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THE ENGLISH ELECTRIC CO., LTD.

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DEUCE Subroutine No. 12 (P01)

Report by
A. Gilmour.

SUMMARY.

The attached document contains details of a DEUCE subroutine for converting a binary number to decimal and for punching it out on a card together with sign.

The subroutine was originally prepared at the 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.

ENCLOSURES.

Sheet 1 - DEUCE Subroutine No. 12 (P01).
Figure sheet S6/10010

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Description. Converts a binary number to decimal and punches on card together with sign. First order subroutine.

Data. a the binary number given to p binary places $|a| < 10$, $16 \leqslant p \leqslant 31$
S the number of decimal digits in the result.

Result. a converted to decimal form and punched on a card with sign (Y positive and X negative) in Column 1. and S decimal digits in columns 2 to (S+1). The decimal point lies between the second and third columns.

Instructions for use.

Stores used.	13	14	15	16	21	20	TCB
Contents at entry.	Link	a	-	-	-	-	OFF
Contents at exit.	-	-	-	-	-	-	OFF

Occupies. m.c. 2-31

Entry in m.c. 28

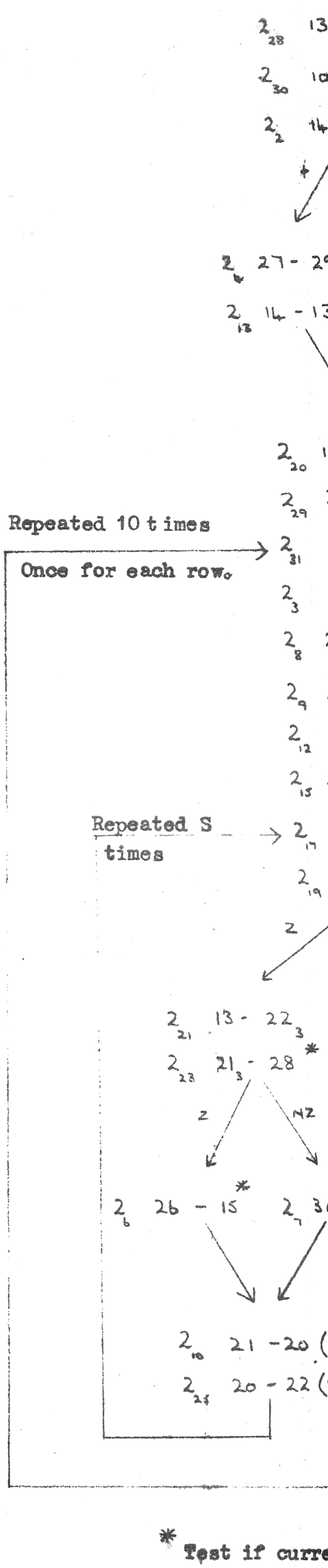
Parameters. (2p-32) as wait no. in m.c. 8
P_{S+2} in m.c. 11
$\frac{1}{2} \times 10^{-(S-1)}$ to 32 b.p. in m.c. 14

Waste Instruction. 1 0 - 0 0 1 in m.c. 27

Clear Punch. There is no instruction to clear the punch in the subroutine. The waste instruction in m.c. 27 may be used for this purpose if required.

This subroutine uses D.S. 20

D.L.		Track						D.L. 2		Track						
Card Nos.								Card Nos.								
mc	NIS	S	D	C	W	T		mc	NIS	S	D	C	W	T		
																Y
																X
																0
																1
0								0								2
1								1								3
2								2	2	14	27		0	0		4
3								3	2	16	21		1	3		5
4								4	2	27	29		0	7	X	6
5								5	2	30	13		0	9	X	7
6								6	2	26	15		0	2		8
7								7	2	30	21		0	1		9
8								8	2	21	22	l	$\boxed{2_p\text{-}32}$	31		Y
9								9	2	2	15		0	1		X
10								10	2	21	20	d	0	13		0
11								11			P_{s+2}					1
12								12	2	2	22		0	1		2
13								13	2	14	13		0	5	X	3
14								14		$\frac{1}{2} \times 10^{-(s-1)}$ to 32 bp.						4
15								15	2	27	14		0	0		5
16								16	2	14	26		0	0		6
17								17	2	24	14		0	0		7
18								18	2	27	29		0	0	X	8
19								19	2	25	28		0	0		9
20								20	2	13	16		0	7		Y
21								21	2	13	22		0	0		X
22								22	2	26	29		0	0	X	0
23								23	2	21	28		0	13		1
24								24	2	2	24		0	0		2
25								25	2	20	22	l	5	22		3
26								26	2	27	26		0	3		4
27								27	1	0	0		0	1		5
28								28	→ 2	13	1		0	0		6
29								29	2	30	13		0	0		7
30								30	2	10	24		0	2		8
31								31	2	30	21		0	2		9



* Test if curre

2_{28} $13 - 1_{30}$ — Plant link

2_{30} $10 - 24$ — Stim punch

2_{2} $14 - 27$

+ / −

2_{4} $27 - 29$ X 2_{5} $30 - 13$ X

2_{13} $14 - 13$ X 2_{16} $14 - 26$ — Punches sign in column 1 of card.

2_{18} $27 - 29$ X

2_{20} $13 - 16$ — Puts |a| in TS16.

2_{29} $30 - 13$

imes

h row. → 2_{31} $30 - 21_{3}$

2_{3} $16 - 21_{2}$ — Puts |a| in DS 21_{2}

2_{8} $21 - 22$ (64 − 2p m.c.) — Shifts |a| in DS21 so that binary point lies between even and odd half.

2_{9} $2_{11} - 15$ [2_{11} is P_{S+2}]

2_{12} $2_{14} - 22_{2}$ [2_{14} is $\frac{1}{2} \times 10^{-(S-1)}$ to 32 b.p.] — Round off.

2_{15} $27 - 14$

ed S → 2_{17} $24 - 14$

2_{19} $25 - 28$ — Test if S decimal digits have been found.

Z / NZ

2_{21} $13 - 22_{3}$ 2_{22} $26 - 29$ X — Punch r's row.

2_{23} $21_{3} - 28$ * 2_{24} $2 - 24$ — Has 9's row been reached?

Z / NZ Z / NZ

2_{26} $27 - 26$ 2_{27} $0 - 0$ — Waste instruction.

b − 15 * 2_{7} $30 - 21_{3}$ 1_{30}

2_{10} $21 - 20$ (2 m.c.)

2_{25} $20 - 22$ (18 m.c.) — Multiplication by 10.

* Test if current decimal digit is an r. If so make contribution to r's row in TS 15.

Date

File Ref.

Sheet Ref. 36/10010

Coding and flow diagram for subroutine P01.
(Punch one decimal number).

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