systems

22364A, EFMP RECORD READ/WRITE

This program allows a user to read or write Integer, Octal, or ASCII records (of N words) on any file in the EFMP environment.

FORTRAN IV.

Contributed:
Enrico Mariani
HP, Italy/Milan

22369A, DOS-M FILE WRITER

This program allows a DOS-M user to write integers, reals, or ASCII data on a specified part of a specified file.

It is conversational.

FORTRAN IV.

Contributed:
Enrico Mariani
HP, Italy/Milan

22373A, ITEMIZED EXTENDED FILE MANAGEMENT PACKAGE

This small package of software working in the EFMP environment gives the user an easy way to handle records divided into items (fields).

It consists of programs designed to maintain a directory for itemized files, subroutines that allow easy use of itemized files, and general purpose programs for listing, checking, etc.

It requires a 16K DOS-M system with EFMP, the Extended File Management Package.

FORTRAN IV.

Contributed:
Enrico P. Mariani
HP, Italy/Milan

22429A, EFMP FILE TRANSFER

This program transfers the contents of an EFMP file to a new destination file or an already existing file. It requires another user program, HP 22433.

FORTRAN IV

Contributed:
Enrico P. Mariani
HP, Italy/Milan

22432A, EFMP DIRECTORY LISTER

This program may be used to list an Extended File Management Package directory.

FORTRAN IV

Contributed:
Bjoern Lindberg
HP, Sweden/Stockholm

22172C, IOC — FORTRAN CALLABLE

This subroutine allows direct calls to .IOC from a FORTRAN program, resulting in data transfers which avoid the formatter. Without the formatter no data conversion can be made, and ASCII input characters are stored in ASCII form, and binary inputs are stored in binary form.

Assembly language, relocatable.

Contributed:
Fritz Joern
HP, Germany/Frankfurt

22238A, FORTRAN RUN-TIME FORMAT SPECIFICATION

This subroutine provides FORTRAN input and output statements with a format reference to an array whose contents may be defined at run time, rather than to a labelled program source statement. During execution, the format pointer in the compiler-generated assembly code is changed to the actual parameter (typically, an integer array name) with which the subroutine is called.

Assembly language, relocatable.

Contributed:
Don Pettengill
HP, Data Systems (Mt. View)

22370A, OFFLINE ENCODE/DECODE FOR THE TALLY DATA SYSTEM

The Tally program is used to encode and decode source tapes which are to be sent over phone lines via a Tally Data System. Encoding inserts checksums, parity bits, etc. at the sending station and decoding deletes these verification punches. To give the user confidence in the accurate transmission at the receiving station, the Tally program checks the encoded tape and then it decodes the accepted data tape.

It is not intended to replace standard data communications procedures in any way. Tally is self-contained, requires only 4K core, and both the sending and receiving stations must have copies of this program.

Assembly language, absolute.

Contributed:
Eugene Burmeister
HP, Loveland Division

22386A, MULTIRECORD FORMATTED OUTPUT LISTER

This program provides user capability to output multi-record formatted data streams to one or more list devices via user command control under DOS. Ostensibly for line-printer listings of punched cards, the user command set allows selective input from several devices and juxtaposition of these input fields. The command set also controls insertions of spaces, characters, portions of a core-saved record, page numbers, page headings, top of form line-spaces, and linefeeds into the data stream. The user may vary output record length by stripping trailing blanks, or partially suppress a listing of the output data stream via command control.

The command set itself may be partially input through the terminal in a conversational mode or mixed with the input data stream in a card reader, photoreader, or other input device.

ALGOL.

Contributed:
Herbert Shear
HP, Data Systems

22193A, INTERPRETIVE BINARY SIMULATOR

The Interpretive Binary Simulator provides the user with an interpretive execution of any program that will run in an 8K computer. The Simulator is similar to program 20002, the BCS Debug Routine, but differs as follows:

a. Tracing can be conducted through IOC and its I/O drivers.

b. A mnemonic printout of simulated instructions is provided.

c. Absolute code is simulated. Relocatable tapes must be prepared by selecting the absolute BCS option.

d. Internally, the Interpretive Binary Simulator appears to be functioning in an 8K computer, but the Simulator requires 16K for its own storage.

Equipment required is 16K of core storage.

Assembly language, relocatable.

Contributed:
Michael E. Sullivan
HP, Automatic Measurement Div.

14901A, HP 21XX VERIFICATION AND TEST FOR THE HP 6936A

This program tests an HP 6936/37 system attached to any HP 2100 family computer. The program sends test signals to, and receives information from, the HP 6936/37 system through a buffered TTY. The TTY driver is included in the program; no external drivers are required.

Tests 1 to 4 verify proper system operation; no special equipment is required. Tests 5 to 10 diagnose a malfunctioning system; an HP 6935A Service Kit is required.

Assembly language, relocatable.

HP supported:
New Jersey Division

14905A, HP 6940A/6941A DIAGNOSTIC

This diagnostic allows a quick check of the initial installation of a HP 6940A/6941A, using interface kit 14543A. (This program is included with that kit.) This diagnostic assumes that the 12566B interface has already been proven operational (by another diagnostic). This diagnostic performs five tests: (1) I/O card basic test, (2) Multiprogrammer flag and interrupt test, (3) Computer-Multiprogrammer Data interface, (4) Multiprogrammer-Computer Data interface and (5) 6941A Addressing and flag timing.

The diagnostic does not test any Multiprogrammer I/O cards.

Assembly language, absolute.

HP supported:
New Jersey Division

20337D, HP 1260B DATA SOURCE INTERFACE DIAGNOSTIC

This routing tests the HP 12604B Data Source Interface Kit, together with the associated digital voltmeter.

Assembly language, absolute.

HP supported:
Automatic Measurement Div.

20348C, HP 12556B DIAGNOSTIC 40-BIT OUTPUT REGISTER

This routine tests the HP 12556B 40-Bit Output Register.

Assembly language, absolute.

HP supported:
Automatic Measurement Div.

20429C, HP 2912A PROGRAMMER CARD DIAGNOSTIC

This routine tests the HP 2912A Reed Scanner and the associated interface kit.

Assembly language, absolute.

HP supported:
Automatic Measurement Div.

20436A, HP 12661A DVS PROGRAM CARD DIAGNOSTIC

This routine tests the HP 12661A interface card and the associated 6200/6800 programmable power supply.

Assembly language, absolute.

HP supported:
Automatic Measurement Div.

24142A, PROCESSOR INTERCONNECT CABLE DIAGNOSTIC

This routine tests the cable in the HP 12875A Processor Interconnect Kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24196A, HP 2100A GENERAL PURPOSE REGISTER TEST

This HP 2100A program tests for proper operation of general purpose interface cards. Currently used for 8-bit and 16-bit duplex registers and 16-bit microcircuit registers.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24197A, HP 2100A PROCESSOR INTERCONNECT CABLE TEST

This HP 2100A program checks the 12875A Processor Interconnect Cable for hardware errors.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24199A, HP 2100A CONTROLLER MICROCIRCUIT TEST

This HP 2100A program tests the proper operation of the 12849 Controller Microcircuit Interface Card in the HP 2100A computer.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

13041B, HP 7900/13210 DIAGNOSTIC

This program tests the HP 7900 Moving-Head Disc Drive and associated interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Mountain View)

24184B, FIXED HEAD DISC/DRUM DIAGNOSTIC

This diagnostic routine tests the HP 2770/71 Disc Memory and the HP 2773/74/75 Drum Memory.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24203A, HP 2100A CARTRIDGE DISC MEMORY DIAGNOSTIC

This HP 2100A program confirms proper output, input and control functions for the cartridge disc memory. Rapid checkout of the controller is provided in addition to exhaustive testing of the drive. The test operator may choose to run under the default mode or define his own test with teleprinter and switch register options. Provision is made for serial checkout of up to four drives. Interaction between drives also can be tested. This diagnostic does not provide checkout of more than one controller. Either DMA channel can be used.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24204A, HP 2100A DISC FILE (HP 2883) DIAGNOSTIC

This diagnostic test program for the HP 2100A computer confirms proper input, output and control functions for the HP 2883 Disc File. Rapid checkout of the controller is provided in addition to exhaustive testing of the drive. The test operator may choose to run under the default mode or define his own test with teleprinter and switch register options. Provision is made for serial checkout of up to two drives. This diagnostic does not provide checkout of more drives. This diagnostic does not provide checkout of more than one controller. Either DMA channel can be used.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24207A, HP 2100A FIXED HEAD DISC/DRUM DIAGNOSTIC

This HP 2100A program tests input, output and control functions of the device under test. The program rapidly checks the interface and exhaustively tests the device itself. The user can design his own tests for specific functions. This diagnostic does not check more than one disc or drum at one time.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24236A, HP 2883 DISC FILE DIAGNOSTIC

Tests input, output, and control functions for the HP 2883 Disc File with an HP 2116, 2115, or 2114 computer. Rapid checkout of one controller and exhaustive, serial testing of two disc drives are provided. The user can employ a default mode or define his own tests through teleprinter and switch register program options. Either DMA channel may be used. This program obsoletes the HP 2883 Disc File Diagnostic, HP order number 24176A.

Assembly language.

HP supported:
Data Systems Development Division (Cupertino)

24237A, CARTRIDGE DISC MEMORY DIAGNOSTIC

Tests input, output, and control functions for the Cartridge Disc Memory with an HP 2116, 2115, or 2114 computer. Rapid checkout of one controller and exhaustive, serial testing of up to four disc drives are provided. Interaction between drives may also be tested. The user can employ a default mode or define his own tests through teleprinter and switch register program options. Either DMA channel may be used. This program obsoletes the Cartridge Disc Memory Diagnostic, HP order number 20585B.

Assembly language.

HP supported:
Data Systems Development Division (Cupertino)

13020E, HP 7970/13181A DIAGNOSTIC

This program tests the proper operation of the HP 7970 9-track Magnetic Tape Unit and 13181A Interface Kit. Equipment required is 4k computer, teletype, one to four magnetic tape drives and interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Mountain View)

13028D, HP 7970/13182 7-TRACK DIAGNOSTIC

This program tests the HP 7970 7-Track Magnetic Tape Unit and interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Mountain View)

13031A, HP 7970E/13183 DIAGNOSTIC

This program verifies proper operation of the HP 7970E/13183 (Read/Write) System combination.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Mountain View)

20411B, TEST: KENNEDY INCREMENTAL MAGNETIC TAPE UNIT

This routine tests the Kennedy 1406 or 1506 Incremental Magnetic Tape Transport and the associated HP interface kit.

Assembly language, absolute.

HP supported:
Automatic Measurement Div.

20433E, HP 3030 MAGNETIC TAPE UNIT DIAGNOSTIC

This routine tests the HP 3030 Magnetic Tape Unit and the associated interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20516B, HP 2020 MAGNETIC TAPE UNIT DIAGNOSTIC

This routine tests the HP 2020 Magnetic Tape Unit and the associated interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20390A, HP 12560A PLOTTER DIAGNOSTIC

This routine tests the Calcomp Model 563 or 565 Digital Incremental Plotter employing the HP 12560A interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

22323A, TEST PATTERN GENERATOR FOR HP 1331C STORAGE SCOPE

Under switch register control, this absolute program generates two scope test patterns. The alignment test pattern is useful for calibration and alignment of the 1331C X-Y Display. A vertical and horizontal test pattern can be displayed under interrupt control.

Assembly language, absolute.

Contributed:
Robert O. Smith
University of Mississippi Medical Center

22174A, BCS DUMP IN BBL FORMAT

Named after the contributor, this program dumps the contents of core storage onto punch tape. Alternatively, the teleprinter can provide a printout of the contents of core storage. The I/O select code of the punch or teleprinter is set into the switch register before starting, and the tape or printout provided is in absolute form. The program is useful for debugging.

Assembly language, relocatable.

Contributed:
Fritz Joern
HP, Italy/Milan

22251A, MAGNETIC TAPE TO LINE PRINTER ROUTINE

Used by the MTS Operating System, this program prints the contents of IBM 360 System magnetic tapes on a Data Products 4300 Line Printer. The tapes can be unlabelled or can have standard labels, and either a fixed, variable, or undefined format can be used. If the format is undefined, the data is printed 60 lines per page, single space. Printer control characters on the tape can be of the USASI type or machine type, or no printer control characters need be used. The program has the capability of skipping designated files. The output is furnished at a rate of 1,000 lines per minute, and all characters are identical with those that would be printed by the IBM 360 System. The magnetic tape lateral recording density can be either 200, 556, or 800 bits per inch.

Equipment required is 16K of core storage, the Direct Memory Access option for the computer, one HP 3030 Magnetic Tape Unit with interface kit, and one Data Products 4300 Line Printer with interface kit.

Assembly language, relocatable.

Contributed:
Jim Overman
HP, Palo Alto

22257A, MTS/BCS SYSTEM ABSOLUTE DUMP

This program dumps an absolute tape under BCS. When used as input to Prepare Tape system, it generates only three data records on file one instead of the usual several hundred. Faster access time under MTS and a significant savings in magnetic tape are the benefits of this program. It can be used along with or instead of the Basic Control System absolute dump option.

When used as a general routine it can dump an entire BCS system or selected core sections enabling system modification without reassembly and generation of a new absolute tape.

Assembly language, relocatable.

Contributed:
Thomas J. Winker
HP, Neely Sales Region

22259A, DOS TO MAGNETIC TAPE DUMP

This absolute program dumps selected source files of length less than 237 sectors, from DOS to a nine-track 7970/3030 in a format compatible with the Magnetic Tape Storage and Retrieval Program, 22198. It is loaded over a "halted" DOS and uses base page constants to find the system directory track and handle the 90/128 sector per track discs. Requires 16K Disc Operating System.

Assembly language, absolute.

Contributed:
Charles Chernack
HP, Eastern Sales Region

22260A, MAGNETIC TAPE TO DOS DUMP

This absolute program loads source files over a "halted" 16K DOS from a nine-track magnetic tape which has been previously prepared by the Magnetic Tape Storage and Retrieval Program, 22198. Any number of tape records may be concatenated to form a single source file on DOS.

The 16K DOS may have a 90 or 128 disc/drum with an HP 7970 or 3030 magnetic tape unit.

Assembly language, absolute.

Contributed:
Charles Chernack
HP, Eastern Sales Region

22280A, ABSOLUTE CORE DUMP ROUTINE

This routine allows dumping selected areas of core onto tape in a format compatible for loading with the Basic

Binary Loader. Two versions are supplied to the user; one absolute for loading through the Basic Binary Loader, and one relocatable for loading through the Basic Control System. No external subprograms are called.

Assembly language, relocatable and absolute.

Contributed:
Donald C. Dougherty
Applied Research Laboratories

22290A, CORE PUNCH IN BBL FORMAT

This program punches selected areas of core in a format which can be reloaded by the Basic Binary Loader. The user inputs the necessary parameters through the switch register at RUN time. Provisions exist to allow punching an absolute tape which will reload to another part of the core. This feature is useful for moving data.

Assembly language, absolute.

Contributed:
Dave Snyder
HP, Santa Clara Division

22296A, HP 2870 DISC/MAGNETIC TAPE DUMP IN DOS-M FORMAT

This dump is an absolute SIO program that contains its own disc driver. It dumps a DOS-M system or user disc from an HP 2870 disc cartridge to magnetic tape for temporary storage. It can later be dumped back to any disc subchannel in a DOS-M compatible format. Discs are labeled according to the label on the tape. A verify option will compare the information on the selected disc with the information on the magnetic tape. If an operating system is copied to disc, the appropriate tracks will be protected.

Assembly language, absolute.

Contributed:
Tom Hall
HP, Eastern Sales Region

22300B, QUICK FIXED HEAD SDUMP

This absolute assembly program uses the magnetic tape and teleprinter SIO drivers to dump or load the contents of a fixed head disc to or from magnetic tape. The program contains its own internal disc "SIO" driver. Speed is obtained by writing one magnetic tape record per logical disc track.

The hardware parity check in the magnetic tape controller is augmented by a software checksum written onto magnetic tape. Requires 16K core, any HP fixed head disc, DMA, any HP magnetic tape drive, and an HP 2752A teleprinter.

Assembly language, absolute.

Contributed:
Charles Chernack
HP, Eastern Sales Region

22321A, HP 2870 DISC DUMP

This absolute program dumps the contents of memory or of any subchannel from an HP 2870 Moving Head Disc to a list output device in ASCII or octal format. The user options are input conversationally at RUN time through the system teleprinter. The list output is accomplished by using the SIO driver of the list device.

Equipment required includes 16K memory, an HP 2870 Moving Head Disc, and HP 2752A Teleprinter and a line printer (optional).

Assembly language, absolute.

Contributed:
Susan Jean Temple
Montana State University

22322A, ABSOLUTE OCTAL OR DECIMAL CORE DUMP

This absolute program dumps core to the teleprinter in double spaced records consisting of one octal address and eight octal or decimal images of word contents. The test program "Character Frequency Distribution in Tape" together with "dump" is useful for detecting defects in paper tape and paper tape devices as well as debugging and scanning programs without accessible source.

Assembly language, absolute.

Contributed:
Dr. J. Schrama
Central Laboratory D.S.M./The Netherlands

22340A, 360 FORMAT MAGNETIC TAPE DUMP

This program accepts ASCII paper tape or IBM 029 punched cards as input and dumps images to an OS/360 compatible nine track magnetic tape. Output may be ASCII or EBCDIC code, standard labelled or unlabelled magnetic tapes with fixed or variable blocked records. It operates under control of BCS.

Equipment required includes 16K core, any HP photo-reader or HP 2761 card reader, and an HP 7970 nine track magnetic tape unit.

ALGOL/Assembly language, relocatable.

Contributed:
Ted Slater
Simon Frazer University/Canada

20403A, LOW MEMORY ADDRESS TEST

This program verifies the accessibility of all memory addresses below the test block.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20404A, HIGH MEMORY ADDRESS TEST

This program verifies the accessibility of all memory addresses above the test block.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20405A, HP 2116A LOW MEMORY CHECKERBOARD TEST

Intended for the 2116A computer, this diagnostic program tests core storage with worst-case word patterns. All addresses below the test block are checked.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20406A, HP 2116A HIGH MEMORY CHECKERBOARD TEST

Intended for the 2116A computer, this program tests core storage with worst-case word patterns. All addresses above the test block are checked.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20426A, HP 2116B HIGH MEMORY CHECKERBOARD TEST

Intended for 2116B computer, this program tests core storage with worst-case word patterns. All addresses above the test block are checked.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20427A, HP 2116B LOW MEMORY CHECKERBOARD TEST

Intended for the 2116B computer, this program tests core storage with worst-case word patterns. All addresses below the test block are checked.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20512A, HP 2116A/14A HIGH MEMORY CHECKERBOARD TEST

Intended for 2115A and 2114A computers, this program tests core storage with worst-case word patterns. All addresses above the test block are checked.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20513A, HP 2115A/14A LOW MEMORY CHECKERBOARD TEST

Intended for 2115A and 2114A computers, this program tests core storage with worst-case word patterns. All addresses below the test block are checked.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24161A, HP 2116C LOW MEMORY PATTERN TEST

Intended for use with the 2116C computer, this program tests core storage with worst-case word patterns. All addresses below the test block are checked.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24162A, HP 2116C HIGH MEMORY PATTERN TEST

Intended for use with the 2116C computer, this program tests core storage with worst-case word patterns. All addresses above the test block are checked.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24193A, HP 2100A LOW MEMORY PATTERN TEST

This HP 2100A program resides in low core and tests for proper operation of 2100A high memory under worst case noise conditions.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24194A, HP 2100A HIGH MEMORY PATTERN TEST

This HP 2100A program resides in high core and tests for proper operation of 2100A low memory under worst case noise conditions.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24198B, HP 2100A MEMORY PARITY CHECK TEST

This HP 2100A program tests for proper operation of the HP 2100A memory parity check circuitry.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24211A, HP 2100A LOW MEMORY ADDRESS TEST

This HP 2100A program tests the memory address register and an area of core specified by the user. It resides in low core (100_8 through 143_8).

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24212A, HP 2100A HIGH MEMORY ADDRESS TEST

This HP 2100A program tests the memory address register and an area of core specified by the user. It resides in high core (3600_8 through 3643_8).

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20400A, ALTER-SKIP INSTRUCTION TEST

This program tests all instructions in the alter-skip group.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20401B, MEMORY REFERENCE INSTRUCTION TEST

This program tests all instructions in the memory-reference group.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20402D, SHIFT-ROTATE INSTRUCTION TEST

This program tests all instructions in the shift-rotate group.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20415A, INTERRUPT DIAGNOSTIC

This program tests the computer interrupt system.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24208A, HP 2100A ALTER-SKIP INSTRUCTION TEST

This HP 2100A program tests the alter-skip group of instructions.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24209A, HP 2100A MEMORY REF. INSTRUCTION TEST

This HP 2100A program tests the memory reference group of instructions.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24210A, HP 2100A SHIFT-ROTATE INSTRUCTION TEST

This HP 2100A program tests the shift-rotate group of instructions.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24214A, HP 2100A EXTENDED ARITHMETIC UNIT TEST

This HP 2100A program tests the extended arithmetic group of instructions.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24215A, HP 2100A INTERRUPT TEST

This program tests the HP 2100A Interrupt Logic and the interrupt capability of any of its I/O slots.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20002B, BCS DEBUG ROUTINE

Employed in conjunction with a user program, the BCS Debug Routine performs any of the following functions:

a. Furnishes a printout of selected portions of core storage.

b. Provides a printout of instructions in the sequence in which they are executed.

c. Modifies the contents of specified registers or core storage locations.

d. Halts the user program at designated break points.

e. Allows a user program to begin at any desired point.

f. Lists the absolute address of the origin of the user program.

Assembly language, relocatable

HP supported:
Data Systems Development Division (Cupertino)

22088A, OCTAL UTILITY SYSTEM (HOCUS)

Designed for use with independent user programs, Hocus performs any of the following operations:

a. Loads any absolute binary tape.

b. In absolute binary form, reproduces on punched tape the contents of specified sections of core storage.

c. Compares an absolute binary tape with the contents of a specified section of core storage.

d. Furnishes a teleprinter printout of the contents of a specified core storage location, and permits modification of the contents of the core storage location.

e. Provides a teleprinter printout of the contents of a specified section of core storage.

f. Searches core storage for a desired word and furnishes a teleprinter printout of its address, or of the addresses of all words which are different.

g. Fills a specified section of core storage with a specified word.

h. Brings about a jump to an address typed on the teleprinter.

i. Reproduces any absolute-binary punched tape.

Though an independent program, Hocus is compatible with the BASIC Operating System.

Assembly language, absolute.

Contributed:
George V. Woodley
HP, Automatic Measurement Div.

22190A, ABSOLUTE PROGRAM CONTROL SYSTEM

This program can either be used as an independent control program, or its subroutines can be inserted into other programs. It performs the following operations:

a. Enters data into memory.

b. Lists core storage contents in binary, decimal, or ASCII form.

c. Punches binary tape compatible with the Absolute Binary Loader.

d. Transfers program control to any location in memory.

e. Executes one instruction without loading.

f. Debugs by stepping through a number of instructions at a time. Simulated registers are used and can be printed out. Fifteen breakpoints can be entered. Jump instructions and subroutines can be listed each time they occur.

Subroutines available include:

a. Octal, decimal or ASCII keyboard input.

b. ASCII character input.

c. Byte input from teleprinter punched tape reader.

d. Octal, decimal or ASCII printer output.

e. ASCII character output.

f. Byte output for teleprinter punch.

g. Carriage control, space, question mark.

h. Teleprinter system interrupt.

Assembly language, absolute.

Contributed:
Barry S. Todd
Naval Weapons Center

22293A, OCTAL ASSEMBLY PROCESSOR AND UTILITY SYSTEM

OCTAPUS is a troubleshooting aid which eliminates time comsuming toggling from the switch register. It is a self-configuring, self-contained program residing within the bounds of a single page in core. Communication is conversational through the teleprinter. The following functions can be performed: assembly into core, inverse assembly from core, punch absolute tape from core, load absolute tape to core, verify absolute tape to core, dump core to teleprinter in octal and jump to any location in core.

Assembly language, absolute.

Contributed:
Harvey Thackston
HP, Southern Sales Region

22314A, RTE CROSS-REFERENCE SYMBOL TABLE GENERATOR

This program produces a Cross-Reference Table of Symbolic names used in HP Assembly language programs. It accepts an assembler source tape as input under RTE, and produces a list of symbols in alphabetical order as output. The symbol name is followed by its location in the program and a list of references.

Assembly language, relocatable.

Contributed:
J. D. Sankey
National Research Council of Canada

24109B, CROSS-REFERENCE SYMBOL TABLE GENERATOR

From an assembly language source program, this program produces and prints an alphabetized cross-reference list of all symbols appearing in the program. Each symbol is followed by the sequence number of the statement in which it is defined, and by the sequence numbers of all statements referring to the symbol. Program 24123, 24125, or 24127 (classification code A002) must be used as the teleprinter or line-printer driver.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24223B, DOS CROSS-REFERENCE ROUTINE

This program processes an assembly language source program under DOS/DOS-M and produces a list of all symbols in the source program and all references to each symbol.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20078A, BCS HP 2312A DRIVER/FORTRAN INTERFACE ROUTINE (L2312)

This routine links FORTRAN or ALGOL requests to the 20076A BCS HP 2312A Driver (D.55). The request must be initiated by the 20078A routine in order to provide the required buffer address parameters.

Assembly language, relocatable.

HP supported:
Automatic Measurement Div.

22014A, BINARY TAPE EDITOR

This program allows manipulation of absolute-address data blocks. When used in conjunction with the Inverse Assembler (program 22013, classification code A018) and with the Assembler program appropriate to the operating system employed, it facilitates the production of a valid inverse-assembly listing.

The Binary Tape Editor (BTD) lists the starting addresses of specified data blocks on a binary punched tape, and can duplicate designated data blocks of a binary tape with the purpose of producing a "continuous" set of tape segments that can be located without halts by the Basic Binary Loader.

Some typical uses of BTED are the following:

a. To inverse-assemble a specified part of a binary punched tape.

b. To create a single binary punched tape from two or more binary punched tapes.

c. To produce from a binary punched tape a second tape in which a data block has been changed.

Equipment required is the Extended Arithmetic Unit.

Assembly language, relocatable.

Contributed:
J. D. Sankey
Division of Applied Physics
National Research Council of Canada

22015B, BASIC LINE RESEQUENCER

The BASIC Line Resequencer Program provides a means of changing the line numbers of a BASIC program. Any statement in the BASIC program which references a changed line number is altered to correspond. The original execution sequence of the BASIC program is retained.

Assembly language, absolute.

Contributed:
T. D. MacCoun
Quindar Electronics, Inc.

22016C, SYMBOLIC ALPHANUMERIC GENERATOR

Furnishing a means of labelling a program or routine, this program generates a block-lettering leader or trailer for a punched tape.

Assembly language, absolute.

Contributed:
Charles Chernack
HP, Eastern Sales Region

22064A, AUTOMATIC TABBING PROGRAM

This program, used when typing and punching assembly language programs on the teleprinter, automatically spaces to the correct columns for operation code, operand, and comments. The program also prevents certain illegal operations, such as comments extending beyond column 5 2 The program allows at least a 30-percent increase in the efficiency of making program tapes.

Assembly language, absolute.

Contributed:
Jim Fearnside
HP, Medical Electronics Div.

22089A, TELEPRINTER OCTAL INPUT PROGRAM

This program permits the user to enter routines by means of the teleprinter. The routine is typed using the octal equivalent of binary machine code. The teleprinter furnishes a printed record of the routine entered, allowing examination for mistakes. One use of this program is to permit service technicians to quickly enter test routines for troubleshooting the computer. The program can also serve

as a test of the switch-register switches and the circuit associated with these switches.

Assembly language, absolute.

Contributed:
Robert Richardson
HP, Eastern Sales Region

22096A, SCOPE SYMBOLIC LISTER

Operating under switch register control, the Symbolic Lister reads a program from punched tape and displays on a CRT screen a symbolic-editor type of listing of the program. The 20208A Scope Display Library is required.

Equipment required is 16K of core storage, the Direct Memory Access option for the computer, and either an HP 2331A X-Y Display Subsystem or any oscilloscope that can be used with the HP 12555A interface kit.

Assembly language, relocatable.

Contributed:
M. H. Kendall
Redstone Arsenal

22105A, COMMENT INSERTER FOR ASSEMBLER PROGRAMS

The Comment Inserter reads assembly-language programs from punched tape, and prints each instruction on the teleprinter. The program pauses after printing each instruction, and the user types a comment for the instruction. After the entire user program has been processed in this manner a new punched tape is produced, containing the user program together with the added comments.

ALGOL

Contributed:
J. Evan Deardorff
HP, Medical Electronics Div.

22173A, I/O INSTRUCTION CONFIGURATOR

CONFI configures assembly-language I/O instructions by overlaying bits 0-5. The user's calling sequence supplies the addresses of instructions to be configured. The routine is used principally for configuring drivers.

Assembly language, relocatable.

Contributed:
Fritz Joern
HP, Italy/Milan

22191A, NAM-ENT-EXT EDITOR

This program is used to change the symbols in NAM, ENT, and EXT statements in relocatable programs on binary punched tapes.

Assembly language, absolute.

Contributed:
Alberto L. Panni
HP, Italy/Milan

22205A, TABULATION AND FORM-FEED CALLS FOR HP 2754 TELEPRINTER

This software product consists of three subroutines which respectively perform the following functions:

a. Move the carriage of an HP 2754 Teleprinter horizontally to the next horizontal tabulation stop.

b. Rotate the platen of an HP 2754 Teleprinter to the next vertical tabulation stop.

c. Rotate the platen of an HP 2754 Teleprinter to the top of the next page.

Equipment required is one HP 2754 Teleprinter, with interface kit.

Assembly language, relocatable.

Contributed:
G. L. Davis
Automatic Electric Labs, Inc.

22250A, EXEC CALL ADAPTER ROUTINE

This routine, used by the BCS or MTS Operating System, accepts RTE, DOS, and DOS-M EXEC calls, permitting RTE, DOS, and DOS-M programs to run under BCS or MTS. However, disc or drum operations are not possible if the BCS or MTS computer system does not include these I/O units. The ICODE words accepted by the routine are the following:

a. 1, READ (with or without WAIT)

b. 2, WRITE (with or without WAIT)

c. 3, CONTROL

d. 13, STATUS

e. 6, STOP

f. 7, PAUSE

g. 8, 9, 10, 11, and 12, CHAINING

h. 11, TIME (set to zero)

It should be noted that RTE, DOS, or DOS-M logical unit numbers apply when this routine is used. Additional functions of the routine are to permit the use of simple binary READ/WRITE/CONTROL requests and chain requests under BCS or MTS.

Assembly language, relocatable.

Contributed:
Fritz Joern
HP, Germany/Frankfurt

22267A, MTS FORTRAN CHAIN

CHAIN is a relocatable subroutine configured into MTS file two which permits a FORTRAN program to chain to an absolute program on file one through a CALL statement.

Assembly language, relocatable.

Contributed:
Stroud Custer
HP, Eastern Sales Region

22269A, PAPER TAPE TITLER

This FORTRAN-callable subroutine allows the user to label his paper tapes under program control. Character size is equivalent to the width of eight-level punched paper tape.

Assembly language, relocatable.

Contributed:
Eugene Burmeister
HP, Loveland

22278A, TAB FOR PREPARING FORTRAN TAPES

FTRAN is an online absolute program for the preparation of FORTRAN source tapes. It is written for a system having only a teleprinter as the output device. Edit file tapes can also be prepared using this program.

Assembly language, absolute.

Contributed:
Tom Prewitt
Delco Electronics

22287A, CHAIN FROM PHOTOREADER IN HP BASIC

This program allows a user to chain programs via the photoreader in HP BASIC, 20392, by executing the SCRATCH, PTAPE, and RUN commands. The statement CALL (63) has to be located immediately before the END statement to facilitate the chaining feature.

Assembly language, absolute.

Contributed:
Peter Frye
HP, Germany/Berlin

22289A, ALGOL ARRAY TRANSFER FOR SEGMENTATION

This routine allows the transfer of array data between ALGOL main and segments under DOS, DOS-M, or RTE. Since COMMON is not normally available in ALGOL, this routine accepts the addresses of up to 10 ALGOL arrays and saves the addresses of the array tables. Another call allows the segments to get these addresses so that it may use the original array directly. Thus, COMMON is established between a main program and its segments by copying the original array table of MAIN into a dummy array table of the segment. Requires ALGOL compiler HP 24129B.

ALGOL/Assembly language, relocatable.

Contributed:
Fritz Joern
HP, Germany/Frankfurt

22302A, RTE/DOS HP 2322A LOW SPEED ANALOG-TO-DIGITAL SUBSYSTEM CONVERSION

This conversion routine allows a FORTRAN program which calls BCS Driver, D.76, to operate without modification with the DOS or RTE HP 2322A Subsystem Driver, DVR76.

Assembly language, relocatable.

Contributed:
Steve Stark
HP, Eastern Sales Region

22303A, RTE/DOS HP 2320A LOW SPEED ANALOG-TO-DIGITAL SUBSYSTEM CONVERSION

This conversion routine allows a FORTRAN program which calls the BCS Driver, D.76, to operate without modification with the DOS or RTE HP 2320A Subsystem Driver, DVR76.

Assembly language, relocatable.

Contributed:
Steve Stark
HP, Eastern Sales Region

22309A, DOS/RTE HP 2322A LOW SPEED ANALOG-TO-DIGITAL SUBSYSTEM CONVERSION

This conversion routine allows a FORTRAN program, which calls the BCS driver D.76, to operate without modification with the DOS or RTE HP 2322A Subsystem Driver, DVR76.

