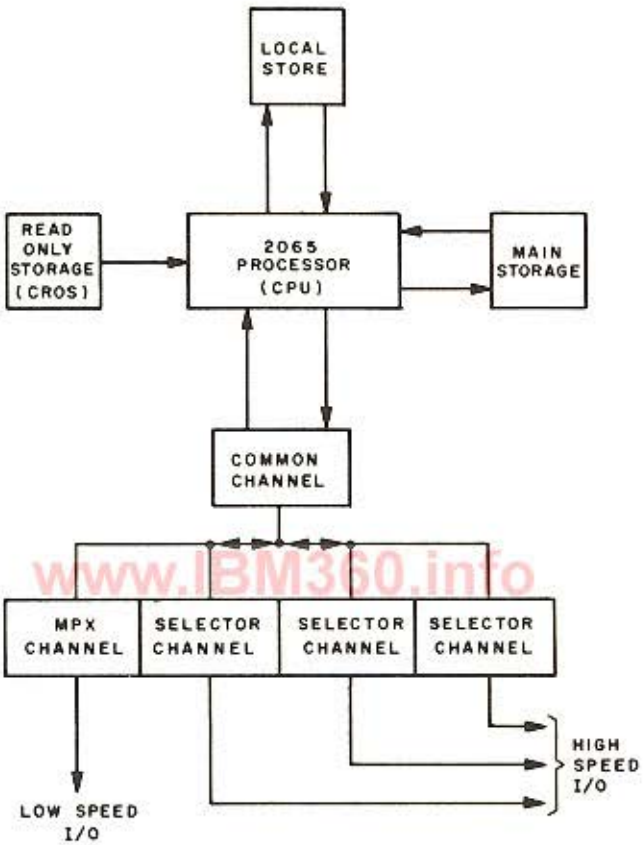
TABLE OF CONTENTS

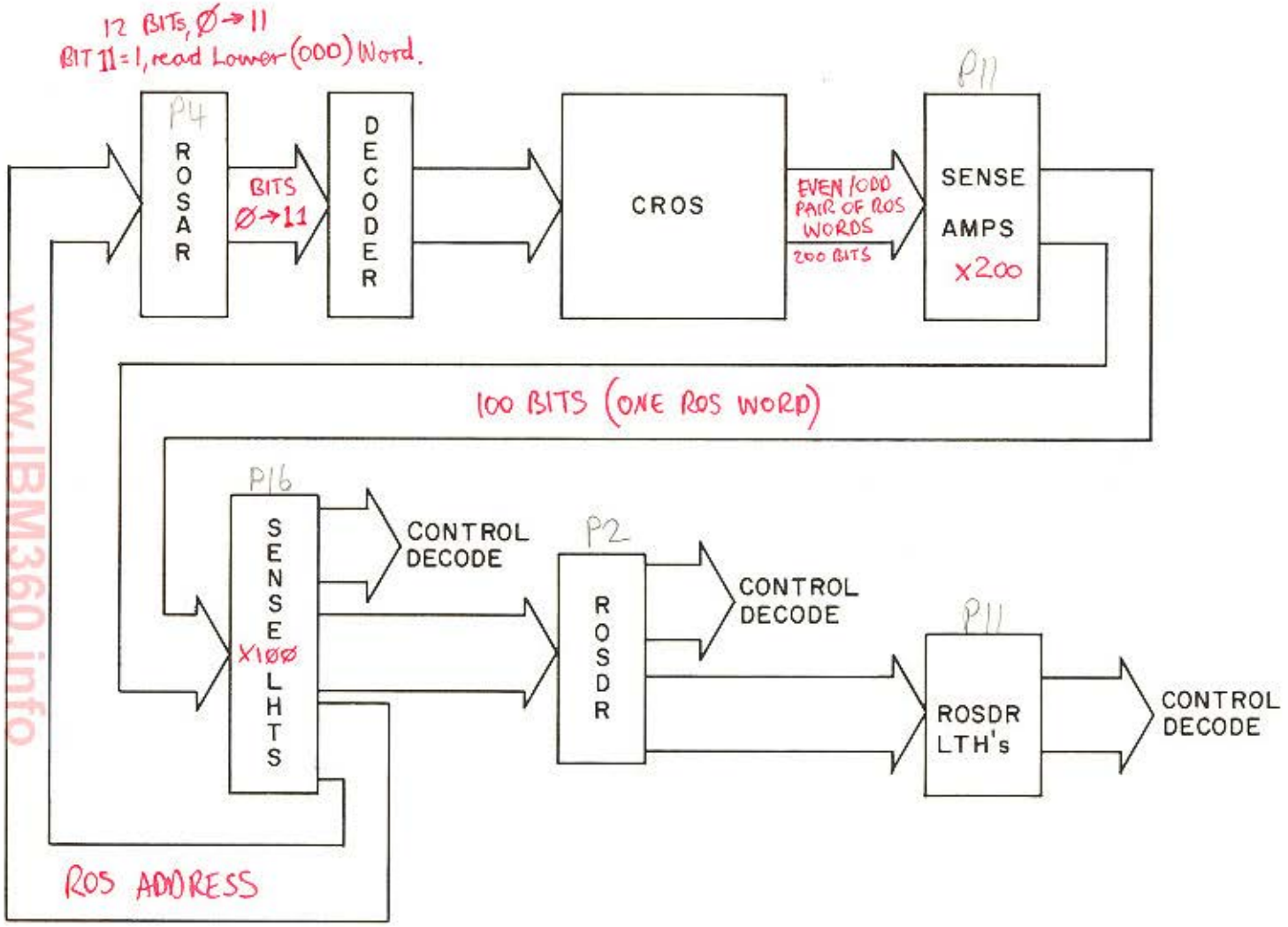
LECTURE NOTES FROM THE FAA ACADEMY 9020 COURSE "IBM 9020D/E SYSTEMS 7201-02 COMPUTING ELEMENT" (ENHANCED IBM S/360 MODEL 65)

Coloured-in by Chris Bigos in Oklahoma USA 1979
Scanned in by Chris Bigos in London UK 2012



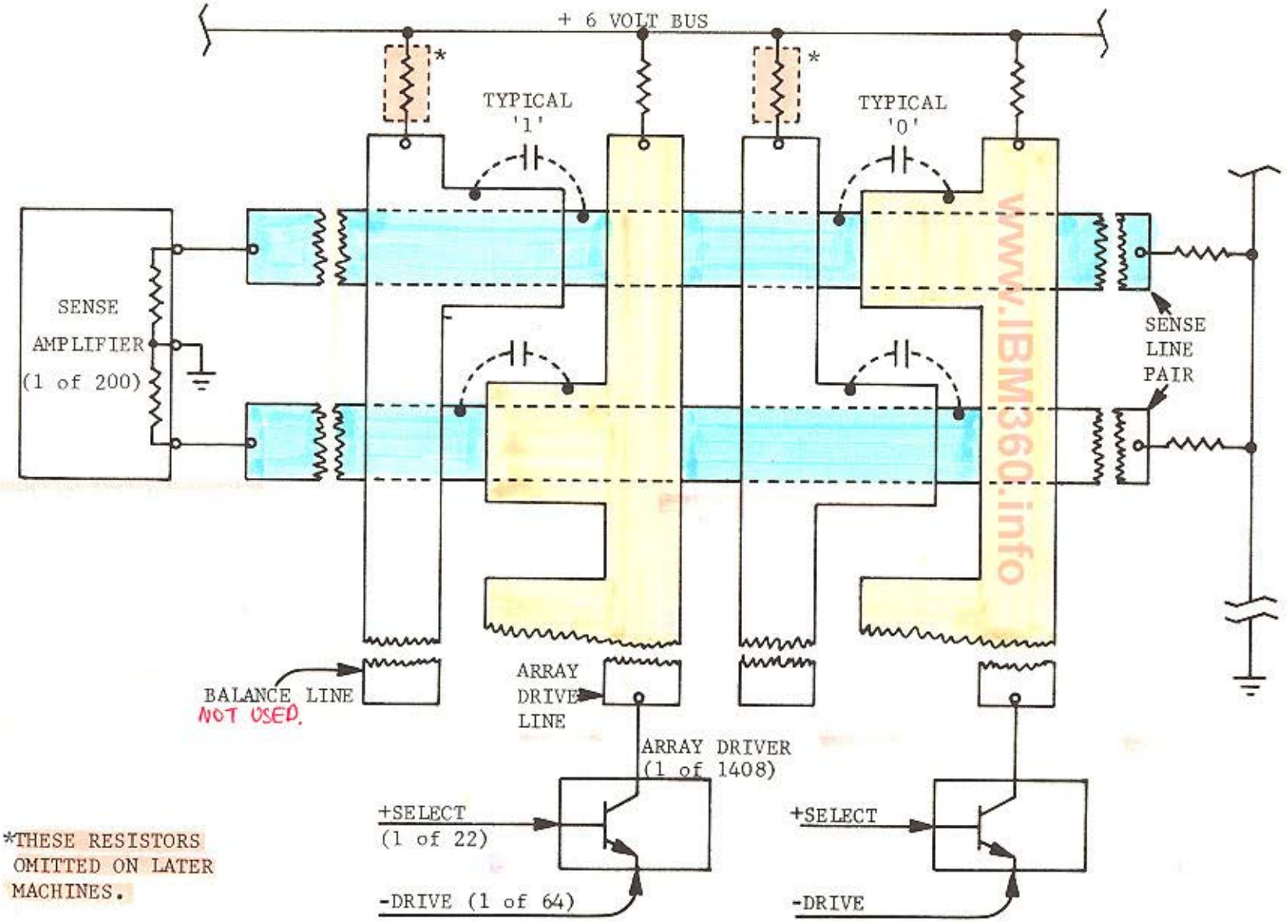
Basic Computer

1-1



CROS "Big Picture"

