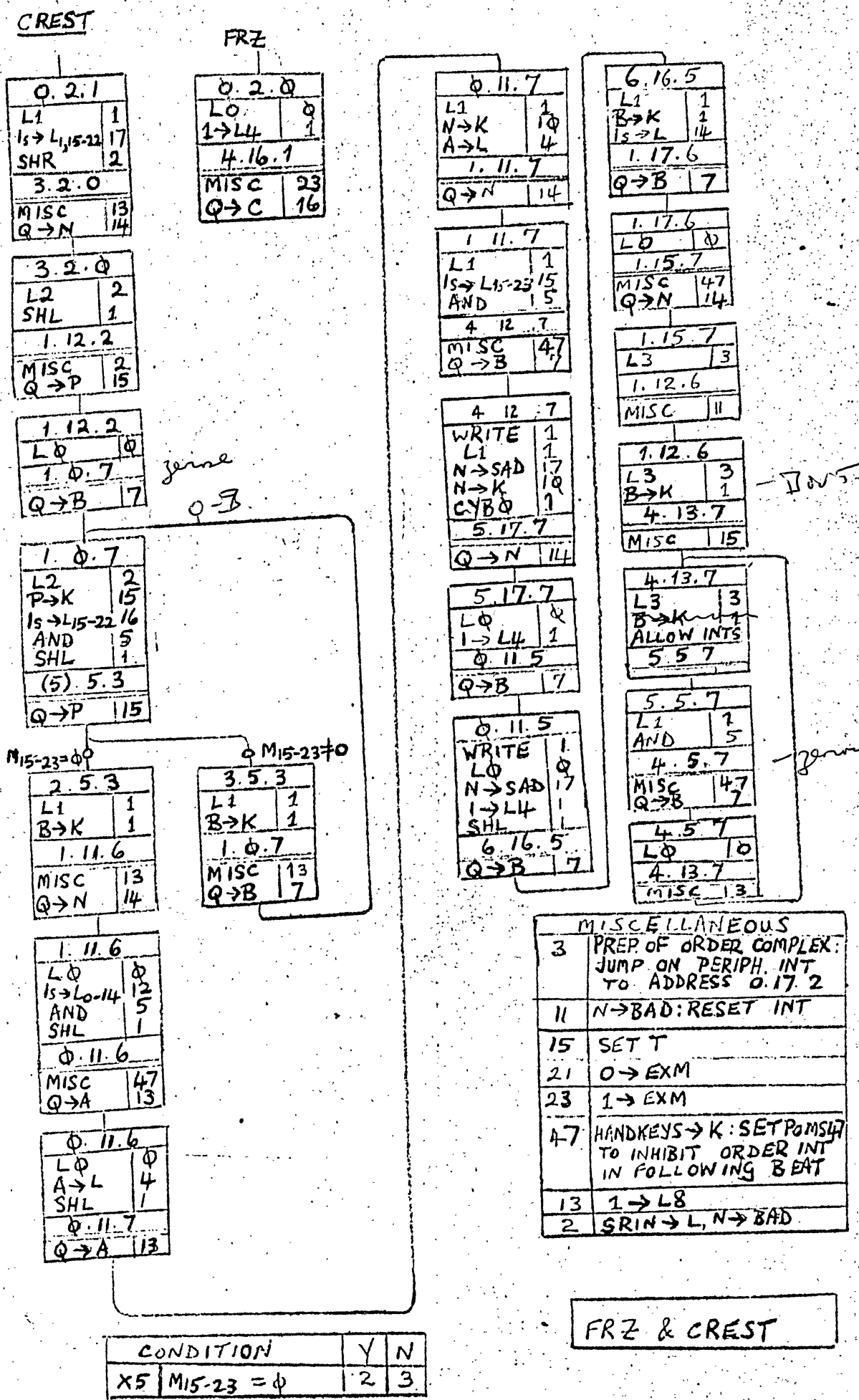
INDEX OF FF.281 MICROPROGRAM SEQUENCE DRAWINGS



SUB	ISS	1	2	3	
ACW	-	0826	0906	0917	

PREPARATION OF ORDER

4.16.1	
LI	1
C→SAD	3
READ	2
BF→K	17
DF→L	3
DVL	1
MISC	3
(0) (0) (0)	
Q→A,N	10

0.17.0. 0.17.1., 0.17.2. 0.17.3., 0.17.4. 0.17.5., 0.17.6. 0.17.7 OR EXECUTION OF ORDER

MODIFIER & MISC. BIT 6

0.17.1	
LI	1
MvD→SAD	2
READ	2
BSM→K	7
A→L	4
DVL	1
MISC	6
(0) (0) (0)	
Q→A,N	10

0.16.6 OR EXECUTION OF ORDER

ESM & K12-14 = 111

FROM 0.17.1

0.16.6	
LØ	Ø
L	Ø
BSM→K	7
3.4.6.	
Q→A	13

3 4 6	
LØ	Ø
L	Ø
P→K	15
4.4.6.	
Q→N	14

4 4 6	
LI	1
N→SAD	17
READ	2
BF→K	17
A→L	4
DVL	1
3.17.2.	
Q→P	15

3 17 2	
LØ	Ø
L	Ø
DF→L	3
0.14.2.	
Q→A	13

0.14.2.	
LØ	Ø
L	Ø
P→K	15
1.10.6	
Q→B	7

1.10.6.	
LI	1
L	Ø
BSM→K	7
A→L	4
5.14.6.	
Q→N	14

5.14.6.	
LØ	Ø
L	Ø
No-21→K	3
(0) (0) (0)	
Q→A	13

EXECUTION OF ORDER

ORDER

0.17.5	
LI	1
C→K	16
16→L	14
5.16.5	
Q→C	16

5 16.5	
LØ	Ø
L	Ø
MISC	47
1.5.7.	
Q→B	7

1 5 7.	
LI	1
L	0
BF→K	17
DF→L	3
MISC	3
(0) (0) (0)	
Q→AN	10

0.17.1. v 0.17.2. v EXECUTION OF ORDER

INSERT

0.17.4	
LØ	Ø
L	Ø
MISC	47
6.6.4.	
Q→B	7

6.6.4.	
LI	1
C→SAD	3
WRITE	1
C→K	16
CIBO	1
4.16.1	
Q→C	16

PREP OF ORDER

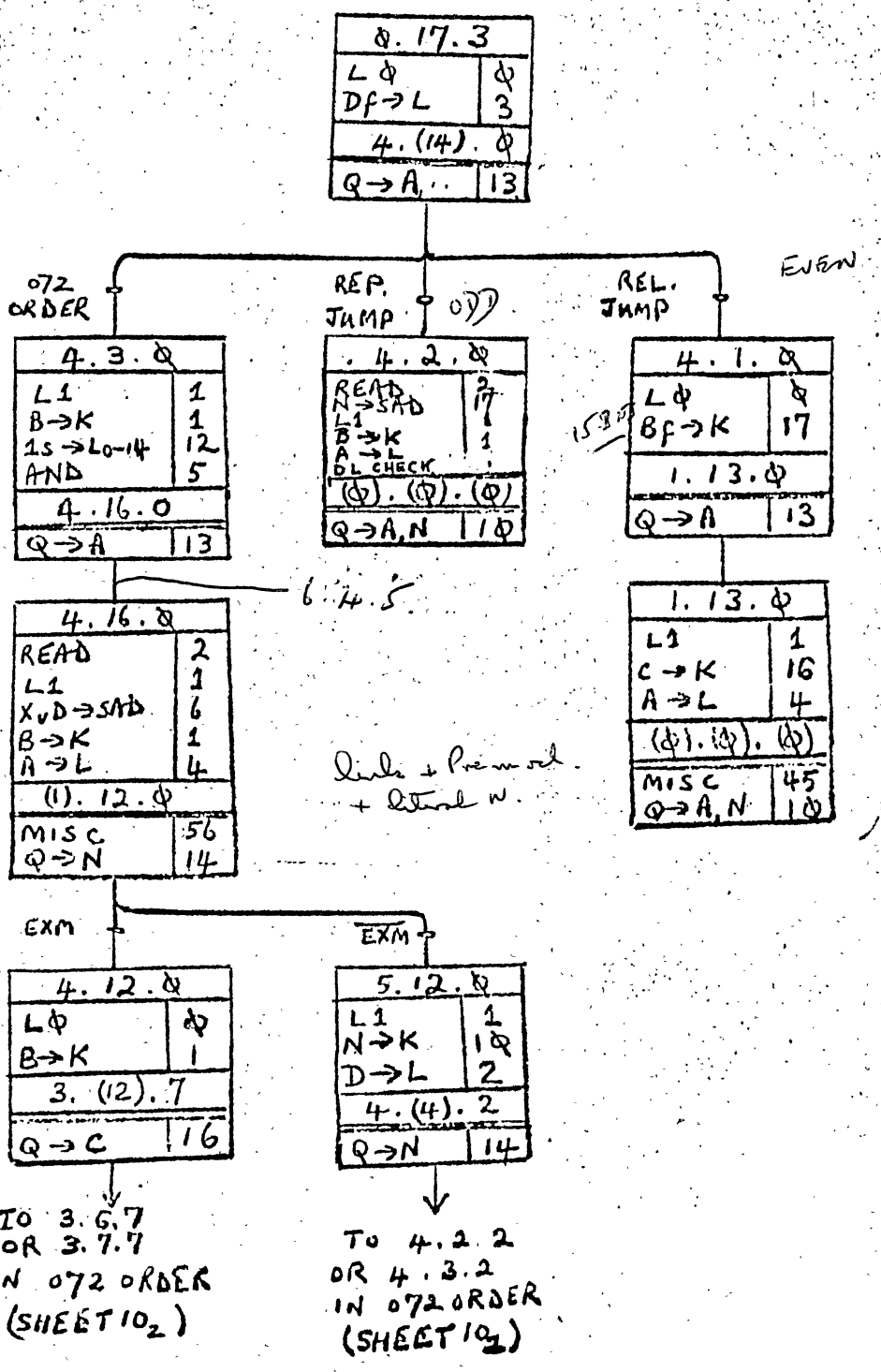
MISCELLANEOUS	
3	SET MM STAT IF MM1 FORCE 7 B_{21-23}→X ; 7 → LINK7-9 ; B_{17-20} → LINK3-6 B_{14-16}→LINK0-2 ; $B_{12,13}$ → N22,23 v 3→N22,23 CHECK FOR INTERRUPT.
6	FORCE 0.16.6 IF $\overline{ESM}$ • K12,13,14 = 111 $B_{22,23}$ → N22,23
47	HANDKEYS → K0-23

NOTES: 1. MODIFY FORCES 0.17.1
INTERRUPT FORCES 0.17.2
GROUP 5-7, EJM FORCES 0.17.3.
INSERT FORCES 0.17.4
ORDER FORCES 0.17.5.
DVL FAIL FORCES 0.17.6/7.
2. B_{SM}→K MEANS INHIBIT CARRY TO M_{22} AND ;
(a) $\overline{ESM}$, B_{0-14}
(b) ESM , B→K & BF→K MEANS B_{0-11}→K v B_{0-14}→K ACCORDING TO FR
DF→L MEANS DATUM→L ACCORDING TO FR, G & EXM

PREPARATION OF ORDER
MODIFIER & MISC BIT 6
ORDER
INSERT

NOTE: THERE ARE TWO ANOMALIES WHEN ON ORDER.
(1) THE LONG MODIFICATION SEQUENCE DOES NOT WORK CORRECTLY.
(2) RELATIVE JUMPS GO TO ONE LESS THAN THE CORRECT ADDRESS.

PREPN. OF ORDER FOR EJM JUMPS.

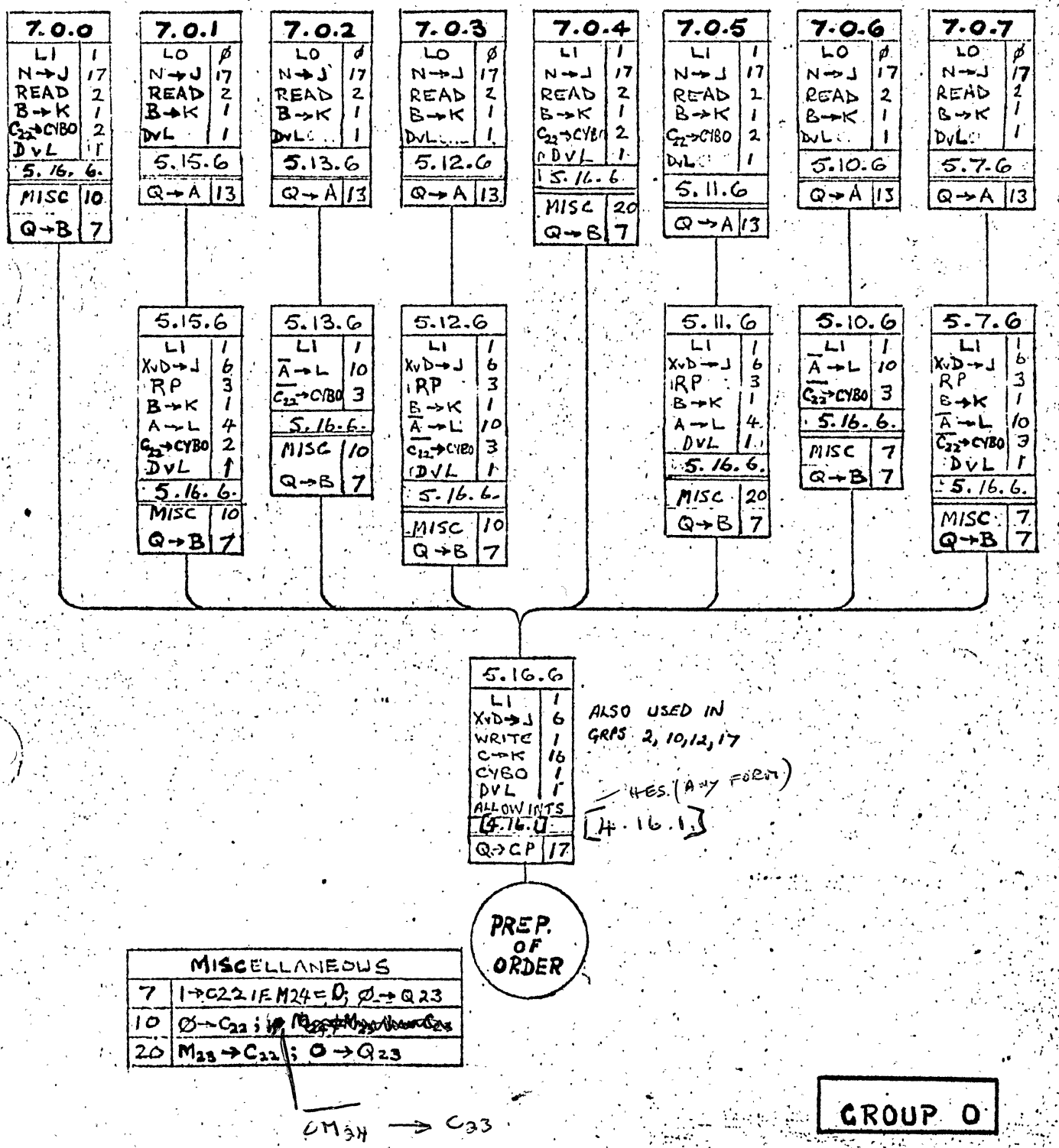


MISCELLANEOUS	
45	SIGN EXTEND A_{13}→L
56	SIGN EXTEND A_{14}→L

CONDITIONS		Y	N
X1	EXM	4	5
Y4	MM3	2	3
Y14	Normal 072 order Rep. Jump Rel. Jump	WΦ W2 WL	

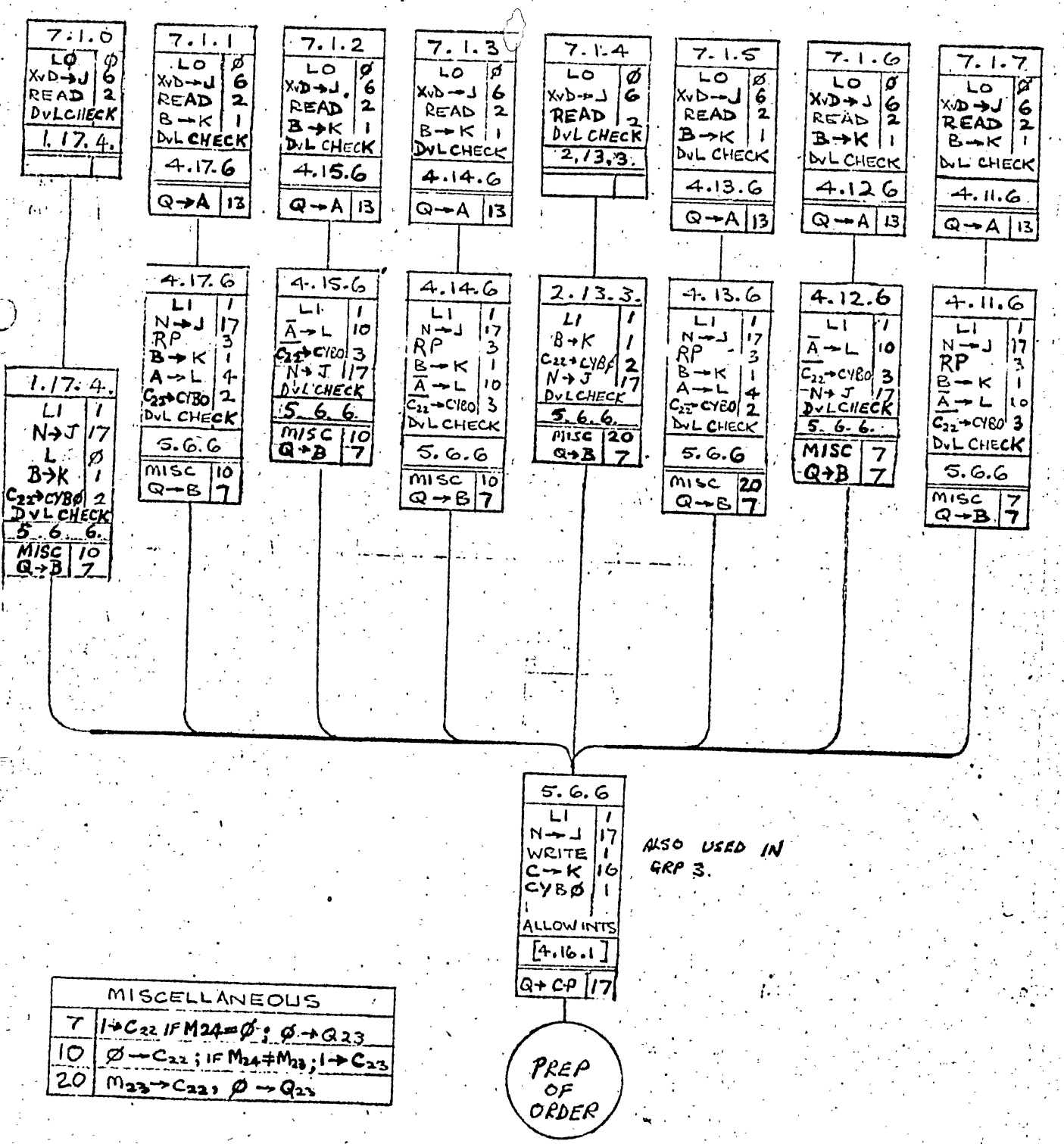
PREPARATION OF ORDER FOR EJM JUMPS

SUB	155	
ACW	·	

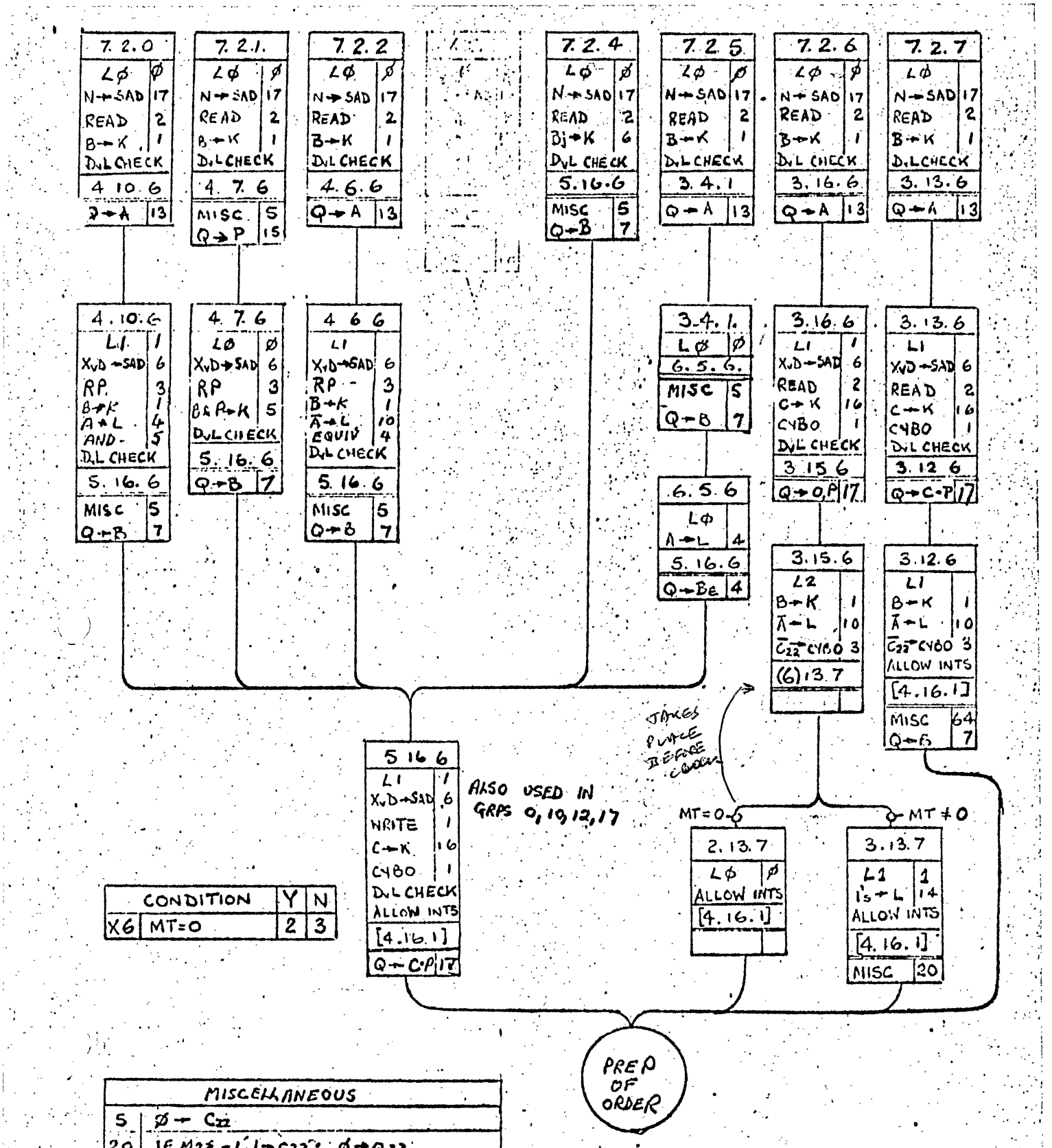


1904/5 E&F LS/30

SUB	ISS		
ACW			

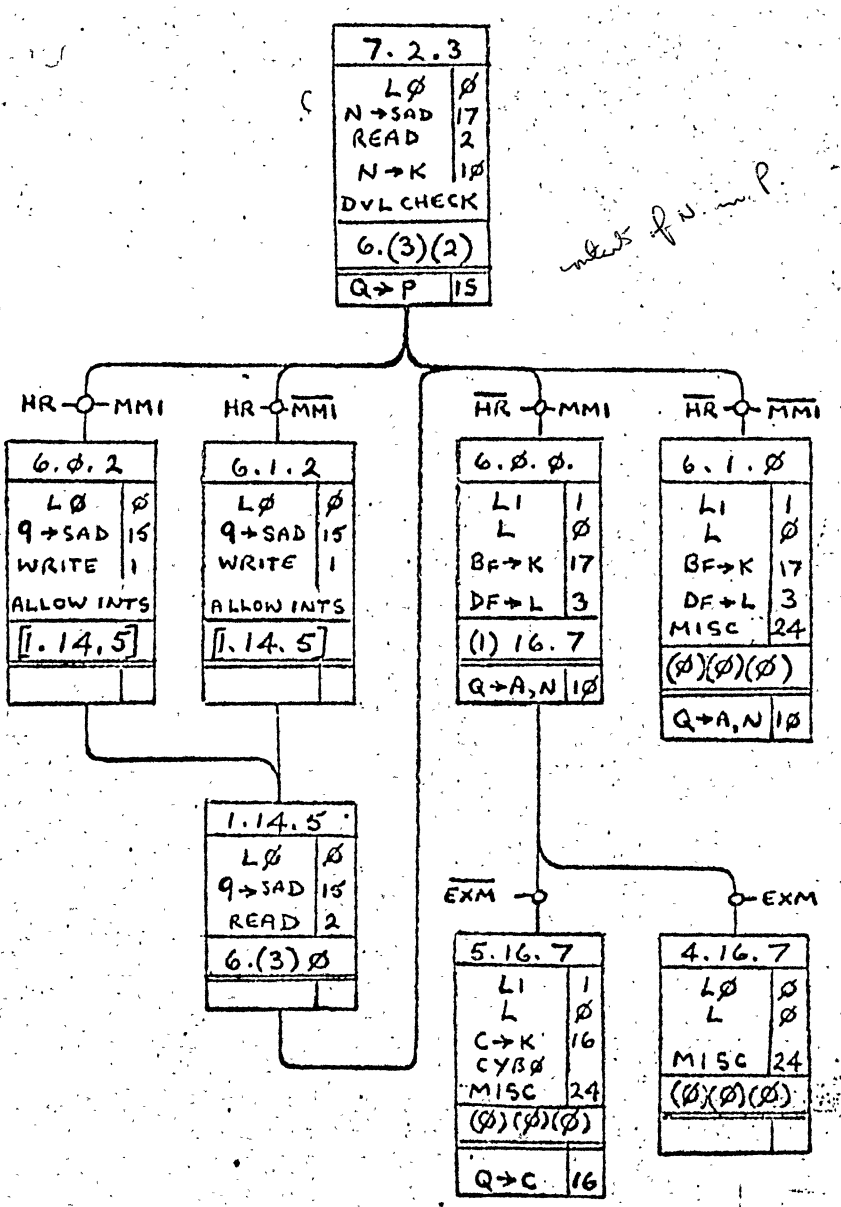

7.1.0
LO ø
XvD→J 6
READ 2
DvL CHECK
1.17.4.
7.1.1
LO ø
XvD→J 6
READ 2
B→K 1
DvL CHECK
4.17.6
Q→A 13
7.1.2
LO ø
XvD→J 6
READ 2
B→K 1
DvL CHECK
4.15.6
Q→A 13
7.1.3
LO ø
XvD→J 6
READ 2
B→K 1
DvL CHECK
4.14.6
Q→A 13
7.1.4
LO ø
XvD→J 6
READ 2
DvL CHECK
2,13,3.
7.1.5
LO ø
XvD→J 6
READ 2
B→K 1
DvL CHECK
4.13.6
Q→A 13
7.1.6
LO ø
XvD→J 6
READ 2
B→K 1
DvL CHECK
4.12.6
Q→A 13
7.1.7
LO ø
XvD→J 6
READ 2
B→K 1
DvL CHECK
4.11.6
Q→A 13
1.17.4.
LI 1
N→J 17
L ø
B→K 1
C22→CYBØ 2
DvL CHECK
5.6.6.
MISC 10
Q→B 7
4.17.6
LI 1
N→J 17
RP 3
B→K 1
A→L 4
C22→CYBØ 2
DvL CHECK
5.6.6
MISC 10
Q→B 7
4.15.6
LI 1
Ā→L 10
C22→CYBØ 3
N→J 17
DvL CHECK
5.6.6.
MISC 10
Q→B 7
4.14.6
LI 1
N→J 17
RP 3
B→K 1
Ā→L 10
C22→CYBØ 3
DvL CHECK
5.6.6
MISC 10
Q→B 7
2.13.3.
LI 1
B→K 1
C22→CYBØ 2
N→J 17
DvL CHECK
5.6.6.
MISC 20
Q→B 7
4.13.6
LI 1
N→J 17
RP 3
B→K 1
A→L 4
C22→CYBØ 2
DvL CHECK
5.6.6
MISC 20
Q→B 7
4.12.6
LI 1
Ā→L 10
C22→CYBØ 3
N→J 17
DvL CHECK
5.6.6.
MISC 7
Q→B 7
4.11.6
LI 1
N→J 17
RP 3
B→K 1
Ā→L 10
C22→CYBØ 3
DvL CHECK
5.6.6
MISC 7
Q→B 7
5.6.6
LI 1
N→J 17
WRITE 1
C→K 16
CYBØ 1
ALLOW INTS
[4.16.1]
Q→CP 17
PREP OF ORDER
ALSO USED IN GRP 3.
MISCELLANEOUS
7 1→C22 IF M24=Ø; Ø→Q23
10 Ø→C22; IF M24≠M23; 1→C23
20 M23→C22; Ø→Q23

SUB	ISS	
ACW		



1904/5 E&F LS/50

SUB	ISS		
ACW	-		



MISCELLANEOUS	
24	THE SAME AS MISC 3 EXCEPT THAT THE "A" STAT IS NOT UNSET

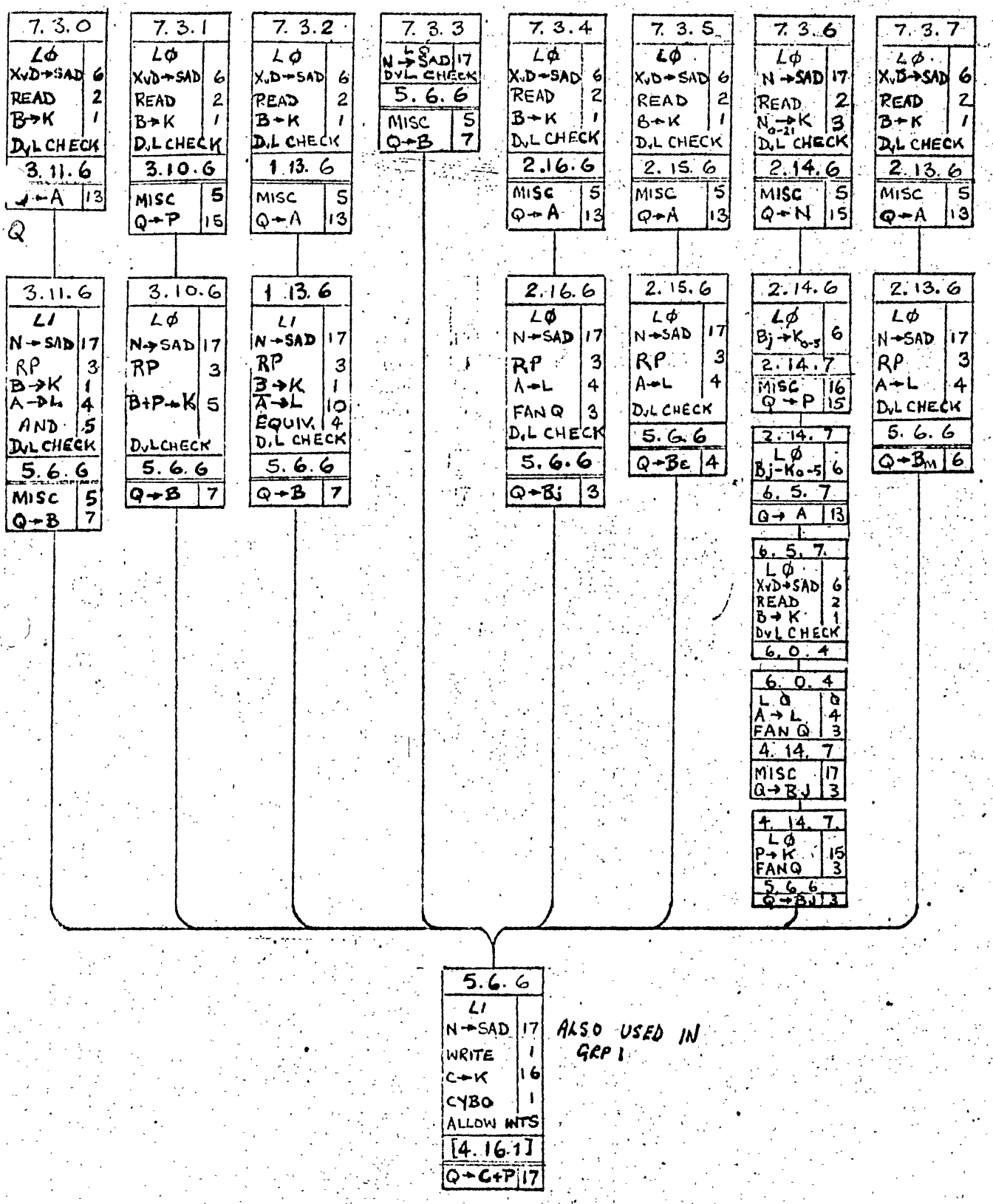
CONDITIONS		Y	N
X1	EXM	4	5
Y3	MMI	Ø	1
Z2	HR	2	Ø