Assembly language, relocatable.

Contributed:
Steven A. Stark
HP, Eastern Sales Region

22310A, FORTRAN/ALGOL ARRAY TRANSFER ROUTINE

The transfer of arrays between a Fortran Program and an Algol Procedure is normally not possible, because there are no array tables in the procedure for the dummy array parameters. This routine creates such array tables which refer to external Fortran arrays. These may be in normal storage or in common. In the Algol procedure, the dimensions can be handled dynamically, so you are able to change array dimensions at Run-Time. The maximum number of indices is three with respect to FTN4. The arrays may be of type real or integer.

Contributed:
Dr. Rolf Robcke
HP, Germany/Frankfurt

22320A, DOS/DOS-M HP 2020/3030 MAGNETIC TAPE CONTROL PROGRAM

This program allows a DOS or DOS-M system operator to manipulate an HP 2020 or HP 3030 magnetic tape unit. Parameters entered with the :PROG,LOADR command determine the operations to be performed: write end-of-file, forward space, back space, rewind, and rewind-standby. Up to four of these operations can be performed with one command.

Assembly language, relocatable.

Contributed:
Dennis I. Smith
Montana State University

22346A, DOS/DOS-M ASSEMBLY LANGUAGE COMMENT INSERTER

This Assembly Language Comment Inserter reads a source assembly language program from a disc file (or paper tape or magnetic tape), prints each statement on the teleprinter allowing the user to add comments if desired and then outputs the commented source to paper tape or magnetic tape. In case the output device is a magnetic tape, the program does the necessary handling of the magnetic tape and, upon completion of the program, the commented source is ready to be stored on the disc using a ":ST,S"

command. Previously commented lines are duplicated without teletype output. A switch option allows duplicating sections without adding comments. This program is similar in operation to 22105 but with the above additional features.

Assembly language, relocatable.

Contributed:
Roland E. Jahn
HP, Medical Electronics Division

22351A, ASCII STRING SEARCH FROM DISC FILE

This program searches a source file on the disc for all occurrences of a specified string of characters as input from the system console or batch device. The maximum string length is 72 characters. The located strings are listed on the line printer or system console by line number and position within the line, and the line itself is printed. Non-printing characters are listed in octal. Requires a minimum DOS or DOS-M System.

FORTRAN II/Assembly language, relocatable.

Contributed:
Allan P. Sherman
HP, Medical Electronics Division

22352A, ACII STRING SEARCH FROM PHOTOREADER

This program searches a source tape for all occurrences of a specified string of characters as input from the teleprinter. The maximum string length is 72 characters and non-printing characters are listed in octal. The located strings are identified by line number and position within the line, and the line itself is listed on the teleprinter or line printer.

FORTRAN II/Assembly language, relocatable.

Contributed:
Allan P. Sherman
HP, Medical Electronics Division

22366A, ALGOL SEGMENT RETURN TO MAIN PROGRAM

Subroutine SEGLINK permits a user to leave an ALGOL main program at any point, call in a segment, execute the segment, and return to the main program at the same point for further execution.

Used in conjunction with HP 22289 ALGOL ARRAY Transfer, this package provides flexible and powerful capabilities to the ALGOL programmer in a DOS/DOS-M environment.

Assembly language, relocatable.

Contributed:
Glyn Harris
HP, England/Slough

22428A, ASSEMBLER JUSTIFICATION PROGRAM

This relocatable program accepts as input any HP Assembler source tape. It produces as output the same Assembler statements with the label, opcode, operand, and comment fields justified.

Special features include switch register options for easy operation under BCS or DOS-M.

ALGOL

Contributed:
Tony Chambers
HP, England/Slough

22431A, DOS-M SEGMENT RETURN TO MAIN

This FORTRAN-ALGOL callable subroutine allows a user in the DOS-M environment to return to a main program from a segment. Optionally, the label at which execution will be resumed may be specified.

Assembly language, relocatable.

Contributed:
Bjoern Lindberg
HP, Sweden/Stockholm

29017A, FORTRAN/ALGOL INTERFACE SUBROUTINE FOR BCS DRIVER D.65 (L65)

L65 is a relocatable assembly language subroutine that interfaces FORTRAN/ALGOL READ or WRITE statements to D.65. The subroutine also allows FORTRAN or

ALGOL programs to make the necessary D.65 CLEAR and STATUS calls.

Assembly languge, relocatable.

HP supported:
Automatic Measurement Division

29018A, LISTEN MODE ASSEMBLER INTERFACE SUBROUTINE FOR BCS DRIVER D.65 (DIR65)

DIR65 is a relocatable assembly language subroutine that performs I/O requests through the HP 12665 card when D.65 is in the Listen Mode. DIR65 must be called by the user's interrupt-scheduled program.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

29019A, LISTEN MODE FORTRAN/ALGOL INTERFACE SUBROUTINE FOR BCS DRIVER D.65 (DRL65)

DRL65 is a relocatable assembly language subroutine that performs I/O requests through the HP 12665 card when D.65 is in the Listen Mode. DRL65 must be called by the user's interrupt-scheduled FORTRAN or ALGOL program.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

29020A, FORTRAN/ALGOL INTERFACE SUBROUTINE FOR BCS DRIVER D.66 (L66)

L66 is a relocatable assembly language subroutine that is called by FORTRAN or ALGOL programs when the user does not want to use READ or WRITE statements in D.66. (READ and WRITE statements use the HP Formatter.) The subroutine also allows FORTRAN or ALGOL programs to make any necessary CLEAR or STATUS calls required to operate D.66.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

29021A, FORTRAN/ALGOL INTERFACE SUBROUTINE FOR RTE DRIVER DVR65 (DLK65)

DLK65 is a utility subroutine which must be used by FORTRAN or ALGOL programs making a DVR65 output request and I/O data call.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

20408C, HP 2737 PUNCH TAPE READER TEST

This routine tests the HP 2737A Punch Tape Reader and its interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20409C, HP 2753 TAPE PUNCH TEST

This routine tests the HP 2753 Tape Punch with the HP 12536 or 12597-003 interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24189B, HP 2100A TAPE READER TEST

This HP 2100A program tests the HP 2748 Tape Reader or the HP 2758 Tape Reader Reroller with the HP 12597-02 Interface Kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24190A, HP 2100A TAPE PUNCH TEST

This HP 2100A program tests the HP 2753 Tape Punch with the HP 12597A-03 Interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24201A, HP 2100A TELEPRINTER TEST

This HP 2100A program tests the HP 12531-60022 Teleprinter Interface card and the HP 2752A or HP 2754 A/B Teleprinter.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20347B, HP 2761A-007 OPTICAL MARK READER DIAGNOSTIC, HP 12602A KIT

This routine tests the HP 2761A-007 Optical Mark Reader with the HP 12602A interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20899B, HP 2761A-007 OPTICAL MARK READER DIAGNOSTIC, HP 12602B KIT

This routine tests the HP 2761A-007 Optical Mark Reader with the HP 12602B interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24174A, HP 2891 CARD READER DIAGNOSTIC

The program confirms proper operation of the HP 2891 Card Reader and HP 12882 Card Reader Interface.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24188B, HP 2100A OPTICAL MARK READER TEST (KIT 12602B)

This HP 2100A program tests the operation of the HP 2761A-007 Optical Mark Reader, using the HP 12602B Interface Kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24192A, HP 2100A CARD READER (HP 2891/12882) DIAGNOSTIC

This HP 2100A program tests the HP 2891 Card Reader and the HP 12882 Card Reader Interface.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20895C, HP 2778 LINE PRINTER DIAGNOSTIC

This routine tests the HP 2778 (120 characters/line) Line Printer and the HP 2778-001 (132 characters/line) Line Printer, together with the associated interface kit. The routine requires the standard carriage-control tape, which is supplied with the HP 12617A interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20999A, HP 2767 LINE PRINTER DIAGNOSTIC

This routine tests the HP 2767 Line Printer and the associated interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24205A, HP 2100A LINE PRINTER (HP 2767) DIAGNOSTIC

This HP 2100A program tests all HP 2767 Line Printer functions, and allows the user to design his own test series for exercising any function.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24218C, HP 2100A LINE PRINTER (HP 2778) TEST

This HP 2100A program tests the HP 2778 Line Printer for errors and malfunctions. The program requires a standard carriage control tape (in the line printer) and a teleprinter (in reporting errors and messages).

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

14903A, HP 21XX VERIFICATION AND TEST FOR DIGITAL VOLTAGE SOURCE

This program provides six test routines and one routine to print a test table for the HP 6129, 6130, 6131, or 6133 Digital Voltage Sources. It uses a buffered TTY to pass information to and from the test program. (The TTY driver is included in the program.) No other drivers are required.

Test 1 checks the unit response and programming timings of the DVS. Test 2 checks the front panel meter accuracy. Tests 3 and 4 check the programmed voltages against actual output voltages to specification. Test 5 tests the current latch programming. Test 6 checks the two types of DVS interrupts. This package requires a five-digit HP Digital Voltmeter.

Assembly language, absolute.

HP supported:
New Jersey Division

20075D, VERIFY HP 5610A ANALOG-TO-DIGITAL TEST

This routine tests the HP 2311A High-Speed Data Acquisition Subsystem.

Assembly language, absolute.

HP supported:
Automatic Measurement Division

20344A, HP 12564A DIAGNOSTIC 10-BIT ANALOG-TO-DIGITAL CARD

This routine tests the HP 12564A Analog-To-Digital Converter.

Assembly language, absolute.

HP supported:
Automatic Measurement Division

20290A, HP 12589A AUTOMATIC CALLING UNIT INTERFACE CARD DIAGNOSTIC

This routine tests the HP 12589 Automatic Calling Unit Interface Card. The routine requires use of the HP 12589-60005 test connector.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20343A, TELEPRINTER OFF-LINE TEST

This routine consists of a punched tape which is read off-line by the tape reader in an HP 2749, 2752, or 2754 Teleprinter. The routine tests mechanical functions of the teleprinter without using the computer.

HP supported:
Data Systems Development Division (Cupertino)

20393A, HP 12622 SEND (ONLY) INTERFACE TEST

This routine tests the HP 12622 interface card. The routine requires use of the HP 12622-60005 test connector.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20417C, HP 2116 TELEPRINTER TEST

Intended for computers of the HP 2116 series, this routine tests the HP 2752 or 2754 Teleprinter.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20420B, HP 2115/2114 TELEPRINTER TEST

Intended for computers of the HP 2115 or 2114 series, this routine tests the HP 2752 or 2754 Teleprinter.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20535A, HP 12587 SEND/RECEIVE INTERFACE TEST

This routine tests the HP 12587 interface kit. The routine requires use of the HP 12587-60005 test connector.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20538A, HP 12621 RECEIVE (ONLY) INTERFACE TEST

This routine tests the HP 12621 interface card. The routine requires use of the HP 12621-60005 test connector.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24187C, HP 2600 KEYBOARD-DISPLAY TERMINAL TEST

This routine tests the HP 2600A Keyboard-Display Terminal and its interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24200A, HP 2100A KEYBOARD-DISPLAY TERMINAL (HP 2600) TEST

This test program for the HP 2100A Keyboard-Display Terminal (2600) confirms proper operation of the HP 12880-60001 Interface Card and provides visual data patterns that test important functions of the terminal.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24217A, HP 2100A AUTO CALL UNIT INTERFACE (HP 12589) TEST

This HP 2100A program tests the Automatic Calling Unit interface, HP 12589A, for malfunctions. A test connector is required and a teleprinter is recommended for operating the program.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24219A, HP 2100A SEND ONLY INTERFACE (HP 12622) TEST

This HP 2100A program tests the HP 12622 Send Interface for errors and malfunctions. A test connector is required and a teleprinter is recommended for reporting errors and messages.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24220A, HP 2100A RECEIVE ONLY INTERFACE (HP 12621) TEST

This HP 2100A program tests the Receive Interface (12621) for errors and malfunctions. A test connector is required and a teleprinter is recommended for reporting errors and messages.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24221B, HP 2100A SEND/RECEIVE INTERFACE (HP 12587) TEST

This HP 2100A program reports errors and malfunctions for the HP 12587 Interface. A test connector is required and a teleprinter is recommended for reporting errors and messages.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

29023A, HP 12772 COUPLER MODEM INTERFACE CARD DIAGNOSTIC

This routine tests the HP 12772 Coupler Modem Interface Card when connected to a telephone data set.

Assembly language, absolute.

HP supported:
Automatic Measurement Division

29024A, HP 12773 COMPUTER MODEM INTERFACE CARD DIAGNOSTIC

This routine tests the HP 12773 Computer Modem Interface Card.

Assembly language, absolute.

HP supported:
Automatic Measurement Division

20345A, HP 12598 MEMORY PARITY CHECK DIAGNOSTIC

This routine tests the HP 12598 Memory Parity Check option.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20412B, HP 2116/HP 12539 TIME BASE GENERATOR TEST

Intended for the HP 2116 computer series, this routine tests the HP 12539 Time Base Generator.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20418D, MEMORY PROTECT DIAGNOSTIC

Intended for the HP 2116 computer series, this routine tests the HP 12581 Memory Protect Interface Kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20421A, HP 2115/2114 HP 12539 TIME BASE GENERATOR TEST

Intended for the HP 2115 and 2114 computer series, this routine tests the HP 12539 Time Base Generator.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20423A, HP 12551 RELAY REGISTER DIAGNOSTIC

This routine tests the HP 12551 Relay Register Interface Kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20428B, HP 12588 POWER FAIL WITH AUTO-RESTART TEST

This routine tests the HP 12588 Power Fail with Auto-Restart option.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20431B, HP 12556A 40-BIT OUTPUT REGISTER DIAGNOSTIC

This routine tests the HP 12556A 40-Bit Output Register.

Assembly language, absolute.

HP supported:
Automatic Measurement Division

20434B, HP 2116 POWER FAIL INTERRUPT TEST

Intended for the Hp 2116 computer series, this routine tests the power fail interrupt circuits.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20435A, DMI DIAGNOSTIC

This routine tests the HP 12582A Direct Memory Increment Interface Kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20439A, HP 12584 TELEPRINTER MULTIPLEXOR INTERFACE TEST

This routine tests the HP 12584, 12584-001, and 12584-002 Teleprinter Multiplexer Interface Kits.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20524A, HP 2114B DMA GENERAL DIAGNOSTIC

This routine tests the Direct Memory Access option for the HP 2114B computer. Optimal use of the routine requires the HP 12554 or 12554M1 16-Bit Duplex Register Interface Kit, or the HP 12566M1 or 12566M2 Microcircuit Duplex Register Interface Kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20525A, HP 2114B DMA RATE AND TRANSFER DIAGNOSTIC

Intended for the HP 2114B computer, this routine tests the ability of the Direct Memory Access option to use every machine cycle to transfer data to or from core storage. The routine requires certain modifications to the DMA circuit card prior to execution.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20543A, CONTROLLER MICROCIRCUIT DIAGNOSTIC

This routine tests the HP 12849 Controller Microcircuit Interface Kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

20546A, HP 2114B/HP 12616 HIGH SPEED I/O CHANNEL TEST

Intended for the HP 2114B computer, this routine tests the HP 12616 High Speed I/O Channel.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

22333A, HP 9300N DISC EXERCISER

This absolute program simulates the hardware exerciser required for aligning the HP 9300N Disc Drive. A control program consisting of command mnemonics and parameters (if required) is entered through the teleprinter keyboard. One mnemonic and its parameter (if required) is typed on each line followed by carriage return. The program is then executed by typing "ex" and carriage return.

Assembly language, absolute.

Contributed:
Harvey E. Thackston
HP, Southern Sales Region

24144A, HP 12591 MEMORY PARITY CHECK TEST

This diagnostic program tests the HP 12591 Memory Parity-Check option.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24163A, GENERAL PURPOSE REGISTER DIAGNOSTIC

This routine tests the HP 12597A 8-Bit Duplex Register Interface Kit, the HP 12554 16-Bit Duplex Register Interface Kit, or the HP 12566 16-Bit Microcircuit Register Interface Kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24175A, HP 12584C TELEPRINTER MULTIPLEXOR TEST

Verifies proper operation of the 12584-60135 TTY Multiplexor Interface Board in an HP 2116, 2115 or 2114 computer.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24185A, HP 2115/2116 DMA DIAGNOSTIC

Tests proper operation of the Direct Memory Access option for an HP 2115 or 2116 computer. A special edge connector (for example, HP 1251-0332 with pin 22 wired to pin 23) must be used. This program obsoletes the DMA Diagnostic program, HP order number 20419.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24186B, EXTENDED ARITHMETIC UNIT DIAGNOSTIC

This routine tests the Extended Arithmetic Unit option.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24191A, HP 2100A PLOTTER (HP 12560) TEST

This HP 2100A program tests for proper operation of the HP 2791A Plotter and the HP 12560 Plotter Interface kit.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24195A, HP 2100A DMA DIAGNOSTIC

This HP 2100A program tests in proper operation of the HP 2100A Direct Memory Access Option. The program requires either a HP 12566 microcirucit register using an HP 1251-0332 connector (with pin 22 wired to pin 23) or a TTY with an HP 12531B Interface. (The best configuration uses both.)

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24202A, HP 2100A PRINTER MULTIPLEXOR TEST

This HP 2100A program confirms proper operation of the HP 12584-60135 Teleprinter Multiplexor Interface Board.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24206B, HP 2100A POWER FAIL DIAGNOSTIC

This HP 2100A program confirms the proper operation of the power fail interrupt for the HP 2100A computer.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24213B, HP 2100A TIME BASE GENERATOR TEST

This HP 2100A program tests the time base generator. An HP 12539 Interface Kit is required.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24216A, HP 2100A RELAY REGISTER TEST

This HP 2100A program tests the relay register. An HP 12551B Interface kit is required.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24222A, HP 2100A MEMORY PROTECT TEST

This HP 2100A program tests the HP 2100A memory protect feature. A teleprinter is required.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

24251A, HP 2100A FLOATING POINT DIAGNOSTIC

This HP 2100A program tests the hardware for floating add, floating subtract, floating multiply, floating divide, fix and float. Results are verified by software routines.

Assembly language, absolute.

HP supported:
Data Systems Development Division (Cupertino)

29005B, HP 12665 COMPUTER SERIAL INTERFACE CARD DIAGNOSTIC

This routine tests the HP 12665 Computer Serial Interface card. The B revision improves operation of oscilloscope test loops within the diagnostic.

Assembly language, absolute.

HP supported:
Automatic Measurement Division

29006A, HP 12813 DIAGNOSTIC

This routine tests the HP 12813 Coupler Serial Interface Card.

Assembly language, absolute.

HP supported:
Automatic Measurement Division

A219, DATA AQUISITIONS SYSTEMS TEST

20072C, VERIFICATION: DACE AXEPT

This verification program contains a working example of Data Acquisition and Control Executive tasks which will operate in any of the following HP equipment systems: 2310A, 2310B, 2310C, 2320A, 2322A, 2323A.

Equipment required is one HP 12539 Time Base Generator.

Assembly language, relocatable.

HP supported:
Automatic Measurement Division

20077B, HP 2312A SUBSYSTEM TEST

This routine tests the HP 2312A Low-Speed Data Subsystem.

Assembly language, absolute.

HP supported:
Automatic Measurement Division

20338D, HP 2310C VERIFICATION TEST

This routine tests the HP 2310C Miniverter System.

Assembly language, absolute.

HP supported:
Automatic Measurement Division

20339B, TEST: HP 2310A/B SUBSYSTEM

This diagnostic routine tests the HP 2310A A/D Converter or the HP 2310B Multiverter.

Assembly language, absolute.

HP supported:
Automatic Measurement Division

20341B, TEST HP 2912 SCANNER/DVM

This diagnostic routine tests the HP 2323A Low-Speed Data Acquisition Subsystem.

Assembly language, absolute.

HP supported:
Automatic Measurement Division

20349D, VERIFY HP 2911 SCANNER/DVM TEST

This routine tests the HP 2911A Guarded Crossbar Scanner, and/or the HP 2401C Integrating Digital Voltmeter or the HP 2402A Integrating Digital Voltmeter, and the associated interface kits.

Assembly language, absolute.

HP supported:
Automatic Measurement Division

20530D, HP 2321 VERIFICATION VER34

This routine tests the HP 2321A subsystem.

Assembly language, absolute.

HP supported:
Automatic Measurement Division

20583C, HP 2311 CALIBRATION — TELEPRINTER

Employing a standard-voltage source, this routine is used for calibrating the HP 5610A A to D Converter.

Assembly language, absolute.

HP supported:
Automatic Measurement Division

A300, MATH AND NUMERICAL ANALYSIS

A301, MATHEMATICS, GENERAL

22084C, INTEGRATED MATH CALCULATOR PROGRAM

The IMCP program allows the entry of programs into the computer without the necessity for a formal written program. To accomplish this the computer and teleprinter are employed in a manner similar to that used for operating many desk-top calculators. The teleprinter keyboard serves to enter integer or floating point decimal numbers, and to command 54 different arithmetic operations and functions. This calculator system may be used in "program mode" for repeated computation of long formulas consisting of many dissimilar steps. Six decimal places of accuracy are guaranteed.

Assembly language, relocatable.

Contributed:
Andre F. Peterlunger
Sandoz Chemicals, Switzerland

22021A, LOCATE MAXIMUM-MINIMUM INTEGER

This routine determines the maximum and minimum of values in an integer array, and indicates the positions in the array of these two values. The routine is FORTRAN callable.

Assembly language, relocatable.

Contributed:
Allan P. Sherman
HP, Medical Electronics Division

22085B, EXTENDED PRECISION CALCULATOR

The XCAL program allows the entry of programs into the computer without the necessity for a formal written program. To accomplish this the computer and teleprinter are employed in a manner similar to that used for operating many desk-top calculators. The teleprinter keyboard serves to enter integer or floating point decimal numbers, and to command 48 different arithmetic operations and functions. This calculator system may be used in "program mode" for repeated computation of long formulas consisting of many dissimilar steps. Ten decimal places of accuracy are guaranteed.

Assembly language, relocatable.

Contributed:
Andre F. Peterlunger
Sandoz Chemicals, Switzerland

22097B, DOUBLE PRECISION INTEGER LIBRARY

This program adds, subtracts, multiplies, and divides double precision (32-bit) numbers. Numbers up to 2,147,483,648 can be handled. The program is FORTRAN callable.

Assembly language, relocatable.

Contributed:
Enrico Mariani
HP, Italy/Milan

22230A, EXTENDED-PRECISION ARITHMETIC LIBRARY

This group of BCS routines provides the capability for extended-precision addition, subtraction, multiplication, and division. Also provided are facilities for extended-precision I/O operations. The routines are FORTRAN callable.

Assembly language, relocatable.

Contributed:
Klaus Stamer
HP, Germany/Frankfurt

22334A, THREE-WORD EXTENDED PRECISION ARITHMETIC ROUTINES

This package of five subroutines allows a user to perform three-word extended precision arithmetic operations. The extended real numbers have a 38 bit mantissa plus a sign bit. These routines are ALGOL, FORTRAN, or Assembler callable.

Assembly language, relocatable.

Contributed:
Jaroslav Dedek
Technical University, Czechoslovakia

22335A, FIVE-WORD EXTENDED PRECISION ARITHMETIC ROUTINES

This package of six subroutines allows a user to perform five-word extended precision arithmetic operations. Each real number has a 63 bit mantissa plus sign and an exponent of 7 bits plus sign and an exponent of 7 bits plus sign. Arithmetic operations are rounded. These routines are callable from ALGOL, FORTRAN, and Assembler.

Assembly language, relocatable.

Contributed:
Anatol Malijevsky and Peter Vonka
Technical University, Czechoslovakia

22268A, DECIMAL ARITHMETIC AND MOVE/ COMPARE ROUTINES

The Decimal Arithmetic routines perform addition, subtraction, and multiplication of ASCII numeric character strings of up to 64 characters. Mixing of signed, unsigned, fixed point and real strings are allowed in the same operation. Leading, trailing, and interspersed non-numeric characters are ignored, while decimal-point placement and sign handling are automatic.

The Move/Compare routines CALL the Decimal Arithmetic to move or compare character strings. Characters are moved from left to right, and overlapping is permitted. Characters are compared from left to right, and the first mismatch determines the relation. A condition code is returned to indicate that the source string is less than, equal to, or greater than the comparison string.

Together these routines allow total manipulation of alphanumeric character strings. ALGOL or FORTRAN-callable.

Assembly language, relocatable.

Contributed:
David R. McClellan
HP, Southern Sales Region

22017A, GAMMA FUNCTION ROUTINE

This routine computes the gamma function by means of the recursion relation and polynomial approximation method. The routine is FORTRAN callable.

FORTRAN II

Contributed.

22018A, K BESSEL FUNCTION ROUTINE

This routine computes the K Bessel function for a given argument and order. In the method used, the routine computes zero order and first order Bessel functions, using series approximations. The routine then computes the Nth order function by means of recurrence relation. Accuracy is usually five decimal places; in worst-case situations accuracy is four decimal places. The routine is FORTRAN callable.

FORTRAN II

Contributed.

22019A, I BESSEL FUNCTION ROUTINE

This routine computes the I Bessel function for a given argument and order. The routine uses either series or asymptotic approximation, depending on the range of the argument. Accuracy is usually five decimal places; in worst-case situations accuracy is four decimal places. The routine is FORTRAN callable.

FORTRAN II

Contributed.

22020A, Y BESSEL FUNCTION ROUTINE

This routine computes the Y Bessel function for a given argument and order. The routine uses the recurrence relation and polynomial approximation technique. Accuracy is usually five decimal places; in worst-case situations accuracy is four decimal places. The routine is FORTRAN callable.

FORTRAN II

Contributed.

22117A, TRANSFORMATIONS

This Stat-Pack FORTRAN program performs any of 25 transformations on one or two input variables. Results are printed and punched, if desired. The transformations include computation of square roots, logarithms, exponential functions, and combination trigonometric and square root functions, as well as various linear functions.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22256A, FRESNEL INTEGRAL EVALUATION

This routine computes the Fresnel sine and cosine integrals

$$S(W) = \int_0^W \sin\left(\frac{\pi}{2} t^2\right) \quad d\ t$$

$$C(W) = \int_0^W \cos\left(\frac{\pi}{2} t^2\right) \quad d\ t$$

to an accuracy of 11 digits using the Extended Precision Floating-Point routines on the FORTRAN IV Relocatable Library. The accuracy desired is a parameter as well as the upper limit of integration (W). Both S(W) and C(W) are returned.

FORTRAN IV.

Contributed:
Jim Katzman
Amdhal Corporation

22220A, LINEAR LEAST SQUARES PROBLEM SOLVER

ALGOL callable, this procedure solves the linear least squares problem:

$$\| A\underline{x} - \underline{b} \|_2 = \text{minimum},$$

where $\| \ \|_2$ indicates the Euclidean norm and A is an m by n ($m \geq h$) real matrix of rank n. A matrix decomposition based on orthogonal Householder transformations is used, rather than solving the normal equations $A^T A\underline{x} = A^T\underline{b}$.

Many vectors, $\underline{b}$, may be given for solution with increased efficiency.

ALGOL

Contributed:
John H. Welsch
HP Laboratories

22022A, SOLUTION OF LINEAR LEAST SQUARES PROBLEMS

This subroutine solves linear least squares problems. In accomplishing this, the routine minimizes the Euclidean norm of B-A*X, where A is an M-by-N matrix with M not less than N. In the special case where M = N, systems of linear equations may be solved. The routine is FORTRAN callable.

FORTRAN II

Contributed.

22023A, TRAPEZOIDAL INTEGRATION ROUTINE

This routine computes the vector integral values for a given general table of argument and function values. Beginnning with Z(1)=0, vector Z is evaluated by means of the trapezoidal rule (second order formula). The routine is FORTRAN callable.

FORTRAN II

Contributed.

22024A, TRAPEZOIDAL INTEGRATION ROUTINE, EQUAL INTERVAL ARGUMENT

This routine computes the vector of integral values for a given equidistant table of function values. Beginning with Z(1) = 0, vector Z is evaluated by means of the trapezoidal rule (second order formula). The routine is FORTRAN callable.

FORTRAN II

Contributed.

22025A, SIMPSON AND NEWTON'S 3/8 INTEGRATION ROUTINE, EQUAL INTERVAL ARGUMENT

This routine computes the vector of integral values for a given equidistant table of function values. The input vector of function values must consist of at least 3 elements. Beginning with Z(1) = 0, vector Z is evaluated by means of Simpson's rule, Newton's 3/8 rule, or a combination of these two rules. Truncation error, computed by the fourth-order method, in most instances is of the order H**5. In the worst-case situation, however, the truncation error of Z(2) is of the order H**4. The routine is FORTRAN callable.

FORTRAN II

Contributed.

22026A, HERMITIAN FOURTH-ORDER INTEGRATION ROUTINE

This routine computes the vector of integral values for a given general table of argument, function, and derivative values. Using the Hermitian Fourth Order Integration Formula, vector Z is evaluated beginning with Z(1) = 0. The routine is FORTRAN callable.

FORTRAN II

Contributed.

22027B, HERMITIAN FOURTH-ORDER INTEGRATION ROUTINE, EQUAL INTERVAL ARGUMENT

This routine computes the vector of integral values for a given equidistant table of function and derivative values. Beginning with Z(1) = 0, vector Z is evaluated by means of the Hermitian Fourth Order Integration Formula. The routine is FORTRAN callable.

FORTRAN II.

Contributed.

22028A, HERMITIAN SIXTH-ORDER INTEGRATION ROUTINE

This routine computes the vector of integral values for a given general table of argument, function, first derivative, and second derivative values. Beginning with Z(1) = 0, vector Z is evaluated by means of the Hermitian Sixth Order Integration Formula. The routine is FORTRAN callable.

FORTRAN II

Contributed.

22029A, HERMITIAN SIXTH-ORDER INTEGRATION ROUTINE, EQUAL INTERVAL ARGUMENT

This routine computes the vector of integral values for a given equidistant table of function, first derivative, and second derivative values. Beginning with Z(1) = 0, vector Z is evaluated by means of the Hermitian Sixth-Order Integration Formula. The routine is FORTRAN callable.

FORTRAN II

Contributed.

22144A, INTEGRATION ROUTINE

This Stat-Pack routine evaluates the definite integral for a function with values of equidistant discrete points. The integral is computed by Simpson's method, giving the exact value of the integral if the function is a polynomial of degree not greater than 3. There must be an odd number of data points. The routine is FORTRAN callable.

FORTRAN II

Contributed.
Roland Jahn
HP, Medical Electronics Div.

A311, POLYNOMIALS AND POLYNOMIAL EQUATIONS

22030A, COMPLEX ROOTS OF A REAL POLYNOMIAL

Using the quotient-difference algorithm with displacement, this routine calculates all real and complex roots of a polynomial expression. The routine is FORTRAN callable.

FORTRAN II

Contributed.

22395A, REAL & COMPLEX ROOTS OF A POLYNOMIAL WITH REAL COEFFICIENTS

This routine calculates all real and complex roots of a given polynomial with real coefficients.

The roots of the polynomial are calculated by means of the quotient-difference algorithm with displacement.

FORTRAN II.

Contributed:
Don Mactaggart
Canadian Marconi Company

22031A, ADD ROWS OF MATRICES

This routine adds corresponding elements of a row of one matrix to a row of another matrix. The output matrix must be a general matrix, and must not be stored in the same location as the input matrix unless the input matrix also is general. The routine is FORTRAN callable.

FORTRAN II

Contributed.

22032A, RANK AND BASIS ROUTINE

For a given m x n matrix, the following calculations are performed by this routine:

a. Determine rank and linearly independent rows and columns (basis)

b. Factorize a submatrix of maximal rank.

c. Express nonbasic rows in terms of basic rows.

d. Express basic variables in terms of free variables.

The left hand triangular factor is normalized so that the diagonal contains all 1's, thus allowing storage of the subdiagonal part.

Gaussian elimination technique is used for calculation of the triangular factors of a given matrix. Complete pivoting is built in. In the case of a singular matrix, only the triangular factors of a submatrix of maximal rank are retained. The remining parts of the resultant matrix give the dependencies of rows and the solution of the homogeneous matrix equation A*X = 0.

This routine is FORTRAN callable.

FORTRAN II

Contributed.

22118B, MATRIX INVERSION SUBROUTINES

FORTRAN callable, these five Stat-Pack subroutines perform the following functions:

a. The Symmetric Matrix Inversion Subroutine inverts a matrix, working only with the diagonal elements and the elements above the diagonal. Maximum dimension of the matrix is 20 x 20.

b. The Maximum Pivotal Element Matrix Inversion Subroutine finds the maximum pivotal element on each row, places these elements in a diagonal, inverts the matrix, then restores the rows and columns to their proper places. Maximum dimension of the matrix is 20 x 20.

c. The Quick Matrix Inversion Subroutine is a rapid method for inverting a matrix. No checks are made for singularity. Maximum dimension of the matrix is 15 x 15.

d. The Matrix Inversion with Check for Significance of Pivotal Element Subroutine inverts a matrix, checking first to determine whether the diagonal elements exceed a specified tolerance. There are no provisions for changing rows to eliminate zero elements on the diagonal. Maximum dimension of the matrix is 10 x 10.

e. The Matrix Inversion Simultaneous-Equation Solver inverts the indicated matrix and solves a set of simultaneous equations, returning the solution, the inverted matrix, and the determinant of the system. Maximum dimension of the matrix is 20 x 20.

FORTRAN II

Contributed:
Ronald Jahn
HP, Medical Electronics Div.

