

Appendix A

APPENDIX A : TRANSLATIONS OF INTERCODE ACTIONS

This appendix gives the computer code equivalent of the various Intercode actions.

Translations are arranged in groups.

Additional instructions may be inserted by the Translator in the following cases:

- (i) Reference to a Transit Area
- (ii) Reference to another chapter (see section 10)
- (iii) Modification of a type 2 instruction (see section 11)
- (iv) Modification using register > 3.

Where the computer code action is preceded by an asterisk, this indicates that extra orders may be inserted to deal with its address. Where there is no asterisk, no extra orders are inserted and the action always refers to a compartment in the current chapter generated by the Translator as a working location or a constant (unless the action uses its address as a literal).

Format of translations:

The computer code versions of all actions are laid out in the following manner:

A	d	m	Div. No.	Address within div.

Blank columns indicate variables inserted by the Translator according to variables in the original Intercode, e.g. addresses, literals, etc.

Appendix A (Cont'd)

Group 0

<u>Intercode</u>	<u>Computer Code</u>	
00	* 6	
01	* 4	
02	* 5	
03	* 3	
04	* 7	
05	* 2	
06	* 9	
07	* 0 d 2	Select (N) into B
	* 10	Multiply by (NC ₁)
08	* 0 d 2	
	* 11	
09	18 1 1 0 1	(AB) aligned to Q2 of B
	* 13	

Group 1

The literal is held as a constant in sections formed by the Translator (except for actions 10, 11, 12 if $L \leq 1 \bar{15} \bar{15} \bar{15}$).

	$L \leq 1 \bar{15} \bar{15} \bar{15}$	$L > 1 \bar{15} \bar{15} \bar{15}$ or $L < 0$
10	1 1 3	6
11	1 1 1	4
12	1 1 2	5

Appendix A (Cont'd)

Intercode

Computer Code

All values of L

16

2				
0	d	2		
*	10			

W/L
Select L into B
W/L or B if non-zero

17

0	d	2		
*	10			

Select L into B

19

1	0	1		
6				
18	1	1		4119
13				

Clear B
(if B is non-zero)
Align to Q2 of B
Literal

Group 2

20

21	0	0		
*	20	0	m	

Transfer to clear A*
Add (H)

21

*	20	0	m	
---	----	---	---	--

22

*	20	1	m	
---	----	---	---	--

23

*	21	1	m	
---	----	---	---	--

24

21	1	0		
*	20	0	m	
*	21	0	0	
	20	0	0	

Copy to W/L
Add (H)
Transfer to (H)
Add W/L

25

*	21	0	m	
---	----	---	---	--

26

*	22	0	m	
---	----	---	---	--

29

*	22	1	m	
---	----	---	---	--

Appendix A (Cont'd)

Group 3

Note: In computer code shift actions, discriminant 0 specifies shift (A), discriminant 1 specifies shift (AB).

Intercode	Computer Code	
30 & 32 left	18 d 1 L	(L positive)
right	18 d 1 4128+L	(L negative)
31 & 33 left	18 d 3 L	(L positive)
right	18 d 3 X 18 d 1 4128-y	where L is negative and $x = X - 4y$, $3 \gg x \gg 0$. If $x = 0$ the first action is omitted.
34	0 d 2	
35	1 0 1	
36	15	
37	14	
38	1 0 2	
39	2 1 0 27 1 0 1 1 3 4 1 0	W/L → change sequence if (AB) = 0 W/L

Group 4

Group 4 actions are in general translated as entries into a subroutine of the Master Programme. The basic form of the expansion is as follows:

(1)	0 1 0	copy ABC, set binary
	0 0 3	
	0 d 2	control information to B
	6 1 0	type of operation in Q6
	4 0 0	route number
	25 1 1	4096
	24 0 3	enter Master
	23 0 2	
(2)	0 1 1	restore ABC

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Appendix A (Cont'd)

The variations occur at the points marked (), as follows:

Action 40: (1) Selects Q1-5 = programme identity, Q6-9 = file identity
 (2) is a 0/0/3 order (restore C, leave A,B as set up by Master)

