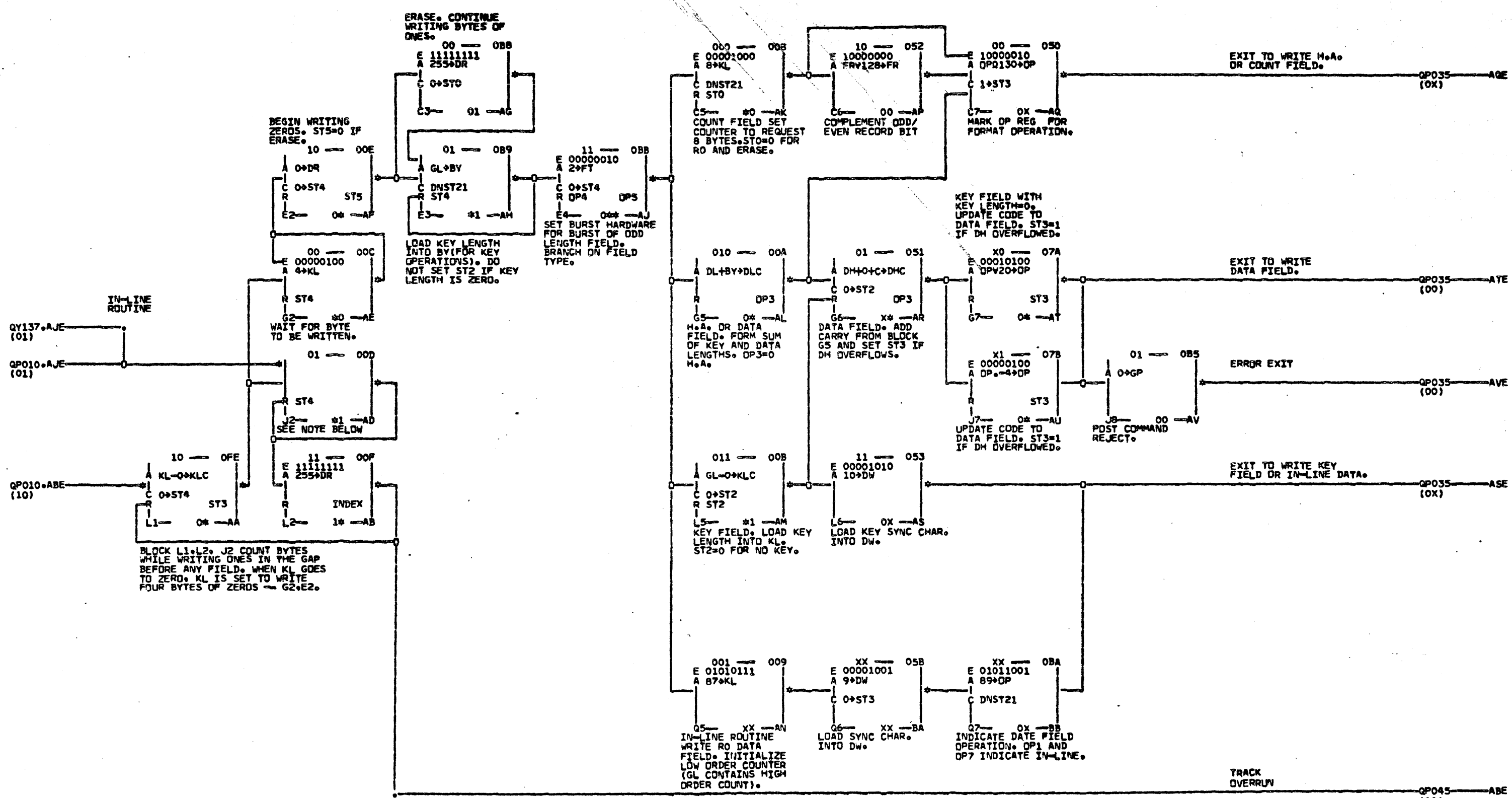


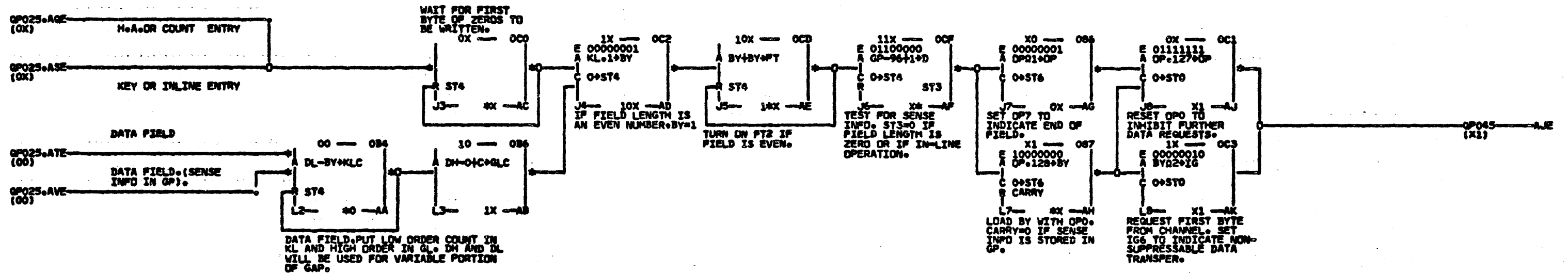
01070

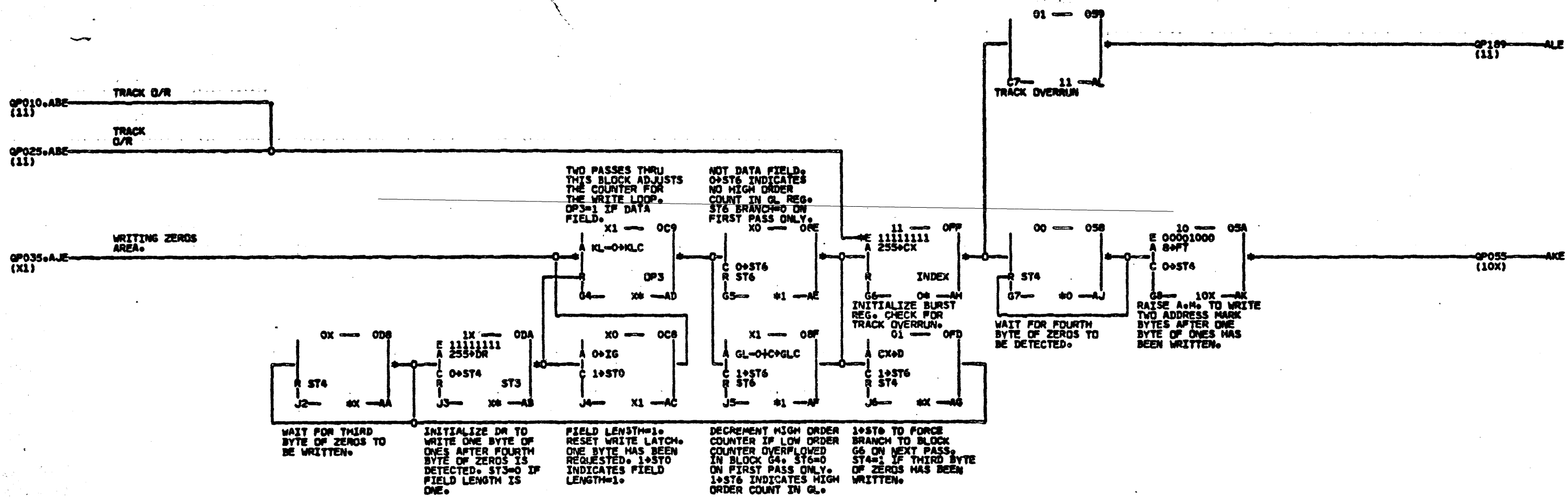


BLOCK L1.L2. J2 COUNT BYTES WHILE WRITING ONES IN THE GAP BEFORE ANY FIELD. WHEN KL GOES TO ZERO. KL IS SET TO WRITE FOUR BYTES OF ZEROS - G2.E2.

TRACK OVERRUN QP045 ABE (11)

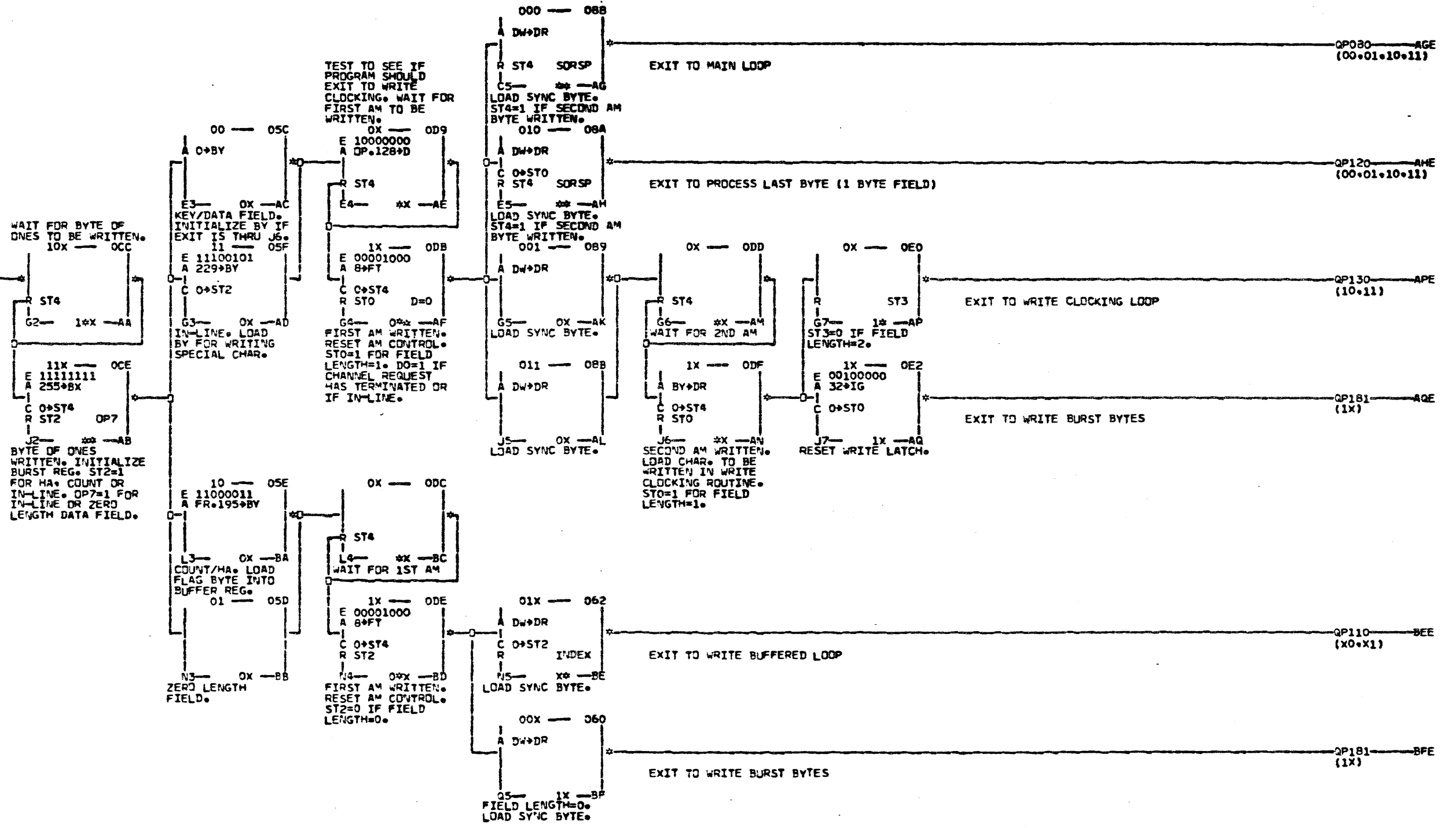
DANON





44078

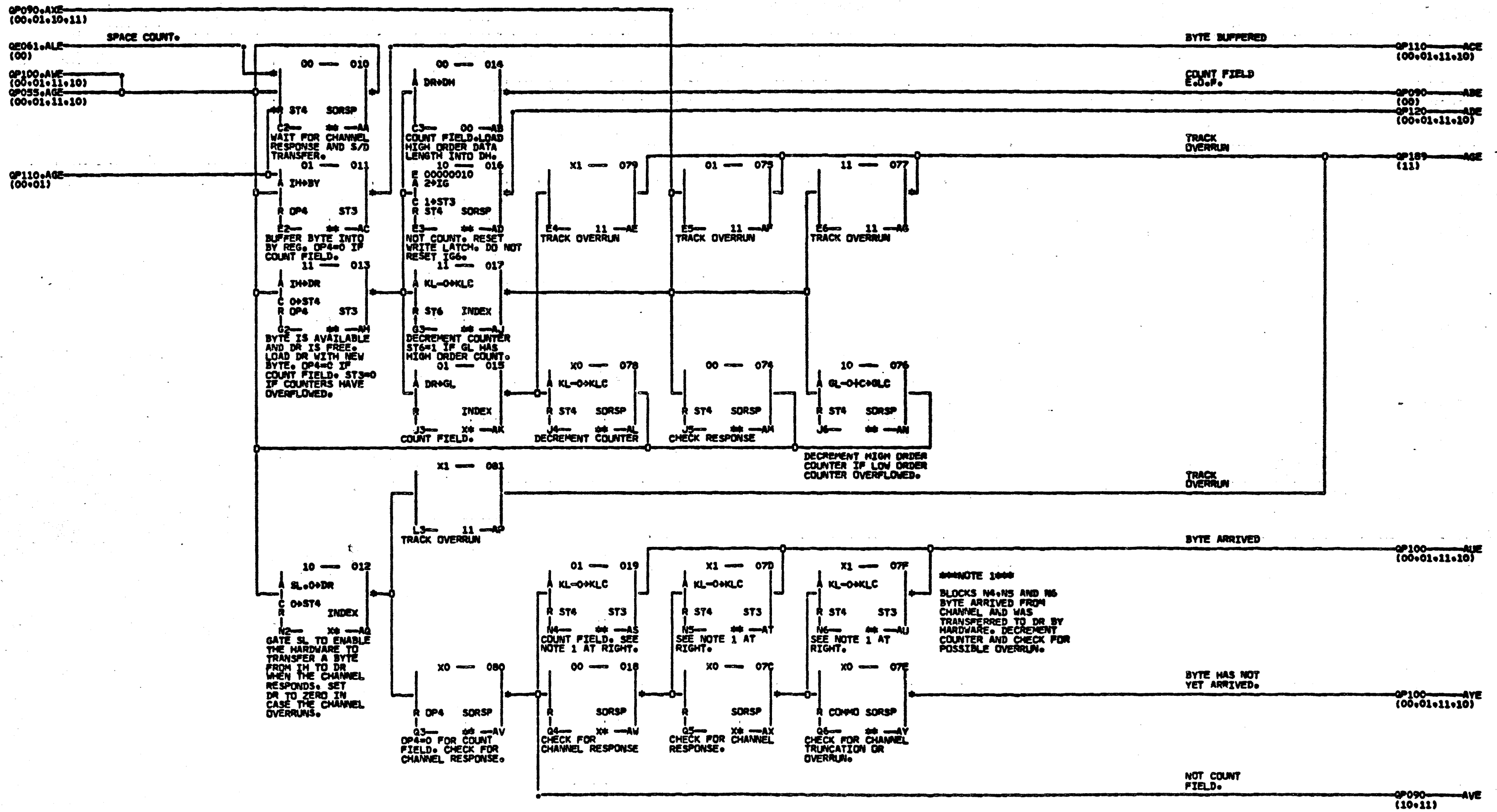
QP045.AKE  
(10X)

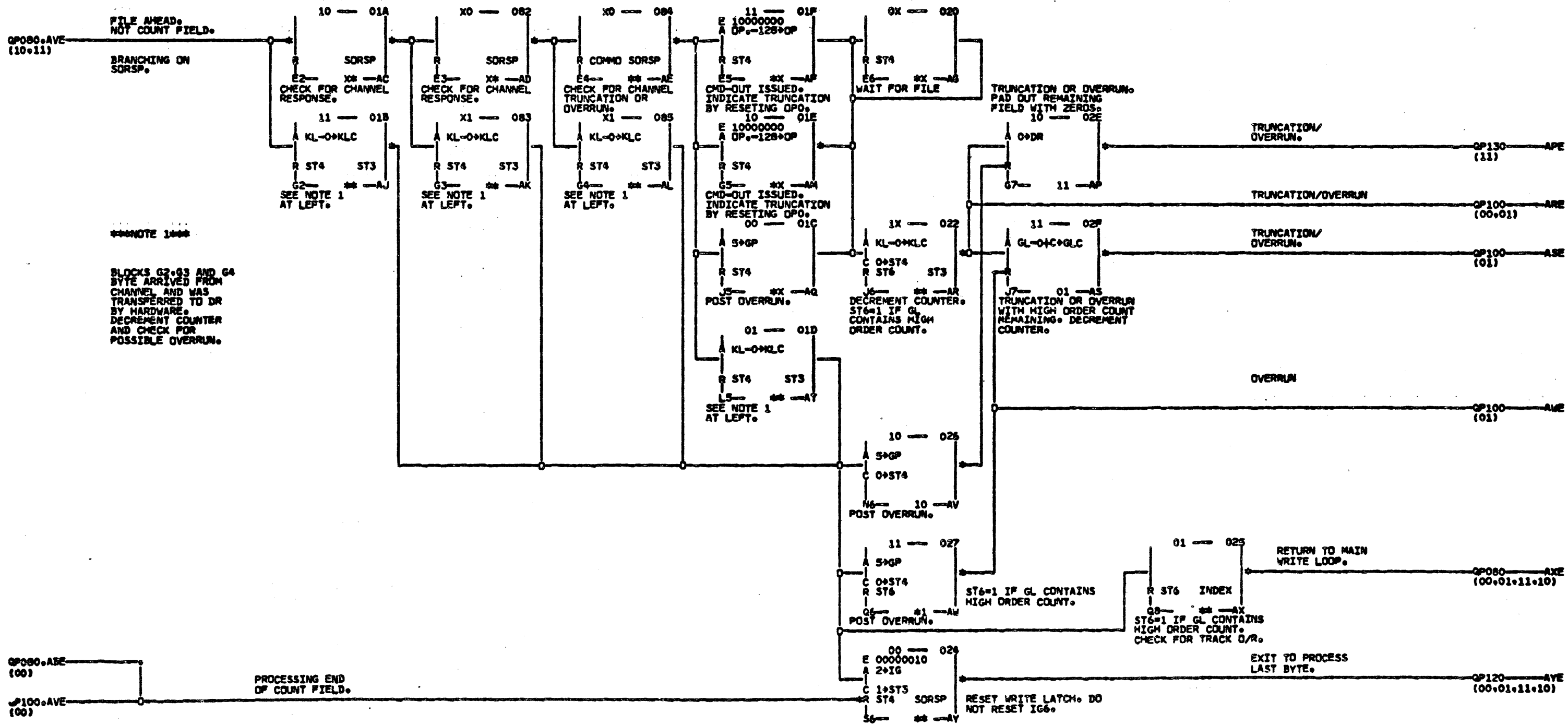


UUCO 90

ca

420613	10/11/66	MACH	2844	DATE	06/01/67	SHEET	1	QP055
420655	03/01/67	NAME	2314/2844	LOG	152B	VERSION		
420656	04/11/67	MODE	MANUAL					
420657	05/22/67	P.N.	2250283					
				GAP WRITING-AM + SYNC BYTE				
				IBM CORP.				



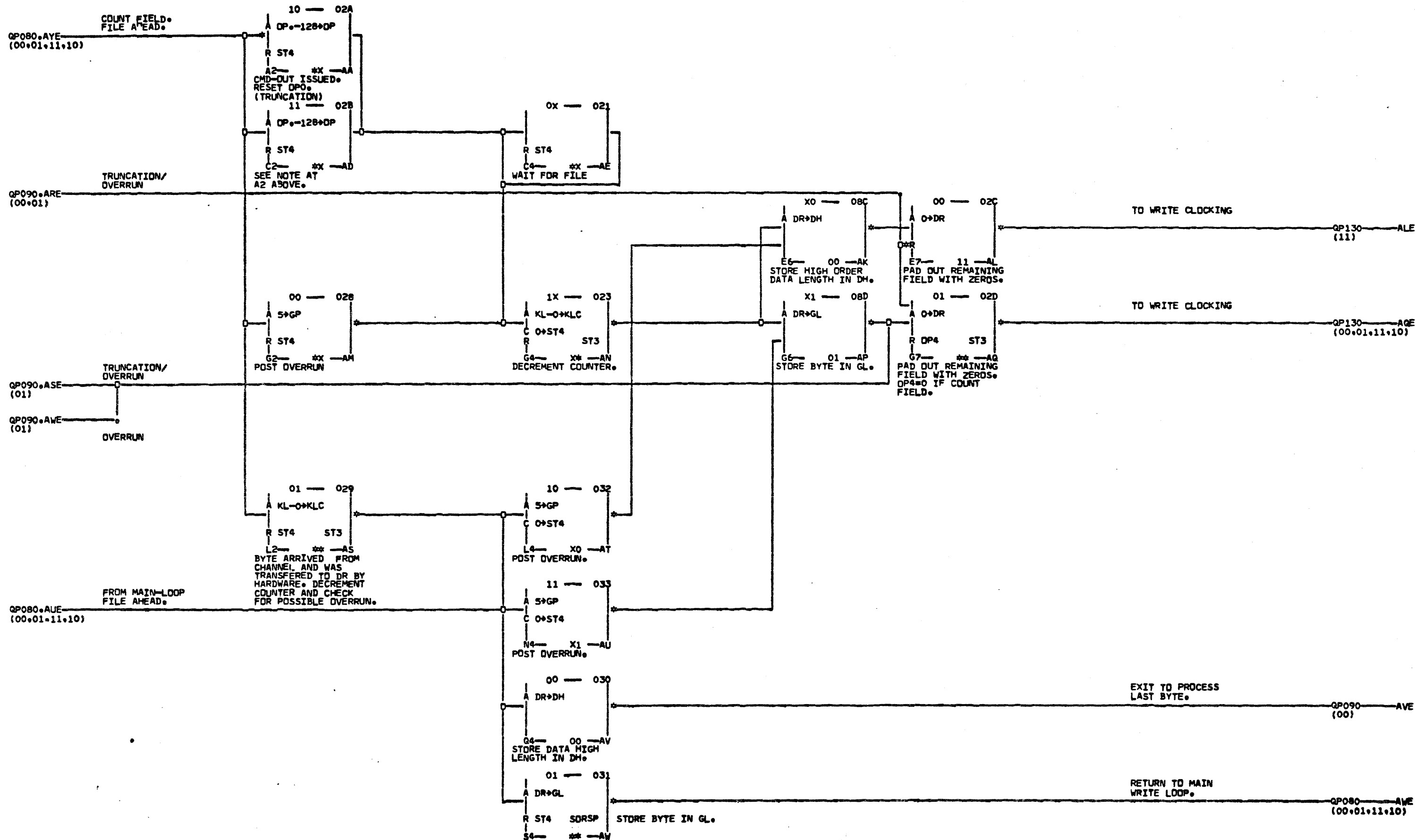


\*\*\*NOTE 1\*\*\*

BLOCKS G2, G3 AND G4 BYTE ARRIVED FROM CHANNEL AND WAS TRANSFERRED TO DR BY HARDWARE. DECREMENT COUNTER AND CHECK FOR POSSIBLE OVERRUN.

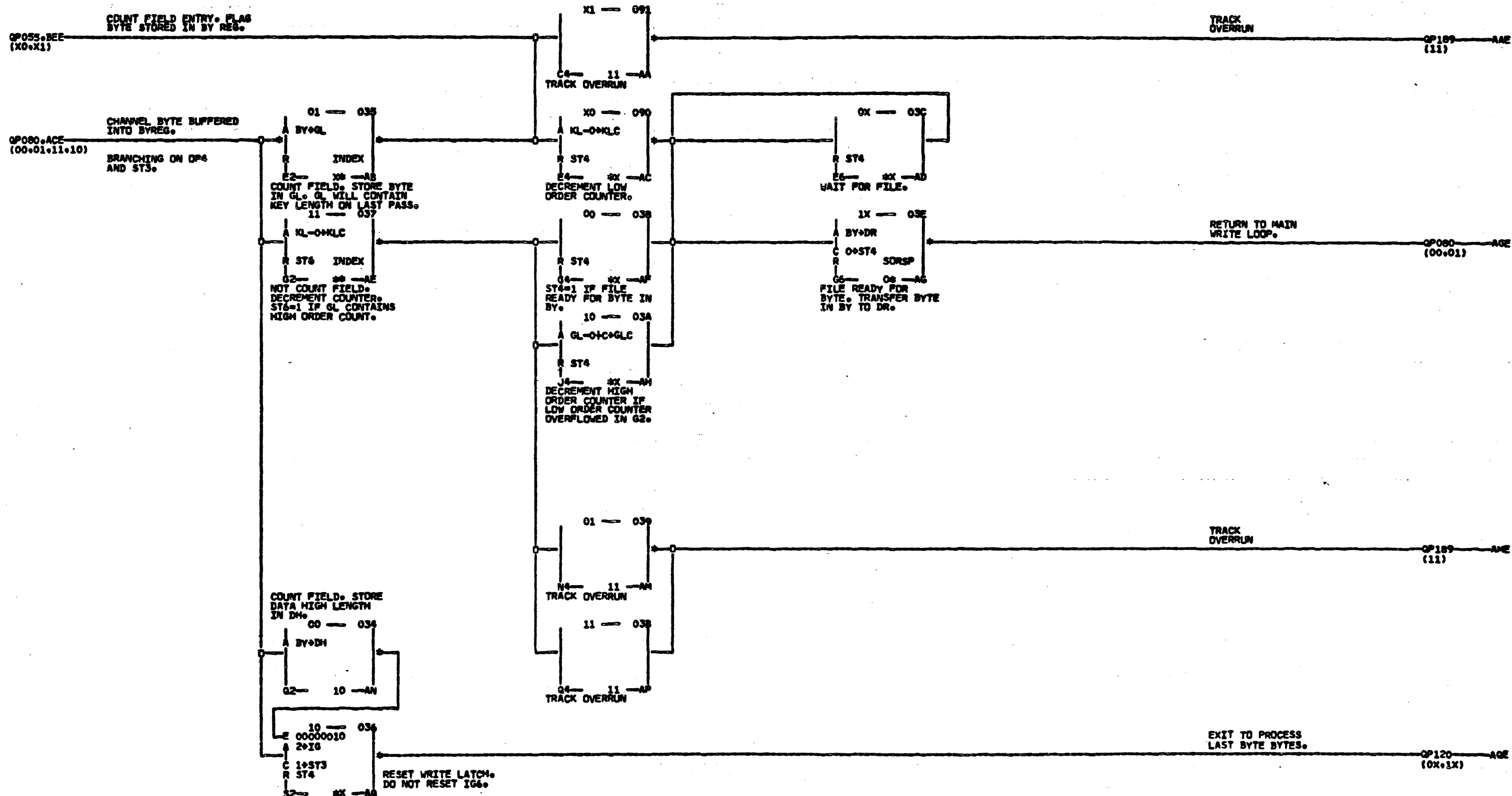
PROCESSING END OF COUNT FIELD.

420613	10/11/66	MACH	2844	DATE	04/21/67	SHEET	1	OP090
420655	03/01/67	NAME	2314/2844	LOG	111D	VERSION		
420656	04/11/67	MODE	MANUAL	WRITE-FILE AHEAD				
		PeNo	2250285	NOT COUNT FIELD				
		IBM CORP.	SDD					

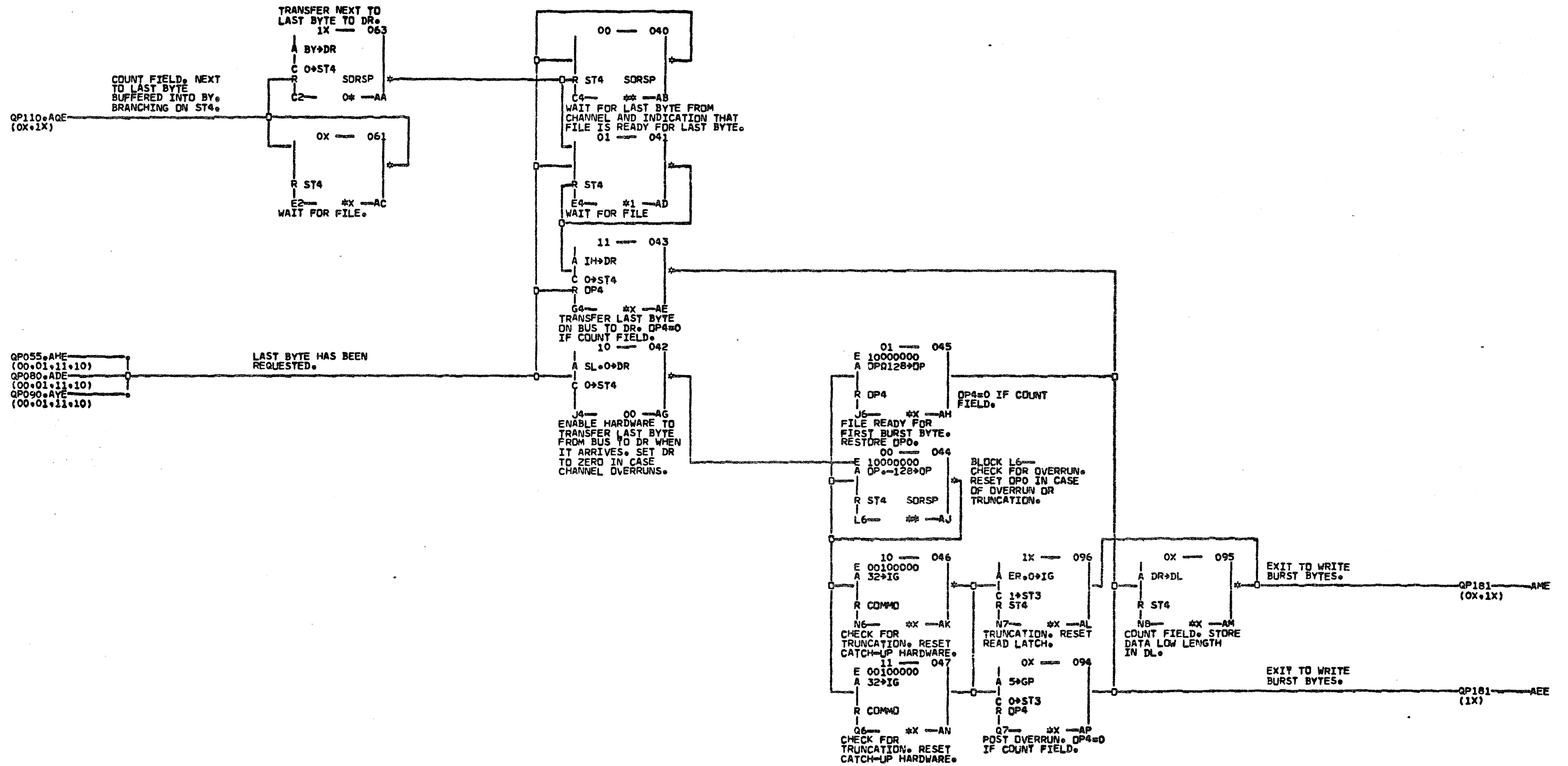


00-78



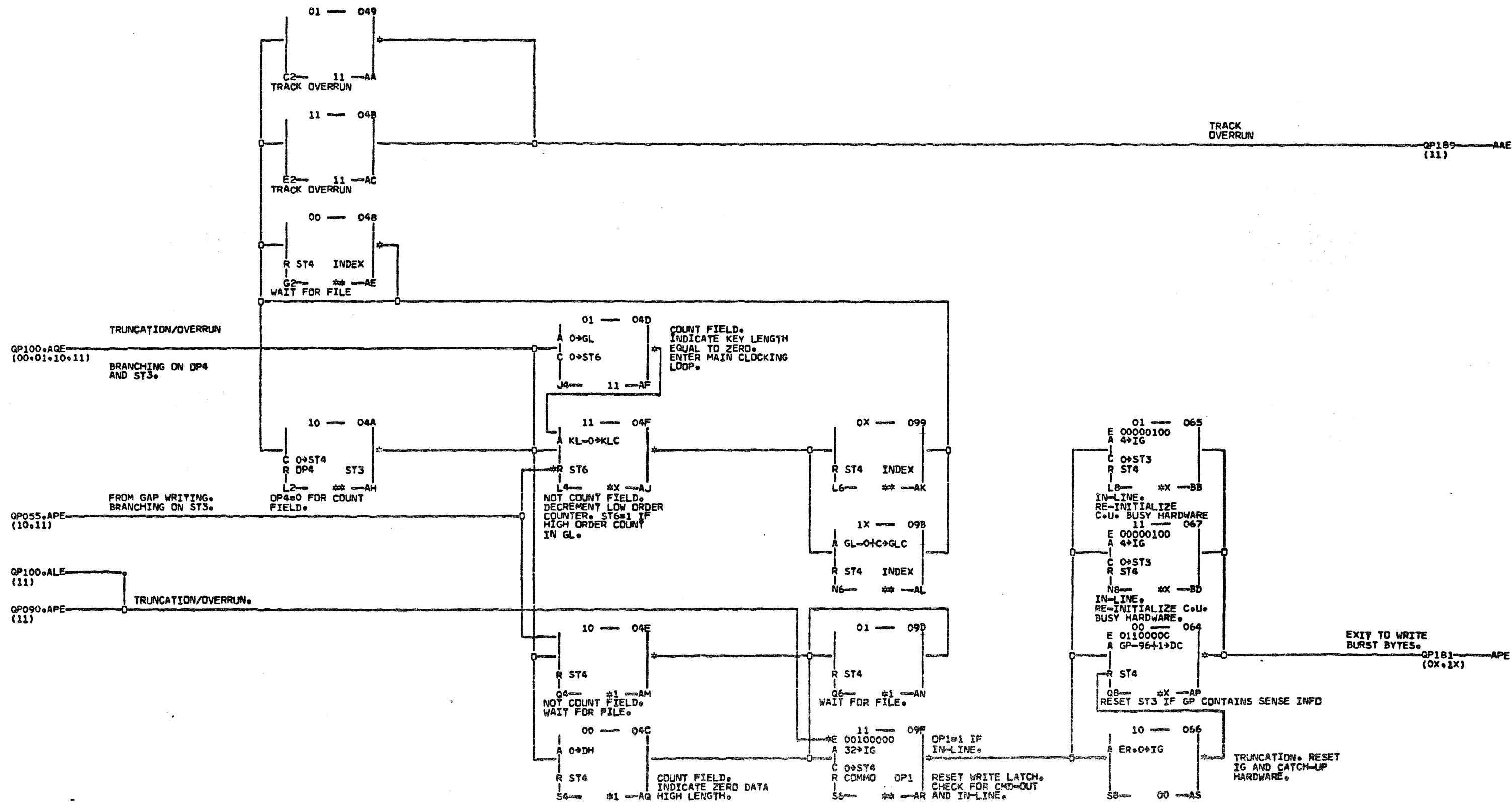


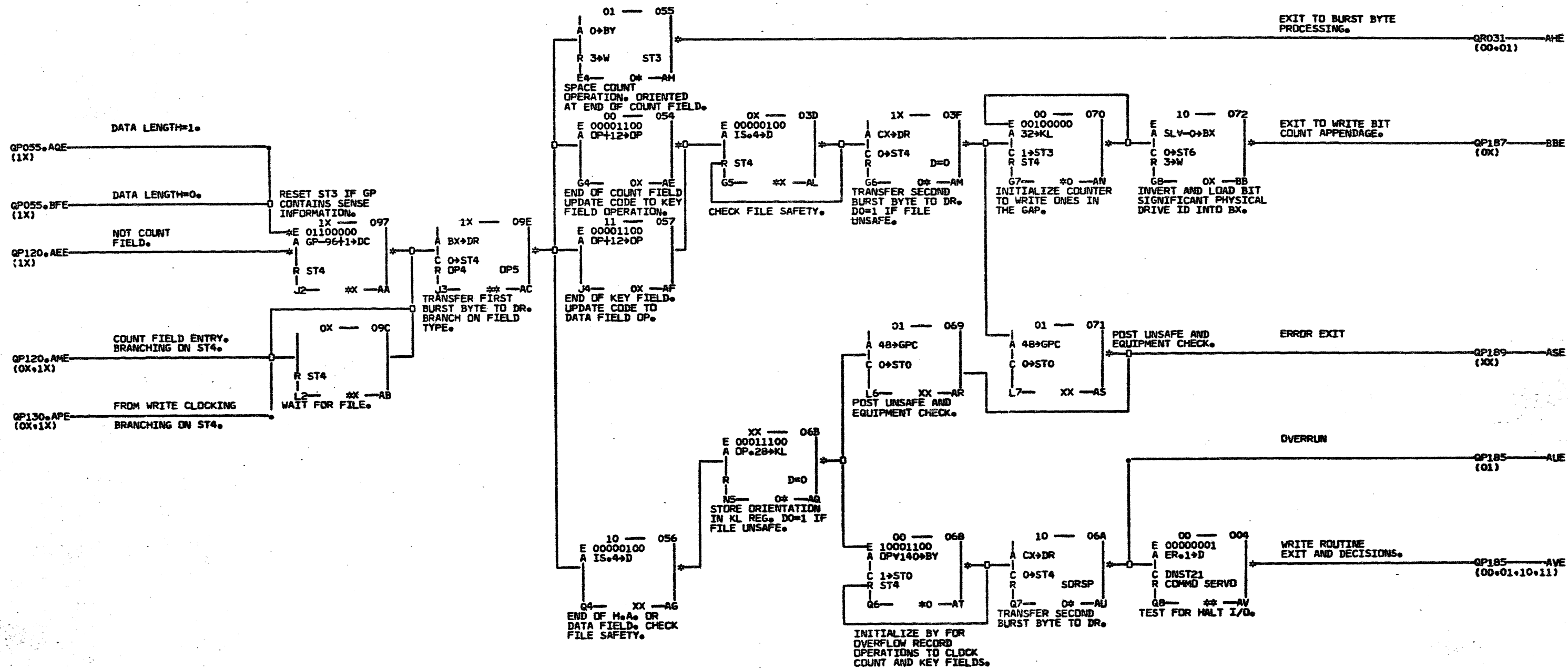
01-11-67



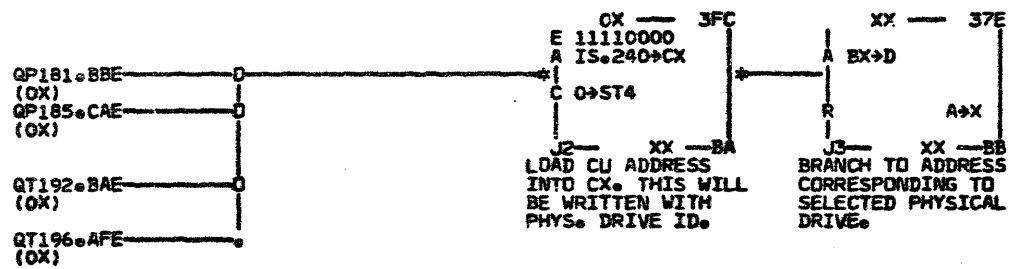
GM-78

ENTRANCE TO WRITE CLOCKING IS MADE WHEN BYTES ARE BEING WRITTEN ON THE FILE, BUT NO DATA TRANSFER EXISTS BETWEEN CHANNEL AND CONTROL UNIT. THE VALUE OF EACH BYTE WRITTEN IS 229 FOR IN-LINES AND ZERO FOR TRUNCATION OR ERROR CASES.

