

SYSTEMS ENGINEERING LABORATORIES PROGRAM LIBRARY

SOFTWARE DESCRIPTION

CATALOG NO. 303007C

DOCUMENTATION REV

DATE June 15, 1970

PROGRAM TITLE: 810A/B Multiply Test (MTPY)

PURPOSE: MTPY uses a random operand generator to generate two operands. The two operands are multiplied by the hardware, the product is then compared to the product of a software multiply. An inequality causes a typeout. The software multiply arrives at a product by adding and shifting.

CONFIGURATION: Basic SYSTEMS 810A/B Computer

SOFTWARE ENVIRONMENT: Stand-Alone

PROGRAM LANGUAGE: SYSTEMS 810A/B Assembly Language

SIZE: 2000₈ - 3351₈ TIMING: Approx. 0.75 microseconds/product

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REASON FOR CHANGE:

Changes were made to allow this program to run with the Keytran System and output all messages to the selectric typewriter by setting Sense Switch 13.

USE:

Start at location 2000₈, the program will run until manually halted.

When running under the Keytran System the Diagnostic Number for this program is eight (8). The program will automatically be started at location 2000₈ and will continuously run until the Index Key is depressed on the selectric typewriter at which time control will be returned to the Keytran Diagnostic Loader.

Sense Switch Settings:

SSW 0 up - Errors are ignored.

SSW 1 up - No error typeout, a halt will occur.

SSW 2 up - The same operands will be used continuously.

SSW 3 up - A halt will occur after an error typeout.

SSW 4 up - A bit pattern will be typed out.

SSW 13 up - Indicates program being run with the Keytran System and that all output will be via the selectric typewriter.

Typeout Format:

Multiply Error

aaaaaa bbbbbb

nnnnnn mmmmmm

xxxxxx yyyyyy

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aaaaaa = Multiplier (In Memory)
 bbbbbb = Multiplicand (In B-Accumulator)
 nnnnnn = Software Product in A
 mmmmmm = Software Product in B
 xxxxxx = Product in A
 yyyyyy = Product in B

Example of a Bit Typeout

```
TTTTTT BBBB
T x xxx xxx xxx xxx xxx - T y yyy yyy yyy yyy yyy
S z zzz zzz zzz zzz zzz - S w www www www www www atc 123 t
a a aaa aaa aaa aaa aaa b b bbb bbb bbb bbb bbb          atc def g
```

where:

```
TTTTTT      = T-Register
BBBBBB      = B-Register
x xxx xxx ... = Bit Pattern of T-Register
y yyy yyy ... = Bit Pattern of -T
z zzz zzz ... = Bit Pattern of T Shifted
w www www.. = Bit Pattern of -T Shifted
a aaa aaa ... = Bit Pattern of A-Register
b bbb bbb ... = Bit Pattern of B-Register
  a          = Sign of A
  t          = Sign of T
  c          = Carry
  d          = 1X
  e          = 2X
  f          = -1X
  g          = Toggle
```

Note

If it is desired to find two operands that fail continuously set sense switch three up, after the typeout and halt set sense switches zero up and two up and three down. The program will run continuously using the operands that failed and the error condition will be ignored allowing easier troubleshooting. To get a bit pattern, after the halt, set sense switches two up and four up. When it starts typing out, lower four to discontinue typeout.