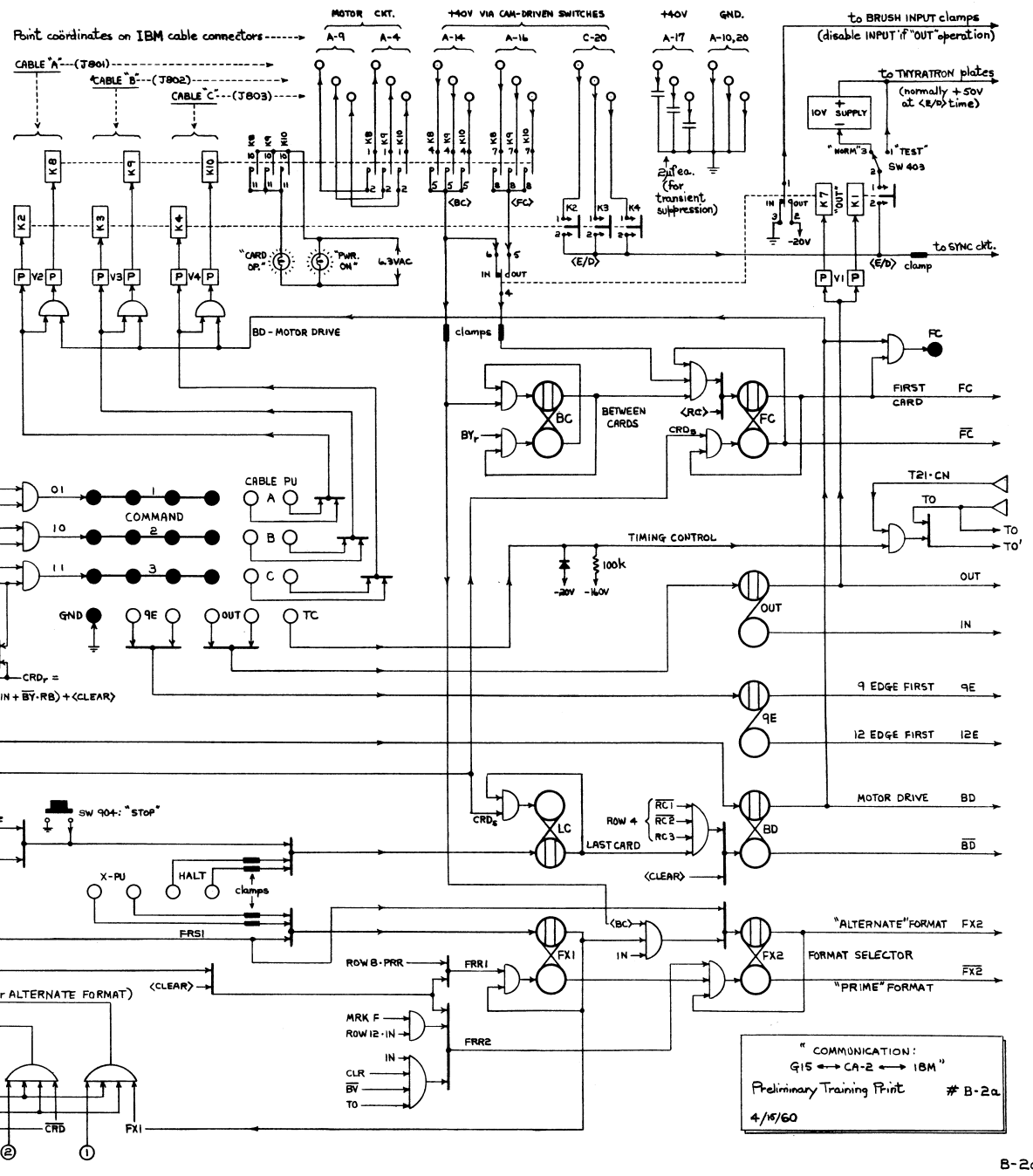
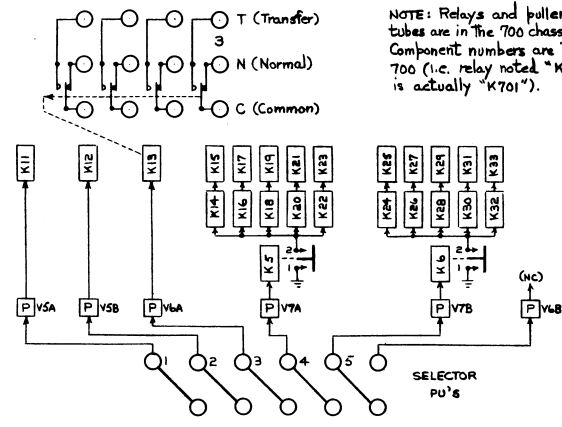
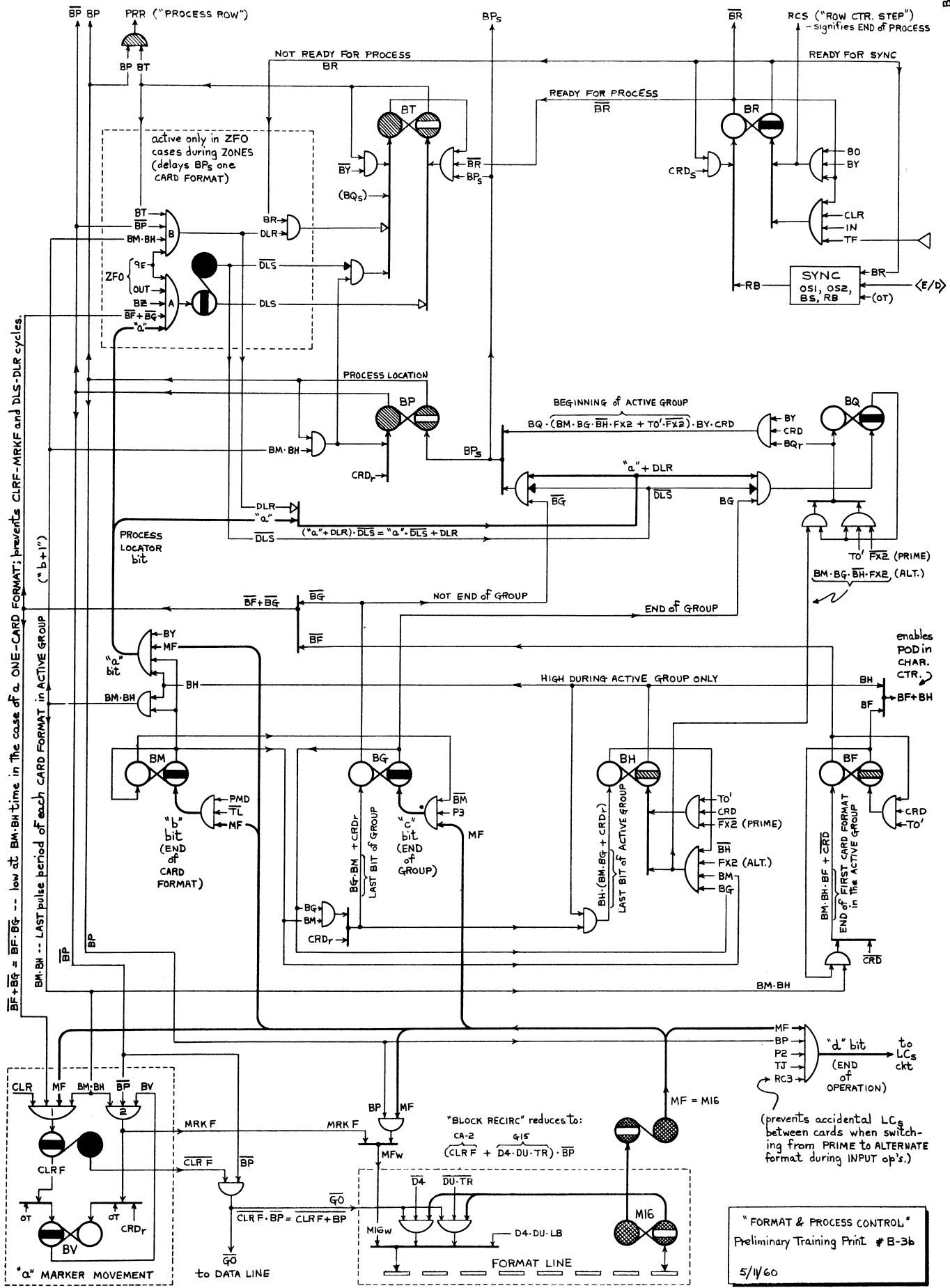
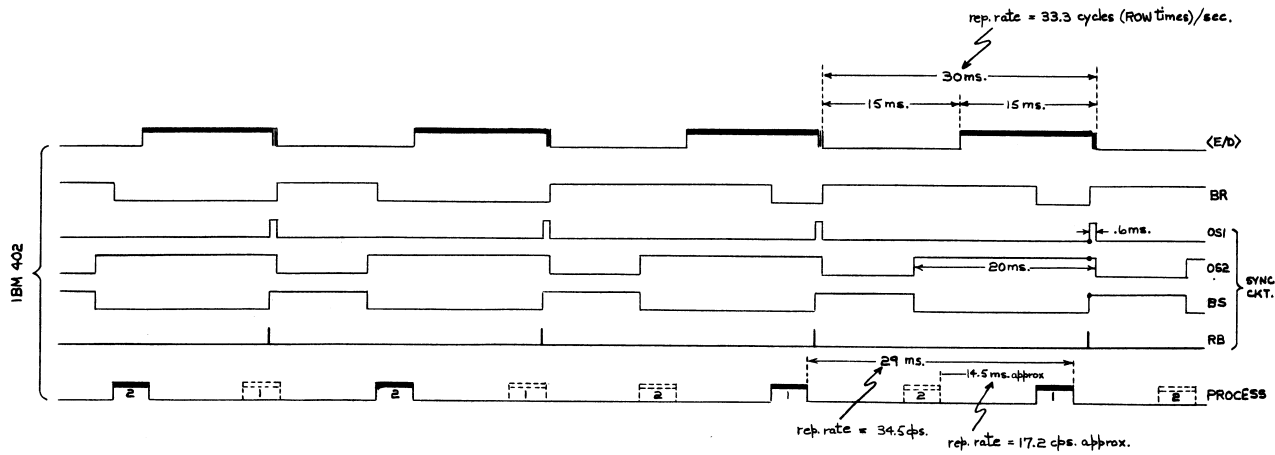
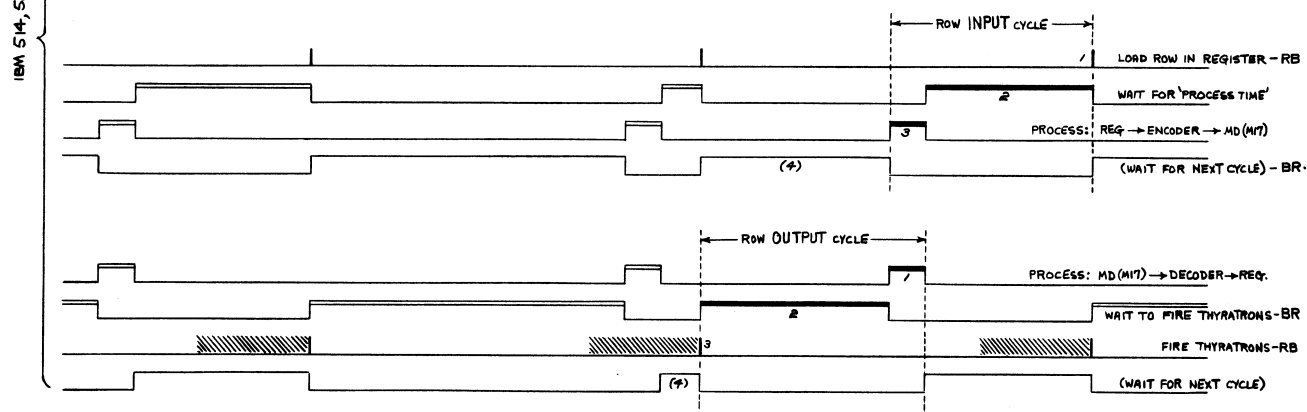
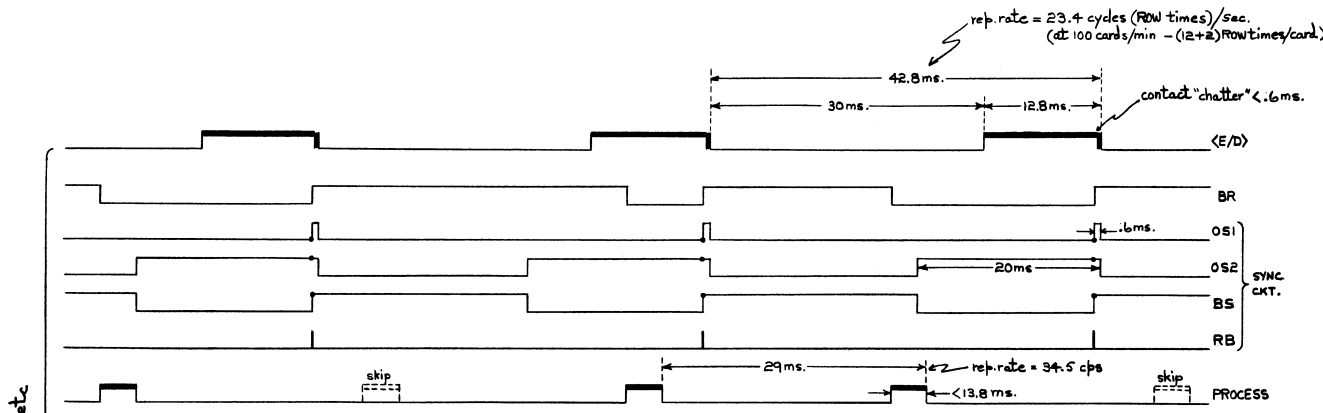
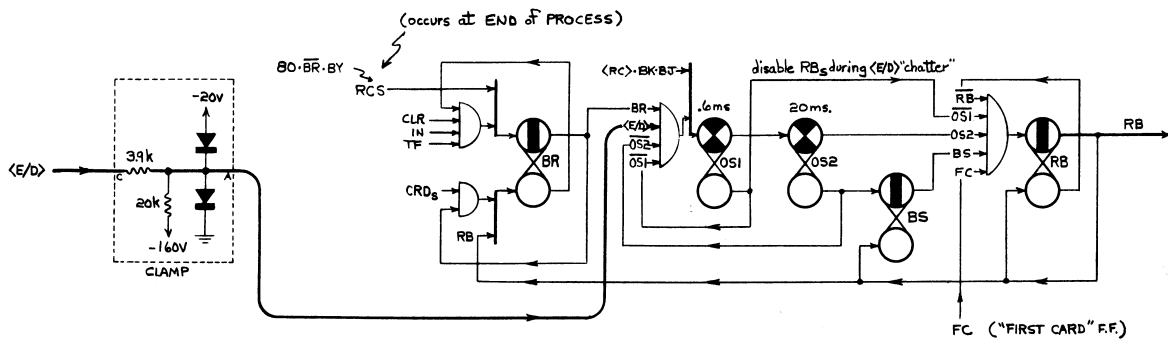


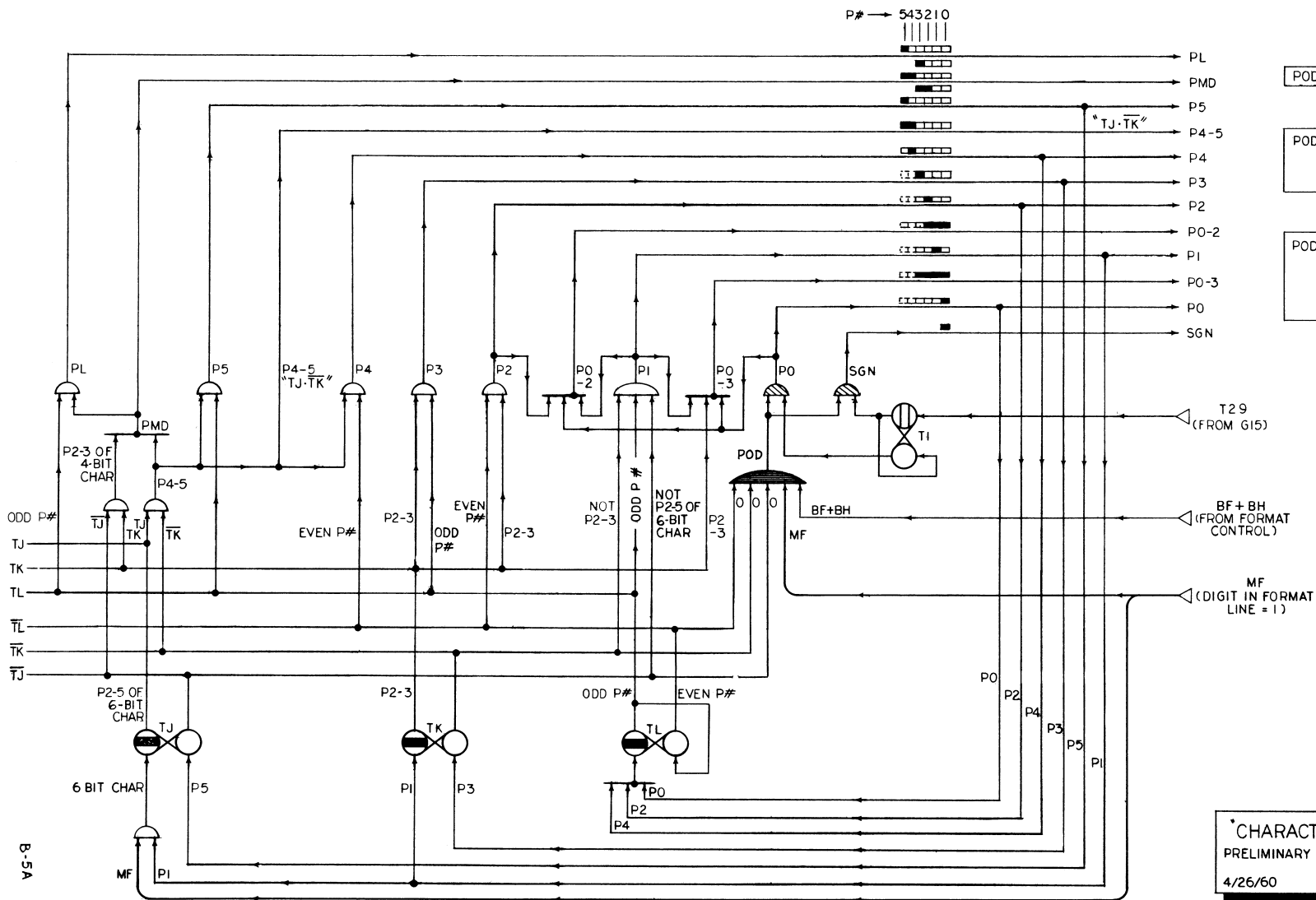
CA-2: THE "BIG PICTURE"
 Preliminary Training Print #B-1a
 4/15/60