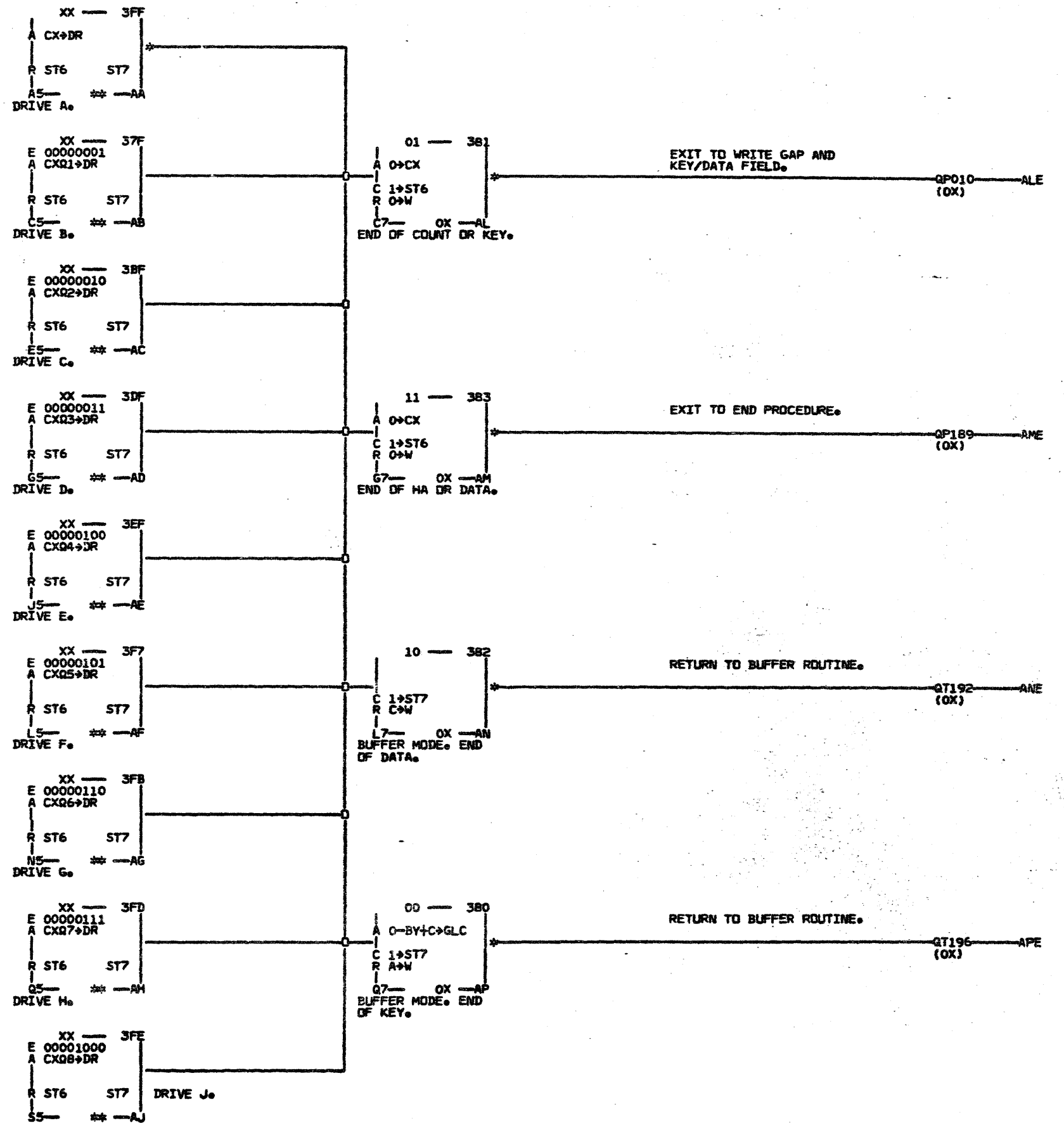






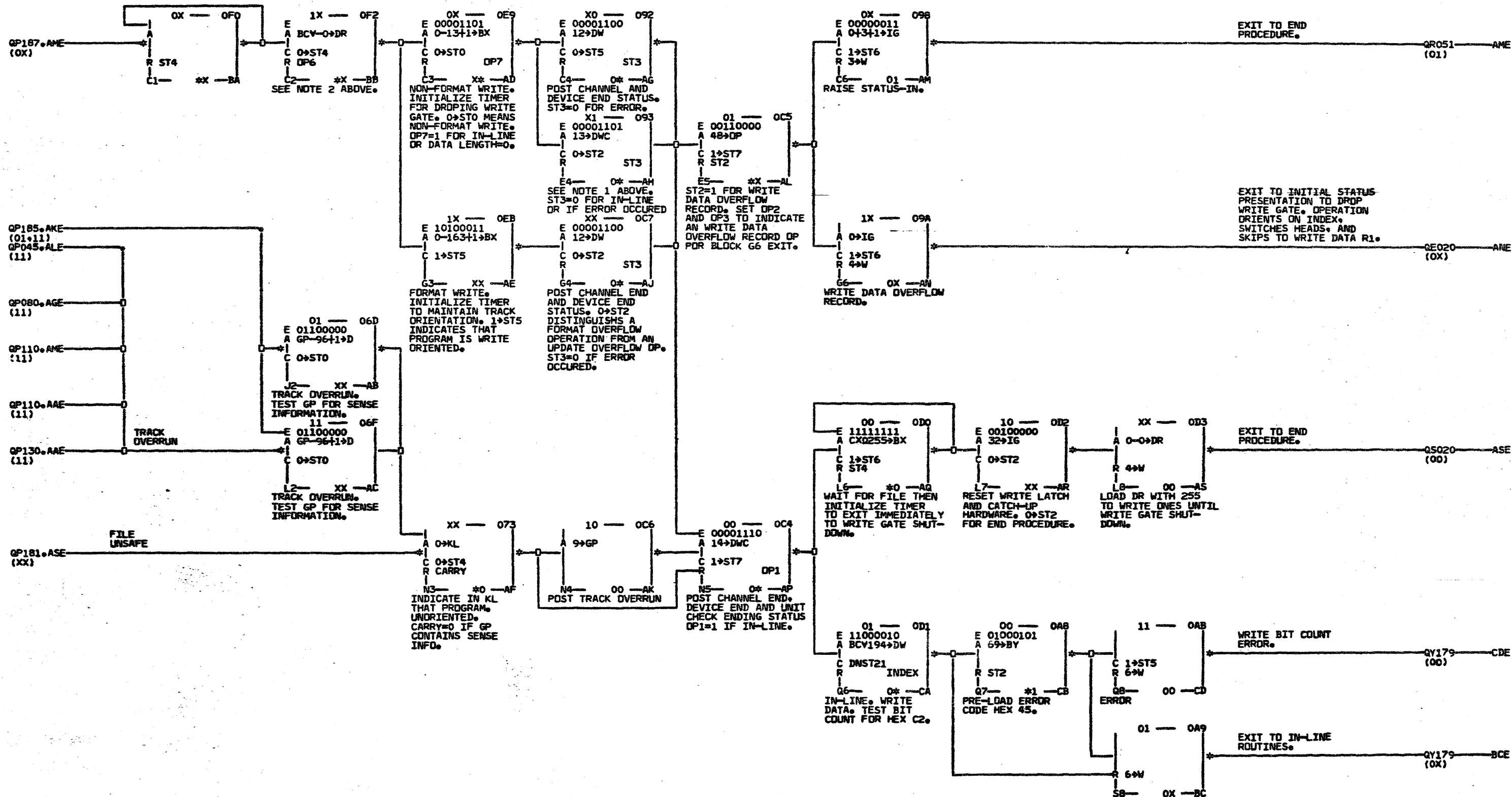


\*\*NOTE\*\*  
 NEXT ADDRESS IS ONE OF THE NINE POSSIBILITIES LISTED AT RIGHT.

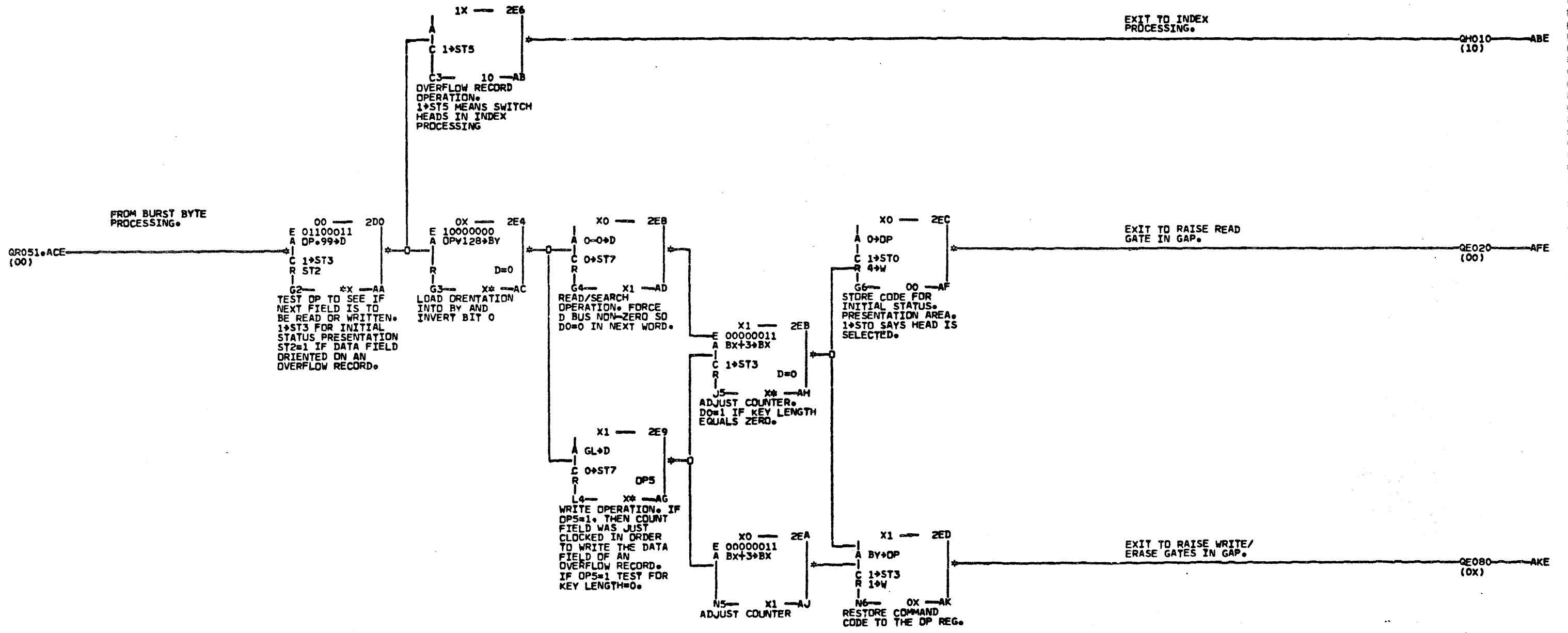


\*\*\*NOTE 2\*\*\*  
 INVERT AND TRANSFER  
 BIT COUNT TO BE  
 WRITTEN AT THE END  
 OF THE FIELD. OP6=1  
 INDICATES FORMAT  
 WRITE.

\*\*\*NOTE 1\*\*\*  
 BLOCK E4—  
 POST CHANNEL END,  
 DEVICE END AND  
 UNIT EXCEPTION  
 ENDING STATUS TO  
 INDICATE END OF FILE.

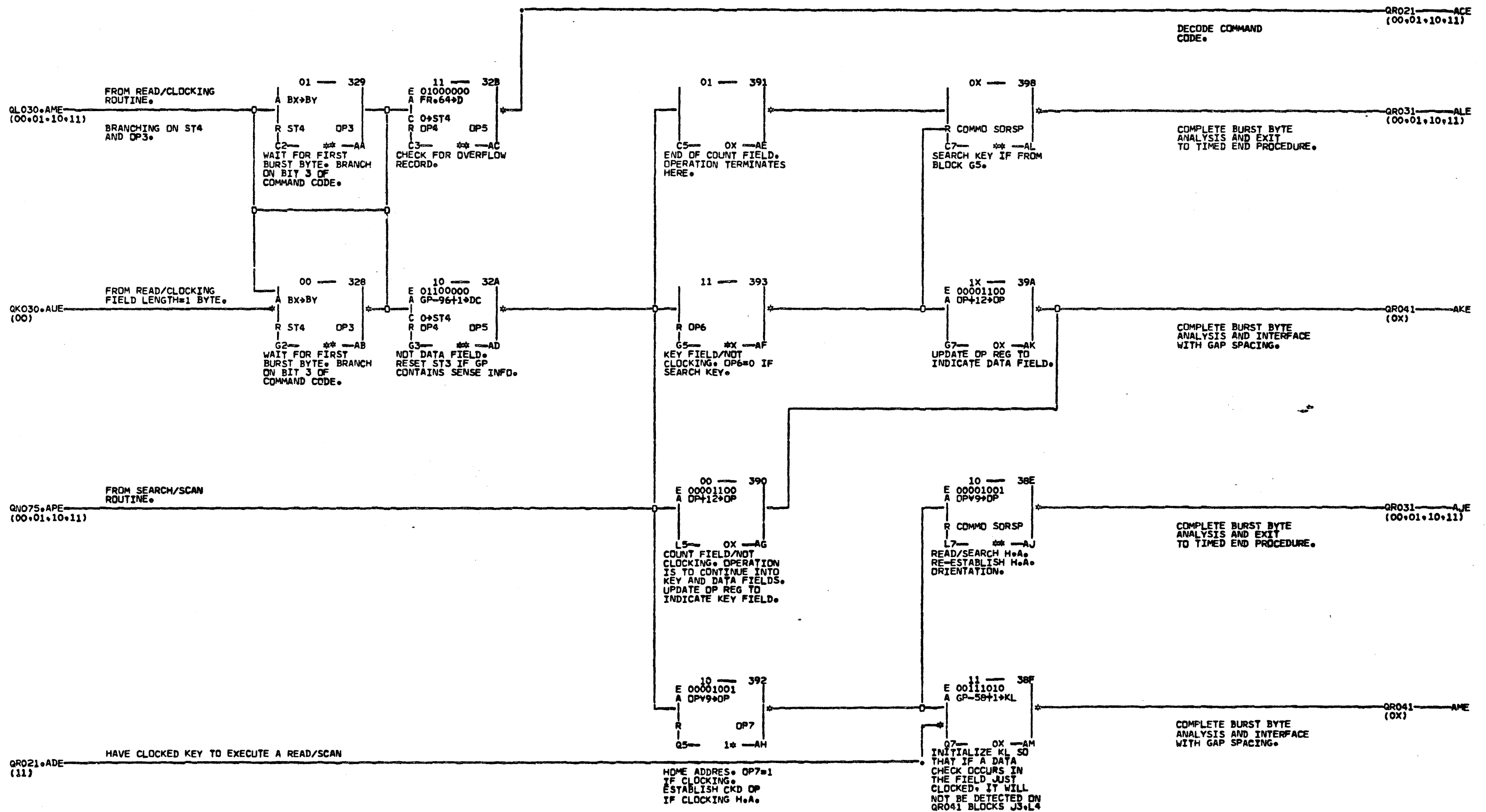


981 P2

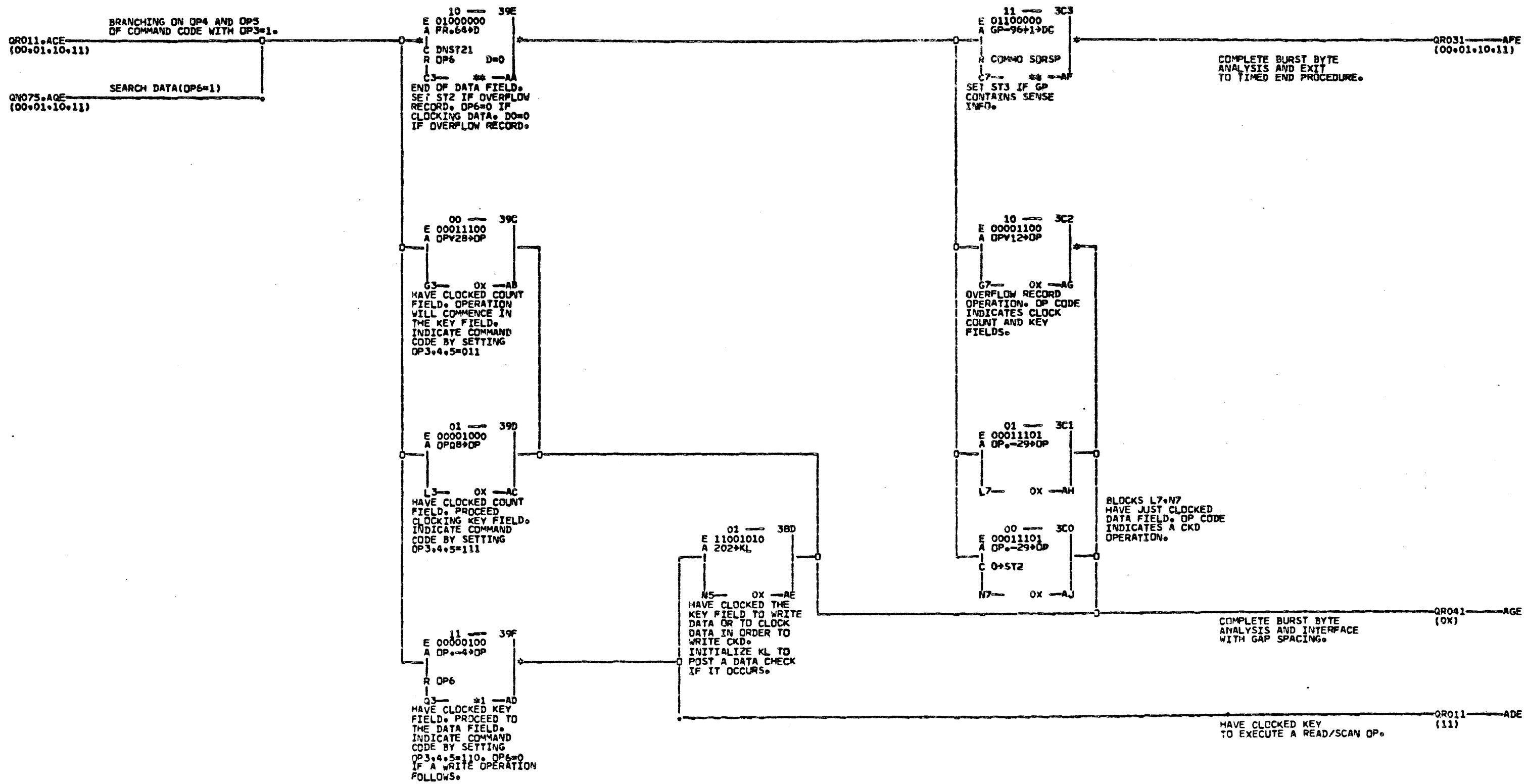


01-0000

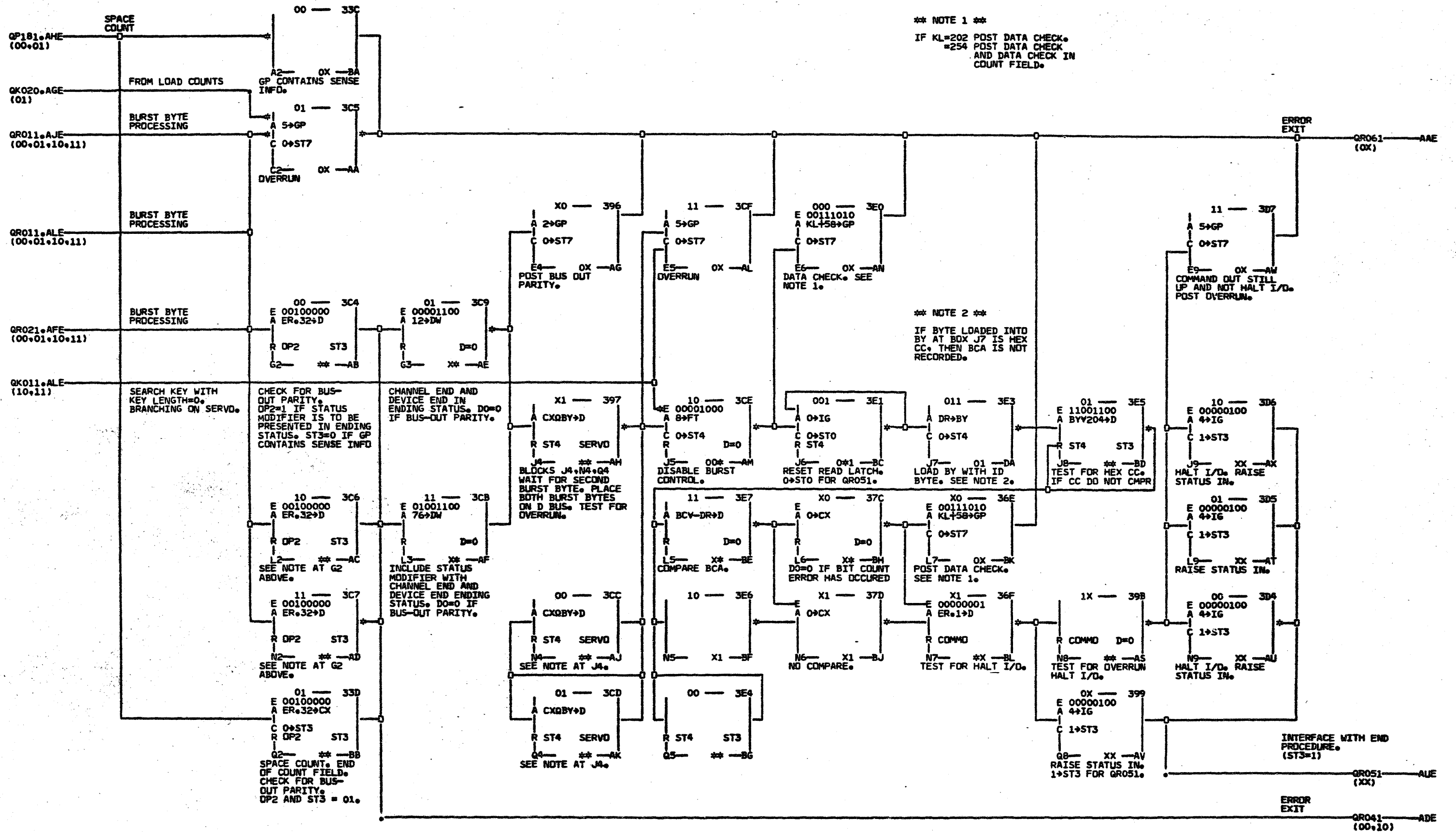




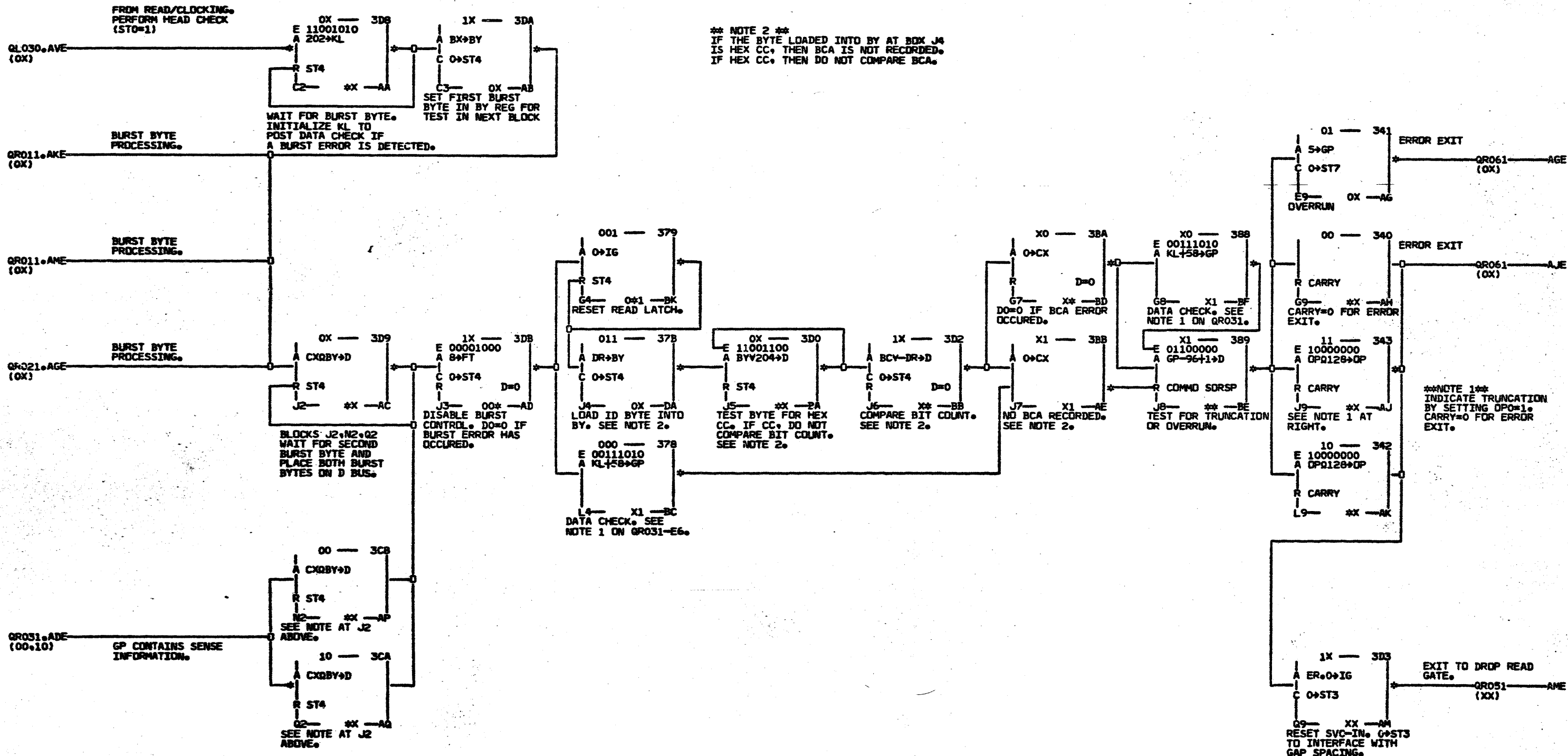
1-1-0-2B



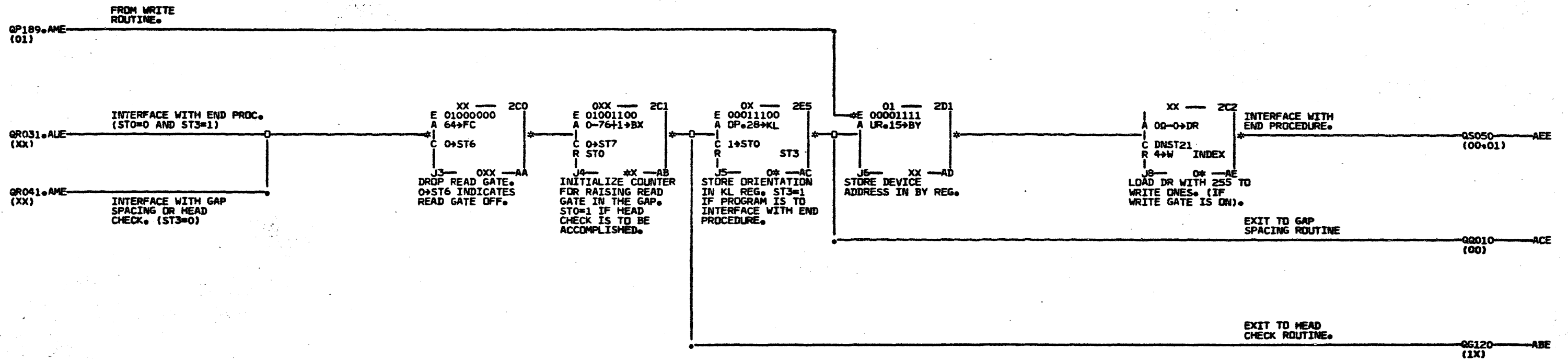
DRAWN



1-6020



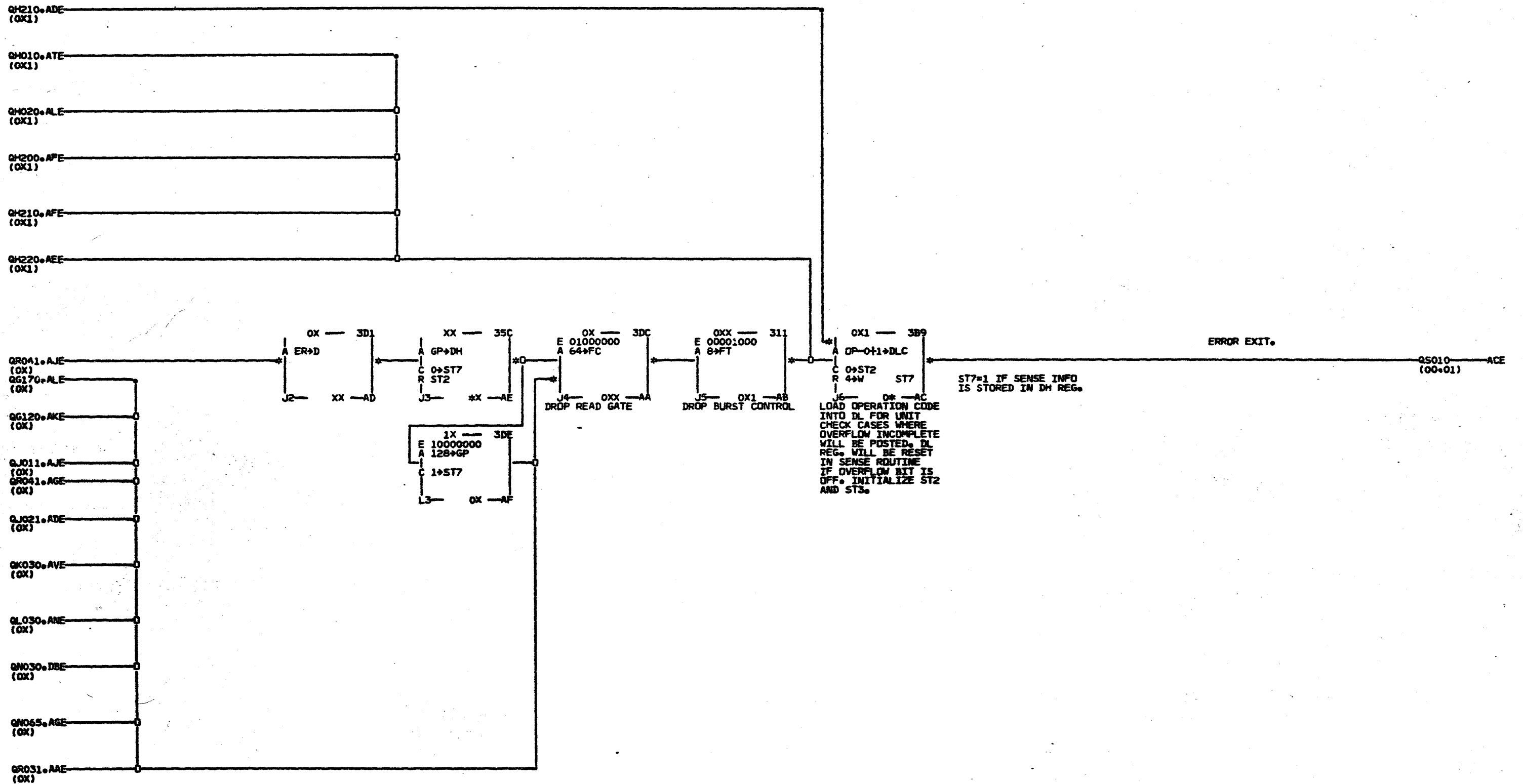
1-2022



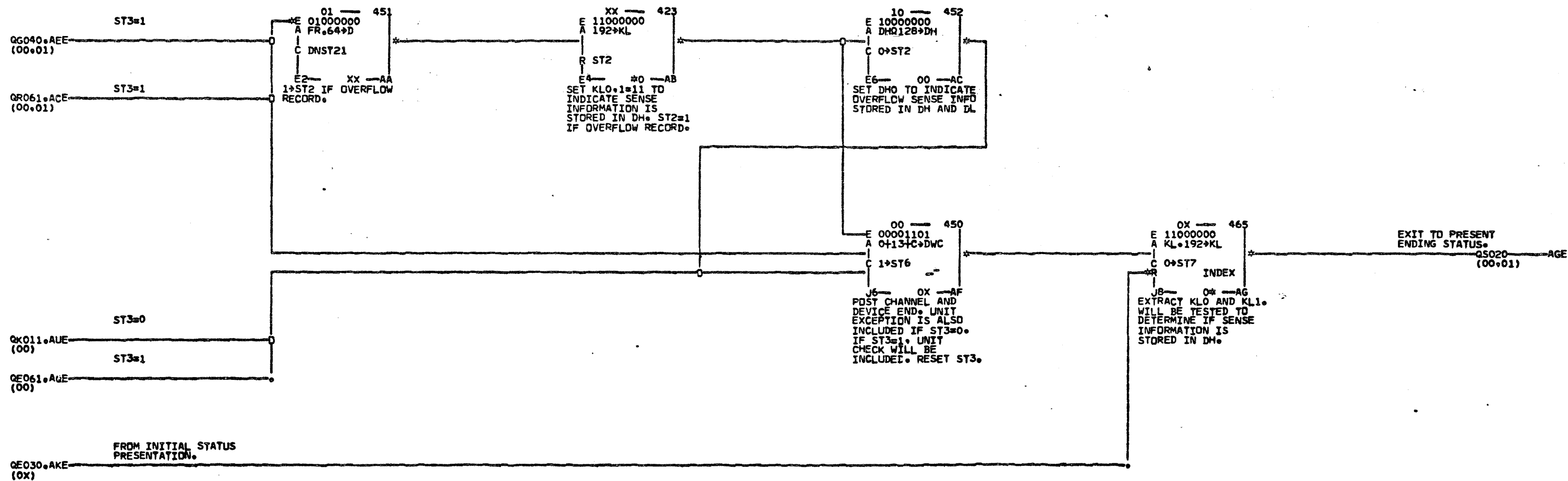
420613	10/11/66	MACH	2844	DATE	11/20/68	SHEET	1	QR051
420655	02/23/67	NAME	2314/2844	LOG	325G	VERSION		
420656	04/11/67	MODE	MANUAL					
420662	01/30/68	P.No	2250298					
420664	10/11/68	IBM CORP.						

INTERFACE WITH END PROCEDURE/  
GAP SPACING/HEAD CHECK

1-1000



14028



01-008

420613  
420655

10/11/66  
02/23/67

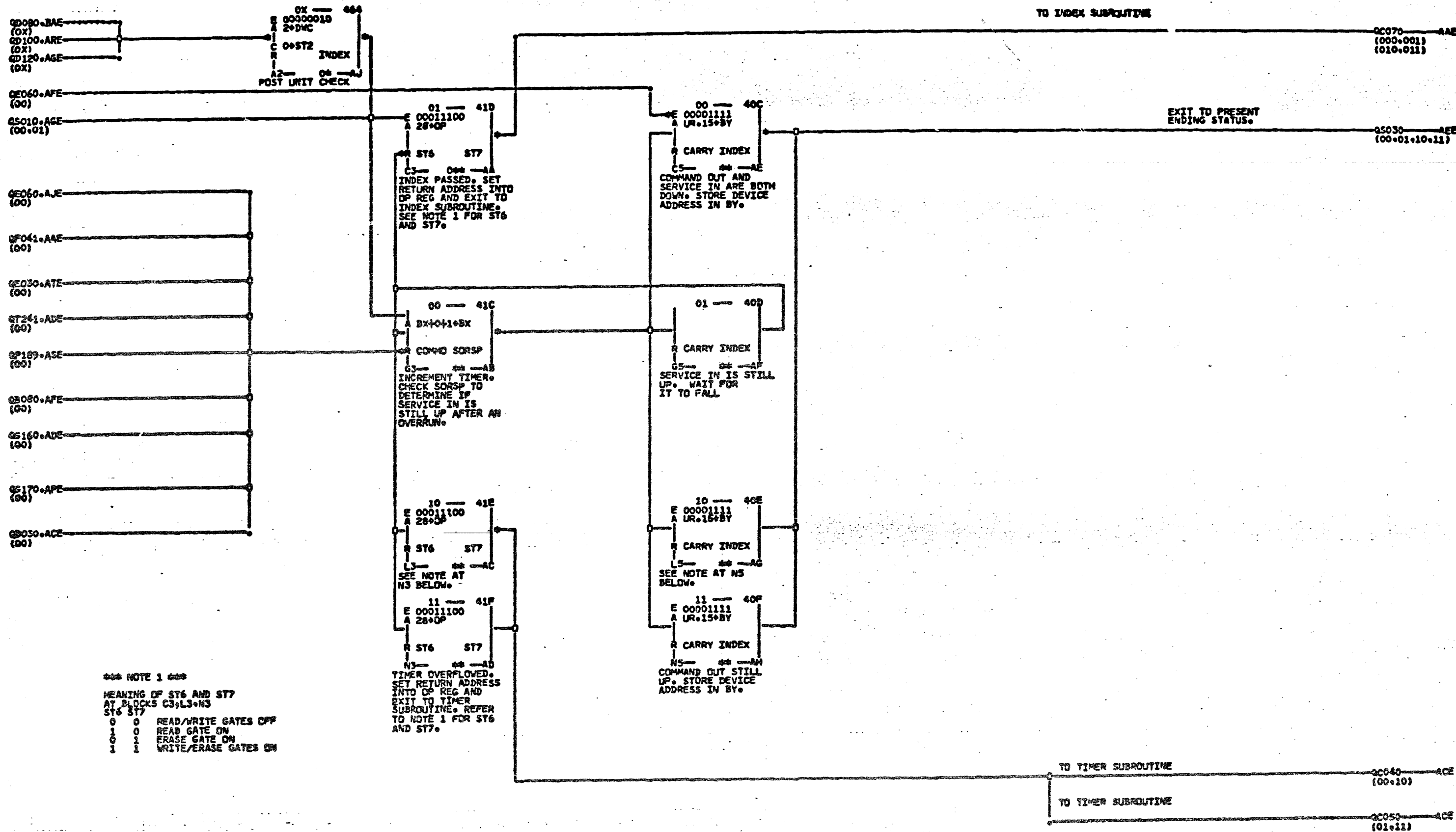
MACH 2844  
NAME 2314/2844  
MODE MANUAL  
P.N. 2250300  
IBM CORP. SDD

DATE 03/03/67  
LOG 0626

END PROCEDURE  
ERROR INTERFACE

SHEET 1  
VERSION 1 QS010

7



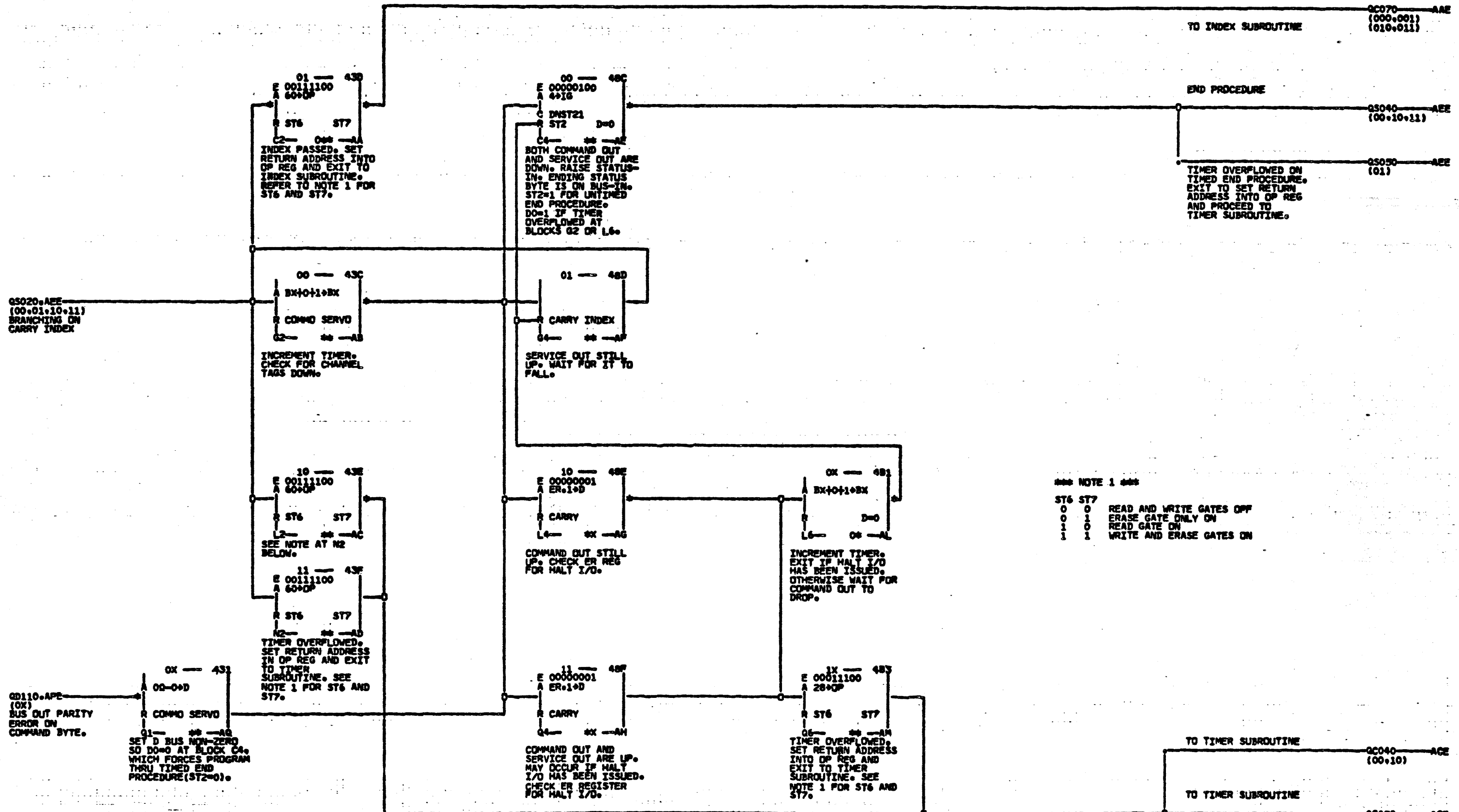
\*\*\* NOTE 1 \*\*\*

MEANING OF ST6 AND ST7  
 AT BLOCKS C3, L3, N3  
 ST6 ST7  
 0 0 READ/WRITE GATES OFF  
 1 0 READ GATE ON  
 0 1 ERASE GATE ON  
 1 1 WRITE/ERASE GATES ON

N3-AD  
 TIMER OVERFLOWED.  
 SET RETURN ADDRESS  
 INTO OP REG AND  
 EXIT TO TIMER  
 SUBROUTINE. REFER  
 TO NOTE 1 FOR ST6  
 AND ST7.

N5-AD  
 COMMAND OUT STILL  
 UP. STORE DEVICE  
 ADDRESS IN BY.





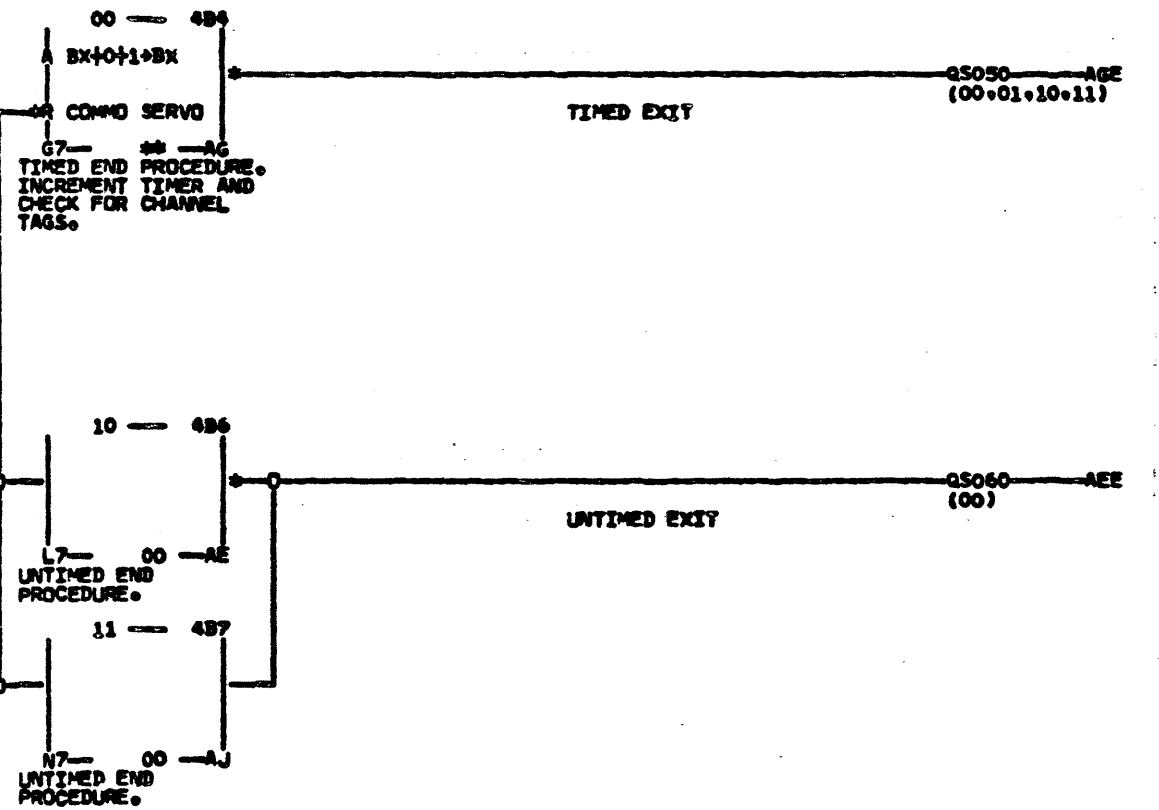
\*\*\* NOTE 1 \*\*\*

ST6	ST7	Action
0	0	READ AND WRITE GATES OFF
0	1	ERASE GATE ONLY ON
1	0	READ GATE ON
1	1	WRITE AND ERASE GATES ON

010458

QS030.AEE  
(00.10.11)

BRANCHING ON  
ST2 AND D=0.