FUNCTION Ø23

1904/5 E & F

LS/51

SUB	1SS		
ACN			
CHAN N			
DATE	26/9/67		
ACD	7803		



MISCELLANEOUS	
5	0 → C22
16	RCH+1 → RCH
17	RCH−1 → RCH

GROUP 3

1904/5 E&F LS 60

SU	ISS	1	
ACN		0906	
CHANGE NO	-	96-100	
DATE	24/9/67	28/11/67	
ACD	7803	-	

040 041 042

7.4.0
LO Ø
N→J 17
READ 2
B→K 1
ALLOW INTS
DVL CHECK
6.14.1
Q→A 13

7.4.1
LO Ø
N→J 17
READ 2
B→K 1
DVL CHECK
ALLOW INTS
3.17.1
Q→A 13

7.4.2
LO Ø
N→J 17
READ 2
B→K 1
DVL CHECK
ALLOW INTS
2.17.1
Q→A 13

Read out M/cand

Mcand in A

6.14.1
LO Ø
XvD→J 6
READ 2
B→K 1
DVL CHECK
6.13.1
MISC 34
Q→P 15

Read out Multiplier

Multiplier in P

3.17.1
LO Ø
XvD→J 6
READ 2
B→K 1
DVL CHECK
3.16.1
MISC 36
Q→P 15

2.17.1
LO Ø
XvD→J 6
READ 2
B→K 1
DVL CHECK
2.16.1
MISC 34
Q→P 15

count of 24 in Logic Shift

0 to NC counter shift

3.13.1
LQ Q
B→K 1
SHR 2
4.10.5
MISC 37
Q→B 7

count 24 + Logic Shift

0 to P23

6.13.1
LO Ø
SHRD 7
(11).1.4
Q→B 7

Shifting P Right Source 3

3.16.1
LQ Q
CYBO 1
SHR 2
3.13.1
Q→B 7

Adding Remainder

4.10.5
LO Ø
SHRD 7
(11).1.4

Shift P

2.16.1
LO Ø
X+IvD→J 7
READ 2
SHRD 7
DVL CHECK
(11).1.4

Remainder result to B

Sequence

List Logic 24

N=2

$P_0=0$ HR $\overline{HR}$ $P_0=0$ $\overline{HR}$ HR $P_0=1$ HR $\overline{HR}$ $P_0=1$ $\overline{HR}$ HR $P_0=0$ $P_0=1$

2.0.4
LO Ø
XvD→J 6
WRITE 1
P→K 15
SHR 2
DVL CHECK
5.17.2
Q→B 7

2.0.5
LO Ø
XvD→J 6
WRITE 1
P→K 15
SHR 2
DVL CHECK
5.17.2
Q→B 7

0.0.4
LI 1
B→K 1
Ā→L 10
CYBO 1
2.0.5
MISC 10
Q→B 7

0.0.5
LI 1
B→K 1
Ā→L 10
CYBO 1
2.0.5
MISC 10
Q→B 7

2.1.4
LO Ø
B→K 1
SHRD 7
(11).(6).(7)
MISC 27
Q→B 7

0.1.4
LI 1
B→K 1
A→L 4
SHRD 7
(11).(6).(7)
MISC 27
Q→B 7

2.1.5
LO Ø
9→J 15
WRITE 1
N→K 10
5.17.1
Q→B 7

0.1.5
LO Ø
9→J 15
WRITE 1
N→K 10
6.17.0
Q→B 7

Point -1 to N if not

Add M/C to Remainder Shift P and Multiplier one Place before Adding

5.17.2
LI 1
X+IvD→J 7
WRITE 1
C→K 16
CYBO 1
DVL CHECK
ALLOW INTS
[4.16.1]
MISC 5
Q→C+P 17

ALSO USED IN Fns 043–046, 111, 113

5.17.1
LØ Ø
10→J 14
WRITE 1
ALLOW INTS
[5.16.1.]

6.17.0
LO Ø
10→J 14
WRITE 1
ALLOW INTS
[6.15.1]

5.16.1.
LO Ø
10→J 14
READ 2
B→K 1
4.17.1.
Q→N 14

6.15.1
LO Ø
10→J 14
READ 2
B→K 1
1.15.0
Q→N 14

4.17.1.
LO Ø
9→J 15
READ 2
2.1.4.

1.15.0
LO Ø
9→J 15
READ 2
0.1.4

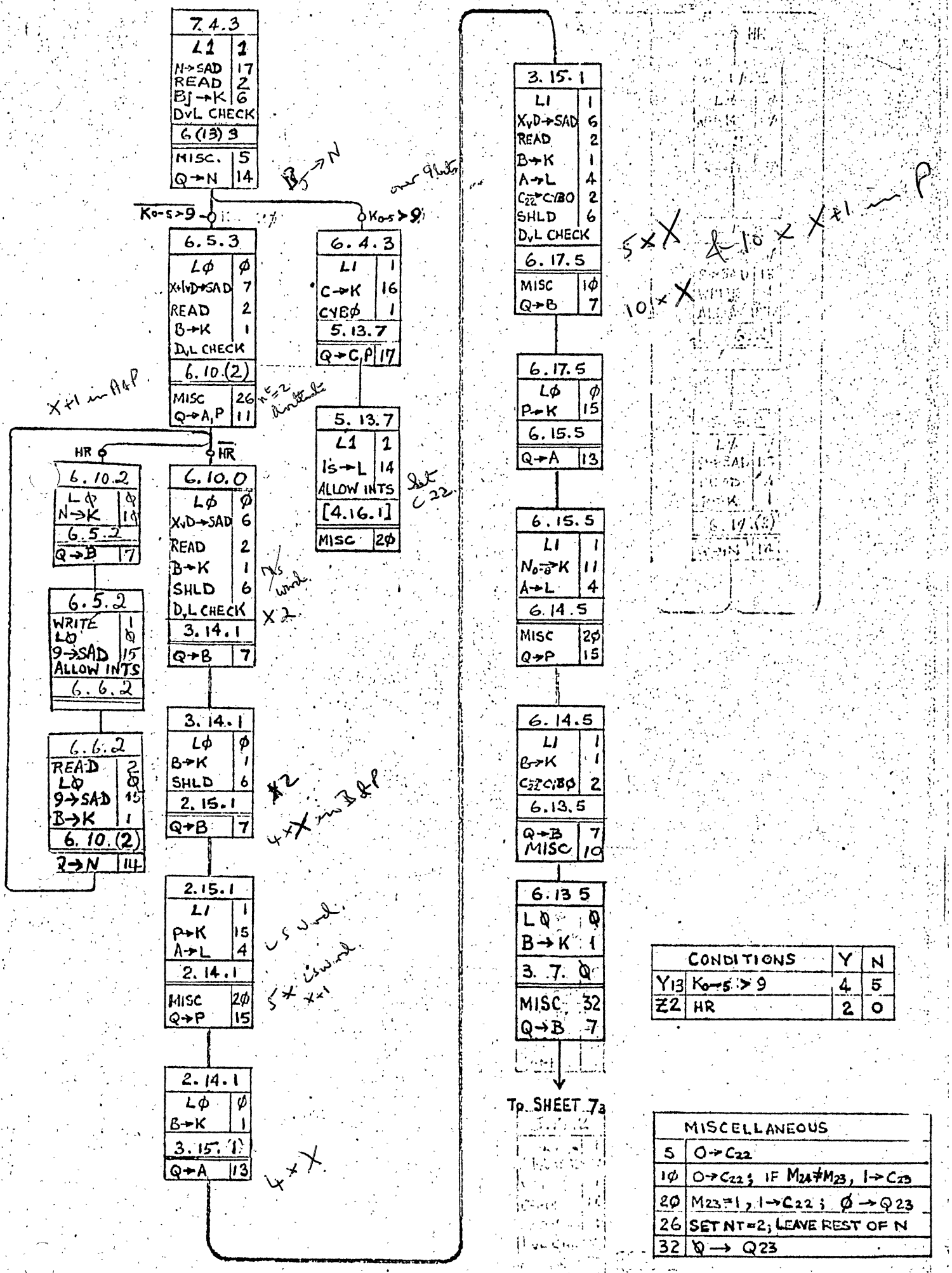
MISCELLANEOUS	
5	0 → C22
10	0 → C22; IF M23 ≠ M23, 1 → C23
27	M24 → Q23; No-9 − 1 → No-9
34	24 → No-9; 1 → Nt
35	C23 → Q23
36	0 → Nt; LEAVE REST OF N

CONDITIONS		Y	N
11	Po = 0	2	0
6	No-9 = 2	0	1
27	HR	5	4

FUNCTIONS 040–2
MULTIPLY

1904/5 E & F LS/70

SUB	ISS	1
ACW		0942



DECIMAL-BINARY CONVERSION

FUNCTION 043

1904/5 E&F

LS/7

SUB	ISS	1
ACN		09.06

044 046

7.4.4
READ L2
N→SAD
B→K
DvLCHECK
ALLOW INTS
(6).12.Q
MISC 5
Q→A 13

lines to A

MT=Q MT≠Q

2.12.Q
L1 1
C→K 16
CYBQ 1
4.16.1
MISC 37
Q→CP 17

Set 0 inflow.

3.12.Q
READ 2
LQ 0
X+HvD→SAD 7
B→K 11
DvLCHECK
4.17.2
MISC 31
Q→P 15

Read out L.S.W. Set indicator to P. Set up count 24 repeatedly log in shift

4.17.2
READ 2
L2 2
XvD→SAD 6
B→K 16
SHLD
DvLCHECK
(12).Q.3

Read out M.S.W. Set sign. Put 0 in L.S.W. pos.

7.4.6
READ N→SAD 2 17
L2 2
B→K 1
DvLCHECK
ALLOW INTS
(6).13.Q
MISC 5
Q→A 13

lines to A as 0

MT=Q MT≠Q

3.13.Q
READ 2
L2 2
X+HvD→SAD 7
B→K 11
DvLCHECK
(16).14.Q
MISC 34
Q→P 15

M.S.W.

2.13.Q
L1 1
C→K 16
CYBQ 1
4.16.1
MISC 37
Q→CP 17

M23=Q M23=1

2.14.Q
L2 2
SHLD 6
(12).Q.3
Q→B 7

3.14.Q
L2 2
1S→L 14
SHLD 6
(12).Q.3
Q→B 7

Sign extend.

A23=M23 A23≠M23

Line skips

3.0.3
L2 2
B→K 1
A→L 10
CYBQ 1
SHLD 6
(12).1.3
MISC 40
Q→B 7

Subtract lines from M.S.W. and shift left one place.

1.Q.3
L2 2
B→K 1
A→L 4
SHLD 6
(12).Q.1
MISC 40
Q→B 7

Add lines to M.S.W. and shift left

1 from count A23=M23 read→P0

A23≠M23 A23=M23 A23=M23 A23≠M23 MT=Q MT≠Q

1.1.3
L2 2
B→K 1
A→L 4
SHLD 6
(12).(4).(2)
MISC 40
Q→B 7

add.

3.1.3
LQ 10
Q.6.6
MISC 37

Subtract

3.Q.1
L2 2
B→K 1
A→L 10
CYBQ 1
SHLD 6
(12).(6).(2)
MISC 40
Q→B 7

1.Q.1
L2 2
B→K 1
(6).10.Q

2.3.3
LQ 10
1.1.3
MISC 64

3 3.3
LQ 10
1.1.3
MISC 37

HR N=2 A23=M23 | HR N≠2 A23≠M23 | HR N≠2 A23=M23 | HR N=2 A23≠M23 | HR N=2 A23=M23 | HR N=2 A23≠M23 | HR N≠2 A23=M23 | HR N≠2 A23≠M23

3.1.2
WRITE 1
LQ 0
9→SAD 15
N→K 10
6.5.4
Q→B 7

To 6.5.4 (SHEET 2)

1.1.2
WRITE 1
LQ 0
9→SAD 15
N→K 10
3.15.4
Q→B 7

To 3.15.4 (SHEET 2)

3.Q.Q
L1 1
B→K 11
A→L 10
CYBQ 1
SHLD 6
6.11.1
MISC 40

To 6.11.1 (SHEET 2)

1.Q.Q
L1 1
B→K 1
A→L 4
SHLD 6
6.12.1
MISC 40

To 6.12.1 (SHEET 2)

3.Q.2
L1 1
B→K 1
A→L 10
CYBQ 1
SHLD 6
6.11.1
MISC 40

To 6.11.1 (SHEET 2)

1.Q.2
L1 1
B→K 1
A→L 4
SHLD 6
6.12.1
MISC 40

To 6.12.1 (SHEET 2)

3.1.Q
L2 2
B→K 1
A→L 10
CYBQ 1
SHLD 6
(12) (6) (2)
MISC 40
Q→B 7

1.1.Q
L2 2
B→K 1
A→L 4
SHLD 6
(12) (6) (2)
MISC 40
Q→B 7

FROM 6.7.Q (SHEET 2)

FROM Q.2.7 (SHEET 2)

DIVISION

FUNCTIONS 044, 046

SHEET 1 OF 2

CONDITIONS		Y	N
X6	MT=Q	2	3
X12	A23=M23	3	1
X16	M23=Q	2	3
Y6	N=2	Q	1
Z	HR	2	Q

Z2

MISCELLANEOUS	
34	24→N0-9; SETNL=1
37	1→C23
40	N0-9-1→N0-9; A23=M23→P0
5	Q→C22
64	if M23=M24, 1→C22

1904/5 E&F LS/72

SUB	ISS	1	2
ACW		0942	0947

FROM $\phi.1.2$ SHEET 1

SHEET 1

SHEET 1

FROM 1.1.2 SHEET 1

FROM $\phi.\phi.2$ AND $\phi.\phi.\phi$ SHEET 1

FROM $1.\phi.2$ AND $1.\phi.\phi$ SHEET 1

6.5.ϕ	
Lϕ	ϕ
1ϕ → SAD	14
WRITE	1
ALLOW INTS	
[6.6.ϕ]	

3.15.4	
Lϕ	ϕ
10 → SAD	14
WRITE	1
ALLOW INTS	
[$\phi.3.7$]	
	1

6.11.1	
L1	1
B → K	1
$\bar{A}$ → L	1ϕ
CYBϕ	1
(11)(1). 1	
Q → B	7

6.12.1	
L1	1
B → K	1
A → L	4
(11).(11). 1	
Q → B	7

6.6.ϕ	
Lϕ	ϕ
1ϕ → SAD	14
READ	2
B → K	1
6.7 ϕ	
Q → N	14

$\phi.3.7$	
Lϕ	ϕ
1ϕ → SAD	14
READ	2
B → K	1
$\phi.2.7$	
Q → N	14

6.7.ϕ	
Lϕ	ϕ
9 → SAD	15
READ	2
3.1.0	

$\phi.2.7$	
Lϕ	ϕ
9 → SAD	15
READ	2
1.1.0	

$A_{23}=\phi$ Divisor +ve

$P_0=\phi$ Rem −ve.

sign of remainder is same as sign of dividend

Divisor +ve, $P_0=1$

$A_{23}=\phi$ $P_\phi=\phi$

$A_{23}=\phi$ $P_\phi=1$

$A_{23}=1$ $P_\phi=1$

$A_{23}=1$ $P_\phi=\phi$

Remainder wrongly signed

2.ϕ.1	
L1	1
B → K	1
A → L	4
$\phi.\phi.1$	
Q → B	7

$\phi.\phi.1$	
Lϕ	ϕ
XvD → SAD	6
WRITE	1
P → K	15
D/L CHECK	
5.17.2	
Q → B	7

$\phi.1.1$	
L2	2
B → K	1
$\bar{A}$ → L	1ϕ
CYBϕ	1
(6). 7. ϕ	

2.1.1	
L1	1
B → K	1
A → L	4
$\phi.1.1$	
Q → B	7

Quotient wrongly signed

sub divisor from Mill Rout

MT ≠ ϕ — 6.3.15 — 1.17.3. FOR 75. — F063 (71)

MT = ϕ

3.7.ϕ	
Lϕ	ϕ
XvD → SAD	6
WRITE	1
P → K	15
D/L CHECK	
5.17.2	
Q → B	7

2.7.ϕ	
L1	1
B → K	1
$\bar{A}$ → L	1ϕ
CYBϕ	1
3.17.ϕ	
Q → B	7

sub divisor from remainder

IF ϕ4ϕ

Fϕ45

5.17.2	
L1	1
X+IvD → SADJ	
WRITE	1
C → K	16
CYBϕ	1
D/L CHECK	
ALLOW INTS	
[4.16.1]	
MISC	5
Q → C+P	17

ALSO USED IN FUNCTION ϕ45. Fϕ4ϕ, F111, F113.

3.17.ϕ	
L2	2
XvD → J	6
WRITE	1
C22 → CYB	2
(6) 2 7	

ALSO USED IN Fϕ45

MT ≠ ϕ

MT = ϕ

3.2.7	
L1	1
P → K	15
CYBϕ	1
5.17.2	
Q → B	7

2.2.7	
L1	1
P → K	15
CYBϕ	1
5.17.2	
MISC	1ϕ
Q → B	7

wrong C22 set

MISCELLANEOUS	
5	ϕ → C22
1ϕ	ϕ → C22; IF $M_{24} \neq M_{23}$ 1 → C23

CONDITIONS		Y	N
X6	MT = ϕ	2	3
X11	$P_\phi = \phi$	2	3
Y11	$A_{23}=1$	1	ϕ

DIVISION

FUNCTIONS 044, 046

SHEET 2 of 2

1904/5 E & F

LS/73

SUB	ISS		
ACW	-		

045

MISCELLANEOUS	
34	$2_{11} \to N_{0-9}$: SET NT = 1
37	$1 \to C_{23}$
44	$N_{0-9} - 1 \to N_{2-9}$: $A_{23} = M_{23} \to P_0$
64	if $M_{23} = M_{24}$, $1 \to C_{22}$

CONDITIONS		Y	N
X6	MT = Ø	2	3
X12	$A_{23} = M_{23}$	3	1
Y6	N = 2	Ø	1
Z2	HR	Ø	2
Z7	HR	5	4

7.4.5
READ 2
L2 2
N→SAD 17
B→K 1
DvL CHECK
ALLOW INTS
(6).15.Ø
MISC 5
Q→A 13

MT=Ø

2.15.Ø
L1 1
C→K 16
CYBQ 1
4.16.1
MISC 37
Q→C,P 17

MT≠Ø

3.15.Ø
READ 2
LQ Ø
X+1vD→SAD 7
B→K 1
DvL CHECK
6.11.Ø
MISC 34
Q→P 15

6.11.Ø
READ 2
L2 2
XvD→SAD 6
B→K 1
SHLD 6
DvL CHECK
(12).1.1

A23=M23

3.1.1
L2 2
B→K 1
A→L 1Ø
CYBQ 1
SHLD 6
(12).5.1
MISC 4Ø
Q→B 7

A23≠M23

1.1.1
L2 2
B→K 1
A→L 4
SHLD 6
(12).6.6
MISC 4Ø
Q→B 7

A23≠M23

1.5.1
L2 2
B→K 1
A→L 4
SHLD 6
(12)(6)(7)
MISC 4Ø
Q→B 7

A23=M23

3.5.1
LQ Q
3.6.6
MISC 37

A23≠M23

1.6.6
L2 2
B→K 1
(6).4.2

MT=Ø

2.4.2
LQ 1Ø
1.5.1
MISC 64

MT≠Ø

3.4.2
LQ 1Ø
1.5.1
MISC 37

A23=M23

3.6.6
L2 2
B→K 1
A→L 1Ø
CYBQ 1
SHLD 6
(12)(6)(7)
MISC 4Ø
Q→B 7

Possible workaround
the -ve may not be
a genuine overflow.

N=1 / N≠2 / A23=M23 / HR

3.1.5
WRITE 1
LQ Ø
9→SAD 15
N→K 1Ø
2.1Ø.3
1Ø→B 17

TO 2.1Ø.3 (SHEET 2)

N≠2 / A23≠M23 / HR

1.1.5
WRITE 1
LQ Ø
9→SAD 15
N→K 1Ø
6.15.Ø
Q→B 17

TO 6.15.Ø (SHEET 2)

N=2 / A23=M23 / $\overline{HR}$

3.Ø.4
L1 1
B→K 1
A→L 1Ø
CYBQ 1
SHLD 6
3.4.11
MISC 4Ø

TO 3.4.4 (SHEET 2)

N=2 / A23=M23 / HR

3.Ø.5
L1 1
B→K 1
A→L 1Ø
CYBQ 1
SHLD 6
3.11.4
MISC 4Ø

TO 3.4.4 (SHEET 2)

N=1 / A23≠M23 / $\overline{HR}$

1.Ø.4
L1 1
B→K 1
A→L 4
SHLD 6
Ø.11.4
MISC 14Ø

TO Ø.11.4 (SHEET 2)

N=2 / A23≠M23 / HR

1.Ø.5
L1 1
B→K 1
A→L 4
SHLD 6
Ø.11.4
MISC 4Ø

TO Ø.11.4 (SHEET 2)

N≠2 / HR / A23=M23

3.1.4
L2 2
B→K 1
A→L 1Ø
CYBQ 1
SHLD 6
(12)(6)(7)
MISC 4Ø
Q→B 7

FROM 2.12.3 (SHEET 2)

N≠2 / $\overline{HR}$ / A23≠M23

1.1.4
L2 2
B→K 1
A→L 4
SHLD 6
(12)(6)(7)
MISC 4Ø
Q→B 7

FROM 5.17.Ø (SHEET 2)

DOUBLE LENGTH DIVISION (ROUNDED)

FUNCTION Ø45

SHEET 1 OF 2

1904/5 E&F

LS/74

SUB	ISS		
ACW	-		

FROM 1.1.5 SHEET 1

FROM 3.1.5 SHEET 1

FROM 3.Ø.(4v5) SHEET 1

FROM 1.Ø.(4v6) SHEET 1

SHEET 1

SHEET 1

6.15.Ø	
LØ	Ø
1Ø→SAD	14
WRITE	1
ALLOW INTS	
[6.14.Ø]	

6.14.Ø	
LØ	Ø
1Ø→SAD	14
READ	2
B→K	1
5.17.Ø	
Q→N	14

5.17.Ø	
LØ	Ø
9→SAD	15
READ	2
1.1.4	

2.1Ø.3	
LØ	Ø
1Ø→SAD	14
WRITE	1
ALLOW INTS	
[2.11.3]	

2.11.3	
LØ	Ø
1Ø→SAD	14
READ	2
B→K	1
2.12.3	
Q→N	14

2.12.3	
LØ	Ø
9→SAD	15
READ	2
3.1.4	

3.4.4	
L1	1
B→K	1
$\overline{A}$→L	1Ø
CYBØ	1
(11)(11)	7
Q→B	7

Ø.11.4	
L1	1
B→K	1
A→L	4
(11)(11)	7
Q→B	7

Down via wrong sign.

PØ=Ø A23=Ø

2.Ø.7	
L1	1
B→K	1
A→L	4
3.Ø.Ø	
Q→B	7

PØ=1 A23=Ø

Ø.Ø.7	
L2	2
B→K	1
(6).11.1	

PØ=1 A23=1

Ø.1.7	
L2	2
B→K	1
$\overline{A}$→L	1Ø
CYBØ	1
(6).5.2	

PØ=Ø A23=1

2.1.7	
L1	1
B→K	1
A→L	4
3.1.Ø	
Q→B	7

Rounding.

Remainder not zero.

Remainder is zero exactly for ÷.

MT=Ø

2.11.1	
LØ	Ø
XvD→SAD	6
WRITE	1
P→K	15
DvL CHECK	
5.17.2	
Q→B	7

MT≠Ø

3.11.1	
L1	1
B→K	1
$\overline{A}$→L	1Ø
CYBØ	1
Ø.13.(7)	
Q→N	14

MT≠Ø

3.5.2	
L2	2
B→K	1
(6).11.1	

MT=Ø

2.5.2	
L1	1
B→K	1
$\overline{A}$→L	1Ø
CYBØ	1
3.17.Ø	
Q→B	7

Remainder - divisor for ÷.

2 remainder less divisor

Used sign if result +ve Ø

Remainder greater than divisor

HR

Ø.13.5	
WRITE	1
9→J	15
ALLOW INTS	
5.16.Ø	

5.16.Ø	
READ	2
9→J	15
B→K	1
$\overline{11}$→L	1Ø
CYBØ	1
Ø.13.4	
Q→N	14

FØ4Ø, FØ44, FØ46, F111, F113.

A23≠M23

1.17.3	
LØ	Ø
A→L	4
3.7.Ø	
Q→B	7

To 3.7.Ø SHEET 73

$\overline{HR}$

Ø.13.4	
LØ	Ø
B→K	1
4.17.Ø	
Q→A	13

A

4.17.Ø	
L2	2
A→L	4
N→K	1Ø
(12).17.3	

A23=M23 2

3.17.3	
LØ	Ø
N→K	1Ø
3.17.Ø	
Q→B	7

3.17.Ø	
L2	2
XvD→SAD	6
WRITE	1
C_{23}→CYBØ	2
(6).2.7	

ALSO USED IN Ø4Ø

FØ44 FØ46

MISCELLANEOUS	
5	Ø → C22
1Ø	Ø→C22; IF M24≠M23.1→C23

CONDITIONS		Y	N
XG	MT = Ø	2	3
XII	PØ = Ø	2	3
X	A23 = M23	3	1
YII	A23 = Ø	Ø	1
::			

MT=Ø

5.17.2	
L1	1
X+1vD→SAD	7
WRITE	1
C→K	16
CYBØ	1
DvL CHECK	
ALLOW INTS	
[4.16.1]	
MISC	5
Q→C+P	17

MT≠Ø

2.2.7	
L1	1
P→K	15
CYBØ	1
5.17.2	
MISC	1Ø
Q→B	7

ALSO USED IN Ø4Ø

MT≠Ø

3.2.7	
L1	1
P→K	15
CYBØ	1
5.17.2	
Q→B	7

Used both for round 4 add in cases 1

DOUBLE LENGTH DIVISION (ROUNDED)

FUNCTION Ø45

SHEET 2 OF 2

75

1904/5 E&F

LS/75

SUB	ISS		
ACW			

Must be express as a binary fraction

7.4.7.	
LØ	Ø
N→SAD	17
C→K	16
DvL CHECK	
5.14.5	
Q→B	7

Read out word into shift area & begin DvL check. C.A in B

5.14.5	
LØ	Ø
1Ø→SAD	14
WRITE	1
N→K	1Ø
5.13.5	
Q→C	16

C.A → C.A in 1Ø

address of our word.

5.13.5	
LØ	Ø
X+1vD→SAD	7
READ	2
B→K	1
DvL CHECK	
ALL. INTS	
[6.5.4]	
Q→A+P	11

Read out X+1

X+1 in A & P

6.5.4	
LØ	Ø
4.17.5	
MISC	26
Q→B	7

Read set shift word.

Store B.

4.17.5	
LØ	Ø
B→K	1
SHLD	6
4.16.5	
Q→B	7

shift left P ×2

4.16.5	
LØ	Ø
B→K	1
SHLD	6
4.15.5	
Q→B	7

shift left P ×2.

4.15.5	
L2	2
P→K	15
A→L	4
(16).7.1	
MISC	32
Q→P	15

P now contains 5 times Binary fraction.

Store Ø in Q 23

$M_{23}=Ø$ (N) → | $M_{23}=1$ → has overflow occurred.

2.7.1	
LØ	Ø
B→K	1
SHLD	6
4.14.5	
Q→N	14

gives 10X in P

Bits shifted out now added with N.

3.7.1	
L1	1
B→K	1
CYBØ	1
SHLD	6
4.14.5	
Q→N	14

if overflow add one to quantity in N

4.14.5	
LØ	Ø
P→K	15
4.13.5	
Q→B	7

10X Binary fraction.

4.13.5	
LØ	Ø
X+1vD→SAD	7
WRITE	1
DvL CHECK	
2.6.6	
MISC	26

Write 10X* in X+1

— set arithmetic shift over all bits 0-3

2.6.6	
LØ	Ø
X+1vD→SAD	6
READ	2
B→K	1
DvL CHECK	
Ø.12.(2)	
Q→A+P	11

Read out X M/S Part of fraction.

X in A & P.

CONDITIONS	
X16	IF M(23)=0; 2→X, ELSE 3→X
Ξ2	IF HR 2→Ξ, ELSE 0→Ξ
Ξ7	IF HR 5→Ξ, ELSE 4→Ξ

Q-HR → | $\overline{Q}$-HR →

Ø.12.2	
LØ	Ø
N→K	1Ø
3.16.5	
Q→B	7

3.16.5	
LØ	Ø
9→SAD	15
WRITE	1
ALLOW INTS	
[3.15.5]	

3.15.5.	
LØ.	Ø
9→SAD	15
READ	2
B→K	1
0.12.(2)	
Q→N	14

Ø.12.Ø	
LØ	Ø
3.17.5	
Q→B	7

Store B

3.17.5	
LØ	Ø
B→K	1
SHLD	6
3.14.5	
Q→B	7

2X X in P.

overspill into B.

SEE SHEET 2

MISCELLANEOUS	
26	SET NT=2; LEAVE REST OF N.
32	Ø→Q23

BINARY DECIMAL CONVERSION

FUNCTION 047

SHEET 1 OF 2

1904/5 E & F

LS/76

SUB	ISS		
ACW	-		

3.14.5	
B→K SHLD	Lø ø / 1 6
3.13.5	
Q→B	7

×2 = ×4 in P.

Overfill.

3.13.5	
L2	2
P→K	15
A→L	4
(16).1ø.4	
MISC	32
Q→P	15

5 × X in P.

ø ← 923.

N / Y — Overflow.

M_{23}=ø — M_{23}=1

2.1ø.4	
Lø	ø
B→K	1
SHLD	6
3.12.5	
Q→B	7

gives 10X in P

overfill now in

3.1ø.4	
L1	1
B→K	1
CYBø	1
SHLD	6
3.12.5	
Q→B	7

gives 10X in P

If overflow + 1 to

3.12.5	
Lø	ø
N→8 K	11
2.17.5	
Q→A	13

Overfill bits from X+1 into A.

2.17.5	
L2	2
P→K	15
A→L	4
(16).7.4	
MISC	32
Q→P	15

Overfill from X+1 added to 10X in P

ø ← 923 above gathered into P.

N / Y — Overflow.

