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ENGLISH ELECTRIC CO. LTD., KIDSGROVE.

Report No: K/AA t 1328
Sheet No: 1.

DEUCE Programme No. 492 (ZP49T)

Read Programme and Enter.

SUMMARY.

This routine is designed to perform the following functionswith the minimum of restrictions:-

(a) Stop & field detector.
(b) Synchronise with clock track (if the previous programme left one in an even m.c.) or select an even m.c.
(c) Clear magnetic drum, reset clock track and clear mercury store.
(d) Read triads (punched in α - field only, β field only, or in both fields) to the drum in any order.
(e) Either fetch selected tracks to selected D.L.'s and enter at a specified point, or
Clear the mercury store and revert to standard single or double field D.L. fillers.

The clear drum facility can be easily removed for restore control purposes, and the routine will deal with the case of no triads to be read.

The fetch selected tracks section is controlled by a parameter card, which enables the main programme to be entered at any specified point with the minimum of effort.

Provision is made to deal with the extra 7 delay lines 1A-7A fitted to all mark IIA machines.

The drum triads produced by POST MORTEM (ZP29T/2) can be read back onto the drum using this routine without any modification of cards.

This routine supersedes ZP39T (No. 358).

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Report No: K/AA t 1328
Sheet No: 2.

DEUCE Programme No. 492 (ZP49T)

Read Programme and Enter.

OPERATING INSTRUCTIONS.

Order of Cards.

Card 0:	Stop & field detector.
Card 1:	Synchronise with clock track or select even m.c.
Card 2:	Clear drum, reset clock track and clear mercury stores. (Card 2 should be omitted for restore control purposes, when the drum is not to be cleared).
Cards 3-9:	D.L.'s 1-5 of routine punched with unconventional fillers.
Triads for drum:	Punched α field only, β field only, or in both fields. The track No. x P_1 to be punched on the Y row of each non-zero field. The X, 0, 1 rows are ignored. A completely zero field will not be written on the drum.
Parameter Card(s)	Punched with one (or more, up to 19) codesfor subroutine B14 on successive rows of the α field. The codewords may be in any order. The last code word should be followed by $BP_2 + TP_{26}$ on the next row to define entry at B_T. N.B. If B = 8, punch ZERO x P_2.

Codewords.

A code word is of the form:-

$TP_1 + DP_{10} + (N+16)\ P_{22}$ for D.L.'s 1-12.

$TP_1 + DP_{10} + P_{17} + (N+16)\ P_{22}$ for D.L.'s 1A-7A (Mk. IIA only)

This will fetch a block of N consecutive tracks starting at track T into delay lines starting at D.L. D, working downwards in both cases (i.e. $T \rightarrow D$, $(T-1) \rightarrow (D-1)$, ... $(T-N+1) \rightarrow (D-N+1)$).

NOTE: A codeword $32P_1 + 10P_{10} + P_{17} + 21P_{22}$ would bring tracks 32, 31, 30, 29, 28 into D.L.'s 10, 9, 8, 7A, 6A respectively.

Final State of the Stores.

At entry at B_T, those D.L.'s filled from the drum will contain the required tracks except for D.L.11 which is overwritten by subsequent fetched tracks. All others contain zeros, except for D.L.1 which contains subroutine B14 unless overwritten. The QS's-DS's are also empty.

If entry is required in D.L.'s 2A-7A, (Mk. IIA only) a P_1 should also be punched on the same row as B and T. Entry in D.L.1A is NOT POSSIBLE with this routine, but this can be overcome by entering a spare m.c. in any other D.L. calling 1A and switching T.C.C. if necessary.

Filling D.L.'s from Cards.

If it is required to revert to conventional fillers for D.L.'s (e.g. to restart with a POST MORTEM result) the parameter card should contain P_{26} on the Y row α field only. This will cause the mercury store to be cleared and 1_0 to be called with the reader running to accept conventional fillers. Note that even with a small programme it is easier to read it all to the drum and recall it by means of the parameter card.