Actions 41,45: (1) is omitted

Normal Actions 42,43 (1) selects pseudo-route number

Actions 42,43 with second C-line: (1) is replaced by:

0	0	2			pseudo-route number
18	1	i		5	
* 24	0	2			second C-line address
18	1	1		4123	

Action 43 for route type 3: (1) is replaced by:

* 24	0	2			data start address
* 29	0	0			into GP transit area
0	0	2			pseudo-route number of GP transit area

Action 43 for route type 4: (1) is replaced by:

6	1	0			set bits in Q10 of programmer's function word depending upon unused sets of 40 print columns (omitted if printing on all 160 columns)
0	1	2			
* 14	1	0			
* 24	0	2			data start address
* 29	0	1			into GP transit area
0	0	2			pseudo-route number of GP transit area

Appendix A (Cont'd)

Action 43 for route type 19: The entire expansion is replaced by:

0	1	0			copy ABC, set binary
0	0	3			
24	0	3			enter subroutine in programme's extra chapter
26	0	0			
24	1	0			W/L = route number
0	0	0			
0	0	0			W/L = pseudo-route number of transit area holding data
0	0	0			W/L = pseudo-route number of GP transit area
2	0	0			W/L = top half of 'bulk clear GP transit area' constant
0	1	1			restore ABC

Action 44: (1) selects the original contents of A into B.
 (2) is a 0/0/3 order (restore C)

Actions 46-49
 NC= 0: (i) selects Q1-5 = C-line literal
 Q6-10 = first line item in decimal (or zero, actions 48 and 49)

Actions 46-49,
 NC/O: (1) is replaced by:

6	0	0			select (NC)
4	1	0			first line item (decimal) in Q6-10
18	1	1		4128	

Group 5

Intercode

Computer Code

50	*	24	0	2			Select table start location	
	*	28	0	2				
51	*	24	0	2		2	Copy ABC Set binary Reset radix Update 'Item +' counter	
	*	28	0	3				
		0	1	0				
		0	0	3				
		1	1	1				
		0	0	3				
	*	3						
52	*	24	0	2				
	*	28	1	2				
53	*	24	0	2			Update 'Item +' counter	
	*	28	1	3				
	*	3						

Note: As these actions usually refer to transit areas one 24/1/2 action is added in each case.

No. of locations as literal

54		6	1	0			bit 38 + quantity in Q6-8 d = 0 to clear short, d = 1 to clear long
	*	28	d	0			

No. of locations as contents of compartment

	0	1	0			5	Copy ABC Set binary B18 Number of locations Reset radix Shift (A) 5L
	0	0	3				
	6						
*	4						
	0	0	3				
	18	0	1				
*	28						

Appendix A (Cont'd)

Intercode

Computer Code

55

*	24	0	2		
	18	1	0	4123	
	1	1	3		
or *	6				
	18	1	1	5	
*	28				

Source Address
 Shift (AB) 5R
 No. of locations literal
 compartment
 Shift (AB) 5L

56

	0	1	0		
	0	0	3		
*	1	d	0		
	18	1	1	10	
	5				
	0	0	3		

Copy ABC
 Binary
 Table look up
 Shift into A
 Difference formed
 Restore radix

57

	8	0	0		
--	---	---	---	--	--

The length of each item as
 specified by L is set as a
 constant by translator

58

	8	1	0		
--	---	---	---	--	--

59

	0	1	0		
	0	0	3		
	24	0	2		
	3	0	0		
	A				
	2	0	0		
	0	1	1		

Copy ABC
 Set binary
 Start
 Less significant half of
 modification register
 Length
 More significant half of
 modification register
 Restore ABC

Appendix A (Cont'd)

Group 6

Intercode

Computer Code

60

0	0	3		
---	---	---	--	--

61

0	0	3		
---	---	---	--	--

62

0	0	3		
---	---	---	--	--

L is set as a constant by the Translator

63

2				
0	0	3		
6				
* 12				

W/L if acting on A
(C) sterling
(A) = address of table start
W/L or N if present

64

2				
0	0	3		
6				
* 12				

W/L if acting on A
(C) decimal
(A) = address of table start
W/L or N if present

65

2				
0	0	3		
6				
* 12				

W/L if acting on A
(C) new radix
(A) = address of table start
W/L or N if present.
(Translator has to work out table and place it in a section).

