

Burroughs

B711 UPDATE

TRAINING
SUPPLEMENT

includes:

B9343-61/62

MATRIX PRINTER CONSOLE

FIELD ENGINEERING PROPRIETY DATA

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B711 UPDATE AND B9343-61/62 MATRIX PRINTER CONSOLE

Table of Contents:

Backplane Map B711-3 -----	1
Backplane Map B721-1 -----	2
 Semi-conductor (chip) Memory:	
Memory Boards MPA and MPB -----	3
Memory Board Chip Layout -----	4
Memory Address Decoding Chart -----	5
MAMI Schematic -----	6
 Memory Loader Wiring Schematic -----	 7
 B346-3 Console DDP:	
60 CPS Console Interface -----	8-9
B9343 Console Control Codes -----	10
DDP Block Diagrams -----	11-- 16
Timing Diagrams -----	17-- 21
DDP Schematics: CS1/CS2/CS3/CS4 -----	22--33
DDP Description -----	34-- 70
 B9343-61/62 Console:	
Console Backplane Layout -----	71
Console Modes of Operation -----	72-- 75
Console Hardware -----	75-- 89
Console Logic Block Diagrams -----	90-- 98
Console Schematics;	
Power Supply -----	99-- 104
L8/L6 Keyboard -----	105-- 107
MTR Switches -----	108
Memory Loader Wiring Diagram -----	109
Print Buffer -----	110

The material contained in this section is intended to be supplemental material for training purposes only. It is not intended to supersede material contained in the technical manual or other manuals published at this time or in the future.

7016 57706

1	RELEASED ER 129
2	DATE 7-2-75 REF 01
3	ECN 4260
4	12-M-75 AF1 13245

NOTES:

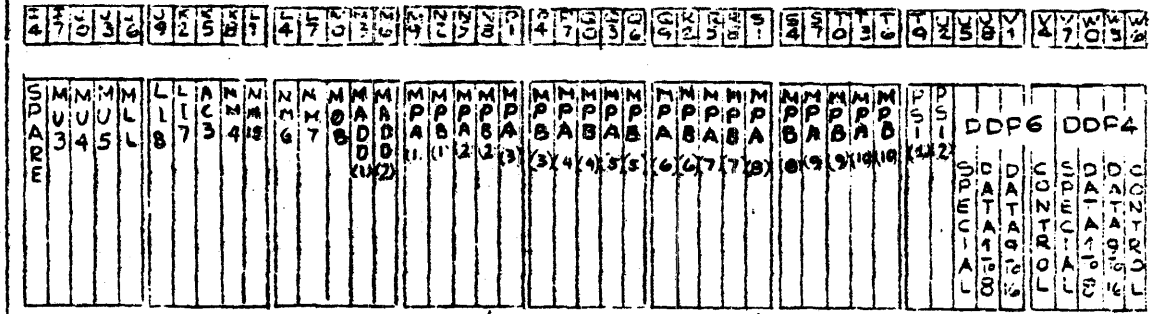
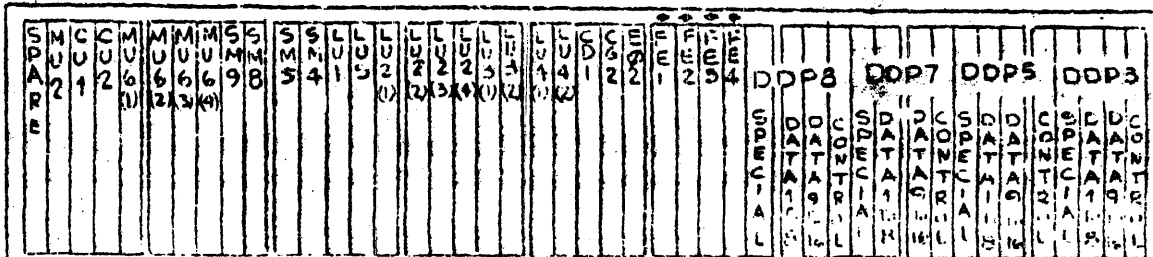
1. SYMBOL REPRESENTS FOREPLANE CONNECTOR.

2. BASIC SYSTEM CONTAINS NO MPA OR MPB CARDS.

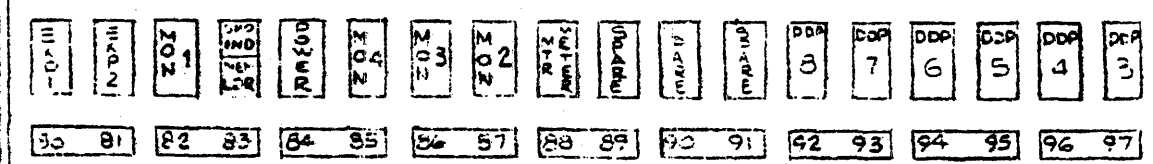
3. SYMBOL REPRESENTS FE CARDS THAT ARE NOT PART OF BASIC SYSTEM POSITIONS SHOWN FOR FIELD ENGRS.

CONTROL	DATA TO 16	B0459	B0460	B0461	B0243	B0244	B0245	B0246	B0247	B0391	B0392	B0393	B0394	B0221	B0222	B0115	SINGLE LINE CONTROL
C01	R01	C02	R02	C03	P01	PT1				TM1	TC1	TPR1	TPP1	LC1			CRT1
C04	R04	C05	R05	C06	P02	PT2	PP2	TM2	TC2	TPR2	TPP2			LC2	LC6		CRT2
					P03	PT3	PP3	TM3	TC3	TPR3	TPP3			LC3	LC7		CRT3
					P04	PT4	PP4	TM4	TC4	TPR4	TPP4			LC4 TO LC5	LC8		CRT4

P1



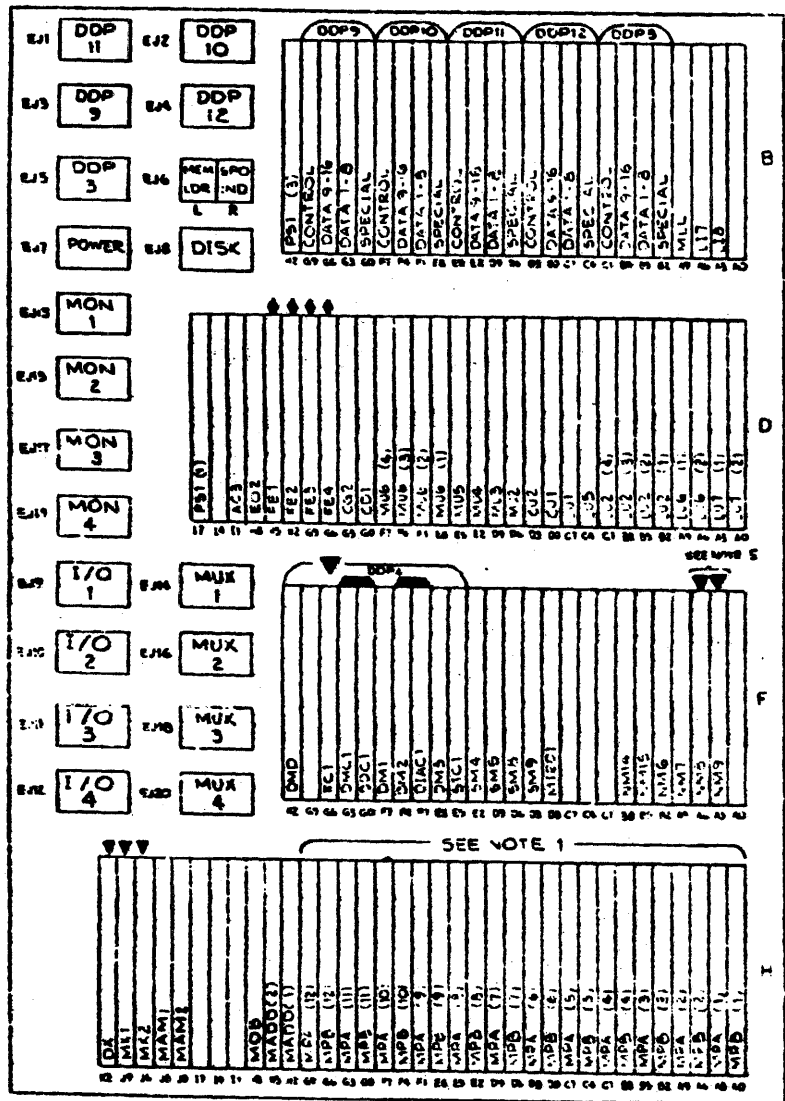
SEE NOTE 2



VIEWED FROM CARD/CONNECTOR INSERTION SIDE

GEN QUAL SPECS 1183 5543 APPLY		TOLERANCES UNLESS OTHERWISE NOTED XXX ± --- XX ± --- ANGLES ± °--	DRAWN D.W.F.	DATE 5-13-75	Burroughs Corporation	
MATERIAL	CHECKED 11/31/75	DATE 6-23-75	COMPUTER SYSTEMS GROUP DOWNTOWN PA 19335			
HEAT TREATMENT	OSGNO/ENGR	DATE	TITLE BACKPLANE MAP		CLASS CC 2-952	
SURFACE TREATMENT	APPROVED	DATE	B711-3 L/M RACK-CARD GATE			
PROPRIETARY TO BURROUGHS CORP - NOT TO BE REPRODUCED, NOR USED FOR MANUFACTURING PURPOSES WITHOUT BURROUGHS ORDER OR PRIOR WRITTEN CONSENT	SCALE SHEET	DWG NO 2605 4932	PLT NO 038	1 of 1		

T
D
B



LOGIC/MEMORY BACKPLANE
VIEWED FROM CARD/CONNECTOR INSERTION SIDE

NOTES:

1. BASIC SYSTEM CONTAINS NO MPA OR MPB CARDS. MEMORY IS IN 8KB INCREMENTS (1 MPA & 1 MPB CARD) TO A MAXIMUM OF 96 KB (TOTAL OF 12 EACH MPA & MPB). ADD MEMORY CARDS (MPA & MPB) FROM RIGHT TO LEFT STARTING AT LOCATION 4A0.
2. SYMBOL INDICATES FRONT EDGE JUMPER CONNECTOR.
3. SYMBOL INDICATES FE CARDS ARE NOT PART OF BASIC SYSTEM - POSITIONS SHOWN FOR FIELD ENGNG.
4. SYMBOL INDICATES OPTIONAL CARD OR CARDS.
5. NMB & NMB9 CARDS ARE BASIC FOR B776 ONLY.

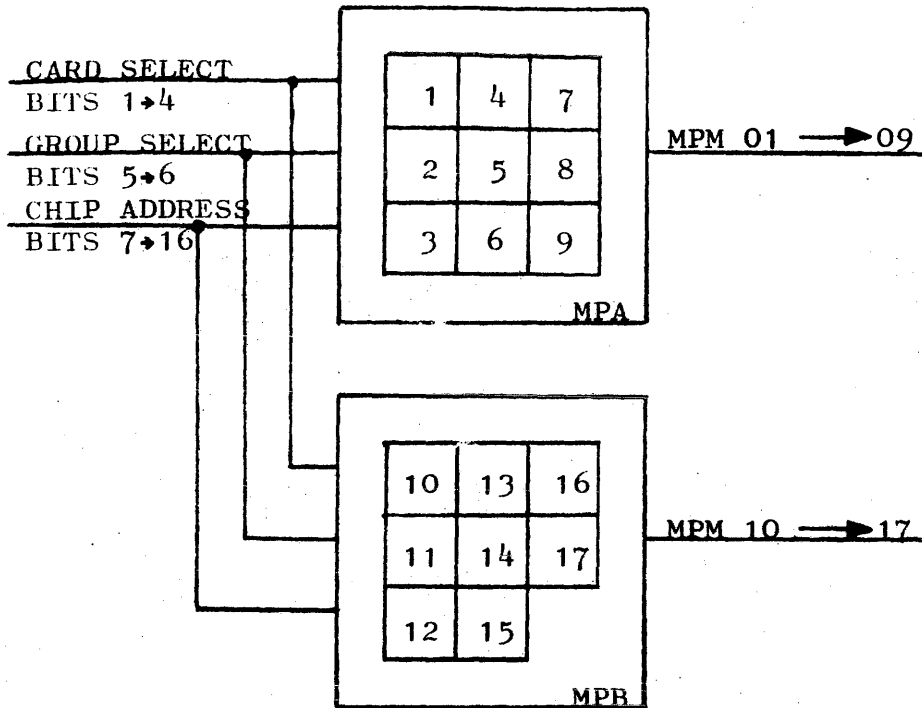
DWG NO	
2605 89C	
SHEET OF 7-19-75	
A	RELEASE PER ER # 112 PER 02
B	ECN 4189 5-7-75
C	ECN 4428 6-8-75

GEN QUAL SPEC 1125 8843 APPLY

TOLERANCES UNLESS OTHERWISE NOTED		DRAWN A. TUREK		DATE 6-17-75	
XXX 2 - XX 2 - ANGLE 2 - 0 - 0		CHECKED		DATE 11-21-75	
MATERIAL		BEGUN/ENGR		DATE	
HEAT TREATMENT		APPROVED		DATE	
SURFACE TREATMENT		TITLE		BACKPLANE MAP	
PROPRIETARY TO BURROUGHS CORP - NOT TO BE REPRODUCED, REPRODUCED FOR MANUFACTURING PURPOSES ONLY		SCALE		2-C	
		2605 8909			

p.2

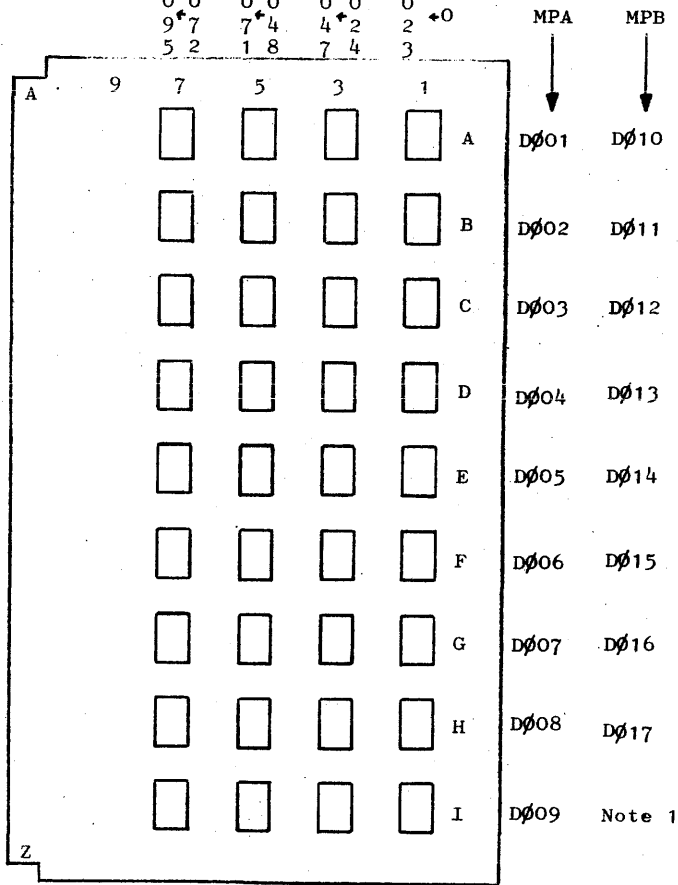
MEMORY BOARDS MPA and MPB



The above is a representation of the memory board layout. MPA contains 36 RAM chips. These chips are grouped together in blocks of 9, thus each group can represent 9 bits. Each chip contains 1,024 1 bit memories, so with 4 groups we have 4096 "9 bit" memories. MPB is similar except that only 32 chips are used. These will give 4096 "8 bit" memories using the same addressing as MPA. Since both cards work together a memory length of 17 bits, (16 + parity) is the result. At all times the address lines 16 thru 5 are applied to all sets of MPA and MPB cards in the memory. The pair to be used is determined by bits 1 thru 4.

ADDRESS INPUT

G	G	G	G
R	R	R	R
0	0	0	0
U	U	U	U
P	P	P	P
4	3	2	1
4 3	3 2	2 1	1
0 0	0 0	0 0	0 0
9*7	7*4	4*2	2 ←0
5 2	1 8	7 4	3

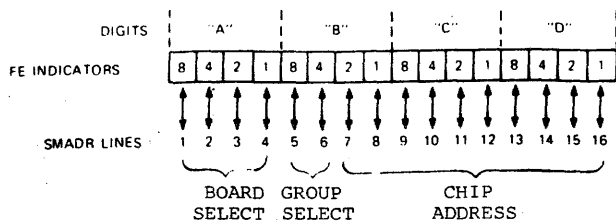


Note 1:
MPB Card does not have chips in row I.

MEMORY BOARD CHIP LAYOUT

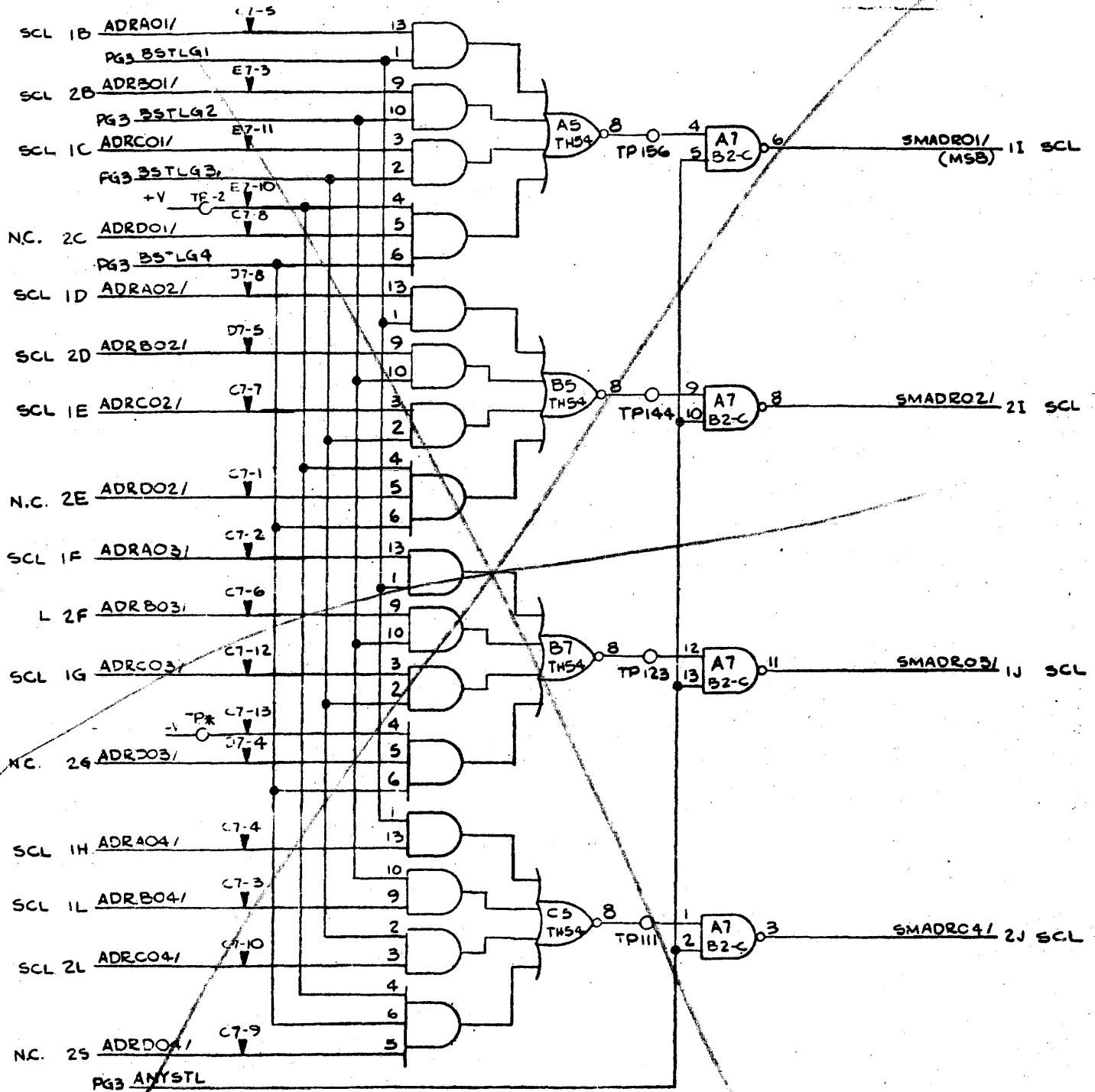
(Non-Component Side)

B720/B776 UPDATE PERFORMANCE ORIENTED TRAINING

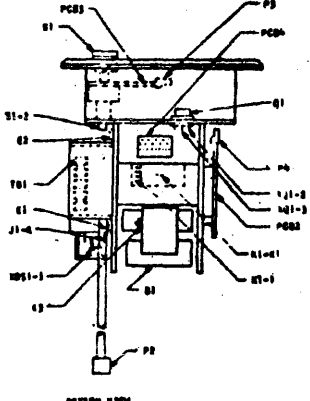
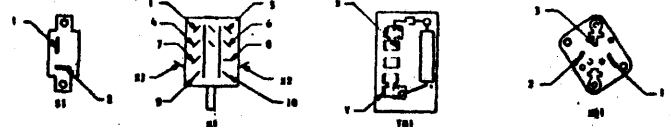
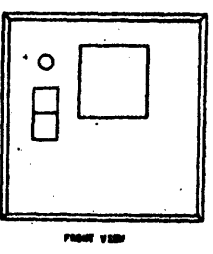
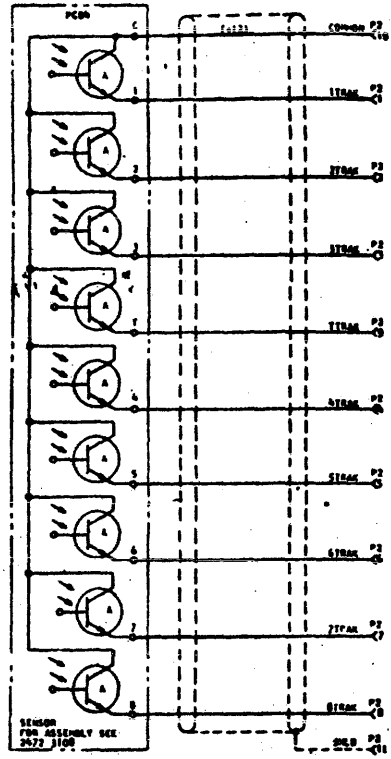
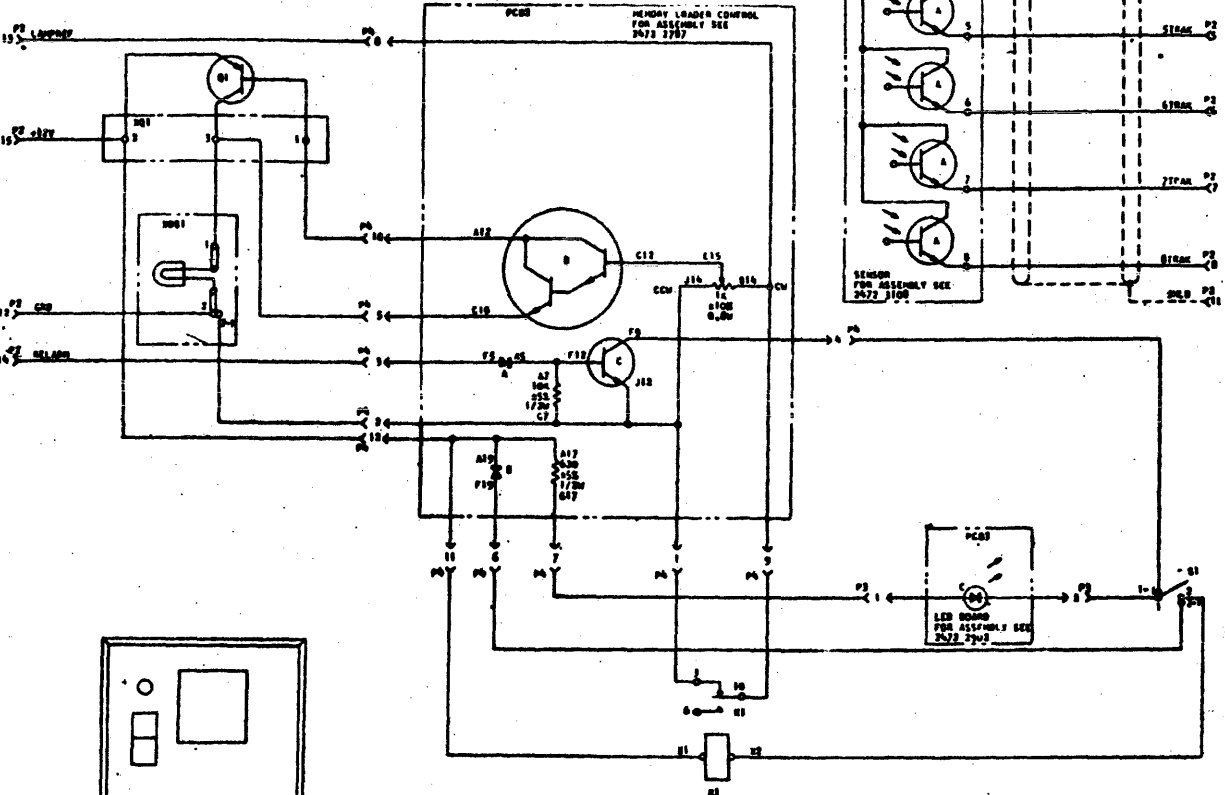
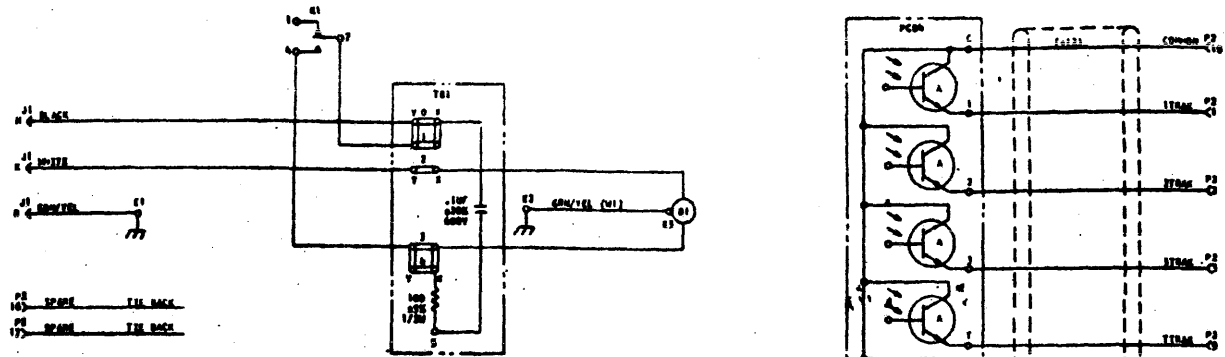


			MEMORY WORD ADDRESS		
1234	56	7890123456	HEXI-DECIMAL	DECIMAL	
0000 MPA & B 1	00 GROUP 1	11111111 0000000000	0000	0000	
	00 GROUP 2	1111111111 0000000000	03FF	1023	
	01 GROUP 3	1111111111 0000000000	07FF	2047	
	10 GROUP 4	1111111111 0000000000	0BFF	3071	
	11	1111111111 0000000000	0FFF	4095	
0001 MPA & B 2	00	1111111111 0000000000	1000	4096	
	01	1111111111 0000000000	1FFF	8191	
0010 MPA & B 3	00	1111111111 0000000000	2000	8192	
	01	1111111111 0000000000	2FFF	12287	
0011 MPA & B 4	00	1111111111 0000000000	3000	12288	
	01	1111111111 0000000000	3FFF	16383	
0100 MPA & B 5	00	1111111111 0000000000	4000	16384	
	01	1111111111 0000000000	4FFF	20479	
0101 MPA & B 6	00	1111111111 0000000000	5000	20480	
	01	1111111111 0000000000	5FFF	24575	
0110 MPA & B 7	00	1111111111 0000000000	6000	24576	
	01	1111111111 0000000000	6FFF	28671	
0111 MPA & B 8	00	1111111111 0000000000	7000	28672	
	01	1111111111 0000000000	7FFF	32767	
1000 MPA & B 9	00	1111111111 0000000000	8000	32768	
	01	1111111111 0000000000	8FFF	36863	
1001 MPA & B 10	00	1111111111 0000000000	9000	36864	
	01	1111111111 0000000000	9FFF	40959	
1010 MPA & B 11	00	1111111111 0000000000	A000	40960	
	01	1111111111 0000000000	AFFF	45055	
1011 MPA & B 12	00	1111111111 0000000000	B000	45056	
	01	1111111111 0000000000	BFFF	49151	