OPERATING INSTRUCTIONS CONT'D.

alter card 0001, 9B row from 30-16 to 31-16

Restore Control. To restore control, ~~card 0002 should be removed~~, thus eliminating the clear drum and reset clock track facility, and a new parameter card punched if necessary. Initial input should then be used to restart, assuming the contents of the mercury are not required. The routine will perform quite satisfactorily if there are no triads for the drum i.e. the parameter card can be placed immediately after card 0009.

Track 0/0. If the first row of a triad (Y) is blank, this indicates either a blank field or track 0/0. The routine does not write zero tracks and therefore a completely blank field is not written and track 0/0 is preserved. However, if a spurious hole is punched in an otherwise blank field, the routine checks to see if a track 0/0 has already been written. If so, it fails; if not it accepts the field as the genuine track 0/0.

Failures.

8, 2-10X Machine is switched to 32 col. Re-assemble pack, switch to 64 col. and restart.
1, 12-24 Machine is on STOP. Put to NORMAL to continue.
3, 1-1 X α field is a second track 0/0.
5, 2-2 X β field is a second track 0/0.

To punch Drum Only. (ie. 15/14) form the pack. ZP49T (cards 0-1) ZP29T/3 (cards 17-19)

alter as follows: card 1 2β . 1, 31-29, 0, 0 shld. be 1, 31-29, 0 30
17 1B 4, 0-4, 30, 8 — 3, 0-4, 30 13
18 X13 3, 9-24 0 3 — 2P1 17-0, 18 18.
19 0α 6, 8-24, 1, 0 9 — 4, 8-24, 1, 0 17
19 9 punch card col. 1.

This pack stops on 1, 31-29 if there is no valid clock track in 15/15 16.

A single shot after the last two failures causes the offending field to be ignored, and the routine continues.

If the O.P.S. lights show all ones during the clear drum period, this indicates that the drum did not carry a valid clock track. (The scope will probably therefore require lining up).

Other Facilities. The first three cards of this routine can be used independently of the rest. Cards 0-2 perform all initial card, synchronise with clock track, clear drum and reset clock track facilities and exit at 1_0 with read called and the mercury store clear.

Converting a Single Field Programme to Double Field. The restrictions (a) to (g) of ZP39T have been removed. One advantage of this is that programme ZP46T/1 is no longer required. A programme can be written and tested in the α-field and then converted to double field by means of a reproducer.

To punch drum only.

If D.L.1 is not required to be filled, the entry can be at any pt. in the A D.L's. In this case punch P1 on the same row as B and T.

If D.L.1 is required to be filled, the entry must be somewhere in D.L. 1-8 and a P1 punched with B and T is ignored.

D.L. 1 Track

Card Nos. 0

Dec	NIS	S	D	C	W	T			mc.
		BLANK						Y	
	1	0	1	1	29	15	x	X FS4	–
	1	0	1	2	30	27	x	0	–
	1	30	1	1	9	8		1	21.22.
0	1	21	28		1	1		2	18
1	1	29	22		1	1		3	15
2	1	4	24		0	1		4	12
3	1	30	21	2	0	1		5	9
4	1	15	31		0	1		6	6
5	1	12	24		31	1		7	3
6	1	9	24		0	31		8	Q2
7	1	1	1		0	28		9	Q2
8								Y	
9								X	
10								0	
11								1	
12								2	
13								3	
14								4	
15								5	
16								6	
17								7	
18								8	
19								9	
20								Y	
21								X	
22								0	
23								1	
24								2	
25								3	
26								4	
27								5	
28								6	
29								7	
30								8	
31								9	

Q_2 9-24
I_3 12-24
I_6 15-31
I_9 30-21 (d)
I_{12} 4-24
I_{15} 29-22_2
I_{18} 21_3-28

z / nz

I_{21} 30-1 (32mc)
I_{31} 0-0x
[Q_1 1-1
I_{31} 0-0x]

I_{22} 30-1 (32mc)
I_0 0-0x
[Q_2 1-1
I_0 0-0x]

Last two instructions only obeyed if n/k is on "NORMAL".