66

6	1	0		
24	0	3		
3	1	0	132	
24	0	3		
2	0	0	132	

$-(2^{39} + 37)$
to division 0
to division 0
(to set sign bit of 132 short)

67

6	1	0		
24	0	3		
3	1	0	132	

$2^{39} + 37$
to division 0

Appendix A (Cont'd)

Group 7

Intercode

Computer Code

70 * 27 0 0

71 * 27 0 1

72 * 27 0 2

73 * 27 0 3

74 * 27 1 0

75 * 27 1 1

76 * 24 1 0

77 & 78

	24	0	3					
	17	0	0		130			
*	5							
*	27	0	3					→ (Action 77)
or *	27	0	2					→ (Action 78)

79

	24	0	3					
	17	0	0		128			
*	27	0	2					→

to division 0

A* exponent

L or (NC₁)

→ (Action 77)

→ (Action 78)

to division 0

A* mantissa

Group 8

Intercode Computer Code

80 (1) No C-lines

*	26	0	0		
---	----	---	---	--	--

(ii) X C-lines

n	*	26	0	0		
n+1		24	1	0		n+X+2
n+2		Absolute address 1st C-line				
n+3		Absolute address 2nd C-line				
n+4		Absolute address 3rd C-line				
⋮						
n+X+1		Absolute address Xth C-line				

81

0	0	0		
---	---	---	--	--

First word of computer code subroutine blank (to act as link)