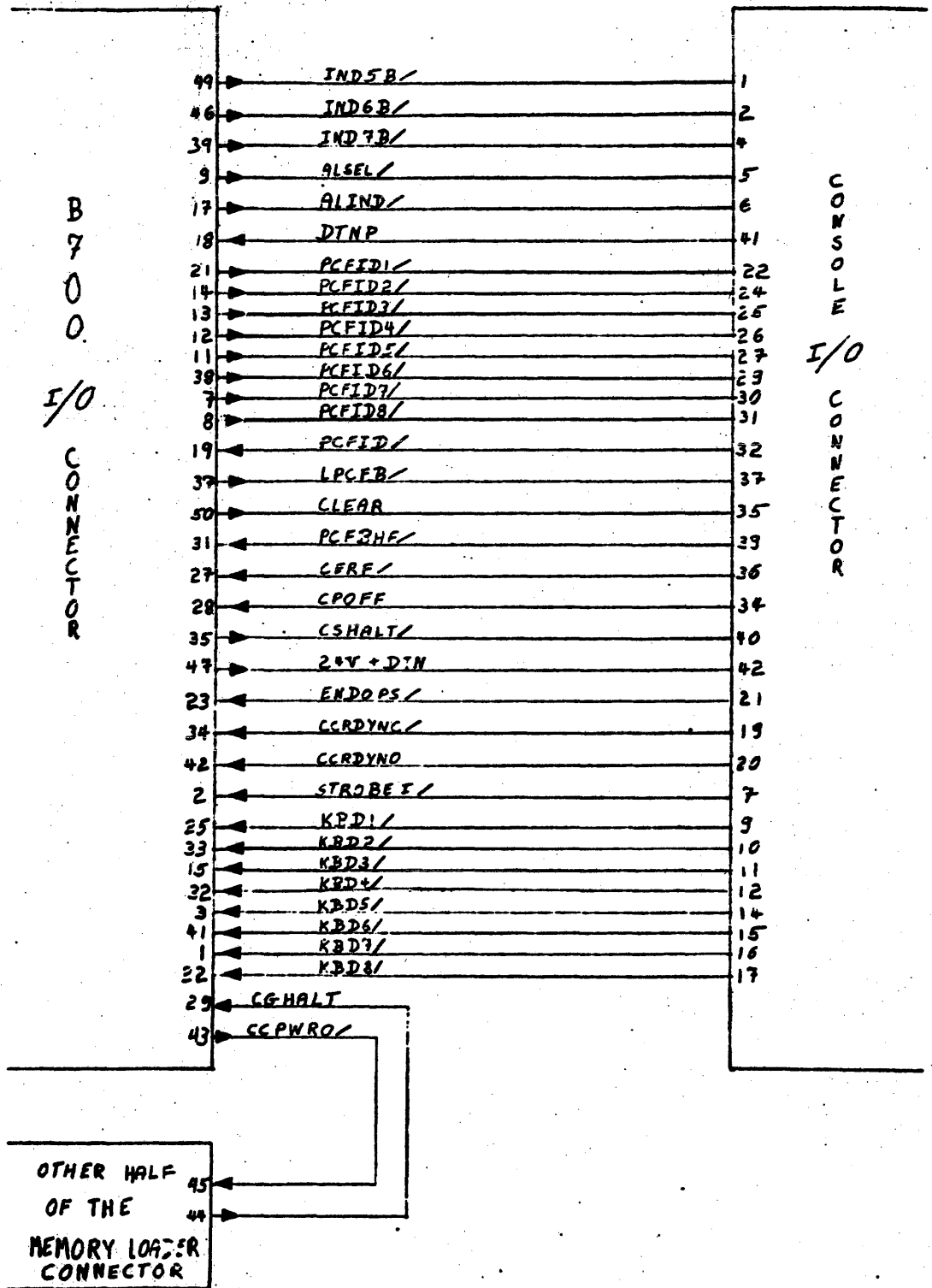
MEMORY ADDRESS DECODING CHART



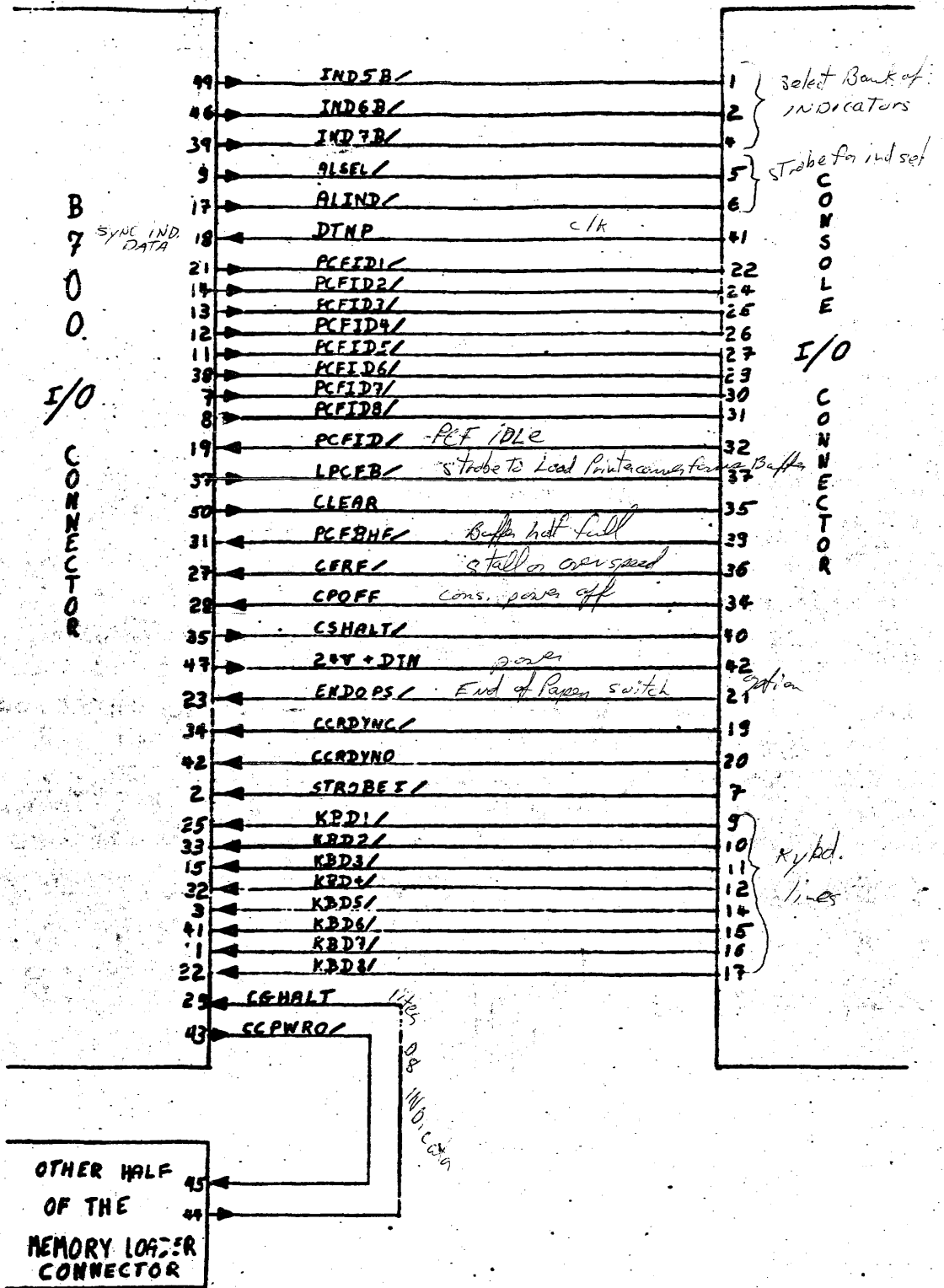
720



2472 2
PART 1
REV 2

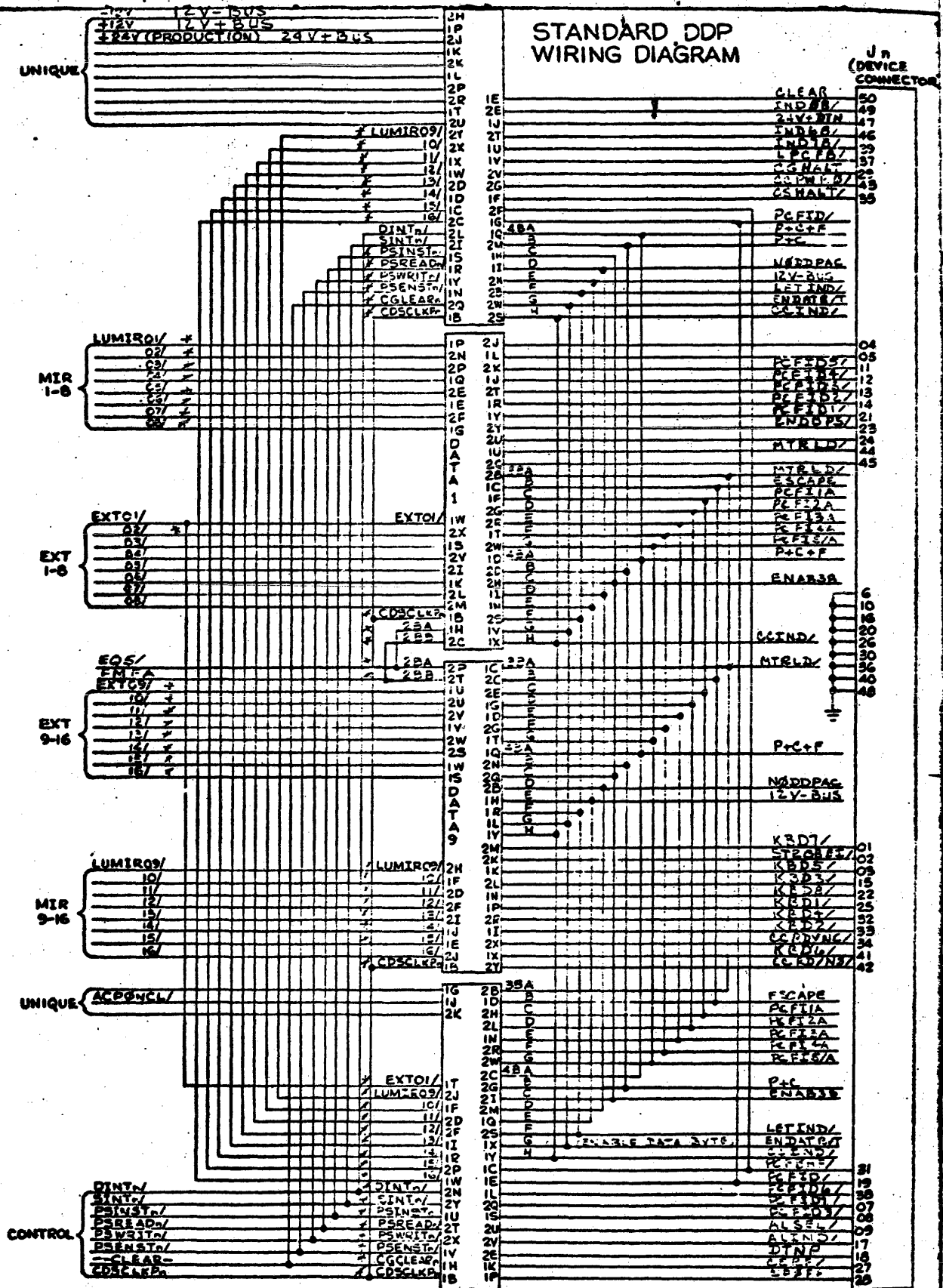


60 CPS CONSOLE INTERFACE



60 CPS CONSOLE INTERFACE

STANDARD DDP WIRING DIAGRAM

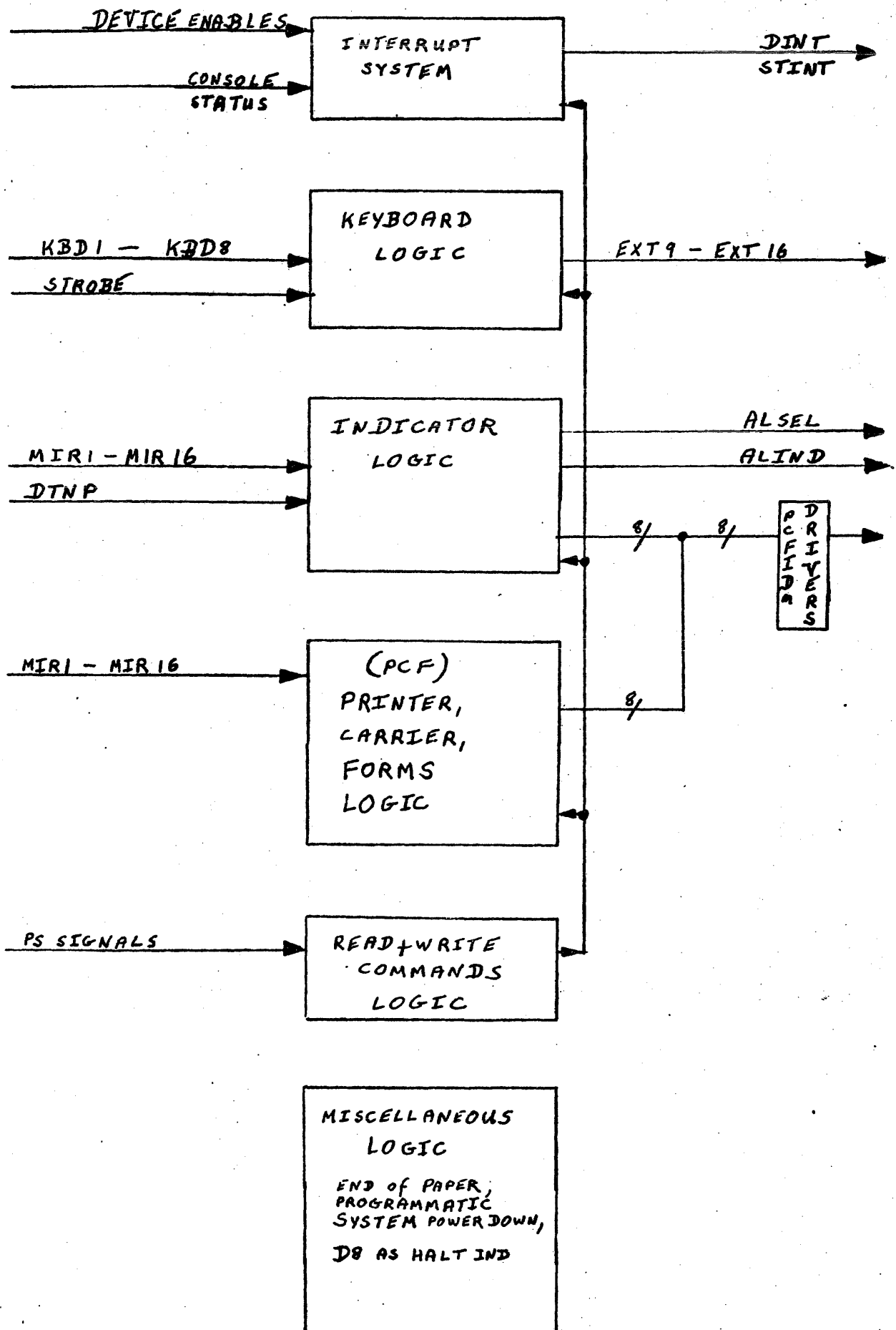


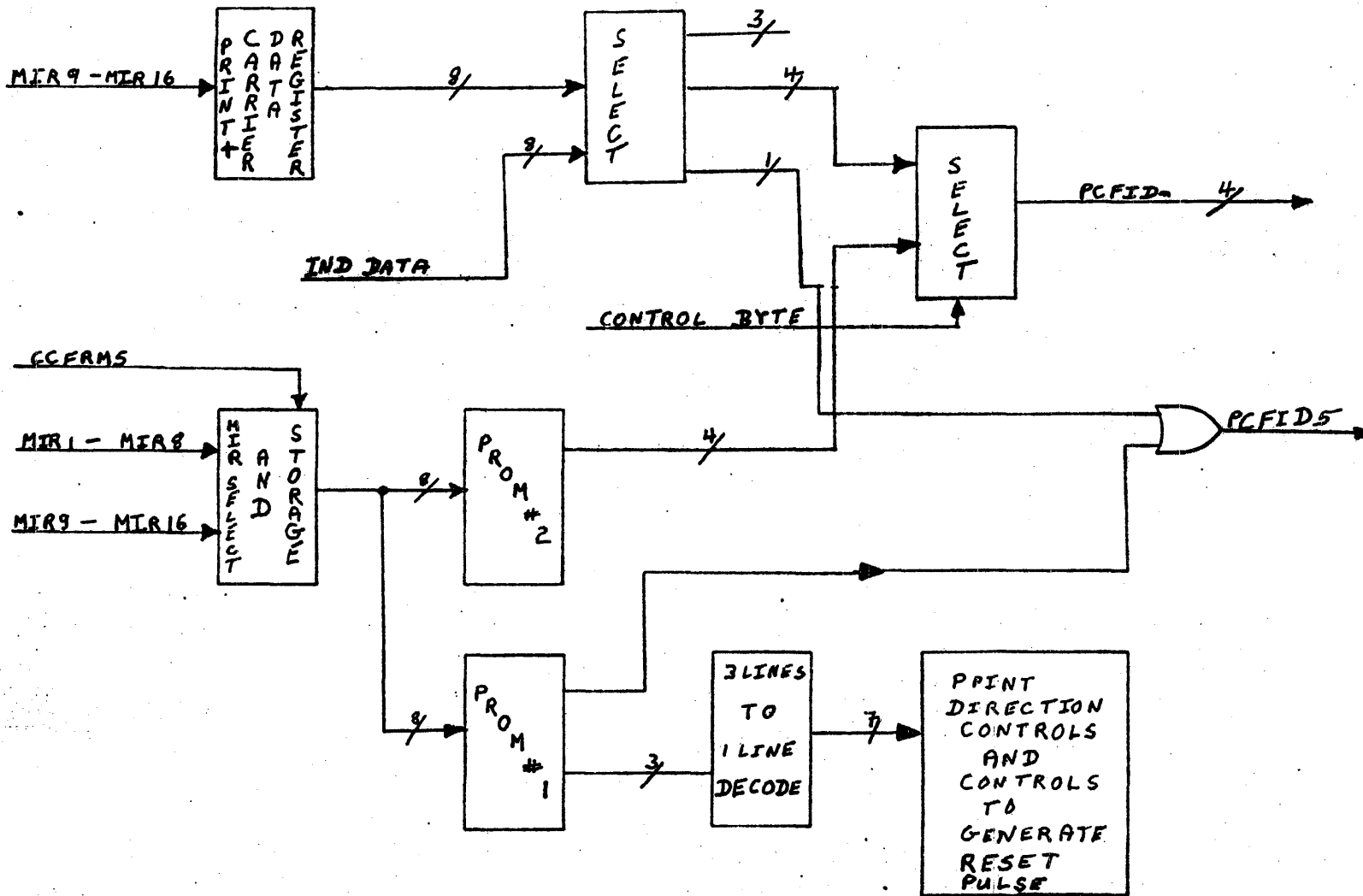
* USED

THIS DRAWING BELONGS TO PEC RTORMA 10-31-

89343 CONSOLE CONTROL CODES

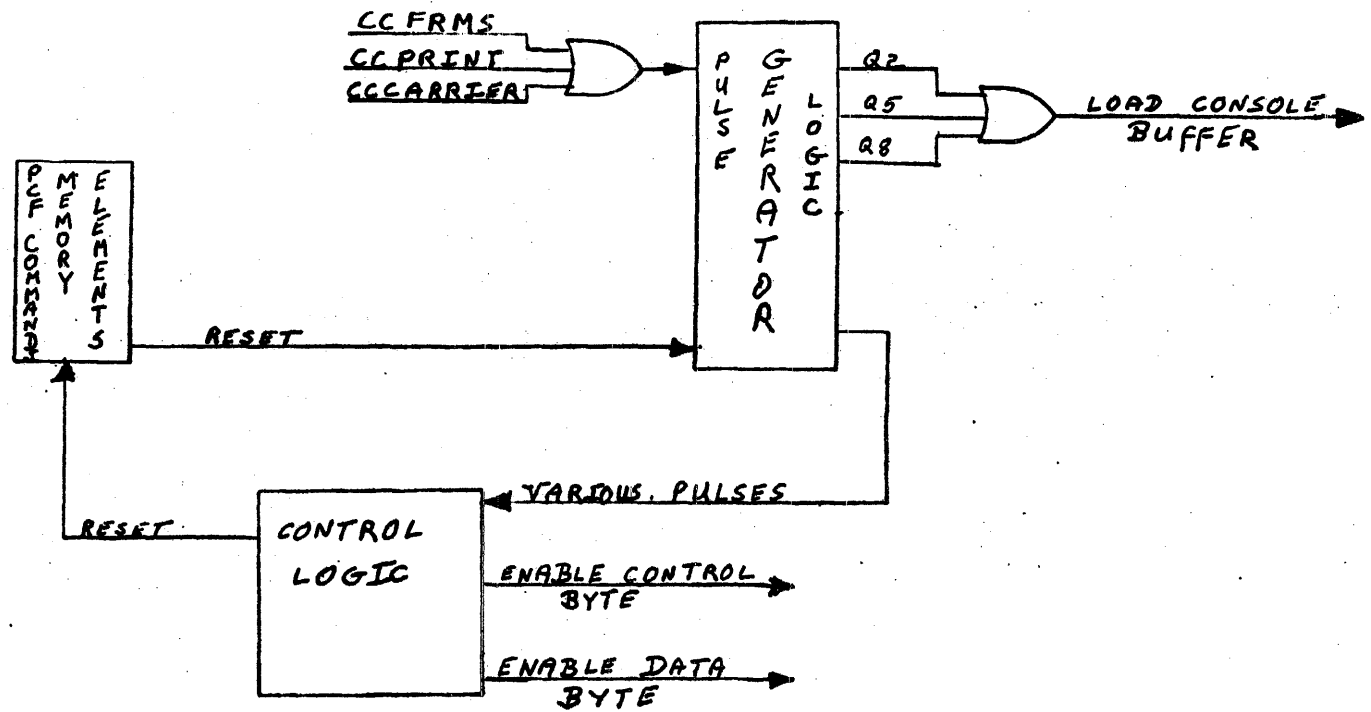
60 CPS CONSOLE CONTROL CODES SENT FROM THE DDP				CONTROL CODES NOT SENT BY DDP BUT EXERCIZABLE BY CONSOLE THROUGH USE OF MAINTENANCE SWITCHES			
CONTROL CODE		CONTROL FUNCTION	REMARKS	CONTROL CODES		CONTROL FUNCTION	REMARKS
CODE	NAME			CODE	NAME		
0-4 0-5	PRTL PRTR	PRINT DIRECTION	PRINT TO THE LEFT PRINT TO THE RIGHT	0-6 0-7	PRTL PRTR	PRINT DIRECTION	PRINT TO THE LEFT PRINT TO THE RIGHT
0-8 0-9 0-A	OPN CLOS O/C	PLATEN OPEN/CLOSE	OPEN PLATEN CLOSE PLATEN COMPLEMENT PLATEN IF THE PRINthead IS ENGAGED AGAINST THE PLATEN, AN OPEN PLATEN OPERATION IS ALWAYS PRECEDED BY A HARDWARE INITIATED HEAD RETRACT	1-2	PMOF	AC MOTOR OFF	RETRACTS THE PRINthead (IF IT HAS NOT BEEN RETRACTED) AND WAITS UNTIL P-C-F IS IN THE IDLE STATE, THEN TURNS THE AC MOTOR OFF.
0-C 0-D	SHLT SHRT	CARRIER POSITIONING	MOVE CARRIER N POSITIONS TO THE LEFT (SHLT) OR RIGHT (SHRT). N IS THE 8-BIT BINARY NUMBER IN THE PRINT BUFFER FIFO IMMEDIATELY FOLLOWING SHLT OR SHRT. N = 0 NO MOVEMENT N = 1 ONE POSITION, ETC. SHLT SETS PRINT DIRECTION TO THE LEFT. SHRT SETS PRINT DIRECTION TO THE RIGHT.	1-3	ENGC	ENGAGE PRINthead	CLOSES THE PLATEN (IF IT IS OPEN) AND THEN ENGAGE THE PRINthead AGAINST THE PLATEN ROLLER READY FOR PRINTING.
1-0	ALARM		SOUNDS AUDIBLE ALARM	1-4	RTRCT	RETRACT PRINthead	WILL RETRACT THE PRINthead.
1-A	ARL	VERTICAL FORMS MOVEMENT	ADVANCE RIGHT AND LEFT PLATENS N LINES. N IS THE 8-BIT BINARY NUMBER IN THE PRINT BUFFER FIFO IMMEDIATELY FOLLOWING THE ADVANCE CODE.	1-5	BKSP	HORIZONTAL SPACING	WILL POSITION ONE SPACE OPPOSITE THE DIRECTION PRESENTLY SPECIFIED. DOES NOT CHANGE SPECIFIED DIRECTION, EXCEPT TO ACCOMPLISH BACKSPACE.
1-C 1-D	SKHDL SKHDR	VERTICAL FORMS MOVEMENT	ADVANCE LEFT (SKHDL) OR RIGHT (SKHDR) PLATEN TO TOP OF FORM. IN PRESENT DESIGN WILL ADVANCE SPECIFIED PLATEN ONE LINE ONLY.	1-6	ENUND	ENABLE UNDERLINE 9 PIN PRINT HEAD ONLY	WILL MODIFY SUBSEQUENT PRINT CHARACTERS (INCLUDING SPACES) BY UNDERLINING THEM. THIS IS IN EFFECT UNTIL SUCH TIME A DSUND CODE IS RECEIVED.
1-E 1-F	INLT INRT	CARRIER MOVEMENT	MOVES CARRIER TO LEFT (INLT) OR RIGHT (INRT) BUMPER AT ESCAPE VELOCITY (6"/SEC.). INLT SETS PRINT DIRECTION TO THE RIGHT. INRT SETS PRINT DIRECTION TO LEFT.	1-7	DSUND	DISABLE UNDERLINE	WILL DISABLE UNDERLINING OF PRINT CHARACTERS CAUSED BY THE CODE. HAS NO EFFECT ON THE UNDERSCORE CODE (5-F).
				1-8 1-9 1-A	ALT ART ARL	VERTICAL FORMS MOVEMENT	ADVANCE LEFT PLATEN (ALT), ADVANCE RIGHT PLATEN (ART), OR BOTH RIGHT AND LEFT PLATENS (ARL) N LINES. N IS THE 8-BIT BINARY NUMBER IN THE OUTPUT FIFO IMMEDIATELY FOLLOWING THE ADVANCE CODE.