M_{23}=0 — M_{23}=1

2.7.4	
Lø	ø
B→K	1
ALLOW INTS	
2.16.5	
Q→A	13

BCD now in A

3.7.4	
L1	1
B→K	1
CYBQ	1
ALLOW INTS	
2.16.5	
Q→A	13

BCD now in A.

2.16.5	
Lø	ø
P→K	15
2.15.5	
Q→B	7

10 × P now into B.

2.15.5	
Lø	ø
X,D→SAD	6
WRITE	1
C→K	16
D,L CHECK	
1.12.(3)	
Q→N	14

Write away 10 × P.

Signout also when no to be written

ZS & A(0-3)=0 — $\overline{ZS}$ ∨ A(0-3) ≠ 0

1.12.0	
L1	1
N→SAD	17
RP	3
1→L4	1
FANQ	3
D,L CHECK	
2.14.5	
Q→Bj	3

Put #20 to show

1.12.1	
Lø	ø
N→SAD	17
RP	3
A→L	4
FANQ	3
D,L CHECK	
3.14.7	
Q→Bj	3

Write away incorrect show to

3.14.7	
Lø	ø
2.14.5	
MISC	22

Reset Z_S

$Q_0 \rightarrow Z_S$.

2.11.5	
Lø	ø
N→SAD	17
WRITE	1
D,L CHECK	
2.13.5	

Write away to store

2.13.5	
L1	1
1ø→SAD	14
READ	2
B→K	1
CYBø	1
ALLOW INTS	
[4.16.1]	
MISC	5
Q→C+P	17

Sign out C.1.13.

MISCELLANEOUS	
5	ø→C_{22}
22	$Q_ø$→Z_S
32	ø→Q_{23}

CONDITIONS	
X16	IF M(23)=ø, 2→X, ELSE 3→X
Z3	IF ZS AND A(ø-3)=ø, ø→Z, ELSE 1→Z

BINARY DECIMAL CONVERSION

FUNCTION 047

SHEET 2 OF 2

1904/5 E&F

LS/77

SUB	ISS		
ACW	-		

CONDITIONS		Y	N
X1	EXM	4	5
Y4	MM3	2	3
Y14	A STAT SET	ϕ	1
Z1	EJM	ϕ	1

27 HES 5 4
X6 M=ϕ 2 3

7.5.ϕ
LϕXvD→J READ ϕ 6 2
DvL CHECK
(1).7.1
MISC 5

7.5.1
Lϕ ϕ
XvD→SAD 6
READ 2
DvL CHECK
(1).7.1
MISC 5

EXM — EXM

4.7.1
L2 2
B→K 1
(6).11.ϕ

5.7.1
L2 2
B→K 1
(6).(4).1

FROM Fϕ54, Fϕ65.

M=ϕ — M≠ϕ — M≠ϕ MM3 — M≠ϕ MM3 — M=ϕ MM3 — M=ϕ MM3

2.11.ϕ
Lϕ ϕ
N→J 17
READ 2
N₀₋₂₁→K
C₂₂,₂₃→K 12
5.1ϕ.(7)
Q→C+P 17

3.11.ϕ
LI 1
C→K 16
CYBϕ 1
2.11.ϕ
Q→N 14

3.3.1
LI 1
C→K 16
CYBϕ 1
2.3.1
Q→N 14

3.2.1
LI 1
C→K 16
CYBϕ 1
2.3.1
Q→N 14

2.3.1
Lϕ ϕ
N→J 17
READ 2
N₀₋₂₁→K
C₂₂,₂₃→K 12
DvL CHECK
5.1ϕ.(7)
Q→C+P 17

2.2.1
LI 1
C→K 16
CYBϕ 1
ALLOW INTS
[4.16.1]
MISC 1
Q→C+P 17

FROM Fϕ52, Fϕ53.
Fϕ60 ϕ61

HR — HR

5.1ϕ.5
Lϕ ϕ
ALLOW INTS
[5.14.4]

5.14.4
Lϕ ϕ
C→J 5
READ 2
DvL CHECK
5.1ϕ.(7)

5.1ϕ.4.
LI 1
B_F→K 17
DF→L 3
(ϕ).(ϕ).(ϕ)
MISC 3
Q→A+N 1ϕ

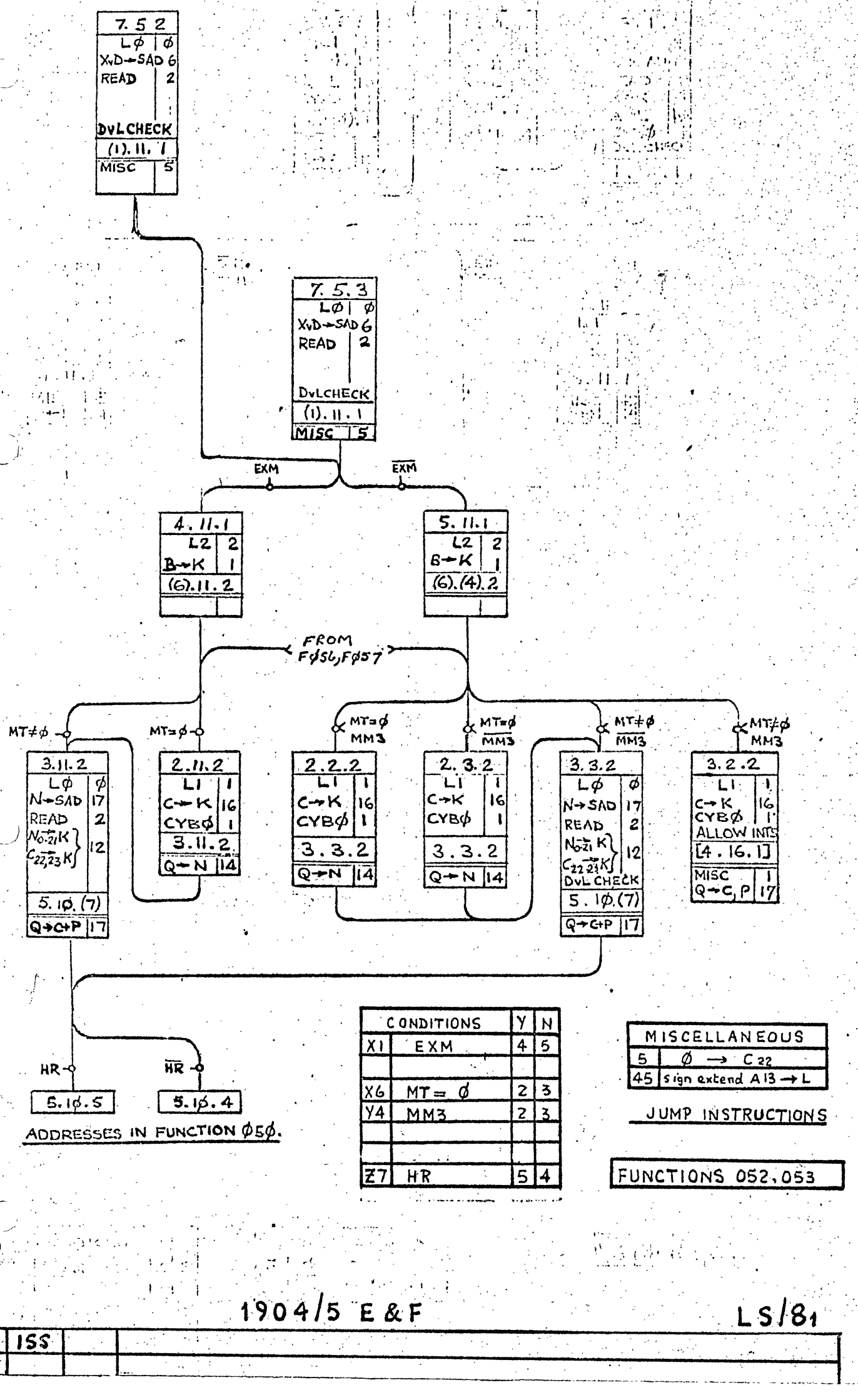
MISCELLANEOUS	
1	SET MON. MODE
5	0 → C₃₂.
3	B₂₁₋₂₃→X; 7→LINK₇₋₉; B₁₇₋₂₃→LINK₃₋₆; B₁₄₋₁₆→LINK₀₋₂; 3→N₂₂,₂₃ (SEE NOTE)
43	N(ϕ-2)→N(ϕ-3)

FUNCTIONS ϕ5ϕ, ϕ51
JUMP INSTRUCTIONS

1904/5 E & F

LS/8o

SUB	155		
ACW	-		



CONDITIONS		Y	N
X1	EXM	4	5
X6	MT = ∅	2	3
Y4	MM3	2	3
Z7	HR	5	4

MISCELLANEOUS	
5	∅ → C22
45	sign extend A13 → L

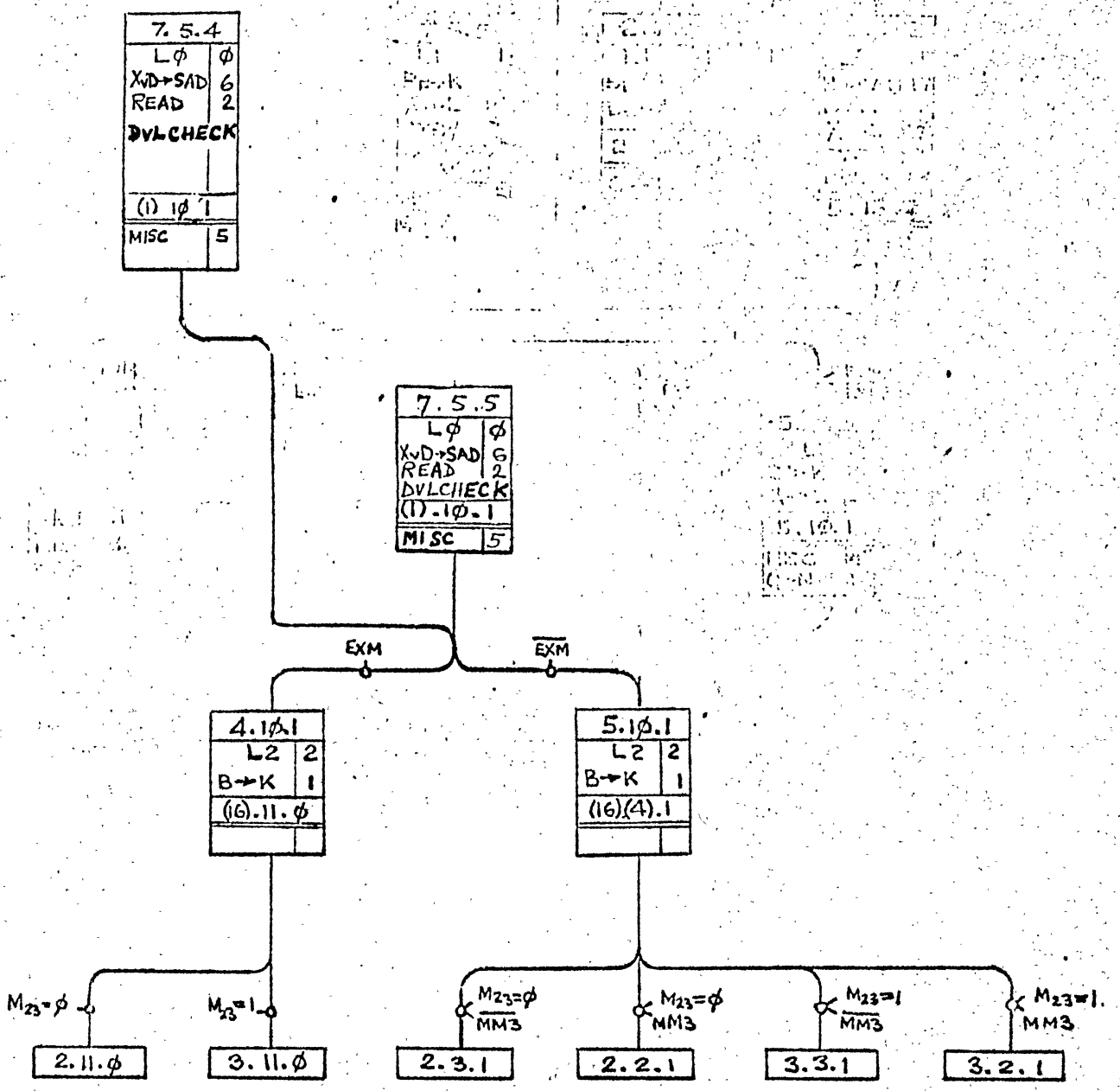
JUMP INSTRUCTIONS

FUNCTIONS 052, 053

1904/5 E & F

LS/81

SUB	ISS		
ACW			



ALL DESTINATION ADDRESSES IN FUNCTION Ø5Ø

CONDITIONS		Y	N
X1	EXM	4	5
X16	$M_{23}=Ø$	2	3
Y4	MM3	2	3

MISCELLANEOUS	
5	Ø→C22
45	SIGN EXTEND A13→L

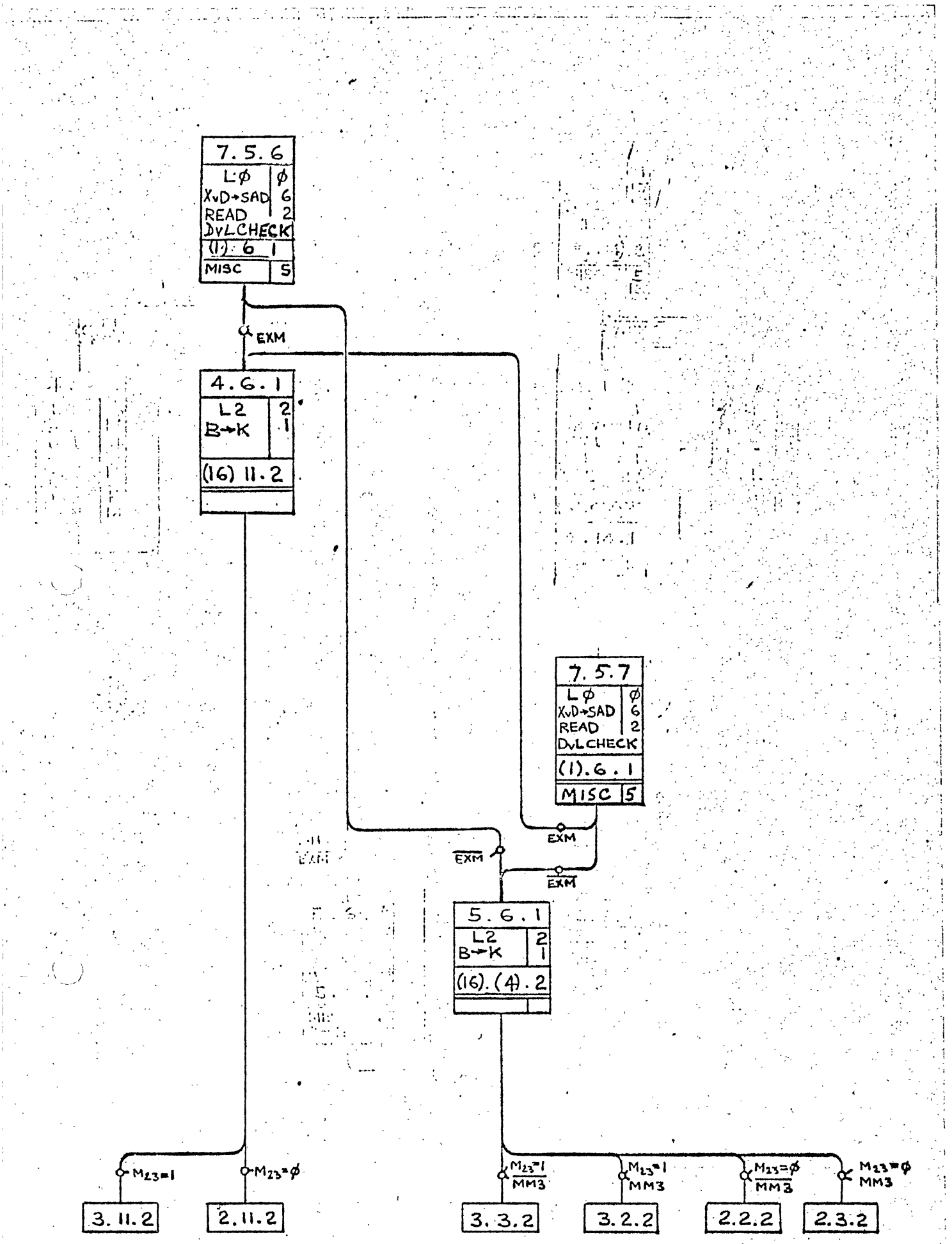
JUMP INSTRUCTIONS

FUNCTIONS Ø54, Ø55

1904/5 E&F

LS/82

SUB	ISS		
ACW	-		
CHANGE No	-		
DATE	24/9/67		
ACD	7803		



ALL DESTINATION ADDRESSES IN FUNCTION φ52.

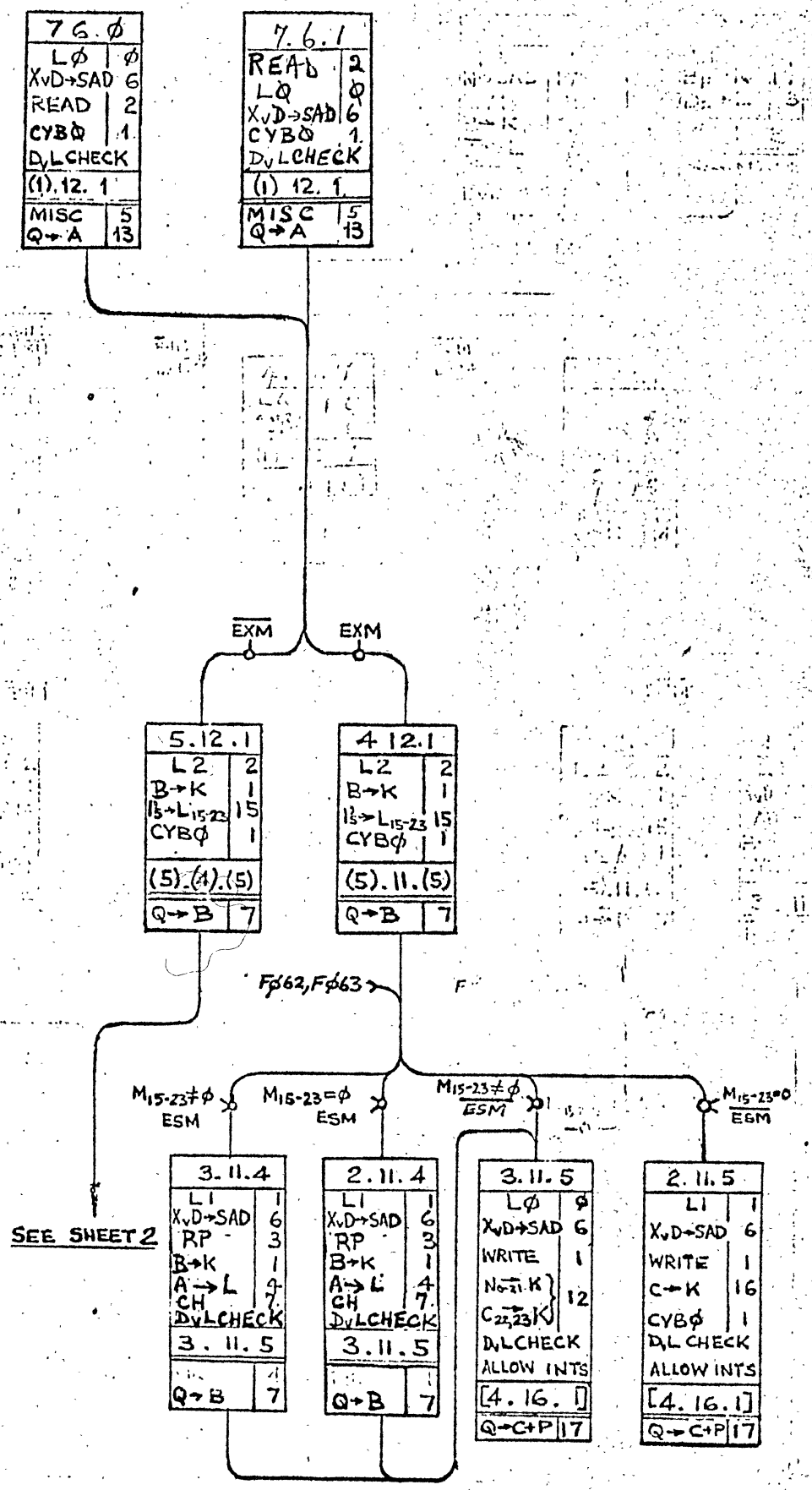
MISCELLANEOUS	
5	φ → C22
15	SIGN EXTEND A13→L

CONDITIONS		Y	N
X1	IF EXM	4	5
X16	IF M23 = φ	2	3
Y4	MM3	2	3

JUMP INSTRUCTIONS

FUNCTIONS 056, 057

SUB	155		
ACW	-		



CONDITIONS		Y	N
X1	EXM	4	5
X5	M15-23=Ø	2	3
Y4	MM3	2	3
5	ESM	4	5

MISCELLANEOUS	
5	Ø → C22
4-5	SIGN EXTEND A13 → L

JUMP INSTRUCTIONS

FUNCTIONS 060, 061

SHEET 1 OF 2

1904/5 E&F

LS/90

SUB	ISS	1
ACW	-	0906

FROM SHEET 1.

Fϕ64 – Fϕ67

Fϕ62, Fϕ63

MIS-23 = ϕ / $\overline{\text{ESM}}$ → MM3

MIS-23 ≠ ϕ / $\overline{\text{ESM}}$ → $\overline{\text{MM3}}$

MIS-23 = ϕ / ESM → MM3

MIS-23 = ϕ / ESM → $\overline{\text{MM3}}$

MIS-23 ≠ ϕ / ESM → MM3

MIS-23 ≠ ϕ / ESM → $\overline{\text{MM3}}$

2.2.5	
LI	1
XvD→SAD	6
WRITE	1
C→K	16
CYBϕ	1
DvL CHECK	
ALLOW INTS	
[4 16 1]	
Q→C+P	17

2.3.5	
LI	1
XvD→SAD	6
WRITE	1
C→K	16
CYBϕ	1
DvL CHECK	
ALLOW INTS	
[4 16 1]	
Q→C+P	17

3.2.5	
LI	1
XvD→SAD	6
WRITE	1
C→K	16
CYBϕ	1
DvL CHECK	
ALLOW INTS	
[4.16.1]	
MISC	1
Q→C+P	17

3.3.5	
Lϕ	ϕ
XvD→SAD	6
WRITE	1
DvL CHECK	
0.1.0	

2.2.4	
LI	1
XvD→SAD	6
RP	3
B→K	1
A→L	4
CH	7
DvL CHECK	
3.3.5	
Q→B	7

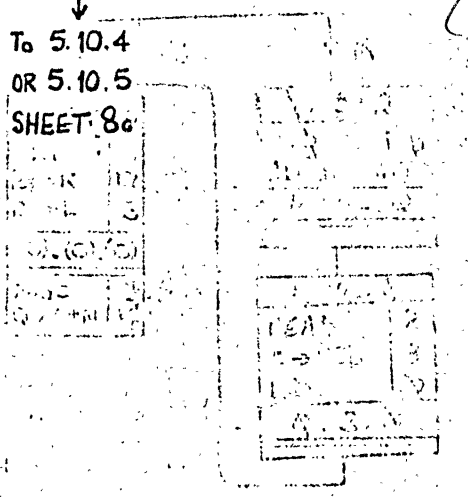
2.3.4	
LI	1
XvD→SAD	6
RP	3
B→K	1
A→L	4
CH	7
DvL CHECK	
3.3.5	
Q→B	7

3.2.4	
LI	1
XvD→SAD	6
RP	3
B→K	1
A→L	4
CH	7
DvL CHECK	
3.3.5	
Q→B	7

3.3.4	
LI	1
XvD→SAD	6
RP	3
B→K	1
A→L	4
CH	7
DvL CHECK	
3.3.5	
Q→B	7

0.1.0	
Lϕ	ϕ
N→SAD	17
READ	2
N$_{\phi-21}$→K, C$_{22,23}$→K	12
DvL CHECK	
5.10 (7)	
Q→C+P	17

To 5.10.4
OR 5.10.5
SHEET 8a



CONDITIONS		Y	N
X1	IF EXM	4	5
X5	IF MIS-23 = ϕ	2	3
Y4	IF MM3	2	3
Z2	IF HR	2	Q
Z1	IF EJM	ϕ	1
Z5	IF ESM	4	5

Z2 IF HR 5 4

MISCELLANEOUS	
1	SET MON MODE
3	PREPN. OF ORDER COMPLEX
4	SUPPRESS CARRY M(21-22)
5	ϕ → C22
4	SIGN EXTEND A13→L

Do not use
enforced in
these instructions
3 are we done
but not required.

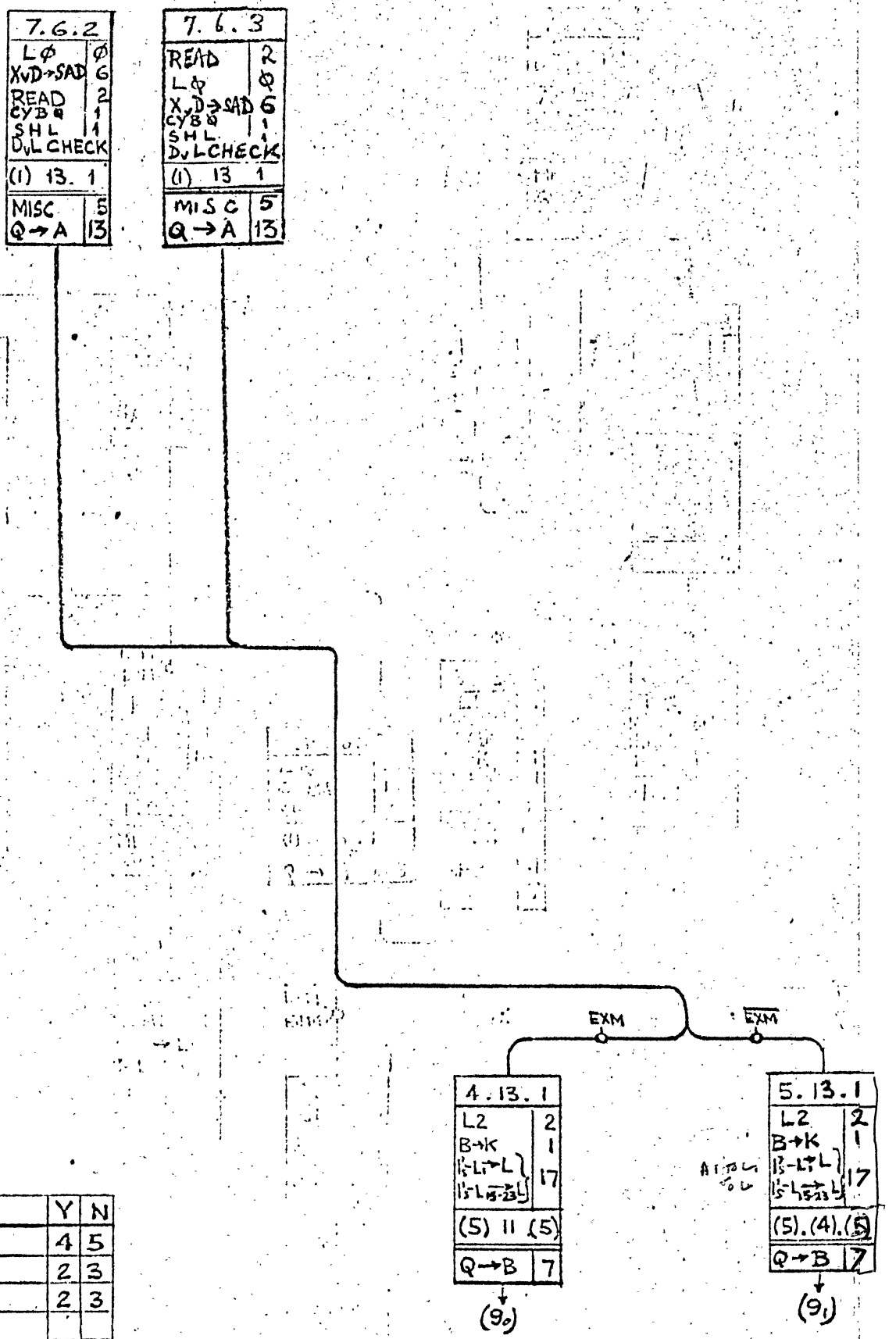
JUMP INSTRUCTION

FUNCTIONS	060, 061

SHEET 2 OF 2

1904/5 E & F LS/9

SUB	ISS	1
ACN	-	0906



CONDITIONS		Y	N
X1	IF EXM	4	5
X5	IF M15-23 = Ø	2	3
Y4	IF MM3	2	3
—			
—			
Z5	IF ESM	4	5

MISCELLANEOUS	
4	SUPPRESS CARRY M(21-22)
5	Ø → C 22
45	SIGN EXTEND A13 → L

ALL DESTINATION ADDRESSES IN FUNCTION Ø6Ø

JUMP INSTRUCTIONS

FUNCTIONS 062, 063

1904/5 E & F LS/9₂

SUB	ISS	1
ACW		0906
CHANGE No		96-100
DATE	26/9/67	28/11/67
ACD	7803	

7.6.4	
LØ	Ø
XvD→J	6
READ	2
DvL CHECK	
(1) 14 1	
MISC	14
Q→A	13

7.6.5	
READ	2
LØ	Ø
XvD→SAD	6
DvL CHECK	
(1) 14. 1	
MISC	14
Q→A	13

EXM

5.14.1.	
L2	2
B→K	1
I's→L15-22	16
CH	7
(4) (4) 5	
MISC	5
Q→B	7

To Fn Ø6Ø (91)

EXM

4.14.1.	
L2	2
B→K	1
I's→L15-22	16
CH	7
(4). 11.5.	
MISC	5
Q→B	7

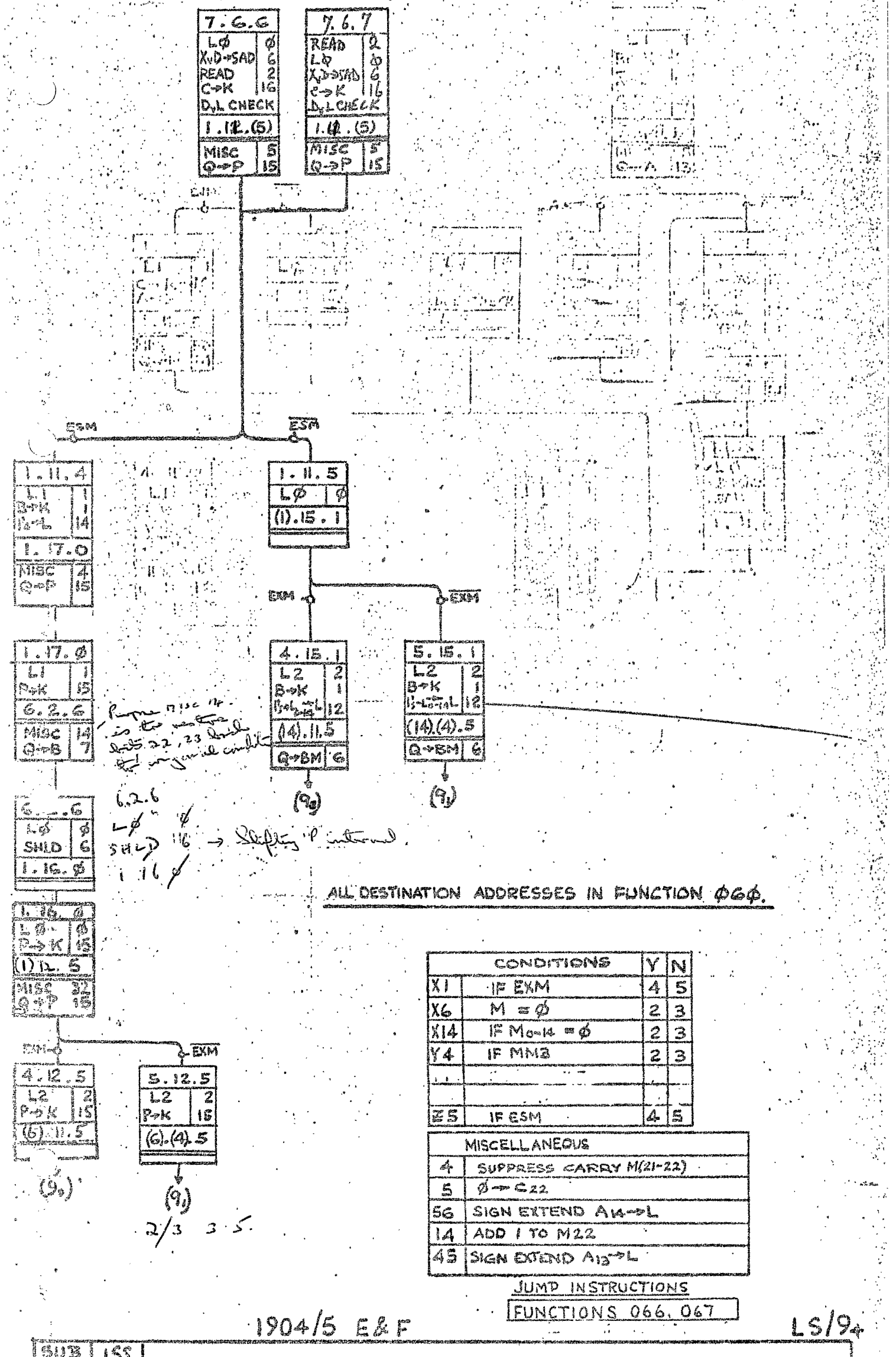
To Fn Ø6Ø (90)

MISCELLANEOUS	
5	Ø→C22
14	ADD 1 TO M22
45	SIGN EXTEND A13→L

JUMP INSTRUCTIONS

FUNCTIONS Ø64, Ø65

CONDITIONS		Y	N
X1	EXM	4	5
X4	M15-21=Ø	2	3
Y4	MM3	2	3



ALL DESTINATION ADDRESSES IN FUNCTION φ6φ.

