

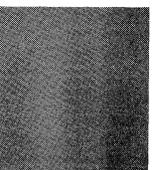
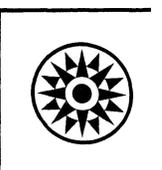
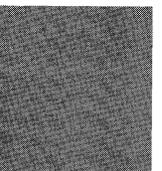
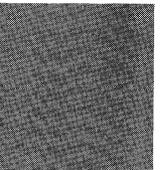
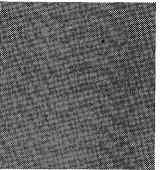
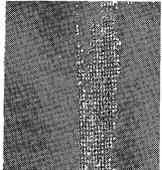
Systems Reference Library

IBM System/360 Bibliography

All available reference literature applicable to the installation and operation of any IBM System/360, except the Model 20, is indexed in this Bibliography. In Part 1, the publications are listed under major subject headings. It is recommended that this sequence be followed in putting together a library. Part 2 provides the abstracts of all publications in form-number sequence.

Publications relating to the Model 20 are indexed in the *IBM System/360 Model 20 Bibliography*, Form A26-3565. Another publication likely to be of interest to the System/360 user is the *IBM Teleprocessing Bibliography*, Form A24-3089.

Additional copies of most publications with form numbers can be ordered through local IBM representatives. Special ordering procedures are given in the abstracts.



Systems Reference Library

Its Organization and Use

For each major IBM data processing system, a *Systems Reference Library* (SRL) has been established to consolidate all basic reference literature necessary in planning, programming, installing and operating the system. A separate SRL covers publications for IBM Tele-processing equipment.

Bibliography

The bibliography lists applicable publications and related materials in subject code and machine type number sequence and provides a brief abstract of each publication.

By reviewing these indexes and abstracts you may select those items of interest to your installation and keep abreast of other materials which may be useful at some future time.

File Numbers, Subject Codes

The cover page of each SRL bulletin shows the title, abstract, form number, and a *file number* for the document. The file number identifies the system or component discussed and the general subject area.

For publications associated with one or two Libraries, the prefix of the file number is the system type (e.g., 1401/1460-, 7080-). When the publication is included in more than two Libraries, the component type (e.g., 1311-, 7330-) is used, if applicable. In other cases "GENL" (general) is used.

The suffix of the file number is the *subject code* which designates a general subject area and the suggested filing sequence. Code 15, for example, is used for all publications related to physical planning specifications; code 33 appears on all publications related to IBM sort and merge programs for the system.

Installation supplies such as coding forms, physical planning templates, and the like are listed under subject code 80.

SRL Publications

The *System Summary*, listed under subject code 00, contains a brief description of the specifications and functional characteristics of system configurations, components, special features, and programming systems. Detailed descriptions, together with program-

ming and operating data, are found under subsequent subject codes.

Also listed under subject code 00 is the *Configurator*, a chart diagramming the components, features, and connections that make up the various configurations of the system.

Technical Newsletters

To keep SRL publications current, additions and other modifications are distributed as *Technical Newsletters* (TNL). These are identified in the masthead with the file number and form number of the publication to which they apply. All previously issued TNL's are also listed so that you may verify receipt of all changes.

SRL Newsletters

A special *SRL Newsletter* is issued periodically (every four weeks if changes have occurred during that period) to update the Bibliography. All current publications are listed in subject code sequence showing form number and title of the publication as well as the form number of applicable Technical Newsletters. Obsolete publications are listed separately with new references indicated. Abstracts of new publications are also given.

The form number revision suffix is shown so that you may verify your publications as current. In some cases more than one edition of a publication is current, since a reprint incorporating previously distributed replacement pages is given a new suffix. When this occurs, all current editions and applicable Technical Newsletters are listed in the SRL Newsletter.

SRL Revision Service

A direct mail revision service is available to IBM system users to supply Technical Newsletters and revised publications for a library. For details concerning subscription procedures, see your local IBM representative.

IBM Programming Systems

SRL Newsletters also show the current status of programming systems available for a system. Additional data, including ordering instructions, for these and application programs are included in the *Catalogs of Programs for IBM Data Processing Systems*.

Major Revision (August 1965)

This edition, Form A22-6822-4, obsoletes Form A22-6822-3.

Copies of this and other IBM publications can be obtained through IBM Branch Offices. Address comments concerning the contents of this publication to:
IBM Corporation, Customer Manuals, Dept. B98, P.O. Box 390, Poughkeepsie, N.Y. 12602

Part 1—Library Subject Code Listing

This part of the Bibliography lists all current publications pertaining to any IBM System/360 except the Model 20. The subject code is indicated to assist in assembling the materials in a recommended sequence. Publications in the Systems Reference Library format show this code on the cover. See Part 3 of the Bibliography for abstracts of the publications listed. (An asterisk preceding the title of a publication indicates that the publication is of interest to users of other IBM Data Processing Systems.)

SUBJECT CODE	FORM NUMBER
00	<i>System/360 Systems Reference Library</i>
System Summary	A22-6810
Model 40 Configurator	A22-6813
Model 50 Configurator	A22-6814
Model 60, 62 Configurator	A22-6815
Model 70 Configurator	A22-6816
Input/Output Configurator	A22-6823
Data Communications Configurator	A22-6824
Model 30 Configurator	A24-3232
01	<i>Machine System</i>
Principles of Operation	A22-6821
Instruction Timing Information	A22-6825
Functional Characteristics—Model 65	A22-6884
Functional Characteristics—Model 30	A24-3231
Operator's Guide—Model 30	A24-3373
Channel Characteristics and Functional Evaluation—Model 30	A24-3411
03	<i>Input/Output</i>
1442-N1 Card Read Punch	A21-9025
2501 Card Reader Models B1 and B2	A21-9026
2520 Card Read Punch Model B1 and Card Punch Models B2 and B3	A21-9027
2540 Card Read Punch	A21-9033
7772 Audio Response Unit	A22-6836
2702 Principles of Operation—Transmission Control	A22-6846
7770 Audio Response Unit Model 3	A22-6848
2250 Display Unit Models 1 and 2 and 2840 Display Control	A22-6851
2280 Film Recorder, 2281 Film Scanner, and 2282 Film Recorder/Scanner	A22-6853
2701 Data Adapter Unit—Principles of Operation	A22-6864
1827 Data Control Unit—Summary Description	A22-6868
1443 Printer Models 1, 2, N1. 1445 Printer Models 1, N1	A24-3120
1015 Inquiry Display Terminal and 1016 Control Unit	A24-3239
1285 Optical Reader	A24-3256
2821 Control Unit	A24-3312
2671 Paper Tape Reader	A24-3388

SUBJECT CODE	FORM NUMBER
2260 Display Station and 2848 Display Control	A27-2700
2250 Display Unit Model 1	A27-2701
05 Magnetic Tape Units and Controls	
7340 Hypertape Drive Model 3	A22-6828
2400 Magnetic Tape Units and 2816 Switching Units—Principles of Operation	A22-6866
07 Disk, Drum, and Data Cell Storage Units and Controls	
2314 Direct Access Storage Facility	A26-3599
2311 Disk Storage Drive—2321 Data Cell Drive Model 1— 2841 Storage Control Unit—2302 Disk Storage Models 3 and 4—7320 Drum Storage	A26-5988
09 Tele-processing Equipment	
2280, 2281, 2282, and 2840 Film Input/Output Units	A22-6850
1070 Process Communication System	A26-5989
13 Special and Custom Features	
Model 30, 1401 Compatibility Feature	A24-3255
Model 30, Compatability Feature	A24-3365
Manual Switching Unit—RPQ 8, 80576	L22-6871
15 Physical Planning Specifications	
Physical Planning	C22-6820
19 Original Equipment Manufacturers' Information	
Input/Output Interface—Channel to Control Unit	A22-6843
2701 Data Adapter Unit	A22-6844
7340 Hypertape Drive Model 3	A22-6861
2400 Magnetic Tape Units	A22-6862
2361 Large Capacity Storage	A22-6869
*1403 Printer	A24-1431
1404 Printer Model 2	A24-3356
2311 Disk Storage Drive	A26-3567
20 Programming Systems	
Catalog of Programs for IBM System/360—April 1965	C20-1619
Programming Support—Programmer's Guide (8K Tape)	C24-3354
Programming Support—Programmer's Guide (8K Disk)	C24-3372
Basic Programming Support Operating Guide: Basic Tape System (8K)	C24-3391
Operating System Introduction	C28-6534
Operating System Storage Estimates	C28-6551
21 Symbolic Assembly Systems	
Basic Support Assembler with Input/Output Macros (8K Tape)	C24-3355
Basic Assembler with Input/Output Macros (8K Disk)	C24-3361
Basic Operating System and Basic Programming Support Macro Definition Language (8K Disk/Tape)	C24-3364
Special Support Basic Assembler Language	C28-6503
Operating System Assembler Language	C28-6514
Basic Programming Support—Basic Assembler—Program Logic	C28-6555

SUBJECT CODE	FORM NUMBER
24 COBOL	
Operating System COBOL Language	C28-6516
Transition Aids—COBOL Language Conversion Program for the 1401—Preliminary Specifications	C28-6559
Transition Aids—COBOL Language Differences	C28-6570
25 FORTRAN	
Special Support FORTRAN Language	C28-6504
FORTRAN IV, E Level Subset	C28-6513
Operating System FORTRAN Language	C28-6515
Transition Aids—FORTRAN II Language Conversion Program for the 1401—Preliminary Specifications	C28-6560
28 Report Program Generator	
Operating System Report Program Generator Language	C24-3337
Basic Programming Support—Report Program Generator (Card)	C24-3374
Operating System Report Program Generator Language Specifications (8K Disk)	C24-3387
Basic Programming Support Report Program Generator Language Specifications (8K Tape)	C24-3418
Report Program Generator Translator	C26-5999
29 Programming Language/One	
An Introduction to PL/1 (Programming Language/One)	C20-1632
Operating System PL/1—Language Specifications	C28-6571
30 Input/Output Control System	
Basic Programming Support—Input/Output (1412/1419)	C24-3398
Basic Programming Support—Input/Output (1418/1428)	C24-3437
Operating System Data Management	C28-6537
Operating System Telecommunications	C28-6553
32 Utility Programs	
Basic Programming Support—Utility Programs	C24-3363
Basic Program Support Operating Guide—Utility Programs	C24-3392
Basic Program Support Operating Guide—Universal Character Set Utility Program	C24-3396
Basic Operating System Utility Programs	C24-3409
Special Support Utility Programs	C28-6505
Basic Programming Support—Basic Utilities Program Logic Manual	C28-6556
Operating System Utilities	C28-6586
33 Sort/Merge	
Basic Support Sort/Merge (Tape) Program	C24-3320
Basic Operating System Sort/Merge Program (8K Disk)	C24-3321
1401/1460 Timing Program for Basic Programming Support Sort/Merge Program (8K Tape)	C24-3345
1401/1460 Timing Program for Basic Operating System Sort/Merge Program (8K Disk)	C24-3377
Operating System Sort/Merge Program	C28-6543
35 System Simulation	
Emulation of the 7074 Data Processing System— Preliminary Specifications	C27-6908

