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NELSON RESEARCH LABORATORIES
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MATHEMATICAL PHYSICS LABORATORY.

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Date 1.4.55
Reference
Order No.

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DEUCE Subroutine No. 20. (F01)

Report by
C. Robinson.

SUMMARY.

The attached document gives details of a DEUCE subroutine for finding the square root of a single length number.

The flow diagram was originally prepared as a programme example in the programme manual. It has been coded for the upper and lower halves of all instruction delay lines, and tested in each.

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NW

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Description. First order subroutine giving $\sqrt{2^n a}$ to the nearest odd integer where a is a number initially in TS13 and n is a parameter planted in m.c. 21 or m.c. 6 of the "lower" or "upper" versions respectively.

Data.

a a positive number where $0 \leq a \leq 2^n$

n a parameter such that $n \leq 31$

Result. $c = \sqrt{2^n a}$ to the nearest odd digit.

Note This sub. does not check that $a \geq 0$

Instructions for Use.

Stores used.	13	14	15
Contents at entry.	a	Link	-
Contents at exit.	-	c	$c-P_1$

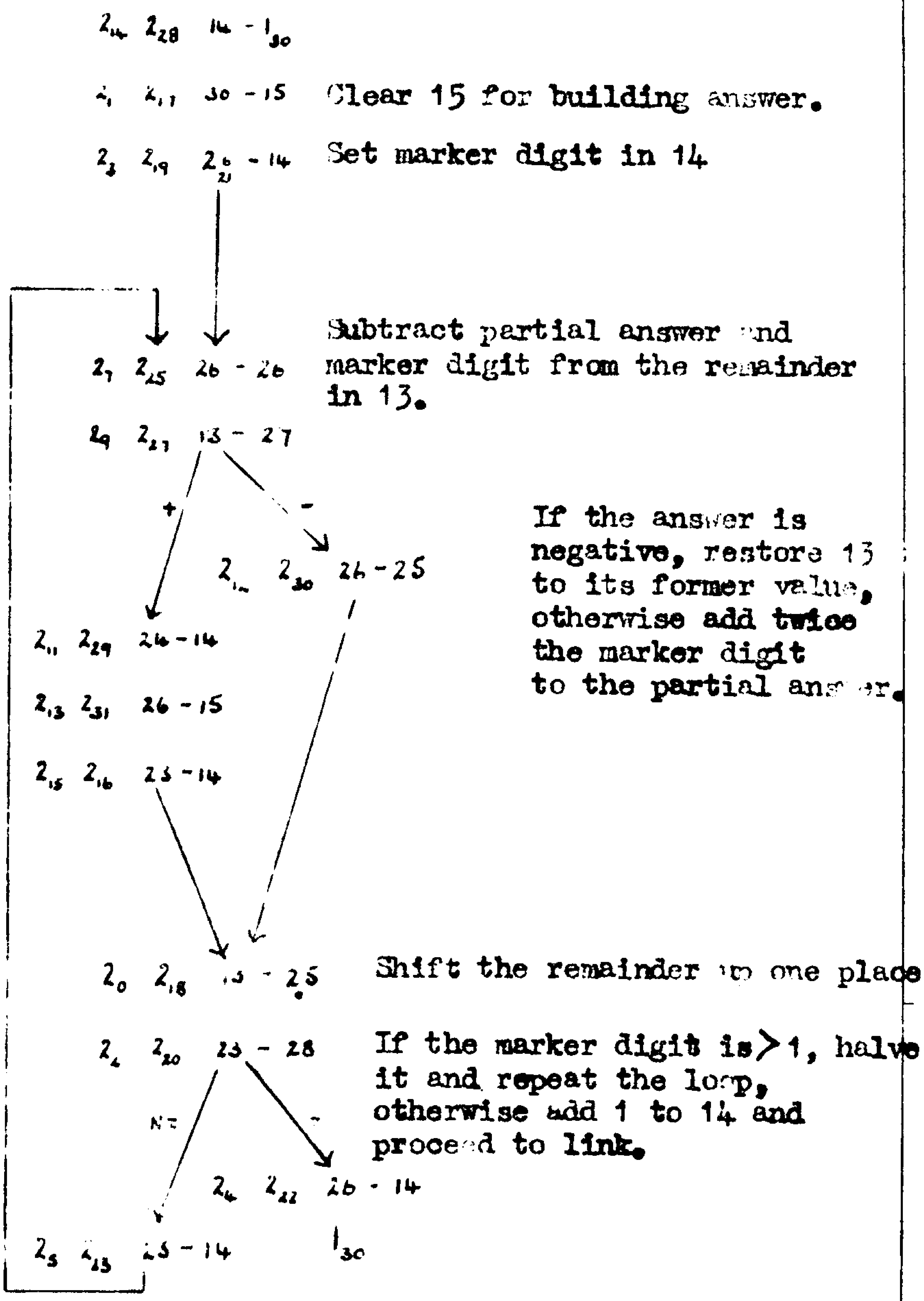
		'Lower' Version	'Upper' Version
Occupies.	m.c.	16-23, 25, 27-31	0-7, 9, 11-15
Entry.	m.c's	28	14
Time.		n m.s.	$n+\frac{1}{2}$ m.s.
Parameter.	P_{n-1} in m.c.	21	6

~~6th Chebychev coefficient is 17, 11, 30, 1, 0, 0, 0.~~

D.L. 2 Track

Card Nos.

mc	NIS	S	D	C	W	T	
							Y
							X
							0
							1
0	2	13	25		0	0	2
1	2	30	15		0	0	3
2	2	23	28		0	0	4
3	2	2	14		1	2	5
4	1	26	14		0	24	6
5	2	23	14		0	0	7
6		Parameter					8
7	2	26	26		0	0	9
8							Y
9	2	13	27		0	0	X
10							0
11	2	24	14		0	0	1
12	2	26	25		0	18	2
13	2	26	15		0	0	3
14	2	14	1		14	17	4
15	2	23	14		0	15	5
16	2	23	14		0	0	6
17	2	30	15		0	0	7
18	2	13	25		0	0	8
19	2	2	14		0	4	9
20	2	23	28		0	0	[illegible]
21		Parameter					[illegible]
22	1	26	14		0	6	0
23	2	23	14		0	0	1
24							2
25	2	26	26		0	0	3
26							4
27	2	13	27		0	0	5
28	2	14	1		0	19	6
29	2	24	14		0	0	7
30	2	26	25		0	18	8
31	2	26	15		0	15	9



NOTE. The marker digit moves down once each loop, and the remainder moves up once each loop, this compares with the normal longhand square root procedure where the remainder shifts two places at each stage.

Flow Diagram and Coding for DEUCE Subroutine No. 20 (W01)

Date

File Ref.