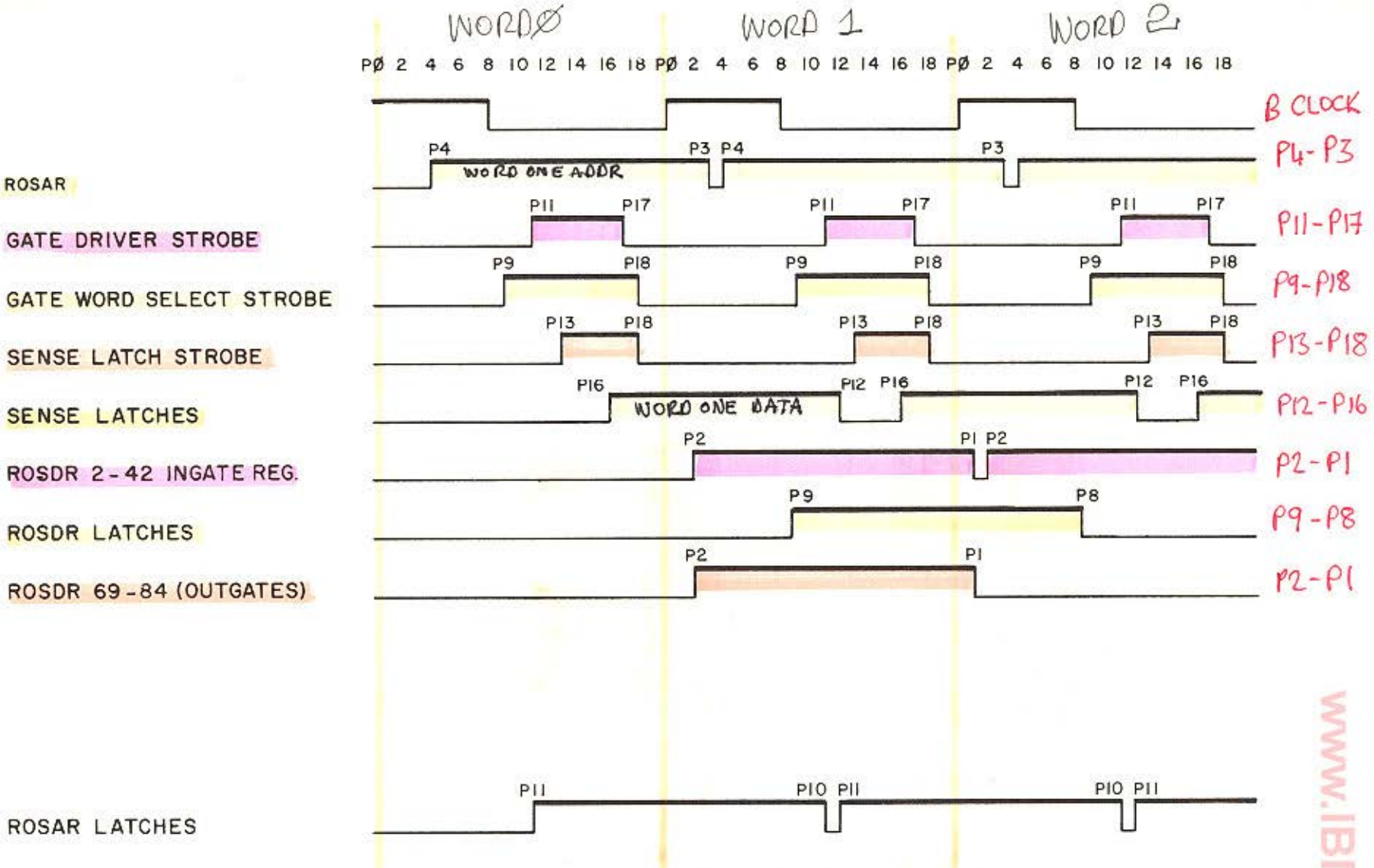
1-2



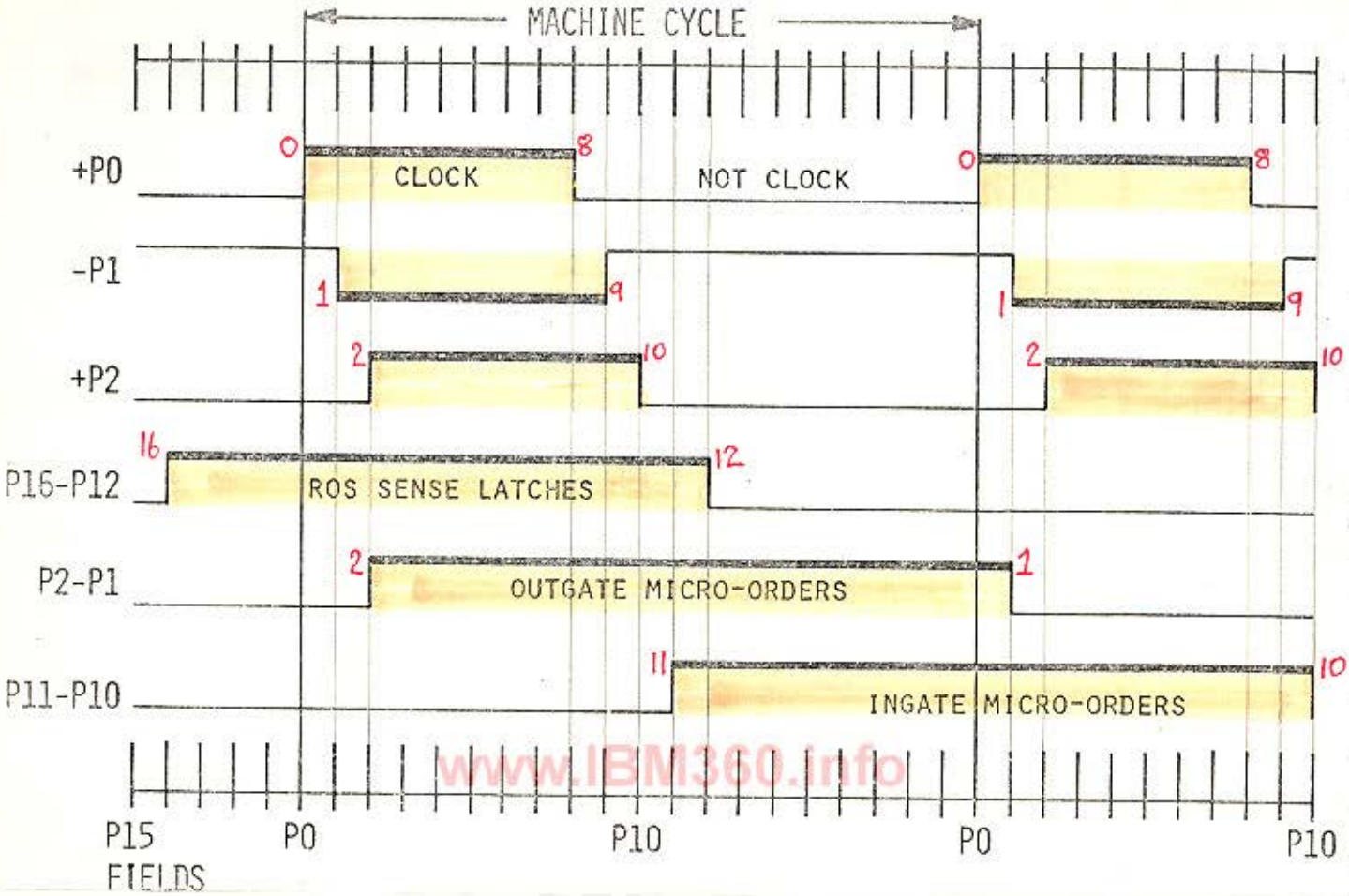
*THESE RESISTORS OMITTED ON LATER MACHINES.

C R O S H A R D W A R E

SEE FETOM P2-10



ROS TIMING See FETOM 1-27



A. P2-P1 (A7 ONLY)
P11-P10 (ALL OTHERS)

B. P11-P10

C. P2-P1 (C3 ONLY)
P11-P10

D. P2-P1 (D1, D2, D3)
P11-P10 (ALL OTHERS)

E. P2-P1
P11-P10

F. P2-P1
P11-P10

G. P2-P1
P11-P10

H. P2-P1

L. P16-P12

NA. P16-P12

K. P16-P12

J. P16-P12

M. P2-P1

N. P2-P1

P. P2-P1

Q. P2-P1

R. P2-P1

T. P2-P1

U. P2-P1

V. P2-P1

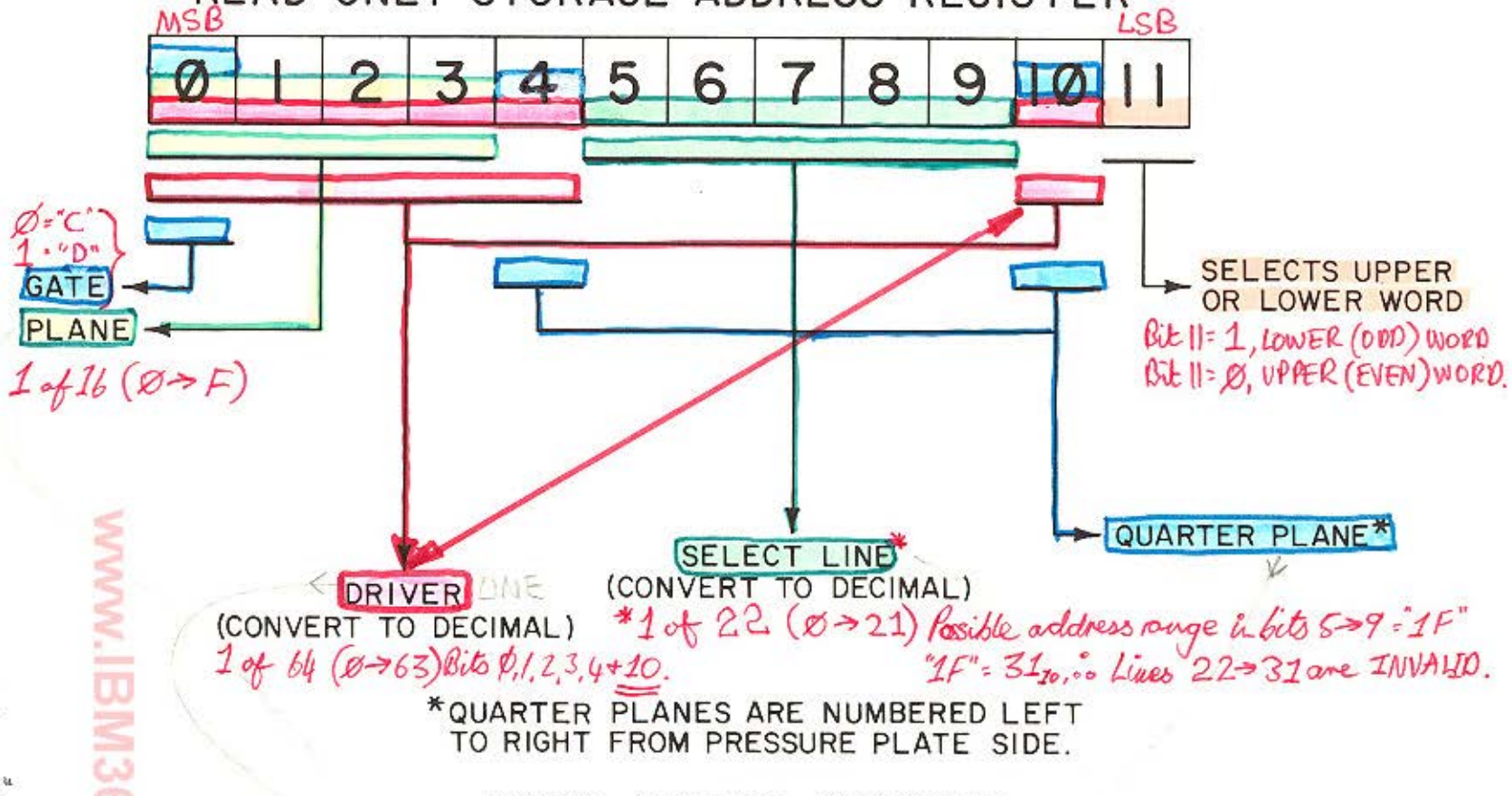
W. P2-P1
P11-P10

ROS FIELD TIMING

SEE FETOM P 1-20

Any ROS address "XD8"→"XFF" is invalid. Any ROS address above "FD7" is invalid.

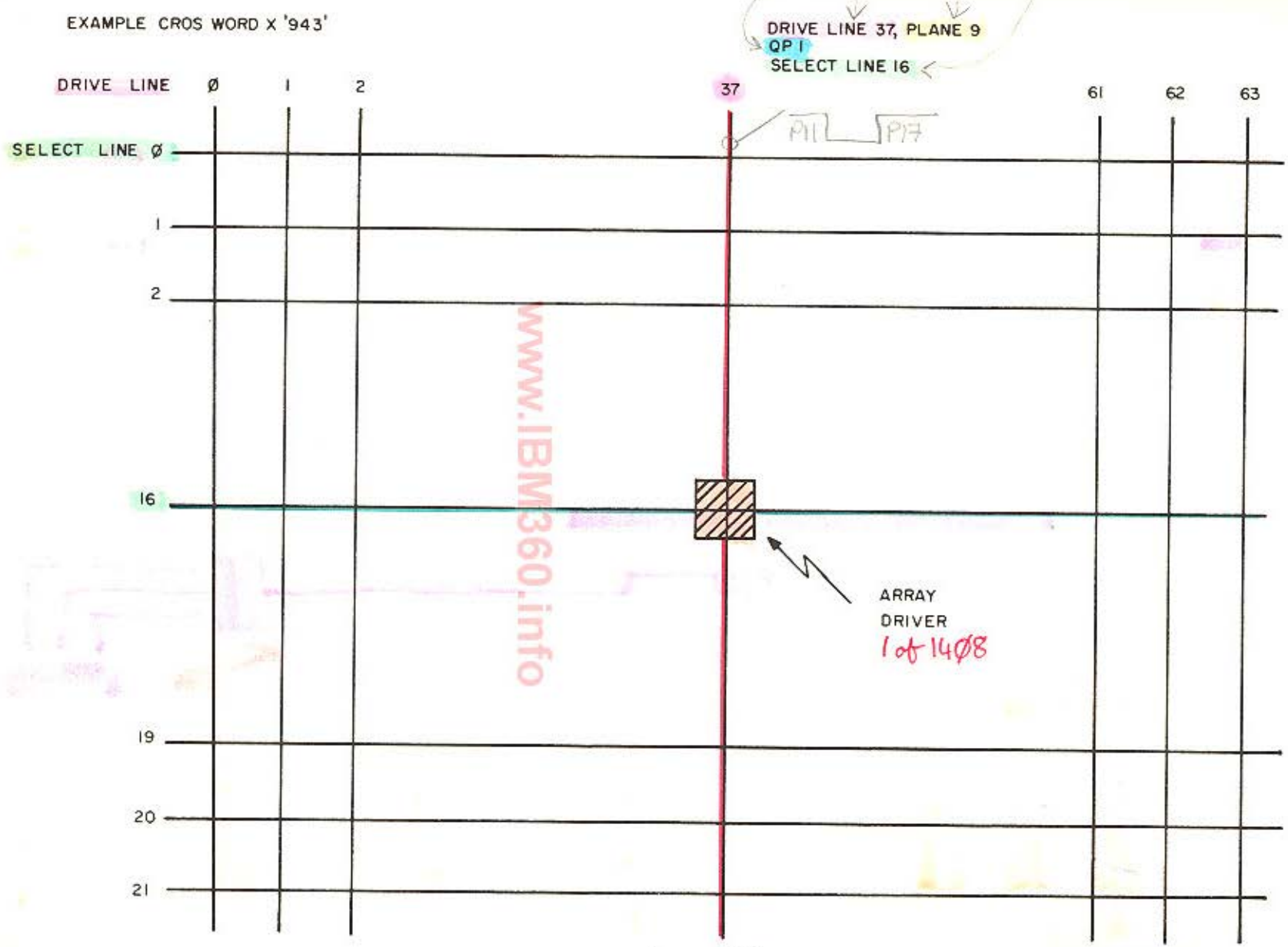
1 0 0 1 0 1 0 0 0 0 0 1 1 = X"943"



