Z.501/22

THE ENGLISH ELECTRIC CO., LTD.

NELSON RESEARCH LABORATORIES
STAFFORD
MATHEMATICS DEPARTMENT.

Telephone:—Stafford 700.

Report No. NS t 239
Date 8. 8. 58.
Reference
Order No.

Front Sheet.

Data Sheet 1

Figure Sheet S6/11317-9.

DEUCE Subroutine No. 269 (R19F/1)

Report by

D.J. Ozanne.

SUMMARY.

The attached document contains details of a DEUCE Subroutine which has been prepared and tested by E.E. (N.R.L. Stafford).

David Ozanne

MATHEMATICS DEPARTMENT.

HEF

Description. Reads n floating decimal numbers (one per card) converts to floating binary and stores in D.L. A onwards. If $a.10^b$ is a standard floating decimal number, then $1 \leq a < 10$ with b an integer or a = 0, b = 0.

This subroutine is quicker, more accurate, uses less storage space, and is of lower order than R19F, which this supersedes.

First Order.

Data. n cards punched in floating decimal $a \cdot 10^b$.

a has sign in DEUCE column 1 & 9 digits in DEUCE Cols. 2-10 with 8 decimal places.

b has sign in DEUCE column 11 & 9 digits in DEUCE Cols. 12-20 punched as integer.

Formulae. $a \cdot 10^b = 10^8 \cdot a \cdot 10^{b-8}$

$= 10^8 \cdot a\,(2^c)^{b-8}$ where $c = \log_2 10$.

$= 10^8 \cdot a\,(2^y)2^z$ where $c\,(b-8) = y + z$ $(0 \leq z < 1)$

$= \frac{10^8\, a}{2^{31}} \cdot 2^z \cdot 2^{y+31}$.

Result. n numbers in standard floating binary stored in continuous store from $A_{0,1}$ onwards.

Failure. 4, 12-24X. Card not decimally punched. Give one single shot to re-read corrected card.

Instructions for Use.

Stores Used.	13	14	15	16	$17_{0,1}$	19	20	21	D.L. $A_{0,1}$ onwards
Contents at Entry.	Link	n	P_{17}	-	-	-	-	-	-
Contents at Exit.	-	-	-	-	-	-	-	x_n	Results in s.f.b

Occupies. D.L.'s 2, 3, $4, 5_{0-15}$.

Entry. 3_{26}

Time. 44 m.s. max. after last S.S. of the nth card.

Parameters. $A = P_{10}$ in 2_{22} (Cards are punched with A = 9)

Constants Available.

$7P_1$	in 3_{15}	P_{31} in 5_0	coeffs. of series for 2^z (30 b.p.)
$-8P_1$	in 4_{13}	$\frac{(\log_e 2)^i}{i!}$ in 5_i	
P_{11}	in 3_{23}	$(1 \leq i \leq 10)$	
P_{2-10}, P_{12-20}	in 4_4		
P_{30}	in 4_2		

NOTES: Read is cleared after last card is read.

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Date

Sheet No. 86/11317.

Deuce Programme

DEUCE Subroutine No. 269 (R19B/1)

Read Floating Decimal to D.L.'s.

