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

DEUCE Programme No. 345 (ZC13)
Programme Store and Fetch.

SUMMARY

A program to read and store on the drum large programs and to fetch sections of program to the DLs as required. Facilities for program testing are incorporated.

Because the instructions are lengthy they are not provided on the normal cards, but are available on foolscap sheets.

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OPERATING INSTRUCTIONS

Order of Cards.

PROGRAM FETCH AND STORE - cards 0-9
One block of program.
Data or further blocks of program interleaved as required.
A block of program consists of:
1) a program block parameter card punched
   Y-row TxP1 + NxP17 (T < 15/15)
   X-row T^{0}xP1 + DxP17
2) N triads of cards destined for tracks T to T-N+1 in that order. These are generally the cards of several program sections.

A program section consists of triads of cards to be put into consecutive DLs in descending order ending at DL1.
The first four rows of each triad are ignored.

Result.

PROGRAM FETCH is written in track 15/15. (cards 7-9)
READ PROGRAM BLOCK is written in track 15/14. (cards 3-5)
The program block is written in tracks T to T-N+1.
The program section on tracks T^{0} to T^{0}-D+1 is transferred by PROGRAM FETCH to DLs D to 1 and entered at 1_{30}. The codeword that specifies this is stored in $15/15_{31}$ and may be obeyed later (see note iii below). Any program section may end by entering PROGRAM FETCH to call down its successor. If 15/14 is not overwritten, any section may specify as its successor READ PROGRAM BLOCK in order to read another block of program (or the parameter card of a block of programs may itself do this).

OPERATING INSTRUCTIONS CONT'D

DESCRIPTION

The program reads triads of cards (ignoring the first four rows of each triad) and stores them on consecutive tracks of the drum. The first section of the program to be obeyed is then put into consecutive DLs including DL1 and entered at 1_{30}. Each such section of the program can end by indicating from where on the drum it is to be replaced and the replacement follows automatically. At any later stage more programs can be read from cards to the drum.

A program section consists of triads of cards destined for DLs D to 1 in that order where D $\leqslant$ 10. (A program section may have a triad for DL12 but if so a wasted triad must be inserted between the DL12 and DL10 triads). Each program section must satisfy the following other conditions:

1) P54 is not used.
2) It starts at 1_{30} by either clearing or calling read.
3) It preserves $12_{29,30,31}$ or alternatively leaves them containing:

12_{29} 1, 15-30, 0, 0
12_{30} 1, 15-31, 0, 29
12_{31} 1, 11-1(1), 30, 29

4) If it uses PROGRAM FETCH to call down its successor it ends

codeword - 16
12 - 1 (32 nos)
1_{30}

where "codeword" is a word to specify in a manner described below where on the drum the next program section is to be found.

Each program section finds the mercury store as it was left by the last section except for the TS's, DL11 and such DLs as it has itself occupied.

A block of programs consists of

a) a number of program sections destined for adjacent sections of the drum but in the reverse order of their order on the drum;
b) a parameter card preceding all these punched Y-row TxP1 + NxP17
X-row T^{O}xP1 + DxP17

where (i) the N triads of the block are to be put into tracks T to T-N+1 in that order; (ii) the section of program to be obeyed immediately after reading the block is to be read from tracks T^{O}... T^{O}-D+1 into DLs D...1. The second row is a standard codeword for PROGRAM FETCH.

Each program block must satisfy one other condition; it must not use 15/15. It is usual to store program in the higher numbered tracks.

This program uses two routines, PROGRAM FETCH (B08) and READ PROGRAM BLOCK. READ PROGRAM BLOCK is described separately at the end of this report.

Additional Facilities

i) At any stage a program section can specify as its successor READ PROGRAM BLOCK (if it has been left in 15/14) and read more program from cards to the drum. The parameter card of each program block specifies the next program section to be obeyed.

ii) A program block may consist of just one card, namely a program parameter card with N=0. In this way the next program section can be specified by a card with the codeword punched on the second row instead of by programming it.

Programme Store and Fetch.