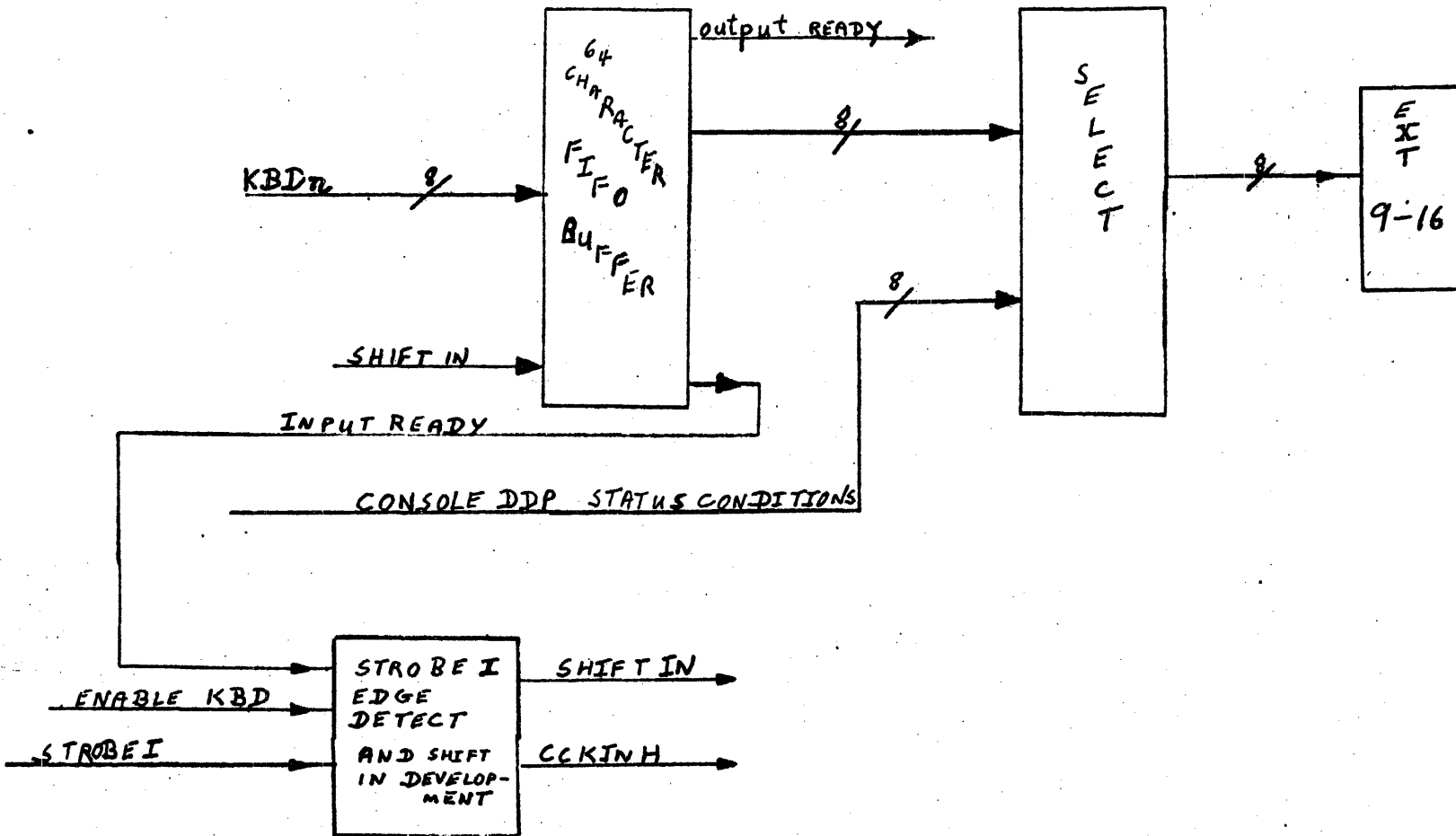


p.12

DDP PCF LOGIC BLOCK DIAGRAM

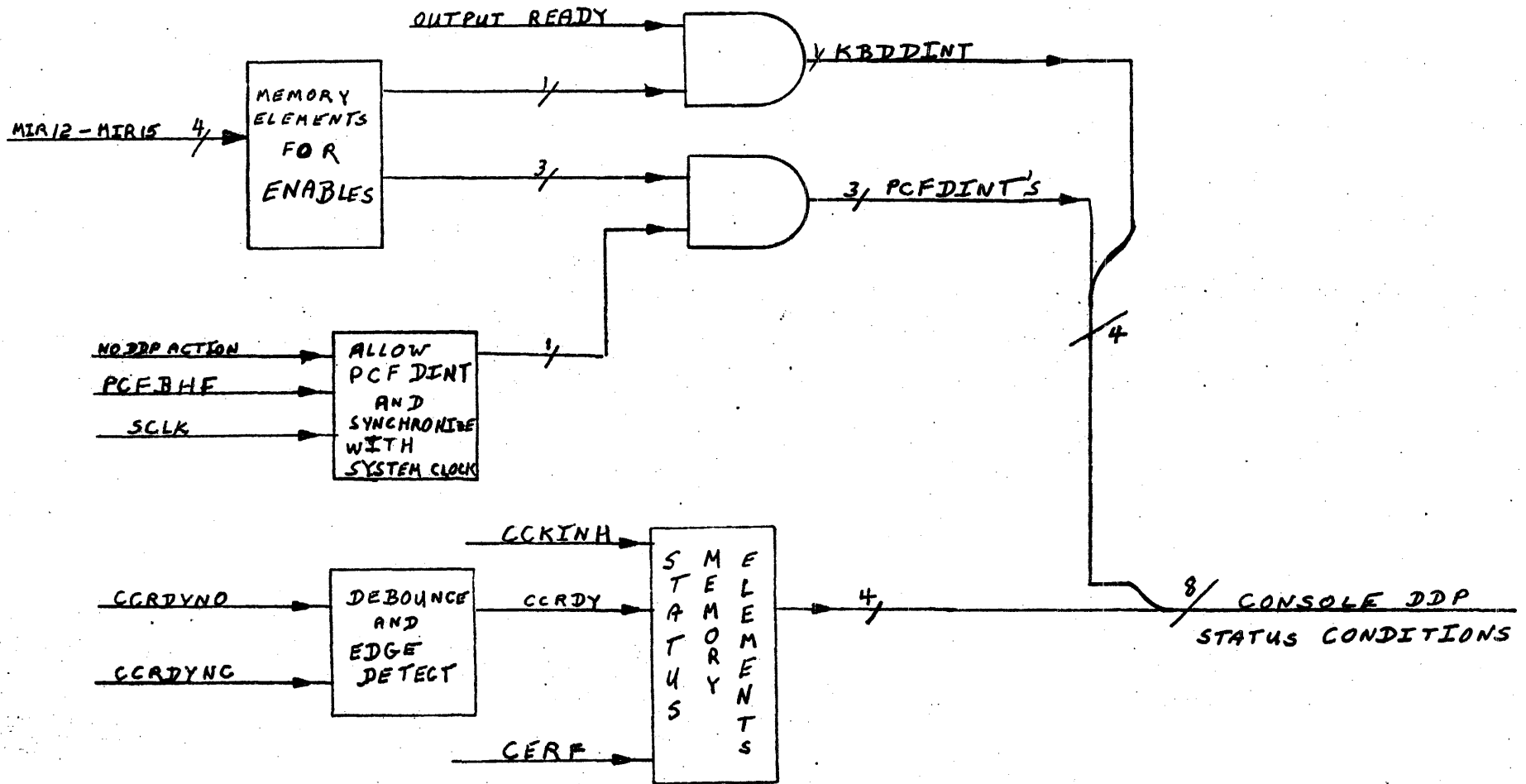


DDP PCF LOGIC BLOCK DIAGRAM



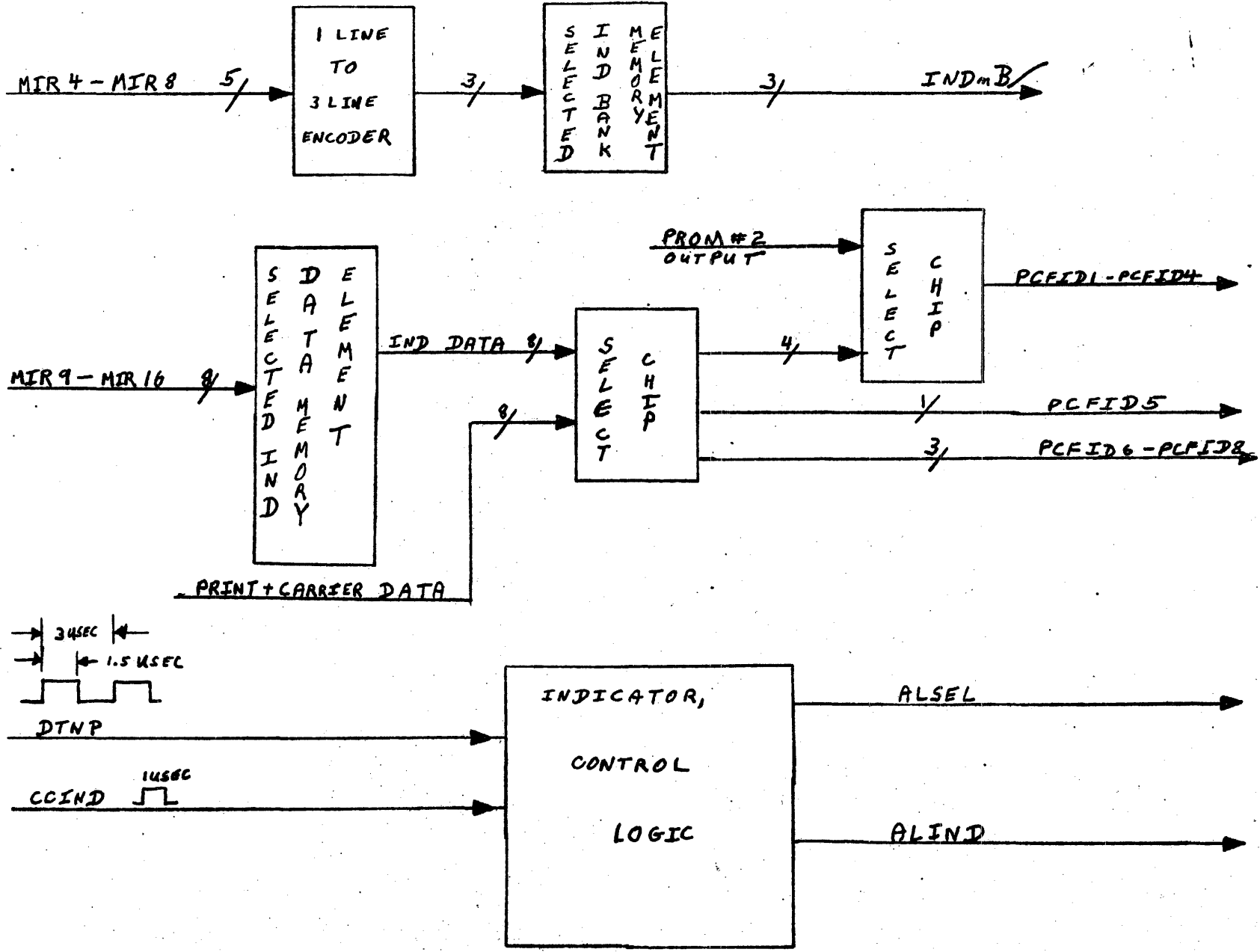
DDP KEYBOARD LOGIC BLOCK DIAGRAM

P.14



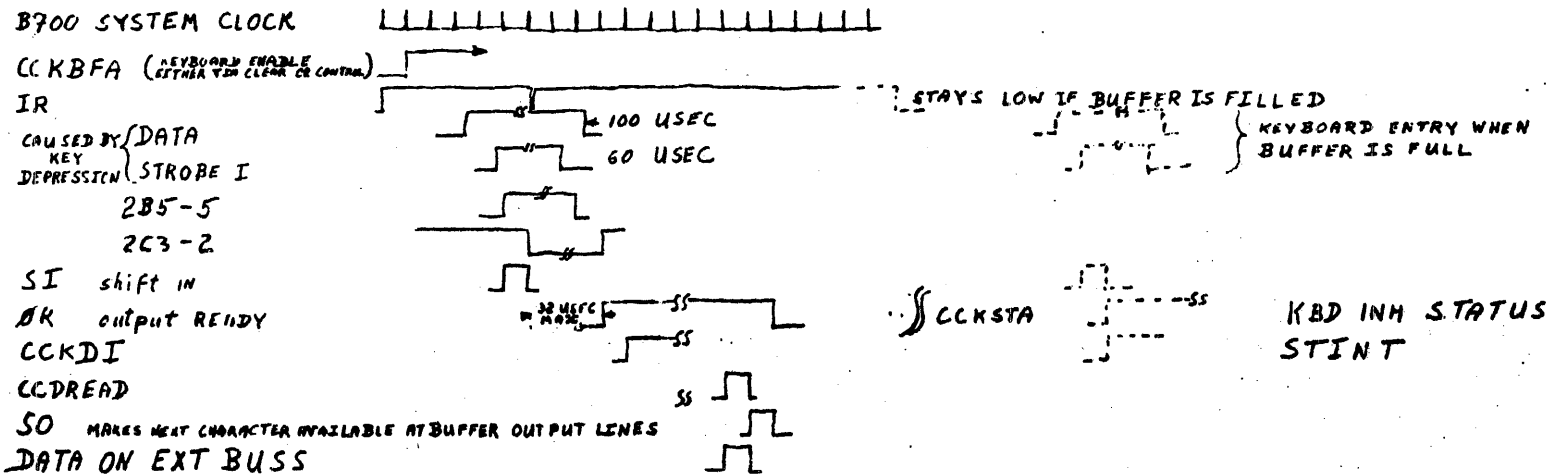
DDP STATUS LOGIC BLOCK DIAGRAM

P.15



DDP INDICATOR LOGIC BLOCK DIAGRAM

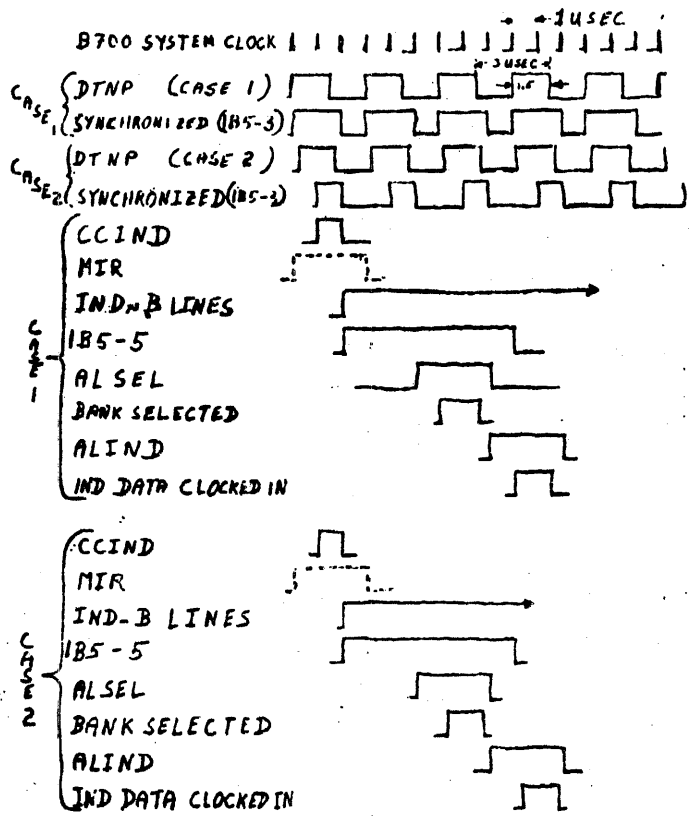
P-16



60 CPS CONSOLE

KEYBOARD TIMING DIAGRAM

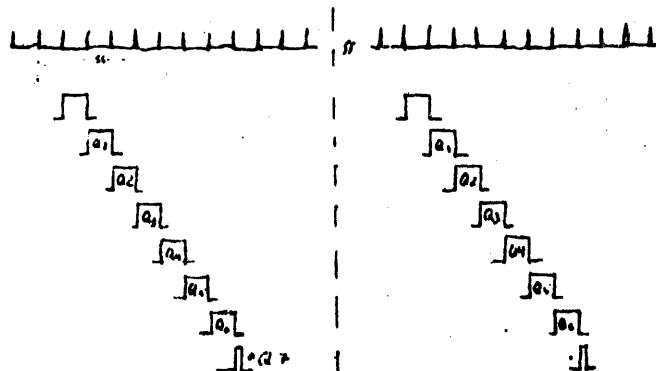
20 OCT 1975



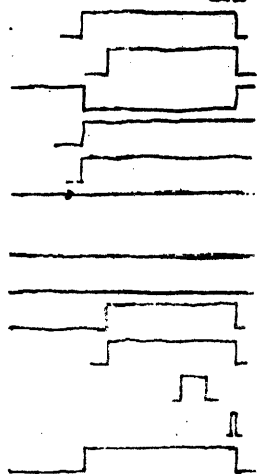
INDICATOR DATA WORD TIMING DIAGRAM

25/OCT/75

B700 SYSTEM CLOCK
MIR
CCPRNT

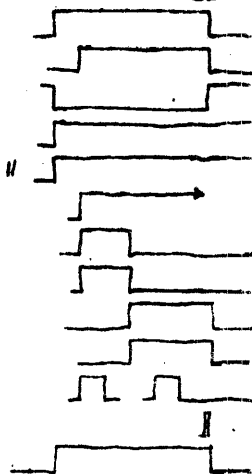
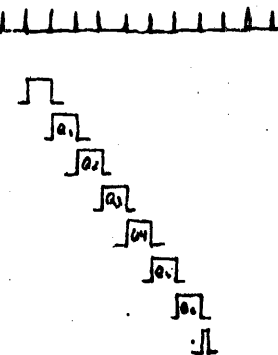


PRINT COMMAND FF
PRINT FF
NO DDP ACTION
TLO = lines
363-10
345-5 (DIRECTION MEMORY)
CHANGE DIRECTION
ENABLE CONT BYTE
ENABLE DATA BYTE
DATA
LPCFB
PICOF CLR
CLRSTB (RESETS 6 pulses)



PRINT RIGHT
COMMAND
WHEN PRECEDING
WAS RIGHT COMMAND

363-11



PRINT LEFT
COMMAND

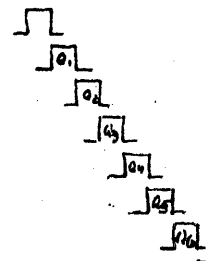
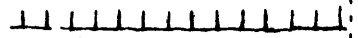
PRINT DATA WORD TIMING DIAGRAM

27/OCT/1975

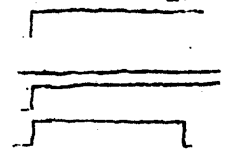
B700 SYSTEM CLOCK

MIR

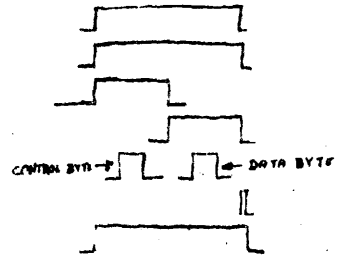
CCCARR



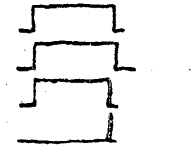
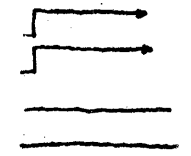
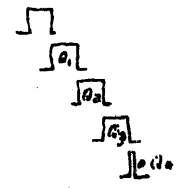
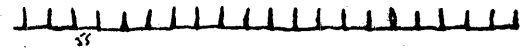
TLO.. lines available
ONE OPERATION
TWO OPERATIONS
2 OP CARRIER



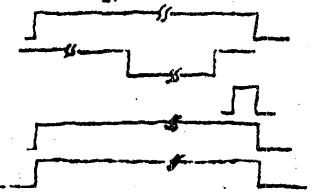
CAR + FMS COMMAND FF
ALLOW Q2
ENABLE CONTROL
ENABLE DATA
LPCFB
FMS + CARRIER CLEAR
NO DDP ACTION



CARRIER POSITIONING
COMMAND
A 2 OPERATION COMMAND



PCFID
3A7-11
3A7-5
INIT

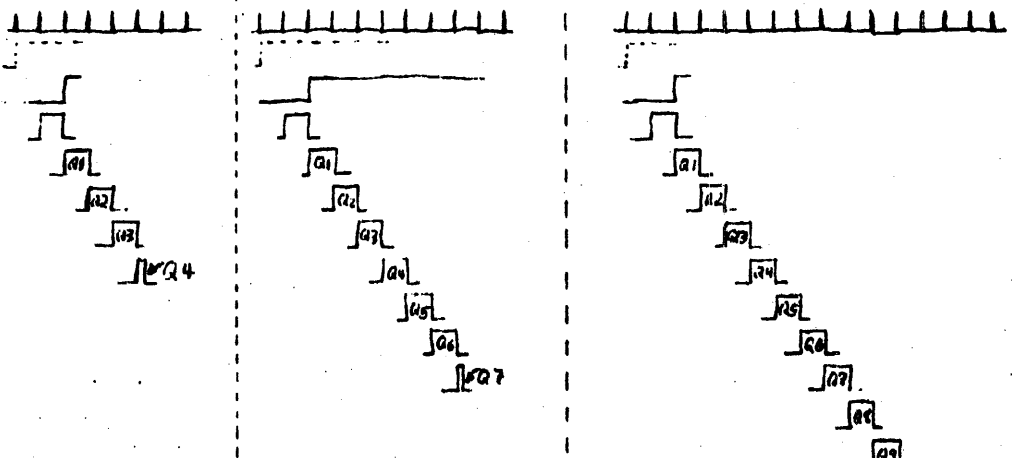


CARRIER INITIALIZE COMMAND

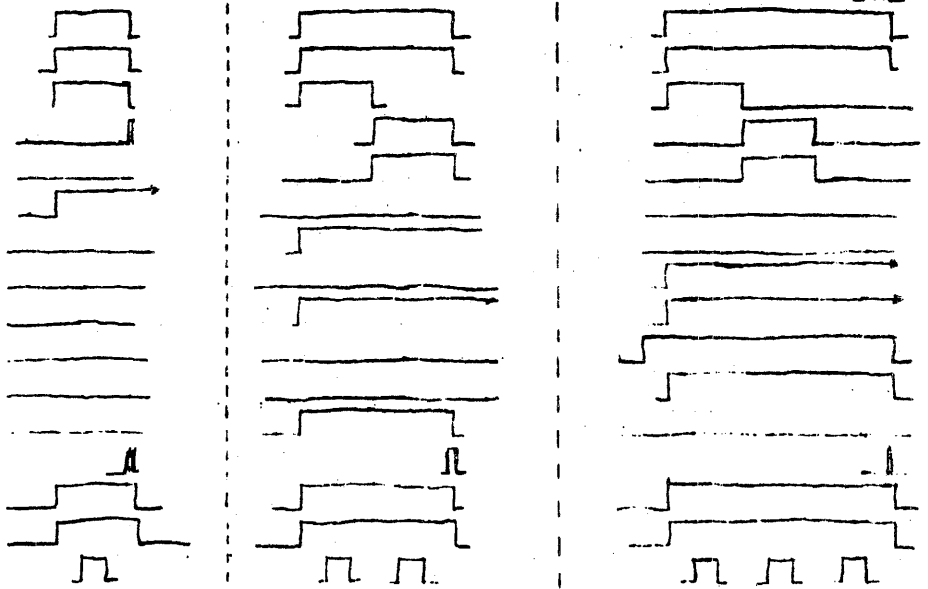
CARRIER DATA WORD TIMING DIAGRAM

27/OCT/1975

MIR
 TLO_n lines
 CCFRMS



CAR + FMS COMMAND FF
 FORMS COMMAND FF
 ENABLE CONTROL
 ENABLE DATA
 FORMS DATA
 ONE OPERATION
 TWO OPERATIONS
 THREE OPERATIONS
 2 + 3 OPS
 EQ 5FF
 Put 01 IN DATA
 Put 10 IN DATA
 P.F.C. Clear
 CLRSTB
 NO DDP ACTION
 LPCFB



ONE OPERATION
 OPEN OR CLOSE
 PLATEN

TWO OPERATIONS
 LEFT PLATEN
 AND ALARM

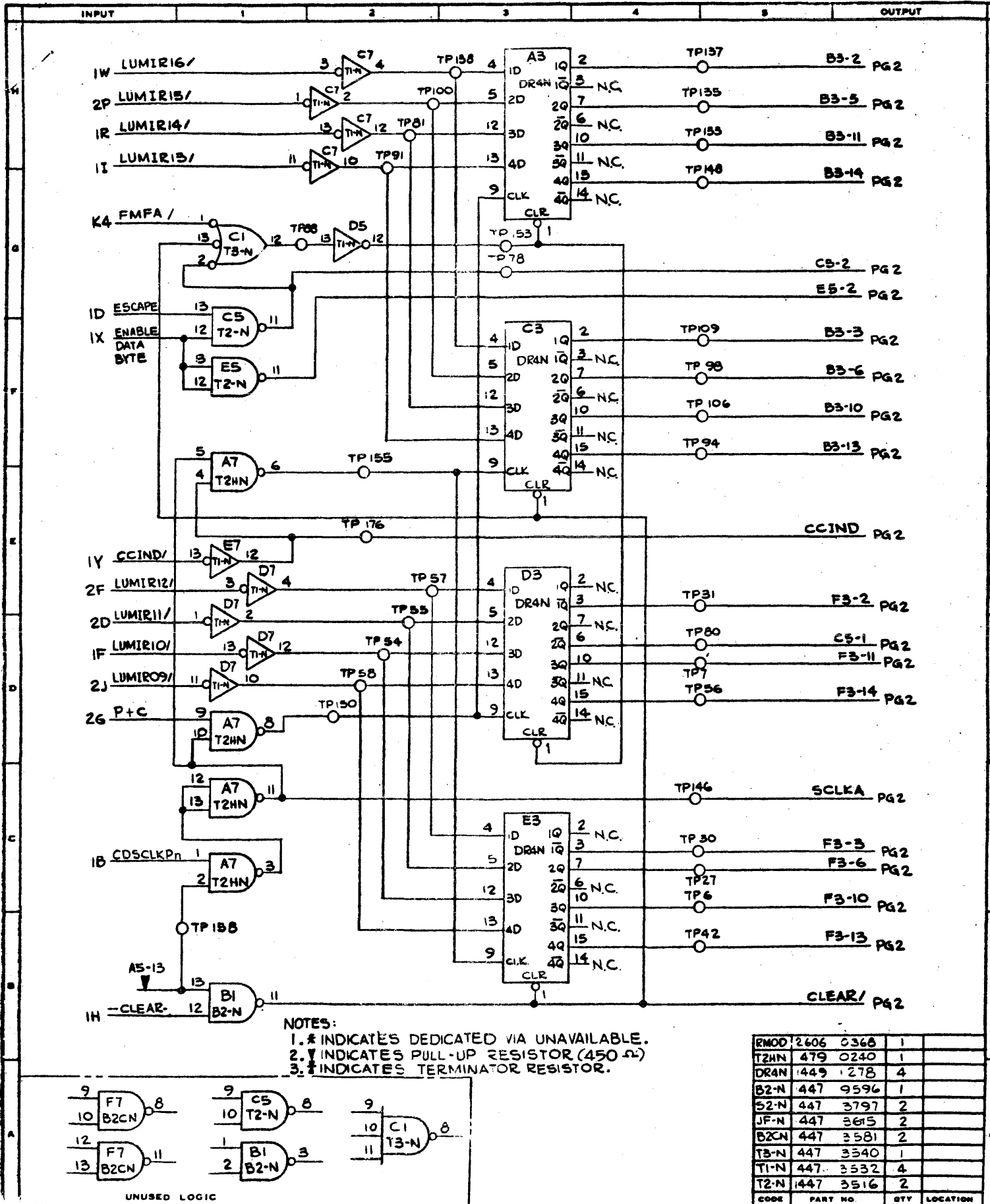
BA3-5

LEFT AND RIGHT PLATEN
 ADVANCE ALSO ALARM

FORMS DATA WORD TIMING DIAGRAM

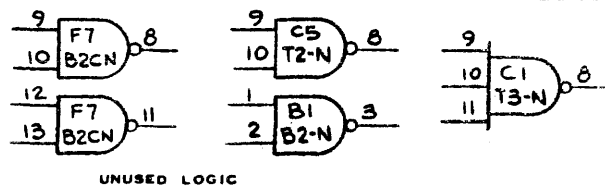
29/OCT/1975

P.21.



NOTES:
 1. * INDICATES DEDICATED VIA UNAVAILABLE.
 2. ▽ INDICATES PULL-UP RESISTOR (450 Ω).
 3. † INDICATES TERMINATOR RESISTOR.

RM0D	2606	0368	1
T2HN	479	0240	1
DR4N	1449	1278	4
B2-N	447	9596	1
B2-N	447	3797	2
JF-N	447	3615	2
B2CN	447	3581	2
T3-N	447	3340	1
TI-N	447	3532	4
T2-N	447	3516	2
CODE	PART NO.	QTY	LOCATION



Burroughs Corporation
 COMPUTER SYSTEMS GROUP DOWNTOWN PLANT
 DOWNTOWN, PA. 19333 U.S. AMERICA

