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NELSON RESEARCH LABORATORIES

STAFFORD

DEUCE Subroutine No. 48 (R03)

Report No. NS t 40

Date 11.8.55

Reference

Order No.

Report by T.D. Westrup.

Front Sheet.

Data Sheet 1.

Figure sheets S6/10122 - S6/10123

SUMMARY

The attached document contains details of a DEUCE Subroutine for reading three signed 9-digit integers from a card and converting them to binary.

The subroutine has been prepared, tested, copied into all instruction delay lines and tested in each at N.R.L.

T.D. Westrup.

MATHEMATICAL PHYSICS LABORATORY.

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NS t 40

Sheet No.:1

Description. Reads three signed 9-digit/decimal integers from a card, converting them to binary. The numbers must be punched with signs in DEUCE Columns 1, 11 and 21, and 9 decimal digits each in DEUCE Columns 2-10, 12-20 and 22-30 respectively.

Data. a, b, c ; signed 9-digit decimal integers on a card.

Result. a, b, c ; in binary.

Failure. If the subroutine enters the loop
2, 9-24 \leftarrow
the card just read is incorrectly punched.

TIME:- $1\frac{1}{3}$ n.s. before Y-row single shot
 $8\frac{1}{2}$ n.s. after 9-row " " " "

Instructions for Use.

Stores Used.	13	14	15	16	19 _{2,3}	20 ₂	20 ₃
Contents at Entry.	Link	-	-	-	-	-	-
Contents at Exit.	a	b	c	c	65P ₁₇	a	b
Stores Used.	21 _{2,3}	3 _{0,1,2}					
Contents at Entry.	-	-					
Contents at Exit.	-	a,b,c					
Occupies.	D.L.2 m.c's	0-5, 7, 9-15, 17-31					
	D.L.3 m.c's	0-2, 6, 8, 10-16, 19-28, 30					
	D.L.4 m.c's	2-31.					
Entry.	4 ₂₁						
Constants etc.	0, 21-0, 0, 0			in	2 ₂₇		
	0, 21-0, 0, 0			in	2 ₂₈		
	P _{2-10, 12-20, 22-30}			in	2 ₁₂		
	65 P ₁₇			in	4 ₂₅		
The Storage Locations contain respectively.	3 ₂₆	4 ₁₈	4 ₁₁	2 ₄	4 ₂₉	3 ₂₂	3 ₁₅
	10 ² P ₁	10 ³ P ₁	10 ⁴ P ₁	10 ⁵ P ₁	10 ⁶ P ₁	10 ⁷ P ₁	10 ⁸ P ₁
Waste Instruction.	1, 0-0, 0, 30			in	3 ₃₀		
Clear Read.	There is no instruction in the subroutine to clear read. The waste instruction in 3 ₃₀ may be replaced by a "clear read" instruction if required.						

Deuce Programme

CODING FOR SUBROUTINE No. 48 (R03)
 Read three signed 9-digit decimal integers.

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

Reserved

10⁵. P1

P2-10, 12-20, 22-30.