OPERATING INSTRUCTIONS CONT'D.

iii) When control has been lost but the program on the drum is intact, the operation can be restarted by reading RE-ENTER PROGRAM FETCH. This will automatically fetch down and obey the same program section as was specified by the last program parameter card to be read.

iv) All the program testing facilities of PROGRAM FETCH are incorporated, namely PSEUDO STOPPERS, PSEUDO REQUEST STOP, PSEUDO EXTERNAL TREE and a clock track that either POST MORTEM or SET OR SYNC CLOCK TRACK will synchronise with.

NOTE

Most programs of sections organised by this program can, with small modifications, be turned into one or more bricks (possibly multi-section) controlled by GIP should the greater flexibility of GIP control be required.

PROGRAM PACK

Card 0	Initial Card
Card 1	CLEAR DRUM (ZP13/1 No. 315)
Card 2	Card to place links in DL12
Cards 3-5	READ PROGRAM BLOCK
Card 6	Program block parameter card punched Y-row 15/15xP1 + P17 X-row 15/14xP1 + P17
Cards 7-9	PROGRAM FETCH (B08 No. 204)

READ PROGRAM BLOCK is first obeyed to write PROGRAM FETCH in 15/15 and itself in 15/14. It then loads to PROGRAM FETCH which fetches it back into the mercury store ready to be obeyed again.

OPERATING INSTRUCTIONS CONT'D.

READ PROGRAMME BLOCK.

Description — A brick to transfer a program block in the form required by PROGRAM STORE AND FETCH from consecutive triads of cards to consecutive tracks of the drum.

Data. — A program block consisting of:

1) a parameter card punched TxP1 + NxP17 on the Y-row ($N \leq T < 256$)
2) N triads of cards.

Result — The contents of the second row of the parameter card are put in $15/15_{31}$ and also in 16.
The contents of the succeeding triads (ignoring the first four rows of each) are put in tracks T to T-N+1.
If READ PROGRAM BLOCK is being obeyed from the reader a copy of itself is put in track T-N.
If READ PROGRAM BLOCK is being obeyed from a copy of itself written by itself on the drum it does not write anything in track T-N.

Occupies DL1 — 1 Section — Type I

Uses — $13, 14, 15, 16, 21_3, 11$.

D.L. 1 Track

Card Nos. 2

mc	NI		D	C	W	T		
	1	0	1		28	28	X	Y
								X
		0	0		0	28	X	0
								1
0	1	0	0		0	28	X	2
1								3
2	1	0	12		25	28	X	4
3	1	5	30		0	0		5
4	1	0	12		26	28	X	6
5	1	15	31		0	29		7
6	1	0	12		27	28	X	8
	1	11	1	1	30	29		9
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
								4
2								5
28								6
9								7
30								8
31								9