SUBJECT CODE	FORM NUMBER
7090/7094 Support Package for IBM System/360	C28-6501
Simulator for the 1410/7010—Preliminary Specifications	C28-6528
Simulator for the 7070/7074—Preliminary Specifications	C28-6530
Simulator for the 7080—Preliminary Specifications	C28-6531
Simulator for the 7090/7094—Preliminary Specifications	C28-6532
Model 40 Emulation of the 1401/1460 Data Processing Systems	C28-6561
Model 40 Emulation of the 1410/7010 Data Processing Systems	C28-6563
Model 65 Emulation of the 709/7090/7094/7094 II Data Processing Systems	C28-6565
Model 50 Emulation of the 1410/7010 Data Processing Systems	C28-6568
36 Supervisor, Monitor	
Operating System—1070 Process Communication Supervisor	C26-5996
Operating System Concepts and Facilities	C28-6535
Operating System—Operation Considerations	C28-6540
37 Automatic Testing Programs	
Basic Programming Support—Autotest (16K Tape)	C24-3343
Basic Operating System—Autotest Specifications (8K Disk)	C24-3378
Basic Programming Support Operating Guide Autotest (8K Tape)	C24-3417
48 Miscellaneous Programs	
Operating System Linkage Editor	C28-6538
Operating System Job Control Language	C28-6539
Operating System Program Support for the 2250 Display Unit	C28-6906
50 Systems Techniques	
Program Conversion Documentation Aids	C20-1612
Operating System Control Program Services	C28-6541
Operating Guide for Basic Assembler and Utilities	C28-6557
80 Installation Supplies	
Proportional Record Layout Format Forms	X20-1702
Reference Data Card	X20-1703
2321 Data Cell Drive Reference Card	X20-1704
2311 Disk Cell Drive Reference Card	X20-1705
2302 Disk Storage Drive Reference Card	X20-1706
7320 Drum Storage Reference Card	X20-1707
Unit Record Input/Output Template	X22-6834
Hypertape Template	X22-6835
Magnetic Tape Record Characteristics	X22-6837
Hypertape Capacity and Timing	X22-6840
Magnetic Tape Template	X22-6855
Processor Template	X22-6856
Communication Equipment Template	X22-6857
Data Storage Template	X22-6858
Consoles and Terminals Template	X22-6859
Magnetic and Optical Character Readers Template	X22-6860
Card Punch Layout—80 Column	X24-3330
Report Program Generator—File Description Sheet	X24-3347
Report Program Generator—File Extension Sheet	X24-3348
Report Program Generator—Line Counter Specification Sheet	X24-3349
Report Program Generator—Input Specification Sheet	X24-3350

SUBJECT CODE	FORM NUMBER
Report Program Generator—Calculation Specification Sheet . . .	X24-3351
Report Program Generator—Output-Format Specification Sheet	X24-3352
Keytabs for 1052—Model 30	X24-3376
2702 Worksheet—Model 30	X24-3406
Multiplexor Channel Worksheet	X24-3407
Assembler Short Coding Form	X28-6506
Assembler Long Coding Form	X28-6507
Assembler Coding Form	X28-6509
90 Education Literature	
System/360 Introductory Notes	C20-1608
Fixed Point Operations	C20-1613
Programming with Base Registers and the Using Instruction . . .	C20-1614
Introduction to Assembly Language Programming	C20-1615
System/360 Decimal Operations	C20-1616
Number System	C20-1618
Logical Operations On Characters and Bits	C20-1623
Edit, Translate, and Execute Instructions	C20-1624
Subroutines and Subprograms	C20-1625
System Customer Education Program	R20-4052
COBOL Coding Course Description	R20-9064
FORTRAN IV Programmed Instruction—Course Description	R20-9105
Operator Planning—Course Description	R20-9106
99 Other Supplementary Information	
Programming Techniques	C20-1620
Storage Utilization Techniques Applied to a Data Reduction Application	C20-1621
Utility of 32-Bit Word for the Scientific User	C20-1628
Large-Capacity Storage for System/360	C20-1629

Part 2—Machine Index

Publications describing the machine components of the System/360, except those of the Model 20, are listed by machine number. The machine index is useful for quickly finding reference material about a specific machine unit. The *IBM System/360 System Summary*, Form A22-6810, which contains general information about the machine components, is not listed in the index. See *IBM System/360 Configurators*, Form Numbers A22-6813, A22-6814, A22-6815, A22-6816, and A24-3232 for the number and type of components.

Refer to *IBM System/360 Model 20 Bibliography*, Form A26-3565, for comparable information regarding the Model 20.

MACHINE NUMBER	TITLE	SUBJECT CODE	FORM NUMBER
1015	1015 Inquiry Display Terminal	03	A24-3239
1016	1016 Control Unit	03	A24-3239
1070	1070 Process Communication System	09	A26-5989
1285	1285 Optical Reader	03	A24-3256
1442	1442-N1 Card Read Punch	03	A21-9025
1443	1443 Printer—Models 1, 2, and N1	03	A24-3120
1445	1445 Printer—Models 1, and N1	03	A24-3120
1827	1827 Data Control Unit	03	A22-6868
2250	2250 Display Unit Model 1	03	A27-2701
2260	2260 Display Station—2848 Display Control	03	A27-2700
2314	2314 Direct Access Storage Facility	07	A26-3599
2400	2400 Magnetic Tape Units and 2816 Switching Units	05	A22-6866
2501	2501 Card Reader Models B1 and B2	03	A21-9026
2520	2520 Card Read Punch Model B1 and Card Punch Models B2 and B3	03	A21-9027
2540	2540 Card Read-Punch	03	A21-9033
2671	2671 Paper Tape Reader	03	A24-3388
2701	2701 Data Adapter Unit	03	A22-6864
2702	2702 Transmission Control	03	A22-6846
2821	2821 Control Unit	03	A24-3312
2848	2848 Display Control—2260 Display Station	03	A27-2700
7340	7340 Hypertape Drive Model 3	05	A22-6828
7772	7772 Audio Response Unit	03	A22-6836

The abstracts for all System/360 publications and materials, except those pertaining to the Model 20, are listed by form number. From the abstract, the System/360 user can determine if a particular publication is applicable. The subject code number is shown at the right of the title.

A21-9025 IBM 1442-N1 Card Read Punch 03

This publication describes the operation of the IBM 1442-N1 Card Read Punch with functional and operational characteristics of the 1442-N1. Special features and timings are explained. (13 pages)

**A21-9026 IBM 2501 Card Reader 03
Models B1 and B2**

This publication describes the operation of the IBM 2501 Card Reader Models B1 and B2, with the IBM System/360 Models 30 and higher. Operating principles and procedures are discussed. (7 pages)

**A21-9027 IBM 2520 Card Read Punch 03
Model B1 and IBM 2520 Card Punch
Models B2 and B3**

This publication describes the operation of the IBM 2520 Card Read Punch Model B1 and the IBM 2520 Card Punch Models B2 and B3 with the IBM System/360 Models 30 and higher. Operating principles and procedures are discussed. (8 pages)

**A21-9033 IBM 2540 Component Description 03
and Operating Procedures**

This publication explains the operating principles, procedures, and controls of the IBM 2540 Card Read Punch. Special features for the 2540 are also discussed.

Refer to the SRL publication, *IBM 2821 Control Unit*, Form A24-3312, for information about the program instructions that control the 2540. (14 pages)

A22-6810 IBM System/360 System Summary 00

This publication provides basic information about the IBM System/360, with the objective of helping readers to achieve a general or preliminary understanding of this new computing/processing system and the interrelationships of its models and parts. Broad system concepts, basic and optional features, and specific input/output devices are briefly discussed. (44 pages)

**A22-6813 IBM System/360 Model 40 00
Configurator**

A schematic drawing shows the complete Model 40 processor with all standard and optional features. Input/output devices are shown on Form A22-6823 and data communications devices on Form A22-6824. (1 page)

**A22-6814 IBM System/360 Model 50 00
Configurator**

A schematic drawing shows the complete Model 50 processor with all standard and optional features. Input/output devices are shown on Form A22-6823 and data communications devices on Form A22-6824. (1 page)

**A22-6815 IBM System/360 Model 60, 62 00
Configurator**

A schematic drawing shows the complete Model 60 and 62 processor with all standard and optional features. Input/output devices are shown on Form A22-6823 and data communications devices on Form A22-6824. (1 page)

**A22-6816 IBM System/360 Model 70 00
Configurator**

A schematic drawing shows the complete Model 70 processor with all standard and optional features. Input/output devices are shown on Form A22-6823 and data communications devices on Form A22-6824. (1 page)

**A22-6821 IBM System/360 Principles of 01
Operation**

This manual is a comprehensive presentation of the characteristics, functions, and features of the IBM System/360. The material is presented in a direct manner, assuming that the reader has a basic knowledge of IBM data processing systems and has read the *IBM System/360 System Summary*, Form A22-6810. The manual is useful for individual study, as an instruction aid, and as a machine reference manual.

The manual defines the System/360 operating principles, central processing unit, instructions, system control panel, branching, status switching, interruption system, and input/output operations.

Descriptions of specific input/output devices used with the System/360 appear in separate publications. Also, details unique to each model of the System/360 appear in separate publications. (168 pages)

A22-6823 IBM System/360 Input/Output Configurator 00

A schematic drawing of all I/O devices for the IBM System/360. (1 sheet)

A22-6824 IBM System/360 Data Communications Configurator 00

A schematic drawing of all data communications devices for the IBM System/360. (1 sheet)

A22-6825 System/360 Instruction Timing Information 01

This bulletin contains instruction timing information for all models of the System/360. For full description of each instruction, refer to *IBM System/360 Principles of Operation*, Form A22-6821. (11 pages)

A22-6828 IBM 7340 Hypertape Drive Model 3 with IBM System/360 05

This publication describes the functions, operations, controls, and timings of the IBM 7340 Hypertape Drive Model 3, including the dynamics of 7340 reading and writing and details on the tape, tape cartridge, and optional automatic cartridge loader. In addition, all necessary details on the function and operation of the IBM 2802 Hypertape Control are presented.

This manual provides information for customer systems personnel and is designed as a reference and guide in the training of operators, system engineers, programmers, managers, and others who need a general idea of how Hypertape operates within the System/360. It is an I/O adjunct to *IBM System/360 Principles of Operation*, Form A22-6821. (28 pages)

A22-6836 IBM 7772 Audio Response Unit with IBM System/360 03

This publication contains general information about the IBM 7772 Audio Response Unit. The areas covered include functional and operational descriptions, systems considerations, and applications. (9 pages)

A22-6843 IBM System/360 I/O Interface-Channel to Control Unit Original Equipment Manufacturers' Information 19

This Original Equipment Manufacturers' Information (OEMI) manual provides the definitions and functional descriptions of the interface lines for the IBM I/O

Interface-Channel to Control Unit. In addition, it contains electrical, mechanical, and cabling considerations and specifications of this interface.