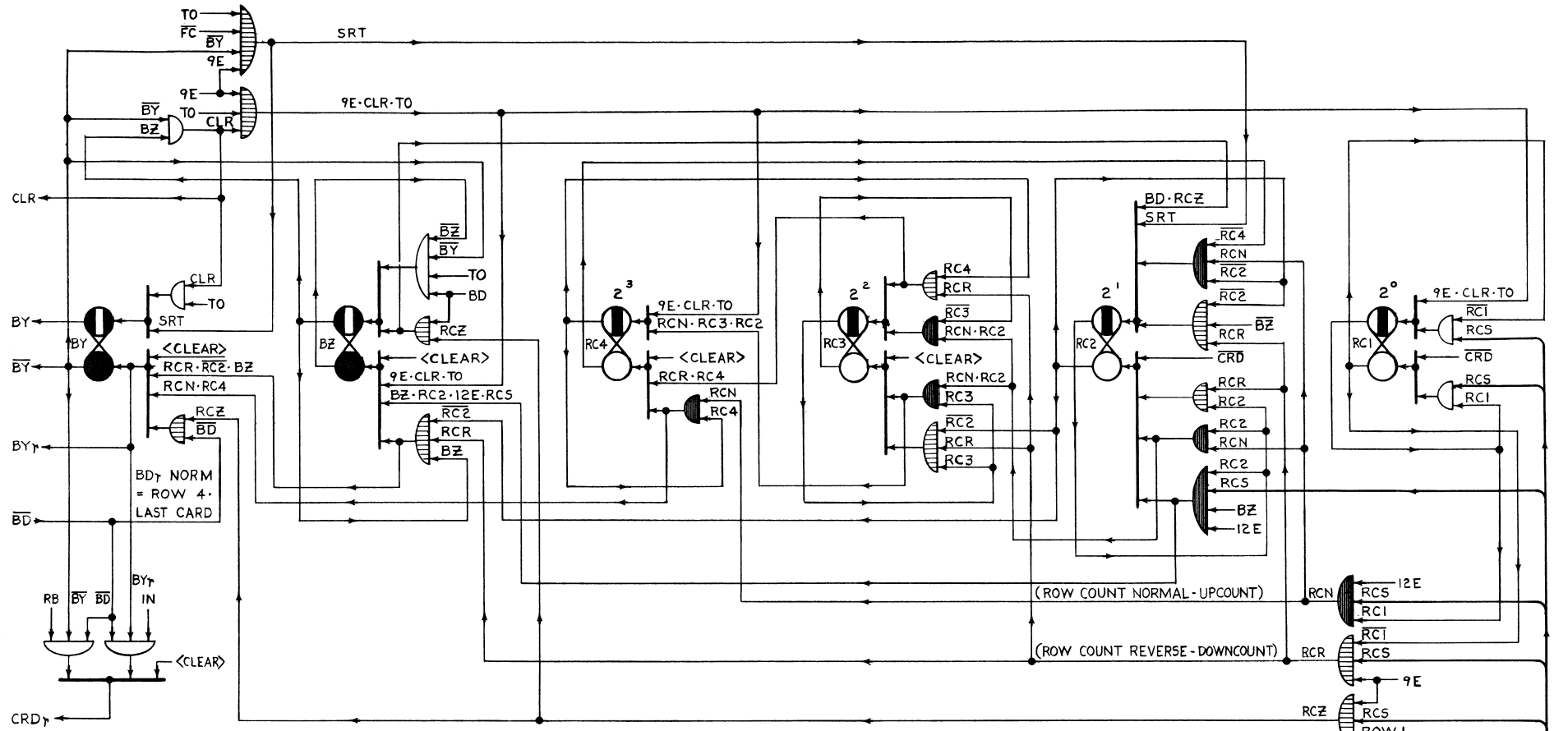


"SYNC. : CA-2 ↔ IBM"
Preliminary Training Print #B-4
4/15/60



	TJ	TK	TL	P#	MF(BF+BH)	
SIGN CHAR	0	0	0	(SGN)	1	(T1)
4-BIT CHAR	0	0	0	P0	1	(T1)
	0	0	1	P1	0	
	0	1	0	P2	X	B O
	0	1	1	P3	X	A C
6-BIT CHAR	0	0	0	P0	1	(T1)
	0	1	0	P1	1	
	1	1	0	P2	X	D
	1	1	1	P3	X	C
	1	0	0	P4	X	B
	1	0	1	P5	X	A

"CHARACTER COUNTER"
 PRELIMINARY TRAINING PRINT B-5A
 4/26/60



12 EDGE FIRST

ROW	BY	BZ	RC4	RC3	RC2	RC1
RDY CLR	0	0	0	0	0	0
12	1	1	0	0	0	0
11	1	1	0	0	0	0
10	1	1	0	0	0	0
9	1	1	0	0	0	0
8	1	1	0	0	0	0
7	1	1	0	0	0	0
6	1	1	0	0	0	0
5	1	1	0	0	0	0
4	1	1	0	0	0	0
3	1	1	0	0	0	0
2	1	1	0	0	0	0
1	1	1	0	0	0	0

gates used exclusively for ZFO.
gates used exclusively for 12 EDGE.

BY_r = RCN · RC4; RC4_r = RCN · RC4; RC1_r = RCS · RC1
BZ_s = BZ · BY · TO · BD

BY_s = CLR · TO
RC1_s = RC1 · RCS
RC2_s = RC4 · RCN · RC2; RC1_r = RCS · RC1

BZ_r = BZ · RC2 · 12E · RCS; RC2_r = RC2 · RCS · BZ · 12E; RC1_s = RC1 · RCS
RC2_s = RC4 · RCN · RC2; RC1_r = RCS · RC1
RC1_s = RC1 · RCS
RC3_s = RC3 · RCN · RC2; RC2_r = RC2 · RCN; RC1_r = RCS · RC1
RC1_s = RCS · RC1
RC2_s = RC4 · RCN · RC2; RC1_r = RCS · RC1
RC1_s = RC1 · RCS
RC4_s = RCN · RC3 · RC2; RC3_r = RCN · RC3 · RC2; RC2_r = RC2 · RCN;
RC1_s = RCS · RC1

ZERO FIRST OUT ALSO KNOWN AS "9 EDGE OUT"

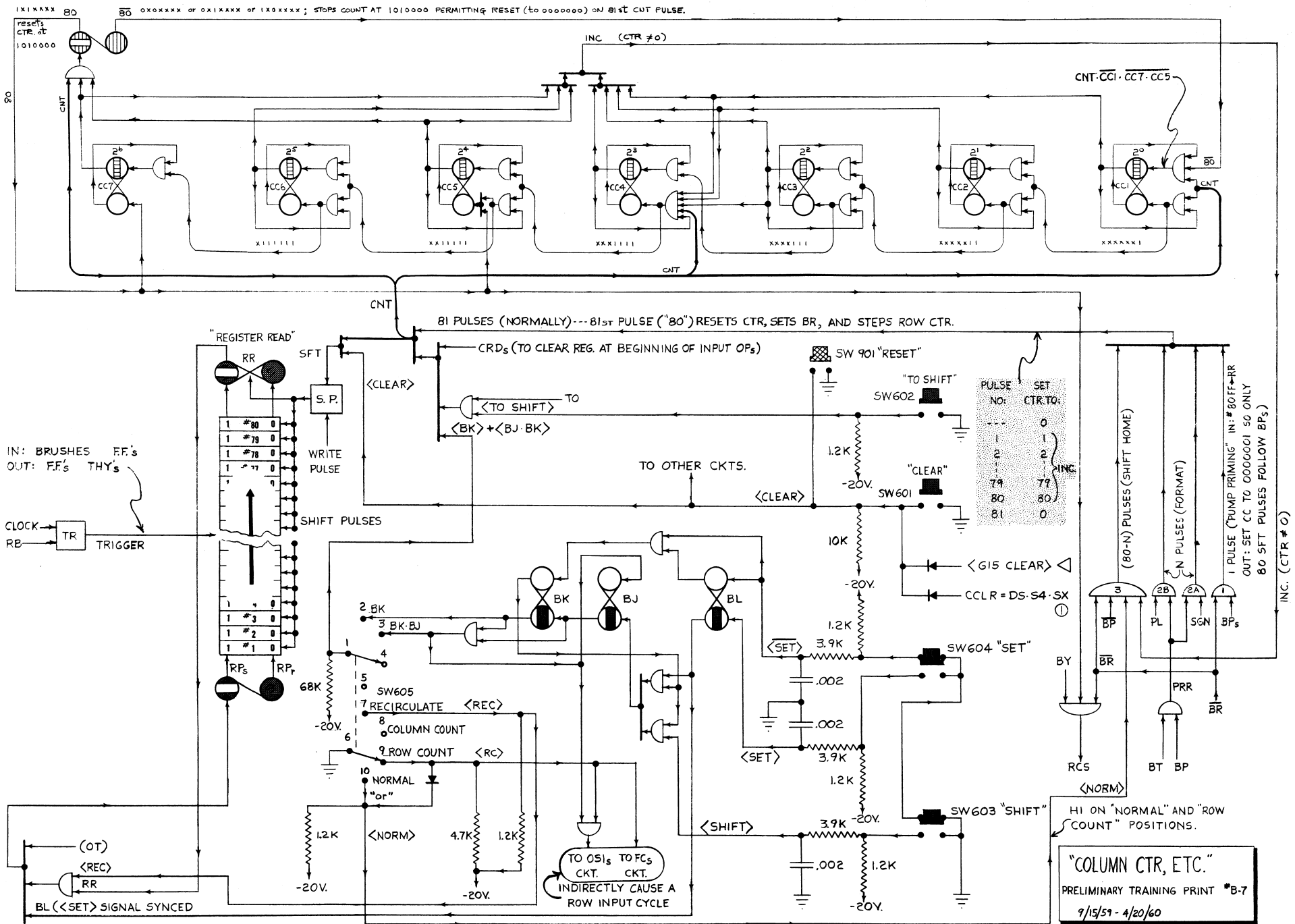
ROW	BY	BZ	RC4	RC3	RC2	RC1
(RDY)	0	0	0	0	0	0
0	1	1	0	0	0	0
11	1	1	0	0	0	0
12	1	1	0	0	0	0
RDY CLR	0	0	0	0	0	0
9	1	1	0	0	0	0
8	1	1	0	0	0	0
7	1	1	0	0	0	0
6	1	1	0	0	0	0
5	1	1	0	0	0	0
4	1	1	0	0	0	0
3	1	1	0	0	0	0
2	1	1	0	0	0	0
1	1	1	0	0	0	0

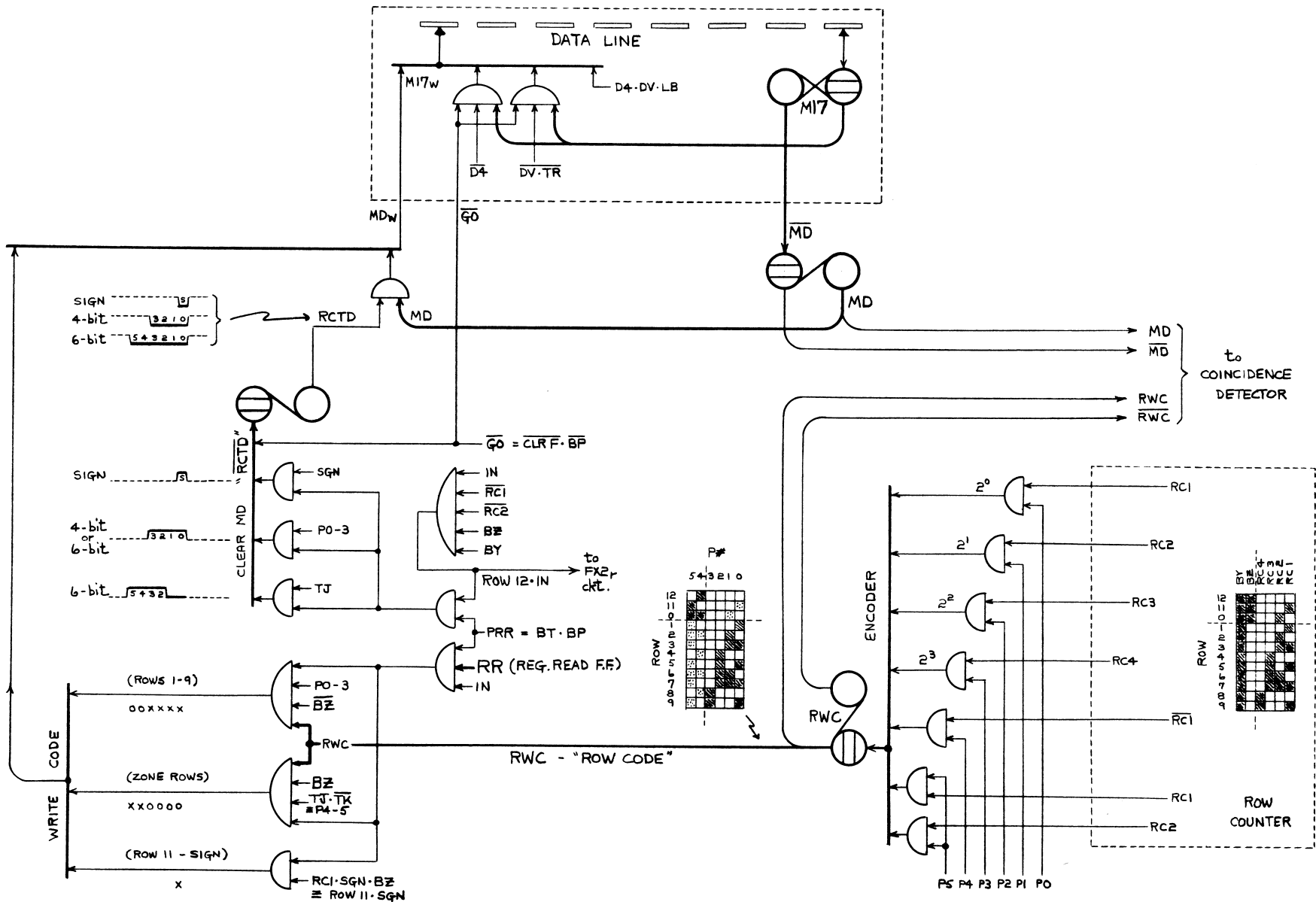
BY_s = SRT; BZ_s = BY · BZ · TO · BD + BD · RCZ; RC2_s = SRT + BD · RCZ; RC1_r = RCS · RC1
RC2_r = RCR · RC2; RC1_s = RC1 · RCS
RC1_r = RCS · RC1

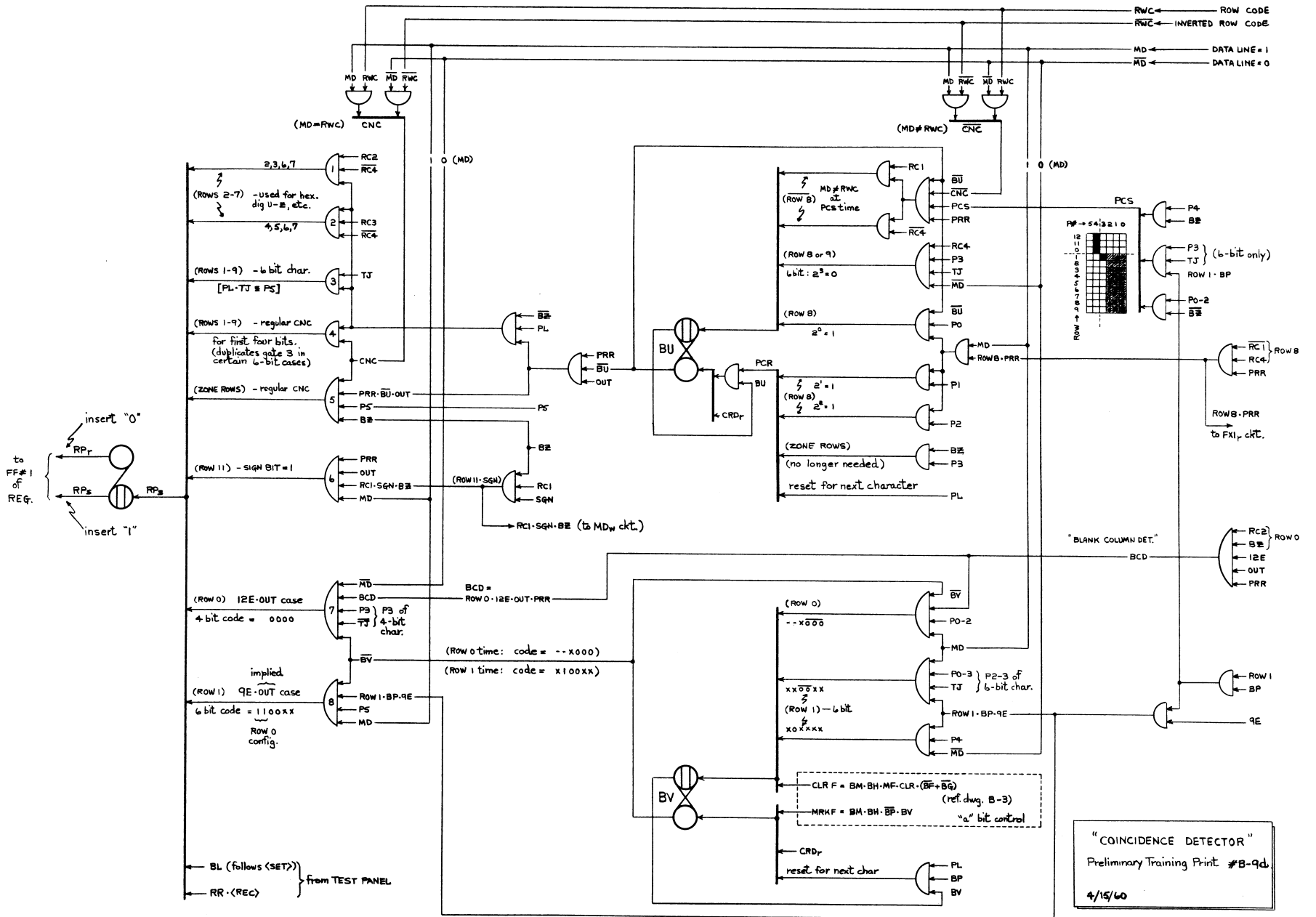
BY_r = RCR · RC2 · BZ; BZ_r = RCR · RC2 · BZ; RC1_s = RCS · RC1
BZ_s = BY · BZ · TO · BD