$Q_2 \quad 30 \quad 1_0$

$Q_2 \quad 0 \quad 0$

$Q_2 \quad 0 \quad 0$

$Q_2 \quad 0 \quad 12_{29}(1,15\cdot 0\ 0,0)$

$Q_2 \quad 0 \quad 12_{30}(1,15\ 51\ 0,29)$

$Q_2 \quad 0 \quad 12_{31}(1,11\ 1(1)\ 30,29)$

CODING AND FLOW DIAGRAM
OF PROGRAM STORE AND FETCH

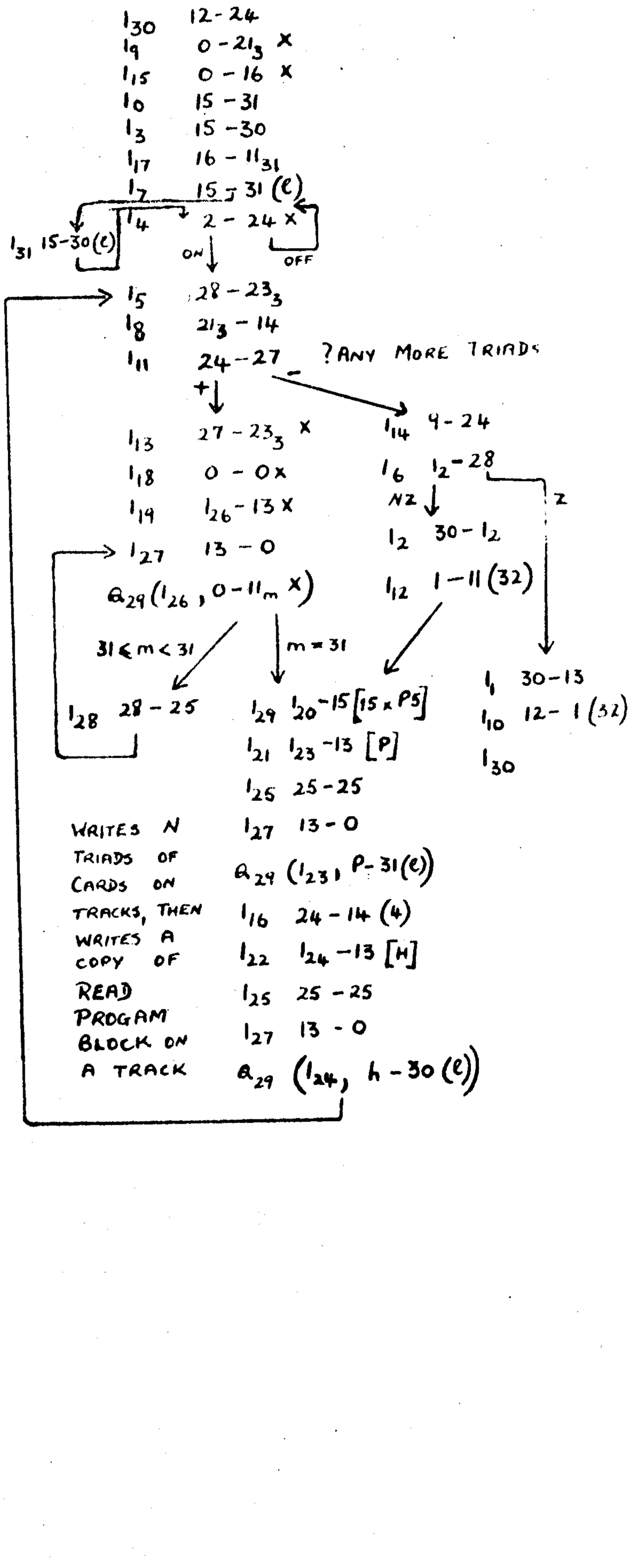
Date

File Ref.

D.L. 1 Track

Card No. 3-5

	NIS	S	D	C	W	T		
								Y
								X
								0
	1	0 - 1			30	29	X	1
	1	15 - 31			0	1		2
	1	30 - 13			0	7		3
	1	30 - 1			30	8		4
	1	15 - 30			0	12		5
	1	2 - 24			0	30	X	6
	1	28 - 23			0	1		7
	1	1 - 28			26	25		8
	1	15 - 31	1		0	22		9
	1	21 - 14			1	1		Y
	1	0 - 21			0	4	X	X
	1	12 - 1	1		19	18		0
	1	24 - 27			0	0		1
	1	1 - 11	1		16	15		2
	1	27 - 23			0	3	X	3
	1	9 - 24			0	22		4
	1	0 - 16			0	15	X	5
	1	24 - 14	1		1	4		6
	1	16 - 11			12	20		7
	1	0 - 0			0	31	X	8
	1	1 - 13			5	6	X	9
		15×P5						Y
	1	1 - 13			0	2		X
	1	1 - 13			0	1		0
	1	0 - 31	1		0	17		1
	1	0 - 30	1		0	6		2
	1	25 - 25			0	0		3
	1	0 - 11			0(15)	29	X	4
	0	13 - 0			0	0		5
	1	28 - 25			0	29		6
	1	1 - 15			21	22		7
	1	12 - 24			0	9		8
	1	15 - 30	1		0	3		9



WRITES N TRIADS OF CARDS ON TRACKS, THEN WRITES A COPY OF READ PROGRAM BLOCK ON A TRACK

CODING AND FLOW DIAGRAM OF PROGRAM STORE AND FETCH (READ PROGRAM BLOCK)

Date

File Ref.

Sheet Ref 56/10891