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Space Guidance Analysis Memo #2-66

TO: SGA Distribution
FROM: Roy Beasley
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SUBJECT: Some Minor Discrepancies between the performance of the AGC4
           Block I Interpreter and its R-467 specifications.

1) LODON

R-467: no pushdown (p. 19).

Actually: pushes down according to present mode

2) NOLOD

R-467: no pushdown (p. 19).

Actually: pushes down according to present mode

3) TSLC

R-467: shift count is stored (p. 29).

Actually: complement of shift count is stored

4) SIGN

R-467: ". . . complement MPAC or VAC, which ever is appropriate".
Actually: doesn't work for vectors at all   (p. 24)

5) BPL

R-467 should read: "If C(MPAC, MPAC + 1, MPAC + 2) $\geq$ 0 . . . "(p. 23)

6) ABVAL

R-467 omits fact that $1/4 \, |\text{Vector length}|^2$ is DP stored in VAC area
locations 28, 29. (p. 28)

7) UNIT

a) R-467: "If a vector has two zero components, the non-zero
component is set to $1 - 2^{-28}$, as in the divide routine. " (p. 32)
Actually: the load indicator is turned on and the contents of VAC
are unspecified.

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b) R-467 omits facts that $1/4 \ |\text{Vector length}|^2$ is stored in VAC area locations 28, 29; $1/2 \ |\text{Vector length}|$ is stored in VAC area locations 30, 31.

8) DDV, BDDV give an oddly patterned overflow indications. (p. 22)

Condition	OVFIND contents
a) 0/0	- 1
b) zero divisor	+ 1
c) |divisor| $\leq$ |dividend| but same sign	- 1
d) |divisor| $\leq$ |dividend| opposite sign	+ 1

9) SQRT

a) R-467: DP result always stored (p. 17).

Actually: DP or TP stored according to mode prior to execution of SQRT.

b) R-467: " . . . $\sqrt{\alpha}$ in MPAC, MPAC + . " (p. 25)

Actually: $\sqrt{\alpha}$ is an unnormalized 28 bit answer which straddles MPAC, MPAC + , and MPAC + 2.

c) for TP square root, R-467 omits fact that C(MPAC + 2) is considered only if C(MPAC) = 0.

d) R-467 omits facts that SQRT of (0, -A, -B) is zero in DP mode and (0, 0, -B) in TP mode.

10) ASIN, ACOS

R-467: omits fact that arguments of the form ($\pm$ 1/2, B) where B < 1/2 are treated as ($\pm$ 1/2, 0) (p. 24)

11) Pushups:

If the first load address of an equation is a push-down list reference (e. g. the inactive address), then the corresponding interpretive instruction must be a unary type; otherwise the loading mode of the current (binary) instruction will be ignored and the "pushups" will be accomplished according to the storing mode of the previous equation.