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FEBRUARY 1972

MEMORANDUM TO: Recipients of Continuous System Modeling Program
360A-CX-16X

SUBJECT: Transmittal of Version 1, Modification Level 3 of
360A-CX-16X

The program materials you have ordered are enclosed. The following describes the contents of the Basic and Optional program packages.

Basic program material consists of:

Application Directory (attached)
User's Manual (GH20-0367-4)
Operator's Manual (GH20-0368-3)
Object Modules and Sample Problem are available on one 9-track Distribution Tape Reel (DTR) @ 800 or 1600 bpi. For further description refer to Tape Key in the Application Directory.

If you have ordered the Optional program material, it consists of:

Source Modules are available on one 9-track Distribution Tape Reel (DTR) @ 800 or 1600 bpi. For further description refer to Tape Key in the Application Directory.

The Operations Manual (GH20-0368-3) contains detailed instructions on installing the program.

Any discrepancy between the material received and the material ordered, or any errors in reproduction, should be reported to the Manager of the Program Library providing your programming systems.

Enclosures

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SYSTEM/360 CONTINUOUS SYSTEM MODELING PROGRAM

(360A-CX-16X)

APPLICATION DIRECTORY

Version 1, Modification Level 3

This is an IBM System/360 program for the simulation of continuous systems. It provides an application-oriented input language that accepts problems expressed in the form of either an analog block diagram or a system of ordinary differential equations. Data input and output are facilitated by means of application-oriented control statements.

This directory contains information concerning all available material associated with the subject application. Its objective is to enable the recipient to understand what he has received, where to locate specific items, and what to do with them.

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DOCUMENTATION DIRECTORY

APPLICATION DESCRIPTION (H20-0240)

This manual contains sufficient information to enable the reader to determine whether the application would be useful to him. The contents of this manual include:

- Introduction
- General Description of the Application
 - Extent of Coverage
 - Advantages
 - Application-Oriented Concepts
 - Integration Methods
 - Special Techniques
 - Precision
- Machine Configuration
- Source Language
- General Systems Chart
- Sample Problem
- Glossary
- Bibliography

USER'S MANUAL (H20-0367-4)

This manual contains sufficient information to permit the reader to understand the component parts of the application and to use them. The contents of this manual include:

- Introduction
- General Description of the Program
- Elements of the S/360 CSMP Language
 - Numeric Constants
 - Symbolic Names
 - Operators
 - Functions
 - Labels
- Structure of the Model
 - Initial, Dynamic, and Terminal Segments
 - Sections - Parallel or Procedural
 - Structure Statements
- Data Statements
- Translation Control Statements
- Execution Control Statements
- Output Control Statements
- User-Defined Functions
 - MACRO Functions
 - PROCEDURE Functions
 - Subprograms
- Modeling Techniques
 - Sorting
 - Nosort Option
 - Initialization
 - Termination
 - Integration
 - Arbitrary Functions
 - Implicit Functions
 - Tabular Data
- Run Control
 - Sequential Runs
 - Main Program Control
- Data Output
- Sample Problem
- Problem Checkout Facilities
- Diagnostic Messages
- Methods
 - Integration Techniques
 - Dynamic Storage Allocation
 - Program Restrictions
 - Reserved Words
 - Statement Ordering
 - System Macros
- Appendix: Index of System/360 CSMP Functions and Statements
- Glossary
- Bibliography

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- Appendix: Index of System/360 CSMP Functions and Statements
- Glossary
- Bibliography

OPERATOR'S MANUAL (H20-0368-3)

This manual contains information regarding actual console operations, including setup procedures which must be performed to execute the program. The contents of this manual include:

- Compiling and Link Editing
 - Basic Distribution
 - Optional Distribution
 - Modifying DEJCSMP2
- S/360 CSMP Cataloged Procedure
- Console Operating Instructions
- Halts and Message List
- Storage Map
- Restart Procedures
- Execution Phase Load Module Storage

SYSTEM MANUAL (Y20-0111)

This manual presents a detailed description of the logical operation of the computer programs associated with the subject application. The contents of this manual include:

- Introduction
- Translation Phase
- Execution Phase
- Functions
- Program Modifications

REFERENCE MATERIAL

Following is a list of publications which contain information relating to the use of this system:

IBM System/360 FORTRAN IV Language (GC28-6515)

This publication describes and illustrates the use of the FORTRAN IV language for the IBM Operating System/360. The reader is presumed to have some knowledge of an existing FORTRAN language.

