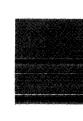# IBM

Systems Reference Library

IBM 7090/7094 Bibliography

This bibliography contains lists and descriptions of the available reference literature for the installation, programming, and operation of the IBM 7090/7094 Data Processing Systems.

In Part 1, the publications are listed by major subject codes. These subject codes provide a sequence for organizing a library of 7090/7094 publications. Part 2 provides a cross-index of publications by machine number. Part 3 provides abstracts, in form-number sequence, of all the publications. Copies of most form-numbered publications can be ordered through the local IBM Sales Representative.

The literature for related IBM Tele-Processing® equipment will be found in the publication *IBM Tele-Processing Bibliography*, Form A24-3089.

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.

Other publications of general interest to a system user (e.g., Education Course Descriptions, Original Equipment Manufacturers' Information manuals) are listed under the heading "Supplementary Information" without a subject code.

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 programming 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 separatedy 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 *Catalog of Programs for IBM Data Processing Systems* (Form C20-8090).

Part 1 — Library Subject Code Listing

This part of the bibliography lists current publications pertaining to the IBM 7090/7094 Data Processing System. New and revised publications will be announced by newsletters referring to this bibliography. Part 3 of the bibliography contains abstracts of the publications listed. (An asterisk preceding the title of a publications indicates that the publication is of interest to users of other IBM Data Processing Systems.)

SUBJECT CODE		FORM NUMBER
00	*IBM 7090/7094 SYSTEMS REFERENCE LIBRARY*	
	7090/7094 Bibliography	A28-6306
	7090 Data Processing System Configurator	A22-6686
	7094 Data Processing System Configurator	A22-6689
	7094 Model II Configurator	A22-6764
01	*MACHINE SYSTEM*	
	7090 Data Processing System Reference Manual	A22-6528
	7094 Data Processing System (Bulletin)	A22-6761
	7094 Data Processing System Reference Manual	A22-6703
	7094 Model II Data Processing System (Bulletin)	A22-6760
	Operator's Guide for IBM 7090 Data Processing System	A22-6535
	709-7090 Data Processing Systems	D22-6508
03	*Input/Output Units*	
	*700-7000 Series DPS Unit Record Equipment	A22-6660
	*1414 Model 6 Input/Output Synchronizer with IBM 7090/7094 Systems	A22-6744
	*1011 Paper Tape Reader	A26-5754
05	*Magnetic Tape*	
	*729, 7330, and 727 Magnetic Tape Units — Principles of Operation	A22-6589
	*7340 Hypertape Drive, Model 1 — Principles of Operation	A22-6616
	7340 Hypertape Drive, Model 1, with the 7090/7094 Data Processing Systems	A22-6746
07	*Disk/Drum Storage*	
	1301 and 1302 Disk Storage, Models 1 and 2, with the 7090, 7094, and 7094 Model II Data Processing Systems	A22-6785
	*1301 and 1302 Disk Storage: Sequential Data Organization	A22-6784
	7320 Drum Storage with 7090/7094 Systems	A22-6747
09	*Tele-Processing Equipment*	
	See IBM Tele-Processing Bibliography	A24-3089
10	*Auxiliary Equipment*	
	*7765 Paper Tape to Magnetic Tape Converter	A22-6570

Installation Supplies

Installation supplies are materials or aids to be used in planning and programming for the 7090/7094 Systems. Part 3 of the bibliography contains abstracts of the items listed.

709/7090 Commercial Translator Procedure Description —
    Coding Form X28-1305
709/7090 Commercial Translator Data Description —
    Coding Form X28-1306
709/7090 Commercial Translator Environment Description —
    Coding Form X28-1522
SHARE 7090 9PAC IOCS Control Cards — Coding Form X28-6140
SHARE 7090 File Processor: Dictionary Definition — Coding Form X28-6141
SHARE 7090 File Processor: Vertical Change Definition —
    Coding Form X28-6142
SHARE 7090 File Processor: Update Change Definition —
    Coding Form X28-6143
SHARE 7090 File Processor: Horizontal Change Definition —
    Coding Form X28-6144
SHARE 7090 File Processor: Change Report Field —
    Request Coding Form X28-6145
SHARE 7090 Reports Generator: Report Definition —
    Format Coding Form X28-6146
SHARE 7090 Reports Generator: Field Parameters —
    Coding Form X28-6147
SHARE 7090 Reports Generator: Dictionary Definition —
    Coding Form X28-6148

Supplementary Information

Listed below are publications of limited interest or special use not included in the library. Subject code numbers have not been assigned.

1. *Education (EDUC):* Publications and materials to be used in   FORM
   educational programs for the 7090/7094 Systems. See abstract   NUMBER
   for description.
   Introduction to IBM Data Processing Systems F22-6517
   *COBOL Programming Education Guide R22-9761
   *COBOL Programming Practice Problems R22-9762
   *FORTRAN Programming Education Guide R23-9527
   *FORTRAN Programming Practice Problems R25-1677
   *Utility Programs and Monitors R25-1675

2. *Original Equipment Manufacturers' Information (OEM):* Includes
   information and/or specifications for the special needs of designers
   of accessory equipment requiring technical information about the
   method of attachment or connection of various IBM devices.
   *729 II, IV, V, and VI Magnetic Tape Units A22-6643
   *7330 Magnetic Tape Units A22-6619
   *7631 File Control Unit A22-6725
   *1414 Input/Output Synchronizer A22-6701

Part 2 — Machine Index

Publications describing the machine components of the 7090/7094 are listed by machine number. See the *7090 DPS Configurator*, Form A22-6686; the *7094 DPS Configurator*, Form A22-6689; or the *7094 Model II Configurator*, Form A22-6764, for the number and type of machine components.

MACHINE NUMBER	TITLE	SUBJECT CODE	FORM NUMBER
711	Unit Record Input/Output Equipment	03	A22-6660
	7090 Data Processing System	01	A22-6528
	7094 Data Processing System	01	A22-6703
716	Unit Record Input/Output Equipment	03	A22-6660
	7090 Data Processing System	01	A22-6528
	7094 Data Processing System	01	A22-6703
721	Unit Record Input/Output Equipment	03	A22-6660
	7090 Data Processing System	01	A22-6528
	7094 Data Processing System	01	A22-6703
729	729, 7330, and 727 Magnetic Tape Units	05	A22-6589
	7090 Data Processing System	01	A22-6528
	7094 Data Processing System	01	A22-6703
1011	1011 Paper Tape Reader	03	A26-5754
	7090 Data Processing System	01	A22-6528
	7094 Data Processing System	01	A22-6703
1014	1014 Remote Inquiry Station	03	G24-6625
	7090 Data Processing System	01	A22-6528
	7094 Data Processing System	01	A22-6703
1301	1301 and 1302 Disk Storage, Models 1 and 2	07	A22-6785
	1301 and 1302 Disk Storage: Sequential Data Organization	07	A22-6784
	7090 Data Processing System	01	A22-6528
	7094 Data Processing System	01	A22-6703
1302	1301 and 1302 Disk Storage, Models 1 and 2	07	A22-6785
	1301 and 1302 Disk Storage: Sequential Data Organization	07	A22-6784
1414	1414-6 Input/Output Synchronizer	03	A22-6744
	7090 Data Processing System	01	A22-6528
	7094 Data Processing System	01	A22-6703
7108	7090 Data Processing System	01	A22-6528
7109	7090 Data Processing System	01	A22-6528
	7094 Data Processing System	01	A22-6703
7110	7094 Data Processing System	01	A22-6703
7151-1	Operator's Guide	01	A22-6535
7151-2	7094 Data Processing System	01	A22-6703
7155	Magnetic Tape Switching Feature	13	G22-6587
7302	7090 Data Processing System	01	A22-6528
	7094 Data Processing System	01	A22-6703
7320	Drum Storage with 7090/7094 Data Processing Systems	07	A22-6747
7330	729, 7330, and 727 Magnetic Tape Units	05	A22-6589

