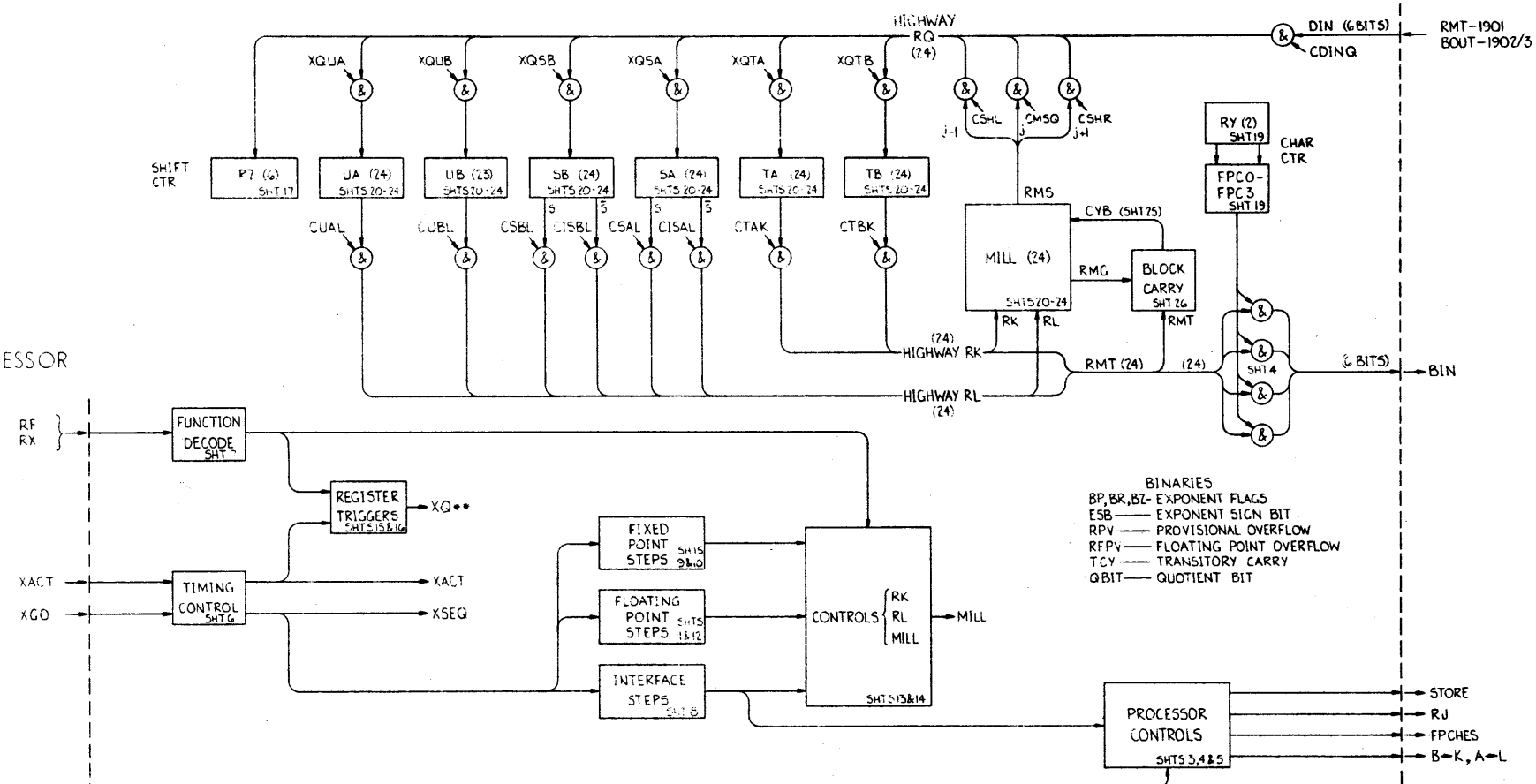
ISS.	CHANGES	
1	P 445-10	10·66
3	1150 Kent	1·67

NOTES:
1. CROSS REFERENCING—FOR SIGNAL SOURCES SEE SHEETS 39 TO 42
2. PIN NUMBERS USED MORE THAN ONCE ARE SHOWN BRACKETED
3. WITH BRICK SOURCES SUCH AS IB14/37* THE ASTERISK DENOTES THAT 37 APPLIES TO THE PIN NUMBER AND NOT THE MONITORING POINT

BLOCK DIAGRAM 1900 SCIENTIFIC UNIT

PROCESSOR



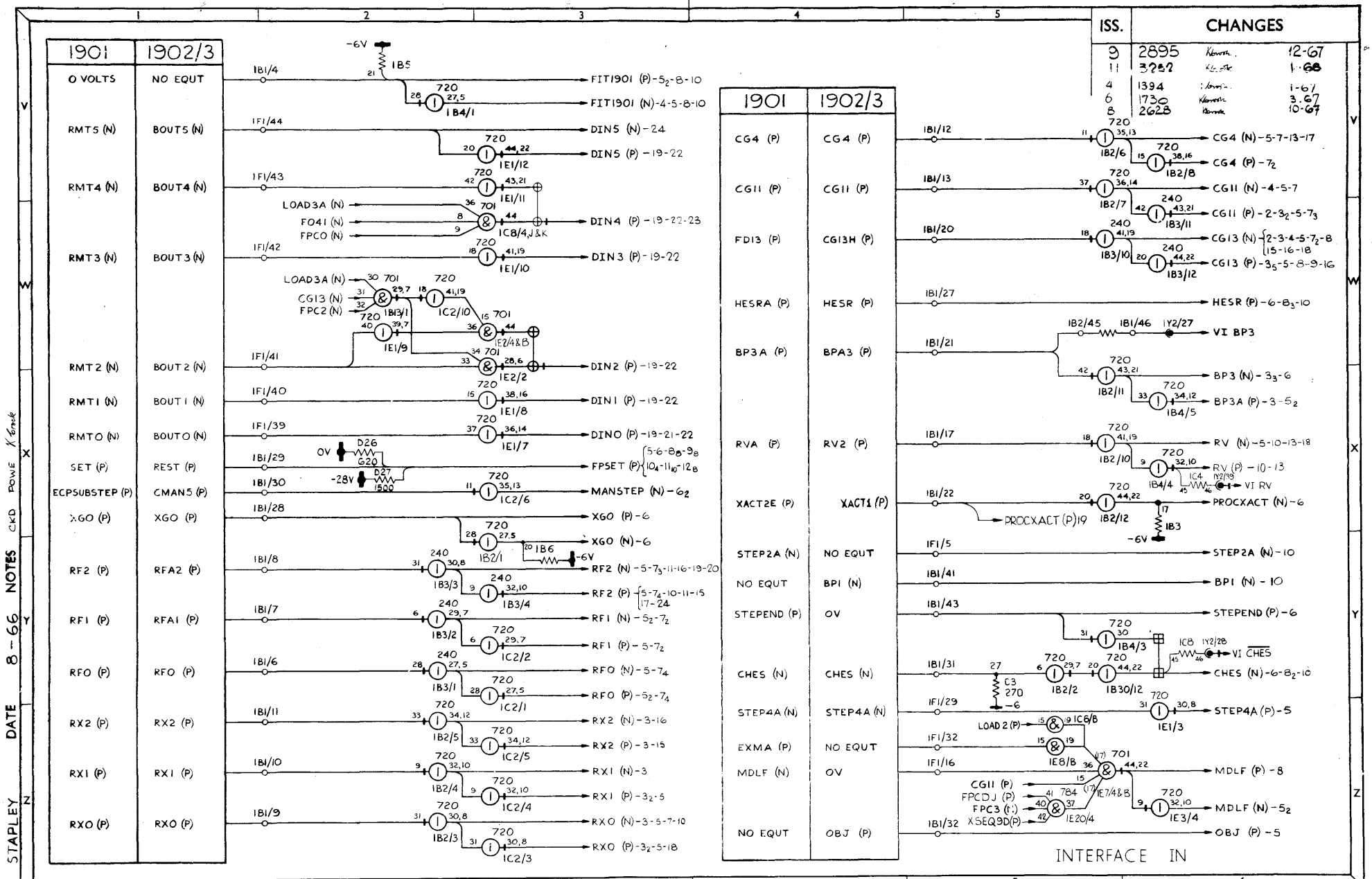
BINARIES
BP, BR, BZ - EXPONENT FLAGS
ESB — EXPONENT SIGN BIT
RPV — PROVISIONAL OVERFLOW
RFPV — FLOATING POINT OVERFLOW
TCY — TRANSITORY CARRY
QBIT — QUOTIENT BIT

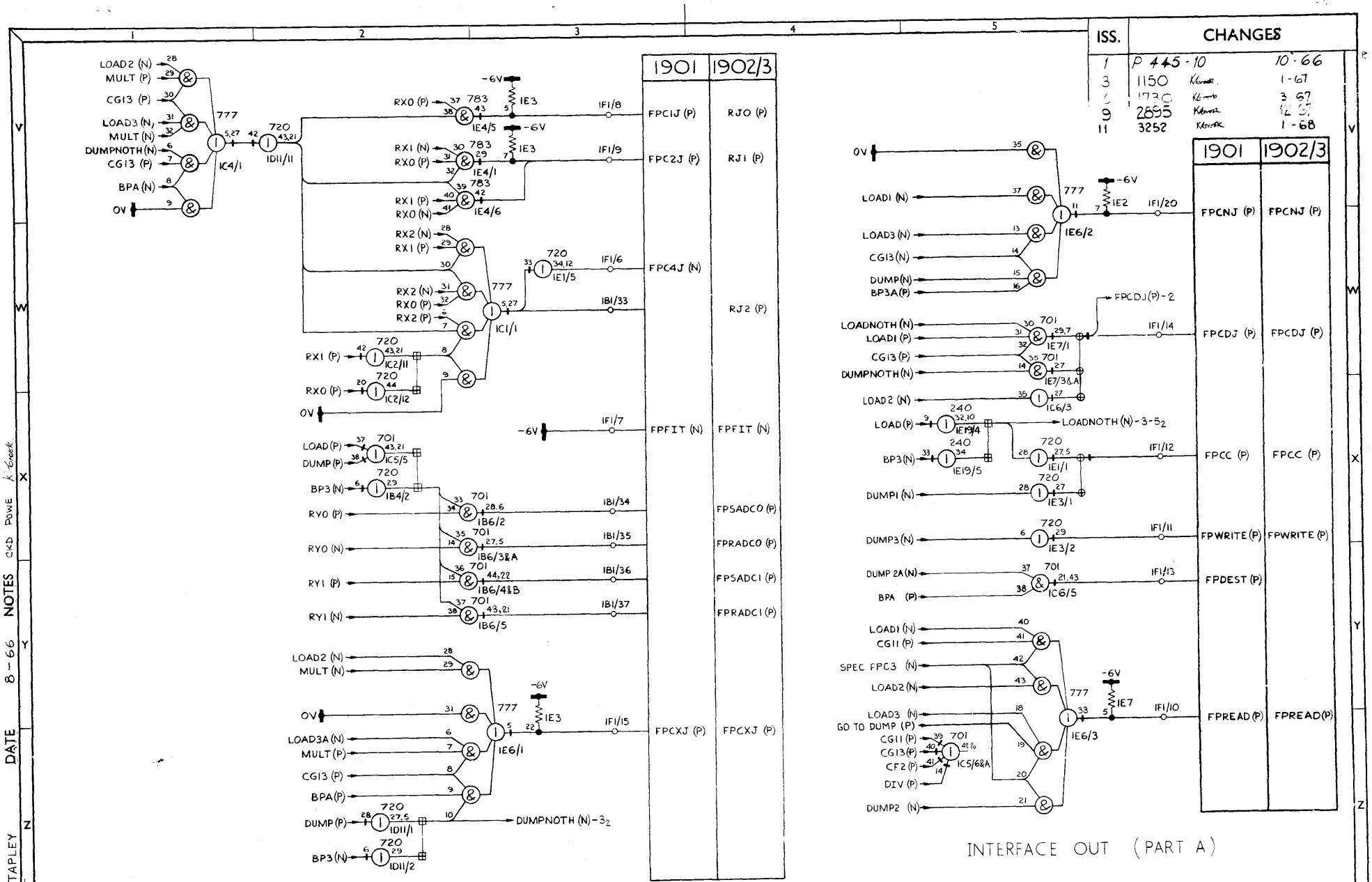
DRAWN BY R. J. OWEN DATE 23-9-66 NOTES CHK PLUCK Kent

ICT	1900 SCIENTIFIC UNIT LOGIC	5016360 / 3	1	D	ISSUE
		DIAGRAM ISSUE	SHEET	CAT	SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

813120 E


1901
1902/3
O VOLTS
NO EQUT
RMT5 (N)
BOUT5 (N)
RMT4 (N)
BOUT4 (N)
RMT3 (N)
BOUT3 (N)
RMT2 (N)
BOUT2 (N)
RMT1 (N)
BOUT1 (N)
RMTO (N)
BOUTO (N)
SET (P)
REST (P)
ECPSUBSTEP (P)
CMAN5 (P)
XGO (P)
XGO (P)
RF2 (P)
RFA2 (P)
RF1 (P)
RFA1 (P)
RFO (P)
RFO (P)
RX2 (P)
RX2 (P)
RX1 (P)
RX1 (P)
RXO (P)
RXO (P)
-6V
1B5
720
1B4/1
1E1/12
1E1/11
1E1/10
1E1/9
1E1/8
1E1/7
1B1/3
1C2/10
1E2/4&B
1E2/2
1C2/6
1B2/1
1B6
-6V
1B3/3
1B3/4
1B3/2
1C2/2
1B3/1
1C2/1
1B2/5
1C2/5
1B2/4
1C2/4
1B2/3
1C2/3
LOAD3A (N)
CG13 (N)
FPC2 (N)
FO41 (N)
FPCO (N)
OV
D26
G20
-28V
D27
1500
FIT1901 (P)-5$_2$-8-10
FIT1901 (N)-4-5-8-10
DIN5 (N)-24
DIN5 (P)-19-22
DIN4 (P)-19-22-23
DIN3 (P)-19-22
DIN2 (P)-19-22
DIN1 (P)-19-22
DIN0 (P)-19-21-22
FPSET (P) {5-6-8$_8$-9$_8$ / 10$_4$-11$_{10}$-12$_8$
MANSTEP (N)-6$_2$
XGO (P)-6
XGO (N)-6
RF2 (N)-5-7$_3$-11-16-19-20
RF2 (P) {5-7$_4$-10-11-15 / 17-24
RF1 (N)-5$_2$-7$_2$
RF1 (P)-5-7$_2$
RFO (N)-5-7$_4$
RFO (P)-5$_2$-7$_4$
RX2 (N)-3-16
RX2 (P)-3-15
RX1 (N)-3
RX1 (P)-3$_2$-5
RXO (N)-3-5-7-10
RXO (P)-3$_2$-5-18
1901
1902/3
CG4 (P)
CG4 (P)
CG11 (P)
CG11 (P)
FDI3 (P)
CG13H (P)
HESRA (P)
HESR (P)
BP3A (P)
BPA3 (P)
RVA (P)
RV2 (P)
XACT2E (P)
XACT1 (P)
STEP2A (N)
NO EQUT
NO EQUT
BP1 (N)
STEPEND (P)
OV
CHES (N)
CHES (N)
STEP4A (N)
STEP4A (N)
EXMA (P)
NO EQUT
MDLF (N)
OV
NO EQUT
OBJ (P)
CG4 (N)-5-7-13-17
CG4 (P)-7$_2$
CG11 (N)-4-5-7
CG11 (P)-2-3$_2$-5-7$_3$
CG13 (N) {2-3-4-5-7$_2$-8 / 15-16-18
CG13 (P)-3$_5$-5-8-9-16
HESR (P)-6-8$_3$-10
VI BP3
BP3 (N)-3$_3$-6
BP3A (P)-3-5$_2$
RV (N)-5-10-13-18
RV (P)-10-13
VI RV
PROCXACT (N)-6
PROCXACT (P)19
-6V
STEP2A (N)-10
BP1 (N)-10
STEPEND (P)-6
VI CHES
CHES (N)-6-8$_2$-10
C3 270 -6
STEP4A (P)-5
LOAD 2 (P)
CG11 (P)
FPCDJ (P)
FPC3 (P)
XSEQ9D(P)
MDLF (P)-8
MDLF (N)-5$_2$
OBJ (P)-5
INTERFACE IN
ISS.
CHANGES
9 2895 Kennett 12-67
11 3282 K.E. Stile 1-68
4 1394 Kennett 1-67
6 1730 Kennett 3-67
8 2628 Kennett 10-67
NOTES
DATE 8-66
DRAWN BY STAPLEY
CKD POWE Krook
I·C·T
1900 SCIENTIFIC UNIT LOGIC
5016360 / 11
DIAGRAM
ISSUE
2
SHEET
D
CAT
ISSUE
SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.
813120 E



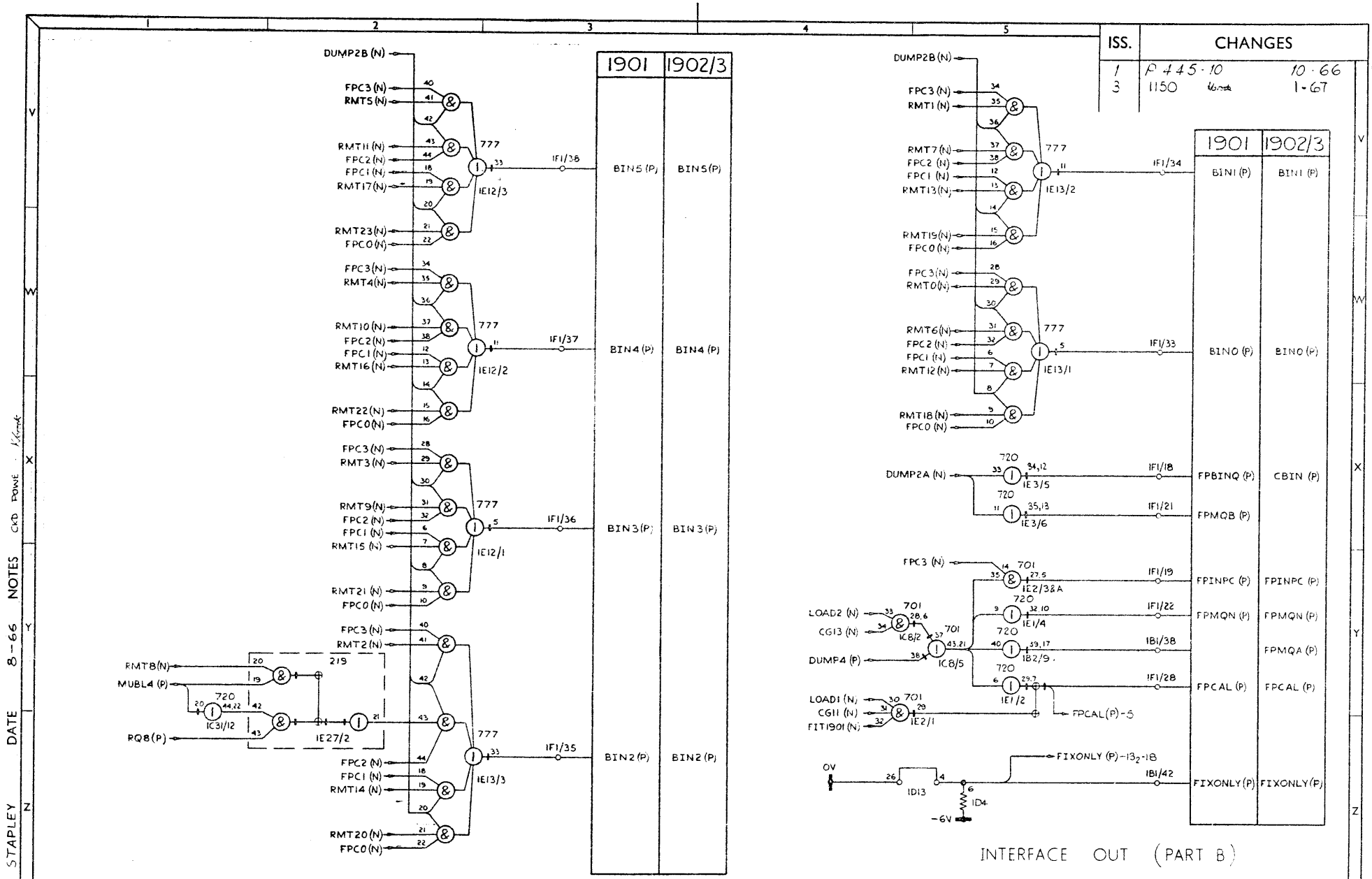
ISS.	CHANGES	
1	P 445-10	10-66
3	1150	1-67
7	1730	3-67
9	2895	12-67
11	3252	1-68

DRAWN BY STAPLEY DATE 8-66 NOTES CKD POWE K Kinsek

I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 11	3	D	ISSUE
		DIAGRAM ISSUE	SHEET	CAT	SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

813120 E



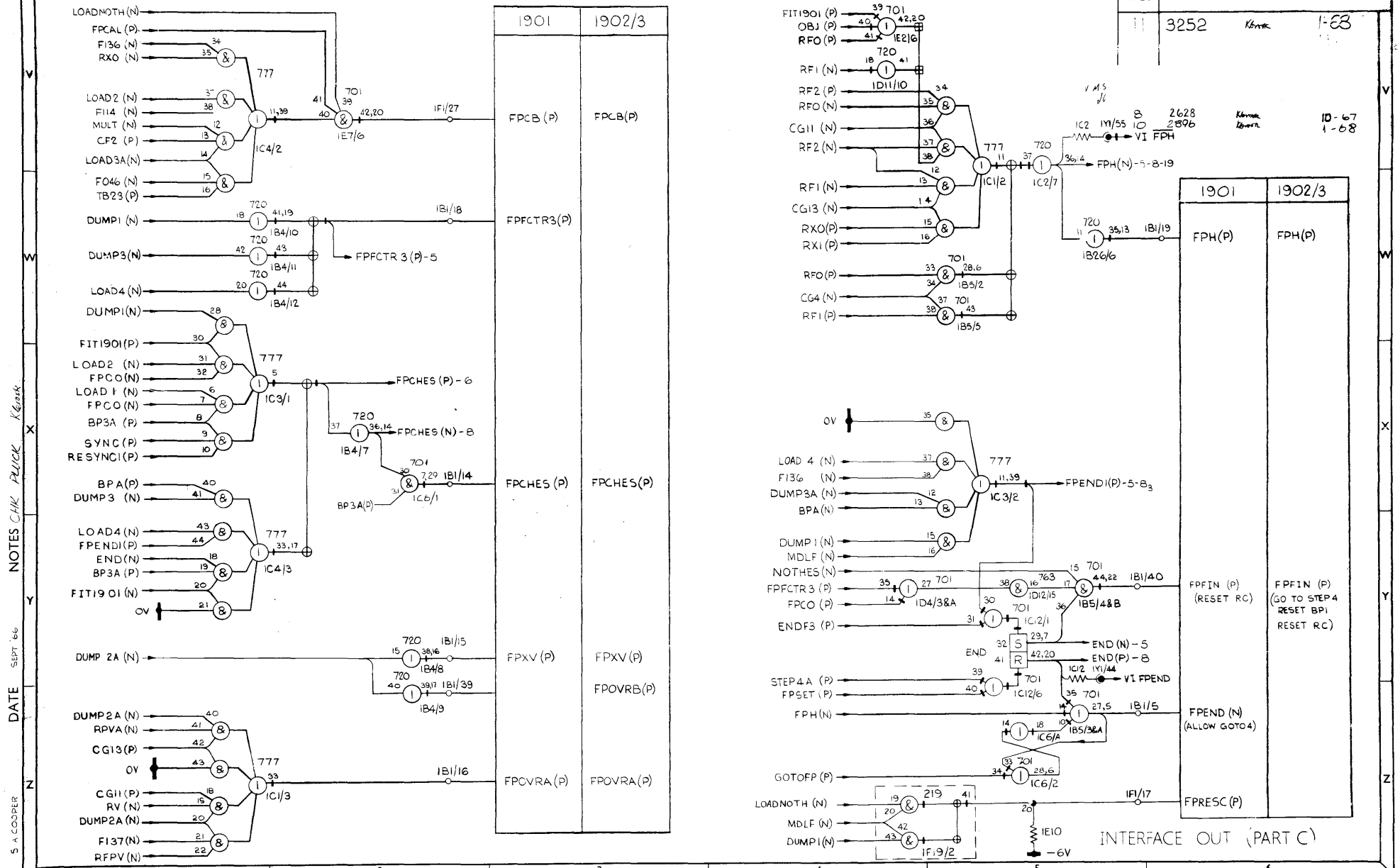
INTERFACE OUT (PART B)

ISS.	CHANGES	
1	P 445 · 10	10 · 66
3	1150 Komak	1 · 67

DRAWN BY STAPLEY DATE 8-66 NOTES CKD Powe Komak

I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 3 DIAGRAM ISSUE	4 SHEET	D CAT	ISSUE SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

813120 E



ISS.	CHANGES		
11	3252	Kbrook	1-68
		Kbrook	10-67
		Kbrook	1-68

1901	1902/3
FPH(P)	FPH(P)

NOTES CHK RUCK Kbrook
DATE SEPT '66
DRAWN BY S A COOPER

I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 11 DIAGRAM / ISSUE	5 SHEET	D CAT.