Future appendices of this manual will contain:

- Power control interface information
- Remote operator control panel interface information
- Panel connector information
- Connector pin locations
- Cable considerations

(47 pages)

A22-6844 IBM 2701 Data Adapter Unit Original Equipment Manufacturers' Information 19

This publication describes the various interfaces associating the IBM 2701 Data Adapter Unit with communication line data subsets and other external devices. In addition, the electrical, mechanical, and cabling considerations and specifications of these interfaces are given. (25 pages)

A22-6846 IBM 2702 Principles of Operation—Transmission Control 03

This publication provides information concerning the operation of the IBM 2702 Transmission Control.

The introduction gives a general description of the 2702. It includes a list of the data communication terminals operable with the 2702, a list of the terminal controls used by the 2702 to operate with the various terminals, and a list of data sets and communication facilities.

The operational functions section discusses communication line addressing, 2702 multiplexor channel operation, and I/O instructions. The section lists various commands and orders used by the 2702 and the transmit and receive operations sequences. It also describes the functions of the status and sense bytes, as well as the polling and addressing of the terminals. (20 pages)

A22-6848 IBM 7770 Audio Response Unit Model 3 with IBM System/360 03

This publication contains general information about the IBM 7770 Audio Response Unit Model 3. The areas covered include operational and functional descriptions, systems considerations, and applications. (9 pages)

A22-6850 IBM 2280, 2281, 2282, and 2840 Film Input/Output Units with IBM System/360 09

This bulletin provides basic information about the IBM 2280 Film Recorder, 2281 Film Scanner, 2282 Film

Recorder/Scanner, and 2840 Display Control, which provide film input and/or output for the System/360. This information will later be incorporated in *IBM System/360 System Summary*, Form A22-6810.

Detailed information is found in IBM System/360 system component description for *IBM 2280 Film Recorder, 2281 Film Scanner, and 2282 Film Recorder/Scanner*, Form A22-6853. (4 pages)

A22-6851 IBM 2250 Display Unit Models 1 and 2 and IBM 2840 Display Control with IBM System/360 03

This publication contains general information about the IBM 2250 Display Unit and the IBM 2840 Display Control. The characteristics, operations, and optional features of these units are described, and several examples of 2250 applications are presented. (11 pages)

A22-6853 IBM 2280 Film Recorder, 2281 Film Scanner, 2282 Film Recorder/Scanner with IBM System/360 03

This document describes the IBM 2280 Film Recorder, IBM 2281 Film Scanner, and IBM 2282 Recorder/Scanner. The 2280 is an output device for producing graphic and alphameric images on film. The 2281 is an input device for converting images on preprocessed film into digital data. The 2282 provides both capabilities within an integrated configuration. The three units can be attached to System/360 via the IBM 2840 Display Control Unit. These film units provide unique flexibility in handling graphic data at very high speed and for a wide range of scientific and industrial applications. (16 pages)

A22-6861 IBM 7340 Hypertape Drive Model 3—OEMI 19

The information in this manual is provided to assist designers of accessory equipment for IBM 7340 Hypertape Drives Model 3. It includes all specifications, and cable information necessary for attaching a 7340-3 to a control unit. (31 pages)

A22-6862 IBM 2400 Magnetic Tape Units—OEMI 19

The information in this manual will assist designers of accessory equipment for IBM 2401, 2402, 2403, and 2404 Magnetic Tape Units. Additional details about the operation and use of these tape units in integrated data processing systems may be obtained from the local IBM Sales Office. Additional information about the maintenance of these tape units may be obtained from the CE Manual of Instruction, the CE Reference Manual, and the CE Maintenance Diagram Manual. (25 pages)

A22-6864 IBM 2701 Data Adapter Unit—Principles of Operation 03

This manual provides information concerning the operation of the IBM 2701 Data Adapter Unit. The manual is divided into three sections.

The first section gives a general description of the 2701 operating terminals, functional organization, special features, and the various configurations of the 2701.

The second section describes the operation of the 2701 with the System/360. Subjects discussed include communication line addressing, multiplexor and selector channel operation, and I/O instructions.

The third section covers transmission adapters. It gives descriptions of the operation of each adapter including transmit and receive operation sequences, status and sense bytes, and polling and addressing of the terminals. (48 pages)

A22-6866 IBM 2400 Magnetic Tape Units and 2816 Switching Units—Principles of Operation 05

This manual contains a comprehensive presentation of the characteristics, functions, and features of the IBM 2400 Magnetic Tape Units and a general description of the IBM 2816 Switching Unit.

In most instances, operational descriptions are limited to the channel and command level. Operating functions and procedures common and fundamental to all I/O operations are described in *IBM System/360 Principles of Operation*, Form A22-6821. Additional information concerning magnetic tape units, general principles, tape handling, and operating procedures is found in the *IBM 729, 7330, and 727 Magnetic Tape Units, Principles of Operation*, Form A22-6589. (22 pages)

A22-6868 IBM 1827 Data Control Unit with System/360—Summary Description 03

This bulletin provides basic information about the IBM 1827 Data Control Unit, which permits the attachment to the IBM System/360 of those units and features of the IBM 1800 Data Acquisition and Control System that supply analog and digital input and output and provide a modular variety of real time data acquisition and process control capabilities for the System/360. This information will later be incorporated in the *IBM System/360 System Summary*, Form A22-6810. (10 pages)

A22-6869 IBM 2361 Core Storage—OEMI 19

The information in this manual is provided to assist designers of accessory equipment for IBM 2361 Core Storage Model 1 and Model 2. It includes all specifications,

timing information, circuit descriptions, and cable information necessary for attaching a 2361 to a system. Additional details about the operation and maintenance of the 2361 may be obtained from the local IBM Branch Office. (22 pages)

A22-6884 IBM System/360 Model 65 01
Functional Characteristics

This manual presents the organization, characteristics, functions and features unique to the IBM System/360 Model 65. Major areas described are system structure, generalized information flow, standard and optional features, instruction timings, and the system control panel. (29 pages)

A24-1431 IBM 1403 Printer—OEMI 19

This manual contains information that will assist non-IBM engineers to attach the IBM 1403 Printer to their equipment. It includes a general description of machine functions and a reference listing of publications and engineering documents. It also contains information concerning machine interface not readily available in other publications. Charts of signal connectors and power plug pin assignments are included. (16 pages)

A24-3120 IBM 1443 Printer Models 1, 2, and 03
N1, and IBM 1445 Printer Models 1, and N1

This reference publication describes the operation of the IBM 1443 and 1445 Printers with the IBM 1240, 1440, and System/360 Model 30 Data Processing Systems. It discusses timing information for the printer and the tape-controlled carriage as well as their functional and operating characteristics. The speed of the printer using various character sets is also described.

For a list of other publications and abstracts, see the IBM bibliography for the associated data processing system. (14 pages)

A24-3231 IBM System/360 Model 30 01
Functional Characteristics

This reference publication describes the relationship of the IBM System/360 Model 30 to the entire System/360. The system's capabilities, features, I/O channels, and operations are also discussed.

The reader can find a more detailed description of the System/360 operations in *IBM System/360 Principles of Operation*, Form A22-6821. The interrelationships of the models and units available with the System/360 are broadly described in *IBM System/360 System Summary*, Form A22-6810. (64 pages)

A24-3232 IBM System/360 Model 30 00
Configurator

A schematic drawing shows the complete Model 30 processor with all standard and optional features. Input/output devices are shown on Form A22-6823 and data communications devices on Form A22-6824. (1 page)

A24-3239 IBM 1015 Inquiry Display Terminal 03
and IBM 1016 Control Unit

This publication describes the functional and operating characteristics of the IBM 1015 Inquiry Display Terminal and the IBM 1016 Control Unit. Each IBM 1016 can have up to ten remote IBM 1015 terminals attached to it. Both the 1016 and the 1015 can initiate operation. Up to 650 characters per second can be displayed on the screen, which can hold 1,200 characters before erasure is necessary. (10 pages)

A24-3255 IBM System/360 Model 30, 13
1401 Compatibility Feature

This publication discusses the 1401 compatibility feature for the IBM System/360 Model 30 processor. This special feature provides a means of rapid and simplified transfer from 1401-oriented applications to the System/360 Model 30.

Refer to the *IBM System/360 System Summary*, Form A22-6810, and the *IBM System/360 Principles of Operation*, Form A22-6821, for complete description and operation procedures for the System/360. (11 pages)

A24-3256 IBM 1285 Optical Reader 03

This publication describes the functional and operating characteristics of the IBM 1285 Optical Reader. It gives descriptions of the instructions used to program operations on the 1285, and the input document requirements related to print quality, format, and type of paper. (15 pages)

A24-3312 IBM 2821 Control Unit 03

This reference publication presents a general description of input/output operations controlled through the IBM 2821 Control Unit. The IBM 1402 Card Read Punch and the IBM 1403, 1404, and 2201 Printers controlled by the IBM 2821 Control Unit are briefly described. Command, status, and sense information pertaining to the attached input/output units is presented. Programming timing considerations for control unit, card reader, card punch, and printers are also presented. For further information about the attached input/output units refer to *IBM 1402 Card Read*

Punch, Form A24-3072, *IBM 1403 Printer*, Form A24-3073, and *IBM 1401 Printer*, Form A24-1446. For further general information about input/output and channel operations refer to *IBM System/360 Principles of Operation*, Form A22-6821. (27 pages)

A24-3356 IBM 1404 Printer Model 2—OEMI 19

This reference manual contains information that will assist non-IBM engineers to attach their equipment to the IBM 1404 Printer Model 2. It contains a general description of machine functions, a reference listing of publications and engineering documents, and information concerning machine interface not readily available in other publications. For titles and abstracts of associated publications, see the *IBM 1401 and 1460 Bibliography*, Form A24-1495. (20 pages)

A24-3365 IBM System/360 Model 30 13
1620 Compatibility Feature

This publication describes the IBM 1620 Compatibility Feature for the IBM System/360 Model 30. This special feature provides a means of rapid and simplified transfer of 1620-oriented applications to the IBM System/360 Model 30. (26 pages)

A24-3373 IBM System/360 Model 30 01
Operator's Guide

This reference publication describes operator procedures for the IBM 2030 Processing Unit and for the IBM 1050 Documentary Console (attached to the IBM System/360 Model 30). For additional information pertaining to operation of the I/O units attachable to System/360 Model 30, refer to the appropriate Systems Reference Library publication. Systems Reference Library publications that pertain to IBM System/360 and attachable I/O units are abstracted and referenced by form number in *IBM System/360 Bibliography*, Form A22-6822. (39 pages)

A24-3388 IBM 2671 Paper Tape Reader 03

This reference publication describes the operation of the IBM 2671 Paper Tape Reader and the IBM 2822 Paper Tape Reader Control Unit when used as input to the IBM System/360 Models 30, 40, and 50. The System/360 channel commands necessary to control the operation of the IBM 2671 are fully described.