The FORTRAN IV language is a symbolic programming language. It parallels the symbolism and format of mathematical notations. In addition, many programming features and facilities are available for expressing the method of solution of a mathematical problem as a meaningful FORTRAN program.

IBM System/360 Operation System FORTRAN IV (G and H) Programmer's Guide (GC28-6817)

This publication describes how to compile, link edit, and execute a FORTRAN IV program. The text also describes the output of compilation and execution, how to make optimal use of the compiler and a load module, and compiler and load module restrictions.

IBM System/360 FORTRAN IV Library: Mathematical and Service Subprograms (GC28-6818)

This publication describes the library subprograms supplied with FORTRAN IV and provides the information necessary to use the library subprograms in either a FORTRAN IV or an assembler language program. In addition, the publication contains algorithms, accuracy statistics and timing estimates, descriptions of error and interruption procedures, storage estimates, and sample storage printouts.

IBM System/360 Operating System Assembler Language (GC28-6514)

This publication contains preliminary specifications for the IBM Operating System/360 Assembler Language. The assembler language is a symbolic programming language used to write programs for the IBM System/360. The language provides a convenient means for representing the machine instructions and related data necessary to program the IBM System/360. The IBM Operating System/360 Assembler Program processes the language and provides auxiliary functions useful in the preparation and documentation of a program and includes facilities for processing the assembler macro language.

Part I of this publication describes the assembler language. Part II of this publication describes an extension of the assembler language - the macro language - used to define macro instructions.

IBM System/360 Operating System Operator's Guide (GC28-6540)

This publication provides the console operator and other machine room personnel with complete operating information for the IBM System/360 Operating System. It includes a discussion of the operator's duties and a description of the console input/output device. Descriptions of initialization procedures, input/output device allocations, job control information, operator commands, and the online messages and corresponding explanations are also included in this publication.

IBM System/360 Operating System - System Programmer's Guide (GC28-6550)

This publication consists of self-contained chapters, each of which provides information on how to modify, extend, or implement capabilities of the IBM System/360 Operating System control program. It is designed primarily for system programmers responsible for maintaining, updating, and extending the operating system features.

IBM System/360 Operating System Job Control Language (GC28-6539)

This publication contains preliminary specifications for the preparation of the IBM Operating System/360 control statements. Included are detailed descriptions of the job, execute, data definition, command, null, and delimiter statements, which form the Job Control Language. Parameters, options, and restrictions are described and illustrated for each statement. The use of the control statements, both individually and together, is illustrated.

IBM System/360 Operating System Messages and Codes (GC28-6631)

This publication lists and explains the messages and completion codes produced by all IBM-supplied components of the IBM System/360 Operating System. The introduction shows the formats of the messages and completion codes, and gives certain information not given in the individual message descriptions. The messages and completion codes are presented in alphameric order.

IBM System/360 Operating System Linkage Editor (GC28-6538)

This publication provides programmers and system analysts with the information necessary to make effective use of the linkage editor of Operation System/360. Included are descriptions of the functions performed automatically by the linkage editor as well as those performed in response to control statements prepared by the programmer.

The linkage editor combines and edits modules to produce a single module that can be loaded by the control program. The linkage editor operates as a processing program rather than a part of the control program.

IBM System/360 Operating System Utilities (GC28-6586)

This publication discusses the capabilities of the IBM System/360 Operating System utility programs and the control statements used with each program. These programs are used by programmers responsible for organizing and maintaining operating system data.

Three types of utility programs are discussed: system utilities and data set utilities, which are used directly with the System/360 Operating System; and independent utilities, which operate outside the operating system. System utilities deal with operating system control data. Data set utilities manipulate data sets at the record level and above. Independent utilities initialize, dump, and restore direct access volumes.