ISSUE

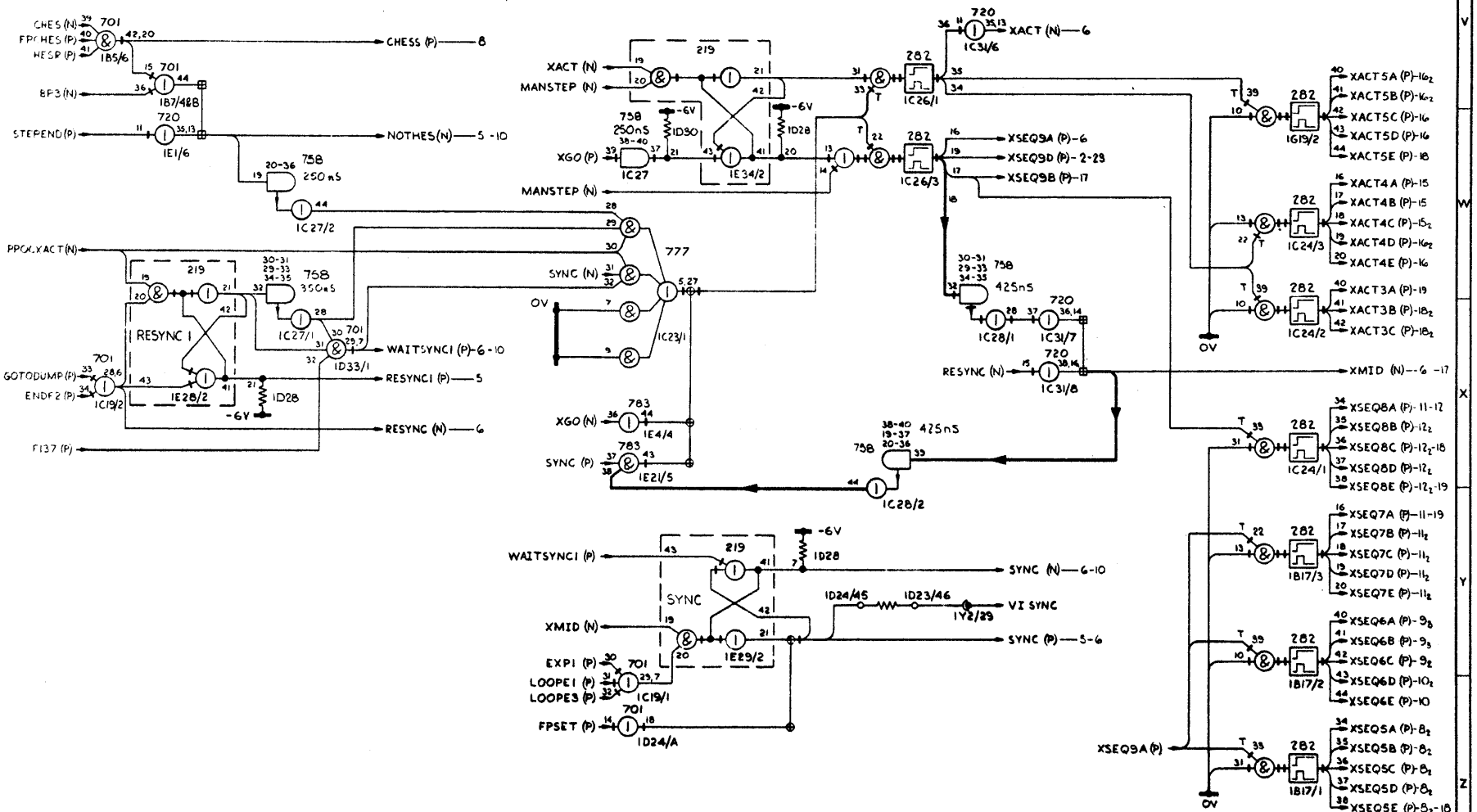
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

B

813120 E

ISS.	CHANGES	
1	P 445-10	10-66
3	1150 KGmk	1-67
4	1394	1-67



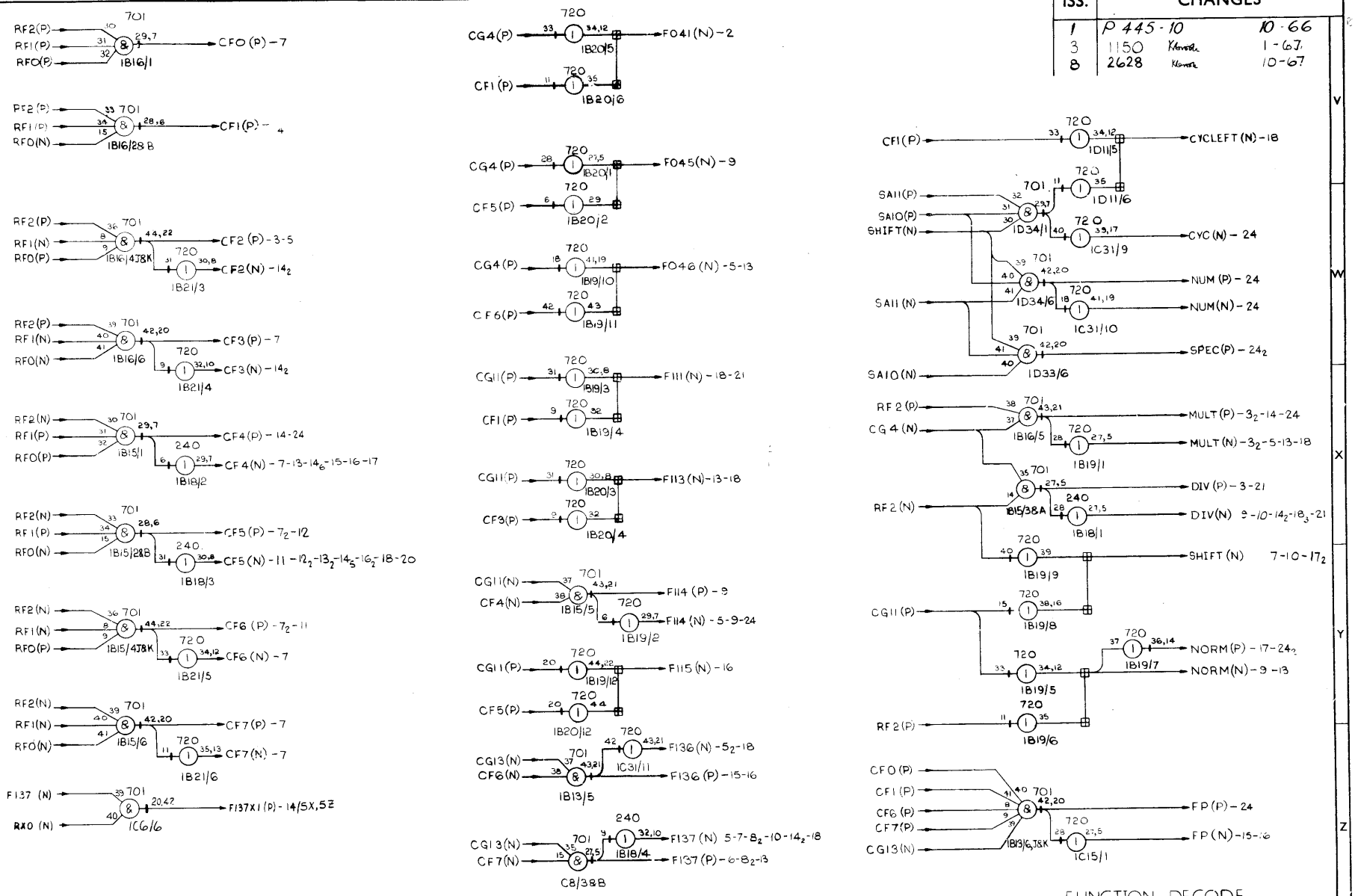
TIMING CONTROL

DRAWN BY STAPLEY DATE 8-66 NOTES CED DOWE 16.11.66

I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 DIAGRAM	4 ISSUE	6 SHEET	D CAT

ISSUE

SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.																														



ISS.	CHANGES	
1	P 445-10	10-66
3	1150 Kennedy	1-67
8	2628 Kennedy	10-67

NOTES

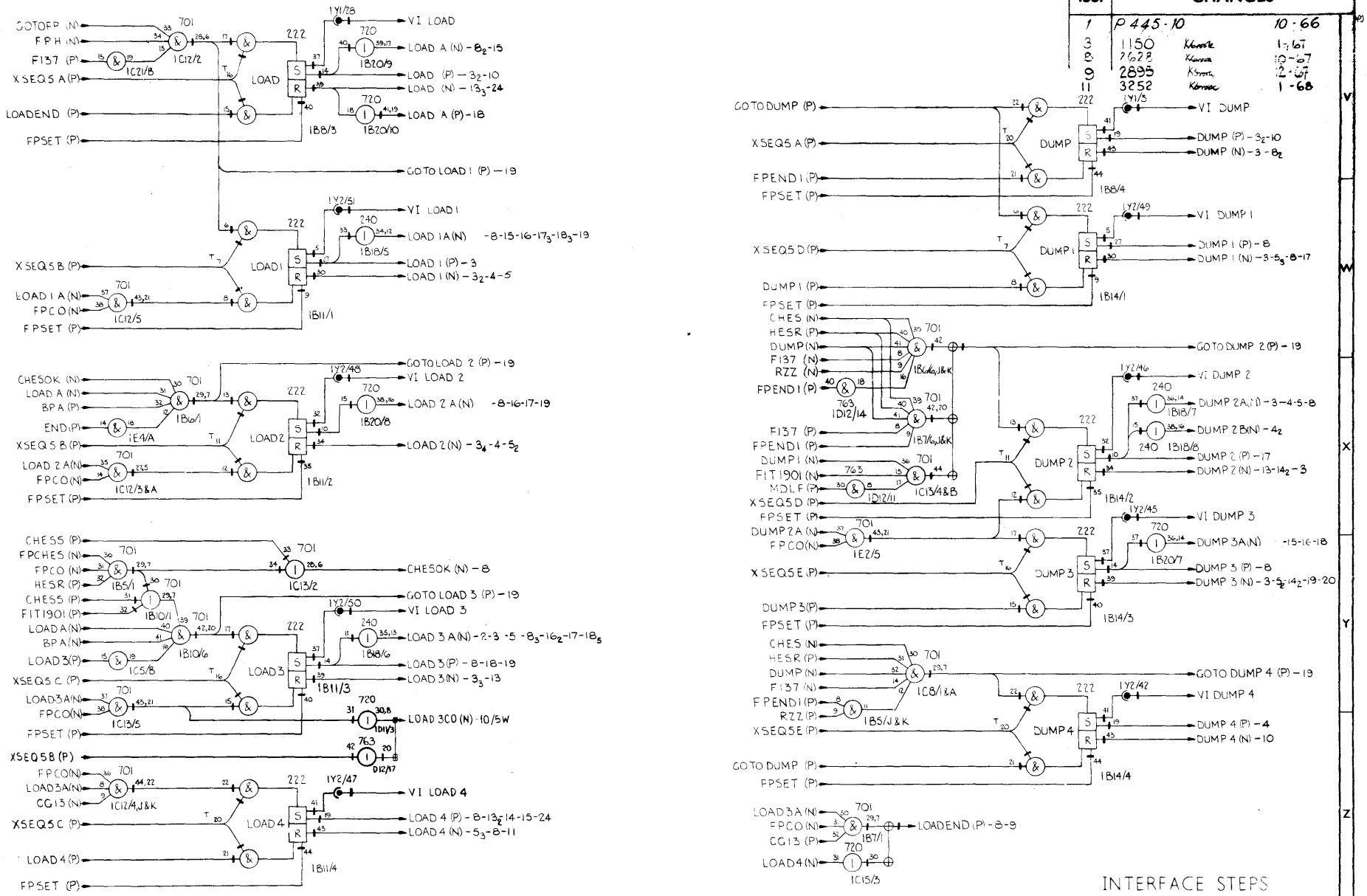
DATE 17-5-66 CKD POWE A Green

DRAWN BY S. Cooper

I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 8	7	D	ISSUE
		DIAGRAM ISSUE	SHEET	CAT	SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
					ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

B

813120 E



ISS.	CHANGES		
1	P445-10		10-66
3	1150	Kbrooke	1-67
8	2628	Kbrooke	10-67
9	2895	K System	12-67
11	3252	Kbrooke	1-68

DRAWN BY R. J. OWEN DATE 10·8·66 NOTES JED PRIME K-BEAK

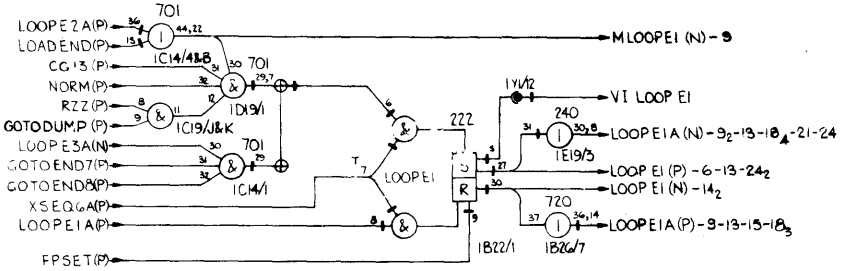
I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 11	8	D	ISSUE
		DIAGRAM ISSUE	SHEET	CAT	SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

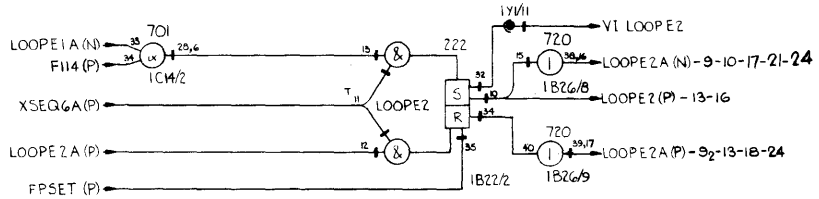
ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

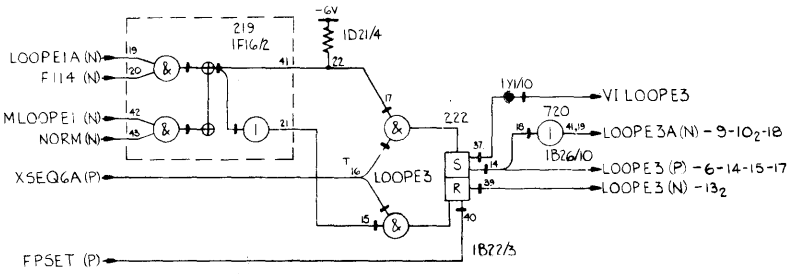
B

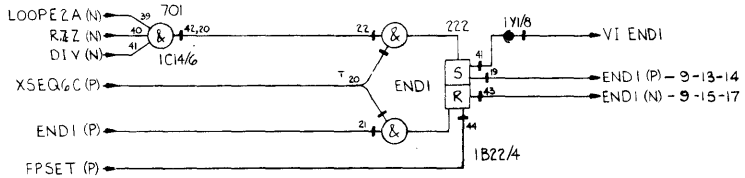
813120 E

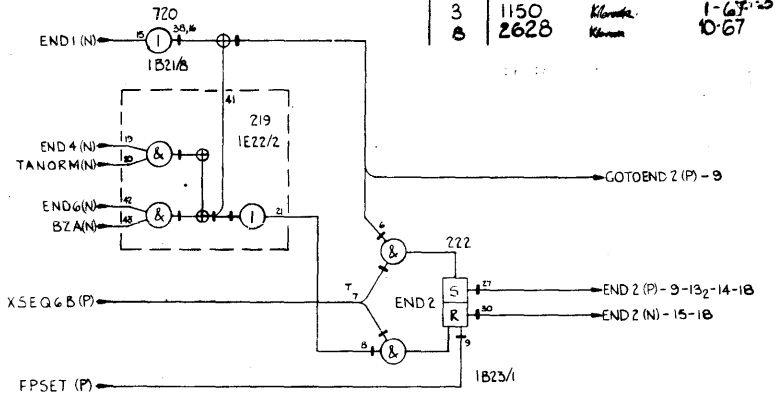
ISS.	CHANGES		
1	P445-10		10-66
3	1150	Klimeck	1-67
8	2628	Klimeck	10-67

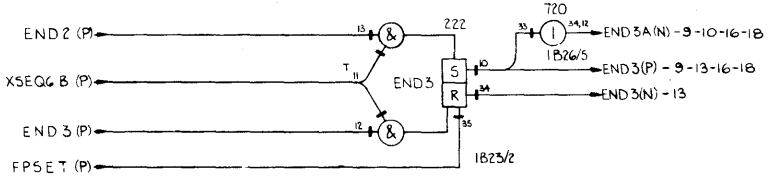


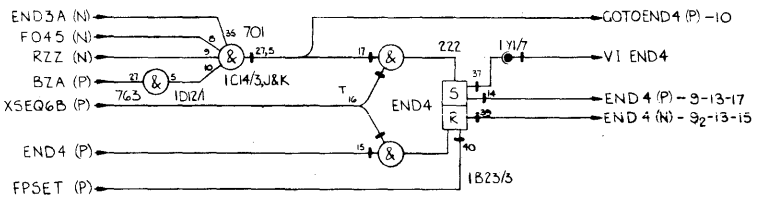


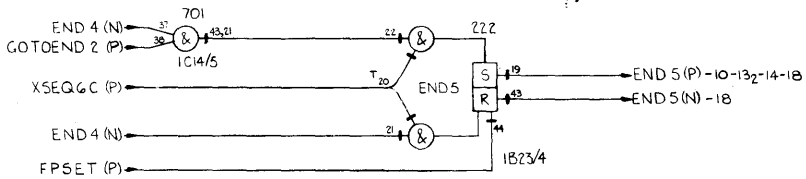








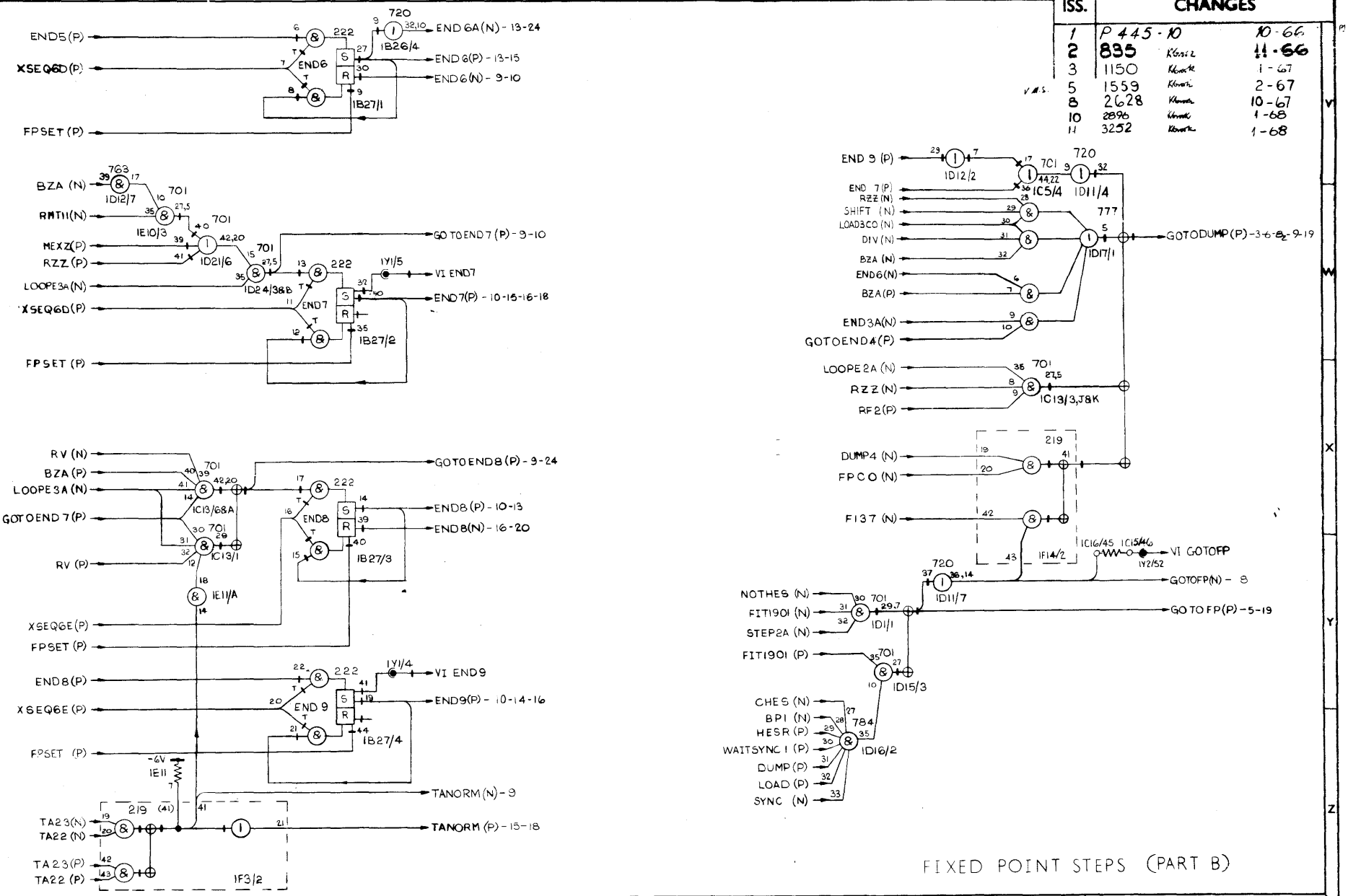




FIXED POINT STEPS (PART A)

DRAWN BY R.J. OWEN DATE 15-8-66 NOTES CKD POWE Klimeck

I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 8	9	D	ISSUE	
		DIAGRAM ISSUE	SHEET	CAT	SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	
					ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.	