CONDITIONS		Y	N
X1	IF EXM	4	5
X6	M = φ	2	3
X14	IF M₀₋₁₄ = φ	2	3
Y4	IF MM3	2	3
E5	IF ESM	4	5

MISCELLANEOUS	
4	SUPPRESS CARRY M(21-22)
5	φ → C22
56	SIGN EXTEND A14→L
14	ADD 1 TO M22
45	SIGN EXTEND A15→L

JUMP INSTRUCTIONS
FUNCTIONS 066, 067

070

7. 7. 0	
L Ø	Ø
DF→L	3
0. 2. (5)	
MISC	5
Q→A	13

071

7. 7. 1	
L Q	Q
DF→L	3
0. 2. (5)	
MISC	5
Q→A	13

ESM

$\overline{ESM}$

0. 2. 4	
L1	1
1s→L15-22	16
ZS→K15	4
1. 17. 1.	
MISC	20

0. 2. 5.	
LI	1
C→K	16
$\overline{A}$→L	10
CYBO	1
0 16 (1)	
Q→P	15

1. 17. 1.	
LI	1
C→K	16
$\overline{A}$→L	10
CYBO	1
1. 17. 5.	
Q→P	15

EJM

$\overline{EJM}$

0 16 0	
L1	1
1s→L15-22	16
ZS→K15	4
1. 17. 1.	
MISC	20

0. 16. 1.	
LI	1
P→K	15
ZS→K15	4
CYBO	1
(1). 5 5.	
Q→B	7

1. 17. 5.	
LI	1
P→K	15
CYBO	1
(1) 5 5.	
Q→B	7

EXM

$\overline{EXM}$

4. 5. 5.	
WRITE	1
XvD→SAD	6
L Q	Q
DvLCHECK	
4. 3.	

5. 5. 5.	
WRITE	1
XvD→SAD	6
L Q	Q
DvLCHECK	
4. (4). (1).	

MM3

$\overline{MM3}$

4. 3. 1.	
LØ	Ø
N→SAD	17
READ	2
No-21→K	3
DvL CHECK	
1. 3. (2).	
Q→CP	17

4. 2. 1.	
LI	1
C→K	16
CYBO	1
ALLOW INTS	
[4. 16. 1.]	
MISC	1
Q→CP	17

HR

$\overline{HR}$

1. 3. 0.	
LI	1
DF→K	17
DF→L	3
MISC	3
(0) (0) (0)	
Q→A+N	10

1. 3. 2.	
LØ	Ø
ALLOW INTS	
[4. 6. 5.]	

4. 6. 5.	
LI	1
C→J	3
READ	2
BF→K	17
DF→L	3
MISC	3
(0) (0) (0)	
Q→AN	10

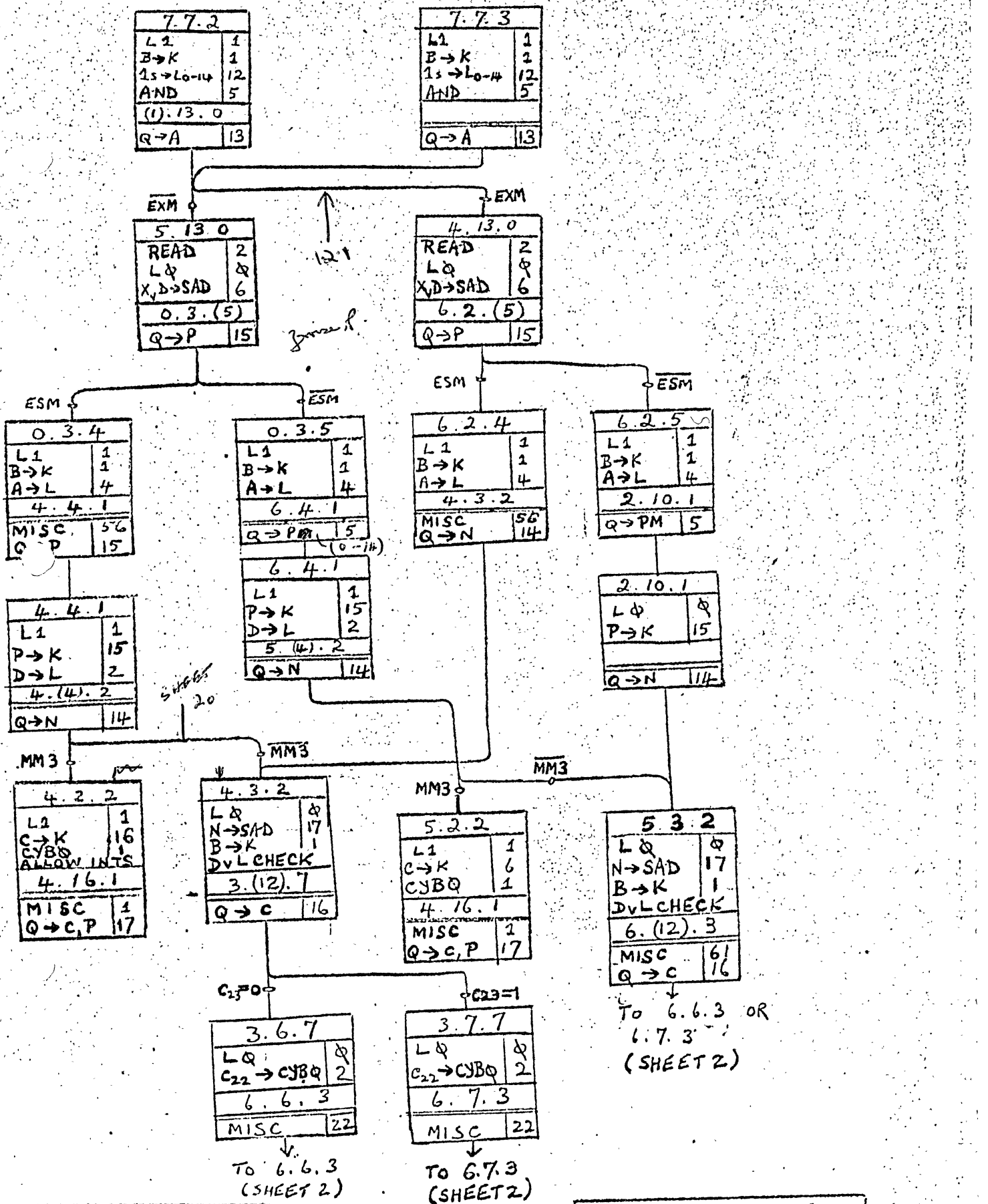
5. 0 → C22.

	CONDITIONS	Y	N
X1	EXM	4	5
Y4	MM3	2	3
Z2	HR	2	0

MISCELLANEOUS	
1	SET MON MODE
3	SEE 'PREP OF ORDER'
20	IF M23=1, 1→C22; 0→Q23
45	SIGN EXTEND, A13→L

SUBROUTINE ENTRY (RELATIVE)

FUNCTIONS 070 & 071



CONDITIONS		Y	N
X1	EXM	4	5
Y4	MM3	2	3
Y12	$C_{23} = 0$	6	7
Z5	ESM	4	5

MISCELLANEOUS	
1	SET MON. MODE
22	Q0 → ZS
56	SIGN EXTEND A14→L
61	K15 → ZS

FUNCTIONS 072 & 073

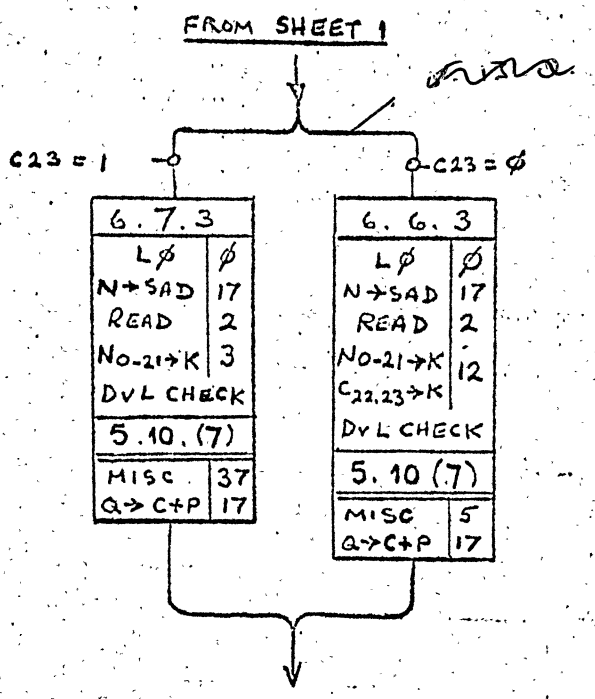
(SUBROUTINE EXITS)

SHEET 1 OF 2

1904/5 E&F

LS/101

SUB	ISS		
ACN	-		



MISCELLANEOUS	
3	SET MM STAT IF MM1. $B_{21-23} \rightarrow X$; $7 \rightarrow LINK_{7-9}$; $B_{17-20} \rightarrow LINK_{3-6}$; $B_{14-16} \rightarrow LINK_{0-2}$; $B_{12,13} \rightarrow N_{22,23}$ v. $3 \rightarrow N_{22,23}$ RESET 'A' STAT. CHECK FOR INTERRUPT
5	$Ø \rightarrow C22$
37	$1 \rightarrow C23$

CONDITIONS		Y	N
Z2	HES. REQUEST	2	Ø

FUNCTIONS 072 & 073

SUBROUTINE EXITS

SHEET 2 OF 2

SUB	ISS	1	
ACW		0906	

CONDITIONS		Y	N
X1	EXM	4	5
Y2	YES (SUCCESS JUMP)	Ø	1
Y4	MM 3	2	3
Z1	EJM	Ø	1
Z2	HES. REQUEST	2	Ø
Z7	HES. REQUEST	5	4

7.7.4	
L1	1
C → K	16
(1)(2)	1
MISC	44
Q → C+P	17

FROM FØ76 v FØ77 (104)

7.7.5	
L1	
C → K	
(1).(2).1	
MISC	44
Q → C, P	17

MISCELLANEOUS	
1	SET MONITOR MODE F/F
3	SET MM F/F IF MM1. B_{21-23} → X. 7 → LINK 7-9 B_{17-20} → LINK 3-6 B_{14-16} → LINK Ø-2. B_{12-13} → N22,23 OR 3 → N22,23. CHECK FOR INTERRUPT. RESET 'A' STAT
33	INHIBIT Q→C IF MM3
44	X=2v4, Ø → C23 ; X=7, INVERT C23; Ø → C22; YES → CYBØ
45	SIGN EXTEND A13 → L

FØ75 (104)

EXM — YES

EXM — YES

EXM — YES

EXM — YES

FØ75 (104)

4.Ø.1	
LØ	Ø
N → SAD	17
READ	2
$N_{Ø-21}$ → K	12
$C_{22,23}$ → K	
5.1Ø.(7)	
Q → C+P	17

4.1.1	
LØ	Ø
C → SAD	3
READ	2
DVL CHECK	
5.1Ø.(7)	

5.1.1	
LØ	Ø
C → SAD	3
READ	2
DVL CHECK	
5.1Ø (7)	

5.Ø.1	
LØ	Ø
N → SAD	17
READ	2
$N_{Ø-21}$ → K	12
$C_{22,23}$ → K	
DVL CHECK	
1 (4)(7)	
MISC	33
Q → C+P	17

To 5.10.4
OR 5 10 5
(SHEET 80)

HR — MM3

1.2.4	
L1	1
C → K	16
CYBØ	1
DVL CHECK	
ALLOW INTS	
[4.16.1]	
MISC	1
Q → C	16

HR — MM3

1.3.4	
L1	1
BF → K	17
DF → L	3
MISC	3
(Ø)(Ø)(Ø)	
Q → A+N	1Ø

HR — MM3

1.2.5	
LØ	Ø
ALLOW INTS	
[2.5.5]	

HR — MM3

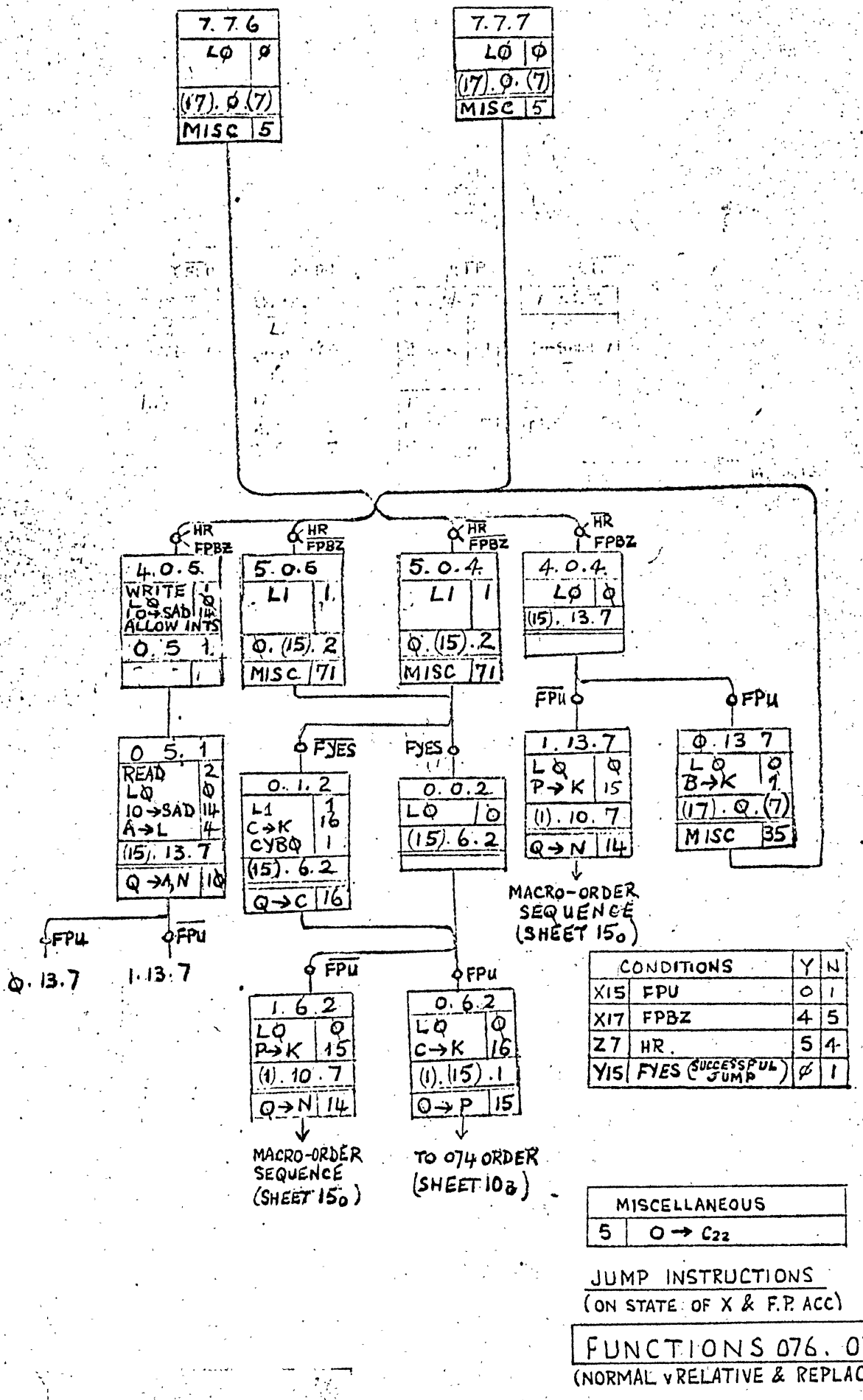
1.3.5	
LØ	Ø
ALLOW INTS	
[2.5.5]	

2.5.5	
LØ	Ø
C → SAD	3
READ	2
1.(4)(7)	

FUNCTIONS Ø74 & Ø75

CONDITIONAL JUMP INSTRUCTIONS
(ON STATE OF X, V AND C)
(NORMAL v RELATIVE)

SUB	ISS	1
ACW	-	0906



1904/5 E & F LS/104

SUB S		1
ACW	-	0906
CHANGE NO	-	96-100
DATE	26/9/67	28/11/67
ACD	7803	.

7.10.0	
LI	1
$N_{0-21} \rightarrow K$	3
$C_{22} \rightarrow$ CYBO	2
5.16.6	
MISC	5
Q→B	7

7.10.1	
LI	1
X,D→SAD	6
PAUSE	3
B→K	1
A→L	4
$C_{22} \rightarrow$ CYBO	2
D,L CHECK	
5.16.6	
MISC	10
Q→B	7

7.10.2	
LI	1
$\bar{A} \rightarrow L$	10
$\bar{C}_{22} \rightarrow$ CYBO	3
5.16.6	
MISC	5
Q→B	7

7.10.3	
LI	1
X,D→SAD	6
PAUSE	3
B→K	1
$\bar{A} \rightarrow L$	10
$\bar{C}_{22} \rightarrow$ CYBO	3
D,L CHECK	
5.16.6	
MISC	10
Q→B	7

7.10.4	
LI	1
$N_{0-21} \rightarrow K$	3
$C_{22} \rightarrow$ CYBO	2
5.16.6	
MISC	20
Q→B	7

7.10.5	
LI	1
X,D→SAD	6
PAUSE	3
B→K	1
A→L	4
$C_{22} \rightarrow$ CYBO	2
D,L CHECK	
5.16.6	
MISC	20
Q→B	7

7.10.6	
LI	1
$\bar{A} \rightarrow L$	10
$\bar{C}_{22} \rightarrow$ CYBO	3
5.16.6	
MISC	7
Q→B	7

7.10.7	
LI	1
X,D→SAD	6
PAUSE.	3
B→K	1
$\bar{A} \rightarrow L$	10
$\bar{C}_{22} \rightarrow$ CYBO	3
D,L CHECK	
5.16.6	
MISC	7
Q→B	7

5.16.6	
LI	1
X,D→SAD	6
WRITE	1
C→K	16
CYBO	1
D,L CHECK	
ALLOW INTS	
[4.16.1]	
Q→C,P	17

ALSO USED IN GRPS 0, 2, 12, 17.

MISCELLANEOUS	
5	$0 \rightarrow C_{22}$
7	if $M_{23} \neq M_{24}$, $1 \rightarrow C_{22}$; $0 \rightarrow Q_{23}$
10	$0 \rightarrow C_{22}$; IF $M_{24} \neq M_{23}$, $1 \rightarrow C_{23}$
20	$M_{23} \rightarrow C_{22}$ (IF 1), $0 \rightarrow Q_{23}$

NB.

PAUSE = READ PAUSE.

LITERALS

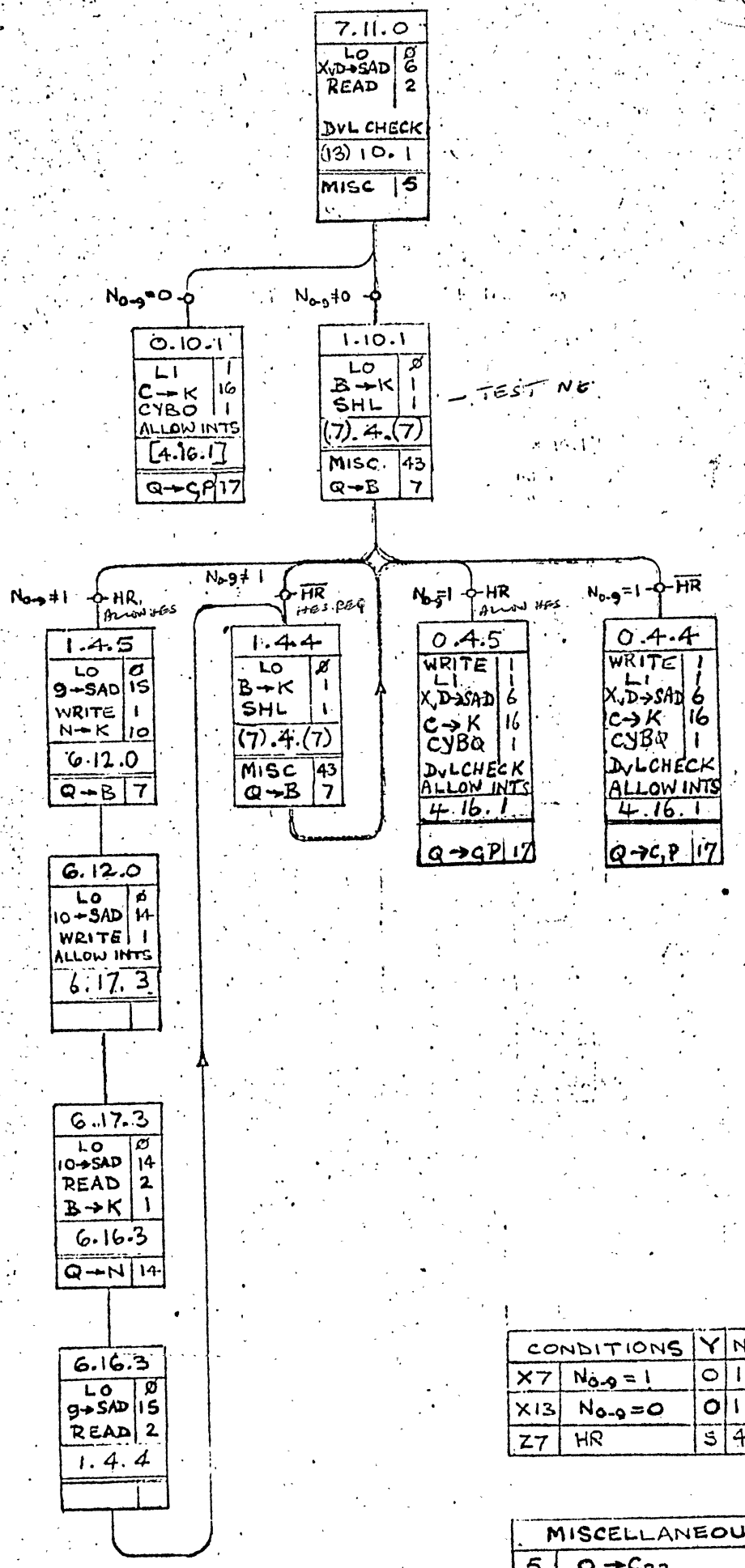
GROUP 10

110

1904/5 E & F

LS/110

ISS	ISS		
DRAWN	-		
CHANGE NO	-		
DATE	26/9/67		
ACD	7803		



CONDITIONS		Y	N
X7	$N_{0-9}=1$	0	1
X13	$N_{0-9}=0$	0	1
Z7	HR	5	4

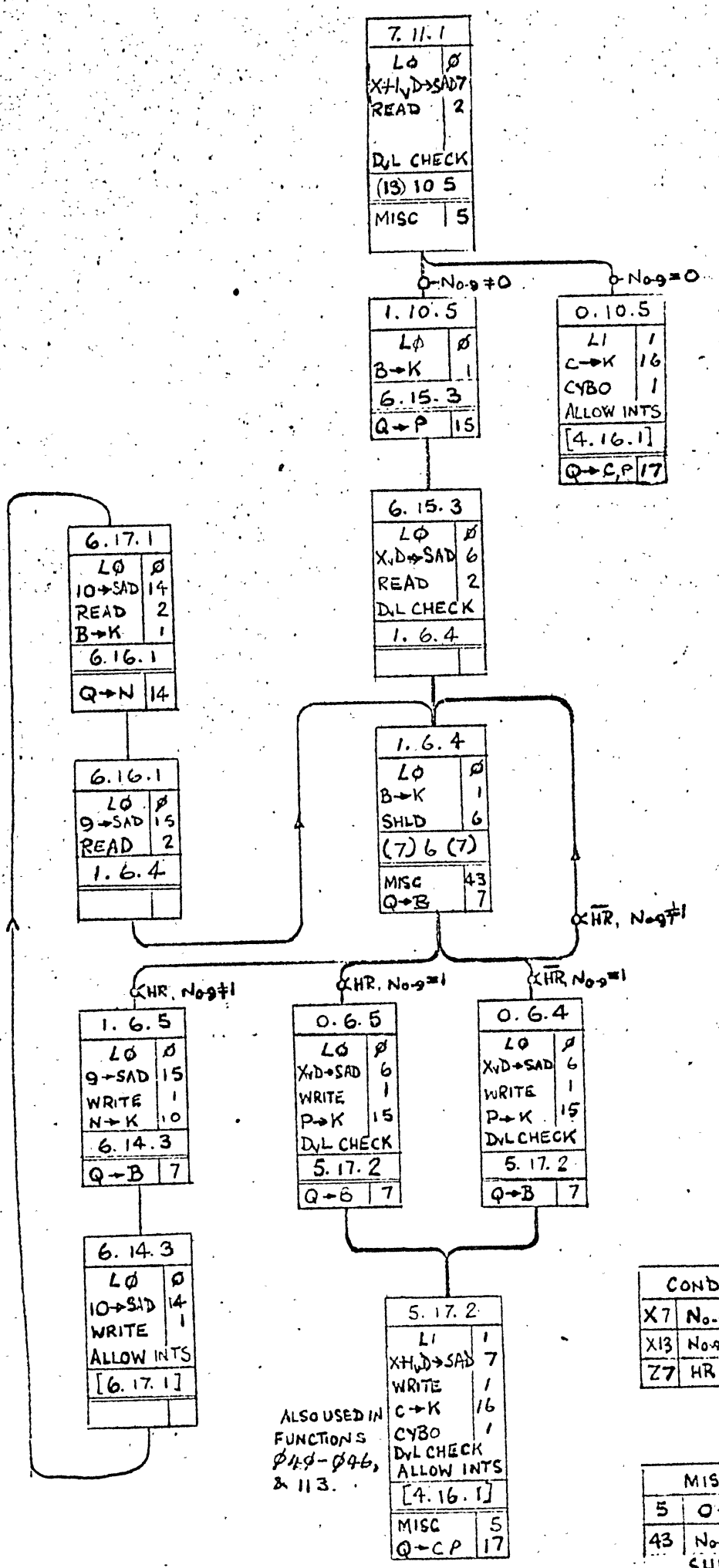
MISCELLANEOUS	
5	$0 \rightarrow C_{22}$
43	$N_{0-9}-1 \rightarrow N_{0-9}$

SHIFT LEFT (SL)

FORCE 110

1904/5 E&F LS/120

SUB	ISS	1
ACW		0917



CONDITIONS		Y	N
X7	No-9=1	0	1
X13	No-9=0	0	1
Z7	HR	5	4

MISCELLANEOUS	
5	0→C22
43	No-9 - 1 → No-9

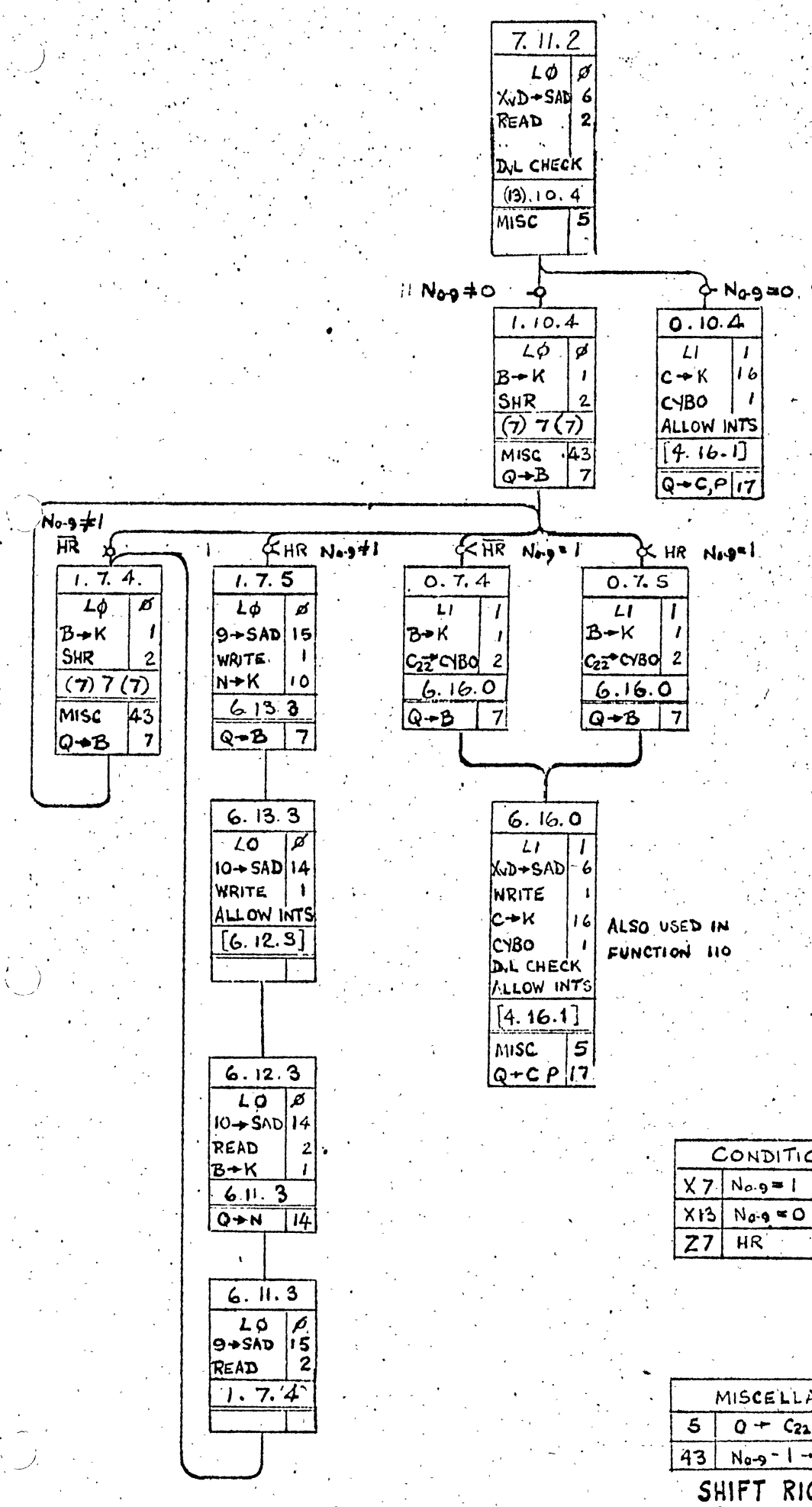
SHIFT LEFT (DL)