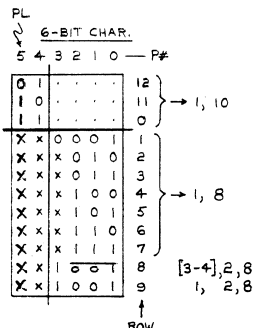
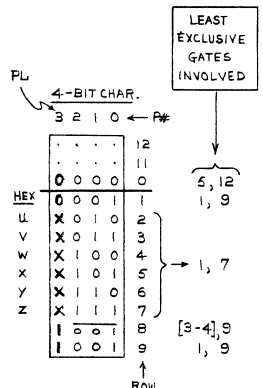
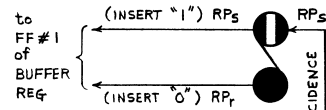
BY_s = CLR · TO; BZ_r = 9E · CLR · TO; RC4_s = 9E · CLR · TO
RC1_r = RCS · RC1
RC4_r = RCR · RC4; RC3_s = RCR · RC4; RC2_s = RCR · BZ · RC2;
RC1_r = RCS · RC1
RC2_r = RCR · RC2; RC1_s = RCS · RC1
RC1_r = RCS · RC1
RC3_r = RCR · RC2 · RC3; RC2_s = RCR · BZ · RC2; RC1_s = RCS · RC1
RC1_r = RCS · RC1
RC2_r = RCR · RC2; RC1_s = RCS · RC1

"ROW COUNTER"
PRELIMINARY TRAINING PRINT # B-6a
4/18/60









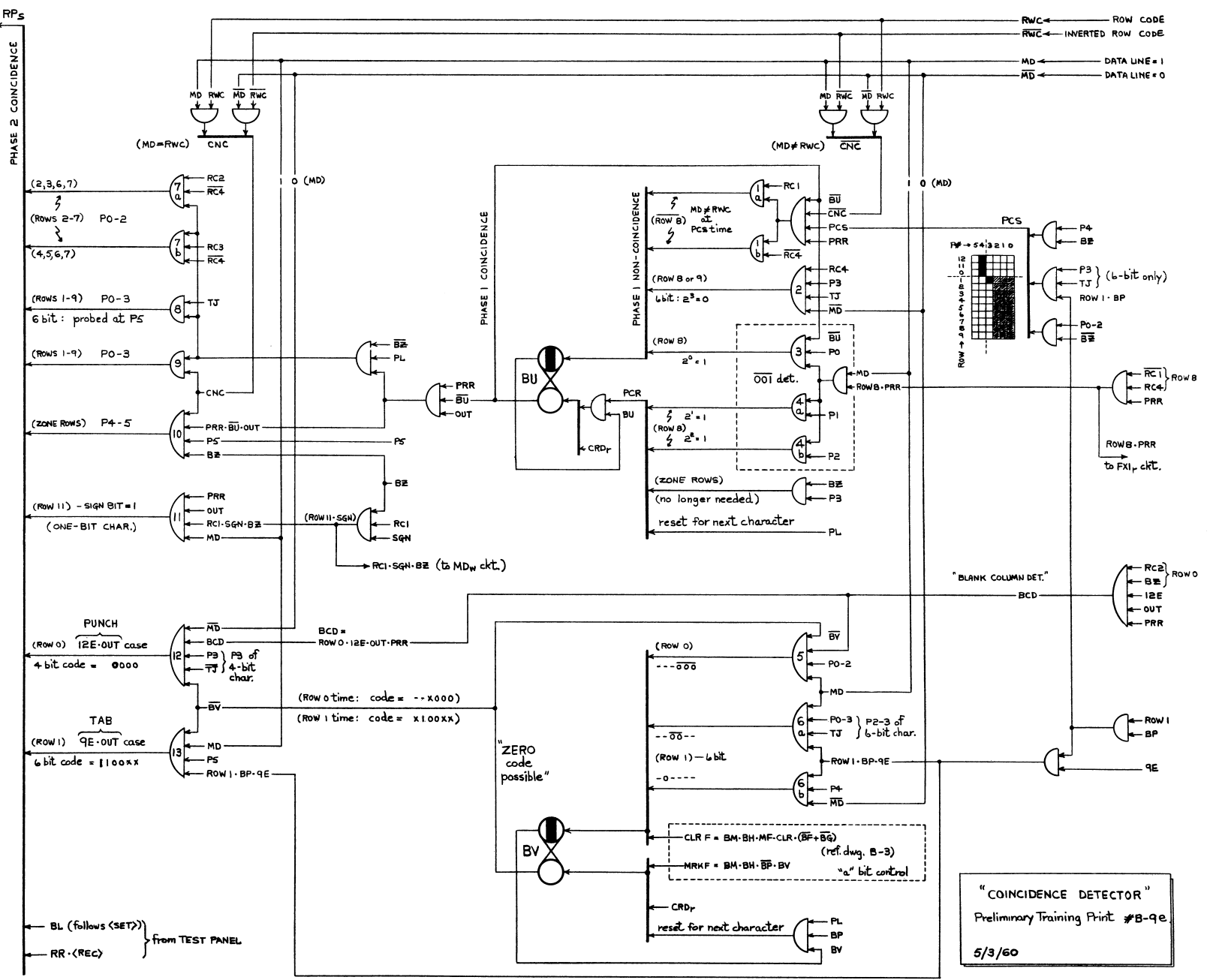
ZERO CODES

0 0 0 0	Row 0	(blank)
0 0 0 0 0	(blank)	(blank)
1 1 0 0 0 0	Row 0	Ø

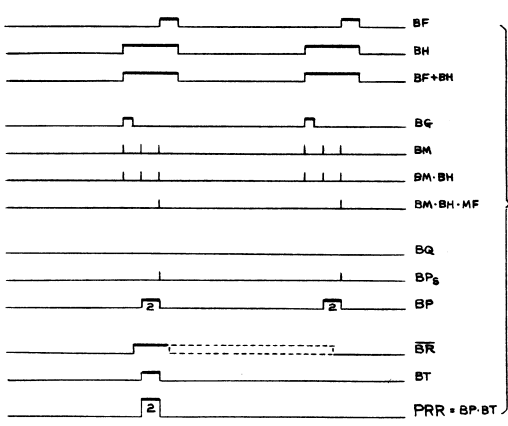
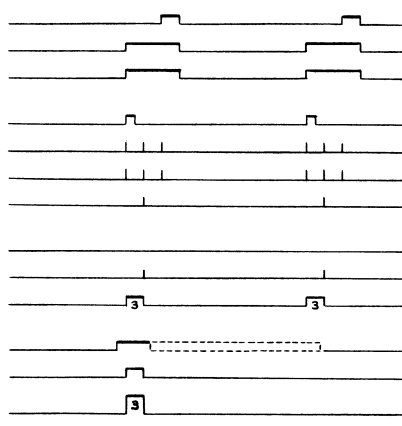
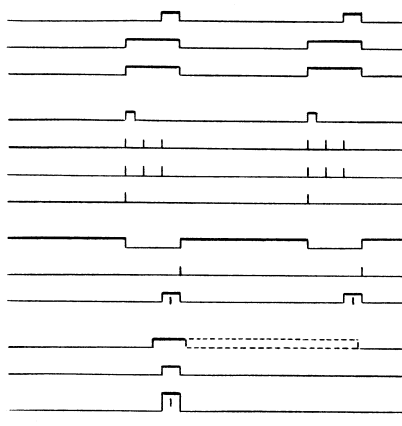
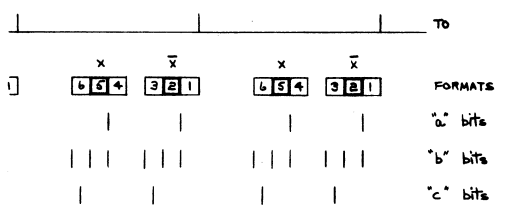
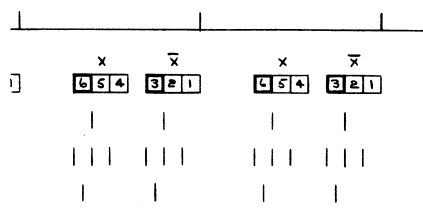
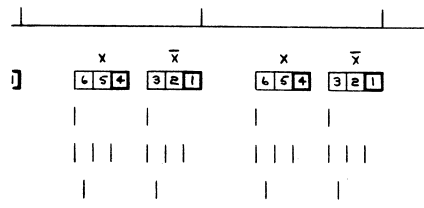
SPECIAL ROW 1 IMPULSE FOR TABULATOR

GATE 13 CODES	ROW IMPULSES	PRINT
1 1 0 0 0 0	0	Ø
1 1 0 0 0 1	0 1	Ø
1 1 0 0 1 0	0 1* 2	S
1 1 0 0 1 1	0 1* 3	T

* ROW 1 IMPULSE ignored by TABULATOR

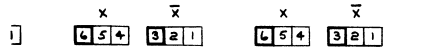
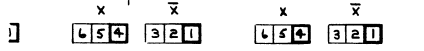
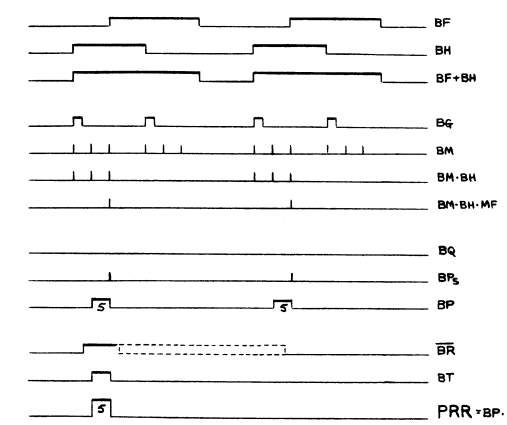
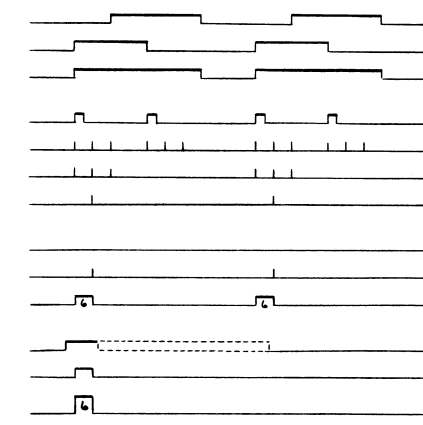
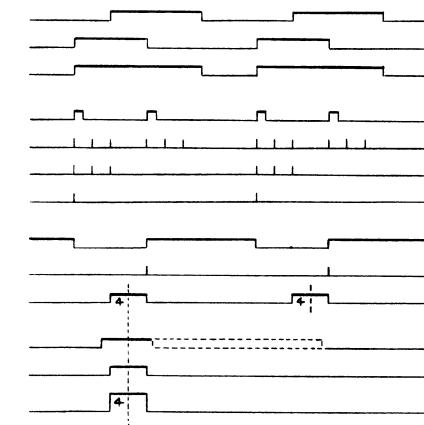