82

26	0	1		
----	---	---	--	--

83

1	1	3		
2				

Select literal
Transfer to switch location

84

6				
2				

Select compartment if specified
Transfer to switch location

85

24	0	1		
26	0	1		
+ locn. of each destination				

86

6				
---	--	--	--	--

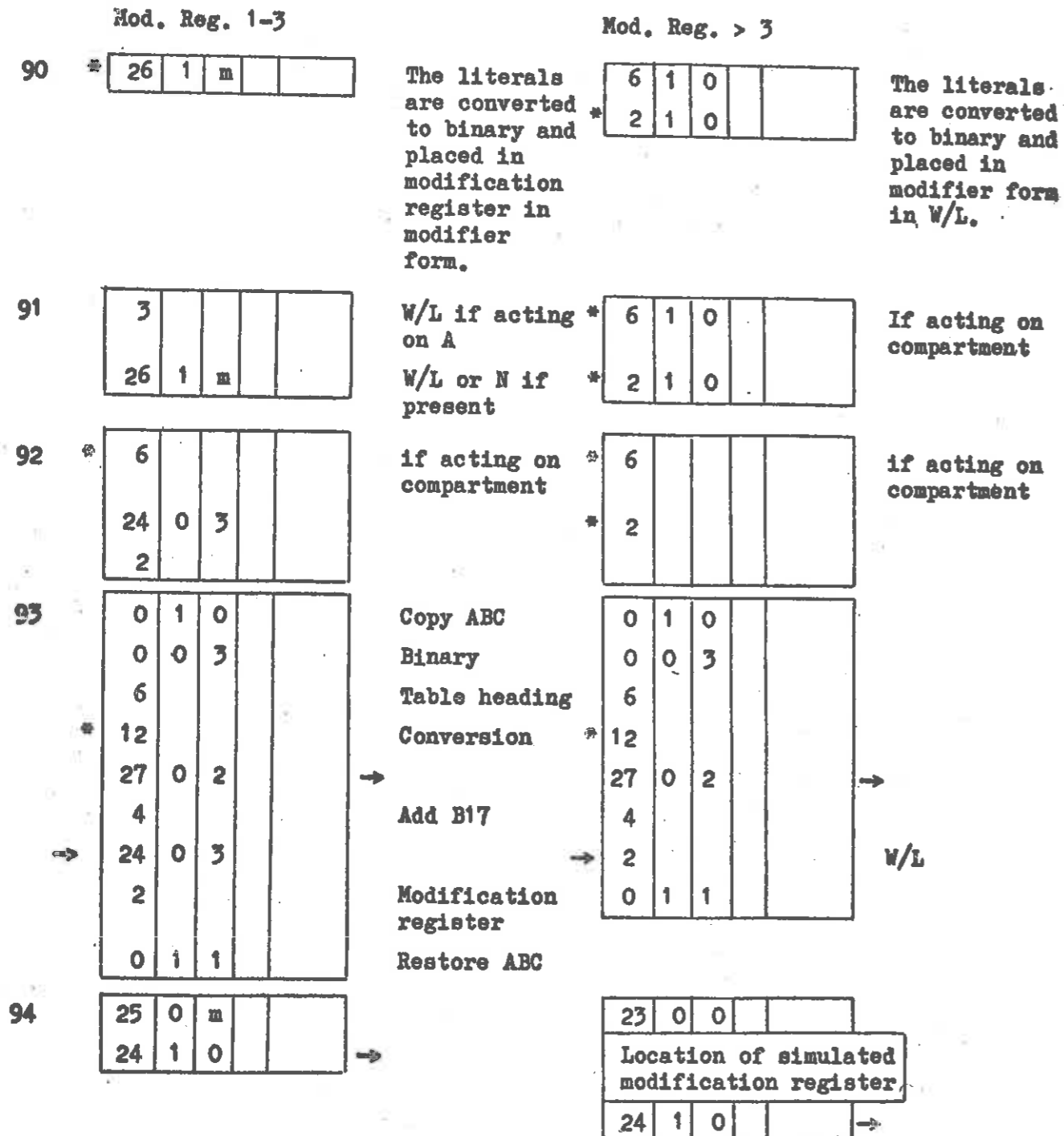
Select location

87

24	0	1		
26	0	1		
+ locn. of each destination				

Compartment specified

Group 9



Appendix A (Cont'd)

Mod. Reg. 1-3

Mod. Reg. > 3

95

24	0	3		
6	1	0		

*

6	1	0		
---	---	---	--	--

96

24	0	3		
6	0	0		

*

6	0	0		
---	---	---	--	--

97 *

24	0	1		
25	0	m		
24	1	0		

→

*

24	0	1		
23	0	0		
0	0	0		
24	1	0		

Location of simulated M.R.
→

98

24	0	3		
4	d	0		

*

4	d	0		
---	---	---	--	--

99

24	0	3		
5	d	0		

*

5	d	0		
---	---	---	--	--

Groups 10 - 13

100 subtracted from each action number.

Group 14

Intercode

Computer Code

140

1	1	3	0	
1	0	1	0	

141

*

31	0	m		
----	---	---	--	--

142

*

31	1	m		
----	---	---	--	--

143

*

30	1	m		
----	---	---	--	--

145

30	0	m		
----	---	---	--	--

146

*

6	1			
9	1			

147

*

30	0	m		
6	1			
9	1			
31	0	m		

W/L

W/L

Appendix A (Cont'd)

Intercode

Computer Code

148	30	0	m	W/L (1)
	*	6	1	
	*	9	1	
	30	0	m	W/L (2)
	31	0	m	W/L (1)
	31	1	m	W/L (2)

Group 15

150

1	1	3			Control data in A and B
0	0	2			
25	1	1	4096		Set non-interruptible
24	0	3			
26	0	2			→ Control to Master Program
+ Locations					

This is also an entry into a subroutine of the Master Program which automatically changes sequence back to a selected location when an option choice has been made.