FUNCTION 111

1904/5 E&F

LS/12

SUB	ISS		
ACW			
CHANGE NO			
DATE	24/9/63		
ACD	7803		



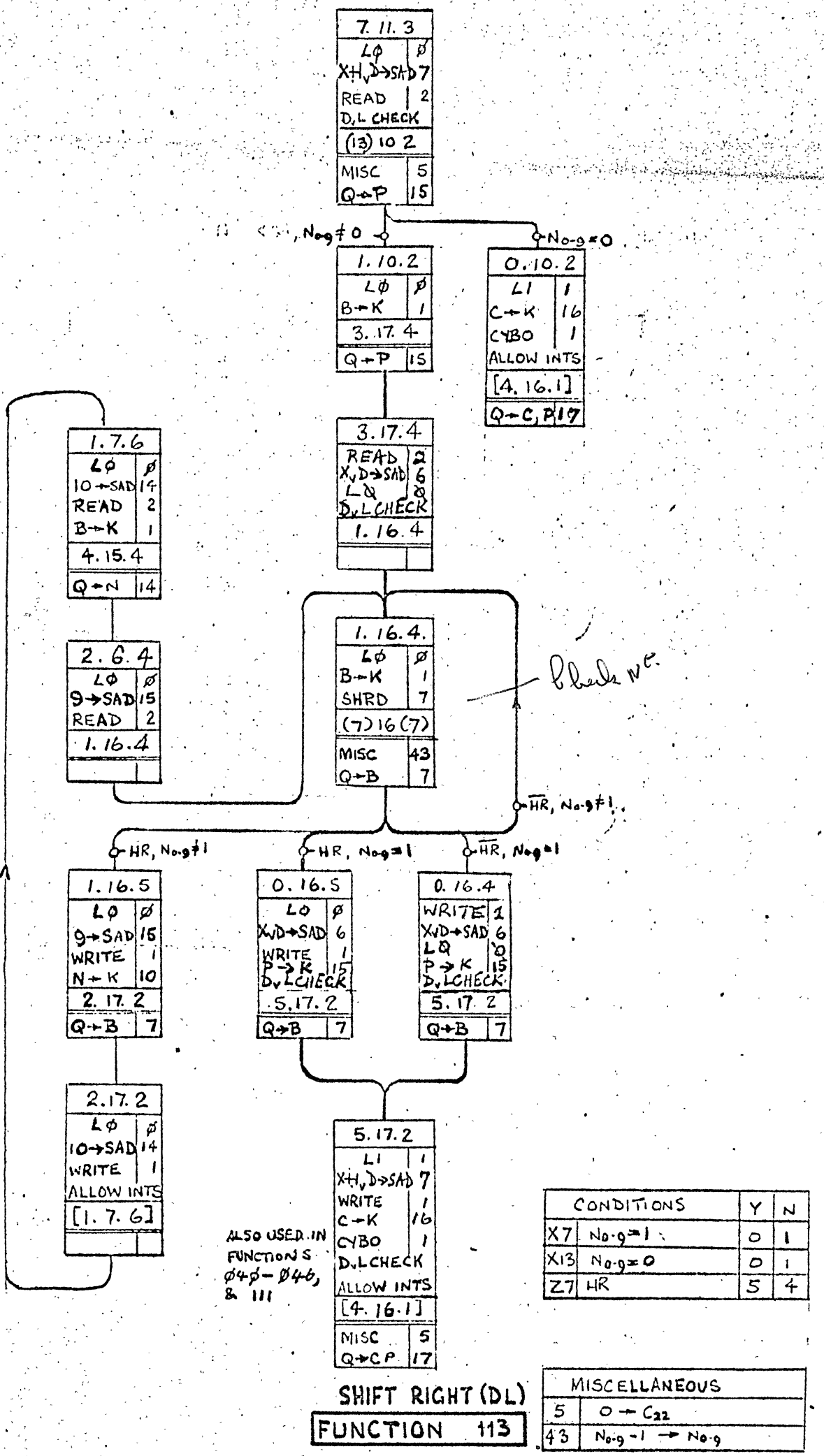
CONDITIONS		Y	N
X7	No-9 = 1	0	1
X13	No-9 = 0	0	1
Z7	HR	5	4

MISCELLANEOUS	
5	0 → C_{22}
43	No-9 - 1 → No-9

SHIFT RIGHT (SL)

FUNCTION 112

SUB	ISS		
ACW			



1904/5 E&F LS/123

SUB	ISS	1		
ACN	-	0906		

CONDITIONS		Y	N
X6	MT=0	2	3
X7	N=1	0	1
X13	No-9=0	0	1
Y5	$Q_{22}=Q_{23}$	4	5
Y1	$C_{23}=0$	6	7
Z2	HR	2	0
Z4	N11=0	4	0

7.11.4
LØ Ø
XvD→SAD 6
READ 2
DvLCHECK
(13) (12) 0
MISC 13
Q→A 13

$C_{23}\neq0$ No-9≠0
1.7.0
LØ Ø
CYBO 1
2.5.1
Q→A P 11

$C_{23}=0$ No-9=0
0.6.0
LØ Ø
B→K 1
0.15.6

$C_{23}\neq0$ No-9=0
0.7.0
LØ Ø
B→K 1
0.15.6

$C_{23}=0$ No-9≠0
1.6.0
LØ Ø
5.16.3
Q→P 15

FUNCTION 115

2.5.1
LI 1
B→K 1
A→L 10
AND 5
2.17.(4)
MISC 31
Q→B 7

5.16.3
L2 2
B→K 1
(6) 5 (4)

FUNCTION 115

N11=0
2.17.4
LØ Ø
B→K 1
SHRD 7
2.16.4
Q→B 7

N11≠0
2.17.0
LØ Ø
0.15.6
Q→B 7

2.16.4
L1 1
XvD→SAD 6
WRITE 1
No-8→K 11
CYBQ 1
DvLCHECK
ALLOW INTS
2.13.4
MISC 30
Q→A 13

2.13.4
LØ Ø
A→L 4
2.12.4
Q→N 14

2.12.4
LØ Ø
2.15.4
MISC 30

2.15.4
LØ Ø
5.15.7
MISC 13
Q→A 13

SHEET 2

N11≠0 MT=0
2.5.0
LØ Ø
0.15.6
Q→B 7

N11≠0 MT≠0
3.5.0
LØ Ø
0.15.6
Q→B 7

N11=0 MT=0
2.5.4
L2 2
P→K 15
(6).16.0

N11=0 MT≠0
3.5.4
L2 2
B→K 1
1.(5) (2)
MISC 26

MT=0
2.16.0
LØ Ø
0.15.6
Q→B

MT≠0
3.16.0
L2 2
B→K 1
1 (5) (2)
MISC 26

TO SHEET 2

HR $Q_{22}=Q_{23}$ N=1
0.4.2
LØ Ø
0.15.6
Q→B 7

HR $Q_{22}\neq Q_{23}$ N=1
0.5.2
LØ Ø
0.15.6
Q→B 7

HR $Q_{22}=Q_{23}$ N=1
0.4.0
LØ Ø
0.15.6
Q→B 7

HR $Q_{22}\neq Q_{23}$ N=1
0.5.0
LØ Ø
0.15.6
Q→B 7

1.4.0
FROM SHT 1

0.15.6
LØ Ø
XvD→SAD 6
WRITE 1
C→K 16
DvLCHECK
6.2.3
MISC 32
Q→C 16

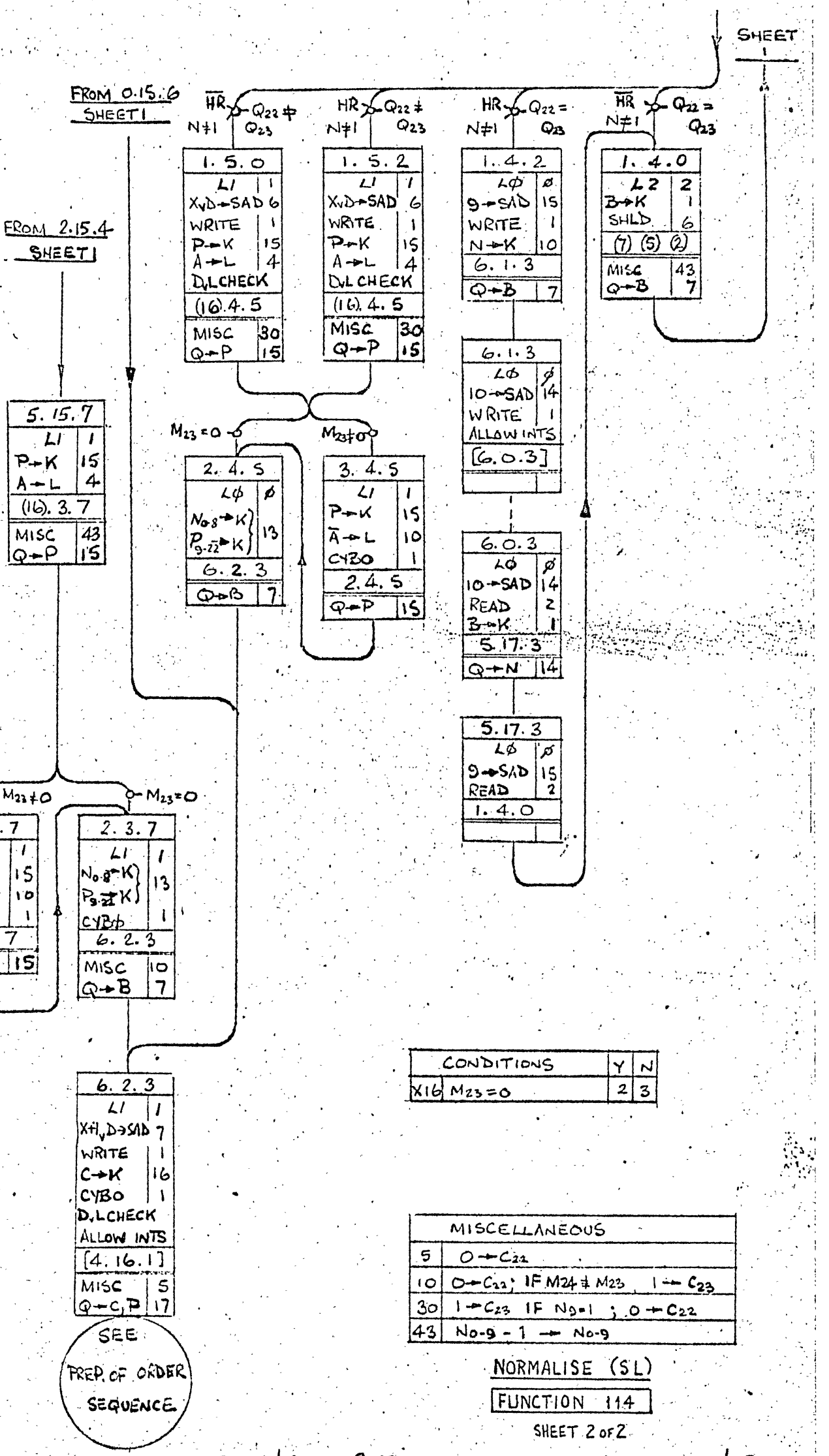
MISCELLANEOUS	
13	1→L8
26	SET Nt=2, LEAVE REST OF N
30	1→C_{23} IF N_9=1 ; 0→C_{22}
31	SET Nt=3, LEAVE REST OF N
32	0→Q_{23}

NORMALISE (SL)
FUNCTION 114
SHEET 1 OF 2

1904/5 E&F

LS/124

SUB	ISS	1	2
ACV	-	0906	0942



CONDITIONS		Y	N
X16	$M_{23}=0$	2	3

MISCELLANEOUS	
5	$0 \rightarrow C_{22}$
10	$0 \rightarrow C_{22}$; IF $M_{24} \neq M_{23}$ $1 \rightarrow C_{23}$
30	$1 \rightarrow C_{23}$ IF $N_{0-9}=1$; $0 \rightarrow C_{22}$
43	$N_{0-9} - 1 \rightarrow N_{0-9}$

NORMALISE (SL)

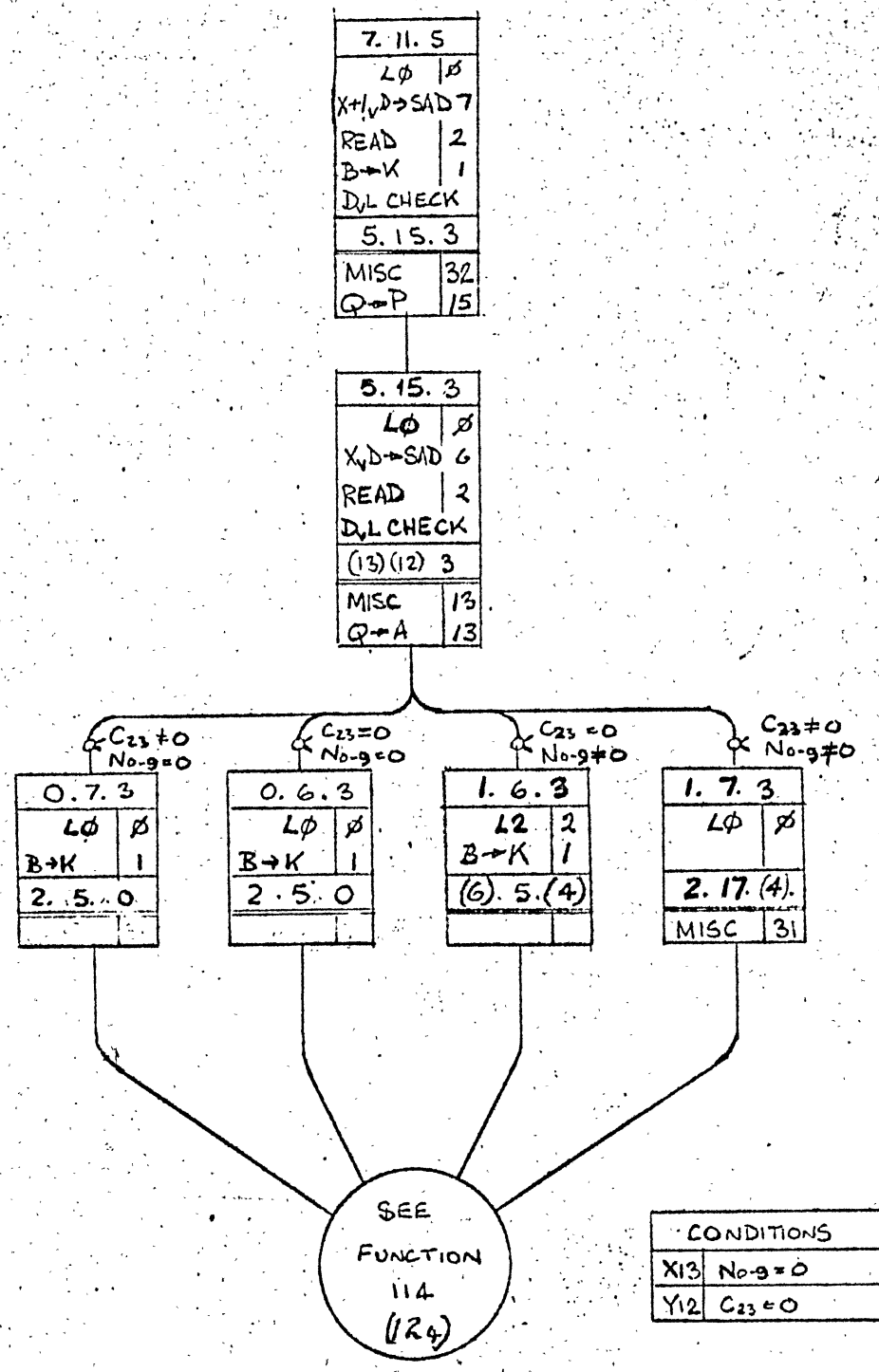
FUNCTION 114

SHEET 2 OF 2

1904/5 E & F

LS/12s

SUB	ISS		
ACN	-		



CONDITIONS		Y	N
X13	No-9=0	0	1
Y12	C_{23}=0	6	7

MISCELLANEOUS	
13	1 → L8
31	SET Nt=3, LEAVE REST OF N
32	0 → Q23

NORMALISE (DL)

FUNCTION 115

1904/5 E&F LS/126

SUB	155	1
ACW	-	0906
HANGE No	-	96-100
DATE	26/9/67	28/11/67
ACD	7803	-

116 Transfer N digits from X_K & X^*_K

STORE

$X_K = X_K + N$ X_K Final Address

$X^*_K = X^*_K + N$ X^*_K Final Address + 1

READ	2
L Q	Q
X+1, D → SAD	7
C → K	16
DYL CHECK	
(1). 11. 5	
MISC	43
Q → P	15

destination address

- count - 1

- C in A → B.

EXM

5. 11. 5	
L Q	Q
No-8 → K	11
5. 12. 3	
MISC	36
Q → A	13

count

not $N^t = 0$

count in A.

5. 12. 3	
L Q	Q
A → L	4
SHR	2
1. 16. 6	
Q → A	13

Count digits & words

shift right once = 2.

1. 16. 6	
L Q	Q
A → L	4
SHR	1
6. 3. 2	
Q → A	13

A = word count

6. 3. 2	
L1	1
BSM → K	7
D → L	2
6. 5. 5	
Q → N	14

B0-14 → K

destination address + data

6. 5. 5	
L Q	Q
N → SA-D	17
N → K	14
A → L	4
CH	7
DL CHECK	1
1. 3. 1	
Q → N	114

check destination + data

1. 3. 1	
L1	1
N → SAD	17
BSM → K	7
D → L	2
ALLOW INTS	
DYL CHECK	
3 14 6	
Q → P	15

destination + data + count - 1

3 14 6	
READ	2
L1	1
X+D → SAD	6
BSM → K	7
D → L	2
DYL CHECK	
0. 16. 3	
Q → N	114

check destination + data + count - 1

initial destination address + data

source address

source + data

To 0. 16. 3 (SHEET 12a)

EXM

4. 11. 5	
L Q	Q
BSM → K	7
1. 3. 3	
Q → C	116

1. 3. 3	
L Q	Q
P → K	15
Q. 14. 3	
Q → B	7

Q. 14. 3	
WRITE	1
L1	1
10 → SA-D	14
No-8 → K	11
CYB Q	1
ALLOW INTS	
1. 10. 3	
Q → P	15

1. 10. 3	
READ	2
L Q	Q
X+D → SAD	6
BSM → K	7
DYL CHECK	
1. 14. 3	
Q → N	14

To 1. 14. 3 (SHEET 12a)

CONDITIONS		Y	N
X1	EXM SET	4	5

MISCELLANEOUS	
14	add 1 to L22
34	24 → N(0-9): set $N_t = 1$
36	Set $N_t = 0$
43	$N_{0-9} - 1 \rightarrow N_{0-9}$

TRANSFER CHARACTER(S)

FUNCTION 116

SHEET 1 of 3

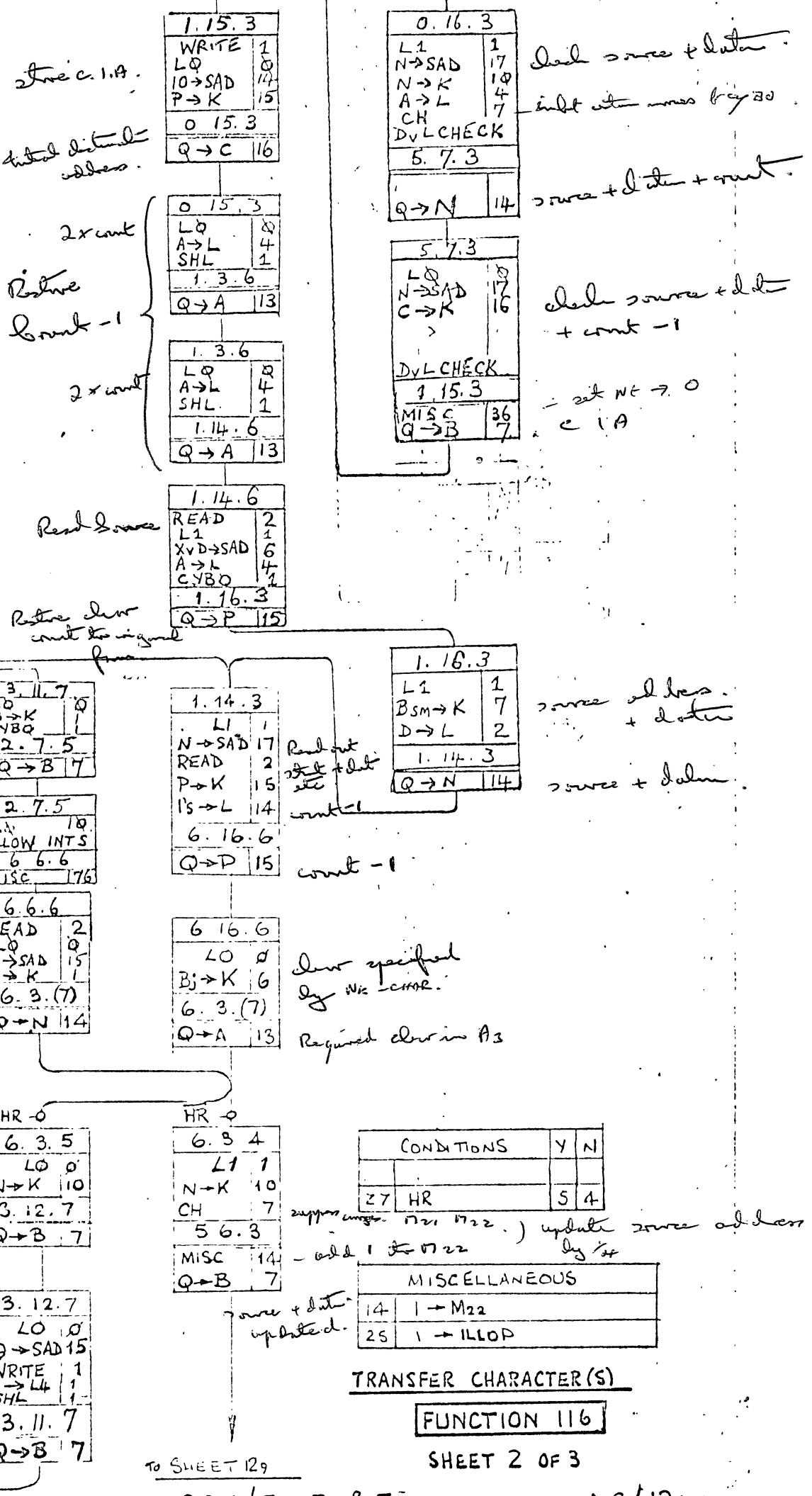
1904/5 E & F

LS/127

SUB	ISS		
ACN	-		

FROM 1.10.3
SHEET 127

FROM 3.14.6
(SHEET 127)



FROM 6.15.6
SHEET 3

TO SHEET 129

SHEET 2 OF 3

1904/5 E & F LS/123

SUR	ISS		
ACW	-		

FROM 6.3.4
SHEET 12B

CONDITIONS	Y	N
X6' MT=0	2	3

MISCELLANEOUS
14 1 → M22

5.6.3
LØ Ø
C→K 16
5.14.7
Q→N 14
destination address.

5.14.7
LØ Ø
B→K 1
1.5.4
Q→C 16
Updated source address.

1.5.4
RP 3
N→SAD 17
LØ Ø
A→L 4
FANQ 3
1.5.5
Q→Bj 3
Read out destination address. A30 writes this.
Write into B

1.5.5
WRITE 1
N→SAD 17
L2 2
P→K 15
(6).17.6
Write Load B to store word
is not 0

MT≠0 MT=0

3.17.6
L1 1
N→K 10
CH 7
6.7.6
MISC 14
Q→B 7
destination address
Updated destination address

2.17.6
L1 1
N→K 10
CH 7
(1) 4.3.
MISC 14
Q→B 7
+1 destination address
destination address

6.7.6
LØ Ø
C→K 16
6.15.6
Q→N 14
Updated source address

6.15.6
LØ Ø
B→K 1
1.14.3
Q→C 16
Updated destination address

EXM

5.4.3
LØ Ø
D→L 2
3.6.1.
Q→A 13
data →

EXM

4.4.3
LØ Ø
6.13.6.
Q→A 13

3.6.1.
L1 1
B→K 1
A→L 10
CYBO 1
6.13.6.
Q→B 7
validate final destination address +¼ - last time

6.13.6
WRITE 1
X+1, D→SAD 7
L1 1
C→K 16
A→L 10
CYBO 1
DYLCHECK
6.12.6
Q→B 7
Write away relative final address.
relative source address. +1/4

6.12.6
WRITE 1
X,D→SAD 6
LØ Ø
DYLCHECK
6.11.6
Write away relative source address +1/4

6.11.6
L1 1
10→SAD 14
READ 2
B→K 1
CYBO 1
ALLOW INTS
[4.16.1]
Q→CIP 17
Read out CIA add 1
Next CIA.

SEE PREP. OF ORDER SEQUENCE

SHEET 2

TRANSFER CHARACTERS

FUNCTION 116

SHEET 3 OF 3

SUB	ISS		
ACW	-		

117 ORDER AND MODIFICATION OF IT

SHEET 1 OF 2

117 ORDER

7.11.7 | LI 1 | N→K 10 | D→L 2 | (1).4.2 | Q→N 14

EXM → 4.4.2 | LØ Ø | A→L 4 | 5.4.2 | Q→N 14

EXM → 5.4.2 | LI 1 | N→SAD 17 | READ 2 | C→K 16 | CYBØ 1 | DVL CHECK | 6.4.5.6 | Q→N 14

HR → 6.10.5 | LØ Ø | ALLOW INTS | Q.5.6

Q.5.6 | L1 1 | C→K 16 | CYBQ 1 | 6.10.(7) | Q→N 14

6.4.6 | LØ Ø | B_SM→K 7 | 6.10(7) | Q→A 13

HR → 6.10.4 | LØ Ø | N→SAD 17 | READ 2 | N→K 10 | DVL CHECK | 6.7.(5) | MISC Q→CP 67 17

Read next instruction

Set A stat. next instruction CP

ESM → 6.7.4 | LI 1 | B_F→K 17 | A→L 4 | 6.(14).1 | Q→N 14

ESM → 6.7.5 | L1 1 | B_F→K 17 | A→L 4 | 5.(14).Q | MISC Q→N 66 14

TO SHEET 12₁₁

MODIFICATION FOLLOWING 117 ASTAT 54

0.17.0 | LØ Ø | D_F→L 3 | 1.13.4 | Q→P 15

1.13.4 | LI 1 | M_YD→J 2 | READ 2 | P→K 15 | A→L 19 | CYBQ 1 | 2.13(14) | Q→N 14

read modifier — destination

2.13.1 | LØ 0 | N 0-21 →K 3 | 6.1(5) | Q→A

ESM → 6.1.4 | L1 1 | B→K 1 | Ā→L 1Ø | CYBØ 1 | 6.7.7 | MISC Q→A 4 13

ØESM → 6.1.5 | LI 1 | B_SM→K 7 10 | Ā→L | CYBQ 1 | 6.10.6 | MISC Q→B 4 7

6.10.6 | LQ Q | B_SM→K 7 | 6.7.7 | Q→A 13

6.7.7 | L1 1 | P→K 15 | A→L 4 | 6.10.3 | MISC Q→N 4 14

0.13.2 | LQ Q | N 0-21→K 3 | 3.4.7 | Q→A 13

3.4.7 | LQ Q | C→K 16 | (Ø)(Ø)(Ø) | Q→P 15

6.10.3 | LØ 0 | N→K 10 | T 15 14 14 | 0.13.2 | Q→N

Read Pre-modifier + 1 → C to N

Pre-modified N address

Pre-modified N address

Pre-modified N address

Set A stat. next instruction CP

A 14 bit Pre-Mod

If allowed set

Pre-mod → N

Pre-mod → B

Pre-mod into A

Pre-mod into P

Pre-modified +N +PARAM.

Jump to link to address eg.

Destroys N address of subroutine

Destroys N + bits of N

N bit stat.

CONDITIONS		Y	N
X1	EXM	4	5
25	ESM	4	5

MISCELLANEOUS	
24	SAME AS MISC 3 EXCEPT THAT "A" STAT NOT RESET
56	SIGN EXTEND A14→L
66	SUPPRESS CARRY TO BIT 15
67	SET 'A' STAT IF 'A' STAT NOT SET: SET ILLOP IF 'A' SET
4	SUPPRESS CARRY M(21-22)

072 ORDER

6.3.1 | LQ Q | A→L 4 | 6.12.7 | Q→P 15

6.12.7 | L1 2 | B→K 1 | 1s→L 0-14 12 | AND 5 | 1.2.Q | MISC Q→A 35 13

To 1.2.0 SHEET 12₁₁

N bit stat.

NORMAL

6.0.1 | L1 1 | N→K 10 | DF→L 3 | (Q).(Ø).(Ø) | MISC Q→A, N 24 10

REP JUMP

6.2.1 | L1 1 | B_F→K 17 | D_F→L 3 | 5.16.2 | MISC Q→N 35 14

5.16.2 | READ 2 | L1 1 | N→SAD 17 | B→K 1 | A→L DL 4 | (1).11.0 | Q→B 7

TO SHEET 12₁₁

REL. JUMP

6.1.1 | LQ Q | A→L 4 | 1.16.2 | Q→N 14

TO SHEET 12₁₁

EJM. ± literal N

Pre mod → N

CONDITION		Y
Y14	Normal	Ø
	Rel. Jump	1
	Rep. Jump	2
	072-3order	3

1904/5 E&F

LS/12 10

SUB	ISS	1
ACW		0942

E.S.M.

FROM 6.7.5 (SHEET 12₁₀)

NORMAL | 072 ORDER | REP. JUMP | REL. JUMP

5.0.0
L1 1
N→K 1Q
Df→L 3
(Q). (Q). (Q)
MISC 24
Q→A, N 1Q

5.3.Q
L1 1
A→L 4
4.5.1
MISC 56
Q→P 15

4.5.1
L Q Q
Bsm→K 7
1.2.(1)
MISC 35
Q→A 13

5.2.Q
L1 1
Bf→K 17
Df→L 3
2.1Q.Q
MISC 35
Q→N 14

2.1Q.Q
READ 2
L1 1
N→SAD 17
B→K 1
A→L 4
DLCHECK
(1). 11.0
MISC 56
Q→B 7

5.1.0
L1 1
A→L 4
1.16.2
MISC 56
Q→N 14

FROM 6.1.1

1.16.2
L Q Q
Bf→K 17
6.17.6
MISC 35
Q→A 13

N→K

6.12.7.