REV	B	A	A
SH	1	2	3
REVISED BY	A	B	
DATE	8-29-75	1-3-75	7-7-75

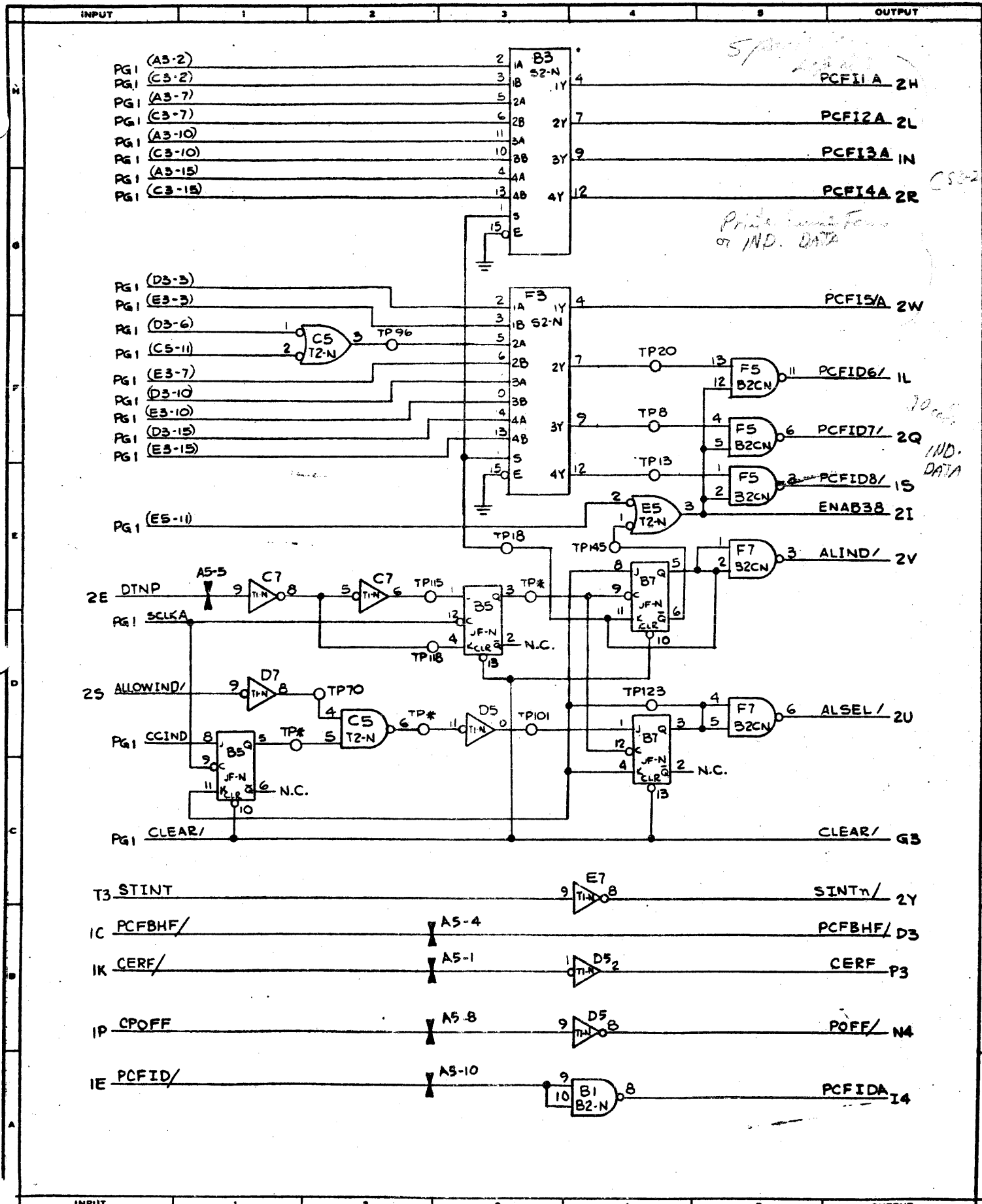
DESIGNED BY: A. TUREK
 CHECKED BY: P. ALBERT
 SIGN OFF: P. ALBERT

DATE: 8-29-75
 DATE: 1-3-75
 DATE: 7-7-75

TITLE: CSI
 SHEET: 103
 DWG NO.: 2605 0966

CLASS CODE: 2-9520
 PLY NO.: 038
 REV: B

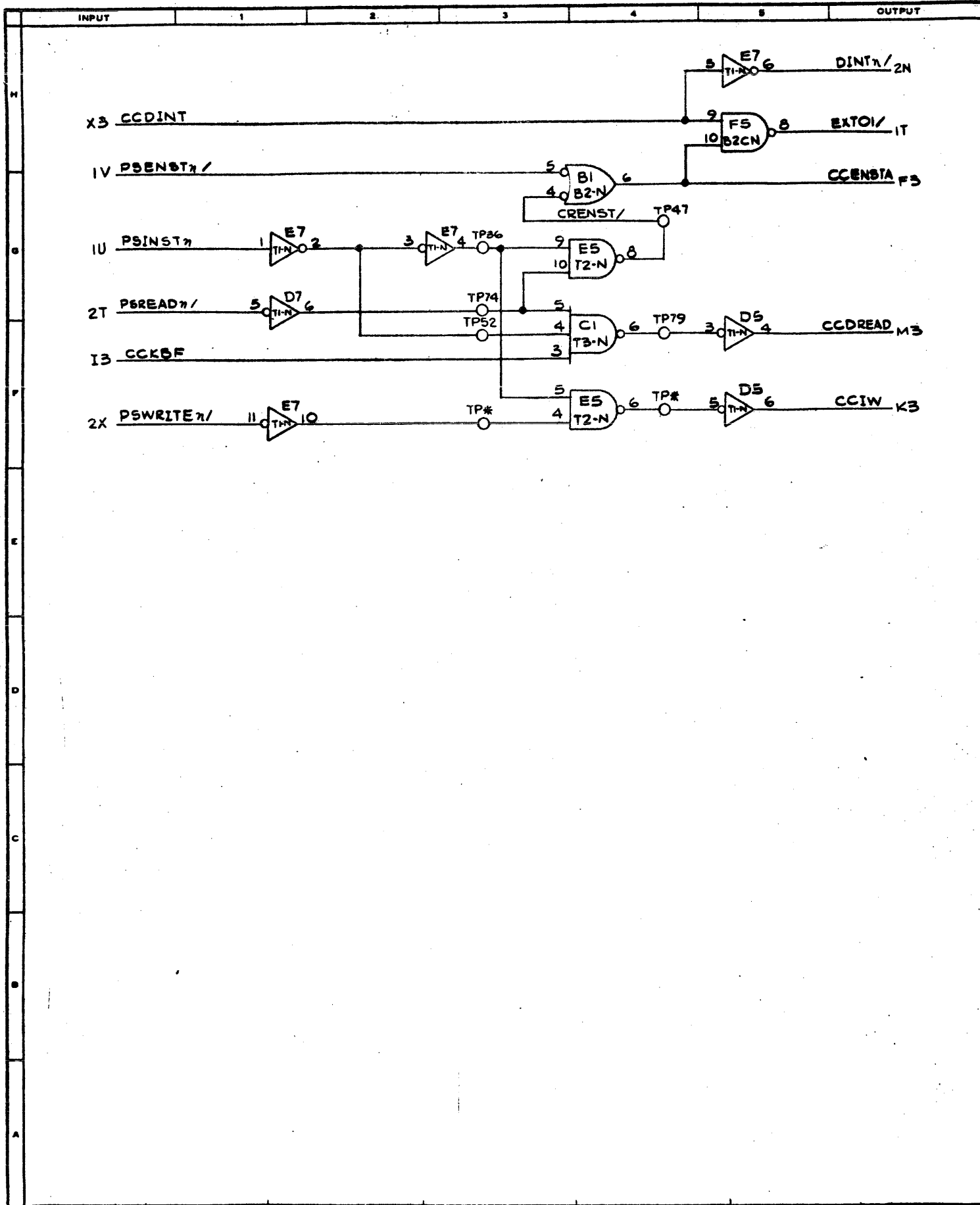
PRINTED IN U.S. AMERICA



SP...
PCF11A 2H
PCF12A 2L
PCF13A 1N
PCF14A 2R
Print...
or IND. DATA

IND. DATA

REVISED 4-15-75 25007



BUSHING 44-121 28607

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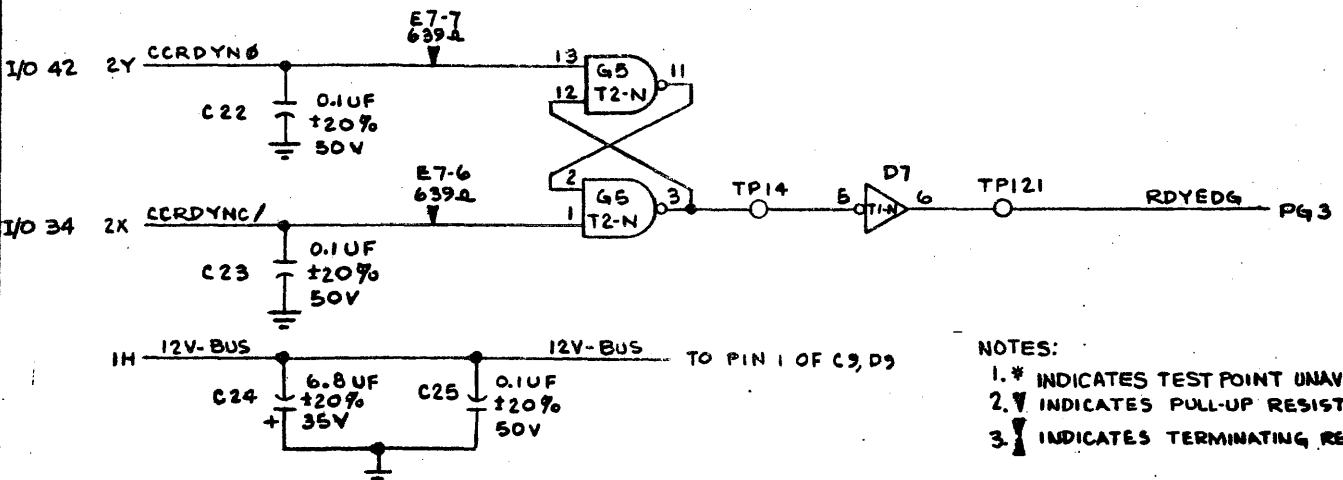
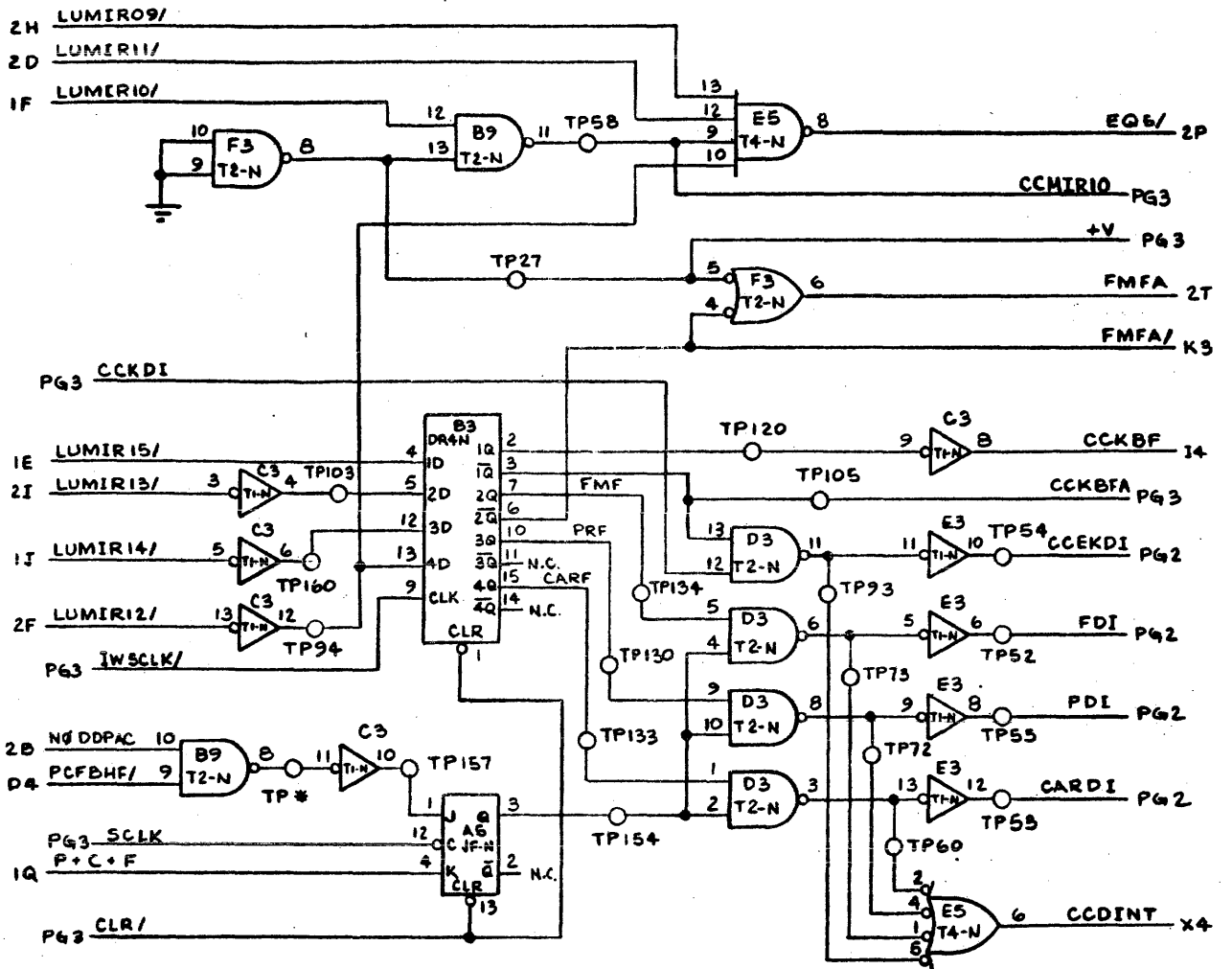
COMPUTER SYSTEMS GROUP DOWNTOWN PLANT
DOWNTOWN, PA. 19333 U.S. AMERICA

REVISIONS

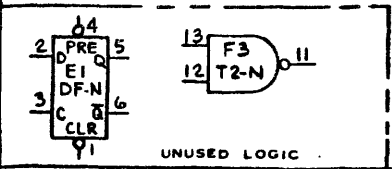
PROPRIETARY TO BURROUGHS CORP. - NOT TO BE REPRODUCED, NOR USED FOR MANUFACTURING PURPOSES EXCEPT ON BURROUGHS ORDER OR PRIOR WRITTEN CONSENT

TITLE		CLASS CODE	
CSI		2-9520	
SHEET	DWG NO.	PLY NO.	REV
3	2605 8766	038	A

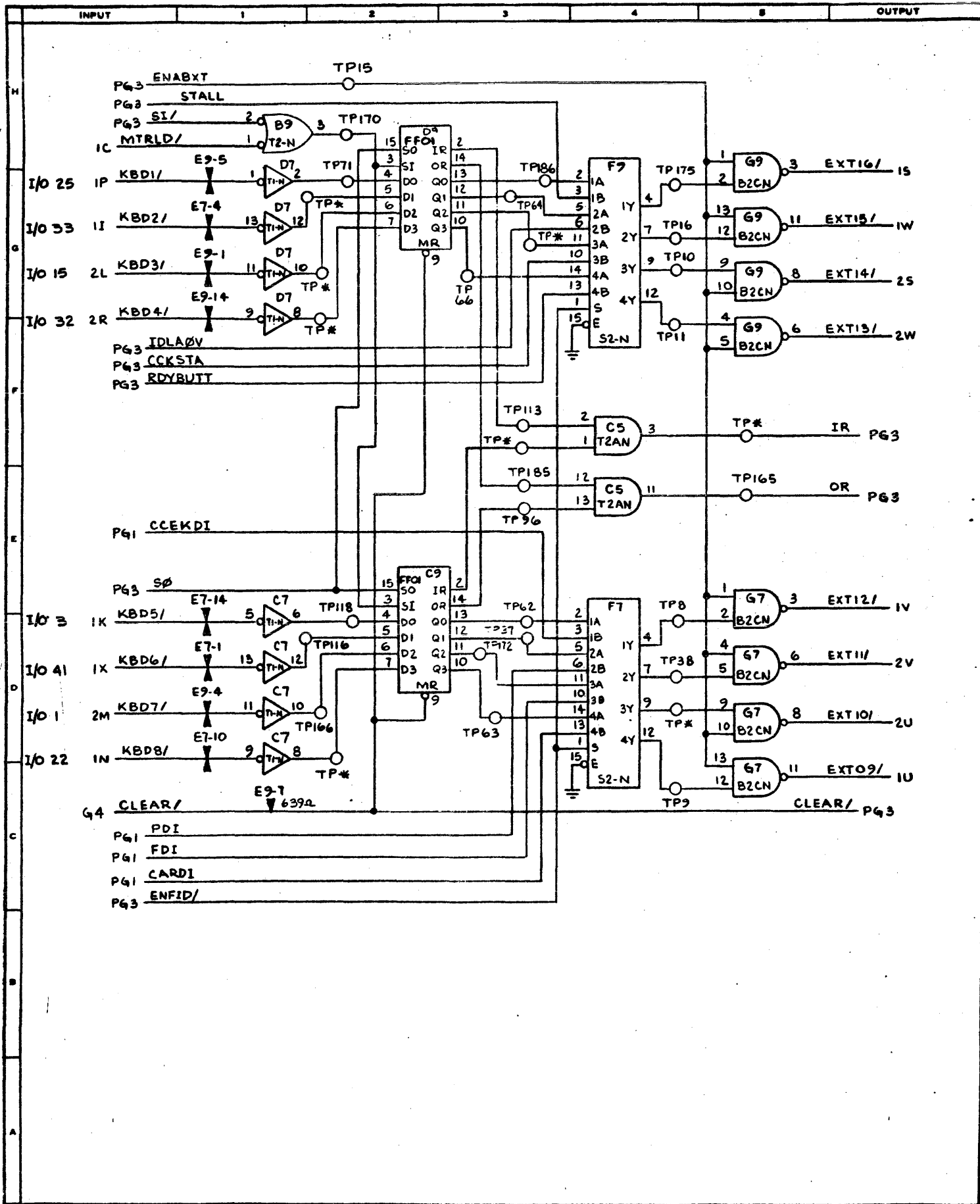
INPUT 1 2 3 4 5 OUTPUT



- NOTES:
- 1. * INDICATES TEST POINT UNAVAILABLE.
 - 2. ▽ INDICATES PULL-UP RESISTOR.
 - 3. ▽ INDICATES TERMINATING RESISTOR.



DF-N	1447 3607	1		RMOD	1447 5396	2	
FFO1	1448 9165	2		T4-N	1447 3565	1	
S2-N	1447 3797	2		BZCN	1447 3581	2	
DR6N	1449 1260	1		T2-N	1447 3516	5	
DR4N	1449 1278	2		JF-N	1447 3615	3	
T2HN	1479 0240	1		T3AH	1447 3557	1	
T2AN	1447 3524	1		TI-N	1447 3532	4	
CODE	PART NO.	QTY	LOCATION	CODE	PART NO.	QTY	LOCATION



DRAWING 44-131 25507

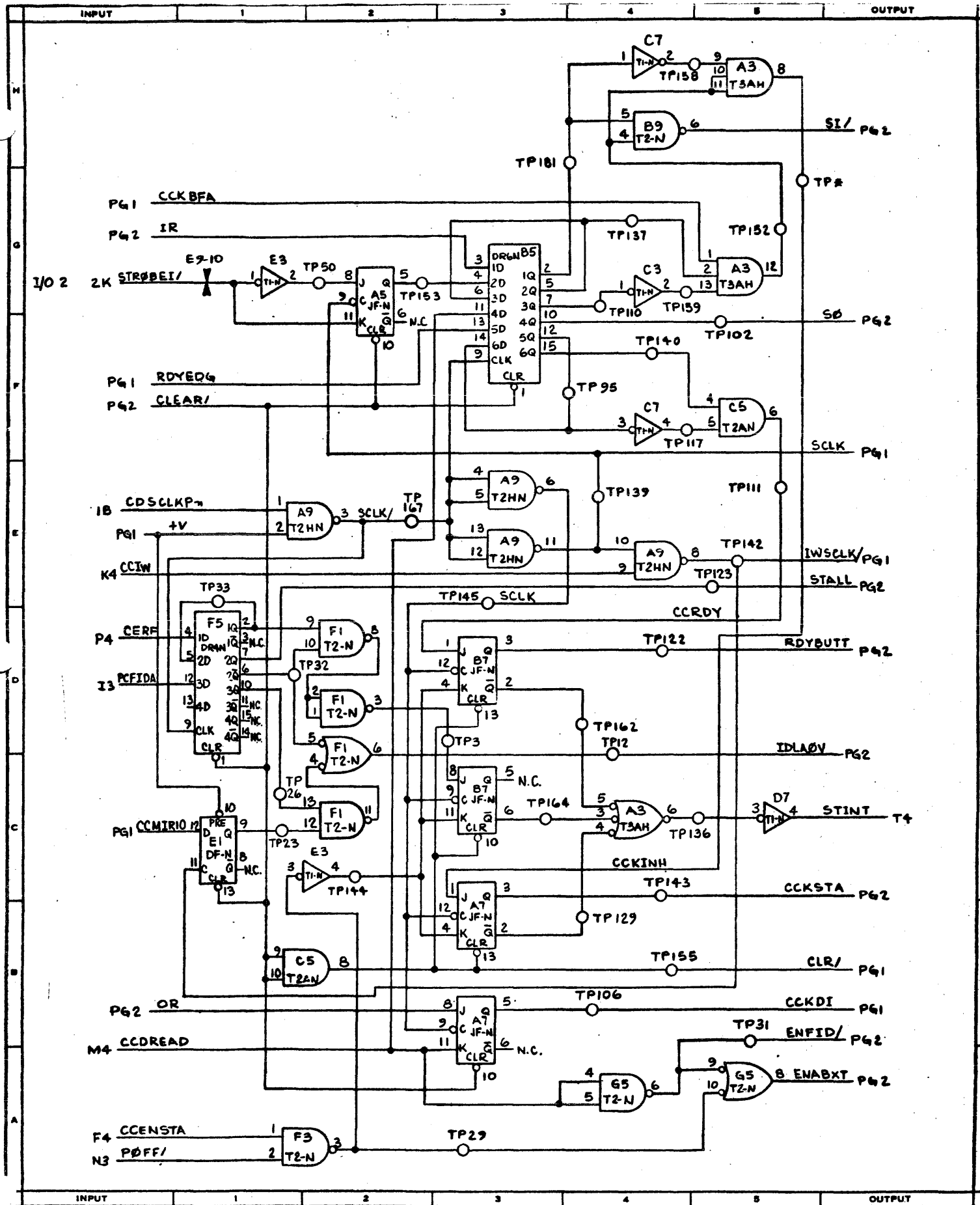
Burroughs Corporation

COMPUTER SYSTEMS GROUP DOWNTOWNTOWN PLANT
DOWNTOWNTOWN, PA. 19335 U.S. AMERICA

PROPRIETARY TO BURROUGHS CORP. - NOT TO BE REPRODUCED, NOR USED FOR MANUFACTURING PURPOSES EXCEPT ON BURROUGHS ORDER OR PRIOR WRITTEN CONSENT.
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REVISIONS

FILE		CLASS CODE	
CS2		2-9520	
SHEET	DWG NO.	PLY NO.	REV
2	2605 8990	038	B

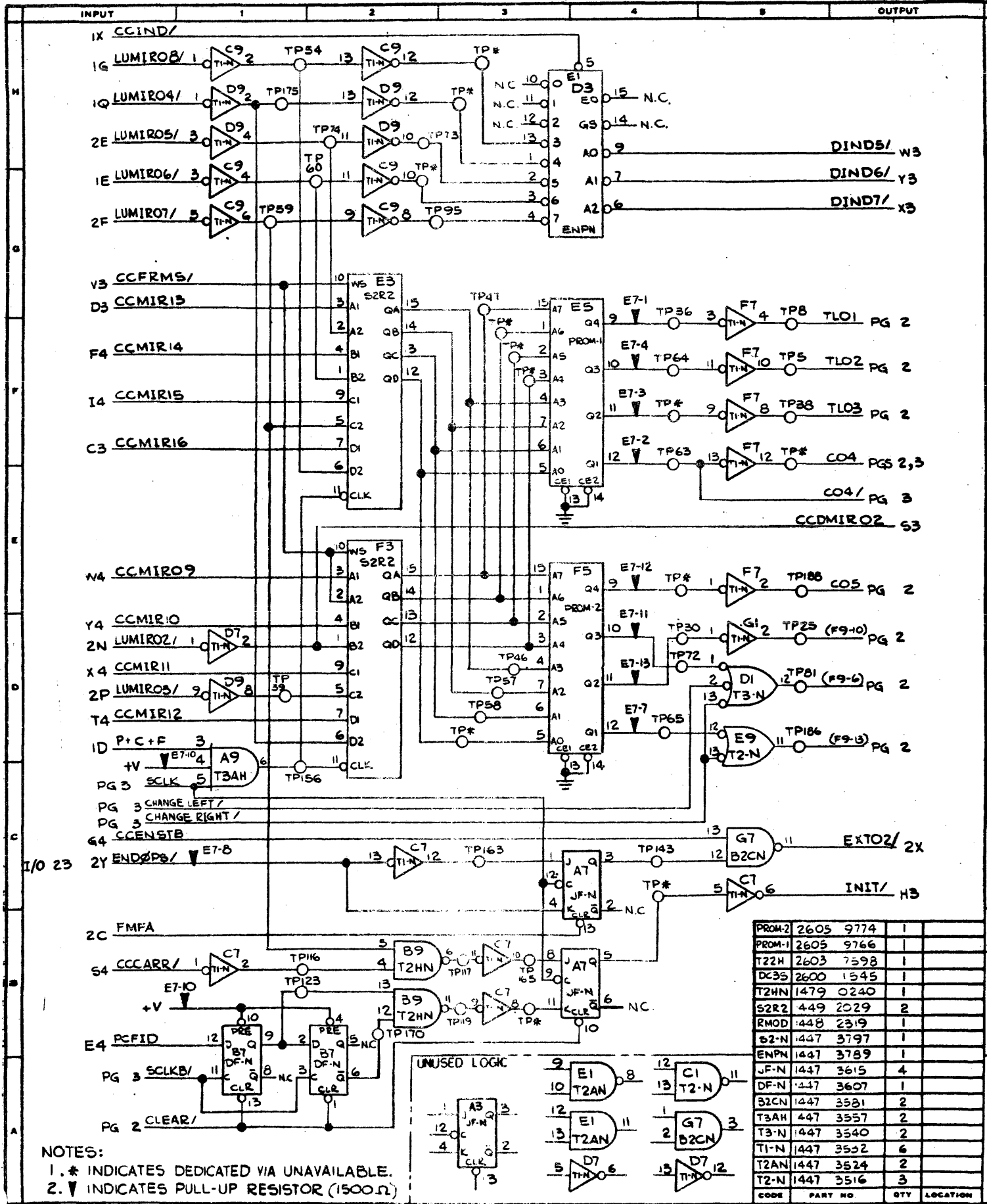


Burroughs Corporation

COMPUTER SYSTEMS GROUP DOWNTOWN PLANT
DOWNTOWN, PA. 19338 U.S. AMERICA

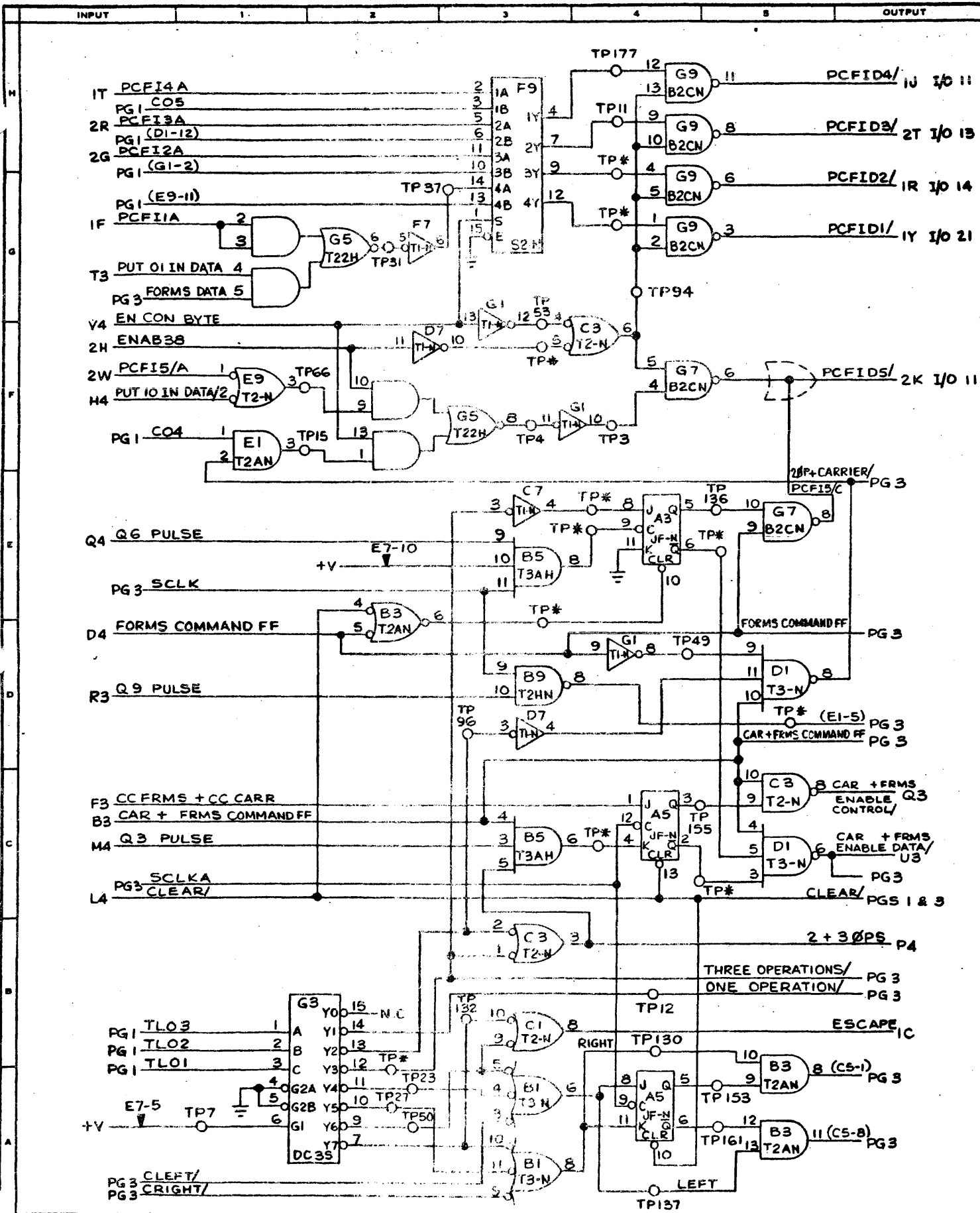
REVISIONS

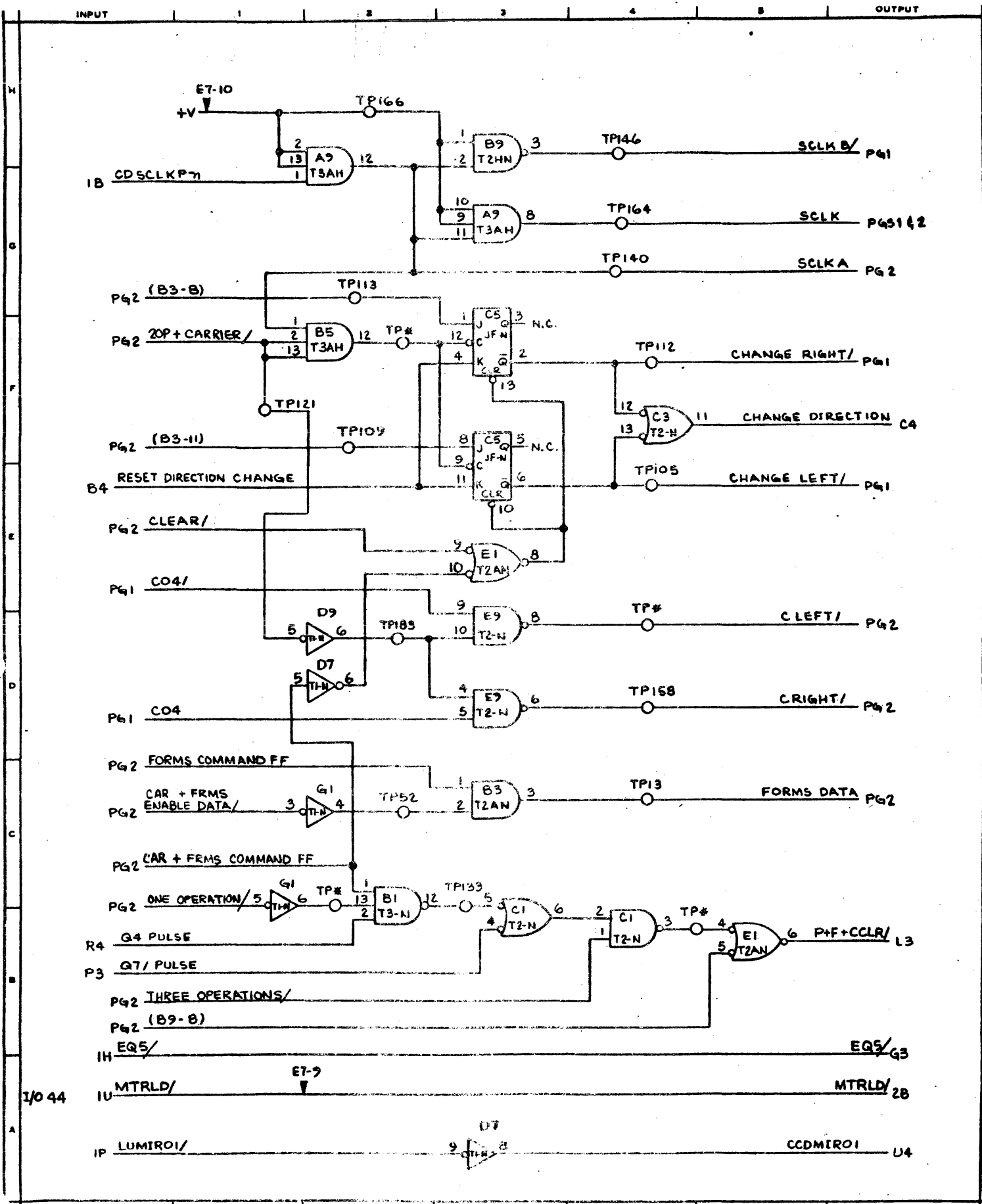
TITLE		CLASS CODE	
CS2		2-9520	
SHEET	DWG. NO.	PLY. NO.	REV.
3	2605 8990	038	B

