



IBM BASIC/VM

Program Number 5668-996

Release 2

IBM BASIC/VM is a program product containing a BASIC language processor and its support library.

IBM BASIC/VM Release 2 runs under:

- VM/System Product (VM/SP) CMS Release 3 or Release 4, with or without the VM/SP High Performance Option (HPO), and within the VM/SP Release 4 System Offering
- VM/Personal Computer (VM/PC) Release 1.1

This product provides a BASIC-oriented programming environment, including its own command set. With IBM BASIC/VM, users can enter, edit, and debug BASIC source statements, and issue library management commands. They can group BASIC source statements into a program or (in some cases) execute them immediately. Because the IBM BASIC/VM environment is self-contained, users are for the most part free of operating system concerns.

Release 2 Enhancements

IBM BASIC/VM Release 2 enhancements include:

Relational Data Base Support: The CALL SQL statement provides access to data managed by IBM's relational data base system, Structured Query Language/Data System (SQL/DS). CALL SQL is a high level, easy-to-use facility that automatically handles necessary data conversions, null representations, and cursor management.

Expanded Numeric Data Types: Two numeric data types, REAL SINGLE and REAL DOUBLE, have been added to supplement the INTEGER and DECIMAL types. REAL data uses the System/370 floating point format, which provides improved computational performance and reduced data storage requirements, especially with the use of REAL SINGLE.

The DECIMAL data type has also been enhanced by extending the decimal exponent range to ± 999 .

Enhanced Interlanguage CALL and GDDM Interface Facilities: Numeric and character arrays may now be passed to subprograms written in FORTRAN, COBOL and PL/I.

BASIC programs may invoke GDDM's Interactive Chart Utility (ICU) and may specify GDDM functions either by name or request control parameter (RCP) code.

Usability Enhancements:

- Full-screen editing permits changes to any program lines that appear on the screen, with immediate diagnostic messages displayed for any lines with syntax errors.
- Program function keys can be set to enter frequently used commands or statements.
- A user profile containing commonly used function key settings and program options can be established. The profile is processed automatically each time BASIC is invoked.

In addition, IBM BASIC/VM Release 2 retains the full functional characteristics of Release 1, including the features listed below.

Source Programming Capabilities

IBM BASIC/VM provides the following development capabilities:

Structured Programming Aids, with statements such as block IF/THEN/ELSE, SELECT/CASE, DO WHILE, and DO UNTIL.

Descriptive Variable Names, up to forty characters long.

Symbolic Statement Labels, also up to forty characters.

Flexible File Handling, including dynamic allocation, use of host system and VSAM access methods, and BASIC's sequential, stream, relative record, or keyed file organization.

Versatile Character String Handling. Users can join strings together, add suffixes or prefixes, and add or delete characters from any position in the string.

Extensive Numeric Capabilities. Users can define numeric variables as integer, decimal, or real. Decimal variables can contain up to 17 significant digits, and can maintain mathematical accuracy of up to 17 places, with a scale factor of ± 999 . Integer variables can contain up to 10 digits, with a maximum value of +2,147,483,647 and a minimum of -2,147,483,648. Real single variables can contain approximately 6 significant digits. Real double variables can contain approximately 15 significant digits. Real single and real double variables have a scale factor of +75 to -78.

Flexible Report Formatting. The IMAGE and FORM statements provide automatic data conversion, spacing, and character presentation.

Program Segmentation, using internal subroutines, and functions, external subprograms and program chaining. Program units may be recursive and can be dynamically loaded or linked together.

Comprehensive CALL Statement. The CALL statement gives users many ways to segment their programs:

- IBM BASIC source programs can call other IBM BASIC source programs in the same workspace.
- IBM BASIC programs can call precompiled IBM BASIC subprograms.

- IBM BASIC programs can call subprograms written in other languages. (OS/VS COBOL, VS FORTRAN, and OS Optimizing PL/I are explicitly supported.)

- IBM BASIC programs can call the Graphical Data Display Manager (GDDM), with or without its optional Presentation Graphics Feature (PGF) or Interactive Chart Utility (ICU).

- IBM BASIC programs can call the host system to execute host system commands.

- With Release 2, IBM BASIC programs can use the CALL SQL statement to access SQL/DS.

Full-Screen Input/Output allows the user to define input and display areas anywhere on the screen.

Flexible Source Program Line Formatting, including use of multiline statements, multistatement lines, and free use of upper-and lowercase, result in easy statement entry.

Extensive Intrinsic Functions, which provide numerous built-in routines to meet a wide range of programming needs with minimal user effort. These routines include numeric and advanced mathematical functions, character string functions, and other functions.

Comprehensive Array Capabilities, can handle arrays of up to seven dimensions with one simple arithmetic or input/output statement

Program-Controlled Error Handling, which allows users to specify corrective actions to be taken if an error occurs during program execution.

Easy Interactive Development

IBM BASIC/VM provides users with tools needed for management of programming activities; the environment can shield them from the underlying operating system structure as well. The interactive development tools are:

- IBM OS PL/I Optimizer Release 5.1: Optimizing Compiler, Resident Library, and Transient Library (5734-PL3); Resident Library only (5734-LM4); Transient Library only (5734-LM5)

Warranty

The IBM BASIC/VM licensed program is warranted to conform to its Licensed Program Specifications when shipped to the customer, if properly used in the specified operating environment.