EJM | EJM

1.2.1
L1 1
P→K 15
A→L 4
(1). 13.0
Q→A 13

To 4.13.0 OR 5.13.0 IN 072 ORDER (SHEET 10₂) 101

1.2.0'
L1 1
P→K 15
A→L 4
6.4.5
MISC 56
Q→A 13

P ± N

6.4.5
L Q Q
Df→L 3
4.16.0
Q→N 14

To 4.16.0 IN PREP. OF ORDER FOR EJM JUMPS

5.16.2

EXM | EXM

4.11.0
L Q Q
B→K 2
(Q). (Q). (Q)
Q→A, N 1Q

5.11.0
L1 1
B→K 1
D→L 2
(Q). (Q). (Q)
Q→A, N 1Q

N + Pre word +1 → A+N

6.17.6
L1 1
N→K 1Q
A→L 4
4.17.3
MISC 45
Q→A 13

4.17.3
L1 1
C→K 16
A→L 4
(Q). (Q). (Q)
Q→A, N 1Q

A = Pre word ± N

Pre word ± N + Present letter No

CONDITIONS		Y	N
X1	EXM	4	5
Z1	EJM	Q	1
Y14	Normal	Q	
	072 Order	3	
	Rep. Jump	2	
	Rel Jump	1	

MISCELLANEOUS	
24	SAME AS 3 EXCEPT A STAY NOT RESET
35	Set link
45	sign extend $A_{13} \rightarrow L$
56	sign extend $A_{14} \rightarrow L$

117 ORDER
SHEET 2 OF 2

1904/5 E&F

LS/12₁₁

SUB	ISS.		
ACW	-		

NULL 123

7.12.3	
L1 C→K	1 16
CYBØ	1
ALLOW INTS	
4.16.1	
MISC Q→CP	57 17

7.12.4	
LØ No-8→K	Ø 11
SHL	1
2.1.(4)	
Q→B	7

HR

2.1.0	
LØ	Ø
1⅓→L	14
5.13.4	
Q→N	14

HR

2.1.2	
WRITE	1
9→J	15
ALLOW INTS	
Q.7.6	

5.13.4	
L1	1
B→K	1
SHL	1
5.12.4	
Q→B	7

0 7.6	
READ	2
9→J	15
2.1.0	

5.12.4	
LQ	Q
B→K	1
SHL	1
0.12.1	
Q→B	7

MODE 125

CONDITION	Y	N
X1 EXM	4	5
Y4 HR	2	Ø

7.12.5	
L1	1
C→K	16
CYBO	1
(1).13.2	
MISC Q→CP	5 17

0.12.1	
LQ	Q
Bj→K	6
4.13.4	
MISC Q→A	17 13

EXM

EXM

4.13.2	
LO	Ø
A→L	4
ALLOW INTS	
[4.16.1]	
MISC	46

5.13.2	
LO	Ø
N→K	10
ALLOW INTS	
[4.16.1]	
MISC	22

4.13.4	
LQ	Q
Bj→K	6
4.12.4	
MISC Q→P	17 15

4.12.4	
LO	Ø
4.11.4	
Q→B	7

4.11.4	
LO	Ø
A→L	4
FANQ	3
6.11.4	
MISC Q→Bj	17 3

6.11.4	
LO	Ø
P→K	15
FANQ	3
5.16.6	
MISC Q→Bj	5 3

120 ANY

7.12.0	
L1	1
XvD→J	6
RP	3
B→K	1
A→L	4
AND DVLCHECK	5
5.16.6	
MISC Q→B	5 7

121 ORN

7.12.1	
LO	Ø
XvD→J	6
RP	3
N_{0-21}→K	3
DVLCHECK	
4.10.4	
MISC Q→P	5 15

4.10.4	
LQ	Q
B&P→K	5
5.16.6	
Q→B	7

122 ERN

7.12.2	
L1	1
XvD→J	6
RP	3
B→K	1
A→L	10
EQU	4
DVLCHECK	
5.16.6	
MISC Q→B	5 7

5.16.6	
L1	1
XvD→J	6
WRITE	1
C→K	16
CYBO	1
DVL CHECK ALLOW INTS	
[4.16.1]	
Q→CP	17

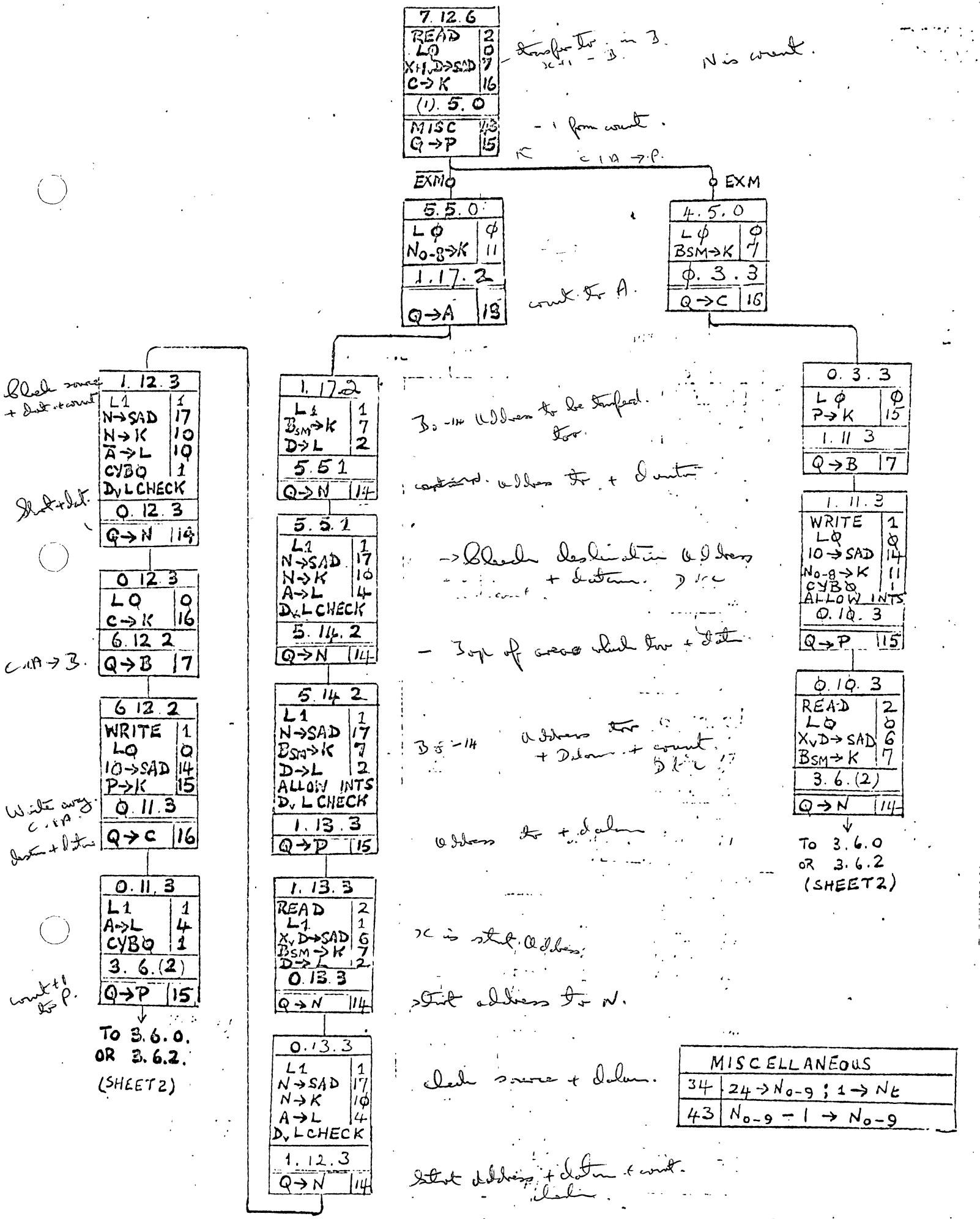
ALSO USED IN GRPS Ø,2,10,17

MISCELLANEOUS	
5	O→C_{22}
17	RCH-1→RCH
25	SET ILLOP
57	SET MM IF X=7&MM2,3,4
22	Q_0→ZS
46	Q3-5→G3-5, QØ→25

FUNCTIONS 120-5

1904/5 E&F LS/130

SUB	ISS	1
ACN		00421



CONDITIONS		Y	N
X1	EXM	4	5
X3	DvL FAIL	0	1

MISCELLANEOUS	
34	24 → No-9 ; 1 → Nt
43	No-9 − 1 → No-9

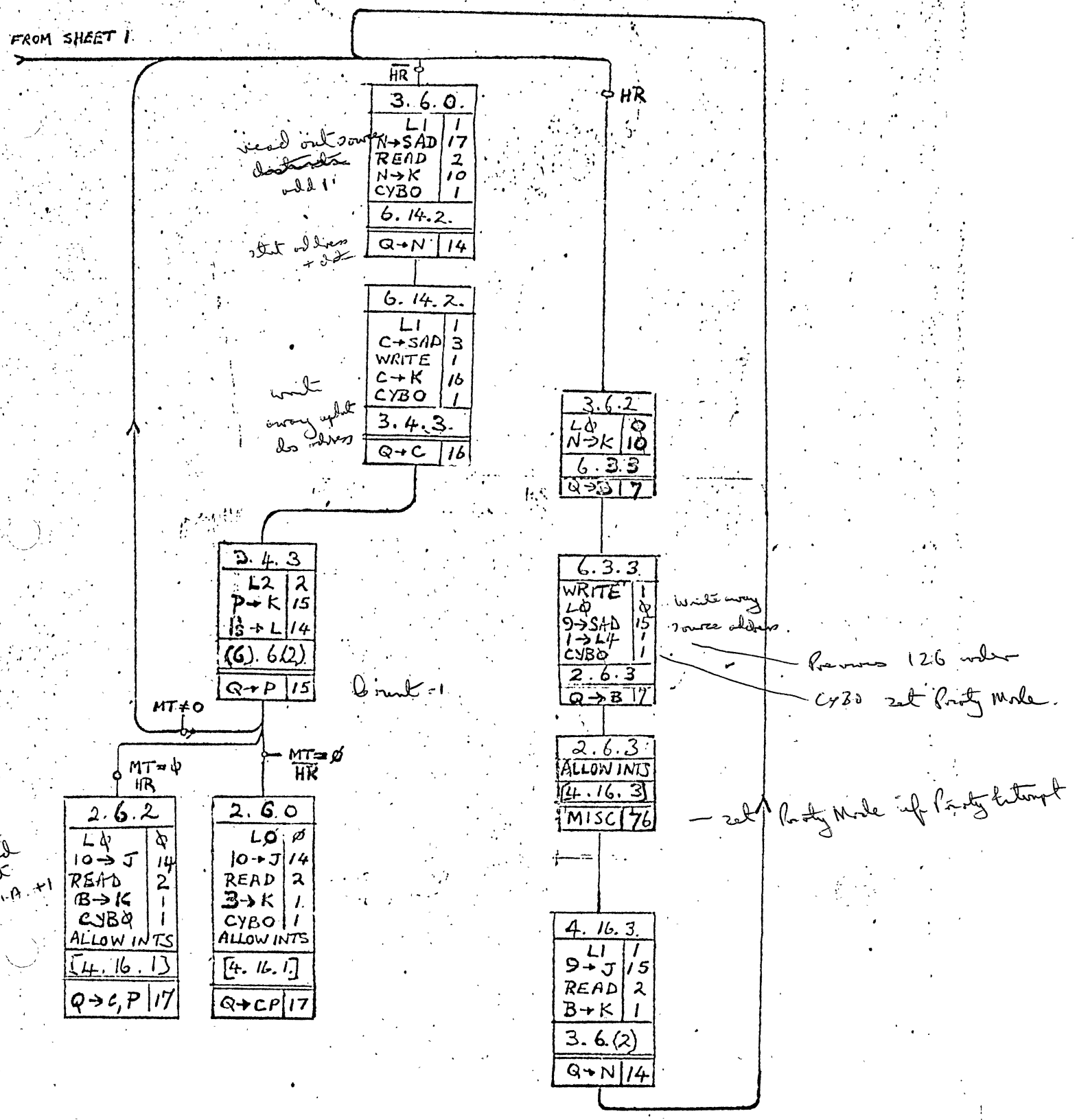
A.CUV —

1904/5 E&F

FUNCTION 126 (MOVE)
SHEET 1 OF 2

LS/131

FROM SHEET 1



read out source address add 1

start address + 1

write every split address

Read out C.U.A. +1

Write every source address

Bit 1 = 1

Removes 126 order

CYBO set Parity Mode

set Parity Mode if Parity Interrupt

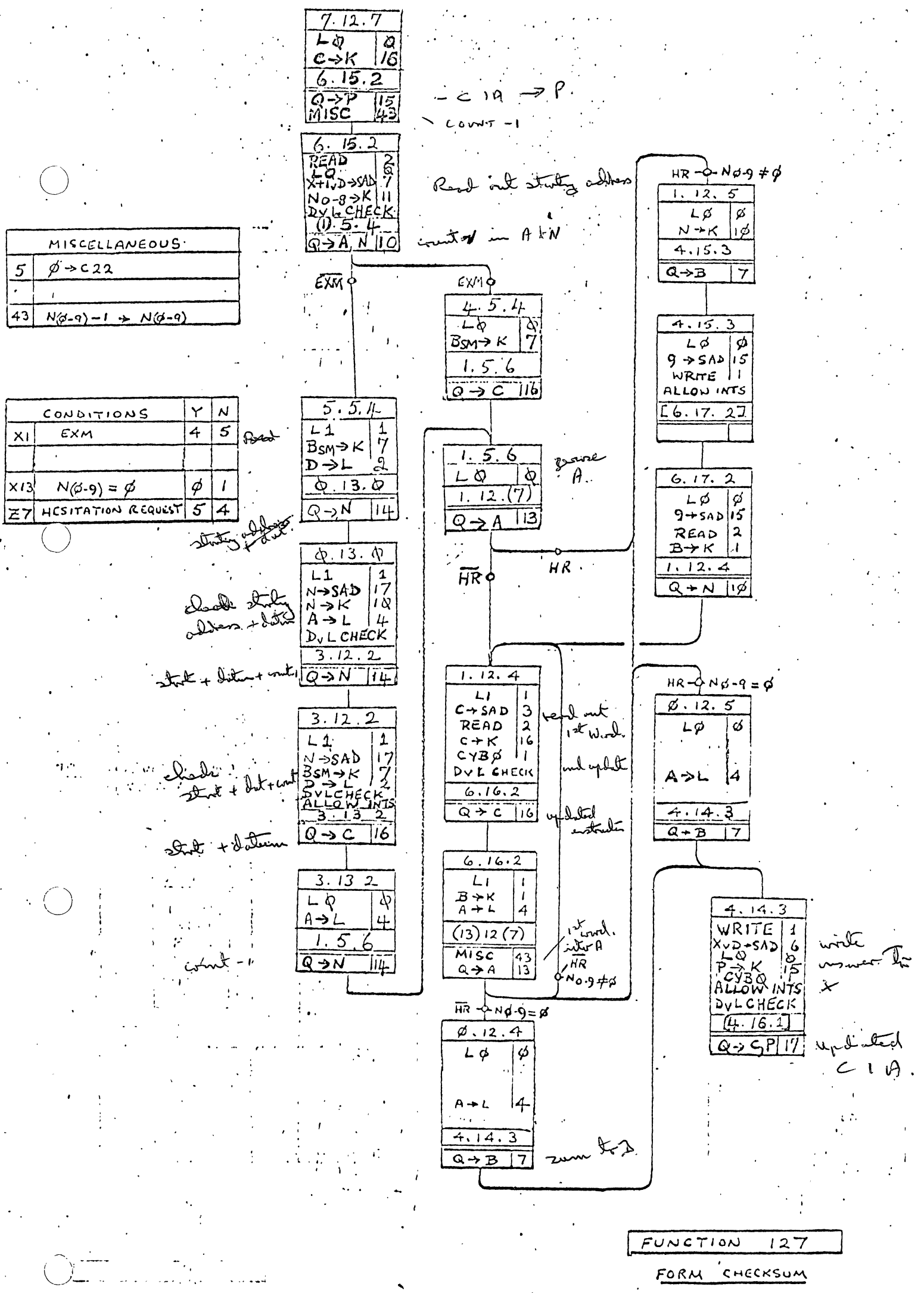
CONDITIONS		Y	N
X6	MT = Φ	2	3
Z2	HR	2	0

FUNCTION 126 (MOVE)

SHEET 2 OF 2

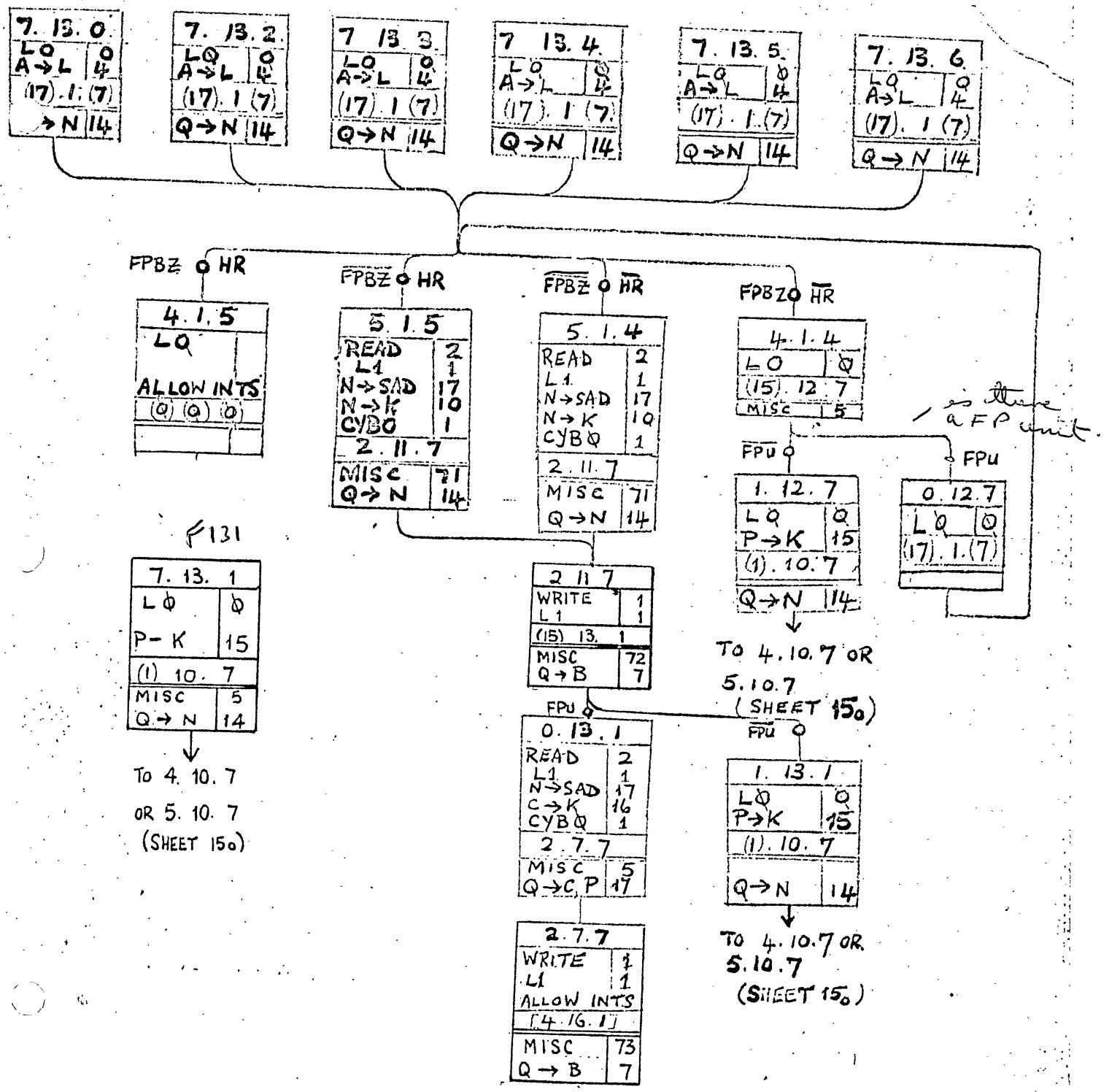
1904/5 E&F LS/132

SUB	ISS		
ACN	-		



1904/5 E&F LS/13

SUB	ISS		
ACW			



MISCELLANEOUS	
5	0→C22
71	LOAD FP F&X STATS
72	LOAD FP ARGUMENT
73	LOAD FP EXPONENT

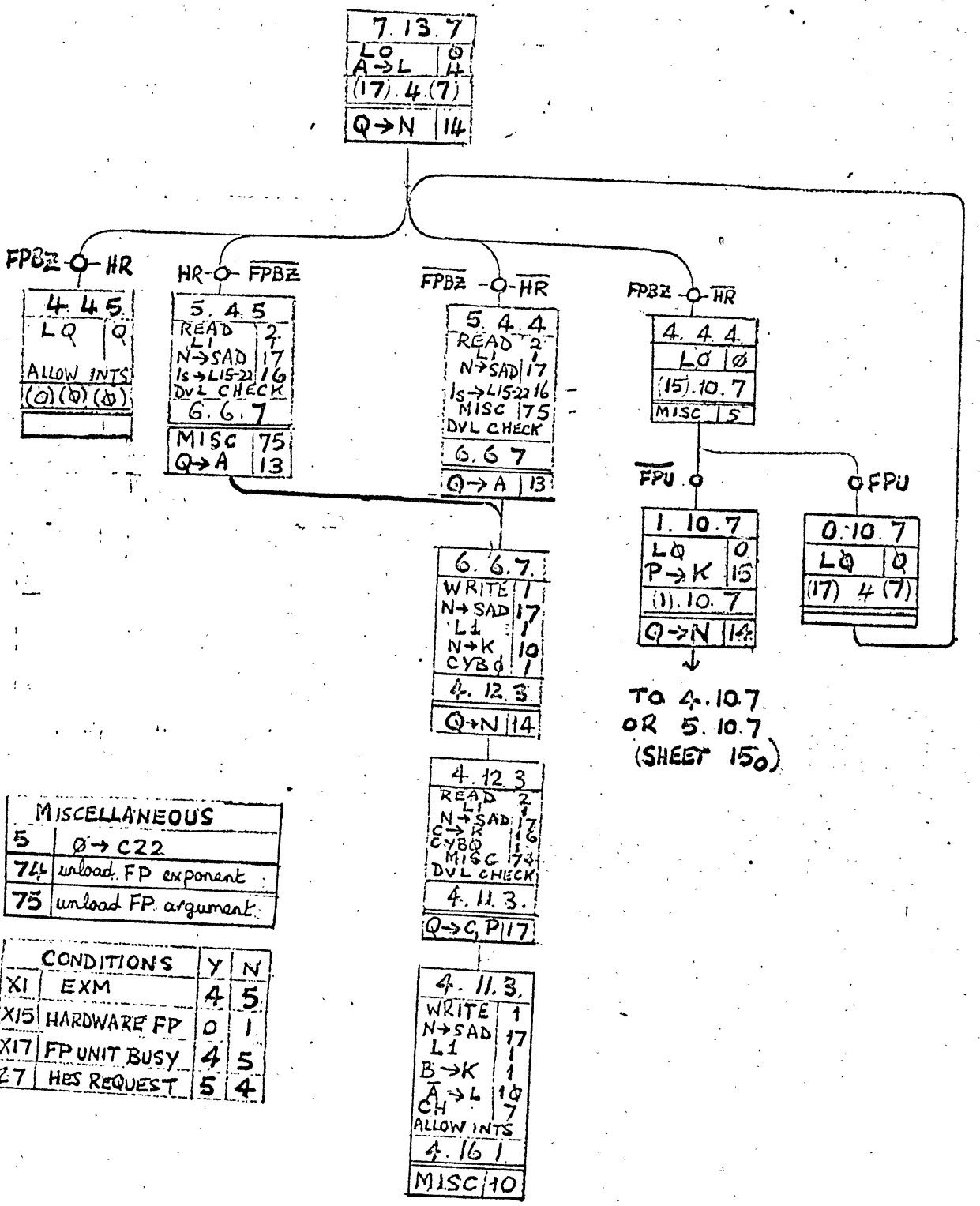
	CONDITIONS	Y	N
X1	EXM	4	5
X	HARDWARE FP	0	1
X17	FP UNIT BUSY	4	5
Z7	HESITATION REQUEST	5	4

4f = Floating Point Unit

FPBZ is forced

FUNCTIONS	130, 132, 133
	134, 135, 136

SUB	ISS	1	2
ACW	-	0906	0941



MISCELLANEOUS	
5	Ø→C22
74	unload FP exponent
75	unload FP argument

	CONDITIONS	Y	N
X1	EXM	4	5
X15	HARDWARE FP	0	1
X17	FP UNIT BUSY	4	5
Z7	HES REQUEST	5	4

1904/5 E&F

FUNCTION 137

LS/14₁

JB	ISS	WAS	1
ACW		14₂	0906
CHANGE NO			96-100
DATE	24/8/67		29/11/67
ACD	7803		-

Group (14) except (64) (150 & 151)

Group 15-16

7.14.0	
LØ	Ø
P→K	15
(1).10.7	
MISC Q→N	5 14

7.14.1 TO 7.14.7
7.15.3 TO 7.15.7
7.16.0 TO 7.16.3
7.16.5 AND 7.16.6
ARE SIMILAR TO 7.14.0 & 7.16.7

7.16.7	
LØ	Ø
P→K	15
(1).10.7	
MISC Q→N	5 14

FROM 076 & 077 ORDERS

FROM GRP13 — EXM — 4.10.7 | LØ Ø | 4.10.7. | 1

EXM — FROM GRP 13 V GRP 17

5.10.7	
LØ	Ø
N→J	17
READ	2
1→L4	1
(3).7.2.	
Q→P	15

Read out instruction
+20 → P

Party Mode

PM

0.7.2	
LØ	Ø
XVD→SAD	6
READ	2
DVLCHECK	
2.15.2	
MISC	62

3.4.0	
LØ	Ø
B→K	1
ALLOW INTS	
4.15.7	
MISC	55

4.15.7	
LØ	Ø
Is→L4 Is23	17
SHL	1
0.11.2	
Q→P	15

TO 0.11.2 IN 164 ORDER (SHEET 153)

PM

1.7.2	
LØ	Ø
2→J	16
WRITE	1
A→L	4
4 17 7	
Q→B	7

Write instruction to X2. N→3

2.7.6.	
LØ	Ø
1→J	1
WRITE SHLD	1 6
0.5.7.	

N enters for Qcc.1
P is now #40

0.5.7	
L1	1
C→K	16
CYBØ	1
3.14.3.	
Q→C	16

INTERRUPT SEQUENCE

Produces address of 129

Outputs address in N

Masking if in other program interrupts

Multi-frame sequence REG N 129 TO W

4. 17. 7	
LØ	Ø
1→L1 & Is→Lis-22	17
SHR	2
1. 17. 7	
MISC Q→N	13 14

1. 17. 7.	
L2	2
0. 15. 7	
MISC Q→N	2 14

0. 15. 7.	
L 2	2
N→K	10
Is→Lis-22	16
AND	5
(5) 7. 6.	

MT≠Ø 15-23 — MT=Ø 15-23

3. 7. 6	
WRITE	1
L1-53	1
P→K	15
CYBØ	1
Ø. 5. 7.	
Q→P	15

MISCELLANEOUS	
5	Ø→C22
2	SRIN→L: N→BAD
55	K20→ZS:
13	1→L8
76	SET PM etc.

