

3100

3200

3300

CONTROL DATA STANDARD SOFTWARE PRODUCTS

3500

**CONTROL DATA MATCHES QUALITY HARDWARE WITH  
A COMPLETE SELECTION OF EXCELLENT SOFTWARE**

*Control Data supports its line of superior computers with a library of excellent standard software products effectively covering a wide range of computer applications. The grouping used in this catalog is according to function:*

*Operating Systems exercise supervisory control*

*Languages are oriented toward programming needs*

*Utility routines perform tasks for users' programs*

*Applications systems are specialized programs*

*Basic software is designed for minimum configurations*

*All requests for further information concerning available 3100/3200/3300/3500 software systems and software systems which are to be released should be directed to the most convenient Control Data Sales Office listed on the back cover.*

*Operating Systems . . . . .*

*Languages . . . . .*

*Input/Output Control . . . . .*

*Applications . . . . .*

*Basic Systems . . . . .*



*Operating systems provided by Control Data make efficient use of various hardware configurations. These operating systems provide automatic job monitoring and supervisory control during compilation, assembly, and execution of users' programs. System storage requirements are kept at a minimum and operator intervention reduced significantly by job stacking, automatic accounting and storage allocation, automatic assignment of input/output functions and operator messages produced on the standard output comment unit.*

*Operating systems include:*

*Tape SCOPE*

*Disk SCOPE*

*Real Time SCOPE*

*MASTER, Multiple Access Shared Time*

*SCOPE Utility Routines*

*Multiple Access Time Sharing*

*Background Program*



210 *Digital Display Keyboard Console*

## **3100/3200/3300/3500 TAPE SCOPE**

A batch job operating system providing complete automatic operation of assembly, compilation and execution. SCOPE permits maximum utilization of memory and is designed around a small resident program which maintains continuity of job processing and provides automatic handling of I/O requests and interrupt processing. Additional routines for job sequencing, program loading, equipment assignment, debugging, library preparation, overlay control, and calling utility routines are stored on the system library tape and called into storage when needed. Either single or stacked jobs can be processed by the system.

The relocatable loader links independently prepared subprograms and library routines. Equipment assignment automatically locates and assigns hardware for I/O requests. Debugging aids include storage maps, system unit protection, octal corrections, snap and recovery dumps, and error messages. New libraries can be created and old ones edited. Overlay control provides for segmentation of large programs into overlays and segments which fit into memory. The operator may call and execute utility routines which reside on the library tape.

**Source Language** COMPASS

### **Publications**

General Information Manual:	Pub. No. 60055400
3200 SCOPE/COMPASS Reference Manual:	Pub. No. 60057700
3100/3200/3300 Instant SCOPE:	Pub. No. 60058000

**Earliest Demonstration Date** Available

**System Release Date** Available

## Hardware Required

### Minimum:

8K Core

1 Data Channel

1 Console Typewriter

1 Tape Controller 322X, 362X, 342X

3 Tapes 601, 603, 604, 606, 607

1 Input Device from the following:

Card Reader 3248/405, 3649/405

Paper Tape Reader 3691

Magnetic Tape 601, 603, 604, 606, 607

1 Output Device from the following:

Printer 3152, 3659/501, 3655/1612, 3256/501

Magnetic Tape 601, 603, 604, 606, 607

1 Punch Device from the following:

Card Punch 3245/544 or 523, 3644/415 or 544 or 523

Paper Tape Punch 3691

Magnetic Tape 601, 603, 604, 606, 607

### Recommended:

1 Additional Data Channel

## **3100/3200/3300/3500 Disk SCOPE**

A variation of Tape SCOPE. The SCOPE library file is stored on a 1311 disk storage drive. The 1311 disk input/output system replaces the SCOPE magnetic tape driver; all logical units may be equipped to predetermined areas of the disk storage system. Logical units may be equipped with tape. Logical units may be assigned only to unsegmented areas wholly contained on one 1311 disk pack. Most of the standard software is included:

**Source Language** COMPASS

### **Publications**

SCOPE/COMPASS Reference Manual: To be announced

**Earliest Demonstration Date** To be announced

**System Release Date** To be announced

### **Hardware Required**

	<i>Minimum</i>	<i>Recommended</i>
Core	16K	16K
Data Channels	1	2
Card Reader	405	405
Card Reader Controller	3248	3421
Card Punch	523/415	415
Card Punch Controller	3245	3245/3644
Printer	501	501
Printer Controller	3256	3659
Disk	1311-1	1/1311-1 & 2/1311-2
Disk Controller	3231	3231

### **3100/3200/3300/3500 Real Time SCOPE**

An operating system which runs programs in the background while processing stacked jobs. All programs run under 3100/3200/3300 SCOPE will run under Real Time SCOPE; and all functions performed by Tape SCOPE will be executed in a compatible manner by Real Time Scope.

The system is designed so that neither the backgrounding nor the real time interrupt features need be used by all jobs at an installation. The operating modes of Real Time SCOPE are:

- Batch processing

- Batch processing with a background program

- Batch processing with real time interrupts

- Batch processing with backgrounding and real time interrupt servicing

A background program, after loading and initial entrance, releases control and regains control only via interrupt. Control is again released when no more work can be accomplished (I/O bound for example).