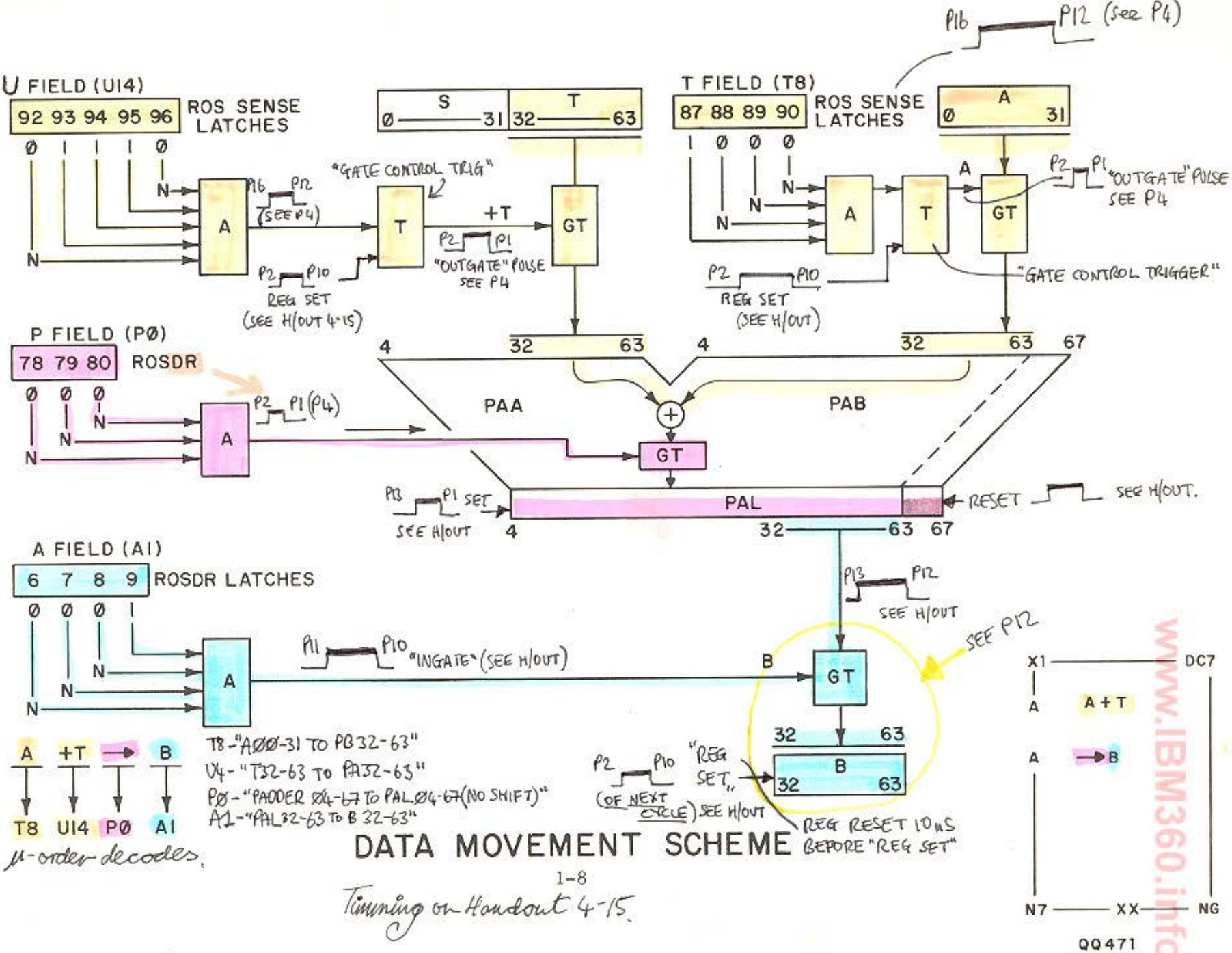
EG:- ADDR. "FAA"

GATE - 1 = "D"
PLANE - F = "15"
DRIVER - 3F = "63"
SEL. LINE - "A" = 1Ø
½ PLANE - "3"
WORD - Ø = "UPPER"

CROS ACCESS SCHEME



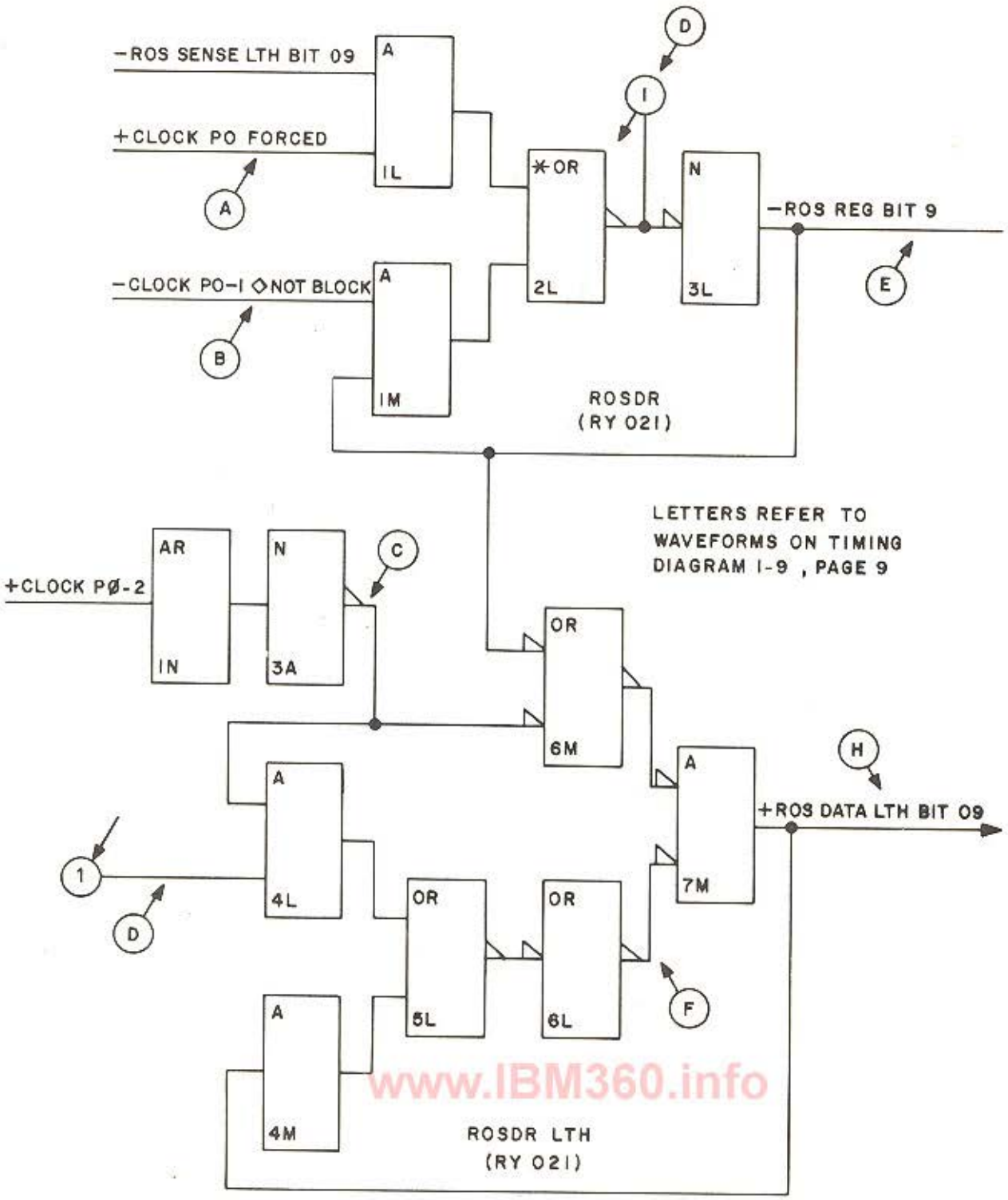
Array Driver



DATA MOVEMENT SCHEME

1-8

Timing on Handout 4-15.



DECODE A1 MICRO-ORDER BIT 9
(GATE PAL TO B REG)

