

THE ENGLISH  ELECTRIC CO., LTD.

NELSON RESEARCH LABORATORIES

STAFFORD

MATHEMATICS DEPARTMENT.

Report No. NS t 219

Date 26. 3.58.

Reference

Order No.

Telephone:— Stafford 700.

Front Sheet.

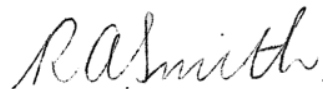
Data Sheet 1.

Figure Sheets S6/11182.

DEUCE Subroutine No. 248 (E11).

Report by
R.A.E.SUMMARY.

The attached document contains details of a DEUCE Subroutine which has been prepared and tested by R.A.E.

MATHEMATICS DEPARTMENT.*A*

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NELSON RESEARCH LABORATORIES
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NS t 219

Sheet No. 1.

Description. Second order subroutine to form $1/16 \log_e x$ to 30 b.p.
~~It is better than E06 and E07 (Nos. 99 and 100) since it uses more economical subroutines.~~

Data. x to 30 b.p. (See NOTE).

Uses. A12/1, No. ~~244~~¹²² in D.L. A.
0 13-0 0 0 in 1₂₈.

Result. c = $1/16 \log_e x$ to 30 b.p.

Maximum error is $(\frac{1}{2} + r/8) P_1$ when $2^{-r} \leq x < 2^{-r+1}$

Failures. 1, 1-1X leading to link if $x < 0$.

Loop of three instructions ~~is~~ 0.

if $x=0$
24-27
24-14
2-22

Instructions for Use.

Stores Used.	13	14	15	16	20	21 ₂	21 ₃
Contents at Entry.	Link	x	-	-	-	-	-
Contents at Exit.	-	-	-	-	-	-	$1/16 \log_e x$
Occupies.	m.c.'s 0-31.						
Entry.	m.c. 29.						
Time.	$(26 + r)$ m.s. if $2^{-r} \leq x < 2^{-r+1}$						
Parameters.	Add AP ₂ in m.c.'s 4, 5, 7 and 28.						

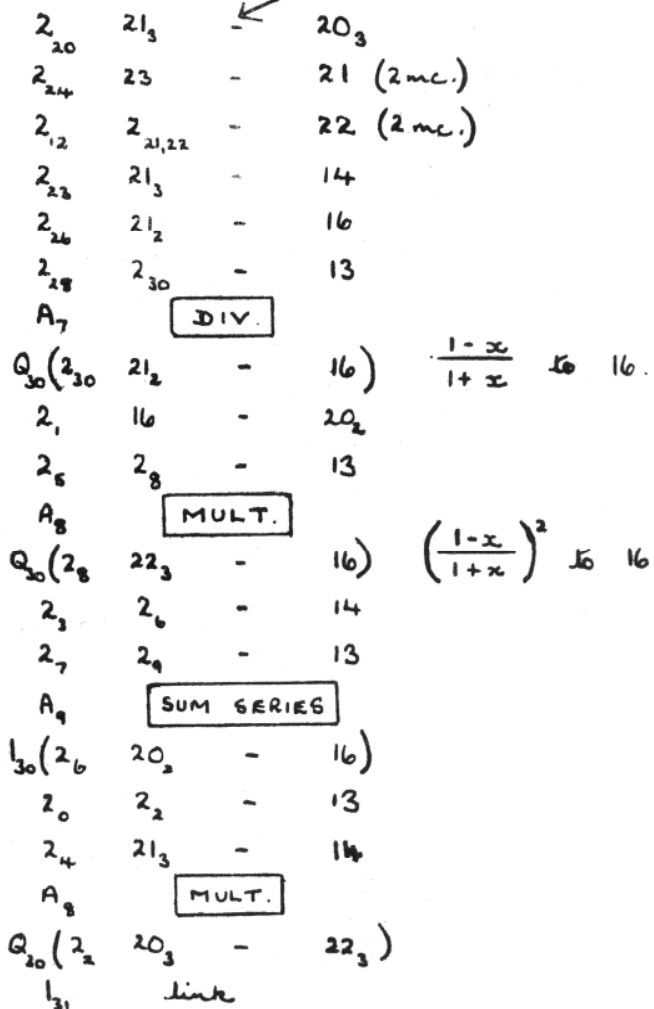
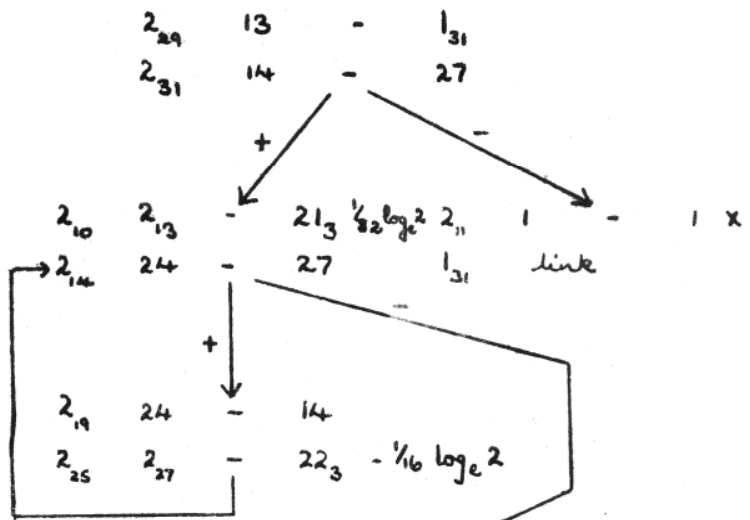
NOTE: If $2^{-q} x$ is given to 30 b.p. the correct value of $1/16 \log_e x$ will be obtained if the constant in m.c. 13 is altered to

$$1/16 (\frac{1}{2} + q) \log_e 2 \text{ to 30 b.p.}$$

March, 1958.

R.A.E. 436.

D.L. 2		Track						
Card Nos.								
mc	NS	S	D	C	W	T		
							Y	
							X	
							0	
							1	
0	2	2	13	0	2		2	
1	2	16	20	1	2		3	
2	1	20	22	1	31		4	
3	2	2	14	1	2		5	
4	A	21	14	1	2		6	
5	A	2	13	1	1		7	
6	2	20	16	0	0		8	
7	A	2	13	0	0		9	
8	2	22	16	1	3		Y	
9		2P5 + 18P7 + 2P32						X
10	2	2	21	1	2		0	
11	1	1	1	0	18	x	1	
12	2	2	22	2	7	9	2	
13		16, 1, 25, 5, 22, 0, 0						3
14	2	24	27	0	3		4	
15		0, 0, 0, 0, 0, 4, 0						5
16		9, 27, 10, 21, 10, 1, 0						6
17		6, 21, 15, 18, 25, 0, 0						7
18		5, 23, 14, 8, 19, 0, 0						8
19	2	24	14	0	4		9	
20	2	21	20	1	2		Y	
21		19, 25, 16, 29, 11, 9, 3						X
22		13, 6, 15, 2, 20, 22, 0						0
23	2	21	14	0	1		1	
24	2	23	21	2	0	18	2	
25	2	2	22	0	19		3	
26	2	21	16	0	0		4	
27		0, 29, 13, 20, 19, 30, 3						5
28	A	2	13	0	9		6	
29	2	13	1	0	0		7	
30	2	21	16	0	1		8	
31	2	14	27	0	9		9	



DEUCE Subroutine No. 248 (E11)

$1/16 \log_2 x_0$

Date

File Ref. NS t 219

Sheet Ref. S6/11182.