10⁴. P1

10³. P1

10³. P1

10⁷. P1

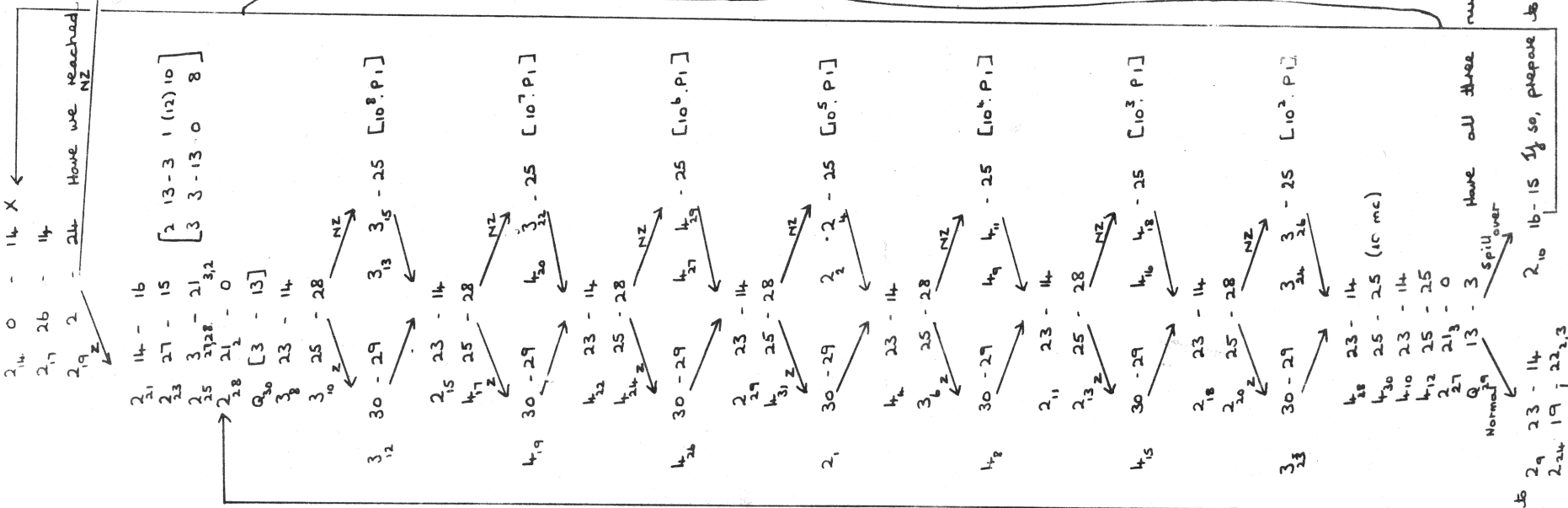
10². P1

65. P17.

10⁶. P1

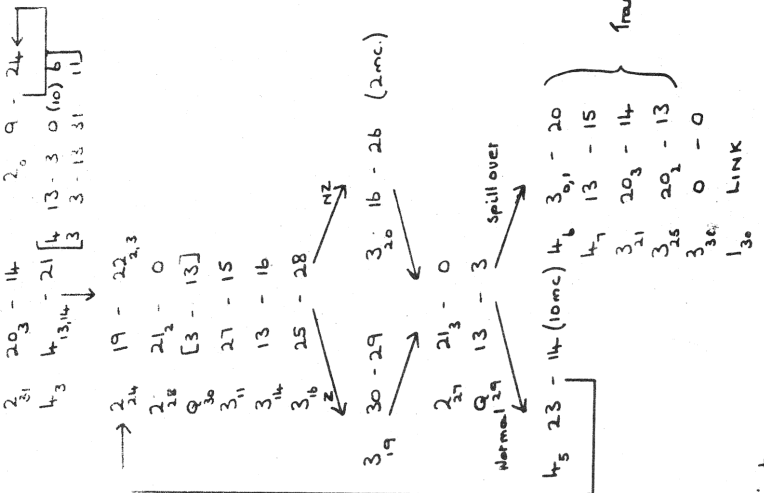
- 2₁ 12 - 24
- 4₂ 13 - 19
- 2₃ 13 - 13₀
- 2₃ 19 - 13
- 2₅ 13 - 19₁
- 2₃₀ 3 - 0₋₂ X
- 4₂ 0 - 20_{2,3} X Store negative signs
- 2₇ 2₁₂ - 15 [P_{2-10, 12-20, 22-30}]
- 2₁₄ 0 - 14 X
- 2₇ 26 - 14
- 2₁₉ 2 - 24

How we reached the 9's row?



If not prepared to deal with the next number.

Check whether an odd number of digits in each column



In a column where the decimal digit has not yet occurred add in the appropriate power of 10. When and after the digit occurs do nothing.

Transfer to 13, 14, 15.

numbers been dealt with on this row? Is read the next row.