Real time devices generate external interrupts which sometimes demand servicing within a short period of time or else data will be lost. Real time devices are provided with a separate data channel. An interrupt generated by a real time device is processed (control transfers to the interrupt subroutine) by the system within 100 microseconds. The device may generate periodic interrupts which signify data ready, but the data will be retained until serviced by the system. The physical devices may be analog linkage systems, multiplexers, remote computers, remote peripherals, and so forth.

Two standard background programs will be supplied:

- SIPP

- File Manager



**Source Language** COMPASS

**Publications** To be announced

**Earliest Demonstration Date** To be announced

**System Release Date** To be announced

**Hardware Required**

	<i>Minimum</i>	<i>Recommended</i>
Core	16K	32K
Data Channels	2	4*
Tapes	2-601/603/604	4-603/604/607
Tape Controllers	3228	3421
Card Reader	405	405
Card Reader Controller	3248	3248
Card Punch	523/415	415
Card Punch Controller	3245	3644
Line Printer	505	501
Line Printer Controller	3256	3256/3659

A maximum of 32K can be used with the 3300 or 3500.

\* Four channels recommended if background operations are used.

**Product Variation**

A modified system which uses mass storage for the library and for storing jobs to be executed as background programs. Significant improvement throughout will be achieved.

**Publications** To be announced

**System Release Date** To be announced

**Additional Hardware Required**

1311 Disk with 3231 Controller, 861 Drum, 2311 Disk, 828 Disk

Minimum: One disk or drum

Recommended: One drum and one disk, or two disk units

## **3300/3500 MASTER**

An operating system which loads and executes jobs concurrently. Jobs may be submitted at any time by operator, or by jobs currently in execution. The system handles jobs which require an on-line response to the submitter. Such jobs are held in mass store and periodically receive small quanta of execution time until the job is completed or until the response is satisfied. MASTER uses the hardware EXEC mode and the memory protection provided by the paging scheme, to completely protect the system, all user programs and all temporary and permanent data files.

The number of on-line response stations that can be active at one time and the percentage of available computer time allowed to these on-line stations are parameters that may be changed while the system is operating. The system can be based on disk or drum storage. MSIO routines provide permanent and temporary mass store allocation and file-oriented input/output operations.

System background routines can be called by the operator, system, or user program to perform on-line peripheral operations. Standard error detection and recovery procedures simplify error recovery, minimize the number of programs affected by the error, provide error logs to aid in system maintenance, standardize interface with operator, and modify the equipment availability table to allow system operation on remaining equipment.

**Source Language** COMPASS — modified for 3300/3500 extended instructions

**Publications** To be announced

**Earliest Demonstration Date** To be announced

**System Release Date** To be announced

## Hardware Required

	<i>Minimum</i>	<i>Recommended</i>
Core	32K	32K
Data Channels	4	4
Drum	1 (861)*	1 (861)**
Card Reader	405	405
Card Reader Controller	3248	3248
Printer	505	501
Printer Controller	3256	3256/3659
Punch	0	415
Card Punch Controller	3245	3446
Tapes	2-601/603/604	4-603/604/607
Tape Controller	3228	3421
Disk	1-1311	5 to 15 1311's
Disk Controller	3231	3231
On-line Consoles	0	25-50

\* If slower system response is acceptable, the 861 drum can be replaced by one 1311 disk storage drive.

\*\* Drum capacity of one million words provides storage exchange for 250 programs with an average length of 4000 words. There is adequate space, therefore, for the system library and high speed scratch storage.

## **3300/3500 MULTIPLE ACCESS TIME SHARING SYSTEM**

Time sharing on the central computer and core memory. Programs are swapped into core for small quanta of execution time until each program terminates or in any other way responds to satisfy a request from the associated remote Teletype<sup>®</sup>. Program execution is initiated when a user at a remote Teletype station signs on, calls for the LOAD of a program stored on the 1311 disk in either core image or relocatable format and executes the program with a GO command. Subsequently he may STOP, TERMINATE and SAVE the program and then sign off.

This system, which operates as a background program with Real Time SCOPE, occupies only the first 16K of core. In 32K cores, the last 16K is available to Real Time SCOPE, Multiple Access Time Sharing, and MATS user-programs for standard processing.

Since there is no hardware relocation, all swapping occurs in a fixed area of core. Programs use MSIO to READ/WRITE files on mass store. Special system requests are available for I/O with the remote Teletypes. All peripheral operations are handled via queued requests. Users do not have direct access to tapes, printers and card equipment. The remote user may call for on-line execution of standard software, special utility routines and user programs. Utility routines include:

- File handling

- Remote Teletypes for input, modification, display, or destruction of files

- Debugging

- Comprehensive, conversational mode, debugging aids

- Interpreter

- Utility routines for use with debugging aids in lieu of hardware memory protection for other users' routines

**Source Language** COMPASS modified for 3300 extended instructions.

**Publications** To be announced

**Earliest Demonstration Date** To be announced

**System Release Date** To be announced

**Hardware Required in Addition to Real Time SCOPE**

	<i>Minimum</i>	<i>Recommended</i>
Drum-861	0	1
Disk-1311	5	10
Teletypes	20	50

### **3100/3200/3300/3500 SCOPE Utility**

A serial peripheral processing and tape manipulation package which provides the following functions operating under SCOPE:

- Tape handling

- Card-tape, card-print, card-punch, tape-print, tape-punch, for word images only, no blocking

- Tape copy

- Verify routine

- Sequencing of card decks and updating of sequenced decks on tape

- Octal dump

The facility for loading and executing user routines under control of Utility rather than SCOPE is also provided.