ISS.	CHANGES		
1	P445-10		10-66
2	835	K Gask	11-66
3	1150	K Gask	1-67
5	1559	K Gask	2-67
8	2628	K Gask	10-67
10	2896	K Gask	1-68
11	3252	K Gask	1-68

V.A.S.

NOTES CHK FLICK K Gask

DATE 16-8-66

DRAWN BY S.A. COOPER

FIXED POINT STEPS (PART B)

I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 11 DIAGRAM / ISSUE	10 SHEET	D CAT

ISSUE

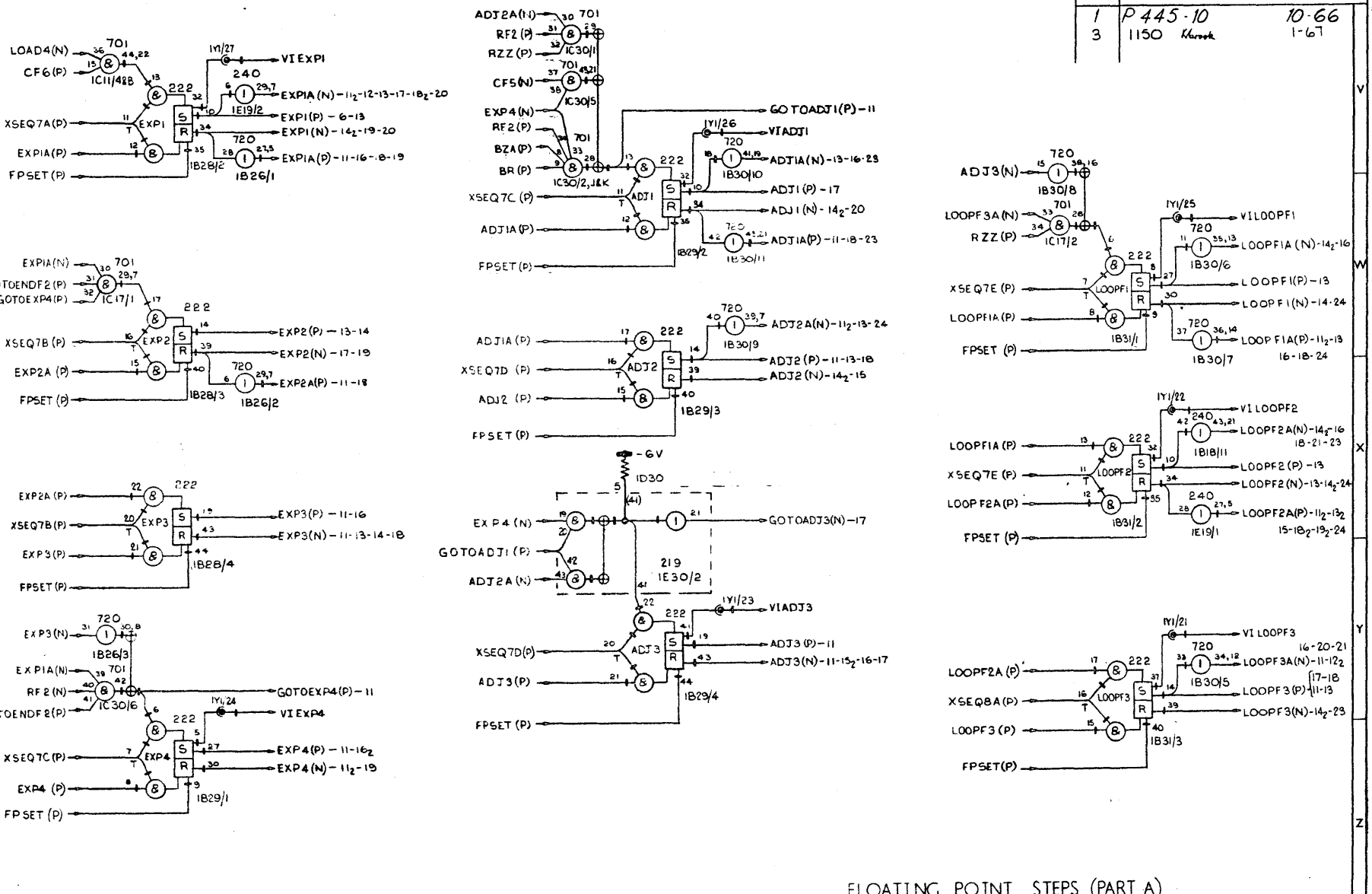
SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

B

813128 E

ISS.	CHANGES	
1	P445-10	10-66
3	1150 KCrook	1-67



FLOATING POINT STEPS (PART A)

DRAWN BY S.A.COOPER DATE 18-8-66 NOTES CKD PONE KCrook

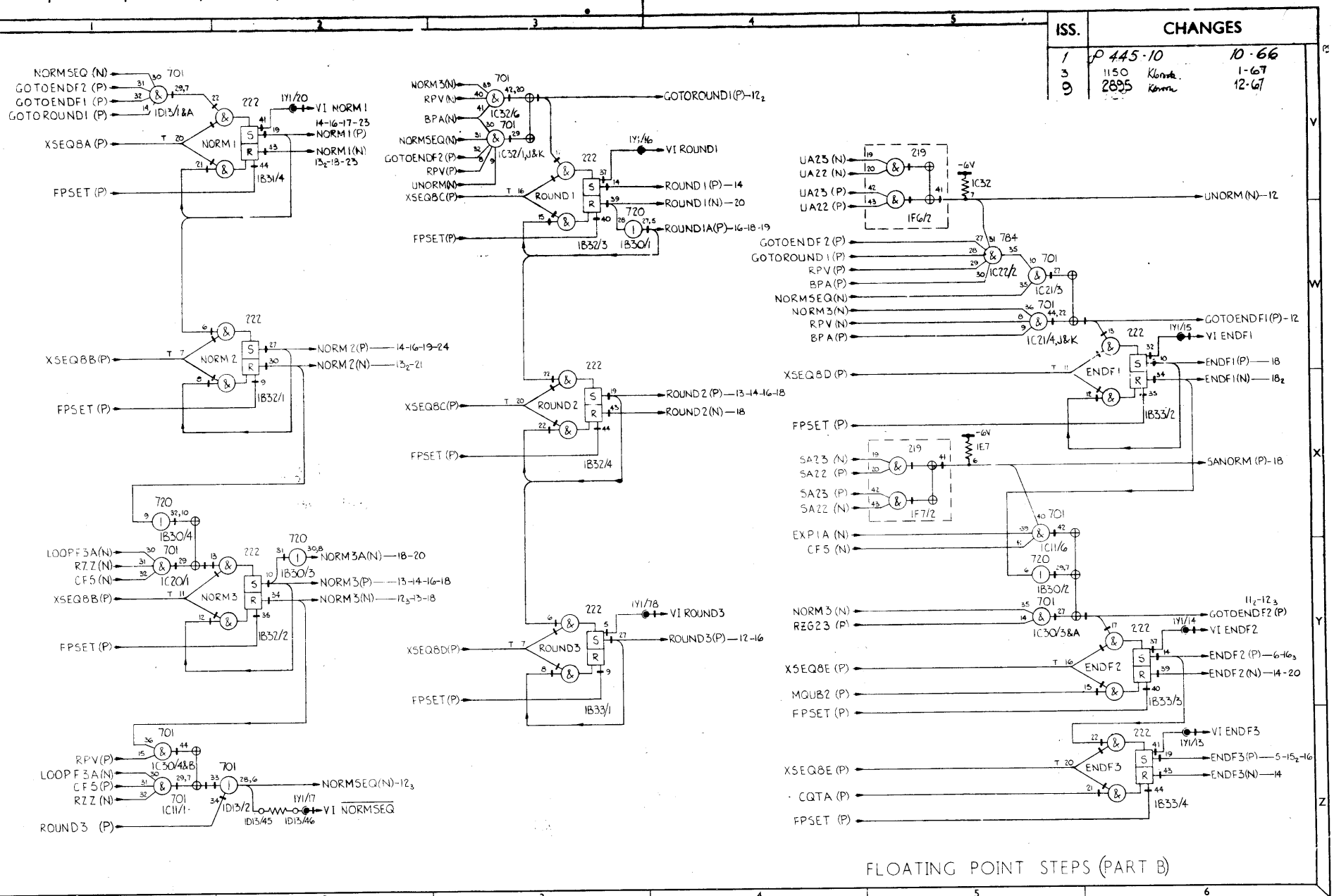
I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 3	11	D
		DIAGRAM ISSUE	SHEET	CAT

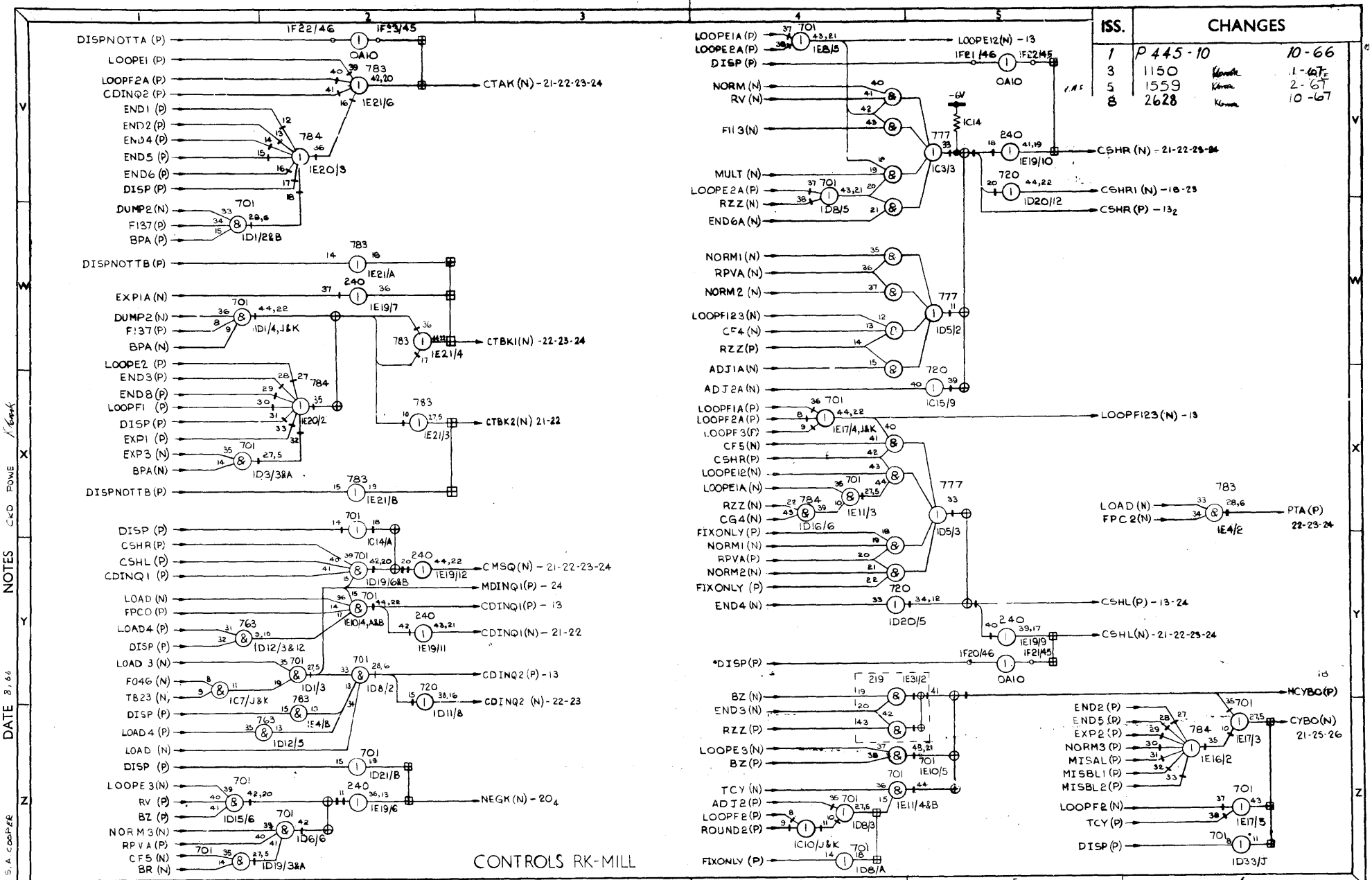
ISSUE

SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

813120 E


ISS. CHANGES
1 P 445-10 10-66
3 1150 Klonsk. 1-67
9 2895 Kenna 12-67
NORMSEQ (N)
GOTOENDF2 (P)
GOTOENDF1 (P)
GOTOROUND1 (P)
IDI3/1 &A
XSEQ8A (P)
FPSET (P)
NORM 1
IB31/4
VI NORM1
14-16-17-23
NORM1 (P)
NORM1 (N) 13₂-18-23
XSEQ8B (P)
NORM 2
IB32/1
NORM 2 (P) — 14-16-19-24
NORM 2 (N) — 13₂-21
LOOPF3A(N)
RZZ (N)
CF5 (N)
IC20/1
NORM 3
IB32/2
NORM3A(N) — 18-20
NORM3(P) — 13-14-16-18
NORM3(N) — 12₃-13-18
RPV(P)
LOOPF3A(N)
CF5(P)
RZZ (N)
IC30/4&8
IC11/1
IDI3/2
IDI3/45 IDI3/46
NORMSEQ(N)-12₃
VI NORMSEQ
ROUND3 (P)
NORM3(N)
RPV(N)
BPA(N)
NORMSEQ(N)
GOTOENDF2(P)
RPV(P)
UNORM(N)
XSEQ8C(P)
IC32/6
IC32/1,J&K
ROUND 1
IB32/3
IB30/1
GOTOROUND1(P)-12₂
VI ROUND1
ROUND 1 (P) — 14
ROUND 1 (N) — 20
ROUND1A(P)-16-18-19
XSEQ8C(P)
ROUND 2
IB32/4
ROUND 2 (P) — 13-14-16-18
ROUND 2 (N) — 18
XSEQ8D(P)
ROUND 3
IB33/1
VI ROUND3
ROUND 3 (P) — 12-16
UA23 (N)
UA22 (N)
UA23 (P)
UA22 (P)
IF6/2
-6V
IC32
UNORM (N) — 12
GOTOENDF2 (P)
GOTOROUND1 (P)
RPV (P)
BPA (P)
IC22/2
IC21/3
NORMSEQ(N)
NORM3(N)
RPV (N)
BPA (P)
IC21/4,J&K
GOTOENDF1(P) - 12
VI ENDF1
XSEQ8D (P)
ENDF1
IB33/2
ENDF1 (P) — 18
ENDF1 (N) — 18₂
FPSET (P)
SA23 (N)
SA22 (P)
SA23 (P)
SA22 (N)
IF7/2
IE7
SANORM (P)-18
EXP1A (N)
CF5 (N)
IC11/6
IB30/2
NORM 3 (N)
REG23 (P)
IC30/3&8A
11₂-12₃
GOTOENDF2 (P)
VI ENDF2
XSEQ8E (P)
ENDF2
IB33/3
ENDF2 (P) — 6-16₃
ENDF2 (N) — 14-20
MQUB2 (P)
FPSET (P)
XSEQ8E (P)
ENDF3
IB33/4
VI ENDF3
ENDF3(P) — 5-15₂-16
ENDF3(N) — 14
CQTA (P)
FPSET (P)
FLOATING POINT STEPS (PART B)
DRAWN BY R.J. OWEN
DATE 28·9·66
NOTES
CKD POWE
I·C·T
1900 SCIENTIFIC UNIT LOGIC
5016360/ 9
DIAGRAM
ISSUE 12
SHEET D
CAT
ISSUE
SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.
813120



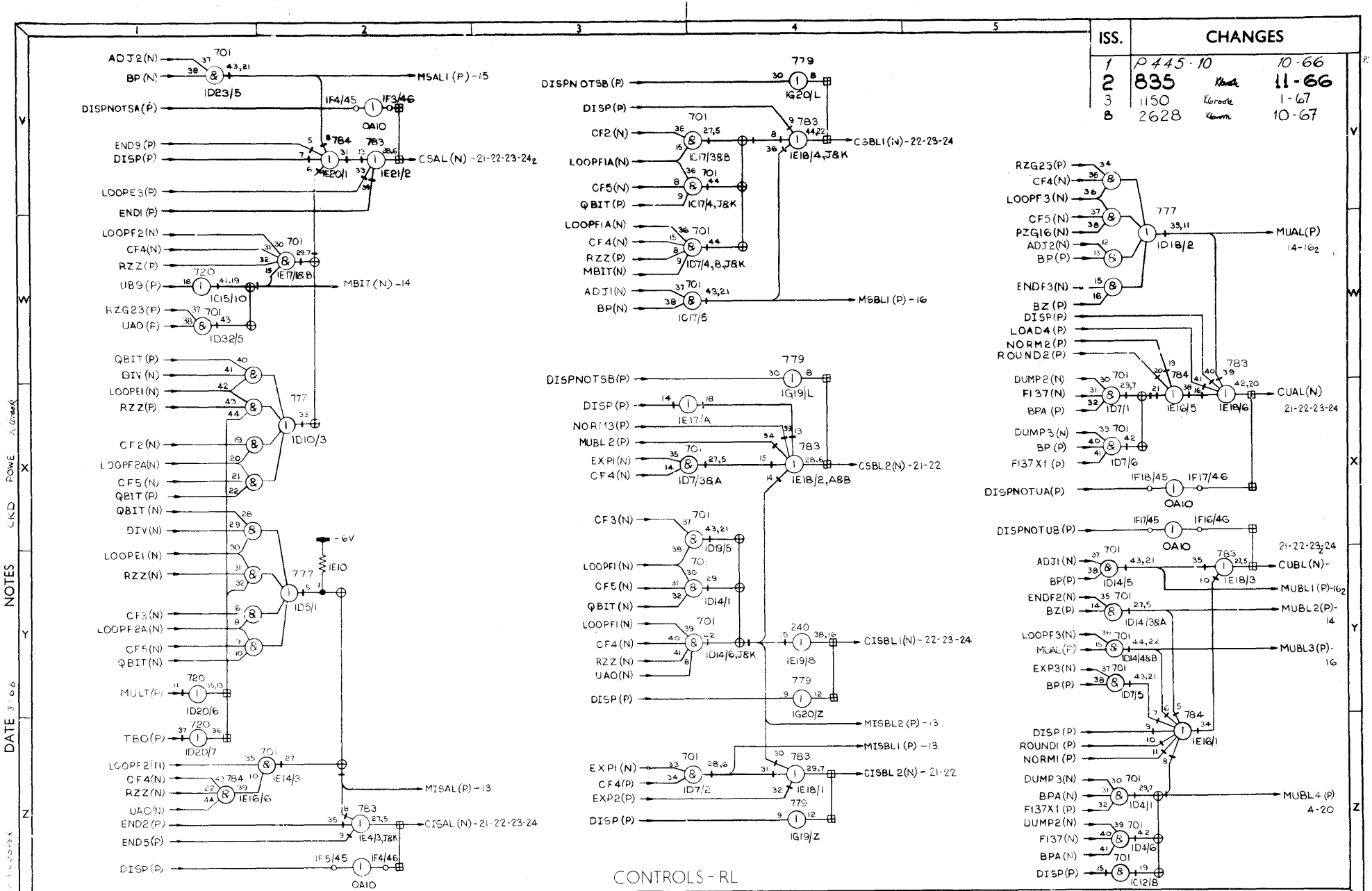
ISS.	CHANGES		
1	P445-10		10-66
3	1150		1-67
5	1559		2-67
8	2628		10-67

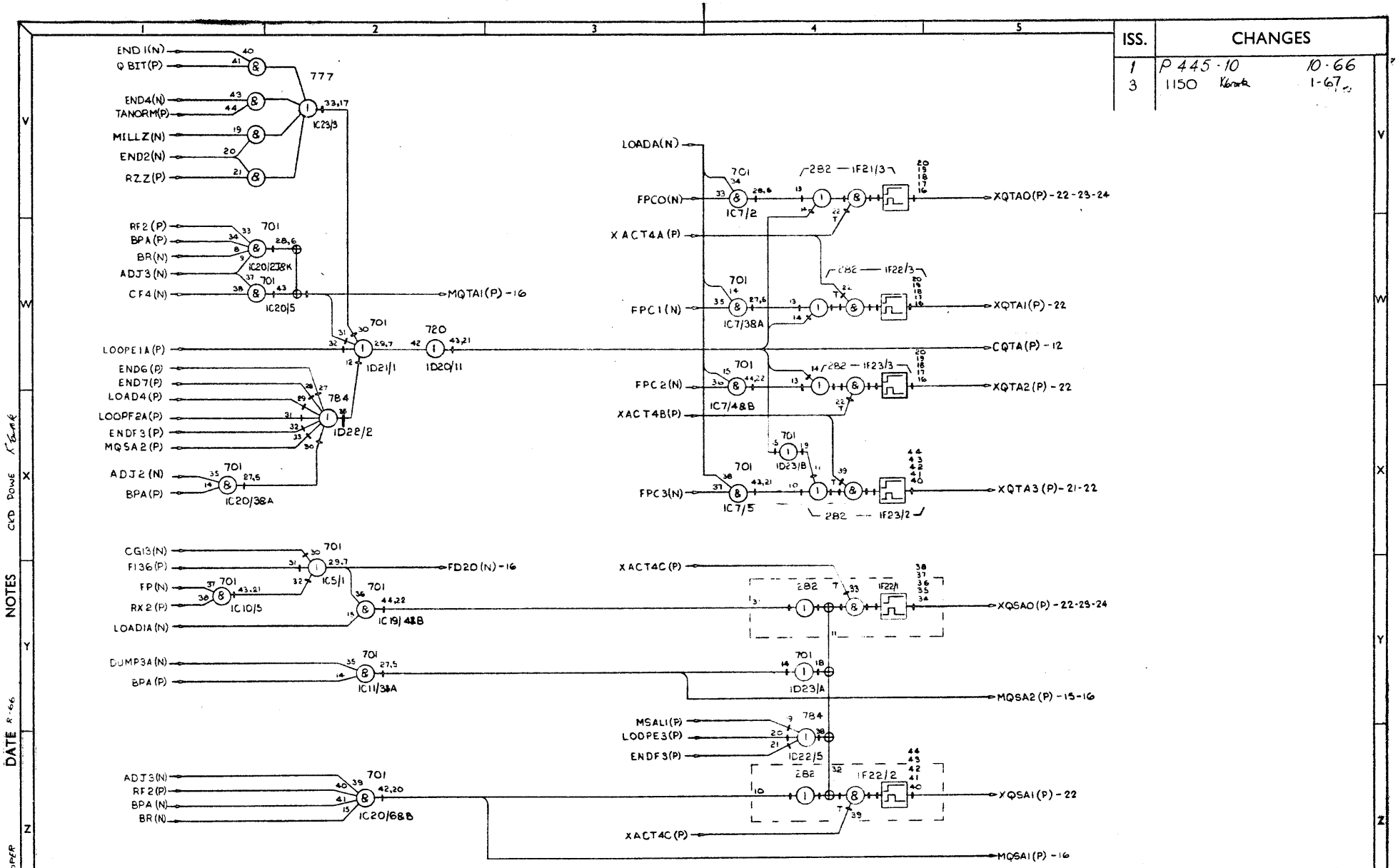
NOTES

DATE 8.66

DRAWN BY S.A COOPER

I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 8 DIAGRAM / ISSUE	13 SHEET	D CAT	ISSUE SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.