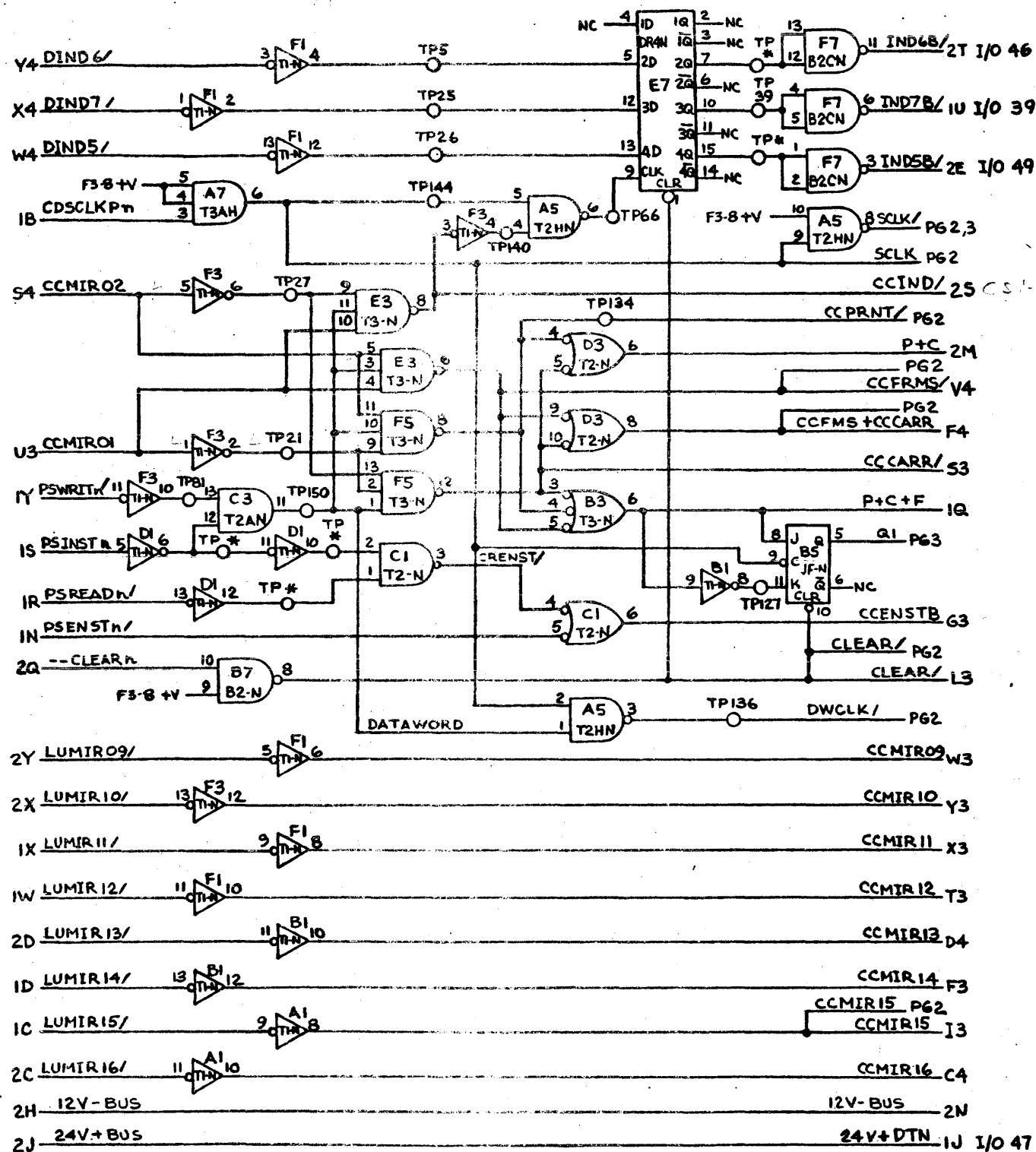


NOTES:
 1. * INDICATES DEDICATED VIA UNAVAILABLE.
 2. ▽ INDICATES PULL-UP RESISTOR (1500Ω)

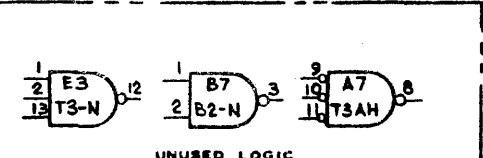
PROM-2	2605	9774	1
PROM-1	2605	9766	1
T22H	2603	7598	1
DC35	2600	1545	1
T2HN	1479	0240	1
S2R2	449	2029	2
RMOD	448	2319	1
62-N	1447	3797	1
ENPN	1447	3789	1
JF-N	1447	3615	4
DF-N	447	3607	1
B2CN	1447	3531	2
T3AH	447	3557	2
T3-N	1447	3540	2
T1-N	1447	3532	6
T2AN	1447	3524	2
T2-N	1447	3516	3
CODE	PART NO	QTY	LOCATION



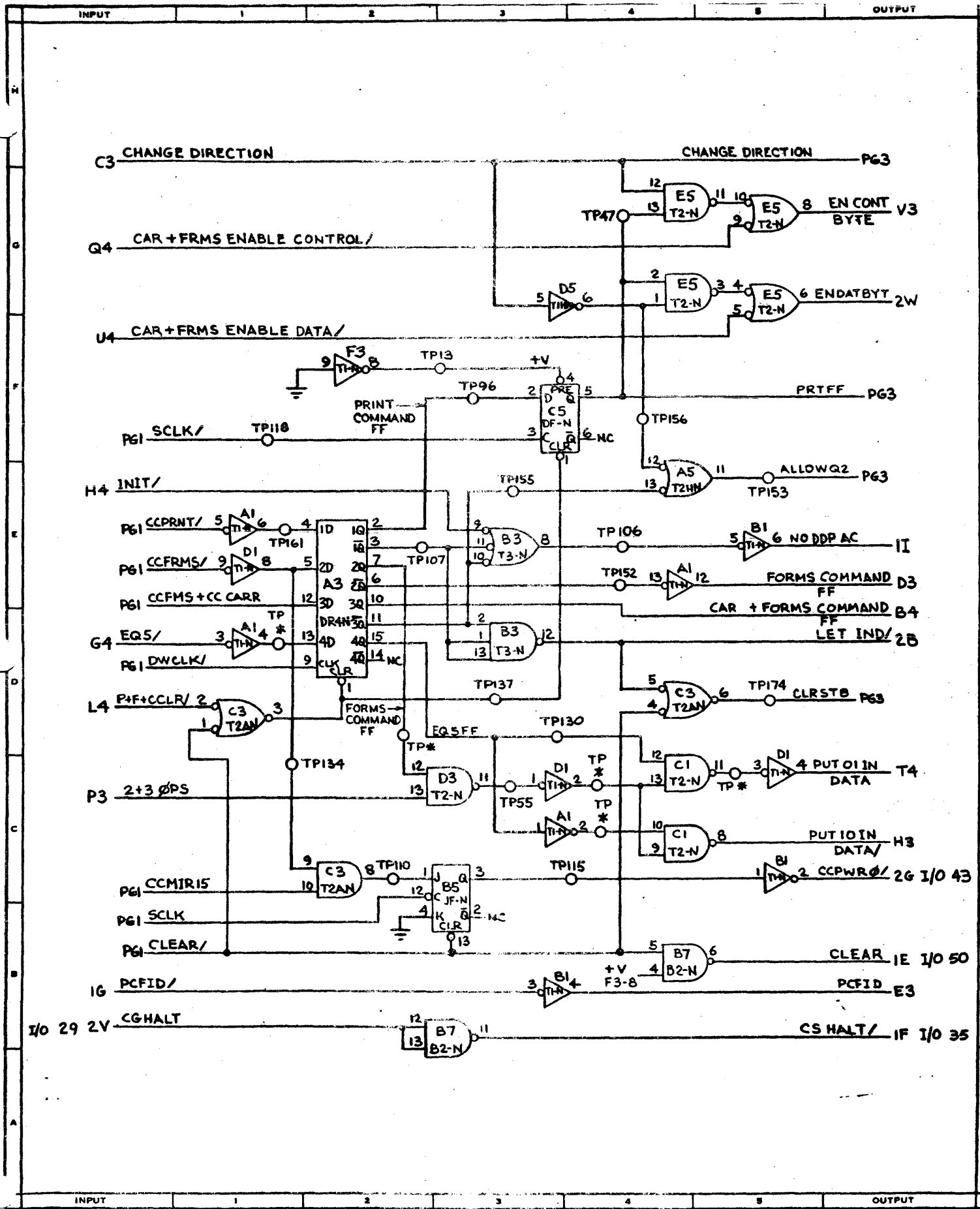


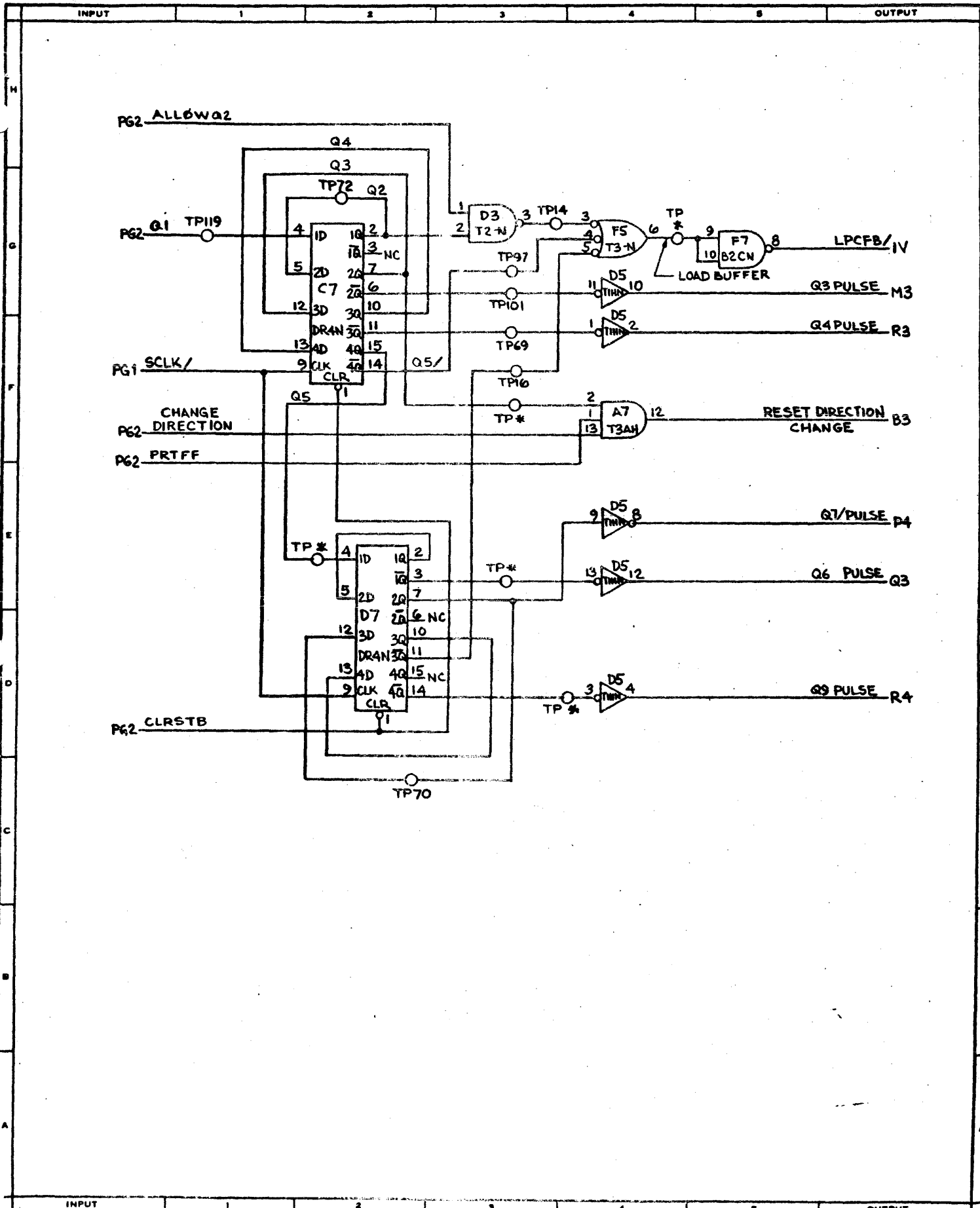


* DESIGNATES TEST POINT UNAVAILABLE



JF-N	1447 3615	1		T2-N	1447 3516	3	
DF-N	1447 3607	1		T2HN	1479 0240	1	
DR4N	1449 1278	4		T3AH	1447 3557	1	
TIHN	1479 7971	1		T3-N	1447 3540	2	
B2-N	1447 9596	1		TI-N	1447 3532	5	
B2CN	1447 3581	1		T2AN	1447 3524	1	
CODE	PART NO.	QTY	LOCATION	CODE	PART NO.	QTY	LOCATION





2.

GENERAL DESCRIPTION

THE DDP PROVIDES THE INTERFACE BETWEEN THE OPERATOR CONSOLE AND A B700 PROCESSOR. IT CONTROLS THE TRANSFER OF INFORMATION AND COMMANDS BETWEEN THE PROCESSOR AND THE VARIOUS CONSOLE FUNCTIONS; E.G., PRINTER, FORMS CONTROL, CARRIER CONTROL, KEYBOARD CONTROL, AND INDICATOR CONTROL.

THE DDP CONSISTS OF FOUR PRINTED CIRCUIT CARDS AND IS REQUIRED FOR 60 CHARACTER PER SECOND CONSOLE BASED B700 PROCESSORS. IT WILL HANDLE BOTH 64 AND 94 CHARACTERS PRINT AND KEYBOARD CONFIGURATIONS.

THE DDP ACTS UPON CONTROL WORDS SENT BY THE PROCESSOR, PERFORMS THE OPERATION SPECIFIED AND, UPON COMPLETION OF THE OPERATION, GENERATES A STATUS WORD CONTAINING OPERATION STATUS AND/OR ERROR STATUS INFORMATION. THE PORT SELECT UNIT (PSU) CONTROLS THE SYNCHRONIZATION OF THE DDP INTERFACE WITH THE PROCESSOR.

2.1

PRODUCT IDENTIFICATION

M&E NO. --- ---	DESCRIPTION -----	STYLE NO. -----	USED ON -----
2605 3850	60 CHAR/SEC CONSOLE CONTROL	B346-3	B711-3 B721-1

3.

PRODUCT DESCRIPTION

3.1

PERIPHERAL DEVICE CHARACTERISTICS

THE PERIPIIPHERAL DEVICE IS A PIN PRINT 60 CHARACTER PER SECOND CONSOLE FUNCTIONALLY EQUIVALENT TO THE UNIT DESCRIBED IN PLYMOUTH SPECIFICATION 1498 5790. IT CONTAINS ITS OWN POWER SUPPLY AND 19 LOGIC CARDS. A MICROPROCESSOR CHIP WITH ACCOMPANYING PROGRAM ACTS UPON CODES SENT BY THE DDP TO PERFORM PRINTER, CARRIER, AND FORMS FUNCTIONS.

TWO BASIC TYPES OF CONSOLES EXIST. ONE TYPE (B9343-61) CONTAINS A PHOTOELECTRIC MEMORY LOADER WITHIN THE CONSOLE, WHEREAS THE OTHER (B9343-62) DOES NOT. THE TYPE CONTAINING THE PAPER TAPE MEMORY LOADER (USED FOR BOOTSTRAP LOADING OF THE PROCESSOR MEMORY) IS USED WITH THE B711-3 PROCESSOR. THE OTHER TYPE IS USED WITH THE B721-1 PROCESSOR AS THE MEMORY LOADER IS CONTAINED WITHIN THE PROCESSOR.

BOTH TYPES HAVE AN OFF-LINE MAINTENANCE CAPABILITY, A FEATURE WHICH ALLOWS TESTING OF BASIC OPERATIONS BY DEPRESSING THE APPROPRIATE KEYBOARD KEYS. EACH CONSOLE ALSO CONTAINS A 32 X 8 FIRST-IN-FIRST-OUT (FIFO) BUFFER WHICH STORES PRINTER-CARRIER-FORMS (P-C-F) CONTROL AND DATA BYTES. THE DDP CONTAINS A 64 X 8 FIFO BUFFER WHICH STORES KEYBOARD DATA.

3.1.1

SYSTEM PRINTER

THE PRINTING ELEMENT ON THE SYSTEM PRINTER IS A MOVEABLE 7-PIN PRINTHEAD. FORMATION OF CHARACTERS IS RESTRICTED TO A 7 X 7 DOT MATRIX. PRINTING IS DONE WHILE THE CARRIAGE MOVES THE PRINTHEAD BY FIRING THE APPROPRIATE PIN OR PINS, AS THE PRINTHEAD PASSES EACH DOT MATRIX COLUMN, THE ENTIRE CHARACTER SET CAN BE GENERATED. THE CARRIER MOVES THE PRINTHEAD IN FRONT OF THE PLATEN AT A PRINT RATE OF 60 CHARACTERS PER SECOND. THE CARRIER CAN BE POSITIONED AT 33 INCHES PER SECOND AND PRINTS 10 CHARACTERS PER INCH HORIZONTALLY. THE CHARACTER GENERATOR PRINTED CIRCUIT BOARD WITHIN THE CONSOLE CAN BE EASILY RECONFIGURED TO PERMIT A VARIETY OF CHARACTER SETS.

THE CODES USED TO SELECT THE VARIOUS CHARACTERS COMPLY WITH BURROUGHS CORPORATE STANDARD KEYBOARD CODES (BURROUGHS STANDARD 1284 9055). FOR SPECIFIC PRINT CHARACTER CODE ASSIGNMENT, SEE SPECIFICATION 1498 5790.

3.1.2

AC PRINTER MOTOR ON/OFF

== -----

THE PRINTER MOTOR ON/OFF IS A DEVICE WHICH AUTOMATICALLY TURNS THE MOTOR OFF WHEN THERE IS NO PRINTER, CARRIER, OR FORMS ACTIVITY FOR 13 SECONDS. THE MOTOR IS TURNED ON AUTOMATICALLY BY THE HARDWARE WHEN A VALID CODE APPEARS IN THE PRINTER-CARRIER-FORMS BUFFER.

3.1.3

FORMS HANDLER

THE PIN PRINTER CONSOLES CONTAIN A 26-INCH WIDE FORMS HANDLER. ALL CONSOLES HAVE A SPLIT PATEN WHICH PERMITS THE USE OF TWO INDEPENDENT FORMS CONTROLS, PIN FEED UNITS WHICH ALLOW THE USE OF CONTINUOUS FAN-FOLD FORMS, AND A VARIETY OF FRONT FEED CHUTES TO ACCOMMODATE LEDGERS AND FORMS OF VARIOUS SIZES FOR FRONT INSERTION. THE FORMS HANDLER IS STATIONARY RELATIVE TO THE PRINTHEAD IN PRINT OPERATIONS. PAPER CAN BE VERTICALLY SPACED AT 20 LINES PER SECOND, 6 LINES PER INCH. ALL CONSOLES MAY BE SUPPLIED WITH THE END-OF-PAPER OPTION (SEE PAR: 3.1.7.3).

3.1.4

CARRIER HANDLER

THE CARRIER POSITIONING THE PRINTHEAD TO THE DESIRED LOCATION. TWO TYPES OF POSITIONINGS MAY BE PERFORMED. THE CARRIER MAY BE INITIALIZED TO EITHER THE LEFT OR RIGHT MARGIN, OR TABBING EITHER LEFT OR RIGHT CAN BE PERFORMED. MARGINS ARE SEPARATED BY 255 CHARACTER POSITIONS.

3.1.5

KEYBOARD

THE KEYBOARD CONTAINS ONLY ELECTRONICALLY DRIVEN ELEMENTS AND, AS SUCH, IS MECHANICALLY INDEPENDENT OF ALL OTHER CONSOLE FUNCTIONS. NO SWITCHES ARE CONTAINED ON THE KEYBOARD OTHER THAN THOSE ASSOCIATED WITH THE KEYBOARD ITSELF. THE KEYBOARD CONTAINS 21 NUMERIC AND CONTROL KEYS, A 61-KEY ALPHANUMERIC TYPEWRITER KEYBOARD, AND 24 PROGRAM KEYS LOCATED IN A ROW ABOVE THE ALPHA AND NUMERIC KEYS. DEPRESSING THE SHIFT KEY WILL PUT THE KEYBOARD INTO THE SHIFTED MODE FOR AS LONG AS THE SHIFT KEY IS HELD DEPRESSED. IF THE SHIFT-LOCK KEY IS DEPRESSED AND RELEASED, THE KEYBOARD WILL ENTER THE SHIFTED MODE, AND THE INDICATOR TO THE LEFT OF THE SHIFT-LOCK KEY WILL ILLUMINATE. BOTH INDICATOR AND KEYBOARD WILL REMAIN IN THIS MODE UNTIL THE SHIFT KEY IS DEPRESSED.

3.1.5
(CONTINUED)

KEYBOARD

KEYBOARD CODES FOR THE VARIOUS KEY POSITIONS AND VERSIONS COMPLY WITH BURROUGHS CORPORATE STANDARD KEYBOARD CODES (BURROUGHS STANDARD 1284 9055).

3.1.6

INDICATORS

THE INDICATOR SECTION CONSISTS OF A ROW OF 36 FUNCTION INDICATORS LOCATED ABOVE THE KEYBOARD. THESE PROVIDE VISUAL INDICATION TO THE OPERATOR OF INFORMATION REGARDING MACHINE AND PROGRAM STATUS AND REQUIRED KEYBOARD ENTRIES. INCLUDED ARE SUCH INDICATIONS AS MACHINE READY, ERROR CONDITION PRESENT, ALPHA KEYBOARD DATA REQUIRED BY THE PROGRAM, AND PROGRAM KEYS ENABLED BY THE PROGRAM. (SEE FIGURE 3-1.)

3.1.6.1

DDP TO CONSOLE INDICATOR INTERFACE
--- -- -----

A. BANK SELECT
-- -----

THE INDICATOR BANKS WILL BE SELECTED VIA THE IND5/, IND6/, AND IND7/ LINES. FIGURE 3-1 SHOWS THE INDICATOR LABELING AND LOCATION.

TABLE 3-1 SPECIFIES INDICATOR SELECT CODES. TO LIGHT AN INDICATOR, THE SELECT LINES ARE CLOCKED INTO "JK" FLIP-FLOPS BY THE "DTNP" CLOCK, WHICH IS GATED WITH "ALSEL". THE FOLLOWING "DTNP" CLOCK WILL CLOCK IN THE "PCFIDN" (N = 1-8) LINES TO DIFFERENT "JK" FLIP-FLOPS. THIS "DTNP" CLOCK IS GATED WITH "ALIND".

B. INDICATOR SELECT
-- -----

TABLE 3-2 SPECIFIES WHICH PARTICULAR LIGHT IS ILLUMINATED BY THE DATA LINES.

FIGURE 3-1: INDICATOR LOCATION

D	S	A	B	S	C	S
00000000	000	00000000	00000000	0	00000000	0
87654321		12345678	12345678		12345678	
	---ON*			---ERROR		---NUM
	---ALPHA					
	---READY					

* "ON" INDICATOR IS LIT WHEN POWER IS APPLIED TO CONSOLE

TABLE 3-1. INDICATOR SELECT

SELECTED	I N D 7	I N D 6	I N D 5
S	0	1	1
A	1	0	0
B	1	0	1
C	1	1	0
D	1	1	1

TABLE 3-2. INDICATOR DATA

I N D I C A T O R S	LINE							
	PCFID- 8/	PCFID- 7/	PCFID- 6/	PCFID- 5/	PCFID- 4/	PCFID- 3/	PCFID- 2/	PCFID- 1/
	A8	A7	A6	A5	A4	A3	A2	A1
B8	B7	B6	B5	B4	B3	B2	B1	
C8	C7	C6	C5	C4	C3	C2	C1	
D8	D7	D6	D5	D4	D3	D2	D1	
				NUM	ERROR	READY	ALPHA	

TABLE 3-1. INDICATOR SELECT

*Maint. switches
IND position*

SELECTED	1	I	I
	N	N	N
	D	D	D
	7	6	5
S	0	1	1
A	1	0	0
B	1	0	1
C	1	1	0
D	1	1	1

To light lights from kybd.

*MAINT.
Numeric
IND.
EXEC
DIR*

*3C
4C
5C
6C
7C*

TABLE 3-2. INDICATOR DATA

8 4 2 1 8 4 2 1

I N D I C A T O R S	LINE							
	PCFID-	PCFID-	PCFID-	PCFID-	PCFID-	PCFID-	PCFID-	PCFID-
	8/	7/	6/	5/	4/	3/	2/	1/
	A8	A7	A6	A5	A4	A3	A2	A1
	B8	B7	B6	B5	B4	B3	B2	B1
	C8	C7	C6	C5	C4	C3	C2	C1
	D8	D7	D6	D5	D4	D3	D2	D1
					NUM	ERROR	READY	ALPHA

*3C FF lights all specials
4C FF lights all A IND
5C FF " all B IND
6C FF " all C IND
7C FF " all D IND*

3.1.7

CODE CONVERSION

3.1.7.1

KEYBOARD

THE KEYBOARD CODES ARE CONVERTED TO THE PROCESSOR INTERNAL ASCII CODES BY MEANS OF TABLE LOOK-UP OVERLAYS. VARIATIONS IN CODE TRANSLATIONS REQUIRED BY INTERNATIONAL CODE SETS ARE PROVIDED BY THESE OVERLAYS.

3.1.7.2

PRINTER

PROCESSOR INTERNAL ASCII CODES ARE TRANSLATED TO BURROUGHS CORPORATE STANDARD KEYBOARD CODES (BURROUGHS STANDARD 1284 9055). FOR INTERNATIONAL MACHINES, THIS CODE IS TRANSLATED WITHIN THE CONSOLE VIA A PROM/ROM TO MATCH THE CHARACTER GENERATOR ROM CODES.

3.1.7.3

END OF PAPER DETECT (ENDOPS/) - OPTIONAL

--- -- -----

PROVISIONS HAVE BEEN MADE ON THE CONSOLE (VIA THE EOPD-6 MODULE) TO DETECT AN OUT-OF-PAPER CONDITION. THIS INFORMATION IS STORED IN A DDP FLIP-FLOP.

WHEN THE FORMS FUNCTION IS SUBSEQUENTLY ENABLED, THE INFORMATION IS PLACED IN STATUS BIT 2 FOR TRANSFER TO THE PROCESSOR VIA THE EXT-02 LINE.

THE EOPD-6 MODULE (END-OF-PAPER DETECTION) IS A DEVICE WHICH, WHEN ACTIVATED, WILL EMIT A SIGNAL INDICATING A BREAK IN THE CONTINUOUS PAPER OR AN OUT-OF-PAPER CONDITION.

THIS DEVICE HAS TWO PROJECTIONS, 5/8" IN WIDTH, STARTING 3.30" AND 11.30" FROM THE LEFT SIDE OF THE PAPER PATH (THE 0 END OF THE FORMS HANDLER).

WHEN THE DEVICE IS USED, IT IS NECESSARY THAT A FORM BE LOCATED OVER EITHER OF THE 5/8" AREAS FOR THIS FEATURE TO FUNCTION.

FOR THE UPPER CONTINUOUS FORMS PATH, THE OUT-OF-PAPER CONDITION SIGNAL WILL OCCUR AT APPROXIMATELY 14-3/8" (87-1/6" SPACES) FROM THE BOTTOM OF THE PRINT LINE TO THE BOTTOM EDGE OF THE PAPER.

3.1.7.3
(CONTINUED)

END OF PAPER DETECT (ENDOPS/) = OPTIONAL
--- -- -----

FOR THE LOWER CONTINUOUS FORMS PATH, THE OUT-OF-PAPER CONDITION SIGNAL WILL OCCUR AT APPROXIMATELY 14-9/16" (87-1/6" SPACES) FROM THE BOTTOM OF THE PRINT LINE TO THE BOTTOM EDGE OF THE PAPER.

3.2.1

DEVICE ACCESS

THE INITIATION OF AN INFORMATION TRANSFER BETWEEN THE PROCESSOR AND DDP IS THE SAME FOR ALL DEVICES; THE DISTINCTION BEING IN THE DEVICE ADDRESS CONTAINED IN THE BASE REGISTER (BR1 OR BR2) OF THE PROCESSOR'S OUTPUT SELECT GATES. THE PORT SELECT UNIT DECODES THREE BIT-GROUPS FROM THE PROCESSOR TO COMPLETELY DEFINE THE OPERATION THAT IS TO TAKE PLACE; THE COMMAND FIELD (NAND BITS 51-54) ESTABLISHES WHETHER THE OPERATION IS TO BE A DEVICE READ OR A DEVICE WRITE; THE FOUR LEAST SIGNIFICANT BITS OF BR1 OR BR2 CONTAIN THE SPECIFIC DEVICE ADDRESS; AND THE MOST SIGNIFICANT BIT OF BR1/BR2 IN CONJUNCTION WITH THE COMMAND TYPE DISTINGUISHES BETWEEN CONTROL, DATA, AND STATUS WORDS. FOR FURTHER DETAILS ON PROCESSOR INTERFACE OPERATIONS REFER TO THE DESCRIPTION OF THE PORT SELECTOR UNIT GIVEN IN PRODUCT SPECIFICATION 1447 9000 FOR B711/B705 PROCESSORS, OR IN 2603 0031 FOR B721 PROCESSORS.

3.2.2

WORD FORMATS

COMMUNICATIONS BETWEEN THE PROCESSOR AND THE CONSOLE DDP INVOLVE THE FOLLOWING WORD TRANSFERS:

CONTROL WORD - OPERATION OF THE CONSOLE IS INITIATED BY THE
----- TRANSFER OF A CONTROL WORD FROM THE PROCESSOR
TO THE CONSOLE DDP. THE CONTROL WORD CONSISTS
OF CONTROL BITS TO ENABLE OR DISABLE DATA IN-
TERRUPTS FROM THE FORMS, PRINTER, CARRIER, AND
KEYBOARD FUNCTIONS OF THE CONSOLE.

DATA WORD - DATA TRANSFER BETWEEN THE PROCESSOR AND THE
----- DDP IS IN 16-BIT PARALLEL, WHERE BIT (16) IS
THE LEAST SIGNIFICANT BIT. A UNIQUE DATA WORD
IS ASSOCIATED WITH THE KEYBOARD, THE CARRIER,
THE PRINTER, THE INDICATORS, AND THE FORMS
HANDLER. EACH DATA WORD CONSISTS OF A DATA
FIELD (EXCEPT FOR THE FORMS HANDLER) AND A
FUNCTION FIELD WHICH IS USED FOR THE CONTROL
OF EACH CONSOLE FUNCTION.

WORD FORMATS

STATUS WORD - THIS WORD IS RETURNED FROM THE DDP TO THE PRO-
----- - - - - -CESSOR WHENEVER THE DDP WISHES TO NOTIFY THE
PROCESSOR THAT A FAILURE OR SPECIFIC FUNCTION-
AL CONDITION HAS OCCURED. IT CONSISTS OF A
DEVICE ADDRESS FIELD WHICH IS INSERTED AT THE
PSU AND A DEVICE STATUS FIELD WHICH IS INSERT-
ED AT THE DDP.