**Source Language** COMPASS

**Publications** Reference Manual: Pub. No. 60130200

**Demonstration Date** Available

**System Release Date** Available

**Hardware Required**

No requirements in addition to SCOPE requirements.

*Programmers can choose the language best suited to the needs of their particular problems. Control Data has implemented programming languages which range from machine-mnemonics to problem-oriented systems, which closely resemble the natural expressions in particular fields of application.*

*The language systems include:*

*FORTRAN, a scientific problem-oriented language*

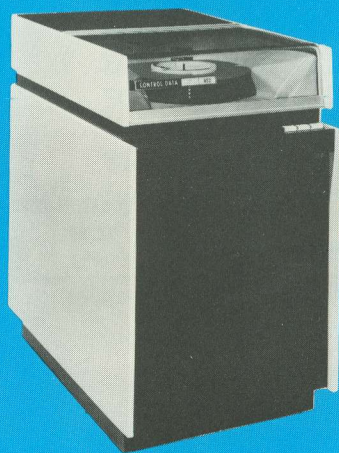
*COBOL, a business-oriented language*

*ALGOL, a universally recognized algebraic programming language*

*COMPASS, a complete machine language assembler*

*Data Processing Package, COMPASS business-oriented macros*

*Report Generator, business data file processing system*



852 Disk Storage Drive Unit

## 3100/3200/3300/3500 ALGOL

The first version of an ALGOL-60 compiler. The programming language includes the complete ALGOL-60 Revised Report, except that integer labels and dynamic *own* arrays are not allowed; arithmetic expressions whose types cannot be determined at compile time are considered *real*; all procedure formal parameters must be specified; a transfer outside the range of the switch causes an abnormal exit from the program. In addition, procedures for input/output handling conforming to the IFIP-ACM proposed standards are provided. The system is designed to compile and execute only proper ALGOL programs. Infringements of the language will be detected both at compile time and at object time. Facility for the inclusions of previous compiled procedures and hand written procedures will be provided.

The compiler operates under SCOPE. The object program is designed to be executed under control of a master program (operating under SCOPE). This master program provides for a segmented execution of the object code. The object code may also be executed directly under SCOPE, without segmentation.

The design of the compiler is based on the ALGOL Compiler developed by P. Naur, et. al., for the GEIR computer. Four main features of this design are:

- Modular structure which permits easier check out and maintenance.

- Error detection which is integrated in the code generation process.

- Utilization of read backward on intermediate scratch units to avoid rewinding.

- Maximum utilization of available memory to reduce or eliminate references to intermediate scratch units.



**Source Language** COMPASS

**Publications**

General Information Manual:	Pub. No. 600132600
Reference Manual:	To be released
Instant Booklet:	To be released

**Earliest Demonstration Date** To be announced

**System Release Date** To be announced

**Hardware Required in Addition to SCOPE**

Minimum: None

Recommended: 607 Tape units with read backward facility

## **3100/3200/3300/3500 COBOL**

A business data processing system containing the required features of the COBOL language, as described in the "Report to Conference on Data Systems Languages" published in 1961, as well as many elective features. The deferment of certain required language elements to subsequent versions of the system does not prohibit the COBOL programmer from solving any particular problems; he is required only to use more simple language constructs. COBOL compiles and executes under the SCOPE system.

Emphasis is on producing the most efficient object code for operations used most in production problems; on operations used less often emphasis is on reduced memory space and ease of compilation. Complete I/O buffering, extensive diagnostics, 12-digit arithmetic, three levels of subscripting and selectable object time trace are some of the features of the system. Compile speeds after loading the main program are entirely dependent on the machine configuration and can vary from 250-350 statements per minute.

**Source Language** COMPASS

### **Publications**

General Information Manual:	Pub. No. 60056300
Instant COBOL:	Pub. No. 60131200
Reference Manual:	Pub. No. 60132000

**Earliest Demonstration Date** Available

**System Release Date** Available

### **Hardware Required in Addition to SCOPE**

Minimum:           None  
Recommended:    Additional 8K Core  
                      One Additional Magnetic Tape  
                      BCD Hardware

### **Product Variation**

Additional language features to be implemented:

    COPY Library   VALUES ARE    COMPUTE       RETENTION-CYCLE IS data-name  
    JUSTIFIED RIGHT   EDITION-NUMBER IS data-name       CORRESPONDING

**Hardware Required** Same as for Version 1.0

**Publications** To be announced

**System Release Date** To be announced

## **3100/3200/3300/3500 COMPASS**

The comprehensive assembler operating under control of the SCOPE operating system. COMPASS facilitates writing of assembly language programs by providing a complete set of machine language mnemonics. The COMPASS language provides the following features: address arithmetic, preloaded data, common assignments, data definitions, listing control, diagnostics, variable field definition.