Console controls, tape specifications, tape splicing procedures, tape loading procedures, and special features available for the IBM 2671 are also described.

Titles and abstracts of associated publications are listed in the *IBM System/360 Bibliography*, Form A22-6822. (28 pages)

A24-3411 IBM System/360 Model 30 01
Channel Characteristics and
Functional Evaluation

This reference publication describes methods used to calculate System/360 Model 30 data handling capabilities that are dependent upon I/O-channel configurations and operations. Consideration of methods are also presented for:

1. Priority attachment of I/O units for maximum throughput,
2. Addressing I/O units,
3. Calculating buffer transfer times,
4. Calculating interference (with the processing unit) caused by channel operations.

Calculations for a System/360 Model 30 with a 1.5-microsecond Read/Write (RW) cycle and with a 2-microsecond RW cycle are discussed separately.

The user of this publication should be thoroughly familiar with I/O programming considerations as described in *IBM System/360 Principles of Operation*, Form A22-6821. Information related to specific I/O devices is contained in separate Systems Reference Library publications. These publications are listed by form number and briefly described in *IBM System/360 Bibliography*, Form A22-6822.

When you are performing loading calculations related to the multiplexor channel operating in multiplex mode, use the *IBM System/360 Model 30 Multiplexor Channel Worksheet*, Form X24-3407. If the IBM 2702 Communications Control is used in your configuration, use the *IBM System/360 Model 30 2702 Worksheet*, Form X24-3406. (75 pages)

A26-3567 IBM 2311 Disk Storage Drive 19
Original Equipment Manufacturers'
Information

This manual contains information that will assist non-IBM engineers in attaching the IBM 2311 Disk Storage Drive to their equipment. It includes a general description of machine functions, a reference listing of publications and engineering documents, and information concerning machine interface not readily available in other publications. (8 pages)

A26-3599 IBM System/360 Component 07
Description—2314 Direct Access
Storage Facility

This publication describes the IBM 2314 Direct Access Storage Facility and presents the functional and operating characteristics. Capacities and timing elements are also shown. (4 pages)

A26-5988 IBM System/360 Component 07
Descriptions—2841 Storage Control Unit
2302 Disk Storage, Models 3 and 4
2311 Disk Storage Drive
2321 Data Cell Drive, Model 1
7320 Drum Storage

This publication contains reference information for the operation and programming of storage devices which attach to the IBM 2841 Storage Control Unit. These storage devices include the IBM 2311 Disk Storage Drive, the IBM 2302 Disk Storage, Models 3 and 4, the IBM 2321 Data Cell Drive, Model 1, and the IBM 7320 Drum Storage. (52 pages)

A26-5989 IBM 1070 Process 09
Communication System

This publication describes the IBM 1070 Process Communication System, including a guide to the numerous ways in which individual units may be grouped together. The relationship between the computer programming and the operation at the process is explained by means of data transmission diagrams. The timing of transmission operations is considered in detail. Charts showing the coding for data and control characters in the system and the special features required for each function are also included. (49 pages)

A27-2700 IBM System/360 Component 03
Description
IBM 2260 Display Station
IBM 2848 Display Control

This manual describes the functional and operating characteristics of the IBM 2260 Display Station and the IBM 2848 Display Control. The two units combine to provide a visual display of data stored in System/360. (19 pages)

A27-2701 IBM System/360 03
Component Description
IBM 2250 Display Unit Model 1

This publication contains detailed information on programming, operation, and special features of the IBM 2250 Display Unit Model 1. The material is presented with the assumption that the reader has read the *IBM System/360 Principles of Operation*, Form A22-6821. The manual *IBM System/360 Component Description: IBM 2250 Display Unit Model 3; IBM 2840 Display Control* Form A27-2702 also may be of interest to the reader. (36 pages)

C20-1608 IBM System/360 90
Introductory Notes

For individuals who require familiarity with the System/360, this manual assumes a knowledge of com-

puter systems and concentrates on the single-system concept of the System/360. This single-system concept incorporates features that were formerly unique on certain systems (channels, for example) and features that are new on the System/360. The Computing System/360, the Operating System/360 (programming support), auxiliary machines, and systems are discussed in terms of functions and features. (59 pages)

C20-1612 IBM System/360 Program 50
Conversion Documentation Aids

One of a series of publications on transition to the System/360, this manual briefly discusses several methods of program conversion, then concentrates on a series of documentation aid programs: verification, updating, flowcharting, and analysis. A list of conversion and documentation aids is included. (12 pages)

C20-1613 IBM System/360 90
Fixed-Point Operations

This publication is an expository introduction to System/360 programming, assuming at least slight programming experience and a basic knowledge of System/360 architecture and assembly language. The presentation is largely in terms of illustrative programs.

The first program is quite simple, serving to illustrate how a few basic instructions work, how the assembly language operates, how an address is formed, what the register layout is, etc. Sample output is shown for almost all programs. Other examples illustrate such matters as complement arithmetic and register overflow. There is considerable review of basic programming concepts and terminology, so that the demands on the reader's prior experience are not great.

The coverage includes arithmetic instructions, instruction formats, decimal and binary point location basics, branching methods, loop terminology, the condition code, automatic base register assignment, and other similar topics needed to provide a foundation of understanding of System/360 programming. (22 pages)

C20-1614 Programming with Base Registers 90
and the USING Instruction

This publication is an expository introduction to programming methods used with base registers when programming in the assembly language for the System/360. It assumes a knowledge of basic System/360 architecture and instructions and at least slight contact with assembly language.

The bulk of the presentation is through illustrative programs.

Topics discussed include review of motivation for use of base registers (address compatibility, relocation,

indexing), the requirements for delegating base register assignment and displacement computation to the assembler, the relation between what is done at assembly time and what is done at execution time, more than one base register and how the choice is made by the assembler, separate base registers for instructions and data, and other topics needed to provide a basic understanding of the use of base registers with the assembly language. (8 pages)

C20-1615 Assembly Language Programming 90

This publication is an expository introduction to the assembly language used with the System/360. It assumes only a slight familiarity with the System/360, being intended as a foundation for later study of instruction and programming details.

Motivations for the use of assembly languages are reviewed. The mechanics of the assembly process are discussed. The parts of an assembly language instruction are described in terms of the coding form. Some of the most commonly used assembler instructions are described. The bulk of the material is devoted to discussions of several illustrative programs written in assembly language. The first example uses only binary instructions; the second exhibits error messages produced by a variety of programming errors; the last example uses decimal instructions. (10 pages)

C20-1616 IBM System/360 Decimal Operations 90

This publication is an expository introduction to the operation and usage of instructions in the System/360 decimal instruction set. At least slight programming experience is assumed, together with a basic understanding of System/360 architecture, assembly language, and fixed-point instructions. Most of the presentation is through illustrative program.

Coverage includes instruction and information formats, arithmetic instructions, assembly language elements related to decimal instructions, decimal point location, the equivalent of shifting, logical operations that are useful with decimal operations, format and base conversion, decimal comparison, and other topics required to provide a basic understanding of decimal operations in the System/360. (18 pages)

C20-1618 IBM System/360 Number Systems 90

This IBM student text on number systems presents a brief review of the principles of positional notation, as applied to the binary and hexadecimal systems of notation. The publication covers the operations of binary and hexadecimal arithmetic, decimal-binary-hexadecimal base conversion, and the principles of base and base-minus-one complementation. (18 pages)

C20-1619 Catalog of Programs for IBM System/360 April 1965 20

This catalog contains a complete listing of all programs available for the IBM System/360.

This catalog contains the following sections:

1. Introduction and instructions on how to use the catalogs and how to order the programs.
2. A Keyword-in-Context (KWIC) Index.
3. Abstracts of all available programs. (8 pages)

C20-1620 System/360 Pointers Programming Techniques 99

This manual of System/360 pointers is devoted to examples illustrating various coding techniques. It not only shows the use of some of the features of the assembly language but more importantly points out the power of the System/360 organization in the solution of common problems or parts thereof. Although many of the examples are slanted toward the mathematician, there are those of sufficiently general interest to provide knowledge for the commercially oriented. (29 pages)

C20-1621 IBM System/360 Pointers Storage Utilization Techniques Applied to a Data Reduction Application 99

The purpose of this publication is to illustrate the use of the System/360 instruction set in the treatment of a typical problem arising in the collection and reduction of data gathered, for example, from an experiment, a sequence of measurements, a scanning operation, or the like. After the data reduction problem is defined, solutions by 7094-type methods and by System/360 techniques are described. Finally a comparison of the two solution methods is presented. (8 pages)

C20-1623 IBM System/360 Logical Operations on Characters and Bits 90

This is an expository treatment of sequences of comparisons, bit operations using And, Or, and Test Under Mask, and various bit and character operations on sequences of bytes. The emphasis is divided between explanation of the action of the System/360 features and the effective use of the features in accomplishing data processing operations. There are many examples, including three complete programs.

The reader is assumed to understand System/360 assembly language programming, and to have studied both fixed-point and decimal operations. (11 pages)

C20-1624 IBM System/360 Edit, Translate, and Execute Instructions 90

This Student Text explains the Edit, Translate, and Execute instructions and provides many examples of their use. There are four complete programs to demonstrate the instructions in a variety of applications.

The reader is assumed to understand System/360 assembly language programming and to have studied both fixed-point and decimal operations. (20 pages)

C20-1625 IBM System/360 Subroutines and Subprograms 90

This Student Text explores some of the technical problems involved in the use of subroutines and subprograms. The technical problems discussed are: communication of program and data locations between routines that may be too far apart to be addressed by one base register, the saving of a return address, program relocation, and address communication between routines that may not have been assembled at the same time and which may have been relocated in loading.

The reader is assumed to have a level of understanding of the System/360 equivalent to that provided by a study of the other texts in this series:

IBM System/360 Assembly Language Programming (C20-1615)

IBM System/360 Fixed-Point Operations (C20-1613)

IBM System/360 Programming with Base Registers and the USING Instruction (C20-1614)

The programs used in the examples in this series of texts were prepared in IBM System/360 Basic Assembler Language format. They introduce and illustrate IBM System/360 concepts and assembler language concepts that will be helpful to a reader planning to use any IBM System/360 assembler language.