ROS WORD	BIT W	X	Y	Z
ASSUME ROS SENSE LTH BIT 9	Ø	1	Ø	Ø

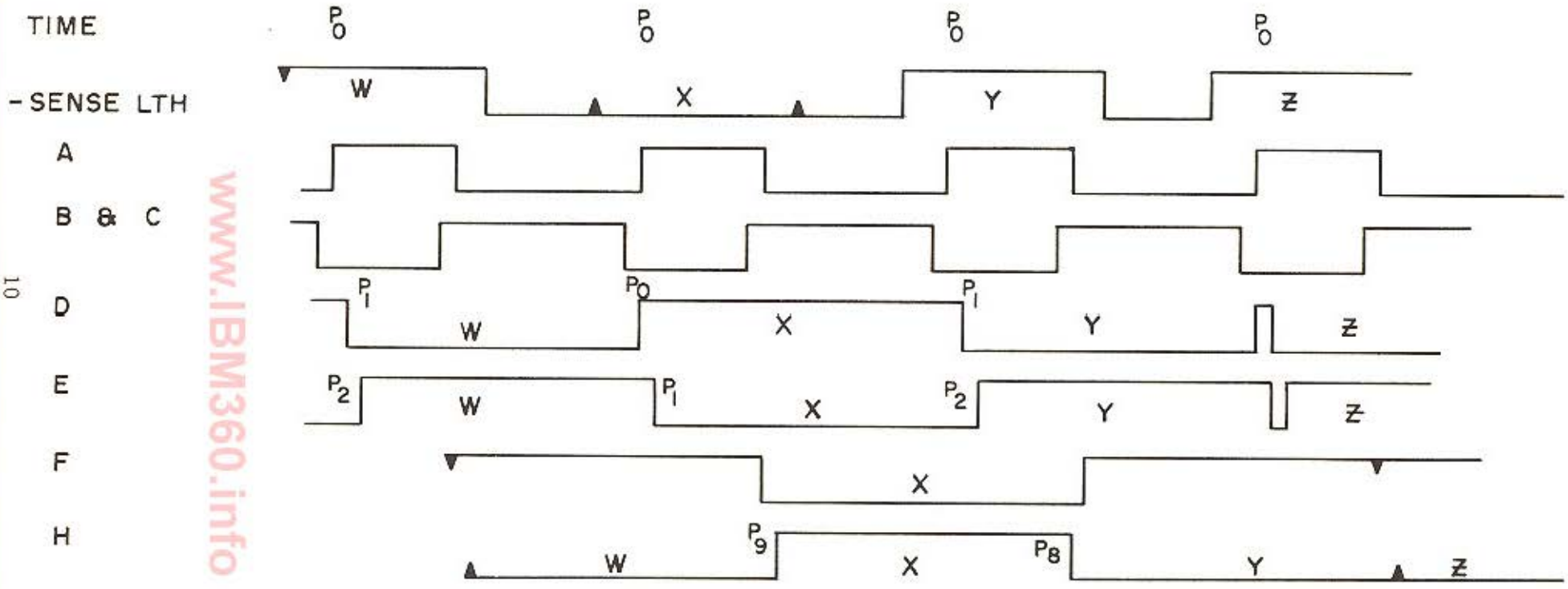
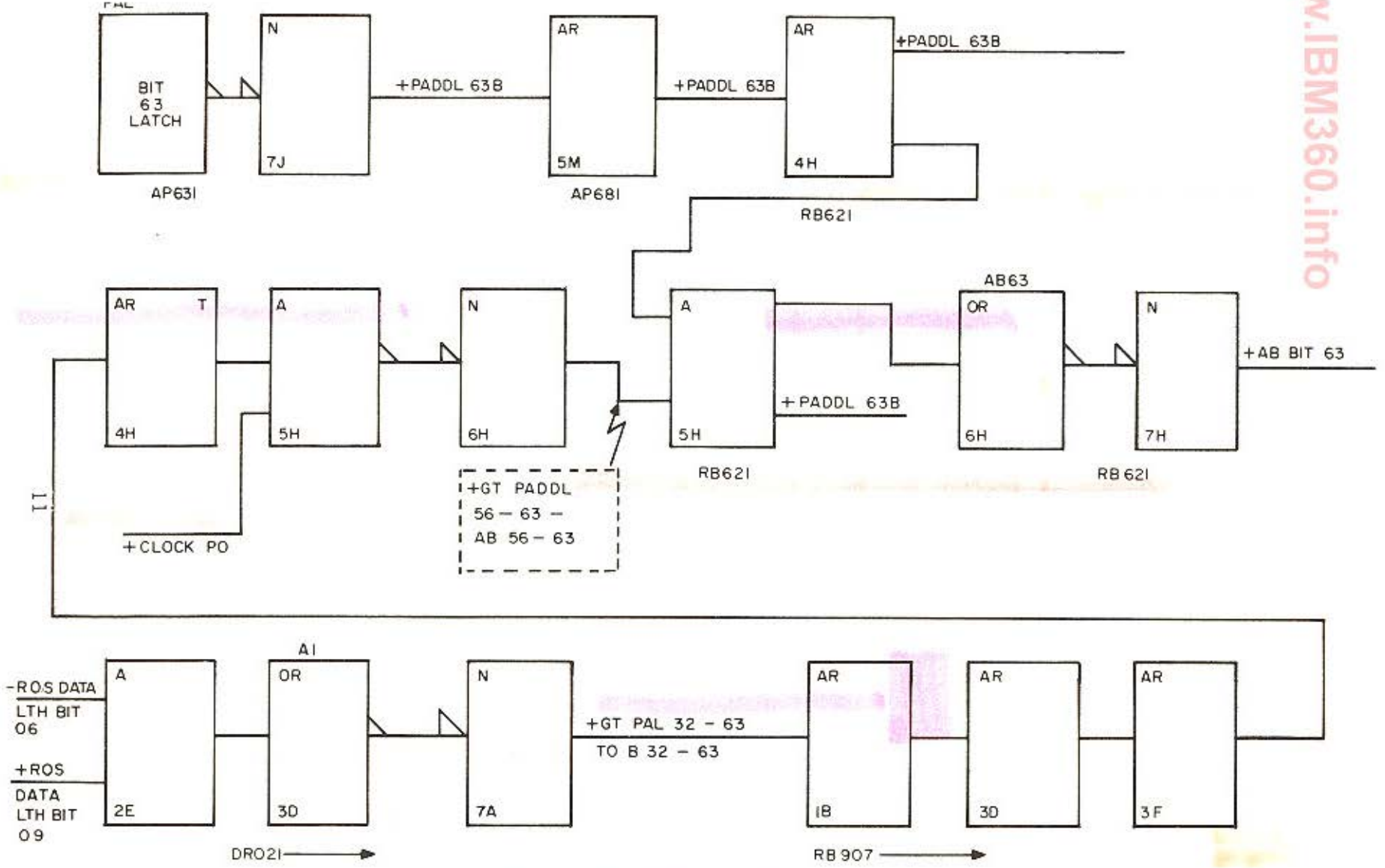
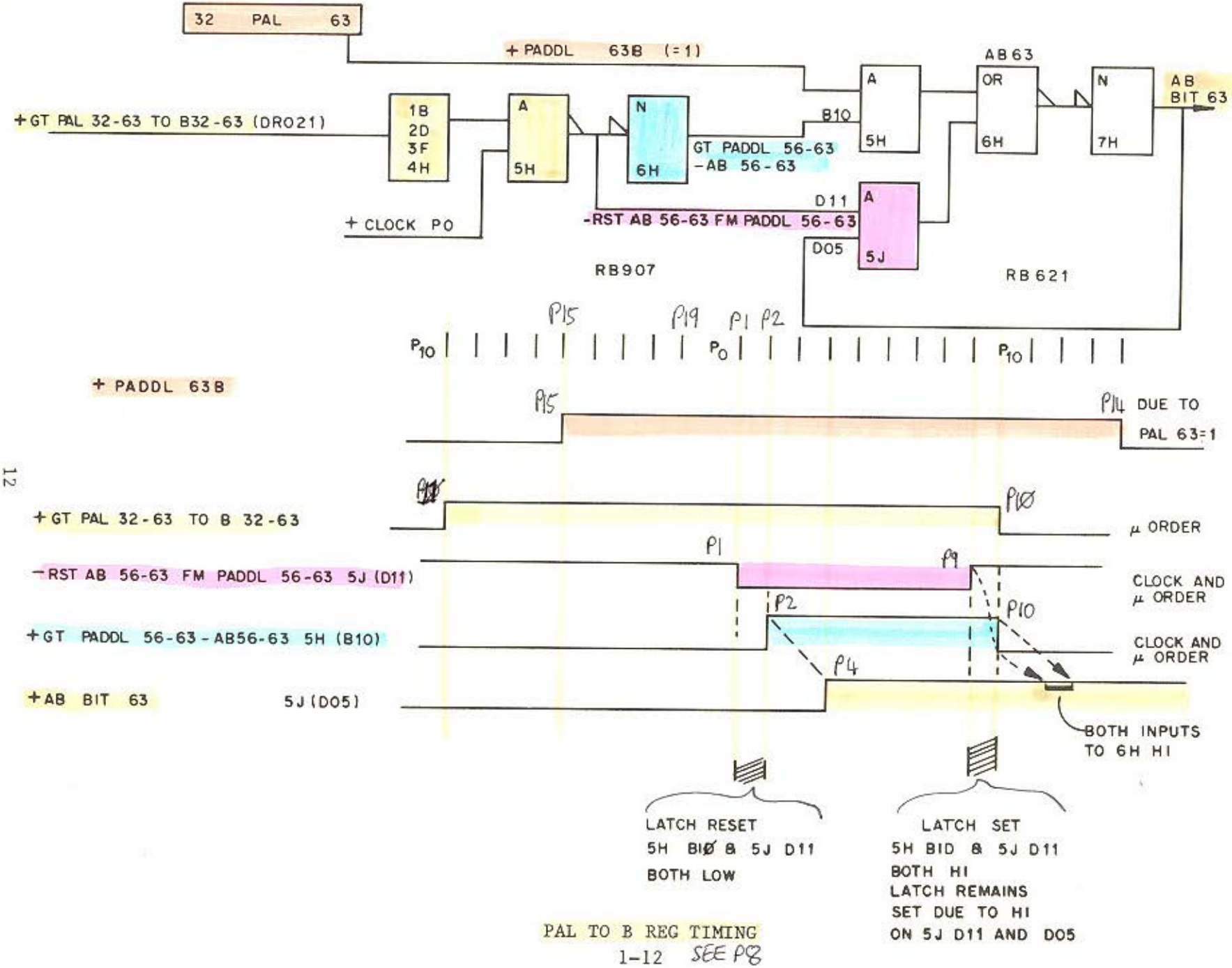