COMPASS also provides macro capabilities: programmer-defined macros and library macros. Library macros are pre-written sequences of instructions which can be referenced by programmers. The flexible COMPASS macro library can be easily expanded and modified to include installation-oriented and specialized sets of instructions.

Source programs may consist of punched cards, paper tape, or BCD card images on magnetic tape. The assembly output provides listing and a relocatable binary object program on punched cards, paper tape or on magnetic tape. The COSY option may be used to reproduce the source program compressed as much as 19:1 compared to the normal BCD source deck size. The compressed source program simplifies maintenance of source programs on magnetic tape.

### **Source Language COMPASS**

#### **Publications**

General Information Manual:	Pub. No. 60055000
SCOPE/COMPASS Reference Manual:	Pub. No. 60057700
3100/3200/3300 Instant COMPASS:	Pub. No. 60059600

**Earliest Demonstration Date** Available

**System Release Date** Available

**Hardware Required in Addition to SCOPE** None

## **3100/3200/3300/3500 DATA PROCESSING PACKAGE**

A macro system which provides the COMPASS programmer with routines to solve business data processing problems. The package includes GPIO, a general purpose I/O system and a set of library macros to move, edit and compare data fields, as well as multiply and divide data routines. All calculations are performed in decimal using 3200 BCD instructions.

**Source Language** COMPASS

### **Publications**

General Information Manual:	Pub. No. 60055100
Reference Manual:	Pub. No. 60059300
3100/3200/3300 Instant COMPASS:	Pub. No. 60059600

**Earliest Demonstration Date** Available

**System Release Date** Available

**Hardware Required in Addition to SCOPE**

Minimum: None

### **3100/3200/3300/3500 FORTRAN**

An algebraic language based on 3600 FORTRAN. Emphasis is placed on generating efficient object code. An important aspect is the efficient handling of subscripted variables at execution time. FORTRAN compiles and executes under the SCOPE system.

Features of FORTRAN include:

- Integer, octal, real, Hollerith and character variables and constants
- Mixed mode arithmetic
- User specification of a non-standard type of arithmetic
- Overlays and segments

Optional modes of compilation provide:

- A listing of source statements
- An assembly listing of the compiled code
- Immediate execution of a compiled program
- A punched relocatable binary deck for use in later executions

Basic compilation speed is 500 cards per minute for a single subprogram in the range of 300-500 cards (on line card read, source and assembly listings suppressed, loadable tape generated). For larger subprograms the rate of compilation is faster; for smaller subprograms it is slower. If listings are produced on line, a 1000-lines/minute printer is driven at full speed.

**Source Language** COMPASS

**Publications**

3200 FORTRAN General Information Manual:	Pub. No. 60055200
3200 FORTRAN Reference Manual:	Pub. No. 60057600
Instant 3200 FORTRAN:	Pub. No. 60131400
3200 Computer Systems Library Routines:	Pub. No. 60058100

**System Release Date** Available

**Hardware Required in Addition to Tape SCOPE** 2 magnetic tape units

## **3100/3200/3300/3500 REPORT GENERATOR**

A commercial data processing language and compiler designed to reduce the programming necessary to generate reports. The user can define the physical and logical characteristics of an input file, define detail and summary report control and specification statements, and enter his own code. The compiler generates object code to perform the following automatic functions: read the input file; step and test the line and page counters to produce header and overflow print lines; print header lines; reset the counters at control breaks; format and edit each report line; give computer control to the user for execution of his own code; terminate the job. The compiler is a translator to COMPASS and consists of a translator pass and the two passes of the COMPASS assembler. The translator executes at maximum speeds.

**Source Language** COMPASS

### **Publications**

General Information Manual: To be announced  
Reference Manual: To be announced

**Earliest Demonstration Date** To be announced

**System Release Date** To be announced

**Hardware Required in Addition to SCOPE** None

### **Product Variation**

The Report Generator will be extended so that the user can call precoded file and data description characteristics contained in the File Manager library. The Report Generator will be accessible to the File Manager. Input/output of this version will be controlled by the Mass Storage Input/Output system (MSIO).



**Hardware Required in Addition to Real Time Scope** None

**System Release Date** To be announced

*Input/Output control routines are included in the 3100/3200/3300/3500 software library to provide access to a number of different I/O media through efficiently preprogrammed library routines.*

*I/O control subprograms include:*

*File Manager*

*Random Access Disk Driver*

*Disk Input/Output*

*SASY, Satellite Peripheral Processing System*

*SIPP, Peripheral Processing System*



273 *Digigraphics System Console*

## 3100/3200/3300/3500 FILE MANAGER

The File Manager system automates many of the functions of a computer center, including data collection and preparation, peripheral processing, tape library maintenance, mass storage file maintenance, extraction of simple reports, and inquiry and job processing, in response to requests from multiple local or remote consoles or peripheral equipment stations. Many of the file manipulation, editing, or printing tasks which typically require a run of a specially prepared program on a central or peripheral computer in present installations, can be accomplished by requests from user consoles to the File Manager system.