MACHINE NUMBER	TITLE	SUBJECT CODE	FORM NUMBER
7340	7340 Hypertape, Model 1	05	A22-6616
	7340 Hypertape, Model 1	05	A22-6746
	7090 Data Processing System	01	A22-6528
	7094 Data Processing System	01	A22-6703
7606	7090 Data Processing System	01	A22-6528
	7094 Data Processing System	01	A22-6703
7607	7090 Data Processing System	01	A22-6528
	7094 Data Processing System	01	A22-6703
7617	Operator's Guide	01	A22-6535
	7094 Data Processing System	01	A22-6703
7631	7090 Data Processing System	01	A22-6528
	7094 Data Processing System	01	A22-6703
	1301 and 1302 Disk Storage, Models 1 and 2	07	A22-6785
	7320 Drum Storage	07	A22-6747
7640	7090 Data Processing System	01	A22-6528
	7094 Data Processing System	01	A22-6703
	7340 Hypertape, Model 1	05	A22-6616
	7340 Hypertape, Model 1	05	G22-6634
7765	7765 Paper Tape to Magnetic Tape Converter	10	A22-6570
7909	7090 Data Processing System	01	A22-6528
	7094 Data Processing System	01	A22-6703
	1301 and 1302 Disk Storage, Models 1 and 2	07	A22-6785
	7320 Drum Storage	07	A22-6747

Part 3 — Abstracts

The abstracts for 7090/7094 system publications and materials are listed below by form number. The subject code is shown at the right of the title.

A22-6528　IBM 7090 Data Processing System　01

This manual presents a textbook type of detail on the operation and use of the 7090 Data Processing System. It contains detailed discussions of data channel operation; computer instructions, commands, and orders; interrupt; input and output components; and programming examples. In addition, comprehensive discussions of general concepts are provided. This manual includes information on the use of IBM 1301 Disk Storage with the 7090 System. (Ref. Man. — 136 pages)

A22-6536　Operator's Guide for IBM 7090　01
Data Processing System

This manual describes the operation of the IBM 7151 Console Control, the IBM 7617 Data Channel Console, and all input/output unit keys and lights. Also included are wiring examples, information paths within the system, and operational procedures. (Ref. Man. — 56 pages)

A22-6570　IBM 7765 Paper Tape to Magnetic　10
Tape Converter

This reference manual contains a description of the 7765 Paper Tape to Magnetic Tape Converter. The functions, operation, and control of the unit are described in detail. (Ref. Man. — 32 pages)

A22-6589　IBM 729, 7330, and 727　05
Magnetic Tape Units — Principles of
Operation

This manual provides comprehensive information on the use of IBM 729 (Models I, II, III, IV, V, and VI), 7330, and 727 Magnetic Tape Units. Subjects covered include principles of writing and reading coded data on magnetic tape, tape unit load and unload procedures, operating keys and lights, systems usage tape handling, organizing tape records and reels, tape labeling and tape library records, tape error recovery procedures, and equipment associated with magnetic tape usage. (SRL — 48 pages)

A22-6616　IBM 7340 Hypertape Drive,　05
Model 1 — Principles of Operation

This manual describes the features of the IBM 7340 Hypertape Drive, Model 1, including data recording rates, recording principles, error detection and correction, access time, and reel cartridge operations. The physical characteristics of the device are described in detail. Also included is a description of the automatic cartridge loader feature, which is available for use with the 7340 Hypertape Drive. A discussion of programming and program control operations is presented. (Ref. Man. — 24 pages)

A22-6619　IBM 7330 Magnetic Tape Units　OEM

This publication gives specifications for attaching a control unit to the IBM 7330 Magnetic Tape Unit. All timings, circuits, and necessary cables are stated. (OEM — 16 pages)

A22-6643　729 II, IV, V, and VI Magnetic　OEM
Configurator

This manual includes information and specifications for use by a manufacturer of original equipment to be attached to IBM 729 II, IV, V, and VI Magnetic Tape Units. (OEM — 40 pages)

A22-6660　IBM 700-7000 Series DPS Unit　03
Record Equipment

This manual presents the operation and use of Unit Record Equipment for the IBM 700-7000 Series Data Processing Systems. It is divided into four sections. Section 1 gives information concerning IBM unit record input/output equipment with a detailed description of the IBM punched card; Sections 2, 3, and 4 describe and give the operational characteristics of the input/output unit record equipment pertaining to specified data processing systems, namely, the 7070 and 7074, the 705 and 7080, and the 709, 7090, and 7094 Data Processing Systems. (Ref. Man. — 117 pages)

A22-6686　7090 Data Processing System　00
Configurator

This schematic drawing shows the complete 7090 Data Processing System with all required and optional features available. The drawing will be revised and reissued whenever a new feature for the 7090 System is announced. (1 page)

A22-6689   7094 Data Processing System   00
         Configurator

This schematic drawing shows the complete 7094 Data Processing System with all required and optional features available. The drawing will be revised and reissued whenever a new feature for the 7094 System is announced. (1 page)

A22-6701   1414 Input/Output Synchronizer   OEM

This manual will assist designers of accessory equipment to be used with the IBM 1410-7000 Series Data Processing Systems that normally use IBM 1414 Input/Output Synchronizers. Connections between the computer and the 1414 and between the 1414 and attached input/output devices are shown, together with timing, power and cable requirements, circuits, and physical specifications. (OEM – 56 pages)

A22-6703   7094 Data Processing System   01

This reference manual describes units of the 7094 System and explains their operating features. All instructions, commands, and orders required for the operation of the system are explained in detail and the IBM 7909 Data Channel Interrupt feature is thoroughly discussed. Information concerning the use of the IBM 7340 Hypertape Drive, the IBM 1301 Disk Storage, and the IBM 1414-6 Input/Output Synchronizer is included. Operator Console and Data Channel Console features and operating techniques are included in this manual. (Ref. Man. – 174 pages)

A22-6725   IBM 7631 File Control   OEM

This manual contains information intended to assist designers of accessory equipment to be used with all models of the 7631 File Control. The following information is included: cable and cable termination data, line driver and line terminator circuitry, physical specifications, functional explanations of signal lines, operators' and customer engineers' control panel operation and design, operation timing charts, design considerations for driver and terminator circuitry, and functional operating considerations. (OEM – 64 pages)

A22-6744   IBM 1414 Model 6 Input/Output   03
         Synchronizer with IBM 7090 and
         7094 Systems

This bulletin describes each device that may be connected to the IBM 1414-6 Input/Output Synchronizer. Included are brief descriptions of the IBM 1009 Data Transmission Unit, IBM 1011 Paper Tape Reader, IBM 1014 Remote Inquiry Unit, and Telegraph Input/Output Units. Data flow between the 1414-6 Synchronizer and the 7090/7094 Systems and addressing of attached devices are described. A working knowledge of the 7090/7094 Systems is assumed. (SRL – 8 pages)

A22-6746   IBM 7340 Hypertape Drive,   05
         Model 1, with IBM 7090/7094 Data
         Processing Systems

This bulletin describes the operation of the Hypertape System with the IBM 7090/7094 Data Processing Systems. System configuration, operating features, and optional features are included. A working knowledge of the 7090/7094 Systems is assumed. (SRL – 8 pages)

A22-6747   IBM 7320 Drum Storage with   07
         7090 and 7094 Systems

This bulletin provides general information about the IBM 7320 Drum Storage, as used with the IBM 7090/7094 Data Processing Systems. It describes the functions and characteristics of the device and discusses method of operation with related equipment. Included is information on the relationship between the 7320 Drum Storage and the IBM 7631 File Control Unit, and the IBM 7909 Data Channel and the IBM 1301 Disk Storage. Commands and orders used to manipulate these devices are discussed. A working knowledge of the 7090/7094 Systems is assumed. (SRL – 24 pages)