22120A, MATRIX ARITHMETIC PROGRAM

This Stat-Pack program adds, subtracts, or multiplies two 2-dimensional matrices which are conformable. Maximum matrix size is 20 x 10.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22119A, MATRIX ARITHMETIC SUBROUTINE

This Stat-Pack subroutine adds, subtracts, or multiplies two 2-dimensional matrices which are conformable. Data is entered one row at a time. Maximum matrix size is 20 x 20. The routine is FORTRAN callable.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

A313, EIGENVALUES AND EIGENVECTORS

22192A, EIGENVALUES OF A SYMMETRIC REAL MATRIX

This routine uses Householder's method and the QR algorithm to find all the eigenvalues of a symmetric matrix.

ALGOL

Contributed:
John H. Welsch
HP Laboratories

22033A, SOLUTION OF SIMULTANEOUS LINEAR EQUATIONS

Using Gauss elimination with complete pivoting, this routine solves a general system of simultaneous linear equations. The routine is FORTRAN callable.

FORTRAN II

Contributed.

22034A, SOLUTION OF SIMULTANEOUS LINEAR EQUATIONS, BAND-MATRIX

This routine solves a system of simultaneous linear equations with a coefficient matrix of band structures. To preserve the band structure in the remaining coefficient matrices, the solution is obtained by means of the Gauss-elimination method with column pivoting only. The routine is FORTRAN callable.

FORTRAN II

Contributed.

22035A, SOLTUION OF SIMULTANEOUS LINEAR EQUATIONS, SYMMETRIC MATRIX

This routine solves a system of simultaneous linear equations with a symmetric coefficient matrix whose upper triangular part is assumed to be stored columnwise. To preserve symmetry in the remaining coefficient matrices, the solution is obtained by means of the Gauss-elimination method with column pivoting only. The routine is FORTRAN callable.

FORTRAN II

Contributed.

22122A, SIMULTANEOUS EQUATION SOLVER PROGRAM

Using the Gaussian elimination method, this program solves up to 22 simultaneous equations whose coefficients are in a single input matrix. A check for matrix singularity is not performed. The program controls its own I/O operations, using any I/O driver in the operating system employed. The program is part of the Stat-Pack group.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22123A, SIMULTANEOUS EQUATION SOLVER ROUTINE

Using the Gaussian elimination method, this routine solves up to 22 simultaneous equations whose coefficients are in a single input matrix. A check for matrix singularity is not performed. The routine does not control its own I/O operations. The routine is part of the Stat-Pack group, and is FORTRAN callable.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22036A, REAL FOURIER TRANSFORM

This FORTRAN callable routine finds the Fourier coefficients of a one-dimension real array. Using the Cooley-Tukey algorithm, the routine gives the coefficients of 2*(2**M) real points when given the input of 2*(2**M) real function values whose arguments are equally spaced. Program 22037 (classification code A316) is required.

Equipment required is 16K of core storage to compile, 8K to execute.

FORTRAN II

Contributed.

22037B, COMPLEX FOURIER TRANSFORM

The function of this FORTRAN callable routine is to perform discrete complex Fourier transforms on a complex 3-dimension array where each dimension is a power of 2.

Equipment required is 16K of core storage to compile, 8K to execute.

FORTRAN II

Contributed.

22189B, GENERAL FAST FOURIER TRANSFORM

This routine employs an efficient algorithm for finding the Fourier transform of a function. The expression evaluated is:

$$F(n) = \frac{1}{N} \sum_{i=0}^{N-1} F(i) e^{-jin \frac{2\pi}{N}}$$

Where the f(i) are in general complex. The Cooley-Tukey algorithm is used, offering large savings in time and storage over other methods. The number of input data must be an integer power of two, and the data must be complex.

Inverse transforms can also be taken with this routine. The inverse transform is:

$$F(i) = \sum_{n=0}^{N-1} F(n) e^{jin \frac{2\pi}{N}}$$

The routine is FORTRAN callable.

FORTRAN II.

Contributed:
Peter K. Bice
HP, Microwave Division

22218A, FAST FOURIER TRANSFORM

This routine finds the Fourier transform of complex, multi-dimensional, complex data. The defining equation is:

$$\text{TRANSFORM}(k_1, k_2, \ldots) = \text{SUM}(\text{DATA}j_1,j_2 \ldots) * \text{EXP}(\text{ISIGN}*2* \text{PI}* \text{SQRT}(-1)*((j_1 - 1)* (k_1 - 1)/\text{NN}(1) + (j_2 - 1) *(k_2 - 1)/\text{NN}(2) + \ldots)))$$

This quantity is summed for all j_1, k_1 between 1 and NN(1), j_2 k_2 between 1 and NN(2), etc. There is no limit to the number of k's (i.e., no limit on the number of dimensions). Also, there is no restriction on the length of the dimensions, although the program runs faster when the lengths are composite integers, and especially fast when the lengths are powers of two.

Both forward (ISIGN=-1) and inverse (ISIGN=+1) transforms can be calculated. If a -1 transform is followed by a +1 transform, the original data will reappear multiplied by NTOT=(NN(1)*NN(2)*. . .).

The routine places the following restrictions on input data and transform values:

a. The number of input data and the number of transform values must be the same.

b. Both the input data and the transform values must represent equispaced points in their respective domains of time and frequency. Calling these spacings DELTAT and DELTAF, it must be true that DELTAF = 2*P1/[NN(I)*DELTAT]. Of course, DELTAT need not be the same for nvery dimension.

c. Conceptually, at least, the input data and the transform output represent single cycles of periodic functions.

The routine is FORTRAN callable.

FORTRAN II

Contributed:
Electronics Research Laboratory
Stanford University

22038A, SYSTEM OF ORDINARY DIFFERENTIAL EQUATIONS

Used by the RTE or DOS Operating System, this FORTRAN callable routine solves a system of first-order ordinary general differential equations with given initial values.

A fourth order method, Hammings Modified Predictor-Corrector Method, is used. This procedure requires four preceding points for computation of a new vector Y of the dependent variables.

The fourth-order Runge-Kutta method is used for adjustment of the initial increment and for computation of starting values. During the entire routine, the increment is automatically adjusted by halving or doubling.

For maximum flexibility in output, an output subroutine must be supplied by the user.

FORTRAN II

Contributed.

22145B, CONFIDENCE INTERVAL FOR MEAN AND VARIANCE OF A NORMAL DISTRIBUTION

This program calculates the upper and lower confidence limits for the mean and variance of a sample, assuming the data to be normally distributed. The user may specify a confidence level of 0.90, 0.95, or 0.99 for the confidence limits of the sample mean. The program generates 0.95 confidence limits for the sample variance, and handles a maximum of 900 data points. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II.

Contributed:
Roland Jahn
HP, Medical Electronics Division

22146C, SAMPLE SIZE DETERMINATION ON THE SAMPLE VARIANCE

This program utilizes an estimate of the sample variance, based on M degrees of freedom and a specified maximum confidence interval length, to determine the sample size required to give any test level estimate of the population mean. The program uses a trial and error method, with the initial sample size specified by the user. The sample size is determined for confidence levels of 0.90, 0.95, and 0.99. This program is part of the State-Pack group.

FORTRAN II.

Contributed:
Roland Jahn
HP, Medical Electronics Division

22156A, PAIRED t-TEST

The Student's t-test for paired observations applies to the case of two samples in which the observations of one sample may be logically related or paired (in time or space), item by item, with the observations of the second sample. The program calculates point estimates (mean, standard deviation, standard error of the mean) for both samples, then calculates the point estimates and value of Student's t on the difference between samples. The value of Student's t is computed for a specified level of confidence, either 0.90, 0.95, or 0.99. A maximum of 600 unweighted (X,Y) data pairs can be handled. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22157B, BARTLETT'S HOMOGENEITY OF VARIANCE TEST

This program tests the hypothesis that the estimated variance from k samples is homogeneous. A one-sided alternative at the 0.95 confidence level is used as the test statistic; that is, if the calculated chi-square value exceeds the tabular value of chi square at the designated probability.

FORTRAN II.

Contributed:
Roland Jahn
HP, Medical Electronics Division

22159B, CHI SQUARE GOODNESS-OF-FIT TEST

This program performs the chi-square goodness-of-fit test, and computes the chi-square value of the test, for any of the following functions: binomial, chi square, F, normal, Poisson, Student's t. The user has the option of specifying the upper and lower bounds for a given number of intervals, or of reading in the endpoints of each interval. A maximum of 1,000 data points can be handled. HP Program 22143, classification code A408, can be used to furnish the source data. HP Program 22159 is part of the Stat-Pack group.

FORTRAN II.

Contributed:
Roland Jahn
HP, Medical Electronics Division

22160A, TESTS OF HYPOTHESIS FOR VARIANCES

The program tests for one of the following:

a. Whether the variance, σ^2, of a normal population equals a specified variance, σ_0^2.

b. Whether the variances, σ_1^2 and σ_2^2, are equal, providing both come from a normal population.

Results are determined with a 95-percent confidence interval. A maximum of 500 (X,Y) data pairs or 1,000 data points can be handled. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22161B, TEST OF HYPOTHESIS FOR MEANS

This program tests (a) whether the mean μ of a normal population equals a specified value μ_0 or (b) whether the means μ_1 and μ_2 are equal (providing both come from a normal population). Both tests first assume $\sigma_1^2 \neq \sigma_2^2$, and then assume $\sigma_1^2 \neq \sigma_2^2$. Results are determined with a confidence interval of 0.90, 0.95, or 0.99. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Division

22183A, SAMPLE SIZE DETERMINATION TO TEST H_0

This program computes the sample size, n, to test either H_0: $\mu = \mu_1$ or H_0: $\mu_1 = \mu_2$ so that the probability of detecting the significant difference, a, is equal to β. A previous requirement is an estimate of the population variance (for $\mu = \mu_1$) or for the common variance (for $\mu_1 = \mu_2$), S^2, based on m degrees of freedom. The table used in determining the sample size is read in as data. The value of $k = a^2/s^2$ is computed, located in the table, and the value of n can then be determined. The value of a, the probability of rejecting H_0 when it is true, is 0.10 for a two-tailed test and 0.05 for a one-tailed test. The values determined for β are 0.80 and 0.95. The program is part of the Stat-Pack group.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

A402, TIME SERIES ANALYSIS

22124A, AUTOCORRLEATION AND SPECTRAL DENSITY

For a given set of data points and a maximum lag (i.e., harmonic), this program calculates autocorrelation coefficients and power spectral density. The input data can be normalized, if desired. The program will handle a maximum of 300 data points.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22125A, MOVING AVERAGES

This Stat-Pack, FORTRAN program computes a set of moving averages of order N from a time-series of M elements. M – N + 1 moving averages are computed and tabulated. The time series may have a maximum of 2000 elements, and the order of the moving average must be less than the number of elements in the time series.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

A403, DISCRIMINANT ANALYSIS

22127A, DISCRIMINANT ANALYSIS PROGRAM

Given two groups of data with up to 20 variables per group, this program calculates a linear function of the variables by which the two groups can be discriminated. The linear function found is the one that maximizes the ratio of the following two elements:

a. The difference between the group means.
b. The standard deviations within the species.

The program is part of the Stat-Pack group.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22128A, LEAST SQUARES REGRESSION PROGRAM

This program performs the calculations for least-squares polynomial regression up to degree three. The user has the option of specifying the degree of fit (linear, quadratic, or cubic), or of specifying a fit through all three degrees. An analysis of variance is performed for each polynomial fit, as well as analysis of individual terms. If desired, the predicted values and residuals are included in the analysis. The program will handle a maximum of 400 (X,Y) data pairs. The program is part of the Stat-Pack group.

Equipment required is at least 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22129A, LINEAR REGRESSION INTERVAL ESTIMATES

This program computes the linear regression function of one independent variable and the confidence prediction intervals for predicted values of the dependent variable, given a 0.90, 0.95, or 0.99 confidence interval. The regression function is evaluated by the method of least squares. An analysis of variance is included. The program will handle a maximum of 750 (X,Y) data pairs. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22130A, POLYNOMIAL REGRESSION PROGRAM

Using the method of least squares, this program generates an approximating polynomial up to the 15th degree. The degree of regression is determined by an iterative technique, the iterative process being terminated by either of the following:

a. When the computed standard error of the dependent variable for the ith iteration (degree i) is less than or equal to the maximum allowable error specified by the user.

b. When the program has fitted the experimental data through a 15th degree polynomial.

The program will handle a maximum of 350 (X,Y) data pairs. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22131A, POLYNOMIAL REGRESSION CONFIDENCE INTERVALS

This program generates confidence interval estimates at a specified confidence level for each predicted point of an ith degree approximating polynomial (i = 1,6). The user may select a confidence level of 0.90, 0.95, or 0.99. Estimates of the regression-covariance matrix also are made. The program will handle a maximum of 400 (X,Y) data pairs. The degree of the input polynomial must be less than, or equal to, 6. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22132A, STEPWISE REGRESSION PROGRAM

This program uses multiple regression to obtain the best fit to a set of observations consisting of one dependent variable and multiple independent variables. In the stepwise regression, a number of intermediate regression equations are obtained, in addition to the complete regression

equation. These intermediate equations are derived by adding one variable at a time; the variable added is the one that makes the greatest improvement in the least squares goodness-of-fit. The insignificant variables are removed from the regression equation before the addition of a new variable. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22133A, BIOASSAY PROGRAM

This program computes predicted X values for given Y values, and the linear regression data for Y on X. If the regression data is not immediately available, the program accepts X and Y values, and computes the predicted X values from the given Y values. For each predicted X value, the output consists of the given Y values for the point, the average of these Y values, the predicted X value itself, and the upper and lower bounds of the 95-percent confidence interval for the predicted X values. The program is designed to handle a maximum of 600 (X,Y) data pairs. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22134A, ORTHOGONAL REGRESSION PROGRAM

By means of orthogonal polynomials, this program generates a regression polynomial in one independent variable up to the fifth degree. A general statistical analysis is included (including the mean, variance, etc.), and confidence limits are generated for the sample mean at the 0.90, 0.95, and 0.99 confidence levels. The regression analysis is then computed, yielding uncorrelated estimators. The polynomial is rewritten in terms of the original variable X, and an analysis of variance is performed term by term. Back solutions are included in the analysis. The program is designed to handle a maximum of 26 data points at equally spaced distances along the ordinate. The maximum polynomial generated is of degree 5. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22135A, LINEAR REGRESSION WITH REPLICATION

This program computes a linear regression and analysis of variance on data with an equal or unequal number of replications (i.e., multiple Y values for a given X value). The program handles a maximum of 150 unweighted (X,Y) data pairs. The values of the independent variable X must be in ascending sequence in order to establish the number of replicates per value of X. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22136A, NONLINEAR REGRESSION PROGRAM

This program performs nonlinear regression calculations to fit a set of data to a function specified by the user. Corrections to a starting value of the parameter values are computed by iteration cycles until the corrections make no change (within a specified tolerance) in the error sum of squares. It must be noted that the final error sum of squares may be quite large if the data does not fit the desired model well. The program is set up to handle 10 parameters, and the model used must have only one X value for each Y value. The procedure is dimensioned to estimate up to 10 parameters from 150 pairs of X and Y values. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22184A, POOLING OF GROUPS IN REGRESSION

Designed to handle a maximum of 15 groups, this program determines whether several groups of data can be pooled into one linear regression. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22185A, MULTIPLE REGRESSION PROGRAM

This program provides an extremely complete statistical analysis, including an analysis of variance table, for estimating the coefficients in the following model:

$$Y_i = \beta_0 + \beta 1 x_{1i} + \beta_2 x_{2i} + \ldots + \beta_k x_{ki} + \epsilon_i (k \leqslant 9)$$

Output is in printed form, and only a single set of data can be processed in one run.

There can be no more than nine independent and one dependent variable. The number of observations is restricted only when the one-pass option is exercised, and then to 2,400 observation vectors for 10 variables. For n variables there must be at least (n+1) observation vectors. The only input constraint is that the ith observation vector (y_i, x_{1i}, x_{2i}, . . . , x_{ki}) must be furnished before the ith + 1 vector. The dependent variable can be in any field. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22187A, NONLINEAR REGRESSION OF A SINGLE-VARIABLE FUNCTION

This program performs nonlinear least squares regression on a single-variable function. The program can operate on any regression model for which FORTRAN functions can be written for evaluation of the partials of the regression model with respect to its regression coefficients. (A user-written program is required for evaluation of the function and its first partials.) A maximum of three independent variables and one dependent variable can be handled, and a maximum of 150 (X,Y) data pairs may be entered per run. The program is part of the Stat-Pack group.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22188A, NONLINEAR REGRESSION OF AN ARBITRARY FUNCTION

This program performs nonlinear least squares regression on an arbitrary function. The mrogram can operate on any regression model for which FORTRAN functions can be written for evaluation of the partials of the regression model with respect to its regression coefficients. (A user program is required for evaluation of the function and its first partials.) A maximum of three independent variables and one dependent variable can be handled, and a maximum of 150 (X,Y) data pairs may be entered per run. The program is part of the Stat-Pack group.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22194A, PSEUDO-RANDOM NUMBER GENERATOR

This FORTRAN callable routine produces 32-bit random numbers between 0.000000 and 0.999999. If the routine is repeated, the same numbers are produced in the same sequence.

Assembly language, relocatable.

Contributed:
Dale N. Murray
Redstone Arsenal

22265A, FLOATING POINT RANDOM NUMBER GENERATOR

This function generates random numbers between "0" and "1" in floating point and returns the values in the A and B registers.

Assembly language, relocatable.

Contributed:
Dieter Schmidtke
HP, Germany/Frankfurt

22308A, GAUSSIAN RANDOM NUMBER GENERATOR

This ALGOL real procedure Gauss (I) generates Gaussian (normal) distributed random numbers with mean MY = 0 and variance SIGMA 2 = 1. The procedure requires two random numbers X_1 and X_2 called from the assembly language function RANDM which generates random numbers in the interval (0, 1). The test case GAUT plots the distribution in the form of a histogram with mean zero and variance one. FORTRAN and ALGOL callable.

ALGOL/Assembly Language, relocatable.

Contributed:
Dr. Rolf Robcke
HP, Germany/Frankfurt

22413A, RANDOM INTEGER NUMBER GENERATOR

IRND(M) is a function subprogram which generates pseudo random number integers in the range $0 \leq X \leq M-1$.

The generating random number string is not automatically restarted when the program is restarted. This can be achieved by the FORTRAN callable subroutine STRND.

Assembly language, relocatable.

Contributed:
Hans R. Biesel
HP, Germany/Boeblingen

22434A, RANDOM NUMBER GENERATORS

Two subroutines using the same algorithm to compute uniformly distributed pseudo-random numbers in the interval (0, 1) are included in this package. One is FORTRAN or ALGOL callable. The other is strictly for use with Assembler main programs and is much faster.

The method employed is described in: Applied Numerical Methods, by Carnahan, Luther, and Wilkes, p. 545.

Assembly language, relocatable.

Contributed:
Jaroslav Dedek
Technical University, Czechoslovakia

22137A, CUMULATIVE DISTRIBUTION PROGRAM

This program generates a frequency distribution for a single data set consisting of 1500 points or less. The mean, median, standard deviation, and interquartiles are included. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22121A, CROSS-TABULATION PROGRAM

This Stat-Pack program performs a cross-tabulation of two single-dimension fixed point arrays which use a Cartesian coordinate scheme. A maximum of 9999 values can be handled for each cell of the array.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22138A, KENDALL'S COEFFICIENT OF CONCORDANCE: W

This program computes Kendall's Coefficient of Concordance: W. This is a measure of the relation among several rankings. Ties are checked, and the degree of association, W, is adjusted accordingly. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22139A, KENDALL'S COEFFICIENT OF CONCORDANCE

This program computes Kendall's Coefficient of Concordance. No check is made for ties. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22140A, KENDALL'S TAU CORRELATION

This program computes Kendall's tau, a rank correlation coefficient, for a given set of ordered (X,Y,) pairs. Associated statistics are also produced, and the program determines the presence or absence of ties in the data set and adjusts tau accordingly. The program handles a maximum of 300 (X,Y) data pairs, which must be sorted in ascending algebraic sequency of the X variable. The program is part of the Stat-Pack grop group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22147A, MULTIPLE CORRELATION ROUTINE

Using a maximum of 20 variables, with up to 999 observations per variable, this routine calculates the means and standard deviations of each variable. The raw sum of squares, cross-product matrix, the variance-covariance matrix, and the correlation matrix, also are determined. The routine is part of the Stat-Pack group, and is FORTRAN callable.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22155A, DUNCAN'S MULTIPLE RANGE TEST

This program computes all statistics and tests involved in Duncan's Multiple Range Test with equal or unequal readings per group. The input data can either be the means and the mean square error, or the observations themselves. In the latter case, an analysis of variance for a completely randomized design is performed. Significance levels of either 0.05 or 0.01 can be selected. A maximum of 100 treatments can be handled, with an equal or unequal number of observations per treatment. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22158B, KOLMOGOROV-SMIRNOV GOODNESS-OF-FIT TEST

For a maximum of 999 data points, this program performs the Kolmogorov-Smirnov goodness-of-fit test for a specified probability distribution. The source data can be tested for fit against any of the following functions: binomial, chi square, F, normal, Poisson, or Student's t. The user has the option of (a) specifying the number of class intervals, (b) letting the program generate class intervals by use of Sturge's rule, or (c) specifying the number of intervals and upper bounds of each interval. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II.

Contributed:
Roland Jahn
HP, Medical Electronics Division

22039A, MEAN, DEVIATION, AND CORRELATION COEFFICIENTS ROUTINE

This FORTRAN callable routine computes means, standard deviations, sums of cross-products of deviations, and correlation coefficients by product-moment correlation coefficients. The number of variables must be greater than the number of observations. The routine is FORTRAN callable.

FORTRAN II

Contributed.

22141A, GENERAL STATISTICS PROGRAM

This program characterizes a particular set of data by performing elementary statistical calculations (point estimates), determining the 0.95 and 0.99 confidence intervals for the sample mean (assuming normal distribution of the data), and generating a histogram of the data points. A maximum of 900 unweighted and ungrouped data points can be handled. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22142B, GENERAL STATISTICS FOR MULTIPLE GROUPS

This program generates point estimates (mean, variance, standard deviation, and standard error) and confidence interval estimates for the sample mean. The analysis may be performed for a maximum of 99 sets or groups of data in a single execution. The user can elect to determine confidence intervals for the sample mean at the 0.90, 0.95, or 0.99 level of confidence. This program is part of the Stet-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22143A, PROBABILITY SUBPROGRAMS

This software product consists of ten routines which calculate the following probability functions: normal cumulative probability function, cumulative binomial function, cumulative Poisson function, F cumulative probability function, chi-square cumulative distribution function, chi-square area for critical values, inverse F distribution function, Student's t distribution, normal probability function, and Student's t cumulative probability function. This software product is part of the Stat-Pack group, and is FORTRAN callable.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22126A, CROSS CORRELATION ANALYSIS

This program computes a set of cross-correlation coefficients for two time series. The minimum and maximum lag input determines the number of coefficients computed. The program will handle a maximum of 900 elements for each time series.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22186A, MULTIPLE CORRELATION MATRIX PROGRAM

This program computes the mean, standard deviation, and Pearson's Correlation Coefficient (r) for 2 to 52 variables. There is no limit on the number of observations per variable. The distinguishing feature of the program is that the computed correlations are furnished in matrix form with variable numbers listed, making it easy to identify values. The program is part of the Stat-Pack group.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22148A, COMPLETELY RANDOMIZED DESIGN

This program performs an analysis of variance on a completely randomized experimental design. A maximum of 400 treatments can be handled, with no restrictions on the number of observations per treatment. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22149A, COMPLETELY RANDOMIZED DESIGN WITH SUBSAMPLING

Using either an equal or an unequal number of observations per treatment, this program performs an anlysis of variance on a completely randomized design with subsampling. For unequal observations per subsample, Satterthwaite's Approximate Test procedure is used. The program will handle a maximum of 20 treatments with up to 20 samples per treatment. There is no limit to the number of determinations per sample and treatment. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22154A, ANALYSIS OF VARIANCE INFORMATION GENERATOR

This program performs an analysis of variance on a randomized block experimental design with subsampling. There may be an equal or unequal number of subsamples per experimental unit (treatment-block combination). Computation of the noncentrality parameter is included in the analysis. Interaction between treatments and blocks is not assumed. The program is designed to handle a maximum of 7 treatments and 7 blocks and a maximum of 99 subsamples per treatment-block combination. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22150A, RANDOMIZED COMPLETE BLOCK DESIGN

This program performs an analysis of variance on a randomized complete block experimental design. A maximum of 100 treatments and 100 blocks can be handled. The program is part of the Stat-Pack group.
callable.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22151B, RANDOMIZED COMPLETE BLOCK DESIGN WITH SUBSAMPLING

This program performs an analysis of variance on a randomized complete block design and subsampling. A maximum of 30 treatments and 30 blocks can be handled. The program is part of the Stat-Pack group.

FORTRAN II.

Contributed:
Roland Jahn
HP, Medical Electronics Division

A410, ANALYSIS OF VARIANCE AND COVARIANCE (Continued)

22153A, THREE-WAY FACTORIAL DESIGN

This program performs a 3-factor factorial analysis of variance for a randomized complete block design with replications. The F statistic computation assumes a "fixed effect" model. A maximum of 8 levels of Factor A, 8 levels of Factor B, 5 levels of Factor C, and 8 replications, can be handled. Missing observations are not permitted, and the design must be balanced (i.e., the same number of observations is required for all treatment combinations over all replicates). The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22152A, TWO-WAY FACTORIAL DESIGN

This program performs an analysis of variance for a two-way factorial in a randomized complete block design. The F test is for a fixed model. Each replicate must be balanced (i.e., the same number of observations is required for each level of each factor). A maximum of 20 levels per factor, and 8 replicates per level, can be handled. The program is part of the Stat-Pack group.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

A413, GENERAL PROBABILITY

22397A, COMBINATION GENERATOR

This subroutine generates all combinations of N objects taken K at a time. The output is a vector or 1-dimensional FORTRAN array containing a particular combination.

The subroutine as supplied is operable is DOS or DOS-M, but may be used under BCS with trivial modifications.

Assembly language, relocatable.

Contributed:
Wayne Covington
HP, Loveland Division

22325A, COPPER-CONSTANTAN THERMOCOUPLE VOLTAGE TO CELSIUS DEGREES CONVERSION

This subroutine accepts a value of the voltage read from a copper-constantan thermocouple in microvolts and returns a temperature value in degrees Centigrade. This value is correct to .1 of a Celsius degree. The method for determining the temperature is interpolation of standard thermocouple tables at 10 degree intervals.

FORTRAN II.

Contributed:
Rodney C. Williams and William L. McLain
Wake Forest University

01530A, ECG INTERPRETIVE SYSTEM

The HP 1530 ECG Interpretive System provides patient history and billing routines and two analysis programs to acquire and process ECG data via telephone-linked terminals or analog tape (batch mode). One analysis program uses the twelve standard leads; the other uses three Frank orthogonal leads.

The system has two versions: Version A, controlled by a modified RTE, requires 16K core memory; Version B, controlled by the 2005C RTE, requires 24K. Recommended system equipment includes:

- HP 2761A Optical Mark Reader
- HP 2748A Punched Tape Reader
- HP 2754B Heavy-Duty Teleprinter
- HP 5614A Character Printer
- HP 5610/11A Data Acquisition Subsystem
- HP 5615A Data Receiver/Controller
- HP 3960A-E15 Analog Tape Recorder
- HP 5613A Three-channel ECG Recorder
- HP 2766A Disc Memory (with HP 2772A Power Supply)

Assembly language, relocatable (12-lead program) FORTRAN/Assembly language, relocatable (Frank-lead program)

HP supported:
Medical Electronics Division

05680A, MEDACE

MEDACE (Medical Data Acquisition Control Executive) is a software package designed to control HP medical data-acquisition systems. MEDACE is particularly suitable for cardiovascular research, bio-medical research, and intensive care monitoring.

Equipment required is at least 8K of core storage, an HP 12539 Time Base Generator or HP 5666A Digital Clock Subsystem, and an HP 5610 A to D Converter with interface kit. Optional equipment is an HP 2761 Optical Mark Reader and an HP 5661 Storage Display Scope.

Assembly language, relocatable.

HP supported:
Medical Electronics Div.

05690A, COMPUTERIZED CARDIAC CATHETERIZATION LABORATORY SYSTEM

This system centralizes and automates the processing of patient information obtained during cardiac catheterization from ECG electrodes, pressure transducers, a dye densitometer and manual entries. Using DOS or DOS-M, the system opens and maintains a patient's file. Both unprocessed and pre-analyzed data are entered throughout the catheterization procedure.

A typical hardware configuration includes:

- HP 5691A Keyboard
- HP 5692A Interface/Switching Control Panel
- HP 2100 Computer (minimum 8K memory)
- HP 5610A Analog to Digital Converter
- HP 5611A Pacer
- HP 2752A Teletype
- HP 5667A Video Monitor
- HP 5662A Scan Converter
- HP 8890A Catheterization Laboratory Recording System

FORTRAN/Assembly language, relocatable.

HP supported:
Medical Electronics Division

22221B, HP BIOMEDICAL RESPONSE AVERAGING PROGRAM

The HP Biomedical Response Averaging Program was written in conjunction with the University of Michigan's Electroencephalograph Laboratory. The University uses the program to analyze brain response to physiological stimuli; a 24-channel electroencephalograph being the response sensor. It should be noted, however, that the program is by no means constrained to EEG use. The signal-averaging technique employed can be a powerful aid in many fields, including the following:

a. High-resolution spectroscopy, where signal averaging can help overcome stability problems.

b. Electrocardiograph work.

c. Fluorescent decay studies.

The program, which is independent, is furnished on two paper tapes. One contains the compiler, which permits user input at the teleprinter in conversational form. The second tape contains the signal averaging program, which provides for data accumulation, statistical analysis, the monitoring of four channels on an oscilloscope, and generation of a report furnishing a statistical analysis for each of the 24 data channels.

Signal averaging is conducted at 1 millisecond per point or longer. Additional features include pre-stimulus condition averaging, dual-resolution sweeps, computation of confidence statistics and weighted averages, and pre-set sweep count. The averages, weighted averages, and confidence statistics for any selected data channel are recorded on an X-Y plotter, furnishing a permanent record in graph form.

Equipment required is the following:

a. 8K of core storage.

b. HP 2310C Miniverter System, with options 01 and 03.

c. HP 7004A X-Y Recorder, with interface kit.

d. Any high quality general purpose oscilloscope, with 4-channel vertical amplifier section and D/A interface kit.

e. HP 12539 Time Base Generator.

f. HP 12566 Duplex Register.

Assembly language, absolute.

Contributed:
George Moore
HP, Data Systems

22222A, BLOOD ACID-BASE VARIABLES DETERMINATION PROGRAM

Using the Astrup technique, this program is an accurate method of determining the acid-base variables in human blood. Two samples of blood are equilibrated with carbon-dioxide/oxygen mixtures of different and known composition, and the pH of each sample is measured. This data, together with an identification of the patient, an optional hemoglobin-concentration measurement, together with other information, is furnished to the computer by means of a marked card. (A slight change to the program allows input from punched tape.) The program "plots" the pH data against nomogram curves, and the output, furnished on the teleprinter, consists of the following:

a. Pco_2 of the sample.

b. Pco_2 of the sample, corrected for hemoglobin oxygen desaturation.

c. Concentration of bicarbonate of the sample.

d. Concentration of bicarbonate of the sample, corrected for hemoglobin oxygen desaturation.

e. Base excess of the sample.

f. Base excess of the sample, corrected for hemoglobin oxygen desaturation.

g. Buffer base of the sample.

h. Buffer base of the sample, corrected for hemoglobin oxygen desaturation.

i. Carbon dioxide content of the sample.

j. Carbon dioxide content of the sample, corrected for hemoglobin oxygen desaturation.

k. Standard bicarbonate.

l. Normal whole blood buffer base.

m. A symbol to denote whether the hemoglobin was physically measured, or calculated from the normal whole blood buffer base.

Equipment required is 8K of core storage.

FORTRAN II

Contributed:
Stan Russell
HP, Midwest Sales Region

22240A, LUNG COMPLIANCE AND RESISTANCE MEASUREMENT SYSTEM

This program enables early detection of the adverse effects of tobacco smoke or other irritants on lung function by determining the resistance to airflow and the compliance of the lung. Intrapleural pressure, volume, and airflow are measured over a breath cycle; tidal volume, respiratory minute volume, respiratory rate, the lung resistances over various parts of the expiration and inspiration cycles, and the dynamic compliance of the total lung are calculated.

The complete cycles are analyzed, each parameter is printed and a further calculation is made of the mean, standard deviation, and coefficient of variance for each parameter.

Equipment required includes 8K memory, 2752A teleprinter, HP 5610 Analog-to-digital Converter, HP 7761A Recording System, HP 350-110CM Preamplifier (2 off), HP 350-5000A Integrating Preamplifier, HP 270 Pressure Transducer, and an HP 268 Flow Transducer.

FORTRAN II.

Contributed:
Glyn Harris
HP, England/Slough

A516, CHEMICAL ENGINEERING

22435A, SECOND VIRIAL COEFFICIENTS

This procedure computes the second virial coefficients B_{11}, B_{22}, and B_{12} of gases and binary gas mixtures by the O'Connell and Prausnitz method. It holds that

$$p\upsilon R = RT + B * p$$

or

$$\frac{p\upsilon}{RT} = z = 1 + B * \frac{P}{RT}$$

where p-υ-T are the pressure, molar volume, and temperature of gas or gaseous mixture, R = 0.082056 1 * atm * deg^{-1} * mol^{-1} is the gas constant, and B is either the second virial coefficient of pure gas (i.e., B_{11} or B_{22}), or of binary gaseous mixture (i.e., $y_1^2 * B_{11} + 2 * y_1 * y_2 * B_{12} + y_2^2 * B_{22}$, where y_1 and y_2 are the molar fractions of the components 1 and 2, respectively).