Some functions, including (but not limited to) data collection and preparation may be accomplished as background functions in parallel with normal job processing under Real Time SCOPE. Requests for other functions are queued and processed in the time between processing of normal jobs.

**Source Language** COMPASS

**Publications** To be announced

**Earliest Demonstration Date** To be announced

**System Release Date** To be announced

### Hardware Required in Addition to Real Time Scope

	<i>Minimum</i>	<i>Recommended</i>
Mass Storage Device	1	3
Remote Consoles	1	3

### Product Variation

A second version of the File Manager will operate on a two computer system.

## **3100/3200/3300/3500 RANDOM ACCESS DISK DRIVER**

A 1311 Disk Driver that operates under control of Tape SCOPE and remains in core or is available from the library at load time. It sets up function code strings, for execution by SCOPE-CIO, to satisfy the following 1311 Disk input/output requests: READ, WRITE, SEEK and SEARCH. It also translates the hardware status indicators into the standard status format. This status is available to the user through a status request to SCOPE-CIO. The standard logical unit number concept is used; prior to run time, a logical unit is assigned to the disk drive with an EQUIP card.

**Source Language** COMPASS

**Publications** Programming Systems Bulletin: Pub. No. 60138300

**Earliest Demonstration Date** Available

**System Release Date** To be announced

### **Hardware Required in Addition to Tape SCOPE**

3231 Disk Controller

1311 Disk Drive

1316 Disk Pack

## **3100/3200/3300/3500 Disk Input/Output System**

Performs direct and indirect I/O processing with the 1311 drive. Direct I/O requests, for logical units, are submitted to SCOPE-CIO which in turn call upon the Disk I/O System to generate the function codes for READ, WRITE, SEEK and SEARCH requests or edit the hardware status bits into standard format for STATUS requests.

The indirect I/O Disk requests result from successive read or write requests for logical units normally assigned to magnetic tape: tape files are simulated on Disk. Disk allocation control cards assign a logical unit to all or part of one 1311 disk drive. When tape simulation is desired the control card indicates the size of the core buffer used to block and unblock the write/read requests from the user program. These buffers are assigned to available memory in high core prior to program loading.

The system is available from the library at load time for tape based systems. It must be in resident for Disk SCOPE and may be in resident for Tape SCOPE. All I/O requests are checked to insure that the addressed area is assigned to the logical unit named in the request.

**Source Language** COMPASS

### **Publications**

SCOPE/COMPASS Reference Manual: To be announced

**Earliest Demonstration Date** To be announced

**System Release Date** To be announced

## **Hardware Required in Addition to Tape SCOPE or Disk SCOPE**

Minimum:

3231 Controller

1311 Disk Storage Drive

1316 Disk Pack

8K Core

16K core memory is needed when simulating the tape requirements for COMPASS, FORTRAN, and so forth. See Disk SCOPE.

Recommended: Dictated by customer needs.

## **3100/3200/3300/3500 Mass Storage Input/Output System**

A modular system of routines which provides a systematic approach to the use of mass store devices by both the scientific and data processing user. All mass storage known to MSIO is allocated by file name and storage requirements. The user may specify the type of mass storage for his file, or the choice may be left to MSIO. Files may be permanent or temporary. All permanent files are protected, and thus available only to those users who display the proper combination of keys.

File descriptions are stored in a file which is available to MSIO. These descriptions may be modified at run time according to the needs of the user; the permanent description is unaffected. A wide variety of file formats is available: fixed and variable length physical and logical records. Four modes of file processing are available: Random, random with address of core buffer, sequential, and sequential with linkage. The command set is: ALLOCATE, OPEN, CLOSE, READ, WRITE, SET, EXTRACT, ADD, REPLACE, INSERT, SEARCH.

Non-resident routines of the system are loaded, if referenced, from the library at load time.

MSIO tape file handling is compatible with GPIO, and MSIO is available to the COMPASS user. MSIO will be available for use with Real Time SCOPE on the 3300.

**Source Language** COMPASS

**Publications** To be announced

**Earliest Demonstration Date** To be announced

**System Release Date** To be announced

### **Hardware Required in Addition to Real Time Scope**

Minimum:           1 3231 Controller  
                      1 1311-1 Disk Storage Drive  
                      1 1316 Disk Pack

Recommended: Dependent upon the user's storage requirements.

### **Product Variation**

The MSIO system is designed to handle other mass storage devices such as the 828 Disk Files and 86 storage units.

**System Release Date** To be announced



## **3100/3200/3300/3500 SAS Y**

Prepares input tapes and post-processes output tapes from a 3600 running Satellite SCOPE version 6.0 Design is centered around maximum speeds on peripheral gear and provisions for adding special processors in the field. Control cards processed are compatible with 160A SAS Y.

The basic features are:

- Printing and/or punching of SCOPE standard OUT and PUN or programmer output tapes
- Stacking (removal) of output tapes to free tape drives
- Printing or punching of tapes introduced into the system by the operator
- Preparation of standard input tapes
- Card to print facility
- Preparation of programmer card to tapes
- Introduction of priority jobs from card reader or tape with provisions for priority printing of standard OUT.
- Accounting of cards, lines, and elapsed time on 3200 peripheral processing.

