TO: All Conversational FORTRAN Users

DATE: August 1970

SUBJECT: IMPROVEMENTS AND REVISIONS

Some significant improvements have been added to the Conversational FORTRAN compiler and the Run-Time Library. Also, all known outstanding errors have been corrected. The purpose of this note is to briefly describe the new system capabilities and the corrections which have been made. There are two versions of the compiler and four versions of the Run-Time Library. The part numbers and new revision levels of these programs are listed below:

DESCRIPTION	REV	PART NUMBER
Conversational FORTRAN	B	394005-010
Conversational FORTRAN Lib-Hard	B	394003-010
Conversational FORTRAN Lib-Soft	B	394004-010
Conversational FORTRAN-4K	B	393295-010
Conversational FORTRAN Lib-4K Sft.	B	394001-010
Conversational FORTRAN Lib-4K Hd	B	394002-010

ADDED CAPABILITIES

A number of new capabilities have been added to the Conversational FORTRAN system. These include new control directives, a quote descriptor capability for hollerith data, free format input, an improved operational procedure.

New Directives

The following compiler directives have been added.

    I   -Initialize (same as restarting at 80_{16})

    PC -Compile FORTRAN statements in PREP mode, but not in free format (i.e., allows continuation statements).

Quote Descriptor

A quote descriptor has been added to the format descriptors. It is used to describe a hollerith string. Example shown below:

    'ABC' equivalent to 3HABC

Free Format Input

A special input format descriptor has been added. It is called "free format input" and is designated by "FF" in a format statement. An example is shown below:

         READ (u, 10) I, J, A, B, C
    10   FORMAT (FF)

The following are restrictions for the input data:

1.   Numbers must meet constant restrictions. (Section 3. 2-CONVERSA-TIONAL FORTRAN)

2.   Numbers must be separated with at least one blank.

3.   A blank within a number is not allowed since the blank is used to separate numbers.

4.   A blank is not interpreted as "0".

5.   No hexadecimal integer constants allowed. Examples of legal data for the above example:

           bbb398b10323bb3. 198621E-2bbbbb13. 0b. 245
           1b13bbbb-. 1bbbbb+348. 9801bbbbbb243. 0E10

Improved Operations

1.   The compiler now uses logical unit 7 instead of 2 as PREP input. This allows the user to PREP from the teletype and then enter his prepped output from a different unit, such as the high speed reader.

2.   The I/O processor has been expanded to handle up to 132 characters of formatted output instead of 80.

3.   The PAUSE statement has been changed, Instead of the program halting, it waits for a toggle of sense switch 3.

4.   When the END statement is read during the PREP mode, the compiler uses the halt and waits for the punch to be turned off. The halts have been replaced with a wait for a toggle of sense switch 3.

5.   An ASCII round routine has been added to the Formatted I/O Processor so that numbers are output exactly as they were input (provided 8 digits or fewer were input). Thus 10. 00 instead of 9. 99. This has also required that the trace output be revised to 8 significant digits.

6. When using "continuation mode" (PC or GC) and input is the tele-
    type, the END statement must be followed by a blank character
    (ENDb) before typing C/R.

7. The PREP output has been revised so that it can be input to the FOR-
    TRAN IV compiler as well as CONFORT.

PROGRAM CORRECTIONS

All known errors in the various revisions of the compiler and library have
been corrected.   These are summarized below for your information.

1. The hyperbolic tangent routine has been corrected.

2. An error in the I**J routine when $J \leq 0$ or I=0, -1, or +1 has been
    corrected.

3. The hardware divide routine has been revised to correctly handle
    negative dividends.

4. A sign bit error in the software multiply routine was fixed.

5. The computed GO TO now can be used in a subroutine as follows:

        SUBROUTINE   GO(I)
        GO TO (10, 20, 30) I

6. The X**Y routine has been corrected.

7. Size errors are now always printed when core is exhaused.

8. The expression evaluator now detects an error when an invalid opera-
    tor is input.

9. The error message routine has been improved.

10. Expressions with only constants on the right are now processed
    (i. e.   I=2*3).

NOTE OF CAUTION

The extensive nature of the changes described above has increased the
size of the Run-Time Library by about 100 locations.   This increase re-
duces the memory capacity available for the users' FORTRAN program
by about 8 to 10 statements.   In 8K systems and above this represents less
than 2% reduction in capacity.   However, in 4K systems it represents
about an 8% reduction in capacity.   Any difficulties encountered with the
revised Conversational FORTRAN should be reported to us on the Soft-
ware Difficulty Report forms.   Be sure to include listings and paper tapes
with the SDR forms.

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