151

25	1	1	4096		Set non-interruptible
24	0	3			
26	0	2			→ To Master unload routine

152

0	1	0			
1	1	3			Set control data in A and B
0	0	2			
25	1	1	4096		Set non-interruptible
24	0	3			
23	0	2			→ Control to Master Program
0	1	1			

Appendix A (Cont'd)

Intercode	Computer Code	
153	n	25 1 1 4096
	n+1	23 0 2 n+3
	n+2	24 1 0 n+9
	n+3	0 0 0 (link)
	n+4	24 0 3
	n+5	6 1 0 138
	n+6	24 0 3
	n+7	0 0 2 156
	n+8	26 0 3 n+3
154		0 1 0 Copy ABC
		0 0 3 Set binary
	*	24 0 2 Select annex start
		24 0 3 Enter Master
		23 0 2
		0 1 1 Restore ABC
155		6 1 0
156		0 1 0 Copy ABC, set binary
		0 0 3
		6 1 0 route type in Q6
		4 0 0 route number
		25 1 1 4096
		24 0 3 Enter Master
		23 0 2
		0 1 1 Restore ABC
157	*	24 0 2
	*	29 0 3
		0 1 0 Copy ABC, set binary
		0 0 3
		1 1 1 2
	*	3 0 0 Update 'item +' counter
		0 0 3 Restore C

Appendix A (Cont'd)

<u>Intercode</u>	<u>Computer Code</u>
158 (1) L=0 *	16 1 0
(11) L=1 *	16 1 1

Time in microseconds.

ACTION	<u>Group 0</u> : ARITHMETIC ON VARIABLES		
	³²⁶ 2½µS store	³⁶⁰ 6µS store	³ 13.5µS store
00	5	12	27 to 36
01	5	12	34 to 36
02	5	12	31 to 39
03	5	12	31 to 39
04	8½	18	52 to 72
05	5	12	30 to 54
06	28½ + 2½R	65 + 6R	405 to 590
07	12s + S + 1	12s + S + 1	254 to 1927
08	or 5½ when s = 0	or 12 when s = 0	
09	36½ + 1½d + 26½b ₅ + ½b ₁₃ + 1½a ₁	42½ + 1½d + 26½b ₅ + ½b ₁₃ + 1½a ₁	513 to 1888
	<u>Group 1</u> : ARITHMETIC ON LITERALS		
10	2½	6	40
11	3½	6	51
12	3	6	45
Last three times doubled if 1 15 15 15 → 150			
16	6 + 12s + 3	23 + 12s + S	284 to 1981
17	1 + 12s + S	11 + 12s + S	254 to 1927
19	41½ + 26½b ₅ + ½b ₁₃ + 1½a ₁ + 1½d	54½ + 26½b ₅ + ½b ₁₃ + 1½a ₁ + 1½d	635 to 2029
	<u>Group 2</u> : FLOATING POINT ARITHMETIC		
20	45 to 70	101 to 126	295 to 462
21	30 to 55	65 to 90	186 to 342
22	30 to 55	65 to 90	186 to 342
23	20	48	81 to 92
24	95 to 145	214 to 264	562 to 896
25	15	36	109 to 120
26 sig. digit	70 to 100	110 to 130	602 to 784
norm.	80 to 90	115 to 125	372 to 538
zero result	20 to 22½	48 to 54	with same multiple
29 sig. digit	75 to 100	105 to 130	
norm.	80 to 95	115 to 130	117 to 179
zero result	15½	36	

Appendix B (Cont'd)