FIG 1-9
LOCATIONS

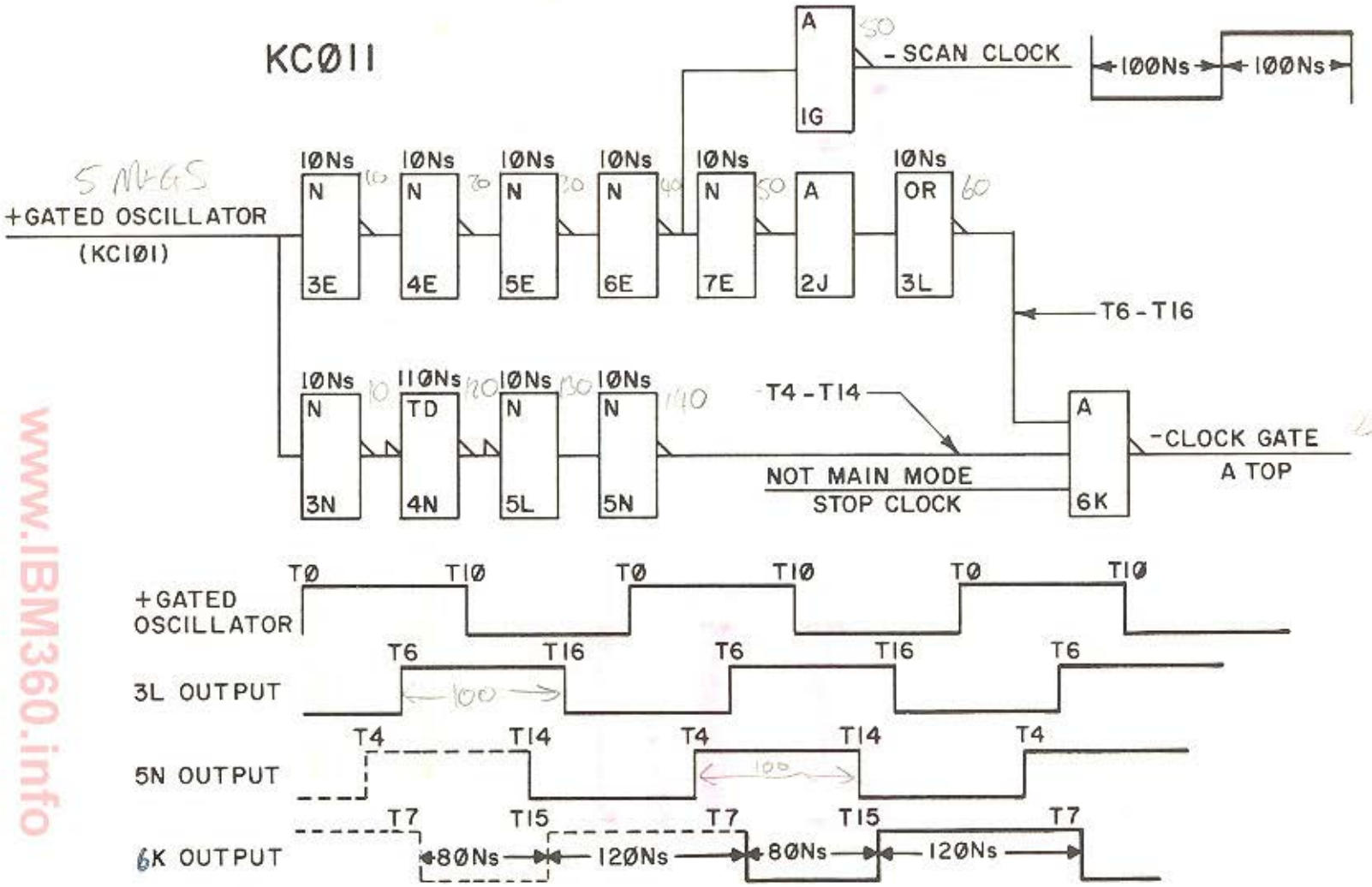


PAL to B Data Movement



PAL TO B REG TIMING

1-12 SEE P8

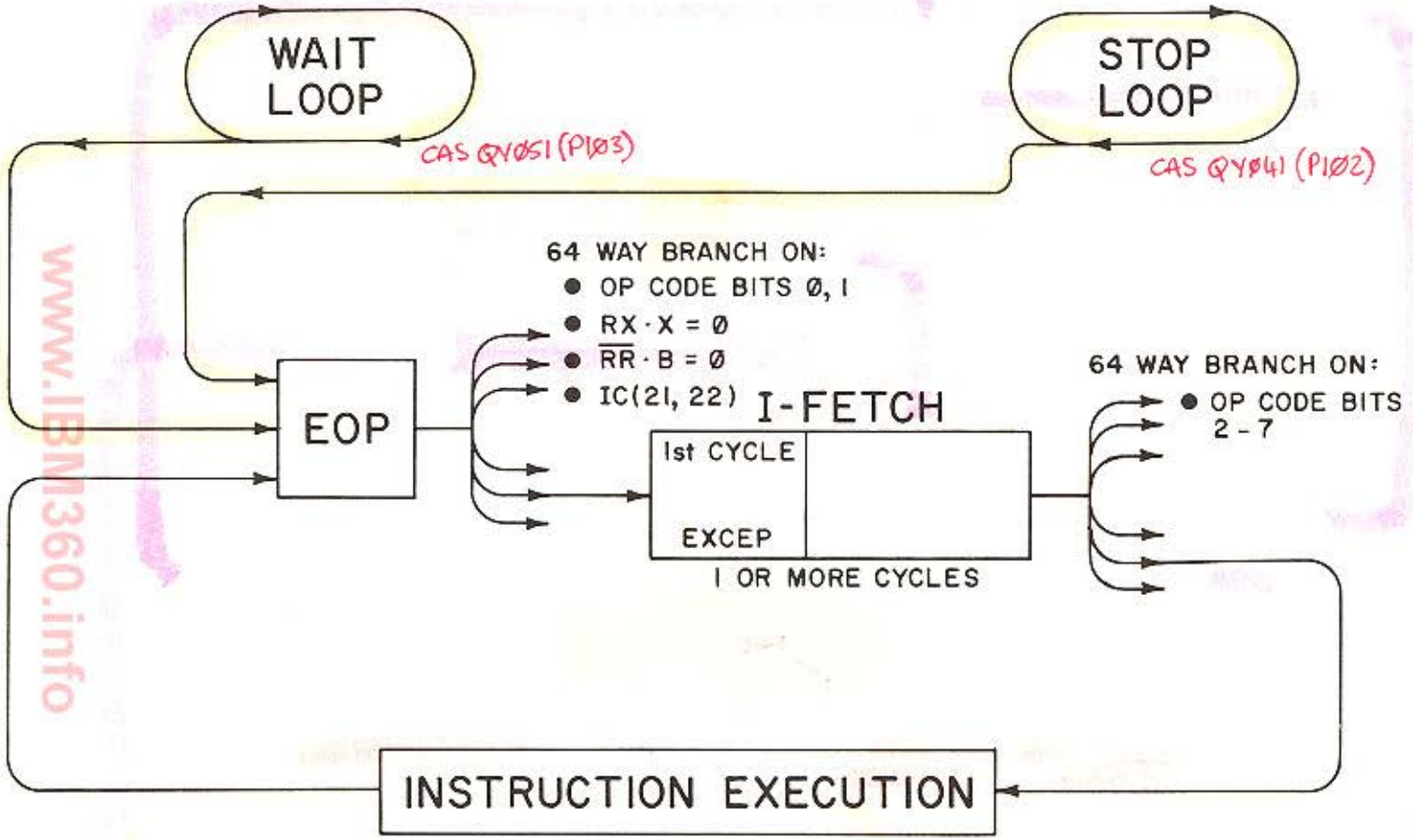


CLOCK FORMATION

MACHINE - LANGUAGE PROGRAM

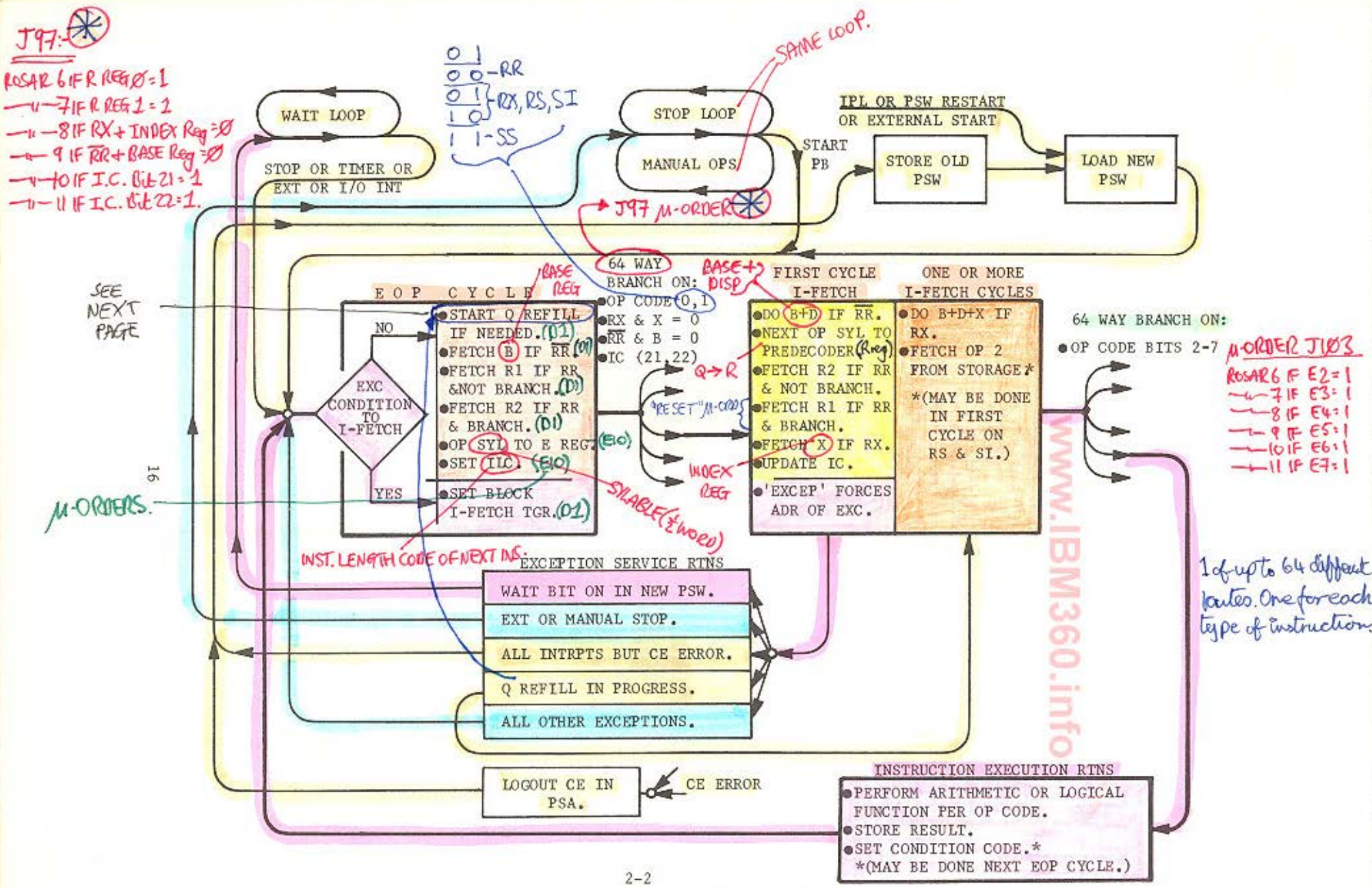
Storage Location	Data & Explanation of Data	
IPSW LOC	IPSW	INST. ADR.
000000	X X X X X X X X	X X 0 0 1 0 0 0
	(BALR) R1 R2 (LM) R1 R3	B D I S (ST) R1 X
001000	0 5 6 0 9 8 0 5	6 0 1 2 5 0 4 5
	B D I S (AP) L1 L2	B1 D I S B2 D I S
001008	6 0 2 A F A 2 1	6 0 2 B 6 0 2 E
	(SCON) R1 R2 (SATR) R1 R2	Reg 0 (ATR 1 Msk) FOR SATR
001010	0 1 2 4 0 D 0 1	4 3 1 2 0 0 0 0
	Reg 1 (ATR 2, Select) FOR SATR	Reg 2 (Config. Msk) FOR SCON
001018	0 0 0 0 0 0 4 2	A 0 F 0 0 4 0 2
	Reg 3 (Config. Msk) FOR SCON	Reg 4 (R1 for ST) FOR SCON (Select Msk)
001020	0 0 0 0 0 0 0 0	0 0 F 0 0 4 0 2
	Reg 5 (X for ST)	AP Op 1 L1 FIELD - 3 BYTES (SIGN)
001028	0 0 0 0 0 0 0 8	X X 4 5 6 7 8 C
	AP Op 2 L2 FIELDS - 2 BYTES	Stor Wd for Reg 4 (ST)
001030	7 8 9 C X X X X	X X X X X X X X

SIGN



MICROPROGRAM "BIG PICTURE"

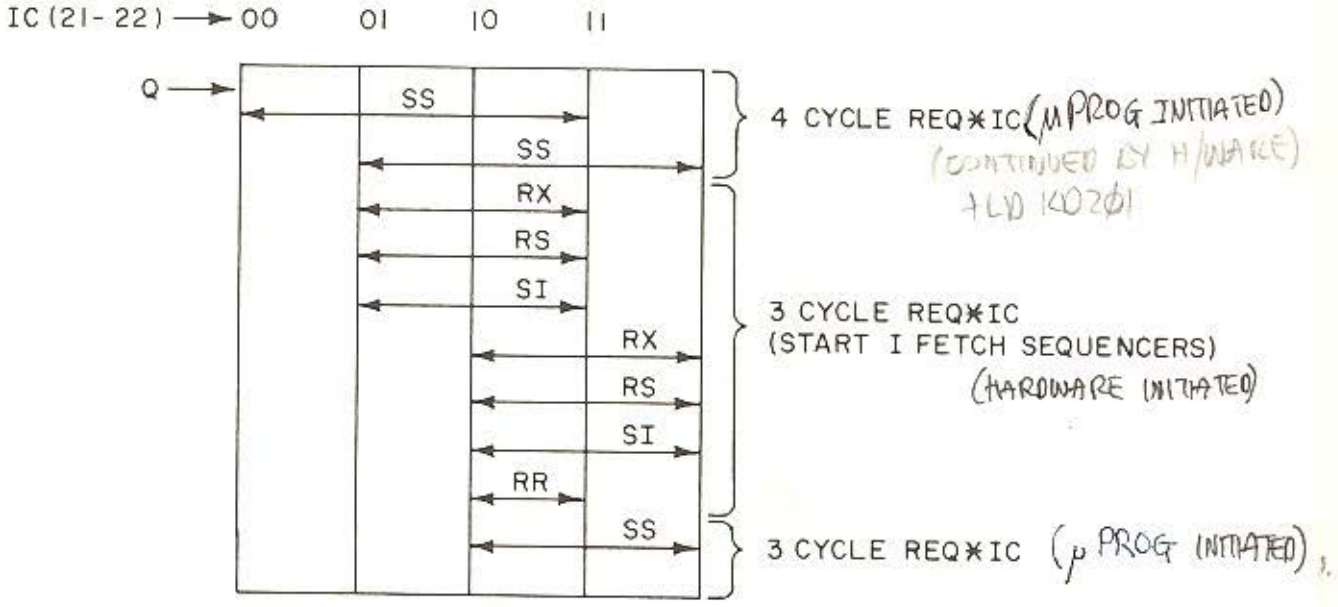
2-1



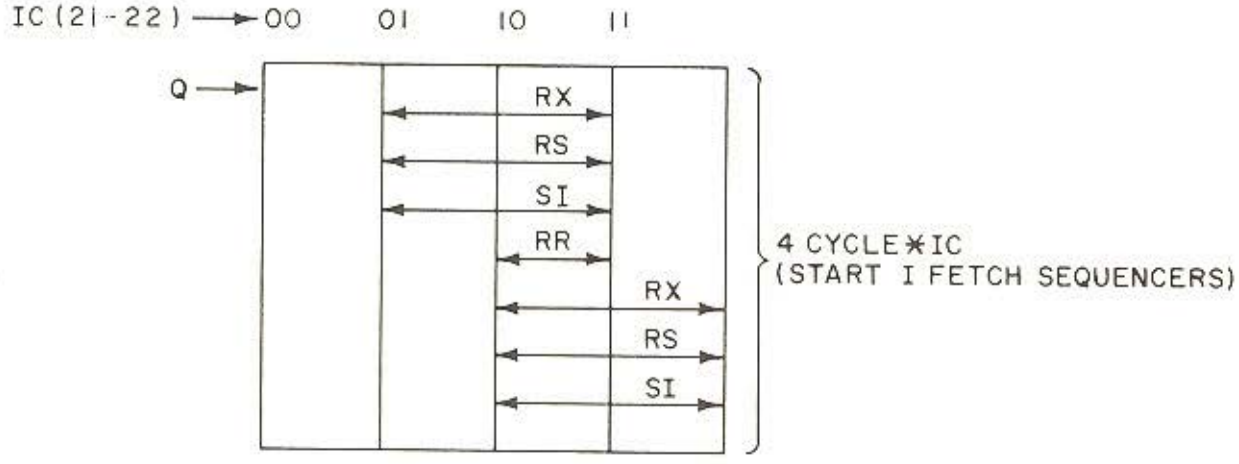
9020 D CE MICRO-PROGRAM "BIG PICTURE"

