

# THE ENGLISH ELECTRIC CO., LTD.

NELSON RESEARCH LABORATORIES

STAFFORD

MATHEMATICAL PHYSICS LABORATORY.

Telephone:—Stafford 700.

Report No. NS t 18

Date 2.4.55

Reference

Order No.

Front Sheet.

Data Sheet 1.

Figure sheet S6/10031

DEUCE Subroutine No. 23 (P04)

Report by

A. Gilmour.

## SUMMARY.

The attached document contains details of a DEUCE Subroutine for converting four single length binary numbers to decimal and punching them out on one card together with signs.

The subroutine was originally prepared at N.P.L., has been tested on the N.P.L. DEUCE at Blackheath and has been copied into all instruction delay lines and tested in each.

A. GILMOUR.

MATHEMATICAL PHYSICS LABORATORY.

NW

NELSON RESEARCH LABORATORIES  
STAFFORD E. E. CO. LTD.

NS t 18

Sheet No.: 1

Description. Converts four single length/ <sup>binary</sup> numbers to decimal and punches them on one card together with signs. Maximum number of decimal digits per number is six. First Order subroutine.

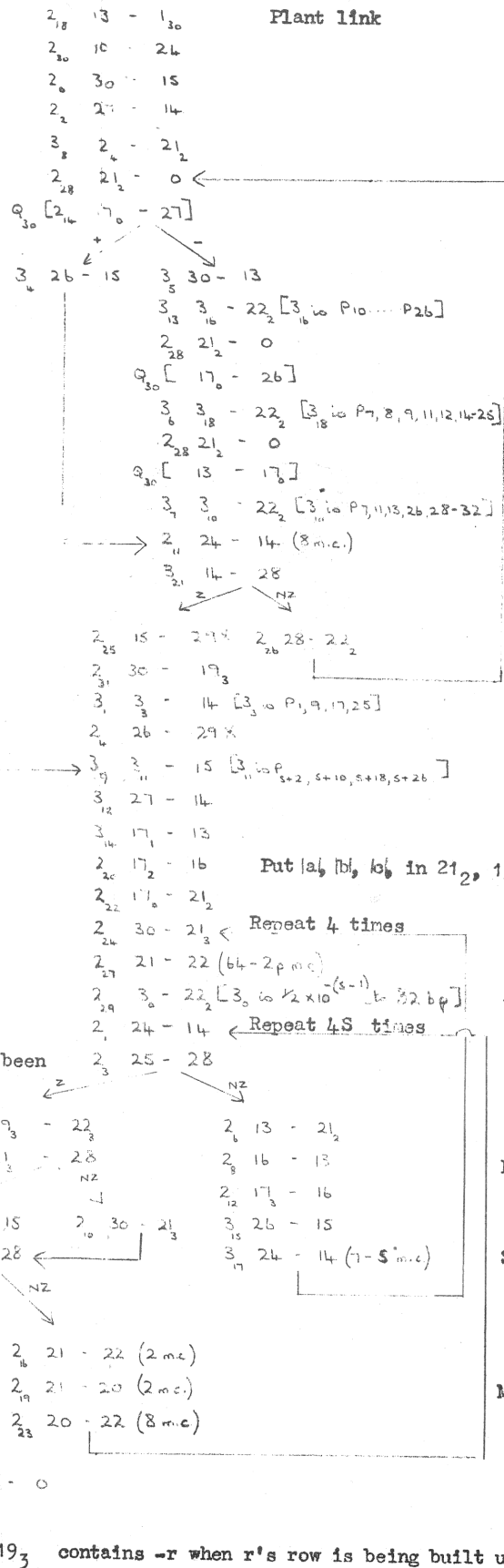
Data. a,b,c,d the four binary numbers to be converted ( |a| , |b| , |c| , |d| < 10) given to p binary places,  $16 \leq p \leq 31$ .  
S the number of decimal digits in each number  $1 \leq S \leq 6$ .