TAPE KEY

The S/360 CSMP tapes, as received by the user, are 9-track or 7-track Distribution Tape Reels (blocked ten cards per record). Both basic and optional material are distributed as unloaded partitioned data sets.

1. Basic material -- object modules, link-edit control cards, sample problem, OS/360 control cards, and assembly source for DEJCSMP2. Number of records equals 344.

<u>File</u>	<u>DS Name</u>	<u>Members</u>	<u>Description</u>
1	CSMP.OBJMOD (blocked 21 cards per record when loaded on a DASD)	All S/360 CSMP subroutines by subroutine name	Object card images
2	CSMP.SYMBM (unblocked when loaded on a DASD)	TRANMOD (110K region) TRANMIN (98K region) EXECMOD	Primary link edit input for creating S/360 CSMP translation phase load modules. Primary link edit input for creating S/360 CSMP execution phase load modules
		CTLCDs	Primary link edit input used by sample procedure
3	CSMP.DECKs (unblocked when loaded on a DASD)	SAMPLE JLCLCARDS DEJCSMP2	Cable reel problem input OS/360 control cards for Figures 3-8 Assembly source cards for DEJCSMP2

2. Optional material -- FORTRAN and assembly source modules. Number of records equals 741.

<u>File</u>	<u>DS Name</u>	<u>Members</u>	<u>Description</u>
1	CSMP.SOURCE (blocked 21 cards per record when loaded on a DASD)	All S/360 CSMP subroutines by subroutine name	Source card images

PREPARATORY SYSTEM PROCEDURES

There are no special preparatory system procedures other than those given in the Operator's Manual.

REQUIRED SYSTEMS

The procedures for installing and operating the distributed program require the IBM System/360 Operating System with its associated utilities and library programs. Linkage Editor F (88K or 128K) is required for link editing the object modules as distributed (blocked 21 cards per record when loaded on a DASD). Other linkage editor programs (44K F level) may be used if an unblocking operation is performed first. When installed, the program operates under System/360 Operating System and requires FORTRAN IV(G) and the linkage editor designated as IEWL. These entry points may be changed to use FORTRAN IV(H) and any linkage editor available by following the Operator's Manual section, "Modifying DEJCSMP2".

The distributed object modules were created by compiling the source modules using FORTRAN IV Level H with optimization.

MACHINE CONFIGURATION

The program requires a minimum of 98K bytes of storage, excluding that required by OS/360, the Standard Instruction set, and the Floating-Point Option.

In addition to the I/O units needed by the Operating System for FORTRAN IV compiling, the program will require three logical utility units, one of which must be a direct access storage device (DASD). The other two may be portions of the required DASD, or may be portions of other DASD's or magnetic tape drives.

STATEMENT OF MAINTENANCE PROCEDURES

This program will be maintained through the distribution of sequentially numbered program releases. A version release replaced the entire program code; a modification release, generally replaces only the changed portions of the program.

The initial availability of a program is called Version 1, Modification Level 0. Each subsequent modification release raises the modification level by one. Each version release raises the version level by one and resets the modification level to zero.

Version and modification releases are made available in one of two ways:

1. Some program releases are sent automatically by the Program Information Department (PID) to all users.
2. All other program releases are sent when ordered by the customer. Ordering instructions are sent to users by PID.

This program is currently classified Type II with Programming Service Classification B. Please contact your IBM Marketing Representative for information concerning available program services.

If, in the future, a new release of this program is made available, the period for which Version 1, Modification Level 3 will remain "current" for programming service purposes, will be specified at the time of the new release.

To report any difficulties encountered in the use of this program, and to obtain a correction, an Authorized Program Analysis Report, (APAR) should be submitted. The APAR should be addressed to:

APAR Processing
IBM Corporation
1501 California Avenue
Palo Alto, California 94304



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FEBRUARY 17, 1972

MEMORANDUM TO: Users of S/360 Continuous System Modeling Program
(360A-CX-16X)

SUBJECT: Availability of Version 1, Modification Level 3

This letter announces the availability of Version 1, Modification Level 3 of the S/360 Continuous System Modeling Program (360A-CX-16X).