A22-6760   IBM 7094 Model II Data   01
         Processing System (Bulletin)

This bulletin provides information about the IBM 7094 Model II Data Processing System. It contains a general description of the main features of the system and uses a sample instruction sequence to illustrate the reduction of core storage cycles through extended sequence overlap operations. A listing of instruction cycle changes and a table of instructions that can be overlapped are included. (SRL – 4 pages)

A22-6761   IBM 7094 Data Processing System   01
         (Bulletin)

This bulletin contains a general description of the IBM 7094 Data Processing System. It describes the main features of the system and provides general information on system configuration, data flow, use of data channels, and instruction timing and overlap. Knowledge of the contents of the publication *IBM 7094 Data Processing System Reference Manual*, Form A22-6703, is assumed. (SRL – 8 pages)

A22-6764   IBM 7094 Model II Configurator   00

This schematic drawing shows the complete 7094 Model II Data Processing System with all required and optional features available. The drawing will be revised and reissued whenever a new feature for the 7094-II System is announced. (1 page)

**A22-6784　IBM 1301 and 1302 Disk Storage:　07
　　　Sequential Data Organization**

This manual describes a way of storing and retrieving data on IBM 1301 and 1302 Disk Storage that is largely independent of the characteristics of the application. The method will enable most users to install and operate disk storage efficiently, with minimum detailed study of the data. A common set of programs and techniques can be used for all data files in disk storage. The approach allows data to be loaded in the most useful sequence, yet allows for random or sequential access to the records. As the data file is loaded, an index is created that associates data identifiers with actual track addresses and permits expansion by an easily used overflow technique. Conversion is accomplished in an orderly and efficient transition from data handling methods presently in use. (SRL — 28 pages)

**A22-6785　IBM 1301, Models 1 and 2, Disk　07
　　　Storage and IBM 1302, Models 1 and 2,
　　　Disk Storage with IBM 7090, 7094, and
　　　7094 II Processing Systems**

This manual provides information concerning IBM Disk Storage — the IBM 1301, Models 1 and 2, and the IBM 1302, Models 1 and 2 — as used with the IBM 7090, 7094, and 7094 II Data Processing Systems. Use of the manual assumes a basic knowledge of these systems. (SRL — 28 pages)

A26-5754　IBM 1011 Paper Tape Reader　03

This manual contains information that describes the operating features, components, control panel, and tape handling and loading procedures for the IBM 1011 Paper Tape Reader. (SRL — 14 pages)

A28-6306　IBM 7090/7094 Bibliography　00

This bibliography contains lists and descriptions of the available reference literature for the installation, programming, and operation of the IBM 7090/7094 Data Processing System.

In Part 1, the publications are listed by major subject codes. These subject codes provide a sequence for organizing a library of 7090/7094 publications. Part 2 provides a cross-index of publications by machine number. Part 3 provides abstracts, in form-number sequence, of all the publications (SRL — 24 pages)

C20-8089　Glossary for Information Processing　20

This publication has been written for IBM customers and employees to fill a need for a set of consistent definitions in the field of information processing. Included are definitions of approximately 1,000 terms and 500 acronyms. (116 pages)

**C20-8090　Catalog of Programs for IBM　20
　　　Data Processing Systems — KWIC Index**

This catalog contains information about all computer programs currently available from the IBM Program Information Department and the Program Distribution Center.

It contains four main sections: an introduction with instructions on how to order programs; an index in both Keyword-in-Context (KWIC) format and classification code format; a section of abstracts describing each program available from the IBM Program Information Department; and a section of abstracts describing each program available from the Program Distribution Center. (230 pages)

**C22-6681　Installation Manual — Physical　15
　　　Planning, IBM Input/Output Components,
　　　7000 Series and 1410 Systems**

This manual describes physical planning for the installation of input/output components used on 1410 or any 7000 series systems. In addition to technical information needed for physical installation planning, it contains recommendations and suggestions to be used as a guide in planning an efficient installation. (Ref. Man. — 52 pages)

**C22-6706　7090/7094 Data Processing　15
　　　Systems Physical Planning Installation
　　　Manual**

This manual contains pertinent physical planning information for installing IBM 7090 and 7094 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 systems. (Ref. Man. — 52 pages)

**C22-6762　IBM 7094 Model II Data Processing　15
　　　System Physical Installation Planning
　　　Specifications (Tentative)**

This publication provides preliminary physical planning information for the field conversion of presently installed IBM 7094 Data Processing Systems to 7094 Model II Systems. Reference is made to the publication *IBM 7090/7094 Data Processing Systems Physical Planning Installation Manual*, Form C22-6706. (Ref. Man. — 2 pages)

**C28-6036　Generalized Sorting Program　33
　　　for the IBM 709 Data Processing
　　　System: Sort 709**

This manual describes the Generalized Sorting Program for the IBM 709 Data Processing System. This

program sorts fixed-length records on as many as five different control fields containing up to 360 bits of binary information or 60 characters of BCD information. Either single or blocked records may be used for input or produced as output. Control cards are used to provide a number of parameters to the generalized sort. These parameters are used to complete a skeleton set of instructions and so produce a specialized sort of maximum time efficiency for the parameters specified. (Ref. Man. — 152 pages)

C28-6052   Generalized Merging Program   33
for the IBM 709 Data Processing System: Merge 709

This manual describes Merge 709 program operation, restrictions, and operating instructions. In addition, the manual includes a section on modification for the program.

Merge 709 can merge up to five sorted input files of fixed-length, binary or BCD records. The Merge program can merge records according to either the 705 or 709 collating sequences, and, with slight modification, any desired sequence may be used. (Ref. Man. — 92 pages)

C28-6054   IBM 7090/7094 Programming   25
Systems: FORTRAN II Programming

This publication presents the FORTRAN II language and programming rules. The IBM Formula Translating System, 7090/7094 FORTRAN, is an automatic coding system for the IBM 7090/7094 Data Processing System. FORTRAN II statements may be translated into machine language statements using either the FORTRAN II Processor operating under the System Monitor of the 7090/7094 IBSYS Operating System or the independent FORTRAN Monitor System. The FORTRAN language closely resembles the ordinary language of mathematics. (SRL — 52 pages)

C28-6066   IBM 7090/7094 Programming   25
Systems: FORTRAN II Operations

This publication provides instructions for the operation and use of the IBM 7090/7094 FORTRAN II System and for the creation and maintenance of the FORTRAN II System tape. This FORTRAN System consists of the FORTRAN II Compiler, the FAP (FORTRAN Assembly Program) Assembler, and the FORTRAN II Monitor. The Monitor coordinates compilation, assembly, and execution of FORTRAN and FAP programs. (SRL — 48 pages)

C28-6235   IBM 7090/7094 Programming   21
Systems: FORTRAN II Assembly Program (FAP)

This publication describes the 7090/7094 FORTRAN II Assembly Program (FAP) in sufficient detail for the programmer to code in the FAP language. FAP and 7090/7094 FORTRAN II can be used with either the IBM FORTRAN Monitor or the IBM 7090/7094 IBSYS System Monitor. FAP is a machine-oriented symbolic language. The programmer can write the major part of his program in FORTRAN, using FAP subroutines where necessary to accomplish those parts of the job for which FORTRAN is not suitable; or he can write the major part of the program in FAP, using FORTRAN subroutines for certain computational and input/output operations. (SRL — 78 pages)

C28-6248   IBM 7090/7094 IBSYS Operating   36
System: System Monitor (IBSYS)

This publication describes the use and general function of the System Monitor of the IBM 7090/7094 IBSYS Operating System. The IBSYS Operating System consists of a number of advanced business and scientific programming aids operating under overall control and direction of the System Monitor. It is designed to process sequentially a variety of unrelated jobs with little or no human intervention.