ALGOL

Contributed:
Jaroslav Dedek
Technical University, Czechoslovakia

22384A, EFFECTIVE PERCEIVED NOISE LEVEL

This program computes the effective perceived noise level (EPNL) of an airplane from the take-off or landing profile according to the American (FAA) and English regulations.

Equipment required includes 8K memory, an HP 12539 Time Base Generator, an HP 2752 Teleprinter, any HP Photoreader and punch, an HP 8064A Analyzer, and an HP 15189A Interface Kit, and HP 12555 D/A Converter, and an HP 1208A X-Y Display.

Assembly language, relocatable.

Contributed:
Frank Rochlitzer
HP, Germany/Boeblingen

A700, BUSINESS AND MANUFACTURING APPLICATIONS

A701, JOB REPORTING

22378A, RTE LOGBOOK

The two FORTRAN programs in this package allow a user to "log": time-in of job, description of job, day, time-out of job; and generate a periodic summary report which includes the number of working days, the number of computer hours available, one-line printouts of each job run along with its run-time, total user hours, total computer hours, and other information pertinent to an RTE environment. Requires 16K core.

FORTRAN II.

Contributed:
Eugene Burmeister
HP, Loveland Division

A720, EDUCATIONAL ADMINISTRATION

22266A, MARK SENSE EDUCATIONAL TEST CARD SCORING PROGRAM

This package consists of two assembler subroutines and one FORTRAN main program to read HP 9320-2062 Educational Test Scoring Mark Sense Cards, calculate individual student scores and overall class statistics, and print the results. The first card read contains the correct answers, and each successive card is graded against that master. Incorrect answers are tabulated for each student, as well as the number of times each answer is chosen for each multiple choice question.

Equipment required includes 8K memory, and HP 2761-07 Mark Sense Reader, and an HP 2752A teleprinter.

FORTRAN II.

Contributed:
Charles Chernack
HP, Eastern Sales Region

22332A, THE EXECUTIVE GAME

THE EXECUTIVE GAME simulates a small industry in which there are up to 9 companies manufacturing and selling a single product. Participants are organized into teams which operate their hypothetical companies in competition with one another. The purpose of THE EXECUTIVE GAME is to provide an imaginary business environment in which participants can practice top-management decision making. The GAME is divided into two programs, and information is transferred between the two programs by means of COMMON storage. Part I accepts and processes team decisions, and Part II outputs Information on Competitors, an Operating Statement, a Cash Flow Statement, an Income Statement, and a Balance Sheet for each team. An additional YEAREND program evaluates each team's performance at the end of each four quarters of play. A text of player's instructions is published by Richard D. Irwin, Inc. (Henshaw and Jackson, *The Executive Game,* 1966). THE EXECUTIVE GAME can be a stimulating and effective learning tool for high school, undergraduate, and graduate business classes, and in management development programs. Minimum hardware requirements include an 8K computer and a teletype.

FORTRAN II.

Contributed:
Dr. Richard J. Ward
Bowling Green State University

22099A, DOS DEMO

This DOS program is designed to demonstrate the major features and capabilities of the Disc Operating System. Two of the features dealt with are batch processing and disc file management. Mark sense cards are used for entering control directives, and the operator can transfer between batch processing and keyboard monitoring to demonstrate the flexibility of the Disc Operating System. The program is intended for a fixed-head disc or drum, and has not been tested with a moving-head disc.

Equipment required is 8K of core storage, one HP 2770/71 Disc Memory with interface kit and power supply or one HP 2773/74/75 Drum Memory with interface kit and power supply, one HP 2761A-007 Optical Mark Sense Card Reader with interface kit, and the following optional devices for the computer: 2-channel Direct Memory Access, Memory Protect, Extended Arithmetic Unit, Memory Parity Check, Extended Arithmetic Unit, and Time Base Generator.

Assembly language, relocatable.

Contributed:
Mark Korell
HP, Data Systems

22040A, SCOPE DISPLAY DEMO

The Scope Display Demo is a self-teaching tool which demonstrates the uses of the programs in the A900-007 Scope Display Library (HP software product 20208A). The program library is used by the HP 2331A X-Y Display Subsystem, or with any oscilloscope employing the HP 12555 Digital-to-Analog Converter as an interface with the computer. An additional function of the Scope Display Demo is to furnish a means by which ASCII character strings can be moved to the most suitable position on the CRT display; the selected position can then be writtn into a program.

FORTRAN II

Contributed:
Thomas Winker
HP, Neely Sales Region

22094A, JEU DE MORPIONS (GAME OF TIC-TAC-TOE)

This program, named after its contributor, plays a game similar to tic-tac-toe with the user. (Tic-tac-toe is known as "noughts and crosses" in Britain.) The game is played on a 20-square grid, and the objective is to place five X's in adjacent squares, either horizontally, vertically, or diagonally. The program attempts to prevent this and select five adjacent squares of its own. The program is conversational, and the user can select either French or English language. The game is known as "jeu de morpions" in France, and as "go-muku" in Japan.

Assembly language, relocatable.

Contributed:
Paul Gavarini
HP, France/Orsay

22298A, BATTLESHIP

Battleship is a computer game for RTE in which five ships are randomly placed in a matrix by the program. The location of these ships is found by the player who proceeds by trial and error until a hit is achieved. Through successive "hits," he can reconstruct the random matrix.

FORTRAN IV.

Contributed:
Eugene Burmeister
HP, Loveland Division

22436A, HANGMAN

This program will play the game of HANGMAN using eighty, five letter words which are read in from the high speed paper tape reader as data. It will ask for letters which it compares with the letters of the word the player chooses. If the player guesses the letters of the chosen word with less than six errors, he gets to choose another word. If he has six errors a picture of a gallows and a stick man hanging is printed along with the word he was guessing. He then gets to choose another word and continues playing. Requires 8K of core.

FORTRAN II

Contributed:
Norman D. Love
Maryville College

22162B, X-Y PLOTTER ON PRINTER

This routine produces graphs on a teleprinter. An X array is scaled to suit the printed graph, and is plotted against either the element number in the array or against another array, Y. Each data point is marked on the graph as a letter "X", and the coordinates of the point also are printed. The routine can commence at any point in the array, and the output can be either a print plot or a bar plot. A maximum of 200 (X, Y) data pairs can be accepted. The routine is part of the Stat-Pack group, and is FORTRAN callable.

FORTRAN II.

Contributed:
Roland Jahn
HP, Medical Electronics Division

22163A, TIME SERIES PLOTTER

Available in function form, this subprogram plots fixed-point integers on the teleprinter. If the value of the integer is from 0 to 50, the point appears as an asterisk, the distance from the left margin of the page being proportionate to the value of the point. If the value is over 50, the integer itself is printed in numerical form at the right hand edge of the page. Successive data points are plotted on successive lines down the page. The routine is part of the Stat-Pack group, and is FORTRAN callable.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22164B, HISTOGRAM PLOTTER PROGRAM

This program sorts a single dimension floating point array into ascending sequence, and (a) produces a histogram of the data points on the teleprinter or line printer, or (b) furnishes the frequency distribution of the data points, or (c) produces both a histogram and a frequency distribution. The program is part of the Stat-Pack group.

Equipment required is at least a 16K computer.

FORTRAN II'

Contributed:
Roland Jahn
HP, Medical Electronics Division

22182A, HISTOGRAM PLOTTER ROUTINE

This routine sorts a single-dimension floating point array into ascending sequence, and (a) produces a histogram of the data points on the teleprinter, or (b) furnishes the frequency distribution of the data points, or (c) produces both a histogram and a frequency distribution. A maximum of 400 data points can be handled; any number of duplications are allowed. (With a slight change in the routine, more than 400 points can be processed.) The routine is part of the Stat-Pack group, and is FORTRAN callable.

FORTRAN II

Contributed:
Roland Jahn
HP, Medical Electronics Div.

22262A, THREE DIMENSIONAL PLOT SUBROUTINE

This routine projects a three-dimensional object in perspective on a simple X-Y plotting system or graphic display terminal. It transforms an (X, Y, Z) coordinate in three space to an orthographic projection in two space, using four calls. The first call defines the angles of the coordinate axes X, Y, Z allowing display of various rotations of an object. The second and third calls set minimum and maximum (X, Y, Z) values, while the fourth call transforms an (X, Y, Z) coordinate in three space to an (IX, IY) coordinate representation in two space.

FORTRAN II.

Contributed:
John S. Shema
Montana State University

22324A, BCS VARIABLE SIZE PLOT FOR THE CALCOMP 565

LINA is a subroutine designed to plot a line and/or symbols through the successive data points in arrays that have been previously scaled. It differs from HP LINE in that the user may specify the size of the symbol. This may prove helpful when drawings are to be reduced photographically for use

in publication. This operates in conjunction with the Plotter Library, HP 20201B.

Equipment required includes 8K core, and the Calcomp Plotter Model 565.

FORTRAN II.

Contributed:
Rodney C. Williams and William L. McLain
Wake Forest University

22348A, X-Y PLOTTER FOR 11-INCH PAGE PRINTER

This program plots X-Y graphs on an 11-inch page printer from a given set of data points. The data is input free field, ordered, and scaled in both dimensions by the program to fit on one page. Two versions of the program are included; one formatted for output to an HP 2767 line printer, and the other for a teleprinter.

This program allows a quick display of data with the limited resolution of a character printer. Up to 100 samples of 10 different variables can be input with the line printer version. Up to 120 samples of 4 different variables can be input with the teleprinter version.

Equipment required includes 8K core, any HP teleprinter, and, optionally, any HP photoreader and an HP 2767 line printer.

FORTRAN II.

Contributed:
Roland E. Jahn
HP, Medical Electronics Division

22425A, THREE DIMENSIONAL TRANSFORMATIONS USING EULER'S ANGLES

This FORTRAN-callable subroutine transforms the coordinates (x, y, z) of a data set to (x', y', z') using Euler's Angles. It is particularly useful in obtaining planar projections of crystal structures. References cited in the documentation give a detailed explanation of the method of Euler's Angles.

Only 8K core and an HP 2752 teleprinter are required, but the routine is particularly useful in conjunction with an HP 1300A Display System. Two test programs demonstrate output on a teleprinter and an HP 1300A Scope.

FORTRAN II

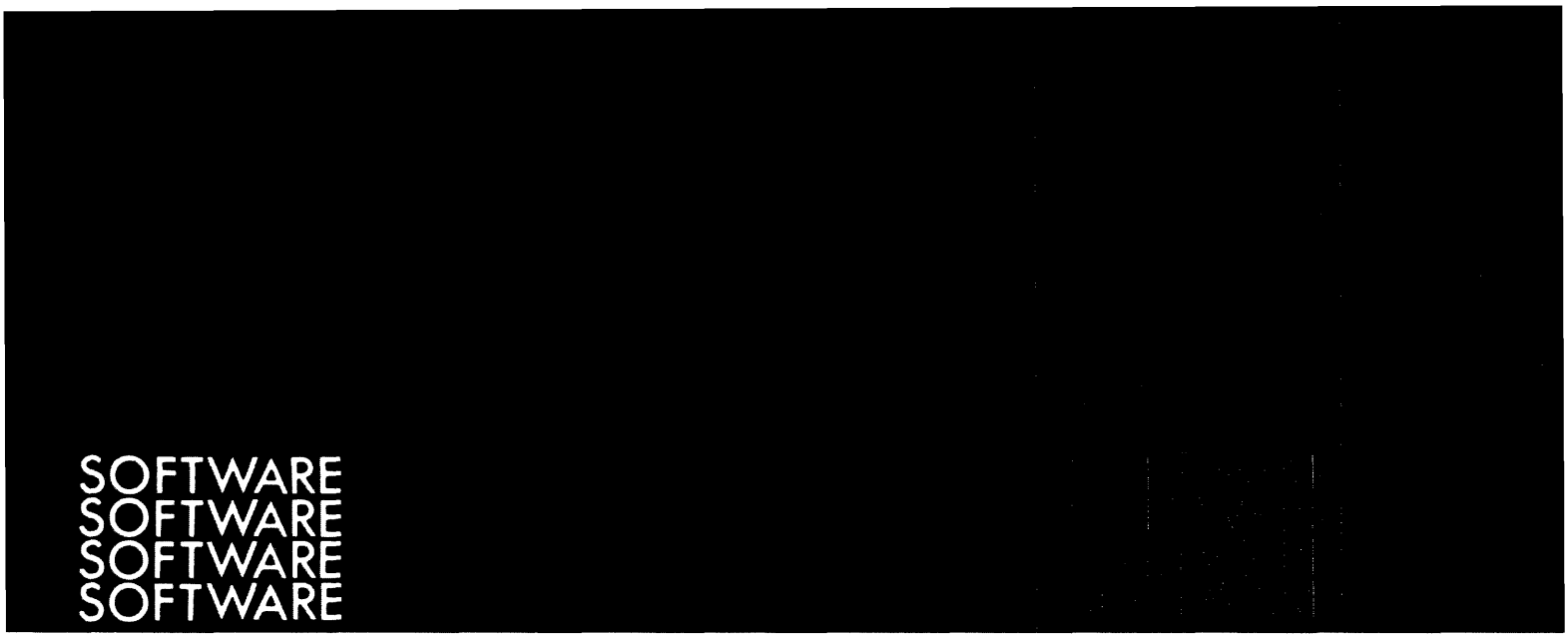
Contributed:
Rodney C. Williams and William L. McLain
Wake Forest University

22426A, LOGARITHMIC AXIS GENERATOR FOR THE CALCOMP 565

The purpose of this program is to generate a logarithmic axis on a Calcomp Plotter. It uses several of the subroutines from the HP Plotter Library. The user may specify length of axis, number of cycles, axis label, and x or y direction of axis. Many users may wish to convert this program to a subroutine for use in more general graphic programs. Instructions for this conversion are enclosed. Requires an 8K 2100 computer.

FORTRAN II

Contributed:
William L. McLain and Rodney C. Williams
Wake Forest University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BCS MAGNETIC TAPE DRIVER 7 TRACK DMA	(A016)	13027B
8K SIO MAGNETIC TAPE DRIVER 7 TRACK	(A016)	13029A
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16K SIO HP 3030 MAGNETIC TAPE DRIVER	(A016)	20334C
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BCS HP 2891A CARD READER DRIVER (D.11)	(A010) 24181A
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16K SIO HP 2778A LINE PRINTER DRIVER	(A011) 20529A
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DOS HP 2778A LINE PRINTER DRIVER (DVR12)	(A011) 20991C
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BCS PLOTTER LIBRARY	(A021) 20201C
DACE LIBRARY	(A021) 20209C
RTE/DOS PLOTTER LIBRARY	(A021) 20810B
SCIENTIFIC SUBROUTINE PACKAGE	(A021) 22329A
STACK ROUTINES	(A021) 22362A
BCS RELOCATABLE LIBRARY, EAU	(A021) 24145A
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SOFTWARE

section III
summary of programs

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(A001)	22403A	HP 2870/7900 EIGHT CHANNEL DISC TIME SHARE BASIC SYSTEM
(A001)	24230B	HP 2000C TIME-SHARED BASIC SYSTEM
(A001)	24231A	HP 2000B/C TIME-SHARED BASIC COMMUNICATIONS PROCESSOR
(A001)	24232B	HP 2000C TIME-SHARED BASIC LOADER (HP 2883 DISC)
(A001)	24233B	HP 2000C TIME-SHARED BASIC LOADER (HP 2870 DISC)
(A001)	24234B	HP 2000B TO HP 2000C CONVERSION (HP 2883 DISC)
(A001)	24235B	HP 2000B TO HP 2000C CONVERSION (HP 2870 DISC)
(A001)	24238B	HP 2000C TIME-SHARED BASIC LOADER
(A001)	24239B	HP 2000B TIME-SHARED BASIC SYSTEM
(A001)	24253B	HP 2000C TIME-SHARED BASIC LOADER (HP 7900 DISC)
(A001)	24254B	HP 2000B TO HP 2000C CONVERSION (HP 7900 DISC)
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(A002)	20322A	4K SIO BUFFERED TELEPRINTER DRIVER
(A002)	20323A	8K SIO BUFFERED TELEPRINTER DRIVER
(A002)	20329A	12K SIO BUFFERED TELEPRINTER DRIVER
(A002)	20330B	16K SIO BUFFERED TELEPRINTER DRIVER
(A002)	20741D	RTE TELEPRINTER DRIVER (DVR00)
(A002)	20985D	DOS TELEPRINTER DRIVER (DVR00)
(A002)	22237C	TELEPRINTER/LINEPRINTER OUTPUT SELECTOR FOR HP BASIC
(A002)	22243A	BCS TELECOMMUNICATIONS DRIVER D.50
(A002)	22244B	16K BINARY SYNCHRONOUS CONTROLLED DATA COMMUNICATIONS PROGRAM
(A002)	22245A	USER INTERFACE TO BCS TELECOMMUNICATIONS DRIVER D.50
(A002)	22246A	DOS-M REMOTE TAPE READER DRIVER (DVR00,DVR07)
(A002)	22311A	BCS POWER FAIL TELEPRINTER DRIVER WITH AUTORESTART OPTION
(A002)	22328A	BCS TELECOMMUNICATIONS DRIVER FOR SYNCHRONOUS AND ASYCHRONOUS DEVICES
(A002)	22367A	8K BINARY SYNCHRONOUS CONTROLLED DATA COMMUNICATIONS PROGRAM
(A002)	22372A	HP 2100 REMOTE BATCH TERMINAL TO A UNIVAC 1108
(A002)	22374A	A BCS ASYNCHRONOUS DATA SET INTERFACE DRIVER
(A002)	22387A	D.70 REVERSE CHANNEL TELECOMMUNICATIONS DRIVER
(A002)	22394A	CORE-SAVING TELEPRINTER I/O DRIVER AND CODE CONVERSION ROUTINE
(A002)	24123A	4K SIO TELEPRINTER DRIVER, LP-COMPAT
(A002)	24125A	8K SIO TELEPRINTER DRIVER, LP-COMPAT
(A002)	24127A	16K SIO TELEPRINTER DRIVER, LP-COMPAT
(A002)	24157B	DOS-M SYSTEM TELEPRINTER DRIVER (DVR05)
(A003)	20098C	BCS 40 BIT OUTPUT REGISTER DRIVER D.54
(A003)	20502B	TIME BASE GENERATOR DRIVER (D.43)
(A003)	22002A	TIME-OF-DAY CLOCK
(A003)	22071A	HP 12539A TIME BASE GENERATOR DRIVER - FORTRAN CALLABLE
(A003)	22112A	HP 12539A TIME BASE GENERATOR DRIVER - BASIC CALLABLE
(A003)	22170A	SYNCHRONOUS HIGH SPEED DATA ACQUISITION PROGRAM
(A003)	22195A	PROGRAM EXECUTION TIMER
(A003)	22229B	HP 12551A/B RELAY REGISTER INTERFACE DRIVER - FORTRAN CALLABLE
(A003)	22271B	ZEISS DMC 25 COLORIMETER DRIVER - FORTRAN CALLABLE
(A003)	22275B	ZEISS DMC 25 COLORIMETER DRIVER - BASIC CALLABLE
(A003)	22313A	HP 12551B RELAY REGISTER INTERFACE DRIVER - BASIC CALLABLE
(A003)	22382B	SYNCHRONOUS DATA COMMUNICATIONS DRIVERS FOR BCS, D.60 AND D.61
(A003)	29001A	COMPUTER SERIAL INTERFACE RTE DRIVER DVR65
(A003)	29002A	COMPUTER SERIAL INTERFACE BCS DRIVER D.65
(A003)	29003A	COUPLER SERIAL INTERFACE RTE DRIVER DVR66
(A004)	22236A	FORTRAN I/O STATUS FUNCTION
(A006)	14900B	BCS 6936A MULTIPROGRAMMER DRIVER (D.61)
(A006)	14904A	HP 6940A/6941A BCS DRIVER, D.61
(A006)	14909A	HP 6940A DRIVER FOR 20392A BASIC
(A006)	20008B	BCS 8-4-2-1 DATA SOURCE INTERFACE DRIVER (D.40)
(A006)	20009B	BCS DIGITAL VOLTMETER PROGRAM DRIVER (D.41)
(A006)	20010C	BCS 8-4-2-1 SCANNER CONTROL DRIVER (D.42)

(A006) 20011B BCS 8-4-2-1/4-2-2-1 DATA SOURCE INTERFACE DRIVER (D.40A)
(A006) 20012C BCS 8-4-2-1/4-2-2-1 SCANNER CONTROL DRIVER (D.42A)
(A006) 20024A BCS DIGITAL VOLTMETER PROGRAM DRIVER (D.41B)
(A006) 20025A BCS HP 2912 SCANNER CONTROL DRIVER (D.42B)
(A006) 20295A RTE HP 12604B DATA SOURCE INTERFACE DRIVER (DVR40)
(A006) 20430B HP 2402A PROGRAMMER/DATE INTERFERENCE DIAGNOSTIC
(A006) 22001A HP 2911A/B CROSSBAR SCANNER DRIVER - FORTRAN CALLABLE
(A006) 22003A HP 2402A DIGITAL VOLTMETER DRIVER - FORTRAN CALLABLE
(A006) 22004A COUNTER DATA SOURCE INTERFACE DRIVER - FORTRAN CALLABLE
(A006) 22005B HP 2401C DIGITAL VOLTMETER DRIVER - FORTRAN CALLABLE
(A006) 22006A HP 2401C DATA SOURCE INTERFACE DRIVER - FORTRAN CALLABLE
(A006) 22007A HP 3440A DATA SOURCE INTERFACE DRIVER - FORTRAN CALLABLE
(A006) 22008A HP 3460A DIGITAL VOLTMETER DRIVER - FORTRAN CALLABLE
(A006) 22048A HP 2402A DATA SOURCE INTERFACE DRIVER - FORTRAN CALLABLE
(A006) 22053B HP 3450A DATA SOURCE INTERFACE DRIVER - FORTRAN CALLABLE
(A006) 22055A HP 3460A/B DATA SOURCE INTERFACE DRIVER - FORTRAN CALLABLE
(A006) 22057A HP 2801A DATA SOURCE INTERFACE DRIVER - FORTRAN CALLABLE
(A006) 22059A HP 2912A REED SCANNER DRIVER - FORTRAN CALLABLE
(A006) 22061A HP 2320 LOW SPEED A-TO-D SUBSYSTEM DRIVER - FORTRAN CALLABLE
(A006) 22062A HP 2322A LOW SPEED A-TO-D SUBSYSTEM DRIVER - FORTRAN CALLABLE
(A006) 22066B HP 6130B DIGITAL VOLTAGE SOURCE DRIVER - FORTRAN CALLABLE
(A006) 22068A HP 3450A DIGITAL VOLTMETER DRIVER - FORTRAN CALLABLE
(A006) 22069A HP 2323A LOW SPEED A-TO-D SUBSYSTEM DRIVER - FORTRAN CALLABLE
(A006) 22075A HP 5100B FREQUENCY SYNTHESIZER DRIVER - FORTRAN CALLABLE
(A006) 22076A HP 5105A FREQUENCY SYNTHESIZER DRIVER - FORTRAN CALLABLE
(A006) 22098A HP 2323A LOW SPEED A-TO-D SUBSYSTEM DRIVER - BASIC CALLABLE
(A006) 22101B HP 2911A/B CROSSBAR SCANNER DRIVER - BASIC CALLABLE
(A006) 22102B HP 3460A/B DATA SOURCE INTERFACE DRIVER - BASIC CALLABLE
(A006) 22103B HP 2401C DATA SOURCE INTERFACE DRIVER - BASIC CALLABLE
(A006) 22104B HP 2402A DATA SOURCE INTERFACE DRIVER - BASIC CALLABLE
(A006) 22106B COUNTER DATA SOURCE INTERFACE DRIVER - BASIC CALLABLE
(A006) 22107B HP 2912A REED SCANNER DRIVER - BASIC CALLABLE
(A006) 22108C HP 3450A DATA SOURCE INTERFACE DRIVER -BASIC CALLABLE
(A006) 22109B HP 3440A DATA SOURCE INTERFACE DRIVER - BASIC CALLABLE
(A006) 22200A WAVETEK BASIC DRIVER
(A006) 22210A HP 2322A LOW SPEED A-TO-D SUBSYSTEM DRIVER - BASIC CALLABLE
(A006) 22211A HP 5100B FREQUENCY SYNTHESIZER DRIVER - BASIC CALLABLE
(A006) 22212A HP 2320A LOW SPEED A-TO-D SUBSYSTEM DRIVER - BASIC CALLABLE
(A006) 22213A HP 5105A FREQUENCY SYNTHESIZER DRIVER - BASIC CALLABLE
(A006) 22215A HP 3480A/B DIGITAL VOLTMETER DRIVER - BASIC CALLABLE
(A006) 22224A HP 6130B DIGITAL VOLTAGE SOURCE DRIVER - BASIC CALLABLE
(A006) 22226B HP 3480A/B DIGITAL VOLTMETER DRIVER - FORTRAN CALLABLE
(A006) 22227A HP 6131B DIGITAL VOLTAGE SOURCE DRIVER - FORTRAN CALLABLE
(A006) 22228A HP 6131B DIGITAL VOLTAGE SOURCE DRIVER - BASIC CALLABLE
(A006) 22276A RTE CROSSBAR SCANNER DRIVER _ CHANNEL CODE CONVERSION
(A006) 22294A DOS/DOS-M/RTE 3480 DVM DRIVER AND BCD CONVERSION
(A006) 22305A HP 2402A DIGITAL VOLTMETER DRIVER - BASIC CALLABLE
(A006) 22317A RTE HP 2310 ANALOG-TO-DIGITAL CONVERTER DISC STORAGE ROUTINE
(A006) 22336A HP 1900 PROGRAMMABLE PULSE GENERATOR - FORTRAN CALLABLE
(A006) 22337A HP 1900 PROGRAMMABLE PULSE GENERATOR DRIVER - BASIC CALLABLE
(A006) 22339A DOS HP 2320A LOW SPEED ANALOG-TO-DIGITAL SUBSYSTEM DRIVER
(A006) 22407A HP 3360A GAS CHROMATOGRAPH SYSTEM DRIVER - BASIC CALLABLE
(A006) 22410A RTE MULTIPROGRAMMER DRIVER (DVR61)
(A007) 20597B DISC OPERATING SYSTEM (HP 2770 SERIES DISC/DRUM)

(A007) 24225D MOVING-HEAD DISC OPERATING SYSTEM
(A008) 20021C PREPARE CONTROL SYSTEM
(A008) 20301B 4K SIO SYSTEM DUMP
(A008) 20313B 8K SIO SYSTEM DUMP
(A008) 20335A 16K SIO SYSTEM DUMP
(A008) 20594A 8K MAGNETIC TAPE SYSTEM
(A008) 20595A 16K MAGNETIC TAPE SYSTEM
(A008) 20802C SYSTEM DUMP
(A008) 20878B HP 2000A TO HP 2000B CONVERSION
(A008) 22042C AN HP 2116-FAMILY SIMULATOR FOR THE IBM 360
(A008) 22338A DISC BASIC EXECUTIVE
(A008) 24016A PREPARE TAPE SYSTEM
(A008) 24172A BCS INPUT/OUTPUT CONTROL, BUFFERED
(A008) 24173A BCS INPUT/OUTPUT CONTROL
(A008) 29014B RTE GENERATOR, MH-RTGEN
(A008) 29015B RTE GENERATOR, FH-RTGEN
(A009) 20005B BCS TAPE READER DRIVER D.01
(A009) 20006B BCS TAPE PUNCH DRIVER D.02
(A009) 20016A BCS TAPE PUNCH DRIVER, IBM 8-LEVEL (D.02A)
(A009) 20303A 4K SIO TAPE READER DRIVER
(A009) 20304A 4K SIO TAPE PUNCH DRIVER
(A009) 20306A 8K SIO TAPE READER DRIVER
(A009) 20307A 8K SIO TAPE PUNCH DRIVER
(A009) 20316A 8K SIO TAPE PUNCH DRIVER, IBM 8-LEVEL
(A009) 20317A 4K SIO TAPE PUNCH DRIVER, IBM 8-LEVEL
(A009) 20319A 16K SIO TAPE READER DRIVER
(A009) 20320A 16K SIO TAPE PUNCH DRIVER
(A009) 20327A 12K SIO TAPE READER DRIVER
(A009) 20328A 12K SIO TAPE PUNCH DRIVER
(A009) 20743D RTE TAPE READER DRIVER (DVR01)
(A009) 20745B RTE HIGH SPEED PUNCH DRIVER (DVR02)
(A009) 20987C DOS TAPE READER DRIVER (DVR01)
(A009) 20989A DOS HIGH SPEED PUNCH DRIVER (DVR02)
(A009) 22044B RUN-TIME DATA INPUT FOR BASIC
(A009) 22078B HIGH SPEED PUNCH DRIVER - BASIC CALLABLE
(A009) 22082B BASIC PHOTOREADER DATA INPUT
(A009) 22176A HP 2754A PUNCH/LIST IN KT MODE
(A009) 22247B FAST DOS/DOS-M PHOTOREADER DRIVER
(A009) 22264B TELEX TO ASCII PHOTOREADER DRIVER
(A009) 22353A DOS/DOS-M PHOTOREADER DRIVER TO READ ABSOLUTE BINARY TAPES
(A010) 20019C BCS CARD READER DRIVER (D.11)
(A010) 20324B 8K SIO CARD READER DRIVER
(A010) 20332A 16K SIO CARD READER DRIVER
(A010) 20520C 4K SIO MARK SENSE CARD READER DRIVER
(A010) 20521C 8K SIO MARK SENSE CARD READER DRIVER
(A010) 20522C 16K SIO MARK SENSE CARD READER DRIVER
(A010) 20817A BCS MARK SENSE DRIVER, KIT HP 12602A, (D.15)
(A010) 20819C BCS MARK SENSE DRIVER, KIT HP 12602B, (D.15)
(A010) 20821B RTE MARK SENSE DRIVER, KIT HP 12602B, (DVR15)
(A010) 20823C DOS MARK SENSE DRIVER, KIT HP 12602B, (DVR15)
(A010) 24178A 4K SIO HP 2891A CARD READER DRIVER
(A010) 24179A 8K SIO HP 2891A CARD READER DRIVER
(A010) 24180A 16K SIO HP 2891A CARD READER DRIVER
(A010) 24181A BCS HP 2891A CARD READER DRIVER (D.11)
(A010) 24182A DOS HP 2891A CARD READER DRIVER (DVR11)
(A010) 24224A RTE HP 2891A CARD READER DRIVER (DVR11)
(A011) 20527B 4K SIO HP 2778A LINE PRINTER DRIVER
(A011) 20528A 8K SIO HP 2778A LINE PRINTER DRIVER
(A011) 20529A 16K SIO HP 2778A LINE PRINTER DRIVER
(A011) 20800C RTE HP 2778A LINE PRINTER DRIVER (DVR12)
(A011) 20991C DOS HP 2778A LINE PRINTER DRIVER (DVR12)
(A011) 22092B 4K, 8K, OR 16K SIO OLIVETTI SV40 DRIVER
(A011) 22095A BASIC HP 2778A LINE PRINTER DRIVER
(A011) 22258A HP 2767 LINE PRINTER BASIC DRIVER
(A011) 22399A HP 2778/2767 LINE PRINTER PATCH FOR EDUCATIONAL BASIC
(A011) 22408A BASIC CALLABLE LINE PRINTER DRIVER
(A011) 22409A EDUCATIONAL BASIC HP 2767 LINE PRINTER DRIVER
(A011) 22411A A.B. DICK VIDEOJET SIO LINE PRINTER DRIVER
(A011) 24164B 4K SIO HP 2767 LINE PRINTER DRIVER
(A011) 24165B 8K SIO HP 2767 LINE PRINTER DRIVER
(A011) 24166B 16K SIO HP 2767 LINE PRINTER DRIVER
(A011) 24167B BCS HP 2767 LINE PRINTER DRVR. (D.16)
(A011) 24168B DOS HP 2767 LINE PRINTER DRIVER (DVR12)
(A011) 24169A RTE HP 2767 LINE PRINTER DRIVER (DVR12)
(A011) 24171B BCS HP 2778A LINE PRINTER DRVR. (D.12)