**Source Language** COMPASS

**Publications** Reference Manual: To be announced

**Earliest Demonstration Date** To be announced

**System Release Date** To be announced

## Hardware Required

	<i>Minimum</i>	<i>Recommended</i>
3600 System		
Core	32K	32K
Tapes (connectable to 3100/3200)	8-607	10-607
Tape Controller	3624	3624
3200 System		
Core	8K	8K
Console Typewriter	1	1
Card Reader	405	405
Card Reader Controller	3248	3649/3447
Punch	415	415
Punch Controller	3245	3644/3446
Data Channels	2	3*
Printer	1-501	2-501/1612
Printer Controller	3256	3659/3655
Satellite Coupler	3682	3682

\* One channel is required for the magnetic tapes and printers for the card reader and one for the card punch.

### **3100/3200/3300/3500 SIPP**

A simultaneous peripheral processing system which operates under 3100/3200 SCOPE. The system will operate with 8K of storage as well as extended storage for the following operations: Card-to-tape, tape-to-print, tape-to-punch, tape-to-print/punch and card-to-print. A maximum of seven operations can be executed on an 8K machine; the number increases by seven for each 4K of increased storage. Operations will be executed at full speed depending on equipment configurations. Combinations can be executed concurrently. Operator to system communication is through the console typewriter. Once the system is in operation, requests can be made at any time. Features of the system include processing of blocked or unblocked tapes and of labeled or unlabeled tapes.

**Source Language** COMPASS

**Publications** Reference Manual: Pub. No. 60130400

**Earliest Demonstration Date** Available

**System Release Date** Available

**Hardware Required in Addition to Tape SCOPE**

Minimum: Peripheral devices as desired.

Recommended: An additional data channel and peripherals.

**Product Variation**

A modified system runs in the background of stacked job processing under Real Time Scope. In this tape version the operator changes unit numbers (thumb dials) if SIPP is preparing standard input and processing standard output for Real Time Scope. When adapted for mass storage, no operator intervention will be required. If four operations are being executed in the background not more than 17 per cent of the total central processor time will be used in processing these operations.

**Hardware Required in Addition to Real Time Scope**

Minimum: Peripheral equipments as desired. For card-to-tape concurrent with batch processing, two additional tapes are required.

Recommended: For maximum efficiency the background peripheral equipments should be on individual channels.

**System Release Date** To be announced

*Applications programs are tested, working programs which perform specialized jobs in industry, business and research.*

*Application programs include:*

*PERT/TIME*

*PERT/COST*

*Sort/Merge*

*SAINT, 1401 Simulator*



*405 Card Reader*

## **3100/3200/3300/3500 PERT/TIME**

A companion program completely compatible with PERT/COST. A file maintenance feature is an integral part of the program and only update cards need be input at each computer run.

### **Features**

Allows random assignment of event numbers

Automatic editing of input errors

Activity reports may be requested by specifying sort keys from predecessor event number, successor event number, slack, expected date, organization or account number

Milestone event report provided

Allows multiple start and end events

Loop detection

Single or 3 time estimates

Flexible calendar specified by input cards

**Source-Language** FORTRAN

### **Publications**

General Information Manual: Pub. No. 60130000

Reference Manual: Pub. No. 60131100

**Earliest Demonstration Date** Available

**System Release Date** Available

## Hardware Required in Addition to SCOPE

Minimum: 1 Magnetic Tape

Recommended: 2 Magnetic Tapes

Activity/event capacities by core size

8K	2000/1400	16K	4000/3000	32K	8000/4095
----	-----------	-----	-----------	-----	-----------

## **3100/3200/3300/3500 PERT/COST**

A companion program completely compatible with PERT/TIME. A file maintenance feature is an integral part of the program and only update cards need be input at each computer run.

### **Features**

Allows random assignments of account or summary numbers on the work breakdown structure blocks

Maximum of nine levels, including top level of one block

No restriction on maximum number of blocks with common parent

Automatic editing of input cards

Two cost reports: management summary and project status report (version 2.0 to be released October 65 will include all cost output reports specified in supplement 1, March 63, of the DOD/NASA Pert Cost guide.

**Source Language** FORTRAN

### **Publications**

General Information Manual: Pub. No. 60130000

Reference Manual: Pub. No. 60132500

**Earliest Demonstration Date** Available

**System Release Date** Available

### **Hardware Required in Addition to SCOPE**

Minimum: 1 Magnetic Tape

Recommended: 3 Magnetic Tapes

Maximum number of work breakdown structure blocks by core size

8K	2500	16K	4000	32K	8000
----	------	-----	------	-----	------



## **3100/3200/3300/3500 SORT/MERGE**

A generalized sort which operates under the SCOPE operating system. This modular program allows sort only, merge only, or sort and merge. Blocked or unblocked, fixed or variable length records may be sorted according to any specified ascending or descending sequence. Files may be recorded in either binary or BCD mode and may have standard, non-standard, or omitted labels. Three user modification exits enable the user to modify records as they are sorted.