Group 3 : PATTERN MANIPULATION

ACTION	2 1/2 μS store	6 μS store	13.5 μS store
30+32 Left } right } d=0	$5\frac{1}{2}+10\frac{1}{2}b_5 + \frac{1}{2}b_{13} + a_1$	$7\frac{1}{2}+18\frac{1}{2}b_5 + \frac{1}{2}b_{13} + a_1$	29+6n 35+6n
* left } right } d=1	$5\frac{1}{2}+26\frac{1}{2}b_5 + \frac{1}{2}b_{13} + 1\frac{1}{2}a_1$	$7\frac{1}{2}+26\frac{1}{2}b_5 + \frac{1}{2}b_{13} + 1\frac{1}{2}a_1$	29+6n
31+33 left (d=0	$1\frac{1}{2}+5q_1 + a_1$	$7+5q_1 + a_1$	10+20f
* right ($10+5q_1 + 2a_1 + 18\frac{1}{2}b_5 + \frac{1}{2}b_{13}$	$14\frac{1}{2}+5q_1 + 2a_1 + 18\frac{1}{2}b_5 + \frac{1}{2}b_{13}$	75+6n+20f
left)	$1\frac{1}{2}+6\frac{1}{2}q_1 + 1\frac{1}{2}a_1$	$7+6\frac{1}{2}q_1 + 1\frac{1}{2}a_1$	10+20f
right) d=1	$10+6\frac{1}{2}q_1 + 3a_1 + 26\frac{1}{2}b_5 + \frac{1}{2}b_{13}$	$14\frac{1}{2}+6\frac{1}{2}q_1 + 3a_1 + 26\frac{1}{2}b_5 + \frac{1}{2}b_{13}$	75+6n+20f
34	5	12	28 to 31
35	5	7	13
36	6	12	52 to 55
37	8	12	71 to 90
38	5 or 3 1/2	7 or 6	51 to 79
39	29 1/2	51 1/2	121 to 196

Group 4 : FILE CONTROL

Note : Time in Master Routines is not included in this group

ACTION	2 1/2 μS store	6 μS store	13.5 μS store
10	52	120	312 to 323
11	17	108	349 to 360
12	57	132	377 to 391
with 2nd c-line	$65\frac{1}{2}+53b_5 + b_{13} + 3a_1$	$111+53b_5 + b_{13} + 3a_1$	516 to 533
13	57	132	377 to 391
with 2nd c-line	$65\frac{1}{2}+53b_5 + b_{13} + 3a_1$	$111+53b_5 + b_{13} + 3a_1$	516 to 533
route type 3	$127+16\frac{1}{2}c_2 + 10c_n + 3\frac{1}{2}c_0$ $+6c_2 + 6w$	$306\frac{1}{2}+26\frac{1}{2}c_2 + 15\frac{1}{2}c_n$ $+13c_2 + 13w$	158 to 175 $+11c_2 + 9c_n + 3c_s$
route type 4	$91\frac{1}{2}+7\frac{1}{2}c_0 + 7\frac{1}{2}c_1 +$ $321\frac{1}{2}+6\frac{1}{2}w$	$198\frac{1}{2}+3\frac{1}{2}c_0 + 12\frac{1}{2}c_1$ $+769\frac{1}{2}+13\frac{1}{2}w$	198 to 235 $+9c_2 + 10c_s$
route type 19	12 1/2	126	375 to 399
14	52	120	259 to 339
16 - 19			
16=0	57	132	377 to 391
16≠0	$62\frac{1}{2}+26\frac{1}{2}b_5 + \frac{1}{2}b_{13} + 1\frac{1}{2}a_1$	$139\frac{1}{2}+26\frac{1}{2}b_5 + \frac{1}{2}b_{13} + 1\frac{1}{2}a_1$	181 to 503

Appendix B (Cont'd)