(A012) 20028B BCS HP 2323A SUBSYSTEM DRIVER ANALOG SCAN SCN-12 (D.77)
(A012) 20076A BCS HP 2312A DRIVER (D.55)
(A012) 20235A RTE HP 2323A SUBSYSTEM DRIVER (DVR77)
(A012) 20236A RTE HP 2320A/2322A SUBSYSTEM DRIVER (DVR76)
(A012) 20398A RTE HP 2312A DRIVER (DVR55)
(A012) 20501E BCS SCN-ANALOG 8-4-2-1 SCAN ROUTINE (D.77)
(A012) 20517C BCS SCN-ANALOG 4-2-2-1 SCAN ROUTINE (D.77)
(A012) 20532A BCS HP 2321A SUBSYSTEM (HP3450/2911A) SCAN ROUTINE SCN 34 (D.77)
(A012) 22199A BASIC LANGUAGE DATA ACQUISITION SYSTEM
(A012) 22361A DOS-M BINARY FILE DATA ACQUISITION
(A012) 22380A HP BASIC DRIVER SYSTEM WITH BINARY DATA I/O
(A012) 29000A RTE HP 2321A SUBSYSTEM DRIVER (DVR74)
(A012) 29004A COUPLER SERIAL INTERFACE BCS DRIVER D.66
(A013) 14902A BCS DIGITAL VOLTAGE SOURCE POWER SUPPLY DRIVER D.70
(A013) 20073C BCS HP 5610A ANALOG TO DIGITAL DRIVER, NON-DMA (D.56)
(A013) 20074A FORTRAN /ALGOL INTERFACE ROUTINE (L5610)
(A013) 20093C BCS HP 5610A ANALOG TO DIGITAL DRIVER, DMA, (D.56A)
(A013) 20094B MULTI/MINIVERTER SCAN ROUTINE SCNMV (D.76)
(A013) 20297D RTE HP 2310/2311 SUBSYSTEM DRIVER (DVR56)
(A013) 20396A RTE HP 12564A 10-BIT ANALOG TO DIGITAL CARD DRIVER (DVR57)
(A013) 22281A MINIVERTER DRIVER
(A013) 22304A HP 5610A ANALOG TO DIGITAL DRIVER - FORTRAN CALLABLE
(A013) 22331A DOS HP 2322A LOW SPEED ANALOG TO DIGITAL SUBSYSTEM DRIVER
(A014) 20014A BCS PLOTTER DRIVER (D.10)
(A014) 20581A DOS PLOTTER DRIVER (DVR10)
(A014) 20808B RTE PLOTTER DRIVER (DVR10)
(A014) 22077B CALCOMP PLOTTER DRIVER - BASIC CALLABLE
(A014) 22080A HP 2331A X-Y DISPLAY SUBSYSTEM DRIVER - FORTRAN CALLABLE
(A014) 22217B HP 2331A X-Y DISPLAY SUBSYSTEM DRIVER - BASIC CALLABLE
(A014) 22219A HIGH SPEED CONTINUOUS LINE PLOTTER FOR HP 7004B
(A014) 22242A X-Y PLOTTING ROUTINE
(A014) 22253A OSCILLOSCOPE PLOTTING SUBROUTINE
(A014) 22263A PLOT, RELAY, WAIT
(A014) 22279A BASIC PLOT SUBROUTINES
(A014) 22291B DOS/DOS-M HP 2331 X-Y SCOPE DISPLAY
(A014) 22315A CONTINUOUS DISPLAY OF ARRAY DATA ON ANALOG X-Y SCOPE
(A014) 22316A VARIABLE DISPLAY OF ARRAY DATA ON ANALOG X-Y SCOPE
(A014) 22318A HP 1331C STORAGE SCOPE DRIVER - BASIC CALLABLE
(A014) 22379A SIO LIST OUTPUT TO A STORAGE SCOPE
(A014) 22390A HP 7004 X-Y RECORDER LIBRARY
(A014) 22391A HP 1331C SIO SCOPE DISPLAY DRIVER
(A014) 23900A DOS STORAGE SCOPE DRIVER (DVR46, $EX50)
(A015) 20079A 8K SIO DISC/DRUM DRIVER
(A015) 20081A 16K SIO DISC/DRUM DRIVER
(A015) 20747C RTE DISC/DRUM DRIVER (DVR30)
(A015) 20995B DOS DISC/DRUM DRIVER (DVR30)
(A015) 22063A HP 2770A/2771A DISC DRIVER - FORTRAN CALLABLE
(A015) 22070A HP 2773A/74A/75A DRUM DRIVER - FORTRAN CALLABLE
(A015) 22110B HP 2773A/74A/75A DRUM DRIVER - BASIC CALLABLE
(A015) 22111C HP 2770A/2771A DISC DRIVER - BASIC CALLABLE
(A015) 22216B HP 2870A CARTRIDGE DISC DRIVER - BASIC CALLABLE
(A015) 22225B HP 2870A CARTRIDGE DISC DRIVER - FORTRAN CALLABLE
(A015) 22233A DOS-M PRIVILEGED DISC I/O ROUTINES
(A015) 22301A HP 2870A CARTRIDGE DISC MEMORY DRIVER - FORTRAN CALLABLE
(A015) 22312A BCS HP 2774/2771 DRUM DRIVER
(A015) 24156C DOS-M HP 2870/7900 DISC DRIVER (DVR 31)
(A015) 24226C DOS-M HP 2883 DISC DRIVER (DVR 31)
(A015) 29013B RTE MOVING HEAD DISC DRIVER (DVR31)
(A016) 13021B 8K SIO HP 7970 MAGNETIC TAPE DRIVER
(A016) 13022B 16K SIO HP 7970 MAGNETIC TAPE DRIVER
(A016) 13023B BCS MAGNETIC TAPE DRIVER
(A016) 13024A DOS HP 7970 MAGNETIC TAPE DRIVER (DVR23)
(A016) 13025A RTE HP 7970 MAGNETIC TAPE DRIVER (DVR23)
(A016) 13026B BCS 7 TRACK DRIVER W/O DMA
(A016) 13027B BCS MAGNETIC TAPE DRIVER 7 TRACK DMA
(A016) 13029A 8K SIO MAGNETIC TAPE DRIVER 7 TRACK
(A016) 13030A 16K SIO MAGNETIC TAPE DRIVER 7 TRACK
(A016) 20007A BCS INCREMENTAL MAGNETIC TAPE DRIVER (D.20)
(A016) 20013E BCS HP 2020 MAGNETIC TAPE DRIVER (D.21)
(A016) 20022E BCS HP 3030 MAGNETIC TAPE DRIVER (D.22)
(A016) 20314D 8K SIO HP 2020 MAGNETIC TAPE DRIVER

(A016) 20315C 4K SIO HP 2020 MAGNETIC TAPE DRIVER
(A016) 20321C 16K SIO HP 2020 MAGNETIC TAPE DRIVER
(A016) 20331C 8K SIO HP MAGNETIC TAPE DRIVER
(A016) 20334C 16K SIO HP 3030 MAGNETIC TAPE DRIVER
(A016) 20336B 4K SIO HP 3030 MAGNETIC TAPE DRIVER
(A016) 20806C RTE HP 3030 MAGNETIC TAPE DRIVER (DVR22)
(A016) 20997B DOS HP 3030 MAGNETIC TAPE DRIVER (DVR22)
(A016) 22100A FILE THREE INPUT FOR MTS ALGOL
(A016) 22161A RTE HP 2020 MAGNETIC TAPE DRIVER
(A016) 22208A HP 3030G MAGNETIC TAPE DRIVER - FORTRAN CALLABLE
(A016) 22239A HP 7970 MAGNETIC TAPE DRIVER - BASIC CALLABLE
(A016) 22270C ALGOL OPERATING SYSTEM FOR MTS
(A016) 22319A DOS/DOS-M HP 2020 MAGNETIC TAPE DRIVER
(A016) 22414A NON-DMA BCS HP 3030 DRIVER
(A017) 20001C 4K BCS RELOCATING LOADER
(A017) 20018G BCS RELOCATING LOADER
(A017) 20925C DOS RELOCATING LOADER
(A017) 22009B BOOTSTRAP LOADER GENERATOR
(A017) 22223C LOADER BOOTSTRAP
(A017) 22297A OFFLINE RELOCATING LOADER
(A017) 22342A DOS-M HARDWARE BOOT
(A017) 22344A ON-LINE SYSTEM LOAD FOR MOVING-HEAD RTE
(A017) 22345A ON-LINE MOVING-HEAD RTE BOOTSTRAP FROM DOS-M OR DOS
(A017) 22349A DOS-M BOOTSTRAP PROGRAM FOR DOS-M OR DOS
(A017) 22350A DOS-M BOOTSTRAP PROGRAM FROM RTE
(A017) 22357A MTS BOOT FROM DOS-M
(A017) 24155C DOS-M RELOCATING LOADER
(A017) 29022A RTE RELOCATING LOADER
(A018) 20392A BASIC SYSTEM
(A018) 20548A FORTRAN COMPILER
(A018) 20549A 4K FORTRAN COMPILER
(A018) 20598C DOS ASSEMBLER
(A018) 20599C DOS FORTRAN
(A018) 20874D RTE ASSEMBLER
(A018) 20875E RTE FORTRAN
(A018) 22013B INVERSE ASSEMBLER
(A018) 22065A FORTRAN TRANSLATOR, IBM 1800 TO HP FORTRAN II
(A018) 22201D PACIFIC UNION COLLEGE MULTI-TERMINAL HP BASIC SYSTEM
(A018) 22255D MSU MULTI-TERMINAL BASIC SYSTEM WITH CARD READER CAPABILITY
(A018) 22261A MINI-BASIC
(A018) 22292B ABSOLUTE OBJECT DECODER
(A018) 22295A BCS INTERPRETER FOR FLOATING POINT OPERATIONS
(A018) 22326A DOS-M RELOCATABLE BASIC
(A018) 22327C SNOBOL COMPILER FOR DOS/DOS-M
(A018) 22385A SYMBOLIC MACRO ASSEMBLER FOR THE HP 2100
(A018) 22389A DOS-M EAU RELOCATABLE BASIC
(A018) 22396A AN HP ASSEMBLER FOR THE IBM 360
(A018) 22415A DOS ABSOLUTE OBJECT DECODER
(A018) 22417A SUPER BASIC FOR DOS-M
(A018) 22438A DOS-M RELOCATABLE REVERSE ASSEMBLER
(A018) 24031B EXTENDED ASSEMBLER NON-EAU
(A018) 24032B EXTENDED ASSEMBLER EAU
(A018) 24036B 4K ASSEMBLER NON-EAU
(A018) 24039B 4K ASSEMBLER EAU
(A018) 24044B ALGOL COMPILER
(A018) 24129B RTE/DOS ALGOL COMPILER
(A018) 24158B DOS-M ASSEMBLER
(A018) 24159B DOS-M FORTRAN
(A018) 24160A EDUCATIONAL BASIC SYSTEM
(A018) 24170C RTE/DOS FORTRAN IV COMPILER
(A018) 24177B RTE/DOS FORTRAN IV COMPILER (10K COMPILER AREA)
(A018) 24246A EXTENDED ASSEMBLER FLOATING POINT
(A018) 24247A 4K ASSEMBLER FLOATING POINT
(A019) 22235A FORTRAN POWER FAIL LINK
(A020) 20686D REAL-TIME EXECUTIVE OPERATING SYSTEM
(A020) 22401A RTE SELF SUSPEND ROUTINE
(A020) 29016C RTE SYSTEM
(A021) 20201C BCS PLOTTER LIBRARY
(A021) 20209C DACE LIBRARY
(A021) 20810B RTE/DOS PLOTTER LIBRARY
(A021) 22329A SCIENTIFIC SUBROUTINE PACKAGE
(A021) 22362A STACK ROUTINES
(A021) 24145A BCS RELOCATABLE LIBRARY, EAU
(A021) 24146A BCS RELOCATABLE LIBRARY, NON-EAU
(A021) 24147A 4K BCS RELOCATABLE LIBRARY, NON-EAU

(A021) 24148A 4K BCS RELOCATABLE LIBRARY, EAU
(A021) 24149A BCS FORTRAN IV LIBRARY
(A021) 24150C RTE/DOS RELOCATABLE LIBRARY, NON-EAU
(A021) 24151C RTE/DOS RELOCATABLE LIBRARY, EAU
(A021) 24152A RTE/DOS FORTRAN IV LIBRARY
(A021) 24153A RTE/DOS FORTRAN FORMATTER
(A021) 24245A HEWLETT-PACKARD COMMERCIAL SUBROUTINES
(A021) 24248A RTE/DOS RELOCATABLE LIBRARY - FLOATING POINT
(A021) 24249A 4K BCS RELOCATABLE LIBRARY - FLOATING POINT
(A021) 24250A BCS RELOCATABLE LIBRARY - FLOATING POINT
(A022) 22273A CLEAR JOB BINARY AREA IN DOS/DOS-M
(A022) 22375A REMOTE HP 2100 ACCESS TO A 32K DOS
(A022) 22377A DOS-M DISC INITIALIZE/PROTECT UTILITY
(A022) 22398A RTE JOB CONTROL LANGUAGE FOR BATCH PROCESSING
(A022) 22416A CREATE DOS-M DIRECTORY ENTRY UNDER PROGRAM CONTROL
(A101) 20100B SYMBOLIC EDITOR
(A101) 20805C RTE EDITOR
(A101) 22114A REPRODUCE/EDIT PAPER TAPE
(A101) 22171A FORTRAN UNIT REFERENCE NUMBER EDITOR
(A101) 22285C CONVERSATIONAL DOS-M DISC FILE EDITOR
(A101) 22286A D H SYMBOLIC EDITOR
(A101) 22371A QUOTATION MARKS CONVERSION IN DOS/DOS-M FILES
(A101) 22393A ON-LINE EDITOR
(A102) 22198C MAGNETIC TAPE STORAGE AND RETRIEVAL PROGRAM
(A102) 22272A DISC/DRUM UTILITY
(A102) 22284A DOS-M DUMP/RESTORE PROGRAM
(A102) 22299A DOS/DOS-M SOURCE STORAGE AND RETRIEVAL
(A102) 22356A PACKED MAGNETIC TAPE STORAGE AND RETRIEVAL FOR DOS-M
(A102) 24227B DOS-M EXTENDED FILE MANAGEMENT PACKAGE
(A102) 24228A DOS-M/HP2000C TIME-SHARE BASIC FILE HANDLER
(A102) 24240A DOS-M/HP 2000C TIME-SHARED BASIC FILE INTERFACE PACKAGE
(A104) 22081A BIT OPERATIONS (SET, CLEAR, TEST) - FORTRAN CALLABLE
(A104) 22204A DATA BLOCK MOVEMENT
(A104) 22207A CHARACTER AND BIT STRING PROCEDURES FOR ALGOL
(A104) 22404A SPACE SAVING ASCII STORAGE ROUTINES
(A105) 20096A CONVERSION ROUTINE MCONV
(A105) 20210A CONVERSION ROUTINE ICONV
(A105) 20288A RTE CONVERSION ROUTINE CONVERT
(A105) 20533A CONVERSION ROUTINE, CONV34
(A105) 22086A EBCDIC TO ASCII TRANSLATOR
(A105) 22093A ASCII/IBM 8-LEVEL CHARACTER CONVERSION ROUTINE
(A105) 22214A CHARACTER CODE TRANSLATOR
(A105) 22274A 4-2-2-1 BCD TO FLOATING POINT CONVERSION FOR RTE
(A105) 22433A ASCII/INTEGER CONVERSION ROUTINE
(A106) 20312A PUNCH/VERIFY ROUTINE
(A106) 22041E PUNCHED TAPE DUPLICATOR
(A106) 22113B MTS PUNCHED TAPE DUPLICATOR
(A106) 22180C FAST PUNCH VERIFY
(A106) 22197A SINGLE DRIVE MAGNETIC TAPE COPY PROGRAM
(A106) 22209C DRUM BASED MAGNETIC TAPE DUPLICATOR
(A106) 22252A RTE/DOS DUPLICATOR PROGRAM
(A106) 22360A DOS-M PAPER TAPE REPRODUCER
(A106) 22368A PAPER TAPE COPY
(A107) 20237A LIBRARIAN
(A107) 22079B NUMERIC STRING SORT FOR ASCII RECORDS
(A107) 22116A ORDERING A FLOATING POINT ARRAY
(A107) 22167A ORDERING A FIXED POINT ARRAY
(A107) 22168A RANKING A FLOATING POINT ARRAY
(A107) 22169A ORDERING A FLOATING POINT ARRAY
(A107) 22282A DOS-M LIBRARIAN
(A107) 22343A FIELDSORT
(A107) 22376A ASCII DISC FILE FIELD SORT
(A107) 22383A ALPHANUMERIC RECORD SORT
(A107) 22430A NUMERIC SORT
(A108) 22090A KEYBOARD TAPE GENERATOR
(A108) 22165A CARD TO MAGNETIC TAPE UTILITY
(A108) 22166A MAGNETIC TAPE TO PRINT UTILITY PROGRAM
(A108) 22341A FTN IV CORE SAVER
(A108) 22347A DOS/DOS-M SOURCE FILE VERIFY PROGRAM
(A108) 22354A DOS-M STORE ABSOLUTES
(A108) 22355A DOS-M PAPER TAPE/DISC VERIFY
(A108) 22358A EASY MAGNETIC TAPE I/O AND STATUS INFORMATION
(A108) 22359A HANDI-O
(A108) 22381A RELOCATABLE MODULE LISTER
(A108) 22392A RELOCATABLE OBJECT UTILITY LIBRARIAN
(A108) 22400A ZERO

(A108) 22427A MEDIA CONVERSION
(A110) 22277A DOS-M FILE ACCESS AND STRING LOOKUP
(A110) 22330A PSEUDO REPORT GENERATOR
(A110) 22364A EFMP RECORD READ/WRITE
(A110) 22369A DOS-M FILE WRITER
(A110) 22373A ITEMIZED EXTENDED FILE MANAGEMENT PACKAGE
(A110) 22429A EFMP FILE TRANSFER
(A110) 22432A EFMP DIRECTORY LISTER
(A112) 22172C IOC - FORTRAN CALLABLE
(A112) 22238A FORTRAN RUN-TIME FORMAT SPECIFICATION
(A112) 22370A OFFLINE ENCODE/DECODE FOR THE TALLY DATA SYSTEM
(A112) 22386A MULTIRECORD FORMATTED OUTPUT LISTER
(A201) 22193A INTERPRETIVE BINARY SIMULATOR
(A202) 14901A HP 21XX VERIFICATION AND TEST FOR THE HP 6936A
(A202) 14905A HP 6940A/6941A DIAGNOSTIC
(A202) 20337D HP 1260B DATA SOURCE INTERFACE DIAGNOSTIC
(A202) 20348C HP 12556B DIAGNOSTIC 40-BIT OUTPUT REGISTER
(A202) 20429C HP 2912A PROGRAMMER CARD DIAGNOSTIC
(A202) 20436A HP 12661A DVS PROGRAM CARD DIAGNOSTIC
(A202) 24142A PROCESSOR INTERCONNECT CABLE DIAGNOSTIC
(A202) 24196A HP 2100A GENERAL PURPOSE REGISTER TEST
(A202) 24197A HP 2100A PROCESSOR INTERCONNECT CABLE TEST
(A202) 24199A HP 2100A CONTROLLER MICROCIRCUIT TEST
(A203) 13041B HP 7900/13210 DIAGNOSTIC
(A203) 24184B FIXED HEAD DISC/DRUM DIAGNOSTIC
(A203) 24203A HP 2100A CARTRIDGE DISC MEMORY DIAGNOSTIC
(A203) 24204A HP 2100A DISC FILE (HP 2883) DIAGNOSTIC
(A203) 24207A HP 2100A FIXED HEAD DISC/DRUM DIAGNOSTIC
(A203) 24236A HP 2883 DISC FILE DIAGNOSTIC
(A203) 24237A CARTRIDGE DISC MEMORY DIAGNOSTIC
(A204) 13020E HP 7970/13181A DIAGNOSTIC
(A204) 13028D HP 7970/13182 7 TRACK DIAGNOSTIC
(A204) 13031A HP 7970E/13183 DIAGNOSTIC
(A204) 20411B TEST: KENNEDY INCREMENTAL MAGNETIC TAPE UNIT
(A204) 20433E HP 3030 MAGNETIC TAPE UNIT DIAGNOSTIC
(A204) 20516B HP 2020 MAGNETIC TAPE UNIT DIAGNOSTIC
(A205) 20390A HP 12560A PLOTTER DIAGNOSTIC
(A205) 22323A TEST PATTERN GENERATOR FOR HP 1331C STORAGE SCOPE
(A207) 22174A BCS DUMP IN BBL FORMAT
(A207) 22251A MAGNETIC TAPE TO LINE PRINTER ROUTINE
(A207) 22257A MTS/BCS SYSTEM ABSOLUTE DUMP
(A207) 22259A DOS TO MAGNETIC TAPE DUMP
(A207) 22260A MAGNETIC TAPE TO DOS DUMP
(A207) 22280A ABSOLUTE CORE DUMP ROUTINE
(A207) 22290A CORE PUNCH IN BBL FORMAT
(A207) 22296A HP 2870 DISC/MAGNETIC TAPE DUMP IN DOS-M FORMAT
(A207) 22300B QUICK FIXED HEAD SDUMP
(A207) 22321A HP 2870 DISC DUMP
(A207) 22322A ABSOLUTE OCTAL OR DECIMAL CORE DUMP
(A207) 22340A 360 FORMAT MAGNETIC TAPE DUMP
(A208) 20403A LOW MEMORY ADDRESS TEST
(A208) 20404A HIGH MEMORY ADDRESS TEST
(A208) 20405A HP 2116A LOW MEMORY CHECKERBOARD TEST
(A208) 20406A HP 2116A HIGH MEMORY CHECKERBOARD TEST
(A208) 20426A HP 2116B HIGH MEMORY CHECKERBOARD TEST
(A208) 20427A HP 2116B LOW MEMORY CHECKERBOARD TEST
(A208) 20512A HP 2116A/14A HIGH MEMORY CHECKERBOARD TEST
(A208) 20513A HP 2115A/14A LOW MEMORY CHECKERBOARD TEST
(A208) 24161A HP 2116C LOW MEMORY PATTERN TEST
(A208) 24162A HP 2116C HIGH MEMORY PATTERN TEST
(A208) 24193A HP 2100A LOW MEMORY PATTERN TEST
(A208) 24194A HP 2100A HIGH MEMORY PATTERN TEST
(A208) 24198B HP 2100A MEMORY PARITY CHECK TEST
(A208) 24211A HP 2100A LOW MEMORY ADDRESS TEST
(A208) 24212A HP 2100A HIGH MEMORY ADDRESS TEST
(A209) 20400A ALTER-SKIP INSTRUCTION TEST
(A209) 20401B MEMORY REFERENCE INSTRUCTION TEST
(A209) 20402D SHIFT-ROTATE INSTRUCTION TEST
(A209) 20415A INTERRUPT DIAGNOSTIC
(A209) 24208A HP 2100A ALTER-SKIP INSTRUCTION TEST
(A209) 24209A HP 2100A MEMORY REF. INSTRUCTION TEST
(A209) 24210A HP 2100A SHIFT-ROTATE INSTRUCTION TEST
(A209) 24214A HP 2100A EXTENDED ARITHMETIC UNIT TEST
(A209) 24215A HP 2100A INTERRUPT TEST
(A211) 20002B BCS DEBUG ROUTINE
(A211) 22088A OCTAL UTILITY SYSTEM (HOCUS)

(A211) 22190A ABSOLUTE PROGRAM CONTROL SYSTEM
(A211) 22293A OCTAL ASSEMBLY PROCESSOR AND UTILITY SYSTEM
(A211) 22314A RTE CROSS-REFERENCE SYMBOL TABLE GENERATOR
(A211) 24109B CROSS-REFERENCE SYMBOL TABLE GENERATOR
(A211) 24223B DOS CROSS REFERENCE ROUTINE
(A212) 20078A BCS HP 2312A DRIVER/FORTRAN INTERFACE ROUTINE (L2312)
(A212) 22014A BINARY TAPE EDITOR
(A212) 22015B BASIC LINE RESEQUENCER
(A212) 22016C SYMBOLIC ALPHANUMERIC GENERATOR
(A212) 22064A AUTOMATIC TABBING PROGRAM
(A212) 22089A TELEPRINTER OCTAL INPUT PROGRAM
(A212) 22096A SCOPE SYMBOLIC LISTER
(A212) 22105A COMMENT INSERTER FOR ASSEMBLER PROGRAMS
(A212) 22173A I/O INSTRUCTION CONFIGURATOR
(A212) 22191A NAM-ENT-EXT EDITOR
(A212) 22205A TABULATION AND FORM-FEED CALLS FOR HP 2754 TELEPRINTER
(A212) 22250A 'EXEC' CALL ADAPTER ROUTINE
(A212) 22267A MTS FORTRAN CHAIN
(A212) 22269A PAPER TAPE TITLER
(A212) 22278A TAB FOR PREPARING FORTRAN TAPES
(A212) 22287A CHAIN FROM PHOTOREADER IN HP BASIC
(A212) 22289A ALGOL ARRAY TRANSFER FOR SEGMENTATION
(A212) 22302A RTE/DOS HP 2322A LOW SPEED ANALOG TO DIGITAL SUBSYSTEM CONVERSION
(A212) 22303A RTE/DOS HP 2320A LOW SPEED ANALOG TO DIGITAL SUBSYSTEM CONVERSION
(A212) 22309A DOS/RTE HP 2322A LOW SPEED ANALOG TO DIGITAL SUBSYSTEM CONVERSION
(A212) 22310A FORTRAN/ALGOL ARRAY TRANSFER ROUTINE
(A212) 22320A DOS/DOS-M HP 2020/3030 MAGNETIC TAPE CONTROL PROGRAM
(A212) 22346A DOS/DOS-M ASSEMBLY LANGUAGE COMMENT INSERTER
(A212) 22351A ASCII STRING SEARCH FROM DISC FILE
(A212) 22352A ASCII STRING SEARCH FROM PHOTOREADER
(A212) 22366A ALGOL SEGMENT RETURN TO MAIN PROGRAM
(A212) 22428A ASSEMBLER JUSTIFICATION PROGRAM
(A212) 22431A DOS-M SEGMENT RETURN TO MAIN
(A212) 29017A FORTRAN/ALGOL INTERFACE SUBROUTINE FOR BCS DRIVER D.65, L65
(A212) 29018A LISTEN MODE ASSEMBLER INTERFACE SUBROUTINE FOR BCS DVR., D.65,DIR65
(A212) 29019A LISTEN MODE FORTRAN/ALGOL INTERFACE SUBROUTINE FOR BCS DVR.,D.65,DRL65
(A212) 29020A FORTRAN/ALGOL INTERFACE SUBROUTINE FOR BCS DRIVER D.66, L66
(A212) 29021A FORTRAN/ALGOL INTERFACE SUBROUTINE FOR RTE DRIVER DVR65,DLK65
(A213) 20408C HP 2737 PUNCH TAPE READER TEST
(A213) 20409C HP 2753 TAPE PUNCH TEST
(A213) 24189B HP 2100A TAPE READER TEST
(A213) 24190A HP 2100A TAPE PUNCH TEST
(A213) 24201A HP 2100A TELEPRINTER TEST
(A214) 20347B HP 2761-A007 OPTICAL MARK READER DIAGNOSTIC, HP 12602A KIT
(A214) 20899B HP 2761A-007 OPTICAL MARK READER DIAGNOSTIC, HP 12602B KIT
(A214) 24174A HP 2891 CARD READER DIAGNOSTIC
(A214) 24186B HP 2100A OPTICAL MARK READER TEST (KIT 12602B)
(A214) 24192A HP 2100A CARD READER (HP 2891/12882) DIAGNOSTIC
(A215) 20895C HP 2778 LINE PRINTER DIAGNOSTIC
(A215) 20999A HP 2767 LINE PRINTER DIAGNOSTIC
(A215) 24205A HP 2100A LINE PRINTER (HP2767) DIAGNOSTIC
(A215) 24218C HP 2100A LINE PRINTER (HP 2778) TEST
(A216) 14903A HP 21XX VERIFICATION AND TEST FOR DIGITAL VOLTAGE SOURCE
(A216) 20075D VERIFY HP 5610A ANALOG TO DIGITAL TEST
(A216) 20344A HP 12564A DIAGNOSTIC 10-BIT ANALOG TO DIGITAL CARD
(A217) 20290A HP 12589A AUTOMATIC CALLING UNIT INTERFACE CARD DIAGNOSTIC
(A217) 20343A TELEPRINTER OFF-LINE TEST
(A217) 20393A HP 12622 SEND (ONLY) INTERFACE TEST
(A217) 20417C HP 2116 TELEPRINTER TEST
(A217) 20420B HP 2115/2114 TELEPRINTER TEST
(A217) 20535A HP 12587 SEND/RECEIVE INTERFACE TEST
(A217) 20538A HP 12621 RECEIVE (ONLY) INTERFACE TEST
(A217) 24187C HP 2600 KEYBOARD-DISPLAY TERMINAL TEST
(A217) 24200A HP 2100A KEYBOARD-DISPLAY TERMINAL (HP 2600) TEST

(A217) 24217A HP 2100A AUTO CALL UNIT INTERFACE (HP 12589) TEST
(A217) 24219A HP 2100A SEND ONLY INTERFACE (HP 12622) TEST
(A217) 24220A HP 2100A RECEIVE ONLY INTERFACE (HP 12621 TEST)
(A217) 24221B HP 2100A SEND/RECEIVE INTERFACE (HP 12587) TEST
(A217) 29023A HP 12772 COUPLER MODEM INTERFACE CARD DIAGNOSTIC
(A217) 29024A HP 12773 COMPUTER MODEM INTERFACE CARD DIAGNOSTIC
(A218) 20345A HP 12598 MEMORY PARITY CHECK DIAGNOSTIC
(A218) 20412B HP 2116/HP 12539 TIME BASE GENERATOR TEST
(A218) 20418D MEMORY PROTECT DIAGNOSTIC
(A218) 20421A HP 2115/2114 HP 12539 TIME BASE GENERATOR TEST
(A218) 20423A HP 12551 RELAY REGISTER DIAGNOSTIC
(A218) 20428B HP 12588 POWER FAIL WITH AUTO-RESTART TEST
(A218) 20431B HP 12556A 40-BIT OUTPUT REGISTER DIAGNOSTIC
(A218) 20434B HP 2116 POWER FAIL INTERRUPT TEST
(A218) 20435A DMI DIAGNOSTIC
(A218) 20439A HP 12584 TELEPRINTER MULTIPLEXOR INTERFACE TEST
(A218) 20524A HP 2114B DMA GENERAL DIAGNOSTIC
(A218) 20525A HP 2114B DMA RATE AND TRANSFER DIAGNOSTIC
(A218) 20543A CONTROLLER MICROCIRCUIT DIAGNOSTIC
(A218) 20546A HP 2114B/HP 12616 HIGH SPEED I/O CHANNEL TEST
(A218) 22333A HP 9300N DISC EXERCISER
(A218) 24144A HP 12591 MEMORY PARITY CHECK TEST
(A218) 24163A GENERAL PURPOSE REGISTER DIAGNOSTIC
(A218) 24175A HP 12584C TELEPRINTER MULTIPLEXOR TEST
(A218) 24185A HP 2115/2116 DMA DIAGNOSTIC
(A218) 24186B EXTENDED ARITHMETIC UNIT DIAGNOSTIC
(A218) 24191A HP 2100A PLOTTER (HP 12560) TEST
(A218) 24195A HP 2100A DMA DIAGNOSTIC
(A218) 24202A HP 2100A PRINTER MULTIPLEXOR TEST
(A218) 24206B HP 2100A POWER FAIL DIAGNOSTIC
(A218) 24213B HP 2100A TIME BASE GENERATOR TEST
(A218) 24216A HP 2100A RELAY REGISTER TEST
(A218) 24222A HP 2100A MEMORY PROTECT TEST
(A218) 24251A HP 2100A FLOATING POINT DIAGNOSTIC
(A218) 29005B HP 12665 COMPUTER SERIAL INTERFACE CARD DIAGNOSTIC
(A218) 29006A HP 12813 DIAGNOSTIC
(A219) 20072C VERIFICATION: DACE AXEPT
(A219) 20077B HP 2312A SUBSYSTEM TEST
(A219) 20338D HP 2310C VERIFICATION TEST
(A219) 20339B TEST: HP 2310A/B SUBSYSTEM
(A219) 20341B TEST: HP 2912 SCANNER/DVM
(A219) 20349D VERIFY HP 2911 SCANNER/DVM TEST
(A219) 20530D HP 2321 VERIFICATION VER34
(A219) 20583C HP 2311 CALIBRATION - TELEPRINTER
(A301) 22021A LOCATE MAXIMUM-MINIMUM INTEGER
(A301) 22084C INTEGRATED MATH CALCULATOR PROGRAM
(A302) 22085B EXTENDED PRECISION CALCULATOR
(A302) 22097B DOUBLE PRECISION INTEGER LIBRARY
(A302) 22230A EXTENDED-PRECISION ARITHMETIC LIBRARY
(A302) 22334A THREE-WORD EXTENDED PRECISION ARITHMETIC ROUTINES
(A302) 22335A FIVE-WORD EXTENDED PRECISION ARITHMETIC ROUTINES
(A304) 22268A DECIMAL ARITHMETIC AND MOVE/COMPARE ROUTINES
(A306) 22017A GAMMA FUNCTION ROUTINE
(A306) 22018A K BESSEL FUNCTION ROUTINE
(A306) 22019A I BESSEL FUNCTION ROUTINE
(A306) 22020A Y BESSEL FUNCTION ROUTINE
(A306) 22117A TRANSFORMATIONS
(A306) 22256A FRESNEL INTEGRAL EVALUATION
(A309) 22022A SOLUTION OF LINEAR LEAST SQUARES PROBLEMS
(A309) 22220A LINEAR LEAST SQUARES PROBLEM SOLVER
(A310) 22023A TRAPEZOIDAL INTEGRATION ROUTINE
(A310) 22024A TRAPEZOIDAL INTEGRATION ROUTINE, EQUAL INTERVAL ARGUMENT
(A310) 22025A SIMPSON AND NEWTON'S 3/8 INTEGRATION ROUTINE, EQUAL INTERVAL ARGUMENT
(A310) 22026A HERMITIAN FOURTH-ORDER INTEGRATION ROUTINE
(A310) 22027B HERMITIAN FOURTH-ORDER INTEGRATION ROUTINE, EQUAL INTERVAL ARGUMENT
(A310) 22028A HERMITIAN SIXTH-ORDER INTEGRATION ROUTINE
(A310) 22029A HERMITIAN SIXTH-ORDER INTEGRATION ROUTINE, EQUAL INTERVAL ARGUMENT
(A310) 22144A INTEGRATION ROUTINE
(A311) 22030A COMPLEX ROOTS OF A REAL POLYNOMIAL
(A311) 22395A REAL AND COMPLEX ROOTS OF A POLYNOMIAL WITH REAL COEFFICIENTS
(A312) 22031A ADD ROWS OF MATRICES