No attempt at completeness is made. It is assumed that the reader will refer to the Systems Reference Library publications for the specific programming conventions that concern him and for additional detail on other subjects. (14 pages)

C20-1628 IBM System/360 Pointers—Utility of 32-Bit Word for the Scientific User 99

This manual of System/360 pointers is intended to show the value of the 32-bit word in many scientific applications. It indicates that in many application areas the probability of adequate significance is high enough to warrant user examination with a worthwhile payoff in reduced job time and time over the 64-bit word. However, this study is intended merely as a guide, and each user should evaluate his own techniques, par-

ticularly in the smaller systems, to determine the full value of the 32-bit option for his installation. (33 pages)

C20-1629 IBM System/360 Pointers Large-Capacity Storage for System/360 99

A System/360 with low-cost auxiliary large-capacity storage (LCS) opens new avenues to problem solving. Some of the relevant factors are presented in this manual. First, the characteristics of LCS are summarized. Second, usage of LCS as an extension of main storage is explained. Third, three ways of using LCS as an input/output device are described—namely, Move instructions, channel-to-channel adapter, and storage channel. This writeup contains preliminary information concerning use of LCS. (6 pages)

C20-1632 An Introduction to PL/1 29

This introduction to PL/1 (Programming Language/One) presents some of the features of the language by means of sample programs; it is not intended to teach programming. The examples progress from the trivial to the more complex, and are intended to illustrate some concepts and uses of the language. This student text supersedes *Introduction to NPL*, Form C20-1617. (48 pages)

C22-6820 IBM System/360 Installation Manual—Physical Planning 15

This manual contains preliminary physical information for installing IBM System/360 data processing systems, including floor planning and electrical, environmental, and structural requirements. It discusses the physical characteristics of each unit and their effect on installation requirements. Detailed cable and location charts are included, together with illustrations and dimensions, on all cable connectors used in the system. (97 pages)

C24-3320 IBM System/360 Basic Programming Support; Sort/Merge (Tape) Program 33

This publication describes the IBM System/360 Basic Programming Support 8K Tape Sort/Merge Program. It contains the following information:

1. Minimum machine requirements for sorting or merging records with this program.
2. Program capabilities.
3. A description of the control statements required to define specific sort or merge operations.
4. A description of the facilities provided for inserting user-written routines into the program. (28 pages)

C24-3321 IBM Basic Operating System/360 33
Sort/Merge Program (8K Disk)

This publication describes the IBM Basic Operating System/360 8K Disk Sort/Merge Program. It contains the following information:

1. Minimum machine requirements for sorting or merging records with this program.
2. Program capabilities.
3. A description of the control statements required to define specific sort or merge operations.
4. A description of the facilities provided for inserting user-written routines into the program (43 pages)

C24-3337 IBM Operating System/360 28
Report Program Generator Language

This reference publication contains fundamentals of RPG programming and language specifications for the IBM Operating System/360 Report Program Generator. For information on the Operating System that is beyond the purpose of this language publication, see *IBM Operating System/360, Concepts and Facilities*, Form C28-6535, and *IBM Operating System/360 Data Management*, Form C28-6537. Examples and sample programs illustrate the use of the RPG language. (145 pages)

C24-3343 IBM System/360 Basic Programming 37
Support—Autotest (16K Tape)

This reference publication describes in detail the testing services provided by the Basic Programming Support Tape Autotest (16K Tape) program and the control cards necessary to use the services. The following features are discussed: Autopatch, display, panel, card list, Autotest Output Tape, the Autotest Card to Tape utility, the Autotest Tape to Printer utility, normal and abnormal dumps, and Disaster Continue. Special Autotest requirements of Job Control are also presented.

The reader should be familiar with *IBM System/360 Principles of Operation*, Form A22-6821 and *IBM System/360 Basic Programming Support Programmer's Guide (8K Tape)*, Form C24-3354. (45 pages)

C24-3345 IBM 1401/1460 Timing Program 33
for IBM System/360 Basic Programming
Support Sort/Merge Program (8K Tape)

This publication contains the specifications and operating procedures for the IBM 1401 and 1460 timing program used to estimate the amount of time required to sort records with the IBM System/360 Basic Programming Support Sort/Merge Program (8K Tape).

The following information is included in this publication:

1. Minimum machine requirements for estimating times with this program.
2. A description of the user-prepared information cards required to define the proposed sort operation.
3. The procedure to follow for executing the timing program.

The user of this publication should be familiar with *IBM System/360 Basic Programming Support Sort/Merge Program (8K Tape)*, Form C24-3320. For a list of associated 1401/1460 publications, see the *IBM 1401/1460 Bibliography*, Form A24-1495. (13 pages)

C24-3354 IBM System/360 Basic Programming 20
Support—Programmer's Guide (8K Tape)

The Programmer's Guide (8K Tape) describes the System/360 Basic Programming Support Tape Assembly System, use of the Control Programs, the Input/Output Control System (iocs), and Building, Maintenance and Service for the System Tape. A comprehensive introduction gives an overall picture of the contents of the entire manual. The major topics explained are:

1. Operation with the Control Programs:
 - a. Functions of the Supervisor: Interrupt handling, operator communication, the Channel Scheduler, and the communication region.
 - b. Job Control program. Control card formats, symbolic I/O assignment, restart procedure.
 - c. Loaders. Initial program loading and the Program Loader.
2. Input/Output Control System (iocs):
 - a. Labels.
 - b. File processing.
 - c. Record processing.
3. Use of the Tape Assembly System:
 - a. Job control with the System Tape.
 - b. Assembly of a Supervisor to be used with problem programs (user programs).
 - c. The Linkage Editor (relocates programs and resolves linkages between program sections).
 - d. Building a loadable program tape of user programs for batch execution.
4. System Tape Building, Maintenance and Service:
 - a. Building a System Tape.
 - b. Maintenance programs.
 - c. Service programs. (131 pages)

C24-3355 IBM System/360 Basic 21
Programming Support Assembler with
Input/Output Macros (8K Tape)

This reference publication describes the Basic Programming Support tape assembler language and the input/output (I/O) macros supplied by IBM for use in

programs written in the assembler language. The general features of the assembler language are described first, followed by a description of each of the three types of assembler language statements: machine-instruction, assembler-instruction, and macro-instruction statements. The description of macro-instructions consists of a description of each of the IBM-supplied I/O macros.

The reader should be familiar with the information presented in the publications: *IBM System/360 Principles of Operation*, Form A22-6821, and *IBM System/360 Basic Programming Support, Programmer's Guide (8K Tape)*, Form C24-3354. (132 pages)

**C24-3361 IBM Basic Operating System/360 21
Assembler with Input/Output Macros (8K Disk)**

This reference publication describes the assembler language and the input/output (I/O) macros supplied by IBM for use in writing programs for 8K disk-oriented System/360 installations. The general features of the assembler language are described first, followed by a description of each of three types of assembler language statements: machine-instruction, assembler-instruction, and macro-instruction statements. The description of the macro-instructions consists of a description of each of the IBM-supplied I/O macros.

The reader should be familiar with the information presented in the publications: *IBM System/360 Principles of Operation*, Form A22-6821, and *IBM Basic Operating System/360, Programmer's Guide (8K Disk)*, Form C24-3372. (169 pages)

**C24-3363 IBM System/360 Basic Programming 32
Support—Utility Programs**

This reference publication contains the specifications for 11 file-to-file utility programs for IBM System/360 Basic Programming Support. These programs are concerned with the transfer of files from input mediums to output mediums.

The programs are:

- Tape to Tape
- Tape to Disk
- Tape to Card
- Tape to Printer
- Disk to Tape
- Disk to Disk
- Disk to Card
- Disk to Printer
- Card to Tape
- Card to Disk
- Card to Printer and/or Punch (45 pages)

**C24-3364 IBM Basic Operating System/360 and 21
IBM System/360 Basic Programming Support
Macro Definition Language (8K Disk/Tape)**

This reference publication describes the macro definition language for the IBM Basic Operating System/360 (8K Disk) and the IBM System/360 Basic Programming Support (8K Tape). The language described in this publication can be used to facilitate the writing of an assembler language program.

The reader should be familiar with the information presented in these publications: *IBM System/360 Principles of Operation*, Form A22-6821; *IBM Basic Operating System/360 Assembler with Input/Output Macros (8K Disk)*, Form C24-3361; and *IBM System/360 Basic Programming Support Assembler with Input/Output Macros (8K Tape)*, Form C24-3355. (45 pages)

**C24-3372 IBM Basic Operating System/360 20
Programmer's Guide (8K Disk)**

This publication describes the 8K disk resident version of the IBM Basic Operating System/360. The system is a set of control programs and processing programs provided for smaller configurations of the IBM System/360. Utilizing IBM 2311 Disk Storage for on-line program residence, Basic Operating System/360 provides stacked-job processing capability, controls all input/output, and provides for continuous operation of all programs run in its environment.

This Programmer's Guide includes descriptions of the control programs, service programs, and system facilities supported by IBM. A comprehensive introduction gives an over-all picture of the entire system. Detailed information is given on these major topics:

1. Operation with the System Control Programs:
 - a. System Organization
 - b. Supervisor Functions
 - c. Job Control Program.
2. Using the System Service Programs:
 - a. Linkage Editor
 - b. Librarian
 - c. System Generation.
3. Data Management:
 - a. Input/Output Control System (IOCS)
 - b. Disk File Organization
 - c. File Processing
 - d. Labels.

(174 pages)

**C24-3374 IBM System/360 Basic Programming 28
Support—Report Program Generator (Card)**

This reference publication contains complete programming specifications for the IBM System/360 Report Program Generator (Card). Included are the basic func-

tions of RPG for readers with unit record experience who are not familiar with RPG. (110 pages)

C24-3377 IBM 1401/1460 Timing Program 33
for IBM Basic Operating System/360
Sort/Merge Program (8K Disk)

This publication contains the specifications and operating procedures for the IBM 1401 and 1460 timing program used to estimate the amount of time required to sort records with the IBM Basic Operating System/360 8K Disk Sort/Merge program.

The following information is included in this publication:

1. Minimum machine requirements for estimating times with this program.
2. A description of the user-prepared information cards required to define the proposed sort operation.
3. The procedure to follow for executing the timing program.

The user of this publication should be familiar with *IBM Basic Operating System/360 Sort/Merge Program (8K Disk)*, Form C24-3321. For a list of associated 1401/1460 publications, see *IBM 1401/1460 Bibliography*, Form A24-1495. (13 pages)

C24-3378 IBM Basic Operating System/360 37
Autotest Specifications (8K Disk)

This reference publication describes in detail the testing services provided by Disk Autotest in the Basic Operating System—8K Disk and the control cards necessary to use the services. The following services are discussed: autopatch, display, panel, the autotest card to tape (variable) utility, the normal and abnormal end of job dumps including the symbolic dump, testing immediately following an assembly, and separate assemblies and tests. Special autotest requirements for job control are also presented.

The reader should be familiar with *IBM System/360 Principles of Operation*, Form A22-6821; *IBM Basic Operating System/360 Programmer's Guide (8K Disk)*, Form C24-3372; *IBM Basic Operating System/360 Utility Programs (8K Disk)*, Form C24-3409; and *IBM Basic Operating System/360 Assembler with Input/Output Macros (8K Disk)*, Form C24-3361. (110 pages)

C24-3387 IBM Basic Operating System/360 28
Report Program Generator Language
Specifications (8K Disk)

This reference publication contains fundamentals of RPG programming and language specifications for the IBM Basic Operating System/360 Report Program Generator. For information on the Basic Operating System

that is beyond the purpose of this language publication, see *IBM Basic Operating System/360 Programmer's Guide (8K Disk)*, Form C24-3372. (153 pages)

C24-3391 Basic Programming Support 20
Operating Guide: Basic Tape
System (8K)

This publication discusses briefly the overall concepts of using the various programs in the Basic Tape System. It describes the function and operation of the Control Programs used in conjunction with the IBM-supplied system tape or user's object program. A section listing error messages provided by the programs or routines is included. System operator communication is discussed, and a section of reference charts for System/360 coding is also included.

