

Engineering Note E-479

Digital Computer Laboratory
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SUBJECT: BASIC CONVERSION PROGRAM, SEPTEMBER, 1952

To: 6345 and 6889 Engineers

From: M. Rotenberg

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Abstract: This note supercedes part 2 of M-1590

Two basic conversion programs will be available by September 15, 1952, one for direct input from standard tape (Direct Basic Conversion) and one for conversion to 5-56 tape (5-56 Basic Conversion). The vocabulary for both of these is identical and is given in this note. No provision is made for the use of floating addresses or multi-register length numbers. The comprehensive conversion program, which will be available soon after September 15, 1952, will treat tapes prepared for basic conversion correctly.

Introduction

The vocabulary of the new basic conversion program provides essentially the same facilities provided by the program previously in use but many details have been changed.

The comprehensive conversion scheme will allow (in addition to the basic facilities described below) a more general number system, a larger number and variety of preset parameters, interpretive instruction codes, automatic selection of interpretive, output, and mistake diagnosis routines, and floating addresses.

Headings

The tape commences with the tape number and author's name typed out:

TAPE 5432-1 T. Brown

or

PARAMETER 1234-5 T. Brown

Each title is followed by one carriage return and then the word FEEDOUT followed by another carriage return. Three inches of blank tape are then fed out.

Both conversion programs print the heading as written, preceded and followed by two carriage returns. In the D. B. program printing of the heading can be suppressed by resetting FF 6 to a negative value by TP 3. The 5-56 Basic pinches the tape number readably on tape and provides suitable feed-out before and after.

When octal addresses are used, the heading is written

TAPE 5432-1 T. Brown, OCTAL
with the same feed-out procedure as before.

Otherwise, decimal addresses are assumed.

Address Assignments

At the start of the program and at any point thereafter an address followed by a vertical bar indicates the location into which the next word is to be stored. In the absence of any further indication words will be stored consecutively. In the absence of even an initial indication words will be stored consecutively starting in register 32.

Relative Addresses

With subroutines and block assembly procedures, blocks of instructions may be written with addresses relative to the start of the block. Relative addresses are always decimal and are always followed by an r sign followed by either a comma or vertical bar. The start of a block is indicated by Or, and other relative addresses such as 17r, may be written if desired and will simply be ignored by the conversion program. An address assignment may be made by writing 35r| which stores the next word in register 35r regardless of consecutivity.

Relative addresses within an instruction simply end with a r sign.

Instructions

Two lower case letters followed by as many digits as are necessary for an address comprise an instruction. The two letters may be any of the following: si, rs, (bi), rd, (bo), rc, -, -, ts, td, ta, ck, -, ex, cp, sp, ca, cs, ad, su, cm, sa, ao, (dm), mr, mh, dv, * , * , sf, - , - . These letter pairs will be assigned code values from 0 through 31 respectively. The function letters in parentheses will be converted properly even though they are not part of the present order code.

Operation cl will be changed from 2 to 30 in the conversion program on the same day it is changed in WWI.

Numbers

Decimal fractions are written as +. or -. followed by exactly 4 digits.

Decimal integers with an implicit factor of 2^{-15} , are written as + or - followed by as many digits as necessary, no decimal point.

Octal numbers are written as 0. or 1. followed by exactly 5 octal digits. The 1. is the start of a negative octal number, the remaining digits being the sevens complement of the absolute magnitude.

Preset Parameters

The only preset parameter available will be the personal parameter pp. As

The former sl, sl, sr, sr*, cl cl*, operations are now to be written as letter triples slr, slh, srr, srh, clc, clh.

many of these as desired may be used. Values are assigned to preset parameters anywhere in the program by writing pp 6 = followed by any word. If no word follows, then pp 6 = 0. Parameters are added or subtracted into words by writing + or - pp 6, e.g., ca 7 - pp 6.

Temporary Storage

The zero-th register of a temporary storage block is assigned by writing anywhere in the program t = followed by an address. To refer to a temporary storage register, the third, for example, one writes ca3t.

Duplicated Words

When several consecutive registers are to be set to contain the same word initially the notation DITTO THRU preceded by the word and followed by an address may be used. For example:

+ .5000 DITTO THRU 100

will put +.5000 in the next available register and in all registers through and including 100.

50 | +.5000 DITTO THRU 100

will put +.5000 in registers 50 through 100 inclusive.

50 | +.5000 DITTO THRU 50r

will give the same results as in the previous example.

The word FEEDOUT, and a suitable amount of blank tape must follow any of the DITTO examples above.

End of Program

The end of the program is indicated by the words START AT followed by the address of the register which contains the first instruction to be obeyed in the program proper. This is followed by a carriage return and the word FEEDOUT followed by another carriage return and blank tape. In the case of the D. B. program, the computer will perform a conditional stop before control is transferred to the indicated register.

Feed-out

Prepared tapes will have feedout after every five lines of printing for use in the Comprehensive Conversion System described later. Feedout may, of course, occur in any quantity anywhere, but if it is to be of use it must be greater than 1.5 inches and must be preceded by the word FEEDOUT and a single carriage return.

Illegal Characters

To aid in the detection of mistakes, the Basic Conversion programs will stop wherever a foreign or illegal character occurs on tape. This includes all binary combinations not contained in the Flexowriter code except 000000 (with 7th hole) which is disregarded. It also includes letters g, j, n, q, w, y, and z and back space.

Disregarded Characters

For the convenience of the typist, nullify (llllll), space, color shift and the foreign character 000000 (with 7th hole) are completely ignored at all times by the Basic Conversion Programs. Carriage return, tab and comma are ignored between words (i.e., two carriage returns or a tab followed immediately by a carriage return are all right), but may not appear within a word for obvious reasons.

Synonyms

For convenience, the characters ℓ and l, and tab and carriage return (␣) are treated intentionally as synonyms.

Signed M. Rotenberg
M. Rotenberg

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