WORD FORMATS ASSOCIATED WITH CONSOLE OPERATIONS ARE GIVEN IN
FIGURE 3-2. DETAILS OF WORD CONTENTS ARE PRESENTED IN THE
FOLLOWING SUBPARAGRAPHS:

	MSB														LSB	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CONTROL WORD	---	---	---	---	---	---	---	---	---	MTR MODE	---	ENABLE CARRIER DATA INTRPT	ENABLE FORMS DATA INTRPT	ENABLE PRINTER DATA INTRPT	ENABLE KYBD DATA INTRPT	---
KEYBOARD DATA WORD	---	---	---	---	---	---	---	---	DATA 8	DATA 7	DATA 6	DATA 5	DATA 4	DATA 3	DATA 2	DATA 1
CARRIER DATA WORD	0	0	---	---	---	---	INITIALIZE	CARRIER DIRECTION	DATA 8	DATA 7	DATA 6	DATA 5	DATA 4	DATA 3	DATA 2	DATA 1
PRINT DATA WORD	0	1	---	---	ESCAPE RIGHT	ESCAPE LEFT	RED RIBBON (NOTE 1)	PRINT	DATA 8	DATA 7	DATA 6	DATA 5	DATA 4	DATA 3	DATA 2	DATA 1
INDICATOR DATA WORD	1	0	---	IND BANK ADDR A	IND BANK ADDR B	IND BANK ADDR C	IND BANK ADDR D	IND BANK ADDR S	DATA 7	DATA 6	DATA 5	DATA 4	DATA 3	DATA 2	DATA 1	DATA 0
FORMS DATA WORD	1	1	---	---	---	---	---	---	---	LEFT PLATEN	---	RIGHT PLATEN	OPEN PLATEN	CLOSE PLATEN	POWER OFF	ALARM
STATUS WORD (NOTE 4)	DATA REQUEST	END OF PAPER	---	DEVICE ADDR 4	DEVICE ADDR 3	DEVICE ADDR 2	DEVICE ADDR 1	DEVICE ADDR 0	CARRIER READY	FORMS READY	PRINTER READY	KYBD READY	READY PB	INTRPT NOT HONORED	PCPID (NOTE 2) OVERSPEED (NOTE 3)	STALL (NOTE 3)

NOTES:

1. RED RIBBON COMMANDS ARE TRANSLATED TO BLACK RIBBON COMMANDS BY DDP.
2. ONLY WHEN IN MTR MODE.
3. STALL AND OVERSPEED ARE EITHER BOTH ON OR BOTH OFF.
4. DEVICE ADDRESS BITS OF STATUS WORD ARE INSERTED AT PSU.

FIGURE 3-2. CONSOLE DDP WORD FORMATS

p. 44

BIT(S) -----	FUNCTION -----
1-9	DON'T CARE.
10	MTR MODE - THIS BIT USED IN THE MTR ONLY. A "1" IN --- ---- THIS BIT ALLOWS THE PCFID/ SIGNAL FROM THE CONSOLE TO GET TO THE STATUS LINES.
11	DON'T CARE.
12	ENABLE CARRIER DATA INTERRUPT - A "1" IN THIS BIT EN- ----- ABLES DATA INTERRUPTS TO THE PROCESSOR WHEN THE CAR- RIER IS READY TO ACCEPT POSITIONING DATA.
13	ENABLE FORMS DATA INTERRUPT - A "1" IN THIS BIT EN- ----- ABLES DATA INTERRUPTS TO THE PROCESSOR WHEN THE FORMS MECHANISM IS READY TO ACCEPT CONTROL DATA.
14	ENABLE PRINTER DATA INTERRUPTS - A "1" IN THIS BIT EN- ----- ABLES DATA INTERRUPTS TO THE PROCESSOR WHEN THE PRINT- ER IS READY TO REQUEST PRINT DATA.
15	ENABLE KEYBOARD DATA INTERRUPT - A "1" IN THIS BIT EN- ----- ABLES DATA INTERRUPTS TO THE PROCESSOR WHEN THE KEY- BOARD IS READY TO TRANSMIT A DATA CHARACTER.
16	"DON'T CARE" BIT.

NOTES:

1. THE KEYBOARD IS ENABLED WHEREAS THE PRINTER, FORMS, AND CARRIER ARE DISABLED BY THE SYSTEM CLEAR.
2. ENABLING OF ANY OF THE CONSOLE DEVICES ALLOWS THAT DEVICE TO GENERATE DATA INTERRUPTS. DISABLING OF ANY OF THE CONSOLE DEVICES RESETS THE DATA INTERRUPT AND INHIBITS ITS SUCCESSIVE DATA INTERRUPTS FOR THAT DEVICE.

3.2.2.2

KEYBOARD DATA WORD

BIT(S) -----	FUNCTION -----
1-8	NOT USED.
9-16	DATA - USED TO TRANSMIT 8-BIT CHARACTER DATA FROM THE ----- KEYBOARD TO THE PROCESSOR VIA THE CONSOLE DDP.

NOTES:

1. KEYBOARD CODES ARE TRANSMITTED TO THE PROCESSOR VIA THE EXTERNAL BUS.
2. THE DATA BIT ASSIGNMENT IS AS FOLLOWS: EXTERNAL BUS BITS 9 THROUGH 12 CONTAIN THE HIGH-ORDER DIGIT OF THE KEYBOARD CODE; EXTERNAL BUS BITS 13 THROUGH 16 CONTAIN THE LOW-ORDER DIGIT.

EXAMPLE:

IF THE KEY AT KEYBOARD LOCATION F3 WERE DEPRESSED IN THE UNSHIFTED MODE, THEN THE EXTERNAL BUS DURING TRANSMISSION WOULD BE:

EXT: BUS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0
												HIGH-ORDER		LOW-ORDER		
												DIGIT		DIGIT		

3.2.2.3

CARRIER DATA WORD

BIT(S) -----	FUNCTION -----
1-2	CONTROL SELECT - DEFINES THE CONSOLE FUNCTION DESTINED ----- FOR THE DATA WORD. A CODE OF (00) SELECTS THE CARRIER CONTROL.
3-6	NOT USED.

3.2.2.3
(CONTINUED)

CARRIER DATA WORD

- 7 INITIALIZE = A "1" IN THIS BIT CAUSES AN INITIALIZA-

TION ROUTINE TO BE PERFORMED WHICH LEAVES THE PRINT
HEAD IN A HOME POSITION ON THE LEFT OR RIGHT DEPENDING
ON THE CARRIER DIRECTION THAT IS GIVEN IN BIT 8.
- 8 CARRIER DIRECTION = DEFINES THE HORIZONTAL DIRECTION

OF THE PRINTER HEAD. A "1" SPECIFIES MOVEMENT TO THE
LEFT.
- 9-16 DATA = DEFINES THE NUMBER OF HORIZONTAL POSITIONS

WHICH THE PRINTER HEAD IS TO BE MOVED FROM ITS CURRENT
POSITION.

NOTES:

1. BITS 1 AND 2 MUST EQUAL "0" FOR ALL CARRIER DATA WORDS.
2. IF BIT 7 = 1 (INITIALIZE), BITS 8 THROUGH 16 ARE "DON'T CARE" BITS.
3. IF BIT 7 = 0, THEN ALL ZEROS IN BITS 9 THROUGH 16 EQUALS NO MOVEMENT. ALL ONES IN BITS 9 THROUGH 16 CAUSES MOVEMENT OF 255 PRINT POSITIONS IN THE DIRECTION DICTATED BY BIT 8.

3.2.2.4

PRINT DATA WORD

BITS(S) -----	FUNCTION -----
1-2	CONTROL SELECT = DEFINES THE CONSOLE FUNCTION DESTINED ----- FOR THE DATA WORD. A CODE OF (01) SELECTS THE SYSTEM PRINTER CONTROL.
3-4	NOT USED.
5-6	ESCAPE = DEFINES CARRIER POSITIONING TO BE LEFT (01), ----- RIGHT (10), OR NO ESCAPE (00). 00 IS NOT TO BE USED FOR PRINTING.

- 7 RED RIBBON - A "1" IN THIS BIT WILL SEND THE RED RIB-
--- -----
BON COMMANDS TO THE DDP; HOWEVER, THE CONSOLE WILL
PRINT IN BLACK.
- 8 PRINT - A "1" IN THIS BIT WILL CAUSE THE CHARACTER DE-

FINED BY BITS 9-16 TO BE PRINTED FOLLOWING ESCAPEMENT
SPECIFIED IN BITS 5-6; OTHERWISE, ESCAPEMENT WILL TAKE
PLACE BUT NO PRINTING WILL OCCUR.
- 9-16 DATA - THE CODES ON THESE BITS DETERMINE THE CHARACTER

TO BE PRINTED. THE CHARACTER SETS 64 OR 94 COMPLY
WITH SPECIFICATION 1284 9055. (ONLY VALID PRINTABLE
ASCII CHARACTERS SHOULD BE SENT.)

NOTES:

1. BITS 1 AND 2 MUST EQUAL "0" AND "1" RESPECTIVELY FOR ALL
PRINTER DATA WORDS.
2. THE PRINTER CAN PERFORM FOUR FUNCTIONS: PRINT RIGHT,
PRINT LEFT, SPACE RIGHT, SPACE LEFT. PRINTING IS DONE
ONLY ON THE FLY.
3. A SPACE MAY BE PRINTED BY SUPPRESSION OF THE PRINT BIT
PLUS THE APPROPRIATE ESCAPEMENT BIT. SPACING MAY ALSO
BE ACCOMPLISHED BY GIVING A 20 CODE TO BE PRINTED.
4. BITS 5 AND 6 SHOULD NEVER BOTH BE "1" OR "0".
5. THERE IS NO PRINT-IN-PLACE CAPABILITY.

BIT(S) -----	FUNCTION -----
1-2	CONTROL SELECT - DEFINES THE CONSOLE FUNCTION DESTINED ----- FOR THE DATA WORD. A CODE OF (10) SELECTS THE INDICA- TOR CONTROL.
3	NOT USED.
4-8	INDICATOR BANK ADDRESS - SPECIFIES THE ADDRESS OF ONE ----- OF FOUR BANKS OF EIGHT INDICATORS EACH OR ONE BANK OF FOUR INDICATORS TO WHICH THE DATA CODE IS DESTINED.
9-16	DATA - SPECIFIES THE DIRECT CODE TO BE DELIVERED TO A ----- BANK OF EIGHT INDICATORS ON THE CONSOLE OPERATOR PANEL.

NOTES:

1. THERE ARE FIVE SETS OF INDICATORS: FOUR 8-BIT AND ONE 4-BIT. FIGURE 3-2 SHOWS THE INDICATOR POSITIONS AND THE INDICATOR DATA WORD CODING REQUIRED TO CONTROL THEM.
2. AN INDICATOR WILL BE ILLUMINATED UPON RECEIPT OF A DATA WORD WITH A "1" IN THE APPROPRIATE DATA BIT POSITION. IT WILL REMAIN ILLUMINATED UNTIL RECEIPT OF A NEW DATA WORD WITH THE SAME CONTROL CODING AND A "0" IN THE APPROPRIATE DATA BIT POSITION OR UNTIL THE CONSOLE CLEAR OR SYSTEM CLEAR PUSHBUTTON IS DEPRESSED.
3. THE "ON" INDICATOR IS ILLUMINATED WHEN POWER COMES ON.
4. ONLY ONE BANK AT A TIME MAY BE SELECTED.

BIT(S) -----	FUNCTION -----
1-2	CONTROL SELECT - DEFINES THE CONSOLE FUNCTION DESTINED ----- FOR THE CONTROL WORD. A CODE OF (11) SELECTS THE FORMS CONTROL.
3-9	"DON'T CARE" BITS.
10	LEFT PLATEN - A "1" IN THIS BIT WILL CAUSE THE LEFT ---- PLATEN TO BE ADVANCED ONE LINE.
11	"DON'T CARE" BIT.
12	RIGHT PLATEN - A "1" IN THIS BIT WILL CAUSE THE RIGHT ---- PLATEN TO BE ADVANCED ONE LINE.
13	OPEN PLATEN - A "1" IN THIS BIT WILL OPEN THE FORMS ---- CONTROL CHUTE.
14	CLOSE PLATEN - A "1" IN THIS BIT WILL CLOSE THE FORMS ---- CONTROL CHUTE.
15	POWER OFF - A "1" IN THIS BIT WILL TURN SYSTEM POWER ---- OFF.
16	ALARM - A "1" IN THIS BIT WILL ACTIVATE THE AUDIBLE ---- ALARM FOR OPERATOR ATTENTION.

NOTES:

1. BITS 1 AND 2 MUST EQUAL "1" FOR ALL FORMS DATA WORDS.
2. IF BITS 10 AND 12 ARE BOTH "1", BOTH LEFT AND RIGHT PLATENS WILL ADVANCE ON A SPLIT PLATEN CONSOLE; HOWEVER, IF A SPLIT-PLATEN CONSOLE IS SET UP TO ACT AS A SINGLE-PLATEN MACHINE, THE LEFT-PLATEN ADVANCE CONTROLS THE ADVANCEMENT. THE RIGHT PLATEN ADVANCE BECOMES INOPERATIVE.

3.2.2.6
(CONTINUED)

FORMS DATA WORD

3. IF BITS 13 AND 14 ARE BOTH "1", THE PLATEN IS COMPLEMENTED.

3.2.2.7

STATUS WORD

BIT(S) -----	FUNCTION -----
1	DATA REQUEST - CONSOLE DDP IS READY TO RECEIVE OR ----- TRANSMIT A DATA CHARACTER. THIS STATUS CONDITION FOLLOWS THE DATA INTERRUPT SIGNAL TO THE PROCESSOR. IT IS THE "OR" OF BITS 9 THROUGH 12.
2	END OF PAPER - PAPER ON LEFT OR RIGHT PLATEN OR BOTH --- -- HAS BEEN EXHAUSTED. (THIS CONDITION IS ONLY REPORTED WHEN FORMS ENABLE IS TRUE.)
3	NOT USED (ALWAYS "0").
2-8	DEVICE ADDRESS - (DEVICE ADDRESS BITS ARE INSERTED AT ----- THE PORT SELECT UNIT.)
9	CARRIER READY - CARRIER BUFFER IS READY FOR NEXT DATA ----- WORD; IT IS EQUAL TO "1" WHENEVER THE CARRIER DATA INTERRUPT IS TRUE.
10	FORMS READY - FORMS BUFFER IS READY FOR NEXT DATA ----- WORD; IT IS EQUAL TO "1" WHENEVER THE FORMS DATA INTERRUPT IS TRUE.
11	PRINTER READY - PRINT BUFFER IS READY FOR NEXT DATA ----- WORD; IT IS EQUAL TO "1" WHENEVER THE PRINTER DATA INTERRUPT IS TRUE.
12	KEYBOARD READY - KEYBOARD CHARACTER IS AVAILABLE FOR ----- TRANSFER TO PROCESSOR; IT IS EQUAL TO "1" WHENEVER THE KEYBOARD DATA INTERRUPT IS TRUE.

- 13 READY - "READY" PUSHBUTTON HAS BEEN DEPRESSED AND CON-

 SOLE IS READY FOR OPERATION.
- 14 INTERRUPT NOT HONORED - PROCESSOR DID NOT SERVICE KEY-

 BOARD DATA INTERRUPT. (SEE NOTE 1.)
- 15 OVERSPEED - CARRIER IS MOVING TOO FAST. (SEE NOTE 2.)

 WHEN IN MTR MODE THIS BIT SIGNIFIES PCFID/ IS ACTIVE.
- 16 STALL - CARRIER IS JAMMED. (SEE NOTE 2.)

NOTES:

- 1. BIT 14 IS EQUAL TO "1" WHEN A KEY IS DEPRESSED AND THE "FIFO" BUFFER ALREADY CONTAINS 64 CHARACTERS.
- 2. BIT 15 AND 16 CAN BE SET TO "1" ONLY AFTER A CARRIER DATA WORD IS ISSUED THAT DIRECTS A CARRIER POSITIONING OPERATION AND EITHER AN OVERSPEED OR A STALL CONDITION IS DETECTED. IN THE OPERATIONAL SYSTEM, EITHER BOTH OR NONE OF THE BITS ARE PRESENT.

3.3

DESIGN CONSIDERATIONS

3.3.1

GENERAL

THE CONSOLE DDP CONTROLS THE FOUR FUNCTIONS OF THE CONSOLE: KEYBOARD (ALPHANUMERIC, NUMERIC, AND PSK'S), PRINTER (INCLUDING CARRIER), FORMS CONTROL, AND INDICATORS. THE TRANSMISSION OF DATA WORDS TO THE CARRIER, FORMS CONTROL, OR PRINTER CAN BE DONE ONLY WHEN A DATA INTERRUPT IS PRESENT FOR THAT FUNCTION TO WHICH THE DATA WORD IS DIRECTED. FETCHING OF DATA FROM THE KEYBOARD BUFFER SHOULD BE DONE ONLY WHEN THE KEYBOARD DATA INTERRUPT IS PRESENT. THE CONSOLE INDICATORS DO NOT GENERATE DATA INTERRUPTS. THE INDICATORS MAY BE SET OR RESET AT ANY TIME; HOWEVER, A 10 MICROSECOND DELAY BETWEEN INDICATOR DATA WORDS SHOULD BE OBSERVED. BETWEEN A PRINT, CARRIER, OR FORMS DATA WORD AND AN INDICATOR DATA WORD A 10 MICROSECOND DELAY MUST BE OBSERVED. ONLY ONE INDICATOR BANK MAY BE ACTIVATED OR DEACTIVATED AT A TIME.

3.3.1.1

DATA BUFFERS

A 64 CHARACTER DEEP "FIFO" BUFFER IS DEDICATED TO THE KEYBOARD. ONE 8-BIT BUFFER IS SHARED WITH PRINTER AND CARRIER DATA. ANOTHER 8-BIT BUFFER IS USED FOR INDICATOR DATA. THESE REGISTERS ARE PROVIDED TO BUFFER DATA TO AND FROM THE PROCESSOR.

3.3.1.2

CONTROL WORD

THE RECEIPT OF AN "INSTRUCTION" SIGNAL COINCIDENT WITH THE "WRITE" SIGNAL FROM THE PSU SPECIFIES TO THE DDP THAT THE INFORMATION ON THE DATA LINES FROM THE PROCESSOR IS A CONTROL WORD.

3.3.1.3

READ STATUS

THE RECEIPT OF AN "INSTRUCTION" SIGNAL COINCIDENT WITH THE "READ" SIGNAL FROM THE PSU NOTIFIES THE DDP TO PLACE ALL STATUS INDICATORS ON THE DATA LINES TO THE PROCESSOR.

3.3.1.4

DATA WORD

IF THE "INSTRUCTION" SIGNAL IS ABSENT WHEN A "READ" OR "WRITE" SIGNAL IS RECEIVED FROM THE PSU, THE DDP IS NOTIFIED TO (RESPECTIVELY) ACCEPT THE DATA WORD ON THE DATA LINES FROM THE PROCESSOR OR PLACE A DATA WORD ON THE DATA LINES TO THE PROCESSOR.

3.3.2

KEYBOARD

THE KEYBOARD IS USED BOTH FOR DATA ENTRY AND FOR PROGRAM CONTROL. THE KEYBOARD IS COMPLETELY INDEPENDENT, ELECTRICALLY AND MECHANICALLY, FROM THE PRINTER. HENCE, ANY TYPING OR PRINTING FROM THE KEYBOARD IS UNDER PROCESSOR CONTROL.

THE KEYBOARD FUNCTION PROCEEDS AS FOLLOWS:

- A. IF THIS FUNCTION IS NOT ALREADY ENABLED, THE PROCESSOR ISSUES A CONTROL WORD ENABLING KEYBOARD DATA INTERRUPTS. (ANY OR ALL OF THE OTHER CONSOLE FUNCTIONS MAY BE ENABLED BY THE SAME CONTROL WORD.)

KEYBOARD

- B. AFTER THE KEYBOARD HAS BEEN ENABLED, THE DEPRESSION OF ANY KEY (ALPHA, NUMERIC, OR PSK) CAUSES THE DDP'S "KEYBOARD READY" CONDITION BIT TO BE SET AND A DATA INTERRUPT SIGNAL TO BE SENT TO THE PROCESSOR. (ALSO, THE CHARACTER CODE IS LOADED INTO THE DDP'S "FIFO" KEYBOARD BUFFER.) A MAXIMUM OF 64 CHARACTERS MAY BE STORED IN THE KEYBOARD "FIFO" BUFFER.
- C. THE PROCESSOR RESPONDS TO THE DATA INTERRUPT BY REQUESTING THE STATUS WORD FOR SOURCE VERIFICATION (ASSUMES MORE THAN ONE CONSOLE FUNCTION IS ENABLED).
- D. FOLLOWING SOURCE VERIFICATION, THE PROCESSOR DIRECTS THE DDP TO PLACE THE KEYBOARD DATA WORD ON THE EXTERNAL BUS, COMPLETING DDP ACTION.
- E. THE KEYBOARD AND ANY OTHER CONSOLE FUNCTION CURRENTLY ENABLED REMAINS SO UNTIL A NEW CONTROL WORD IS ISSUED WITH THE RESPECTIVE BIT(S) RESET.

INDICATOR CONTROL

INDICATOR FUNCTIONS ARE PASSIVE IN NATURE IN THAT DATA INTERRUPTS ARE NOT INVOLVED IN THEIR IMPLEMENTATION. INDICATORS ARE ILLUMINATED THROUGH THE ISSUANCE OF AN "INDICATOR" DATA WORD BY THE FIRMWARE. EIGHT BITS OF THE DATA WORD CONTAIN THE DIRECT CODE TO BE DELIVERED TO ONE OF FOUR BANKS OF EIGHT INDICATORS EACH AND ONE BANK OF FOUR INDICATORS; EACH OF THE OTHER EIGHT BITS CONTAINS A "1" IF THE CORRESPONDING INDICATOR IS TO BE ILLUMINATED, OTHERWISE A "0". (SEE FIGURE 3-2.) AT POWER ON (SYSTEM CLEAR), ALL LAMPS ARE OFF EXCEPT FOR THE "ON" INDICATOR, WHICH IS ON WHENEVER POWER TO THE CONSOLE IS PRESENT.

DATA ENTRY

THE FIRMWARE ADVISES THE OPERATOR AS TO THE TYPE OF DATA ENTRY REQUIRED BY THE ILLUMINATION OF INDICATOR LAMPS WHICH BEAR LEGENDS IDENTIFYING THE KEYBOARD ENTRIES TO BE MADE. FOR SIMPLE DATA ENTRY, THE "NUMERIC" LAMP IS TURNED ON ACCOMPANIED BY WHATEVER SUPPLEMENTARY INFORMATION LAMPS ARE REQUIRED. NO DIRECT LINK EXISTS BETWEEN THE INDICATOR LAMPS AND THE KEYBOARDS WHEN THE CONSOLE IS IN NORMAL MODE. THE INDICATORS MERELY IDENTIFY THE ENTRY TO BE MADE. ANY ASSOCIATED CONSOLE FUNCTIONS ARE HANDLED UNDER PROCESSOR FIRMWARE CONTROL, VIA THE APPROPRIATE DDP CONTROL LOGIC.

3.3.4
(CONTINUED)

DATA ENTRY

THE DATA ENTRY PROCEDURE AND PROCESSOR RESPONSE IS AS FOLLOWS:

- A. THE PROCESSOR LIGHTS THE APPROPRIATE INDICATORS (NUMERIC SEQUENCE AND TYPE OF ENTRY REQUIRED);
- B. THE OPERATOR DEPRESSES THE NUMERIC KEY OF THE DATA WORD (MOST SIGNIFICANT DIGIT FIRST);
- C. THE PROCESSOR ACCEPTS THE CHARACTER FROM THE DDP AND STORES IT IN A PREDETERMINED LOCATION;
- D. THE OPERATOR DEPRESSES THE SUCCEEDING KEYS AND THE PROCESSOR ACCEPTS EACH IN TURN AND STORES IT IN AN APPROPRIATE LOCATION. SOFTWARE DETERMINES IF THE ENTRY IS BY DOLLARS OR CENTS.
- E. THE OPERATOR DEPRESSES THE OPERATION CONTROL KEY TO TERMINATE THE DATA ENTRY AND INFORM THE PROCESSOR OF THE NATURE OF THE DATA ENTRY (DEBIT, CREDIT, OLD BALANCE, ETC.)
- F. THE PROCESSOR FIRMWARE ALIGNS THE DATA TO A PRESUMED DECIMAL POSITION, INSERTS PUNCTUATION, AND CALCULATES THE LOCATION AT WHICH PRINTING OF THE DATA ON THE CONSOLE PRINTER IS TO START.

3.3.5

CARRIER CONTROL

THE CARRIER FUNCTION IS USED TO HORIZONTALLY POSITION THE CARRIER MECHANISM ANYWHERE OVER THE WIDTH OF THE PRINTING AREA. THE FUNCTION PROCEEDS AS FOLLOWS:

- A. THE PROCESSOR HAS SENT OR WILL SEND TO THE DDP A CONTROL WORD WHICH INCLUDES THE CARRIER AMONG THE FUNCTIONS ENABLED.
- B. WHEN THE CARRIER IS READY TO ACCEPT A POSITIONING COMMAND, IT WILL SET THE DDP'S "CARRIER READY" CONDITION BIT AND A DATA INTERRUPT WILL BE SENT TO THE PROCESSOR.
- C. THE PROCESSOR RESPONDS BY REQUESTING THE STATUS WORD FOR SOURCE VERIFICATION.

3.3.5
(CONTINUED)

CARRIER CONTROL

- D. FOLLOWING VERIFICATION, THE PROCESSOR WILL SEND A "CARRIER" DATA WORD TO THE DDP; EIGHT BITS OF THE WORD CONTAIN THE MAGNITUDE OF THE NUMBER OF COLUMNS TO MOVE AND A 1-BIT CODE INDICATES DIRECTION.
- E. THE DDP ENERGIZES THE APPROPRIATE INTERFACE LINES TO THE CARRIER, COMPLETING THE DDP ACTION.
- F. ANY DATA INTERRUPTS CURRENTLY ENABLED REMAIN SO UNTIL A NEW CONTROL WORD IS ISSUED WITH THE RESPECTIVE CONTROL BIT(S) RESET.

3.3.5.1

INITIALIZATION

WHEN POWER IS TURNED ON, CARRIER POSITION MUST BE INITIALIZED. AS PART OF THE POWER-ON ROUTINE, THE PROCESSOR ISSUES A CARRIER DATA WORD WITH THE INITIALIZATION BIT SET TO MOVE THE CARRIER TO THE SELECTED DIRECTION TO THE MARGIN SET FOR THE FORMS HANDLER. THE DDP MOVES THE CARRIER AT SLOW SPEED UNTIL MOTION CEASES AND THEN SETS THE CARRIER DATA INTERRUPT.

3.3.5.2

RIBBON CONTROL

THE PIN PRINTER CONSOLE ONLY HAS A BLACK RIBBON BOTH 64 AND 94 CHARACTER SET. ANY RED RIBBON COMMANDS TO THE DDP WILL BE TRANSLATED TO BLACK RIBBON COMMANDS BY THE DDP.

3.3.5.3

PRINT PROCEDURE 64/94 CHARACTER SETS

THE PRINT PROCEDURE IS AS FOLLOWS:

- A. THE PROCESSOR HAS SENT OR WILL SEND TO THE DDP A CONTROL WORD WHICH INCLUDES THE PRINTER AMONG THE FUNCTIONS ENABLED.
- B. WHEN READY TO ACCEPT A PRINT COMMAND, THE PRINTER WILL SET THE DDP'S "PRINTER READY" CONDITION BIT, AND A DATA INTERRUPT WILL BE SENT TO THE PROCESSOR.
- C. THE PROCESSOR REQUESTS SOURCE VERIFICATION.

D. FOLLOWING SOURCE VERIFICATION, THE PROCESSOR SENDS A "PRINT" DATA WORD TO THE DDP FOR SUBSEQUENT TRANSFER TO THE PRINTER. DEPENDING ON THE DATA BITS SET, THE PRINTER WILL PRINT ON THE FLY IN EITHER DIRECTION, OR PRINT A SPACE. THE PRINTER WILL NOT PRINT IN A CARRIER POSITION, BUT MUST BE MOVING TO PRINT.

E. STEPS (B) THROUGH (D) ARE REPEATED FOR EACH CHARACTER (OR SPACE) TO BE PRINTED. INTERRUPTS FROM THE PRINTER REMAIN ENABLED UNTIL THE FIRMWARE ISSUES A CONTROL WORD WHICH HAS THE PRINTER DATA INTERRUPT BIT RESET.

CARRIER AND FORMS FUNCTIONS ARE INTERLEAVED WITH PRINTER FUNCTIONS TO CONTROL THE POSITIONING AND FORMS ADVANCE OPERATIONS. THE FIRMWARE MAINTAINS RECORDS OF PRINthead LOCATION AND VERTICAL POSITIONING ON THE FORM. EDITING FUNCTIONS (E.G., PUNCTUATION, DECIMAL POINT LOCATION, BIT SIGNIFICANCE, ETC.) ARE ACCOMPLISHED BY FIRMWARE.

3.3.6

FORMS CONTROL

ALL PIN PRINT CONSOLES WILL HAVE A SPLIT PLATEN. THE FORMS DATA WORD CONTAINS TWO BITS WHICH PROVIDE INDIVIDUAL CONTROL OF THE PLATENS FOR FORMS ADVANCE SO THAT THE PLATENS CAN BE OPERATED INDEPENDENTLY. A "1" IN THE BIT WILL CAUSE THE RESPECTIVE PLATEN TO ADVANCE ONE LINE.

3.3.6.1

ALARM

ONE BIT OF THE FORMS DATA WORD IS USED TO ACTIVATE AN AUDIBLE ALARM IN THE CONSOLE. A "1" IN THIS BIT WILL SOUND THE ALARM.

3.3.6.2

OPEN/CLOSE

TWO BITS OF THE FORMS DATA WORD IS USED TO OPEN AND CLOSE THE PLATENS. THIS FUNCTION IS BOTH FIRMWARE INTERLOCKED AND HARDWARE INTERLOCKED (IN CONSOLE LOGIC) WITH PRINT SUCH THAT MOTION CAN NOT OCCUR AT PRINT TIME.

3.3.7

STATUS AND DATA INTERRUPTS

3.3.7.1

STATUS INDICATORS

ALL STATUS INDICATIONS ARE RETURNED TO THE PROCESSOR IN RESPONSE TO AN "ENABLE STATUS" SIGNAL (ENST, SCLOCK) OR A "READ STATUS" REQUEST (READ, INSTRUCTION, SCLOCK) FROM THE PROCESSOR.