ISS. CHANGES
1 P445-10 10-66
2 835 11-66
3 1150 1-67
8 2628 10-67
ADJ2(N)
BP(N)
ID23/5
MSALI(P)-15
DISPNOTSA(P)
IF4/45
IF3/46
OA10
END9(P)
DISP(P)
CSAL(N)-21-22-23-24
IE20/1
IE21/2
LOOPE3(P)
END1(P)
LOOPF2(N)
CF4(N)
RZZ(P)
UB9(P)
IC15/10
MBIT(N)-14
RZG23(P)
UAO(P)
ID32/5
QBIT(P)
DIV(N)
LOOPEI(N)
RZZ(P)
ID10/3
CF2(N)
LOOPF2A(N)
CF5(N)
QBIT(P)
QBIT(N)
DIV(N)
LOOPEI(N)
RZZ(N)
ID5/1
-6V
IE10
CF3(N)
LOOPF2A(N)
CF5(N)
QBIT(N)
MULT(P)
ID20/6
TBO(P)
ID20/7
LOOPF2(N)
CF4(N)
RZZ(N)
IE14/3
IE16/6
MISAL(P)-13
UAO(N)
END2(P)
END5(P)
IE4/3,J&K
CISAL(N)-21-22-23-24
DISP(P)
IF5/45
IF4/46
OA10
DISPNOTSB(P)
IG20/L
DISP(P)
CF2(N)
LOOPF1A(N)
IC17/38B
CSBL1(N)-22-23-24
IE18/4,J&K
CF5(N)
QBIT(P)
IC17/4,J&K
LOOPF1A(N)
CF4(N)
RZZ(P)
MBIT(N)
ID7/4,8,J&K
ADJ1(N)
BP(N)
IC17/5
MSBLI(P)-16
DISPNOTSB(P)
IG19/L
DISP(P)
IE17/A
NORM3(P)
MUBL2(P)
EXP1(N)
CF4(N)
ID7/38A
CSBL2(N)-21-22
IE18/2,A&B
CF3(N)
ID9/5
LOOPF1(N)
CF5(N)
QBIT(N)
ID14/1
LOOPF1(N)
CF4(N)
RZZ(N)
UAO(N)
ID14/6,J&K
IE19/8
CISBL1(N)-22-23-24
DISP(P)
IG20/Z
MISBL2(P)-13
MISBL1(P)-13
EXP1(N)
CF4(P)
EXP2(P)
ID7/2
IE18/1
CISBL2(N)-21-22
DISP(P)
IG19/Z
RZG23(P)
CF4(N)
LOOPF3(N)
CF5(N)
PZG16(N)
ADJ2(N)
BP(P)
ID18/2
MUAL(P)
14-16
ENDF3(N)
BZ(P)
DISP(P)
LOAD4(P)
NORM2(P)
ROUND2(P)
DUMP2(N)
FI37(N)
BPA(P)
ID7/1
IE16/5
IE18/6
CUAL(N)
21-22-23-24
DUMP3(N)
BP(P)
FI37X1(P)
ID7/6
IF18/45
IF17/46
DISPNOTUA(P)
OA10
DISPNOTUB(P)
IF17/45
IF16/46
OA10
ADJ1(N)
BP(P)
ID14/5
IE18/3
CUBL(N)-
21-22-23-24
MUBL1(P)-16
ENDF2(N)
BZ(P)
ID14/38A
MUBL2(P)-14
LOOPF3(N)
MUAL(P)
ID14/4&B
MUBL3(P)-16
EXP3(N)
BP(P)
ID7/5
IE16/1
DISP(P)
ROUND1(P)
NORM1(P)
DUMP3(N)
BPA(N)
FI37X1(P)
ID4/1
MUBL4(P)
4-20
DUMP2(N)
FI37(N)
BPA(N)
ID4/6
DISP(P)
IC12/8
CONTROLS-RL
NOTES
DATE 8-66
DRAWN BY
I·C·T
1900 SCIENTIFIC UNIT LOGIC
5016360 / 8
DIAGRAM ISSUE
14 SHEET
D CAT
ISSUE
SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.
813120 E



ISS.	CHANGES	
1	P445-10	10-66
3	1150 Kbank	1-67

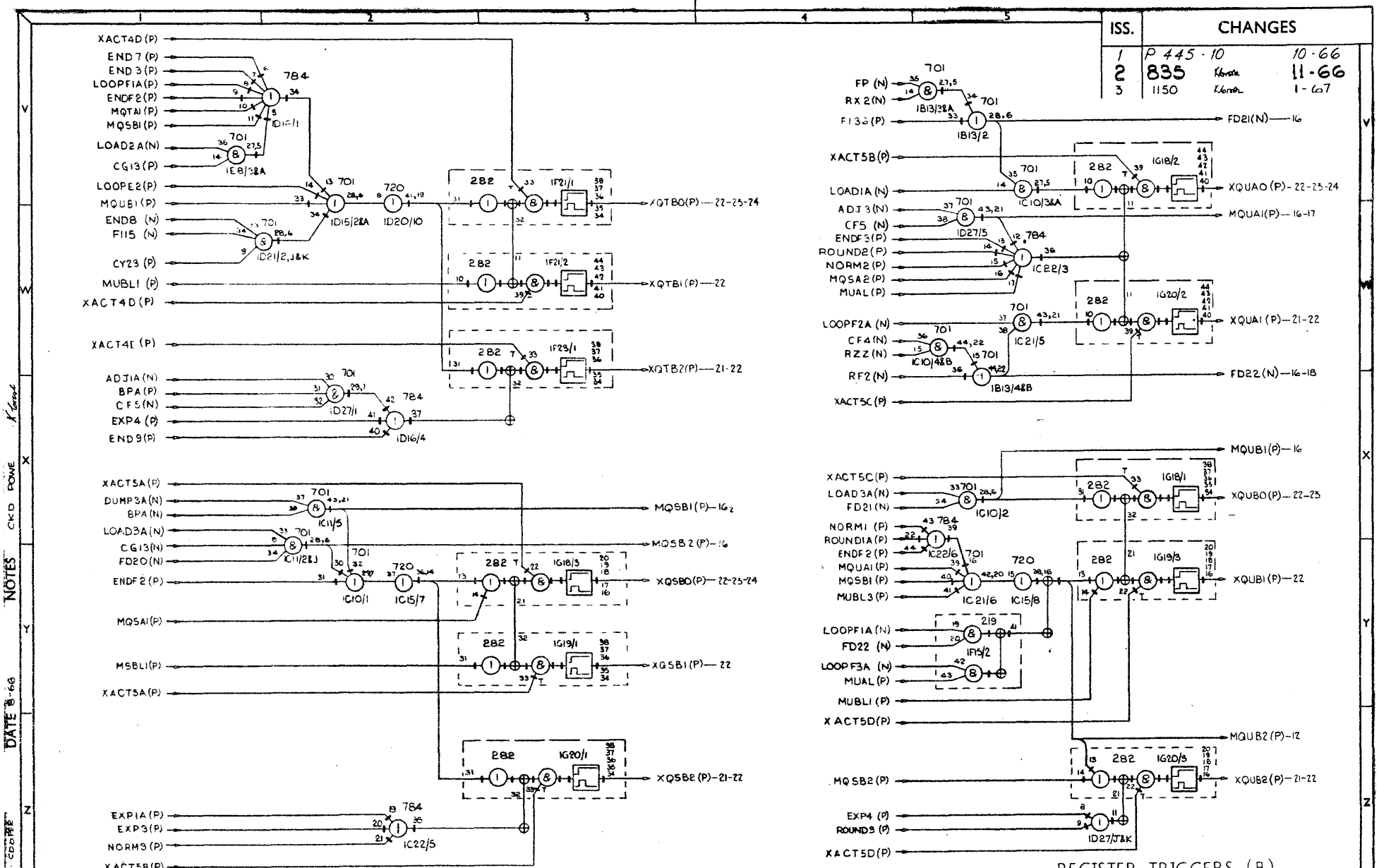
NOTES

DATE R-66

DRAWN BY D.A. COOPER

I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 3 DIAGRAM / ISSUE	15 SHEET	D CAT	ISSUE SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

813120

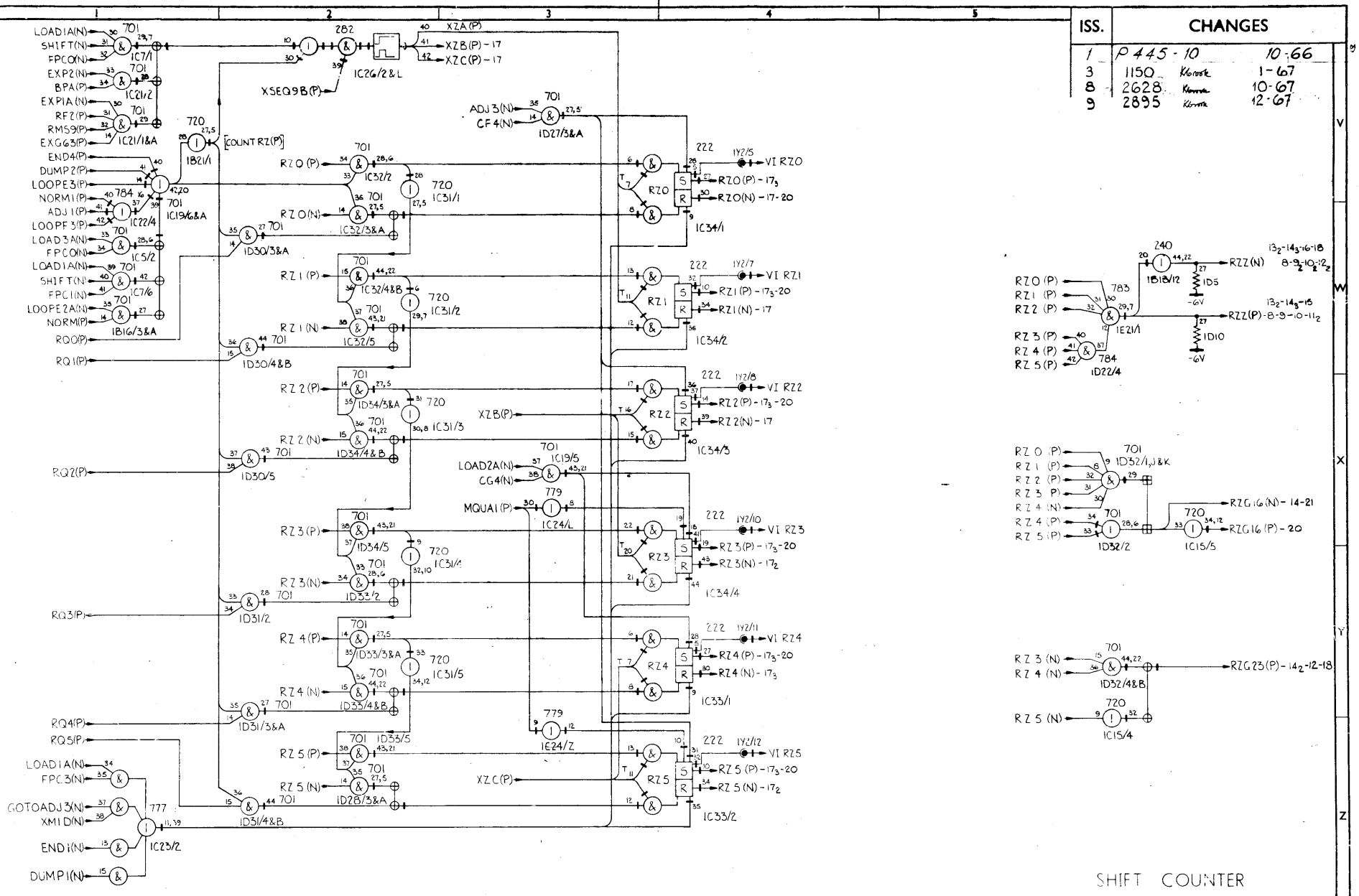


ISS.	CHANGES		
1	P 445 - 10		10-66
2	835	Kbrook	11-66
3	1150	Kbrook	1-67

DRAWN BY [illegible] DATE 8-66 CKD POME NOTES

I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360/ 3	16	D	ISSUE
		DIAGRAM ISSUE	SHEET	CAT	SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.



ISS.	CHANGES		
1	P445-10		10-66
3	1150	K Kronk	1-67
8	2628	K Kronk	10-67
9	2895	K Kronk	12-67

DRAWN BY R J OWEN DATE 16 9 66 NOTES CKD RWE K Kronk

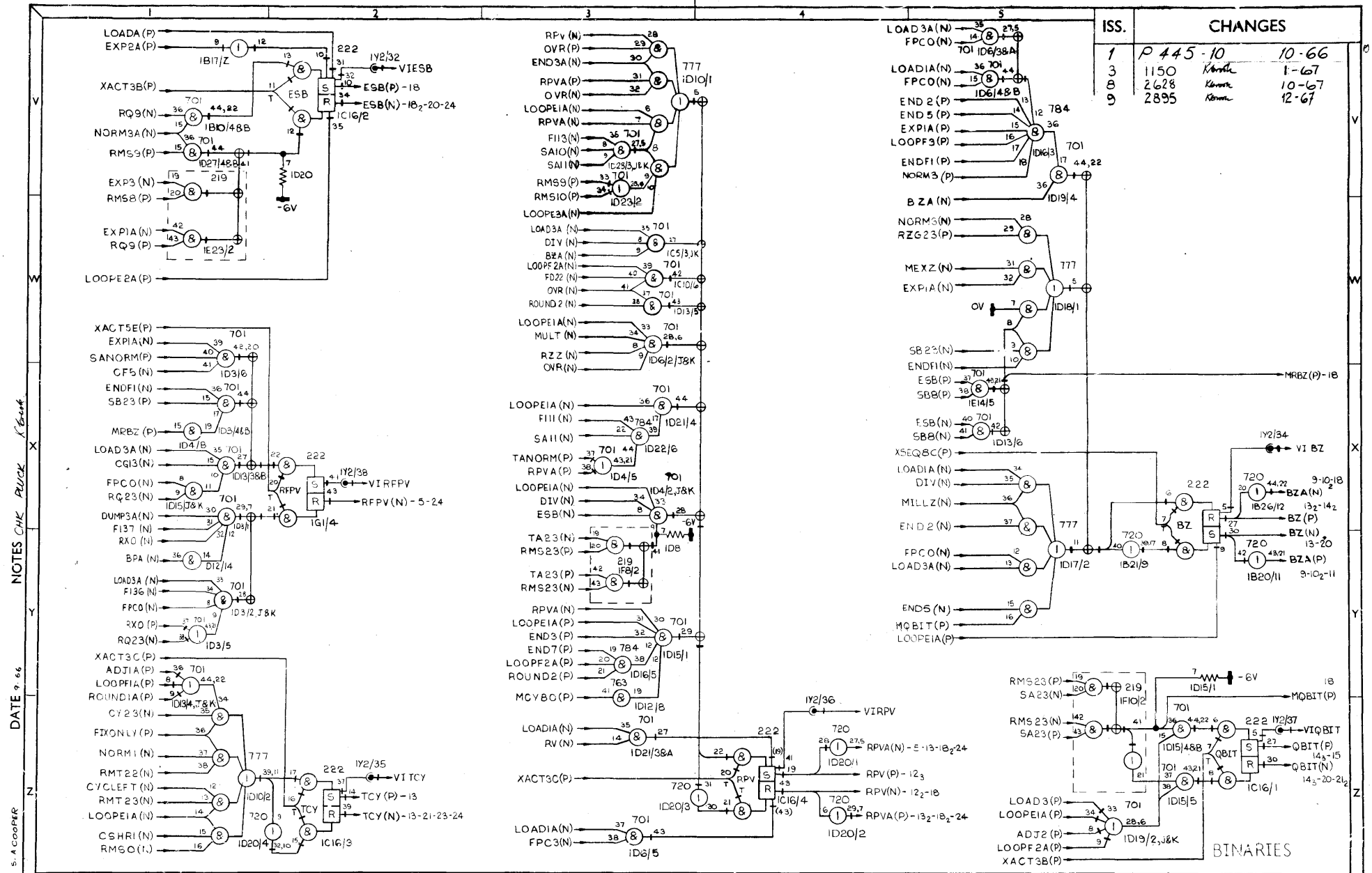
I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360/9	17	D
	B	DIAGRAM	ISSUE 1 SHEET	CAT

ISSUE

SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

8131/20 E



ISS.	CHANGES		
1	P445-10		10-66
3	1150	Kovats	1-67
8	2628	Kovats	10-67
9	2895	Kovats	12-67

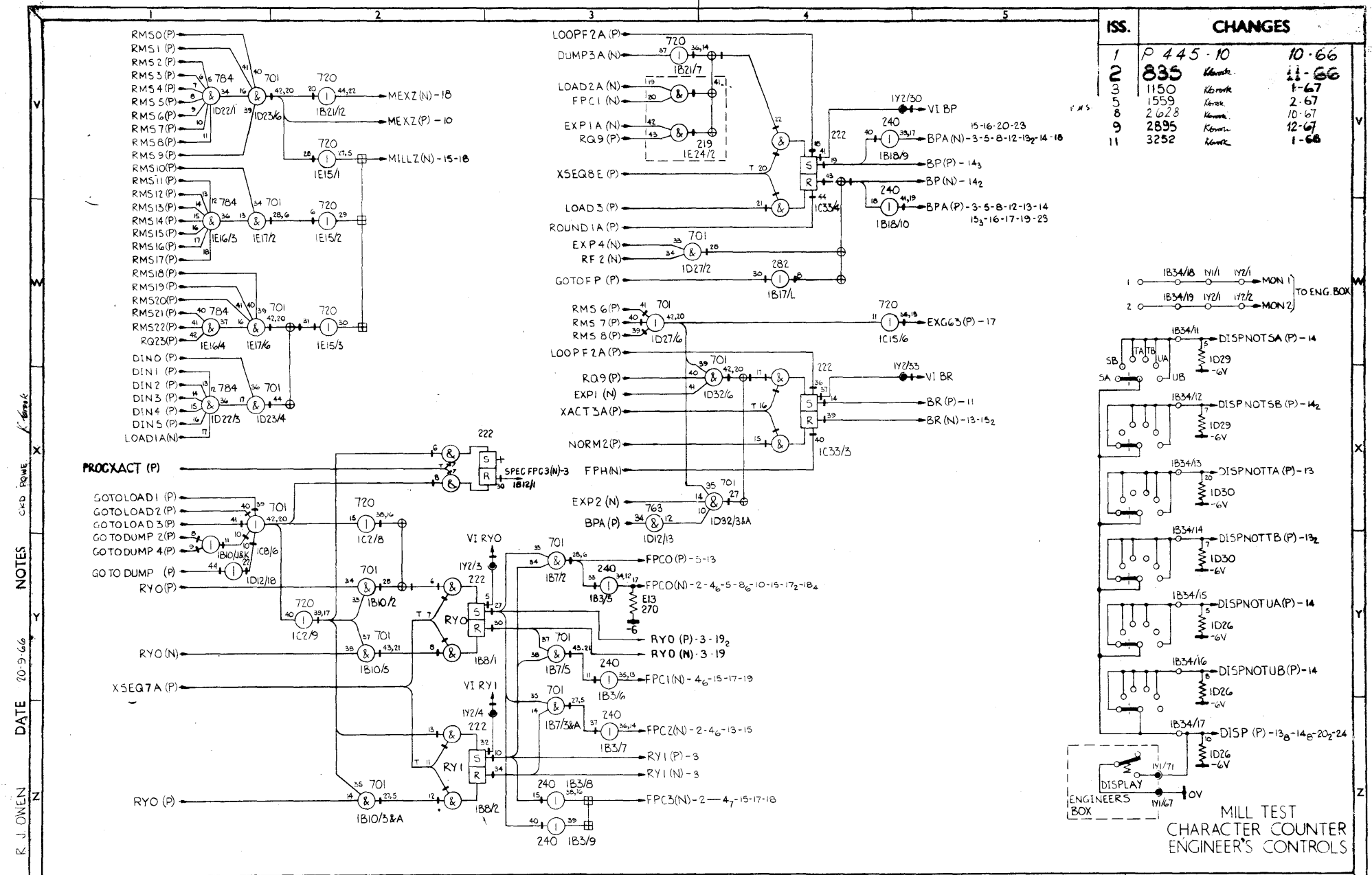
NOTES CHK RUCK K6446

DATE 9.66

DRAWN BY S. ACOOPER

I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 9 DIAGRAM / ISSUE	18 SHEET	D CAT	ISSUE SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 — ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

813120 E



ISS.	CHANGES		
1	P 445 · 10		10·66
2	835	Kbrook	11-66
3	1150	Kbrook	1-67
5	1559	Kbrook	2·67
8	2628	Kbrook	10·67
9	2895	Kbrook	12-67
11	3252	Kbrook	1-68