The System Monitor includes the System Supervisor, the System Core-Storage Dump Program, the System Editor, the System Nucleus, and the Input/Output Executor. In general, the introduction of this publication and sections describing the System Supervisor and the System Core-Storage Dump Program are directed primarily to the applications programmer. The remaining sections are directed to the systems programmer. (SRL — 80 pages)

C28-6252   IBM 7090/7094 Support Package   35
for the IBM 7040/7044

This manual describes a method of running 7040/7044 programs on the IBM 7090/7094 Data Processing Systems. This program consists of an assembly program (similar to 709/7090 FAP), a 7040/7044 simulator subroutine, and library utility programs under the control of a monitor. The assembly program will accept most programs written in 7040/7044 assembly language, and will convert these programs into machine language. Then, at the user's option, the monitor will load these programs and initiate their execution. (Ref. Man. — 10 pages)

C28-6274   IBM 7090/7094 Programming   25
Systems: FORTRAN IV Language

This publication contains a description of the 7090/7094 FORTRAN IV language that is processed by the FORTRAN IV Compiler. This compiler is a component of the 7090/7094 IBJOB Processor. FORTRAN is an automatic coding system designed primarily for scientific and engineering computations. The language closely resembles the language of mathematics and includes various types of arithmetic, control, input/output, and specification statements. The manual provides descriptions of the format and effect of these statements and provides examples of how they can be used. It also describes the methods of utilizing available mathematical subroutines. (SRL — 40 pages)

C28-6275   IBM 7090/7094 IBSYS Operating   27
System: IBJOB Processor

This publication describes the 7090/7094 IBJOB Processor and its various components. Included are descriptions of the IBJOB Processor as a whole, the functions that are performed by the various components of the IBJOB Processor, and the requirements for use of the IBJOB Processor and its components.

The IBJOB Processor is a group of programs used to translate programming languages. It consists of: the Processor Monitor (IBJOB); two compilers — the FORTRAN IV Compiler (IBFTC) and the COBOL Compiler (IBCBC); an assembler — the Macro Assembly Program (IBMAP); a relocating loader — the Loader (IBLDR); and a library of preassembled subroutines to be used, if required, by the object program — the Subroutine Library (IBLIB).

The publication is divided into two parts: the first part contains information for the applications programmer, and the second part contains information for the systems programmer. (SRL — 108 pages)

C28-6299   IBM 7090/7094 IBSYS-IOEX,   36
Programming Systems Analysis Guide

This manual provides detailed information on the internal logic of the System Monitor of the IBM 7090/7094 IBSYS Operating System. It is intended for technical personnel who are responsible for diagnosing the system operation or for adapting the programming system to special uses.

Programming Systems Analysis Guides represent an extension of the information contained in the corresponding Systems Reference Manuals. Included are flow charts, memory maps, condition aids, and detailed descriptions of the program logic. The level of detail limits the utility of these manuals to technically qualified personnel who have prerequisite knowledge of other 7090/7094 bulletins and manuals. (SRL — 120 pages)

C28-6307   IBM 7090/7094 Generalized Sorting   33
System: 7090/7094 Sort

This publication describes the IBM 7090/7094 Generalized Sorting System. The 7090/7094 Sort program sorts fixed-length or variable-length records written in either signed or unsigned binary or BCD mode. The records can be sorted using either the commercial or scientific collating sequences, in ascending or descending order. The program operates under the System Monitor.

The publication is divided into two parts. Part 1 discusses the organization and structure of the program, including a description of the sorting and merging techniques used. Part 2 gives detailed information for using the program, including general specifications, control card formats, tape record format and file structure, and user modification procedures. (SRL — 44 pages)

C28-6311   IBM 7090/7094 Programming   21
Systems: Macro Assembly Program
(MAP) Language

This publication provides detailed information for writing source programs in the 7090/7094 Macro Assembly Program (MAP) language. The MAP language is a versatile programming language that provides the user with an extensive set of pseudo-operations as well as all of the 7090 and 7094 machine operations.

The publication is divided into three main parts. Part 1 provides basic information on the main features and capabilities of the language. Part 2 describes the functions of the pseudo-operations and gives examples of their formats and uses. Part 3 describes macro operations and macro-related pseudo-operations and explains their use in programs.

The Macro Assembly Program (IBMAP) is a component of the 7090/7094 IBJOB Processor, and, as such, operates under the IBJOB Processor. (SRL — 56 pages)

C28-6321   IBM 7090/7094 Utility Programs   32
Using IBM 7340 Hypertape Drives

This publication describes the utility programs provided for IBM 7340 Hypertape Drives when used with the IBM 7090/7094 Data Processing Systems and provides programmers and operators with instructions for using the programs.

The programs described in the publication are:

1. Binary Loader for Hypertape. This program loads programs from a 7340 Hypertape Drive into 7090 or 7094 core storage.

2. Core and Tape Dump. This program writes, as output, the contents of core storage or the contents of tapes. The tapes are written in either the BCD or binary

mode and may be mounted on either a 7340 Hypertape Drive or a 729 Magnetic Tape Unit. (SRL — 24 pages)

C28-6345 IBM 7090/7094 IBSYS Operating 30
System: Input/Output Control System

This publication provides a description of the 7090/7094 Input/Output Control System and includes detailed programming information. IOCS is a flexible programming system that automatically controls transmission of data to and from recording devices and makes the data readily available for processing.

The publication contains a discussion of basic concepts and explains the use of IOCS commands and routines. The techniques of sequential processing are discussed in the main body of the manual, and a separate section is provided on random processing. Several sample programs are included.

Two forms of IOCS are accessible to the programmer. Library IOCS is contined in the IBJOB Subroutine Library and is used in conjunction with the Macro Assembly Program (MAP). Full IOCS (7090-IO-919) is provided as an independent system for use with the IBM 7090/7094 FORTRAN II Assembly Program (IBSFAP). Differences in the two systems are made explicit in the manual. A third form, FORTRAN IOCS, is used by FORTRAN IV object programs. (SRL — 100 pages)

C28-6355 IBM 7090/7094 IBSYS Operating 36
System: Operator's Guide

This publication provides the operator and machine-room personnel with complete instructions required to operates the IBM 7090/7094 IBSYS Operating System. Descriptions of System Monitor control cards, initial start procedures, system halts, and the on-line messages and their explanations are included. (SRL — 48 pages)

C28-6362 IBM 7090/7094 IBSYS Operating 27
System: Specifications for IBJOB Processor
Debugging Package

This publication describes the IBJOB Processor Debugging Package. The debugging package is a programming aid that enables the user to obtain dynamic dumps of specified areas during program execution. The package contains two separate facilities: one available for COBOL programs at compilation time; and one available for FORTRAN IV and MAP programs at load time. (SRL — 16 pages)

C28-6364 IBM 7090/7094 IBSYS Operating 32
System Utilities

This publication provides descriptions of the utility routines available to users of the IBM 7090/7094 IBSYS Operating System equipped with IBM 1301 Disk Storage; IBM 7320 Drum Storage, IBM 729 Magnetic Tape, or IBM 7340 Hypertape Units. Included are descriptions of the following routines:
1. Format-Track Generation
2. Home-Address and Record-Address Generation
3. Load Disk/Drum
4. Dump Disk/Drum
5. Restore Disk/Drum
6. Clear Disk/Drum
7. Tape Dump

A section is also included in which the Utility Monitor is described. (SRL — 24 pages)

C28-6372 IBM 7090-7040 Direct Couple 36
System: Preliminary Specifications

This publication describes the programming support that will be provided for users of the IBM 7040-7090/7094, 7044-7094/7094 II Direct Couple feature #3270. The Direct Couple Operating System (DCS) consists of a modified 7090 System Monitor (IBSYS), a new 7090 Input/Output Executor (IOEX), a modified 7090 IBJOB Processor, and a complete 7040 Control Package that services the input/output requirements of the 7090. (SRL — 24 pages)

C28-6376 IBM 7090/7094 FORTRAN IV 25
Compiler (IBFTC) Replacement:
Specifications and Language Additions

This publication provides the programmer with the information needed to plan for the use of the new and faster 7090/7094 FORTRAN IV Compiler (IBFTC) that will replace the present FORTRAN IV Compiler. In almost every respect, the new compiler will operate within the environment of the present IBJOB Processor.