Version 1, Modification Level 3 is a maintenance release which corrects program and documentation errors. APAR letter numbers APS-374, PA-008, PA-011, PA-015, PA-042, PA-046, PA-052, PA-066, PA-093, PA-111, PA-112, PA-113, PA-114, PA-117, PA-118, PA-192 and PA-366 are included as machine readable corrections. APAR letter numbers APS-376, PA-010, PA-012 and PA-189 are incorporated as documentation corrections.

The following subroutines were corrected for this maintenance release: ADAMS, ALPHA, BCDIST, BUILD, CENTRL, DATAST, DELAY, DEJCSMP2, GAUSS, IMPL, IMPULS, INITLZ, INTGST, INTRAN, INTRP, MILNE, MMACST, NUMER, RKS, RMACST, RNDGEN, SCAN, SEQUEST, SIMOUT, STATUS, STEP and STRUST. All FORTRAN modules in the system have been recompiled using Release 20.1 FORTRAN IV Level H with Optimization (OPT=1). All source modules (optional machine readable) have been resequenced for this release.

The user should be aware of the following usage changes resulting from these maintenance corrections:

- (1) Any user written subroutine that calls GAUSS, RNDGEN, or STEP will require modification to supply a HISTORY pointer as the first argument of the call.
- (2) RNDGEN and GAUSS have been corrected to only produce one output value for each integration step. Multiple calls to RNDGEN (or GAUSS) within a model will produce independent strings of values.
- (3) The MILNE integration error formula has been corrected to provide a more stringent test that incorporates both absolute and relative error inputs.
- (4) The system default integration absolute error has been changed to .0001.

If you return your Preprinted Program Order Form, you will receive the following Basic Materials to update the program to Version 1, Modification Level 3:

- Updated Application Directory to VLM3
- Updated User's Manual (GH20-0367-4) replaces GH20-0367-3
- Updated Operator's Manual (GH20-0368-3) replaces GH20-0368-2
- Updated object modules, JCL control cards and sample problem are available on one 9-track, Distribution Tape Reel (DTR) @800 or 1600 bpi.

If you have ordered the Optional Material, it consists of:

- Updated source modules which are available on one 9-track Distribution Tape Reel (DTR) at 800 or 1600 bpi.

Please see attached ordering instructions , Attachment A.

The updated Operator's Manual (GH20-0368-3) contains detailed instructions on installing the program modification.

S/360 Continuous System Modeling Program is assigned programming service classification B. Version 1, Modification Level 2 will remain "current" for programming service purposes for three months following the date of this memorandum.

Please contact your local IBM representative to discuss the standard programming error reporting (APAR) procedure.

This program has been registered by system type and is listed under the name and address shown on your order. Program Modifications, as and when made by IBM, will be sent to this same address. Should there be a change in your system type, or in your address, or should you no longer need maintenance on this particular program, we would appreciate your notifying your local IBM Branch Office.

Enclosures

cc: SE Managers

ATTACHMENT A

Users of S/360 Continuous System Modeling Program (360A-CX-16X)
Version 1, Modification Level 3
Ordering Instructions

Enclosed you will find a preprinted Program Order Form for S/360 Continuous System Modeling Program (360A-CX-16X). This form, following IBM Branch Office approval, should be used to order the replacement program from the Program Information Department.

The following steps are necessary to complete the preprinted Program Order Form:

Section 1, Line 1: 360ACX16X (preprinted)
Column 14 enter: R: Reorder total replacement
D: Delete this system from the profile.

Columns 15-20	21-22	23-24
Program Number Extension -----	Distribution Medium Type -----	User Volume Requirement -----
BASIC none	DTR 9/800	28 none
none	DTR 9/1600	29 none

Section 2 Preprinted
Section 3 Indicate as required
Section 4 User Registration

If changes are to be made to Section 4, use the following codes:

"M" to Modify Registration

"D" to Delete the entire user registration from the PID files

"S" Special "Ship To" - This order only.

Section 5 Must be completed by the IBM Branch Office.

Submit this form to your IBM Branch Office for approval.

If you are no longer a user of this program, please return the preprinted order form to PID with a D in Section 1, Line 1, column 14.