420613  
420655  
420656

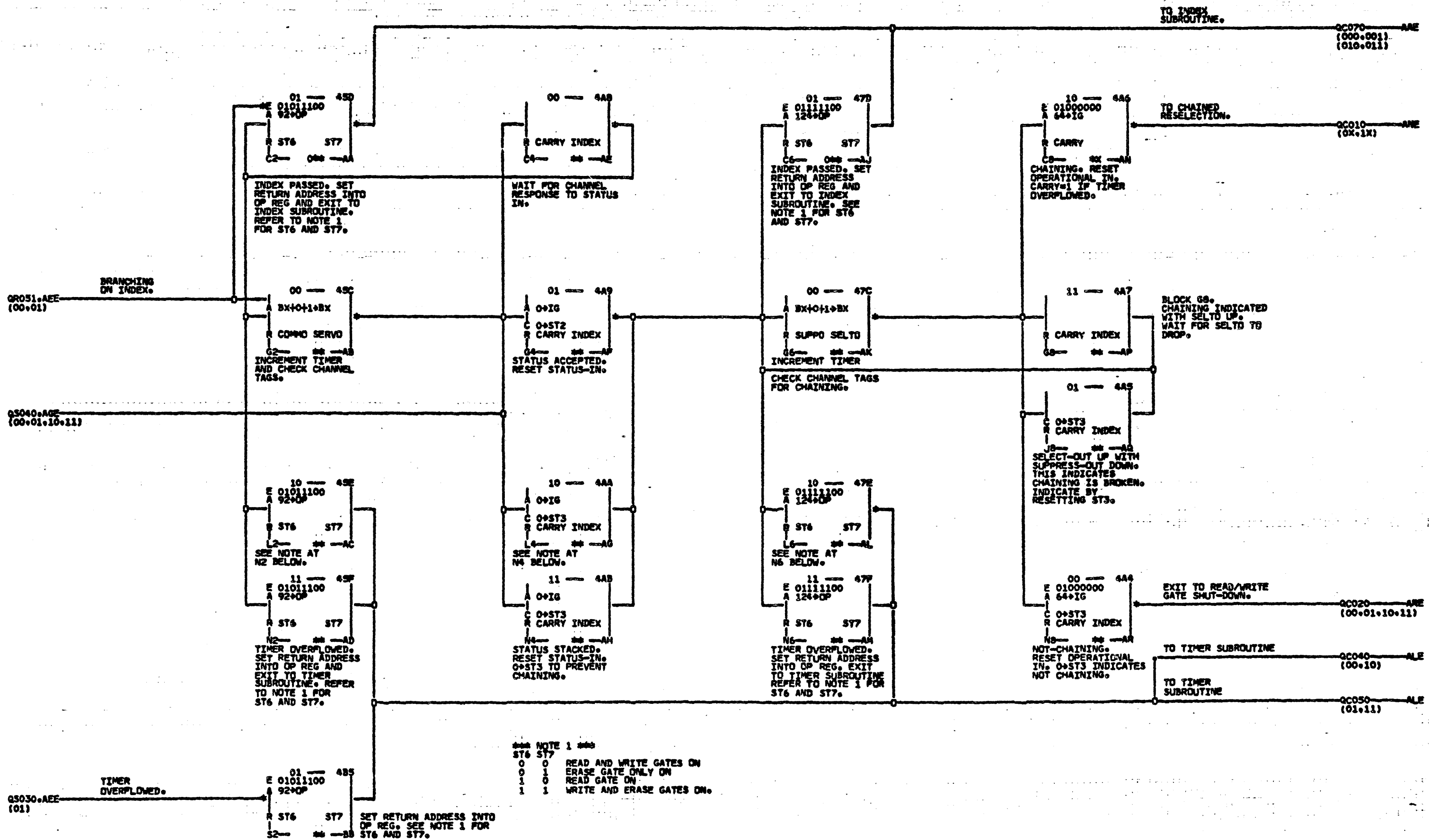
10/14/66  
03/01/67  
04/11/67

MACH 2844  
NAME 2314/2844  
MODE MANUAL  
P.O. No. 2250303  
IBM CORP. SDD

DATE 04/21/67  
LOG 111D

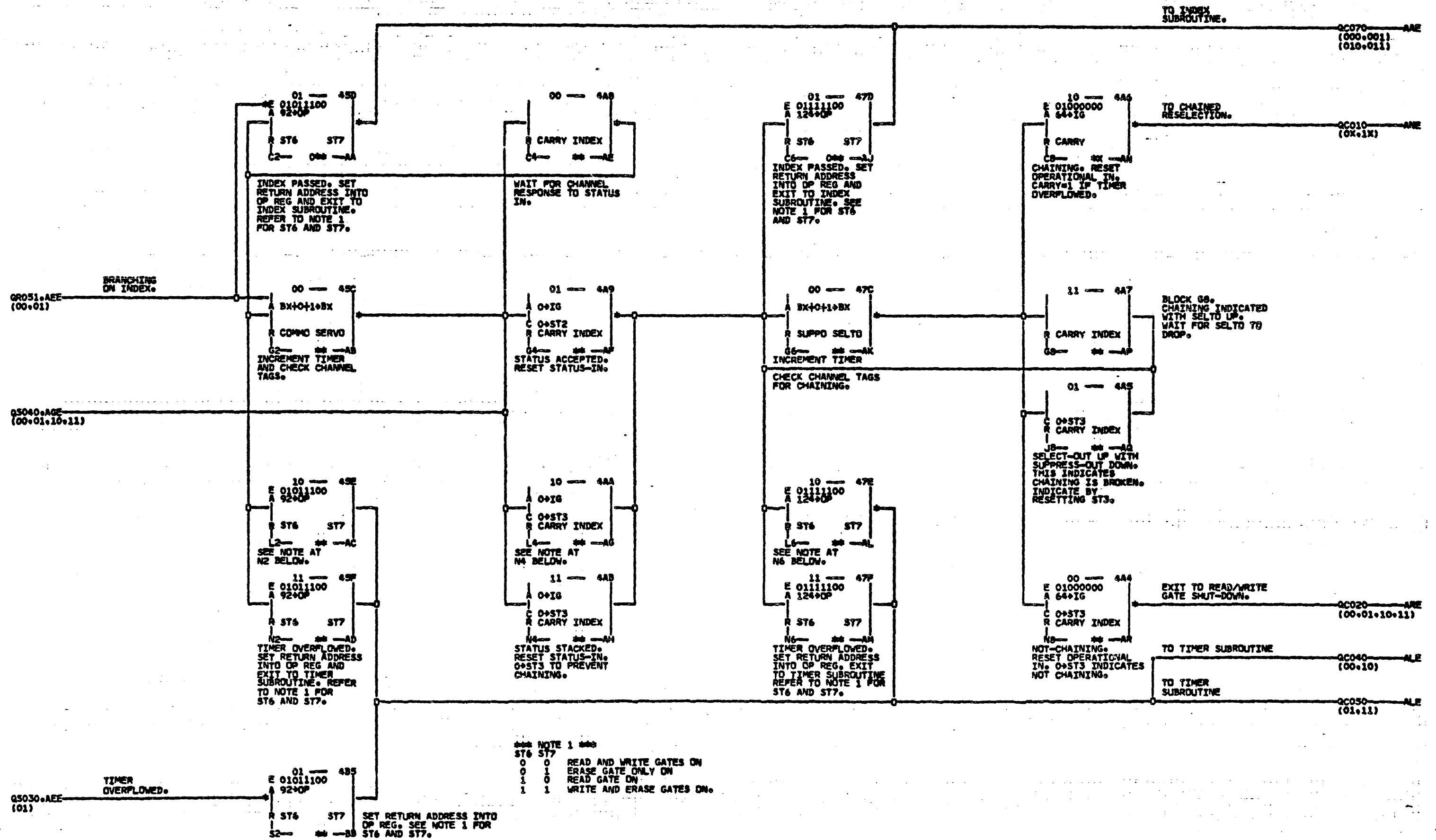
SHEET 1 QS040  
VERSION

END PROCEDURE-TIMED/UNTIMED  
INTERFACE



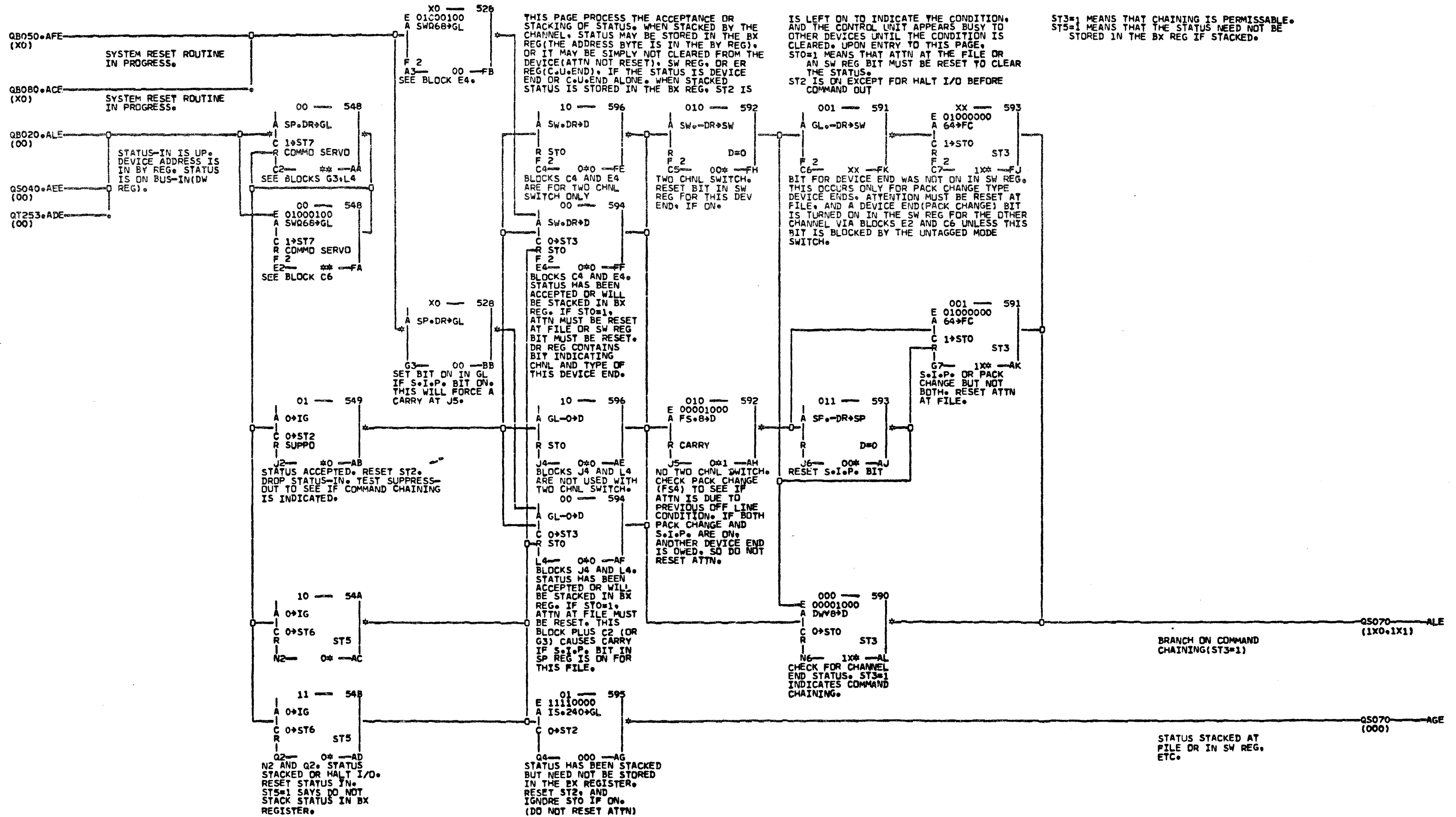
NOTE 1  
 ST6 ST7  
 0 0 READ AND WRITE GATES ON  
 0 1 ERASE GATE ONLY ON  
 1 0 READ GATE ON  
 1 1 WRITE AND ERASE GATES ON.

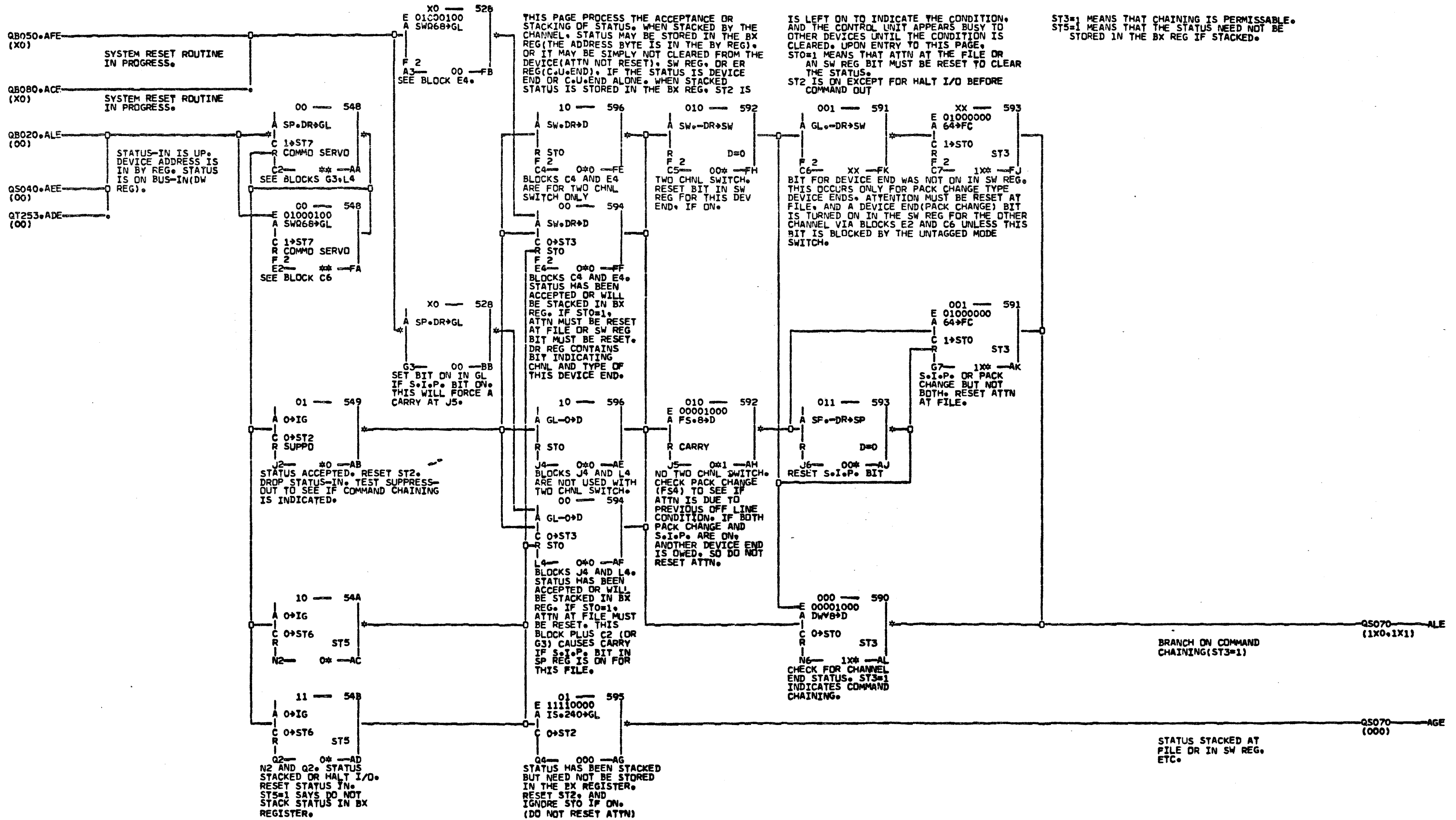
1400



\*\*\* NOTE 1 \*\*\*  
 ST6 ST7  
 0 0 READ AND WRITE GATES ON  
 0 1 ERASE GATE ONLY ON  
 1 0 READ GATE ON  
 1 1 WRITE AND ERASE GATES ON.

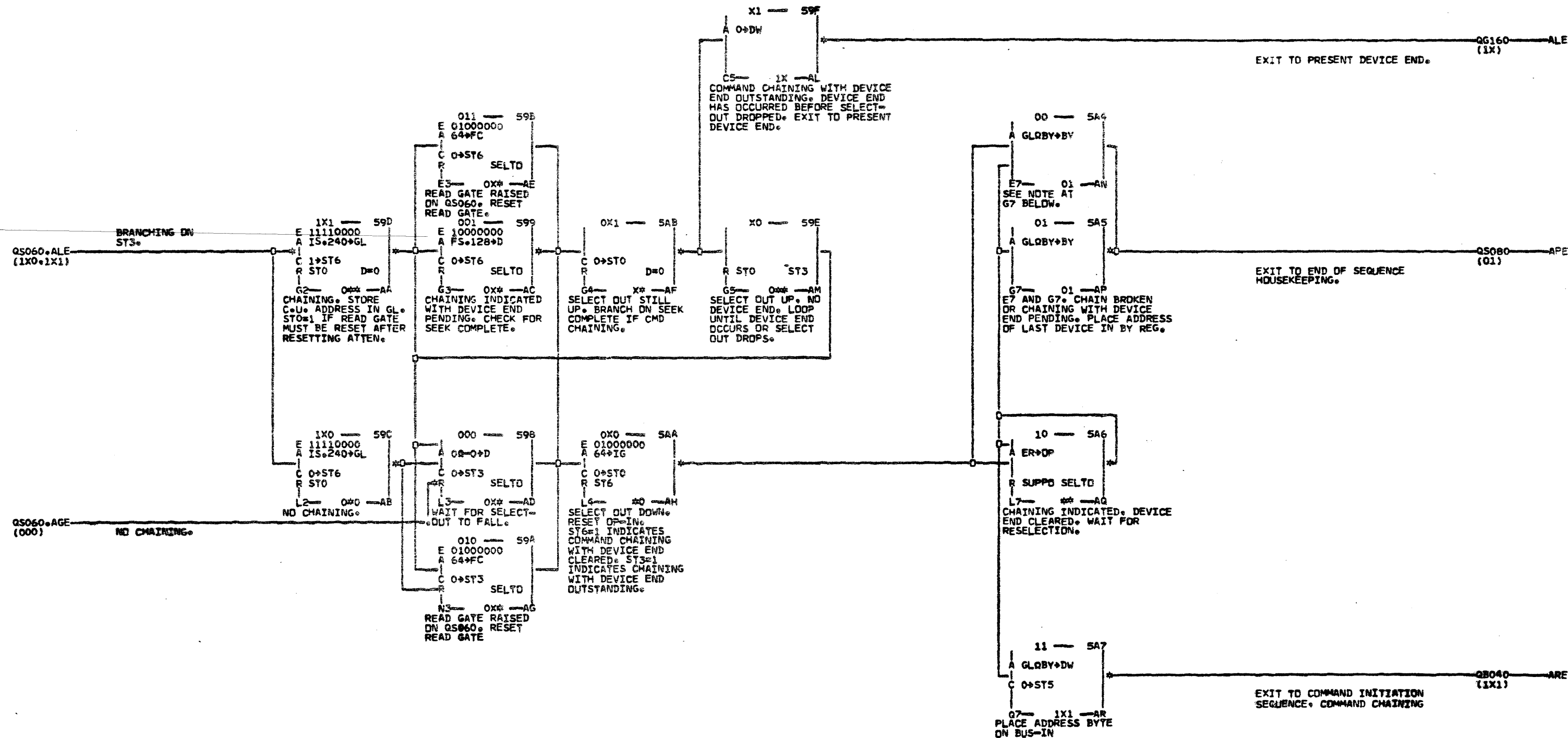
05050





06090

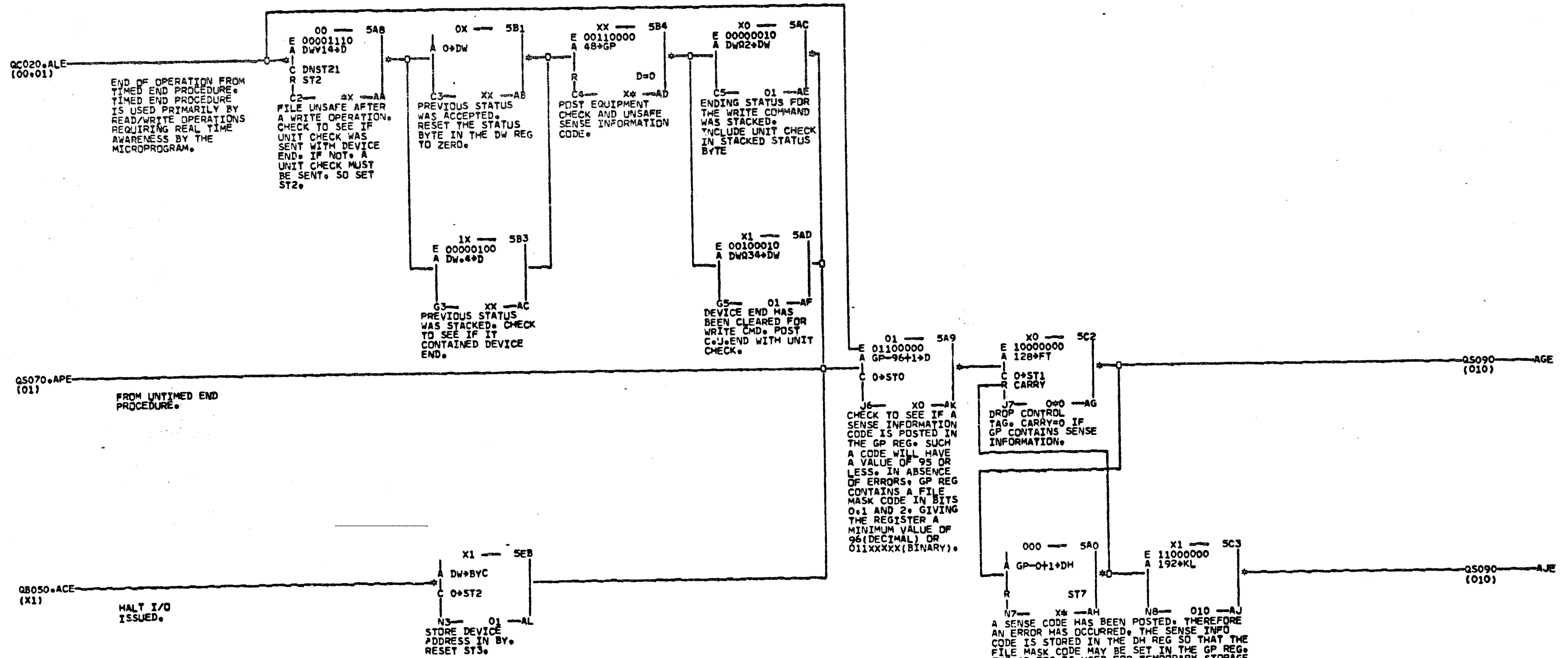
THIS PAGE COMPLETES THE STATUS SEQUENCE.



0-4068

420613	10/11/66	WACH	2844	DATE	03/03/67	SHEET	1	Q5070
420652	01/16/67	NAME	2314/2844	LOG	062G	VERSION		
420655	03/01/67	MODE	MANUAL					
		P.No.	2250306					
		IBM CORP.	SDD					
						END PROCEDURE-UNTIED		
						CHAINING CHECK		

THIS PAGE CHECKS FOR OUTSTANDING ERROR CONDITIONS AND SENSE INFORMATION AFTER CHAINING IS BROKEN. A SENSE INFORMATION CODE IN THE GP REG MAY BE RECOGNIZED BY A VALUE OF 95 OR LESS (DECIMAL) IN THE REGISTER.



END OF OPERATION FROM TIMED END PROCEDURE. TIMED END PROCEDURE IS USED PRIMARILY BY READ/WRITE OPERATIONS REQUIRING REAL TIME AWARENESS BY THE MICROPROGRAM.

FILE UNSAFE AFTER A WRITE OPERATION. CHECK TO SEE IF UNIT CHECK WAS SENT WITH DEVICE END. IF NOT, A UNIT CHECK MUST BE SENT, SO SET ST2.

PREVIOUS STATUS WAS ACCEPTED. RESET THE STATUS BYTE IN THE DW REG TO ZERO.

POST EQUIPMENT CHECK AND UNSAFE SENSE INFORMATION CODE.

ENDING STATUS FOR THE WRITE COMMAND WAS STACKED. INCLUDE UNIT CHECK IN STACKED STATUS BYTE.

PREVIOUS STATUS WAS STACKED. CHECK TO SEE IF IT CONTAINED DEVICE END.

DEVICE END HAS BEEN CLEARED FOR WRITE CMD. POST C.J. END WITH UNIT CHECK.

CHECK TO SEE IF A SENSE INFORMATION CODE IS POSTED IN THE GP REG. SUCH A CODE WILL HAVE A VALUE OF 95 OR LESS. IN ABSENCE OF ERRORS, GP REG CONTAINS A FILE MASK CODE IN BITS 0,1 AND 2, GIVING THE REGISTER A MINIMUM VALUE OF 96 (DECIMAL) OR 011XXXXX (BINARY).

DROP CONTROL TAG. CARRY=0 IF GP CONTAINS SENSE INFORMATION.

A SENSE CODE HAS BEEN POSTED. THEREFORE AN ERROR HAS OCCURRED. THE SENSE INFO CODE IS STORED IN THE DH REG SO THAT THE FILE MASK CODE MAY BE SET IN THE GP REG. THE GP REG IS USED FOR TEMPORARY STORAGE OF THE ERROR CODE BECAUSE THE DH REGISTER IS NOT ALWAYS AVAILABLE WHEN AN ERROR OCCURS, AND ALSO BECAUSE AN ERROR CODE PROVIDES A VALUE IN THE GP REG WHICH CANNOT NORMALLY OCCUR, AND MAY THEREFORE BE RECOGNIZED UNIQUELY. BITS 0 AND 1 OF THE KL REG ARE SET AS FOLLOWS

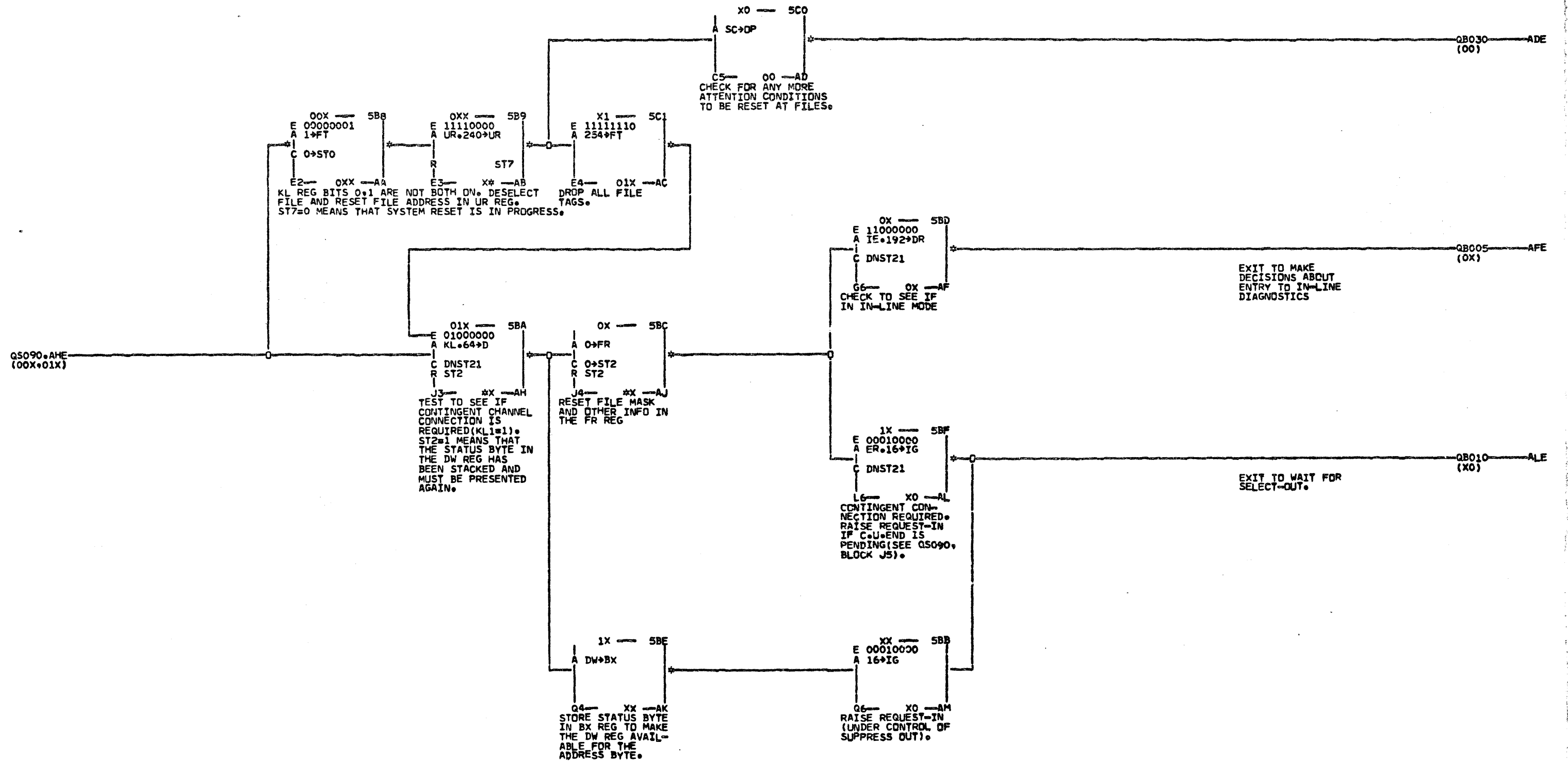
KL0	KL1	Action
1	1	SENSE CODE IN DH. MAINTAIN CHNL AND FILE CONNECTION.
0	1	SENSE CODE IN DH. FILE CONNECTION BROKEN BUT MAINTAIN CHNL CONNECTION.
1	0	SENSE CODE IN DH. BUT HAS BEEN SENSED. BREAK CONTINGENT CONNECTIONS.
0	0	NO SENSE CODE STORED.

08080





THIS PAGE COMPLETES THE DESELECTION HOUSEKEEPING AND OPERATES THE PROPER REQUEST-IN CONTROLS BEFORE RETURNING TO THE BASIC WAIT LOOPS.



00-58

## INTRODUCTION

THE PURPOSE OF THIS RESIDENT DIAGNOSTIC MICROPROGRAM IS TO DETECT AND IDENTIFY COMPONENT FAILURES IN THE 2314. THE DIAGNOSTIC CONSISTS OF 7 TESTS.

1. CE PANEL AND INDICATORS TEST. (QX003)
2. ROSAR TEST (QX003)
3. REGISTER DISPLAY TEST. (QX005)
4. STORAGE SCAN TEST. (QX003)
5. ALU TEST. (QX005)
6. REGISTER TEST. (QX005)
7. BRANCHING TEST. (QX005)

EACH TEST IS DESIGNED TO RUN SEPARATELY BUT TESTS 5-7 MAY BE COMBINED TO RUN AUTOMATICALLY AS ONE TEST BY SETTING THE START ADDRESS SWITCHES AT 601 AND NOT USING THE STOP ADDRESS SWITCHES. (THE MULTI-TAG SWITCH MUST BE IN TAGGED MODE IF THE 2 CHANNEL SWITCH FEATURE IS INSTALLED)

THE TEST SEQUENCE IS SUCH THAT A MINIMUM OF CIRCUITRY IS TESTED INITIALLY. THEN THE TESTS ARE EXPANDED TO EVENTUALLY ENCOMPASS THE CENTRAL FLOW OF THE 2314. DUE TO THE NATURE OF SOME FAILURES. I.E. INTERMITTENTS ETC. AND THE NATURE OF MICROPROGRAMMING ITSELF. ANY PARTICULAR FAILURE MAY INFLUENCE THE NEXT TEST. IT IS THEREFORE POSSIBLE FOR ERRORS TO BE PROPAGATED AND THE ERROR INDICATION BE FALSE. TO MINIMIZE THIS POSSIBILITY, IT IS SUGGESTED THAT ALL TESTS BE RUN IN SEQUENCE.

WITH THE CHECK STOP SWITCH ACTIVE, AN INDICATION THAT A MALFUNCTION HAS BEEN DETECTED WILL BE THE LIGHTING OF THE MACHINE STOP LIGHT. BY USING THE ALU STATEMENT STOP. THE CA-16 DECODE IS BROUGHT UP WHICH STOPS THE 2314. ALONG WITH THIS, THE BINARY EQUIVALENT OF THE ERROR ADDRESS IS DISPLAYED IN THE REGISTER DISPLAY LIGHTS. IF ROSAR IS 601, 2 OR 3, USE TABLE 1-2 TO LOCATE THE ERROR LOOP IN THE FLOW DIAGRAMS.

THREE METHODS FOR FURTHER ISOLATION OF THE ERROR ARE AVAILABLE.

1. REPLACE THE CARD(S) SPECIFIED BY THE ERROR STOP ADDRESS INDEX (TABLE 2. THIS PAGE AND RERUN THE PROGRAM(S) THAT FAILED.)
2. SINGLE CYCLE THROUGH THE FAILING TEST SEQUENCE AND EXAMINE THE CONTENTS OF THE REGISTERS IN ORDER TO PINPOINT THE PROBLEM.
3. LOOP IN THE FAILING SEQUENCE (USING THE BUILT IN SHORT SCOPING LOOPS) BY PLACING THE CHECK STOP SWITCH IN THE RUN POSITION, SET STARTING ADDRESS 601, 2 OR 3 INTO ROSAR AND THEN PRESSING THE START SWITCH. THE PROGRAM WILL LOOP CONTINUOUSLY, WITH OR WITHOUT THE ERROR TO ALLOW SCOPING FOR THE PROBLEM.

TABLE 1.  
BINARY DATA TO HEX CONVERSION.  
BITS 0123-4567

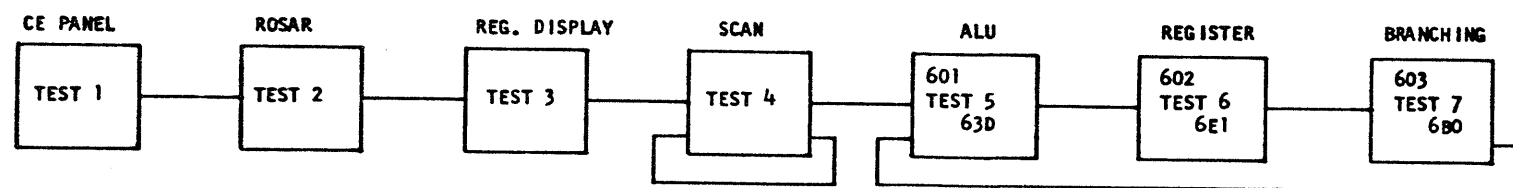
HEX
0000-0-0000
0001-1-0001
0010-2-0010
0011-3-0011
0100-4-0100
0101-5-0101
0110-6-0110
0111-7-0111
1000-8-1000
1001-9-1001
1010-A-1010
1011-B-1011
1100-C-1100
1101-D-1101
1110-E-1110
1111-F-1111

SINCE ALL ERROR STOPS ARE IN MODULE SIX, HEX ADDRESSES WILL BE READ AS 6XX, WHERE THE XX IS DETERMINED FROM TABLE 1, FOR EXAMPLE, REG DISPLAY LIGHT CONFIGURATION IS 0111 1101. BITS 0-3 GIVE US 0111. FROM TABLE 1, 0111=7. BITS 4-7 GIVE US 1101. TABLE 1 GIVES 1101=D. THEREFORE, THE HEX ADDRESS OF THE ERROR STOP IS 67D.

THE FAILING COMPONENTS CALLED OUT IN TABLE 2 ARE POSSIBLE BAD CARDS, BUT ARE NOT NECESSARILY THE ONLY FAILURES THAT COULD CAUSE THE INDICATED CONDITION.

HEX PAGE	ERROR STOP ADDRESS INDEX	FAILING COMPONENTS
60A QX020	B1J7, C1B6, C1E5	
60C QX020	B2J3, B2G2	
60E QX020	B2G2	
60F QX020	B1J7	
610 QX020	B1J7, C1B6	
611 QX020	B2G2	
613 QX020	B2J3	
617 QX020	B1J7, C1B6, C1E5	
618 QX030	B1J7, B2G2, B2G3	
61B QX030	B1J7	
61F QX030	B1J7, B2G3, B2G4	
620 QX030	B2G3, B2G4	
621 QX030	B2J3	
622 QX030	B1J7, B2G2	
624 QX040	B2J2, B2H4, B2J4, B2F5	
626 QX030	B2J2, B2H4, B2J4, B2F5	
628 QX030	B2L4, B2K3, B2H3, B2C3, B2G4	
632 QX040	B2L4, B2L5, B2M5	
638 QX040	B2L4, B2L5, B2M5	
63C QX040	B2L5, B2M5	
650 QX050	B3D4, B3G6, B3C2, B1E3	
652 QX050	B3B6, B3B4, B1E2	
656 QX050	B1J6, B1G2, B1E3	
658 QX050	B1D6, B1J2, B1E3	
65C QX050	B1C6, B1J2, B1E3	
65E QX060	B1M6, B1L2, B1E3	
662 QX060	B1M6, B1J2, B1E3	
664 QX060	B1L6, B1L2, B1E3	
666 QX060	B3C4, B3B4, B1E2	
668 QX060	B1F6, B1G2, B1E3	
66A QX060	B1G6, B1F7, B1E3	
670 QX060	B1D4, B1G2, B1E3	
672 QX060	B1E6, B1J2, B1E3	
678 QX070	RUN REGISTER TEST	
679 QX070	C1C3	
67A QX070	C1B3	
67C QX070	RUN REGISTER TEST	
67D QX070	C1C3	
67E QX070	C1B3	

680 QX070	RUN REGISTER TEST
681 QX070	C1C3
682 QX070	C1B3
684 QX070	RUN REGISTER TEST
685 QX070	C1C3
686 QX070	C1B3
688 QX070	C1E5, B1F2, B1H2
689 QX070	B1J4, C1E7
68A QX070	B1L3, C1E4
68C QX070	C1E5, B1F2, B1H2
68D QX070	B1J7, C1B6
68E QX070	B1J4, C1E7
690 QX070	C1E5, B1F2, B1H2
691 QX070	B1L3, C1E4
692 QX070	B1J7, C1E4
695 QX080	C1B3
696 QX080	C1C3
697 QX080	RUN REGISTER TEST
699 QX080	C1B3
69A QX080	C1C3
69B QX080	RUN REGISTER TEST
69D QX080	C1B3
69E QX080	C1C3
69F QX080	RUN REGISTER TEST
6A1 QX080	C1B3
6A2 QX080	C1C3
6A3 QX080	RUN REGISTER TEST
6A5 QX080	B1H4, C1E4
6A6 QX080	B1J4, C1E7
6A7 QX080	B1J4, C1D3, B1H2, B1D2
6A9 QX080	B1J7, C1G6, C1K5, C1G7
6AA QX080	B1J7, C1B6
6AB QX080	C1E5, B1J7, B1H2, B1D2
6AD QX080	B1J4, C1E7
6AE QX080	B2G2
6AF QX080	C1E5, B1H2, B1D2, B1D3
6B1 QX080	B1L3, C1E4
6B2 QX080	B1L3, C1E4
6B3 QX080	C1E5, B1H2, B1D2, B1D3
6E9 QX060	ONE OF 8 SW REGS FAILED. BE SURE MULTI- TAG SWITCH IS IN TAGGED MODE. EXAMINE UR FOR ADDRESS OF BAD SW REG AND REFER TO ALD LOGICS FOR CARD LOCATIONS.



TO RUN TESTS 5 THRU 7 CONTINUOUSLY, SET START ADDRESS 601 INTO ROSAR; SET MODE SELECT SWITCH TO "RUN", AND PRESS START. THE MULTI-TAG SWITCH MUST BE IN TAGGED MODE IF THE 2 CHANNEL SWITCH FEATURE IS INSTALLED.

RED



DATE	EC NUMBER	DATE	EC NUMBER	DIAGNOSTIC MICRO PROGRAM		
NOV66	420613			INTRODUCTION, TABLE 1 AND 2		
APR 67	420656			DATE	NOV66	P/N 2244556
						TYPE 2314/2844
				<b>IBM</b>		QX001

2

3

4

5

6

7

## TEST 1. CE PANEL INDICATOR TEST.

THIS TEST VARIFIES THAT ALL INDICATOR LIGHTS ARE OK, AND THAT THE RESET SWITCH IS FUNCTIONING.