MILL TEST
CHARACTER COUNTER
ENGINEER'S CONTROLS

DRAWN BY R.J. OWEN DATE 20-9-66 NOTES CKD ROWE

ICT	1900 SCIENTIFIC UNIT LOGIC	5016360 / 11	19	D
		DIAGRAM ISSUE	SHEET	CAT

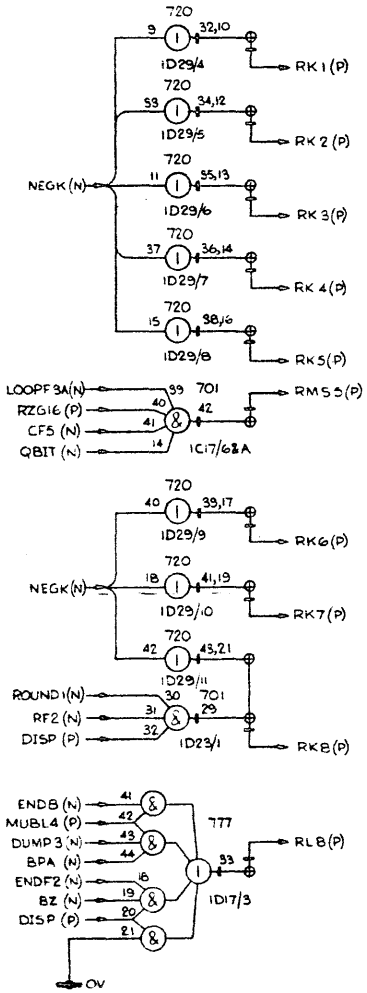
ISSUE
SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

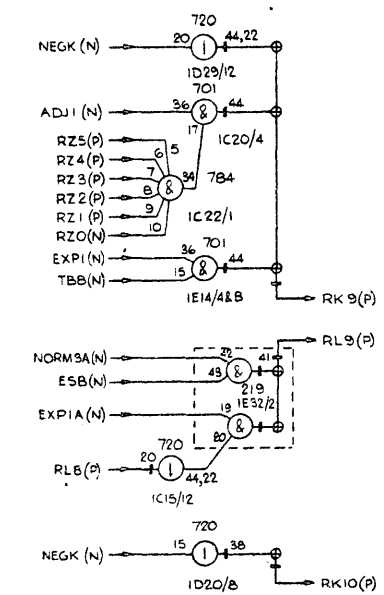
ISS.	CHANGES	
1	P 445-10	10-66
2	895 Kbrook.	11-66
3	1150 Kbrook	1-67

MILL BRICK LOCATION TABLE

BIT	219	SA	SB	TA	TB	UA	UB	'A'	'B'	'C'	IYi/D
0	IE34	IF34/1	IG34/1	IF33/1	IF32/1	IG33/1	IG32/1	ID34/6*	IG31/1	IF33	IYi/29
1	IE33	/2	/2	/2	/2	/2	/2	NA	IG31/2	IE33	32
2	IE32	/3	/3	/3	/3	/3	/3	NA	IG31/3	IE32	30
3	IE31	/4	/4	/4	/4	/4	/4	NA	IG30/1	IE31	33
4	IE30	IF31/1	IG29/1	IF30/1	IF29/1	IG28/1	IG27/1	NA	IG30/2	IE30	34
5	IE29	/2	/2	/2	/2	/2	/2	NA	IG30/3	IE29	37
6	IE28	/3	/3	/3	/3	/3	/3	NA	IG26/1	IE28	35
7	IE27	/4	/4	/4	/4	/4	/4	NA	IG26/2	IE27	38
8	IE26	IF28/1	IG24/1	IF27/1	IF26/1	IG23/1	IG22/1	NA	IG26/3	IE26	36
9	IE24	/2	/2	/2	/2	/2	/2	NA	IG21/1	IE24	39
10	IE23	/3	/3	/3	/3	/3	/3	ID24/20*	IG21/2	IE23	40
11	IE22	/4	/4	/4	/4	/4	/4	ID24/21*	IG21/3	IE22	43
12	IF20	IG16/1	IG15/1	IF18/1	IF17/1	IG14/1	IG13/1	IF24/22*	IG17/1	IF20	41
13	IF19	/2	/2	/2	/2	/2	/2	IF24/21*	IG17/2	IF19	44
14	IF16	/3	/3	/3	/3	/3	/3	IE15/17*	IG17/3	IF16	42
15	IF15	/4	/4	/4	/4	/4	/4	IE15/19*	IG12/1	IF15	45
16	IF14	IG11/1	IG10/1	IF12/1	IF11/1	IG8/1	IG7/1	IE15/14*	IG12/2	IF14	46
17	IF13	/2	/2	/2	/2	/2	/2	IE15/13*	IG12/3	IF13	49
18	IF10	/3	/3	/3	/3	/3	/3	IE11/21*	IG6/1	IF10	47
19	IF8	/4	/4	/4	/4	/4	/4	IE11/20*	IG6/2	IF8	50
20	IF7	IG4/1	IG3/1	IF5/1	IF4/1	IG2/1	IG1/1	IE3/16*	IG6/3	IF7	48
21	IF6	/2	/2	/2	/2	/2	/2	IE3/17*	IG5/1	IF6	51
22	IF3	/3	/3	/3	/3	/3	/3	IE3/19*	IG5/2	IF3	52
23	IF2	/4	/4	/4	/4	/4	—	NA	IG5/3	IF2	55

BOARD 219 MONITOR POINTS
1 RQ (P)
2 RQ (N)
3 RL (P)
4 RK (P)
5 RMG (N)
6 RMT (N)
7 OUTPUT EL.2
8 CY (P)
9 RMS (P)





THESE ARE ALL ATTACHMENTS TO THE MILL. TRUE OUTPUTS ARE ON THE MILL DRAWING SHEET 22.

NOTE
WITH BRICK SOURCES SUCH AS ID34/6*, THE ASTERISK DENOTES THAT 6 APPLIES TO THE PIN NO NOT THE MONITORING POINT ON THE BRICK.

MILL BRICK LOCATION TABLE
MILL ATTACHMENTS

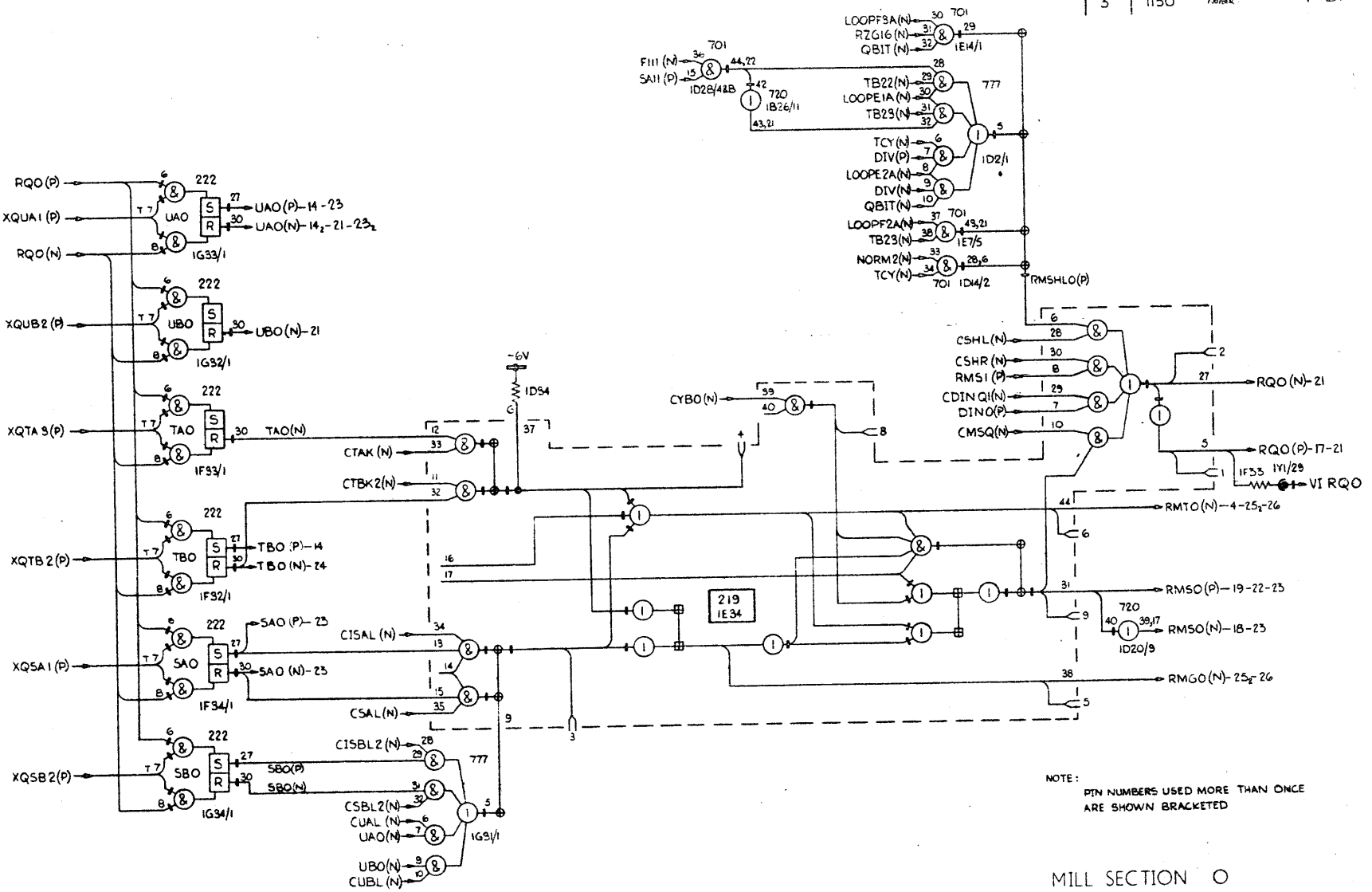
NOTES Chk Alex. Kbrook
DATE SEPT 66
DRAWN BY R.J. POWE

I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 DIAGRAM	3 ISSUE	20 SHEET	D CAT

ISSUE
SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

843120 E

ISS.	CHANGES	
1	P445-10	10-66
2	835 Remark	11-66
3	1150 Remark	1-67



NOTE:
PIN NUMBERS USED MORE THAN ONCE ARE SHOWN BRACKETED

MILL SECTION O

NOTES: INK BLACK KGM16

DATE SEPT '66

DRAWN BY R.J. POWE

I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 3	21	D
		DIAGRAM ISSUE	SHEET	CAT

ISSUE

SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

813120 E

ISS.	CHANGES		
1	P445-10		10-66
3	1150	Komrr	1-67

SIGNAL VERSIONS

SIGNAL	*=0	*=1	*=2	*=3	*=4	*=5
CDINQ*		17-0	22-18			
CISBL*		23-9	8-0			
CSBL*		23-9	8-0			
CTBK*		23-9	8-0			
XQSA*	23-12	11-0				
XQSB*	23-16	15-3	8-0			
XQTA*	23-18	17-12	11-6	5-0		
XQTB*	23-16	15-9	8-0			
XQUA*	23-12	11-0				
XQUB*	22-16	15-9	8-0			
DIN*	0,6,12,18	1,7,13,19	2,8,14,20	3,9,15,21	4,10,16,22	5,11,17

ELEMENT			
1	2	3	4
28	31	36	18
6	13	17	22
7	11	16	20
8	12	15	21
9	35	40	44

222 PIN NUMBERS

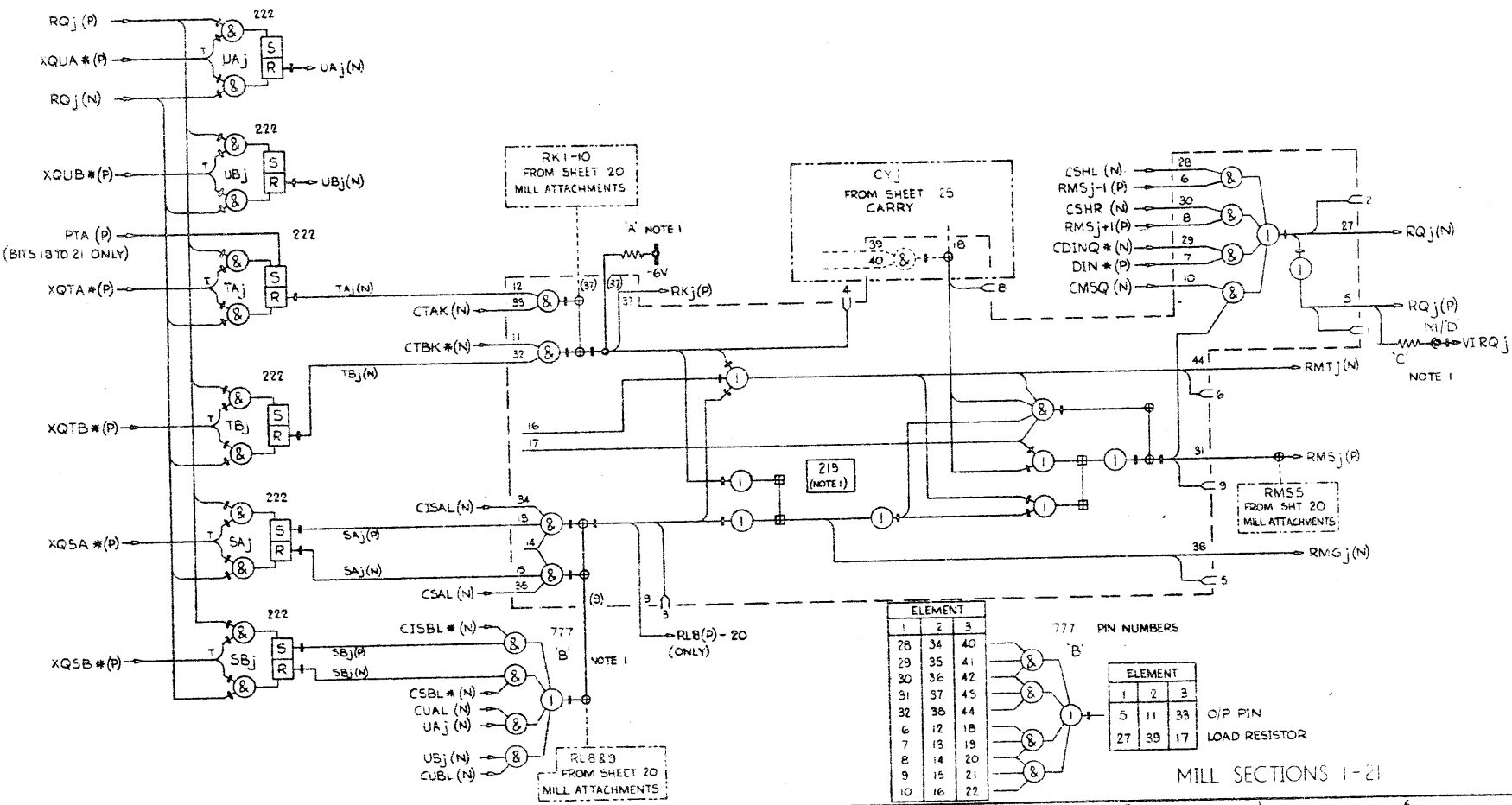
ELEMENT			
	2	3	4
27	10	14	19
30	34	39	43

NOTES.

1/ FOR LOCATION OF CARDS AND ELEMENT USED ON EACH MILL SLICE REFER TO TABLE ON SHEET 20

2/ FOR j SUBSTITUTE MILL BIT Nº

3/ PIN NUMBERS USED MORE THAN ONCE ARE SHOWN BRACKETED



ELEMENT		
1	2	3
28	34	40
29	35	41
30	36	42
31	37	43
32	38	44
6	12	18
7	13	19
8	14	20
9	15	21
10	16	22

ELEMENT		
1	2	3
5	11	33
27	39	17

DRAWN BY R.J. POWE | DATE SEPT '66 | NOTES CKD K Gould

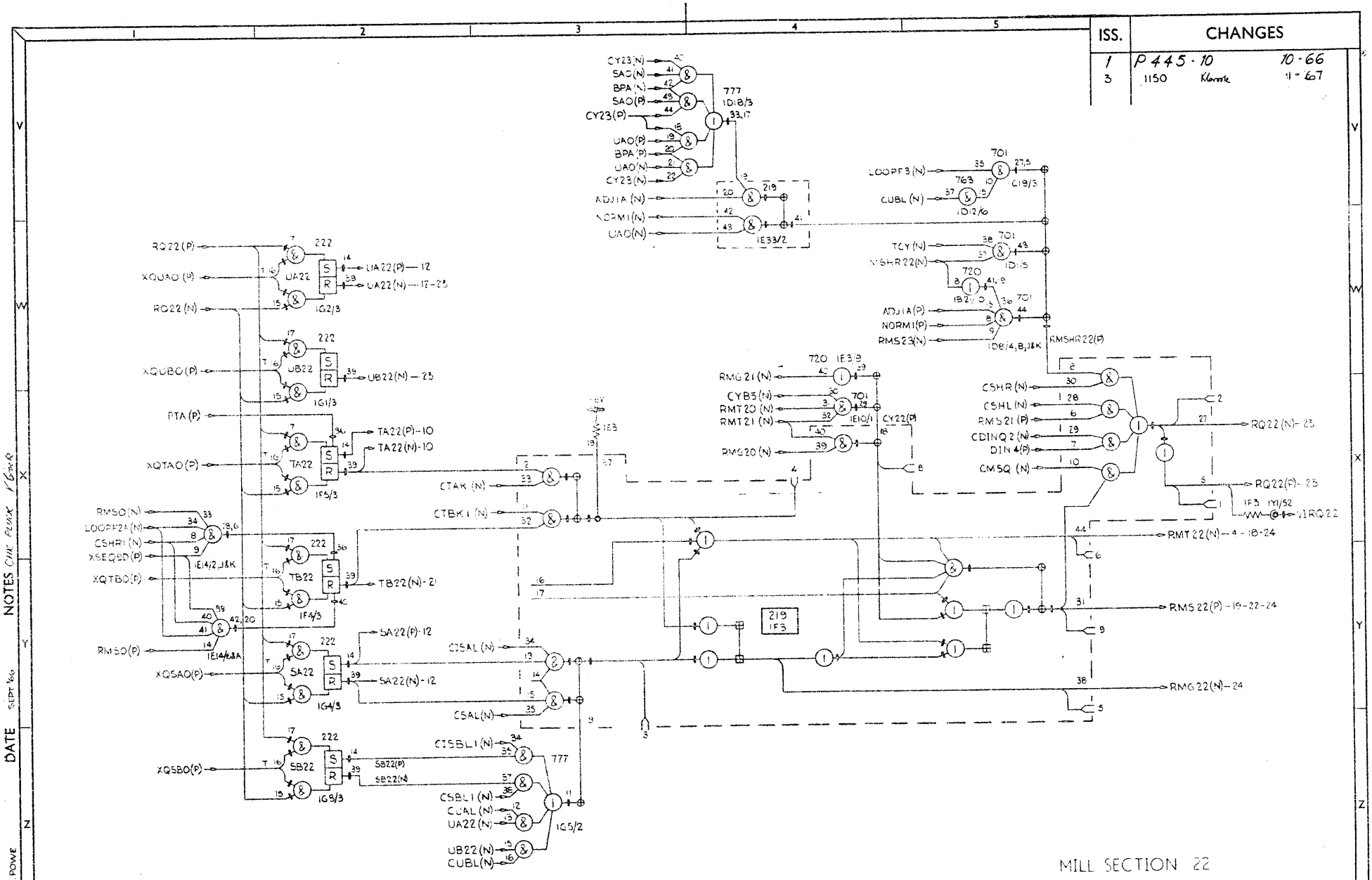
I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 3 DIAGRAM ISSUE	22 SHEET	D CAT

ISSUE

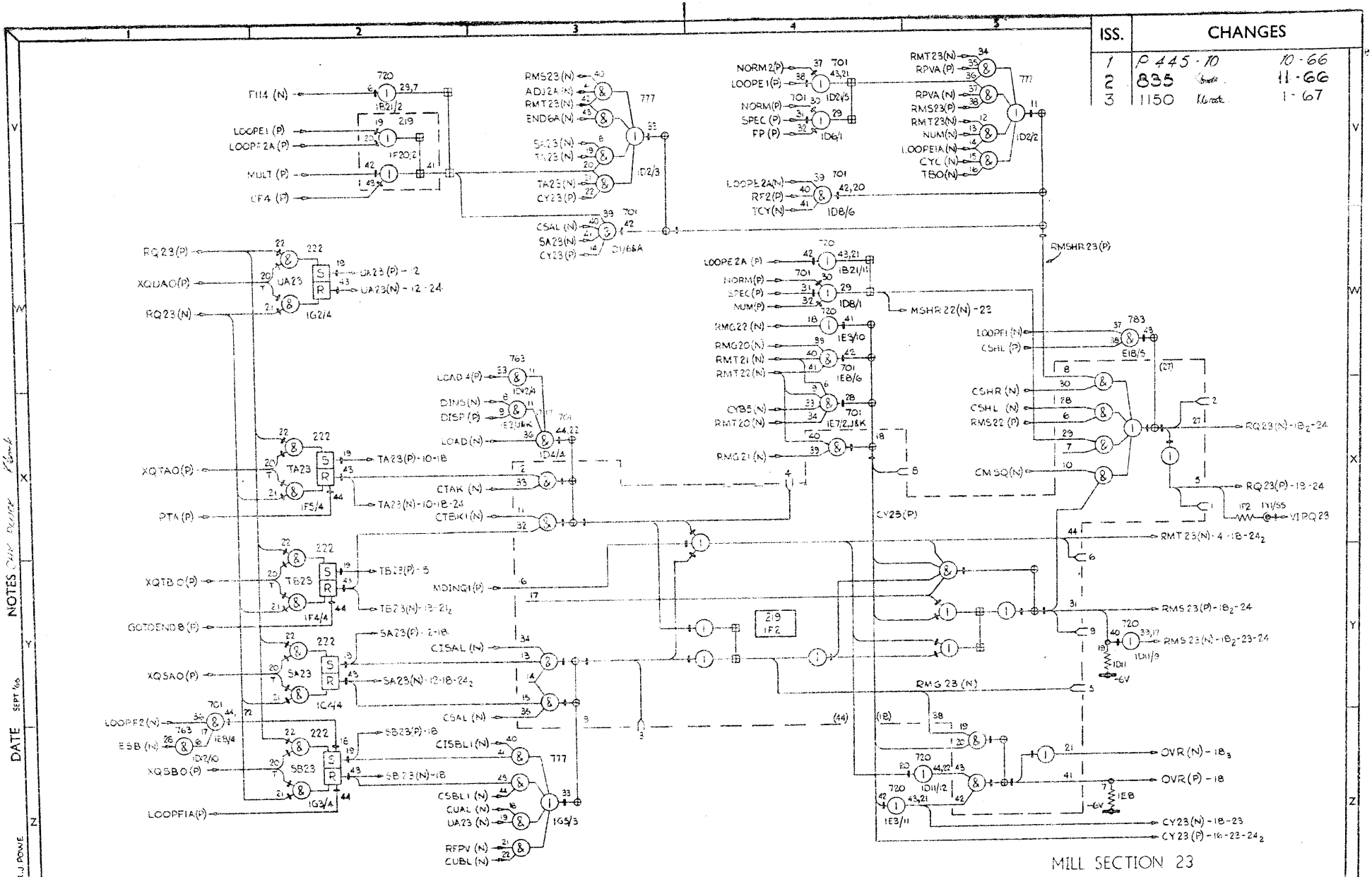
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ISSUE																														

ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

813120 E


ISS. CHANGES
1 P445·10 10·66
3 1150 Klamrk 4·67
NOTES CHK PUNK K Gard
DATE SEPT '66
DRAWN BY R.J POWE
MILL SECTION 22
I·C·T
1900 SCIENTIFIC UNIT LOGIC
5016360 / 3
DIAGRAM ISSUE
23 SHEET
D CAT
ISSUE
SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

ISS.	CHANGES	
1	P 445 · 10	10 · 66
2	835 Issue	11 · 66
3	1150 Issue	1 · 67

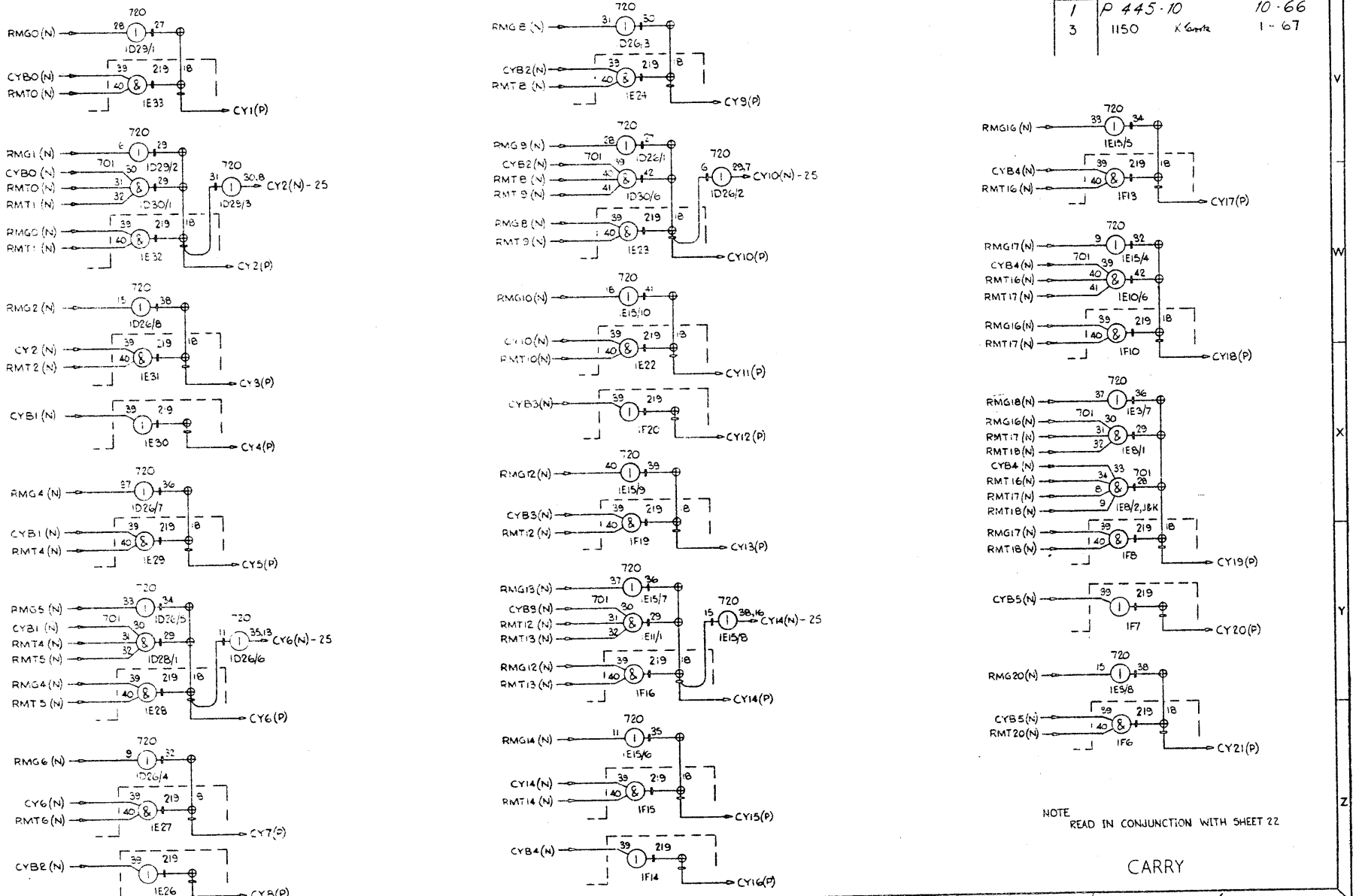


I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 3 DIAGRAM / ISSUE	24 SHEET	D CAT

ISSUE

SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.																														

S13120 E



ISS.	CHANGES	
1	P 445-10	10-66
3	1150 K Goode	1-67

NOTES CHK PLMR K Goode
DATE SEPT '66
DRAWN BY R.J. POWE

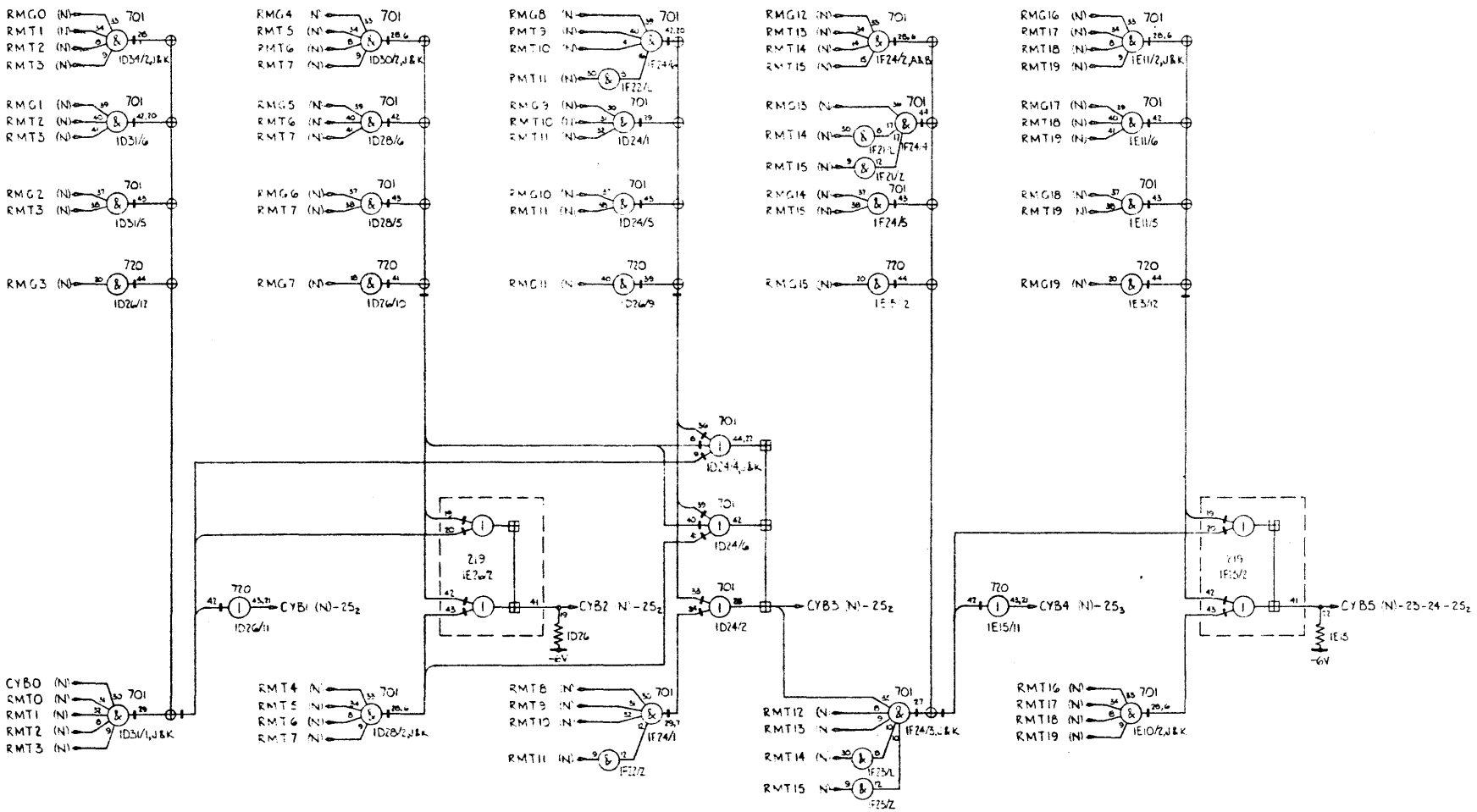
I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 3	25	D	ISSUE
		DIAGRAM	ISSUE	SHEET	CAT

SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

813120 E

ISS.	CHANGES		
1	P 445-10		10-66
3	1150	Kbrook	1-67



BLOCK CARRY

NOTES C&D POWE

DATE 9.8.66

DRAWN BY R. J. OWEN

I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 3	26	D
		DIAGRAM ISSUE	SHEET	CAT

ISSUE

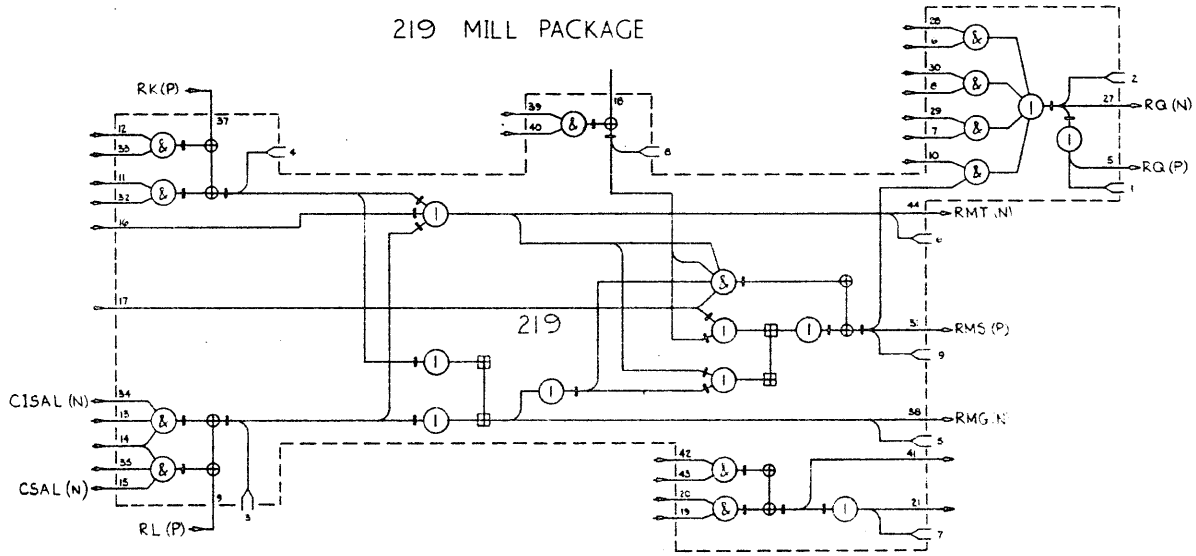
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

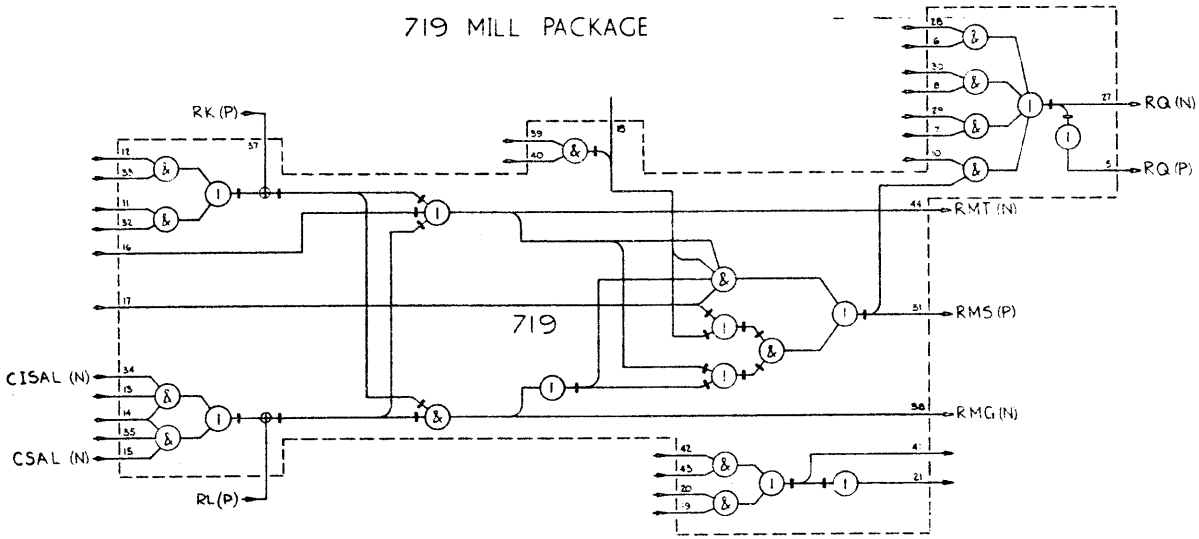
843120 E

ISS.	CHANGES	
1	P445-10	10-66

219 MILL PACKAGE



719 MILL PACKAGE



NOTES

ABOVE IS THE INTERNAL LOGIC ARRANGEMENT OF THE 219 SILICON MILL SLICE CARD. IT IS EXTERNALLY BOTH FUNCTIONALLY AND ELECTRICALLY IDENTICAL WITH THE 719 GERMANIUM MILL SLICE CARD WHICH USES THE DOUBLE-DIODE LOGIC AS SYMBOLISED BELOW.
NOTE THAT THE CARD IS ALSO USED AS A GENERAL GATING CARD, e.g. ON SHEET 4, AND IS ALWAYS DRAWN IN 219 FORM.
MONITOR POINTS AS SHOWN ABOVE ARE PROVIDED ON 219 ONLY.
THE TWO CARDS ARE FULLY INTERCHANGEABLE.

⊂n DENOTES MONITOR POINT No. n FROM TOP OF PACKAGE.

MILL PACKAGE

NOTES CHK Alick Knight. DATE 3-10-66 DRAWN BY R. J. OWEN

I·C·T	1900 SCIENTIFIC UNIT LOGIC	5016360 / 1	27	D
		DIAGRAM ISSUE	SHEET	CAT

ISSUE
SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
ISSUE NUMBERS OF OTHER SHEETS AT THE TIME OF ISSUING THIS SHEET.

613120

INTERFACE PROCEDURES.

Notes:

Avoids blocking RQ at C0
Incoming char. is spread over RQ
Last char. + 18 bits of TA ⟶ RQ

Necessary to test sign of divisor
First division loop flag

Keeps RADC in step with RY
Data word or N on 1902-3
Data word on 1901
N on 1901
Adds datum to X on RJ

+ Represents logical OR
• Represents logical AND

LOADING

The loading sequence is entered by GOTOFP from the Processor.
A single binary LOAD is on during the whole sequence even when hesitations are in progress.

LOAD does:
SET TA23-18 to 011111 at C2
CDINQ1, INHIBIT CMSQ at C3, C2, C1
CDINQ2, CMSQ at C0
TA ⟶ RK
DIN5 ⟶ RK23 [Only applies at C0]
SET ESB

LOAD•$\overline{BP3}$ [i.e. Load not in hesitation] does:
CONTINUE CYCLE
TRIGGER TA CHARACTER-WISE
ALLOW RY to RADC on 1902-3
CBCH if 1902-3
CB if 1901•$\overline{(LOAD1•CG11)}$
CAL if 1901•LOAD1•CG11
CDJ if $\overline{LOAD1}$•CG13

DATUM is added to N as appropriate in STEP 1 by CP control
RESC 1902-3 allow MDLF for CG4 and CG13 (not 130, 131)
1901 Set FPRESC if MDLF•(OBJ + RMB)•C2

GOTOFP is CHES•$\overline{HESR}$•BP1 on 1902-3
STEP2 on 1901

LOAD1 loads n or N
LOAD2 loads x or x* or does A + 1 ⟶ N
LOAD3 loads x * or x or n*
LOAD4 restores TA

CHANGES
ISS. 1 3
P445-10 10-66
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5016360 DIAGRAM
1900 SCIENTIFIC UNIT LOGIC
I.C.T

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INTERFACE PROCEDURES
LOAD1 TO LOAD4

Notes:	
FPAR is F132-F135	LOAD1 (LOAD n OR N) LOAD (N) to SA if (CG4 + F136 + FPAR•$\overline{RX2}$) LOAD (N) to UA if (F136 +(FPAR•RX2)) TRANSFER N to SA if CG11
RZ must be 63 before RQ ⟶ RZ	CLEAR RZ at C3 COUNT RZ if SHIFT
	RQ to RZ at C0 if SHIFT
Clear FP accumulator Zero divisor. Finish at LOAD3	INHIBIT DIN if (F136•RX0) SET BZ if (MILLZ•DIV) at C0
	CLEAR RPV at C3. COPY RV to RPV
	CHES at C0
BP is set off by entry GOTOFP	GOTO LOAD2 [CHES•$\overline{HESR}$•LOAD•$\overline{BP}$]
	LOAD2 [LOAD (X) OR (X + 1) OR DO A + 1 ⟶ N]
	LOAD (X) TO TB if MULT LOAD (X*) to TB if $\overline{MULT}$•$\overline{CG13}$ A + (1 at C3) ⟶ A, N if CG13
Clear l.s. half of operand Reduces to 23 in LOAD3 Hesitation return flag Hesitation corrupts RN on 1901	INHIBIT DIN if F114 SET RZ to 24 if CG4 SET BP at C1 CHES if 1902-3
	GOTO LOAD3 [((CHES•$\overline{HESR}$) + 1901)•LOAD•BP]
	LOAD3 [LOAD OTHER HALF]
	LOAD (X) if CG11 + F044 + F045 } to TA (LOAD REGISTER) LOAD (X*) if F042 LOAD (N) if CG13 to: UBE, SB if F136 + FPAR•$\overline{RX2}$) UBF, TB if F136 + (FPAR•RX2)
Clear RQ All 1's to RQ & RMS23 for QBIT setting	INH. DIN if F040 + F041 + (F046•$\overline{TB23}$) + (F136•RX0) CLOSE ALL RQ GATES if (F046•TB23) & FORCE RMS23
Rounding constant Exponent sign is inverted in program	FORCE DIN4 at C0 if F041 INVERT DIN2 at C2 if CG13
	COUNT RZ at C0
Overflow if divisor zero Compare dividend/divisor sign for first mill operation	SET RPV if BZ SET QBIT if (RMS23 = SA23)
Floating point overflow if indicated in n* "First time" flag for normalise F114/5	SET RFPV if CG13•RQ23•C0 RESET IF F136•C0•(RX0 + $\overline{RQ23}$) RESET BP SET BZ at C0
No function to do.	GO TO DUMP if (DIV•BZ) + (SHIFT RZZ) LOADEND if $\overline{CG13}$•C0
Begin loop if multiply, divide or shift	GOTO LOOPE1 if (LOADEND•$\overline{CG13}$•$\overline{NORM}$•$\overline{FPEND}$)
Test exponent first if F114/5	GOTO LOOPE3 if (LOADEND•NORM) GOTO LOAD4 if CG13
	LOAD4 [RESTORE TA]
	UA ⟶ TA STEPEND [PROCESSOR]
Function completed	FPEND if F136 LOADEND if $\overline{F136}$
Begin function if F132-F135	GOTO EXP1 if $\overline{F136}$

\+ Represents logical OR

• Represents logical AND

CHANGES

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DIAGRAM

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1	P445 · 10 10-66
3	1150 Kbrook 1-67
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INTERFACE PROCEDURES.

STORING

The writing of results to the store is identified by a single binary DUMP which is on during the whole sequence even when hesitations are in progress. The DUMP sequence is entered by GOTODUMP in the fixed point orders which also does RESYNC, and by GOTOFP•F137. DUMP is switched off by FPEND.

