



# DECUS

## PROGRAM LIBRARY

DECUS NO.	FOCAL8-172
TITLE	XPON
AUTHOR	David A. Moon
COMPANY	Wayland High School Wayland, Massachusetts
DATE	December 14, 1970
SOURCE LANGUAGE	FOCAL

Although this program has been tested by the contributor, no warranty, express or implied, is made by the contributor, Digital Equipment Computer Users Society or Digital Equipment Corporation as to the accuracy or functioning of the program or related program material, and no responsibility is assumed by these parties in connection therewith.



## XPON

DECUS Program Library Write-up

DECUS NO. FOCAL8-172

### ABSTRACT

The purpose of XPON is to calculate integer powers of positive integers with more than the usual seven digits of precision in FOCAL. As the result is computed, it is divided into groups of five digits. Each group occupies a FOCAL variable. The method of exponentiation is repeated multiplication.

### RESTRICTIONS

Numbers of more than about 50 digits will run off the line when printed out. This could be easily fixed, but in most cases numbers this long take a minute or more to calculate (in LIBRA) and so are unsuitable for computation by FOCAL.

When a large number is used as the base, information may be lost during FMPY. The program does not detect this. Line 2.1 could be modified to check the exponent on X(L) and type an error message if it exceeded 10 ↑ 6.

### FUNCTION OF LINE GROUPS IN XPON

1. Accept input. Perform the repeated multiplication in a FOR...;DO 2 command. When the computation is completed direct group 3 to type out the answer.
2. Multiply each group of 5 digits in the answer array X(L) by the base. Propagate carries. Add new members to X(L) when a carry occurs out of the leftmost member X(N).
3. Skip leading zeros. (In case group 2 has assigned extra array elements.) Direct group 4 to print out 5-digit groups that are not leading zeros.
4. Drive group 5. (With a FOR)
5. Extract the 5 digits from the array element in which they are stored, then print the digits by means of IF;TYPE statements in order to avoid the space (or "=") that would occur between numbers if TYPE %1,Q was used.
6. A set of one line subroutines to type out digits. When group 5 transfers into group 6 by an IF, one line is executed, one digit is printed, then the DO 5 automatically terminates.