Each individual program section gives the specific operating procedure for that particular program, supplying information such as: description of card decks, and procedures to be followed.

Refer to the SRL publication, *IBM System/360 Model 30 Operator's Guide*, Form A24-3373, for information about the operation of the System/360. (91 pages)

C24-3392 IBM System/360 Basic Program 32
Support Operating Guide: Utility Programs

This reference publication contains the guidelines to operate the following file-to-file utility programs:

- Tape-to-Tape Program 360P-UT-054
- Tape-to-Card Program 360P-UT-053
- Tape-to-Printer Program 360P-UT-052
- Card-to-Tape Program 360P-UT-051
- Card-to-Printer/Punch Program 360P-UT-050.

These programs can be ordered individually or by group program number.

The reader should be familiar with the IBM System/360 publications: *IBM System/360 Basic Programming Support Utility Programs*, Form C24-3363; *IBM System/360 Principles of Operation*, Form A22-6821; and other device manuals associated with his device configuration. (17 pages)

C24-3396 IBM System/360 Basic 32
Programming Support Operating Guide
Universal Character Set Utility Program

This reference publication contains the *Operating Guide* for the Universal Character Set Utility Program used to load the read/write storage units in the IBM 2821 Control Unit. Included in the manual are a description of the UCS program deck, control cards, system and deck preparation, error waits and options, and operating instructions. An *Appendix* contains related information including standard train/chain arrange-

ments and the Extended Binary Coded Decimal Interchange Code.

The user of this publication should be familiar with *IBM 2821 Control Unit*, Form A24-3312 and *IBM 1403 Printer*, Form A24-3073. (21 pages)

C24-3398 IBM System/360 Basic 30
Programming Support Input/Output
(1412/1419)

This publication describes the programming necessary to use Input/Output 1412/1419 (I/O 1412/1419) for processing document records from an IBM 1412 or 1419 Magnetic Character Reader with an IBM System/360. The general description gives an over-all picture of how the program operates. The user should be familiar with the following IBM publications: *IBM System/360 Principles of Operation*, Form A22-6821; *IBM System/360 Basic Programming Support, Programmer's Guide (8K Tape)*, Form C24-3354; *IBM System/360 Basic Programming Support, Basic Assembler Language*, Form C28-6503; *IBM System/360 Model 30 Functional Characteristics*, Form A24-3231; *IBM 1412 Magnetic Character Reader*, Form A24-1421; and *IBM 1219 Reader Sorter, IBM 1419 Magnetic Character Reader*, Form A24-1499. (20 pages)

C24-3409 IBM Basic Operating System/360 32
Utility Programs

This reference publication describes the IBM Basic Operating System/360 Utility programs. The programs described are:

1. Eleven file-to-file programs for transferring a file from input mediums to output mediums.
2. A program to clear one or more areas of disk storage and establish pre-formatted tracks.

The reader should be familiar with the information presented in the publication *IBM Basic Operating System/360 Programmer's Guide (8 Disk)*, Form C24-3372. (52 pages)

C24-3417 Basic Programming Support 37
Operating Guide: Autotest (8K Tape)

This reference publication contains information the operator must know to test an object program using the 8K Tape Autotest Program. Autotest can be executed only on a machine with a minimum of 16K positions of main storage.

The reader should be familiar with the IBM System/360 publications: *IBM System/360 Basic Programming Support Autotest (8K Tape)*, Form C24-3343; *IBM System/360 Basic Programming Support*

Operating Guide: Basic Tape System (8K), Form C24-3391; and *IBM System/360 Model 30 Operators Guide*, Form A24-3373. (16 pages)

C24-3418 IBM System/360 Basic 28
Programming Support Report Program
Generator Language Specifications
(8K Tape)

This reference publication contains complete programming specifications for the IBM System/360 Report Program Generator (8K Tape). Included are the basic functions of RPG for readers with tape experience who are not familiar with RPG. For more detailed information regarding the generation of system tapes and input/output facilities provided, refer to the publication *IBM System/360 Basic Programming Support Programmer's Guide (8K Tape)*, Form C24-3354. (137 pages)

C24-3437 Basic Programming Support 30
(Input/Output) 1418/1428

This publication describes the input/output 1418/1428 (I/O 1418/1428) supplied by IBM for System/360 application using the IBM 1418 or 1428 Optical Character Readers. The I/O 1418/1428 program provides complete interruption-handling capability, controls all input/output, and controls a document buffer for maximum throughput.

The reader should be familiar with the information presented in the following publications: *IBM System/360 Principles of Operation*, Form A22-6821; *IBM System/360 Basic Programming Support, Basic Assembler Language*, Form C28-6503; *IBM 1418 Optical Reader, IBM 1428 Alphameric Optical Reader*, Form A24-1473. (40 pages)

C26-5996 IBM Basic Operating System/360 36
IBM 1070 Process Communication
Supervisor

This publication provides specifications for the IBM 1070 Process Communication Supervisor. This supervisor works in conjunction with the IBM Basic Operating System/360 (8K Disk) to handle telecommunications between a System/360 host computer and a network of remotely-located 1070 terminals.

Included in this publication are detailed descriptions of the routines that make up the supervisor package, the macro-instructions used to call the routines, and performance data to help plan for use of the system. Also included is a glossary of process communication terms and a sample program illustrating the use of the supervisor in a typical application. (34 pages)

C26-5999 IBM System/360 RPG Translator 28

This manual provides programming specifications for the IBM System/360 RPG Translator. It describes the operations necessary for converting a 1400 RPG source program to a System/360 RPG source program.

The information contained in this publication will enable a 1400 RPG programmer to determine and to formulate preliminary plans for its use.

This manual lists the machine features required and supported, describes the functional characteristics of the program, and provides a section on data checking and operating characteristics. Restrictions to the program are defined, and suggested solutions are provided. A program example is also included.

Related System/360 RPG literature is contained in the following publications: *IBM System/360 Model 20 Report Program Generator*, Form C26-3600; *IBM System/360 Basic Programming Support RPG (Card)*, Form C24-3374; *IBM Basic Operating System/360 RPG Language Specifications (8K Disk)*, Form C24-3387; and *IBM Operating System/360 Report Program Generator Language*, Form C24-3337. (20 pages)

C27-6908 IBM System/360 Emulation of the IBM 7074 Data Processing System Preliminary Specifications 35

This publication contains preliminary information about the IBM 7074 Emulator program to be used with the IBM 7070/7074 Compatibility Feature. The Emulator, comprising the Emulator program and the Compatibility Feature, allows execution of programs written for the IBM 7070 and 7074 on certain models of IBM System/360 Groups 50 and 65. This publication is intended to assist current IBM 7070 and IBM 7074 users in planning for the use of the Emulator. (20 pages)

C28-6501 IBM 7090/7094 Support Package for IBM System/360 35

The IBM 7090/7094 Support Package for the IBM System/360 consists of three programs. These programs are designed to permit the assembly, testing, and execution on an IBM 709, 7090, 7094, or 7094 II Data Processing System, of programs written for an IBM System/360. The three component programs are a 7090 assembly program, a 7090 simulator program, and a 1401 input program.

The support package can process all System/360 assembler language and machine language programs that are not specifically dependent on input/output timing considerations. It accepts the machine instruction and assembler instruction mnemonic codes of the IBM System/360 special support basic assembler language and simulates the standard, scientific, commercial, universal, storage protection, and direct con-

trol instruction sets of System/360. It simulates most input/output operations and most interruption procedures of System/360. Simulation of up to 64K bytes of System/360 main storage is allowed. With certain limitations, the support package simulates the operations of the 1052 Printer-Keyboard, 1402 Card Read Punch, 1403 Printer, 1442 Card Read Punch, 1443 Printer, and the 2401, 2402, 2403, and 2404 Magnetic Tape Units. In addition, it provides extensive facilities for use in detecting and tracing errors in object programs.

Assembly and simulator programs operate under a supervisor program called in by the 7090/7094 Operating System Monitor, *IBSYS*.

It is assumed that the user of this publication is familiar with the basic assembler language and with the *IBM System/360 Principles of Operation*, Form A22-6821. (73 pages)

C28-6503 IBM System/360 Special Support Basic Assembler Language 21

This publication contains complete information for writing programs in the basic assembler language, a symbolic programming language for the IBM System/360. The basic assembler language provides programmers with a convenient way to make full use of the operating capabilities of the IBM System/360. Source programs written in the basic assembler language are translated into object programs by a program called basic assembler.

The basic assembler and its language are both described in this publication. The description of the language includes the rules for writing source programs, a list of the machine instructions that can be represented symbolically, and explanations of the instructions used to control the basic assembler. The description of the basic assembler is of those features that affect the planning and writing of source programs. (69 pages)

C28-6504 IBM System/360 Special Support FORTRAN Language 25

The IBM System/360 special support FORTRAN language is a set of statements, composed of expressions and operators, which are used to write a source program. The FORTRAN language provides users with an easy method for efficiently writing and documenting programs. It closely resembles the language of mathematics and is designed to be used primarily for mathematically oriented computer applications. The presentation of material in this publication is such that no previous knowledge of the FORTRAN language is required. (56 pages)

C28-6505 IBM System/360 Special Support Utility Programs 32

This publication provides information on the special support utility programs provided for users of the IBM System/360. The programs are relocatable program loader, absolute program loader, dump program, and input/output support package. Basic functions of these programs are to load assembled programs in absolute and relocatable format, to provide listings of the contents of storage, and to provide routines needed to operate input/output devices. Functions of each program and modifications possible in each program are described. The publication includes sufficient information to allow the user to evaluate the IBM provided utility programs in planning his installation requirements. (38 pages)

C28-6513 IBM Operating System/360 FORTRAN IV (E Level Subset) 25

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

The FORTRAN IV (E Level Subset) language is a symbolic programming language. It parallels the symbolism and format of mathematical notation. In addition, many programming features and facilities are available for expressing the method of solution of a mathematical problem as a meaningful FORTRAN program. (83 pages)

C28-6514 IBM System/360 Operating System Assembler Language 21

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. Page II of this publication describes an extension of the assembler language—the macro language—used to define macro-instructions. (86 pages)

C28-6515 IBM System/360 Operating System FORTRAN Language 25

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. (61 pages)

C28-6516 IBM Operating System/360 COBOL Language 24

COBOL (Common Business Oriented Language) is similar to English. It was developed by the Conference of Data Systems Languages (CODASYL). COBOL provides a convenient method of coding programs to handle commercial data processing problems.

This publication describes COBOL as implemented for the IBM Operating System/360.