D.L. 2 Track Card Nos.							D.L. 3 Track Card Nos.							D.L. 4 Track Card Nos.							
mc	NIS	S	D	C	W	T	mc	NIS	S	D	C	W	T	mc	NIS	S	D	C	W	T	
0	3	10	15	0		0	0	3	21	22	2	0	1	0	3	27	26	0		8	2
1	3	25	20	1		1	1	2	12	22		0	0	1	5	20	25	1		11	3
2	2	0	14	0		0 X	2	4	4	16		0	4	2			P30				4
3	4	3	13	0		0	3	3	21	19	2	0	1	3	4	24	2	9		35	5
4	2	26	10	0		0	4	2	28	25	2	0	1	4			P2-10, 12-20				6
5	5	21	17	2	1	5	5	4	5	14		10(4)	10	5	3	10	27	0		0	7
6	6	2	24	0		0	6	3	19	22	1	0	7	6	5	26	25	0		5	8
7	3	26	14	0		0	7	4	0	0		0	7	7	5	27	26	0		5	9
8	2	26	14	0		0	8	4	4	23		5	6	8	2	0	30	0		32 X	Y
9	2	10	25	0		0	9	3	13	20		0	0	9	4	14	22	0		1	X
10	2	30	21	2	0	1	10	4	21	22	2	0	15	10	3	21	23	0		0	0
11	3	4	14	0		0	11	3	2	26	1		1	11	4	30	30	0		6	1
12	5	4	24	0		24	12	4	14	22	1		3	12	4	17	16	3		4	2
13	2	3	13	0		0	13	2	4	21	0		1	13			8P1				3
14			start for 2n				14	3	13	28	0		0	14	4	24	14	1	0	8	4
15	2	27	15	0		0	15			7P1				15			15, 9, 24, 19, 6, 4, 1				5
16	2	20	14	0		0	16	2	4	24	0		2	16	3	21	16	0		0	6
17	2	23	14	0		0	17	2	3	12	0		1	17	3	0	24	0		8	7
18	4	23	25	0		0	18	4	21	15	1		1	18	4	21	23	0		0	8
19	2	15	22	0		0	19	3	0	0		0	0 X	19	4	13	1	9		14	9
20	4	2	25	0		0	20	4	17	25	2		2	20	4	0	24	1		3	Y
21	2	3	15	0		0	21	2	17	26	1		1	21	3	30	21	2	0	2	X
22	1	21	P1	2	2	0	22	3	14	25	0		0	22	3	30	21	1	5	4	0
23	2	25	25	0		0	23			P11				23	3	15	13	0		4	1
24	2	15	16	0		1	24	4	23	14	1	0	20	24	4	14	25	0		0	2
25	2	0	0	0		1	25	0	13	0	1	0	3	25	4	16	28	0		27	3
26	2	27	24	0		0	26	4	12	24	0		15	26	4	13	5	0		0	4
27	2	0	24	0		0	27	3	25	26	3	25	25	27	4	21	14	0		0	5
28	2	13	27	0		0	28			plantail				28	5	16	13	0		0	6
29	3	27	15	0		0	29	4	27	25	1	2	0	29	4	25	28	0		1	7
30	3	27	26	0		0	30	3	16	25	3	0	1	30	2	30	17	2	0	2 X	8
31	4	17	22	2	3	4	31	2	30	13		0	0	31	3	4	15	1		4	9

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Date

Sheet No. E6/11318

Deuce Programme

DEUCE Subroutine No. 269 (R19F/1)

Read Floating Decimal to D.L.'s.