The sort requirements are described by control cards read from the standard input. The tournament replacement method of sorting and either balanced or polyphase methods of merging are used.

**Source Language** COMPASS

### **Publications**

General Information Manual: Pub. No. 60055800  
Reference Manual: Pub. No. 60059700  
SORT Timing Guide: Pub. No. 60083700

**Earliest Demonstration Date** Available

**System Release Date** Available

### **Hardware Required in Addition to SCOPE**

Minimum: 1 Magnetic Tape Unit  
Recommended: Additional 8K Memory Module  
Up to 16 Magnetic Tape Units

**Product Variation**

A second version to provide backward merge options.

**System Release Date** To be announced

**Hardware Required in Addition to SCOPE System:** One Magnetic tape unit

## **3100/3200/3300/3500 SAINT 1401 SIMULATOR**

An interpretive program which completely simulates the basic IBM 1401. In addition, SAINT simulates the following special and optional 1401 features.

Multiply/Divide	Store Address Register
Print Storage	Move Record
Additional Print Control	High, Low, Equal, Compare
Expanding Print Edit	Sense Switches
Indexing	

The console typewriter is used to simulate the 1401 console functions. Complete input/output with word marks is provided.

By using the 1401 pseudo instruction J (Jump Out) to exit from simulator mode, the user may switch in and out of simulation mode, so that portions of the program may be in 1401 language and other parts in 3100/3200 language.

Programs run under SAINT average one-half to one and one-half times the 1401 speed, depending on the instruction mix, the peripheral equipment, and the central processor.

**Source Language** COMPASS

### **Publications**

SAINT Programming System Bulletin: Pub. No. 60085200  
SAINT General Information Manual: Pub. No. 60132100  
SAINT Reference Manual: Pub. No. 60131300

**Earliest Demonstration Date** Available

**System Release Date** Available

## Hardware Required

Additional memory and peripheral devices required are determined by the 1401 being simulated.

Memory:

<i>1401 Memory Size</i>	<i>3100/3200 Memory Size Required</i>
4000 characters	8192 words
8000 characters	8192 words
12000 characters	16384 words
16000 characters	16384 words

Peripheral devices simulated:

Console	6 Tape Drives (7330; 729 II, IV, VI)
Printer (1403)	Console Inquiry Station (1407)
Card Read/Punch Unit (1402)	

Recommended Peripheral Equipment:

3200 Console	544 or 415 Card Punches
501 Printer	Up to six 604 or 697 Tapes
405 Card Reader	

A 1612 printer may be used; print lines are limited to 120 characters.

A 100 CPM 523 card punch may be used.

## Product Variation

Version 2 will improve operating performance and flexibility. It will also include additional 1401 features not previously simulated, such as:

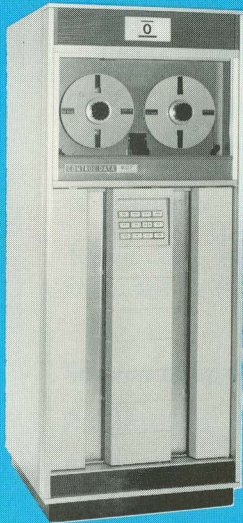
Column binary operations	
Compressed tape operations	1440/1460 operations
Disk I/O (1311)	Sterling arithmetic/editing

**Publications** To be announced

**System Release Date** To be announced

*The BASIC software package provides an assembler, compiler, and set of utility programs designed to operate with a minimum 4K hardware configuration. The package is also upward compatible with expanded 3100/3200/3300/3500 configurations.*

*The BASIC package includes:  
Autoload Utility  
Basic Assembler  
FORTRAN II*



607 *Tape Transport*

### **3100/3200/3300/3500 AUTOLOAD UTILITY**

A peripheral processing and tape handling package which is independent of 3100/3200/3300/3500 SCOPE. It includes the following serial peripheral processing functions.

Card-tape, tape-print, tape-punch, card-print, and card-punch. These functions are available for BCD or binary card images with no provisions for blocking or labeling.

Tape copy for record sizes limited only by available core memory.

Verification of tape copy and card decks.

Sequencing of card decks

Updating of sequenced decks on tape

Octal dump facility

The system can be used as an operating system for loading and executing user routines from an input tape. Standard COMPASS binary deck format is used. Linking and library search are provided, although externals cannot be referenced in character instruct. A limited I/O system is provided.

Rewinding, unloading, backspacing, skip file forward and backward, and write end-of-file are included in the tape handling utility routines.

**Source Language** COMPASS

**Publication** Reference Manual: Pub. No. 60130100

**Earliest Demonstration Date** Available

**System Release Date** Available

## Hardware Required

	<i>Minimum</i>	<i>Recommended</i>
Core	4K	4K
Data Channel	1	1
Tapes	1-601/603/604	2-603/604/607
Tape Controller	3228	3421
Card Reader	405	405
Card Reader Controller	3248	3248/3649
Card Punch	0	415
Card Punch Controller	0	3245/3644
Line Printer	0	1612/501
Line Printer Controller	0	3256/3659

## **3100/3200/3300/3500 BASIC ASSEMBLER**

The basic assembly language system. This subset of the COMPASS language operates under its own executive control. The language includes mnemonic operation codes, symbolic addressing techniques and a set of pseudo instructions for data and storage definition. The executive program controls loading of the assembler together with required I/O drivers. The relocatable loader provides facility for loading, with error detection, of object programs.