Two COBOL compilers are implemented for Operating System/360, called COBOL E and COBOL F. Differences between the features implemented by the two compilers are discussed in the preface. IBM extensions to COBOL are also discussed in the preface.

This publication discusses the four divisions of a COBOL program and describes the following special features of System/360 COBOL:

1. Report Writer Feature
2. Sort Feature
3. Source Program Library Facility
4. Specifications for the Sterling Currency Feature and International Considerations
5. COBOL Debugging Language

Three appendixes are included:

1. A list of definitions of terms in COBOL formats
2. A COBOL word list
3. A sample problem on asynchronous processing

This publication provides the programmer with rules for writing programs in COBOL for System/360. Users unacquainted with COBOL should first familiarize themselves with the publication: *COBOL: General Information Manual*, Form F28-8053-2. (169 pages)

C28-6528 IBM System/360 Simulator for the IBM 1410/7010 Preliminary Specifications 35

This publication contains information needed in planning for use of the Simulator during the conversion of a 1410/7010 installation to a System/360 installation.

In effect, the Simulator will enable the System/360 to perform as a 1410/7010. This will permit the running of 1410/7010 programs that are not rewritten for the System/360.

The reader should be familiar with the contents of the following publications: *IBM System/360 System Summary*, Form A22-6810; *IBM System/360 Principles of Operation*, Form A22-6821; *IBM 1410 Principles of Operation*, Form A22-0526; and *IBM 7010 Principles of Operation*, Form A22-6726. (13 pages)

C28-6530 IBM System/360 Simulator 35
for the IBM 7070/7074
Preliminary Specifications

This publication contains information needed in planning for use of the Simulator during the conversion of a 7070/7074 installation to a System/360 installation.

In effect, the Simulator will enable the System/360 to perform as a 7070/7074. This will permit the running of 7070/7074 programs that are not rewritten for the System/360.

The reader should be familiar with the contents of the following publications: *IBM System/360 System Summary*, Form A22-6810; *IBM System/360 Principles of Operation*, Form A22-6821; *IBM 7070/7074 Data Processing Systems*, Form A22-7003. (14 pages)

C28-6531 IBM System/360 Simulator 35
for the IBM 7080
Preliminary Specifications

This publication contains information needed in planning for use of the Simulator during the conversion of a 7080 installation to a System/360 installation.

In effect, the Simulator will enable the System/360 to perform as a 7080. This will permit the running of 7080 programs that are not rewritten for the System/360.

The reader should be familiar with the contents of the following publications: *IBM System/360 System Summary*, Form A22-6810; *IBM System/360 Principles of Operation*, Form A22-6821; *IBM 7080 Principles of Operation*, Form A22-6560. (12 pages)

C28-6532 IBM System/360 Simulator 35
for the IBM 7090/7094
Preliminary Specifications

This publication contains information needed in planning for use of the Simulator during the conversion of a 7090/7094 installation to a System/360 installation.

In effect, the Simulator will enable the System/360 to perform as a 7090/7094. This will permit the running of 7090/7094 programs that are not rewritten for the System/360.

The reader should be familiar with the contents of the following publications: *IBM System/360 System Summary*, Form A22-6810; *IBM System/360 Principles of Operation*, Form A22-6821; *IBM 7090 Principles of Operation*, Form A22-6528; *IBM 7094 Principles of Operation*, Form A22-6703; *Operator's Guide for IBM 7090 Data Processing System*, Form A22-6535. (14 pages)

C28-6534 IBM Operating System/360 20
Introduction

This publication describes the general organization, function, and application of Operating System/360.

Operating System/360 is designed to extend the performance and application of Computing System/360 and to assist the manager, programmer, and operator of the system. The operating system consists of a comprehensive set of language translators and service programs operating under the supervisory control and coordination of an integrated set of control routines. It is designed for use with Models 30, 40, 50, 60, 62, 70, and 92 of Computing System/360. The operating system is located in direct-access storage, such as disk or drum, and operates on a computing system having 32,768 bytes or more of main storage. (22 pages)

C28-6535 IBM Operating System/360 36
Concepts and Facilities

This publication describes the basic concepts of Operating System/360 and guides the programmer in the use of its various facilities.

Operating System/360 is a comprehensive set of language translators and service programs, operating under the supervisory control and coordination of an integrated control program. It is designed for use with Groups 30, 40, 50, 60, 62, 70, and 92 of Computing System/360. It assists the programmer by extending the performance and application of the computing system. (92 pages)

C28-6537 IBM Operating System/360 30
Data Management

This publication contains preliminary information concerning the data management facilities of IBM Operating System/360. It provides programmers coding in the assembler language with the information necessary to begin designing programs using these facilities.

This publication describes the cataloging, space allocation, and data access features of the operating system. Information is also included on record and label formats and data organizations. (70 pages)

C28-6538 IBM Operating System/360 48
Linkage Editor

This publication provides programmers and systems analysts with the information necessary to make effective use of the linkage editor of Operating 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 as a part of the control program. (47 pages)

C28-6539 IBM Operating System/360 48
Job Control Language

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. (33 pages)

C28-6540 IBM Operating System/360 36
Operating Considerations

This publication provides preliminary operating information for IBM Operating System/360, for planning and training purposes. It includes a brief discussion of the operator's duties, plus descriptions of the console input/output device and the system control panel that he will use. Initialization procedures, input/output device allocation procedures, job control information, operator commands, and the general format of console messages are outlined. (26 pages)

C28-6541 IBM Operating System/360 50
Control Program Services

This publication describes the use of system macro-instructions that request the supervisor, data management, and test translator services of the Operating System/360 control program. It also presents the linkage conventions that have been established for use in Operating System/360. (332 pages).

C28-6543 IBM System/360 Operating 33
System—Sort/Merge Program

This publication provides programmers and systems analysts with the preliminary specifications for the IBM Operating System/360 Sort/Merge Program. This

material is for planning purposes; detailed information will be provided when the system is released. The programming information given includes the specifications for using the program, instructions for preparing control statements, and a general description of the program, including facilities for modifications. Timing estimates are provided in the "Appendix."

The sort/merge program provides a generalized sorting and merging capability that adjusts itself to each particular application. (115 pages)

C28-6551 IBM Operating System/360 20
Storage Estimates

This publication contains preliminary information concerning the main and auxiliary storage requirements of IBM Operating System/360. It is directed to system programmers responsible for the selection and evaluation of an installation's operating system. Brief discussions of control program features are also included. (73 pages)

C28-6553 IBM Operating System/360 30
Telecommunications

This publication contains preliminary information on how to apply and use IBM Operating System/360 for remote message processing and how to use the control program for performing the input/output operations of a data communications system.

Guidance is provided for problem programming within the system. Descriptions of applicable macro-instructions, suggesting how, when, and where to use them are also included. (88 pages)

C28-6555 IBM System/360 Basic Programming 21
Support—Basic Assembler—Program Logic Manual

This publication was prepared by Programming Systems to provide detailed information on the internal logic of the IBM System/360 Basic Programming Support Basic Assembler. It is intended for technical personnel who are responsible for diagnosing the system operation and/or adapting the programming system to special usage. (103 pages)

C28-6556 IBM System/360 Basic Programming 32
Support—Basic Utilities—Program Logic Manual

This manual provides detailed information on the internal logic of the IBM System/360 Basic Programming Support Basic Utilities. The programs are:

- Absolute Loader
- Relocating Loader

Single-Phase Dump Program
Two-Phase Dump Program
I/O Support Package

This publication is intended for technical personnel who are responsible for analyzing program operations, diagnosing them, and/or adapting them to special usage. (136 pages)

C28-6557 IBM System/360 Basic Programming 50
Support—Operating Guide for Basic
Assembler and Utilities

This publication describes the preparation and use of the Basic Assembler and Basic Utility Programs. The Basic Assembler converts programs written in the assembler language into machine language object code. The Basic Utility Programs are concerned with loading programs into storage, printing out the contents of storage, and using input/output devices. (29 pages)

C28-6559 IBM System/360 Transition Aids: 24
COBOL Language Conversion Program
for the IBM 1401 Preliminary Specifications

This publication contains preliminary information about the IBM COBOL Language Conversion Program (COBOL LCP). The COBOL LCP facilitates transition to IBM System/360 by converting COBOL source programs written for IBM current-system COBOL compilers into source programs for a System/360 COBOL compiler, Design Level E or Design Level F. This publication is intended to assist users of current COBOL in planning for use of the COBOL Language Conversion Program. (42 pages)

C28-6560 IBM System/360 Transition Aids: 25
FORTRAN II Language Conversion
Program for the IBM 1401
Preliminary Specifications

This publication contains preliminary information about the IBM FORTRAN II Language Conversion Program (FORTRAN LCP). The FORTRAN LCP facilitates transition to IBM System/360 by detecting statements in current-systems FORTRAN II source programs that are incompatible with System/360 FORTRAN IV, by converting these statements to the proper System/360 format when possible, and by flagging statements that cannot be converted. This publication is intended to assist programmers and other installation personnel in planning for use of this conversion program. (71 pages)

C28-6561 IBM System/360, Model 40 35
Emulation of the IBM 1401/1460
Data Processing Systems

This publication provides preliminary information for the user who is planning to supplement or replace his IBM 1401 or 1460 card/tape system with an IBM System/360, Model 40. Emulation is a technique which utilizes both equipment capabilities (Compatibility Feature) and programming to execute object programs of other data processing systems. This technique provides substantial improvement over the speeds achievable with simulators. The 1401/1460 Emulator allows the user to run 1401/1460 programs on the System/360, Model 40, with little or no reprogramming.

Included in this document are the characteristics, functions, requirements, limitations, and operating procedures of the Emulator. (16 pages)

C28-6563 IBM System/360, Model 40 35
Emulation of the IBM 1410/7010
Data Processing Systems

This publication provides preliminary information for the user who is planning to supplement or replace his IBM 1410 or 7010 card/tape/disk system with an IBM System/360, Model 40. Emulation is a technique which utilizes both equipment capabilities (Compatibility Feature) and programming to execute object programs of other data processing systems. The 1410/7010 Emulator allows the user to run 1410/7010 programs on the System/360, Model 40, with little or no programming. This technique provides substantial improvement over the speeds achievable with simulators.

Included in this document are the characteristics, functions, requirements, limitations and operating procedures of the Emulator. (24 pages)

C28-6565 IBM System/360, Model 65 35
Emulation of the IBM 709/7090/7094/
7094 II Data Processing Systems

This publication provides preliminary information about the characteristics, functions, requirements, limitations, and operating procedures of the IBM 709/7090/7094/7094 II Emulator. This Emulator allows the user who plans to supplement or replace his present data processing system with the IBM System/360, Model 65, to execute his current programs on the IBM System/360 without reprogramming.