CONDITIONS		Y	N
X1	EXM	4	5
X3	PM	0	1
X6	MT=Ø	2	3

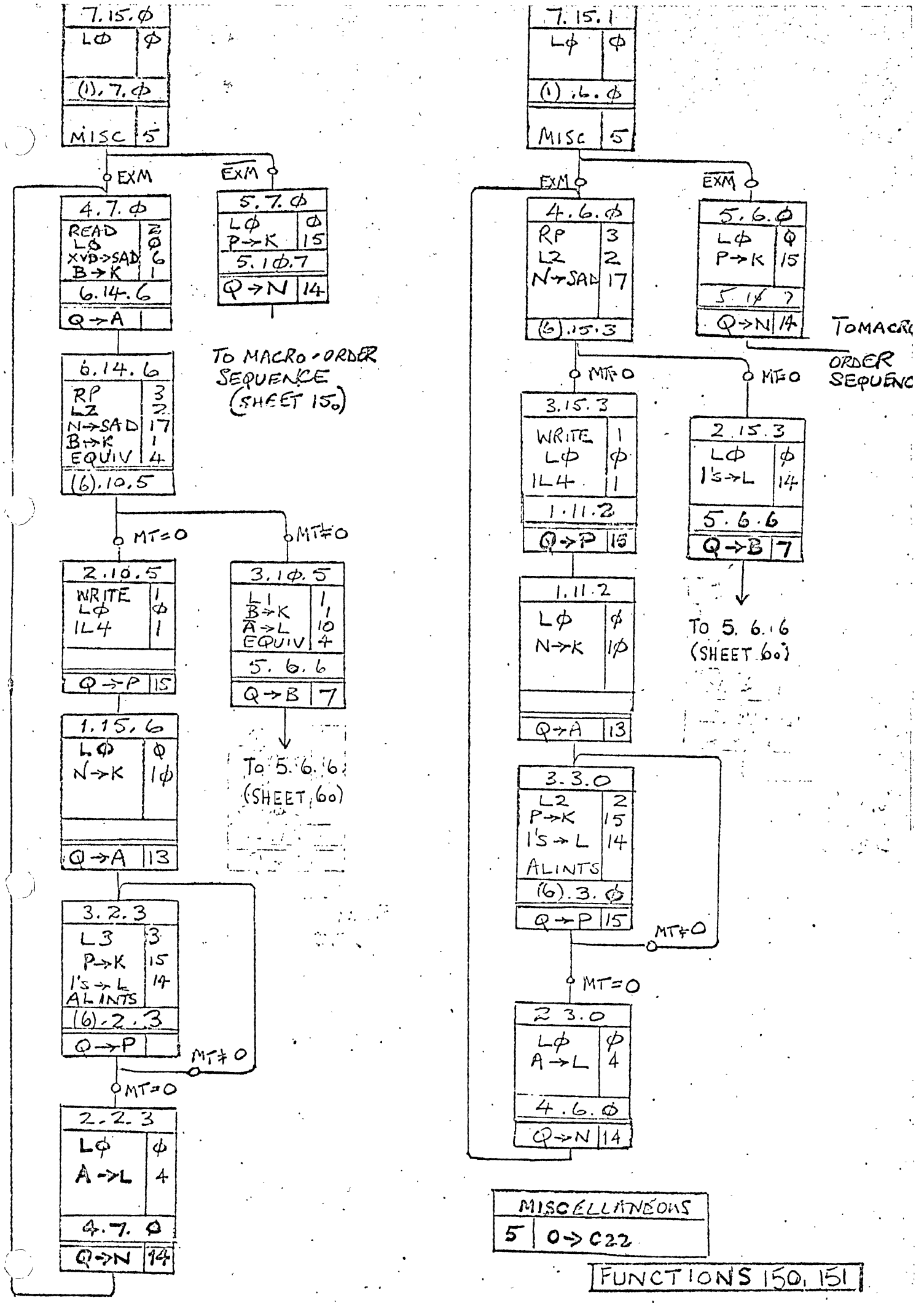
+21 → P

19

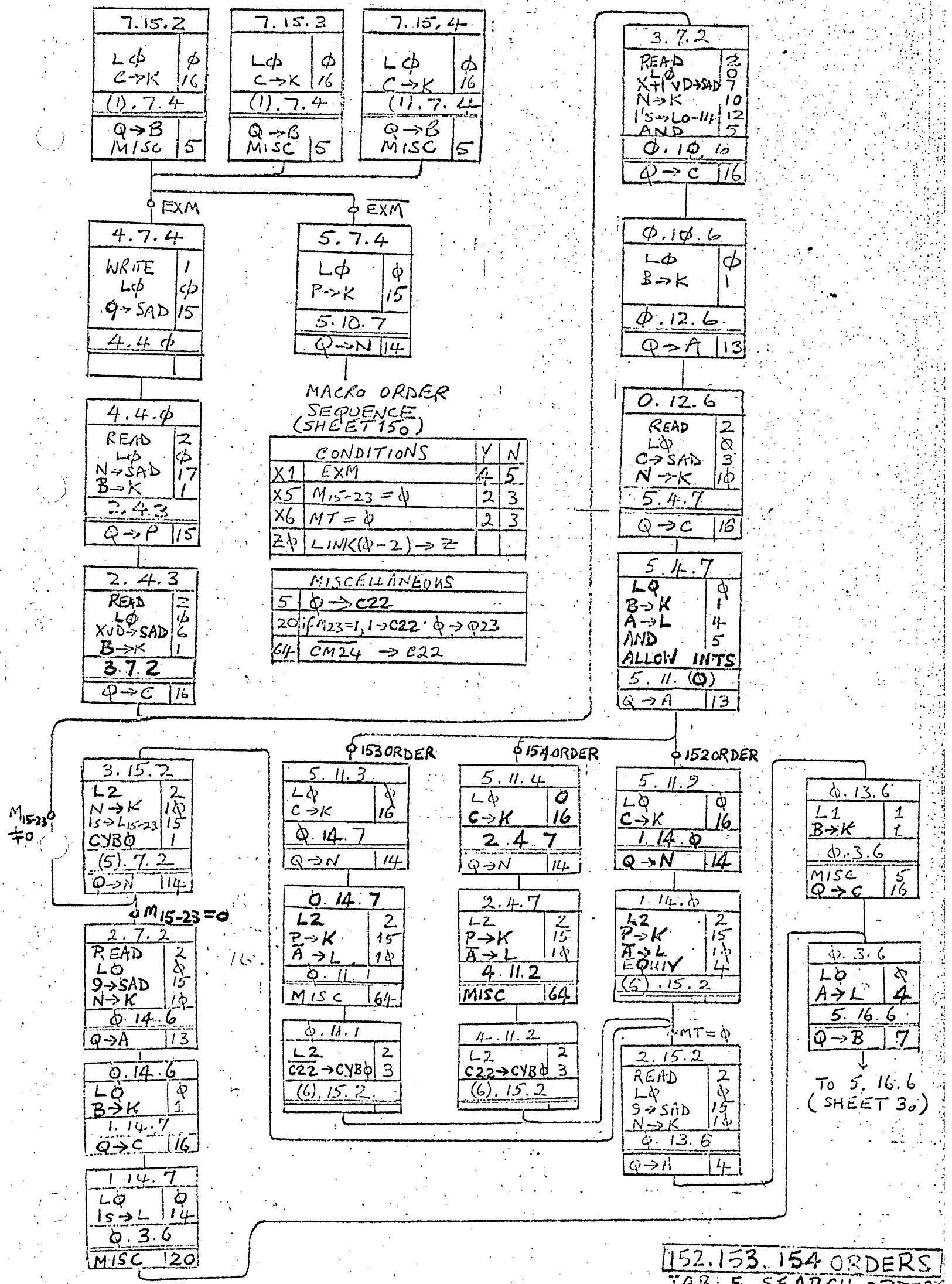
GROUPS 14, 15, 16 (MACRO-ORDERS) EXCEPT 150-2, 164

1904/5 E&F LS/150

S	ISS	1	
ACW	-	0906	
CHANGE No		96-100	
DATE	26/9/67	28/11/67	
ACD	7803	-	



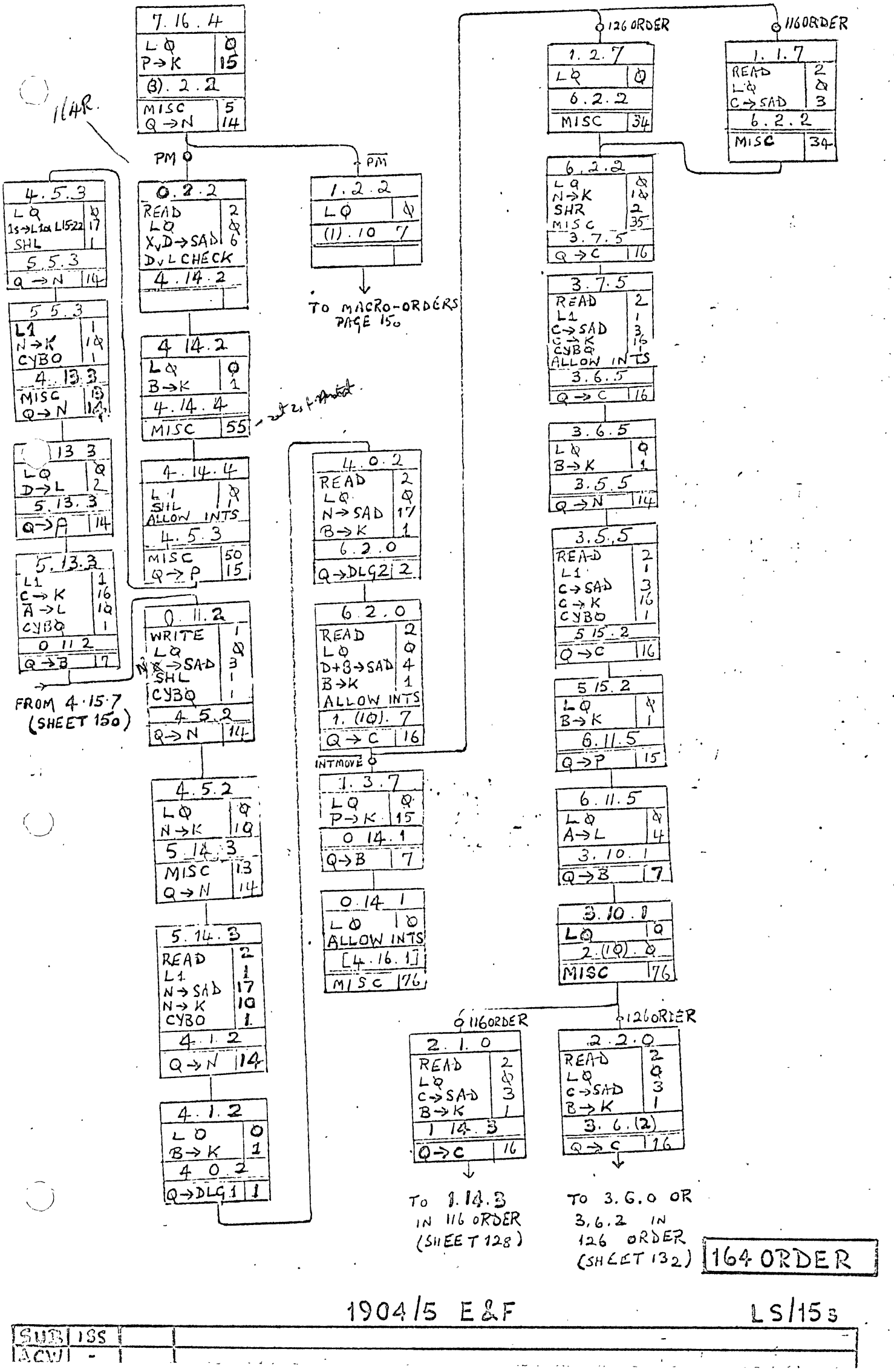
SUB	ISS	1
AGW	-	09061



152.153.154 ORDERS
TABLE SEARCH ORDERS

LS/152

SUB	ISS	1	
ACW	-	D90/6	



1904/5 E&F

LS/153

SUB	ISS		
ACW	-		

7.17.0	
LO	ø
CYBØ	1
SHL	1
(1).1.6	
MISC	5
Q→B	7

EXM — EXM

4.1.6.	
LØ	ø
B→K	1
SHL	1
(7).2.6.	
Q→B	7

N≠1 — N=1

1.2.6.	
L3	3
MISC	2
5.16.6.	
Q→B	7

5.16.6	
WRITE	1
L&	&
XvD→SAD	6
C→K	16
CYBØ	1
DvL CHECK	
ALLOW INTS	
4.16.1	
Q→C,P	17

ALSO USED IN GPS ø,2,10,12

0.2.6.	
L3	3
MISC	2
1.14.1	
Q→A	13

N → L
DELETE TIMER.
DELETE TIMER IN A.

1.14.1.	
LØ	ø
B→K	1
MISC	13
1.15.1.	
Q→N	14

N = #40H
256 + 4N = 260

1.15.1.	
L1	1
N→SAD	17
READ	2
B→K	1
A→L	4
DvL CHECK	
5.17.6	
Q→B	7

Update Print.

5.17.6	
WRITE	1
XvD→SAD	6
L&	&
DvL CHECK	
5.12.7	
0→B	7

Updated out to X
special Reg w/ X.

5.12.7	
WRITE	2
L1	1
N→SAD	17
C→K	16
CYBQ	1
ALLOW INTS	
4.16.1	
Q→C,P	17

Since B.

5.1.6	
LØ	ø
P→K	15
5.10.7	
Q→N	14

→ MACRO-ROUTINE (150)

5.0.6	
LØ	ø
P→K	15
5.10.7.	
Q→N	14

→ MACRO-ROUTINE (150)

7.17.1.	
LØ	ø
(1).0.6	
MISC	5
Q→B	7

EXM — EXM

4.0.6.	
L2	1
XvD→J	6
READ	2
B→K	1
MISC	2
DvL CHECK	
4.16.6.	

? must be optional

B →(2) K-BOUT.

N → BA,

N = special N-L as N=2 ms

4.16.6.	
L1	1
C→K	16
CYBØ	1
ALLOW INTS	
[4.16.1]	
Q→C,P	17

→ PREP OF ORDER (20)

MISCELLANEOUS	
2	SRIN→L, N→BAD
5	ø→C22
13	1→L8

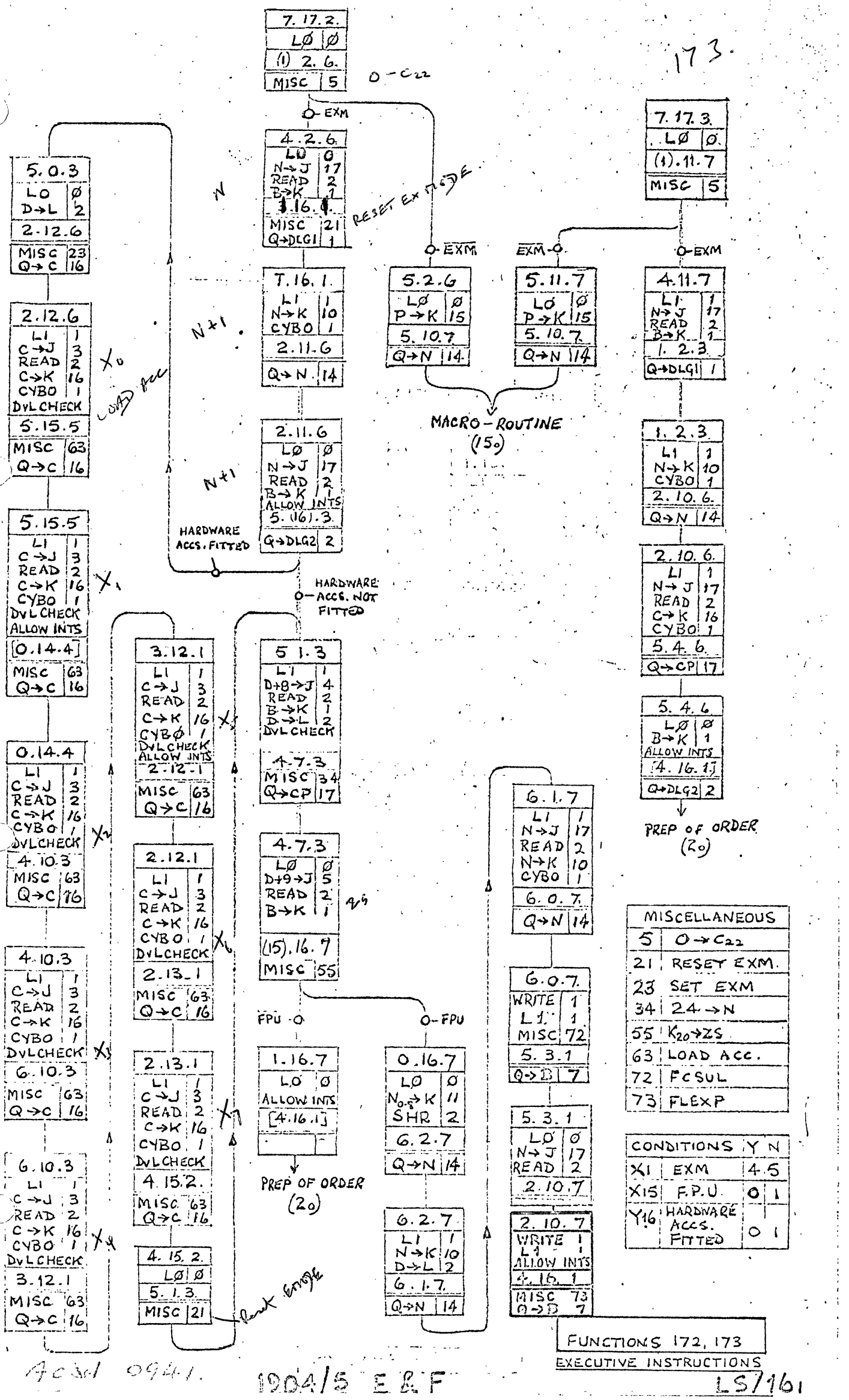
CONDITION		Y	N
X1	EXM	4	5
X7	No-9=1	0	1

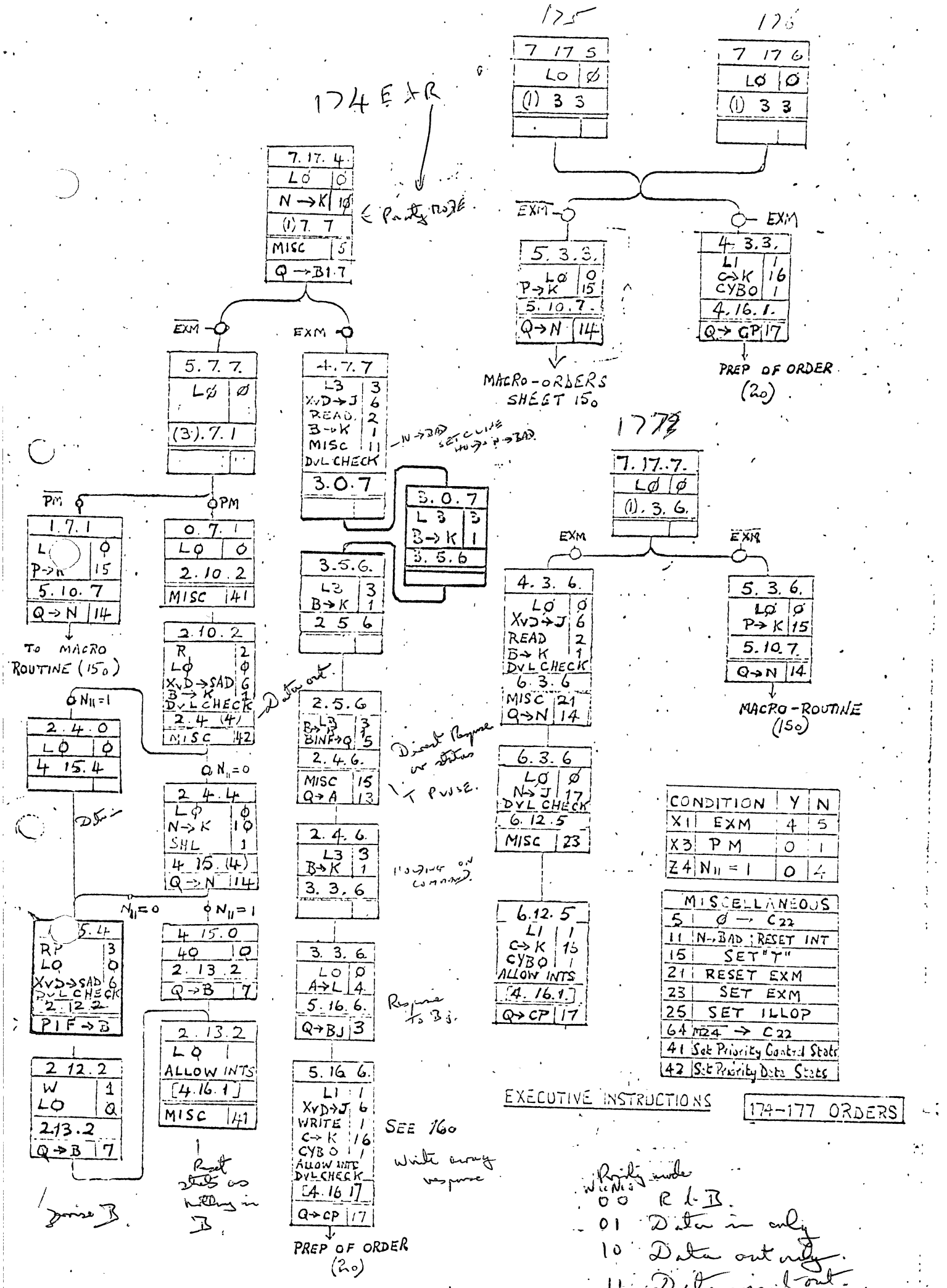
FONCTIONS 170, 171

171

1904/5 E&F LS/160

SUB	ISS		
ACW	-		


7.17.2. LØ Ø (1) 2.6. MISC 5
O-C22
EXM
4.2.6. LØ 0 N→J 17 READ 2 B→K 1 3.16.4. MISC 21 Q→DLG1 1
RESET EXTRACODE
N
N+1
T.16.1. LI 1 N→K 10 CYBO 1 2.11.6. Q→N 14
2.11.6. LØ Ø N→J 17 READ 2 B→K 1 ALLOW INTS 5.(16).3. Q→DLG2 2
N+1
HARDWARE ACCS. FITTED
HARDWARE ACCS. NOT FITTED
5.0.3. LO Ø D→L 2 2.12.6. MISC 23 Q→C 16
2.12.6. LI 1 C→J 3 READ 2 C→K 16 CYBO 1 DVL CHECK 5.15.5. MISC 63 Q→C 16
X0
LOAD Acc
5.15.5. LI 1 C→J 3 READ 2 C→K 16 CYBO 1 DVL CHECK ALLOW INTS 0.14.4. MISC 63 Q→C 16
X1
0.14.4. LI 1 C→J 3 READ 2 C→K 16 CYBO 1 DVL CHECK 4.10.3. MISC 63 Q→C 16
X2
4.10.3. LI 1 C→J 3 READ 2 C→K 16 CYBO 1 DVL CHECK 6.10.3. MISC 63 Q→C 16
X3
6.10.3. LI 1 C→J 3 READ 2 C→K 16 CYBO 1 DVL CHECK 3.12.1. MISC 63 Q→C 16
X4
3.12.1. LI 1 C→J 3 READ 2 C→K 16 CYBO Ø 1 DVL CHECK ALLOW INTS 2.12.1. MISC 63 Q→C 16
X5
2.12.1. LI 1 C→J 3 READ 2 C→K 16 CYBO 1 DVL CHECK 2.13.1. MISC 63 Q→C 16
X6
2.13.1. LI 1 C→J 3 READ 2 C→K 16 CYBO 1 DVL CHECK 4.15.2. MISC 63 Q→C 16
X7
4.15.2. LØ Ø 5.1.3. MISC 21
Rank Entry
5 1.3. LI 1 D+8→J 4 READ 2 B→K 1 D→L 2 DVL CHECK 4.7.3. MISC 34 Q→CP 17
4.7.3. LØ Ø D+9→J 5 READ 2 B→K 1 (15).16.7 MISC 55
4 Qs
FPU-O
O-FPU
1.16.7. LO Ø ALLOW INTS [4.16.1.] PREP OF ORDER (20)
0.16.7. LØ 0 N0.→K 11 SHR 2 6.2.7. Q→N 14
6.2.7. LI 1 N→K 10 D→L 2 6.1.7. Q→N 14
6.1.7. LI 1 N→J 17 READ 2 N→K 10 CYBO 1 6.0.7. Q→N 14
6.0.7. WRITE 1 L1 1 MISC 72 5.3.1. Q→D 7
5.3.1. LØ Ø N→J 17 READ 2 2.10.7.
2.10.7. WRITE 1 L1 1 ALLOW INTS 4.16.1. MISC 73 Q→D 7
7.17.3. LØ Ø (1).11.7 MISC 5
EXM
EXM
EXM
5.2.6. LØ Ø P→K 15 5.10.7. Q→N 14
5.11.7. LO Ø P→K 15 5.10.7. Q→N 14
MACRO-ROUTINE (15)
4.11.7. LI 1 N→J 17 READ 2 B→K 1 1.2.3. Q→DLG1 1
1.2.3. LI 1 N→K 10 CYBO 1 2.10.6. Q→N 14
2.10.6. LI 1 N→J 17 READ 2 C→K 16 CYBO 1 5.4.6. Q→CP 17
5.4.6. LØ Ø B→K 1 ALLOW INTS 4.16.1. Q→DLG2 2
PREP OF ORDER (20)
MISCELLANEOUS
5 O→C22
21 RESET EXM.
23 SET EXM
34 24→N
55 K20→ZS
63 LOAD ACC.
72 FCSUL
73 FLEXP
CONDITIONS Y N
X1 EXM 4 5
X15 F.P.U. 0 1
Y16 HARDWARE ACCS. FITTED 0 1
FUNCTIONS 172, 173
EXECUTIVE INSTRUCTIONS



EXECUTIVE INSTRUCTIONS

174–177 ORDERS

1904/5 E&F

LS/162

ISS	1	2	
ACN		0906	0941
CHANGE No	-	96-100	103-105/107
DATE	20/9/67	20/11/67	12/1/68
ACD	7803		-

MC HES

0.15.2
L3 | 3
4.16.2

4.16.2
L3 | 3
2.16.2

2.16.2
L3 | 3
0.15.1

MC HES

0.15.1	
L2	2
Z→SAD	13
RP	3
B→K	1
A_{0-14} L) / $\bar{A}_{0-14}$ L)	12
(14).14.2	
Q→B	7

Counter word zero.

Put 1 in SUBTRACT 1 FROM COUNT.

Counter word -1 Jump to 3.

CONDITIONS		Y	N
X2	WF	0	1
	WB	1	0
	CHF	2	0
X10	CWR	4	5
X14	$MT_{0-14}=0$	2	3
Y1	MCH	4	6
Y7	IN	0	1

MISCELLANEOUS.	
2	SRIN→L, N→BAD
12	1→BSTOP set CWR if RJ19.
14	1→M22
52	IFBSTOPSET, GATEL
53	RESET KP STAT
54	RESET KP STAT. IFBSTOP SET, GATE L

3.0.6
LOOP
STOP

3.1.6.
LOOP
STOP

$MT_{0-14} \neq 0$

3.14.2.	
LØ	Ø
Z→SAD	13
WRITE	1
(2)(7) 6.	

Write away updated count

$MT_{0-14} = 0$

2.14.2	
LØ	Ø
Z→SAD	13
WRITE	1
(2)(7) 6	
MISC	12

WORK FORWARD OR ENTER

COUNTER FORWARD

WF IN

0.0.6	
LI	1
Z+1→SAD	11
RP	3
B→K	1
CYBO	1
(10) 12.2	
Q→B	7

WB IN

1.0.6	
LI	1
Z+1→SAD	11
RP	3
B→K	1
1's→L	14
(10) 17.4	
Q→B	7

WF OUT

0 1.6	
LI	1
Z+1→SAD	11
RP	3
B→K	1
CYBO	1
(10).10.2	
Q→B	7

WB OUT

1.1.6	
LI	1
Z+1→SAD	11
RP	3
B→K	1
1's→L	14
(10).16.4	
Q→B	7

CHF IN

2.0.6	
LI	1
Z+1→SAD	11
RP	3
B→K	1
CH	7
(10).6.4	
MISC	14
Q→B	7

CHF OUT

2.1.6	
LI	1
Z+1→SAD	11
RP	3
B→K	1
CH	7
(10).6.7	
MISC	14
Q→B	1

Update address

Update during

CWR

4.12.2	
LI	
Z+1→SAD	11
WRITE	1
B→K	1
1's→L	14
1.15.2	
Q→N	14

TO 1.15.2. (SHEET 3)

4.17.4.	
LI	1
Z+1→SAD	11
WRITE	1
B→K	1
CYBO	1
1.15.2	
Q→N	14

TO 1.15.2. (SHEET 3)

4.10.2	
LI	1
Z+1→SAD	11
WRITE	1
B→K	1
1's→L	14
1.4.1.	
Q→N	14

TO 1.4.1. (SHEET 3)

4.16.4	
LI	1
Z+1→SAD	11
WRITE	1
B→K	1
CYBO	1
1.4.1	
Q→N	14

TO 1.4.1 (SHEET 3)

4.6.4	
LI	1
Z+1→SAD	11
WRITE	1
B→K	1
1's→L	14
CH	7
4.6.4.	
MISC	52
Q→N	14

TO 4.6.4. (SHEET 3)

4.6.7	
LI	1
Z+1→SAD	11
WRITE	1
B→K	1
1's→L	14
CH	7
4.6.7.	
MISC	52
Q→N	14

TO 4.6.7. (SHEET 3)

Write away updated word

5.12.2	
LI	1
Z+1→SAD	11
WRITE	1
B→K	1
1's→L	14
0.(1).1	
MISC	53
Q→N	14

*TO SHEET2.

Write away updated word

5.17.4	
LI	1
Z+1→SAD	11
WRITE	1
B→K	1
CYBO	1
1.(1).1	
MISC	53
Q→N	14

5.10.2	
LI	1
Z+1→SAD	11
WRITE	1
B→K	1
1's→L	14
0.6.7	
MISC	53
Q→N	14

5.16.1	
LI	1
Z+1→SAD	11
WRITE	1
B→K	1
CYBO	1
1.6.7	
MISC	53
Q→N	14

5.6.4	
LI	1
Z+1→SAD	11
WRITE	1
B→K	1
1's→L	14
CH	7
2.(1).1	
MISC	54
Q→N	14

5.6.7	
LI	1
Z+1→SAD	11
WRITE	1
B→K	1
1's→L	14
CH	7
2.6.7	
MISC	54
Q→N	14

Write away updated limit word

0.4.1. / 0.6.1.

0.4.1. / 0.6.1.

0.6.7.

0.6.7.

2.4.1. / 2.6.1

2.6.7.