**Source Language** Basic Assembler

### **Publications**

General Information Manual: Pub. No. 60056800

Basic Assembler Reference Manual: Pub. No. 60057100

**Earliest Demonstration Date** Available

**System Release Date** Available

### **Hardware Required**

Minimum:

4K Core

Data Channel

Input device from the following:

Paper Tape Reader 3691

Card Reader 3248/405, 3649/405

Magnetic Tape 322X, 362X/601, 603, 604, 606, 607



Output device from the following:

Paper Tape Punch	3691
Card Punch	3245/544, 3644/415
Magnetic Tape	322X, 362X/601, 603, 604, 606, 607

Recommended:

One additional output device from the following:

Printer	3655/1612, 3152, 3659/501, 3256/501
Typewriter	3692, 3201
Magnetic Tape	322X, 362X/601, 603, 604, 606, 607

## **3100/3200/3300/3500 BASIC FORTRAN II**

A problem-oriented language written as a sequence of statements, provides a simple algebraic solution of mathematical or scientific problems. BASIC FORTRAN II includes the following features:

- Reserves areas of memory for variables and arrays
- Permits common storage areas for variables and arrays
- Specifies mode types (REAL, INTEGER and CHARACTER) for values
- Specifies arithmetic expressions by arithmetic signs and algebraic names

**Source Language** COMPASS

### **Publications**

General Information Manual: Pub. No. 60056800  
Basic FORTRAN II Reference Manual: Pub. No. 60056900

**Earliest Demonstration Date** Available

**System Release Date** Available

### **Hardware Required**

Minimum:

4K Core  
Data Channel

Input device from the following:

Paper Tape Reader	3691
Card Reader	3248/405, 3649/405
Magnetic Tape	322X, 362X/601, 603, 604, 606, 607

Output device from the following:

Paper Tape Punch	3691
Card Punch	3245/544, 3644/415
Magnetic Tape	322X, 362X/601, 603, 604, 606, 607

Recommended:

One additional output device from the following:

Printer	3655/1612, 3152, 3659/501, 3256/501
Typewriter	3692, 3201
Magnetic Tape	322X, 362X/601, 603, 604, 606, 607



<b>INDEX</b>	<b>Page</b>
ALGOL .....	17
Autoload Utility .....	55
Basic Assembler .....	57
Basic FORTRAN II .....	59
COBOL .....	19
COMPASS .....	21
Data Processing Package .....	23
Disk Input-Output .....	35
Disk SCOPE .....	5
File Manager .....	31
FORTRAN .....	25
Mass Storage Input/Output .....	37
MASTER .....	9
Multiple Access Time Sharing .....	11
PERT/COST .....	47
PERT/TIME .....	45
Random Access Disk Driver .....	33
Real Time SCOPE .....	7
Report Generator .....	27
SAINT .....	51
SASY .....	39
SCOPE Utility .....	13
SIPP .....	41
Sort/Merge .....	49
Tape SCOPE .....	3

## CONTROL DATA SALES OFFICES

ALAMOGORDO • ALBUQUERQUE • ATLANTA • BILLINGS • BOSTON • CAPE  
CANAVERAL • CHICAGO • CINCINNATI • CLEVELAND • COLORADO SPRINGS  
DALLAS • DAYTON • DENVER • DETROIT • DOWNEY, CALIFORNIA • GREENS-  
BORO, NORTH CAROLINA • HONOLULU • HOUSTON • HUNTSVILLE • MIAMI  
MONTEREY, CALIFORNIA • INDIANAPOLIS • ITHACA • KANSAS CITY, KANSAS  
LOS ANGELES • MADISON, WISCONSIN • MINNEAPOLIS • NEWARK • NEW  
ORLEANS • NEW YORK CITY • OAKLAND • OMAHA • PALO ALTO • PHILA-  
DELPHIA • PHOENIX • PITTSBURGH • SACRAMENTO • SALT LAKE CITY  
SAN BERNARDINO • SAN DIEGO • SANTA BARBARA • SAN FRANCISCO  
SEATTLE • ST. LOUIS • TULSA • WASHINGTON, D. C.

AMSTERDAM • ATHENS • BOMBAY • CANBERRA • DUSSELDORF • FRANK-  
FURT • HAMBURG • JOHANNESBURG • LONDON • LUCERNE • MELBOURNE  
MEXICO CITY • MILAN • MONTREAL • MUNICH • OSLO • OTTAWA • PARIS  
TEL AVIV • STOCKHOLM • STUTTGART • SYDNEY • TOKYO (C. ITOH ELEC-  
TRONIC COMPUTING SERVICE CO., LTD.) • TORONTO • ZURICH



**CONTROL DATA**  
CORPORATION

Control Data Corporation, Documentation Department  
3145 Porter Drive, Palo Alto, California