Licensed Program Specifications may be updated from time to time and such updates may constitute a change in specifications.

Following the discontinuance of all program services, this program will be distributed on an As Is basis without warranty of any kind either express or implied.

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM program product in this publication is not intended to state or imply that only IBM's program product may be used. Any functionally equivalent program may be used instead.

Any other documentation with respect to this licensed program, including any documentation referenced herein, is provided for information purposes only and does not extend or modify these specifications.

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Line-by-line Syntax Checking, which provides immediate syntax checking and diagnosis of each line a user enters.

Interactive Editing Facilities, to change, merge, insert, delete, and copy source lines.

Easy-to-Use Debugging Features, which provide commands and statements for convenient program debugging.

The On-line HELP Facility, which provides diagnostic, tutorial, and reference information.

Flexible Program Execution, in which either source or precompiled code can be executed in the interactive environment.

Access to System Functions. IBM BASIC commands and statements interact with the system. Input/output statements have defaults that limit the need for additional system commands; IBM BASIC/VM makes the necessary system connections.

Execution of Source or Precompiled Code. In the BASIC interactive environment, users can execute source programs directly, or they can compile them, save them, and then execute them later, either alone or together with other source program segments.

Flexible Batch Operation. When running IBM BASIC in batch mode, users can compile and combine main and subprograms together, or combine such programs dynamically at run time.

Reentrant Processor and Library

The BASIC Processor and Library routines and compiled object programs are reentrant; many programs can share one copy maintained in shared virtual storage.

Compatibility and Conversion

IBM BASIC/VM is both source and object code compatible with IBM BASIC/MVS. Valid source programs and compiled object code that run on either MVS or VM will run on the other. Some changes may be necessary for system dependent functions invoked in the CALL SYSTEM statement, file names in the OPEN and CHAIN statements, and exception codes returned by the CODE function.

IBM BASIC Release 2 is a functional extension of Release 1. With only minor exceptions, programs which run correctly on Release 1 will continue to do so on Release 2. Areas where Release 1 programs might require some updating relate to new reserved words and exception codes, and use of the OPTION ARITHMETIC statement.

Industry Standards

The IBM BASIC/VM program product is designed according to the specifications of the following industry standards, as understood and interpreted by IBM as of October 1984.

- American National Standard for Minimal BASIC, ANSI X3.60-1978
- International Organization for Standardization proposed standard ISO Minimal BASIC DP ISO-6373
- European Computer Manufacturers Association Standard for Minimal BASIC ECMA-55 Minimal BASIC, January 1978.

These standards are technically equivalent.

In addition, IBM BASIC/VM has many capabilities not contained in the above standards.

Specified Operating Environment

Machine Requirements

By IBM BASIC/VM: IBM BASIC/VM Release 2 operates on IBM processors supported by the designated host operating systems. The decimal and floating-point instruction sets must be included.

The virtual storage required to operate IBM BASIC/VM depends upon whether the SPEED or SPACE option was chosen at installation time:

- For the SPEED option, a minimum of approximately 750K bytes is required.
- For the SPACE option, a minimum of approximately 525K bytes is required.

IBM BASIC/VM may be installed in discontinuous saved segments (DCSS).

In addition, IBM BASIC/VM work areas, the user's program and data, and the host operating system need space within the user's virtual machine.

The direct-access storage space required for IBM BASIC/VM residence is approximately 5300 blocks of 1024 bytes each.

By IBM BASIC/VM Object Program Execution:

Storage requirements are dependent on the facilities and functions used in the source program. The decimal and floating point instructions sets are required. The timer feature is required if the TIME or TIME\$ intrinsic function is used, if the time of processing is required, or if the RANDOMIZE statement is used to alter the random number sequence.

Programming Requirements

IBM BASIC/VM and its generated object programs run under:

- VM/System Product (VM/SP) CMS Release 3 or Release 4, with or without the VM/SP High Performance Option (HPO), and within the VM/SP Release 4 System Offering
- VM/Personal Computer (VM/PC) Release 1.1

Source code and related licensed materials for the IBM BASIC/VM licensed program will not be made available to customers, and these items are not orderable.

For installation under VM/SP-CMS, an EXEC procedure is provided as part of IBM BASIC/VM.

If VSAM files are processed, VSE/VSAM program number 5746-AM2 is required.

Calls to the relational data base require the Structured Query Language/Data System (SQL/DS) Release 3, program product 5748-XXJ.

Calls to GDDM functions require the IBM Graphical Data Display Manager (GDDM) Release 3 or Release 4, program product 5748-XXH, with or without the optional Presentation Graphics Feature (PGF).

Calls to COBOL, FORTRAN, or PL/I require that programs in those languages have been compiled by the appropriate product. At execution time, the appropriate library must be available. The products explicitly supported are:

- IBM OS/VS COBOL Release 2.4: Compiler and Library (5740-CB1); Library only (5740-LM1);
- IBM VS FORTRAN Release 4: Compiler and Library (5748-FO3); Library only (5748-LM3);

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