HESITATION SEQUENCE
SHEET 1 OF 3

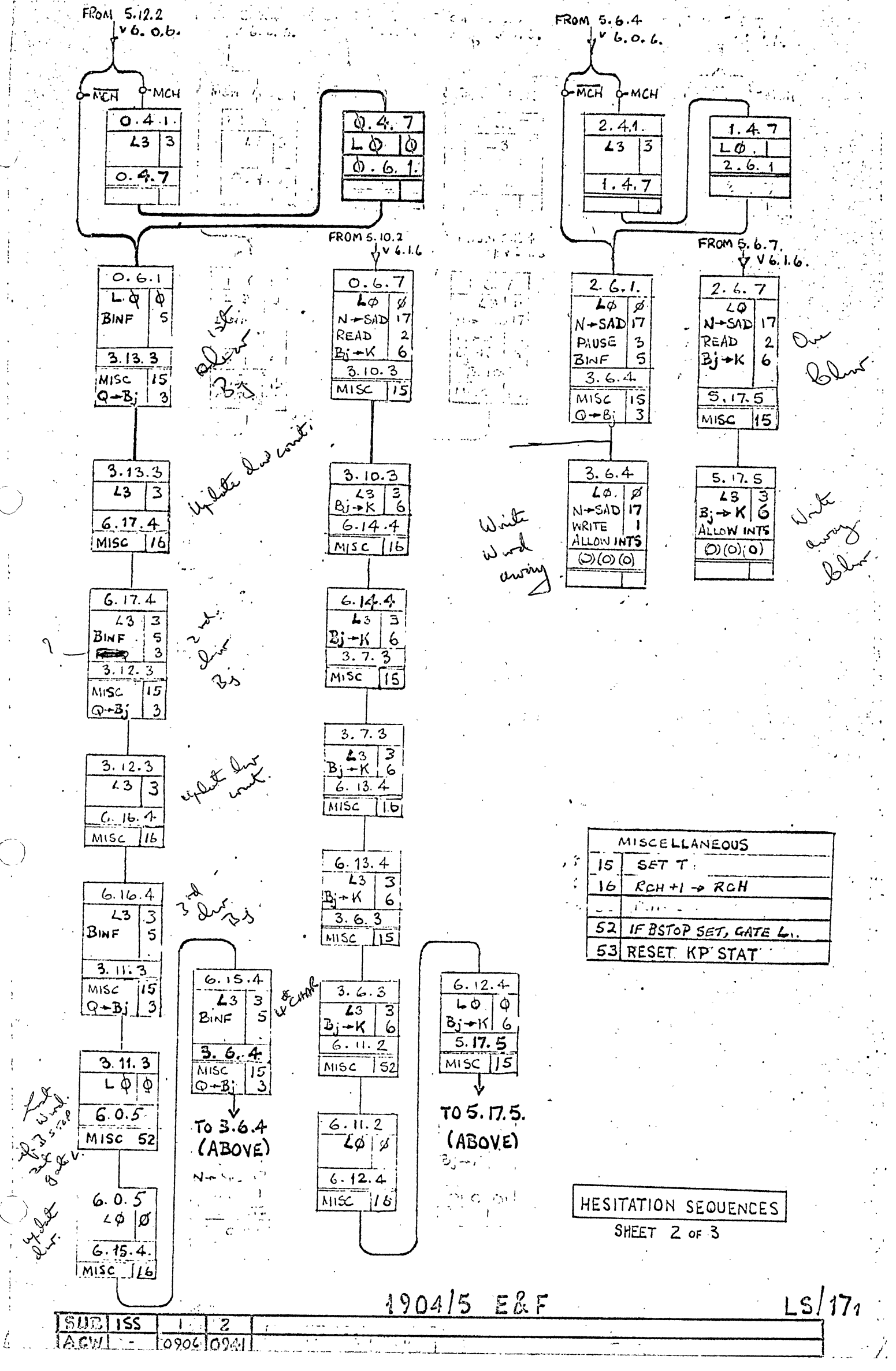
NB: Z - 256+4N

ACN 0941

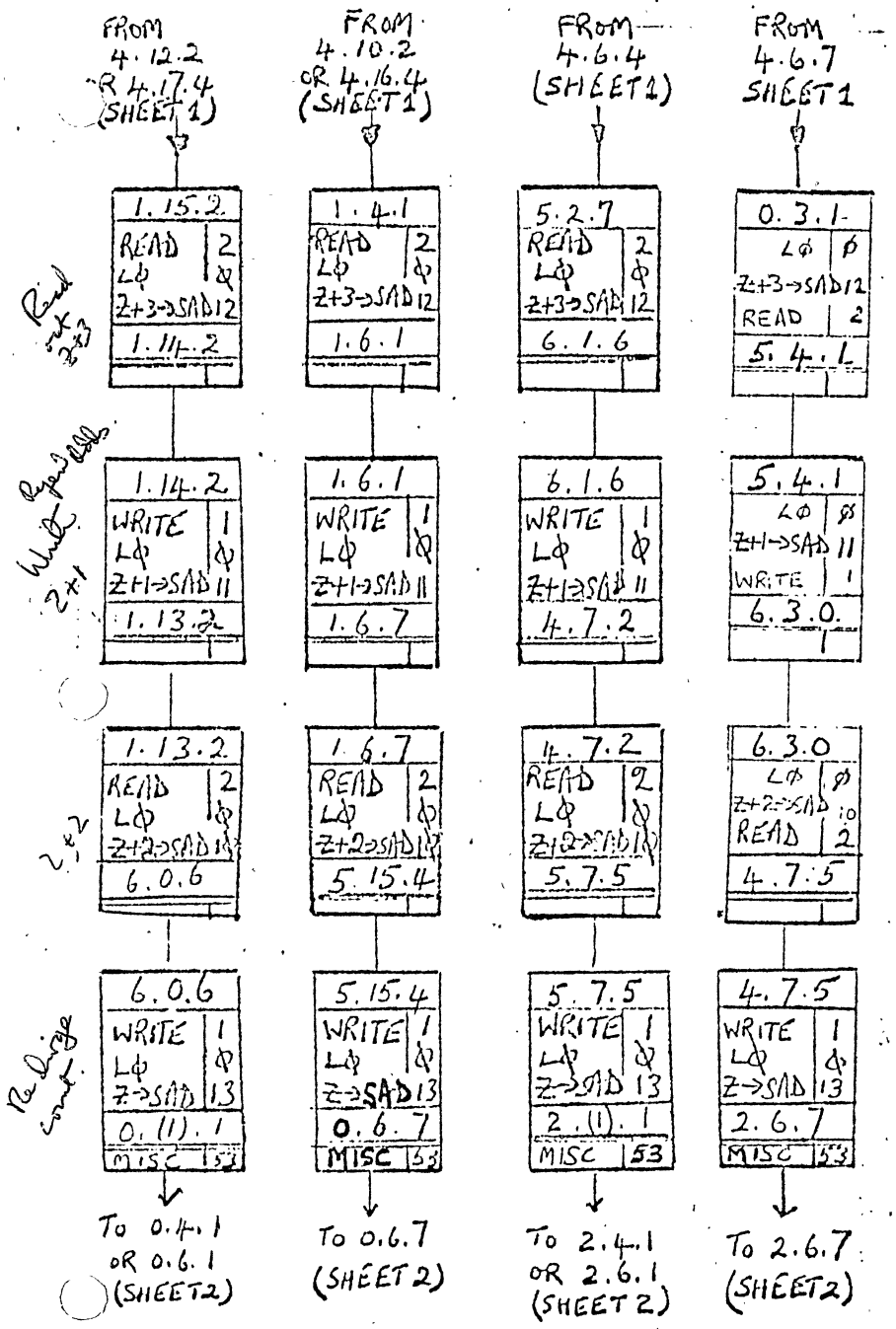
1904/5 E&F

LS/170

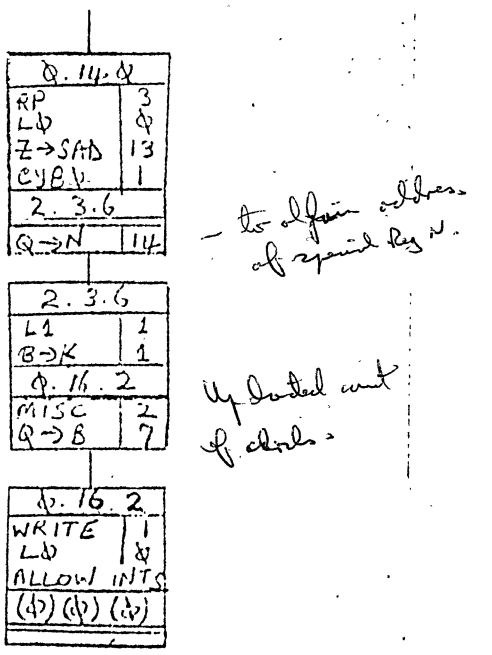
SUB | ISS	1	2


FROM 5.12.2 v 6.0.6.
MCH
MCH
0.4.1. L3 3 0.4.7
0.4.7 LØ Ø 0.6.1.
0.6.1 LØ Ø BINF 5 3.13.3 MISC 15 Q→Bj 3
FROM 5.10.2 v 6.1.6
0.6.7 LØ Ø N→SAD 17 READ 2 Bj→K 6 3.10.3 MISC 15
FROM 5.6.4 v 6.0.6.
2.4.1. L3 3 1.4.7
1.4.7 LØ 2.6.1
2.6.1 LØ Ø N→SAD 17 PAUSE 3 BINF 5 3.6.4 MISC 15 Q→Bj 3
FROM 5.6.7. v 6.1.6.
2.6.7 LØ N→SAD 17 READ 2 Bj→K 6 5.17.5 MISC 15
3.13.3 L3 3 6.17.4 MISC 16
6.17.4 L3 3 BINF 5 3.12.3 MISC 15 Q→Bj 3
3.12.3 L3 3 6.16.4 MISC 16
6.16.4 L3 3 BINF 5 3.11.3 MISC 15 Q→Bj 3
3.11.3 LØ Ø 6.0.5 MISC 52
6.0.5 LØ Ø 6.15.4. MISC 16
6.15.4 L3 3 BINF 5 3.6.4 MISC 15 Q→Bj 3
TO 3.6.4 (ABOVE)
3.10.3 L3 3 Bj→K 6 6.14.4 MISC 16
6.14.4 L3 3 Bj→K 6 3.7.3 MISC 15
3.7.3 L3 3 Bj→K 6 6.13.4 MISC 16
6.13.4 L3 3 Bj→K 6 3.6.3 MISC 15
3.6.3 L3 3 Bj→K 6 6.11.2 MISC 52
6.11.2 LØ Ø 6.12.4 MISC 16
6.12.4 LØ Ø Bj→K 6 5.17.5 MISC 15
TO 5.17.5. (ABOVE)
3.6.4 LØ Ø N→SAD 17 WRITE 1 ALLOW INTS (0)(0)(0)
5.17.5 L3 3 Bj→K 6 ALLOW INTS (0)(0)(0)
MISCELLANEOUS
15 SET T
16 RCH+1 → RCH
52 IF BSTOP SET, GATE L..
53 RESET KP STAT
HESITATION SEQUENCES
SHEET 2 OF 3
1904/5 E&F
LS/171
SUB ISS 1 2
AGW - 0906 0941

CONTROL WORD RECHARGE



MILL TIMER HES



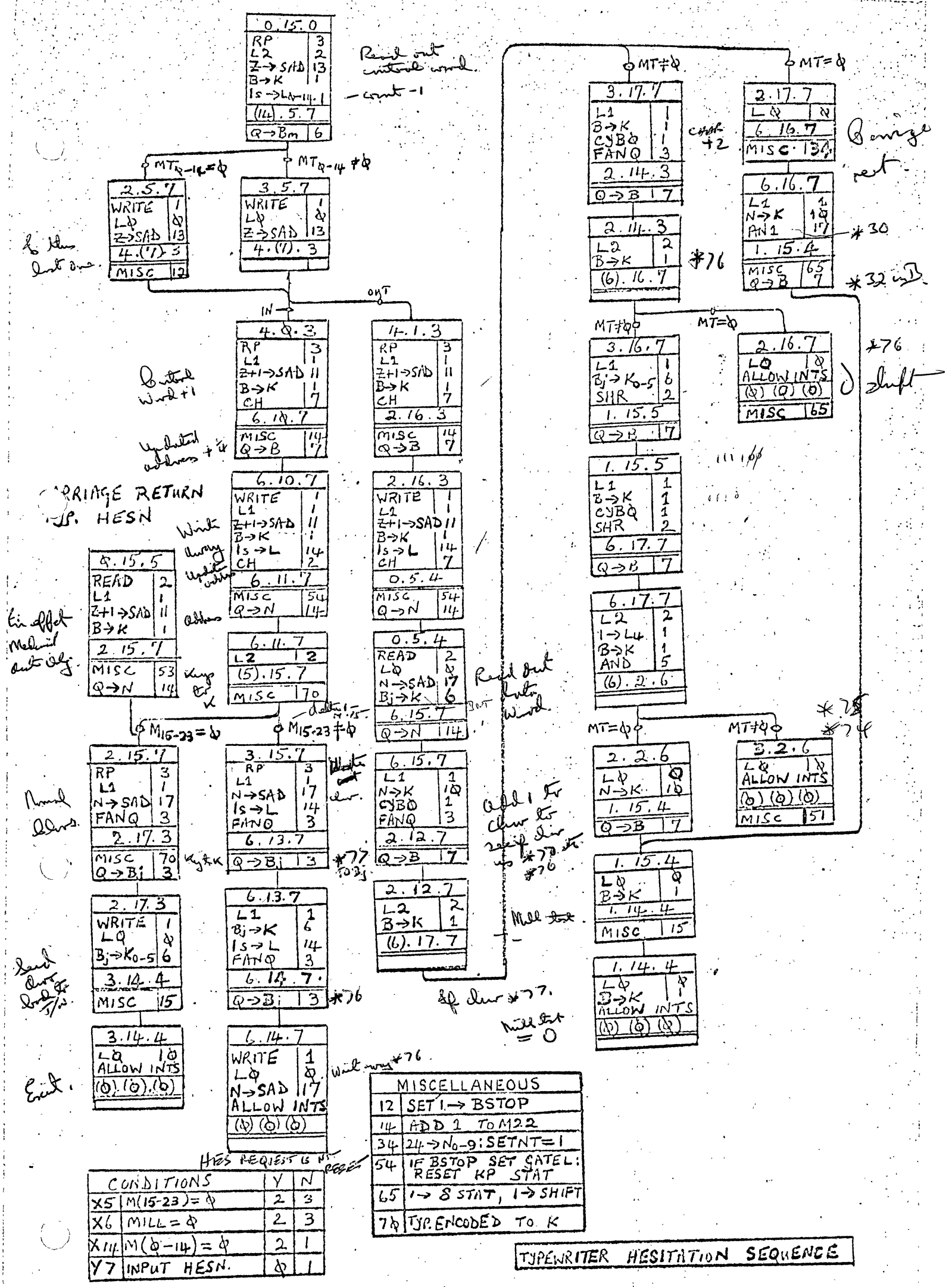
8 words for this
2 control words for normal Pairs
256 + 4N & 256 + 4N + 1

MISCELLANEOUS	
2	SRIN → L, N → BAD
53	RESET KP STAT

CONDITION		Y	N
Y1	MCH	4	6

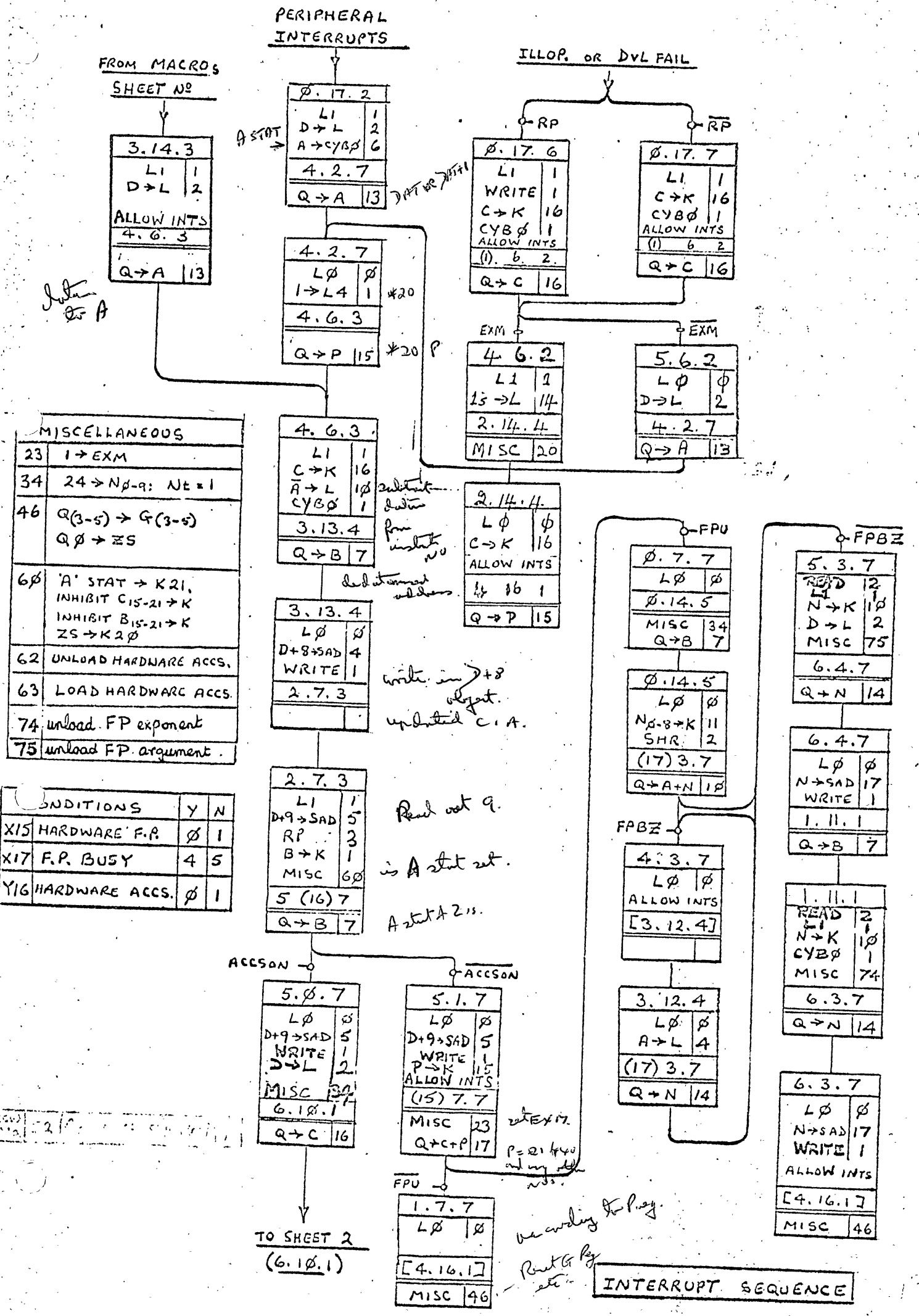
HESITATION SEQUENCE

SUB	ISS	1	2
ACW	-	0906	0941



1904/5 E&F LS/18ϕ

SUB	ISS	1	2
ACW		0906	0942


PERIPHERAL INTERRUPTS
FROM MACROS SHEET Nº
ILLOP. OR DVL FAIL
RP
RP
EXM
EXM
FPU
FPBZ
FPBZ
ACCSON
ACCSON
A STAT
3.14.3
LI 1
D→L 2
ALLOW INTS
4.6.3
Q→A 13
Ø.17.2
LI 1
D→L 2
A→CYBØ 6
4.2.7
Q→A 13
4.2.7
LØ Ø
1→L4 1
4.6.3
Q→P 15
*20
*20
P
Ø.17.6
LI 1
WRITE 1
C→K 16
CYBØ 1
ALLOW INTS
(1). 6. 2.
Q→C 16
Ø.17.7
LI 1
C→K 16
CYBØ 1
ALLOW INTS
(1) 6 2
Q→C 16
4.6.2
LI 1
15→L 14
2.14.4
MISC 20
5.6.2
LØ Ø
D→L 2
4.2.7
Q→A 13
4.6.3
LI 1
C→K 16
Ā→L 1Ø
CYBØ 1
3.13.4
Q→B 7
2.14.4.
LØ Ø
C→K 16
ALLOW INTS
Q→P 15
Ø.7.7
LØ Ø
Ø.14.5
MISC 34
Q→B 7
Ø.14.5
LØ Ø
Nø-8→K 11
SHR 2
(17) 3.7
Q→A+N 1Ø
5.3.7
READ 2
LI 1
N→K 1Ø
D→L 2
MISC 75
6.4.7
Q→N 14
6.4.7
LØ Ø
N→SAD 17
WRITE 1
1.11.1
Q→B 7
1.11.1
READ 2
LI 1
N→K 1Ø
CYBØ 1
MISC 74
6.3.7
Q→N 14
6.3.7
LØ Ø
N→SAD 17
WRITE 1
ALLOW INTS
[4.16.1]
MISC 46
4.3.7
LØ Ø
ALLOW INTS
[3.12.4]
3.12.4
LØ Ø
A→L 4
(17) 3.7
Q→N 14
3.13.4
LØ Ø
D+8→SAD 4
WRITE 1
2.7.3
2.7.3
LI 1
D+9→SAD 5
RP 3
B→K 1
MISC 6Ø
5 (16) 7
Q→B 7
write in D+8 algst.
updated C.A.
Read out 9.
is A stat set.
A stat A 21 is.
5.Ø.7
LØ Ø
D+9→SAD 5
WRITE 1
D→L 2
MISC 34
6.1Ø.1
Q→C 16
5.1.7
LØ Ø
D+9→SAD 5
WRITE 1
P→K 15
ALLOW INTS
(15) 7.7
MISC 23
Q→C+P 17
1.7.7
LØ Ø
[4.16.1]
MISC 46
MISCELLANEOUS
23 1→EXM
34 24→NØ-9: Nt=1
46 Q(3-5)→G(3-5) QØ→ZS
6Ø 'A' STAT→K21, INHIBIT C15-21→K INHIBIT B15-21→K ZS→K2Ø
62 UNLOAD HARDWARE ACCS.
63 LOAD HARDWARE ACCS.
74 unload FP exponent
75 unload FP. argument.
CONDITIONS Y N
X15 HARDWARE F.P. Ø 1
X17 F.P. BUSY 4 5
Y16 HARDWARE ACCS. Ø 1
TO SHEET 2 (6.1Ø.1)
INTERRUPT SEQUENCE
SHEET 1 OF 2
1904/5 E&E
LS/19o

FROM SHEET 1
(5.0.7)

6.10.1	
L0	0
1s→L1 and L15-22	17
SHL	1
1.4.3	
Q→N	14

MISCELLANEOUS	
23	1 → EXM
43	$N_{0-9}-1 \rightarrow N_{0-9}$
62	UNLOAD HARDWARE ACCS
63	LOAD HARDWARE ACCS

CONDITIONS		Y	N
X15	HARDWARE F.P.	0	1
X7	$N_{0-9}=1$	0	1

1.4.3	
L0	0
C→SAD	3
RP	3
6.7.1	

6.7.1	
L1	1
C→SAD	3
WRITE	1
C→K	3
CYBQ	1
(7) 4.3	
MISC	43
Q→C	16

$N_{0-9}=1$ $N_{0-9}\neq 1$

0.4.3	
L0	0
1→SAD	1
READ	2
ALLOW INTS	
6.6.1	
MISC	63

6.6.1	
L0	0
2→SAD	16
READ	2
1s→L	14
3.16.3	
Q→N	14
MISC	63

from sheet 1 for X_1

from sect 2

read out X_0-X_4

write to store digit Prog. with X_0 X_4

3.16.3	
L Q	Q
1s→L1 and L15-22	17
SHL	1
1.5.3	
Q→N	14

1.5.3	
L Q	Q
C→SAD	3
RP	3
6.5.1	

6.5.1	
L1	1
C→SAD	3
WRITE	1
C→K	3
CYBQ	1
(7).5.3	
MISC	43
Q→C	16

$N_{0-9}=1$ $N_{0-9}\neq 1$

0.5.3	
L0	0
P→K	15
ALLOW INTS	
(15).7.7	
MISC	23
Q→C	16

EXM

enter EXEC on state of P.

X_4-7

TO SHEET 19$_0$

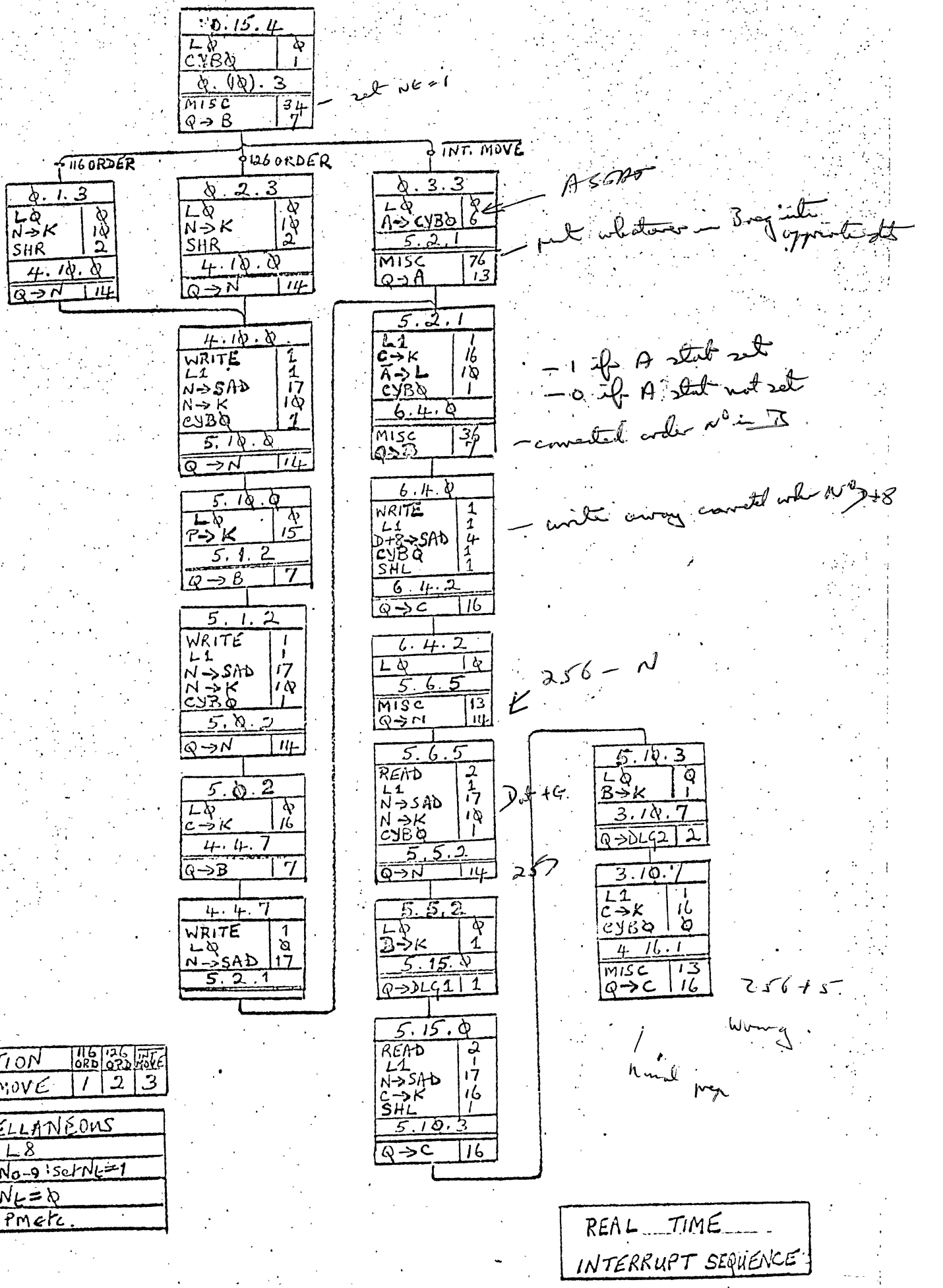
INTERRUPT SEQUENCE

SHEET 2 OF 2

1904/5 E&F

LS/19$_1$

SUB	ISS		
ACW			


0.15.4
L Q | Q
CYBQ | 1
Q.(10).3
MISC | 34
Q→B | 7
set NE=1
116 ORDER
126 ORDER
INT. MOVE
Q.1.3
L Q | Q
N→K | 10
SHR | 2
4.10.Q
Q→N | 14
Q.2.3
L Q | Q
N→K | 10
SHR | 2
4.10.Q
Q→N | 14
Q.3.3
L Q | Q
A→CYBQ | 6
5.2.1
MISC | 76
Q→A | 13
ASGD
put whatever in B reg into appropriate
4.10.Q
WRITE | 1
L1 | 1
N→SAD | 17
N→K | 10
CYBQ | 1
5.10.Q
Q→N | 14
5.10.Q
L Q | Q
P→K | 15
5.1.2
Q→B | 7
5.1.2
WRITE | 1
L1 | 1
N→SAD | 17
N→K | 10
CYBQ | 1
5.Q.2
Q→N | 14
5.Q.2
L Q | Q
C→K | 16
4.4.7
Q→B | 7
4.4.7
WRITE | 1
L Q | Q
N→SAD | 17
5.2.1
5.2.1
L1 | 1
C→K | 16
A→L | 10
CYBQ | 1
6.4.Q
MISC | 36
Q→B | 7
= 1 if A stat set
= 0 if A stat not set
= carried order N° in B
6.14.Q
WRITE | 1
L1 | 1
D+8→SAD | 4
CYBQ | 1
SHL | 1
6.14.2
Q→C | 16
write away carried adr N°+8
6.4.2
L Q | Q
5.6.5
MISC | 13
Q→N | 14
256 − N
5.6.5
READ | 2
L1 | 1
N→SAD | 17
N→K | 10
CYBQ | 1
5.5.2
Q→N | 14
D+G
257
5.5.2
L Q | Q
B→K | 1
5.15.Q
Q→DLQ1 | 1
5.15.Q
READ | 2
L1 | 1
N→SAD | 17
C→K | 16
SHL | 1
5.10.3
Q→C | 16
5.10.3
L Q | Q
B→K | 1
3.10.7
Q→DLQ2 | 2
3.10.7
L1 | 1
C→K | 16
CYBQ | 0
4.16.1
MISC | 13
Q→C | 16
256+5
Wrong
kind reg
CONDITION | 116 ORD | 126 ORD | INT MOVE
Y10 INT. MOVE | 1 | 2 | 3
MISCELLANEOUS
13 | 1 → L 8
34 | 24 → No-9 ; set NE=1
36 | set NE=0
76 | set PM etc.
REAL TIME
INTERRUPT SEQUENCE

X=0 Y →

Z ↓	0	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17
0	TEST	060	CREST	060	114	114	114	114	TEST		047	127	HES	TYH	070	117
1	044	044	CREST		HES		HES	174	110	126	152		164	HES	070	MOD
2			164	060	114	114		140	113	164	047	117	MOD	HES	HES	INT
3			126	126	INT	INT	115	115	126	126	126	126	116	116	116	P.O.O
4	040	040	070	072	110	TYH	111	112	112	045	127	045	172	RTI	113	INSERT
5	040	040	070	072	110	117	111	112	111	CREST	127	045	INT	TYH	113	ORDER
6	HES	HES	170	152		117	115	124	152		152	152	152	114	MOD	INT
7	045	045	044	044	HES	140	HES	INT	137	131	130	076		CREST	172	INT

X=1 Y →

Z ↓	0	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17
0	044	044	117	070	114	114	114	114			047	P.O.O	060	040	066	066
1	044	045	117	116	HES	045	HES	174	110	INT	047		170	170	172	070
2	044	044	164	070	114	114		140	113	126		HES	HES	HES	117	
3	044	044	116	116	INT	INT	115	115	116	126	126	126	116	116	116	045
4	045	045	074	074	110	116	111	112	112	066	127	117	TYH	TYH	113	010
5	045	045	074	074	110	116	111	112	111	066	127	117	023	TYH	113	070
6	HES	HES	170	116		127	045	113	MOD		CREST	140	116	150	150	CREST
7				173	131	ORDER	HES	INT	137	131	130	076		CREST	172	CREST

X=2 Y →

Z ↓	0	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17
0			126	126	174	114	126	044	117	050	044	046	046	045	114	114
1	044	044	050	050	HES	114	HES	047	072	045	172	172	043	043	042	042
2			052	052	046	045	126	152	174	052	174	174	HES	152	HES	113
3			150	044	152	126	126	INT	045	045	045	014	TYH	151	TYH	TYH
4	040	040	060	060	174	114	113	047	047	060	114	114	INT	114	114	114
5	040	040	060	060	114	074	074	126	150	060	140	047	047	047	047	047
6	HES	HES	TYH	HES	174	174	047	CREST	173	172	172	037	036	035	034	116
7	045	045	044	114	HES	TYH	HES	130	130	130	TYH	026	036	TYH	TYH	TYH

X=3 Y →

Z ↓	0	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17
0	044	044	RTI	RTI	140	114	126	044	074	050	044	046	046	045	114	044
1	044	045	050	050	025	045	116	047	164	045	172	041	043	043	041	041
2	044	044	052	052	045	045	126	152	074	052	127	127	HES	152		MOD
3	044	044	150	044	126	116	HES	HES	HES	HES	HES	HES	INT	151	INT	045
4	045	045	060	060	045	114	HES	047	047	060	INT	INT	TYH	044		113
5	045	045	060	060	114	116	116	116	150	060	047	047	047	047	047	047
6			TYH	174	MOD	174	045	032	031	030	027	027	116	026	026	116
7			044	114	117	TYH	072	072			116	026	047	TYH	TYH	TYH

FIXED STORE MAP

SHEET 1 OF 2

ACM — 1904/5 FRF

LS/210

X = 4

Y →

Z ↓	0	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17
0		P.O.0	P.O.0	P.O.0	152	126	151	150	RTI	117	P.O.0	072		174	P.O.0	045
1	074	074	070	070	072	117	056	050	054	052	060	062	064	066	P.O.0	040
2	164	164	072	072	117	164	INT		HES		HES	125	164	172	HES	044
3	TYH	TYH		175	116		INT	172	172	137	137		127	127	126	117
4	076	130	131	131	137	127	HES	152	121	124	124	124	164	174	HES	HES
5	076	130	131	131	137	070	070		041	116	066	047	047	047	047	047
6	171	170	172	177	MOD		022	021	020	017	015	015	013	012	171	011
7			INT	INT	RTI	CREST	HES	174	140	173		CREST	036	140	023	CREST

X = 5

Y →

Z ↓	0	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17
0	117	117	117	117	RTI	126	151	150	RTI	117	P.O.0	072		RTI	045	045
1	074	074	RTI	172		126	056	050	054	052	060	062	064	066	040	040
2	RTI	RTI	072	072	117	RTI	INT		HES		HES	125	126	151	117	040
3	172	172		175	116		116	116	RTI	116	116		164	115	114	114
4	076	130	131	131	137	127	HES	152	050	124	124	124	050	HES	HES	HES
5	076	130	131	131	137	070	RTI		050	116	066	047	047	172	ORDER	HES
6	171	170	172	177	173		010	007	006	005	003	002	MOD	001	000	170
7	INT	INT	HES	INT	152	CREST	HES	174	140	173	170	043	116	114	023	CREST

X = 6

Y →

Z ↓	0	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17
0	023	023	164		RTI	044	044	044	043	045	110	072	045	045	110	040
1	117	117	117	117	072	INT	INT	INT	INT	044	044	040	040	040	111	111
2	023	023	116	116	RTI	043	043	131	043	HES	126	072	126	127	127	127
3	114	114	114	126	043	043	072	072	172	112	112	112	111	111	110	110
4		117	072	116	137	047	INSERT	117	117	124	HES	HES	HES	HES	HES	HES
5	130	117	072	116	117	116	072	117	117	116	177	043	043	043	CREST	043
6	HES	HES	066	177	117	026	116	116	117	116	116	116	150	116	116	117
7	172	172	172	INT	INT	036	137	117	TYH	TYH	117	TYH	TYH	TYH	TYH	TYH

X = 7

Y →

Z ↓	0	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17
0	000	010	020	030	040	050	060	070	100	110	120	130	140	150	160	170
1	001	011	021	031	041	051	061	071	101	111	121	131	141	151	161	171
2	002	012	022	032	042	052	062	072	102	112	122	132	142	152	162	172
3	003	013	023	033	043	053	063	073	103	113	123	133	143	153	163	173
4	004	014	024	034	044	054	064	074	104	114	124	134	144	154	164	174
5	005	015	025	035	045	055	065	075	105	115	125	135	145	155	165	175
6	006	016	026	036	046	056	066	076	106	116	126	136	146	156	166	176
7	007	017	077	037	047	057	067	077	107	117	127	137	147	157	167	177

FIXED STORE MAP

1904/5 E&F

LS/21

SUB	ISS	
ACW	-	