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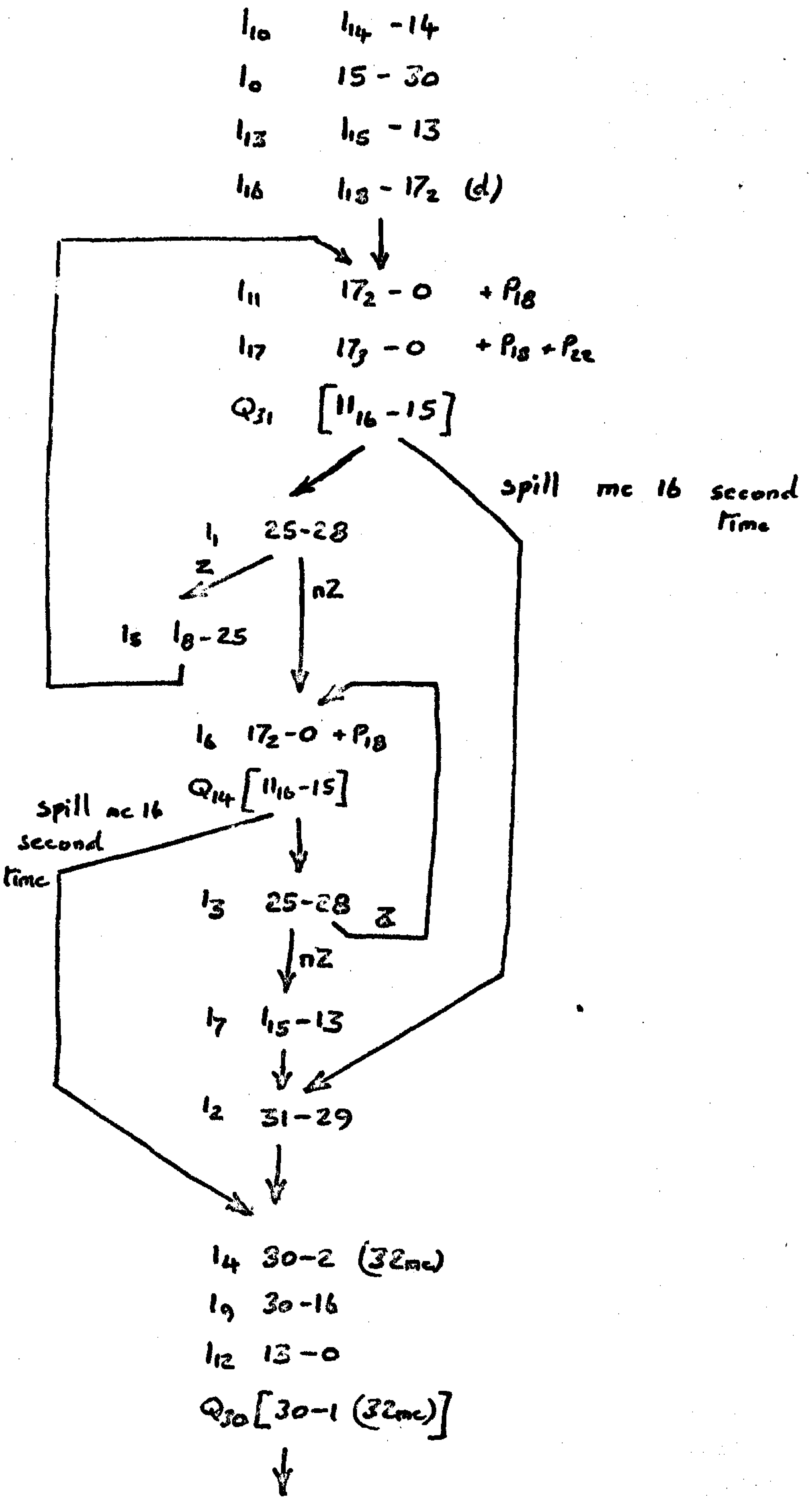
D.L. 1			Track					
Card Nos. 1								
mc	NIS	S	D	C	W	T		
								Y
								X
								0
								1
0	1	15	30		0	11		2
1	1	25	28		0	2		3
2	1	31	29		0	0		4
3	1	25	28		0	1		5
4	1	30	2	1	4	3		6
5	1	1	25		1	4		7
6	$3P_1$	17	0		6	6		8
7	1	1	13		6	25		9
8	—— P_{18} + P_{27} ——							Y
9	1	30	16		0	1		X
10	1	1	14		2	20		0
11	$5P_1$	17	0		1	4		1
12	0	13	0		16	16		2
13	1	1	13		0	1		3
14	—— P_{31} ——							4
15	1	30	1	1	1	0		5
16	1	1	17	2	0	25		6
17	$7P_1$	17	0	1	12	12		7
18	1	11	15		30 (14)	19		8
19	1	11	15		13 (15)	31		9
20								Y
21								X
22								0
23								1
24								2
25								3
26								4
27								5
28								6
29								7
30								8
31								9