1. ACTIVATE THE CE PANEL BY SWITCHING FROM NORMAL TO CE.
2. TURN CE PANEL POWER ON.
3. PRESS RESET/LAMP TEST SWITCH. VERIFY THAT ALL LAMPS TURN ON.
4. RELEASE RESET/LAMP TEST SWITCH. VERIFY THAT ALL LAMPS TURN OFF EXCEPT MACHINE STOP LAMP AND ROSAR PARITY LAMP, WHICH SHOULD BE ON.
5. SET THE REGISTER SELECT SWITCH TO OP.
6. PRESS THE DISPLAY SWITCH TO BLACK. VERIFY THAT THE PARITY BIT IS ON IN THE REGISTER DISPLAY LIGHTS.
7. IF OK, PROCEED TO TEST 2. IF NOT, REFER TO ALD PAGES PREFIXED BY SP.

## TEST 2. ROSAR TEST.

THIS TEST CHECKS THAT ALL ONES AND ZEROS CAN BE MANUALLY SET INTO ROSAR.

1. SET START ADDRESS SWITCHES TO FFF.
2. PRESS SET ADDRESS SWITCH. VERIFY THAT ALL ROSAR LIGHTS ARE ON.
3. SET START ADDRESS SWITCHES TO 000.
4. PRESS SET ADDRESS SWITCH. VERIFY THAT ALL ROSAR LIGHTS ARE OFF EXCEPT FOR THE PARITY LIGHT.
5. SET START ADDRESS SWITCHES TO 001.
6. PRESS SET ADDRESS SWITCH. VERIFY THAT PARITY LIGHT GOES OFF.
7. IF OK, PROCEED TO TEST 3. IF ADDRESS CANNOT BE SET CORRECTLY, PROBABLE FAILING CARDS ARE:

ROSAR  
8-11 C114, C1M3, SEE KK001  
0-7 C1K3, C1M5, C1L2, KK021  
P C1L4, C1M3, C1K3, C1J4.  
SEE KK001 AND KK022.

## TEST 3. REGISTER DISPLAY TEST.

THIS TEST CHECKS THE REGISTER DISPLAY LOGIC BY MANUALLY SETTING BIT PATTERNS INTO THE OP-REG AND DISPLAYING THEM IN THE REGISTER DISPLAY LIGHTS.

1. PRESS RESET SWITCH.
2. SET THE DATA SWITCHES TO FF (THESE ARE TWO LOW ORDER START ADDRESS SWITCHES).
3. SET REGISTER SELECT SWITCH TO OP.
4. PRESS ENTER BLACK SWITCH.
5. PRESS DISPLAY BLACK SWITCH. VERIFY THAT ALL REGISTER DISPLAY LIGHTS ARE ON.
6. REPEAT STEPS 2-5 WITH DATA SWITCHES SET TO 00. VERIFY THAT ALL REGISTER DISPLAY LIGHTS ARE OFF EXCEPT PARITY LIGHT.
7. REPEAT STEPS 2-5 WITH DATA SWITCHES SET TO FF. VERIFY THAT ALL REGISTER DISPLAY LIGHTS ARE ON.
8. PRESS RESET SWITCH. VERIFY THAT ALL REGISTER DISPLAY LIGHTS ARE OFF EXCEPT PARITY LIGHT.
9. REPEAT STEPS 2-5 WITH DATA SWITCHES SET TO 01. VERIFY THAT PARITY LIGHT GOES OFF.
10. IF ALL OK, PROCEED TO TEST 4 (QX003). IF NOT, SET REGISTER SELECT TO BY, AND REPEAT STEPS 1-7. THIS WILL ELIMINATE OP REG AS ERROR SOURCE.
11. IF REGISTER DISPLAY IS NOW CORRECT, GO TO TEST 6 (QX005). IF REGISTER DISPLAY IS INCORRECT, REPLACE ONE OR MORE OF THE FOLLOWING CARD

B2D3, B2H2, B2G3, B2K6, B2J6, B2C5.

## TEST 4. STORAGE SCAN TEST.

THIS TEST SEQUENTIALLY DRIVES EACH WORD WITHIN A MODULE TO VERIFY THE CORRECTNESS OF THE SALS OUTPUT. THE SCAN MICROPROGRAM IS A SEQUENCE OF TWO WORD LOOPS, CONSISTING OF THE HOME WORD (SHOWN AT RIGHT) AND THE WORD UNDER TEST (EACH OTHER WORD IN THE MODULE INDIVIDUALLY). THE HOME WORD ADDRESSES THE TEST WORD VIA THE ALU OUTPUT AND INCREMENTS THIS ADDRESS BY ONE EACH LOOP. THE GP REGISTER IS USED AS THE ADDRESS COUNTER. THE NORMAL BRANCH FROM THE TEST WORD IS SUPPRESSED AND THE MICROPROGRAM IS FORCED TO RECYCLE TO THE HOME WORD SET INTO THE START ADDRESS SWITCHES.

SET UP AND RUN INSTRUCTIONS.

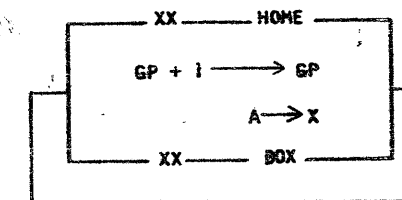
1. SET MODE SELECT SWITCH TO SCAN.
2. SET START ADDRESS SWITCHES TO HEX ADDRESS OF HOME WORD OF MODULE YOU WISH TO RUN. EXAMPLE, FOR TEST OF MODULE 0, SET START ADDRESS TO 006.
3. SET THE CHECK STOP SWITCH TO CHECK STOP
4. PRESS THE RESET SWITCH.

## 5. PRESS SET ADDRESS SWITCH.

6. PRESS START SWITCH. MACHINE SHOULD CYCLE THROUGH ALL ADDRESSES OF THE MODULE SELECTED. THERE SHOULD BE NO CHECK STOPS. IF OK, STOP 2314. SET START ADDRESS OF NEXT MODULE TO BE RUN. REPEAT STEPS 5-6 UNTIL ALL MODULES ARE SCANNED. IF A CHECK STOP OCCURS, MACHINE WILL STOP WITH NEXT HIGHER ROSAR 0-11 BITS IN GP-REGISTER, ALONG WITH A CHECK LIGHT. THIS INDIVIDUAL STEP MAY BE RUN IN SINGLE CYCLE MODE IF DESIRED.

## SCAN HOME WORDS

MODULE	HOME ADDRESS (HEX)	WORD
0		006
1		100
2		200
3		300
4		400
5		500
6		600
7		701
8		800
9		900
A		A00
B		B00
C		C00
D		D00
E		E00



SEE PAGE QX010  
FOR SCAN WORDS.

DATE	EC NUMBER	DATE	EC NUMBER	DIAGNOSTIC MICROPROGRAM TEST			
NOV 66	420613			1 THRU 4			
APR 67	420656			DATE	NOV 66	P/N	2244557
AUG 68	420664					TYPE	2314/2844
				IBM		QX003	

## TEST 5 ALU TEST

THIS MICROPROGRAM IS WRITTEN TO SUPPLEMENT THE TWO WIRE CHECK IN THE ALU.

PAGE QX020 TESTS ST2 AND D = 0. PAGE QX030 TESTS ST3, CARRY AND T/C. PAGE QX040 EXERCISE THE ALU CIRCUITRY ALLOWING THE TWO WIRE CHECK TO DETECT ANY ALU FAILURES.

- PRESS RESET SWITCH.
- SET MODE SELECT SWITCH TO RECYCLE.
- SET START ADDRESS SWITCHES TO 601.
- SET STOP ADDRESS SWITCHES TO 63D
- SET CHECK STOP SWITCH TO CHECK STOP.
- PRESS SET ADDRESS SWITCH.
- PRESS START SWITCH. MACHINE STOP LIGHT SHOULD REMAIN OUT. IF SO, GO TO TEST 6. IF MACHINE STOP LIGHT AND DATA LIGHT COME ON, PROCEED TO STEP 8. IF ONLY THE MACHINE STOP LIGHT COMES ON (WITH ROSAR SHOWING 601) THEN PROCEED TO STEP 9.
- THIS FAILURE WAS DETECTED BY THE ALU TWO WIRE CHECK. THE FAILURE IS CAUSED BY AN UNEQUAL SUM AND NOT-SUM. TEST THE LEVEL OF SUM AND NOT-SUM. USE TABLE 3 FOR TEST POINTS AND FAULT LOCATIONS. IF ALL POSITIONS CHECK OUT OK THEN THE FAILURE WAS DETECTED BY THE A-BUS PARITY CIRCUIT. COMPARE THE REGISTER DISPLAY LIGHTS WITH CORRECT VALUE. THE CORRECT VALUE MAY BE DETERMINED FROM THE PREVIOUS MICROPROGRAMMING WORD.
- THIS FAILURE WAS DETECTED BY THE MICROPROGRAM. THE ERROR ADDRESS WILL BE DISPLAYED ON THE REGISTER DISPLAY LTS. USE TABLE 1-2 (QX001) TO LOCATE FAILURE.

## TEST 6 REGISTER TEST

TEST 6 TESTS ALL POSITIONS OF EACH REGISTER AND ALSO INSURES THAT THE CD DECODES ARE FUNCTIONING CORRECTLY. AN INITIAL VALUE OF ZERO IS LOADED INTO THE FIRST REGISTER. THEN THE VALUE IS INCREMENTED BY 1 FOR THE SUCCEEDING REGISTERS. THEN THE CONTENTS OF THE REGISTERS ARE COMPARED AGAINST A CORRECT VALUE WHICH IS IN BY REGISTER. IF ALL REGISTERS ARE OK THEN THE ABOVE LOADING PROCEDURE IS REPEATED BUT WITH THE INITIAL VALUE INCREMENTED BY 1. THE ABOVE PROCESS IS REPEATED 255 TIMES.

THE REASON FOR DIFFERENT VALUES IN EACH REGISTER IS TO INSURE THAT ONE AND ONLY ONE REGISTER IS ENTERED AT ANY ONE TIME.

- PLACE MULTI-TAG SWITCH IN TAGGED MODE IF THE 2 CHANNEL SWITCH FEATURE IS INSTALLED.
- PRESS RESET SWITCH.
- SET MODE SELECT SWITCH TO RECYCLE.
- SET START ADDRESS SWITCH TO 602.
- SET STOP ADDRESS SWITCH TO 6E1.
- SET CHECK STOP SWITCH TO CHECK STOP.
- PRESS SET ADDRESS SWITCH.
- PRESS START SWITCH. MACHINE STOP LIGHT SHOULD REMAIN OUT. IF SO, GO TO TEST 7. IF MACHINE STOP LIGHT COMES ON (WITH ROSAR SHOWING 602) PROCEED TO STEP 9.
- THE ERROR ADDRESS IS DISPLAYED ON THE REGISTER DISPLAY LIGHTS. USE TABLE 1-2 (QX001) TO LOCATE FAILURE.

## TEST 7 BRANCHING TEST

THIS TEST CHECKS THE ABILITY OF THE 2314 TO BRANCH ON BOTH THE ZERO AND ONE STATE OF THE OP REG AND THE ST REG. THIS TEST DOES NOT CHECK THE FOLLOWING:

- ANY CHAN TAG OR FILE BRANCHING.
- ST1 = 1. SET BY INDEX FROM FILE ONLY.
- ST4 = 1. SET BY DATA FROM FILE ONLY.
- DO = 0. CHECKED QX020
- DO = 1. CHECKED QX020
- A → X, K → W. CHECKED BY SCAN TEST (QX003).

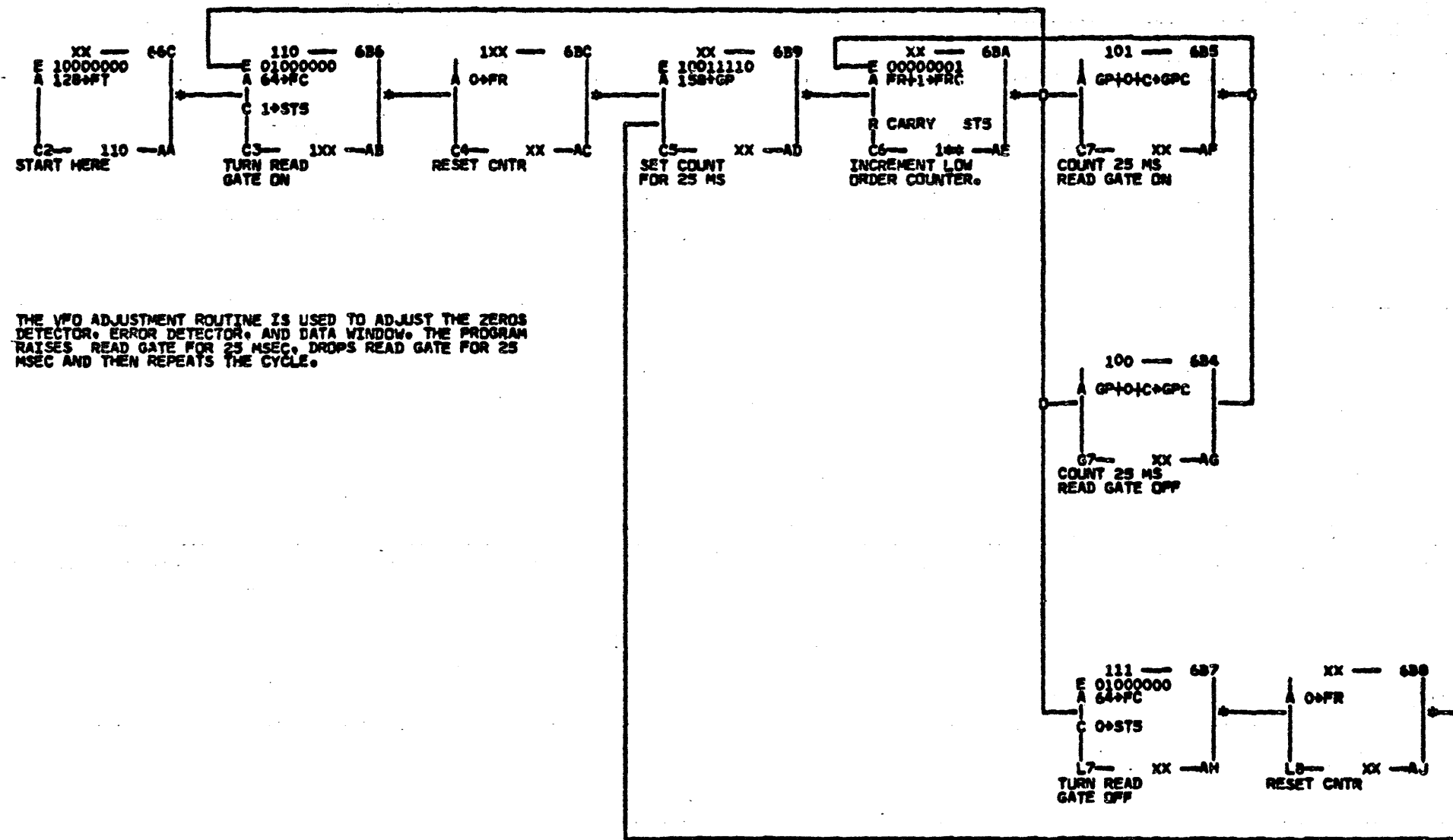
THE PROGRAM IN GENERAL WILL SET THE OP REG TO ALL ONES. WHILE TESTING THE BRANCH CAPABILITY OF THE OP REG. THE ST REG IS SET TO ALL ONES. THESE BRANCHES ARE THEN TESTED. THEN THE OP REG IS SET TO ZERO AND WHILE THE BRANCH CAPABILITY OF THE OP REG IS BEING TESTED THE ST REG IS SET TO ZERO. THIS IS SUBSEQUENTLY TESTED.

- PRESS RESET SWITCH
- SET MODE SELECT SWITCH TO RECYCLE.
- SET START ADDRESS SWITCH TO 603.
- SET STOP ADDRESS SWITCH TO 68D.
- SET CHECK STOP SWITCH TO CHECK STOP.
- PRESS SET ADDRESS SWITCH.
- PRESS START SWITCH. MACHINE STOP LIGHT SHOULD REMAIN OUT. IF SO, THE BASIC DIAGNOSTICS HAVE BEEN COMPLETED. IF MACHINE STOP LIGHT COMES ON (WITH ROSAR SHOWING 603) PROCEED TO STEP 8.
- THE ERROR ADDRESS IS DISPLAYED ON THE REGISTER DISPLAY LIGHTS. USE TABLE 1-2 (QX001) TO LOCATE FAILURE.

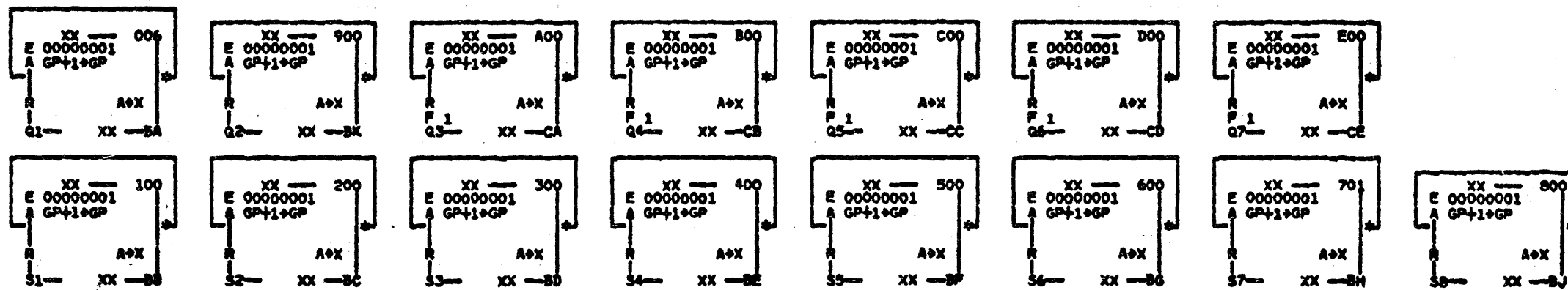
TABLE 3

ALU POS	SUM (+L)	NOT-SUM (+L)	FAILING CARD
6	B2B3-D07	B2B3-B08	B2B3, B2B4
5	B2B4-D07	B2B4-B08	B2B4, B2C4
7	B2C3-D07	B2C3-B08	B2C3, B2B3
4	B2C4-D07	B2C4-B08	B2C4, B2D4
3	B2D4-D07	B2D4-B08	B2D4, B2E4
2	B2E4-D07	B2E4-B08	B2E4, B2F4
1	B2F4-D07	B2F4-B08	B2F4, B2G4
0	B2G4-D07	B2G4-B08	B2G4, B2C3

DATE	EC NUMBER	DATE	EC NUMBER	DIAGNOSTIC MICROPROGRAM			
NOV 66	420613			TEST 5 THRU 7.			
APR 67	420656			DATE	NOV 66	P/N	2244558
						TYPE	2314/2844
				IBM		QX005	



THE VFO ADJUSTMENT ROUTINE IS USED TO ADJUST THE ZEROS DETECTOR, ERROR DETECTOR, AND DATA WINDOW. THE PROGRAM RAISES READ GATE FOR 25 MSEC, DROPS READ GATE FOR 25 MSEC AND THEN REPEATS THE CYCLE.



THE BLOCKS IN THE Q AND S ROWS AT THE LEFT ARE THE SCAN WORDS FOR THE INDICATED MODULES. REFER TO QX003 FOR DIRECTIONS IN EXECUTING THE SCAN FUNCTION.

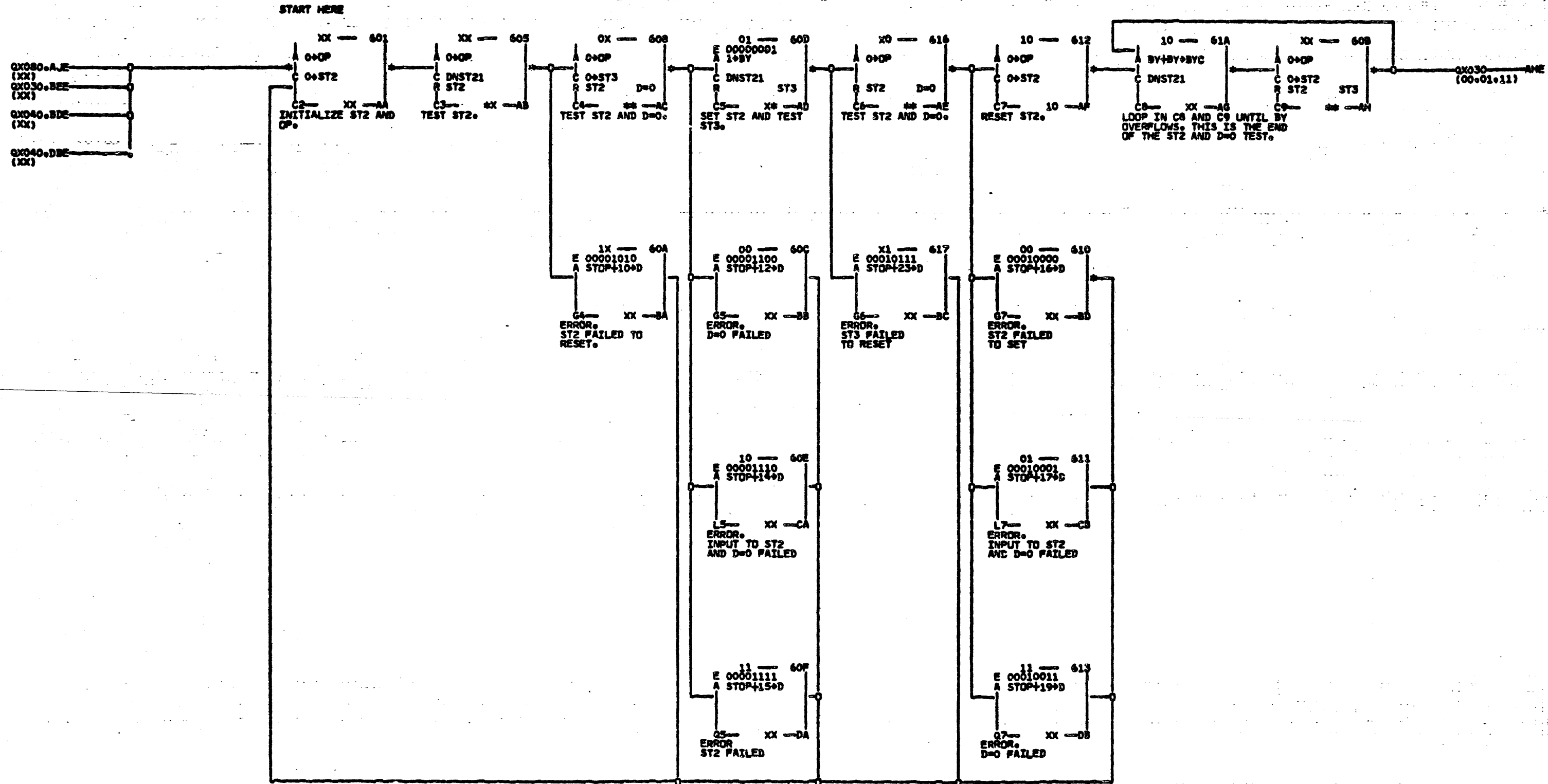
420613  
420652  
420656

10/11/66  
12/20/66  
04/06/67

MACH 2844  
NAME 2314/2844  
MODE MANUAL  
P.No. 2250310  
IBM CORP. SDD

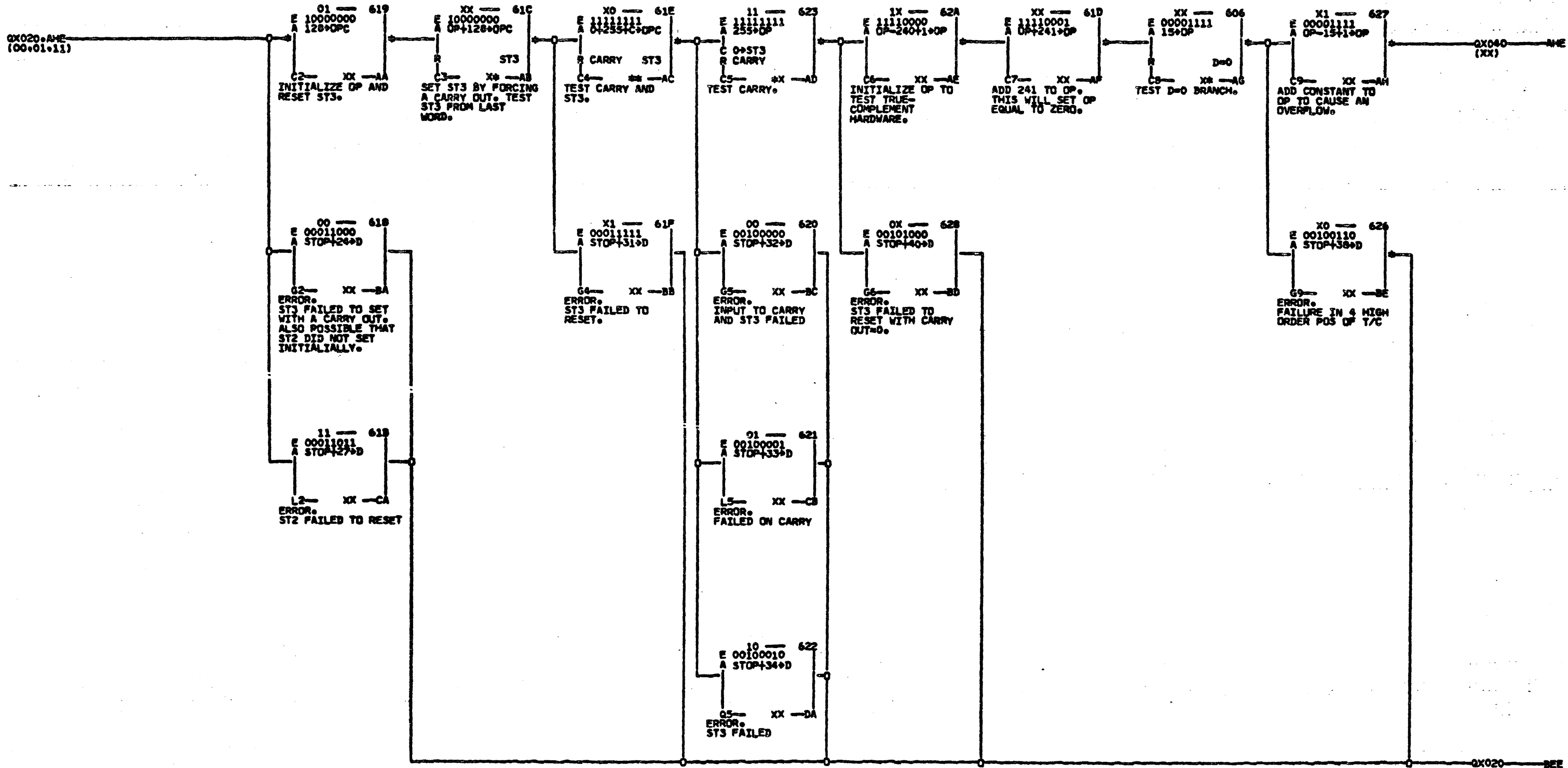
DATE 04/21/67  
LOG 111D  
VFO ADJUSTMENT  
MICROPROGRAM

SHEET 1  
VERSION 0X010



TEST FAILURE

000000

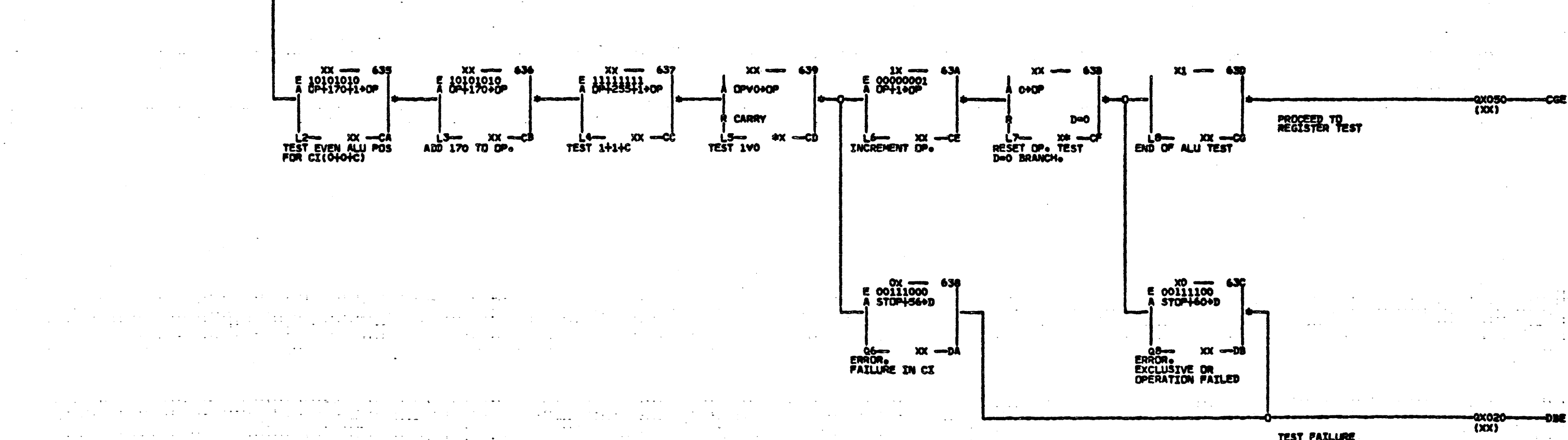
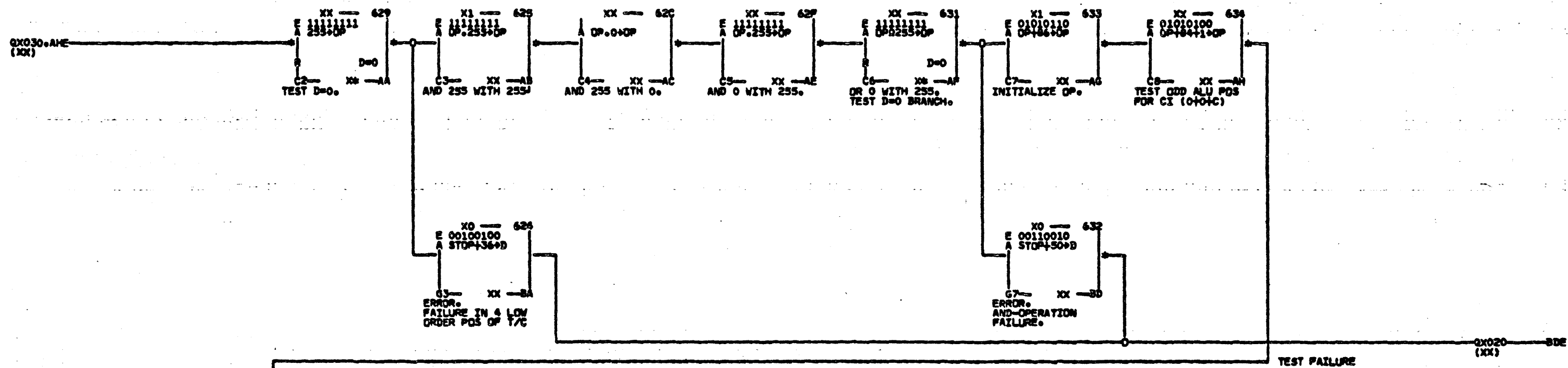


TEST FAILURE 0X020 AHE (XX)

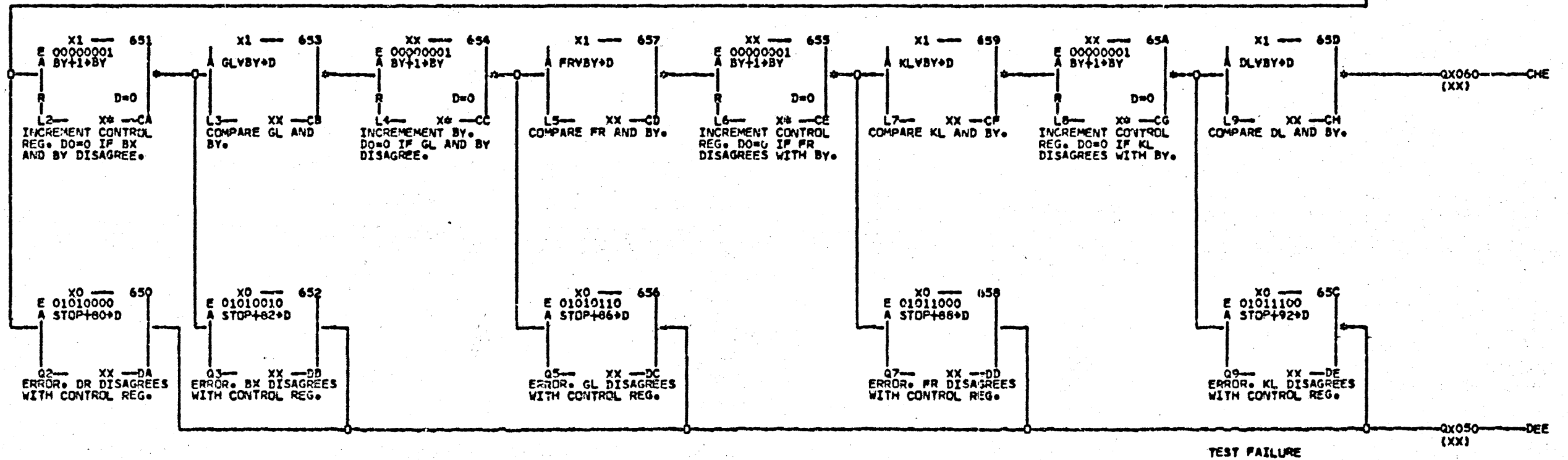
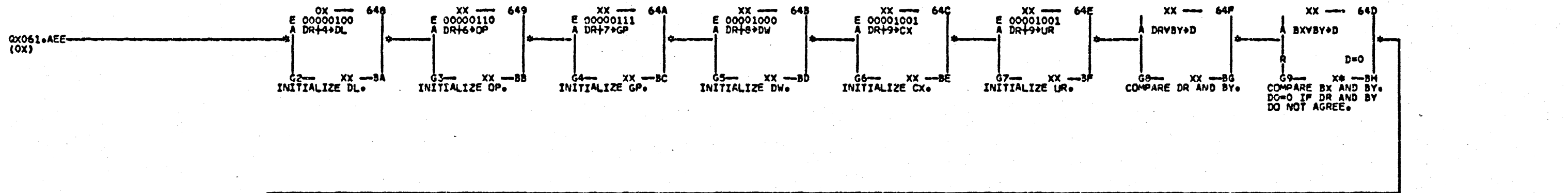
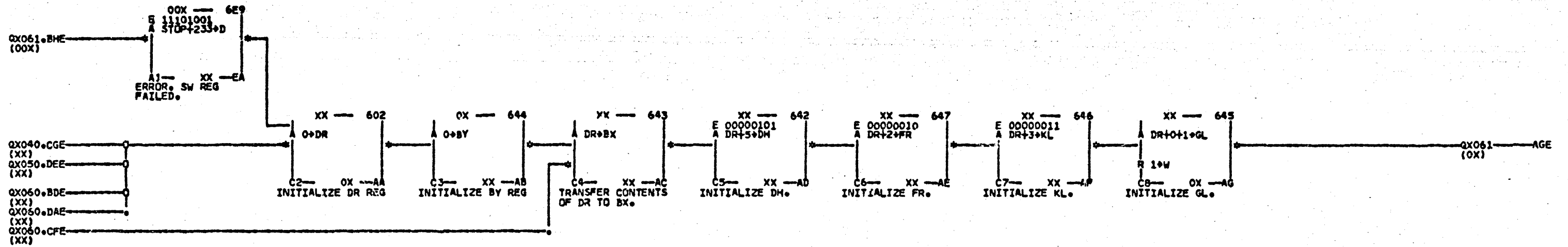
420613	10/11/66	MACH	2844	DATE	04/21/67	SHEET	1	0X030
420656	04/06/67	NAME	2314/2844	LOG	111D	VERSION		
		MODE	MANUAL					
		P.n.	2250312					
		IBM CORP.	SDD					
						DIAGNOSTIC PROGRAM		
						ALU TEST. TEST 5		

040X8



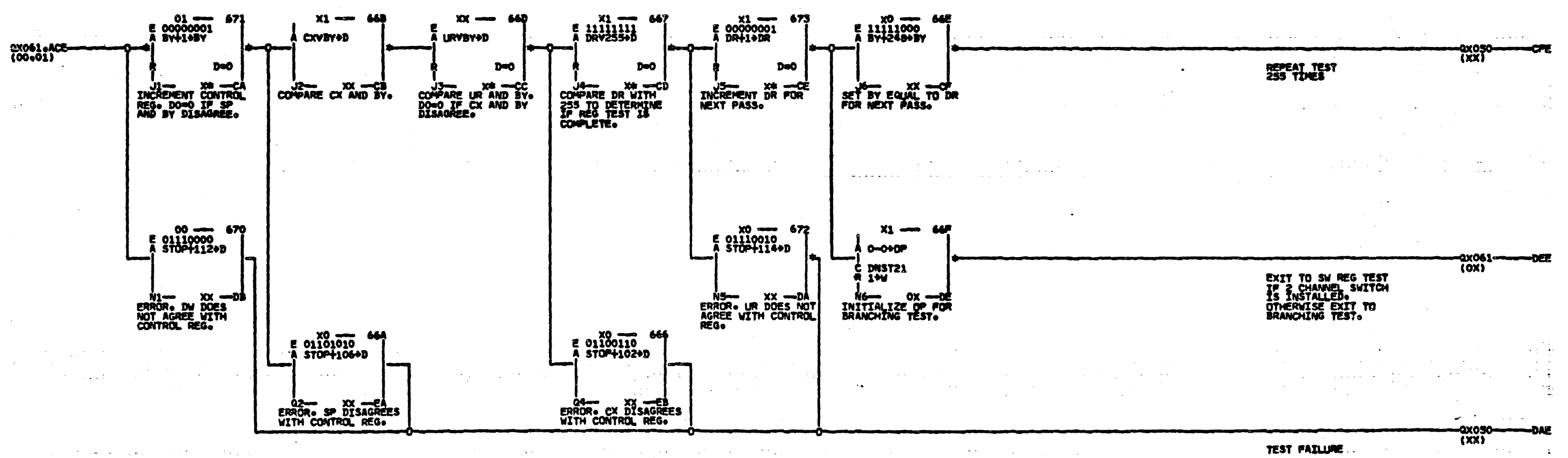
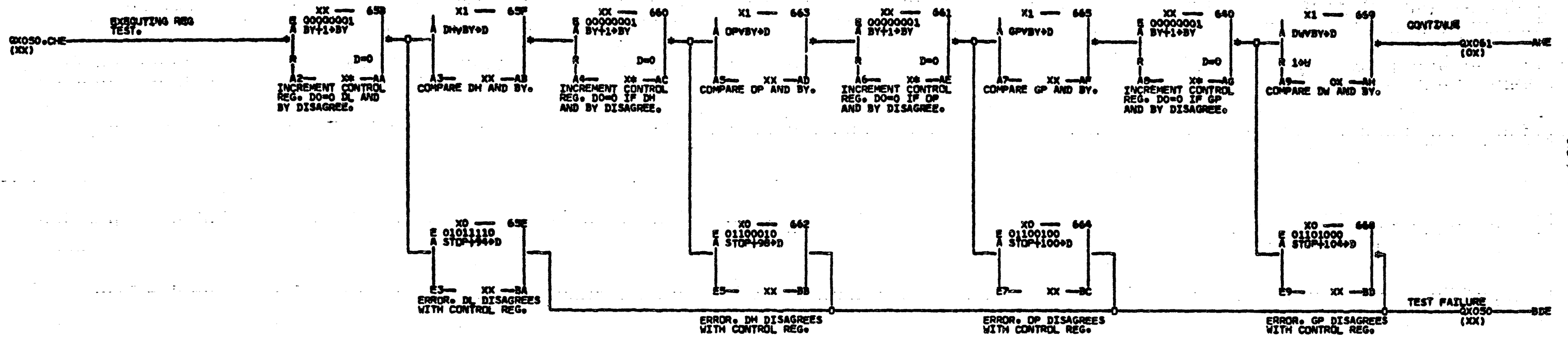


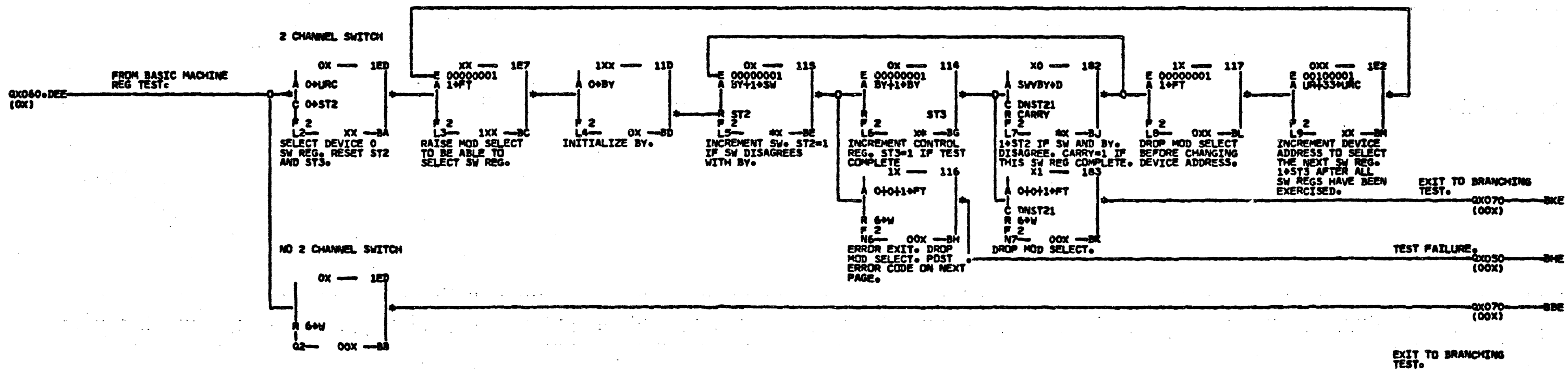
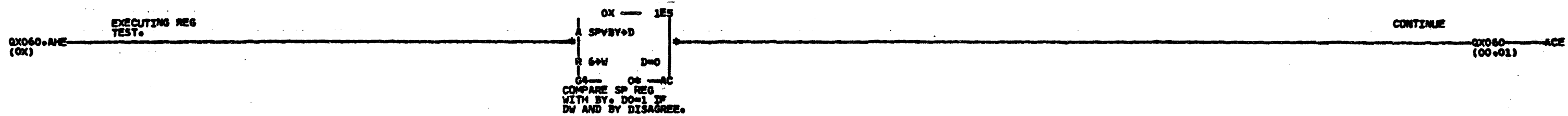
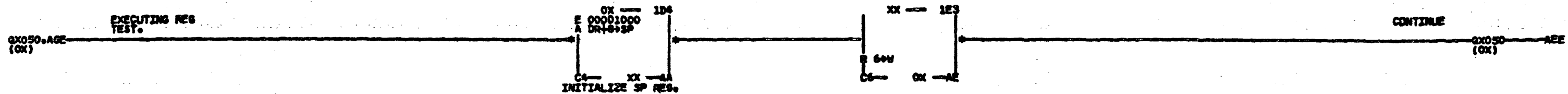
040X6



TEST FAILURE

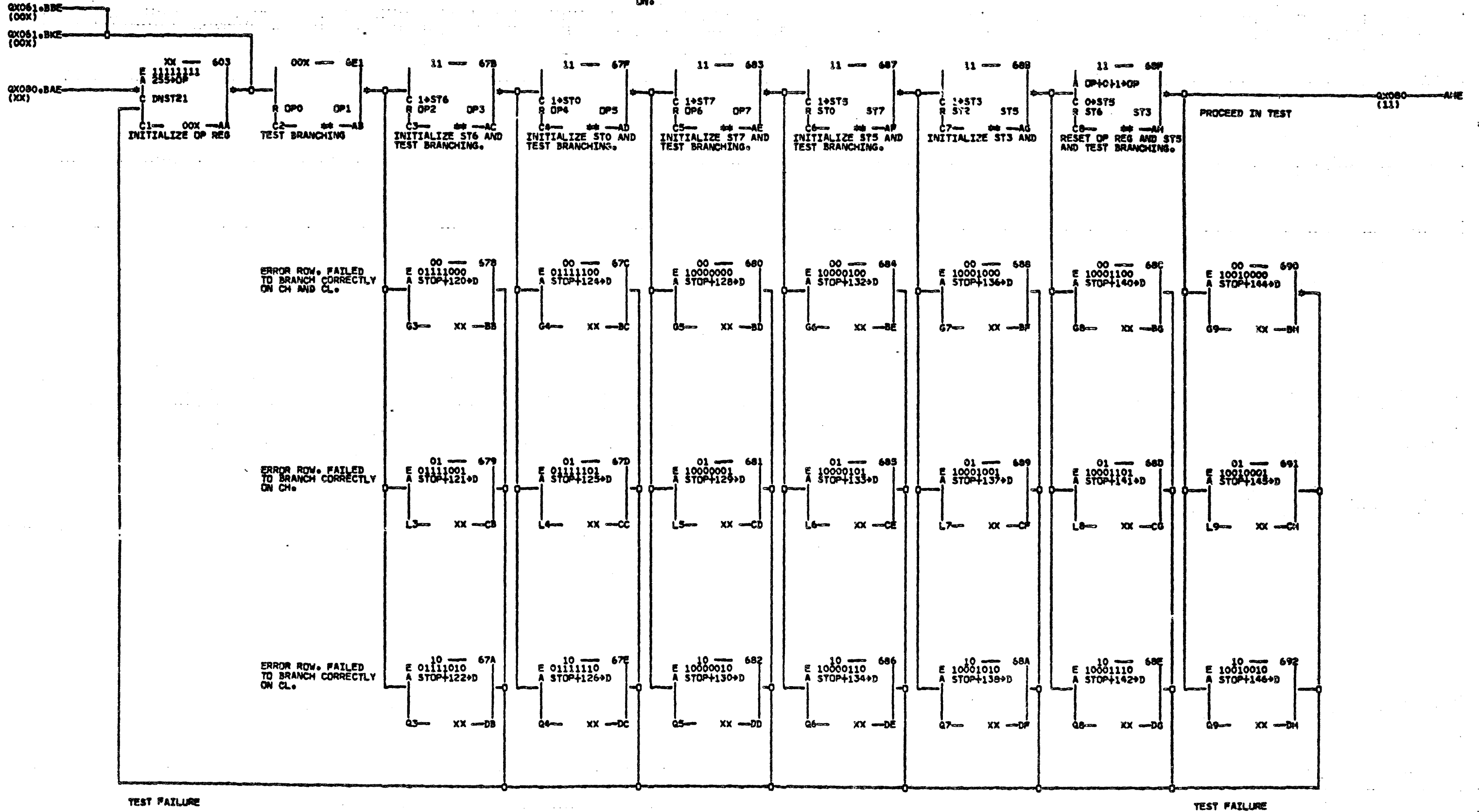
040000





4-0000

THE TESTS ON THIS PAGE  
INSURE THAT ALL BRANCHING  
CONDITIONS CAN BE TURNED  
ON.