(A312) 22032A RANK AND BASIS ROUTINE
(A312) 22118B MATRIX INVERSION SUBROUTINES
(A312) 22119A MATRIX ARITHMETIC SUBROUTINE
(A312) 22120A MATRIX ARITHMETIC PROGRAM
(A313) 22192A EIGENVALUES OF A SYMMETRIC REAL MATRIX
(A314) 22033A SOLUTION OF SIMULTANEOUS LINEAR EQUATIONS
(A314) 22034A SOLUTION OF SIMULTANEOUS LINEAR EQUATIONS, BAND-MATRIX
(A314) 22035A SOLUTION OF SIMULTANEOUS LINEAR EQUATIONS, SYMMETRIC MATRIX
(A314) 22122A SIMULTANEOUS EQUATION SOLVER PROGRAM
(A314) 22123A SIMULTANEOUS EQUATION SOLVER ROUTINE
(A316) 22036A REAL FOURIER TRANSFORM
(A316) 22037B COMPLEX FOURIER TRANSFORM
(A316) 22189B GENERAL FAST FOURIER TRANSFORM
(A316) 22218A FAST FOURIER TRANSFORM
(A318) 22038A SYSTEM OF ORDINARY DIFFERENTIAL EQUATIONS
(A401) 22145B CONFIDENCE INTERVAL FOR MEAN AND VARIANCE OF A NORMAL DISTRIBUTION
(A401) 22146C SAMPLE SIZE DETERMINATION ON THE SAMPLE VARIANCE
(A401) 22156A PAIRED T-TEST
(A401) 22157B BARTLETT'S HOMOGENEITY OF VARIANCE TEST
(A401) 22159B CHI SQUARE GOODNESS-OF-FIT TEST
(A401) 22160A TESTS OF HYPOTHESIS FOR VARIANCES
(A401) 22161B TEST OF HYPOTHESIS FOR MEANS
(A401) 22183A SAMPLE SIZE DETERMINATION TO TEST H0
(A402) 22124A AUTOCORRELATION AND SPECTRAL DENSITY
(A402) 22125A MOVING AVERAGES
(A403) 22127A DISCRIMINANT ANALYSIS PROGRAM
(A404) 22128A LEAST SQUARES REGRESSION PROGRAM
(A404) 22129A LINEAR REGRESSION INTERVAL ESTIMATES
(A404) 22130A POLYNOMIAL REGRESSION PROGRAM
(A404) 22131A POLYNOMIAL REGRESSION CONFIDENCE INTERVALS
(A404) 22132A STEPWISE REGRESSION PROGRAM
(A404) 22133A BIOASSAY PROGRAM
(A404) 22134A ORTHOGONAL REGRESSION PROGRAM
(A404) 22135A LINEAR REGRESSION WITH REPLICATION
(A404) 22136A NONLINEAR REGRESSION PROGRAM
(A404) 22184A POOLING OF GROUPS IN REGRESSION
(A404) 22185A MULTIPLE REGRESSION PROGRAM
(A404) 22187A NONLINEAR REGRESSION OF A SINGLE-VARIABLE FUNCTION
(A404) 22188A NONLINEAR REGRESSION OF AN ARBITRARY FUNCTION
(A405) 22194A PSEUDO-RANDOM NUMBER GENERATOR
(A405) 22265A FLOATING POINT RANDOM NUMBER GENERATOR
(A405) 22308A GAUSSION RANDOM NUMBER GENERATOR
(A405) 22413A RANDOM INTEGER NUMBER GENERATOR
(A405) 22434A RANDOM NUMBER GENERATORS
(A406) 22137A CUMULATIVE DISTRIBUTION PROGRAM
(A407) 22121A CROSS-TABULATION PROGRAM
(A407) 22138A KENDALL'S COEFFICIENT OF CONCORDANCE: W
(A407) 22139A KENDALL'S COEFFICIENT OF CONCORDANCE
(A407) 22140A KENDALL'S TAU CORRELATION
(A407) 22147A MULTIPLE CORRELATION ROUTINE
(A407) 22155A DUNCAN'S MULTIPLE RANGE TEST
(A407) 22158B KOLMOGOROV-SMIRNOV GOODNESS-OF-FIT TEST
(A408) 22039A MEAN, DEVIATION, AND CORRELATION COEFFICIENTS ROUTINE
(A408) 22141A GENERAL STATISTICS PROGRAM
(A408) 22142B GENERAL STATISTICS FOR MULTIPLE GROUPS
(A408) 22143A PROBABILITY SUBPROGRAMS
(A409) 22126A CROSS CORRELATION ANALYSIS
(A409) 22186A MULTIPLE CORRELATION MATRIX PROGRAM
(A410) 22148A COMPLETELY RANDOMIZED DESIGN
(A410) 22149A COMPLETELY RANDOMIZED DESIGN WITH SUBSAMPLING
(A410) 22150A RANDOMIZED COMPLETE BLOCK DESIGN
(A410) 22151B RANDOMIZED COMPLETE BLOCK DESIGN WITH SUBSAMPLING
(A410) 22152A TWO-WAY FACTORIAL DESIGN
(A410) 22153A THREE-WAY FACTORIAL DESIGN
(A410) 22154A ANALYSIS OF VARIANCE INFORMATION GENERATOR
(A413) 22397A COMBINATION GENERATOR
(A505) 22325A COPPER-CONSTANTAN THERMOCOUPLE VOLTAGE TO CELSIUS DEGREES CONVERSION
(A506) 01530A ECG INTERPRETIVE SYSTEM
(A506) 05680A MEDACE
(A506) 05690A COMPUTERIZED CARDIAC CATHETERIZATION LABORATORY SYSTEM
(A506) 22221B HP BIOMEDICAL RESPONSE AVERAGING PROGRAM
(A506) 22222A BLOOD ACID-BASE VARIABLES DETERMINATION PROGRAM
(A506) 22240A LUNG COMPLIANCE AND RESISTANCE MEASUREMENT SYSTEM

(A516)	22435A	SECOND VIRIAL COEFFICIENTS
(A517)	22384A	EFFECTIVE PERCEIVED NOISE LEVEL
(A701)	22378A	RTE LOGBOOK
(A720)	22266A	MARK SENSE EDUCATIONAL TEST CARD SCORING PROGRAM
(A880)	22332A	THE EXECUTIVE GAME
(A901)	22040A	SCOPE DISPLAY DEMO
(A901)	22099A	DOS DEMO
(A903)	22094A	JEU DE MORPIONS (GAME OF TIC-TAC-TOE)
(A903)	22298A	BATTLESHIP
(A903)	22436A	HANGMAN
(A904)	22162B	X-Y PLOTTER ON PRINTER
(A904)	22163A	TIME SERIES PLOTTER
(A904)	22164B	HISTOGRAM PLOTTER PROGRAM
(A904)	22182A	HISTOGRAM PLOTTER ROUTINE
(A904)	22262A	THREE DIMENSIONAL PLOT SUBROUTINE
(A904)	22324A	BCS VARIABLE SIZE PLOT FOR THE CALCOMP 565
(A904)	22348A	X-Y PLOTTER FOR 11 INCH PAGE PRINTER
(A904)	22425A	THREE DIMENSIONAL TRANSFORMATIONS USING EULER'S ANGLES
(A904)	22426A	LOGARITHMIC AXIS GENERATOR FOR THE CALCOMP 565

SOFTWARE
SOFTWARE
SOFTWARE
SOFTWARE

section IV
ordering information

OPTION NUMBERS

Software products are ordered by specifying the program number, together with an option number which indicates the type of product required. The option number consists of a letter followed by two digits, for instance: A02, B01, or L00. The letter indicates the form of product required, and the digits indicate the specific media by means of which it is to be supplied. The form indicated by each letter is listed below.

a. "B" indicates binary tape or cards.

b. "S" indicates source-language tape or cards.

c. "L" indicates a program listing.

d. "A" indicates binary tape or cards, source-language tape or cards, and a program listing.

e. "D" indicates all documentation other than a program listing.

f. "K" indicates source-language tape or cards, and all documentation other than a program listing.

The digits identifying the specific physical form of a software product have the following significance:

a. "00" indicates printed material only.

b. "01" indicates punched paper tape.

c. "02" indicates punched metallized-Mylar tape.

d. "11" indicates punched or mark-sense cards.

e. "20" indicates 7-track magnetic tape.

f. "21" indicates 9-track magnetic tape.

To take an example, "D00" indicates the documentation for the specified program, other than the program listing. (Documentation is made available separately so the user may examine it to see if the program fits his needs.)

To illustrate further, the following entry appears in the price list:

20014A (A014)
BCS PLOTTER DIRVER D.10

B01	-	$10
B02	-	$20
S01	-	$15
S02	-	$25
L00	-	$ 5
A01	-	$30
A02	-	$50

To order the program in binary form on punched paper tape, together with a program listing, the order appears as follows:

20014A	B01	$10
20014A	L00	$ 5

Normally, only those software products shown in the ordering information may be ordered. However, contributed programs (22000 Series) which have a K01 option are also available on punched metallized-Mylar tape. Order these using option K02 and double the price shown for the K01.

ORDERING PROCEDURE

Orders should be sent to the nearest Hewlett-Packard Sales and Service Office. These offices, and their addresses, are listed at the back of this catalog. Shipments normally are by Air Parcel Post. No charge is made for postage.

PRICE LIST

The price list is furnished on the pages which follow. Prices are subject to change.

01530A (A506) ECG INTERPRETIVE SYSTEM

For ordering information please contact your local HP Sales Office

05680A (A506) MEDACE

For ordering information please contact your local HP Sales Office

05690A (A506) COMPUTERIZED CARDIAC CATHETERIZATION LABORATORY SYSTEM

For ordering information please contact your local HP Sales Office

13020E (A204) HP 7970/13181A DIAGNOSTIC

B01	$ 10
S01	$ 60
L00	$ 10

13021B (A016) 8K SIO HP 7970 MAGNETIC TAPE DRIVER

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

13022B (A016) 16K SIO HP 7970 MAGNETIC TAPE DRIVER

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

13023B (A016) BCS MAGNETIC TAPE DRIVER

B01	$ 10
B02	$ 20
S01	$ 35
S02	$ 55
L00	$ 5
A01	$ 50
A02	$ 80

13024A (A016) DOS HP 7970 MAGNETIC TAPE DRIVER (DVR23)

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

13025A (A016) RTE HP 7970 MAGNETIC TAPE DRIVER (DVR23)

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

13026B (A016) BCS 7 TRACK DRIVER W/ 0 DMA

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

13027B (A016) BCS MAGNETIC TAPE DRIVER 7 TRACK DMA

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

13028D (A204) HP 7970/13182 7 TRACK DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 70
S02	$ 110
L00	$ 10
A01	$ 90
A02	$ 140

13029A (A016) 8K SIO MAGNETIC TAPE DRIVER 7 TRACK

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

13030A (A016) 16K SIO MAGNETIC TAPE DRIVER 7 TRACK

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

13031A (A204) HP 7970E/13183 DIAGNOSTIC

B01	$ 10
S01	$ 75
L00	$ 10

13041B (A203) HP 7900/13210 DIAGNOSTIC

B01	$ 15
B02	$ 25
S01	$ 140
S02	$ 210
L00	$ 20
A01	$ 175
A02	$ 255

14900B (A006) BCS 6936A MULTIPROGRAMMER DRIVER (D.61)

B01	$ 10
S01	$ 15
L00	$ 5
A01	$ 30

14901A (A202) HP 21XX VERIFICATION AND TEST FOR THE HP 6936A

B01	$ 10
S01	$ 90
L00	$ 25
A01	$ 125

14902A (A013) BCS DIGITAL VOLTAGE SOURCE POWER SUPPLY DRIVER D.70

B01	$ 10
S01	$ 30
L00	$ 5
A01	$ 45

14903A (A216) HP 21XX VERIFICATION AND TEST FOR DIGITAL VOLTAGE SOURCE

B01	$ 10
S01	$ 90
L00	$ 25
A01	$ 125

14904A (A006) HP 6940A/6941A BCS DRIVER, D.61

B01	$ 10
S01	$ 30
L00	$ 5
A01	$ 45

14905A (A202) HP 6940A/6941A DIAGNOSTIC

B01	$ 10
S01	$ 20
L00	$ 5
A01	$ 35

14909A (A006) HP 6940A DRIVER FOR 20392A BASIC

B01	$ 10
S01	$ 15
L00	$ 5
A01	$ 30

20001C (A017) 4K BCS RELOCATING LOADER

B01	$ 10
B02	$ 20
S01	$ 55
S02	$ 85
L00	$ 10
A01	$ 75
A02	$ 115

20002B (A211) BCS DEBUG ROUTINE

B01	$ 10
B02	$ 20
S01	$ 40
S02	$ 60
L00	$ 5
A01	$ 55
A02	$ 85

20005B (A009) BCS TAPE READER DRIVER D.01

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20006B (A009) BCS TAPE PUNCH DRIVER D.02

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20007A (A016) BCS INCREMENTAL MAGNETIC TAPE DRIVER (D.20)

B01	$ 10
B02	$ 20
S01	$ 25
S02	$ 15
L00	$ 5
A01	$ 30
A02	$ 50

20008B (A006) BCS 8-4-2-1 DATA SOURCE INTERFACE DRIVER (D.40)

B01	$ 15
B02	$ 25
S01	$ 15
S02	$ 25
L00	$ 15
A01	$ 30
A02	$ 50

20009B (A006) BCS DIGITAL VOLTMETER PROGRAM DRIVER (D.41)

B01	$ 15
B02	$ 25
S01	$ 15
S02	$ 25
L00	$ 15
A01	$ 30
A02	$ 50

20010C (A006) BCS 8-4-2-1 SCANNER CONTROL DRIVER (D.42)

B01	$ 15
B02	$ 25
S01	$ 15
S02	$ 25
L00	$ 15
A01	$ 30
A02	$ 50

20011B (A006) BCS 8-4-2-1/4-2-2-1 DATA SOURCE INTERFACE DRIVER (D.40A)

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 25
A01	$ 25
A02	$ 45

20012C (A006) BCS 8-4-2-1/4-2-2-1 SCANNER CONTROL DRIVER (D.42A)

B01	$ 15
B02	$ 25
S01	$ 15
S02	$ 25
L00	$ 15
A01	$ 30
A02	$ 50

20013E (A016) BCS HP 2020 MAGNETIC TAPE DRIVER (D.21)

B01	$ 10
B02	$ 20
S01	$ 35
S02	$ 55
L00	$ 5
A01	$ 50
A02	$ 80

20014A (A014) BCS PLOTTER DRIVER (D.10)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20016A (A009) BCS TAPE PUNCH DRIVER, IBM 8-LEVEL (D.02A)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20017C (A002) BCS TELEPRINTER DRIVER D.00

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20018G (A017) BCS RELOCATING LOADER

B01	$ 10
B02	$ 20
S01	$ 60
S02	$ 90
L00	$ 10
A01	$ 80
A02	$ 120

20019C (A010) BCS CARD READER DRIVER (D.11)

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20021C (A008) PREPARE CONTROL SYSTEM

B01	$ 10
B02	$ 20
S01	$ 85
S02	$ 135
L00	$ 10
A01	$ 105
A02	$ 165

20022E (A016) BCS HP 3030 MAGNETIC TAPE DRIVER (D.22)

B01	$ 10
B02	$ 20
S01	$ 30
S02	$ 50
L00	$ 5
A01	$ 45
A02	$ 75

20024A (A006) BCS DIGITAL VOLTMETER PROGRAM DRIVER (D.41B)

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20025A (A006) BCS HP 2912 SCANNER CONTROL DRIVER (D.42B)

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20028B (A006) BCS HP 2323A SUBSYSTEM DRIVER ANALOG SCAN SCN-12 (D.77)

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20072C (A219) VERIFICATION: DACE AXEPT

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20073C (A013) BCS HP 5610A ANALOG TO DIGITAL DRIVER, NON-DMA (D.56)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20074A (A013) FORTRAN /ALGOL INTERFACE ROUTINE (L5610)

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20075D (A216) VERIFY HP 5610A ANALOG TO DIGITAL TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20076A (A012) BCS HP 2312A DRIVER (D.55)

B01	$ 15
B02	$ 25
S01	$ 15
S02	$ 25
L00	$ 15
A01	$ 30
A02	$ 50

20077B (A219) HP 2312A SUBSYSTEM TEST

B01	$ 15
B02	$ 25
S01	$ 15
S02	$ 25
L00	$ 15
A01	$ 30
A02	$ 50

20078A (A212) BCS HP 2312A DRIVER/ FORTRAN INTERFACE ROUTINE (L2312)

B01	$ 15
B02	$ 25
S01	$ 15
S02	$ 25
L00	$ 15
A01	$ 30
A02	$ 50

20079A (A015) 8K SIO DISC/DRUM DRIVER

B01	$ 10
B02	$ 20
S01	$ 25
S02	$ 35
L00	$ 5
A01	$ 40
A02	$ 60

20081A (A015) 16K SIO DISC/DRUM DRIVER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20093C (A013) BCS HP 5610A ANALOG TO DIGITAL DRIVER, DMA, (D.56A)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20094B (A013) MULTI/MINIVERTER SCAN ROUTINE SCNMV (D.76)

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20096A (A105) CONVERSION ROUTINE MCONV

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20098C (A003) BCS 40 BIT OUTPUT REGISTER DRIVER D.54

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20100B (A101) SYMBOLIC EDITOR

B01	$ 15
B02	$ 25
S01	$ 70
S02	$ 100
L00	$ 5
A01	$ 90
A02	$ 130

20201C (A021) BCS PLOTTER LIBRARY

B01	$ 15
B02	$ 25
S01	$ 75
S02	$ 135
L00	$ 10
A01	$ 100
A02	$ 170

20209C (A012) DACE LIBRARY

B01	$ 10
B02	$ 20
S01	$ 60
S02	$ 90
L00	$ 5
A01	$ 75
A02	$ 115

20210A (A105) CONVERSION ROUTINE ICONV

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20235A (A012) RTE HP 2323A SUBSYSTEM DRIVER (DVR77)

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20236A (A012) RTE HP 2320A/2322A SUBSYSTEM DRIVER (DVR76)

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20237A (A107) LIBRARIAN

B01	$ 5
B02	$ 15
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 25
A02	$ 45

20288A (A105) RTE CONVERSION ROUTINE CONVERT

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20290A (A217) HP 12589A AUTOMATIC CALLING UNIT INTERFACE CARD DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 10
A01	$ 40
A02	$ 60

20295A (A006) RTE HP 12604B DATA SOURCE INTERFACE DRIVER (DVR40)

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20297D (A013) RTE HP 2310/2311 SUBSYSTEM DRIVER (DVR56)

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20301B (A008) 4K SIO SYSTEM DUMP

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20303A (A009) 4K SIO TAPE READER DRIVER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20304A (A009) 4K SIO TAPE PUNCH DRIVER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20306A (A009) 8K SIO TAPE READER DRIVER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20307A (A009) 8K SIO TAPE PUNCH DRIVER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20312A (A106) PUNCH/VERIFY ROUTINE

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20313B (A008) 8K SIO SYSTEM DUMP

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20314D (A016) 8K SIO HP 2020 MAGNETIC TAPE DRIVER

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20315C (A016) 4K SIO HP 2020 MAGNETIC TAPE DRIVER

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20316A (A009) 8K SIO TAPE PUNCH DRIVER, IBM 8-LEVEL

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20317A (A009) 4K SIO TAPE PUNCH DRIVER, IBM 8-LEVEL

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20319A (A009) 16K SIO TAPE READER DRIVER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20320A (A009) 16K SIO TAPE PUNCH DRIVER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20321C (A016) 16K SIO HP 2020 MAGNETIC TAPE DRIVER

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20322A (A002) 4K SIO BUFFERED TELEPRINTER DRIVER

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20323A (A002) 8K SIO BUFFERED TELEPRINTER DRIVER

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20324B (A010) 8K SIO CARD READER DRIVER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20327A (A009) 12K SIO TAPE READER DRIVER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20328A (A009) 12K SIO TAPE PUNCH DRIVER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 10
A01	$ 35
A02	$ 55

20329A (A002) 12K SIO BUFFERED TELEPRINTER DRIVER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20330B (A002) 16K SIO BUFFERED TELEPRINTER DRIVER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20331C (A016) 8K SIO HP MAGNETIC TAPE DRIVER

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20332A (A010) 16K SIO CARD READER DRIVER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20334C (A016) 16K SIO HP 3030 MAGNETIC TAPE DRIVER

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20335A (A008) 16K SIO SYSTEM DUMP

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20336B (A016) 4K SIO HP 3030 MAGNETIC TAPE DRIVER

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20337D (A202) HP 1260B DATA SOURCE INTERFACE DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 55
S02	$ 95
L00	$ 5
A01	$ 70
A02	$ 120

20338D (A219) HP 2310C VERIFICATION TEST

B01	$ 15
B02	$ 25
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 35
A02	$ 55

20339B (A219) TEST: HP 2310A/B SUBSYSTEM

B01	$ 15
B02	$ 25
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 35
A02	$ 55

20341B (A219) TEST: HP 2912 SCANNER/DVM

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20343A (A217) TELEPRINTER OFF-LINE TEST

B01	$ 5
B02	$ 15

20344A (A216) HP 12564A DIAGNOSTIC 10-BIT ANALOG TO DIGITAL CARD

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20345A (A218) HP 12598 MEMORY PARITY CHECK DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 35
A01	$ 30
A02	$ 50

20347B (A214) HP 2761-A007 OPTICAL MARK READER DIAGNOSTIC, HP 12602A KIT

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20348C (A202) HP 12556B DIAGNOSTIC 40-BIT OUTPUT REGISTER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20349D (A219) VERIFY HP 2911 SCANNER/DVM TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20390A (A205) HP 12560A PLOTTER DIAGNOSTIC

B01	$ 10
S01	$ 20
L00	$ 5

20392A (A018) BASIC SYSTEM

B01	$ 25
B02	$ 45
S01	$ 245
S02	$ 385
L00	$ 30
A01	$ 300
A02	$ 460

20393A (A217) HP 12622 SEND (ONLY) INTERFACE TEST

B01	$ 15
B02	$ 25
S01	$ 55
S02	$ 85
L00	$ 5
A01	$ 75
A02	$ 115

20396A (A013) RTE HP 12564A 10-BIT ANALOG TO DIGITAL CARD DRIVER (DVR57)

B01	$ 15
B02	$ 25
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 35
A02	$ 55

20398A (A012) RTE HP 2312A DRIVER (DVR55)

B01	$ 15
B02	$ 25
S01	$ 15
S02	$ 25
L00	$ 15
A01	$ 30
A02	$ 50

20400A (A209) ALTER-SKIP INSTRUCTION TEST

B01	$ 15
B02	$ 25
S01	$ 155
S02	$ 235
L00	$ 10
A01	$ 180
A02	$ 270

20401B (A209) MEMORY REFERENCE INSTRUCTION TEST

B01	$ 15
B02	$ 25
S01	$ 75
S02	$ 105
L00	$ 10
A01	$ 100
A02	$ 140

20402D (A209) SHIFT-ROTATE INSTRUCTION TEST

B01	$ 10
B02	$ 20
S01	$ 25
S02	$ 35
L00	$ 5
A01	$ 40
A02	$ 60

20403A (A208) LOW MEMORY ADDRESS TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20404A (A208) HIGH MEMORY ADDRESS TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20405A (A208) HP 2116A LOW MEMORY CHECKERBOARD TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20406A (A208) HP 2116A HIGH MEMORY CHECKERBOARD TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20408C (A213) HP 2737 PUNCH TAPE READER TEST

B01	$ 10
B02	$ 20
S01	$ 50
S02	$ 70
L00	$ 10
A01	$ 70
A02	$ 100

20409C (A213) HP 2753 TAPE PUNCH TEST

B01	$ 15
B02	$ 25
S01	$ 50
S02	$ 70
L00	$ 10
A01	$ 75
A02	$ 105

20411B (A204) TEST: KENNEDY INCREMENTAL MAGNETIC TAPE UNIT

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20412B (A218) HP 2116/HP 12539 TIME BASE GENERATOR TEST

B01	$ 10
B02	$ 20
S01	$ 25
S02	$ 35
L00	$ 5
A01	$ 40
A02	$ 60

20415A (A209) INTERRUPT DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20417C (A217) HP 2116 TELEPRINTER TEST

B01	$ 10
B02	$ 20
S01	$ 25
S02	$ 35
L00	$ 5
A01	$ 40
A02	$ 60

20418D (A218) MEMORY PROTECT DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 40
S02	$ 60
L00	$ 5
A01	$ 55
A02	$ 85

20420B (A217) HP 2115/2114 TELEPRINTER TEST

B01	$ 10
B02	$ 20
S01	$ 25
S02	$ 35
L00	$ 5
A01	$ 40
A02	$ 60

20421A (A218) HP 2115/2114 HP 12539 TIME BASE GENERATOR TEST

B01	$ 10
B02	$ 20
S01	$ 25
S02	$ 35
L00	$ 5
A01	$ 40
A02	$ 60

20423A (A218) HP 12551 RELAY REGISTER DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20426A (A208) HP 2116B HIGH MEMORY CHECKERBOARD TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20427A (A208) HP 2116B LOW MEMORY CHECKERBOARD TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20428B (A218) HP 12588 POWER FAIL WITH AUTO-RESTART TEST

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20429C (A202) HP 2912A PROGRAMMER CARD DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20430B (A006) HP 2402A PROGRAMMER/ DATE INTERFERENCE DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20431B (A218) HP 12556A 40-BIT OUTPUT REGISTER DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20433E (A204) HP 3030 MAGNETIC TAPE UNIT DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 60
S02	$ 90
L00	$ 10
A01	$ 80
A02	$ 120

20434B (A218) HP 2116 POWER FAIL INTERRUPT TEST

B01	$ 10
B02	$ 20
S01	$ 30
S02	$ 50
L00	$ 5
A01	$ 45
A02	$ 75

20435A (A218) DMI DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20436A (A202) HP 12661A DVS PROGRAM CARD DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20439A (A218) HP 12584 TELEPRINTER MULTIPLEXOR INTERFACE TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20501E (A012) BCS SCN-ANALOG 8-4-2-1 SCAN ROUTINE (D.77)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20502B (A003) TIME BASE GENERATOR DRIVER (D.43)

B01	$ 15
B02	$ 25
S01	$ 15
S02	$ 25
L00	$ 15
A01	$ 30
A02	$ 50

20512A (A208) HP 2116A/14A HIGH MEMORY CHECKERBOARD TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20513A (A208) HP 2115A/14A LOW MEMORY CHECKERBOARD TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20516B (A204) HP 2020 MAGNETIC TAPE UNIT DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 40
S02	$ 60
L00	$ 10
A01	$ 60
A02	$ 90

20517C (A012) BCS SCN-ANALOG 4-2-2-1 SCAN ROUTINE (D.77)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20520C (A010) 4K SIO MARK SENSE CARD READER DRIVER

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20521C (A010) 8K SIO MARK SENSE CARD READER DRIVER

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20522C (A010) 16K SIO MARK SENSE CARD READER DRIVER

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20524A (A218) HP 2114B DMA GENERAL DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 35
S02	$ 55
L00	$ 5
A01	$ 50
A02	$ 80

20525A (A218) HP 2114B DMA RATE AND TRANSFER DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20527B (A011) 4K SIO HP 2778A LINE PRINTER DRIVER

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20528A (A011) 8K SIO HP 2778A LINE PRINTER DRIVER

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20529A (A011) 16K SIO HP 2778A LINE PRINTER DRIVER

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20530D (A219) HP 2321 VERIFICATION VER34

B01	$ 15
B02	$ 25
S01	$ 45
S02	$ 75
L00	$ 5
A01	$ 65
A02	$ 105

20532A (A012) BCS HP 2321A SUBSYSTEM (HP3450/2911A) SCAN ROUTINE SCN 34 (D.77)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20533A (A105) CONVERSION ROUTINE, CONV34

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20535A (A217) HP 12587 SEND/ RECEIVE INTERFACE TEST

B01	$ 10
B02	$ 20
S01	$ 40
S02	$ 60
L00	$ 5
A01	$ 55
A02	$ 85

20538A (A217) HP 12621 RECEIVE (ONLY) INTERFACE TEST

B01	$ 10
B02	$ 20
S01	$ 40
S02	$ 60
L00	$ 5
A01	$ 55
A02	$ 85

20543A (A218) CONTROLLER MICROCIRCUIT DIAGNOSTIC

B01	$ 10
S01	$ 30
L00	$ 5

20546A (A218) HP 2114B/HP 12616 HIGH SPEED I/O CHANNEL TEST

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20548A (A018) FORTRAN COMPILER

B01	$ 25
B02	$ 45
S01	$ 240
S02	$ 390
L00	$ 30
A01	$ 295
A02	$ 465

20549A (A018) 4K FORTRAN COMPILER

B01	$ 40
B02	$ 80
S01	$ 445
S02	$ 755
L00	$ 40
A01	$ 525
A02	$ 875

20581A (A014) DOS PLOTTER DRIVER (DVR10)

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20583C (A219) HP 2311 CALIBRATION - TELEPRINTER

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20594A (A008) 8K MAGNETIC TAPE SYSTEM

B01	$ 30
B02	$ 60
S01	$ 55
S02	$ 85
L00	$ 15
A01	$ 100
A02	$ 160

20595A (A008) 16K MAGNETIC TAPE SYSTEM

B01	$ 30
B02	$ 60
S01	$ 55
S02	$ 85
L00	$ 15
A01	$ 100
A02	$ 160

20596F (A001) HP 2000A TIME-SHARED BASIC SYSTEM

This program is available to users of 2000A Time Shared Basic Systems. For further information, please contact an HP Sales and Service Office.

20597B (A007) DISC OPERATING SYSTEM (HP 2770 SERIES DISC/DRUM)

B01	$ 65
B02	$ 105
S01	$ 420
S02	$ 630
L00	$ 40
A01	$ 525
A02	$ 775

20598C (A018) DOS ASSEMBLER

B01	$ 75
B02	$ 145
S01	$ 185
S02	$ 285
L00	$ 40
A01	$ 300
A02	$ 370

20599C (A018) DOS FORTRAN

B01	$ 70
B02	$ 120
S01	$ 345
S02	$ 555
L00	$ 45
A01	$ 460
A02	$ 720

20688D (A020) REAL-TIME EXECUTIVE OPERATING SYSTEM

THIS PROGRAM IS AVAILABLE TO USERS OF 2005A REAL TIME EXECUTIVE. FOR FURTHER INFORMATION, PLEASE CONTACT AN HP SALES AND SERVICE OFFICE.

20741D (A002) RTE TELEPRINTER DRIVER (DVR00)

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20743D (A009) RTE TAPE READER DRIVER (DVR01)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20745B (A009) RTE HIGH SPEED PUNCH DRIVER (DVR02)

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20747C (A015) RTE DISC/DRUM DRIVER (DVR30)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20800C (A011) RTE HP 2778A LINE PRINTER DRIVER (DVR12)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20802C (A008) SYSTEM DUMP

B01	$ 10
B02	$ 20
S01	$ 35
S02	$ 55
L00	$ 5
A01	$ 50
A02	$ 80

20805C (A101) RTE EDITOR

B01	$ 10
B02	$ 20
S01	$ 45
S02	$ 75
L00	$ 5
A01	$ 60
A02	$ 100

20806C (A016) RTE HP 3030 MAGNETIC TAPE DRIVER (DVR22)

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20808B (A014) RTE PLOTTER DRIVER (DVR10)

B01	$ 10
B02	$ 20
S01-	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

20810B (A021) RTE/DOS PLOTTER LIBRARY

B01	$ 15
B02	$ 25
S01	$ 80
S02	$ 140
L00	$ 10
A01	$ 105
A02	$ 175

20817A (A010) BCS MARK SENSE DRIVER, KIT HP 12602A, (D.15)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20819C (A010) BCS MARK SENSE DRIVER, KIT HP 12602B, (D.15)

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20821B (A010) RTE MARK SENSE DRIVER, KIT HP 12602B, (DVR15)

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20823C (A010) DOS MARK SENSE DRIVER, KIT HP 12602B, (DVR15)

B01	$ 10
S01	$ 20
L00	$ 5

20874D (A018) RTE ASSEMBLER

B01	$ 75
B02	$ 145
S01	$ 180
S02	$ 280
L00	$ 40
A01	$ 295
A02	$ 465

20875E (A018) RTE FORTRAN

B01	$ 70
B02	$ 120
S01	$ 340
S02	$ 550
L00	$ 45
A01	$ 455
A02	$ 715

20878B (A008) HP 2000A TO HP 2000B CONVERSION

This program is available to users of 2000B Time Share Basic Systems. For further information, please contact an HP Sales and Service office.