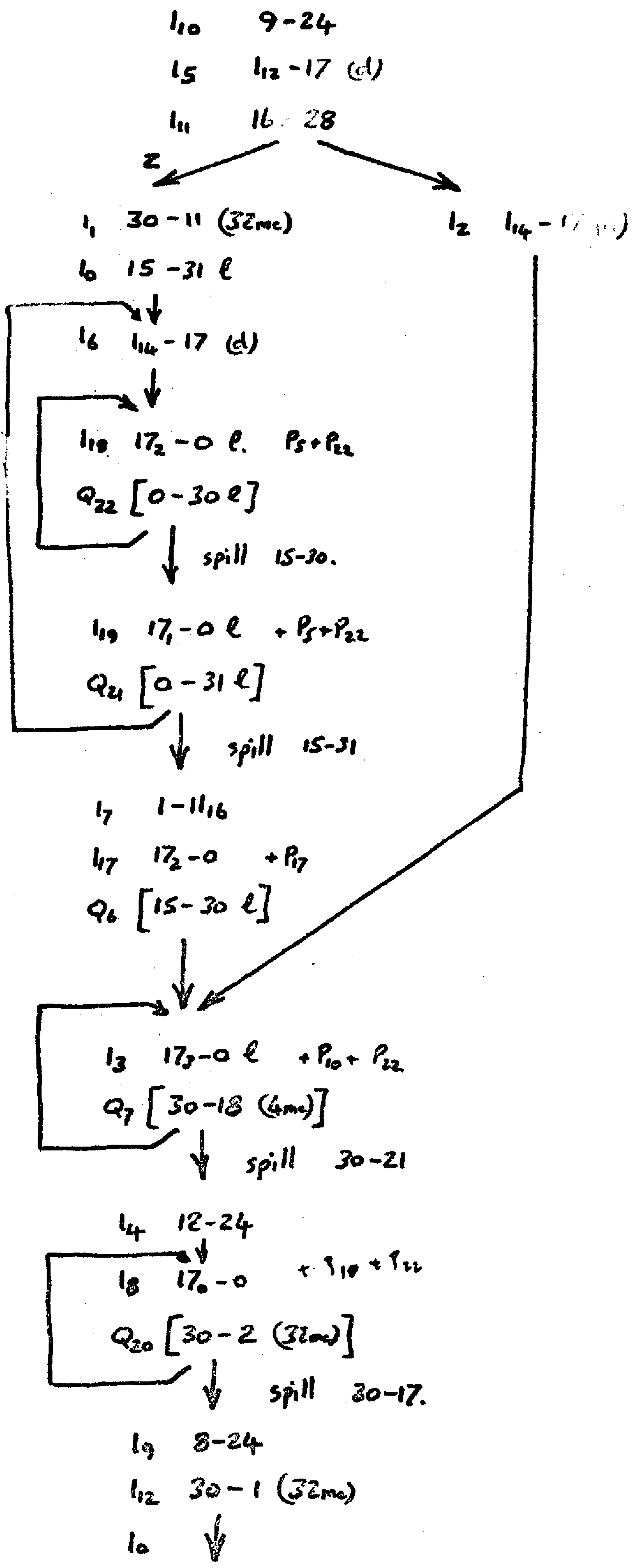
Enter l_0 synchronised with clock track if valid.

mc 10-19 punched on α field rows 0-9.
mc 0-9 punched on β field rows 0-9.