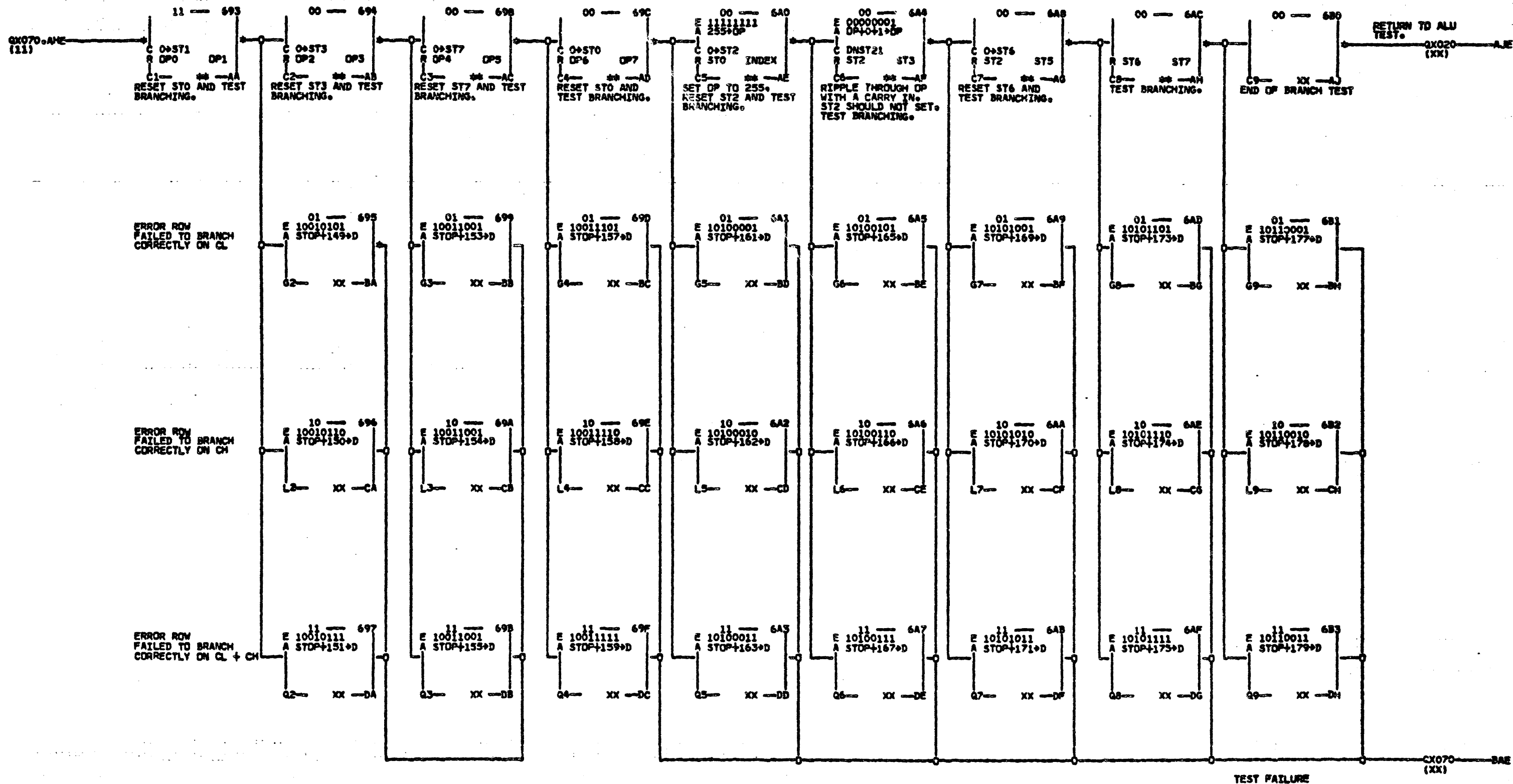
TEST FAILURE

TEST FAILURE

0-40X2

420613	10/11/66	MACH	2844	DATE	04/21/67	SHEET	1	QX070
420652	12/20/66	NAME	2314/2844	LDG	111D	VERSION		
420656	04/06/67	MODE	MANUAL					
		P.N.	2250317					
		IBM CORP.	SDD					
				DIAGNOSTIC PROGRAM BRANCHING TEST. TEST 7				

THE TESTS ON THIS PAGE INSURE THAT ALL BRANCHING CONDITIONS CAN BE TURNED OFF.



ERROR ROW FAILED TO BRANCH CORRECTLY ON CL

ERROR ROW FAILED TO BRANCH CORRECTLY ON CH

ERROR ROW FAILED TO BRANCH CORRECTLY ON CL + CH

TEST FAILURE

IN-LINE TEST ROUTINES

TABLE OF CONTENTS

GENERAL DESCRIPTION-----QY010  
 OPERATING REQUIREMENTS AND PRECAUTIONS----QY020  
 OPERATING PROCEDURE-----QY020  
 ROUTINE DESCRIPTIONS-----QY030  
 ERROR CODE DICTIONARY-----QY090

PURPOSE

IN THE EVENT OF FAILURE OF ANY ONE OF THE EIGHT ON-LINE FILE MODULES, THE SPARE FILE MODULE CAN BE SUBSTITUTED FOR THE AILING MODULE. THE 2314 CONTINUES FUNCTIONING WITH EIGHT MODULES ON-LINE. IN-LINE ROUTINES PERMIT TESTING THE SPARE MODULE WHILE THE 2314 CONTINUES TO FUNCTION IN THE SYSTEM. WHEN A ROUTINE IS BEING EXECUTED, THE CONTROL UNIT PRESENTS BUSY TO THE CHANNEL, UPON COMPLETION OF A PARTICULAR SECTION OF A TEST, THE CONTROL UNIT RETURNS CONTROL TO THE CHANNEL. RESULTS OF THE TEST ARE SAVED IN A DISPLAY REGISTER ON THE CE PANEL. AT THE END OF A CHANNEL-FILE OPERATION, THE CONTROL UNIT IS AVAILABLE FOR ANOTHER PASS THROUGH A SECTION OF AN IN-LINE ROUTINE. THUS, BOTH CHANNEL OPERATIONS AND IN-LINE ROUTINES ARE EXECUTED BY SHARING THE CONTROL UNIT.

GENERAL DESCRIPTION

CE PANEL CONTROLS FOR IN-LINES

THE CE-NORMAL-IN LINE SWITCH MUST BE IN THE IN-LINE POSITION. WITH THE SWITCH IN THIS POSITION, ALL CONTROL TOGGLE SWITCHES ARE INACTIVE EXCEPT CHECK RESET. THE FOLLOWING CE FUNCTIONS ARE ACTIVE:

1. MODE SWITCH POSITIONS LOAD, RTN, ERR, AND RESULT.  
 LOAD-CAUSES ROUTINE CODE TO BE STORED FROM THE DATA SWITCHES.  
 RTN -CAUSES ROUTINE CODE TO BE DISPLAYED. IN A SENSE THIS A NEUTRAL POSITION FOR THE MODE SWITCH. THE DATA SWITCHES CAN BE CHANGED WHEN IN ROUTINE MODE.  
 ERR -CAUSES ROUTINE TO BE EXECUTED. IF AN ERROR IS DETECTED, THE ROUTINE STOPS WITH THE ERROR CODE LATCHED IN THE DISPLAY REGISTER. CONTROL IS RETURNED TO THE CHANNEL UNTIL THE ERROR IS CLEARED BY CHECK RESET.  
 RESULT-CAUSES ROUTINE TO BE EXECUTED BUT AN ERROR DOES NOT CAUSE A STOP. AN ERROR CAUSES THE ROUTINE TO RE-INITIALIZE TO ITS STARTING POINT AND CONTINUE OPERATION.
2. DATA SWITCHES ARE ACTIVE TO ENTER ROUTINE CODES AND TEST DATA. A MICROPROGRAM STATEMENT OF 0 → GP LOADS GP FROM THE DATA SWITCHES.
3. THE STOP ADDRESS SWITCHES ARE ACTIVE TO PROVIDE A SYNC AT SYNC HUB AND TO TURN ON PROBE LAMP. CHECK RESET TURNS OFF THE PROBE. THE STOP FUNCTION OF THE SWITCHES IS NOT ACTIVE.
4. THE DISPLAY REGISTER IS ACTIVE TO DISPLAY ROUTINE CODES AND ERROR CODES. REGISTERS CANNOT BE DISPLAYED IN THE IN-LINE MODE.

DATE	EC NUMBER	DATE	EC NUMBER	IN LINE GENERAL INFORMATION			
NOV 66	420613			DATE	NOV 66	P/N	2244559
						TYPE	2314/2844
				<b>IBM</b>		QY010	

OPERATING REQUIREMENTS & PRECAUTIONS

1. USE A CE DISK PACK OR FORMATTED SCRATCH PACK ONLY. SOME ROUTINES WRITE AND COULD DESTROY DATA ON A PACK.
2. IN-LINE ROUTINES REQUIRE A SPECIAL FORMATTED DISK PACK. CE PACKS ARE PROPERLY FORMATTED WHEN THEY ARE SHIPPED FROM THE PLANT. UTILITY PROGRAM FFFI IS PROVIDED TO RECONSTRUCT TEST DATA ON THE CE PACK IF IT IS INADVERTENTLY ALTERED. FFFI WILL NOT RECONSTRUCT ALIGNMENT TRACKS.
3. THE FOLLOWING DISK PACK REQUIREMENTS MUST BE MET:
  - A. ALL TRACKS (EXCEPT ALIGNMENT TRACKS) MUST HAVE VALID HOME ADDRESS. ALIGNMENT CYLINDERS ARE 71, 72, 73, 74, 75, 117, 118, AND 119.
  - B. CYLINDERS 001 AND 199 MUST HAVE A 7000 BYTE RO PRERECORDED.
  - C. CYLINDERS 001, 005, 195, AND 199 MUST BE DEFECT FREE.
4. THE SPARE DRIVE SELECTOR PLUG MUST BE INSERTED INTO DRIVE TO BE TESTED.
5. SYSTEM PROGRAM MUST BE CAPABLE OF HANDLING A CONTROL UNIT BUSY CONDITION TO RUN IN-LINES.
6. IN-LINES CANNOT BE USED AT THE SAME TIME AS THE MACHINE LANGUAGE DFT'S.
7. DO NOT MOVE THE DATA SWITCHES WITH THE MODE SELECT SWITCH IN ERROR OR RESULT. ERRORS CAN BE CAUSED BY MOVING THE DATA SWITCHES DURING ROUTINE EXECUTION.
8. CARE SHOULD BE OBSERVED WHEN ENTERING TEST DATA. BY SETTING SWITCHES TOO HIGH, AN INVALID CYLINDER ADDRESS, STROKE LENGTH, OR HEAD ADDRESS WILL CAUSE ONE OR MORE OF THE FOLLOWING:
  - (1) SEEK INCOMPLETE
  - (2) END OF CYLINDER
  - (3) SELECT LOCK
 ANY OF THE ABOVE CONDITIONS MUST BE RESET BEFORE OPERATION OF ANY ROUTINE CAN CONTINUE. ROUTINE 20 WILL RESET CONDITIONS (2) AND (3). ROUTINE 40 WILL RESET CONDITIONS (1) AND (2).
9. THE DISPLAY LIGHTS SHOULD NOT BE INTERPRETED AS AN ERROR IN RESULT MODE. THE LOGICAL "OR" OF SEVERAL CODES COULD APPEAR IN LIGHTS.
10. AVOID EXECUTING ROUTINE 60 IN RESULT MODE, OR USING CHECK RESET TO RESET AN ERROR CONDITION IN ERROR MODE. REFER TO ROUTINE DESCRIPTION.
11. IT IS RECOMMENDED THAT THE INDICATOR SECTION OF THE CE FILE TEST BOX BE USED WHENEVER IN-LINES ARE BEING USED. THE INDICATOR CAN PROVIDE USEFUL INFORMATION REGARDING FAILURES. THE ERROR CODE DICTIONARY RECOMMENDS SPECIFIC APPLICATION OF THE INDICATOR BOX TO DIAGNOSE PROBLEMS.

OPERATING PROCEDURE

1. LOAD ROUTINE CODE
  - A. SET THE CE-NORMAL SWITCH TO IN-LINE.
  - B. SET THE MODE SWITCH TO ROUTINE (RTN).
  - C. SET THE HIGH ORDER DATA SWITCH TO THE DESIRED ROUTINE. THE LOW ORDER SWITCH CAN BE IN ANY POSITION.
  - D. SET THE MODE SWITCH TO LOAD, VERIFY THAT THE CORRECT ROUTINE CODE APPEARS IN THE DISPLAY REGISTER.
  - E. ROUTINE CODE 0 IS AN INVALID ROUTINE. EXECUTION OF THIS ROUTINE WILL RESULT IN AN ERROR INDICATION.
2. ENTER TEST DATA
  - A. SET MODE SELECT SWITCH TO ROUTINE.
  - B. SET DATA SWITCHES TO DESIRED POSITION. REFER TO ROUTINE DESCRIPTIONS FOR SPECIFIC SETTING OF DATA SWITCHES.
3. EXECUTE ROUTINE
  - A. SET MODE SELECT TO ERROR (ERR) MODE. THE FIRST DETECTED ERROR WILL CAUSE AN ERROR CODE TO APPEAR IN THE DISPLAY REGISTER. CHECK RESET WILL RESET THE DISPLAY REGISTER.
  - B. TO VERIFY THAT A ROUTINE IS OPERATING CORRECTLY SET THE STOP ADDRESS SWITCHES TO THE ADDRESS SHOWN BELOW AND OBSERVE THE PROBE LIGHT. CHECK RESET RESETS THE LIGHT.

TO VERIFY

STOP ADDRESS

RECALIBRATE OR SEEK		5E7
READ HA		350
READ DATA		352
WRITE DATA		6EA
FULL CYLINDER OPERATION (AFTER ALL HEADS)		7C3
CAR. STATUS TEST		3E2
SAFETY CIRCUITS TEST	1. SINGLE TEST	74B
	2. SEQUENTIAL MODE	74F
AN ERROR HAS OCCURED		6C1
CHAINED MODE		7B6

- C. AN ALTERNATE METHOD OF EXECUTION IS RESULT MODE. THE ROUTINE IS EXECUTED BUT ERRORS DO NOT CAUSE A STOP. THIS MODE IS USEFUL IF A SCOPE LOOP IS DESIRED. RESULT MODE IS NOT PERMISSIBLE IN SOME ROUTINES. REFER TO ROUTINE DESCRIPTIONS.

4. ERROR ANALYSIS

REFER TO ERROR CODE DICTIONARY FOR MEANING OF ERRORS AND PROBABLE CAUSES.

DATE	EC NUMBER	DATE	EC NUMBER	OPERATING INFORMATION			
NOV 66	420613						
JAN 67	420652			DATE	NOV 66	P/N	2244560
MAR 67	420655					TYPE	2314/2844
JAN 68	420662			<b>IBM</b>		QY020	
12NOV68	420664						



2 3 4 5 6 7

GENERAL ROUTINE DESCRIPTION

GENERAL ROUTINE DESCRIPTION

THE ROUTINES MAKE USE OF THE MAIN MICROPROGRAM SEEK (QG050) AND WRITE (QP020) ROUTINES TO PERFORM THE FUNCTIONS OF SEEKING AND WRITING. THE IN LINE BRANCH (MNEMONIC INLIN) CONTROLS THE MICROPROGRAM EXIT FROM THESE ROUTINES AND RETURNS THE MICROPROGRAM (IN THE IN LINE MODE) TO IN LINE CONTROL DECISIONS INSTEAD OF ALLOWING THE MICROPROGRAM TO CONTINUE ON INTO END PROCEDURE. THIS BRANCH ALSO PREVENTS THE MAIN PROGRAM SEEK AND WRITE ROUTINES FROM ENTERING THE IN LINE AREA. THERE IS A SEPARATE READ/CLOCKING ROUTINE TO PERFORM THE FUNCTION OF READING IN THE IN LINE MODE (QY139)

THE KEY TO UNDERSTANDING THE OPERATION OF THE SEPARATE ROUTINES IS THE 345 EXECUTION CONTROL CODE. THESE THREE BITS ( IE 345) ARE GATED TO THE OP REGISTER JUST PRIOR TO ENTERING EACH INDIVIDUAL ROUTINE. EACH ROUTINE THEN DECODES THE 345 CODE IN ORDER TO DETERMINE WHAT FILE FUNCTION SUBROUTINE (SEEK, READ, WRITE, HEAD ADVANCE, ETC.) TO PERFORM. THIS CODE IS UPDATED BY EACH FILE FUNCTION SUBROUTINE SO THAT THE ROUTINE EXECUTION CONTROL MAY PERFORM THE NEXT SEQUENTIAL FILE FUNCTION. PRIOR TO A "RETURN TO CHANNEL," THE 345 CODE IS STORED BACK IN THE IE 345 BITS AND REMAINS UNALTERED BY THE MAIN MICROPROGRAM DURING NORMAL CHANNEL OPERATION. REFER TO DIAGRAM AT RIGHT OF PAGE.

BRANCHING TO EACH INDIVIDUAL ROUTINE IS ACCOMPLISHED BY THE (A = X) BRANCH (QY100).

BLOCK DIAGRAM OF IN LINE EXECUTION

```

    graph LR
      QB005 --> MRD[MODE AND ROUTINE DECODE]
      MRD --> CAU[345 CODE ANALYSIS AND UPDATE]
      CAU --> RTCH[RETURN TO CHANNEL]
      CAU --> SEEK[SEEK]
      CAU --> REC[RECALIBRATE]
      CAU --> MISC[MISC.]
      CAU --> READHA[READ HA]
      CAU --> READDATA[READ DATA]
      CAU --> WRITEDATA[WRITE DATA]
      RTCH --> EXIT[EXIT]
      SEEK --> EXIT
      REC --> EXIT
      MISC --> EXIT
      READHA --> HCC[HEAD AND CYL. CHECK]
      HCC --> EXIT
      READDATA --> EXIT
      WRITEDATA --> EXIT
      EXIT --> QB005
  
```

DATE	EC NUMBER	DATE	EC NUMBER	GENERAL ROUTINE DESCRIPTION			
NOV 66	420613						
				DATE	NOV 66	P/N	2244561
						TYPE	2314/2844
				<b>IBM</b>		QY030	

2

3

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ROUTINE DESCRIPTIONS

ROUTINE 10 CHAINED MODE

- SET UP: 1. LOAD CODE 1X (X CAN BE ANY SETTING)
2. SET DATA SWITCHES TO HEX 80.  
CAUTION: FAILURE TO SET DATA SWITCHES TO HEX 80 WILL RESULT IN IMPROPER OPERATION
3. EXECUTE IN ERROR MODE ONLY.

NOTE: ALLOW SUFFICIENT TIME TO MAKE ONE COMPLETE PASS THRU EACH ROUTINE LISTED BELOW. SET STOP ADDRESS SWITCHES TO 7B6 AND OBSERVE THE PROBE LIGHT TO VERIFY COMPLETION OF ROUTINE 10.

PURPOSE: THIS TEST PROVIDES A SEQUENCE OF TESTS THAT ARE CHAINED TOGETHER TO PROVIDE RAPID FAULT ISOLATION WHEN NO PARTICULAR AREA IS SUSPECTED, AND TO VERIFY SUCCESSFUL MAINTENANCE OR REPAIR ACTIVITY ON THE SPARE FILE.

FOUR INDIVIDUAL ROUTINES ARE ACTUALLY EXECUTED SEQUENTIALLY IN THIS TEST. THE FOUR ROUTINES ARE THE SAFETY CIRCUITS TEST, THE CAR STATUS TEST, THE WRITE DATA TEST, AND THE RANDOM SEEK TEST. THE FIRST THREE TESTS ARE PERFORMED ONLY ONCE. THE SEQUENCE TERMINATES IN THE RANDOM SEEK ROUTINE AND WILL CONTINUE THERE UNTIL THE CE INTERVENES.

- SUMMARY OF ROUTINE SEQUENCE:
- EXECUTE ROUTINE 20 (ALL TESTS) ONCE
  - EXECUTE ROUTINE 30 ONCE
  - EXECUTE ROUTINE 40 (FULL CYLINDER MODE)
  - EXECUTE AND LOOP IN ROUTINE 90

ROUTINE 20 SAFETY CIRCUITS TEST

- SET UP: 1. LOAD CODE 2X (X CAN BE ANY SETTING)
2. ENTER MODE OF OPERATION (SEQUENTIAL OR SINGLE TEST) AND DESIRED TEST FOR SINGLE TEST OPERATION IN LOW ORDER DATA SWITCH.

(REFER TO "SUMMARY OF ROUTINE SEQUENCE" FOR DEFINITION OF TESTS AND ORDER OF TESTS IN SEQUENTIAL MODE)

HEX	TEST
0	SEQUENTIAL MODE (ALL TESTS)
1	TEST 1
2	TEST 2
3	TEST 3
4	TEST 4
5	TEST 5
6	TEST 6
7	TEST 7
8	TEST 8

3. EXECUTE IN ERROR MODE.
4. RESULT MODE CAN BE USED IF ERRORS ARE OCCURING AND CONTINUOUS OPERATION IS DESIRED.

PURPOSE: THE TEST CREATES AN UNSAFE CONDITION IN THE DRIVE AND THEN CHECKS THAT THE SAFETY CIRCUITS DETECT THE UNSAFE CONDITION. THE RESULTING SELECT LOCK IS THEN RESET AND THE TEST CONTINUES. IF THE LOW ORDER DATA SWITCH IS NOT SET TO 0, ONLY ONE TEST WILL BE EXECUTED. IF THE LOW ORDER DATA SWITCH IS SET TO 0, ALL THE TESTS WILL BE EXECUTED IN THE ORDER LISTED BELOW.

- SUMMARY OF ROUTINE SEQUENCE:
- |   | 345 CODE |
|---|----------|
| 1. TEST 4: RESET SELECT LOCK            | 100      |
| 2. TEST 5: NO AC TRANSITIONS            | 101      |
| 3. TEST 6: SHORT DURATION ERASE GT.     | 110      |
| 4. TEST 7: ERASE GT. AND NOT SEEK READY | 111      |
| 5. TEST 8: WRITE GT. AND NO ERASE GT.   | 000      |
| 6. TEST 1: 2 WRITE AND 2 ERASE CURRENTS | 001      |
| 7. TEST 2: SHORT DURATION WRITE GATE    | 010      |
| 8. TEST 3: MULTIPLE Y SELECT            | 011      |

ROUTINE 30 CAR, STATUS TEST

- SET UP: 1. LOAD CODE 3X (X CAN BE ANY SETTING)
2. DATA SWITCHES ARE INOPERABLE
3. EXECUTE IN ERROR MODE.
4. RESULT MODE CAN BE USED IF ERRORS ARE OCCURING AND A CONTINUOUS OPERATION IS DESIRED.

PURPOSE: THIS ROUTINE TESTS THE ABILITY OF THE CONTROL UNIT TO SELECT THE SPARE DRIVE, SET AND RESET CAR, AND DETECT END OF CYLINDER. THE LINE DRIVERS AND RECEIVERS ARE EXERCISED AND THE FILE STATUS LINES ARE CHECKED.

- SUMMARY OF ROUTINE SEQUENCE:
- |  | 345 CODE |
|--|----------|
| 1. SAVE PRESENT CYL. ADDRESS IN GL     | 100      |
| 2. RESET CAR                           | 100      |
| 3. CHECK IF CAR IS RESET               | 101      |
| 4. SET CAR TO 255                      | 101      |
| 5. CHECK IF CAR SET PROPERLY           | 110      |
| 6. SET HEAD 20                         | 110      |
| 7. CHECK FOR END OF CYLINDER           | 111      |
| 8. CHECK FILE OPERABLE                 | 000      |
| 9. RESTORE PRESENT CYL. ADDRESS TO CAR | 000      |
| 10. EXIT-INITIALIZE 345 CODE TO 100    | 001      |

DATE	EC NUMBER	DATE	EC NUMBER	ROUTINE DESCRIPTIONS			
NOV 66	420613						
JAN 67	420652			DATE	NOV 66	P/N	2244562
MAR 67	420655					TYPE	2314/2844
12NOV68	420664			IBM		QY040	

## ROUTINE DESCRIPTIONS

## ROUTINE 40 \_\_\_\_\_ RESTORE-SEEK TEST

- SET UP: 1. LOAD CODE 4X (X CAN BE ANY SETTING)
2. ENTER CYLINDER ADDRESS FOR SEEK IN DATA SWITCHES. EXAMPLE: HEX 00 THRU C7 (EXCEPT CE CYLINDERS)
3. EXECUTE ROUTINE IN ERROR MODE.
4. RESULT MODE CAN BE USED IF ERRORS ARE OCCURRING AND CONTINUOUS OPERATION IS DESIRED.

PURPOSE: RETURNS THE ACCESS TO 000, THEN SEEKS TO THE ADDRESS SPECIFIED BY THE DATA SWITCHES. BOTH THE RESTORE AND THE SEEK ARE VERIFIED BY READING AND COMPARING HA ON HEAD 0. A SEEK TO A CE ALIGNMENT CYLINDER WILL RESULT IN ERROR CODE 61 (NO RECORD FOUND) BEING DISPLAYED.

SUMMARY OF ROUTINE SEQUENCE:	345 CODE
1. TEST FOR DRIVE UNSAFE, OFF-LINE OR BUSY, RESTORE	100
2. READ HA-COMPARE CYL. BYTE WITH 0A	101
3. SEEK TO CYL. SPECIFIED BY DATA SWITCHES	110
4. READ HA-COMPARE CYL. BYTE WITH 0A	111
5. EXIT-SET 345 CODE TO 100	000

NOTE: AFTER THE MODE SELECT SWITCH IS RETURNED TO RTN MODE, THE ROUTINE WILL CONTINUE TO EXECUTE UNTIL STEPS 3 AND 4 HAVE BEEN COMPLETED.

## ROUTINE 50 \_\_\_\_\_ HEAD ALIGNMENT (SCOPE LOOP)

- SET UP: 1. SEEK TO CYLINDER 73 (HEX 49) USING ROUTINE 40. (SEEK TO CYLINDER 118 IF CIRCUMFERENTIAL ADJUSTMENT IS DESIRED).
2. LOAD CODE 5X (X CAN BE ANY SETTING).
3. SET DATA SWITCHES TO HEAD ADDRESS THAT IS TO BE CHECKED. (HEX 00 THRU 13). SELECT HEAD 09 OR 10 (HEX 09 OR 0A) FOR CIRCUMFERENTIAL ADJUSTMENT.
4. EXECUTE IN RESULT MODE.
5. SCOPE READ SIGNAL AT A2-B2D07 AND/OR A2-B2B07 USING INDEX AS A SYNC.

PURPOSE: THIS ROUTINE ALLOWS VERIFICATION OF HEAD ALIGNMENT BY EXAMINING THE DIFFERENTIAL READ SIGNAL AT CYLINDER 73 OF A CE DISK PACK.

THE ACCESS MUST FIRST BE POSITIONED AT CYLINDER 73 USING ROUTINE 40. ON THE FIRST PASS THRU ROUTINE 50, THE PROGRAM SEEKS TO THE HEAD SELECTED BY THE DATA SWITCHES. ON EVERY IN-LINE PASS THEREAFTER, THE ROUTINE RAISES READ GATE FOR 3 TO 4 REVOLUTIONS. (READ GATE IS RAISED UPON ENTRY AND IS NOT RESET UNTIL FOUR INDEX SIGNALS HAVE BEEN DETECTED).

IN ORDER TO SWITCH HEADS, IT IS NECESSARY TO RETURN THE MODE SELECT SWITCH TO RTN MODE BEFORE ALTERING THE DATA SWITCHES. OTHERWISE, A HEAD SEEK TO THE NEW SETTING OF THE DATA SWITCHES WILL NOT RESULT.

IT SHOULD BE NOTED THAT THIS ROUTINE IS PROVIDED FOR THE EXPRESS PURPOSE OF CHECKING HEAD ALIGNMENT. IN-LINES SHOULD NOT BE USED FOR THE ACTUAL ADJUSTMENT OF A LARGE NUMBER OF HEADS. SUCH ACTION WOULD REQUIRE FREQUENT TRIPS BETWEEN THE CE PANEL AND THE PHYSICAL DRIVE AND WOULD ALSO SEVERELY DEGRADATE CUSTOMER THROUGHPUT. IF STANDARD ALIGNMENT PROCEDURE OF MANY HEADS IS REQUIRED, THEN THE CE FILE TEST BOX SHOULD BE USED.

SUMMARY OF ROUTINE SEQUENCE:	345 CODE
1. SEEK TO HEAD SPECIFIED BY DATA SWITCHES. SET CONTROL CODE = 000.	100
2. RAISE READ GATE AND SEARCH FOR INDEX. UPDATE CODE TO 001 AFTER DETECTING INDEX.	000
3. SEARCH FOR NEXT INDEX. UPDATE CODE TO 010 AFTER DETECTING INDEX.	001
4. SEARCH FOR NEXT INDEX. UPDATE CODE TO 011 AFTER DETECTING NEXT INDEX.	010
5. SEARCH FOR NEXT INDEX. UPDATE CODE TO 100 AFTER DETECTING INDEX.	011
6. RESET READ GATE AND EXIT. INITIALIZE CODE TO 000 SO THAT NEXT PASS THRU IN-LINES WILL BEGIN AT STEP 2 ABOVE.	100

## ROUTINE 60 \_\_\_\_\_ SEEK-SEEK TEST

- SET UP: 1. POSITION THE ACCESS TO THE LOWER OF THE TWO DESIRED CYLINDERS USING ROUTINE 40.
2. LOAD CODE 6X (X CAN BE ANY SETTING)
3. SET DATA SWITCHES TO THE DIFFERENCE BETWEEN THE TWO CYLINDERS.
4. EXECUTE ROUTINE IN ERROR MODE ONLY. DO NOT USE CHECK RESET.

NOTE: USE OF CHECK RESET TO RESET AN ERROR CAN CAUSE ERRATIC EXECUTION. ON ANY DETECTED ERROR THE 345 CODE IS RE-INITIALIZED TO 100, THE STARTING CONFIGURATION. IF THE ERROR OCCURED ON THE GREATER OF THE TWO CYLINDERS, THE NEXT ACCESS WILL START FROM THAT CYLINDER AND SEEK AN ADDITIONAL NUMBER OF CYLINDERS SPECIFIED BY THE DATA SWITCHES. A SEEK TO CRASH STOP COULD POSSIBLY RESULT.

5. DO NOT EXECUTE IN RESULT MODE.

PURPOSE: PERMITS SEEKING BETWEEN ANY TWO CYLINDERS (EXCEPT CE CYLINDERS). EACH SEEK IS VERIFIED BY READING AND COMPARING HA ON HEAD 0.

SUMMARY OF ROUTINE SEQUENCE:	345 CODE
1. TEST FOR DRIVE OFF LINE, UNSAFE OR BUSY	100
2. SEEK TO 0A PLUS CONTENTS OF DATA SWITCHES	100
3. READ HA-COMPARE CYL. BYTE WITH 0A	101
4. SEEK TO 0A MINUS CONTENTS OF DATA SWITCHES	110
5. READ HA-COMPARE CYL. BYTE WITH 0A	111
6. EXIT-SET 345 CODE TO 100	000

DATE	EC NUMBER	DATE	EC NUMBER	ROUTINE DESCRIPTIONS		
NOV 66	420613					
JAN 67	420652			DATE	NOV 66	P/N 2244563
JAN 68	420662					TYPE 2314/2844
				<b>IBM</b>		QY050

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ROUTINE DESCRIPTION

ROUTINE 70 SEQUENTIAL SEEK-NO HA COMPARE

- SET UP: 1. LOAD CODE 7X (X CAN BE ANY SETTING)  
 2. SET DATA SWITCHES TO A VALID HEAD ADDRESS: (HEX 00 THRU 13)  
 3. EXECUTE IN ERROR MODE ONLY

PURPOSE: SEEK EACH CYLINDER OF A CE DISK PACK. THE SEEK STARTS WITH THE ADDRESS IN CAR AND THE ADDRESS IS INCREMENTED BY ONE ON EACH SUCCESSIVE SEEK UNTIL CYLINDER 199 IS REACHED. THE ROUTINE THEN BEGINS DECREMENTING CYLINDERS UNTIL CYL. 000 IS REACHED. THE ROUTINE STARTS SEEKING FORWARD AGAIN. THERE IS NO COMPARE ON HOME ADDRESS.

SUMMARY OF ROUTINE SEQUENCE: 345 CODE

- 1. CYLINDER LIMIT TEST X00
- 2. SEEK TO OA ± 1 CYL. X00
- 3. DO NOT READ HA-TURN OF BIT 5 OF 345 CODE X01

NOTE: BIT 3 OF THE 345 CODE INDICATES THE DIRECTION OF THE SEEK. BIT 3 = 1 INDICATES FORWARD SEEKING, BIT 3 = 0 INDICATES REVERSE SEEKING. BIT 3 IS COMPLIMENTED EACH TIME CYL. 199 OR CYL. 000 IS REACHED.

ROUTINE 80 SEQUENTIAL SEEK-COMPARE HA

- SET UP: 1. LOAD CODE 8X (X CAN BE ANY SETTING)  
 2. ENTER HEAD ADDRESS TO BE USED FOR COMPARING HA IN DATA SWITCHES. (HEX 00 THRU 13)  
 3. EXECUTE IN ERROR MODE ONLY.

PURPOSE: THIS ROUTINE IS THE SAME AS ROUTINE 70, EXCEPT THAT EACH SEEK IS VERIFIED BY COMPARING HA ON THE HEAD SELECTED BY THE DATA SWITCHES. (READ HA IS BYPASSED ON CE CYLINDERS)

SUMMARY OF ROUTINE SEQUENCE: 345 CODE

- 1. CYLINDER LIMIT TEST X00
- 2. SEEK TO OA ± 1 CYL. X00
- 3. READ HA-COMPARE CYL. BYTE TO OA X01
- 4. SET 345 CODE TO X00

NOTE: REFER TO NOTE PERTAINING TO ROUTINE 70.

ROUTINE 90 SEMI-RANDOM SEEK

- SET UP: 1. LOAD CODE 9X (X CAN BE ANY SETTING)  
 2. ENTER HEAD ADDRESS TO BE USED FOR READING HA IN DATA SWITCHES. (HEX 00 THRU 13)  
 3. EXECUTE IN ERROR MODE ONLY.

PURPOSE: TESTS THE ABILITY OF THE DRIVE TO SEEK VARIOUS STROKE LENGTHS AND TO READ HOME ADDRESS FOLLOWING EACH SEEK.

SUMMARY OF ROUTINE SEQUENCE: 345 CODE

- 1. SEEK TO CYLINDER 064 100
- 2. READ HA 101
- 3. EXIT-RETURN TO CHANNEL 110
- 4. SEARCH FOR INDEX-GENERATE RANDOM NUMBER 111
- 5. SEEK TO RANDOM CYLINDER 010
- 6. READ HA (BYPASSED ON CE CYLS.) 011
- 7. SEEK TO CYL. 64 100

A

B

C

D

E

DATE	EC NUMBER	DATE	EC NUMBER	ROUTINE DESCRIPTIONS	
NOV 66	420613			DATE	NOV 66
				P/N	2244564
				TYPE	2314/2844
				IBM QY060	

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## ROUTINE DESCRIPTIONS

ROUTINE A0 \_\_\_\_\_ READ R0, CYLINDER 001

- SET UP: 1. LOAD CODE AX (X CAN BE ANY SETTING)  
 2. ENTER MODE OF OPERATION (FULL CYLINDER OR SINGLE HEAD) AND HEAD ADDRESS FOR SINGLE HEAD OPERATION IN DATA SWITCHES.  
 A. FULL CYLINDER MODE-ENTER HEX 80  
 B. SINGLE HEAD-ENTER HEAD ADDRESS (HEX 00 THRU 13)  
 3. EXECUTE IN ERROR MODE.

PURPOSE: TESTS THE ABILITY OF THE DRIVE TO READ A 7000 BYTE PRE-RECORDED TEST RECORD. THE DRIVE SEEKS TO CYLINDER 001, COMPARES HA, AND READS R0.

IN FULL CYLINDER MODE, THE READING IS ACCOMPLISHED ON ALL HEADS. READING STARTS WITH HEAD 0 AND ADVANCES THRU HEAD 19. HEAD CHECK IS BYPASSED IN FULL CYLINDER MODE.

SINGLE HEAD MODE ALLOWS CONTINUOUS READING ON ONE HEAD. THIS IS USEFUL WHEN A SINGLE HEAD IS SUSPECTED.

SUMMARY OF ROUTINE SEQUENCE: 345 CODE

- |  |     |
|--|-----|
| 1. SEEK TO CYL. 001 (HEAD ADVANCE IF M/H MODE) | 100 |
| 2. READ HOME ADDRESS                           | 101 |
| 3. READ R0                                     | 110 |
| 4. EXIT-INITIALIZE 345 CODE TO 100             | 111 |

ROUTINE B0 \_\_\_\_\_ READ R0, CYLINDER 199

THIS ROUTINE IS THE SAME AS ROUTINE A0, EXCEPT CYLINDER 199 IS USED.

ROUTINE C0 \_\_\_\_\_ READ TEST RECORD-CYLS 005, 195

- SET UP: 1. LOAD CODE CX (X CAN BE ANY SETTING)  
 2. ENTER MODE OF OPERATION (FULL CYLINDER OR SINGLE HEAD) AND HEAD ADDRESS FOR SINGLE HEAD OPERATION IN DATA SWITCHES.  
 A. FULL CYLINDER MODE - ENTER HEX 80  
 B. SINGLE HEAD - ENTER HEAD ADDRESS (HEX 00 THRU 13)  
 3. EXECUTE IN ERROR MODE.