"COINCIDENCE DETECTOR"
Preliminary Training Print #B-9e
5/3/60

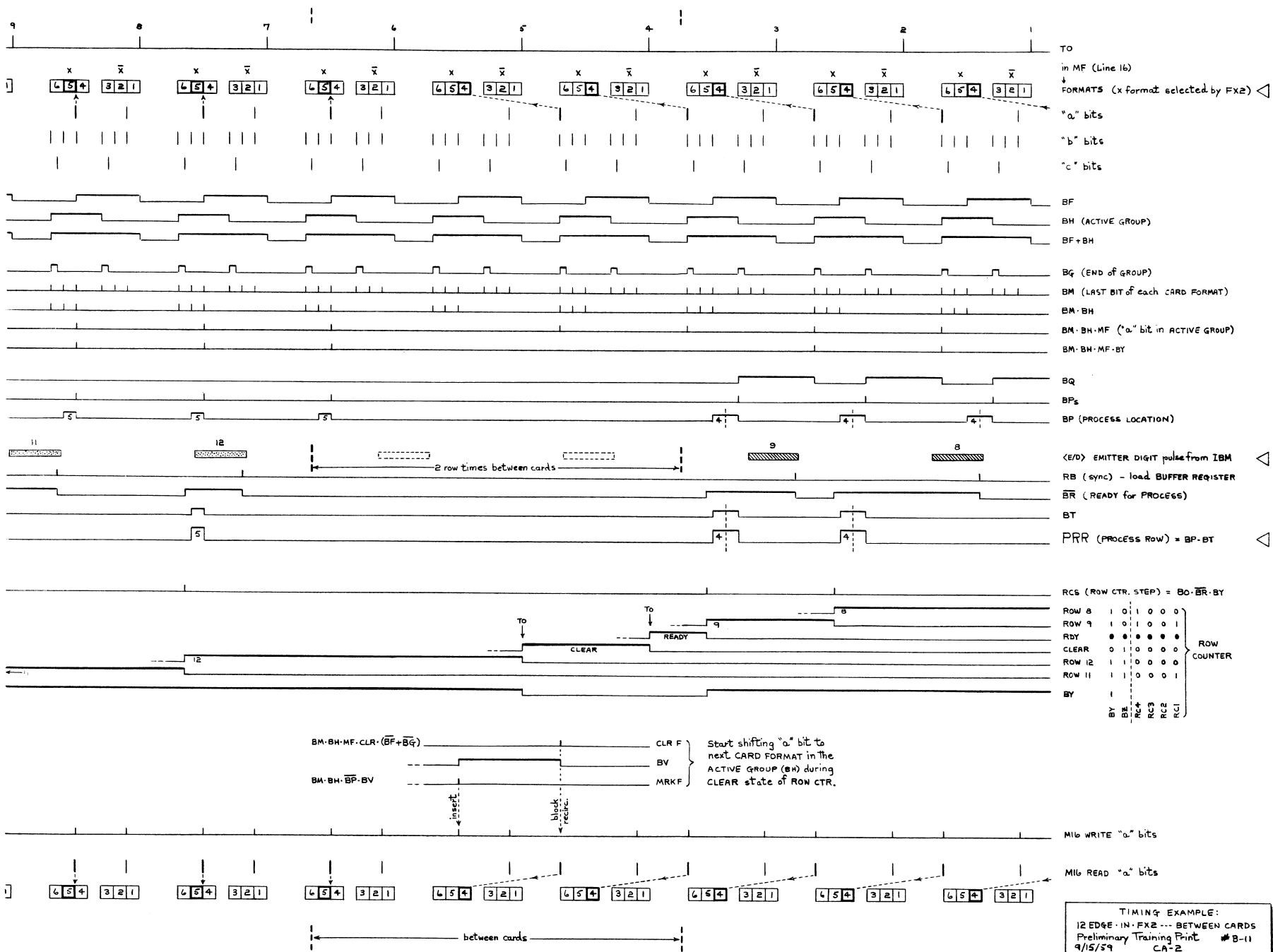


FX2: PRIME FORMAT

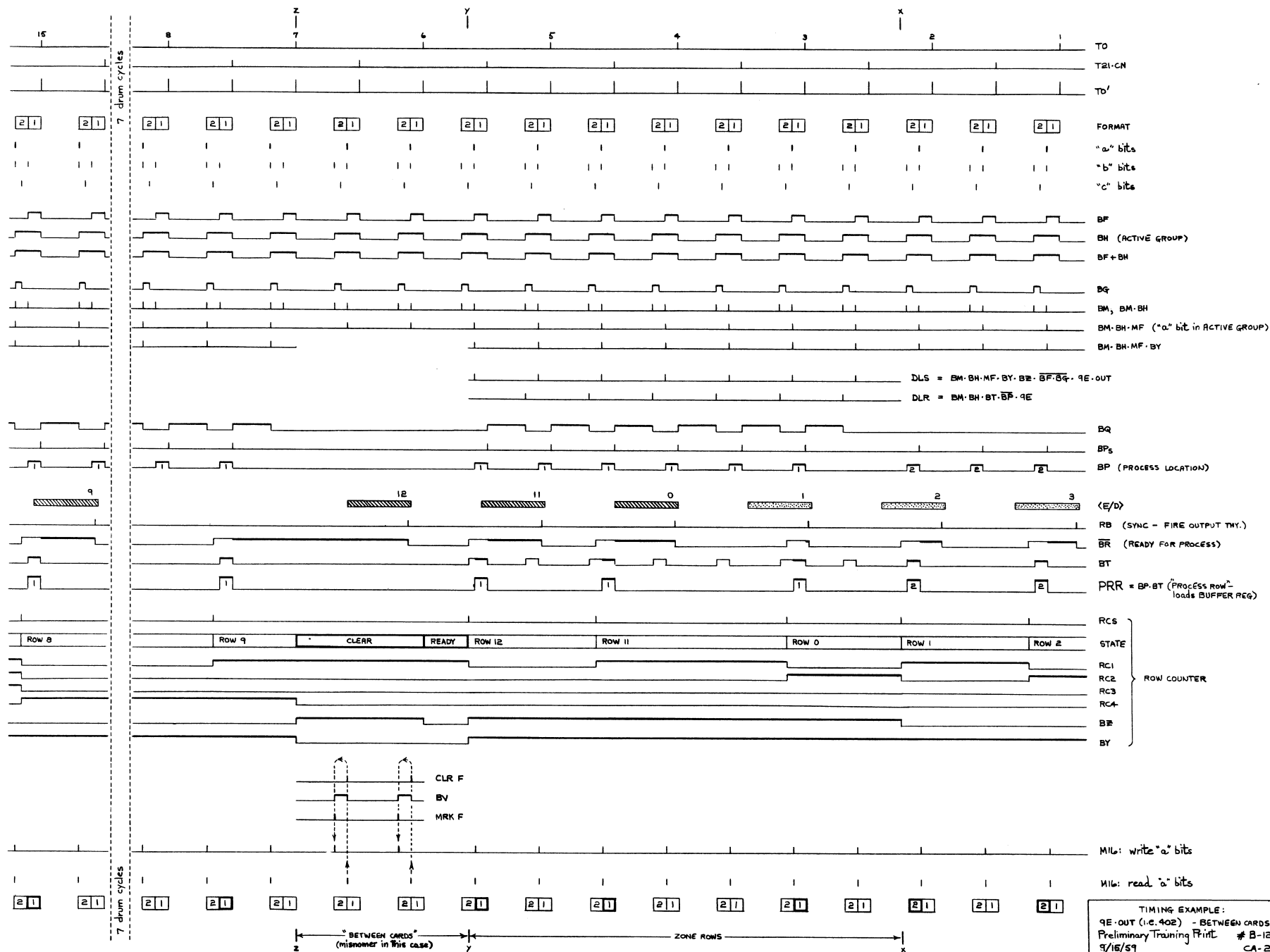
FX2: ALTERNATE FORMAT



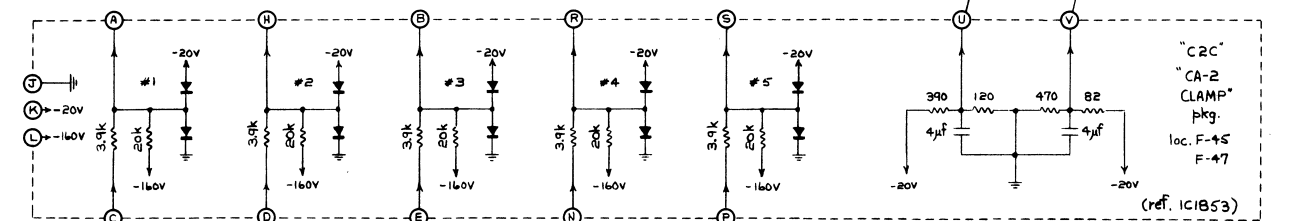
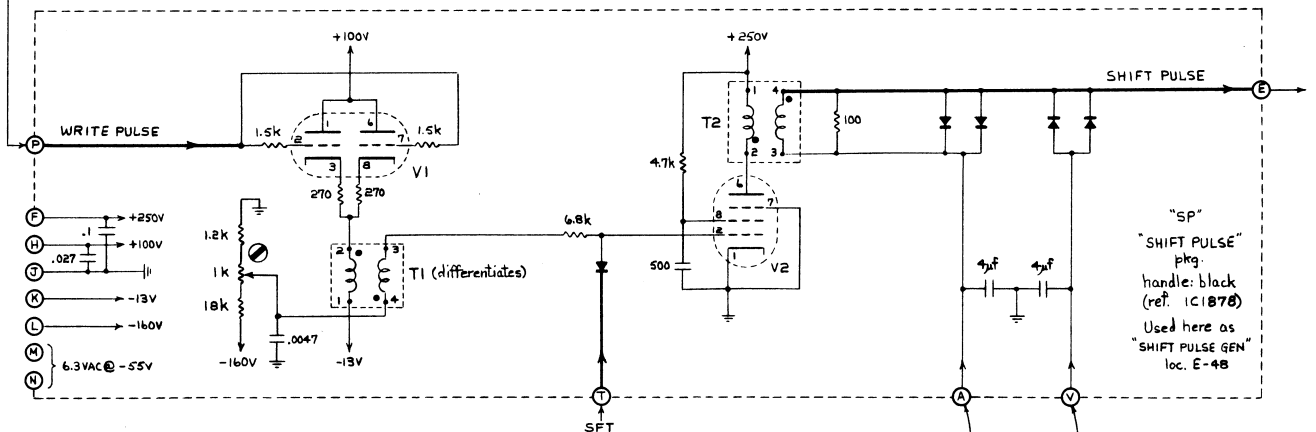
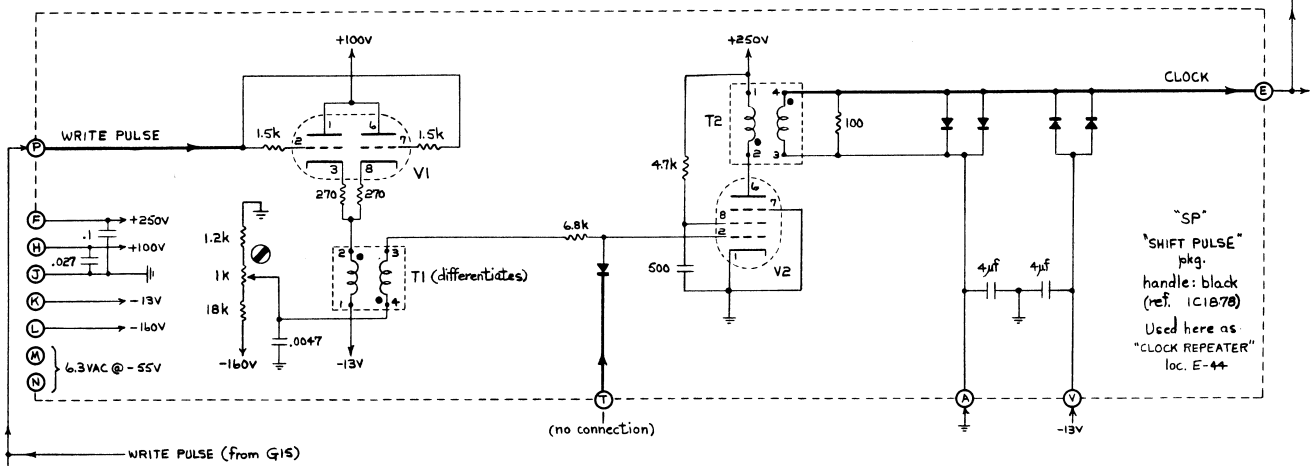
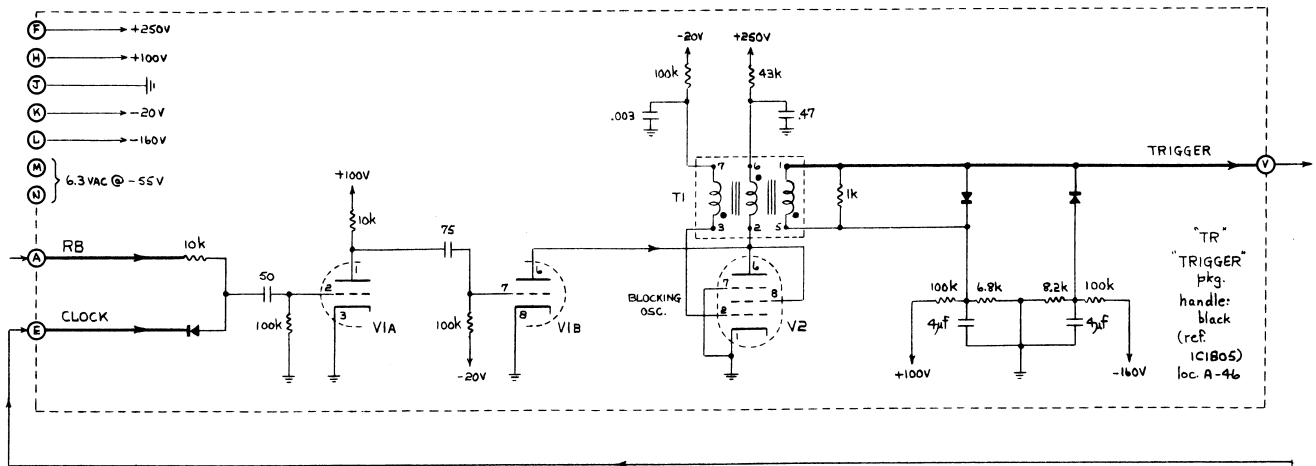
CYCLIC ACTION:
CARD FORMAT SELECTION
Preliminary Training Print # B-10
9/15/59 CA-2

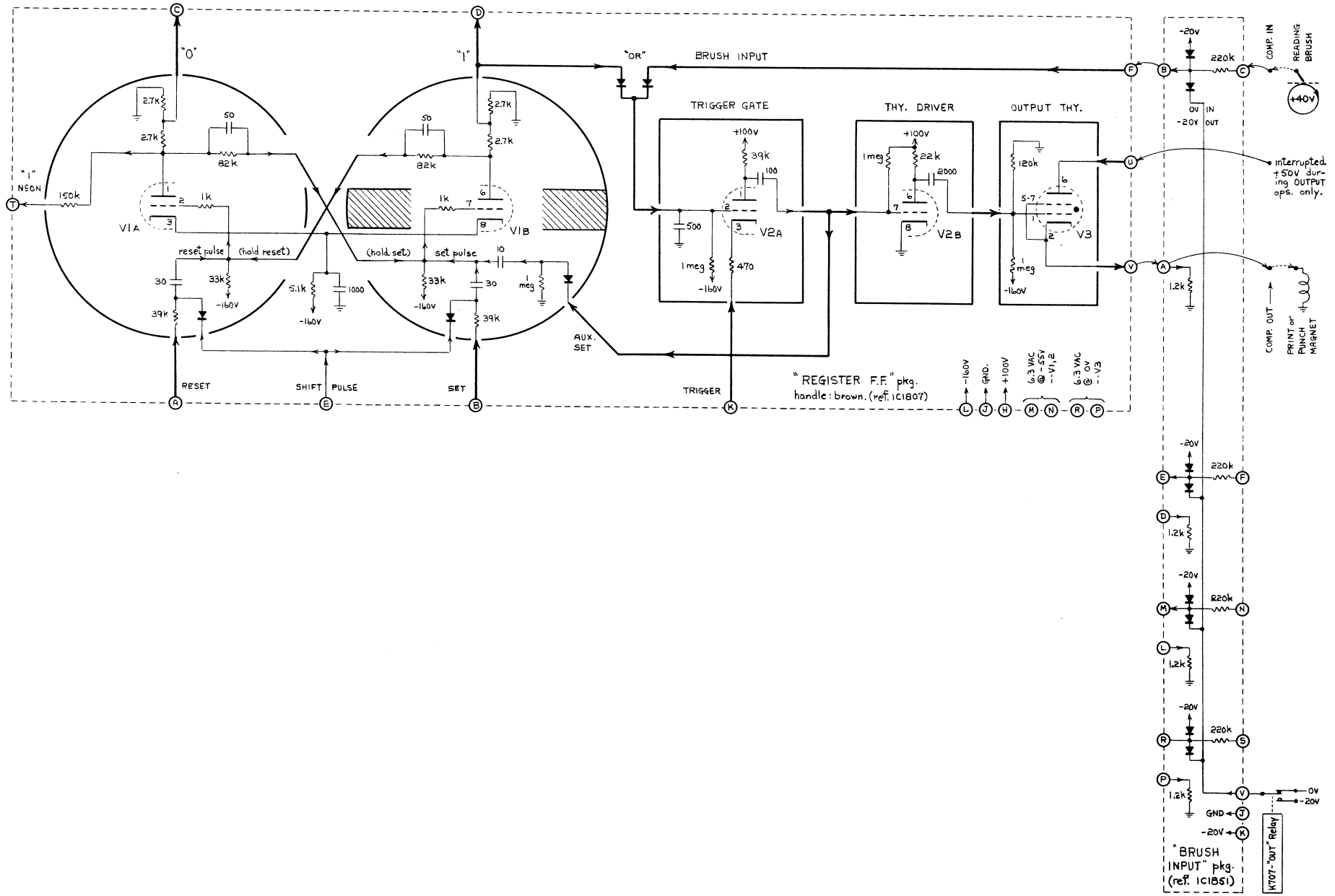


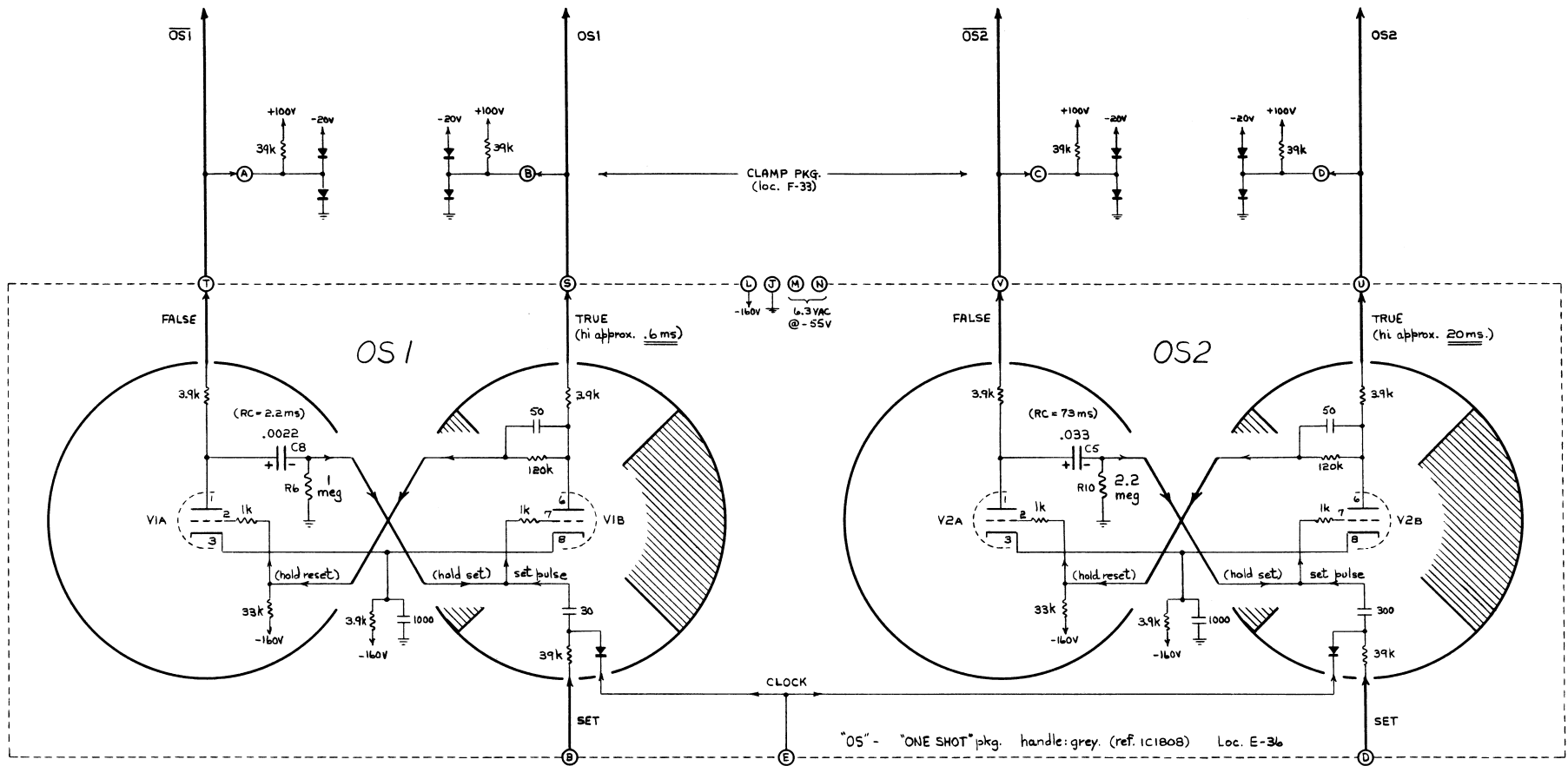
TIMING EXAMPLE:
 12 EDGE-IN FX2 BETWEEN CARDS
 Preliminary Training Print #B-11
 9/5/59 CA-2



TIMING EXAMPLE:
 QE·OUT (i.e. 402) - BETWEEN CARDS
 Preliminary Training Print # B-12
 9/15/59 CA-2

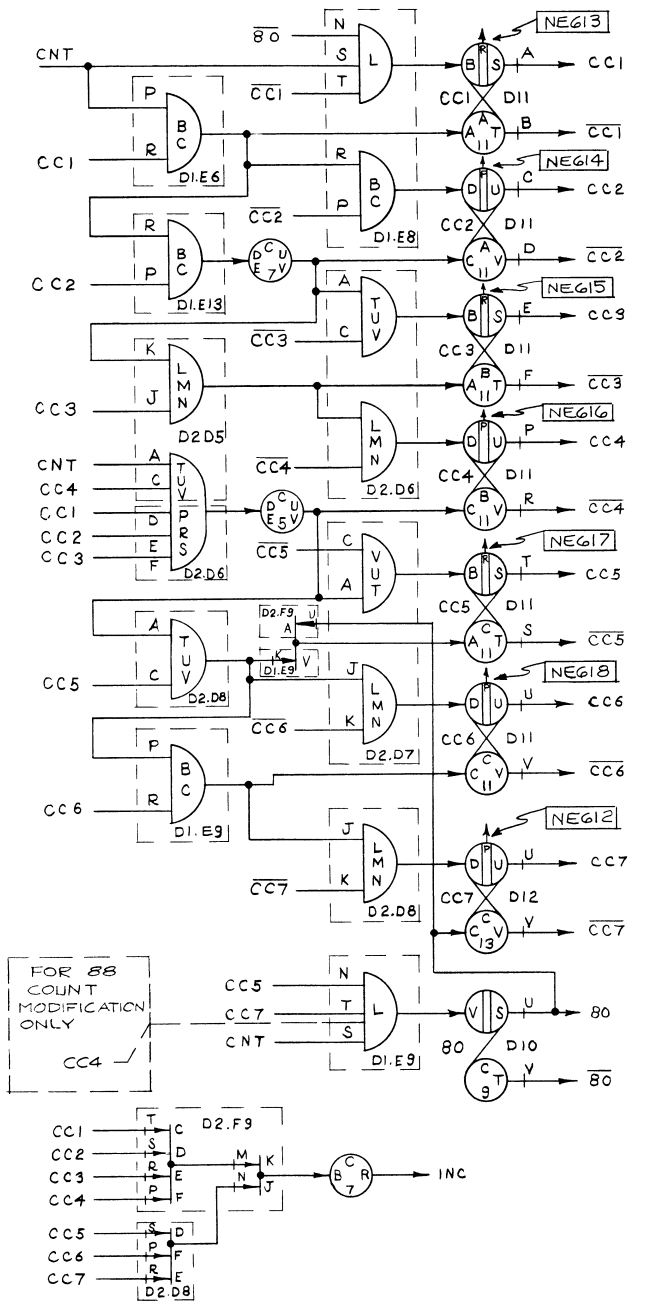






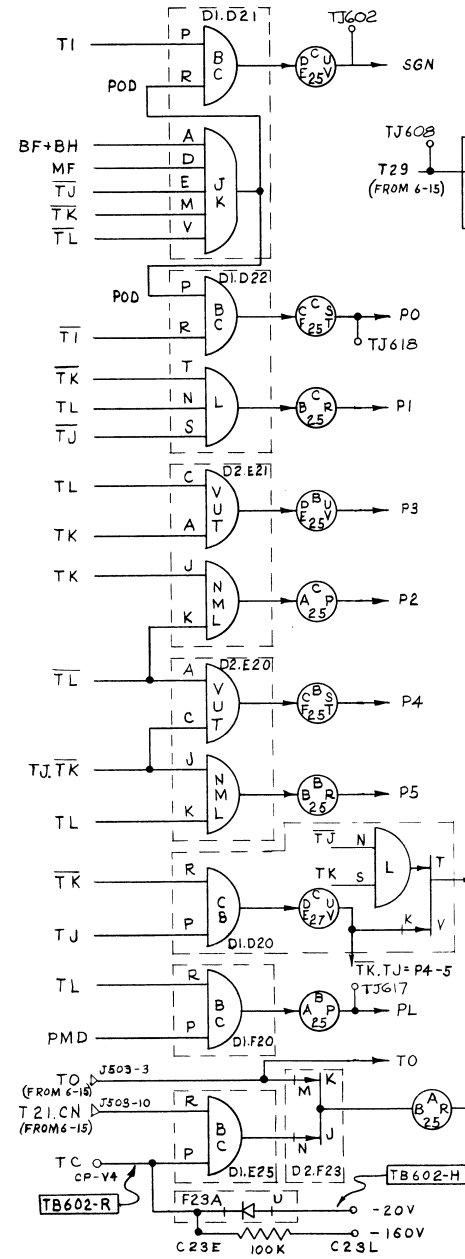
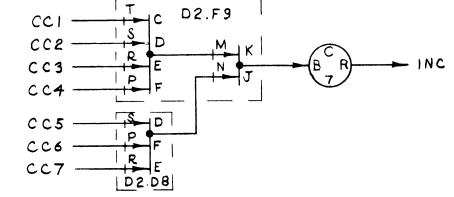
ZONE	ITEM NO.	CIRC. STR.	NO. REQ.	PART NO.	DESCRIPTION	ZONE	ITEM NO.	CIRC. STR.	NO. REQ.	PART NO.	DESCRIPTION
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REVISIONS			
LTR.	DESCRIPTION	DATE	APPR.
A	PRODUCTION RELEASE	4/21/59	DA
B	SEE ECO# 1007	4/21/59	DA