Group 5 : RE-ARRANGEMENTS

ACTION	2 1/2 μS store	6 μS store	13.5 μS store
50	10+12u+6w	2A+14u+12w	82+80u+59w
51	11+2 1/2 r+1 1/2 n-2q +12 1/2 r+S+2 1/2 t	96+1 1/2 r+6 1/2 n-2q +14 1/2 r+s+5 1/2 t	321 to 345+18t +106u+66w
52	10+d+2v+12 1/2 w+ 10e if alpha 8 1/2 e if numeric	2A+d+12 1/2 e+14 1/2 w	99+6d+115e+63e, +102w
53	15+d+6e+3t+13w	36+d+8e+5 1/2 t+15w	(126 to 150+6d+83e
54			(+18e, +3At+7Aw
loc. as literal	1A+2 1/2 W	23+6W	75 to 8A+30W
loc. as compartment	1A 1/2 +2 1/2 W+18 1/2 b 5 +1 1/2 b 13 +q 1	90 1/2 +6W+18 1/2 b 5 +q 1 +1 1/2 b 13	291 to 302+30W
55	26 1/2 b 5 +1 1/2 b 13 +1 1/2 q 1 +1288x+80 1/2 y +19 1/2 if literal +22 if compartment	26 1/2 b 5 +1 1/2 q 1 +1 1/2 b 13 +12W +30 1/2 if literal +36 1/2 if compartment	10W +167 to 17A if literal +199 if compartment (26a+276
56	33+2 1/2 a+26 1/2 b 5 +1 1/2 b 13 +1 1/2 q 1	73 1/2 +6a+26 1/2 b 5 +1 1/2 b 13 +1 1/2 q 1	(to 31a + 27E
57	12 1/2 +20g+5p+5w.	30+18g+12p+12w	115+136g+29p+13w
58	10+25g+5p+5w	2A+60g+12p+12w	109+166g+29p+13w
59	18+18 1/2 b 5 +1 1/2 b 13 +q 1	109 1/2 +18 1/2 b 5 +q 1 +1 1/2 b 13	370 to 120

Group 6 : RADIX FACILITIES

ACTION	2 1/2 μS store	6 μS store	13.5 μS store
60	5	12	28
61	5	12	28
62	5	12	28
63	19 1/2 +2 1/2 Q+2d	12+6Q+2d	180 to 1897
64	19 1/2 +2 1/2 Q+2d	42+6Q+2d	180 to 1897
65	19 1/2 +2 1/2 Q+2d	12+6Q+2d	130 to 1897
66	30	72	173 to 230
67	17 1/2	12	100 to 133

Appendix B(Cont'd)

Group 7 : SEQUENCE CHANGES

ACTION	2 $\frac{1}{2}$ μ S store	6 μ S store	13.5 μ S store
70	3 $\frac{1}{2}$	6	20 to 35
71	3 $\frac{1}{2}$	6	23 to 35
72	3	6	20 to 26
73	3	6	23
74	3 $\frac{1}{2}$	6	20 to 66
75	3 $\frac{1}{2}$	6	23 to 66
76	2 $\frac{1}{2}$	6	18
77	17 $\frac{1}{2}$	48	157 to 165
78	17 $\frac{1}{2}$	48	154 to 168
79	15 $\frac{1}{2}$	36	123 to 129

Group 8 : SUBROUTINES AND SWITCHES

ACTION	2 $\frac{1}{2}$ μ S store	6 μ S store	13.5 μ S store
80			
no c-lines	5	12	36
x c-lines	7 $\frac{1}{2}$ +X5X	18+12X	54+27X to 54+36X
81	2 $\frac{1}{2}$	6	20
82	5	12	33
83	7 $\frac{1}{2}$	18	70 to 94
84	10	24	57 to 90
85	12 $\frac{1}{2}$	30	73
86	5	12	27 to 36
87	12 $\frac{1}{2}$	30	73

Group 9 : MODIFICATION REGISTER CONTROLS

ACTION	2 $\frac{1}{2}$ μ S store		6 μ S store		13.5 μ S store	
	Mod.Reg. 1-3	Mod.Reg. >3	Mod.Reg. 1-3	Mod.Reg. >3	Mod.Reg. 1-3	Mod.Reg. >3
90	12 $\frac{1}{2}$	10	30	24	78	57 to 90
91	17 $\frac{1}{2}$	10	35	24	108 to 132	57 to 90
92	17 $\frac{1}{2}$	10	32	24	100 to 133	57 to 90

GROUP 9 (Cont'd)

Appendix B (Cont'd)

ACTION	2 1/2 μS store		6 μS store		13.5 μS store	
	Mod.Reg. 1-3	Mod.Reg. >3	Mod.Reg. 1-3	Mod.Reg. >3	Mod.Reg. 1-3	Mod.Reg. >3
95	55+2 1/2 N+Σ d	47 1/2+2 1/2 N+Σ d	126+6Q+Σ d	108+6Q+Σ d	437 to 2162	39A to 2119
96	12 1/2 (15 if N ₃ =1)	15 1/2	30	36	7A to 98	10A to 116
95	12 1/2	5	30	12	70 to 79	27 to 36
96	12 1/2	5	30	12	70 to 79	27 to 36
97	20(20 if N ₃ =1)	25 1/2	40	60	11A to 138	16A to 176
98	12 1/2	5	30	12	77 to 79	3A to 36
99	12 1/2	5	30	12	7A to 82	31 to 39

Actions 100 - 131 see computer code section times in Volume I.