DUMP1 TO DUMP4

Notes:

Add datum to X on RJ

DUMP does CDJ and INHIBIT MDLF if $\overline{CG13} \bullet \overline{BP3}$

DUMP 1 [ENTERED BY GOTODUMP; TEST RESC]

Hesitation re-entry flag
Clears address binaries in 1901 for a hesitation
Inhibits all store cycles
Hesitation corrupts RN on 1901
MDLF is harmless on 1902-3

CLEAR RZ
CONTINUE CYCLE
FCTR3 [PROCESSOR]
ALLOW MDLF on 1902-3
CHES if 1902-3
FPEND if 1901•MDLF
GOTO DUMP2 if (1901•$\overline{MDLF}$) or (1902-3 from CHES)

DUMP 2 [TRANSFER DATA]

BP is off first time round, on second time round
Exponent sign is inverted in program
Floating point overflow is set in n*

If $\overline{F137}$, TA if $\overline{BP}$, TB if BP
If F137, UA if $\overline{BP}$, UB if BP
} to BIN and to RB
INVERT BIN2 if F137•BP•C2
RFPV ⟶ RQ23 WHEN UB ⟶ $\overline{RQ}$
READ; DESTRUCTIVE IF 1901 & BP
CXJ if F137
CXJ if $\overline{F137} \bullet \overline{BP}$
CX*J if $\overline{F137} \bullet BP$
} CONTROLLED BY DUMP•$\overline{BP3}$

Function has produced overflow
Hesitation re-entry flag

SET RV if (F137•RFPV) + ($\overline{F137}$•RPV)
COUNT RZ
GOTO DUMP3 at C0

DUMP 3 [WRITE STORE. UPDATE REGISTERS FP]

F137•RX0. Set FP acc. to FP zero

BP is off first time round, on second time round

WRITE, CONTINUE CYCLE
UA if $\overline{BP} \bullet (\overline{F137 \bullet RX0})$
UB if $BP \bullet (\overline{F137 \bullet RX0})$
2^{8} if BP•NOT UB
} to UA, SA, TA if $\overline{BP}$; UB, SB, TB if BP
RESET RFPV if (F137•RX0)
SET BP at XSEQ
FCTR3
FPEND if BP
CHES if $\overline{BP}$
GOTO DUMP4 if F137 [CHES•$\overline{HESR}$•F137•$\overline{FPEND}$•$\overline{RZZ}$] OR
GOTO DUMP2 if $\overline{F137}$ [CHES•$\overline{HESR}$•$\overline{F137}$•$\overline{FPEND}$]

DUMP 4 [COUNT RN]

Wholly processor operation

RA +[1 at C3] ⟶ RA, RN
GOTO DUMP1

\+ Represents logical OR

• Represents logical AND

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CHANGES

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FIXED POINT FUNCTIONS
LOOPE1 TO LOOPE3

Notes:

TA ± SA in multiply/divide. TA if shift/normalise

No shift occurs in last time round multiply/divide

Shift left into slice 0

Shift right into slice 22

Shift right into slice 23 in normalise

In multiply the equivalent of RMS24

End effects of right shift - m.s. half

End effects of right shift - m.s. half

TCY acts as a buffer for what falls off the end

Quotient bit = 1 if divisor "goes"

In division this first overflow may be phoney

Overflow in numeric left shift

"First time" flag for normalise F114/5

Shifts multiplier, quotient or other half of x:

TCY acts as a buffer for what falls off the end

Forces sign of l.s. half to zero

Division 'first time flag'

Loop count

Normalise uses LOOPE1-3, others LOOPE1 & 2 only

Function completed

Division end effects

If not first time, +1 if RV, -1 if $\overline{RV}$

Loop count

Exponent overflow

Exponent is negative or reaches zero or arg. is zero

Argument normalised

+ Represents logical OR

• Represents logical AND

LOOPE 1 [ARITHMETIC OPERATION]

TA → TA
+SA if (MULT•TB0•$\overline{RZZ}$) + (DIV•$\overline{QBIT}$)
+ INVSA, INPC if (MULT•TB0•$\overline{RZZ}$)+(DIV•$\overline{QBIT}$)

SHIFT LEFT if F111 + (NORM•$\overline{RV}$) + (DIV•$\overline{RZZ}$)
SHIFT RIGHT if F113 + (NORM•RV) + (MULT•$\overline{RZZ}$)

RMSHLO = TB23 if (F111•$\overline{SA11}$) OTHERWISE TB22

RMSHR22 = RMS23

RMSHR23 = (NORM•RPV•$\overline{TA23}$) + (NORM•$\overline{RPV}$•TA23)
+(MULT•((TA23•$\overline{CY23}$) + (TA23•SA23) +(CSAL•SA23•$\overline{CY23}$)))
+(CYCLIC•TB0) + (NUM•TA23) + ($\overline{RPV}$•TA23•SPEC)
+(SPEC•RPV•$\overline{TA23}$)

TCY = (F111•CYCLIC•TA23) + (CSHR•RMS0)

QBIT = DIV• (SA23 = RMS23)

RPV = (MULT•RZZ•OVR) + (DIV• ESB• (TA23 = RMS23))+ (F111•SA11•(TA23 ≠ RMS23)) + ($\overline{SPECR}$• RPV)

RESET BZ

GOTO LOOPE3 if F114 ELSE GOTO LOOPE2

LOOPE2 [SHIFT OPERATION]

TB → TB
SHIFT LEFT if F111 + (NORM•$\overline{RV}$) + DIV
SHIFT RIGHT if F113 + (NORM•RV) + MULT

RMSHLO = TCY if $\overline{DIV}$, QBIT if DIV
RMSHR22 = TCY if (NORM + (SHIFT•SA11)); RMS23 if not
RMSHR23 = TCY if (MULT•$\overline{RZZ}$) + (SHIFT•$\overline{SA11}$); 0 if not

SUPPRESS RQ23 if NUM + NORM + SPEC

RESET ESB

COUNT RZ if $\overline{NORM}$

GOTO LOOPE3 if NORM ELSE GOTO LOOPE1 if ($\overline{NORM}$•$\overline{RZZ}$)

ELSE GOTO DUMP if (MULT + SHIFT)•RZZ ELSE GOTO END1 if DIV•RZZ

LOOPE3 [ADJUST EXPONENT IN NORMALIZE]

SA → SA, INPC if $\overline{BZ}$, +2046 if ($\overline{BZ}$•$\overline{RV}$)

COUNT RZ

SET RPV if (RMS9 + RMS10)• $\overline{BZ}$

GOTO END7 if (RMS0-9 = 0 + (RQ11•BZ) +RZZ) ELSE

GOTO END8 if (RV•$\overline{BZ}$) + ($\overline{RV}$•(TA22 ≠ TA23)) ELSE

GOTO LOOPE1

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FIXED POINT FUNCTIONS.

END1 TO END9

Notes:

Add divisor back if last QBIT was 0

Flag for F045 (rounded division)

END1 [LAST QUOTIENT BIT ZERO]

TA + SA ⟶ TA if $\overline{QBIT}$
RESET RZ
GOTO END2

END2 [REMAINDER = DIVISOR]

Set remainder zero if remainder = divisor

TA + INVSA + INPC ⟶ TA if (MILLZ + $\overline{RZZ}$)
SET BZ if MILLZ
GOTO END3

END3 [ROUND QUOTIENT]

Add 1 to quotient if remainder = divisor or F045

TB + [INPC if (BZ + $\overline{RZZ}$)] ⟶ TB

Overflow here is as phoney as the one in LOOPE1

REVERSE RPV if OVR

Rounding procedure if first time and non zero remainder

GOTO END4 if (F045•RZZ•$\overline{BZ}$) ELSE GOTO DUMP

END4 [SHIFT REMAINDER]

We now test to see if remainder > ½ divisor

TA SHIFT LEFT ⟶ TA if (TA23 = TA22).
RMSHILO = 0

Flag for F045 (rounded division)

COUNT RZ

If TA23 ≠ TA22 remainder must be greater than ½ divisor

GOTO END2 if (TA23 ≠ TA22) ELSE GOTO END5

END5 [COMPARE DIVISOR & TWICE REMAINDER]

TA + INVSA + INPC ⟶ MILL

Set BZ if rounding required

SET BZ if SA23 = RMS23
GOTO END6

END6 [RESTORE REMAINDER]

TA SHIFT RIGHT ⟶ TA. RMSHR23 = RMS23

Finish if rounding not required

GOTO END2 if BZ ELSE GOTO DUMP

END7 [NORMALIZE. ZERO RESULT]

0 ⟶ TA, TB. CLEAR RPV
GOTO DUMP

END8 [ROUND IN NORMALISE FN.]

Rounding F115 must not carry to m.s. half

TB + 2^8 ⟶ TB if (F115• $\overline{CY23}$)

Suppresses sign in l.s. half

RESET TB23 WITH GOTO END8
GOTO END9

END9 [PLACE EXPONENT]

SA ⟶ TBE
GOTO DUMP

\+ Represents logical OR

• Represents logical AND

CHANGES

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FIXED POINT FUNCTIONS

Begin with register contents as tabled

FUNCTION	ACTION	SA	TA	TB
040	x:' = x.n	n	0	x
041	x:' = x.n +2^{-24}	n	2^{22}	x
042	x:' = x.n +x*	n	x*	x
044	x*' = x: ÷ n	n	x	x*
045	x*' = x: ÷ n rounded	n	x	x*
046	x*' = x* ÷ n	n	Sign x*	x*
111	Shift x: left	N (RZ)	x	x*
113	Shift x: right	N (RZ)	x	x*
114	Normalise x	N	x	0
115	Normalise x:	N	x	x*

MULTIPLY

Multiply SA by TB, product to T. No end effects.

DIVIDE

Divide T by SA forming quotient in TB, End effects.

SHIFT

Shift T. No end effects.

NORMALISE

Normalise T, adjust SA. End effects.

LOOPE1, 2 do arithmetic and shift operations.
LOOPE3 adjusts exponent in F114/5
END1 to 6 do division end effects
END7 to 9 do normalise end effects

FLOATING POINT FUNCTIONS

F	X = 0	X = 4
132	a:' = a: + n:	a:' = n: + a:
133	a:' = a: - n:	a:' = n: - a:
134	a:' = a: x n:	a:' = n: x a:
135	a:' = a: ÷ n:	a:' = n: ÷ a:

F	X = 0	X = 1
136	a:' = n:	a:' = 0
137	n:' = a:	n:' = a:, a:' = 0

Begin with a: in U, S, T
If X = 0 load n: to S and UE
If X = 4 load n: to T and UF

	U	S	T
X = 0	a_f — n_e	n:	a:
X = 4	n_f — a_e	a:	n:

LOAD/STORE

F136 uses only LOAD1 to LOAD4
F137 uses only DUMP1 to DUMP4

ADD/SUBTRACT [ADSU]

If TE - SE IS +, TE → SE, Shift & round S
If TE - SE IS -, UE → SE, Shift & round U, T
} T ± S → U
Normalise U, SE

MULTIPLY [MY]

TE + SE → SE. Clear T. Multiply U by S, product to T. (and to U last time round). Normalise U, SE.

DIVIDE [DV]

TE − SE → SE. Shift T right. Clear U. Divide T by S, quotient to U. Normalise U, SE

EXP1 to 4 do all exponent computations
ADJ1 to 3 adjust the operand
LOOPE1 to 3 do the function
NORM1 to 3 normalise the argument
ROUND1 to 3 round the argument
ENDF1 to 3 test exponent and place the result

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FLOATING POINT FUNCTIONS
EXP1 TO EXP4

CHANGES
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Notes:

Compare/add/sub exponents
10 bits wide

Store difference in RZ if positive and ⩽ 63
BP stores sign of difference
No adjustment required if exps. equal
BR says exp. difference is out of range
ESB (exp.sign bit) acts as 10th bit
Dividing by zero

BR saysexp. difference is out of range

ESB (exp.sign bit) acts as 10th bit

Saves splitting the argument
Ensures correct operand shift in division
Operand adjustment required

\+ Represents logical OR

o Represents logical AND

EXP1 [ALL FUNCTIONS COMP/ADD/SUB EXPs]

TBE → RK, TB8 → RK9
If $\overline{MY}$: $\overline{SBE}$ → RL
If $\overline{MY}$: $\overline{SBE}$ → RL, INPC
} RL8 → RL9
RQ → SBE
RQ → RZ if (ADSU•$\overline{M9}$•EX ⩽ 63)
SET BP FROM $\overline{M9}$
SET BZ if $\overline{EXZERO}$
SET BR if ($\overline{M9}$•EX > 63)
M9 → ESB
IF (DV•$\overline{SANORM}$) SET RFPV and GOTO ENDF2 ELSE
If (MY+DV) GOTO EXP4 ELSE GOTO EXP2

EXP2 [CORRECT NEGATIVE DIFFERENCE. A/S ONLY]

$\overline{SBE}$, +INPC → RZ if $\overline{BP}$
SET BR if ($\overline{BP}$•EX>63)
SET ESB [READY FOR EXP3]
GOTO EXP3

EXP3 [SELECT FINAL EXPONENT. A/S ONLY]

TBE if BP, UB if $\overline{BP}$ → SBE
M8 → ESB
GOTO EXP4

EXP4

0 → TBE, UBE
RESET BP if (MY+DV)
GOTO ADJ1 if (DV+(ADSU•$\overline{BZ}$•$\overline{BR}$)) ELSE
GOTO ADJ3 and CLEAR RZ

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FLOATING POINT FUNCTIONS

ADJ1 TO ADJ3

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Notes:

ADJ1 [ADJUST LEAST SIG. HALF]

Shift dividend right or 'low exp' operand
Round in A/S penultimate shift
- If $\overline{BP}$, UB→UBF, TBF; and TBE if DV
- If BP, SB→SBF
- $+2^9$ if RZ=1. CY23→TCY
- COUNT RZ
- SHIFT RIGHT

Computes 'carried down' bit
- RMSHR23=0
- RMSHR22= [CY23≠(UAO if $\overline{BP}$, SAO if BP)]
- GOTO ADJ2

ADJ2 [ADJUST MOST SIG. HALF]

Shift divided right or 'low exp' operand
- If $\overline{BP}$, UA→UA, TA. SET QBIT if (RMS23 =SA23)
- If BP, SA→SA

Round in A/S penultimate shift
- INPC = TCY
- SHIFT RIGHT

Sign can change by rounding
- RMSHR23=RMS23 • RMT23
- RMSHR22=RMS23
- GOTO ADJ1 if (ADSU. $\overline{RZZ}$) ELSE GOTO ADJ3 AND CLEAR RZ

ADJ3 [CLEAR REGISTERS]

Clear product register
- 0→U if DV. SET RZ to 40

Clear quotient register
- 0→T if MY. SET RZ to 37

Clear T if worthless in A/S
- 0→T if (ADSU•$\overline{BP}$•BR)

Clear SF if worthless in A/S
- 0→SA, SBF if (ADSU•BP•BR)
- GOTO LOOPF1

+ Represents logical OR

• Represents logical AND

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FLOATING POINT FUNCTIONS
LOOPF1 TO LOOPF3

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Notes:

TB ± SB ——→ TB
Final produce in multiply or sum or difference in
A/S ——→ UB

Maintains sign of l.s. half zero

Only one half of multiplier (U) is shifted

TA ± SA ——→ TA. Final product in multiply or sum or difference in A/S ——→ UA

Store initial exp. sign in SB23

Overflow in multiply/add/subtract

See LOOPE1

Done by bi-phase collector forcing
BP avoids rounding after re-normalising
Division exp. is 1 out due to dividend shift

Shift appropriate half of multiplier/quotient

See logic of MBIT
Enters QBIT into correct place in U

Divide ——→ NORM3 to adjust exp. for dividend shift

+ Represents logical OR

• Represents logical AND

LOOPF1 [ALL FUNCTIONS. OPERATE ON L.S. HALF]

{TB ——→ TB; AND UB if ((MY•RZZ) + ADSU)
+SBF if (MY•MBIT•$\overline{RZZ}$) + (DV•$\overline{QBIT}$) + AD
+INVSBF, INPC if (MY•MBIT•RZZ) + (DV•QBIT) + SU
CY23 ——→ TCY
RESET SB23
SHIFT RIGHT if (MY•$\overline{RZZ}$), LEFT if DV
RMSHL0 = 0
RQ23 FORCED ZERO if NOT LEFT SHIFT
RMSHR22 = RMS23 (0)
MBIT IS UB9 WHILE RZ > 23, UA0 WHILE RZ ≤ 23
GOTO LOOPF2

LOOPF2 [ALL FUNCTIONS. OPERATE ON M.S. HALF]

{TA ——→ TA; AND UA if ((MY•RZZ) + ADSU)
+ SA if (MY•MBIT•$\overline{RZZ}$) + (DV•$\overline{QBIT}$) + AD
+ INVSA if (MY•MBIT•RZZ) + (DV•QBIT) + SU
INPC = TCY
COPY ESB INTO SB23
SET QBIT if RMS23 = SA23
SET RPV if ("TR. UA"•OVR)
SHIFT AS IN LOOPF1
RMSHL0 = TB23
RMSHR22 = RMS23. RMSHR23 AS FIXED POINT MPY
RMS0 ——→ TB22 if MY•$\overline{RZZ}$
SET BP [ROUNDING FLAG] .
SET BR [DIV. EXP. FLAG]

GOTO LOOPF3

LOOPF3 [SHIFT MULTIPLIER/QUOTIENT]

UA ——→ UA if ((MY•RZ ≤ 23) + (DV•RZ > 16))
OTHERWISE UB ——→ UB
SHIFT AS IN LOOPF1
COUNT RZ
RMSHR22 = 1 if 'UB'
{RMSHL0 = QBIT•RZ > 16
RMS5 = QBIT•RZ ≤ 16•DIV
GO to LOOPF1 if $\overline{RZZ}$ ELSE NORMSEQ if $\overline{DV}$
ELSE NORM3

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FLOATING POINT FUNCTIONS.

NORMALISE SEQUENCE

Notes:

Argument in C. Exponent in SBE, ESB, SB23

NORMSEQ [NORMALISE ROUTINE ENTRY SWITCHING]

40 Shifts without norm. Therefore argument zero

If (NORM3•RZ = 23) GOTO ENDF2 ELSE

Argument normalised. Rounding required
Argument renormalised after rounding
Normalising required

If ($\overline{RPV}$•UNORM•BP) GOTO ROUND1 ELSE
If ($\overline{RPV}$•UNORM•$\overline{BP}$) GOTO ENDF1 ELSE
GOTO NORM1

NORM1 [NORMALISE L.S. HALF]

UB ⟶ UB
SHIFT LEFT if $\overline{RPV}$, RIGHT if RPV
RMSHL0 = 0. RMS22 ⟶ TCY
RMSHR22 = UA0

Monitors for zero argument

COUNT RZ
GOTO NORM2

NORM2 [NORMALISE M.S. HALF]

UA ⟶ UA. RESET BR
SHIFT LEFT if $\overline{RPV}$, RIGHT if RPV
RMSHL0 = TCY
RMSHR22 = RMS23
RMSHR23 = $\overline{RMS23}$

Correct for overflow in right normalise

GOTO NORM3

NORM3 [ADJUST EXPONENT IN SB]

Adjust exponent (±1) in 10 bit opd.

{SBE ⟶ RL, ESB ⟶ RL9
+1 (INPC); 2046 ⟶ RK if $\overline{RPV}$•($\overline{DV}$•$\overline{BR}$)} RQ9 ⟶ ESB

40 shifts without norm. Therefore argument zero

SET BZ if RZ = 23

GOTO ROUND1 if RPV•BP
GOTO ENDF1 if RPV•$\overline{BP}$
NORMSEQ if $\overline{RPV}$

+ Represents logical OR

• Represents logical AND

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FLOATING POINT FUNCTIONS
ROUNDING & FINISHING.

Notes:

Rounding in A/S is before add/sub
Notes that rounding has occurred

ROUND 1 [ROUND L.S. HALF]

UB + [2^8 if NOT ADSU] → UB. CY23 → TCY
RESET BP.
GOTO ROUND2

ROUND 2 [ROUND M.S. HALF]

Overflow causes re-normalising

UA + TCY → UA
SET RPV if OVR
GOTO ROUND3

ROUND 3 [IDLE]

Test normalising required after rounding

0 → UBE. NORMSEQ

ENDF1 [TEST EXP.OVERFLOW/UNDERFLOW]

Exponent overflow i.e. > +255
Exponent underflow i.e. < -256. Result zero

SET RFPV if (ESB ≠ SB8)•$\overline{SB23}$
SET BZ if (ESB ≠ SB8)•SB23
GOTO ENDF2

ENDF2 [L.S. HALF RESULT]

Result or FP zero to all registers
Resynchronise clocks

UB, SBE if $\overline{BZ}$; 2^8 if BZ → UB, SB, TB
RESYNC
GOTO ENDF3

ENDF3 [M.S. HALF RESULT]

Function complete

UA if $\overline{BZ}$; 0 if BZ → UA, SA, TA
FPEND

\+ Represents logical OR

• Represents logical AND

ISSUE SHEET 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
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38 SHEET

3 ISSUE

5016360 DIAGRAM

1900 SCIENTIFIC UNIT LOGIC

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67850 B

NAME	SOURCE	REF
SLICE 0	E34	21
SLICE 1	E33	
SLICE 2	E32	
SLICE 3	E31	
SLICE 4	E30	
SLICE 5	E29	
SLICE 6	E28	
SLICE 7	E27	
SLICE 8	E26	
SLICE 9	E24	
SLICE 10	E23	
SLICE 11	E22	22
SLICE 12	F20	
SLICE 13	F19	
SLICE 14	F16	
SLICE 15	F15	
SLICE 16	F14	
SLICE 17	F13	
SLICE 18	F10	
SLICE 19	F8	
SLICE 20	F7	
SLICE 21	F6	
SLICE 22	F3	23
SLICE 23	F2	24
ADJ1(P)	B29/2	11/4W
ADJ1(N)	B29/2	11/4W
ADJ1A(P)	B30/11	11/4W
ADJ1A(N)	B30/10	11/4W
ADJ2(P)	B29/3	11/4X
ADJ2(N)	B29/3	11/4X
ADJ2A(N)	B30/9	11/4W
ADJ3(P)	B29/4	11/4Y
ADJ3(N)	B29/4	11/4Y
BP(P)	C34/4	19/5V
BP(N)	C34/4	19/5V
BP1(N)	J	2/6Y
BP3(N)	B2/11	2/6X
BP3A(P)	B4/5	2/6X
BPA(P)	B18/10	19/5W
BPA(N)	B18/9	19/5V
BR(P)	C33/3	19/5X
BR(N)	C33/3	19/5X

NAME	SOURCE	REF
BZ(P)	B28/1	18/6Y
BZ(N)	B28/1	18/6X
BZA(P)	B20/11	18/6Y
BZA(N)	B26/12	18/6X
CDINQ1(P)	E10/4	13/3Y
CDINQ1(N)	E19/11	13/3Y
CDINQ2(P)	D8/2	13/3Y
CDINQ2(N)	D11/8	13/3Y
CF0(P)	B16/1	7/2V
CF1(P)	B16/2	7/2V
CF2(P)	B16/4	7/2W
CF2(N)	B21/3	7/2W
CF3(P)	B16/6	7/2W
CF3(N)	B21/4	7/2X
CF4(P)	B15/1	7/2X
CF4(N)	B18/2	7/2X
CF5(P)	B15/2	7/2X
CF5(N)	B18/3	7/2Y
CF6(P)	B15/4	7/2Y
CF6(N)	B21/5	7/2Y
CF7(P)	B15/6	7/2Y
CF7(N)	B21/6	7/2Z
CG11(P)	B3/11	2/6W
CG11(N)	B2/7	2/6V
CG13(P)	B3/12	2/6W
CG13(N)	B3/10	2/6W
CG4(P)	B2/8	2/6V
CG4(N)	B2/6	2/6Y
CHES(N)	B4/3	2/6Y
CHES0K(N)	C13/2	8/2Y
CHESS(P)	B5/6	6/2V
CISAL(N)	E4/3	14/2Z
CISBL1(N)	E19/8	14/4Y
CISBL2(N)	E18/1	14/4Z
CMSQ(N)	E19/12	13/3Y
CQTA(P)	D20/11	15/5W
CSAL(N)	E21/2	14/2V
CSBL1(N)	E18/4	14/4V
CSBL2(N)	E18/2	14/4X
CSHL(P)	D5/3	13/5Y
CSHL(N)	E19/9	13/5Y
CSHR(P)	C3/3	13/5W
CSHR(N)	E19/10	13/5V

NAME	SOURCE	REF
CSHR1(N)	D20/12	13/5V
CTAK(N)	E21/6	13/3V
CTBK1(N)	E21/4	13/3W
CTBK2(N)	E21/3	13/3X
CUAL(N)	E18/6	14/6X
CUBL(N)	E18/3	14/6Y
CYB0(N)	E17/3	13/6Z
CYB1(N)	D26/11	26/2Y
CYB2(N)	E26/2	26/3Y
CYB3(N)	D24/2	26/4Y
CYB4(N)	E15/11	26/5Y
CYB5(N)	F13/2	26/6Y
CYC(N)	C31/9	7/6W
CYCLEFT(N)	D11/5	7/6V
CY2(N)	D29/3	25/2W
CY6(N)	D26/6	25/2Y
CY10(N)	D26/2	25/4V
CY14(N)	E15/8	25/4Y
CY23(P)	1F2/18*	24/6Z
CY23(N)	1E3/11	24/6Z
DIN0(P)	E1/7	2/3X
DIN1(P)	E1/8	2/3X
DIN2(P)	E2/2	2/3W
DIN3(P)	E1/10	2/3W
DIN4(P)	E1/11	2/3W
DIN5(P)	E1/12	2/3V
DIN5(N)	ZF44	2/3V
DISP(P)	B34/17*	19/6Z
DISPNOTTA(P)	B34/13*	19/6X
DISPNOTTB(P)	B34/14*	19/6Y
DISPNOTSA(P)	B34/11*	19/6W
DISPNOTSB(P)	B34/12*	19/6X
DISPNOTUA(P)	B34/15*	19/6Y
DISPNOTUB(P)	B34/16*	19/6Y
DIV(P)	B15/3	7/6X
DIV(N)	B18/1	7/6X
DUMP(P)	B8/4	8/6V
DUMP(N)	B8/4	8/6V
DUMP1(P)	B14/1	8/6W
DUMP1(N)	B14/1	8/6W
DUMP2(P)	B14/2	8/6X
DUMP2(N)	B14/2	8/6X
DUMP2A(N)	B18/7	8/6X