The 7090/7094 FORTRAN IV language will be enlarged to include the following four language features: (1) input/output without an explicit input/output list and FORMAT statement, (2) a maximum of seven dimensions for arrays, (3) nonstandard returns from subroutines, and (4) multiple entry points to a subprogram. (SRL — 16 pages)

C28-6377 IBM 7090/7094 FORTRAN IV 25
Language: Input/Output Without Explicit
List and FORMAT

This publication provides the programmer with the information needed to plan for the use of the following 7090/7094 FORTRAN IV language addition: input/

output and conversion without an explicit input/output list and a FORMAT statement. This feature will be implemented in a future version of the 7090/7094 FORTRAN IV Compiler. (SRL — 8 pages)

C28-6773 IBM 7090/7094 Input/Output   30
Control System: Programming Systems Analysis Guide

This manual provides detailed information on the internal logic of the IBM 7090/7094 IOCS. It is intended for technical personnel who are responsible for diagnosing the system operation or for adapting the programming system to special usage.

Programming Systems Analysis Guides represent an extension of the information contained in the corresponding System Reference Manuals. Included are flow charts, memory maps, condition aids, and detailed descriptions of program logic. The level of detail limits the utility of these manuals to technically qualified personnel who have prerequisite knowledge of other 7090/7094 bulletins and manuals. (SRL — 144 pages)

C28-6780 IBM 7090/7094 Generalized Sorting   33
System (7090/7094 SORT), Programming Systems Analysis Guide

This manual is produced by the IBM Programming Systems department to provide detailed information on the internal logic of the IBM 7090/7094 Generalized Sorting System — Version 5, Modification 2, IBM program 7090-SM-922. It is intended for technical personnel who are responsible for diagnosing the system operation, or for adapting it to special usage. (SRL — 160 pages)

D22-6508 IBM 709/7090 Data Processing   01
Systems

This manual provides general information concerning both the IBM 709 and 7090 Data Processing Systems. A brief survey of the machine components together with the operating functions of binary computers is provided. Included in this manual are comparisons of operating speeds of electron tube and transistorized equipment. (GI Man. — 52 pages)

F22-6517 Introduction to IBM Data   Educ
Processing Systems

This manual is designed for use in training programs where a basic knowledge of computers is the end objective or is a prerequisite to the detailed study of a particular IBM system. The subject matter has been generalized and reference to actual machines and systems has been minimized. (96 pages)

F28-8001 Sorting Methods for IBM Data   33
Processing Systems

This manual describes some basic methods of sorting. It points out general considerations and rules that will make it easier to evaluate different approaches to the problem of sorting. The following topics are covered: methods of tape sorting, internal sorting, generalized and specific sorting programs, general considerations in sorting, estimating sort time, and a list of terms and abbreviations. (GI Man. — 56 pages)

F28-8043 IBM Commercial Translator   23

The IBM Commercial Translator is an automatic coding system intended primarily for commercial data processing. The system facilitates programming since programs can be written in a form based on English, and since the verbs, nouns, arithmetic expressions, and logical expressions making up the language are powerful — a single command can cause an operation that involves an extended sequence of machine steps. A processor is used to convert a Commercial Translator program into a machine language program.

This manual discusses the structure of the language, the procedure description, and the data description. (The environment description is covered in the publications for the 7090 processor.) It also contains a primer-type description of the language for beginning programmers. (GI Man. — 124 pages)

F28-8053 COBOL   24

COBOL is a result of efforts to produce an English-language-like programming language that can be used to solve a wide variety of business related problems. The COBOL language for programming computers was developed by a committee of the Conference on Data Systems Languages (CODASYL) as a cooperative effort of computer users in industry, the Department of Defense and other Federal Government agencies, and computer manufacturers. The name COBOL is derived from "COmmon Business Oriented Language." This manual describes the language specified by CODASYL as COBOL-1961, i.e., the COBOL specifications described in the official government manual for 1961. (GI Man. — 172 pages)

F28-8074 FORTRAN   25

FORTRAN is an automatic coding system developed to provide a means of expressing problems in a symbolic source language similar to the language of mathematics. This manual describes FORTRAN and prepares the reader to use the facilities it provides. FORTRAN is available for most IBM Data Processing Systems. (GI Man. — 104 pages)

G22-6587 Tape Switching Feature for IBM   **13**
729 II and 729 IV Magnetic Tape Units

This bulletin describes the operation and use of the tape switching feature. Sample system layouts, the switch console, and operating characteristics are described. (Bulletin — 8 pages)

J22-6727 IBM 7320 Drum Storage Physical   **15**
Planning

This bulletin describes specifications of size, environment, cable lengths, power consumption, and weight for the 7320 Drum Storage. (Bulletin — 2 pages)

J24-1427 Simulation of the IBM 1410 with   **35**
the IBM 704, IBM 709, and IBM 7090

The program described in this bulletin enables the user to test and correct 1410 programs prior to installation of an IBM 1410 Data Processing System. This program simulates the function and performance of the IBM 1410 by using the IBM 704, 709, and 7090 Data Processing Systems. This bulletin describes the steps required to program the simulated 1410 and the procedures for operating the machine with which simulation is performed. (Bulletin — 8 pages)

J28-0238 IBM 1401 Peripheral Integrated   **48**
**Processing System for Use with 7000
Series Data Processing Systems**

This bulletin describes the external specifications for the IBM 1401 Peripheral Integrated Processing System. This system permits the consecutive execution of peripheral programs that are independent of each other both in their operation and in the data upon which they act. The bulletin contains the rules which determine whether a peripheral processing program can participate in this monitored system operation. (Bulletin — 24 pages)

J28-5626 Simulation of the 1710 Control   **35**
System on the 709/7090

This bulletin describes the programming package that makes feasible the simulation of the 1710 Control System on a 709 or 7090 Data Processing System. The program can also be used to simulate a 1620. A method is provided for the simulation of a real-time situation. Machine requirements, method of simulation, input requirements, output, and error procedures are among the topics covered. Built-in dumps, tracing (full or selective) and memory alteration cards facilitate debugging of new programs. (Bulletin — 20 pages)

J28-6039 704-709/7090 Input/Output   **35**
Compatibility Program — Compatibility II

Compatibility II is a program which makes possible the execution of 704 programs on the IBM 709/7090 by simulating 704 input/output operations. The use of Compatibility II requires 8K storage. This bulletin describes the functioning and use of Compatibility II, including restrictions and operating instructions. It assumes prior knowledge of the operation of the 709 compatibility instructions.