D.L. 5 Track

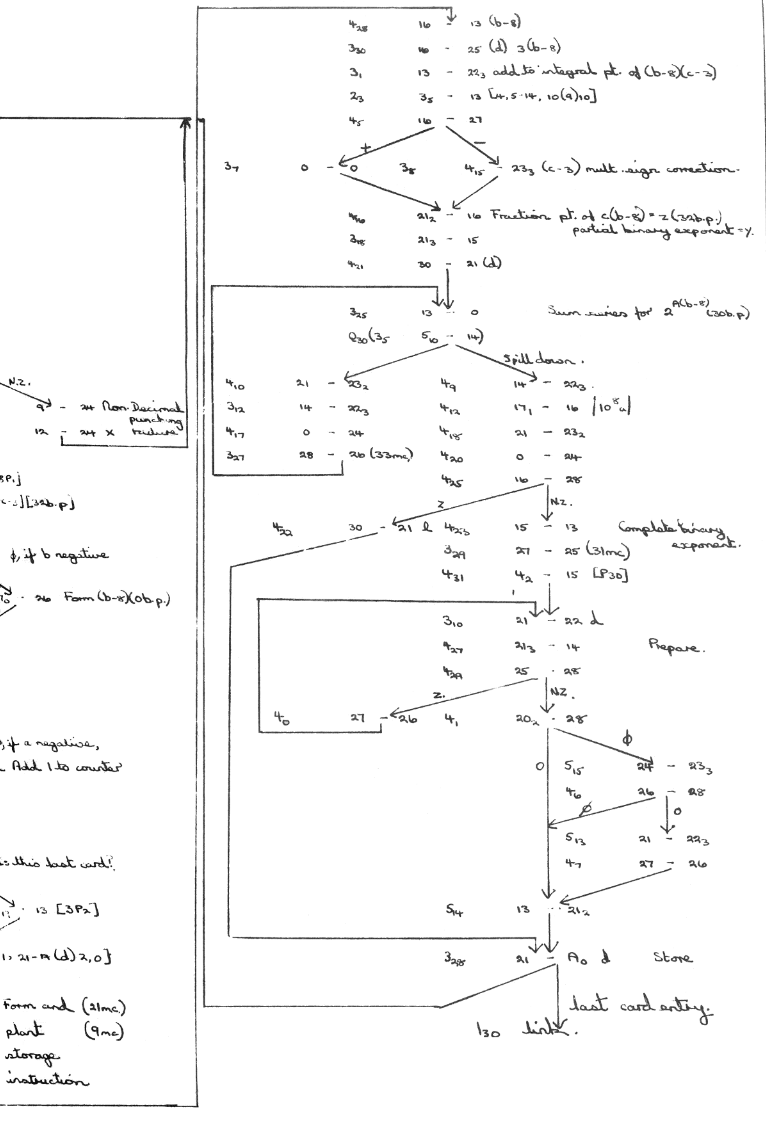
Card Nos.

mc	NIS	S	D	C	W	T	
0	0,	0, 0,		0,	0, 0·1		
1	30,	15, 1,		25,	5, 22·0		
2	0,	24, 23,		31,	31, 7·0		
3	27,	5, 24,		26,	24, 1·0		
4	27,	10, 5,		27,	9, 0·0		
5	0,	4, 22,		11,	1, 0·0		
6	18 ~~26~~,	16, 1,		5,	0, 0·0		
7	25 ~~26~~,	31, 15,		0,	0, 0·0		
8	12 ~~11~~,	12, 1,		0,	0, 0·0		
9	13,	3, 0,		0,	0, 0·0		
10	8,	0, 0,		0,	0, 0·0		
11	4	12	24		0	17	x
12	2	30	31		0	18	
13	4	21	22		0	24	
14	2	13	21		0	12	
15	4	24	23		0	21	
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

D.L. Track

Card Nos.

(Second and third sections of the form — columns mc, NIS, S, D, C, W, T, rows 0–30 — are blank.)