3.3.7.2

STATUS INTERRUPTS

THE THREE CONDITIONS THAT WILL CAUSE THE CONSOLE TO GENERATE A STATUS INTERRUPT ARE:

- A. "READY" PUSHBUTTON HAS BEEN DEPRESSED (BIT 13 SET).
- B. KEYBOARD INTERRUPT NOT HONORED (BIT 14 SET).
- C. OVERSPEED OR STALL CONDITIONS OF THE CARRIER (BIT 15 AND BIT 16 SET FOR EITHER CASE).

KEYBOARD INTERRUPT NOT HONORED IS SET IF THE KEYBOARD "FIFO" BUFFER CONTAINS 64 CHARACTERS AND ANOTHER KEY IS DEPRESSED. OVERSPEED AND STALL CONDITIONS ARE GENERATED BY THE CONSOLE "CERF" SIGNAL WHENEVER THE FAULTY CONDITION OCCURS. IN THIS CONDITION, THE CONSOLE BECOMES INOPERATIVE. TO RECOVER FROM THIS CONDITION, EITHER THE CONSOLE CLEAR OR SYSTEM CLEAR PUSHBUTTONS MUST BE DEPRESSED.

THE PROCESSOR FIRMWARE WILL RESET ANY BIT CAUSING A STATUS INTERRUPT AT THE SYSTEM CLOCK TIME FOLLOWING STATUS INTERROGATION. THE FOUR "DEVICE READY" BITS AND THE "DATA REQUEST" BIT IN THE STATUS WORD ARE USED IN THE DATA INTERRUPT FUNCTIONS (SEE BELOW) AND DO NOT CAUSE A STATUS INTERRUPT.

DATA INTERRUPTS

THE CONDITIONS THAT WILL CAUSE THE CONSOLE TO GENERATE A DATA INTERRUPT ARE LISTED BELOW. IN EACH CASE THE RESPECTIVE CONDITION BIT AND THE "DATA REQUEST" BIT WILL BE SET IN THE STATUS WORD, RESULTING IN A DATA INTERRUPT BEING SENT TO THE PROCESSOR.

- A. CARRIER HAS BEEN ENABLED AND IS READY TO PERFORM A CARRIER FUNCTION.
- B. FORMS CONTROL HAS BEEN ENABLED AND IS READY TO PERFORM A FORMS FUNCTION.
- C. PRINTER HAS BEEN ENABLED AND IS READY TO PERFORM A PRINT FUNCTION.
- D. KEYBOARD HAS BEEN ENABLED AND A KEY HAS BEEN DEPRESSED (BUFFER HAS A CHARACTER).

THE DATA INTERRUPTS FOR THE CARRIER, FORMS, AND PRINTER WILL BE RESET AT THE END OF THE CLOCK PERIOD THAT TRANSMITS THE DATA WORD FROM THE PROCESSOR TO THE DDP. THE DATA INTERRUPT FOR THE KEYBOARD WILL BE RESET AT THE END OF THE CLOCK PERIOD THAT FETCHES THE DATA FROM THE DDP'S KEYBOARD BUFFER TO THE PROCESSOR.

DISABLING OF A CONSOLE FUNCTION (CARRIER, FORMS, PRINTER OR KEYBOARD) WILL RESET ITS DATA INTERRUPT BIT. SYSTEM CLEAR DISABLES THE CARRIER, FORMS, AND PRINTER DATA INTERRUPTS BUT ENABLES THE KEYBOARD DATA INTERRUPTS.

HARDWARE RESTRICTIONS

THE FOREGOING PROCEDURAL DESCRIPTIONS APPLY TO TYPICAL CONSOLE OPERATIONS AND MAY VARY AT THE DISCRETION OF THE PROGRAMMER; HARDWARE RESTRICTIONS NOT SPECIFICALLY STATED THEREIN BUT WHICH MUST BE ADHERED TO INCLUDE THE FOLLOWING:

- A. PRINTER DATA INTERRUPTS MUST BE HONORED WITHIN 15 MILLISECONDS IN ORDER TO MAINTAIN MAXIMUM PRINTER SPEED; HOWEVER, NO LOSS OF PRINTER DATA WILL OCCUR IF THIS TIME INTERVAL IS NOT MAINTAINED.
- B. CONSECUTIVE TYPE I INSTRUCTIONS THAT TEST FOR A DATA/STATUS INTERRUPT AND DO A CONDITIONAL DEVICE WRITE WILL CAUSE THE LOSS OF PRINTER, FORMS, OR CARRIER FUNCTIONS, SINCE THE DATA INTERRUPT IS RESET AT THE END OF THE FIRST DEVICE WRITE WITH THE SYSTEM CLOCK.

3.3.8
(CONTINUED)

HARDWARE RESTRICTIONS

- C. IF THE PLATEN IS OPEN, PRINTING MAY BE DONE WITHOUT SENDING THE CLOSE PLATEN. THE CONSOLE WILL AUTOMATICALLY PERFORM THE CLOSE PLATEN FUNCTION.
- D. BETWEEN PRINTER, CARRIER OR FORMS DATA WORDS AND AN INDICATOR DATA WORD A PROGRAMMATIC DELAY OF 10 USEC MUST ALSO BE INSERTED. BETWEEN AN INDICATOR AND PRINTER-CARRIER-FORMS (P-C-F) DATA WORD, A PROGRAMMATIC DELAY OF 10 USEC MUST BE INSERTED. BETWEEN CONSECUTIVE INDICATOR DATA WORDS, A PROGRAMMATIC DELAY OF 8 USEC IS REQUIRED.
- E. ONLY 255 PRINT POSITIONS ARE AVAILABLE PER LINE.
- F. WHEN A STATUS INTERRUPT IS RECEIVED WITH THE "STALL" AND/OR "OVERSPEED" FLAG SET, THE CONSOLE CLEAR PUSHBUTTON MUST BE DEPRESSSED BEFORE THE PROGRAM CAN MAKE USE OF THE CONSOLE AGAIN. AT WHICH TIME, THE CARRIER MUST BE INITIALIZED TO EITHER MARGIN.
- G. THE STATUS WORD MUST BE INTERROGATED FOR THE PROPER DATA INTERRUPT WHEN MORE THAN ONE CONSOLE FUNCTION IS ENABLED AT THE SAME TIME.
- H. THE POSITION OF THE CARRIER MUST BE REMEMBERED PROGRAMMATICALLY.
- I. ONLY ONE INDICATOR BANK MAY BE SELECTED PER INDICATOR DATA WORD.
- J. INDICATOR DATA MAY NOT FOLLOW ANY CONSOLE DATA WORD BY LESS THAN 11 MICROSECONDS.
- K. AFTER CONSOLE OR SYSTEM CLEAR OR HARDERROR CLEAR ARE ACTIVATED, THE CONSOLE CANNOT ACCEPT A COMMAND FOR 200 MILLISECONDS. TO ACCOMPLISH THIS DELAY, A CARRIER DATA COMMAND WITH ALL BITS LOW SHOULD BE SENT. ANY DEVICE BESIDES THE KEYBOARD SHOULD BE ENABLED. AFTER THE SRQ FROM THIS IS RECEIVED, THE CONSOLE IS READY TO ACCEPT COMMANDS.
- L. PRINTING IS DONE ON THE FLY BETWEEN DETENT POSITIONS INSTEAD OF AT DETENT POSITIONS.
- M. IF THE CONSOLE IS STALLED, IT MUST BE CLEARED BEFORE COMMANDS AFTER THE STALL ARE ACCEPTED.

3.3.8
(CONTINUED)

HARDWARE RESTRICTIONS

- N. ANY COMMANDS IN THE CONSOLE BUFFER STILL WAITING FOR EXECUTION WILL BE CLEARED IF HARDERROR CLEAR OR ANY OTHER CLEAR IS GENERATED.

3.3.9

DDP TO CONSOLE P-C-F INTERFACE FUNCTIONS
--- -- -----

THE P-C-F (PRINTER-CARRIER-FORMS) MECHANISM IS CONTROLLED BY THE BASIC PROCESSOR THROUGH A SET OF CODES WHICH SPECIFIES THE CONTROL AND ITS PARAMETER, AND THE CHARACTERS TO BE PRINTED. THESE CODES ARE LOADED BY THE BASIC PROCESSOR INTO AN OUTPUT BUFFER, WHERE THEY ARE RETRIEVED AND INTERPRETED BY THE TPU MICROPROCESSOR TO PERFORM THE SPECIFIED OPERATION.

TABLE 3-3 LISTS AND DEFINES THE CONTROL CODES USED IN THE CONTROL OF THE P-C-F MECHANISM.

3.3.9.1

PRINTER-CARRIER-FORMS-CODE-SET

THE CODE SET FOR THE CONTROL OF THE PRINTER-CARRIER-FORMS CONSISTS OF 8-BIT CODES, WHICH CAN BE DIVIDED INTO THREE GROUPS: CONTROL CODES, PRINT CODES, AND NO-OP CODES.

FIGURE 3-3 SHOWS THE P-C-F DOMESTIC CODE SET.

A. CONTROL CODES
-- -----

THE CONTROL CODES ARE USED TO CONTROL PRINTING FORMAT, FORMS HANDLING, CARRIER POSITIONING, AS WELL AS THE PRINT-HEAD RETRACTION AND ENGAGEMENT. THE CONTROL CODES APPEAR IN ASCII STICKS 0 AND 1, AND THEY ARE DESCRIBED IN TABLE 3-3.

TABLE 3-3. P-C-F MECHANISM CONTROL CODES

CODE	NAME	FUNCTION	REMARKS												
0-1	PIP	PRINT-IN-PLACE	MODIFY NEXT PERIOD OR COMMA TO PRINT IN BETWEEN PRINT POSITIONS.												
0-4	PRTL		PRINT TO THE LEFT.												
0-5	PRTR	PRINT	PRINT TO THE RIGHT.												
0-6	PRTL	DIRECTION	PRINT TO THE LEFT.												
0-7	PRTR		PRINT TO THE RIGHT.												
0-8	OPN	PLATEN	OPEN PLATEN.												
0-9	CLOS	OPEN/CLOSE	CLOSE PLATEN.												
0-A	D/C		COMPLEMENT PLATEN.												
<p>IF PRINTHEAD IS ENGAGED AGAINST PLATEN, AN OPEN PLATEN OPERATION IS ALWAYS PRECEDED BY A HARDWARE INITIATED HEAD RETRACT.</p>															
0-C	SHLT	CARRIER	MOVE CARRIER "N" POSITIONS TO LEFT (SHLT) OR TO RIGHT (SHRT). "N" IS 8-BIT BINARY NUMBER IN OUTPUT "FIFO" BUFFER IMMEDIATELY FOLLOWING SHLT OR SHRT.												
0-D	SHRT	POSITIONING													
<table style="margin-left: auto; margin-right: auto;"> <tr> <td>N = 0</td> <td>NO MOVEMENT</td> </tr> <tr> <td>N = 1</td> <td>ONE MOVEMENT</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td>N = N</td> <td>"N" MOVEMENT</td> </tr> </table>				N = 0	NO MOVEMENT	N = 1	ONE MOVEMENT							N = N	"N" MOVEMENT
N = 0	NO MOVEMENT														
N = 1	ONE MOVEMENT														
N = N	"N" MOVEMENT														
<p>SHLT SETS PRINT DIRECTION TO LEFT. SHRT SETS PRINT DIRECTION TO RIGHT.</p>															
1-0	ALARM	ALARM	SOUNDS AUDIBLE ALARM.												
1-1	POFF	POWER OFF	RETRACTS PRINTHEAD (IF IT HAS NOT BEEN RETRACTED) AND WAITS UNTIL P-C-F IS IN IDLE STATE, THEN CAUSES MACHINE TO GO ON STANDBY POWER.												

TABLE 3-3. P-C-F MECHANISM CONTROL CODES (CONT.)

Code	Function	Description	Notes
1-2	PMOF	AC MOTOR OFF	RETRACTS PRINTHEAD (IF IT HAS NOT BEEN RETRACTED) AND WAITS UNTIL P-C-F IS IN IDLE STATE, THEN TURNS AC MOTOR OFF.
1-3	ENGG	ENGAGE PRINTHEAD	CLOSES PLATEN (IF IT IS OPEN) AND THEN ENGAGES PRINTHEAD AGAINST THE PLATEN ROLLER READY FOR PRINTING.
1-4	RTRCT	RETRACT PRINTHEAD	RETRACTS THE PRINTHEAD.
1-5	BKSP	HORIZONTAL SPACING	POSITIONS ONE SPACE OPPOSITE DIRECTION PRESENTLY SPECIFIED. DOES NOT CHANGE SPECIFIED DIRECTION EXCEPT TO ACCOMPLISH BACKSPACE.
1-6	ENUND	ENABLE UNDERLINE	MODIFIES SUBSEQUENT PRINT CHARACTERS (INCLUDING SPACES) BY UNDERLINING THEM. THIS IS IN EFFECT UNTIL SUCH TIME AS A DSUND CODE IS RECEIVED.
1-7	DSUND	DISABLE UNDERLINE	DISABLES UNDERLINING OF PRINT CHARACTERS CAUSED BY ENUND CODE. HAS NO EFFECT ON THE UNDERSCORE CODE (5-F).
1-8	ALT	VERTICAL FORMS MOVEMENT	ADVANCE LEFT PLATEN (ALT), RIGHT PLATEN (ART), OR BOTH PLATENS (ARL) "N" LINES. "N" IS 8-BIT BINARY NUMBER IN OUTPUT "FIFO" BUFFER IMMEDIATELY FOLLOWING THE ADVANCE CODE.
1-9	ART		
1-A	ARL		
1-C	SKHDL	VERTICAL	ADVANCE LEFT (SKHDL) OR RIGHT (SKHDR) PLATEN TO TOP OF FORM. IN PRESENT DESIGN, ADVANCES SPECIFIED PLATEN ONE LINE.
1-D	SKHDR	FORMS MOVEMENT	
1-E	INLT	CARRIER MOVEMENT	MOVES CARRIER TO LEFT (INLT) OR RIGHT (INRT) BUMPER AT ESCAPE VELOCITY (6"/SEC). INRT SETS PRINT DIRECTION TO THE RIGHT. INLT SETS PRINT DIRECTION TO THE LEFT.
1-F	INRT		

BITS B8 B7 B6 B5					0	1	2	3	4	5	6	7	
	B4	B3	B2	B1	COL	ROW							
0 0 0 0	0	0	0	0	0	0	NO-OP	ALARM	SPACE	b	@	P	
0 0 0 1	0	0	0	1	1	1		POFF	!	!	A	Q	
0 0 1 0	0	0	1	0	2	2	NO-OP ²	MOF	"	2	B	R	
0 0 1 1	0	0	1	1	3	3	NO-OP ²	ENGG	#	3	C	S	
0 1 0 0	0	1	0	0	4	4	PRILT	RTRCT	\$	4	D	T	
0 1 0 1	0	1	0	1	5	5	PRTRT	BKSP	%	5	E	U	
0 1 1 0	0	1	1	0	6	6	PRILT	ENUND	&	6	F	V	
0 1 1 1	0	1	1	1	7	7	PRTRT	DSUND	/	7	G	W	
1 0 0 0	1	0	0	0	8	8	OPN	ALT ¹	(8	H	X	
1 0 0 1	1	0	0	1	9	9	CLOS	ART ¹)	9	I	Y	
1 0 1 0	1	0	1	0	10	10	O/C	ARL ¹	*	:	J	Z	
1 0 1 1	1	0	1	1	11	11	NO-OP	NO-OP	+	;	K	[
1 1 0 0	1	1	0	0	12	12	SHLT ¹	SKHDL	<	<	L	\	
1 1 0 1	1	1	0	1	13	13	SHRT ¹	SKHDR	-	-	M]	
1 1 1 0	1	1	1	0	14	14	LNLT ¹	INLT	.	>	N	^	
1 1 1 1	1	1	1	1	15	15	LNRT ¹	INRT	/	?	O	_	
												o	BLANK

NOTES:

1. MUST BE FOLLOWED BY A COUNT.
2. NO-OP WITH DELAY OF 50-100 ms.

FIGURE 3-3. P-C-D DOMESTIC CODE SET

P.64

B. PRINT CODES

-- -----

THE CODES IN ASCII STICKS 2 THROUGH 7 AND 10 THROUGH 15 ARE DEFINED TO BE PRINT CODES. THE PRINT CODES WILL INITIATE A PRINT OPERATION AND ADDRESS THE CHARACTER GENERATOR ROM WHICH DEFINES THE PINS IN THE PRINTHEAD THAT ARE TO BE FIRED TO FORM A PRINT PATTERN, AS THE HEAD TRAVELS IN THE SPECIFIED DIRECTION. ALL PRINT CODES EXCEPT THE SPACE CODE 2=0 WILL CLOSE THE CARRIAGE AND ENGAGE THE PRINTHEAD AGAINST THE PLATEN PRIOR TO THE ACTUAL PRINT OPERATION.

NOTE THAT THE TPU MICROPROCESSOR DOES NOT MANIPULATE THE PRINT CODES IN ANY WAY. THESE CODES WILL DIRECTLY ADDRESS THE CHARACTER GENERATOR ROM'S, AND WHATEVER ARE ADDRESSED AT THOSE LOCATIONS WILL BE PRINTED.

C. NO-OP CODES

-- -----

THE NO-OP CODES ARE SPECIFIED ON THE CODE ASSIGNMENT CHART (FIGURE 3-3). THERE ARE 2 TYPES OF NO-OP CODES:

1. STANDARD NO-OPS
0=0, 0=B, 1=B AND ALL ASCII STICKS 8 AND 9 CODES ARE REGULAR NO-OPS THAT TIME OUT WITHIN 300 MICROSECONDS AFTER THEY ARE LOADED INTO THE OUTPUT BUFFER BY THE PROCESSOR. AFTER THIS MAXIMUM TIME DELAY, THE TPU MICROPROCESSOR IS READY TO SERVICE THE NEXT CODE (IF ANY) IN THE OUTPUT BUFFER.
2. NO-OPS WITH DELAY
0=2 AND 0=3 ARE NO-OPS THAT PROVIDE A DELAY OF 100-150 MILLISECONDS BEFORE THE TPU MICROPROCESSOR RETURNS TO SERVICE THE NEXT CODE (IF ANY) IN THE OUTPUT BUFFER.

THE P=C=F IDLE STATUS BIT WILL INDICATE "BUSY" DURING THE DELAY WHEN ANY OF THESE NO-OPS CODES ARE PROCESSED BY THE TPU MICROPROCESSOR.

3.3.9.2

P-C-F INITIALIZATION

THE P-C-F CONTROL PROGRAM IN THE TPU MICROPROCESSOR WILL BE INITIALIZED TO THE IDLE STATE BY ANY ONE OF THE FOLLOWING:

- A. MACHINE FULL OPERATIONAL POWER IS TURNED ON.
- B. THE CONSOLE MANUAL CLEAR PUSHBUTTON IS DEPRESSED.
- C. HARDERROR CLEAR IS GENERATED.
- D. SYSTEM CLEAR IS DEPRESSED.

THE INITIALIZATION WILL TURN THE AC MOTOR ON, RETRACT THE PRINT-HEAD, OPEN THE CARRIAGE, AND SET THE PRINT DIRECTION TO THE RIGHT. ANY OTHER FORMS OR CARRIER MOVEMENT MUST BE INITIATED PROGRAMMATICALLY.

INITIALIZATION WILL ALSO CLEAR THE CARRIER VELOCITY ERROR FLAG.

3.3.9.3

RED RIBBON

THERE IS NO RED RIBBON CAPABILITY AT THE PRESENT TIME.

3.3.9.4

AC MOTOR ON/OFF CONTROL

--

THERE IS A MOTOR OFF TIMER, SUCH THAT IF THE PRINTER-CARRIER-FORMS ARE IDLE CONTINUOUSLY FOR APPROXIMATELY 13 SECONDS, THE AC MOTOR WILL AUTOMATICALLY TURN OFF.

ANY CODE, INCLUDING NO-DP CODES, WILL TURN THE MOTOR BACK ON, EXCEPT THE 0-0, 1-1, OR 1-2 CODES.

3.3.9.5

PRINthead ENGAGEMENT AND RETRACTION

THE PRINthead IS RETRACTED BY THE FOLLOWING:

- A. A RTRCT CODE (1-4).
- B. THE PRINTER-CARRIER-FORMS ARE IDLE FOR A TIME PERIOD OF 1.6 SECONDS. THIS TIME PERIOD IS FIELD ALTERABLE IN INCREMENTS OF 400 MILLISECONDS, STARTING AT A MINIMUM OF 400 MILLISECONDS AND UP TO A MAXIMUM OF 6 SECONDS.

3.3.9.5
(CONTINUED)

PRINthead ENGAGEMENT AND RETRACTION

- C. THE PRINthead IS ALWAYS RETRACTED PRIOR TO AC MOTOR OFF OR POWER OFF.
- D. AN OPEN PLATEN OPERATION IS ALWAYS PRECEDED BY A HEAD RETRACTION TO AVOID MECHANICAL INTERFERENCE.

THE PRINthead IS ENGAGED BY THE FOLLOWING:

- A. ANY CODE IN STICKS 2 THROUGH 7 (EXCEPT THE SPACE CODE, 2-0), OR ANY CODES IN STICKS 10 THROUGH 15, WILL CLOSE THE CARRIAGE AND ENGAGE THE PRINthead AGAINST THE PLATEN.
- B. IF UNDERLINE HAS BEEN ENABLED BY THE ENUND CODE, A SPACE CODE (2-0) WILL CLOSE THE PLATEN AND ENGAGE THE PRINthead AGAINST THE PLATEN TO PRINT THE UNDERLINE.

3.3.9.6

BALL PRINTER VS. PIN PRINTER

THERE IS AN OPERATIONAL DIFFERENCE BETWEEN THE PIN PRINTER, AND THE BALL PRINTER: THE PIN PRINTER PRINTS "ON-THE-FLY", IN BETWEEN DETENT POSITIONS; WHEREAS, THE BALL PRINTER ESCAPES AND THEN PRINTS ON THE DETENT POSITION AFTER THE ESCAPEMENT.

CONSIDER THE FOLLOWING CODE SEQUENCE:

PRTRT, A, PRTLt, B.

THE BALL PRINTER WILL DISPLAY THE CHARACTERS "BA" IN CONTIGUOUS PRINT POSITIONS; WHEREAS THE PIN PRINTER, EXECUTING THE SAME CODE SEQUENCE, WILL PRINT "B" RIGHT ON TOP OF THE CHARACTER "A". NO ATTEMPT IS MADE IN THE P=C=F CONTROL PROGRAM TO RECONCILE THIS BASIC DIFFERENCE.

3.4.1
(CONTINUED)

SIGNALS FROM DDP TO CONSOLE

ALLOW SELECT (ALSEL/)

ALLOWS SINGLE CLOCK TO SELECT PROPER INDICATOR BANK.

INDICATOR BANK (IND5B/, IND6B/, IND7B/)

THE CODE ON THESE THREE LINES DETERMINES WHICH INDICATOR BANK IS SELECTED.

3.4.2

SIGNALS FROM CONSOLE TO DDP

PRINTER, CARRIER, FORMS IDLE (PCFID/)

THIS SIGNAL IS ACTIVE WHENEVER THE CONSOLE "FIFO" BUFFER IS EMPTY AND THE CONSOLE IS IDLE.

CONSOLE GENERATED CLOCK (DTNP)

CONSOLE GENERATED CLOCK USED TO SYNCHRONIZE INDICATOR DATA AND BANK SELECT COMMANDS.

CARRIER ERROR FLAG (CERF/)

THIS SIGNAL IS ACTIVE WHENEVER THE CARRIER STALLS OR HAS AN OVER-SPEED CONDITION. THE CONSOLE "CLEAR" PUSHBUTTON MUST BE PRESSED TO RESET THIS STATUS.

CONSOLE POWER OFF (CPOFF)

THIS SIGNAL, WHEN ACTIVE, PREVENTS THE DDP FROM GIVING ANY STATUS CONDITIONS.

PRINTER, CARRIER, FORMS BUFFER HALF FULL (PCFBHF/)

THIS SIGNAL GOES ACTIVE WHENEVER THE CONSOLE "FIFO" BUFFER CONTAINS 14, 15, OR 16 EIGHT-BIT WORDS. IT IS RESET WHEN THE CONSOLE HAS EMPTIED THE BUFFER TO 14, 15, OR 16 EIGHT-BIT WORDS.

CONSOLE READY (CCRDYND, CCRDYNC/)

INDICATES THAT "READY" PUSHBUTTON ON CONSOLE HAS BEEN DEPRESSED.

KEYBOARD LINES (KBDN/)

CONSISTS OF EIGHT DATA LINES FOR TRANSMITTING CHARACTERS FROM THE CONSOLE KEYBOARD TO THE 64-CHARACTER "FIFO" BUFFER IN THE DDP.

STROBE INDICATION (STROBEI)

INFORMS DDP THAT THE KEYBOARD DATA LINES CONTAIN A CHARACTER.

END-OF-PAPER SUPPLY (ENDOPS/)

NOTIFIES DDP THAT THE LEFT OR RIGHT OR BOTH PLATENS HAVE RUN OUT OF PAPER. (THIS FEATURE IS OPTIONAL.)

PROGRAMMATIC SYSTEM POWER OFF (CCPWRD/)

THIS SIGNAL, WHEN ACTIVE, POWERS DOWN THE PROCESSOR AND CONSOLE.

3.4.3

SIGNALS FROM PROCESSOR TO DDP

CLOCK HALT (CGHALT)

THIS SIGNAL, WHEN ACTIVE, INDICATES THAT THE PROCESSOR CLOCKS
HAVE STOPPED.

3.4.4

SIGNAL CABLES

THE SIGNAL INTERFACE BETWEEN THE CONSOLE AND THE CONSOLE DDP IS
PROVIDED BY CABLE ASSEMBLY 2605 9790. AC POWER FOR THE CONSOLE
IS PROVIDED VIA CABLE ASSEMBLY 2606 2281.

B9343 LOGIC BACKPLANE

Fig. 27 illustrates the layout of the console backplane as viewed from the frontplane side.

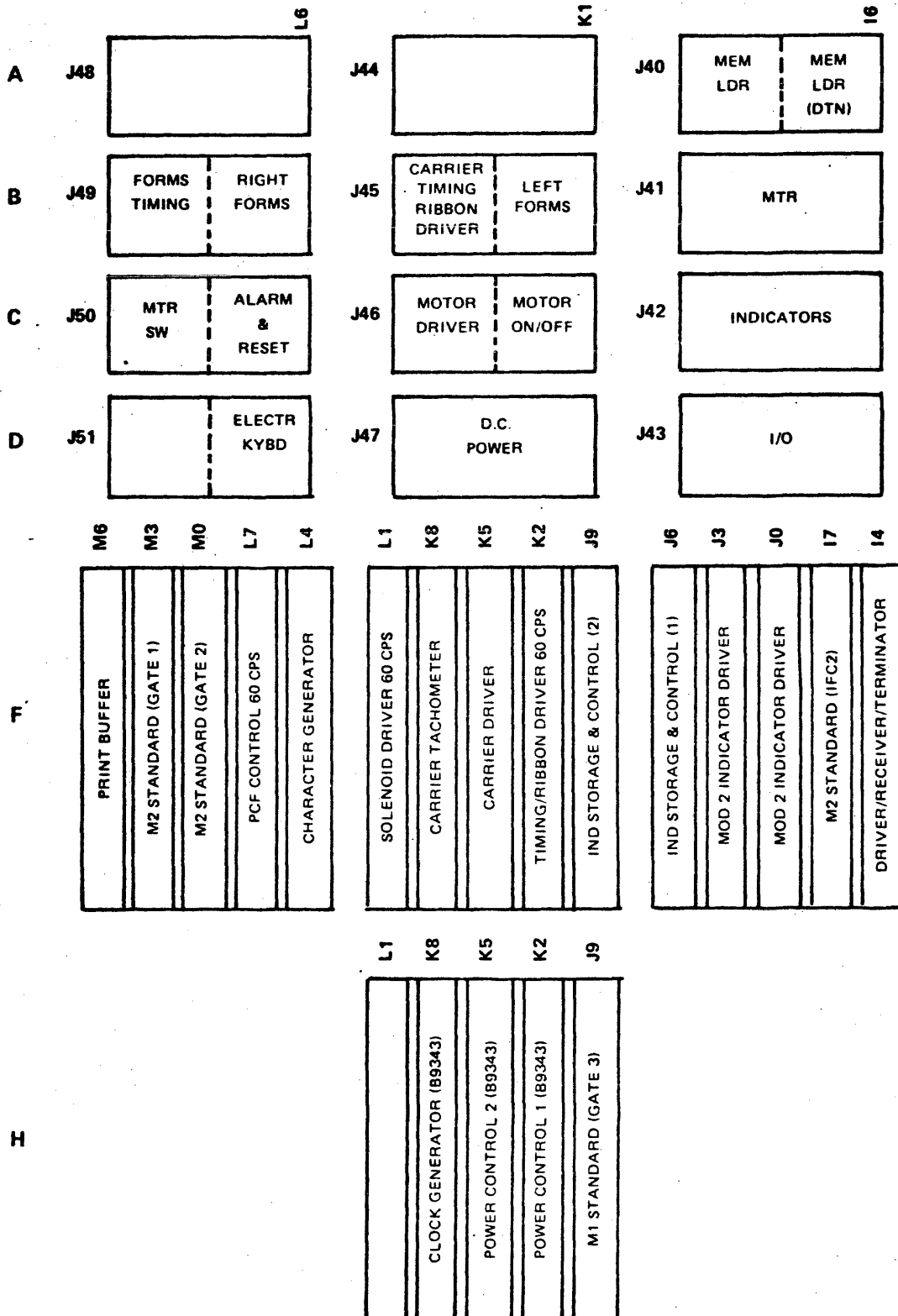


Fig. 27 CONSOLE BACKPLANE LAYOUT

1.0 CONSOLE MODES OF OPERATION

1.1 General

There is a series of two position switches mounted in the console for switching between a maintenance mode and normal mode of operation. In the normal mode of operation, the console is controlled by the interface lines. In the maintenance mode the console is controlled by its own keyboard. The switches, called MTR Switches, are listed below:

- 1) NORM-MAINT
- 2) PCF-IND
- 3) LOAD-EXEC
- 4) DIR-RPT
- 5) ALPHA-NUM

1.2 Normal Mode

For normal mode of operation, Switch 1 should be set to the NORM position and Switch 5 should be set to the ALPHA position.