Note that nonstandard 704 instructions may not operate in the same way on the 709 and 7090 as on the 704. Therefore, programs including such instructions might not be executed properly when used in conjunction with Compatibility II. (Bulletin — 12 pages)

J28-6042 Simulation of the IBM 7070 on the   **35**
IBM 704 and the IBM 7090

The simulation programs described in this bulletin may be used to test and debug 7070 programs prior to installation of an IBM 7070 Data Processing System. The operations that are simulated and the debugging data that is generated are described in the manual. The 7070 simulation programs for the 704 and the 7090 are very similar. The features of the 7090 program that differ from those of the 704 program are outlined in this bulletin, and a detailed procedure for operating the 704 Simulator is provided. (Bulletin — 24 pages)

J28-6043 IBM 7090 Generalized Sorting   **33**
**Program Sort 709: Sorting Times for
the IBM 7090**

This bulletin includes a short description of Sort 7090 (IBM Generalized Tape Sorting Program, Sort 709, used on the IBM 7090 Data Processing System), a glossary of a few terms, and timing tables. The timing tables include data on recommended input blocking, internal blocking, capacity in records of a sort, as well as the time required for each phase of the program. The tables cover the range from 5 to 500 word records. (Bulletin — 44 pages)

J28-6059 Addenda and Errata to the Sort   **33**
709 Manual

This bulletin presents addenda and errata to the IBM Reference Manual, *Generalized Sorting Program for the IBM 709 Data Processing System: Sort 709*, Form C28-6036. The additional material presented includes information pertaining to collating sequences, restart procedure, and some packaged modifications to the Sort 709 program. The errata consist of a one-page insert (between pages 104 and 105) to the Sort 709 manual. (Bulletin — 6 pages)

J28-6061   Addenda to the Merge 709 Manual   33

This bulletin presents addenda to the IBM Reference Manual, *Generalized Merging Program for the IBM 709 Data Processing System: Merge 709*, Form C28-6052. The material includes information pertaining to collating sequences, restart procedure, and some packaged modifications to the Merge 709 program. (Bulletin – 4 pages)

J28-6080   709 Utility Programs   32

This bulletin describes and includes operating instructions for seven utility programs written for use with the IBM 709 Data Processing System: the Mnemonic Octal Loader; the Tape Build; the Random File Generator; the Tape Compare; the Sequence Check; the Tape Dump; and the Spot Tracer. (Bulletin – 20 pages)

**J28-6135   32K 709/7090 FORTRAN: Adding   25
Built-In Functions**

This bulletin describes the techniques for adding built-in functions to the 32K 709/7090 FORTRAN System. Built-in functions are compiled into FORTRAN object programs as open subroutines; that is, they appear in the object program once for every time they are referred to in the source program. (Bulletin – 8 pages)

**J28-6138   Sort 709: Sorting Times for the   33
7090 with 729 VI Magnetic Tape Units**

This bulletin provides the formula for calculating tape times when estimating sorting times for Sort 709 used on an IBM 7090 equipped with IBM 729 Magnetic Tape Units. (Bulletin – 2 pages)

**J28-6156   IBM 7090 Generalized Sorting   33
Program Using IBM 7340 Hypertape Drives**

This bulletin presents information on the IBM 7090 Generalized Sorting Program for IBM 7090 Data Processing Systems equipped with IBM 7340 Hypertape Drives and/or IBM 729 Magnetic Tape Units. (Bulletin – 2 pages)

**J28-6166   IBM 7090 Programming Systems: 28
SHARE 7090 9PAC Part 1: Introduction
and General Principles**

SHARE 7090 9PAC is a business-oriented programming system that facilitates the establishment and maintenance of data files and enables the user to obtain any desired report on this data with a minimum of programming effort, in a timely manner, and in the format which the user specifies. 7090 9PAC operates under the control of the IBSYS Monitor. This publication is a general introduction to the 9PAC System

and is the first part of a reference manual which describes the 9PAC System and prepares the reader to use its facilities. Other parts of the manual are: *Part 2 – The File Processor*, Form J28-6167, and *Part 3 – The Reports Generator*, Form J28-6168. *The Supplement*, Form J28-6211, contains additions and corrections needed to update the first three parts. Operating instructions for 9PAC are contained in the publication *IBM 7090/7094 IBSYS Operating System: Operator's Guide*, Form C28-6275. (Bulletin – 32 pages)

**J28-6167   IBM 7090 Programming Systems: 28
SHARE 7090 9PAC Part 2: The File
Processor**

This bulletin describes the File Processor portion of the 9PAC System. The File Processor has two major functions: file establishment and file maintenance. (Bulletin – 98 pages)

**J28-6168   IBM 7090 Programming Systems: 28
SHARE 7090 9PAC Part 3: The Reports
Generator**

This bulletin describes the Reports Generator portion of the 9PAC System. The Reports Generator produces object programs that will produce reports and/or records. (Here, *reports* refers only to tape files for printing or card punching, and *records* refers to any type of magnetic tape file.) (Bulletin – 64 pages)

**J28-6169   IBM 709/7090 Commercial   23
Translator Processor**

This manual contains a description of the Commercial Translator Processor and the Commercial Translator source language for the 709/7090 Data Processing Systems. Included are sections on the compiler, loader, supervisory system, systems operation, and systems maintenance. A sample problem is included. (Bulletin – 224 pages)

**J28-6173   IBM 7000/1400 Output Editing   48
System**

The 7000/1400 Output Editing System provides facilities whereby the output of a large-scale IBM 7000 Series computer program may be edited and printed, or punched on the IBM 1401. The system is made up of the I-Language, the 1401 D-Program, and S-Programs for the several 7000 Series computers. The I-Language and the D-Program are machine-independent and are presented in full in this bulletin. A separate S-Program publication is available for the 7090. (Bulletin – 64 pages)

J28-6174 IBM 7090 Programming System: 48
S-Program for the IBM 7090

This bulletin gives detailed information for the use of the S-Program (String Program) for the IBM 7090. The 7090 S-Program is part of the IBM 7000/1400 Output Editing System, which also includes the I-Language and the 1401 D-Program. These parts of the system are documented in the Bulletin, *IBM 7000/1400 Output Editing System,* Form J28-6173. (Bulletin — 14 pages)

J28-6190 IBM 709/7090 Programming 25
Systems: FORTRAN Input/Output Package
for the 32K Version

This bulletin describes a common input/output package, the IBM 709/7090 FORTRAN Input/Output Package, which is used by the 32K 709/7090 FORTRAN System for all input and output operations. The Input/Output Package can perform tape, printer, punch, and card reader operations. (Bulletin — 18 pages)

J28-6206 Simulation of the IBM 7750 35
Programmed Transmission Control on the
IBM 7090/7094

This bulletin describes a program that simulates the IBM 7750 Programmed Transmission Control, its host computer, and its communication network. This simulation program is useful for testing 7750 programs prior to their use on an IBM Tele-Processing system, but it is not a substitute for a 7750. The bulletin describes the features, limitations, and timing considerations of the simulator, and discusses simulator components and control cards. (Bulletin — 16 pages)

J28-6211 IBM 7090 Programming Systems: 28
SHARE 7090 9PAC Supplement

This bulletin contains additions and corrections to the three other bulletins which make up the 9PAC Reference Manual: J28-6166, J28-6167, and J28-6168. This bulletin also describes the preparation of 9PAC Files for use with the 7090/7094 Sort program and the allocation of core storage for 9PAC object programs. (Bulletin — 20 pages)

J28-6258 IBM 709/7090 Programming 23
Systems Commercial Translator Processor
Supplement for 1301 Sequential Operations

This bulletin describes the operation of Commercial Translator under the System Monitor of the 7090/7094 IBSYS Operating System using IBM 1301 Disk Storage. It is intended as a supplement to the reference manual, *IBM 709/7090 Commercial Translator Processor,* Form J28-6169. (Bulletin — 4 pages)

J28-6260 IBM 7090/7094 Programming 24
Systems: IBJOB Processor Part 5: COBOL
Compiler (IBCBC)

This is the fifth of several bulletins that make up the IBJOB Processor manual. The bulletin contains complete descriptions of those elements of the COBOL language that are in the initial version of the 7090/7094 COBOL Compiler, (IBCBC), which is a component of the IBJOB Processor. (Bulletin — 114 pages)

J28-6269 IBM 7090/7094 Utilities for 7320 32
Capability

This bulletin describes the utility routines which support the IBM 7320 Drum Storage in sufficient detail to permit planning for their use. These routines are the same utility routines that are provided for the IBM 7090/7094 Data Processing Systems with IBM 1301 Disk Storage and described in the bulletin, *IBM 7090/7094 Utility Routines for the IBM 1301 Disk Storage,* Form J28-6223. (Bulletin — 2 pages)

J28-6270 IBM 7090/7094 Basic Monitor 36
(IBSYS) and 709/7090 Input/Output Control
System for 7320 Capability