43463, AAC-942E (12/75)

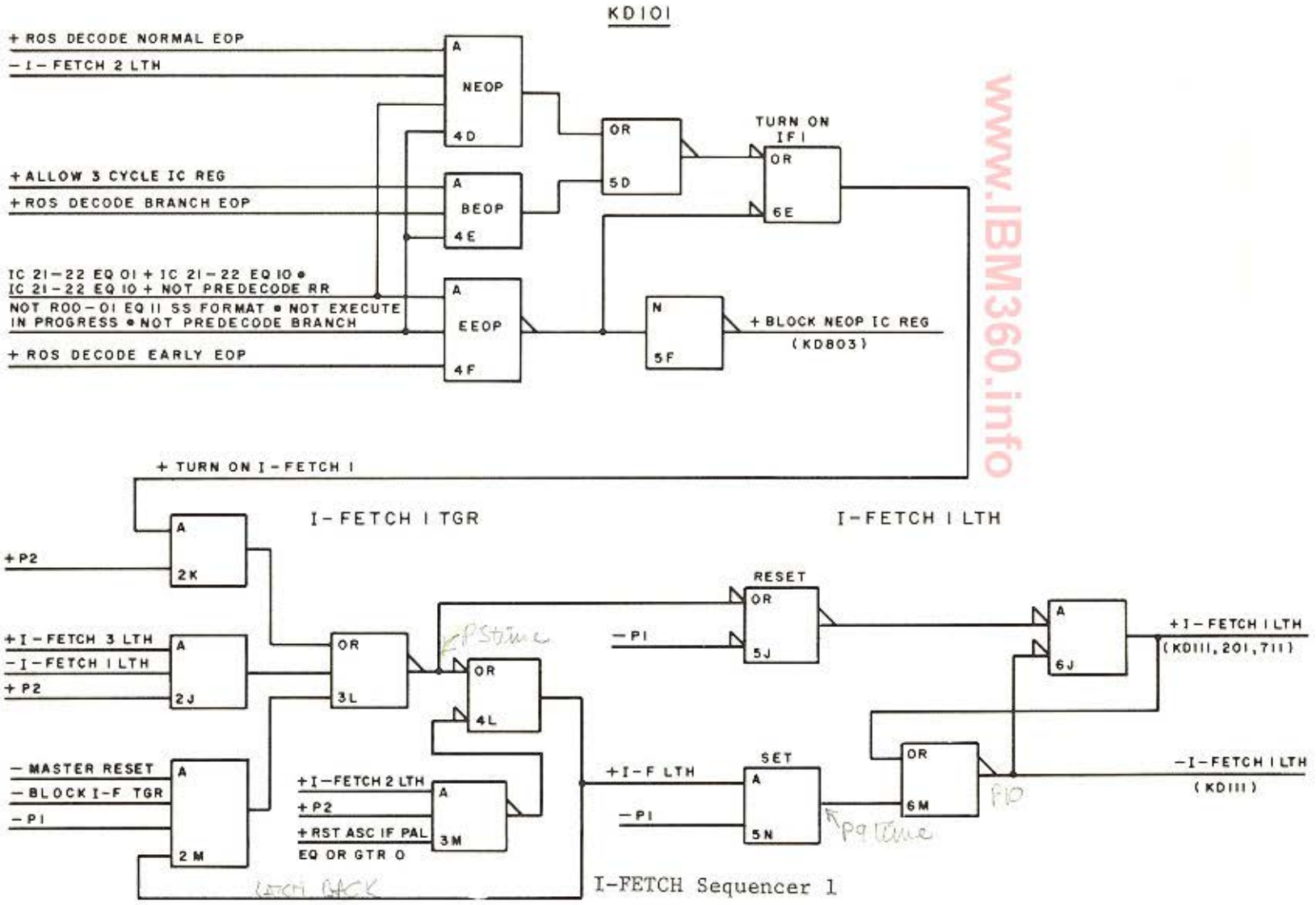
INSTRUCTION REQUEST DURING NEOP OR BEOP
(NOT BRANCH INSTRUCTIONS OR EXECUTE NOT
IN PROGRESS) REF: FEMDM 5-2, 5-30

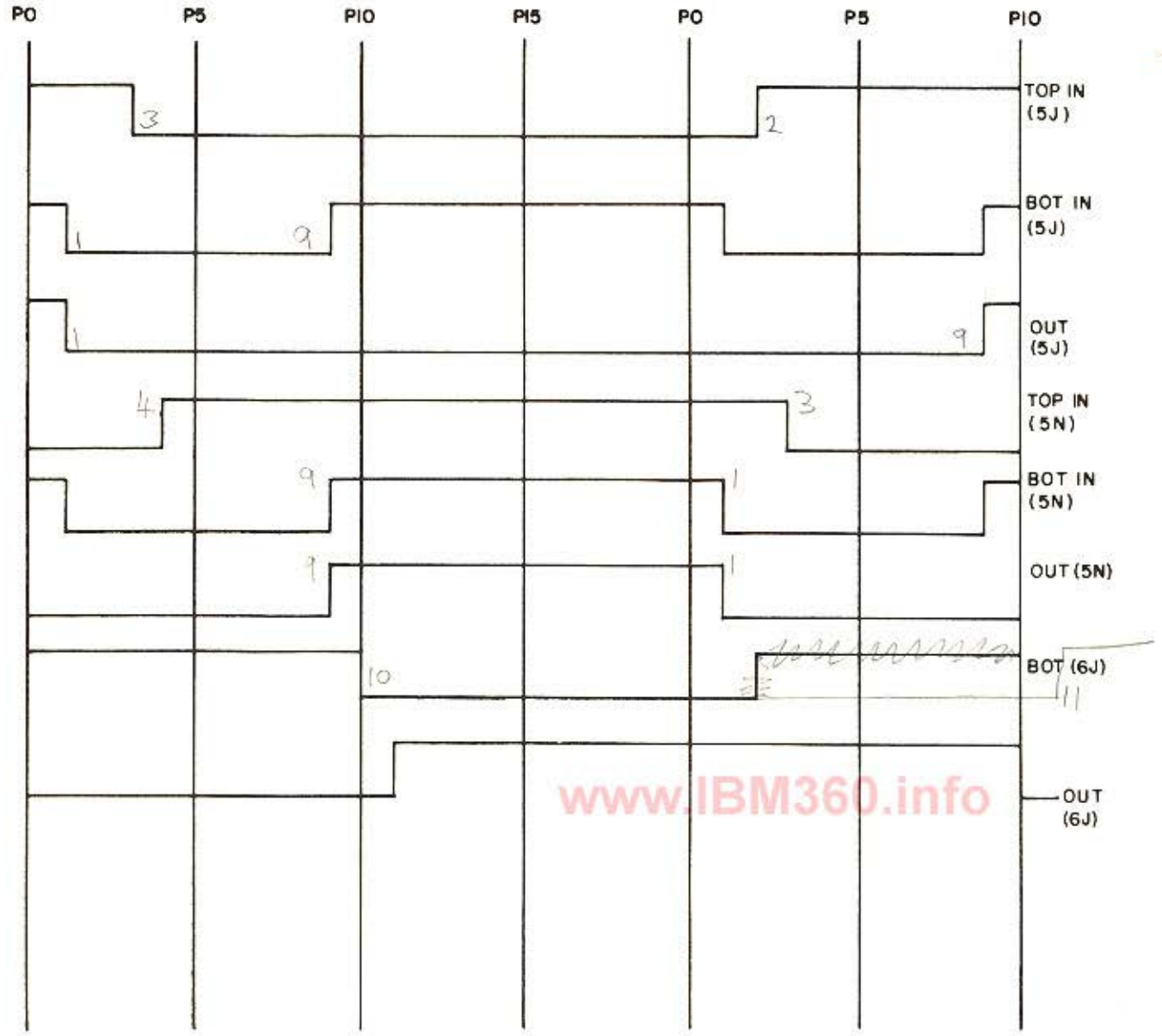


INSTRUCTION REQUEST DURING EEOP
(NOT BRANCH INSTRUCTIONS OR EXECUTE
NOT IN PROGRESS) REF: FEMDN 5-3, 5-30



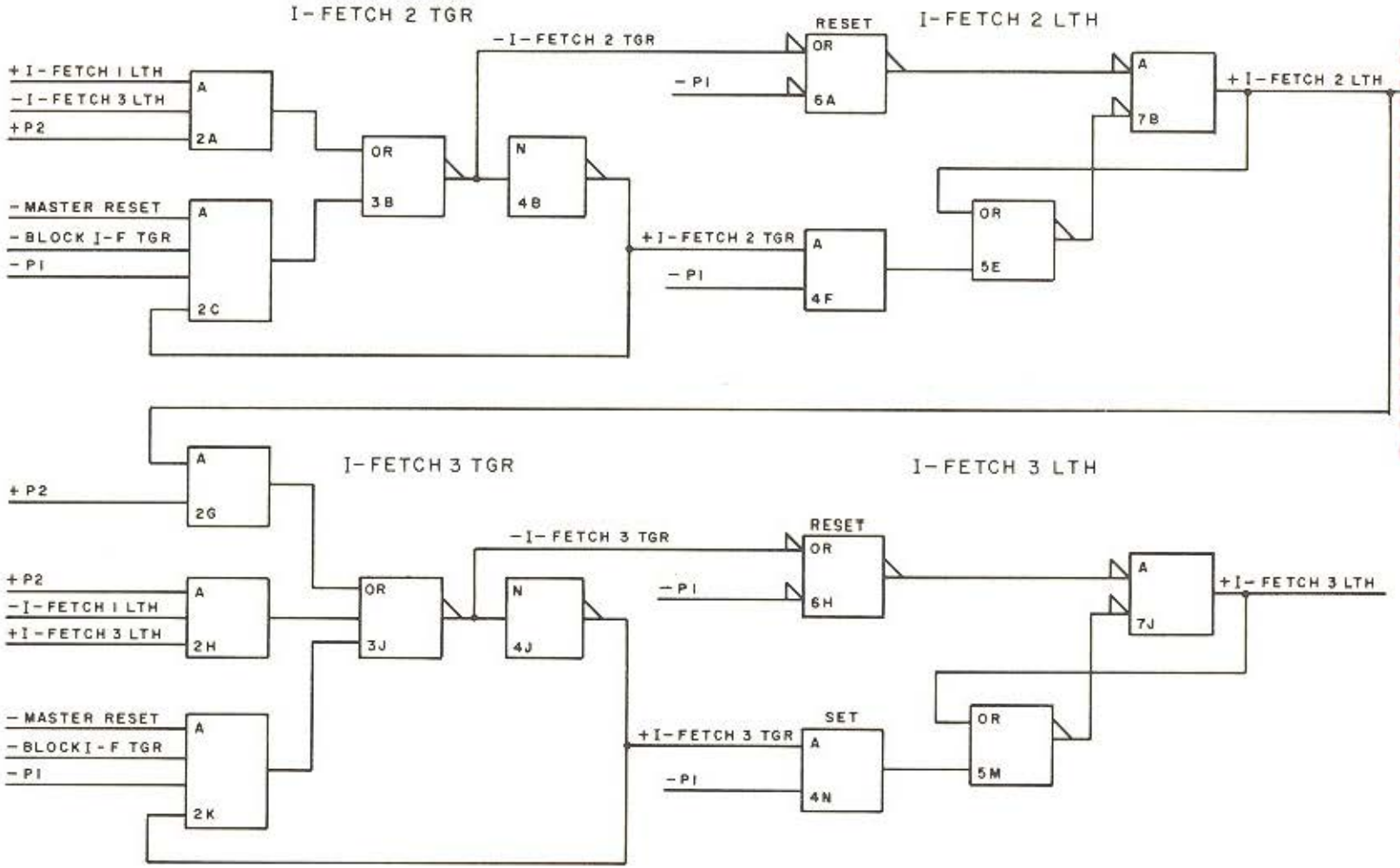
Instruction Request During NEOP and BEOP