D.L. 1 Track

Card Nos. 2

mc	NIS	S	D	C	W	T		
								Y
								X
								0
								1
0	1	15	31	1	0	4		2
1	1	30	11	1	30	29		3
2	1	1	17	2	10	31		4
3	$5P_1$	17	0	1	2	2		5
4	1	12	24		0	2		6
5	1	1	17	2	5	4	h	7
6	1	1	17	2	6	10		8
7	1	1	11		7	8		9
8	$5P_1$	17	0	1	10	10		Y
9	1	8	24		0	1		X
10	1	9	24		0	25		0
11	1	16	28		0	20		1
12	1	30	1	3	19	18		2
13	1	31	30	1	0	15		3
14	1	31	29	1	0	26		4
15	1	30	17	1	0 (12)	26		5
16					P_{31}			6
17	$2P_1$	17	0		19	19		7
18	$4P_1$	17	0	1	2	2		8
19	$4P_1$	17	0	1	0	0		9
20								Y
21								X
22								0
23								1
24								2
25								3
26								4
27								5
28								6
29								7
0								8
31								9



mc 10-19 punched in α field rows 0-9

mc 0-9 punched in β field rows 0-9.

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DEUCE Programme No. 492 (ZP49T)

Read Programme and Enter.

D.L. 1 Track

Card Nos. 3, 4_{y-5}

mc	NIS	S	D	C	W	T	
0	0	1	1		0	0	
1	2	30	1	1	14	13	
2	1	24	14	1	20	24	
3	1	16	1		20	3	
4		$P_{10-14} + P_{22-25}$					
5	1	23	14	1	16	19	
6	1	23	14	1	19	22	
7	1	14	13		0	2	
8	1	1	15		8	10	
9	1	1	13		1	6	
10	1	1	15		3	8	
11	1	1	26		0	1	
12	1	17	29		0 (15)	22	
13		$P_1 + P_{10} + P_{22}$					
14	1	13	14		0	0	
15		$P_{5-8} + P_{15} + P_{21} + P_{30}$					
16	1	1	15		0	1	
17	1	24	14	1	2	5	
18		$P_{5-8} + P_{21} + P_{30}$					
19	1	1	13		0	3	
20	1	13	1		8	29	
21	1	17	30		16	25	
22	1	1	13		1	5	
23	1	1	13		2	4	
24	1	15	25		0	0	
25	1	11	0	3	7 (14)	6	
26	1	25	25		0	0	
27	$3P_1$	11	0	3	7 (14)	6	
28	0	13	0		0	0	
29	1	1	15		5	6	
30	2	1	13		0	24	
31	1	14	28		0	1	

D.L. 2 Track

Card Nos. 4_{6-9}, 5

mc	NIS	S	D	C	W	T	
0	2	0	14		0	0	X
1	3	12	11	1	1	0	
2	2	2	15		0	1	
3	3	1	1		0	27	X
4					P_{26}		
5	2	25	28		0	0	
6	4	0	14		0	11	X
7	2	3	17	1	0	3	
8	4	26	28		0	0	
9	5	4	17	1	13	16	
10	4	0	14		0	29	
11	2	21	19	2	0	0	X
12	2	3	15		0	0	
13	3	30	21	2	0	0	X
14	2	25	21		1	1	
15	3	16	18		2	2	X
16	1	30	2	1	15	14	
17	3	24	14	1	0	3	
18	2	14	28		0	0	
19	1	30	2	1	11	10	
20	2	2	14		9	29	
21	2	2	28		8	31	
22	1	1	1		0	16	
23	1	2	13		5	15	
24	$10P_1$	17	0	1	5	5	
25	$13P_1$	17	0	1	2	2	
26	$13P_1$	17	0	1	0	0	
27	2	30	17	1	1	0	
28	1	1	13		0	10	
29	2	30	11	1	20	19	
30	1	1	14		1	3	
31	$7P_1$	17	0	1	1	1	