This bulletin contains the descriptive information that is necessary for planning the use of IBM 7320 Drum Storage with the System Monitor of the IBM 7090/7094 IBSYS Operating System and the 709/7090 Input/Output Control System. (Bulletin — 2 pages)

J28-6310 IBM 7090/7094 Programming 24
Systems: COBOL and Commercial
Translator — A Comparison

This bulletin provides a summary of the major differences in the language specification for COBOL and Commercial Translator as currently implemented for the IBM 7090/7094. The presentation presupposes some knowledge of one language or the other. The bulletin is intended to provide general information for those who wish to translate a source program from either language to the other, but it is not intended to provide complete technical guidance for such translation. (Bulletin — 8 pages)

J28-8023 Machine-Optimal Approximations 48

This bulletin gives an example of the proper adaptation of a well known mathematical approximation for solution on a binary machine. The square root function is used for illustration. (Bulletin — 4 pages)

J28-8064   1301 Input/Output Control System   30
for 1410 and 7000 Series Data Processing
Systems

This bulletin describes the Input/Output Control System for IBM 1410, 7070, 7074, 7080, and 7090 Data Processing Systems having IBM 1301 Disk Storage. Use of the 1301 Input/Output Control System will greatly reduce the programming time and effort for programs that process disk storage data. Topics discussed in this bulletin include: data considerations, types of disk storage applications, use of the 1301 Input/Output Control System, and the manner in which the system will be made available for each individual data processing system. (Bulletin — 60 pages)

L22-6554   IBM 7090 and 7094 Data Processing   13
Systems: Core Storage Clock and Interval
Timer — RPQ F89349 (7090) or RPQ
880295 (7094)

This special features bulletin provides information on the core storage clock and interval timer for the 7090/7094 Data Processing Systems. This feature consists of a permanently assigned core storage location that is periodically incremented whenever the data processing system is operating or is waiting to operate. (Bulletin — 2 pages)

L22-6636   IBM 7090 and 7094 Data Processing   13
Systems: Additional Core Storage RPQ
E02120 (7090) or RPQ E15724 (7094)

The Additional Core Storage feature for the IBM 7090/7094 Data Processing System provides a second 7302 Core Storage, increasing the capacity of main storage by 32,768 words. This special features bulletin provides information on program selection of storage units, effect of two additional console switches, and effect of channel trap operation. It also explains instructions used with the feature and discusses special programming considerations necessary with the additional storage unit. Physical planning diagrams and information are provided. (Bulletin — 16 pages)

L22-6641   IBM 7090/7094 Multiprogramming   13
Package RPQ E07291 (7090) or
RPQ 880287 (7094)

Two functions needed for efficient multiprogramming or time-sharing of the computer system are automatic relocation of instructions and variable bounds storage protection. The multiprogramming package provides both functions without extending execution time of any computer instruction. This special features bulletin provides a brief description of the relocation mode and explains instructions used with automatic relocation and with variable bounds storage protection. (Bulletin — 4 pages)

L22-6767   IBM 7253 Model 1 Core File for   13
IBM 7090/7094 Systems — RPQ F96084

The IBM 7253 Model 1 Core File is made up of three 32,768-word modules, providing 98,304 words of random access file storage when attached to a 7090 or 7094 Data Processing System. This special features bulletin describes the features and provides detailed information on the instructions used with it. Also included is information on data flow, trap and interrupt operation, accessing, program timing, and physical planning. Three brief programming examples are provided. The bulletin assumes knowledge of the 7090 or 7094 Data Processing System. (Bulletin — 8 pages)

R22-9761   COBOL Programming Education   Educ
Guide

The major topics covered in this guide include COBOL language, 1410 and 7070 COBOL. The instructor will use this Guide in conjunction with the COBOL Programming Practice Problems (R22-9762) and Overhead Projector Foil (V25-6171) to teach a 3-1/2 day COBOL Programming Course and/or an additional 1-1/2 day 1410 or 7070 COBOL Programming Course. (267 pages)

R22-9762   COBOL Programming Practice   Educ
Problems

The reusable Practice Problem Booklet is given to each student attending the COBOL Programming Course. The booklet contains 14 problems covering the topics presented in the COBOL Programming Education Guide (R22-9761). (9 pages)

R23-9527   FORTRAN Programming   Educ
Education Guide

This is an instructor's guide for a FORTRAN Programming Class. It includes a 1-1/2 day 1401 FORTRAN guide, which is used with FORTRAN Practice Problems (R25-1677). (53 pages)

R25-1675   Utility Programs and Monitors   Educ

This is an instructor's guide covering the following topics: utility programs, testing systems, operating systems, general purpose monitors, and an evaluation of monitors. (32 pages)

R25-1677   FORTRAN Programming   Educ
Practice Problems

This reusable Practice Problem Booklet is given to each student attending the FORTRAN Programming Course. The booklet contains 18 problems covering the topics presented in the FORTRAN Programming Course Education Guide (R23-9527). (8 pages)

X22-1245   7090/7094 Physical Planning Templates   80

These acetate sheets contain equipment templates (1/4″=1′ scale) for use in planning a machine room layout. The following components are shown: 7302, 7606, 7100, 7607, 7151, 7608, 7617, 7618, 711, 716, 721, and 729. (2 sheets)

X22-6126   711 Card Reader Diagram Pad   80

Each sheet contains a control panel diagram showing all of the standard hubs for the control panel wiring of the 711 Card Reader. (25 sheets per pad — 8-1/2 x 11)

X22-6127   716 Printer Diagram Pad   80

Each sheet contains a control panel diagram showing all of the standard hubs for the control panel wiring of the 716 Printer. (25 sheets per pad — 17 x 11)

X22-6665   1301 Physical Planning Templates   80

This item contains equipment templates on acetate sheets (1/4″ = 1′ scale) for planning machine room layouts. The units are: 1301 Disk Storage, 7904, 7907, 7908, 7909 Data Channels, and 7631 File Control. (1 sheet)

X22-6666   Input/Output Components Physical Planning Templates   80

This item contains equipment templates on acetate sheets (1/4″ = 1′ scale) for planning machine room layouts. The units are: the 7904, 7907, 7908, 7909 Data Channels; the 1414 Models 1-7 Input/Output Synchronizers; the 729 Models ii and iv Magnetic Tape Units; the 1009 Data Transmission Unit; the 1011 Paper Tape Reader; and the 1014 Remote Inquiry Unit. (1 sheet)

X22-6669   Input/Output Hypertape Physical Planning Templates   80

This acetate sheet contains equipment templates (1/4″ = 1′ scale) for use in planning machine room layouts. The following components are shown: 7340, 7640, 7907, 7908, 7909, and 7904. (1 sheet)

X22-6682   7090 Reference Card   80

This reference card lists the 7090 instructions in alphabetic and numeric sequence. In addition, the 7607 and 7909 Data Channel commands, as well as the 1301 Disk Storage and 7340 Hypertape orders, are listed. (Card)

X22-6691   7094 Reference Card   80

This reference card lists all 7094 instructions in both alphabetic and numeric sequence. The card also includes data channel commands, and disk storage and Hypertape orders. (Card)

X22-6785   Magnetic Tape Record Characteristics   80

This card provides statistics for use in estimating tape processing times and record capacity per full reel. (Card)

X24-6518   1011 Paper Tape Reader Control Panel Diagram   80

This sheet contains a control-panel diagram for 5-track tape on the front, and a diagram for 8-track tape on the back. (25 sheets per pad — 8-1/2 x 11)

X24-6531   1301 Disk Storage Layout   80

This form facilitates planning the assignment of a maximum of 2,500 characters in disk storage. (25 sheets per pad — 16-1/2 x 11)

X28-0784   709 SHARE Symbolic Coding Form   80

This form is used when programming in the FORTRAN Assembly Program language or the Macro Assembly Program language. Columns and lines are ruled and numbered to facilitate both programming and card punching. (50 sheets per pad — 11 x 8-1/2)

