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Report No. NS t 173
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Reference
Order No.

Front Sheet.

Data Sheet 1.

Figure Sheet S6/10693.

DEUCE Subroutine No. 189 (R04/2)	Report by N.P.L.

SUMMARY.

The attached document contains details of a DEUCE Subroutine which has been prepared and tested by N.P.L.

MATHEMATICAL PHYSICS LABORATORY.

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Description. This first order subroutine reads four 5-digit signed decimal numbers from a card, converts them to binary and then multiplies them by a given scaling factor. It is an improved version of R04/1. It eliminates 18_1, saves two instructions and saves two major cycles for each negative number and one major cycle for each positive number.

Data. a, b, c, d signed 5 digit decimal numbers with D decimal places. Signs punched in cols. 1, 9, 17, 25 and digits in cols. 2-6, 10-14, 18-22, 26-30. Constant 'A' can be subtracted from all values if desired.

Useful Scaling factors. See R04/1 (172) NS t 158.

Result. a, b, c, d to p binary places in $17_{0, 1, 2, 3}$.

Failures. 9-~~24~~ leading to NE (see parameters) if card is not decimally punched.

Error. $\pm\frac{1}{2} P_1$.

TIME $\frac{1}{3}$ ms before Y row single shot
$25\frac{1}{4}$ (max) after 9 row " "

Instructions for Use.

Stores Used.	13	14	15	16	17_0	17_1	17_2	17_3	18_0	19_2	20	21
Contents at Entry.	link	-	-	-	-	-	-	-	-	-	-	-
Contents at Exit.	k_d	-	-	A	K_a	K_b	K_c	K_d	-	1_{26}	-	-

Occupies. D.L.'s 2, 3, 4_{6-8}.

Entry. 2_{28}.

Parameters. 'A' in 3_{18} K. $10^{-D}2^{30}$ in 3_{31} (K = 2^p to produce a, b, c, d, to p binary places) "Add $NP_2 + LP_{26}$ in 2_1

Time. 25 m.s. after reading the 9's row.

Constants available. P_{26} in 2_4, 10^4 in 2_{10}, 10^3 in 2_{17}

10^2 in 2_{24}, $P_{17, 24}$ in 2_{20}

$P_{2-6, 10-14, 18-22, 26-30}$ in 2_{21}.

NOTE. Read is cleared in 3_{19}.

This subroutine is the same as R04/1 No. 172 except for these modifications.

3_4	13	-	16
4_6	21_2	-	18_0
4_8	30	-	21_2
3_{29}	3_{31}	-	21_3
3_1	0	-	24
3_0	30	-	13
3_2	21	-	22 (4mc.)
4_7	21_2	-	23_2
3_{30}	18_0	-	21_2
2_9	25	-	28

Z NZ

2_{11} 21_3 - 13 2_{12} 21_3 - 26

3_{15} 3_{18} - 26

2_{22}

Alterations to coding

4_6 :	4	21	- 18	0	0
3_0 :	3	30	- 13	1	0
2_{11} :	3	21	- 13	0	2
2_{12} :	3	21	- 26	1	1
3_{30} :	2	18	- 21	0	9
4_7 :	3	21	- 23	1	21

and 4_5 and 4_9 are saved.