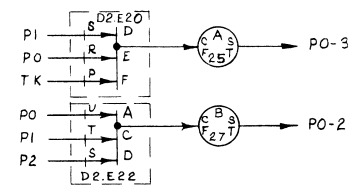
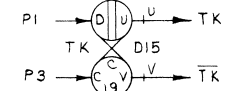
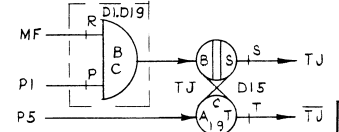
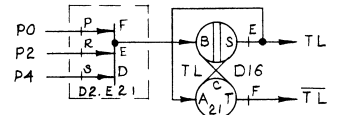


FOR 88
COUNT
MODIFICATION
ONLY

CC4



	TJ	TK	TL	
P0	0	0	0	4 BIT CHARACTER
P1	0	0	1	
P2	0	1	0	
P3	0	1	1	
P0	0	0	0	6 BIT CHARACTER
P1	0	0	1	
P2	1	1	0	
P3	1	1	1	
P4	1	0	0	
P5	1	0	1	

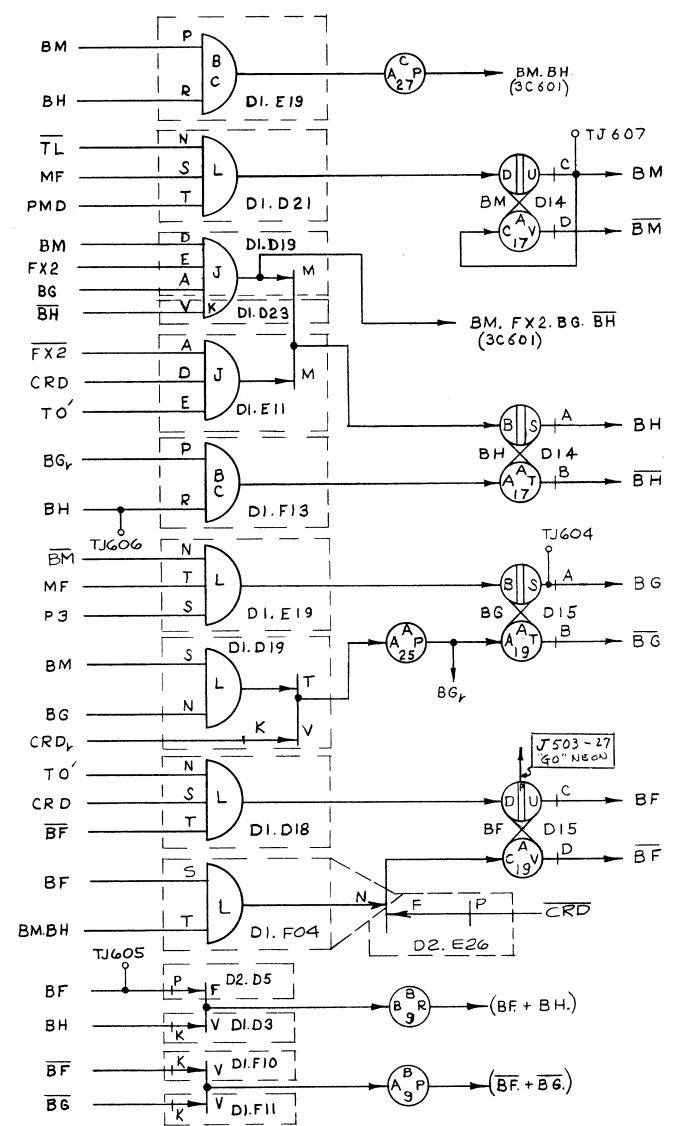
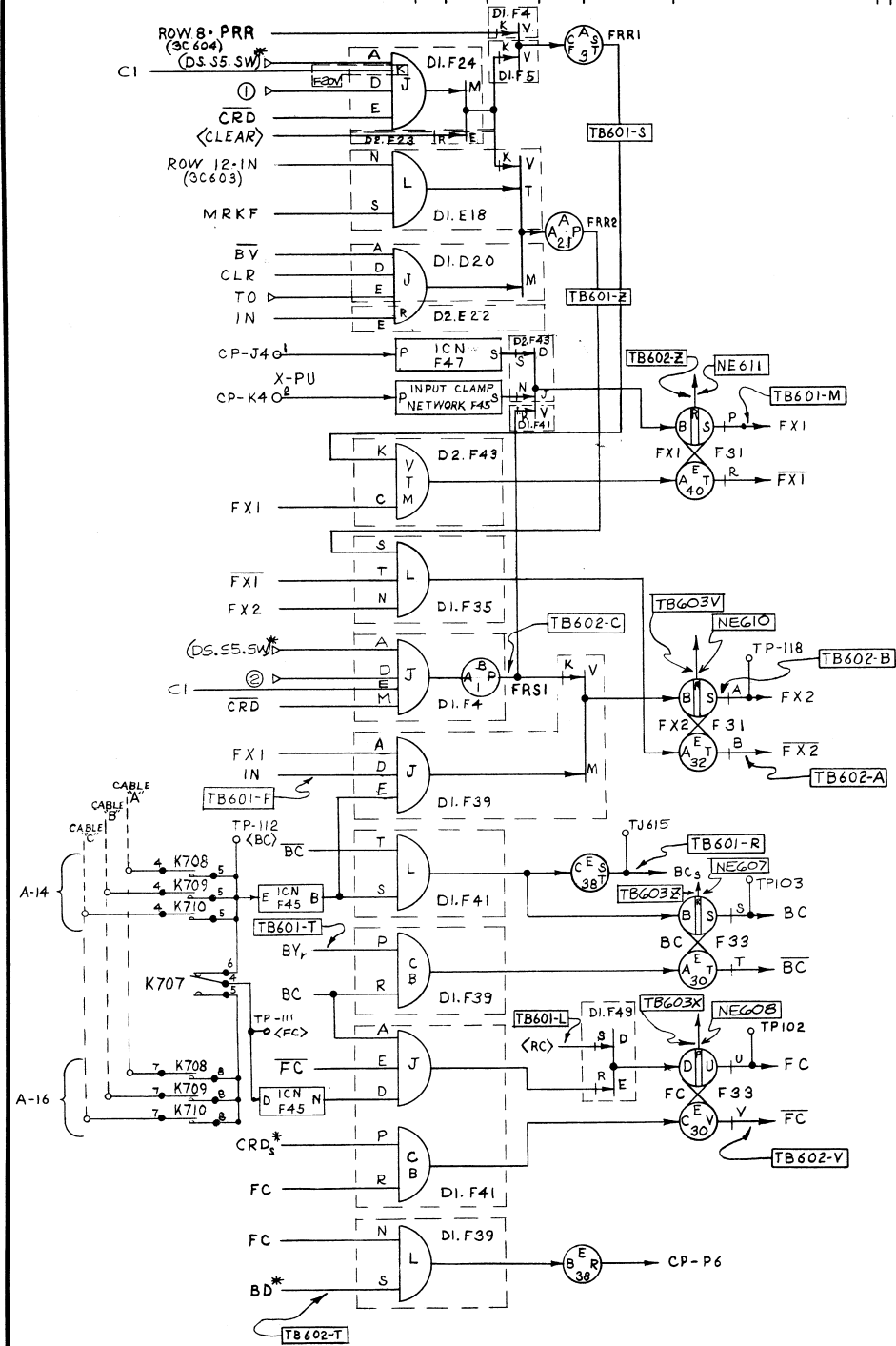


3C599B

MATERIAL DESCRIPTION		MATERIAL SPECIFICATION		FIRST USED ON		SIMILAR TO		NEXT ASSEM.		MODEL NO.	
TOLERANCES AND NOTES EXCEPT AS NOTED		SCALE		DRAWN BY		CHKD. BY		ELECT. ENGR.		PROJ. ENGR.	
ANGULAR ± 1/2°		1/8"		NAME		DATE		K. Yadav		4-21-59	
LINEAR .XX ± .03				DATE				4-21-59		6-3-59	
.XX ± .010											
1. MACHINED FINISH											
2. MACHINED DIA'S ON COMMON CENTER											
3. MACHINED SURFACES SQUARE TO RESPECTIVE AXIS WITHIN .005 PER IN.											
4. BREAK SHARP EDGE .010 R. APPROX.											
5. ALL DIMENSIONS IN INCHES.											
Bendix Computer		DIVISION OF BENDIX AVIATION CORPORATION		LOS ANGELES, CALIF.		TITLE		PART NO.		CHG. LTR.	
						SCHEMATICS - COLUMN COUNTER CHARACTER COUNTER-CA-2		3C599		B	

ZONE	ITEM NO.	CIRC. STR.	NO. REQ.	PART NO.	DESCRIPTION	ZONE	ITEM NO.	CIRC. STR.	NO. REQ.	PART NO.	DESCRIPTION
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REVISIONS			
LTR.	DESCRIPTION	DATE	APPR.
A	PRODUCTION RELEASE	2/19/57	274
B	SEE ECO # 1007	1/19/57	104

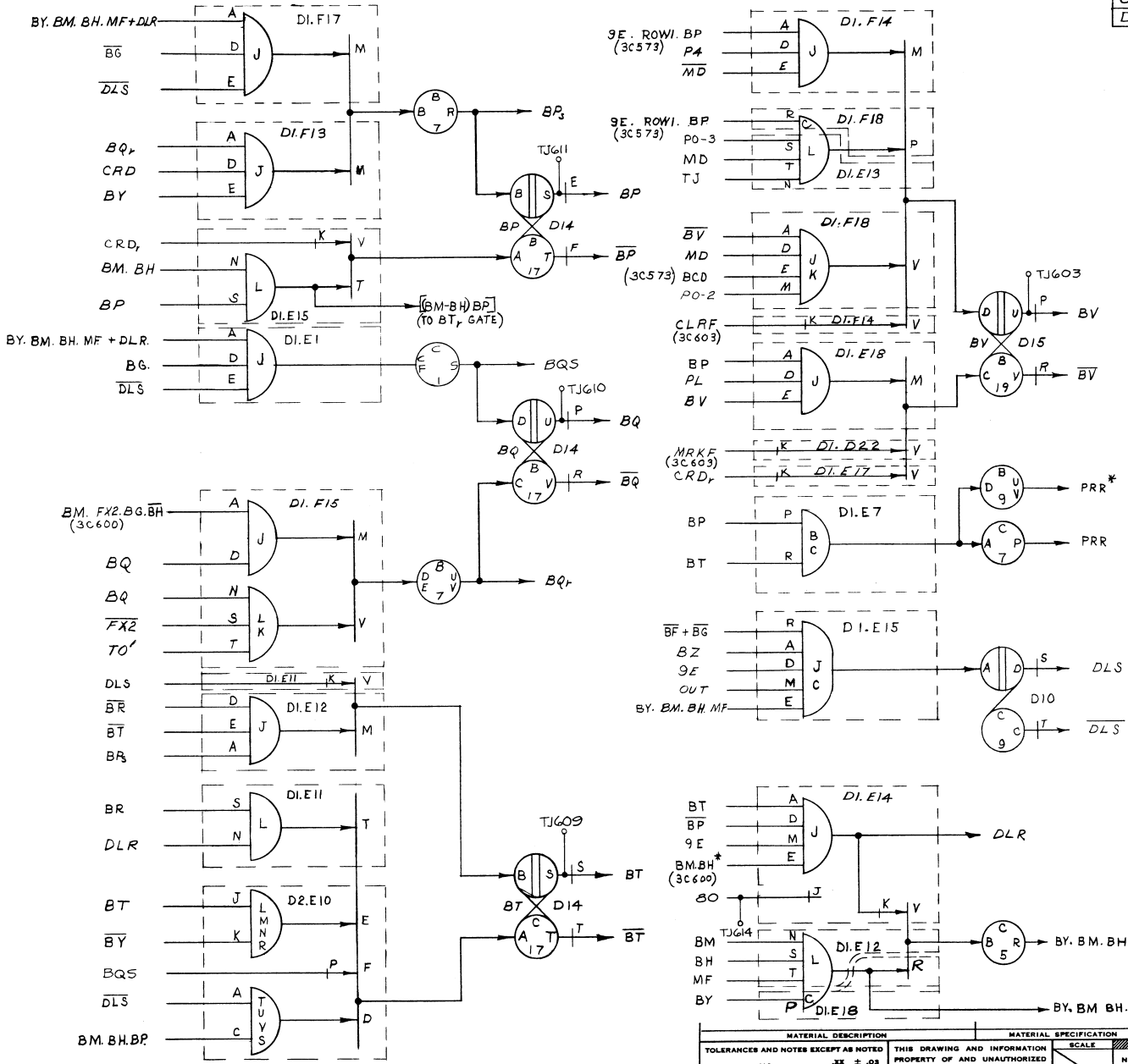


3C600 B

MATERIAL DESCRIPTION		MATERIAL SPECIFICATION		FIRST USED ON		SIMILAR TO		NEXT ASSEM.		MODEL NO.	
TOLERANCES AND NOTES EXCEPT AS NOTED		SCALE		DRAWN BY		CHKD. BY		MECH. ENGR.		PROJ. ENGR.	
ANGULAR ± 1/2°		LINEAR .XX ± .03		NAME		DATE		DATE		DATE	
1. MACHINED FINISH		MU IN RMS		L.R. Kelly		2-3-57		K. Vaden		5-4-57	
2. MACHINED SHAFT ON COMMON CENTER		CONCENTRIC WITHIN .005 F.I.R.		DATE							
3. MACHINED SURFACES SQUARE TO RESPECTIVE AXIS WITHIN .005 PER IN.		4. BREAK SHARP EDGE .010 R. APPROX.		TITLE		PART NO.		CHG. LTR.			
5. ALL DIMENSIONS IN INCHES.		Bendix Computer		SCHEMATICS - FORMAT		3C600		B			
		DIVISION OF BENDIX AVIATION CORPORATION		CONTROL GATE - CA-2							
		LOS ANGELES, CALIF.									

ZONE	ITEM NO.	CIRC. SYM.	NO. REQ.	PART NO.	DESCRIPTION	ZONE	ITEM NO.	CIRC. SYM.	NO. REQ.	PART NO.	DESCRIPTION
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REVISIONS			
LTR.	DESCRIPTION	DATE	APPR.
A	PRODUCTION RELEASE	5/29/57	KJA
B	SEE ECO # 1007	8/3/57	DH
C	SEE ECO # 1032	12/5/57	DH
D	SEE ECO # 1046	1/15/58	DH