GROUPS 10 - 13 : COMPUTER CODE ACTIONS

For timing see User's Manual Vol. I Appendix D.

GROUP 14 : DOUBLE LENGTH ARITHMETIC

ACTION	2 1/2 μS store		6 μS store		13.5 μS store	
140	7 1/2		13		83	
141	3 8 1/2 (N-ve) 8 (N+ve)		18		80	
142	8 1/2 (N-ve) 8 (N+ve)		18		90	
143	7 1/2 (AB+ve) 8 (AB-ve)		18		100	
145	7 1/2 (AB+ve) 8 (AB-ve)		18		60	
146	37 1/2+2 1/2 R		78 + 6R		432 to 626	
147	49+2 1/2 R (AB+ve) 50+2 1/2 R (AB-ve)		11A + 6R		572 to 766	
148	6A 1/2+2 1/2 R (AB+ve) 66 1/2+2 1/2 R (AB-ve)		150 + 6R		722 to 916	

GROUP 15 : MASTER ROUTINES CONTROLS

Note: Time in Master Routine is not included.

ACTION	$2\frac{1}{2}\mu\text{S}$ store	6 μS store	13.5 μS store
150	$2A\frac{1}{2}$	5A	171 to 177
151	17	36	103
152	$49\frac{1}{2}$	11A	356 to 362
153	$44\frac{1}{2}$	102	27A to 289
154	A1	96	296
155	5	12	27 to 36
156	52	120	36A to 375
157	$37\frac{1}{2}+12\frac{1}{2}r+3t+Aw$	$90+1A\frac{1}{2}r+6\frac{1}{2}t+6w$	not applicable
158	4+5p	$12(\frac{1}{2}+p)$	50+43p

Note

With $2\frac{1}{2}$ S and 6 S store machine add 1 store cycle if address is modified by reg. m. With Leo III the time extra taken when modifying depends on the action.

Constants

a	= no. of searches
$b_1 \dots b_{13}$	= bit positions of M
c_d	= no. of alpha characters
c_n	= no. of numeric characters
c_o	= no. of zero characters
c_1	= no. of no-zero characters
c_2	= no. of basic qtt >9
C^2	= no. of characters
C_s	= no. of space characters
d	= no. of discards
d'	= sum of digits to be converted
d''	= sum of digits in modules of Quotient
e	= no. of words edited
+f	for no. of left shifts required
-f	for one left shift required
F	= no. of bits which are not set in function words bits b_{37} , b_{38} , b_{39}
g	= no. of items merged
+h	= no. of right shifts required
-h	= 1 left shift required
h	= no. of items unpacked into numeric form

Appendix B(Cont'd)

p = no. of comparisons made
q = character position (1-5) of L/E or B/E in last word if action ends on
either of these
q₁q₂ = quartet positions of N
q' = q₂, or 3, whichever is less
q'' = q₂, or 5, whichever is less
Q = number of quartets set
r = no. of words read
R = radix (e.g. for decimal = 10)
s = no. of signif. chars. in N
S = most signif. of these
t = no. of table entries
V = no. of spaces inserted
w = no. of words written
W = no. of long words in source
x = multiples of 256 words
y = multiples of 16 words
z = multiples of 1 word
d = no. of items unpacked into alpha form

APPENDIX C

SPECIMENS of programme sheets for submission of programmes on
paper tape.

Note: Forms different from those shown here may of course be used provided
the paper tape produced from them is identical with tape produced
from the forms in this appendix.