D.L. 3 Track

Card Nos. 6, 7_{y-1}

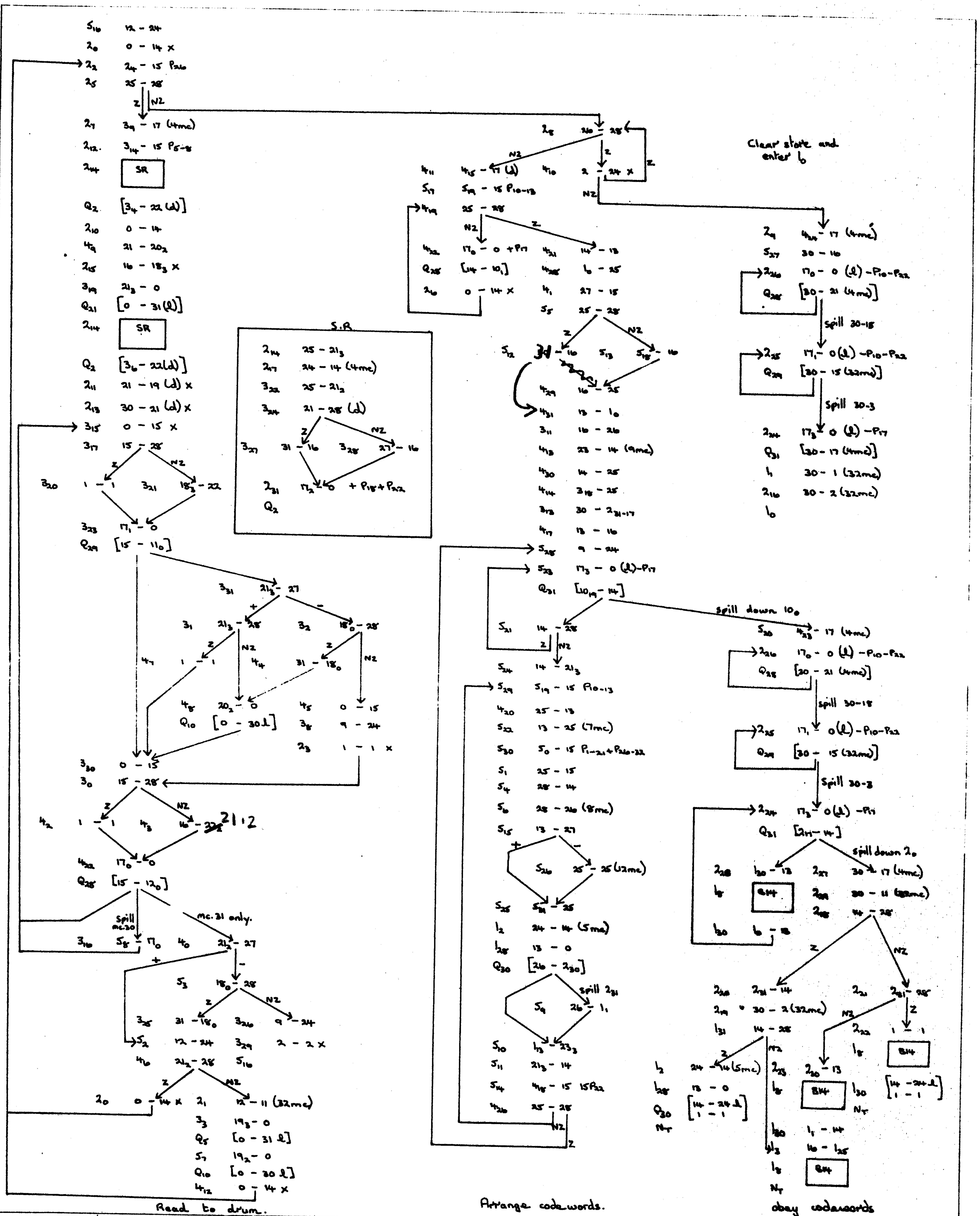
mc	NIS	S	D	C	W	T		
								Y
								X
								0
								1
0	4	15	28		0	0		2
1	4	21	28		0	4		3
2	4	18	28		0	0		4
3	0	19	0		0	0		5
4	3	0	30	1	0	18		6
5	2	0	31	1	0	23		7
6	4	0	30	1	0	0		8
7	5	0	31	1	0	0		9
8	2	9	24		0	25		Y
9	3	15	11		0 (15)	31		X
10	2	3	22	2	30 (14)	6		0
11	4	16	26		0	0		1
12	3	15	12		1 (15)	17		2
13	4	30	2	1	16	2		3
14		P_{5-8}						4
15	3	0	15		0	0	X	5
16	3	5	17		22	29		6
17	3	15	28		0	1		7
18	$15P_1$ ~~4~~	~~19~~	~~31~~	~~2~~	~~1~~	~~0~~	X	8
19	0	21	0		0	0		9
20	3	1	1		0	1		Y
21	3	18	22		0	0		X
22	3	25	21		0	0		0
23	$2P_1$	17	0		4	4		1
24	3	21	28	2	0	1		2
25	5	31	18		1	7		3
26	3	9	24		0	1		4
27	2	31	16		0	2		5
28	2	27	16		0	1		6
29	5	2	2		0	17	X	7
30	3	0	15		0	0		8
31	3	21	27		0	0		9