PURPOSE: THIS ROUTINE IS PROVIDED TO TEST THE ABILITY OF THE DRIVE TO READ THE TEST RECORD PRE-RECORDED BY ROUTINE D0. THIS IS VERY USEFUL TO CHECK THE ABILITY OF A DRIVE TO READ A RECORD THAT WAS WRITTEN BY ANOTHER DRIVE.

THE ACCESS SEEKS BETWEEN CYLINDERS 005 AND 195. HOME ADDRESS IS VERIFIED AND A 7000 BYTE TEST RECORD IS READ AFTER EACH SEEK.

CORRECT OPERATION OF THE BIT COUNT HARDWARE WITHIN THE CONTROL UNIT (BC REG AND CONTROLS) DURING READ MODE IS ALSO INCLUDED IN THE TEST.

ROUTINE D0 MUST BE EXECUTED BEFORE THIS TEST.

SUMMARY OF ROUTINE SEQUENCE:

345 CODE

- |  |     |
|--|-----|
| 1. SEEK TO CYL. 195 (HEAD ADVANCE IF M/H MODE) | 100 |
| 2. READ HOME ADDRESS                           | 101 |
| 3. TURN ON OPS TO PREVENT WRITING              | 110 |
| 4. READ DATA (ORIENT ON INDEX)                 | 111 |
| 5. SEEK TO CYL. 005                            | 000 |
| 6. READ HOME ADDRESS                           | 001 |
| 7. TURN ON OPS TO PREVENT WRITING              | 110 |
| 8. READ DATA (ORIENT ON INDEX)                 | 111 |

DATE	EC NUMBER	DATE	EC NUMBER	ROUTINE DESCRIPTIONS			
NOV 66	420613						
JAN 68	420662			DATE	NOV 66	P/N	2244565
12NOV68	420664					TYPE	2314/2844
				<b>IBM</b>		QY070	

ROUTINE DESCRIPTIONS

ROUTINE DO \_\_\_\_\_ WRITE TEST RECORD-CYLS. 005, 195

- SET UP: 1. LOAD CODE DX (X CAN BE ANY SETTING)  
 2. ENTER MODE OF OPERATION (FULL CYLINDER OR SINGLE HEAD) AND HEAD ADDRESS FOR SINGLE HEAD OPERATION IN DATA SWITCHES.  
     A. FULL CYLINDER MODE-ENTER HEX 80  
     B. SINGLE HEAD MODE-ENTER HEAD ADDRESS (HEX 00 THRU 13)  
 3. EXECUTE IN ERROR MODE.

PURPOSE: TESTS ABILITY OF THE DRIVE TO SEEK BETWEEN CYLINDERS 005 AND 195, READ AND COMPARE HOME ADDRESS, WRITE A 7000 BYTE DATA FIELD OF RO AND READ THE DATA FIELD JUST WRITTEN.

CORRECT OPERATION OF THE BIT COUNT HARWARE IN THE CONTROL UNIT (BC REG AND CONTROLS) DURING BOTH READ AND WRITE OPERATIONS IS ALSO INCLUDED IN THE TEST.

SUMMARY OF ROUTINE SEQUENCE:                      345 CODE

- |  |     |
|--|-----|
| 1. SEEK TO CYL. 195 (HEAD ADVANCE IF M/H MODE) | 100 |
| 2. READ HOME ADDRESS                           | 101 |
| 3. WRITE DATA                                  | 110 |
| 4. READ DATA (ORIENT ON INDEX)                 | 111 |
| 5. SEEK TO CYL. 005                            | 000 |
| 6. READ HOME ADDRESS                           | 001 |
| 7. WRITE DATA                                  | 010 |
| 8. READ DATA (ORIENT ON INDEX)                 | 011 |

ROUTINE EO \_\_\_\_\_ HEAD ALIGNMENT WRITE TEST, CYL. 005

- SET UP: 1. LOAD CODE EX (X CAN BE ANY SETTING)  
 2. ENTER HEAD TO BE SELECTED INTO DATA SWITCHES (HEX 00 THRU 13) THERE IS NO MULTI HEAD OPTION.  
 3. EXECUTE IN ERROR MODE

PURPOSE: TEST EO OR FO SHOULD BE USED WHENEVER HEAD MISALIGNMENT IS SUSPECTED. IF A HEAD IS OUT OF ALIGNMENT, IT WILL NOT BE ABLE TO READ. (ROUTINES A,B,C, AND D WILL POST ERROR CODE 61-NO RECORD FOUND, SINCE H.A. CAN NOT BE READ) ROUTINES EO AND FO READ H.A. ON A GOOD HEAD, SWITCH TO THE SUSPECTED HEAD (SELECTED BY DATA SWITCHES), WRITE A 7000 BYTE DATA RECORD, THEN READ BACK THE RECORD. IF THE HEAD CAN READ WHAT IT HAS JUST WRITTEN BUT IS OTHERWISE INCAPABLE OF READING, THEN THE HEAD IS PROBABLY OUT OF ALIGNMENT.

NOTE: THE TEST ASSUMES THAT THE HEAD THAT IS ONE LESS THAN THE HEAD SELECTED BY THE DATA SWITCHES IS NOT OUT OF ALIGNMENT.

SUMMARY OF ROUTINE SEQUENCE:                      345 CODE

- |  |     |
|--|-----|
| 1. SEEK TO CYL. 005, HEAD SEEK IS TO ONE LESS THAN DATA SWITCHES.          | 100 |
| 2. READ HOME ADDRESS (NO HEAD CHECK)                                       | 101 |
| 3. IF NOT HEAD 0, ADVANCE HEAD. IF HEAD 0, RESET THE HEAD ADDRESS REGISTER | 110 |
| 4. WRITE A 7000 BYTE DATA FIELD  | 110 |
| 5. READ DATA (ORIENT ON INDEX)   | 111 |

NOTE: SEE NOTE UNDER ROUTINE FO.

ROUTINE FO \_\_\_\_\_ HEAD ALIGNMENT WRITE TEST, CYL. 195

THIS ROUTINE IS THE SAME AS ROUTINE EO. EXCEPT THE SEEK IS TO CYLINDER 195.

NOTE: WHEN AN ERROR STOP HAS OCCURED WHEN EXECUTING ROUTINE EO OR ROUTINE FO, THE INDICATOR SECTION OF THE CE FILE TEST BOX WILL DISPLAY THE HEAD SELECTED BY THE DATA SWITCHES, IF THE ERROR OCCURED IN STEPS 3,4 OR 5 OF THE ROUTINE. IF THE ERROR OCCURED IN STEPS 1 OR 2 OF THE ROUTINE, THE HEAD DISPLAYED BY THE INDICATOR WILL BE ONE LESS THAN THE HEAD SELECTED BY THE DATA SWITCHES.

DATE	EC NUMBER	DATE	EC NUMBER	ROUTINE DESCRIPTIONS		
NOV 66	420613					
JAN 67	420652			DATE	NOV 66	P/N 2244566
MAR 67	420655					TYPE 2314/2844
JAN 68	420662			<b>IBM</b>		QY080
12NOV68	420664					

A  
B  
C  
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E

2			3			4			5			6			7		
ERROR CODE	CONDITION	PAGE	ERROR CODE	CONDITION	PAGE	ERROR CODE	CONDITION	PAGE	ERROR CODE	CONDITION	PAGE	GENERAL NOTES APPLYING TO SELECT LOCK ERROR CODES.					
11	TEST 8 RAISES WRITE GATE WITHOUT ERASE GATE WHICH SHOULD CAUSE A WRITE UNSAFE. SELECT LOCK FAILED TO SET FOR TEST 8, RTN 20. (SEE NOTE 1).	QY110	1D	TEST 3 FORCES A MULTIPLE Y SELECTION BY SELECTING HEAD 30. THIS SHOULD CAUSE A HEAD UNSAFE. SELECT LOCK FAILED TO SET FOR TEST 3, RTN 20. (SEE NOTE 1).	QY110	25	TEST 5 RAISES ADDRESS MARK WHILE WRITING BYTES OF HEX 9F. THE ABSENCE OF CLOCK AND DATA BITS SHOULD CAUSE A WRITE UNSAFE. SELECT LOCK FAILED TO SET FOR TEST 5, RTN 20. (SEE NOTE 1).	QY110				<p>NOTE 1: THE FILE STATUS WAS EXAMINED .5 USEC AFTER THE FALL OF THE FILE BUS LINES AND NO UNSAFE CONDITION WAS DETECTED. EXAMINE THE SELECT LOCK LIGHT. IF THE LIGHT IS ON, THE UNSAFE IS BEING DETECTED BY THE FILE LOGIC BUT RESPONSE IS NOT OCCURRING WITHIN THE SPECIFIED TIME LIMIT. PROBABLE FAILURE IS WITH THE SAFETY CIRCUIT CARDS. IF THE LIGHT IS OFF, THE UNSAFE IS NOT OCCURRING OR THE FILE LOGIC IS NOT DETECTING THE CONDITION. IF THE FILE IS ABLE TO READ AND WRITE (ROUTINE 20 CAN BE EXECUTED ERROR FREE), THEN THE FAILURE IS MOST LIKELY WITH THE SAFETY CIRCUIT CARDS. OTHERWISE, THE LINE RECEIVERS, DRIVERS, CABLES, AND CONNECTORS WOULD ALSO BE SUSPECTED. SAFETY CIRCUIT CARDS ARE LOCATED AT A1D2, A2C1 AND A2E1 FOR THE UPPER DRIVE AND A1D6, A2C1 AND A2E1 FOR THE LOWER DRIVE.</p> <p>NOTE 2: AFTER GENERATING AND DETECTING AN UNSAFE CONDITION, THE CONTROL UNIT ATTEMPTED TO RESET THE SELECT LOCK. HOWEVER, FILE STATUS STILL INDICATED AN UNSAFE CONDITION. INDEX IS ONE OF THE CONDITIONS THAT RESETS A SELECT LOCK. INSURE THAT INDEX IS STAYING UP FOR A MINIMUM OF 20 USEC. IT IS ALSO POSSIBLE THAT THE UNSAFE CONDITION IS PREVAILING OR THAT ANOTHER TYPE OF SELECT LOCK OCCURED AND IS PREVAILING. OTHERWISE, THE FAILURE IS PROBABLY WITH THE SAFETY CIRCUIT CARDS ON THE A2 BOARD (C1, E1).</p> <p>NOTE 3: BEFORE EXECUTING THE TEST, AN UNSAFE WAS DETECTED AND RESET SUCCESSFULLY. THIS IS NOT AN ERROR CONDITION IF A SELECT LOCK EXISTED AT THE SPARE DRIVE PRIOR TO EXECUTING ROUTINE 20 AND THE PROGRAM WAS EXECUTED IN SINGLE TEST MODE. OTHERWISE THE SELECT LOCK OCCURED BETWEEN TESTS. THE LATTER CASE WILL NOW BE CONSIDERED. THE ROUTINE WAITS FOR THE RISE OF INDEX, GENERATES THE UNSAFE CONDITION, DETECTS AND RESETS THE SELECT LOCK, AND THEN RETURNS CONTROL TO THE CHANNEL. AFTER CONTROL IS RETURNED TO IN-LINES, THE ROUTINE REPEATS THE ABOVE SEQUENCE WITH THE NEXT SEQUENTIAL TEST OR REPEATS THE SAME TEST IF NOT IN SEQUENTIAL MODE. IT IS POSSIBLE THAT THE UNSAFE WAS RESET SUCCESSFULLY, BUT CAME BACK ON BETWEEN THE RETURN TO CHANNEL AND ENTRY TO THE NEXT TEST. IF SUCH IS THE CASE, THE SELECT LOCK LIGHT SHOULD NOW BE ON. (ASSUMING THE CONDITION IS NOT INTERMITTENT.)</p>	A				
12	SELECT LOCK FAILED TO RESET FOR TEST 8, RTN 20. (SEE NOTE 2).	QY110	1E	SELECT LOCK FAILED TO RESET FOR TEST 3, RTN 20. (SEE NOTE 2).	QY110	26	SELECT LOCK FAILED TO RESET FOR TEST 5, RTN 20. (SEE NOTE 2).	QY110									
13	SELECT LOCK ON AT ENTRY TO TEST 8, RTN 20. (SEE NOTE 3).	QY110	1F	SELECT LOCK ON AT ENTRY TO TEST 3, RTN 20. (SEE NOTE 3).	QY110	27	SELECT LOCK ON AT ENTRY TO TEST 5, RTN 20. (SEE NOTE 3).	QY110									
15	TEST 1 FORCES 2 WRITE AND 2 ERASE CURRENTS BY RAISING HEAD ADVANCE WHILE WRITING ON HEAD 0. HEAD 1 BECOMES SELECTED BEFORE HEAD 0 HAS A CHANCE TO DESELECT. THIS SHOULD CAUSE A HEAD UNSAFE. SELECT LOCK FAILED TO SET FOR TEST 1, RTN 20. (SEE NOTE 1)	QY110	21	TEST 4 IS A SUBROUTINE OF ROUTINE 20 THAT RESETS AN UNSAFE. THE TEST IS EXECUTED IF AN UNSAFE IS DETECTED UPON ENTRY TO ANOTHER TEST, IF IT IS SELECTED BY SINGLE MODE TO RESET ANY EXISTING SELECT LOCK AT THE SPARE DRIVE, OR IT IS THE FIRST TEST EXECUTED IN SEQUENTIAL MODE. SELECT LOCK ON AT ENTRY TO TEST BUT WILL NOT RESET. UPON ENTRY TO ONE OF THE TESTS, AN UNSAFE WAS DETECTED BY THE PROGRAM. TEST 4 WAS EXECUTED TO RESET THE UNSAFE, BUT WAS UNSUCCESSFUL. A HARD UNSAFE CONDITION PROBABLY PREVAILS.	QY110	29	TEST 6 RAISES ERASE GATE FOR 1.5 USEC AND THEN DROPS ERASE GATE. THE DETECTION OF ERASE CURRENT AND NO ERASE GATE SHOULD CAUSE A WRITE UNSAFE. SELECT LOCK FAILED TO SET FOR TEST 6, RTN 20. (SEE NOTE 1).	QY110	2A	SELECT LOCK FAILED TO RESET FOR TEST 6, RTN 20. (SEE NOTE 2).	QY110						
16	SELECT LOCK FAILED TO RESET FOR TEST 1, RTN 20. (SEE NOTE 2)	QY110	22	SELECT LOCK CAME ON AFTER ENTRY TO TEST 4 AND WILL NOT RESET. NO UNSAFE CONDITION WAS PRESENT UPON ENTRY TO TEST 4, BUT AN UNSAFE WAS DETECTED AFTER EXECUTING THE SELECT LOCK RESET SUBROUTINE. APPARENTLY, THE SELECT LOCK RESET LOGIC IS SOMEHOW CREATING A SELECT LOCK.	QY110	2A	SELECT LOCK FAILED TO RESET FOR TEST 6, RTN 20. (SEE NOTE 2).	QY110	2B	SELECT LOCK ON AT ENTRY TO TEST 6, RTN 20. (SEE NOTE 3).	QY110						
17	SELECT LOCK ON AT ENTRY TO TEST 1, RTN 20. (SEE NOTE 3)	QY110	23	SELECT LOCK ON AT ENTRY TO TEST 4 BUT RESET. THIS IS NOT AN ERROR CONDITION IF A SELECT LOCK EXISTED AT THE SPARE DRIVE PRIOR TO EXECUTING ROUTINE 20. THE PROGRAM WAS STOPPED WITH A DISPLAY CODE MERELY TO DRAW ATTENTION TO THE ABOVE FACT. IF A SELECT LOCK INDICATION DID NOT EXIST AT THE SPARE DRIVE PRIOR TO EXECUTING ROUTINE 20, THEN EITHER THE SELECT LOCK LAMP IS BAD OR AN UNSAFE CONDITION WAS OCCURED BETWEEN TEST 8 AND TEST 4 IN SEQUENTIAL MODE. REFER TO NOTE 3 IF SUCH IS THE CASE.	QY110	2B	SELECT LOCK ON AT ENTRY TO TEST 6, RTN 20. (SEE NOTE 3).	QY110	2D	SELECT LOCK FAILED TO SET FOR TEST 7, RTN 20. (SEE NOTE 1).	QY110						
19	TEST 2 RAISES WRITE AND ERASE GATES AND THEN DROPS ERASE GATE 1.5 USEC LATER. ERASE GATE IS HELD UP LONGER TO AVOID AN UNSAFE CAUSED BY DROPPING ERASE GATE TO FAST. THE DETECTION OF WRITE CURRENT WITHOUT WRITE GATE SHOULD CAUSE A WRITE UNSAFE. SELECT LOCK FAILED TO SET FOR TEST 2, RTN 20. (SEE NOTE 1)	QY110				2E	SELECT LOCK FAILED TO RESET FOR TEST 7, RTN 20. (SEE NOTE 2).	QY110	2E	SELECT LOCK FAILED TO RESET FOR TEST 7, RTN 20. (SEE NOTE 2).	QY110						
1A	SELECT LOCK FAILED TO RESET FOR TEST 2, RTN 20. (SEE NOTE 2)	QY110				2F	SELECT LOCK ON AT ENTRY TO TEST 6, RTN 20. (SEE NOTE 3).	QY110									
1B	SELECT LOCK ON AT ENTRY TO TEST 2, RTN 20. (SEE NOTE 3)	QY110															

DATE	REC NUMBER	DATE	REC NUMBER	ERROR CODE DICTIONARY		
NOV 66	420613			PAGE 1		
JAN 67	420652			DATE	MAR 67	P#M 2244567
MAR 67	RED420655					TYPE 2314/2844
JUN 67	420658					
24-JUL-69	424046					QY090

2			3			4			5			6			7																							
ERROR CODE	CONDITION	PAGE	ERROR CODE	CONDITION	PAGE	ERROR CODE	CONDITION	PAGE	ERROR CODE	CONDITION	PAGE	ERROR CODE	CONDITION	PAGE	ERROR CODE	CONDITION	PAGE																					
41	CAR DID NOT SET: ROUTINE 30 TRANSFERRED ALL ONES TO CAR AND THEN EXAMINED OA, BUT OA WAS NOT EQUAL TO 255.  OBSERVE CAR WITH THE CE INDICATOR BOX TO DETERMINE WHICH BITS IF ANY ARE NOT BEING SET. THE PROBABLE FAULT AREAS ARE LISTED FOR THE FOLLOWING CONDITIONS:  A. CAR IS ZERO (1) CAR REGISTER CARD (A1J2,J6) (2) SET CYLINDER LINE RECEIVER CARD (A1L2,L6)  B. SOME OF THE BITS SET (1) CAR REGISTER CARD (A1J2,J6) (2) FAILURE IN BITS 0 THRU 4 LINE RECEIVER CARD (A1J2,K6) (3) FAILURE IN BITS 5 THRU 7 LINE RECEIVER CARD (A1L2,L6) (4) CABLES OR CONNECTORS TO LINE RECEIVERS.  C. CAR IS 255 (1) LINE DRIVER CARD (A1K2,K6) (2) INITIAL SEEK LATCH IS ON. SET CYLINDER SHOULD HAVE RESET THE LATCH. (A1E4,K4) OR INPUTS. (3) GATE CARD (A1C4,H4).	QY111	43 (CONT)	B. HAR NOT 20 (1) HEAD ADDRESS REGISTER CARD (A1M2,E2-A1M6,E6) (2) SET HEAD LINE RECEIVER CARD (A1L2,L6) (3) CABLES OR CONNECTORS TO LINE RECEIVERS		46 (CONT)	POSSIBLE CAUSES: A. ERROR COMMON TO READ ONLY: (1) ALLOW BC ADVANCE; (C2B3) (2) RESET BC REG (C2B3) (3) DISABLE LATCH (C2B3,C2B4)  NOTE: EXECUTE THE ROUTINE IN CE MODE WITH THE CHECK STOP SWITCH ACTIVE. ACTIVATE THE CHECK RESET AND START SWITCHES UNTIL THE ERROR CODE APPEARS IN THE DISPLAY REGISTER. DISPLAY THE DW REGISTER. THE BITS ON IN DW INDICATE THE BIT POSITIONS OF THE TOTAL COUNT WHICH ARE IN ERROR.		49	SEEK INCOMPLETE:  FILE INOPERABLE WAS DETECTED DURING ROUTINE EXECUTION. EXIT WAS MADE TO FILE STATUS CHECK, WHERE SEEK INCOMPLETE WAS DETECTED.  A SEEK TO AN ILLEGAL CYLINDER HAS PROBABLY OCCURED. EXECUTE ROUTINE 40. (TO A LEGAL CYLINDER) AND THEN CHECK THE FOLLOWING IF THE CONDITION PREVAILS.  A. DETENT LATCH CARD (A1F4,L4). B. CYLINDER PULSE TRANSDUCER. C. CYLINDER PULSE DETECTOR CARD (A1A2,A6). D. SEEK INC LATCH ALWAYS ON (A1C4,H4). E. ACCESS TIMING CARD (A1F2,F6). F. LINE DRIVER CARD (A1L2,L6).	QY130	4A	END OF CYLINDER:  FILE INOPERABLE WAS DETECTED DURING ROUTINE EXECUTION. EXIT WAS MADE TO FILE STATUS CHECK, WHERE END OF CYLINDER WAS DETECTED.  THE CONDITON WAS PROBABLY CAUSED BY SELECTING AN ILLEGAL HEAD WITH THE DATA SWITCHES. EXECUTE ROUTINE 20 AND THEN RE-EXECUTE THE DESIRED ROUTINE AND CHECK BELOW FOR THE PROBABLE CAUSES IF THE CONDITION PREVAILS.  A. HEAD ADDRESS REGISTER (A1M2,E2-A1M6,E6) B. LINE DRIVER CARD (A1L2,L6)	QY130	4B	NOT ON LINE:  THE FILE HAS GONE OFF LINE SOMETIME DURING ROUTINE EXECUTION. (THE FILE WAS ON LINE UPON ENTRY TO ERROR OR RESULT MODE)  REFER TO ERROR CODE 48 FOR POSSIBLE CAUSES.	QY130	47	UNSAFE:  FILE INOPERABLE WAS DETECTED DURING ROUTINE EXECUTION. EXIT WAS MADE TO FILE STATUS CHECK, WHERE FILE UNSAFE WAS DETECTED.  THE CONDITION PROBABLY EXISTED UPON ENTRY TO THE ROUTINE. EXECUTE ROUTINE 20, THEN RE-EXECUTE THE DESIRED ROUTINE AND CHECK BELOW IF THE CONDITION PREVAILS.  A. SELECT LOCK LAMP NOT ON (1) CHECK LIGHT BULB. IF BAD AND LAMP LIGHTS AFTER REPLACEMENT. GO TO CONDITION B BELOW. (2) FALSE ERROR INDICATION DUE TO LINE DRIVER CARD (A1L2,L6)  B. SELECT LOCK LAMP ON (1) FALSE DETECTION OF AN UNSAFE AT SAFETY CIRCUIT CARDS. (A2D2,D6-A1C1,E1) (2) WRITE DATE LINE RECEIVER CARD (A1K2,K6) (3) MULTIPLE SELECT CARD (A2C1) (4) WRITE/ERASE CURRENT CARD (A2E1) (5) HEAD ADDRESS REGISTER (A1M2,H6)	QY130	48	NOT ON LINE:  FILE STATUS WAS CHECKED PRIOR TO ENTERING ERROR OR RESULT MODE AND THE FILE WAS FOUND TO BE OFF LINE.  THE PROBABLE CAUSES ARE LISTED FOR THE FOLLOWING CONDITIONS:  A. READY LAMP OFF (1) REMOVE AND RESTORE THE MOD. SELECTOR PLUG, THEN CHECK THE POWER SEQUENCING CIRCUITS IF THE CONDITION PREVAILS. (2) CHECK SPEED RELAY, COVER INTERLOCKS, MOTOR RELAY, PACK ON CONTACT, ETC.  B. READY LAMP ON (1) CE REAR COVER SWITCH OFF (2) LINE DRIVER CARD (A1L2,L6) (3) HEADS EXTENDED SWITCH (4) MOD. SELECT IS NOT REACHING FILE, WHICH WILL BLOCK FILE STATUS FROM REACHING THE CONTROL UNIT.	QY100	42	CAR DID NOT RESET: ROUTINE 30 TRANSFERRED ALL ZEROS TO CAR AND THEN EXAMINED OA, BUT OA WAS NOT ZERO.  OBSERVE CAR WITH THE CE INDICATOR BOX TO DETERMINE WHICH BITS IF ANY ARE NOT BEING RESET. THE PROBABLE FAULT AREAS ARE LISTED FOR THE FOLLOWING CONDITIONS:  A. SOME BITS DID NOT RESET (1) CAR REGISTER CARD (A1J2,J6) (2) FAILURE IN BITS 0 THRU 4 LINE RECEIVER CARD (A1J2,K6) (3) FAILURE IN BITS 5 THRU 7 LINE RECEIVER CARD (A1L2,L6) (4) SET CYLINDER LINE RECEIVER CARD (A1L2,L6) (5) CABLES OR CONNECTORS TO LINE RECEIVER CARDS  B. CAR ZERO (1) LINE DRIVER CARD (A1K2,K6)	QY111	44	NO INDEX FOR 27 MSEC:  27 MSEC ELAPSED WITHOUT DETECTING INDEX, WHILE SEARCHING FOR INDEX IN ORDER TO RESET A SELECT LOCK.	QY107	43	WRITE BIT COUNT ERROR  ROUTINES DO,EO,FO WRITE A 7000 BYTE RECORD OF HEX "E5". THE BIT COUNT REGISTER WAS NOT HEX "C2" AS IT SHOULD HAVE BEEN. THE BIT COUNT HARDWARE IN THE CONTROL UNIT IS, THEREFORE, FAILING. EXECUTE ROUTINE CO, WHICH READS BACK THE 7000 BYTE RECORD. IF ERROR CODE HEX "46" OCCURS, THEN THE BIT COUNT IS FAILING IN READ MODE ALSO AND THE FAILURE IS COMMON TO BOTH READ AND WRITE. IF NO ERROR OCCURS WITH ROUTINE CO, THEN THE FAILURE IS COMMON TO WRITE MODE ONLY.  PROBABLE CAUSES ARE:  A. ERRORS COMMON TO BOTH READ AND WRITE: (1) BC REG (B1H3) (2) ALLOW BC ADVANCE. (C2H7,C2B3) (3) RESET BC REG (C2H7,C2B3) (4) DISABLE LATCH (C2B4,C2B3) (5) "A" REG ASSEMBLY (B1G4)  B. ERRORS COMMON TO WRITE ONLY: (1) ALLOW BC ADVANCE (C2B3) (2) RESET BC REG (C2B3) (3) DISABLE LATCH (C2B3,C2B4)  NOTE: EXECUTE ROUTINE DO IN CE MODE WITH THE CHECK STOP SWITCH ACTIVE. ACTIVATE THE CHECK RESET AND START SWITCHES UNTIL THE ERROR CODE APPEARS IN THE DISPLAY REGISTER. DISPLAY THE DW REGISTER. THE BITS ON IN DW INDICATE THE BIT POSITIONS OF THE TOTAL BIT COUNT WHICH ARE IN ERROR.	QP189	44	READ BIT COUNT ERROR  ROUTINES CO,DO,EO AND FO READ A 7000 BYTE RECORD OF HEX "E5". THE BIT COUNT SHOULD HAVE BEEN HEX "C2", BUT WAS NOT. THE BIT COUNT HARDWARE (BC REG AND CONTROLS) IS FAILING DURING READ MODE. IF THE ERROR OCCURED DURING ROUTINES DO, ED OR FO, THEN THE FAILURE ONLY OCCURS IN READ MODE. AS SUCH REFER TO POSSIBLE CAUSES LISTED BELOW. IF THE ERROR OCCURED DURING ROUTINE CO, THEN EXECUTE ROUTINE DO. IF THE SAME ERROR OCCURS AGAIN THEN ERROR IS COMMON TO READ MODE ONLY. AS SUCH REFER TO POSSIBLE CAUSES BELOW. IF ERROR CODE HEX "45" OCCURS, THEN THE FAILURE IS COMMON TO READ AND WRITE AND THE POSSIBLE CAUSES ARE LISTED UNDER ERROR CODE HEX "45".	QY139	43	NO END OF CYLINDER: ROUTINE 30 ATTEMPTED TO SET HEAD 20 TO FORCE END OF CYLINDER, BUT NO END OF CYLINDER STATUS WAS RECEIVED FROM THE FILE.  OBSERVE HAR WITH THE CE INDICATOR BOX TO DETERMINE IF HEAD 20 IS BEING SET. THE PROBABLE FAULT AREAS ARE LISTED FOR THE FOLLOWING CONDITIONS:  A. HAR IS 20 (1) LINE DRIVER (A1L2,L6) (2) CABLES OR CONNECTORS	QY111

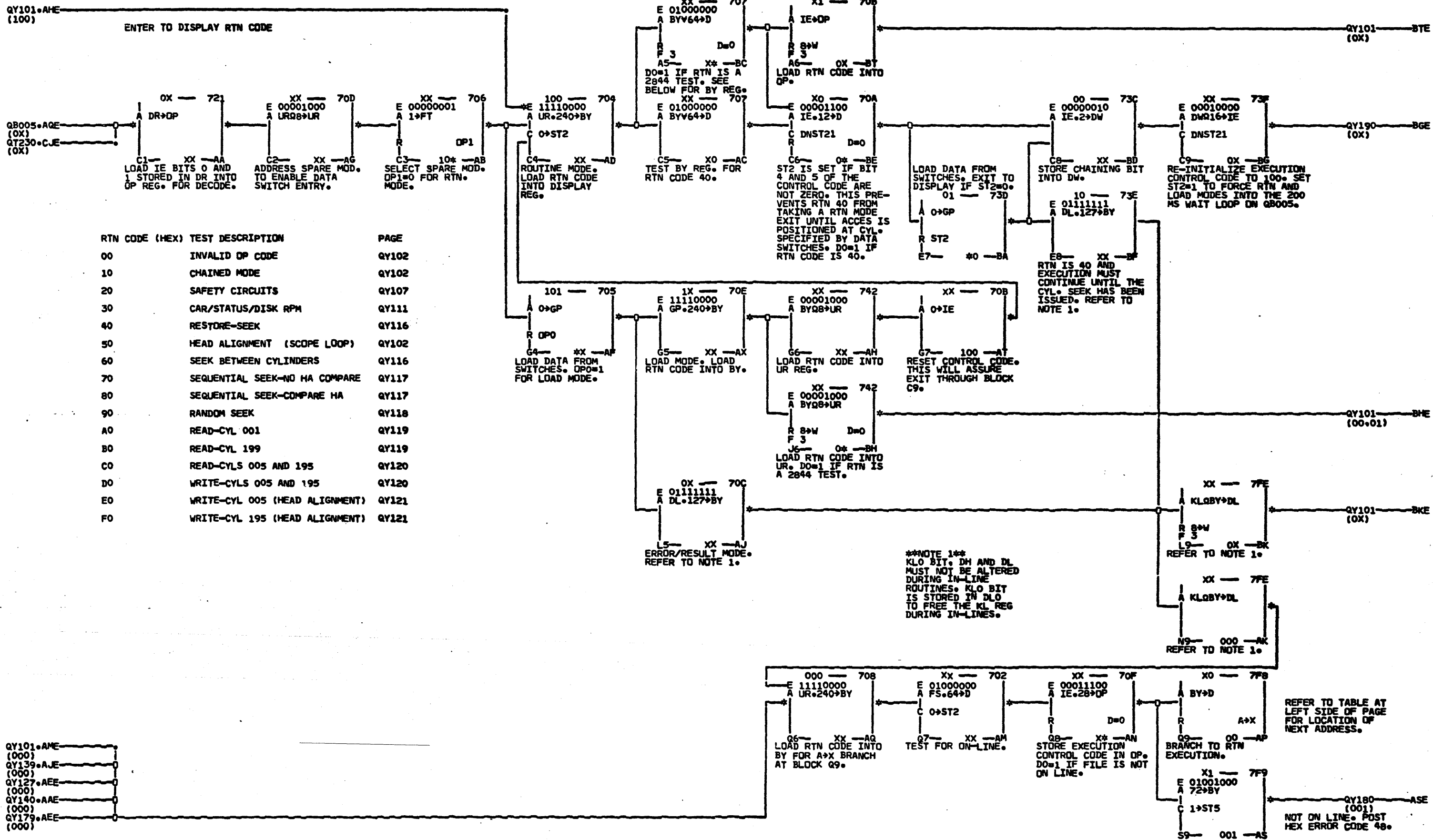
DATE	EC NUMBER	DATE	EC NUMBER	ERROR CODE DICTIONARY			
MAR 67	420655			PAGE 2			
JAN 68	420662			DATE	NOV 68	P/N	2250860
12NOV68	420664					TYPE	2314/2844
24JUL69	424046			IBM		QY092	

RED



2			3			4			5			6			7					
ERROR CODE	CONDITION	PAGE	ERROR CODE	CONDITION	PAGE	ERROR CODE	CONDITION	PAGE	ERROR CODE	CONDITION	PAGE	ERROR CODE	CONDITION	PAGE	ERROR CODE	CONDITION	PAGE			
4C	FILE INOPERABLE: (NO CAUSE DETECTED)  FILE INOPERABLE WAS DETECTED DURING ROUTINE EXECUTION, BUT UNSAFE, ON LINE, SEEK INCOMPLETE, AND END OF CYLINDER WERE INTERROGATED OKAY.  IF THE ERROR INDICATION IS HARD, THEN THE PROBABLE CAUSE IS A MULTIPLE MOD. SELECT. OTHERWISE AN INTERMITTENT CONDITION CAUSED BY LOOSE CONNECTIONS, ERRATIC INTERLOCK SWITCH, ETC. WOULD BE SUSPECTED.	QY130	4F	GATED ATTENTION DID NOT SET:  AFTER A SEEK, THE GATED ATTENTION LATCH DID NOT SET.  OBSERVE THE CE INDICATOR BOX AND CHECK BELOW FOR THE PROBABLE FAILURE AREAS.  A. GATED ATTENTION LIGHT OFF (LATCH DID NOT SET) ATTENTION OR GATED ATTENTION LATCH CARDS (A1C4, J4-A1D4, J4) OR (A1F4, L4)  B. GATED ATTENTION LIGHT ON (LATCH SET-FALSE INDICATION AT FCU) (1) SCOPE TO MAKE SURE BUSY STATUS IS COMING FROM THE FILE DURING ACCESS MOTION. IF BUSY IS NOT BEING GENERATED DURING ACCESS, THE PROGRAM ASSUMES THE SEEK IS COMPLETE, DETECTS NO GATED ATTENTION, AND THEREFORE POSTS ERROR CODE 4F.  (2) LINE DRIVER CARD (A1K2, K6)	QY135	61	INDEX SENSED-NO RECORD FOUND:  IN SEARCHING FOR HA OR THE DATA FIELD, INDEX WAS DETECTED WITHOUT DETECTING A ST4.  THE PROBABLE REASONS FOR THE CONDITION ARE LISTED BELOW.  A. THE DISK PACK IS NOT FORMATTED (PROBABLE CAUSE)  B. INDEX TRANSDUCER BAD  C. HEAD OUT OF ALIGNMENT-REFER TO ROUTINE EO  D. POSSIBLE READ FAILURE	QY138	65	READ ERROR DATA FIELD:  ONE OR BOTH OF THE BURST BYTES AFTER THE DATA FIELD ARE NON-ZERO.  THIS IS AN APPARENT READ FAILURE.	QY139	69	FILE UNSAFE AFTER A WRITE DATA OPERATION:  SELECT LOCK LAMP ON: AN UNSAFE IS CREATED BY WRITING. REFER TO ERROR CODE 47 FOR POSSIBLE CAUSES.  SELECT LOCK LAMP OFF: WRITE CURRENT SENSE WAS NOT DETECTED, BUT AN UNSAFE DID NOT OCCUR. EXECUTE ROUTINE 20. IF OKAY, THEN CHECK THE WRITE CURRENT SENSE LINE FROM THE FILE, AND WRITE GATE AT THE FILE.	QY179	6A	INDEX SENSED DURING A WRITE DATA OPERATION:  THE PROBABLE CAUSE IS AN ERRATIC INDEX TRANSDUCER	QY179	71	CONTROL UNIT ERROR:  THE MICROPROGRAM TOOK AN IMPOSSIBLE BRANCH. GO OFF LINE AND EXECUTE RESIDENT DIAGNOSTICS.	QY127
4D	GATED ATTENTION DID NOT RESET:  A DETECTED GATED ATTENTION GENERATED FROM A SEEK WOULD NOT RESET. OBSERVE THE CE INDICATOR BOX AND CHECK BELOW FOR THE PROBABLE CAUSES.  A. GATED ATTENTION LIGHT ON (LATCH DID NOT RESET) (1) READ GATE AND BLOCK (A1F4, L4) (2) ATTENTION OR GATED ATTENTION LATCH CARDS (A1C4, J4-A1D4, J4) OR (A1F4, L4) (3) AN UNSAFE BLOCKS READ GATE FROM REACHING THE FILE, WHICH WOULD PREVENT GATED ATTENTION FROM RESETTING. INSURE THAT THE FILE DID NOT GO UNSAFE DURING ROUTINE EXECUTION.  B. GATED ATTENTION LIGHT OFF (LATCH RESET--A FALSE INDICATION AT FCU) (1) LINE DRIVER CARD (A1K2, K6) (2) CABLES OR CONNECTORS	QY135	51	WRONG CYLINDER-CAR AND HA DISAGREE:  THE SECOND CYLINDER BYTE READ FROM THE HOME ADDRESS AREA DOES NOT AGREE WITH OA. CHECK THE INDICATOR ON TOP OF THE ACCESS AND REFER BELOW FOR POSSIBLE FAILURES.  A. ACCESS IS AT CORRECT POSITION (1) DISK PACK NOT PROPERLY FORMATTED (2) POSSIBLE READ FAILURE  B. ACCESS IS NOT AT CORRECT POSITION (SEEK ERROR) (1) CYLINDER PULSE TRANSDUCER (2) DIFFERENCE COUNTER (A1H2, H6) CHECK CE INDICATOR TO SEE IF COUNT REMAINS. (3) SOLENOID DRIVER (4) ACCESS TIMING CARD (A1F2, F6) (5) DETENT MECHANISM	QY140	62	INDEX SENSED CONCURRENTLY WITH ST4:  IN SEARCHING FOR HA OR THE DATA FIELD, INDEX AND ST4 WERE SENSED CONCURRENTLY.  THIS IS A HIGHLY IMPROBABLE FAILURE. HOWEVER, THE POSSIBLE CAUSES ARE LISTED BELOW.  A. INDEX TRANSDUCER BAD  B. DISK PACK IS NOT PROPERLY FORMATTED  C. POSSIBLE READ FAILURE	QY138	71	CONTROL UNIT ERROR:  THE MICROPROGRAM TOOK AN IMPOSSIBLE BRANCH. GO OFF LINE AND EXECUTE RESIDENT DIAGNOSTICS.	QY127	63	SYNC BYTE INCORRECT:  THE SYNC BYTE BEFORE HA/DATA FIELD IS INCORRECT.  THE PROBABLE CAUSES ARE LISTED BELOW.  A. POSSIBLE READ FAILURE  B. POSSIBLE WRITE FAILURE WHEN DATE FIELD WAS FORMATTED WITH ROUTINES D, E OR F, (THIS ONLY APPLIES WHEN READING DATE ON CYLINDERS 005 OR 195)	QY138	73	NO INDEX FOR 27 MSEC:  WHILE SEARCHING FOR INDEX IN ORDER TO OPERATE ON HA OR THE DATA FIELD, 27 MSEC ELAPSED WITHOUT DETECTING INDEX.	QY136			
4E	PACK CHANGE LATCH WOULD NOT RESET:  FILE STATUS INDICATED THAT THE PACK CHANGE LATCH WAS ON AND WOULD NOT RESET.  THIS LATCH SHOULDN T HAVE BEEN ON, UNLESS THE FILE WAS JUST POWERED ON, THE DOOR WAS OPENED, THE BACK COVER WAS REMOVED, OR THE MOD. SELECTOR PLUG WAS MOVED.  FAILURE MUST BE ONE OF THE FOLLOWING:  A. PACK CHANGE LATCH CARD (A1E4, K4)  B. LINE DRIVER CARD (A1L2, L6)	QY136	52	WRONG HEAD - GP AND HA DISAGREE:  THE SECOND HEAD BYTE READ FROM THE HOME ADDRESS AREA DOES NOT AGREE WITH THE HEAD SELECTED BY THE DATA SWITCHES (GP).  A. DISK PACK NOT PROPERLY FORMATTED (THIS IS THE PROBABLE CAUSE)  B. POSSIBLE READ ERROR	QY140	64	READ ERROR HA:  ONE OR BOTH OF THE BURST BYTES AFTER HOME ADDRESS ARE NON-ZERO.  THIS IS AN APPARENT READ FAILURE.	QY139	FE	DO IS AN INVALID OP CODE. NOTE THAT A SYSTEM OR SELECTIVE RESET WILL CAUSE THIS CONDITION.	QY102									

DATE	EC NUMBER	DATE	EC NUMBER	ERROR CODE DICTIONARY			
MAR 67	420655			PAGE 3			
APR 67	420656			DATE	MAR 67	P/N	2250861
JAN 68	420662					TYPE	2314/2844
12NOV68	420664			<b>IBM</b>		QY094	



RTN CODE (HEX)	TEST DESCRIPTION	PAGE
00	INVALID OP CODE	QY102
10	CHAINED MODE	QY102
20	SAFETY CIRCUITS	QY107
30	CAR/STATUS/DISK RPM	QY111
40	RESTORE-SEEK	QY116
50	HEAD ALIGNMENT (SCOPE LOOP)	QY102
60	SEEK BETWEEN CYLINDERS	QY116
70	SEQUENTIAL SEEK-NO HA COMPARE	QY117
80	SEQUENTIAL SEEK-COMPARE HA	QY117
90	RANDOM SEEK	QY118
A0	READ-CYL 001	QY119
B0	READ-CYL 199	QY119
C0	READ-CYLS 005 AND 195	QY120
D0	WRITE-CYLS 005 AND 195	QY120
E0	WRITE-CYL 005 (HEAD ALIGNMENT)	QY121
F0	WRITE-CYL 195 (HEAD ALIGNMENT)	QY121

\*\*\*NOTE 1\*\*  
 KLO BIT, DH AND DL  
 MUST NOT BE ALTERED  
 DURING IN-LINE  
 ROUTINES. KLO BIT  
 IS STORED IN DLO  
 TO FREE THE KL REG  
 DURING IN-LINES.