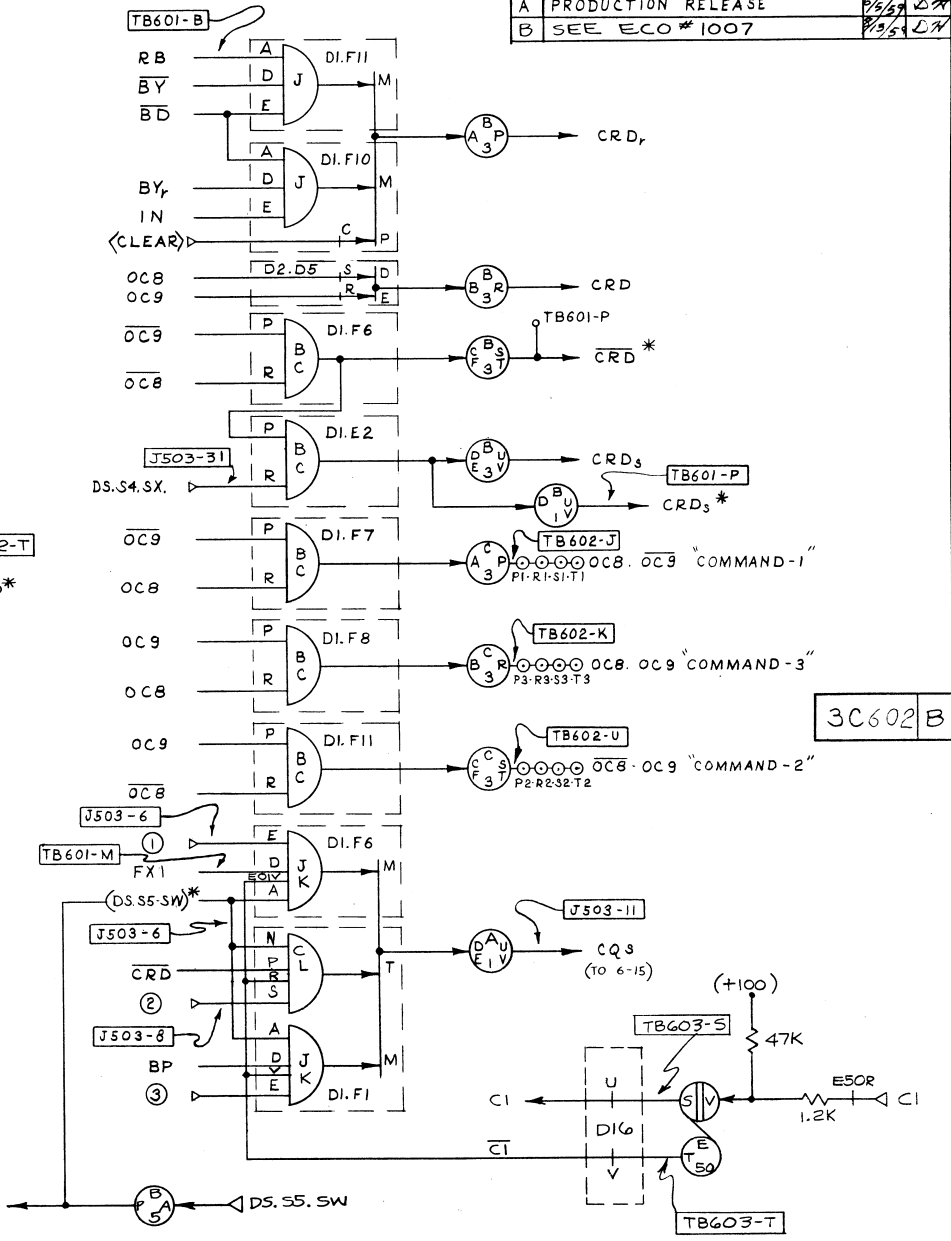
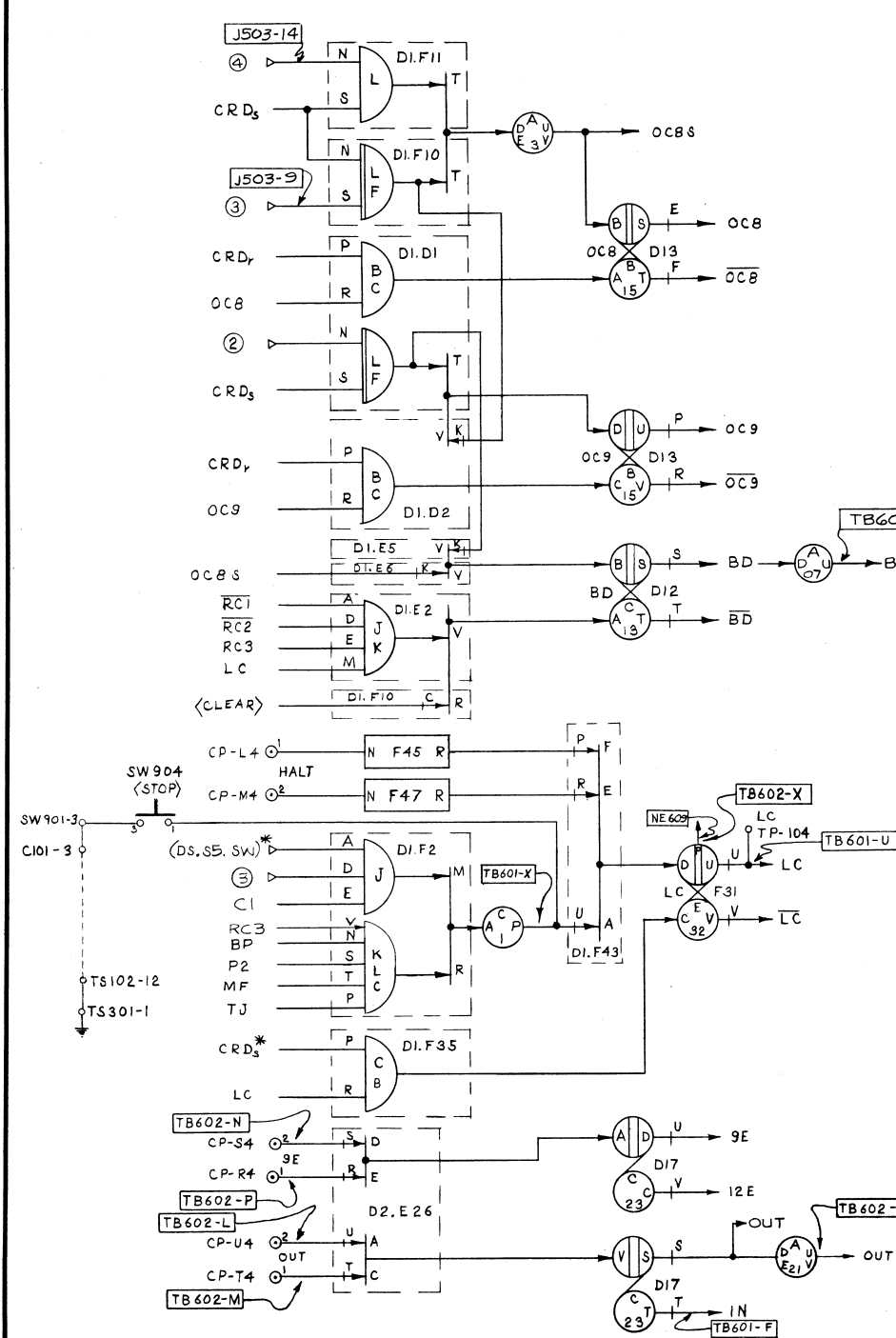


3C601 D

MATERIAL DESCRIPTION		MATERIAL SPECIFICATION		FIRST USED ON		SIMILAR TO		NEXT ASSEM.		MODEL NO.	
TOLERANCES AND NOTES EXCEPT AS NOTED		THIS DRAWING AND INFORMATION		DRAWN BY		MECH. ENGR.		ELECT. ENGR.		PROJ. ENGR.	
ANGULAR ± 1/2°		PROPERTY OF AND UNAUTHORIZED		NAME				K. Yadan		K. Yadan	
LINEAR .001 ± .001		REPRODUCTION FORBIDDEN BY		DATE				4.21.59		5-4-57	
1. MACHINED FINISH		Bendix Computer		TITLE		PART NO.		3C601		CHG. LTR.	
2. MACHINED DIA'S ON COMMON CENTER		DIVISION OF BENDIX AVIATION CORPORATION		SCHEMATICS -						D	
3. MACHINED SURFACES SQUARE TO RESPECTIVE		LOS ANGELES, CALIF.		PROCESS CONTROL - CA-2							
4. BREAK SHARP EDGE .010 R. APPROX.											
5. ALL DIMENSIONS IN INCHES.											

ZONE	ITEM NO.	CIRC. STR.	NO. REQ.	PART NO.	DESCRIPTION	ZONE	ITEM NO.	CIRC. STR.	NO. REQ.	PART NO.	DESCRIPTION
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REVISIONS			
LTR.	DESCRIPTION	DATE	APPR.
A	PRODUCTION RELEASE	8/25/59	DA
B	SEE ECO # 1007	8/25/59	DA

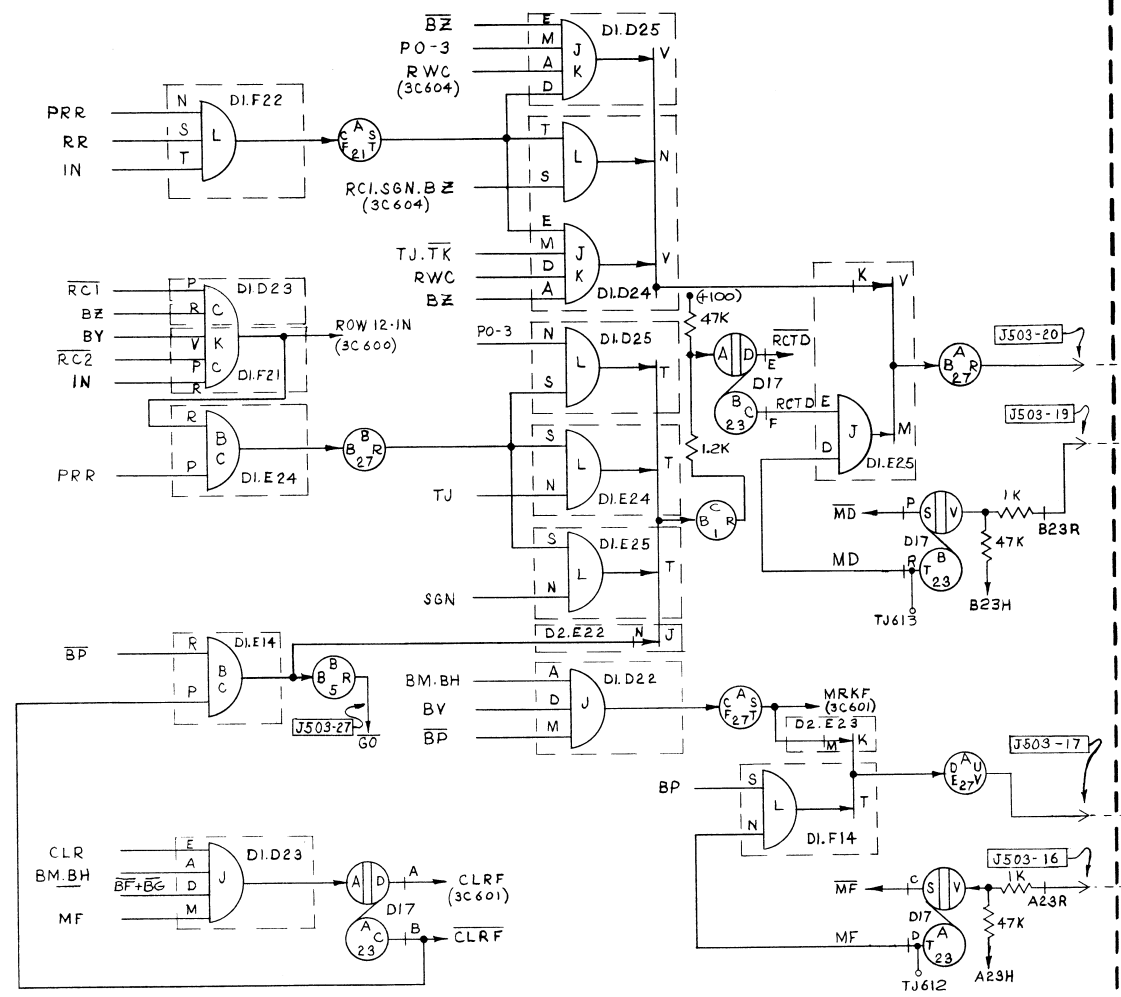


3C602 B

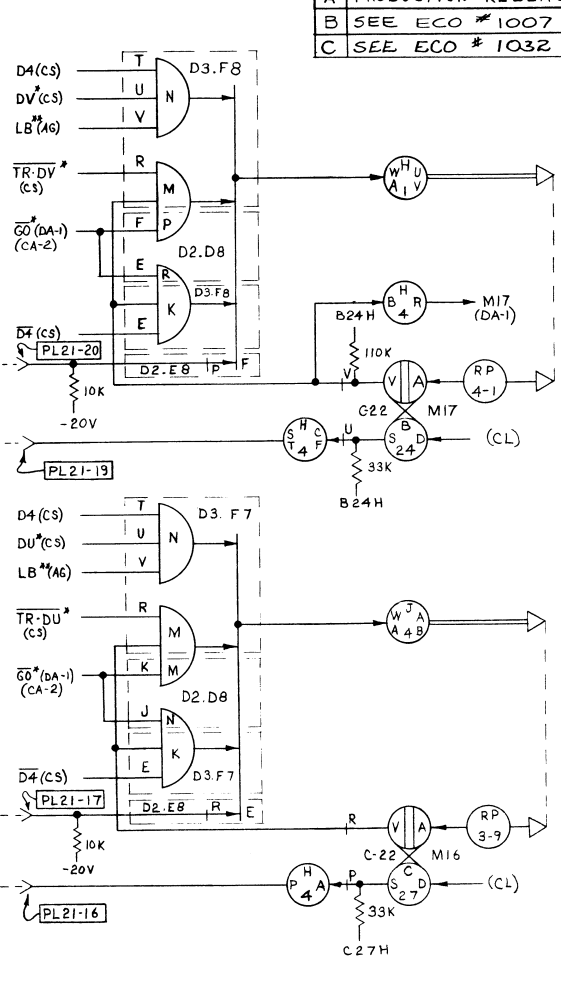
TOLERANCES AND NOTES EXCEPT AS NOTED		MATERIAL SPECIFICATION		FIRST USED ON		SIMILAR TO		NEXT ASSEM.		MODEL NO.	
ANGULAR	LINEAR	SCALE	DRAWN BY	CHKD. BY	MECH. ENGR.	ELECT. ENGR.	PROJ. ENGR.	DATE	PART NO.	CHG. LTR.	REV.
± 1/2°	± .010		J. R. Rieley				K. Yadav	3-7-59	4-21-59	5-4-59	
1. MACHINED FINISH MU IN RMS 2. MACHINED DIA'S ON COMMON CENTER CONCENTRIC WITHIN .008 F.I.L. 3. MACHINED SURFACES SQUARE TO RESPECTIVE AXIS WITHIN .008 PER IN. 4. BREAK SHARP EDGE .010 R. APPROX. 5. ALL DIMENSIONS IN INCHES.											
THIS DRAWING AND INFORMATION PROPERTY OF AND UNAUTHORIZED REPRODUCTION FORBIDDEN BY Bendix Computer DIVISION OF BENDIS AVIATION CORPORATION LOS ANGELES, CALIF.											
TITLE SCHEMATICS - CONTROL SWITCH - CA-2								PART NO. 3C602		CHG. LTR. B	

ZONE	ITEM NO.	CIRC. STR.	NO. REQ.	PART NO.	DESCRIPTION	ZONE	ITEM NO.	CIRC. STR.	NO. REQ.	PART NO.	DESCRIPTION
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REVISIONS			
LTR.	DESCRIPTION	DATE	APPR.
A	PRODUCTION RELEASE	11/29	LS
B	SEE ECO # 1007	11/29	LS
C	SEE ECO # 1032	12/29	LS



CA-2



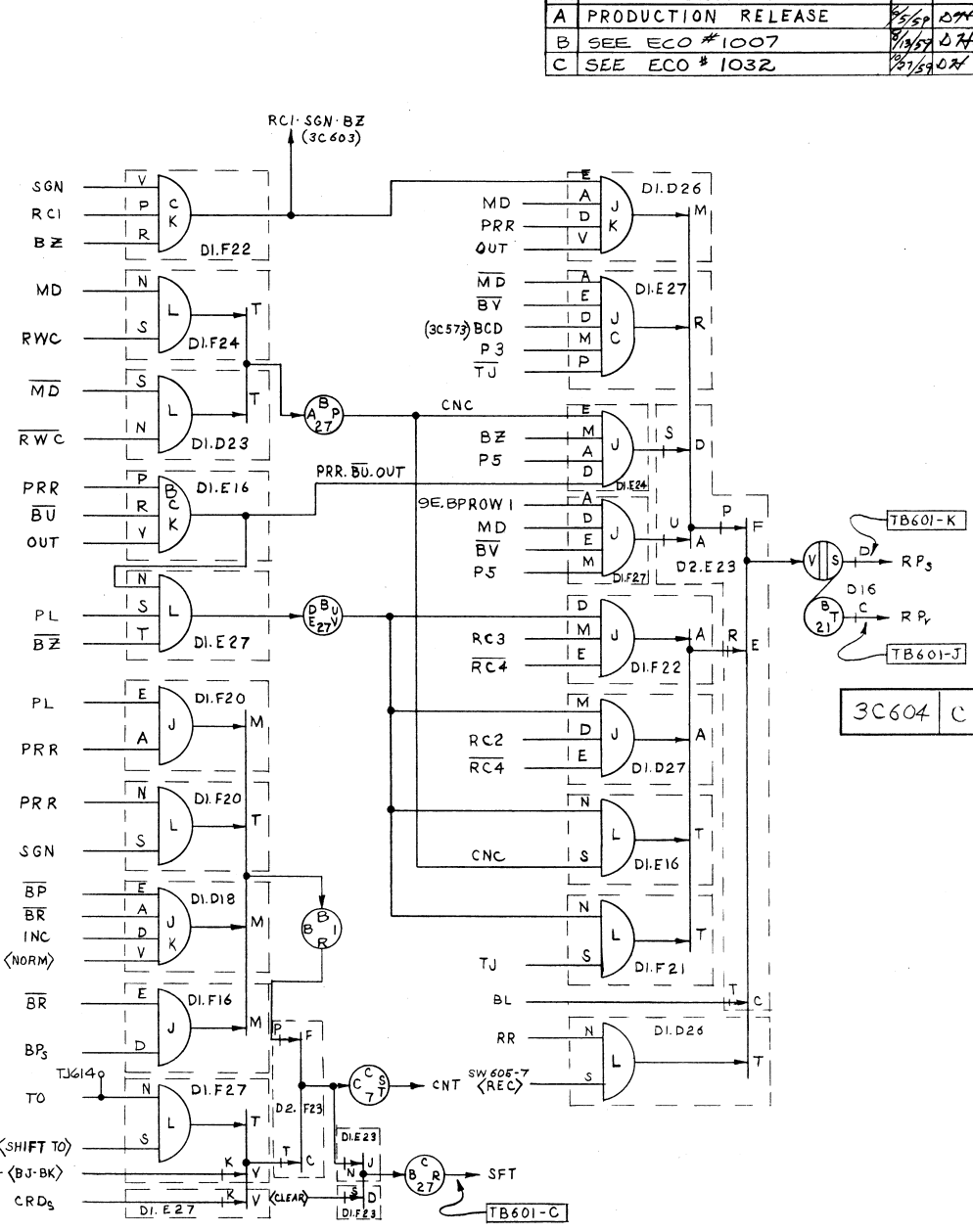
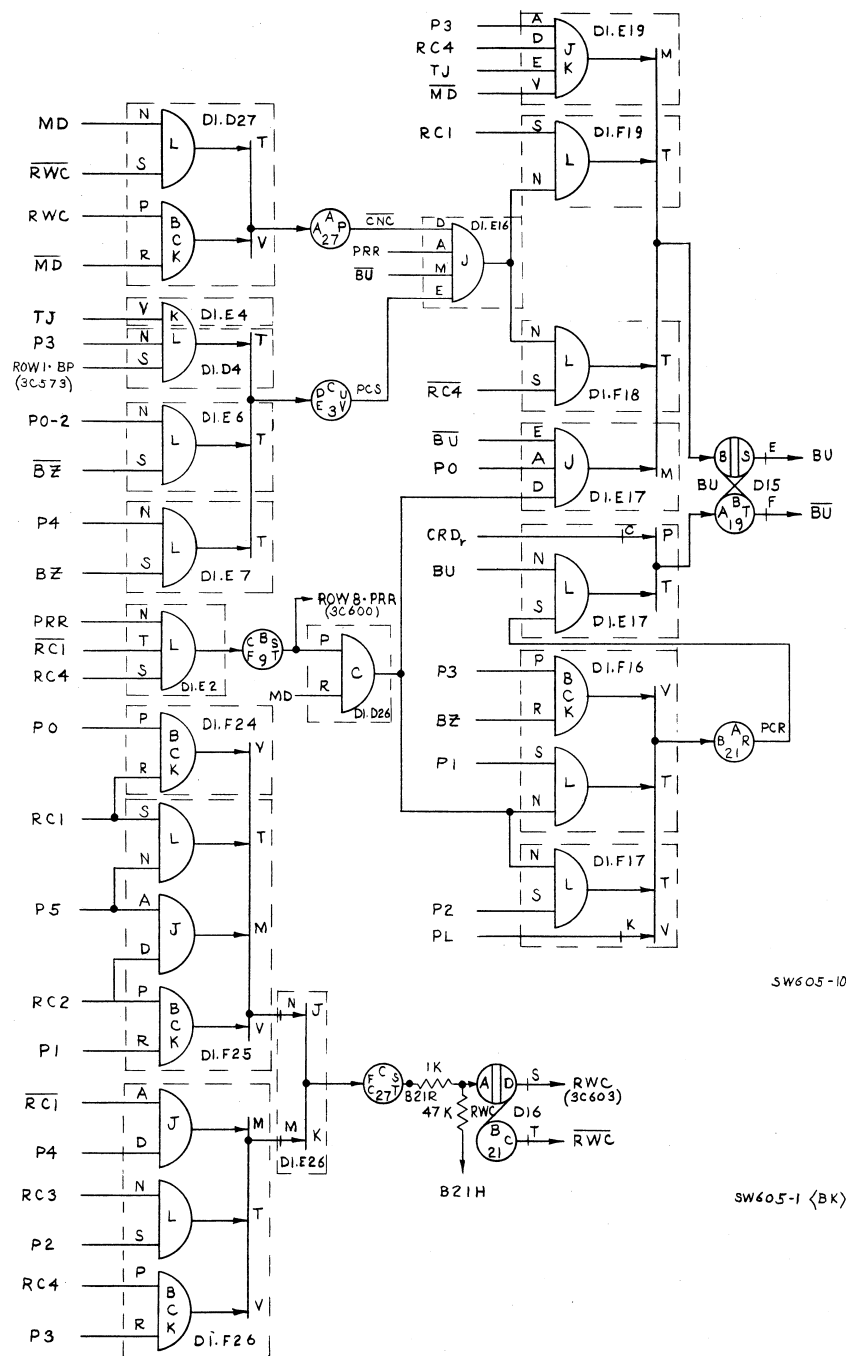
G-15