Deuce Programme

DEUCE Programme No. 492 (ZP49T)

Read Programme and Enter.

D.L. 4	Track							D.L. 5	Track							
Card Nos. 7_{2-9}, 8_{y-5}								Card Nos. 8_{6-9}, 9								
mc	NIS	S	D	C	W	T		mc	NIS	S	D	C	W	T		
																Y
																X
																0
																1
0	5	21	27		0	0		0		$P_{1-21} + P_{26-32}$						2
1	5	27	15		0	2		1	5	25	15		0	1		3
2	4	1	1		0	18		2	4	12	24		0	2		4
3	4	16	~~22~~ 21		1	17		3	3	18	28		3	20		5
4	4	31	18		2	2		4	5	28	14		0	0		6
5	3	0	15		1	1		5	5	25	28		0	5		7
6	2	21	28		0	24		6	5	28	26	1	0	7		8
7	3	1	1		0	21		7	0	19	0		1	1		9
8	0	20	0		0	0		8	4	15	12		0	2		Y
9	2	21	20		1	4		9	5	26	1		22	31		X
10	2	2	24		28	28	X	10	5	1	23		1	31		0
11	5	4	17	2	2	4		11	5	21	14		0	1		1
12	2	0	14		0	20	X	12	4	~~30~~ 31	16		0	~~15~~ 17		2
13	4	23	14	1	7	15		13	4	5	16		3	14		3
14	3	3	25		2	29		14	4	4	15		2	10		4
15	5	10	14		19	20		15	5	13	27		0	8		5
16	2	14	10		2	8		16	2	12	24		0	14		6
17	5	13	16		0	9		17	4	5	15		0	0		7
18					$15P_{22}$			18	0	13	23	1	0	0	X	8
19	4	25	28		0	0		19		P_{10-13}						9
20	5	25	13		0	0		20	2	4	17	1	1	4		Y
21	4	14	13		0	5		21	5	14	28		0	0		X
22	$2P_1$	17	0		4	4		22	5	13	25	1	0	6		0
23	2	2	14		17	27		23	$10P_1$	17	0	1	6	6		1
24	2	30	22	1	0 (3)	28		24	5	14	21		1	3		2
25	2	30	16	3	26 (12)	26		25	1	5	25		4	7		3
26	5	25	28		0	0		26	5	25	25	1	18	29		4
27	1	30	17	1	2	0		27	2	30	16		0	29		5
28	4	1	25		2	3		28	5	9	24		0	25		6
29	4	16	25		0	0		29	4	5	15		20	21		7
30	4	14	25		0	14		30	5	5	15		0	1		8
31	3	13	1		31	10		31	5	[illegible]	2		12	10		9



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