X28-1213   SHARE System for the IBM 709   80

This binder with index tabs is provided to hold the distribution of loose-leaf pages that constitute the sos Reference Manual. Index tabs corresponding to the various sections of the manual are included. (Binder)

X28-1305   709/7090 Commercial Translator Procedure Description — Coding Form   80

This form is used in coding the Procedure Description of a Commercial Translator program for IBM 709 or 7090 Data Processing Systems. (25 sheets per pad — 11 x 8-1/2)

X28-1306   709/7090 Commercial Translator Data Description — Coding Form   80

This form is used in coding the Data Description of a Commercial Translator program for IBM 709 or 7090 Data Processing Systems. (25 sheets per pad — 11 x 8-1/2)

X28-1464   COBOL Program Sheet   80

The COBOL Program Sheet is used in writing the entries of a COBOL source program. The sheet is designed in accordance with the principles governing the COBOL Reference Format, as described in the publication *COBOL General Information Manual*, Form F28-8053. It provides for recording the entries for all four divisions of a COBOL program — Identification, Environment, Data, and Procedure. (25 sheets per pad — 11 x 8-1/2)

X28-1520   COBOL Reference Card   80

The COBOL language is based on English and allows the programming of business problems in a readable form. This card provides a handy reference to material frequently used by the COBOL programmer. Included are a COBOL word list, basic COBOL formats, and the following tables:

Special Characters used in COBOL	Arithmetic Operators
Arithmetic Expressions Sequence of Symbols	Relational Operators
Conditional Expressions Sequence of Symbols	Data-Items Pictorial Characters

X28-1522   709/7090 Commercial Translator   80
Environment Description — Coding Form

This form is used in coding the Environment Descriptions of a Commercial Translator program for IBM 709 or 7090 Data Processing Systems. It is used in conjunction with Forms X28-1305 and X28-1306, which are used for coding the Procedure and Data Description, respectively. (25 sheets per pad — 11 x 8-1/2)

X28-6140   SHARE 7090 9PAC IOCS Control   80
Cards — Coding Form

This is one of nine coding forms used with the SHARE 7090 9PAC System. The form numbers for the entire set are X28-6140 through X28-6148. (25 sheets per pad — 11 x 8-1/2)

X28-6141   SHARE 7090 File Processor: 80
Dictionary Definition — Coding Form

This is one of nine coding forms used with the SHARE 7090 9PAC System. (25 sheets per pad — 11 x 8-1/2)

X28-6142   SHARE 7090 File Processor: Vertical   80
Change Definition — Coding Form

This is one of the nine coding forms used with the SHARE 7090 9PAC System. (25 sheets per pad — 11 x 8-1/2)

X28-6143   SHARE 7090 File Processor: 80
Update Change Definition — Coding Form

This is one of the nine coding forms used with the SHARE 9PAC System. (25 sheets per pad — 11 x 8-1/2)

X28-6144   SHARE 7090 File Processor: 80
Horizontal Change Definition — Coding Form

This is one of the nine coding forms used with the SHARE 9PAC System. (25 sheets per pad — 11 x 8-1/2)

X28-6145   SHARE 7090 File Processor: Change   80
Report Field Request — Coding Form

This is one of the nine coding forms used with the SHARE 9PAC System. (25 sheets per pad — 11 x 8-1/2)

X28-6146   SHARE 7090 Reports Generator: 80
Report Definition Format — Coding Form

This is one of the nine coding forms used with the SHARE 9PAC System. (25 sheets per pad — 11 x 8-1/2)

X28-6147   SHARE 7090 Reports Generator: 80
Field Parameters — Coding Form

This is one of the nine coding forms used with the SHARE 7090 9PAC System. (25 sheets per pad — 11 x 8-1/2)

X28-6148   SHARE 7090 Reports Generator: 80
Dictionary Definition — Coding Forms

This is one of the nine coding forms used with the SHARE 7090 9PAC System (25 sheets per pad — 11 x 8-1/2)

X28-6333   IBM 7040/44-7090/94 Symbolic   80
Language — Coding Sheet

Any of the symbolic languages accepted by the assembly programs in the IBM 7090/7094 Programming Systems and the IBM 7040/7044 Programming Systems can be coded on this form. Columns and lines are ruled and numbered to facilitate both programming and card punching. (25 sheets per pad — 8-1/2 x 14)

X28-7327   FORTRAN Coding Form   80

This form is used when programming in the FORTRAN language. Columns and lines are ruled and numbered to facilitate both programming and card punching. (50 sheets per pad — 11 x 8-1/2)

220-8045   Report to Conference on Data   24
Systems Languages COBOL

Including Initial Specifications for a Common Business Oriented Language (COBOL) for Programming Electronic Digital Computers

The COBOL language was developed by the Conference on Data Systems Language (CODASYL). The purpose and nature of the COBOL language are indicated by the following excerpt from the foreword to the manual: "The Conference on Data Systems Language is a voluntary cooperative effort of users of data processing systems (both in government and industry) and man-

ufacturers of data processing systems. The objective of this effort is to develop a common language, basically in English, which is oriented toward business data processing problems, open-ended and independent of any make or model of data processing equipment." The present manual sets forth the initial specifications for the COBOL language. This manual is published by the U.S. Government Printing Office and is made available through IBM as a customer service. (172 pages)

328-1219 SHARE Operating Systems (SOS) 21
Reference Manual: Distribution Number 1

The SOS System for the IBM 709 is a joint effort of SHARE and IBM Programming Systems. This material is the first in a series of distributions of material for insertions in the loose-leaf binder publication *SOS Reference Manual — SHARE System for the IBM 709*, Form X28-1213. Further distributions consisting of additional insertions and/or replacement pages are published, namely: Distribution No. 2, Form 328-1262; Distribution No. 3, Form 328-1377; Distribution No. 4, Form 328-1395; Distribution No. 5, Form 328-1406; and Distribution No. 6, Form 328-1624. When assembled, the material included in these distributions will constitute the reference manual for SOS.

Distribution No. 1 includes the reference material for the following sections of the manual: Section 04 — Lister, and Section 05 — Modify and Load. (Looseleaf — 18 sheets)

328-1262 SHARE Operating Systems (SOS) 21
Reference Manual: Distribution Number 2

This second distribution of SOS pages consists of prefatory material, which includes an updated Table of Contents and a list of current pages, two sheets to replace corresponding sheets of Distribution No. 1, Form 328-1219, Section 01 — Introduction, Section 08 — the IB Monitor, and four appendixes. (Looseleaf — 38 sheets)

328-1377 SHARE Operating Systems (SOS) 21
Reference Manual: Distribution Number 3

This third distribution of SOS pages includes an updated Table of Contents, a list of current pages, Section 06 — the Debugging System, and Section B — the Index. (Looseleaf — 51 sheets)

328-1395 SHARE Operating Systems (SOS) 21
Reference Manual: Distribution Number 4

This is the fourth distribution of SOS pages. Included in this distribution are part of Section 07 — the Input/Output System, Section 09 — the SHARE Monitor, updated pages for the Table of Contents, a list of current pages, the Index, and replacements for several pages previously published. (Looseleaf — 71 sheets)

328-1406 SHARE Operating Systems (SOS) 21
Reference Manual: Distribution Number 5

This distribution of SOS material contains both new material and pages to replace some previously published. The new material consists of Section 02 — the SCAT Language, Section 03 — the Compiler, two chapters of Section 07 — the Input/Output System, Section 11 — the Glossary; and two appendixes. (Looseleaf — 177 sheets)

328-1624 SHARE Operating Systems (SOS) 21
Reference Manual: Distribution Number 6

This distribution completes the SHARE 709 System Reference Manual. Both new material and pages to replace some pages previously published are included. The new material consists of Section 10 — Programming and Operating Notes, and three new appendixes: Appendix 4 — Notes on the SOS Library Tape; Appendix 5 — The IB System Tape; and Appendix 6 — The Printer Board. (Looseleaf — 78 sheets)

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