Emulation is a technique that uses special equipment and programming to execute programs written for one data processing system on another. This technique is similar to, but substantially faster than, simulation. (24 pages)

C28-6568 IBM System/360, Model 50 35
Emulation of the IBM 1410/7010
Data Processing Systems

This publication provides preliminary information for the user who is planning to supplement or replace his IBM 1410 or 7010 card/tape/disk system with an IBM System/360, Model 50. Emulation is a technique which utilizes both equipment capabilities (Compatibility Feature) and programming to execute object programs of other data processing systems. The 1410/7010 Emulator allows the user to run 1410/7010 programs on the System/360, Model 50, with little or no reprogramming. This technique provides substantial improvement over the speeds achievable with simulators.

Included in this document are the characteristics, functions, requirements, limitations, and operating procedures of the Emulator. (20 pages)

C28-6570 IBM System/360 Transition Aids 24
COBOL Language Differences

This publication summarizes the System/360 and Current Systems specifications for major IBM COBOL language elements requiring evaluation, and possible conversion, during the transition to IBM System/360 COBOL. System/360 COBOL differences from Current Systems COBOL are also summarized. Where pertinent, the distinction is made between Level E and Level F COBOL for System/360. (79 pages)

C28-6571 IBM Operating System/360 29
PL/1: Language Specifications

This manual is a description of the full facilities of PL/1 to be implemented under Operating System/360. However, the reader should not assume that all facilities will be available at initial release. Manuals for specific System/360 implementations will be released later.

Another publication will be issued specifying a subset of the facilities of the language described in this manual. This subset is planned for implementation under the Basic Operating System/360 and Basic Program Support for System/360. (158 pages)

C28-6586 IBM Operating System/360 32
Utilities

This publication contains preliminary information on the capabilities and requirements for executing Operating System/360 utility programs. These programs are used by programmers responsible for organizing and maintaining Operating System/360 data.

Three types of utility programs are discussed: *system utilities* and *data set utilities*, which are designed for direct use with Operating System/360; and *independent utilities*, which are designed to operate outside and in support of the operating system. System utilities deal with operating system control data. Data set utilities handle individual data set records. Independent utilities initialize, dump, and restore direct-access volumes. (40 pages)

C28-6906 IBM Operating System/360 48
Programming Support for
IBM 2250 Display Unit

The Graphic Programming Support Package provides a variety of modules that free a programmer from tedious and repetitive coding of standard functions, and that perform functions denied a routine in the problem state. This publication provides a System/360 programmer, coding in the assembler language, with preliminary information needed to effectively apply the capabilities of the IBM 2250 Display Unit to his problem.

Descriptions of macro-instructions are presented, including applications, actions, formats, options, restrictions, and programming notes. Problem-oriented routines, which serve as basic building blocks for problem-program applications, are discussed in a similar fashion. Pertinent information regarding modules that assure compatibility between the operating system and the IBM 2250 Display Unit is also included. Aspects of program logic are discussed where they are necessary. (68 pages)

L22-6871 Manual Switching Unit 13
RPQ 8, 80576
Special Systems Feature Bulletin

This bulletin describes the function of the manual switching unit for System/360 signal lines. Physical and electrical requirements are given along with examples of possible system configurations utilizing a switching unit. (1 sheet)

R20-4052 IBM System/360 Education 90
Program

This folder is to be used by customer management, in conjunction with IBM marketing representatives, to plan a comprehensive System/360 education program for an installation. It contains descriptions of the System/360 courses offered by IBM and a representative organization chart which has a recommended course sequence for each job function. This chart is to be used as an aid for determining when personnel should attend courses scheduled at IBM Education Centers. Space is provided for entering the names of

specific personnel and course dates under each course. (Folded card)

R20-9064 IBM System/360 COBOL Coding 90
Course Description

The IBM System/360 COBOL Coding Course Description describes the course, its objectives and length, the intended audience, the prerequisites and the course code. It lists all materials required by the instructor and the students. Abstracts are included for the educational materials created specifically for the course. Also, abstract references are provided for the other materials. (4 pages)

R20-9105 IBM System/360 FORTRAN IV 90
Programmed Instruction—Course Description

The IBM System/360 FORTRAN IV Programmed Instruction Course Description describes the course, its objectives and length, the intended audience, the prerequisites and the course code. It lists all materials required by the instructor and the students. Abstracts are included for the educational materials created specifically for the course. Also, abstract references are provided for the other materials. (4 pages)

R20-9106 IBM System/360 Operator 90
Planning—Course Description

This course description describes the course, its objectives and length, the intended audience, the prerequisites and the course code. It lists all materials required by the instructor and the students. Abstracts are included for the educational materials created specifically for the course. Also, abstracts references are provided for the other materials. (3 pages)

X20-1702 Proportional Record Layout 80
Format Forms

The front side of this form consists of the Proportional Record Layout Form. It is suitable for card, tape, and disk records. Positional markings are 00–99 and 01–100.

The back side of the form is the Record Format Form. This form permits record layouts to be prepared without the space limitations of positional markings. Space is also provided for reference data.

These forms are general-purpose and may be used for all systems. (25 per pad—11 x 16½)

X20-1703 System/360 Reference Data Card 80
The information on this card is a digest of the data contained in the *IBM System/360 Principles of Opera-*

tion, Form A22–6821 and *IBM Basic Support Assembler with Input/Output Macros (8K Tape)*, Form C24–3355. (Card– 5 fold)

X20-1704 IBM 2321 Data Cell Drive 80
Reference Card

A capacity and transmission time reference card arranged in a tabular format. Formulas and examples of how to use the card are included. (Folded Card)

X20-1705 IBM 2311 Disk Cell Drive 80
Reference Card

A capacity and transmission time reference card arranged in a tabular format. Formulas and examples of how to use the card are included. (Folded Card)

X20-1706 IBM 2302 Disk Storage Drive 80
Reference Card

A capacity and transmission time reference card arranged in a tabular format. Formulas and examples of how to use the card are included. (Folded Card)

X20-1707 IBM 7320 Drum Storage 80
Reference Card

A capacity and transmission time reference card arranged in a tabular format. Formulas and examples of how to use the card are included. (Folded Card)

X22-6834 IBM System/360 Unit Record I/O 80
Template

Equipment templates on acetate sheets, ¼ inch equals 1 foot scale, for planning machine room layouts. (1 sheet)

X22-6835 IBM System/360 Hypertape Template 80
Equipment templates on acetate sheets, ¼ inch equals 1 foot scale, for planning machine room layouts. (1 sheet)

X22-6837 Magnetic Tape Record 80
Characteristics—IBM 2400 Series
Magnetic Tape Units

This card is presented as an aid in estimating tape processing time and record capacity per reel. (Card)

X22-6840 Hypertape Capacity and Timing 80
This card is presented as an aid in estimating tape processing time and record capacity per reel. (Card)

- X22-6855 Magnetic Tape Template 80**
Equipment templates on acetate sheets, ¼ inch equals 1 foot scale, for planning machine room layouts. (1 sheet)
- X22-6856 IBM System/360 Processors Template 80**
Equipment templates on acetate sheets, ¼ inch equals 1 foot scale, for planning machine room layouts. (5 sheets)
- X22-6857 Communication Equipment Template 80**
Equipment templates on acetate sheets, ¼ inch equals 1 foot scale, for planning machine room layouts. (1 sheet)
- X22-6858 Data Storage Template 80**
Equipment templates on acetate sheets, ¼ inch equals 1 foot scale, for planning machine room layouts. (3 sheets)
- X22-6859 IBM System/360 Consoles and Terminals Template 80**
Equipment templates on acetate sheets, ¼ inch equals 1 foot scale, for planning machine room layouts. (2 sheets)
- X22-6860 Magnetic and Optical Character Readers Template 80**
Equipment templates on acetate sheets, ¼ inch equals 1 foot scale, for planning machine room layouts. (1 sheet)
- X24-3330 Card Punch Layout—80 Column 80**
This form provides 25 lines of 80 columns each to assist programmers when coding in card format. (25 per pad—8½ x 13)
- X24-3347 IBM System/360 RPG File Description Sheet 80**
The file description specification sheet provides information about the input and output files used by the object program. (25 per pad—8½ x 13)
- X24-3348 IBM System/360 RPG File Extension Sheet 80**
The file extension sheet is used to provide information about table files, chaining files, and record address files. (25 per pad—8½ x 13)
- X24-3349 IBM System/360 RPG Line Counter Specification Sheet 80**
This line-counter specification sheet is used if a report that will ultimately be printed is to be stored on some intermediate device, and if the program uses overflow indicators (for automatic skipping). (25 per pad—8½ x 13)
- X24-3350 IBM System/360 RPG Input Specification Sheet 80**
The input specification sheet is used to specify the files to be read into the system, identify records contained in the file, and describe the location of the data fields in each record. (25 per pad—8½ x 13)
- X24-3351 IBM System/360 RPG Calculation Specification Sheet 80**
The calculation specification sheet is used to specify operations and calculations on input data obtained from previous calculations. (25 per pad—8½ x 13)
- X24-3352 IBM System/360 RPG Output-Format Specification Sheet 80**
This output-format specification sheet is used to specify the location of the data fields in the output records and the kind of output fields to be produced. (25 per pad—8½ x 13)
- X24-3376 IBM 1052 Key-tabs—System/360 Model 30 80**
These key-tabs are fastened on the front of the keys on the IBM 1052 when the Model 30 is being operated in 1400 Compatibility mode. (Plastic Sheet—5½ x 8½)
- X24-3406 IBM 2702 Worksheet—System/360 Model 30 80**
Multiplexor channel multiplex mode loading evaluation for IBM System/360 Model 30 may indicate an apparent overload for the IBM 2702 Transmission Control Unit (when attached to the multiplexor channel). The IBM 2702 Worksheet is then used with an alternate procedure for evaluation of the 2702. This worksheet is designed for use with the alternate procedure for the 2702 described in *IBM System/360 Model 30 Channel Characteristics and Functional Evaluation*, Form A24-3411. (25 per pad—11 x 16½)

X24-3407 Multiplexor Channel Worksheet— 80
System/360 Model 30

This worksheet is used to facilitate evaluation of the channel effects imposed upon IBM System/360 Model 30 when the multiplexor channel is operating in multiplex mode. The evaluation procedure is described in the *IBM System/360 Model 30 Channel Characteristics and Functional Evaluation*, Form A24-3411. (25 per pad—11 x 16½)

X28-6506 IBM System/360 Assembler Short 80
Coding Form

This form is designed to assist programmers in coding programs in the IBM System/360 special support basic assembler language, as described in Form C28-6503. (25 per pad—8½ x 11)

X28-6507 IBM System/360 Assembler Long 80
Coding Form

This form is designed to assist programmers in coding programs in the IBM System/360 special support basic assembler language, as described in Form C28-6503. (25 per pad—8½ x 14)

X28-6509 IBM System/360 Assembler 80
Coding Form

This form is designed to assist programmers in coding programs in the IBM System/360 operating system assembler language, as described in Form C28-6514. (25 per pad—8½ x 14)



**International Business Machines Corporation
Data Processing Division
112 East Post Road, White Plains, N. Y. 10601**