20895C (A215) HP 2778 LINE PRINTER DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 35
S02	$ 55
L00	$ 10
A01	$ 55
A02	$ 85

20899B (A214) HP 2761A-007 OPTICAL MARK READER DIAGNOSTIC, HP 12602B KIT

B01	$ 15
B02	$ 25
S01	$ 70
S02	$ 110
L00	$ 10
A01	$ 95
A02	$ 145

20925C (A017) DOS RELOCATING LOADER

B01	$ 15
B02	$ 25
S01	$ 75
S02	$ 125
L00	$ 10
A01	$ 100
A02	$ 160

20985D (A002) DOS TELEPRINTER DRIVER (DVR00)

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20987C (A009) DOS TAPE READER DRIVER (DVR01)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20989A (A009) DOS HIGH SPEED PUNCH DRIVER (DVR02)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20991C (A011) DOS HP 2778A LINE PRINTER DRIVER (DVR12)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20995B (A015) DOS DISC/DRUM DRIVER (DVR30)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

20997B (A016) DOS HP 3030 MAGNETIC TAPE DRIVER (DVR22)

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

20999A (A215) HP 2767 LINE PRINTER DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 70
S02	$ 110
L00	$ 20
A01	$ 100
A02	$ 150

22001A (A006) HP 2911A/B CROSSBAR SCANNER DRIVER - FORTRAN CALLABLE

D00	$ 2
K01	$ 10

22002A (A003) TIME-OF-DAY CLOCK

D00	$ 2
K01	$ 10

22003A (A006) HP 2402A DIGITAL VOLTMETER DRIVER - FORTRAN CALLABLE

D00	$ 2
K01	$ 10

22004A (A006) COUNTER DATA SOURCE INTERFACE DRIVER - FORTRAN CALLABLE

D00	$ 2
K01	$ 10

22005B (A006) HP 2401C DIGITAL VOLTMETER DRIVER - FORTRAN CALLABLE

D00	$ 2
K01	$ 10

22006A (A006) HP 2401C DATA SOURCE INTERFACE DRIVER - FORTRAN CALLABLE

D00	$ 2
K01	$ 10

22007A (A006) HP 3440A DATA SOURCE INTERFACE DRIVER - FORTRAN CALLABLE

D00	$ 2
K01	$ 10

22008A (A006) HP 3460A DIGITAL VOLTMETER DRIVER - FORTRAN CALLABLE

D00	$ 2
K01	$ 10

22009B (A017) BOOTSTRAP LOADER GENERATOR

D00	$ 2
K01	$ 10

22013B (A018) INVERSE ASSEMBLER

D00	$ 2
K01	$ 10

22014A (A212) BINARY TAPE EDITOR

D00	$ 2
K01	$ 10

22015B (A212) BASIC LINE RESEQUENCER

D00	$ 2
K01	$ 10

22016C (A212) SYMBOLIC ALPHANUMERIC GENERATOR

```
D00     $   2
K01     $  10
```

22017A (A306) GAMMA FUNCTION ROUTINE

```
D00     $   2
K01     $  10
```

22018A (A306) K BESSEL FUNCTION ROUTINE

```
D00     $   2
K01     $  10
```

22019A (A306) I BESSEL FUNCTION ROUTINE

```
D00     $   2
K01     $  10
```

22020A (A306) Y BESSEL FUNCTION ROUTINE

```
D00     $   2
K01     $  10
```

22021A (A301) LOCATE MAXIMUM-MINIMUM INTEGER

```
D00     $   2
K01     $  10
```

22022A (A309) SOLUTION OF LINEAR LEAST SQUARES PROBLEMS

```
D00     $   2
K01     $  10
```

22023A (A310) TRAPEZOIDAL INTEGRATION ROUTINE

```
D00     $   2
K01     $  10
```

22024A (A310) TRAPEZOIDAL INTEGRATION ROUTINE, EQUAL INTERVAL ARGUMENT

```
D00     $   2
K01     $  10
```

22025A (A310) SIMPSON AND NEWTON'S 3/8 INTEGRATION ROUTINE, EQUAL INTERVAL ARGUMENT

```
D00     $   2
K01     $  10
```

22026A (A310) HERMITIAN FOURTH-ORDER INTEGRATION ROUTINE

```
D00     $   2
K01     $  10
```

22027B (A310) HERMITIAN FOURTH-ORDER INTEGRATION ROUTINE, EQUAL INTERVAL ARGUMENT

```
D00     $   2
K01     $  10
```

22028A (A310) HERMITIAN SIXTH-ORDER INTEGRATION ROUTINE

```
D00     $   2
K01     $  10
```

22029A (A310) HERMITIAN SIXTH-ORDER INTEGRATION ROUTINE, EQUAL INTERVAL ARGUMENT

```
D00     $   2
K01     $  10
```

22030A (A311) COMPLEX ROOTS OF A REAL POLYNOMIAL

```
D00     $   2
K01     $  10
```

22031A (A312) ADD ROWS OF MATRICES

```
D00     $   2
K01     $  10
```

22032A (A312) RANK AND BASIS ROUTINE

```
D00     $   2
K01     $  10
```

22033A (A314) SOLUTION OF SIMULTANEOUS LINEAR EQUATIONS

```
D00     $   2
K01     $  10
```

22034A (A314) SOLUTION OF SIMULTANEOUS LINEAR EQUATIONS, BAND-MATRIX

```
D00     $  2
K01     $  10
```

22035A (A314) SOLUTION OF SIMULTANEOUS LINEAR EQUATIONS, SYMMETRIC MATRIX

```
D00     $  2
K01     $  10
```

22036A (A316) REAL FOURIER TRANSFORM

```
D00     $  2
K01     $  10
```

22037B (A316) COMPLEX FOURIER TRANSFORM

```
D00     $  2
K01     $  10
```

22038A (A318) SYSTEM OF ORDINARY DIFFERENTIAL EQUATIONS

```
D00     $  2
K01     $  10
```

22039A (A408) MEAN, DEVIATION, AND CORRELATION COEFFICIENTS ROUTINE

```
D00     $  2
K01     $  10
```

22040A (A901) SCOPE DISPLAY DEMO

```
D00     $  2
K01     $  10
```

22041E (A106) PUNCHED TAPE DUPLICATOR

```
D00     $  2
K01     $  10
```

22042C (A008) AN HP 2116-FAMILY SIMULATOR FOR THE IBM 360

```
D00     $  2
K21     $  75
```

22044B (A009) RUN-TIME DATA INPUT FOR BASIC

```
D00     $  2
K01     $  10
```

22048A (A006) HP 2402A DATA SOURCE INTERFACE DRIVER - FORTRAN CALLABLE

```
D00     $  2
K01     $  10
```

22053B (A006) HP 3450A DATA SOURCE INTERFACE DRIVER - FORTRAN CALLABLE

```
D00     $  2
K01     $  10
```

22055A (A006) HP 3460A/B DATA SOURCE INTERFACE DRIVER - FORTRAN CALLABLE

```
D00     $  2
K01     $  10
```

22057A (A006) HP 2801A DATA SOURCE INTERFACE DRIVER - FORTRAN CALLABLE

```
D00     $  2
K01     $  10
```

22059A (A006) HP 2912A REED SCANNER DRIVER - FORTRAN CALLABLE

```
D00     $  2
K01     $  10
```

22061A (A006) HP 2320 LOW SPEED A-TO-D SUBSYSTEM DRIVER - FORTRAN CALLABLE

```
D00     $  2
K01     $  10
```

22062A (A006) HP 2322A LOW SPEED A-TO-D SUBSYSTEM DRIVER - FORTRAN CALLABLE

```
D00     $  2
K01     $  10
```

22063A (A015) HP 2770A/2771A DISC DRIVER - FORTRAN CALLABLE

```
D00     $  2
K01     $  10
```

22064A (A212) AUTOMATIC TABBING PROGRAM

D00 $ 2
K01 $ 10

22065A (A018) FORTRAN TRANSLATOR, IBM 1800 TO HP FORTRAN II

D00 $ 2
K01 $ 10

22066B (A006) HP 6130B DIGITAL VOLTAGE SOURCE DRIVER - FORTRAN CALLABLE

D00 $ 2
K01 $ 10

22068A (A006) HP 3450A DIGITAL VOLTMETER DRIVER - FORTRAN CALLABLE

D00 $ 2
K01 $ 10

22069A (A006) HP 2323A LOW SPEED A-TO-D SUBSYSTEM DRIVER - FORTRAN CALLABLE

D00 $ 2
K01 $ 10

22070A (A015) HP 2773A/74A/75A DRUM DRIVER - FORTRAN CALLABLE

D00 $ 2
K01 $ 10

22071A (A003) HP 12539A TIME BASE GENERATOR DRIVER - FORTRAN CALLABLE

D00 $ 2
K01 $ 10

22075A (A006) HP 5100B FREQUENCY SYNTHESIZER DRIVER - FORTRAN CALLABLE

D00 $ 2
K01 $ 10

22076A (A006) HP 5105A FREQUENCY SYNTHESIZER DRIVER - FORTRAN CALLABLE

D00 $ 2
K01 $ 10

22077B (A014) CALCOMP PLOTTER DRIVER - BASIC CALLABLE

D00 $ 2
K01 $ 10

22078B (A009) HIGH SPEED PUNCH DRIVER - BASIC CALLABLE

D00 $ 2
K01 $ 10

22079B (A107) NUMERIC STRING SORT FOR ASCII RECORDS

D00 $ 2
K01 $ 10

22080A (A014) HP 2331A X-Y DISPLAY SUBSYSTEM DRIVER - FORTRAN CALLABLE

D00 $ 2
K01 $ 10

22081A (A104) BIT OPERATIONS (SET, CLEAR, TEST) - FORTRAN CALLABLE

D00 $ 2
K01 $ 10

22082B (A009) BASIC PHOTOREADER DATA INPUT

D00 $ 2
K01 $ 10

22084C (A301) INTEGRATED MATH CALCULATOR PROGRAM

D00 $ 2
K01 $ 10

22085B (A302) EXTENDED PRECISION CALCULATOR

D00 $ 2
K01 $ 10

22086A (A105) EBCDIC TO ASCII TRANSLATOR

D00 $ 2
K01 $ 10

22088A (A211) OCTAL UTILITY SYSTEM (HOCUS)

D00 $ 2
K01 $ 10

22089A (A212) TELEPRINTER OCTAL INPUT PROGRAM

D00 $ 2
K01 $ 10

22090A (A108) KEYBOARD TAPE GENERATOR

D00 $ 2
K01 $ 10

22092B (A011) 4K, 8K, OR 16K SIO OLIVETTI SV40 DRIVER

D00 $ 2
K01 $ 10

22093A (A105) ASCII/IBM 8-LEVEL CHARACTER CONVERSION ROUTINE

D00 $ 2
K01 $ 10

22094A (A903) JEU DE MORPIONS (GAME OF TIC-TAC-TOE)

D00 $ 2
K01 $ 10

22095A (A011) BASIC HP 2778A LINE PRINTER DRIVER

D00 $ 2
K01 $ 10

22096A (A212) SCOPE SYMBOLIC LISTER

D00 $ 2
K01 $ 10

22097B (A302) DOUBLE PRECISION INTEGER LIBRARY

D00 $ 2
K01 $ 10

22098A (A006) HP 2323A LOW SPEED A-TO-D SUBSYSTEM DRIVER - BASIC CALLABLE

D00 $ 2
K01 $ 10

22099A (A901) DOS DEMO

D00 $ 2
K01 $ 10

22100A (A016) FILE THREE INPUT FOR MTS ALGOL

D00 $ 2
K01 $ 10

22101B (A006) HP 2911A/B CROSSBAR SCANNER DRIVER - BASIC CALLABLE

D00 $ 2
K01 $ 10

22102B (A006) HP 3460A/B DATA SOURCE INTERFACE DRIVER - BASIC CALLABLE

D00 $ 2
K01 $ 10

22103B (A006) HP 2401C DATA SOURCE INTERFACE DRIVER - BASIC CALLABLE

D00 $ 2
K01 $ 10

22104B (A006) HP 2402A DATA SOURCE INTERFACE DRIVER - BASIC CALLABLE

D00 $ 2
K01 $ 10

22105A (A212) COMMENT INSERTER FOR ASSEMBLER PROGRAMS

D00 $ 2
K01 $ 10

22106B (A006) COUNTER DATA SOURCE INTERFACE DRIVER - BASIC CALLABLE

D00 $ 2
K01 $ 10

22107B (A006) HP 2912A REED SCANNER DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22108C (A006) HP 3450A DATA SOURCE INTERFACE DRIVER -BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22109B (A006) HP 3440A DATA SOURCE INTERFACE DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22110B (A015) HP 2773A/74A/75A DRUM DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22111C (A015) HP 2770A/2771A DISC DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22112A (A003) HP 12539A TIME BASE GENERATOR DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22113B (A106) MTS PUNCHED TAPE DUPLICATOR

```
D00     $   2
K01     $  10
```

22114A (A101) REPRODUCE/EDIT PAPER TAPE

```
D00     $   2
K01     $  10
```

22116A (A107) ORDERING A FLOATING POINT ARRAY

```
D00     $   2
K01     $  10
```

22117A (A306) TRANSFORMATIONS

```
D00     $   2
K01     $  10
```

22118B (A312) MATRIX INVERSION SUBROUTINES

```
D00     $   2
K01     $  10
```

22119A (A312) MATRIX ARITHMETIC SUBROUTINE

```
D00     $   2
K01     $  10
```

22120A (A312) MATRIX ARITHMETIC PROGRAM

```
D00     $   2
K01     $  10
```

22121A (A407) CROSS-TABULATION PROGRAM

```
D00     $   2
K01     $  10
```

22122A (A314) SIMULTANEOUS EQUATION SOLVER PROGRAM

```
D00     $   2
K01     $  10
```

22123A (A314) SIMULTANEOUS EQUATION SOLVER ROUTINE

```
D00     $   2
K01     $  10
```

22124A (A402) AUTOCORRELATION AND SPECTRAL DENSITY

```
D00     $   2
K01     $  10
```

22125A (A402) MOVING AVERAGES

```
D00     $   2
K01     $  10
```

22126A (A409) CROSS CORRELATION ANALYSIS

```
D00     $   2
K01     $  10
```

22127A (A403) DISCRIMINANT ANALYSIS PROGRAM

D00 $ 2
K01 $ 10

22128A (A404) LEAST SQUARES REGRESSION PROGRAM

D00 $ 2
K01 $ 10

22129A (A404) LINEAR REGRESSION INTERVAL ESTIMATES

D00 $ 2
K01 $ 10

22130A (A404) POLYNOMIAL REGRESSION PROGRAM

D00 $ 2
K01 $ 10

22131A (A404) POLYNOMIAL REGRESSION CONFIDENCE INTERVALS

D00 $ 2
K01 $ 10

22132A (A404) STEPWISE REGRESSION PROGRAM

D00 $ 2
K01 $ 10

22133A (A404) BIOASSAY PROGRAM

D00 $ 2
K01 $ 10

22134A (A404) ORTHOGONAL REGRESSION PROGRAM

D00 $ 2
K01 $ 10

22135A (A404) LINEAR REGRESSION WITH REPLICATION

D00 $ 2
K01 $ 10

22136A (A404) NONLINEAR REGRESSION PROGRAM

D00 $ 2
K01 $ 10

22137A (A406) CUMULATIVE DISTRIBUTION PROGRAM

D00 $ 2
K01 $ 10

22138A (A407) KENDALL'S COEFFICIENT OF CONCORDANCE: W

D00 $ 2
K01 $ 10

22139A (A407) KENDALL'S COEFFICIENT OF CONCORDANCE

D00 $ 2
K01 $ 10

22140A (A407) KENDALL'S TAU CORRELATION

D00 $ 2
K01 $ 10

22141A (A408) GENERAL STATISTICS PROGRAM

D00 $ 2
K01 $ 10

22142B (A408) GENERAL STATISTICS FOR MULTIPLE GROUPS

D00 $ 2
K01 $ 10

22143A (A408) PROBABILITY SUBPROGRAMS

D00 $ 2
K01 $ 10

22144A (A310) INTEGRATION ROUTINE

D00 $ 2
K01 $ 10

22145B (A401) CONFIDENCE INTERVAL FOR MEAN AND VARIANCE OF A NORMAL DISTRIBUTION

D00 $ 2
K01 $ 10

22146C (A401) SAMPLE SIZE DETERMINATION ON THE SAMPLE VARIANCE

D00 $ 2
K01 $ 10

22147A (A407) MULTIPLE CORRELATION ROUTINE

D00 $ 2
K01 $ 10

22148A (A410) COMPLETELY RANDOMIZED DESIGN

D00 $ 2
K01 $ 10

22149A (A410) COMPLETELY RANDOMIZED DESIGN WITH SUBSAMPLING

D00 $ 2
K01 $ 10

22150A (A410) RANDOMIZED COMPLETE BLOCK DESIGN

D00 $ 2
K01 $ 10

22151B (A410) RANDOMIZED COMPLETE BLOCK DESIGN WITH SUBSAMPLING

D00 $ 2
K01 $ 10

22152A (A410) TWO-WAY FACTORIAL DESIGN

D00 $ 2
K01 $ 10

22153A (A410) THREE-WAY FACTORIAL DESIGN

D00 $ 2
K01 $ 10

22154A (A410) ANALYSIS OF VARIANCE INFORMATION GENERATOR

D00 $ 2
K01 $ 10

22155A (A407) DUNCAN'S MULTIPLE RANGE TEST

D00 $ 2
K01 $ 10

22156A (A401) PAIRED T-TEST

D00 $ 2
K01 $ 10

22157B (A401) BARTLETT'S HOMOGENEITY OF VARIANCE TEST

D00 $ 2
K01 $ 10

22158B (A407) KOLMOGOROV-SMIRNOV GOODNESS-OF-FIT TEST

D00 $ 2
K01 $ 10

22159B (A401) CHI SQUARE GOODNESS-OF-FIT TEST

D00 $ 2
K01 $ 10

22160A (A401) TESTS OF HYPOTHESIS FOR VARIANCES

D00 $ 2
K01 $ 10

22161B (A401) TEST OF HYPOTHESIS FOR MEANS

D00 $ 2
K01 $ 10

22162B (A904) X-Y PLOTTER ON PRINTER

D00 $ 2
K01 $ 10

22163A (A904) TIME SERIES PLOTTER

D00 $ 2
K01 $ 10

22164B (A904) HISTOGRAM PLOTTER PROGRAM

D00 $ 2
K01 $ 10

22165A (A108) CARD TO MAGNETIC TAPE UTILITY

D00 $ 2
K01 $ 10

22166A (A108) MAGNETIC TAPE TO PRINT UTILITY PROGRAM

D00 $ 2
K01 $ 10

22167A (A107) ORDERING A FIXED POINT ARRAY

D00 $ 2
K01 $ 10

22168A (A107) RANKING A FLOATING POINT ARRAY

D00 $ 2
K01 $ 10

22169A (A107) ORDERING A FLOATING POINT ARRAY

D00 $ 2
K01 $ 10

22170A (A003) SYNCHRONOUS HIGH SPEED DATA ACQUISITION PROGRAM

D00 $ 2
K01 $ 10

22171A (A101) FORTRAN UNIT REFERENCE NUMBER EDITOR

D00 $ 2
K01 $ 10

22172C (A112) IOC - FORTRAN CALLABLE

D00 $ 2
K01 $ 10

22173A (A212) I/O INSTRUCTION CONFIGURATOR

D00 $ 2
K01 $ 10

22174A (A207) BCS DUMP IN BBL FORMAT

D00 $ 2
K01 $ 10

22176A (A009) HP 2754A PUNCH/LIST IN KT MODE

D00 $ 2
K01 $ 10

22180C (A106) FAST PUNCH VERIFY

D00 $ 2
K01 $ 10

22181A (A016) RTE HP 2020 MAGNETIC TAPE DRIVER

D00 $ 2
K01 $ 10

22182A (A904) HISTOGRAM PLOTTER ROUTINE

D00 $ 2
K01 $ 10

22183A (A401) SAMPLE SIZE DETERMINATION TO TEST H0

D00 $ 2
K01 $ 10

22184A (A404) POOLING OF GROUPS IN REGRESSION

D00 $ 2
K01 $ 10

22185A (A404) MULTIPLE REGRESSION PROGRAM

D00 $ 2
K01 $ 10

22186A (A409) MULTIPLE CORRELATION MATRIX PROGRAM

D00 $ 2
K01 $ 10

22187A (A404) NONLINEAR REGRESSION OF A SINGLE-VARIABLE FUNCTION

```
D00     $   2
K01     $  10
```

22188A (A404) NONLINEAR REGRESSION OF AN ARBITRARY FUNCTION

```
D00     $   2
K01     $  10
```

22189B (A316) GENERAL FAST FOURIER TRANSFORM

```
D00     $   2
K01     $  10
```

22190A (A211) ABSOLUTE PROGRAM CONTROL SYSTEM

```
D00     $   2
K01     $  10
```

22191A (A212) NAM-ENT-EXT EDITOR

```
D00     $   2
K01     $  10
```

22192A (A313) EIGENVALUES OF A SYMMETRIC REAL MATRIX

```
D00     $   2
K01     $  10
```

22193A (A201) INTERPRETIVE BINARY SIMULATOR

```
D00     $   2
K01     $  10
```

22194A (A405) PSEUDO-RANDOM NUMBER GENERATOR

```
D00     $   2
K01     $  10
```

22195A (A003) PROGRAM EXECUTION TIMER

```
D00     $   2
K01     $  10
```

22197A (A106) SINGLE DRIVE MAGNETIC TAPE COPY PROGRAM

```
D00     $   2
K01     $  10
```

22198C (A102) MAGNETIC TAPE STORAGE AND RETRIEVAL PROGRAM

```
D00     $   2
K01     $  20
```

22199A (A012) BASIC LANGUAGE DATA ACQUISITION SYSTEM

```
D00     $  10
K01     $  30
```

22200A (A006) WAVETEK BASIC DRIVER

```
D00     $   2
K01     $  10
```

22201D (A018) PACIFIC UNION COLLEGE MULTI-TERMINAL HP BASIC SYSTEM

```
D00     $   2
K01     $  20
```

22204A (A104) DATA BLOCK MOVEMENT

```
D00     $   2
K01     $  10
```

22205A (A212) TABULATION AND FORM-FEED CALLS FOR HP 2754 TELEPRINTER

```
D00     $   2
K01     $  10
```

22207A (A104) CHARACTER AND BIT STRING PROCEDURES FOR ALGOL

```
D00     $   2
K01     $  10
```

22208A (A016) HP 3030G MAGNETIC TAPE DRIVER - FORTRAN CALLABLE

```
D00     $   2
K01     $  10
```

22209C (A106) DRUM BASED MAGNETIC TAPE DUPLICATOR

```
D00     $   2
K01     $  10
```

22210A (A006) HP 2322A LOW SPEED A-TO-D SUBSYSTEM DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22211A (A006) HP 5100B FREQUENCY SYNTHESIZER DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22212A (A006) HP 2320A LOW SPEED A-TO-D SUBSYSTEM DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22213A (A006) HP 5105A FREQUENCY SYNTHESIZER DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22214A (A105) CHARACTER CODE TRANSLATOR

```
D00     $   2
K01     $  10
```

22215A (A006) HP 3480A/B DIGITAL VOLTMETER DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22216B (A015) HP 2870A CARTRIDGE DISC DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22217B (A014) HP 2331A X-Y DISPLAY SUBSYSTEM DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22218A (A316) FAST FOURIER TRANSFORM

```
D00     $   2
K01     $  10
```

22219A (A014) HIGH SPEED CONTINUOUS LINE PLOTTER FOR HP 7004B

```
D00     $   2
K01     $  10
```

22220A (A309) LINEAR LEAST SQUARES PROBLEM SOLVER

```
D00     $   2
K01     $  10
```

22221B (A506) HP BIOMEDICAL RESPONSE AVERAGING PROGRAM

```
D00     $   5
K01     $  40
```

22222A (A506) BLOOD ACID-BASE VARIABLES DETERMINATION PROGRAM

```
D00     $   2
K01     $  10
```

22223C (A017) LOADER BOOTSTRAP

```
D00     $   2
K01     $  10
```

22224A (A006) HP 6130B DIGITAL VOLTAGE SOURCE DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22225B (A015) HP 2870A CARTRIDGE DISC DRIVER - FORTRAN CALLABLE

```
D00     $   2
K01     $  10
```

22226B (A006) HP 3480A/B DIGITAL VOLTMETER DRIVER - FORTRAN CALLABLE

```
D00     $   2
K01     $  10
```

22227A (A006) HP 6131B DIGITAL VOLTAGE SOURCE DRIVER - FORTRAN CALLABLE

```
D00     $   2
K01     $  10
```

22228A (A006) HP 6131B DIGITAL VOLTAGE SOURCE DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22229B (A003) HP 12551A/B RELAY REGISTER INTERFACE DRIVER - FORTRAN CALLABLE

```
D00     $   2
K01     $  10
```

22230A (A302) EXTENDED-PRECISION ARITHMETIC LIBRARY

```
D00     $   2
K01     $  10
```

22233A (A015) DOS-M PRIVILEGED DISC I/O ROUTINES

```
D00     $   2
K01     $  10
```

22235A (A019) FORTRAN POWER FAIL LINK

```
D00     $   2
K01     $  10
```

22236A (A004) FORTRAN I/O STATUS FUNCTION

```
D00     $   2
K01     $  10
```

22237C (A002) TELEPRINTER7 LINEPRINTER OUTPUT SELECTOR FOR HP BASIC

```
D00     $   2
K01     $  10
```

22238A (A112) FORTRAN RUN-TIME FORMAT SPECIFICATION

```
D00     $   2
K01     $  10
```

22239A (A016) HP 7970 MAGNETIC TAPE DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22240A (A506) LUNG COMPLIANCE AND RESISTANCE MEASUREMENT SYSTEM

```
D00     $   2
K01     $  20
```

22242A (A014) X-Y PLOTTING ROUTINE

```
D00     $   2
K01     $  10
```

22243A (A002) BCS TELECOMMUNICATIONS DRIVER D.50

```
D00     $   2
B01     $  20
K01     $  60
```

22244B (A002) 16K BINARY SYNCHRONOUS CONTROLLED DATA COMMUNICATIONS PROGRAM

```
D00     $   2
B01     $  20
K01     $  40
L00     $  15
```

22245A (A002) USER INTERFACE TO BCS TELECOMMUNICATIONS DRIVER D.50

```
D00     $   2
B01     $  10
K01     $  10
```

22246A (A002) DOS-M REMOTE TAPE READER DRIVER (DVR00,DVR07)

```
D00     $   2
K01     $  20
```

22247B (A009) FAST DOS/DOS-M PHOTOREADER DRIVER

```
D00     $   2
K01     $  10
```

22250A (A212) 'EXEC' CALL ADAPTER ROUTINE

```
D00     $   2
K01     $  10
```

22251A (A207) MAGNETIC TAPE TO LINE PRINTER ROUTINE

D00	$ 2
B01	$ 20
K01	$ 80
L00	$ 15

22252A (A106) RTE/DOS DUPLICATOR PROGRAM

D00	$ 2
K01	$ 10

22253A (A014) OSCILLOSCOPE PLOTTING SUBROUTINE

D00	$ 2
K01	$ 10

22255D (A018) MSU MULTI-TERMINAL BASIC SYSTEM WITH CARD READER CAPABILITY

D00	$ 5
B01	$ 20
K01	$ 130
L00	$ 15

22256A (A306) FRESNEL INTEGRAL EVALUATION

D00	$ 2
K01	$ 10

22257A (A207) MTS/BCS SYSTEM ABSOLUTE DUMP

D00	$ 2
K01	$ 10

22258A (A011) HP 2767 LINE PRINTER BASIC DRIVER

D00	$ 2
K01	$ 10

22259A (A207) DOS TO MAGNETIC TAPE DUMP

D00	$ 2
K01	$ 10

22260A (A207) MAGNETIC TAPE TO DOS DUMP

D00	$ 2
K01	$ 10

22261A (A018) MINI-BASIC

D00	$ 2
K01	$ 10

22262A (A904) THREE DIMENSIONAL PLOT SUBROUTINE

D00	$ 2
K01	$ 10

22263A (A014) PLOT, RELAY, WAIT

D00	$ 2
K01	$ 10

22264B (A009) TELEX TO ASCII PHOTOREADER DRIVER

D00	$ 2
K01	$ 10

22265A (A405) FLOATING POINT RANDOM NUMBER GENERATOR

D00	$ 2
K01	$ 10

22266A (A720) MARK SENSE EDUCATIONAL TEST CARD SCORING PROGRAM

D00	$ 2
K01	$ 10

22267A (A212) MTS FORTRAN CHAIN

D00	$ 2
K01	$ 10

22268A (A304) DECIMAL ARITHMETIC AND MOVE/COMPARE ROUTINES

D00	$ 2
K01	$ 30

22269A (A212) PAPER TAPE TITLER

D00	$ 2
K01	$ 10

22270C (A016) ALGOL OPERATING SYSTEM FOR MTS

D00	$ 2
K01	$ 10

22271B (A003) ZEISS DMC 25 COLORIMETER DRIVER - FORTRAN CALLABLE

```
D00     $   2
K01     $  10
```

22272A (A102) DISC/DRUM UTILITY

```
D00     $   2
K01     $  10
```

22273A (A022) CLEAR JOB BINARY AREA IN DOS/DOS-M

```
D00     $   2
K01     $  10
```

22274A (A105) 4-2-2-1 BCD TO FLOATING POINT CONVERSION FOR RTE

```
D00     $   2
K01     $  10
```

22275B (A003) ZEISS DMC 25 COLORIMETER DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22276A (A006) RTE CROSSBAR SCANNER DRIVER _ CHANNEL CODE CONVERSION

```
D00     $   2
K01     $  10
```

22277A (A110) DOS-M FILE ACCESS AND STRING LOOKUP

```
D00     $   2
K01     $  10
```

22278A (A212) TAB FOR PREPARING FORTRAN TAPES

```
D00     $   2
K01     $  10
```

22279A (A014) BASIC PLOT SUBROUTINES

```
D00     $   2
K01     $  10
```

22280A (A207) ABSOLUTE CORE DUMP ROUTINE

```
D00     $   2
K01     $  10
```

22281A (A013) MINIVERTER DRIVER

```
D00     $   2
K01     $  10
```

22282A (A107) DOS-M LIBRARIAN

```
D00     $   2
K01     $  10
```

22284A (A102) DOS-M DUMP/RESTORE PROGRAM

```
D00     $   2
K01     $  10
```

22285C (A101) CONVERSATIONAL DOS-M DISC FILE EDITOR

```
D00     $   2
K01     $  10
```

22286A (A101) D H SYMBOLIC EDITOR

```
D00     $   2
K01     $  20
```

22287A (A212) CHAIN FROM PHOTOREADER IN HP BASIC

```
D00     $   2
K01     $  10
```

22289A (A212) ALGOL ARRAY TRANSFER FOR SEGMENTATION

```
D00     $   2
K01     $  10
```

22290A (A207) CORE PUNCH IN BBL FORMAT

```
D00     $   2
K01     $  10
```

22291B (A014) DOS/DOS-M HP 2331 X-Y SCOPE DISPLAY

```
D00     $   2
K01     $  20
```

22292B (A018) ABSOLUTE OBJECT DECODER

D00 $ 2
K01 $ 20

22293A (A211) OCTAL ASSEMBLY PROCESSOR AND UTILITY SYSTEM

D00 $ 2
K01 $ 20

22294A (A006) DOS/DOS-M/RTE 3480 DVM DRIVER AND BCD CONVERSION

D00 $ 2
K01 $ 10

22295A (A018) BCS INTERPRETER FOR FLOATING POINT OPERATIONS

D00 $ 2
K01 $ 20

22296A (A207) HP 2870 DISC/ MAGNETIC TAPE DUMP IN DOS-M FORMAT

D00 $ 2
K01 $ 10

22297A (A017) OFFLINE RELOCATING LOADER

D00 $ 2
K01 $ 50
L00 $ 15

22298A (A903) BATTLESHIP

D00 $ 2
K01 $ 10

22299A (A102) DOS/DOS-M SOURCE STORAGE AND RETRIEVAL

D00 $ 2
K01 $ 10

22300B (A207) QUICK FIXED HEAD SDUMP

D00 $ 2
K01 $ 10

22301A (A015) HP 2870A CARTRIDGE DISC MEMORY DRIVER - FORTRAN CALLABLE

D00 $ 2
K01 $ 10

22302A (A212) RTE/DOS HP 2322A LOW SPEED ANALOG TO DIGITAL SUBSYSTEM CONVERSION

D00 $ 2
K01 $ 10

22303A (A212) RTE/DOS HP 2320A LOW SPEED ANALOG TO DIGITAL SUBSYSTEM CONVERSION

D00 $ 2
K01 $ 10

22304A (A013) HP 5610A ANALOG TO DIGITAL DRIVER - FORTRAN CALLABLE

D00 $ 2
K01 $ 10

22305A (A006) HP 2402A DIGITAL VOLTMETER DRIVER - BASIC CALLABLE

D00 $ 2
K01 $ 10

22308A (A405) GAUSSION RANDOM NUMBER GENERATOR

D00 $ 2
K01 $ 10

22309A (A212) DOS/RTE HP 2322A LOW SPEED ANALOG TO DIGITAL SUBSYSTEM CONVERSION

D00 $ 2
K01 $ 10

22310A (A212) FORTRAN/ALGOL ARRAY TRANSFER ROUTINE

D00 $ 2
K01 $ 10

22311A (A002) BCS POWER FAIL TELEPRINTER DRIVER WITH AUTORESTART OPTION

D00 $ 2
K01 $ 10

22312A (A015) BCS HP 2774/2771 DRUM DRIVER

D00 $ 2
K01 $ 10

22313A (A003) HP 12551B RELAY REGISTER INTERFACE DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22314A (A211) RTE CROSS-REFERENCE SYMBOL TABLE GENERATOR

```
D00     $   2
K01     $  10
```