REFER TO TABLE AT  
 LEFT SIDE OF PAGE  
 FOR LOCATION OF  
 NEXT ADDRESS.

NOT ON LINE. POST  
 HEX ERROR CODE 48.

QY101.AME (000)  
 QY139.AJE (000)  
 QY127.AEE (000)  
 QY140.AAE (000)  
 QY179.AEE (000)

00140

00 — 700  
 E 11111110  
 A 254BY  
 C 1ST5  
 C2 — 0X — AA  
 INVALID OP CODE.  
 LOAD HEX ERROR  
 CODE FE.

QY190 — AAE  
 (OX)

ROUTINE 50  
 00 — 750  
 A 0A9GL  
 R — 0P3  
 J2 — XX — AC  
 LOAD CONTENTS OF  
 CAR INTO GL. THIS  
 WILL PREVENT THE  
 ACCESS FROM RE-  
 POSITIONING IN THE  
 SEEK RTN. 0P3=1 ON  
 FIRST PASS ONLY.

X0 — 72E  
 E 11111111  
 A 255DW  
 C 1ST0  
 G4 — X0 — AD  
 INITIALIZE COUNTER FOR BLOCK E2  
 ON QY137. 1ST0 IS USED ON QY137  
 TO INDICATE ROUTINE 50.  
 X1 — 72F  
 E 00011100  
 A 28DP  
 J4 — X0 — AB  
 SET CONTROL CODE  
 SO THAT BIT 3 WILL  
 RESET AFTER THE  
 SEEK OPERATION.

EXIT TO SEARCH FOR INDEX AND RAISE READ GATE.

QY136 — ADE  
 (X0)

SEEK TO HEAD SPECIFIED BY DATA SWITCHES.

QY125 — ABE  
 (X0)

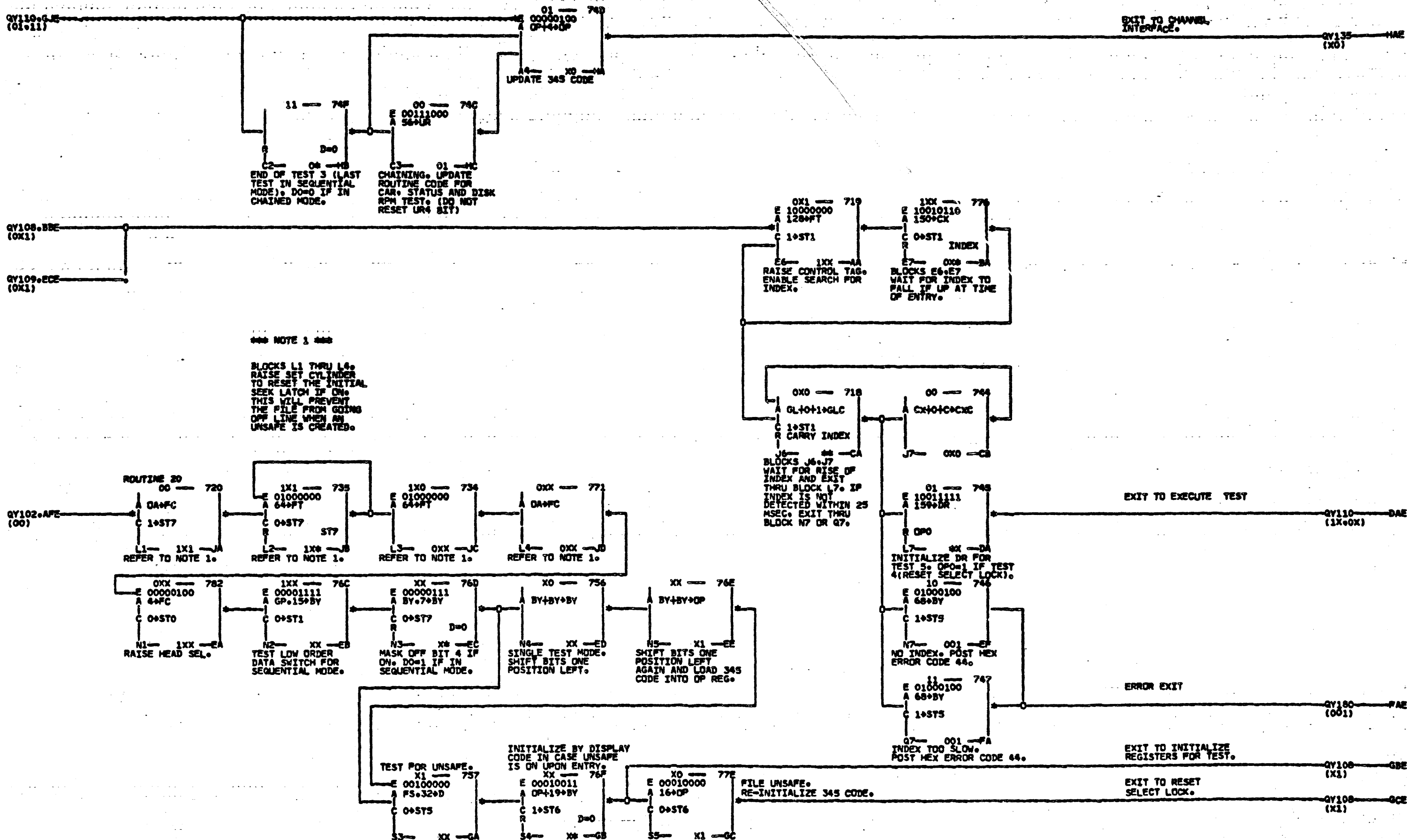
00 — 710  
 E 00000010  
 A 0PQ2IE  
 N2 — XX — AE  
 CHAINED MODE. SET  
 IE6 TO INDICATE  
 CHAINING.

XX — 751  
 E 00101000  
 A 40UR  
 N4 — 00 — AF  
 LOAD ROUTINE  
 CODE 20. (UR4 BIT  
 IS SPARE MOD SELECT)

QY107 — APE  
 (00)

NOV 68

420613	10/11/66	MACH	2944	DATE	02/20/68	SHEET	1	QY102
420656	04/06/67	NAME	234/2844	LOG	051P	VERSION		
420662	01/15/68	MODE	MANUAL					
		P.N.	2250320	IN LINE - INVALID OP				
		IBM CORP.	SDD	CODE ANALYSIS				



NOTE 1

BLOCKS L1 THRU L4.  
RAISES SET CYLINDER  
TO RESET THE INITIAL  
SEEK LATCH IF ON.  
THIS WILL PREVENT  
THE FILE FROM GOING  
OFF LINE WHEN AN  
UNSAFE IS CREATED.

ROUTINE 20  
00 --- 720  
A 0A+FC  
C 1+ST7  
L1 --- 1X1 --- JA  
REFER TO NOTE 1.

1X1 --- 735  
A 01000000  
A 64+FT  
C 0+ST7  
L2 --- 1X1 --- JB  
REFER TO NOTE 1.

1X0 --- 734  
A 01000000  
A 64+FT  
C 0+ST7  
L3 --- 0XX --- JC  
REFER TO NOTE 1.

0XX --- 771  
A DA+FC  
C 0+ST7  
L4 --- 0XX --- JD  
REFER TO NOTE 1.

0XX --- 782  
A 00000100  
A 4+FC  
C 0+ST0  
N1 --- 1XX --- EA  
RAISE HEAD SEL.

1XX --- 76C  
A 00001111  
A GP.15+BY  
C 0+ST1  
N2 --- XX --- EB  
TEST LOW ORDER  
DATA SWITCH FOR  
SEQUENTIAL MODE.

XX --- 76D  
A 00000111  
A BY.7+BY  
C 0+ST7  
N3 --- XX --- EC  
D=0  
MASK OFF BIT 4 IF  
ON. DO=1 IF IN  
SEQUENTIAL MODE.

X0 --- 756  
A BY+BY+BY  
C 0+ST7  
N4 --- XX --- ED  
SINGLE TEST MODE.  
SHIFT BITS ONE  
POSITION LEFT.

XX --- 76E  
A BY+BY+OP  
C 0+ST7  
N5 --- X1 --- EE  
SHIFT BITS ONE  
POSITION LEFT  
AGAIN AND LOAD 345  
CODE INTO OP REG.

0X0 --- 718  
A 0L+0+1+GLC  
C 1+ST1  
R CARRY INDEX  
J6 --- --- CA  
BLOCKS J6-J7  
WAIT FOR RISE OF  
INDEX AND EXIT  
THRU BLOCK L7. IF  
INDEX IS NOT  
DETECTED WITHIN 25  
MSEC. EXIT THRU  
BLOCK N7 OR Q7.

00 --- 744  
A CX+0+C+CX  
C 0+ST1  
INDEX  
J7 --- 0X0 --- CB

01 --- 748  
A 10011111  
A 159+DR  
C 0+ST0  
R OP0  
L7 --- 0X --- DA  
INITIALIZE DR FOR  
TEST 5. OP=1 IF TEST  
4 (RESET SELECT LOCK).

10 --- 746  
A 01000100  
A 68+BY  
C 1+ST5  
N7 --- 001 --- EF  
NO INDEX. POST HEX  
ERROR CODE 44.

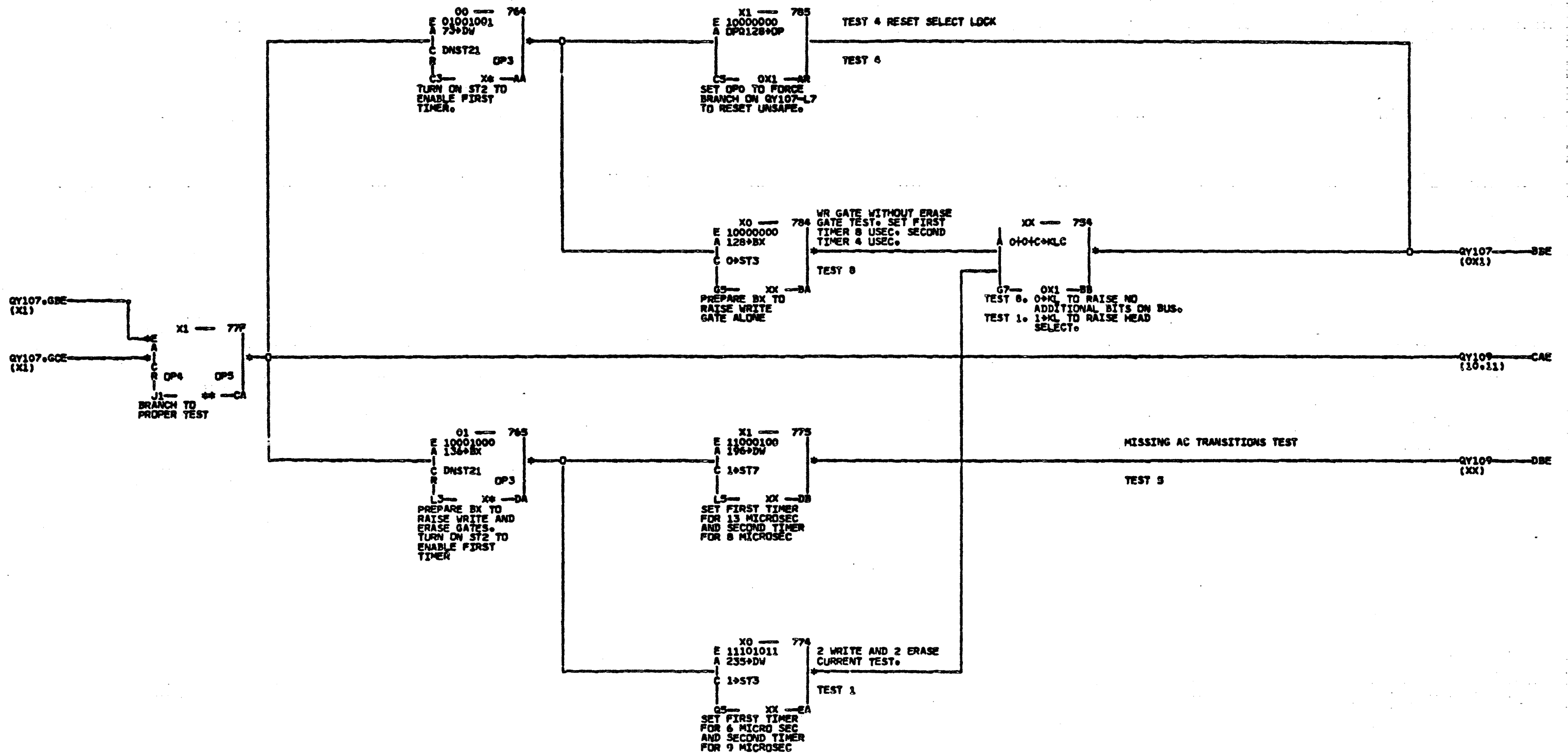
11 --- 747  
A 01000100  
A 68+BY  
C 1+ST5  
Q7 --- 001 --- FA  
INDEX TOO SLOW.  
POST HEX ERROR CODE 44.

TEST FOR UNSAFE.  
X1 --- 757  
A 00100000  
A FS.32+D  
C 0+ST5  
S3 --- XX --- GA

INITIALIZE BY DISPLAY  
CODE IN CASE UNSAFE  
IS ON UPON ENTRY.  
XX --- 76F  
A 00010011  
A DP+19+BY  
C 1+ST6  
D=0  
S4 --- XX --- GB

X0 --- 77E  
A 00010000  
A 16+DP  
C 0+ST6  
S5 --- X1 --- GC

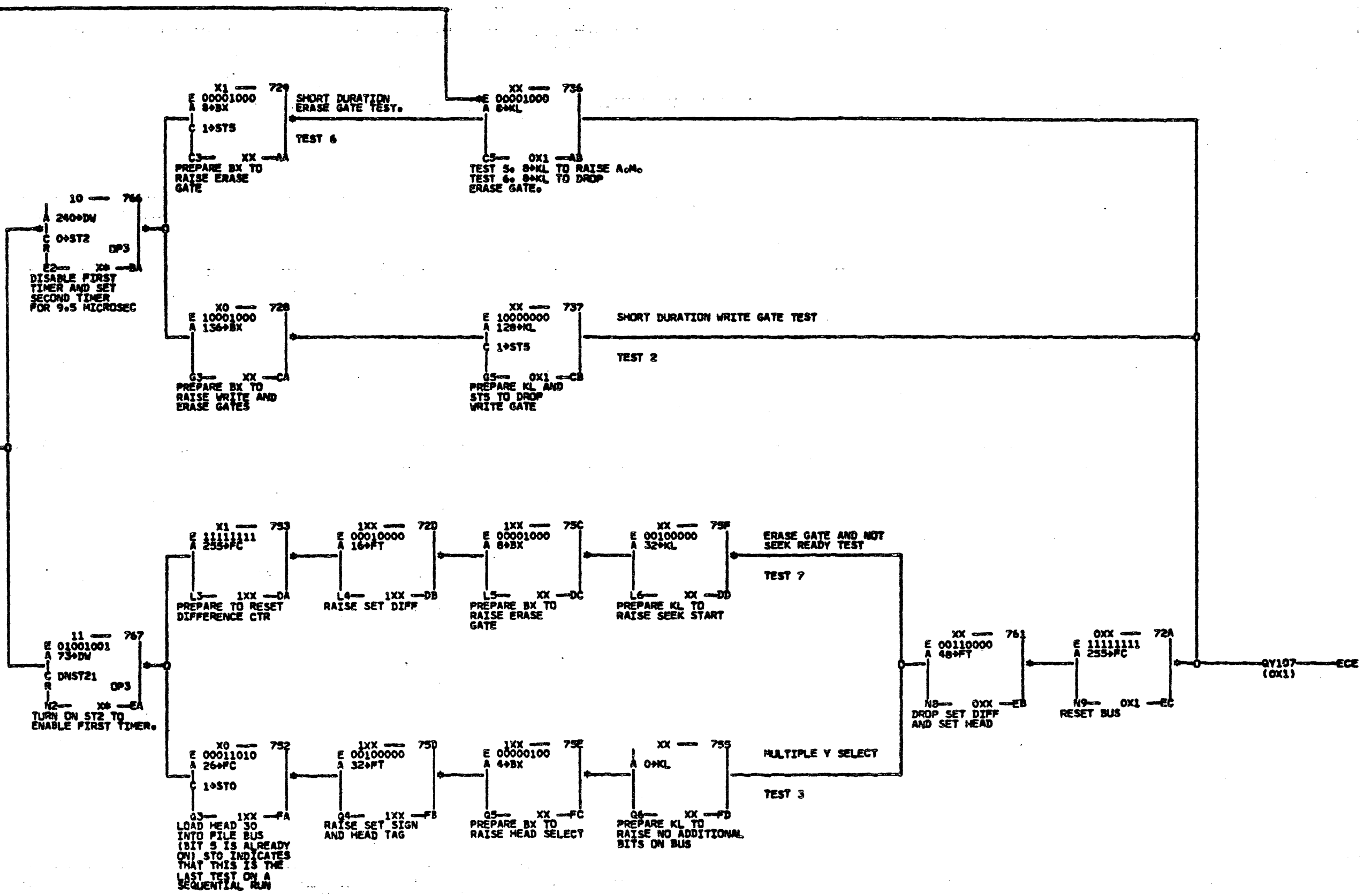
FILE UNSAFE.  
RE-INITIALIZE 345 CODE.



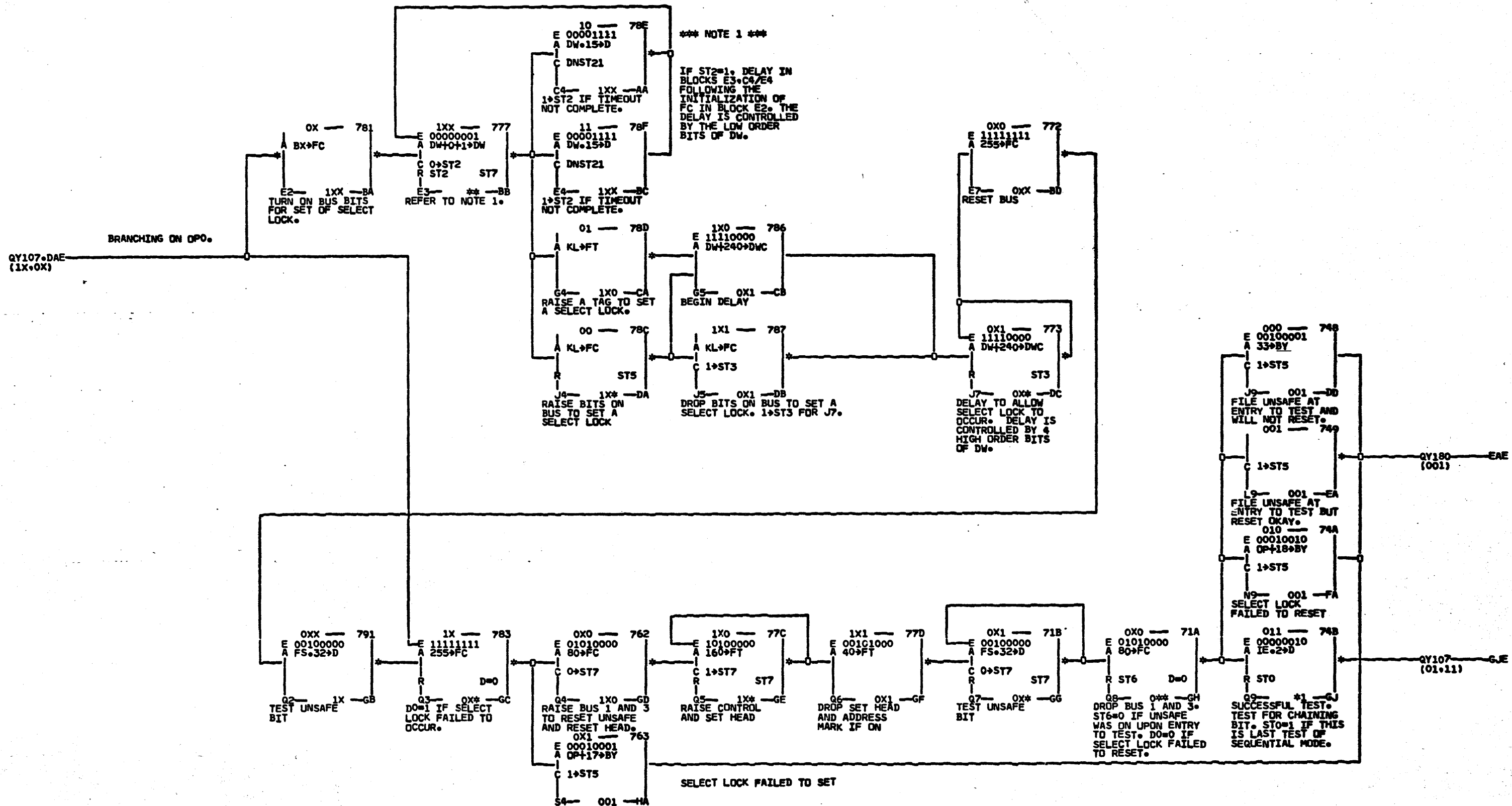
TEST 9

QY108.DBE  
(XX)

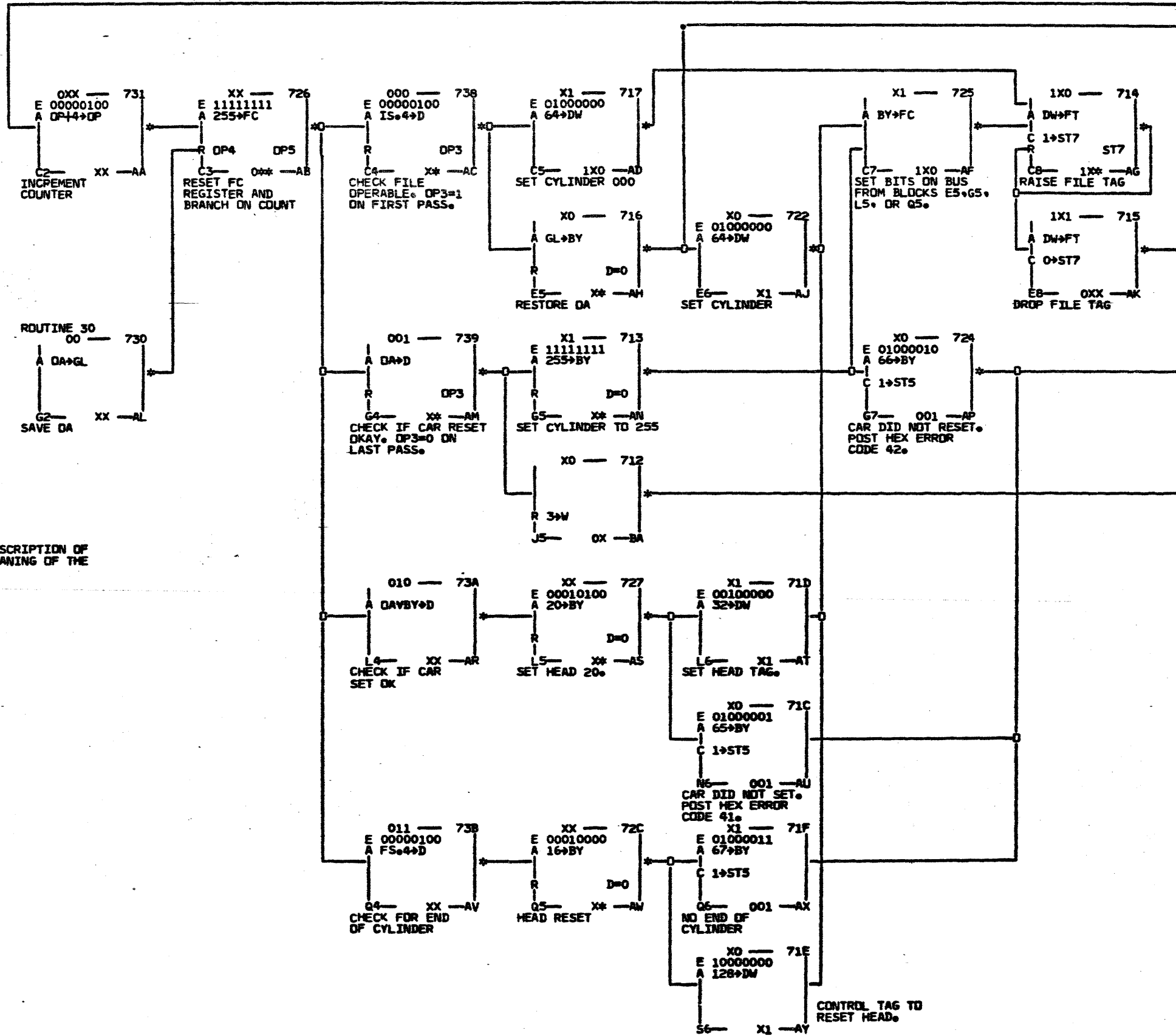
QY108.CAE  
(10.11)



0-04-48



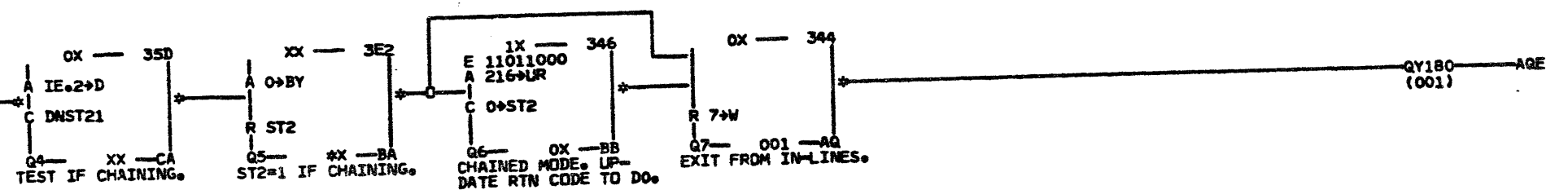
01-40



REFER TO QY040 FOR A DESCRIPTION OF ROUTINE SEQUENCE AND MEANING OF THE 345 CODE (STORED IN DP).



QY111.BAE  
(OX)



UNCLAS

420664

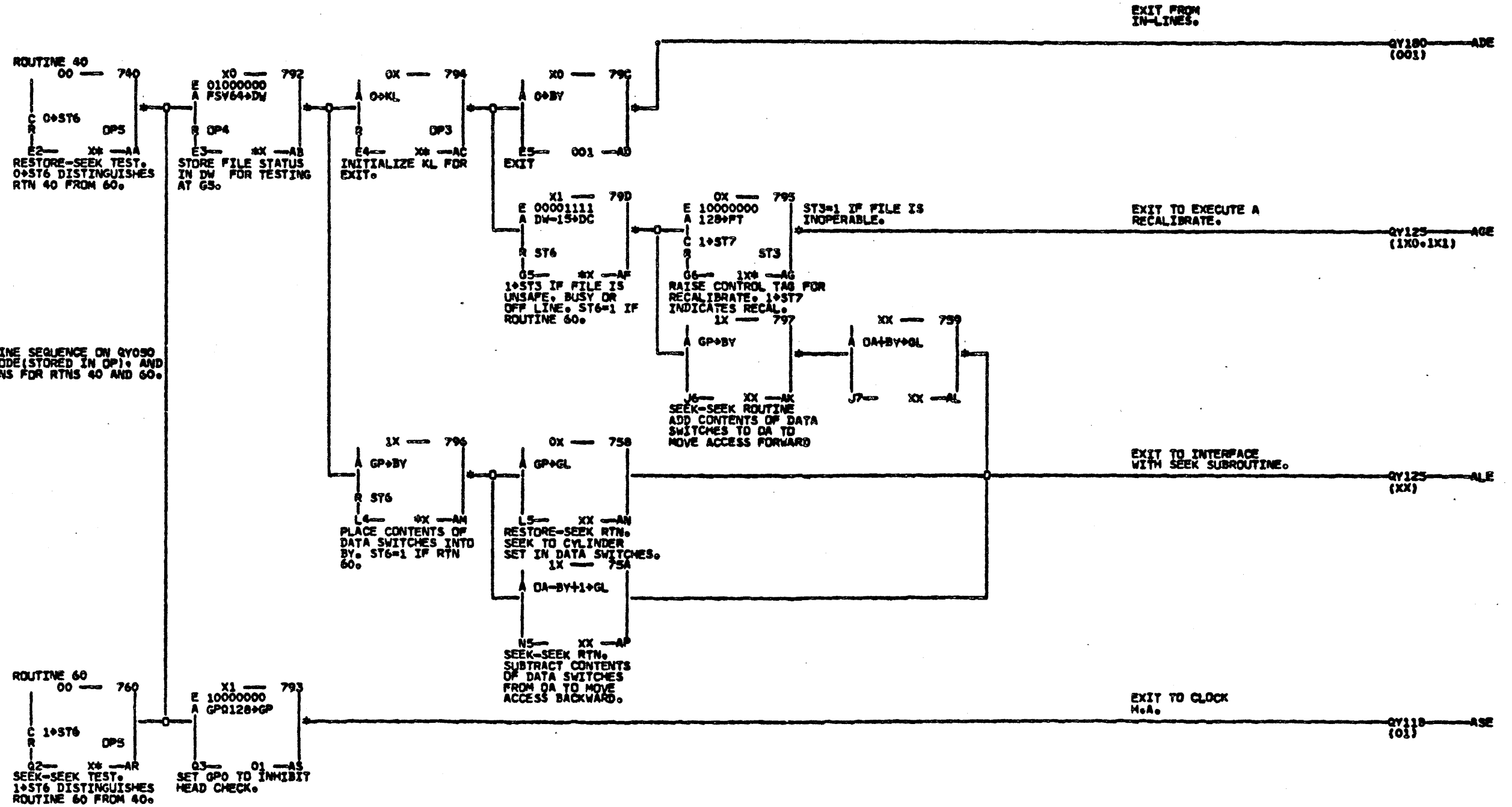
11/11/68

MACH  
NAME  
MODE  
P.No  
IBM CORP.

2844  
MANUAL  
2250326

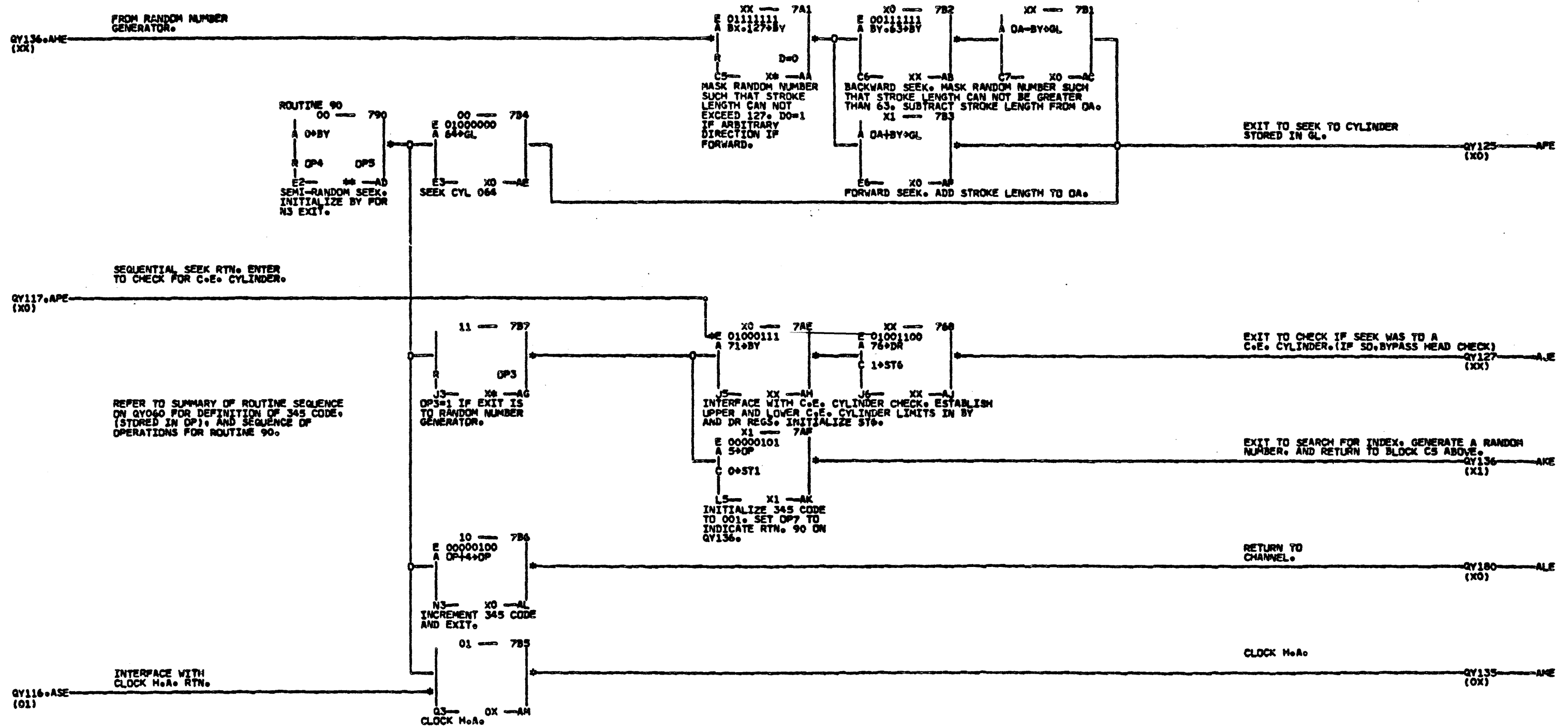
DATE 11/20/68  
LDG 3256  
ROUTINE 30  
EXIT.

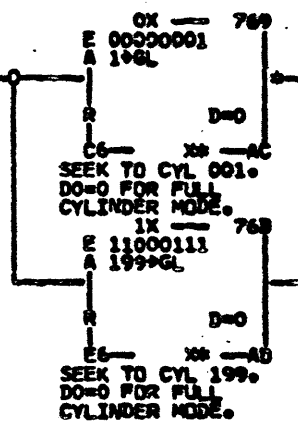
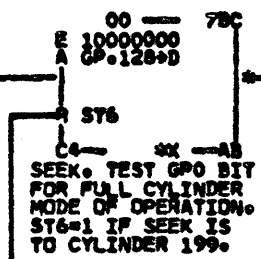
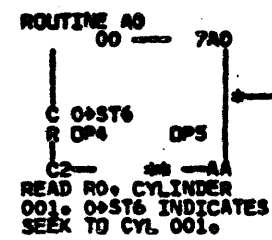
SHEET 1 QY115  
VERSION



REFER TO SUMMARY OF ROUTINE SEQUENCE ON QY030 FOR MEANING OF THE 345 CODE (STORED IN DP), AND THE SEQUENCE OF OPERATIONS FOR RTNS 40 AND 60.

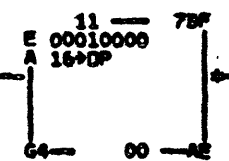




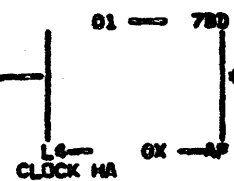


INTERFACE WITH  
SEEK SUBROUTINE.

QV120 --- ACE  
(X0-X1)

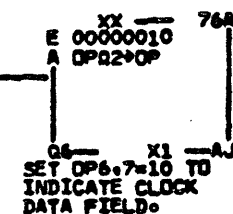
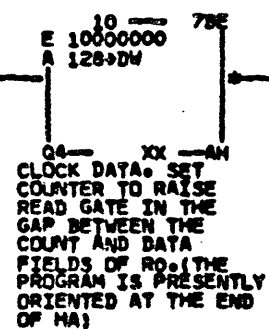
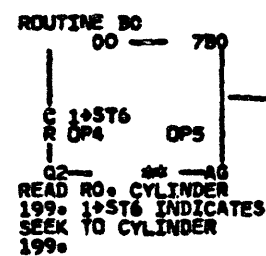


REFER TO SUMMARY OF ROUTINE SEQUENCE ON  
QV070 FOR A DESCRIPTION OF THE 345 CODE  
(STORED IN OP). AND THE SEQUENCE OF  
OPERATIONS IN ROUTINES A0 AND B0.



EXIT TO DETECT  
INDEX AND CLOCK HA

QV135 --- APE  
(0X)



EXIT TO CLOCK  
DATA.

QV136 --- AJE  
(X1)

420613  
420656

10/11/66  
04/06/67

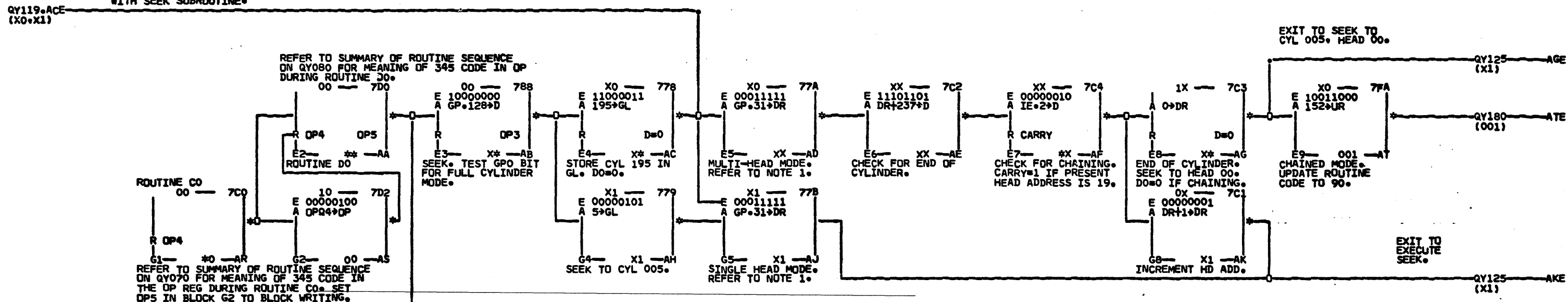
MACH 2844  
NAME 2314/2844  
MODE MANUAL  
P.N. 2250330  
IBM CORP. SDD

DATE 04/21/67  
LOG 111D

SHEET 1  
VERSION QV119

IN-LINE. READ DATA  
EXECUTION CONTROL

ROUTINES A0 AND B0. INTERFACE WITH SEEK SUBROUTINE.

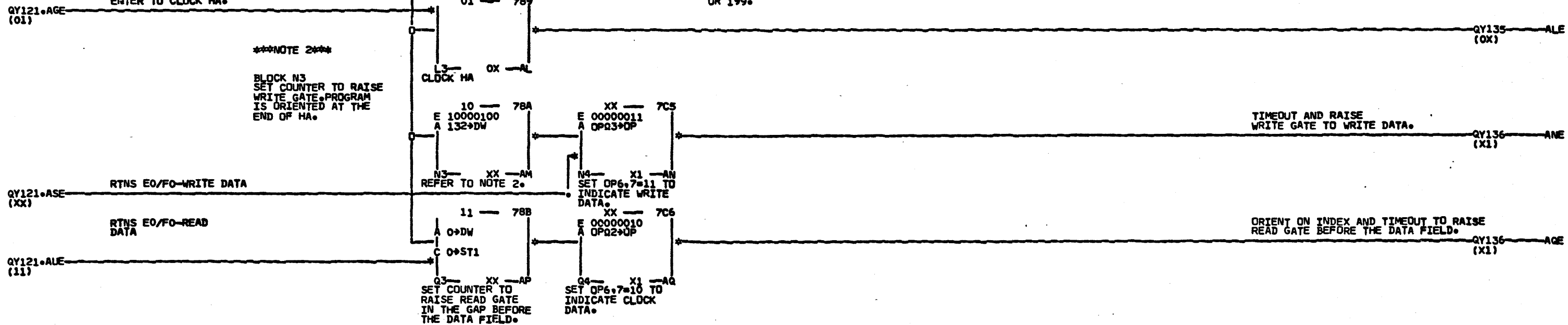


REFER TO SUMMARY OF ROUTINE SEQUENCE ON QY070 FOR MEANING OF 345 CODE IN THE OP REG DURING ROUTINE C0. SET OP5 IN BLOCK G2 TO BLOCK WRITING.

REFER TO SUMMARY OF ROUTINE SEQUENCE ON QY080 FOR MEANING OF 345 CODE IN OP DURING ROUTINE D0.

\*\*\*NOTE 1\*\*\*  
GP CONTAINS THE PRESENT HEAD ADDRESS WHICH WAS OBTAINED FROM THE DATA SWITCHES IN SINGLE HEAD MODE OR READ FROM H.A. IN MULTI-HEAD MODE. IN MULTI-HEAD MODE THE HEAD ADDRESS IS NOT INCREMENTED WHEN SEEKING TO CYL 005 OR 199.

ROUTINES E0 AND F0. ENTER TO CLOCK HA.



\*\*\*NOTE 2\*\*\*

BLOCK N3 SET COUNTER TO RAISE WRITE GATE. PROGRAM IS ORIENTED AT THE END OF HA.

RTNS E0/F0-WRITE DATA

RTNS E0/F0-READ DATA

01-48

ROUTINE E0  
00 7E0  
A 0>GP  
C 0>ST6  
R 0P4  
C2 0>AA  
WRITE TEST-CYL  
005. LOAD DATA  
SWITCHES WITH  
HEAD ADDRESS.  
0>ST6 INDICATES  
SEEK TO CYL 005.

00 7D4  
E 00011111  
A GP.31>DR  
R ST6  
C3 0>AB  
SEEK. LOAD HEAD  
ADDRESS FROM DATA  
SWITCHES INTO DR.  
ST6=1 IF SEEK IS  
TO CYL 199.

0X 7A8  
E 00000101  
A 5>GL  
R D=0  
C4 0>AC  
LOAD CYL 005 INTO  
GL. DO=1 IF HEAD 0  
IS IN DATA SWITCHES  
1X 7AA  
E 11000011  
A 195>GL  
R D=0  
E4 0>AE  
LOAD CYL 195 INTO  
GL. DO=1 IF HEAD 0  
IS IN DATA SWITCHES

X0 79A  
A DR-0>DR  
C5 0>AD  
DECREMENT DR. HEAD  
SEEK IS TO ONE LESS  
THAN DATA SWITCHES.  
X1 79B  
E 00010011  
A 19>DR  
E5 0>AP  
HEAD 0 IS IN DATA  
SWITCHES. SET DR TO  
SEEK TO HEAD 19.