3C603 C

MATERIAL DESCRIPTION		MATERIAL SPECIFICATION		FIRST USED ON		SIMILAR TO	NEXT ASSEM.	MODEL NO.
TOLERANCES AND NOTES EXCEPT AS NOTED		THIS DRAWING AND INFORMATION		SCALE	DRAWN BY	CHKD. BY	MECH. ENGR.	ELECT. ENGR.
ANGULAR ± 1/2°		PROPERTY OF AND UNAUTHORIZED		NAME	1.A. Latta			
LINEAR .XX ± .03		REPRODUCTION FORBIDDEN BY		DATE	3-11-59			
.010		REPRODUCTION FORBIDDEN BY						
1. MACHINED FINISH		Bendix Computer		TITLE	SCHEMATICS - MEMORY LINE		PART NO.	3C603
2. MACHINED DIA'S ON COMMON CENTER		DIVISION OF BENDIX AVIATION CORPORATION						CHG. LTR. C
3. MACHINED SURFACES SQUARE TO RESPECTIVE		LOS ANGELES, CALIF.						
4. BREAK SHARP EDGE 0.015 R. APPROX.								
5. ALL DIMENSIONS IN INCHES.								

ZONE	ITER NO.	CIRC. SYM.	NO. REG.	PART NO.	DESCRIPTION	ZONE	ITER NO.	CIRC. SYM.	NO. REG.	PART NO.	DESCRIPTION
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REVISIONS			
LTR.	DESCRIPTION	DATE	APPR.
A	PRODUCTION RELEASE	2/2/59	DH
B	SEE ECO # 1007	1/13/59	DH
C	SEE ECO # 1032	2/1/59	OR



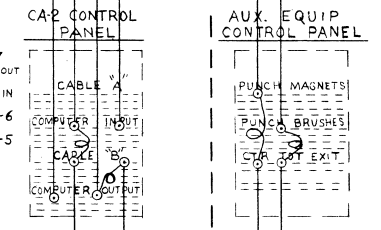
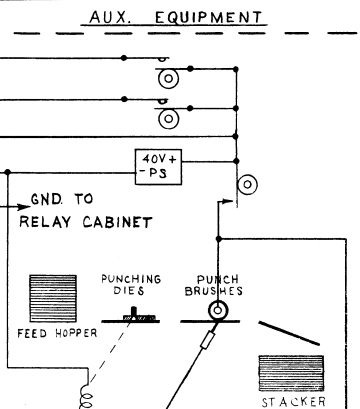
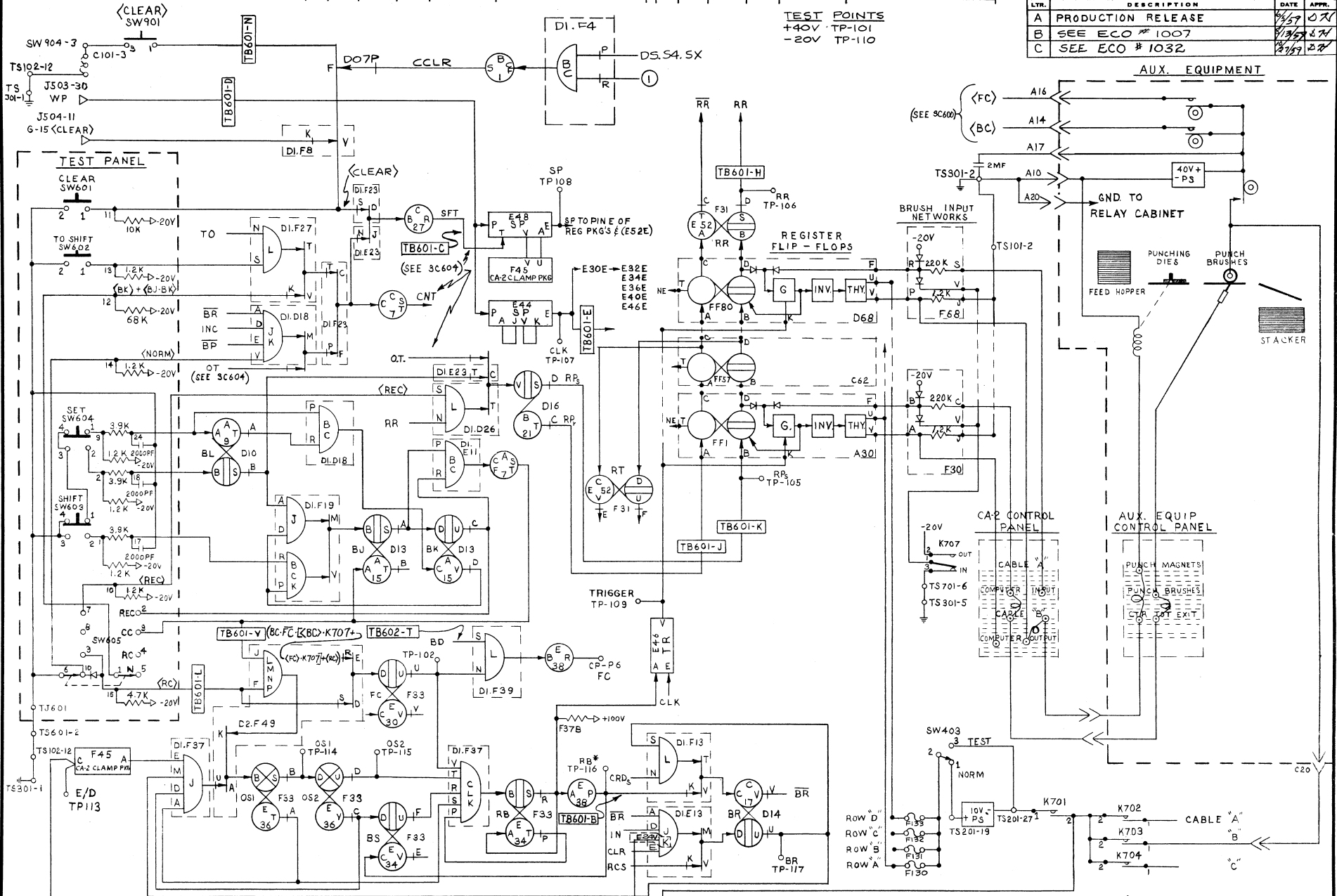
3C604 C

TOLERANCES AND NOTES EXCEPT AS NOTED		MATERIAL SPECIFICATION		FIRST USED ON		SIMILAR TO		NEXT ASSEM.		MODEL NO.	
ANGULAR ± 1/2°	LINEAR .XX ± .01	SCALE	DRAWN BY	CHKD. BY	MECH. ENGR.	ELECT. ENGR.	PROJ. ENGR.				
1. MACHINED FINISH MU IN RMS		THIS DRAWING AND INFORMATION PROPERTY OF AND UNAUTHORIZED REPRODUCTION FORBIDDEN BY		NAME <i>S.H. Kelly</i>		DATE 3-7-59		K. Vadev		2.21.59 5-4LS1	
2. MACHINED DIA'S ON COMMON CENTER CONCENTRIC WITHIN .008 P.I.R.		Bendix Computer DIVISION OF BENDIS AVIATION CORPORATION LOS ANGELES, CALIF.		DATE		DATE		DATE		DATE	
3. MACHINED SURFACES SQUARE TO RESPECTIVE AXIS WITHIN .005 PER IN.				TITLE		PART NO.		CHG. LTR.			
4. BREAK SHARP EDGE .010 R. APPROX.		SCHEMATICS - COINCIDENCE DETECTOR - CA-2		3C604		C					
5. ALL DIMENSIONS IN INCHES.											

ZONE	ITEM NO.	CIRC. STR.	NO. REQ.	PART NO.	DESCRIPTION	ZONE	ITEM NO.	CIRC. STR.	NO. REQ.	PART NO.	DESCRIPTION
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TEST POINTS
+40V TP-101
-20V TP-110

REVISIONS			
LTR.	DESCRIPTION	DATE	APPR.
A	PRODUCTION RELEASE	11/27/59	OK
B	SEE ECO # 1007	11/27/59	OK
C	SEE ECO # 1032	11/27/59	OK

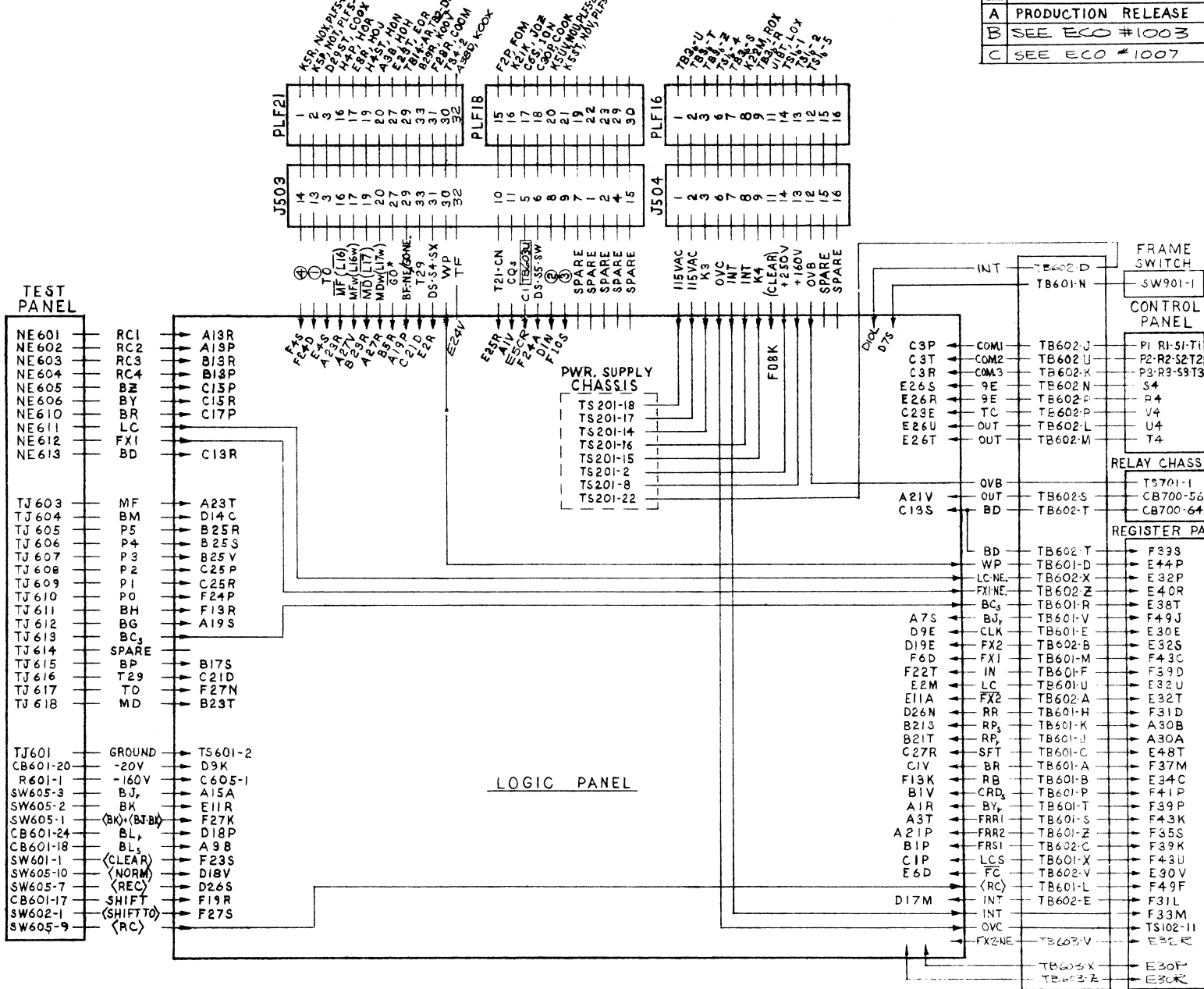


MATERIAL DESCRIPTION		MATERIAL SPECIFICATION		FIRST USED ON		SIMILAR TO		NEXT ASSEM.		MODEL NO.	
TOLERANCES AND NOTES EXCEPT AS NOTED		SCALE		DRAWN BY		MECH. ENGR.		ELECT. ENGR.		PART NO.	
ANGULAR ± 1/2°		SCALE		NAME J.A. Sady		K. Yadav		A. Z. Sg		CHG. LTR.	
LINEAR .XXX ± .010		REPRODUCTION FORBIDDEN BY		DATE 3-30-59						3C609	
1. MACHINED FINISH MU IN RMS		THIS DRAWING AND INFORMATION PROPERTY OF AND UNAUTHORIZED REPRODUCTION FORBIDDEN BY		TS201-19						C	
2. MACHINED DIA'S ON COMMON CENTER CONCENTRIC WITHIN .008 P.L.R.		Bendix Computer		TS201-27						C	
3. MACHINED SURFACES SQUARE TO RESPECTIVE AXIS WITHIN .008 P.L.R.		DIVISION OF BENDIX AVIATION CORPORATION		K701						C	
4. BREAK SHARP EDGE .010 R. APPROX.		LOS ANGELES, CALIF.		K702						C	
5. ALL DIMENSIONS IN INCHES.		TITLE		K703						C	
		SCHEMATICS -		K704						C	
		BUFFER REGISTER								C	

TF
J503-32

ZONE	REV. NO.	CIRC. STR.	NO. RES.	PART NO.	DESCRIPTION

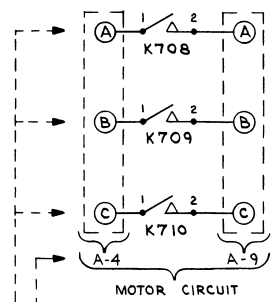
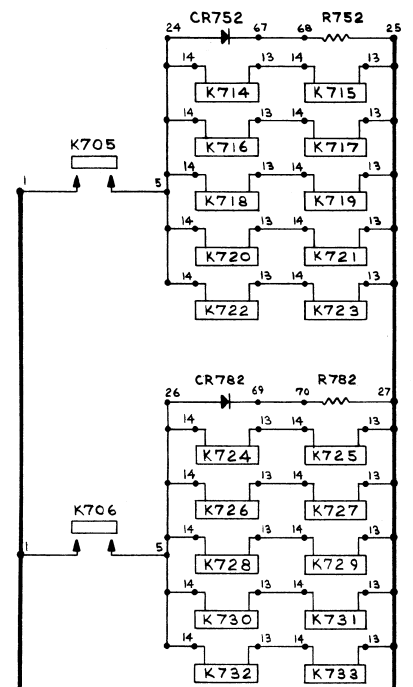
REVISIONS		
LTR.	DESCRIPTION	DATE
A	PRODUCTION RELEASE	4/29/59
B	SEE ECO #1003	4/29/59
C	SEE ECO #1007	4/29/59



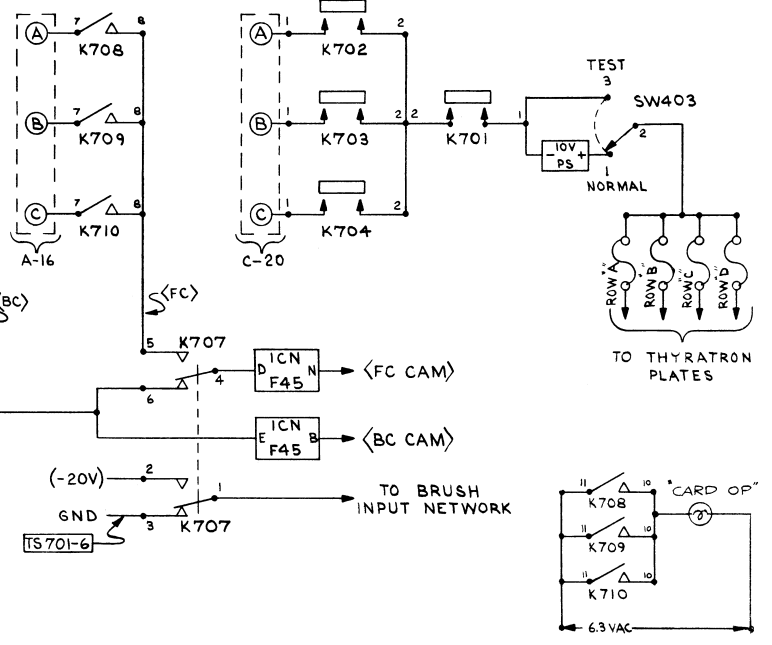
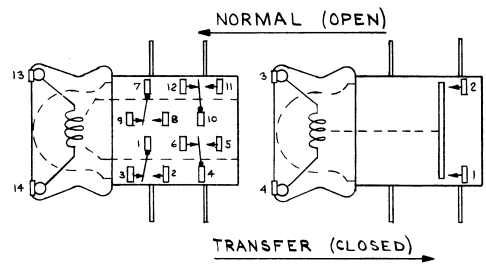
MATERIAL DESCRIPTION		MATERIAL SPECIFICATION		FIRST USED ON		SIMILAR TO		NEXT ASSEM.		MODEL NO.	
TOLERANCES AND NOTES EXCEPT AS NOTED		THIS DRAWING AND INFORMATION PROPERTY OF AND UNAUTHORIZED REPRODUCTION FORBIDDEN BY		SCALE	DRAWN BY	CHKD. BY	MECH. ENGR.	ELECT. ENGR.	PROJ. ENGR.		
ANGULAR ± 1/2°		LINEAR .XX ± .010		NAME	SELBY					K. Yadav	
1. MACHINED FINISH		MU IN RMS		DATE	4-7-59					4-21-59	
2. MACHINED DIA'S ON COMMON CENTER CONCENTRIC WITHIN .002 F.J.R.				TITLE		SHEETS		PART NO.		CHG. LTR.	
3. MACHINED SURFACES SQUARE TO RESPECTIVE AXIS WITHIN .004 PER IN.				Bendix Computer		DIVISION OF BENDIS AVIATION CORPORATION		30614		C	
4. BREAK SHARP EDGE .002 D. APPROX.				LOS ANGELES, CALIF.		SCHEMATICS-INTERCONN. TO LOGIC PNL-CA-2		30614		C	
5. ALL DIMENSIONS IN INCHES.											