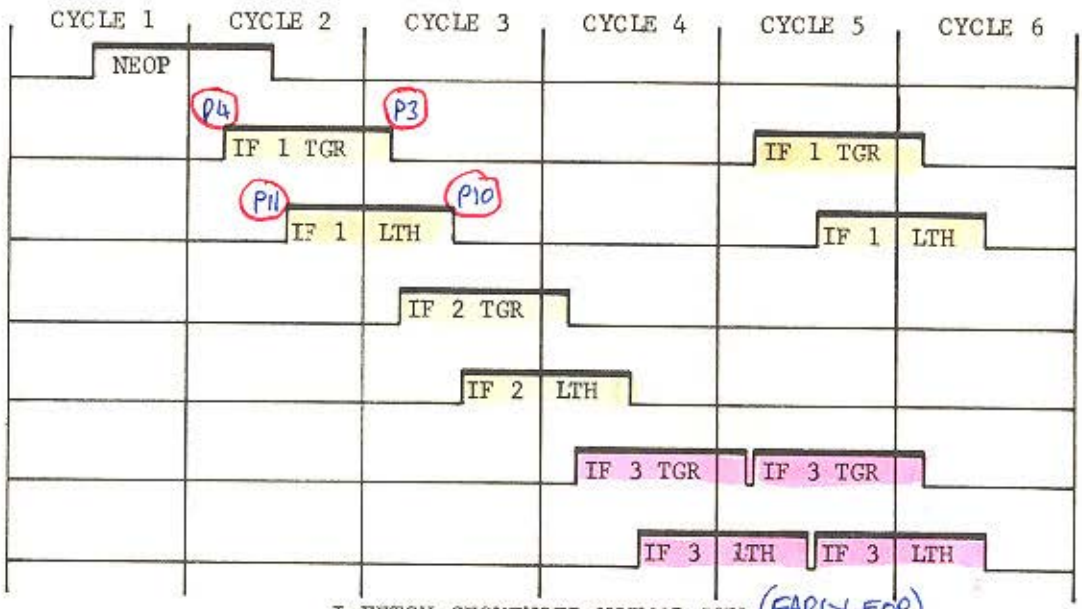


I-FETCH Sequencer 1 Timing

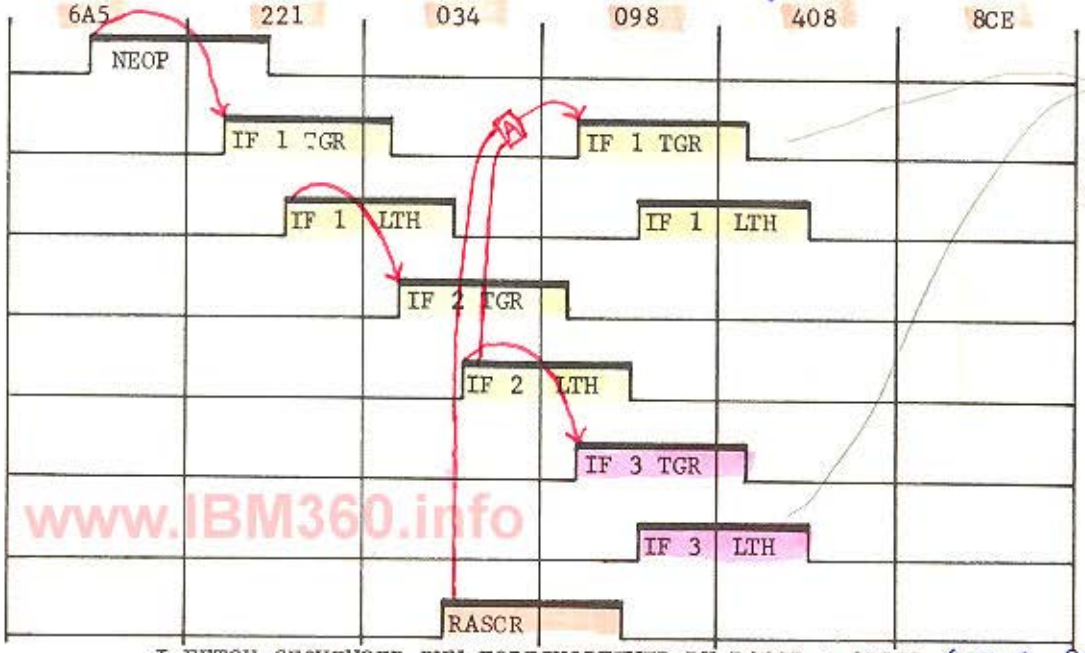
2-5



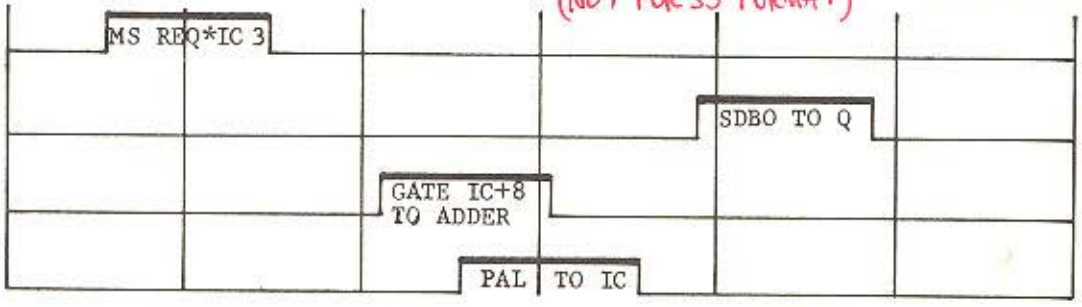
I-Fetch Sequencers 2 and 3



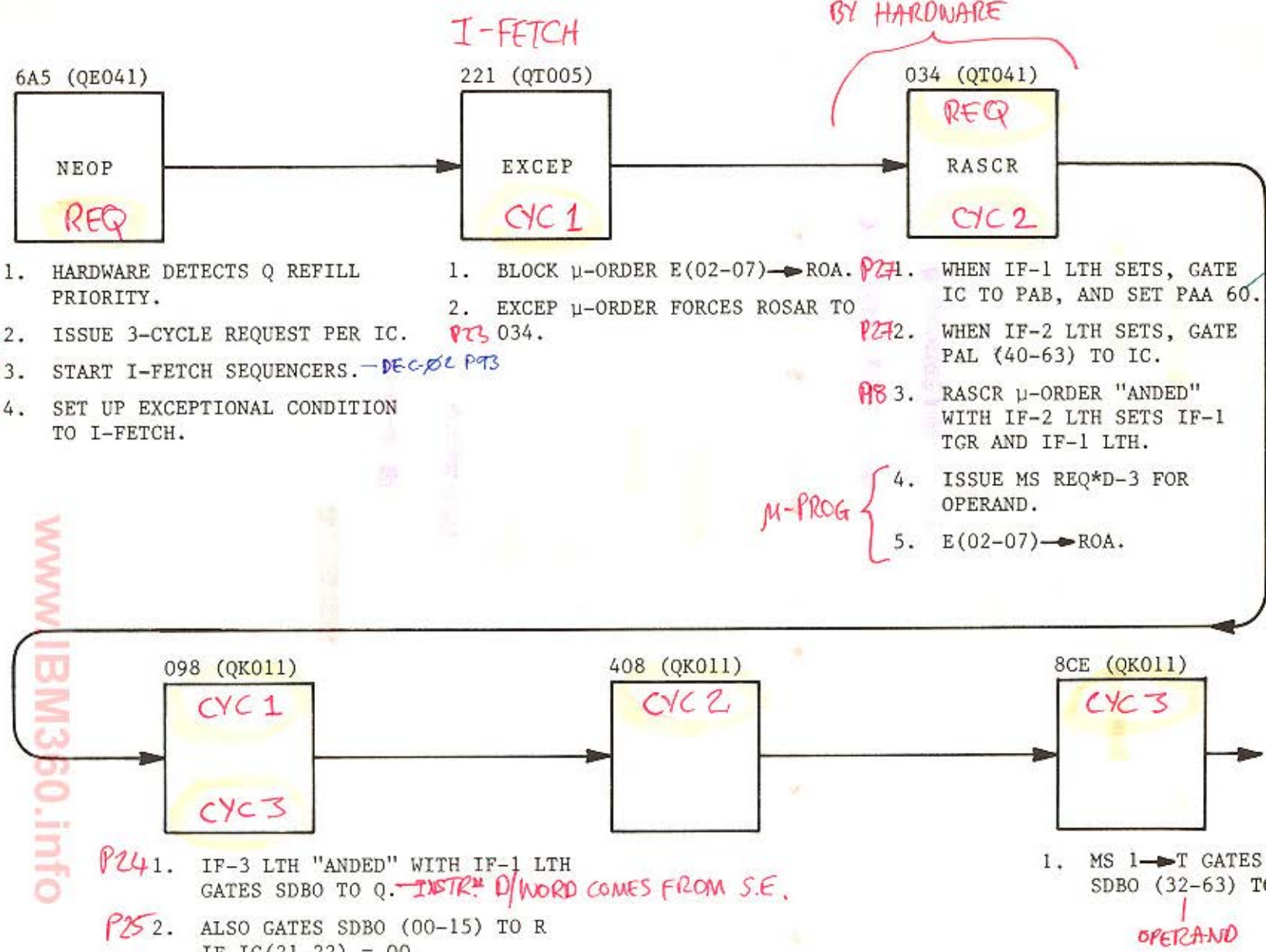
I-FETCH SEQUENCER NORMAL RUN. (EARLY EOP)



I-FETCH SEQUENCER RUN FORESHORTENED BY RASCR M-ORDER. (NEOP+BEOP)
(NOT FOR SS FORMAT)

