MASSACHUSETTS INSTITUTE OF TECHNOLOGY
INFORMATION PROCESSING CENTER

March 23, 1970

MODIFICATIONS TO BASIC

The following changes reflect the differences between the implementation of BASIC described in the Mark II Time-Sharing Service reference manual "BASIC Language" and the implementation of the language on the Multics system. Robert Frankston of the Student Information Processing Board (SIPB) provided the information for this publication. The corrections are based on experimentation with the system and on the implementation of BASIC on TSS/645 at the Rome Air Development Center, Rome, New York. If more differences are discovered by persons using the language on Multics, they should be reported to Dick Steinberg, Room 39-427.

Users of full Multics may get instructions on the use of the BASIC command and of the BASIC editor by typing "help basic" and "help bsys" from command level.

Users of the sipb0 system, a service offered by the SIPB, should get a copy of the Board's handout. When logging in for the first time, the user should type "help". To keep up to date on the latest improvements, he should type "help news" periodically.

Page ii

Data files, chaining and full function capabilities are not available in this implementation. However, the merge command in the sipb0 system does provide the ability to combine separate files containing programs and data.

Page iii

The references to the TRACE command and to Data Files should be removed.

Page iv

The commands listed for pages 53 through 63 are not available.

Page 5

In actually using BASIC on Multics, one would type in the program by using the BASIC editor. This editor is known as "bsys" in standard Multics. In the sipb0 system, it is called with the edit command.

The run command may be given from within the editor. To run a program while at command level, the command basic is given followed by the name of the program.

In formulas, the symbol for exponentiation is ^ on the model 37 teletype and ¬, on the IBM 2741 and 1050 terminals.

Page 6

The NUM function is not available.

Page 7

paragraph 3: A comma is not permitted following the last number.

Page 10

All lists and tables must be dimensioned.

The third example should include

```
10 dim b(10,10)
```

Again the dimension (dim) statement is necessary.

A single letter is equivalent to the zeroth entry in the corresponding list. That is, A(0) is the same as A.

In the sample program on this and the following page, as pointed out above, the run command is given from within the BASIC editor. The actual console messages given by the computer differ and include the compilation time. The word READY is not typed.

Page 11

Again the dim statement is needed.

The dim statement must be placed before the first occurrence of the variable it describes.

Page 13

There are differences between the script shown and what actually is found on Multics.

1. Instead of giving the command NEW, the programmer should type

```
bsys maxsin     {in full Multics}
edit maxsin     {in sipb0}
```

For a new program the response is

```
Program not found.  Input assumed.
```

For an old program the response is

```
Edit.
```

2. The character # is used on Multics to erase the previous character. It may be used repeatedly to delete several characters. A group of spaces is considered to be a single character. The character @ may be used to delete an entire line. The @ should be immediately followed by the new contents of the line.

3. The message after the run command is different. The run command itself must be in lower case.

4. In order to stop execution, the QUIT key should be depressed. This is labeled ATTN, INTERRUPT or RESET LINE depending upon the terminal being used. In full Multics this must be followed by the command "basic$abort" to return to the editor. In sipb0 one is placed back in the editor immediately.

Page 14

5. The list command must be given in lower case.

6. The save command must be given in lower case.

7. After the save command is given, the quit command should be given to return from the editor.

Page 15

In the multiple assignment form of the LET statement, the variables on the left of the = may not be subscripted.

In the data statement, numbers exceeding the precision of the implementation will be flagged.

Page 17

The restriction on the depth of the FOR statements may differ.

All arrays, lists and tables must be dimensioned, even if the subscripts are not greater than 10.

Page 19

In rule 4, the trailing zeros are printed if there are any digits on the right of the decimal point.

The numbers on the right are never printed on top of each other.

Page 20

The SPC function prints the number of blank spaces specified by its arguments. If the number of spaces exceeds the width of the basic line (75 characters), the current line is printed and a new line is started.

The functions TIM, CLK$, DAT$, HPS, VPS, LIN, ASC, STR$, VAL and LEN are not available.

Page 21

The RND function requires an argument. The most common values are arguments 0 and -1. Unless the RANDOMIZE statement is used, RND(0) gives repeatable results for each run command. The values RND(-1) are different each time it is used for each run.

Pages 22-28

The functions TIM, CLK$, DAT$, HPS, VPS, LIN, ASC, STR$, VAL and LEN are not available.

Page 29

The DEF statement is less restricted in that the function name may be any three letters that do not conflict with either vocabulary words or special function names (i.e., sin, cos, etc.) that are part of the system. With respect to vocabulary, no function names may begin with the following two character combinations:

GO ST TH TO

The system will not be able to detect the difference at that period of analysis.

Page 30

Only the single line form of the DEF statement is permitted. Thus, the only acceptable DEF statements must contain "-". The FNEND statement is not available.

Pages 32-34

The CHAIN statement is not available.

The TRACE statement is not available.

Pages 35-36

The TRACE statement is not available.

Page 37

All matrices referenced must be dimensioned prior to the first reference even if they are less than 10x10.

Page 38

The DET function appears to be implemented in the MAT rather than the LET statement. The actual implementation is obscure and undocumented. Any user who determines how to use it should report the information.

Page 41

It appears that the MAT INPUT and MAT PRINT statements are usable only for matrices. The NUM function is not available.

The STRING SIZE maximum is 60 characters.

All strings must appear in a dim statement prior to the first use, even if the dimension is 1. If the string is referenced without a subscript being specified, a subscript of 1 is assumed.

Page 43

The character set on Multics is different for some of the characters. If an attempt is made to convert an illegal character, the message STRING ERROR is typed, but the program continues.

Pages 44-64

The features described for Data Files are not available.

Pages 65-69

The messages typed are different and sometimes self-explanatory.

Page 70

The actual limitations of the Multics implementation differ.