Result. a,b,c,d converted to decimal and punched on a card with the signs in DEUCE columns 1, 9, 17, 25 (Y row positive, X row negative) and decimal digits in DEUCE columns 2 to S + 1, 10 to S + 9, 18 to S + 17, 26 to S + 25.

Instructions for Use.

Stores used.	13	14	15	16	17 <sub>0</sub>	17 <sub>1</sub>	17 <sub>2</sub>	17 <sub>3</sub>
Contents at entry.	Link	-	-	-	a	b	c	d
Contents at exit.	d	zero	-	d	a	b	c	d
			ng					
Stores used.	19 <sub>3</sub>	20	21 <sub>2</sub>	21 <sub>3</sub>				
Contents at entry.	-	-	-	-				
Contents at exit.	-	-	d	-				
Occupies.	D.L.2 and 3 <sub>0-21</sub>							
Entry.	2 <sub>18</sub>							
Parameters.	(2p-31) as wait no. in 2 <sub>27</sub> $\frac{1}{2} \times 10^{-(S-1)}$ to 32 b.p. in 3 <sub>0</sub> P <sub>S+2, S+10, S+18, S+26</sub> in 3 <sub>11</sub> (S-1) as wait no. in 3 <sub>17</sub>							
Waste Instruction.	1 0-0, 0, 8 in 3 <sub>20</sub>							
Clear Punch.	No clear punch instruction is provided in this subroutine but the waste instruction in 3 <sub>20</sub> may be used for this purpose if required.							
Constants etc. available.	(0) 21-0, 0, 0 in 2 <sub>28</sub> .							

D.L. Track							D.L. Track							
Card Nos.							Card Nos.							
mc	NIS	S	D	C	W	T	mc	NIS	S	D	C	W	T	
														Y
														X
														0
														1
0	2	30	15	0	0		0		$\frac{1}{2} \times 10$			6 32 b.p		2
1	2	24	14	0	0		1	2	3	14	0	1		3
2	3	27	14	0	4		2	3	21	19	1	5		4
3	2	25	28	0	0		3			P1,9,17,25				5
4	3	26	29	0	3	X	4	2	26	15	0	5		6
5	2	19	22	0	0		5	3	30	13	0	6		7
6	2	13	21	0	0		6	2	3	22	10	20		8
7	2	21	28	0	0		7	2	3	22	1	2		9
8	2	16	18	0	2		8	2	2	21	4	18		Y
9	2	26	15	0	2		9	3	3	15	0	1		X
10	2	30	21	1	1		10			P7,11,13,26,28-32				0
11	3	24	14	1	8		11			P5+2, s+10, s+18, s+26				1
12	3	17	16	1	1		12	3	27	14	0	0		2
13	2	14	28	0	0		13	2	3	22	1	13		3
14	3	17	27	0	4		14	2	17	13	1	4		4
15	2	15	29	0	0	X	15	3	26	15	0	0		5
16	2	21	22	0	1		16			P10-26				6
17	3	2	24	0	0		17	2	24	14	1	5		7
18	2	13	1	10	10		18			P7,8,9,11,12,14-25				8
19	2	21	20	0	2		19	2	19	21	0	0		9
20	2	17	16	0	0		20	1	0	0	0	8		Y
21	3	27	23	0	11		21	2	14	28	0	2		X
22	2	17	21	0	0		22							0
23	2	20	22	1	8		23							1
24	2	30	21	1	1		24							2
25	2	15	29	0	4	X	25							3
26	2	28	22	0	0		26							4
27	2	21	22	1	2p-31	0	27							5
28	0	21	0	0	0		28							6
29	2	3	22	1	2		29							7
30	2	10	24	0	0		30							8
31	3	30	19	0	0		31							9



Form |a|, |b|, |c|, |d| and punch signs.

Shift number in 21 so that binary point lies between even and odd half.

Replace |a| by |b|, |b| by |c| and |c| by |d|

Shift marker in 14 for next number

Multiply by 10.