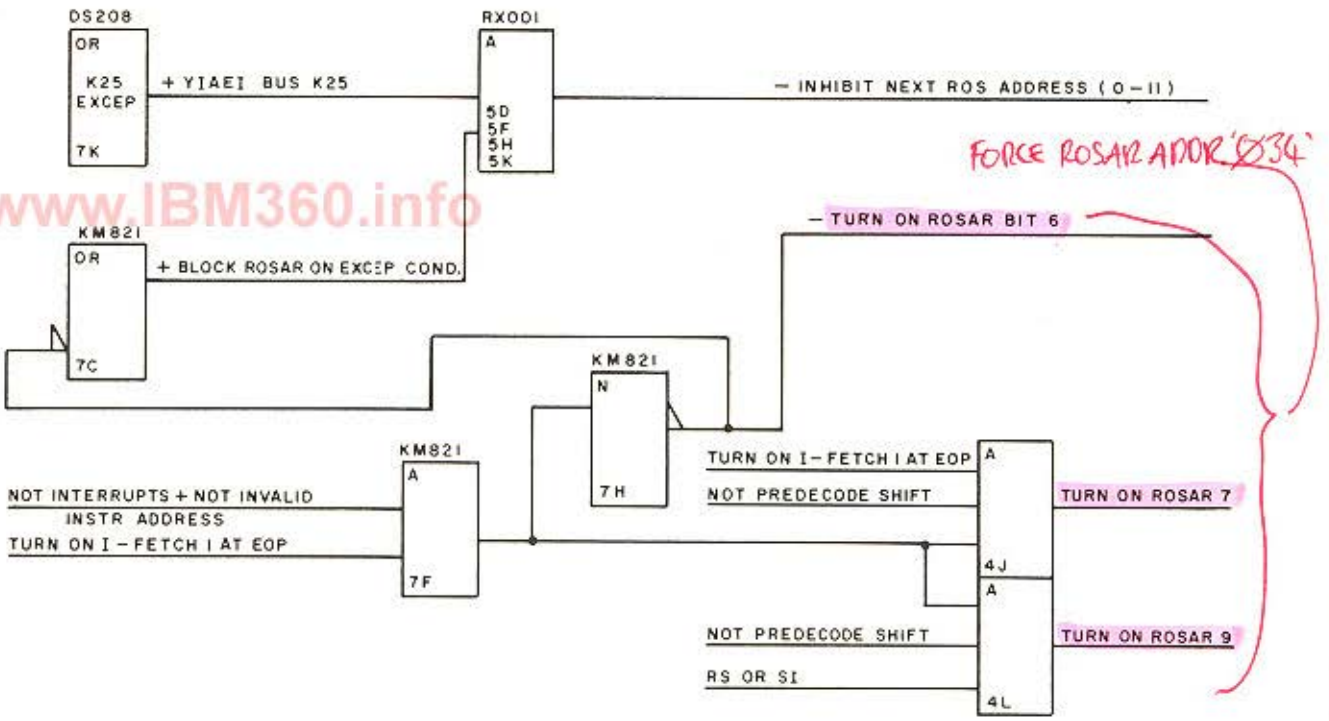


2-7 See next page. + DE-C-02 P93



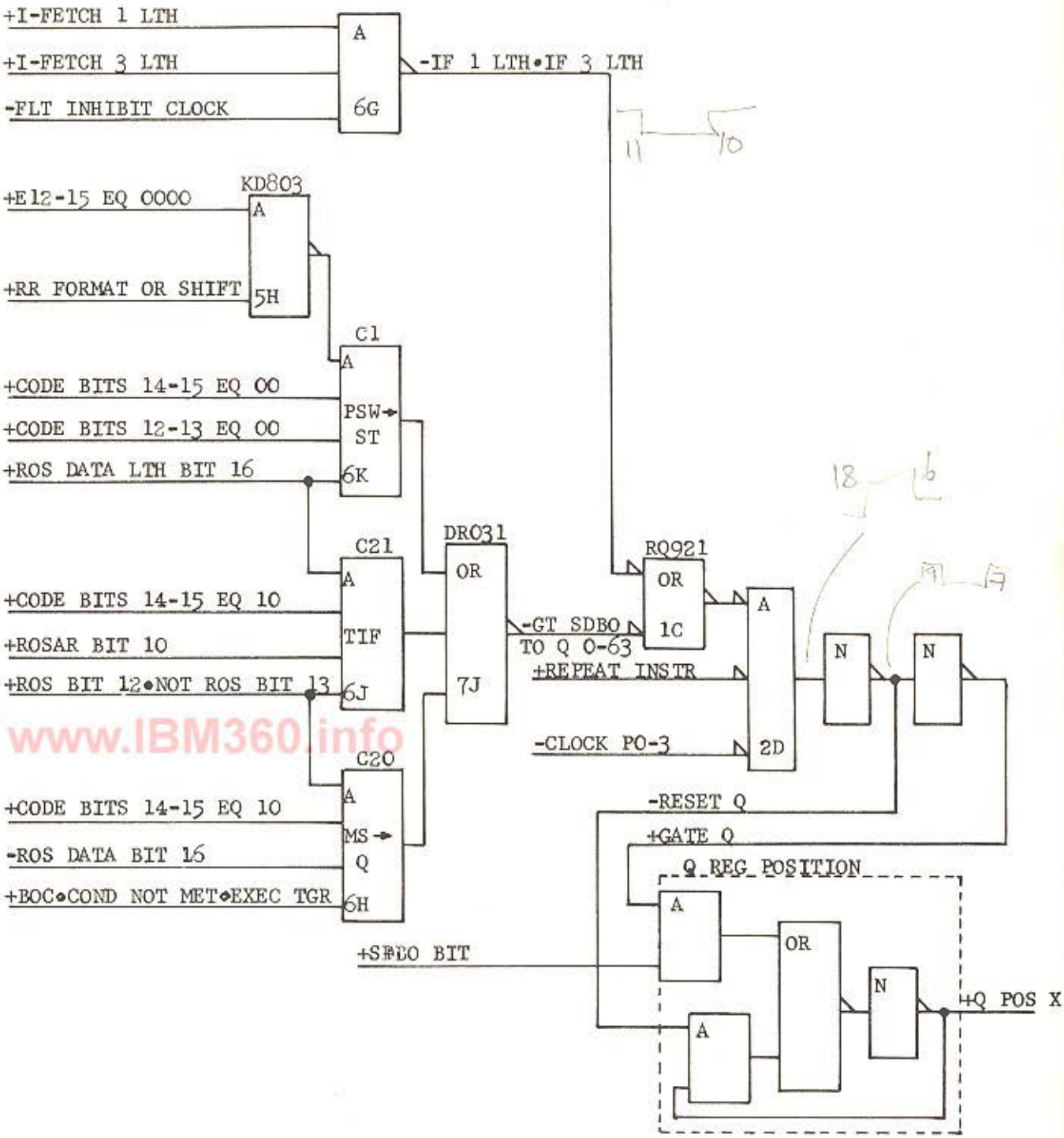
Q REFILL EXCEPTIONAL CONDITION (NEOP)

Flow Chart in PE-C-02 Page 111.



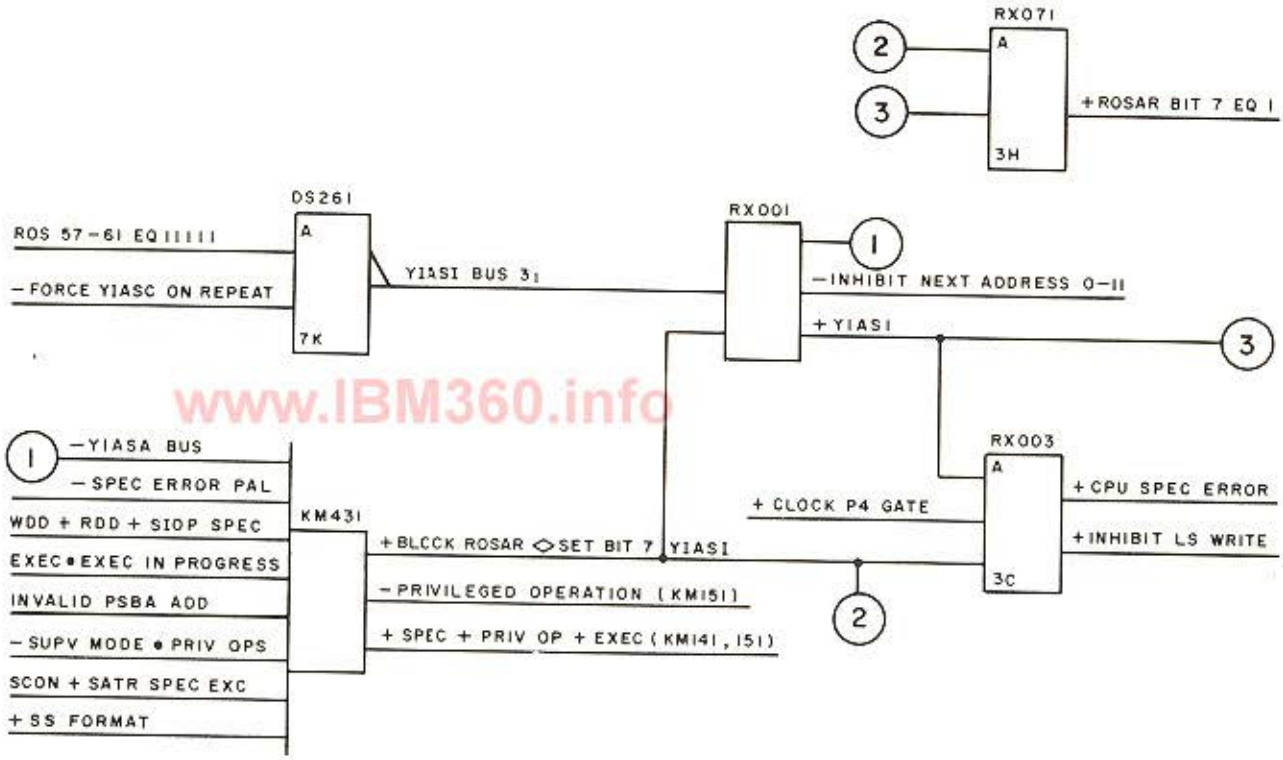
Exception μ-Order For "Q" Refill Priority (ROS Ø34) (RS-SI FORMAT)

2-9



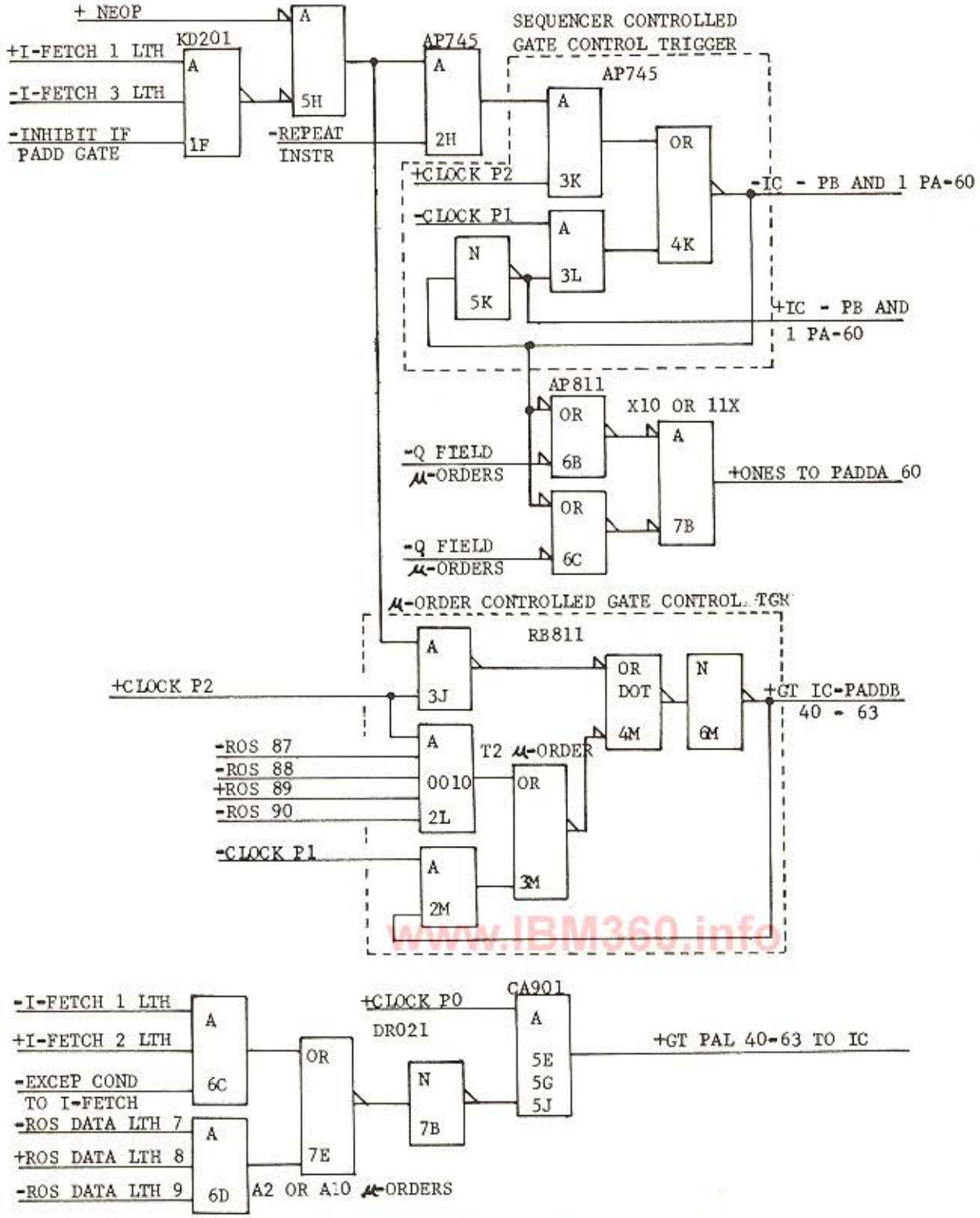
GATING SDBO TO Q REG.

2-10



SPEC μ-Order (K31) Force ROS to Ø1Ø

2-12



GATING IC PLUS 8 TO PARALLEL ADDER TO IC.