22315A (A014) CONTINUOUS DISPLAY OF ARRAY DATA ON ANALOG X-Y SCOPE

```
D00     $   2
K01     $  10
```

22316A (A014) VARIABLE DISPLAY OF ARRAY DATA ON ANALOG X-Y SCOPE

```
D00     $   2
K01     $  10
```

22317A (A006) RTE HP 2310 ANALOG-TO-DIGITAL CONVERTER DISC STORAGE ROUTINE

```
D00     $   2
K01     $  10
```

22318A (A014) HP 1331C STORAGE SCOPE DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  10
```

22319A (A016) DOS/DOS-M HP 2020 MAGNETIC TAPE DRIVER

```
D00     $   2
K01     $  10
```

22320A (A212) DOS/DOS-M HP 2020/ 3030 MAGNETIC TAPE CONTROL PROGRAM

```
D00     $   2
K01     $  10
```

22321A (A207) HP 2870 DISC DUMP

```
D00     $   2
K01     $  10
```

22322A (A207) ABSOLUTE OCTAL OR DECIMAL CORE DUMP

```
D00     $   2
K01     $  10
```

22323A (A205) TEST PATTERN GENERATOR FOR HP 1331C STORAGE SCOPE

```
D00     $   2
K01     $  10
```

22324A (A904) BCS VARIABLE SIZE PLOT FOR THE CALCOMP 565

```
D00     $   2
K01     $  10
```

22325A (A505) COPPER-CONSTANTAN THERMOCOUPLE VOLTAGE TO CELSIUS DEGREES CONVERSION

```
D00     $   2
K01     $  10
```

22326A (A018) DOS-M RELOCATABLE BASIC

```
D00     $   2
B01     $  10
K01     $ 110
```

22327C (A018) SNOBOL COMPILER FOR DOS/DOS-M

```
D00     $   5
K01     $ 150
L00     $  15
```

22328A (A002) BCS TELECOMMUNICATIONS DRIVER FOR SYNCHRONOUS AND ASYCHRONOUS DEVICES

```
D00     $   2
B01     $  10
K01     $  60
L00     $  15
```

22329A (A021) SCIENTIFIC SUBROUTINE PACKAGE

```
D00     $   2
B01     $  20
K01     $  20
```

22330A (A110) PSEUDO REPORT GENERATOR

```
D00     $   2
K01     $  20
```

22331A (A013) DOS HP 2322A LOW SPEED ANALOG TO DIGITAL SUBSYSTEM DRIVER

```
D00     $   2
K01     $  10
```

22332A (A880) THE EXECUTIVE GAME

```
D00     $   2
K01     $  10
```

22333A (A218) HP 9300N DISC EXERCISER

```
D00     $   2
K01     $  10
```

22334A (A302) THREE-WORD EXTENDED PRECISION ARITHMETIC ROUTINES

```
D00     $   2
K01     $  10
```

22335A (A302) FIVE-WORD EXTENDED PRECISION ARITHMETIC ROUTINES

```
D00     $   2
K01     $  10
```

22336A (A006) HP 1900 PROGRAMMABLE PULSE GENERATOR - FORTRAN CALLABLE

```
D00     $   2
K01     $  20
```

22337A (A006) HP 1900 PROGRAMMABLE PULSE GENERATOR DRIVER - BASIC CALLABLE

```
D00     $   2
K01     $  20
```

22338A (A008) DISC BASIC EXECUTIVE

```
D00     $   2
B01     $  20
K01     $  60
L00     $  15
```

22339A (A006) DOS HP 2320A LOW SPEED ANALOG-TO-DIGITAL SUBSYSTEM DRIVER

```
D00     $   2
K01     $  10
```

22340A (A207) 360 FORMAT MAGNETIC TAPE DUMP

```
D00     $   2
K01     $  30
```

22341A (A108) FTN IV CORE SAVER

```
D00     $   2
K01     $  10
```

22342A (A017) DOS-M HARDWARE BOOT

```
D00     $   2
K01     $  10
```

22343A (A107) FIELDSORT

```
D00     $   2
K01     $  10
```

22344A (A017) ON-LINE SYSTEM LOAD FOR MOVING-HEAD RTE

```
D00     $   2
K01     $  10
```

22345A (A017) ON-LINE MOVING-HEAD RTE BOOTSTRAP FROM DOS-M OR DOS

```
D00     $   2
K01     $  10
```

22346A (A212) DOS/DOS-M ASSEMBLY LANGUAGE COMMENT INSERTER

```
D00     $   2
K01     $  10
```

22347A (A108) DOS/DOS-M SOURCE FILE VERIFY PROGRAM

```
D00     $   2
K01     $  10
```

22348A (A904) X-Y PLOTTER FOR 11 INCH PAGE PRINTER

```
D00     $   2
K01     $  10
```

22349A (A017) DOS-M BOOTSTRAP PROGRAM FOR DOS-M OR DOS

D00 $ 2
K01 $ 10

22350A (A017) DOS-M BOOTSTRAP PROGRAM FROM RTE

D00 $ 2
K01 $ 10

22351A (A212) ASCII STRING SEARCH FROM DISC FILE

D00 $ 2
K01 $ 10

22352A (A212) ASCII STRING SEARCH FROM PHOTOREADER

D00 $ 2
K01 $ 10

22353A (A009) DOS/DOS-M PHOTOREADER DRIVER TO READ ABSOLUTE BINARY TAPES

D00 $ 2
K01 $ 10

22354A (A108) DOS-M STORE ABSOLUTES

D00 $ 2
K01 $ 10

22355A (A108) DOS-M PAPER TAPE/ DISC VERIFY

D00 $ 2
K01 $ 10

22356A (A102) PACKED MAGNETIC TAPE STORAGE AND RETRIEVAL FOR DOS-M

D00 $ 2
K01 $ 30

22357A (A017) MTS BOOT FROM DOS-M

D00 $ 2
K01 $ 10

22358A (A108) EASY MAGNETIC TAPE I/ O AND STATUS INFORMATION

D00 $ 2
K01 $ 10

22359A (A108) HANDI-O

D00 $ 2
K01 $ 10

22360A (A106) DOS-M PAPER TAPE REPRODUCER

D00 $ 2
K01 $ 10

22361A (A012) DOS-M BINARY FILE DATA ACQUISITION

D00 $ 2
K01 $ 10

22362A (A021) STACK ROUTINES

D00 $ 2
K01 $ 10

22364A (A110) EFMP RECORD READ/ WRITE

D00 $ 2
K01 $ 10

22366A (A212) ALGOL SEGMENT RETURN TO MAIN PROGRAM

D00 $ 2
K01 $ 10

22367A (A002) 8K BINARY SYNCHRONOUS CONTROLLED DATA COMMUNICATIONS PROGRAM

D00 $ 2
B01 $ 20
K01 $ 50
L00 $ 15

22368A (A106) PAPER TAPE COPY

D00 $ 2
K01 $ 20

22369A (A110) DOS-M FILE WRITER

D00 $ 2
K01 $ 10

22370A (A112) OFFLINE ENCODE/
DECODE FOR THE TALLY DATA SYSTEM

D00	$ 2
K01	$ 10

22371A (A101) QUOTATION MARKS
CONVERSION IN DOS/DOS-M FILES

D00	$ 2
K01	$ 10

22372A (A002) HP 2100 REMOTE BATCH
TERMINAL TO A UNIVAC 1108

D00	$ 2
K01	$ 40
L00	$ 15

22373A (A110) ITEMIZED EXTENDED
FILE MANAGEMENT PACKAGE

D00	$ 2
K01	$ 60

22374A (A002) A BCS ASYNCHRONOUS
DATA SET INTERFACE DRIVER

D00	$ 2
K01	$ 20

22375A (A022) REMOTE HP 2100
ACCESS TO A 32K DOS

D00	$ 2
K01	$ 30

22376A (A107) ASCII DISC FILE
FIELD SORT

D00	$ 2
K01	$ 10

22377A (A022) DOS-M DISC
INITIALIZE/PROTECT UTILITY

D00	$ 2
K01	$ 10

22378A (A701) RTE LOGBOOK

D00	$ 2
K01	$ 10

22379A (A014) SIO LIST OUTPUT TO A
STORAGE SCOPE

D00	$ 2
K01	$ 10

22380A (A012) HP BASIC DRIVER
SYSTEM WITH BINARY DATA I/O

D00	$ 2
K01	$ 20

22381A (A108) RELOCATABLE MODULE
LISTER

D00	$ 2
K01	$ 10

22382B (A003) SYNCHRONOUS DATA
COMMUNICATIONS DRIVERS FOR
BCS, D.60 AND D.61

D00	$ 2
K01	$ 30

22383A (A107) ALPHANUMERIC RECORD
SORT

D00	$ 2
K01	$ 10

22384A (A517) EFFECTIVE PERCEIVED
NOISE LEVEL

D00	$ 2
K01	$ 40
L00	$ 15

22385A (A018) SYMBOLIC MACRO
ASSEMBLER FOR THE HP 2100

D00	$ 2
B01	$ 10
K01	$ 70
L00	$ 15

22386A (A112) MULTIRECORD
FORMATTED OUTPUT LISTER

D00	$ 2
K01	$ 10

22387A (A002) D.70 REVERSE CHANNEL
TELECOMMUNICATIONS DRIVER

D00	$ 2
K01	$ 40
L00	$ 15

22389A (A018) DOS-M EAU RELOCATABLE BASIC

D00	$ 2
B01	$ 20
K01	$ 100
L00	$ 15

22390A (A014) HP 7004 X-Y RECORDER LIBRARY

D00	$ 2
K01	$ 10

22391A (A014) HP 1331C SIO SCOPE DISPLAY DRIVER

D00	$ 2
K01	$ 10

22392A (A108) RELOCATABLE OBJECT UTILITY LIBRARIAN

D00	$ 2
K01	$ 10

22393A (A101) ON-LINE EDITOR

D00	$ 2
K01	$ 10

22394A (A002) CORE-SAVING TELEPRINTER I/O DRIVER AND CODE CONVERSION ROUTINE

D00	$ 2
K01	$ 10

22395A (A311) REAL AND COMPLEX ROOTS OF A POLYNOMIAL WITH REAL COEFFICIENTS

D00	$ 2
K01	$ 10

22396A (A018) AN HP ASSEMBLER FOR THE IBM 360

D00	$ 2
K01	$ 25
L00	$ 15

22397A (A413) COMBINATION GENERATOR

D00	$ 2
K01	$ 10

22398A (A022) RTE JOB CONTROL LANGUAGE FOR BATCH PROCESSING

D00	$ 2
K01	$ 10

22399A (A011) HP 2778/2767 LINE PRINTER PATCH FOR EDUCATIONAL BASIC

D00	$ 2
K01	$ 10

22400A (A108) ZERO

D00	$ 2
K01	$ 10

22401A (A020) RTE SELF SUSPEND ROUTINE

D00	$ 2
K01	$ 10

22403A (A001) HP 2870/7900 EIGHT CHANNEL DISC TIME SHARE BASIC SYSTEM

D00	$ 5
B01	$ 20
K01	$ 410
L00	$ 15

22404A (A104) SPACE SAVING ASCII STORAGE ROUTINES

D00	$ 2
K01	$ 10

22407A (A006) HP 3360A GAS CHROMATOGRAPH SYSTEM DRIVER - BASIC CALLABLE

D00	$ 2
K01	$ 10

22408A (A011) BASIC CALLABLE LINE PRINTER DRIVER

D00	$ 2
K01	$ 10

22409A (A011) EDUCATIONAL BASIC HP 2767 LINE PRINTER DRIVER

D00	$ 2
K01	10

22410A (A006) RTE MULTIPROGRAMMER DRIVER (DVR61)

D00 $ 2
K01 $ 10

22411A (A011) A.B. DICK VIDEOJET SIO LINE PRINTER DRIVER

D00 $ 2
K01 $ 10

22413A (A405) RANDOM INTEGER NUMBER GENERATOR

D00 $ 2
K01 $ 10

22414A (A016) NON-DMA BCS HP 3030 DRIVER

D00 $ 2
K01 $ 20

22415A (A018) DOS ABSOLUTE OBJECT DECODER

D00 $ 2
K01 $ 10

22416A (A022) CREATE DOS-M DIRECTORY ENTRY UNDER PROGRAM CONTROL

D00 $ 2
K01 $ 10

22417A (A018) SUPER BASIC FOR DOS-M

D00 $ 2
B01 $ 10
K01 $ 100

22425A (A904) THREE DIMENSIONAL TRANSFORMATIONS USING EULER'S ANGLES

D00 $ 2
K01 $ 10

22426A (A904) LOGARITHMIC AXIS GENERATOR FOR THE CALCOMP 565

D00 $ 2
K01 $ 10

22427A (A108) MEDIA CONVERSION

D00 $ 2
K01 $ 10

22428A (A212) ASSEMBLER JUSTIFICATION PROGRAM

D00 $ 2
K01 $ 10

22429A (A110) EFMP FILE TRANSFER

D00 $ 2
K01 $ 10

22430A (A107) NUMERIC SORT

D00 $ 2
K01 $ 10

22431A (A212) DOS-M SEGMENT RETURN TO MAIN

D00 $ 2
K01 $ 10

22432A (A110) EFMP DIRECTORY LISTER

D00 $ 2
K01 $ 10

22433A (A105) ASCII/INTEGER CONVERSION ROUTINE

D00 $ 2
K01 $ 10

22434A (A405) RANDOM NUMBER GENERATORS

D00 $ 2
K01 $ 10

22435A (A516) SECOND VIRIAL COEFFICIENTS

D00 $ 2
K01 $ 10

22436A (A903) HANGMAN

D00 $ 2
K01 $ 10

22438A (A018) DOS-M RELOCATABLE REVERSE ASSEMBLER

D00	$ 2
K01	$ 20

23900A (A014) DOS STORAGE SCOPE DRIVER (DVR46, $EX50)

B01	$ 20
S01	$ 20

24016A (A008) PREPARE TAPE SYSTEM

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

24031B (A018) EXTENDED ASSEMBLER NON-EAU

B01	$ 15
B02	$ 25
S01	$ 100
S02	$ 150
L00	$ 15
A01	$ 130
A02	$ 190

24032B (A018) EXTENDED ASSEMBLER EAU

B01	$ 15
B02	$ 25
S01	$ 100
S02	$ 150
L00	$ 15
A01	$ 130
A02	$ 190

24038B (A018) 4K ASSEMBLER NON-EAU

B01	$ 10
B02	$ 20
S01	$ 80
S02	$ 120
L00	$ 10
A01	$ 100
A02	$ 150

24039B (A018) 4K ASSEMBLER EAU

B01	$ 10
B02	$ 20
S01	$ 80
S02	$ 120
L00	$ 10
A01	$ 100
A02	$ 150

24044B (A018) ALGOL COMPILER

B01	$ 15
B02	$ 25
S01	$ 215
S02	$ 335
L00	$ 20
A01	$ 250
A02	$ 380

24109B (A211) CROSS-REFERENCE SYMBOL TABLE GENERATOR

B01	$ 10
B02	$ 20
S01	$ 25
S02	$ 35
L00	$ 5
A01	$ 40
A02	$ 60

24123A (A002) 4K SIO TELEPRINTER DRIVER, LP-COMPAT

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24125A (A002) 8K SIO TELEPRINTER DRIVER, LP-COMPAT

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24127A (A002) 16K SIO TELEPRINTER DRIVER, LP-COMPAT

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24129B (A018) RTE/DOS ALGOL COMPILER

B01	$ 30
B02	$ 50
S01	$ 190
S02	$ 290
L00	$ 21
A01	$ 241
A02	$ 361

24142A (A202) PROCESSOR INTERCONNECT CABLE DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24144A (A218) HP 12591 MEMORY PARITY CHECK TEST

B01	$ 10
B02	$ 20
S01	$ 30
S02	$ 50
L00	$ 10
A01	$ 50
A02	$ 80

24145A (A021) BCS RELOCATABLE LIBRARY, EAU

B01	$ 20
B02	$ 30
S01	$ 170
S02	$ 270
L00	$ 25
A01	$ 215
A02	$ 325

24146A (A021) BCS RELOCATABLE LIBRARY, NON-EAU

B01	$ 20
B02	$ 30
S01	$ 170
S02	$ 270
L00	$ 25
A01	$ 215
A02	$ 325

24147A (A021) 4K BCS RELOCATABLE LIBRARY, NON-EAU

B01	$ 20
B02	$ 30
S01	$ 175
S02	$ 275
L00	$ 25
A01	$ 220
A02	$ 330

24148A (A021) 4K BCS RELOCATABLE LIBRARY, EAU

B01	$ 20
B02	$ 30
S01	$ 170
S02	$ 270
L00	$ 25
A01	$ 215
A02	$ 325

24149A (A021) BCS FORTRAN IV LIBRARY

B01	$ 20
B02	$ 30
S01	$ 155
S02	$ 245
L00	$ 30
A01	$ 205
A02	$ 305

24150C (A021) RTE/DOS RELOCATABLE LIBRARY, NON-EAU

B01	$ 20
B02	$ 30
S01	$ 155
S02	$ 255
L00	$ 25
A01	$ 200
A02	$ 310

24151C (A021) RTE/DOS RELOCATABLE LIBRARY, EAU

B01	$ 20
B02	$ 30
S01	$ 160
S02	$ 260
L00	$ 25
A01	$ 205
A02	$ 315

24152A (A021) RTE/DOS FORTRAN IV LIBRARY

B01	$ 25
B02	$ 35
S01	$ 160
S02	$ 260
L00	$ 35
A01	$ 220
A02	$ 330

24153A (A021) RTE/DOS FORTRAN FORMATTER

B01	$ 10
B02	$ 20
S01	$ 45
S02	$ 75
L00	$ 10
A01	$ 65
A02	$ 105

24155C (A017) DOS-M RELOCATING LOADER

B01	$ 15
B02	$ 25
S01	$ 100
S02	$ 150
L00	$ 10
A01	$ 125
A02	$ 180

24156C (A015) DOS-M HP 2870/7900 DISC DRIVER (DVR 31)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24157B (A002) DOS-M SYSTEM TELEPRINTER DRIVER (DVR05)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24158B (A018) DOS-M ASSEMBLER

B01	$ 75
B02	$ 145
S01	$ 180
S02	$ 280
L00	$ 40
A01	$ 295
A02	$ 465

24159B (A018) DOS-M FORTRAN

B01	$ 70
B02	$ 120
S01	$ 345
S02	$ 555
L00	$ 45
A01	$ 460
A02	$ 720

24160A (A018) EDUCATIONAL BASIC SYSTEM

B01	$ 15
B02	$ 25
S01	$ 225
S02	$ 365
L00	$ 20
A01	$ 260
A02	$ 410

24161A (A208) HP 2116C LOW MEMORY PATTERN TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24162A (A208) HP 2116C HIGH MEMORY PATTERN TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24163A (A218) GENERAL PURPOSE REGISTER DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24164B (A011) 4K SIO HP 2767 LINE PRINTER DRIVER

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

24165B (A011) 8K SIO HP 2767 LINE PRINTER DRIVER

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

24166B (A011) 16K SIO HP 2767 LINE PRINTER DRIVER

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

24167B (A011) BCS HP 2767 LINE PRINTER DRVR. (D.16)

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

24168B (A011) DOS HP 2767 LINE PRINTER DRIVER (DVR12)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24169A (A011) RTE HP 2767 LINE PRINTER DRIVER (DVR12)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24170C (A018) RTE/DOS FORTRAN IV COMPILER

B01	$ 10
B02	$ 100
S01	$ 450
S02	$ 710
L00	$ 50
A01	$ 570
A02	$ 860

24171B (A011) BCS HP 2778A LINE PRINTER DRVR. (D.12)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24172A (A008) BCS INPUT/OUTPUT CONTROL, BUFFERED

B01	$ 10
B02	$ 20
S01	$ 30
S02	$ 50
L00	$ 5
A01	$ 45
A02	$ 75

24173A (A008) BCS INPUT/OUTPUT CONTROL

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24174A (A214) HP 2891 CARD READER DIAGNOSTIC

B01	$ 15
B02	$ 25
S01	$ 95
S02	$ 145
L00	$ 15
A01	$ 125
A02	$ 185

24175A (A218) HP 12584C TELEPRINTER MULTIPLEXOR TEST

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

24177B (A018) RTE/DOS FORTRAN IV COMPILER (10K COMPILER AREA)

B01	$ 35
B02	$ 55
S01	$ 305
S02	$ 465
L00	$ 25
A01	$ 365
A02	$ 545

24178A (A010) 4K SIO HP 2891A CARD READER DRIVER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24179A (A010) 8K SIO HP 2891A CARD READER DRIVER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24180A (A010) 16K SIO HP 2891A CARD READER DRIVER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24181A (A010) BCS HP 2891A CARD READER DRIVER (D.11)

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

24182A (A010) DOS HP 2891A CARD READER DRIVER (DVR11)

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

24184B (A203) FIXED HEAD DISC/DRUM DIAGNOSTIC

B01	$ 15
B02	$ 25
S01	$ 105
S02	$ 165
L00	$ 20
A01	$ 140
A02	$ 210

24185A (A218) HP 2115/2116 DMA DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 60
S02	$ 90
L00	$ 10
A01	$ 80
A02	$ 120

24186B (A218) EXTENDED ARITHMETIC UNIT DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 40
S02	$ 60
L00	$ 10
A01	$ 60
A02	$ 90

24187C (A217) HP 2600 KEYBOARD-DISPLAY TERMINAL TEST

B01	$ 10
B02	$ 20
S01	$ 35
S02	$ 55
L00	$ 10
A01	$ 55
A02	$ 85

24188B (A214) HP 2100A OPTICAL MARK READER TEST (KIT 12602B)

B01	$ 15
B02	$ 25
S01	$ 75
S02	$ 115
L00	$ 15
A01	$ 105
A02	$ 155

24189B (A213) HP 2100A TAPE READER TEST

B01	$ 10
B02	$ 20
S01	$ 30
S02	$ 50
L00	$ 5
A01	$ 45
A02	$ 75

24190A (A213) HP 2100A TAPE PUNCH TEST

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

24191A (A218) HP 2100A PLOTTER (HP 12560) TEST

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

24192A (A214) HP 2100A CARD READER (HP 2891/12882) DIAGNOSTIC

B01	$ 15
B02	$ 25
S01	$ 90
S02	$ 140
L00	$ 15
A01	$ 120
A02	$ 180

24193A (A208) HP 2100A LOW MEMORY PATTERN TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24194A (A208) HP 2100A HIGH MEMORY PATTERN TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24195A (A218) HP 2100A DMA DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 55
S02	$ 85
L00	$ 10
A01	$ 75
A02	$ 115

24196A (A202) HP 2100A GENERAL PURPOSE REGISTER TEST

B01	$ 10
B02	$ 20
S01	$ 30
S02	$ 50
L00	$ 5
A01	$ 45
A02	$ 75

24197A (A202) HP 2100A PROCESSOR INTERCONNECT CABLE TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24198B (A208) HP 2100A MEMORY PARITY CHECK TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24199A (A202) HP 2100A CONTROLLER MICROCIRCUIT TEST

B01	$ 10
B02	$ 20
S01	$ 30
S02	$ 50
L00	$ 5
A01	$ 45
A02	$ 75

24200A (A217) HP 2100A KEYBOARD-DISPLAY TERMINAL (HP 2600) TEST

B01	$ 10
B02	$ 20
S01	$ 30
S02	$ 50
L00	$ 10
A01	$ 50
A02	$ 80

24201A (A213) HP 2100A TELEPRINTER TEST

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

24202A (A218) HP 2100A PRINTER MULTIPLEXOR TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24203A (A203) HP 2100A CARTRIDGE DISC MEMORY DIAGNOSTIC

B01	$ 15
B02	$ 25
S01	$ 135
S02	$ 215
L00	$ 20
A01	$ 170
A02	$ 260

24204A (A203) HP 2100A DISC FILE (HP 2883) DIAGNOSTIC

B01	$ 15
B02	$ 25
S01	$ 130
S02	$ 200
L00	$ 20
A01	$ 165
A02	$ 235

24205A (A215) HP 2100A LINE PRINTER (HP2767) DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 70
S02	$ 110
L00	$ 15
A01	$ 95
A02	$ 145

24206B (A218) HP 2100A POWER FAIL DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24207A (A203) HP 2100A FIXED HEAD DISC/DRUM DIAGNOSTIC

B01	$ 15
B02	$ 25
S01	$ 110
S02	$ 170
L00	$ 20
A01	$ 145
A02	$ 215

24208A (A209) HP 2100A ALTER-SKIP INSTRUCTION TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24209A (A209) HP 2100A MEMORY REF. INSTRUCTION TEST

B01	$ 15
B02	$ 25
S01	$ 45
S02	$ 75
L00	$ 10
A01	$ 70
A02	$ 110

24210A (A209) HP 2100A SHIFT-ROTATE INSTRUCTION TEST

B01	$ 10
B02	$ 20
S01	$ 30
S02	$ 50
L00	$ 5
A01	$ 45
A02	$ 75

24211A (A208) HP 2100A LOW MEMORY ADDRESS TEST

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

24212A (A208) HP 2100A HIGH MEMORY ADDRESS TEST

B01	$ 10
B02	$ 20
S01	$ 10
S02	$ 20
L00	$ 5
A01	$ 25
A02	$ 45

24213B (A218) HP 2100A TIME BASE GENERATOR TEST

B01	$ 10
B02	$ 20
S01	$ 55
S02	$ 85
L00	$ 10
A01	$ 75
A02	$ 115

24214A (A209) HP 2100A EXTENDED ARITHMETIC UNIT TEST

B01	$ 10
B02	$ 20
S01	$ 40
S02	$ 60
L00	$ 10
A01	$ 60
A02	$ 90

24215A (A209) HP 2100A INTERRUPT TEST

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

24216A (A218) HP 2100A RELAY REGISTER TEST

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24217A (A217) HP 2100A AUTO CALL UNIT INTERFACE (HP 12589) TEST

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

24218C (A215) HP 2100A LINE PRINTER (HP 2778) TEST

B01	$ 10
B02	$ 20
S01	$ 35
S02	$ 55
L00	$ 10
A01	$ 55
A02	$ 85

24219A (A217) HP 2100A SEND ONLY INTERFACE (HP 12622) TEST

B01	$ 15
B02	$ 25
S01	$ 55
S02	$ 85
L00	$ 10
A01	$ 80
A02	$ 120

24220A (A217) HP 2100A RECEIVE ONLY INTERFACE (HP 12621 TEST)

B01	$ 10
B02	$ 20
S01	$ 40
S02	$ 60
L00	$ 10
A01	$ 60
A02	$ 90

24221B (A217) HP 2100A SEND/ RECEIVE INTERFACE (HP 12587) TEST

B01	$ 10
B02	$ 20
S01	$ 40
S02	$ 60
L00	$ 10
A01	$ 60
A02	$ 90

24222A (A218) HP 2100A MEMORY PROTECT TEST

B01	$ 10
B02	$ 20
S01	$ 35
S02	$ 55
L00	$ 10
A01	$ 55
A02	$ 85

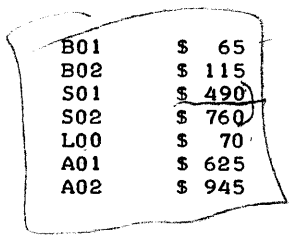
24223B (A211) DOS CROSS REFERENCE ROUTINE

B01	$ 10
B02	$ 20
S01	$ 40
S02	$ 60
L00	$ 10
A01	$ 60
A02	$ 90

24224A (A010) RTE HP 2891A CARD READER DRIVER (DVR11)

B01	$ 10
B02	$ 20
S01	$ 20
S02	$ 30
L00	$ 5
A01	$ 35
A02	$ 55

24225D (A007) MOVING-HEAD DISC OPERATING SYSTEM



B01	$ 65
B02	$ 115
S01	$ 490
S02	$ 760
L00	$ 70
A01	$ 625
A02	$ 945

24226C (A015) DOS-M HP 2883 DISC DRIVER (DVR 31)

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24227B (A102) DOS-M EXTENDED FILE MANAGEMENT PACKAGE

B01	$ 30
B02	$ 50
S01	$ 135
S02	$ 220
L00	$ 20
A01	$ 185
A02	$ 290

24228A (A102) DOS-M/HP2000C TIME-SHARE BASIC FILE HANDLER

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

24230B (A001) HP 2000C TIME-SHARED BASIC SYSTEM

This program is available to users of HP 2000 series Time Share BASIC Systems. For further information, please contact an HP Sales and Service office.

24231A (A001) HP 2000B/C TIME-SHARED BASIC COMMUNICATIONS PROCESSOR

This program is available to users of HP 2000 series Time Share BASIC Systems. For further information, please contact an HP Sales and Service office.

24232B (A001) HP 2000C TIME-SHARED BASIC LOADER (HP 2883 DISC)

This program is available to users of HP 2000 series Time Share BASIC Systems. For further information, please contact an HP Sales and Service office.

24233B (A001) HP 2000C TIME-SHARED BASIC LOADER (HP 2870 DISC)

This program is available to users of HP 2000 series Time Share BASIC Systems. For further information, please contact an HP Sales and Service office.

24234B (A001) HP 2000B TO HP 2000C CONVERSION (HP 2883 DISC)

This program is available to users of HP 2000 series Time Share BASIC Systems. For further information, please contact an HP Sales and Service office.

24235B (A001) HP 2000B TO HP 2000C CONVERSION (HP 2870 DISC)

This program is available to users of HP 2000 series Time Share BASIC Systems. For further information, please contact an HP Sales and Service office.

24236A (A203) HP 2883 DISC FILE DIAGNOSTIC

B01	$ 15
B02	$ 25
S01	$ 135
S02	$ 205
L00	$ 20
A01	$ 170
A02	$ 250

24237A (A203) CARTRIDGE DISC MEMORY DIAGNOSTIC

B01	$ 15
B02	$ 25
S01	$ 135
S02	$ 215
L00	$ 20
A01	$ 170
A02	$ 260

24238B (A001) HP 2000C TIME-SHARED BASIC LOADER

This program is available to users of HP 2000 series Time Share BASIC Systems. For further information, please contact an HP Sales and Service office.

24239B (A001) HP 2000B TIME-SHARED BASIC SYSTEM

This program is available to users of HP 2000 series Time Share BASIC Systems. For further information, please contact an HP Sales and Service office.

24240A (A102) DOS-M/HP 2000C TIME-SHARED BASIC FILE INTERFACE PACKAGE

B01	$ 10
B02	$ 20
S01	$ 30
S02	$ 50
L00	$ 5
A01	$ 45
A02	$ 75

24245A (A021) HEWLETT-PACKARD COMMERCIAL SUBROUTINES

B01	$ 30
B02	$ 50
S01	$ 30
S02	$ 50
L00	$ 10
A01	$ 70
A02	$ 110

24246A (A018) EXTENDED ASSEMBLER FLOATING POINT

B01	$ 15
B02	$ 25
S01	$ 100
S02	$ 150
L00	$ 15
A01	$ 130
A02	$ 190

24247A (A018) 4K ASSEMBLER FLOATING POINT

B01	$ 10
B02	$ 20
S01	$ 80
S02	$ 120
L00	$ 10
A01	$ 100
A02	$ 150

24248A (A021) RTE/DOS RELOCATABLE LIBRARY - FLOATING POINT

B01	$ 20
B02	$ 30
S01	$ 155
S02	$ 255
L00	$ 25
A01	$ 200
A02	$ 310

24249A (A021) 4K BCS RELOCATABLE LIBRARY - FLOATING POINT

B01	$ 20
B02	$ 30
S01	$ 160
S02	$ 260
L00	$ 25
A01	$ 205
A02	$ 315

24250A (A021) BCS RELOCATABLE LIBRARY - FLOATING POINT

B01	$ 20
B02	$ 30
S01	$ 160
S02	$ 260
L00	$ 25
A01	$ 205
A02	$ 315

24251A (A218) HP 2100A FLOATING POINT DIAGNOSTIC

B01	$ 10
B02	$ 20
S01	$ 40
S02	$ 60
L00	$ 5
A01	$ 55
A02	$ 85

24253B (A001) HP 2000C TIME-SHARED BASIC LOADER (HP 7900 DISC)

B01	$ 20
B02	$ 30
S01	$ 350
S02	$ 580
L00	$ 35
A01	$ 405
A02	$ 645

24254B (A001) HP 2000B TO HP 2000C CONVERSION (HP 7900 DISC)

B01	$ 10
B02	$ 20
S01	$ 70
S02	$ 110
L00	$ 10
A01	$ 90
A02	$ 140

29000A (A012) RTE HP 2321A SUBSYSTEM DRIVER (DVR74)

B01	$ 15
B02	$ 25
S01	$ 15
L00	$ 5
A01	$ 35

29001A (A003) COMPUTER SERIAL INTERFACE RTE DRIVER DVR65

B01	$ 10
B02	$ 20
S01	$ 30
S02	$ 50
L00	$ 5
A01	$ 45
A02	$ 75

29002A (A003) COMPUTER SERIAL INTERFACE BCS DRIVER D.65

B01	$ 10
B02	$ 20
S01	$ 40
S02	$ 60
L00	$ 5
A01	$ 55
A02	$ 85

29003A (A003) COUPLER SERIAL INTERFACE RTE DRIVER DVR66

B01	$ 10
B02	$ 20
S01	$ 15
S02	$ 25
L00	$ 5
A01	$ 30
A02	$ 50

29004A (A012) COUPLER SERIAL INTERFACE BCS DRIVER D.66

B01	$ 10
B02	$ 20
S01	$ 15
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