SOURCE REFERENCE LIST 'A'

NAME	SOURCE	REF
DUMP2B(N)	B18/8	8/6X
DUMP3(P)	B14/3	8/6Y
DUMP3(N)	B14/3	8/6Y
DUMP3A(N)	B20/7	8/6Y
DUMP4(P)	B14/4	8/6Z
DUMP4(N)	B14/4	8/6Z
DUMPNOTH(N)	D11/1	3/3Z
END(P)	C12/6	5/5Y
END(N)	C12/1	5/5Y
END1(P)	B22/4	9/3Z
END1(N)	B22/4	9/3Z
END2(P)	B23/1	9/6W
END2(N)	B23/1	9/6W
END3(P)	B23/2	9/6X
END3(N)	B23/2	9/6X
END3A(N)	B26/5	9/6X
END4(P)	B23/3	9/6Y
END4(N)	B23/3	9/6X
END5(P)	B23/4	9/6Z
END5(N)	B23/4	9/6Z
END6(P)	B27/1	10/3V
END6(N)	B27/1	10/3V
END6A(N)	B26/4	10/3V
END7(P)	B27/2	10/3W
END7(N)	B27/2	10/3W
END8(P)	B27/3	10/3X
END8(N)	B27/3	10/3X
END9(P)	B27/4	10/3Y
END9(N)	B27/4	10/3Z
ENDF1(P)	B33/2	12/6W
ENDF1(N)	B33/2	12/6X
ENDF2(P)	B33/3	12/6Y
ENDF2(N)	B33/3	12/6Y
ENDF3(P)	B33/4	12/6Z
ENDF3(N)	B33/4	12/6Z
ESB(P)	C16/2	18/2V
ESB(N)	C16/2	18/2V

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5016360/8 DIAGRAM ISSUE

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817058 B

NAME	SOURCE	REF
EXG63(P)	C15/6	19/5W
EXP1(P)	B28/2	11/2V
EXP1(N)	B28/2	11/2V
EXP1A(P)	B26/1	11/2V
EXP1A(N)	E19/2	11/2V
EXP2(P)	B28/3	11/2W
EXP2(N)	B28/3	11/2W
EXP2A(P)	B26/2	11/2X
EXP3(P)	B28/4	11/2X
EXP3(N)	B28/4	11/2X
EXP4(P)	B29/1	11/2Z
EXP4(N)	B29/1	11/2Z
F137X1(P)	C6/6	7/2Z
F041(N)	B20/5	7/4V
F045(N)	B20/1	7/4V
F046(N)	B19/10	7/4W
F111(N)	B19/3	7/4X
F113(N)	B20/3	7/4X
F114(P)	B15/5	7/4Y
F114(N)	B19/2	7/4Y
F115(N)	B19/12	7/4Y
F136(P)	B15/5	7/4Z
F136(N)	C31/11	7/4Z
F137(P)	C8/3	7/4Z
F137(N)	B18/4	7/4Z
FD20(N)	C5/1	15/2Y
FD21(N)	B13/2	16/6V
FD22(N)	B13/4	16/6X
FIT1901(P)	I	2/3V
FIT1901(N)	B4/1	2/3V
FIXONLY(P)	D13/4*	4/5Z
FP(P)	B13/6	7/6Z
FP(N)	C15/1	7/6Z
FPC0(P)	B7/2	19/3Y
FPC0(N)	B3/5	19/3Y
FPC1(P)	B7/5	19/3Y
FPC1(N)	B3/6	19/3Y
FPC2(N)	B3/7	19/3Z
FPC3(N)	B3/9	19/3Z
FPCAL(P)	E1/2	4/5Z
FPCHES(P)	C3/1	5/2X

NAME	SOURCE	REF
FPCHES(N)	B4/7	5/2X
FPEND1(P)	C3/2	5/5X
FPH(N)	C2/7	5/5V
FPSET(P)	I	2/3X
FPFCTR3(P)	**B4/10**	**5/2W**
FPCDJ(P)	E7/1	3/5W
GOTOADJ1(P)	C30/5	11/4V
GOTOADJ3(N)	E30/7	11/4X
GOTODUMP(P)	D17/1	10/6W
GOTODUMP2(P)	B6/6	8/6W
GOTODUMP4(P)	C8/1	8/6Y
GOTOEND2(P)	B21/8	9/6V
GOTOEND4(P)	C14/3	9/6X
GOTOEND7(P)	D24/3	10/3W
GOTOEND8(P)	C13/6	10/3X
GOTOENDF1(P)	C21/4	12/6W
GOTOENDF2(P)	B30/2	12/6Y
GOTOEXP4(P)	B26/3	11/2Y
GOTOFP(P)	D1/1	10/6Y
GOTOFP(N)	D11/7	10/6Y
GOTOLOAD1(P)	C12/2	8/2V
GOTOLOAD2(P)	B6/1	8/2X
GOTOLOAD3(P)	B10/6	8/2Y
GOTOROUND1(P)	C32/6	12/4V
HESR(P)	I	2/6W
LOAD(P)	B8/3	8/2V
LOAD(N)	B8/3	8/2V
LOAD1(P)	B11/1	8/2W
LOAD1(N)	B11/1	8/2W
LOAD1A(N)	B18/5	8/2W
LOAD2(N)	B11/2	8/2X
LOAD2A(N)	B20/8	8/2X
LOAD3(P)	B11/3	8/2Y
LOAD3(N)	B11/3	8/2Y
LOAD3A(N)	B18/6	8/2Y
LOAD4(P)	B11/4	8/2Z
LOAD4(N)	B11/4	8/2Z
LOADA(P)	B20/10	8/2V
LOADA(N)	B20/9	8/2V

NAME	SOURCE	REF
LOADEND(P)	B7/1	8/5Z
LOADNOTH(N)	E19/4	3/5X
LOOPE1(P)	B22/1	9/3V
LOOPE1(N)	B22/1	9/3V
LOOPE12(N)	E8/5	13/5V
LOOPE1A(P)	B26/7	9/3W
LOOPE1A(N)	E19/3	9/3V
LOOPE2(P)	B22/2	9/3W
LOOPE2A(P)	B26/9	9/3X
LOOPE2A(N)	B26/8	9/3W
LOOPE3(P)	B22/3	9/3X
LOOPE3(N)	B22/3	9/3Y
LOOPE3A(N)	B26/10	9/3X
LOOPF1(P)	B31/1	11/6W
LOOPF1(N)	B31/1	11/6W
LOOPF123(N)	E17/4	13/5X
LOOPF1A(P)	B30/7	11/6W
LOOPF1A(N)	B30/6	11/6W
LOOPF2(P)	B31/2	11/6X
LOOPF2(N)	B31/2	11/6X
LOOPF2A(P)	E19/1	11/6X
LOOPF2A(N)	B18/11	11/6X
LOOPF3(P)	B31/3	11/6Y
LOOPF3(N)	B31/3	11/6Y
LOOPF3A(N)	B30/5	11/6Y
LOAD3CO(N)	D11/5	8/2Z
MANSTEP(N)	C2/6	2/3X
MBIT(N)	C15/10	14/2W
MCYBO(P)	E10/5	13/6Y
MDINQ1(P)	D1/3	13/3Y
MDLF(P)	E7/4	2/6Z
MDLF(N)	E3/4	2/6Z
MEXZ(P)	D23/6	19/2V
MEXZ(N)	B21/12	19/2V
MILLZ(N)	E15/1	19/2V
MISAL(P)	D5/1	14/2Z
MISBL1(P)	D7/2	14/4Z
MISBL2(P)	D19/5	14/4Z
MLOOPE1(N)	C14/4	9/3V
MQBIT(P)	F10/2	18/6Y
MQSA1(P)	C20/6	15/5Z
MQSA2(P)	C11/3	15/5Y

SOURCE REFERENCE LIST 'B'

NAME	SOURCE	REF
MQSB1(P)	C11/5	16/3X
MQSB2(P)	C11/2	16/3Y
MQTA1(P)	C20/2	15/2W
MQUA1(P)	D27/5	16/6W
MQUB1(P)	C10/2	16/6X
MQUB2(P)	C15/8	16/6Z
MRBZ(P)	E14/5	18/6X
MRFPV(P)	D3/1	18/2Y
MSAL1(P)	D23/5	14/2V
MSBL1(P)	C17/5	14/4W
MSHR22 (N)	B21/11	24/5W
MUAL(P)	D18/2	14/6W
MUBL1(P)	D14/5	14/6Y
MUBL2(P)	D14/3	14/6Y
MUBL3(P)	D14/4	14/6Y
MUBL4(P)	D4/1	14/6Z
MULT(P)	B16/5	7/6X
MULT(N)	B19/1	7/6X
MON1	B34/18*	19/6W
MON2	B34/19*	19/6W
NEGK(N)	E19/6	13/6Z
NORM(P)	B19/7	7/6Y
NORM(N)	B19/5	7/6Y
NORM1(P)	B31/4	12/2V
NORM1(N)	B31/4	12/2V
NORM2(P)	B32/1	12/2W
NORM2(N)	B32/1	12/2W
NORM3(P)	B32/2	12/2Y
NORM3(N)	B32/2	12/2Y
NORM3A(N)	B30/2	12/2Y
NORMSEQ(N)	D13/2	12/2Z
NOTHES(N)	B7/4	6/2W
NUM(P)	D34/6	7/6W
NUM(N)	C31/10	7/6W

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ISSUE
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NAME	SOURCE	REF
OBJ(P)	I	2/6Z
OVR(P)	F2/41*	24/6Z
OVR(N)	F2/7	24/6Z
PROCXACT(P)	I	2/5X
PROCXACT(N)	B2/12	2/6X
PTA(P)	E4/2	13/6X
QBIT(P)	C16/1	18/6Z
QBIT(N)	C16/1	18/6Z
RESYNC(N)	C19/2	6/2X
RESYNC1(P)	E28/7	6/2X
RF0(P)	C2/1	2/3Y
RF0(N)	B3/1	2/3Y
RF1(P)	C2/2	2/3Y
RF1(N)	B3/2	2/3Y
RF2(P)	B3/4	2/3Y
RF2(N)	B3/3	2/3Y
RFPV(N)	G1/4	18/2X
RL8(P)	D17/3	22/3Z
RMGO(N)	E34/5	21/6Y
RMGj(N)	-/5	22/6Y
RMG22(N)	F3/5	23/6Y
RMS0(N)	D20/9	21/6Y
RMS0(P)	E34/9	21/6Y
RMSj(P)	-/9	22/6Y
RMS22(P)	F3/9	23/6Y
RMS23(P)	F2/9	24/6Y
RMS23(N)	D11/9	24/6Y
RMT0 (N)	E34/6	21/6X
RMTj(N)	-/6	22/6X
RMT22(N)	F3/6	23/6X
RMT23(N)	F2/6	24/6X
ROUND1(P)	B32/3	12/4V
ROUND1(N)	B32/3	12/4V
ROUND1A(P)	B30/1	12/4W
ROUND2(P)	B32/4	12/4X
ROUND2(N)	B32/4	12/4X
ROUND3(P)	B33/1	12/4Y
RPV(P)	C16/4	18/4Z
RPV(N)	C16/4	18/4Z
RPVA(P)	D20/2	18/4Z
RPVA(N)	D20/1	18/4Z
RQO(P)	E34/1	21/6X
RQO(N)	E34/2	21/6X
RQj(P)	-/1	22/6X
RQj(N)	-/2	22/6X
RQ22(P)	F3/1	23/6X
RQ22(N)	F3/2	23/6X
RQ23(P)	F2/1	24/6X
RQ23(N)	F2/2	24/6X
RV(P)	B4/4	2/6X
RV(N)	B2/10	2/6X
RX0(P)	C2/3	2/3Z
RX0(N)	B2/3	2/3Z
RX1(P)	C2/4	2/3Z
RX1(N)	B2/4	2/3Z
RX2(P)	C2/5	2/3Z
RX2(N)	B2/5	2/3Z
RY0(P)	B8/1	19/3Y
RY0(N)	B8/1	19/3Y
RY1(P)	B8/2	19/3Z
RY1(N)	B8/2	19/3Z
RZ0(P)	C34/1	17/4V
RZ0(N)	C34/1	17/4W
RZ1(P)	C34/2	17/4W
RZ1(N)	C34/2	17/4W
RZ2(P)	C34/3	17/4X
RZ2(N)	C34/3	17/4X
RZ3(P)	C34/4	17/4Y
RZ3(N)	C34/4	17/4Y
RZ4(P)	C33/1	17/4Y
RZ4(N)	C33/1	17/4Y
RZ5(P)	C33/2	17/4Z
RZ5(N)	C33/2	17/4Z
RZG16(P)	C15/5	17/6X
RZG16(N)	D32/2	17/6X
RZG23(P)	D32/4	17/6X
RZZ(P)	E21/1	17/6W
RZZ(N)	B18/2	17/6W
SA0(P)	F34/1	21/2Y
SA0(N)	F34/1	21/2Y
SA10(P)	F28/3	22/2Y
SA10(N)	F28/3	22/2Y
SA11(P)	F28/4	22/2Y
SA11(N)	F28/4	22/2Y
SA22(P)	G4/3	23/2Y
SA22(N)	G4/3	23/2Y
SA23(P)	G4/4	24/2Y
SA23(N)	G4/4	24/2Y
SB8(P)	G24/1	22/2Z
SB8(N)	G24/1	22/2Z
SB23(P)	G3/4	24/2Z
SB23(N)	G3/4	24/2Z
SANORM(P)	F7/P	12/6X
SHIFT(N)	B19/8	7/6Y
SPEC(P)	D33/6	7/6W
STEP2A(N)	I	2/6Y
STEP4A(P)	E1/3	2/6Z
STEPEND(P)	I	2/6Y
SYNC(P)	E29/7	6/5Y
SYNC(N)	E29/P	6/5Y
SPECFPC3(N)	B12/1	19/2X
TA22(P)	F5/2	23/2X
TA22(N)	F5/3	23/2X
TA23(P)	F5/4	24/2X
TA23(N)	F5/4	24/2X
TANORM(P)	F3/7	10/3Z
TB0(P)	F32/1	21/2X
TB0(N)	F32/1	21/2X
TB22(N)	F4/2	23/2X
TB23(P)	F4/4	24/2X
TB23(N)	F4/4	24/2X
TCY(P)	C16/3	18/2Z
TCY(N)	C16/3	18/2Z
UA0(P)	G33/1	21/2W
UA0(N)	G33/1	21/2W
UA1-3(N)	G33	22/2W
UA4-7(N)	G28	
UA8-11(N)	G23	
UA12-15(N)	G14	

SOURCE REFERENCE LIST 'C'

NAME	SOURCE	REF
UA16-19(N)	G8	22/2W
UA20-21(N)	G2	
UA22(P)	G2/3	23/2W
UA22(N)	G2/3	23/2W
UA23(P)	G2/4	24/2W
UA23(N)	G2/4	24/2W
UB0(N)	G32/1	21/2W
UB1-3(N)	G32	22/2W
UB4-7(N)	G27	
UB8-11(N)	G22	
UB9(P)	G22/2	
UB12-15(N)	G13	
UB16-19(N)	G7	
UB20-21(N)	G1	
UB22(N)	G1/3	23/2W
UNORM(N)	F6/P	12/6V
WAITSYNC1(P)	D33/1	6/2X
XACT(N)	C31/6	6/5V
XACT3A(P)	C24/2	6/6W
XACT3B(P)		6/6X
XACT3C(P)		
XACT4A(P)	C24/3	6/6W
XACT4B(P)		
XACT4C(P)		
XACT4D(P)		
XACT4E(P)		
XACT5A(P)	G19/2	6/6V
XACT5B(P)		
XACT5C(P)		6/6W
XACT5D(P)		
XACT5E(P)		
XGO(P)	I	2/3X
XGO(N)	B2/1	2/3Y
XMID(N)	C31/7	6/6X
XQSA0(P)	F22/1	15/5Y

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2	835 11-66
11	3252 KG 1-68

NOTES CHK PLUCK - K.Groom

DATE

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I·C·T

1900 SCIENTIFIC UNIT LOGIC

DIAGRAM 5016360/11 ISSUE

SHEET 41

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NAME	SOURCE	REF
XQSA1(P)	F22/2	15/5Z
XQSB0(P)	G18/3	16/3Y
XQSB1(P)	G19/1	16/3Y
XQSB2(P)	G20/1	16/3Y
XQTA0(P)	F21/3	15/5V
XQTA1(P)	F22/3	15/5W
XQTA2(P)	F23/3	15/5W
XQTA3(P)	F23/2	15/X
XQTB0(P)	F21/1	16/3V
XQTB1(P)	F21/2	16/3W
XQTB2(P)	F23/1	16/3W
XQUA0(P)	G18/2	16/6V
XQUA1(P)	G20/2	16/6W
XQUB0(P)	G18/1	16/6X
XQUB1(P)	G19/3	16/6Y
XQUB2(P)	G20/3	16/6Z
XSEQ5A(P)		
XSEQ5B(P)	B17/1	6/6Z
XSEQ5C(P)		
XSEQ5D(P)		
XSEQ5E(P)		
XSEQ6A(P)		6/6Y
XSEQ6B(P)	B17/2	
XSEQ6C(P)		
XSEQ6D(P)		6/6Z
XSEQ6E(P)		
XSEQ7A(P)		
XSEQ7B(P)	B17/3	6/6Y
XSEQ7C(P)		
XSEQ7D(P)		
XSEQ7E(P)		
XSEQ8A(P)		
XSEQ8B(P)	C24/1	6/6X
XSEQ8C(P)		
XSEQ8D(P)		
XSEQ8E(P)		
XSEQ9A(P)		
XSEQ9B(P)	C26/3	6/5W
XSEQ9D(P)		
XZB(P)	C26/2	17/3V
XZC(P)	C26/2	17/3V

SOURCE REFERENCE
LIST 'D'

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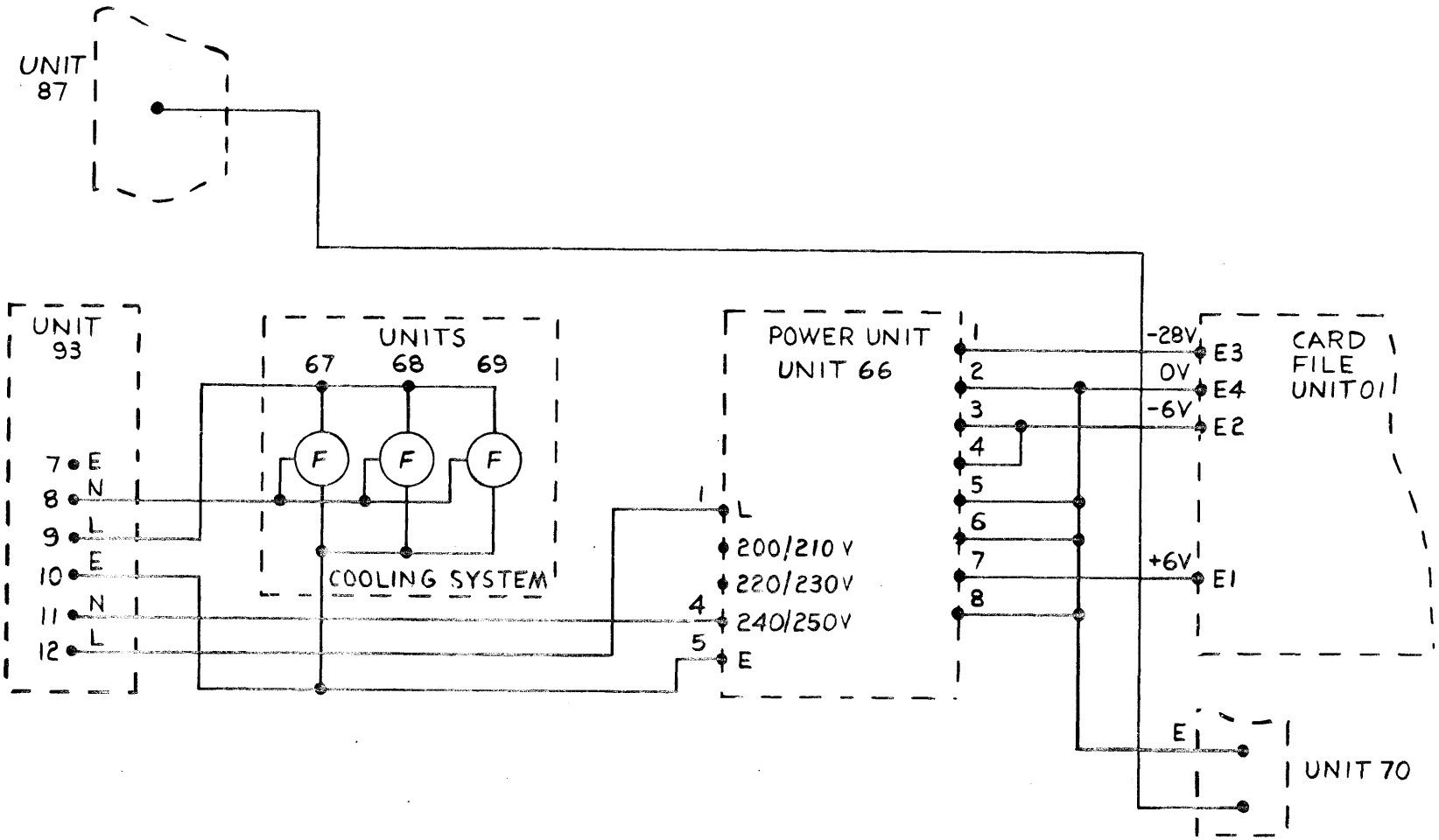

SCIENTIFIC UNIT

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3	INTERFACE OUT 'A'
4	INTERFACE OUT 'B'
5	INTERFACE OUT 'C'
6	TIMING CONTROL
7	FUNCTION DECODE
8	INTERFACE STEPS
9	FIXED POINT STEPS 'A'
10	FIXED POINT STEPS 'B'
11	FLOATING POINT STEPS 'A'
12	FLOATING POINT STEPS 'B'
13	CONTROLS RK - MILL
14	CONTROLS RL
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17	SHIFT COUNTER
18	BINARIES
19	CHARACTER COUNTER
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20	MILL ATTACHMENTS
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