ZONE	ITEM NO.	CIRC. STR.	NO. REQ.	PART NO.	DESCRIPTION	ZONE	ITEM NO.	CIRC. STR.	NO. REQ.	PART NO.	DESCRIPTION
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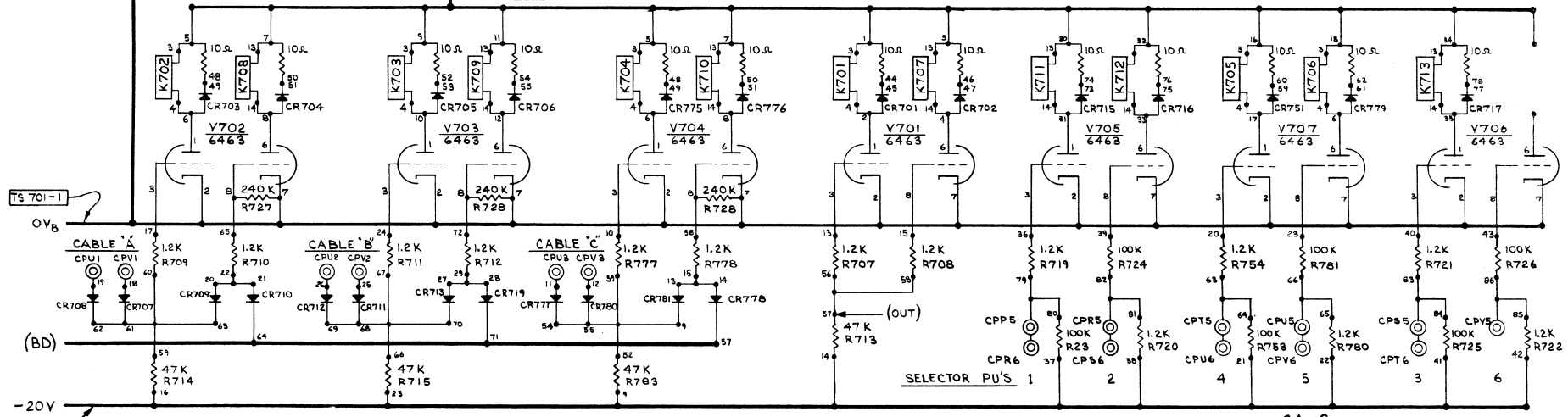
REVISIONS			
LTR.	DESCRIPTION	DATE	APPR.
A	PRODUCTION RELEASE	7/9/59	SA



POINT COORDINATES ON IBM CONNECTORS
 NOTE: (A) REFERS TO CABLE "A" (J801)
 (B) REFERS TO CABLE "B" (J802)
 (C) REFERS TO CABLE "C" (J803)



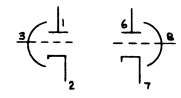
3C624 A



TS 701-2

V708 - SPARE 6463 (TYPICAL)

FOR CABLE CONNECTORS TO IBM
 EQUIPMENT SEE REF. DWG 3C626
 3C627
 3C628



MATERIAL DESCRIPTION		MATERIAL SPECIFICATION		FIRST USED ON		SIMILAR TO		NEXT ASSEM.		MODEL NO.	
TOLERANCES AND NOTES EXCEPT AS NOTED		SCALE		DRAWN BY		MECH. ENGR.		ELECT. ENGR.		PROJ. ENGR.	
ANGULAR ± 1/4°		LINEAR .XX ± .03		NAME S. SELBY						DATE	
1. MACHINED FINISH		MU IN RMS		DATE 7-9-59		9 July 59				7-17-59	
2. MACHINED DIA'S ON COMMON CENTER		CONCENTRIC WITHIN .008 P.I.R.		BENDIX COMPUTER		DIVISION OF BENDIX AVIATION CORPORATION		LOS ANGELES, CALIF.		PART NO. 3C624	
3. MACHINED SURFACES SQUARE TO RESPECTIVE AXIS WITHIN .008 PER IN.		4. BREAK SHARP EDGE .010 R. APPROX.		TITLE SCHEMATIC - CA-2 CONTROL RELAY						CHG. LTR. A	
5. ALL DIMENSIONS IN INCHES.											

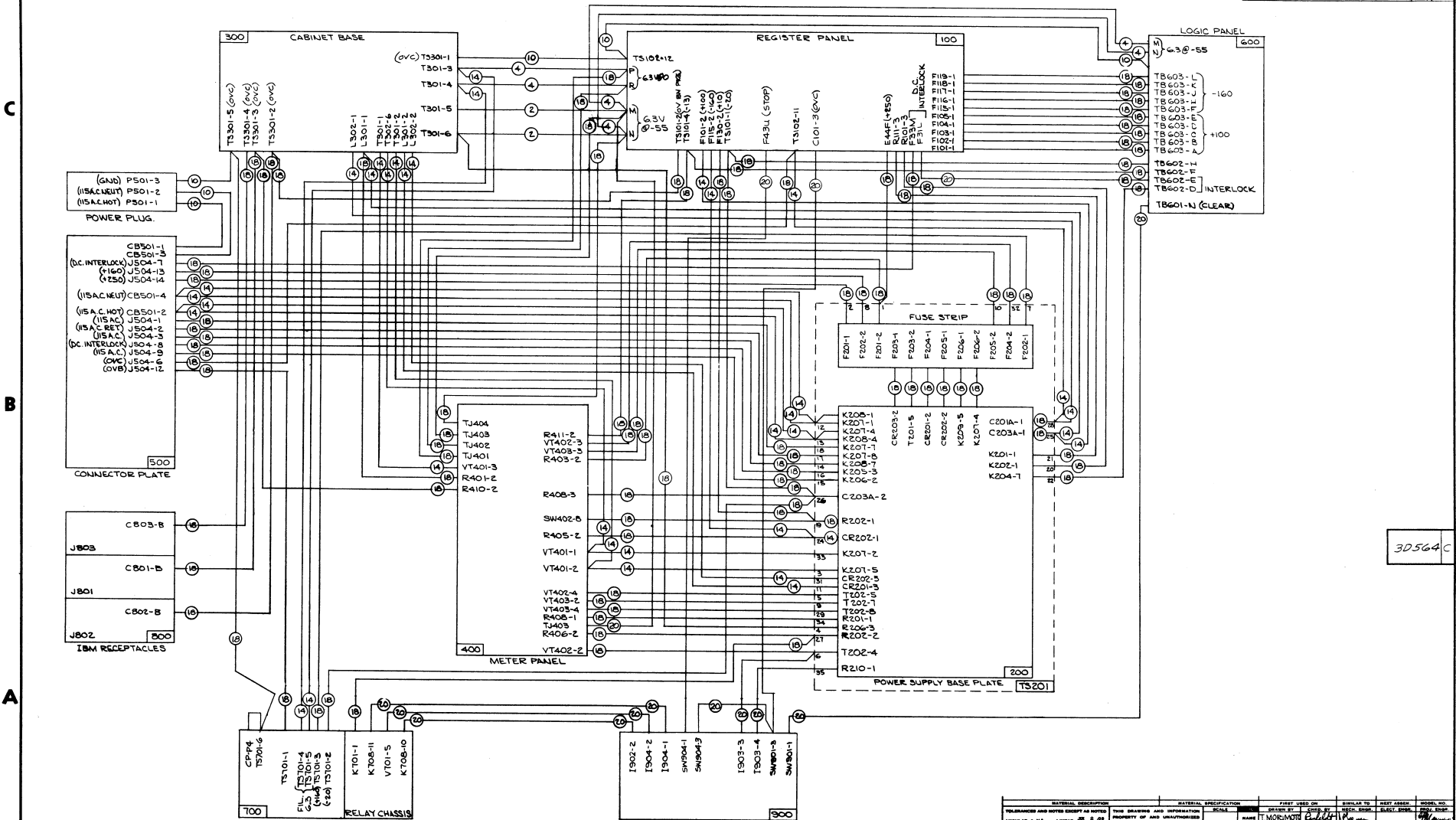
3

2

1

REV.	ITEM NO.	CHK. BY	DATE	DESCRIPTION	REV.	ITEM NO.	CHK. BY	DATE	DESCRIPTION	REV.	ITEM NO.	CHK. BY	DATE	DESCRIPTION
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REVISIONS			
REV.	DATE	BY	DESCRIPTION
A	12/27/53	K. W.	PRODUCTION RELEASE
B	1/2/54	K. W.	SEE ECO # 972
C	1/2/54	K. W.	SEE ECO # 975



3D564C

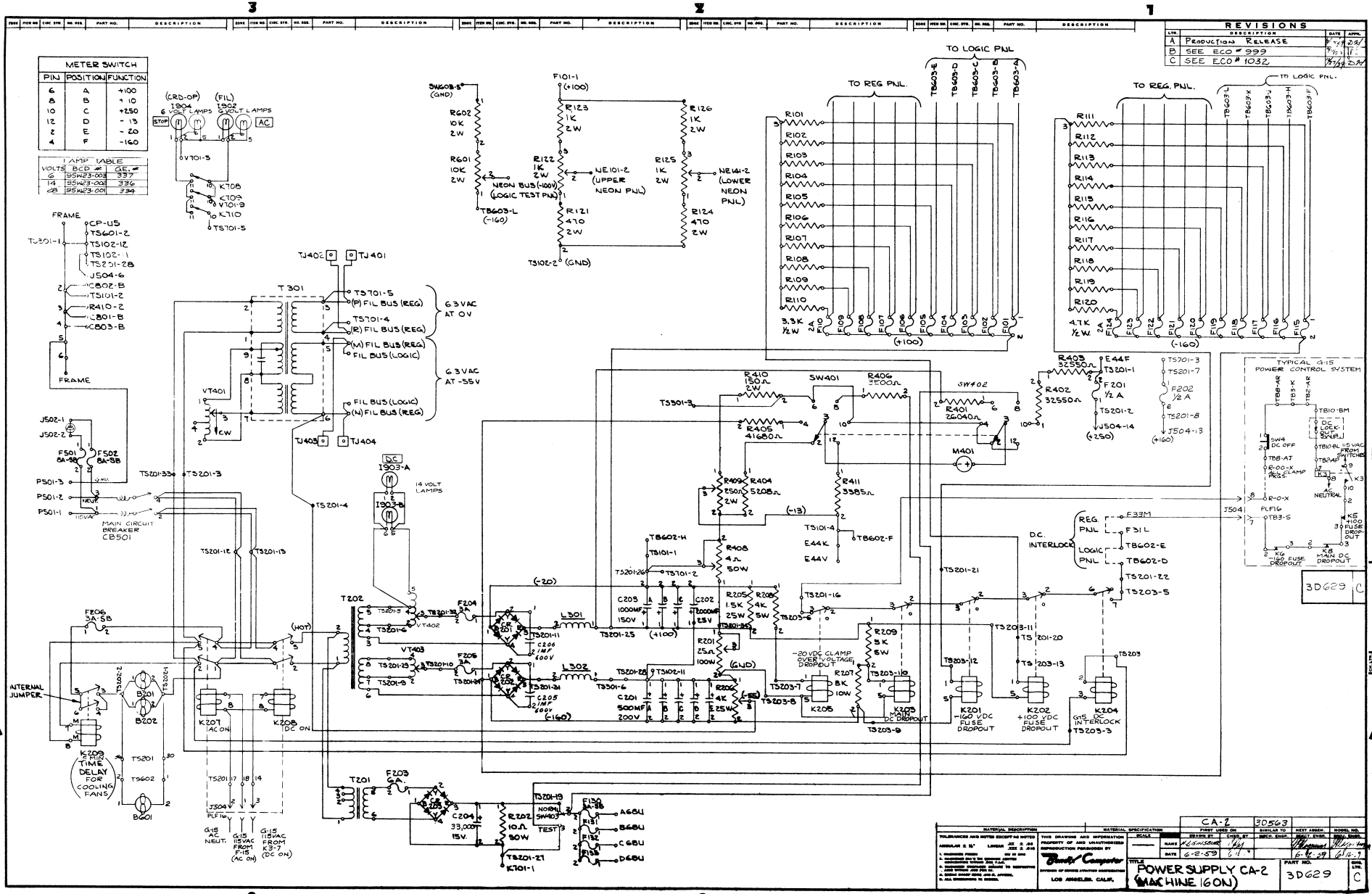
REVISION	DESCRIPTION	DATE	BY	APPROVED
1	CA-2 CABLE DIAGRAM, POWER (MACHINE 3.0N)	12-5-53	1-6-54	1-6-53

TITLE: CA-2 CABLE DIAGRAM, POWER (MACHINE 3.0N)
 PART NO.: 3D564
 DATE: 12-5-53
 BY: 1-6-54
 APPROVED: 1-6-53

3

2

1



REVISONS		DATE	BY
A	PRODUCTION RELEASE	7/21/57	JL
B	SEE ECO # 999	7/21/57	JL
C	SEE ECO # 1032	7/21/57	JL

METER SWITCH		
POSITION	FUNCTION	
6	A	+100
8	B	+10
10	C	+250
12	D	-13
2	E	-20
4	F	-160

LAMP TABLE		
VOLTS	WATTAGE	QTY.
6	35W23-001	337
14	35W23-001	336
25	35W23-001	338

MATERIAL DESCRIPTION		MATERIAL SPECIFICATION		CA-2		30563	
QUANTITY	DESCRIPTION	QUANTITY	DESCRIPTION	REVISED BY	DATE	REVISED BY	DATE
1	POWER SUPPLY	1	POWER SUPPLY				
THIS DRAWING AND APPROPRIATE PROPERTY OF AND INFORMATION CONTAINED HEREIN IS UNCLASSIFIED DATE 12-29-81 BY 60322/UC/BAW				TITLE: POWER SUPPLY CA-2 (MACHINE 160N)			

CHECKING OS-1 & OS-2 TIMING

With the advent of IBM series 50 equipment, it has become most important during installation to check the CA-2 one-shots (OS-1 and OS-2) in relation to the emitter digit signal (<E/D>) from the card equipment. On standard speed IBM equipment, it still behooves us to check <E/D> in relation to the one-shots because:

- (1) The 402 RC filter may be faulty.
- (2) The cam may be out of adjustment giving the <E/D> an improper duty cycle.
- (3) The cam contacts may be bouncing, sticking, or arcing.

Each of the above may allow the card equipment to work alright (though with less lifespan) offline but not with the CA-2.

OS-1 has the job of eliminating the contact chatter at the beginning of the <E/D> signal. It accomplishes this when it is high longer than the duration of chatter. The standard 0.6 millisecond seems to be sufficient in all cases. If more time is required, R6 in OS-1 may be increased.

OS-2 sees to it that the CA-2 uses each <E/D> to step the CA-2 row counter only once. If OS-2 is high for too short a duration, an <E/D> which represents one row in the card equipment, may step the CA-2 row counter twice, and thusly lose our synchronism for row timing. While OS-2 is high it prevents us from making further use of the <E/D>. However, if OS-2 is high for too long a duration, it may prevent the CA-2 from recognizing the next <E/D>. Therefore, we want OS-2 to be high longer than the width of the <E/D>, but to go low before the next <E/D> comes along. This may be adjusted by changing the value of R10 in OS-2.

An overall check of both OS-1 and OS-2 is to sync on BC_s and look at the twelve <E/D> per card or line on a slow sweep. Taking the probe from <E/D> and looking at RB should show one RB for each <E/D>. All these signals are on test jacks.

For the "big picture", <E/D> with the help of OS-1 and OS-2 produces an RB. RB resets BR and permits a "process row" (BP·BT). The "80" count at the end of "process row" steps the row counter flip-flops.

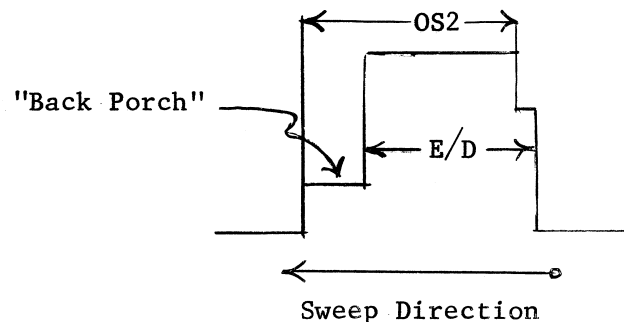
It is recommended that a check of OS-1 and OS-2 in relation to the <E/D> of each piece of card equipment used with the CA-2 be included as a part of CA-2 installation procedure.

Submitted by
George Arsulich

SCOPING <E/D> vs. OS-2 TIMING

Since most field service engineers do not have a dual-beam oscilloscope available, the following procedure is very desirable to thoroughly check the <E/D> vs. OS-2 timing.

1. Bend the ends of two equal resistors (anything from 100K to 1 meg.) into a "U" shape so that they will fit tightly into the E/D and OS-2 test jacks. (The wattage is unimportant, but the heavier leads of 1 or 2 watt carbons work better.)
2. Cross the ends of the two resistors and clip the scope probe to their junction.
3. Since the <E/D> signal is about 40-50 volts while the OS-2 signal is 20 volts, the resulting composite signal may be interpreted by analysis of relative amplitudes.
4. Synching on BC_S (test jack), each of the 12 <E/D> vs. OS-2 signals should look about as follows:



5. The critical point to check is that there is an adequate "back porch" to the signal, indicating that the "on-time" of OS-2 is sufficiently longer than the E/D on-time.
6. Since E/D signals are notoriously non-uniform in duration, it is important to check each one of the 12 such waveforms. Sometimes the zone E/D pulses are much longer than the digit pulses.

Prepared by
Vernon Magnuson