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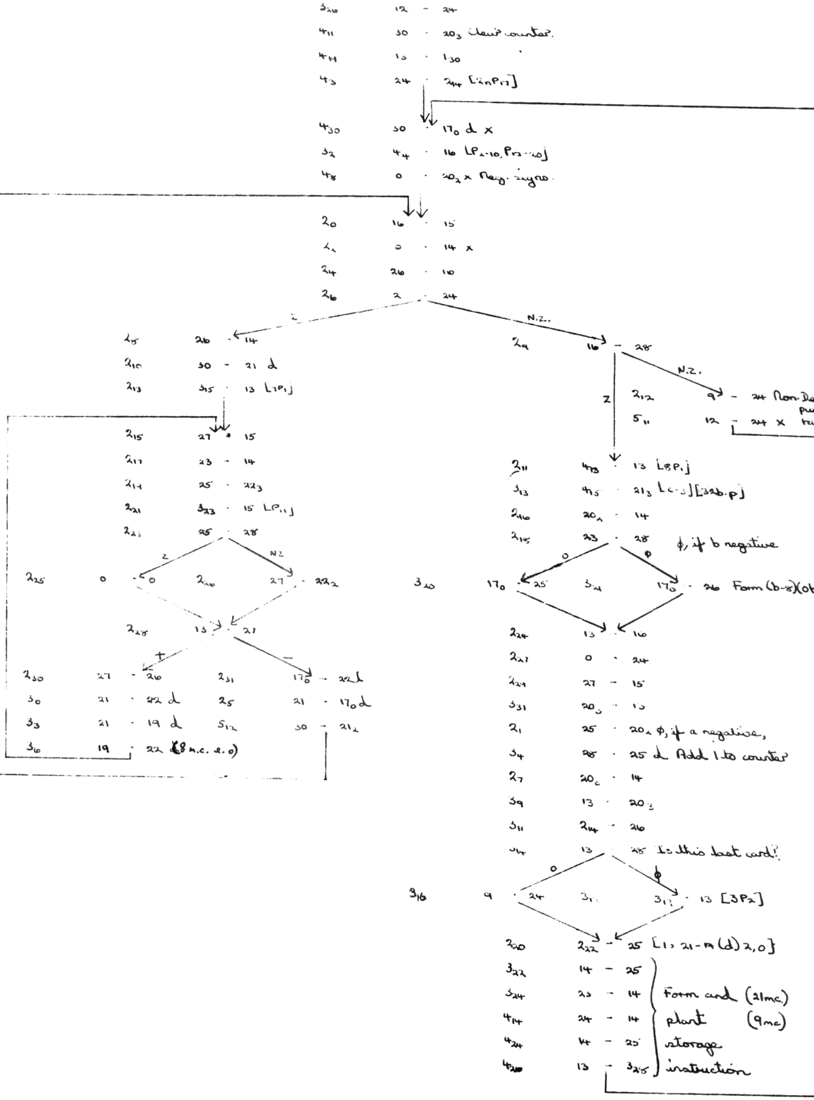
DEUCE Subroutine No. 269 (R19F/1)
Read Floating Decimal to D.L.'s

Date
File Ref. [illegible] 239



3_26 12 - 24
4_11 30 - 20_3 Clear counter.
4_14 13 - 1_30
4_3 24 - 2_14 [2nP17]
4_30 30 - 17_0 d x
3_2 4_4 - 16 [P2-10, P13-20]
4_8 0 - 20_2 x Neg. sign.
2_0 16 - 15
2_2 0 - 14 x
2_4 26 - 10
2_6 2 - 24
Z
N.Z.
2_8 26 - 14
2_10 30 - 21 d
2_13 3_15 - 13 [7P1]
2_15 27 - 15
2_17 23 - 14
2_19 25 - 22_3
2_21 3_23 - 15 [P11]
2_23 25 - 28
Z
NZ
2_25 0 - 0
2_26 27 - 22_2
2_28 13 - 21
+
−
2_30 27 - 26
3_0 21 - 22 d
3_3 21 - 19 d
3_6 19 - 22 (8 m.c. e.o)
2_31 17_0 - 22 d
2_5 21 - 17_0 d
5_12 30 - 21_2
2_9 16 - 28
N.Z.
Z
2_12 9 - 24 Non-De
5_11 12 - 24 x
2_11 4_13 - 13 [8P1]
3_13 4_15 - 21_3 [c-s][32b.p]
2_16 20_2 - 14
2_18 23 - 28 ϕ, if b negative
0
ϕ
3_20 17_0 - 25
3_21 17_0 - 26 Form (b-8)(ob
2_24 13 - 16
2_27 0 - 24
2_29 27 - 15
3_31 20_3 - 13
2_1 25 - 20_2 ϕ, if a negative,
3_4 28 - 25 d Add 1 to counter
2_7 20_0 - 14
3_9 13 - 20_3
3_11 2_14 - 26
3_14 13 - 28 Is this last card?
0
ϕ
3_16 9 - 24
3_17 - 13 [3P2]
2_20 2_22 - 25 [1, 21-19 (d) 2,0]
3_22 14 - 25
3_24 23 - 14
4_14 24 - 14
4_24 4 - 25
4_26 13 - 3_28
Form and (21mc.)
plant (9mc)
storage
instruction