EXIT TO INTERFACE  
WITH SEEK SUBROUTINE.  
QY125  
(X1) ADE

01 7D5  
E 10000000  
A GP.128>GP  
C3 0>AG  
CLOCK MA. SET GP0  
BIT TO INHIBIT  
HEAD CHECK.  
XX 711  
E 01000100  
A 68>FC  
R D=0  
C3 0>AV  
DROP READ GATE AND  
HEAD SELECT. DO=1  
IF INITIAL SEEK  
WAS TO HEAD 0.

0X1 799  
E 00010000  
A 16>FC  
R D=0  
C4 0>AJ  
HEAD 0 IN DATA SWITCHES  
SET COUNTER TO  
BUT HEAD 19 IS IN HAR.  
RAISE HEAD RESET.  
0X0 798  
E 00010011  
A 0-19>GL  
L4 10X AN

1XX 7C7  
E 00010100  
A 0-20>GL  
R D=0  
C5 0>AK  
SET COUNTER TO  
TIME-OUT BEFORE  
SELECTING HEAD.  
10X 7CC  
E 00000001  
A 1>FC  
C 1>ST6  
R ST6  
L5 10X AP

XX 7A9  
E 00010000  
A 16>FC  
R D=0  
C6 0>AL  
DROP HEAD RESET  
11X 7CE  
E 00000001  
A 1>FC  
L6 00X AQ  
DROP HEAD ADVANCE

00X 7D1  
E 00000001  
A GL+1>GL  
R CARRY  
J7 00X AN  
01X 7D3  
E 00000100  
A 4>FC  
L7 1XX AR  
RAISE HEAD SELECT

J7 COUNTS 10 MICROSECONDS  
BEFORE RAISING HEAD SELECT

1XX 7CD  
E 10001001  
A 137>DW  
L8 00X AS  
SET TIMER TO  
RAISE WRITE GATE

TIMEOUT TO RAISE WRITE  
GATE TO WRITE DATA.  
QY120  
(XX) ASE

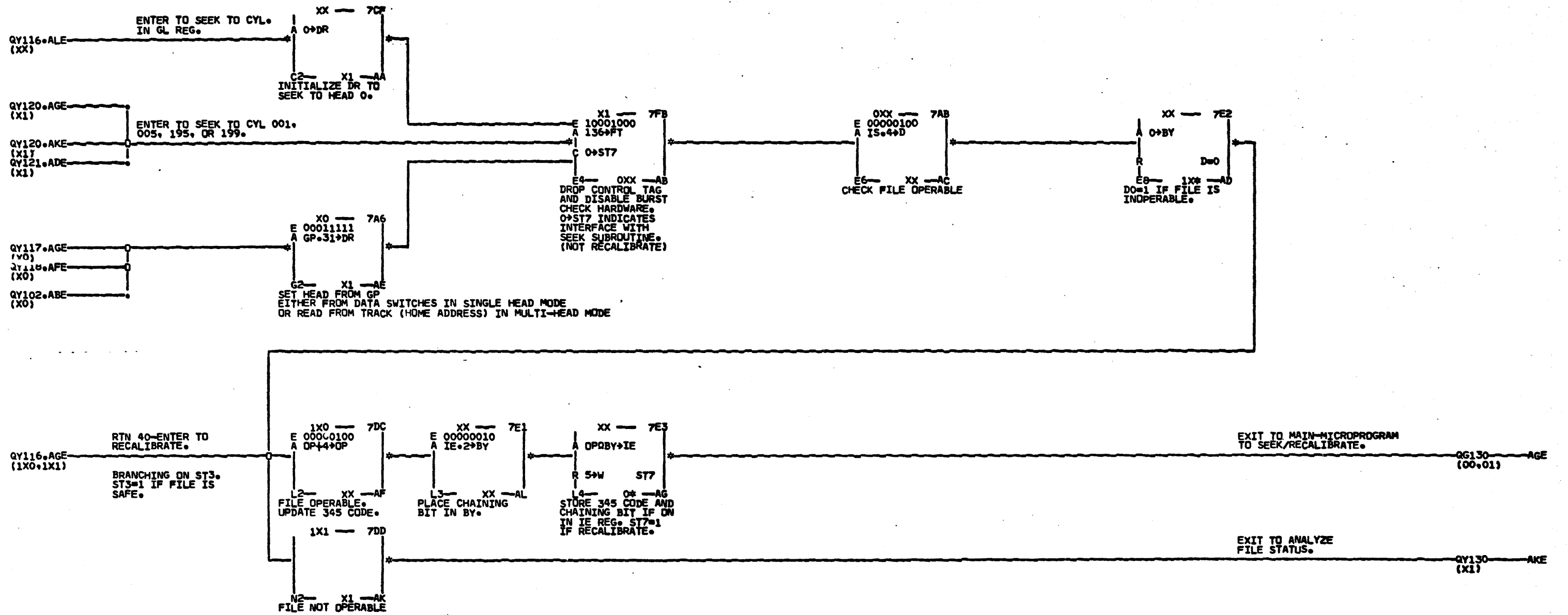
REFER TO SUMMARY OF ROUTINE SEQUENCE  
ON QY080 FOR MEANING OF 345 CODE IN  
THE DP REG DURING ROUTINES E0 AND F0.

ROUTINE F0  
00 7F0  
A 0>GP  
C 1>ST6  
R 0P4  
C2 0>AT  
WRITE TEST-CYL  
195. 1>ST6  
INDICATES SEEK  
TO CYL 195.

10 7D6  
E 00011111  
A GP.31>D  
R D=0  
C3 0>AH  
ADVANCE HEAD AND THEN WRITE DATA.  
TEST HEAD ADDRESS FROM DATA  
SWITCHES FOR HEAD 0.  
11 7D7  
E 00011111  
A GP.31>D  
R D=0  
C3 0>AU  
READ DATA-ORIENT  
ON INDEX

HEAD SEEK WAS TO ONE LESS THAN THE DATA  
SWITCHES. RAISE HEAD ADVANCE TO WRITE  
AND READ DATA WITH HEAD SELECTED IN DATA  
SWITCHES. GL IS INITIALIZED TO TIME-OUT  
BEFORE RAISING HEAD SELECT.

ORIENT ON INDEX AND TIMEOUT TO RAISE  
READ GATE BEFORE THE DATA FIELD.  
QY120  
(11) AUE



UNP-4P

420613  
420656  
420662

10/11/66  
04/06/67  
01/15/68

MAC  
NAME 2314/2844  
CODE  
PoNe  
IBM CORP. SDD

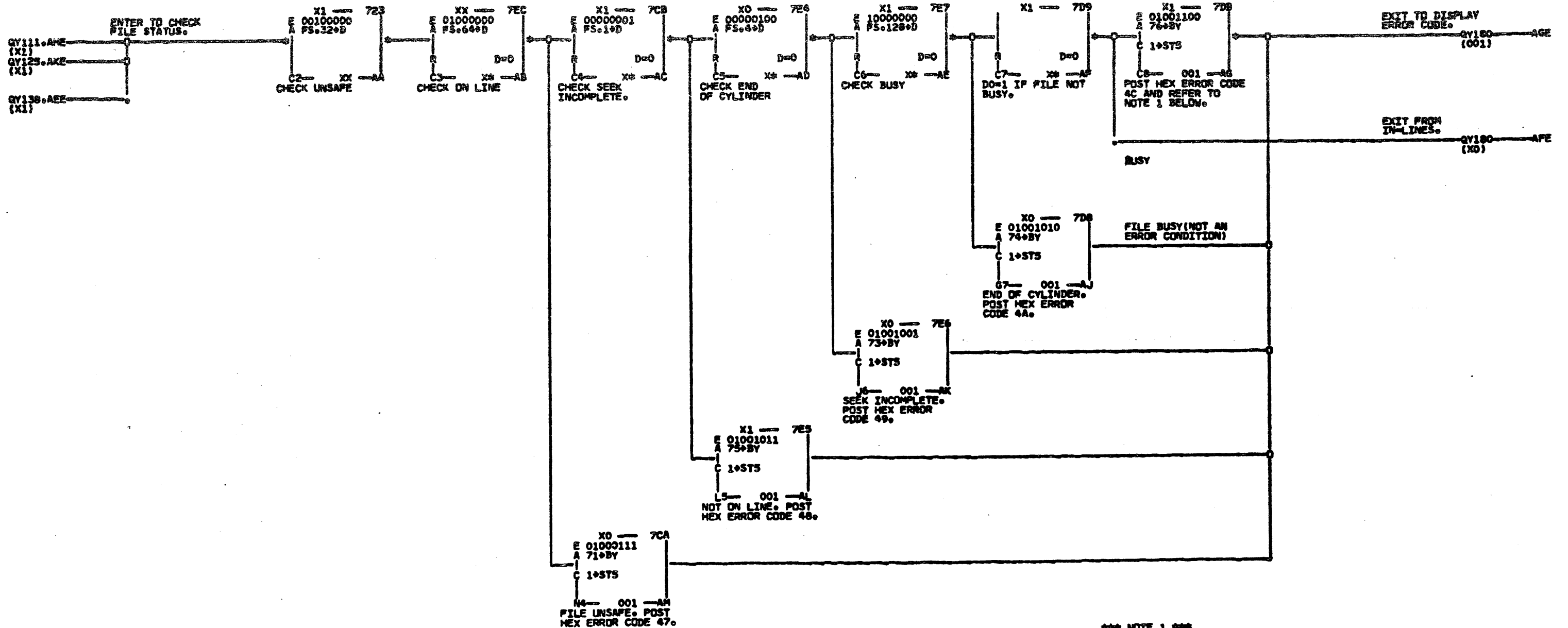
DATE 02/20/68  
LOG 051P

IN-LINE SEEK  
INITIALIZATION

SHEET 1 QY125  
VERSION

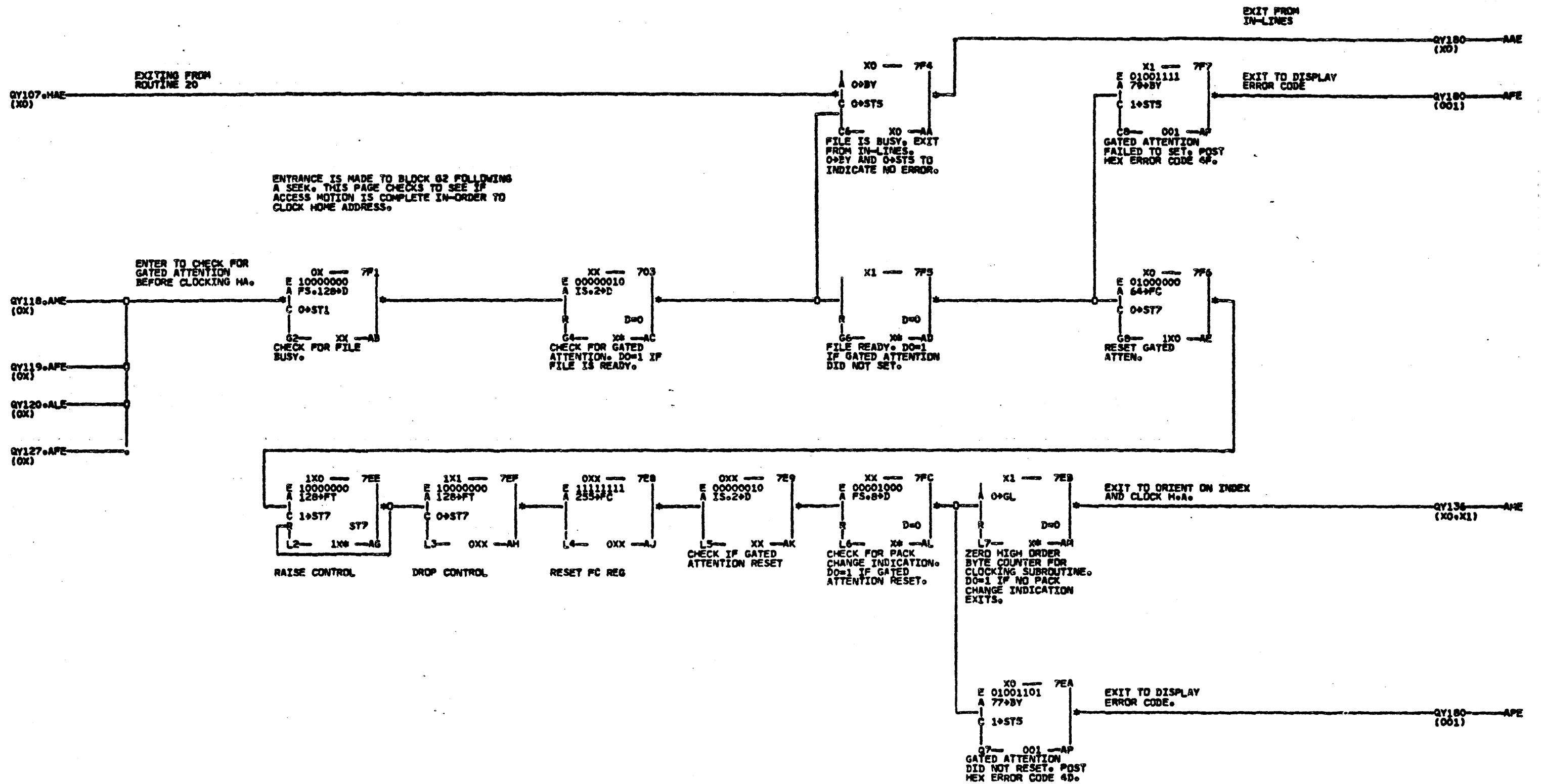


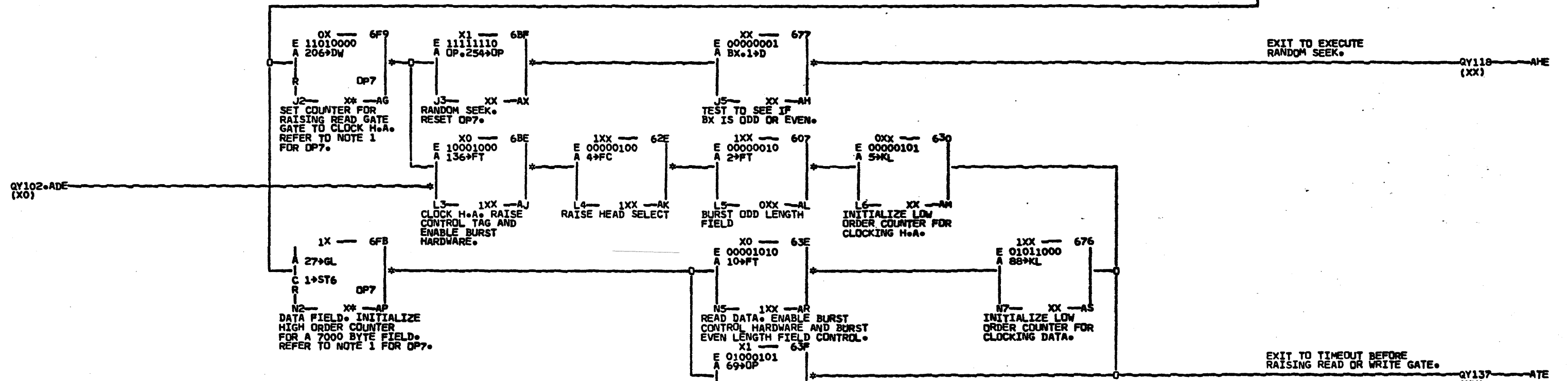
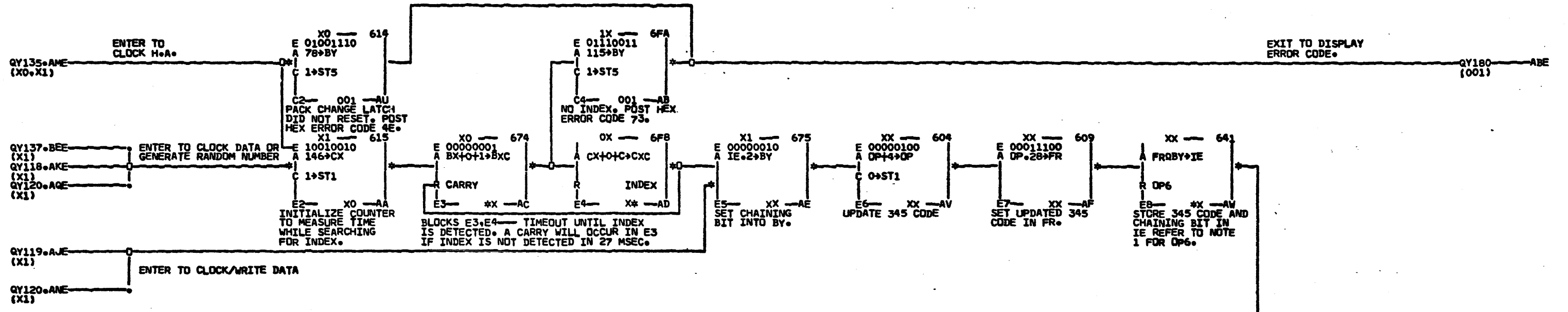




\*\*\* NOTE 1 \*\*\*

BLOCK C8. THIS CONDITION SHOULD NOT OCCUR. THIS ERROR INDICATES THAT THE FILE INOPERABLE BIT WAS SET BUT FILE STATUS WAS INTERROGATED OKAY. POSSIBLE CAUSES ARE SLOW CARD OR ERRATIC INTERLOCK SWITCH OR MULTIPLE MOD SELECT.

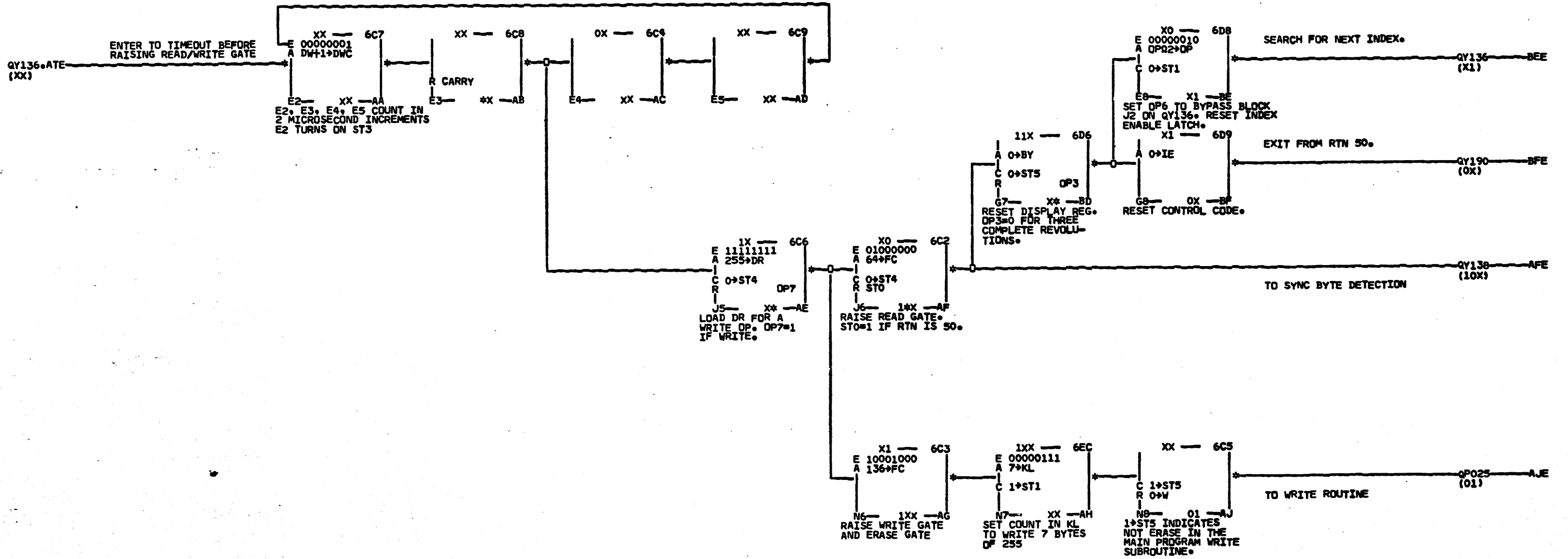


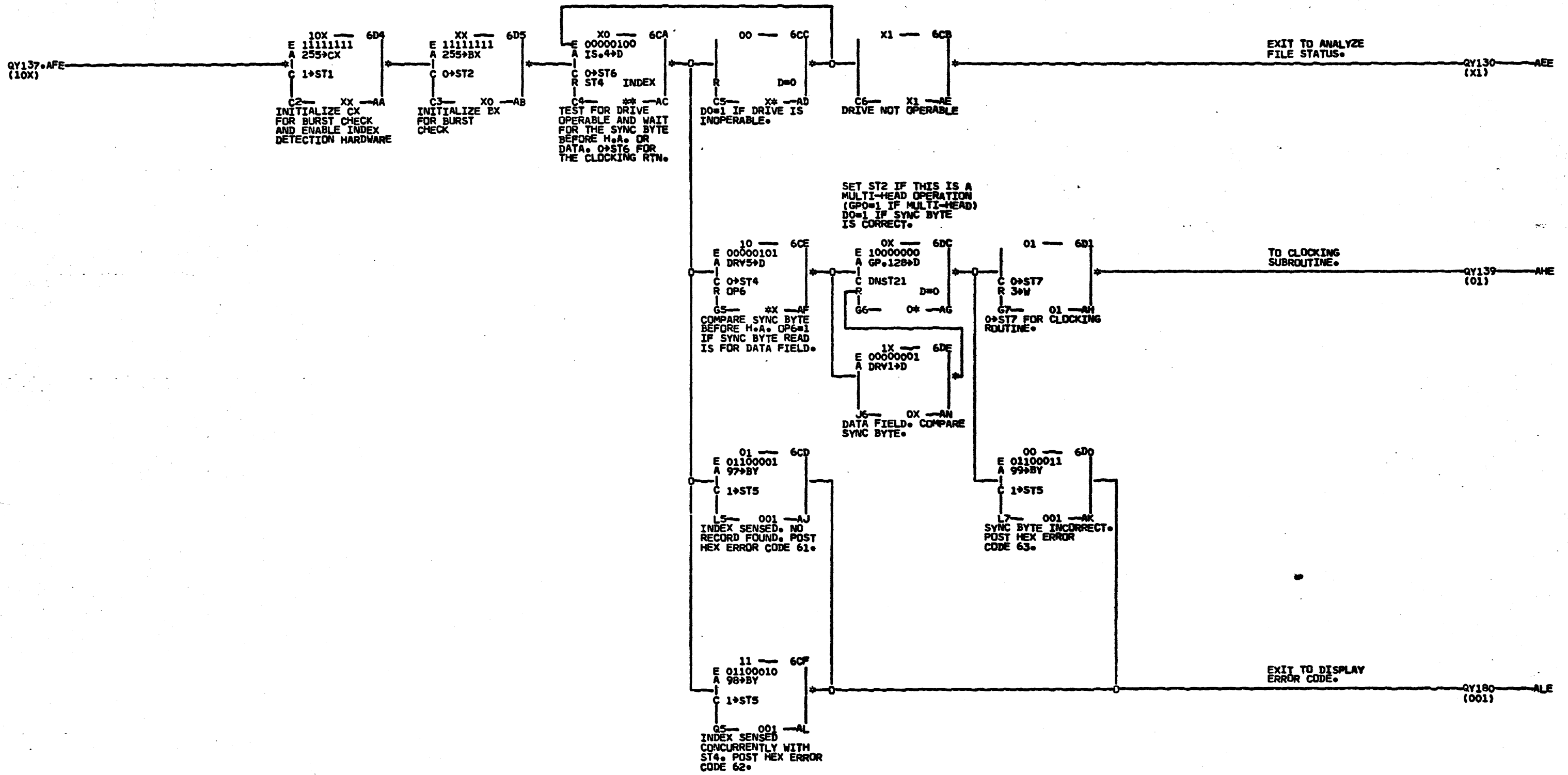


\*\*\* NOTE 1 \*\*\*

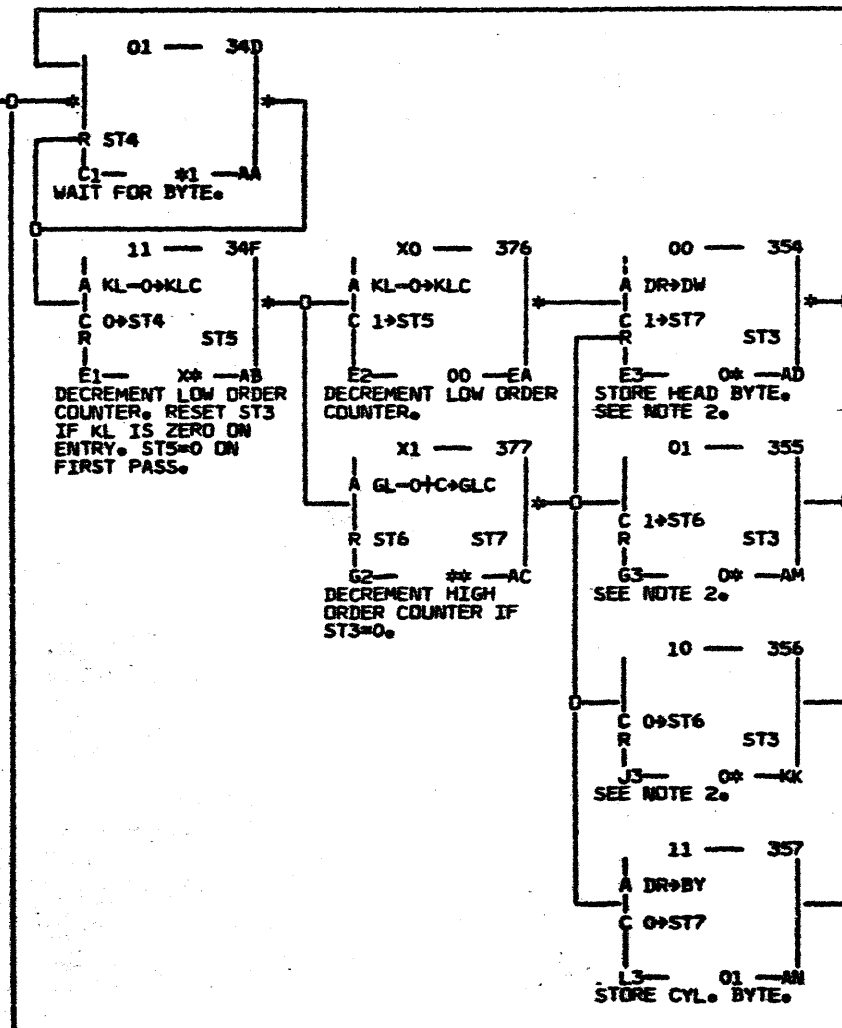
OP6	OP7	Function
0	0	CLOCK H.A.
0	1	RANDOM SEEK
1	0	CLOCK DATA
1	1	WRITE DATA

WRITE DATA. SET CODE INTO OP TO INDICATE WRITE DATA IN-LINE ROUTINES IN THE MAIN MICROPROGRAM WRITE SUBROUTINE.





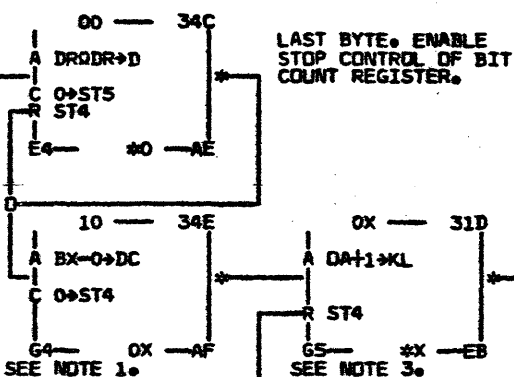
QY138, AHE  
(01)



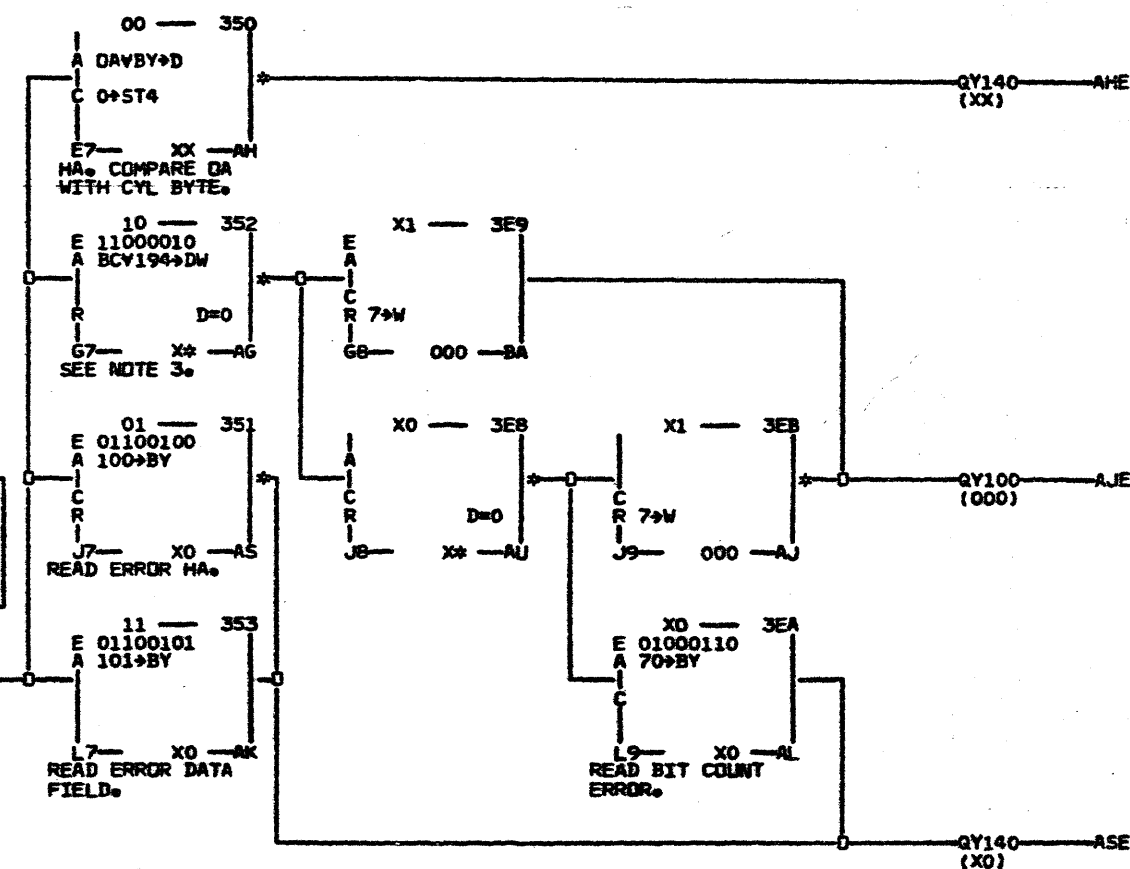
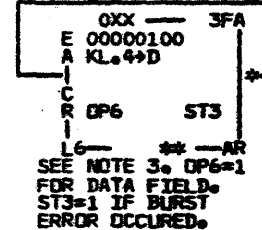
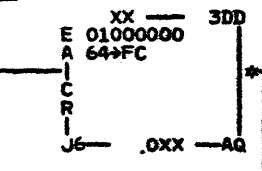
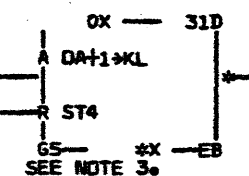
\*\*\*NOTE 1\*\*\*  
SET ST3 IF EITHER BX OR CX IS NON-ZERO.

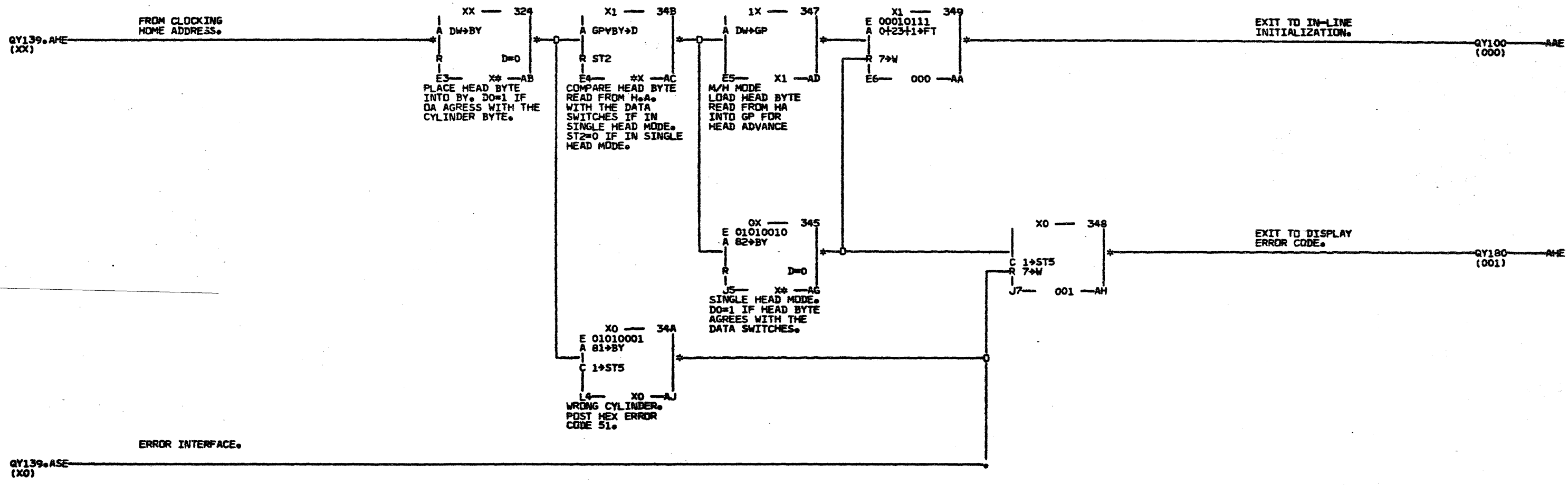
\*\*\*NOTE 2\*\*\*  
ST3=0 IF HIGH AND LOW ORDER COUNTS HAVE BEEN EXHAUSTED.

\*\*\*NOTE 3\*\*\*  
THE BIT COUNT REG (BC) IS TESTED FOR HEX C2 IF RTN IS C0 OR D0. IF S0, QA=CYL 005 OR 195 AND DA+1→KL WILL SET KL4 BIT. OTHERWISE KL4=0 SO DO NOT COMPARE BC REG.



LAST BYTE. ENABLE STOP CONTROL OF BIT COUNT REGISTER.





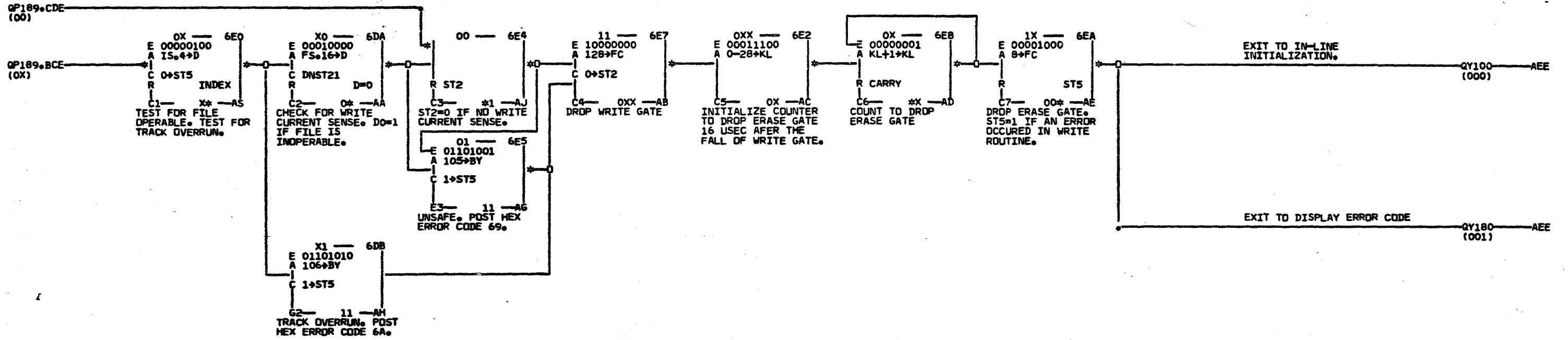
0 21-48

420613	10/11/66	MACH	2844	DATE	11/20/68	SHEET	1	QY140
420656	04/06/67	NAME	2314/2844	LOG	3256	VERSION		
420664	10/11/68	MODE	MANUAL					
		P.No	2250341					
		IBM CORP.	SDD					

IN-LINE CYLINDER AND HEAD CHECK



ENTRY IS FROM MAIN PROGRAM  
WRITE SUBROUTINE (WRITE DATA)



420613  
420656  
420664

10/24/66  
04/06/67  
11/11/68

MACH 2844  
NAME 2314/2844  
MODE MANUAL  
P.No. 2250342  
IBM CORP. SDD

DATE 11/20/68  
LDG 3256

SHEET 1 QY179  
VERSION

IN-LINE. WRITE EXIT

QV107.FAE  
(001)  
QV110.EAE  
(001)  
QV100.ASE  
(001)  
QV135.AFE  
(001)  
QV111.APE  
(001)  
QV115.AQE  
(001)  
QV116.ADE  
(001)  
QV130.AGE  
(001)  
QV135.APE  
(001)  
QV136.ABE  
(001)  
QV138.ALE  
(001)  
QV127.AKE  
(001)  
QV140.AHE  
(001)  
QV120.ATE  
(001)  
QV179.AEE  
(001)

RE-INITIALIZE AND  
INTERFACE WITH  
EXIT OPERATIONS.

001 709  
E 00010000  
A 16+OP  
N2 XO AA  
RE-INITIALIZE 345  
CODE=100.

X0 7DA  
E 00000010  
A IE.2+D  
N3 XX AB  
TEST FOR CHAINING

XX 7F2  
E 00011100  
A OP.28+PR  
N4 XX AC  
D=0  
SET 345 CODE INTO  
PR. DO=0 IF  
CHAINING.

X1 733  
A PR+IE  
N5 OX AG  
NOT CHAINING. STORE  
345 CODE IN IE.  
E 00000010 732  
A PRQ2+IE  
N6 OX AP  
CHAINING. STORE  
345 CODE AND  
CHAINING BIT IN IE.

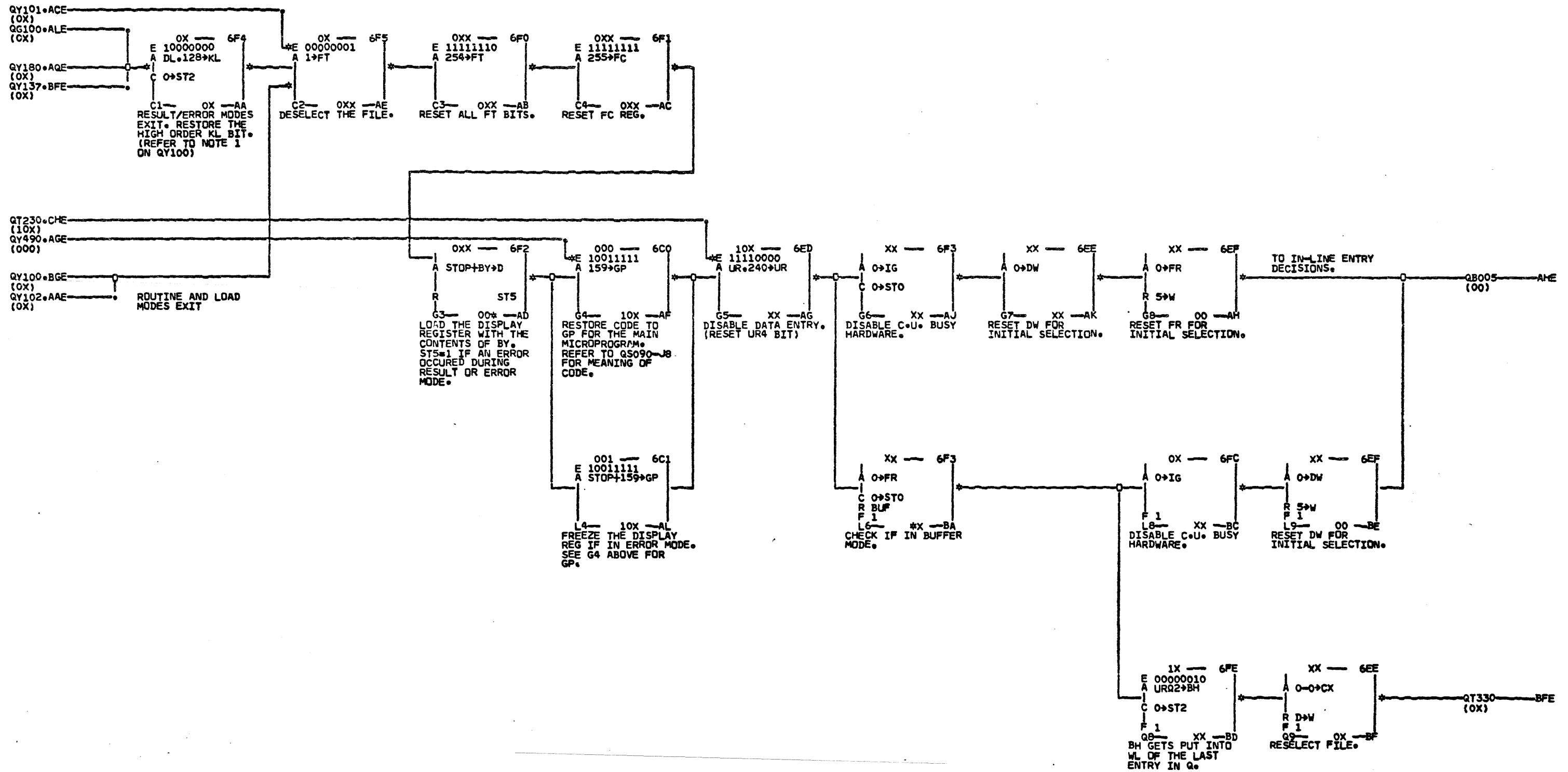
RESULT AND ERROR  
MODE EXITS.

QV190 AGE  
(OX)

QV130.AFE  
(X0)  
QV118.ALE  
(X0)  
QV135.AAE  
(X0)

INTERFACE WITH  
EXIT OPERATIONS.

00000



091-10