1.3 Maintenance Mode

1.3.1 Indicator Control

The table below lists the switch positions required to exercise the indicator from the keyboard:

- 1) MAINT
- 2) IND

- 3) EXECUTE
- 4) DIRECT
- 5) NUMERIC

Under these conditions, the first byte loaded from the keyboard will select the desired indicator group A, B, C, D, or S (see Table 1). The second byte loaded determines which lamps will be illuminated. A third byte will again select a group of indicators, while a fourth byte will determine the lamps illuminated. Two keyboard entries are required to generate one byte.

1.3.2 PCF Control

The table below indicates the switch positions required to generate PCF commands singly.

- 1) MAINT
- 2) PCF
- 3) EXECUTE
- 4) DIRECT
- 5) NUMERIC

Under these conditions the PCF logic will immediately execute commands when entered from the keyboard. Multiple byte commands will of course not be executed until the final byte is entered from the keyboard.

If Switch 5 is returned to the ALPHA position, entry is from the ALPHA position of the keyboard. Only one key depression will be required to enter a byte of data in this mode. One must know the codes generated by each key in this mode in order to effectively exercise the PCF logic. (The indicator could be exercised with Switch 5 in the ALPHA position also. One might, e.g., use this mode to check the codes being issued by the keyboard for various alpha keys.)

There is another mode in which the PCF logic may be dynamically exercised. In this mode the switches are first set as shown below:

- 1) MAINT
- 2) PCF
- 3) LOAD
- 4) DIRECT
- 5) (NUMERIC) (ALPHA)

Thirty-one bytes of information are loaded into the FIFO under these conditions. No actions will occur until the switch settings are changed. If it is desired to execute the 31-byte string once only, Switch 3 will be set at this time (after loading 31 bytes) to the EXECUTE position and the commands will be immediately executed in sequence.

If it is desired to repeatedly execute these commands, one first sets Switch 4 to REPEAT position, and then sets Switch 3 to EXECUTE position. To stop the execution under these conditions, Switch 4 is returned to the DIRECT position while the commands are being executed.

2.0 CONSOLE HARDWARE

2.1 Power Supply

2.1.1 A.C. Power Supply

A.C. power is supplied to the machine through a 5-wire power cord from the processor. The A.C. power path is to relay K1 via the 8 amp circuit breaker CB1. Relay K1 is controlled by the power control logic when enabled by the control power supply. When energized, K1, will supply A.C. to power transformer T1, the PCF motor, and the memory loader (if present).

2.1.2 Control Power Supply

The control power supply provides the voltages necessary to power the console up from full power off. The voltages and their basic functions are listed as follows:

<u>Name</u>	<u>Function</u>
24V+DTN	+24V D.C. for Power Control 1 and 2 and Relay K1. The source of 24V+DTN is the processor via the I/O cable

<u>Name</u>	<u>Function</u>
6V+CONT	Produces 5+CONT for Power Control Logic
COUNT	60 HZ clock for 4 second delay counters.

It should be noted that the control power supply is energized when processor power is on, the AC power cord is connected, the I/O cable is connected and CBI is set.

2.1.3 D.C. Power Supply

The D.C. power supply basically consists of the constant voltage transformer T1, three full wave rectifiers, CR1-CR6, shunt capacitor filters, C1-C6 and C8, and a series pass voltage regulator VR1. The supply produces +24V, +12V, +5V, and -12V. The following is the load rating and type of regulation of the voltages:

<u>Voltage</u>	<u>Rating, Amperes</u>	<u>Regulation</u>
+24V	9.00	CVT
+12V	8.00	CVT
+ 5V	6.33	VR1
-12V	3.00	CVT

The distribution of the voltages through the fuses is as follows:

<u>Fuse</u>	<u>Voltage</u>	<u>Function</u>
F1	+24V	Printhead pin solenoids
F2	+24V	Carrier motor

<u>Fuse</u>	<u>Voltage</u>	<u>Function</u>
F3	+24V	Forms, engage/retract solenoid
F5	+12V	Indicators, PCF logic
F6	-12V	PCF logic
F7	+12V	Source for +5 voltage regulator

For a detailed description of the +5 voltage regulator, refer to an L8000 Technical Manual.

D.C. voltage distribution is accomplished by a harness from J10 on the D.C. panel to J47 on the backplane.

2.2 Logic Gate

2.2.1 Clock Generator PWB

A 10 MHz crystal oscillator drives a 9316 counter set up as a mod 15 counter. The outputs of this counter are decoded to produce the following 3 usec clocks:

- 1) CLM/PC
- 2) CLS/PC
- 3) P
- 4) PF

CLM/CP and CLS/PC are clocks used for clocking various flip-flops on Power Control 1 and 2.

The P clock is used as the basic clock of the printer carrier, forms logic and is sent to the DDP for indicator loading synchronization. The PF clock is used in the indicators for loading synchronization.

Other functions on the Glock Generator are circuits for out-of-paper detection and the Forms Timing Unit.

2.2.2 Power Control 1 PWB.

The Power Control 1 card contains the under voltage sensing circuits and under voltage detect circuit.

Under Voltage Sensing

Two dual independent differential amplifier IC packages are used to provide 3 differential amplifiers required for undervoltage sensing. Three voltage levels are sampled to generate under voltage 1 (UV1). These voltages are the following:

12V+10	(+12V)
12V-18	(-12V)
24V+DTN	(+24V)

The breakdown under voltage levels are as follows:

<u>Nominal</u>	<u>Breakdown</u>
+12V	+10.7V
-12V	-10.7V
+24V	+18.8V

Under Voltage Detect

The under voltage detect circuit utilizes a TTL monostable multivibrator I.C. to generate the 100 millisecc undervoltage detect pulse UVD.

The UVD pulse is used to hold the console system initialized after a detected under voltage on UV1

Under Voltage Turn Off

The under voltage turn off signal (UVTO/) is the logic NAND of FPF (full power FF) and UV1.

2.2.3 Power Control 2 PWB

The Power Control 2 card is made up of the following circuits:

- Four second Start Delay (SD/)
- Full power F.F. (FPF)
- K1 control driver (K1CONT)
- Initialize F.F.
- Power on reset (POR/C)
- Hold solenoid control (HOLDSOL)

Four Second Delay (SD/)

The four second delay circuit will provide the control for holding the console initialized during a power up sequence. This delay allows the power supply voltages to stabilize at their proper levels before the console can be operated. The time delay is determined by two 4 bit counters. The power on switch signal START/ will clear and enable the counters to be clocked by the 60 HZ signal, COUNT, from the control power supply. When the counter has reached a count of 256, it will complement the JK.F.F. on its output and terminate Start Delay.

Full Power F.F. (FPF)

This F.F. indicates all power is on in the console or the power control logic is in the process of powering up to full power. Full power F.F. (FPF) can be set only by the power on switch. FPF will be reset synchronously by a detected under voltage condition (UVD) or a power off command or reset asynchronously via UVTO/.

K1 Control Driver (K1CONT)

K1 control driver energizes the A.C. mains relay K1 during power up and full power. K1 is energized whenever the power on switch is depressed or when the FPF is set and there is no under voltage condition sensed (UV1/ is high, i.e. monitored voltages are in tolerance).

Initialize F.F.

The Initialize F.F. (loc. B6F7) is set and reset by the signal INIT/. The output of the F.F. is one of the signals used to generate power on reset (POR/C). The signal INIT/ is generated on the Carrier Tachometer PWB, and INIT/ is generated by pressing the console initialize switch or by receiving a clear

command from the processor. INIT/ will be active low. INIT/ will be low as long as the clear command is received or the initialize switch is depressed. After the clear command is removed or the initialize switch is released, INIT/ remains low for approximately 150 milliseconds.

Power on Reset (POR/C)

This is the console reset signal and it is generated during power up, under voltage detect, console initialize (or clear) and power down.

Hold Solenoid Control (HOLDSOL)

This signal is logically equivalent to POR/C and is used to prevent damage to the carrier hold solenoid clapper mechanism in the event of power loss or console initialization while the carrier is moving.

2.2.4 Interface PWB's

Interface between console and processor DDP is performed by the Driver/Receiver/Terminator (IFC1) and M2 Standard (IFC2) PWB's.

Driver/Receiver/Terminator (IFC1) PWB

This card contains the termination resistors for the input data lines, 2 DTL hex inverter

I.C.'s for buffering the input data, pull-up resistors for the output data lines, two RC filters for the Direct-Repeat MTR switch, and a two resistor termination for the driver of the P clock on the Clock Generator PWB.

M2 Standard (IFC2) PWB

This card contains the I/O cable drivers for the keyboard data lines, KBDn/, the keyboard strobe, STROBEI/, and the various console status lines. The drivers are open collector TTL 2-Input NAND gates.

Interface Signals, Console Input

The following table lists the input interface lines and their function:

<u>Name</u>	<u>Function</u>
24V+DTN	+24V control voltage
PCFIDn/	Printer, carrier, forms or indicator input data, 8 lines, active low
LPCFB/	Load printer, carrier, forms buffer, active low
CLEAR	Clear (initialize) console, causes POR/C to be generated
INDnB/	Indicator bank select data, 3 lines, active low
ALSEL/	Select indicator bank strobe, active low, synchronous with DTNP
ALIND/	Load indicator data strobe, active low, synchronous with DTNP

Interface Signals, Console Output

The following table lists the output interface signals and their function:

<u>Name</u>	<u>Function</u>
KBDn/	Keyboard data, 8 lines, active low
STROBEI/	Keyboard data strobe, active low, inhibited when console is in maintenance mode
PCFBHF/	Printer, carrier, forms buffer half full, active low, wired OR'ed with the power on reset signal so that console will indicate that it is not ready to accept data during initialize or clearing.
PCFID/	Printer, carrier, forms idle, active low
CERF/	Carrier error, active low
DTNP	Clock for synchronizing loading of indicators, 3 usec period
CPOFF	Console power off
ENDOPS/	End of paper, active low
CCRDYNC/	Console ready switch normally closed contact
CCRDYNO	Console ready switch normally open contact

2.2.5 Print Buffer PWB

The Print Buffer card contains a 32 byte data buffer, data multiplexing, and indicator strobes for maintenance mode operation of the indicators.

Data Buffer

The data buffer is a 32 x 8 FIFO asynchronous buffer with a half-full flag and it is operated in a parallel-in, parallel-out mode. The output of the FIFO is buffered by 8 exclusive-or gates and goes to the PCF logic on the signal lines OBDIC-OBD8C. The output extend line, OEX, is high when data is present in the FIFO and is gated with signals from the MTR Switches. The resulting signal, OEXTC, goes to the PCF logic to indicate that data is present, but is forced low in the load maintenance mode so that data may be loaded into the FIFO without being dumped by the PCF logic. The FIFO data is loaded by the signal load print buffer, LPB. This signal comes from the processor in normal mode operation, from the keyboard in direct maintenance mode operation and from the output dump signal, ODC/XC, in repeat maintenance mode operation. LPB is generated from these sources on the M2 Standard (Gate 1) and M2 Standard (Gate 2) PWB's.

Data Multiplexer

Four quad 2 input multiplexers I.C.'s are connected to form an 8 bit, 3 input multiplexer for routing data to the FIFO and to the indicators. The three inputs for the multiplexer are data lines from the processor, PCFIDn, which are selected

during normal mode operation, data lines from the keyboard, IBDnC, which are selected during direct maintenance mode and data lines from the FIFO output, OBCnC, which are selected during repeat maintenance mode operation.

Indicator Strobes

In indicator maintenance mode operation, a keyboard strobe, NIS, is used to clock a JK F.F. which is wired to complement on each clock pulse. The clock is gated with the outputs of the F.F. to provide two strobes, IOCAC/ and LDIND/, which alternately pulse with each keyboard strobe. IOCAC/ is the indicator bank select strobe and LDIND/ is the indicator load strobe.

2.2.6 M2 Standard (Gate 1), M2 Standard (Gate 2), and M1 Standard (Gate 3) PWB's

The functions performed by these PWB's fall into the following categories: signal inversion for obtaining the correct logic level between the interface, keyboard and PCF logic, illumination of indicator D8 by the signal CGHALT/ and mode control of the console. Circuitry in the latter category include load print buffer strobe (LPB),

indicator bank select strobe (IOCAC), indicator load strobe (LDIND), and indicator bank select data (NINDnB/). Refer to Figures 2 and 3 for more detail.

These cards each contain 4 DTL I.C.'s which are hex inverters, quad 2 input NAND gates, or triple 3-input NAND gates. The outputs of each I.C. and all gate inputs on the card except one are brought out to the backplane edge connector.

Note: These three cards are not interchangeable with another.

2.2.7 Indicator Storage & Control (1) and (2) PWB's
Indicator Storage and Control (1) controls the A, C, and Special indicators (20 indicators) and Indicator Storage and Control (2) controls the B and D indicators (16 indicators). Each card is identical and may be interchanged. Each contains 22 F.F.'s: 20 for storing which indicator is to be illuminated and 2 F.F.'s for storing which indicator bank has been selected for loading data. The following table lists the signals and their functions for these cards.

<u>Name</u>	<u>Function</u>
Dn/C	Indicator data, 8 lines
NINDnB/	Indicator bank select data, 3 lines
IOCAC	Strobe for bank select data
LDIND	Strobe for loading indicator data, must be high coincident with clock PF
PF	Clock for synchronization
POR/C	Asynchronous clear (sets all F.F.'s on card)
IANF/	A bank outputs, 8 lines
IBnF/	B bank outputs, 8 lines
ICnF/	C bank outputs, 8 lines
IDnF/	D bank outputs, 8 lines
ITYF/	Alpha indicator output
IRYF/	Ready indicator output
IERDIN/	Error indicator output
INUF/	Numeric indicator output

2.2.8 Mod II Indicator Driver PWB's

The console has two of these cards for driving the indicators with data from the Indicator Storage and Control cards. Each card has 20 sets of a DTL inverter driving a 2N708 transistor which sinks the indicator bulb current. The inputs are active low to illuminate an indicator. The driver cards are identical and may be interchanged.

2.3 Machine Wiring

The B9343-60 CPS Console differs significantly from the L9000 machines in its wiring harnesses.

The B9343-60 CPS uses "point-to-point" wiring harnesses, that is each harness generally has only two connectors, instead of more complex harnesses with several connectors. Refer to the system and basic machine wiring schematics for more detail.

TABLE 1

INDICATOR SELECTION

<u>Select Byte (Numeric KBD Entry)</u>	<u>Indicator Group Selected</u>
7-7	D
6-6	C
5-5	B
4-4	A
3-3	S

FIGURE 1
A.C. DISTRIBUTION
AND CONTROL

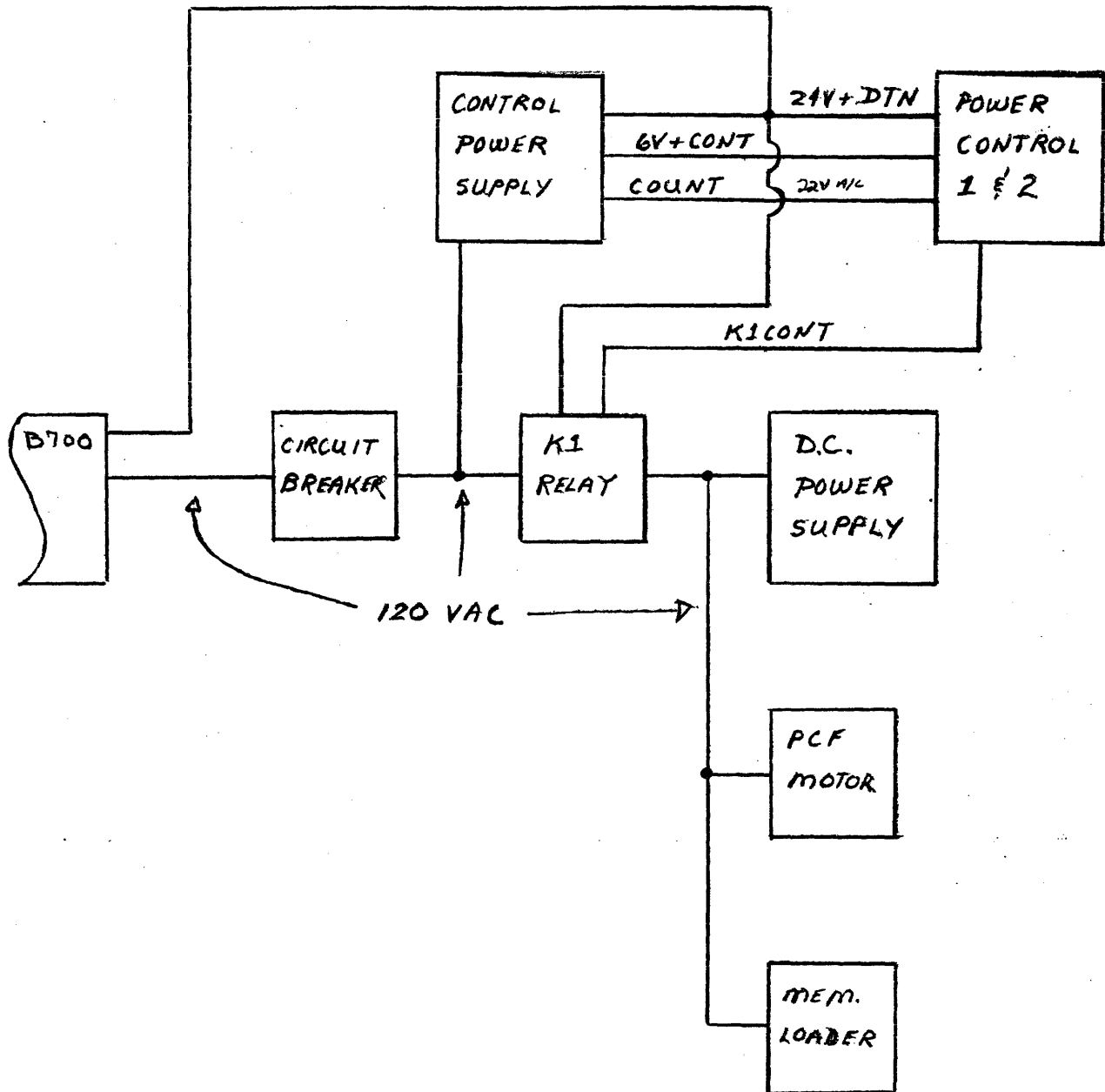


FIGURE 2
PCF LOGIC

NORMAL MODE

MAINT/ H

NUMBER/ H

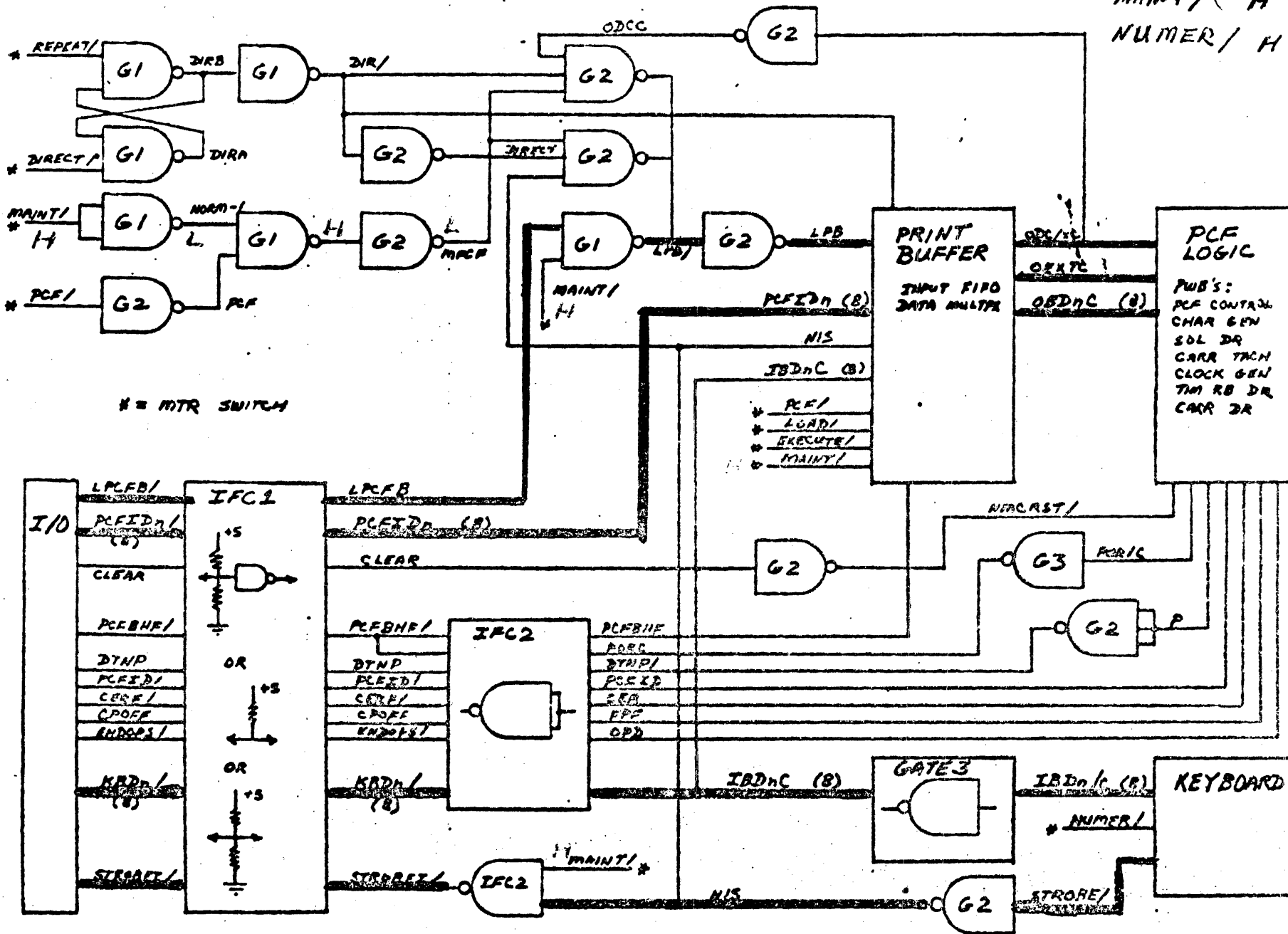


FIGURE 3
PCF CONTROL

MAINTENANCE
MODE
LOAD (FIFO)

DIRECT/ L
REPEAT/ H
MAINT/ L
PCF/ L
LOAD/ L
EXECUTE/ H
NUMER/ L

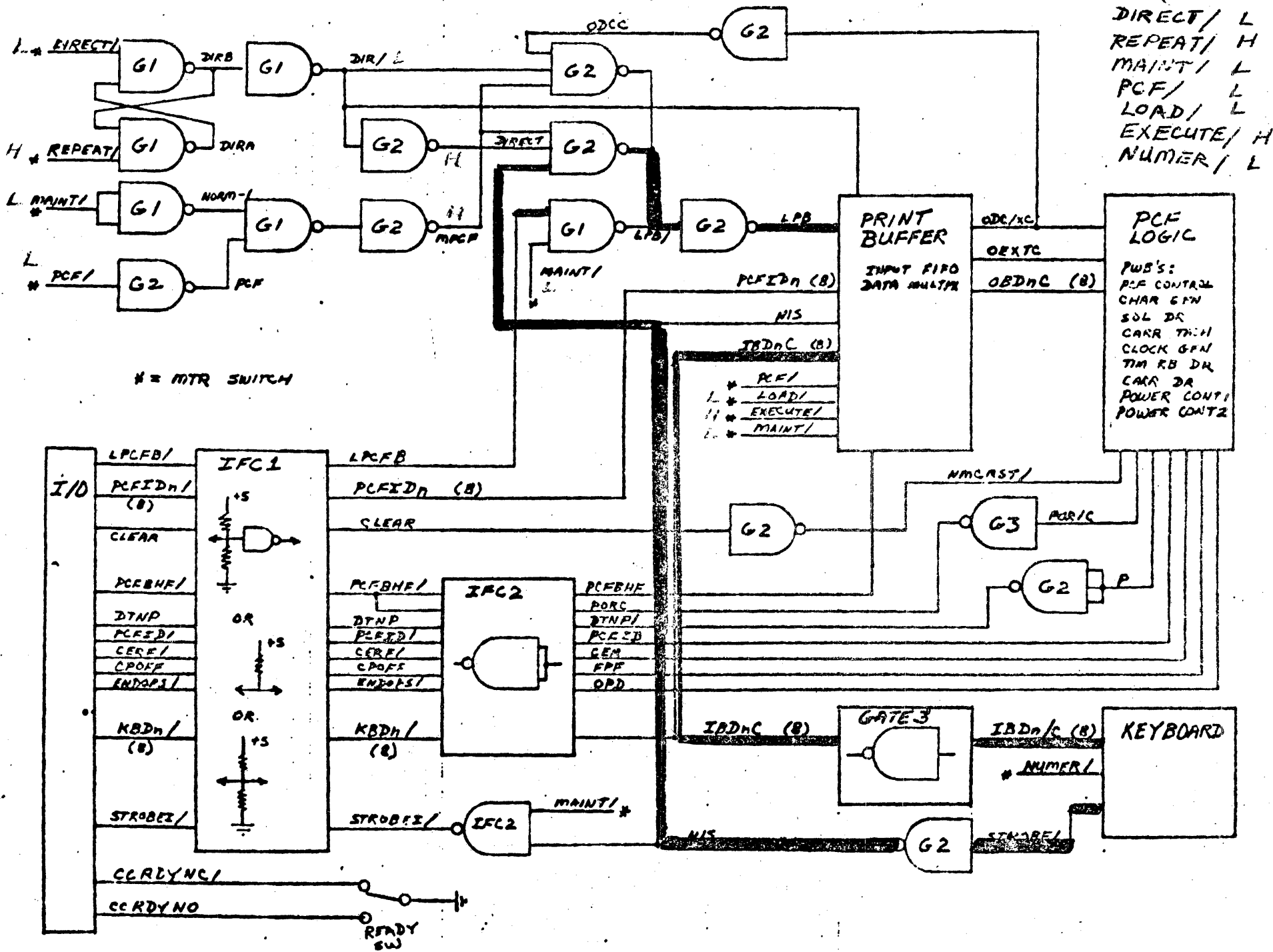


FIGURE 4
PCF CONTROL

MAINTENANCE
MODE
SINGLE PCF COMMANDS

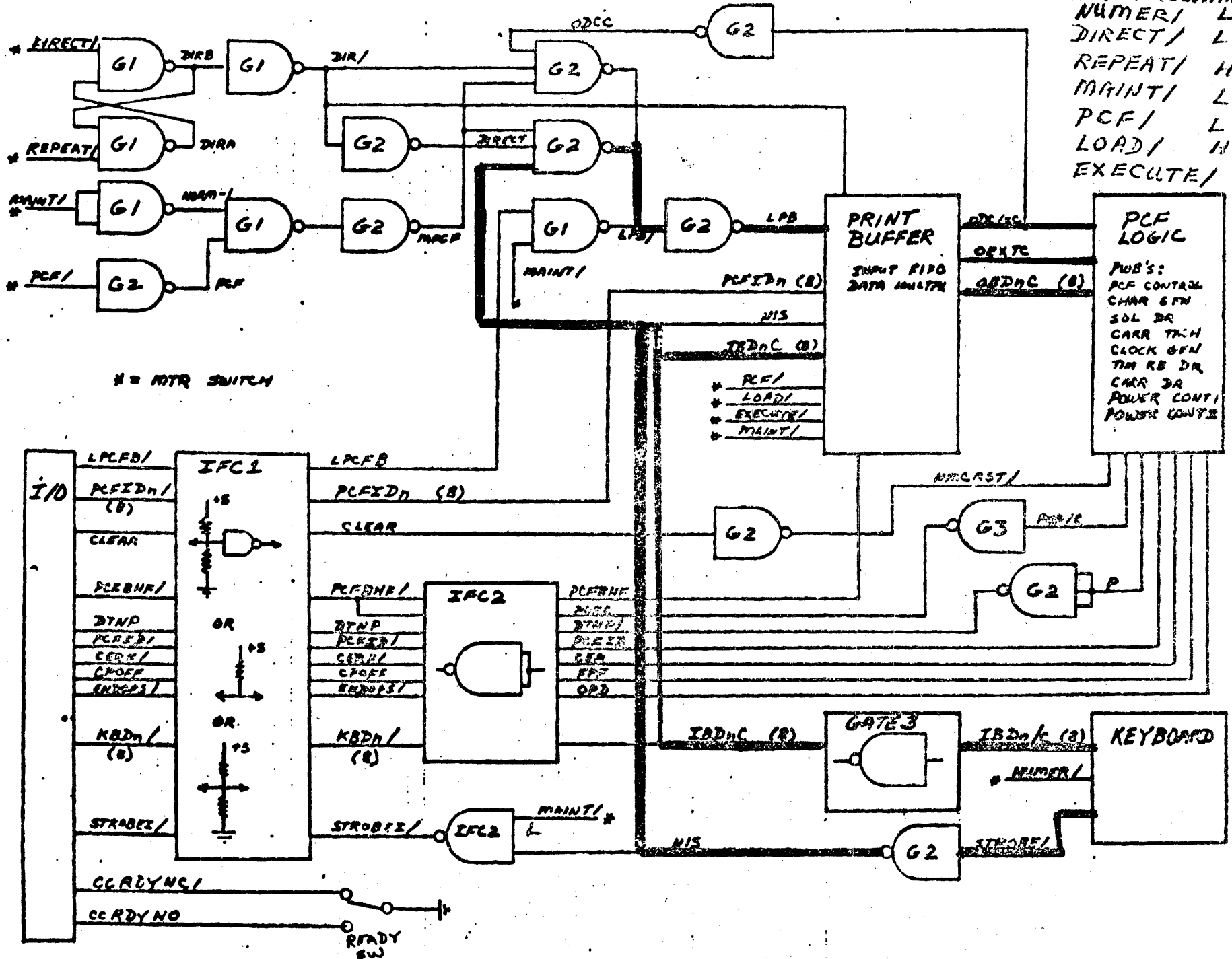
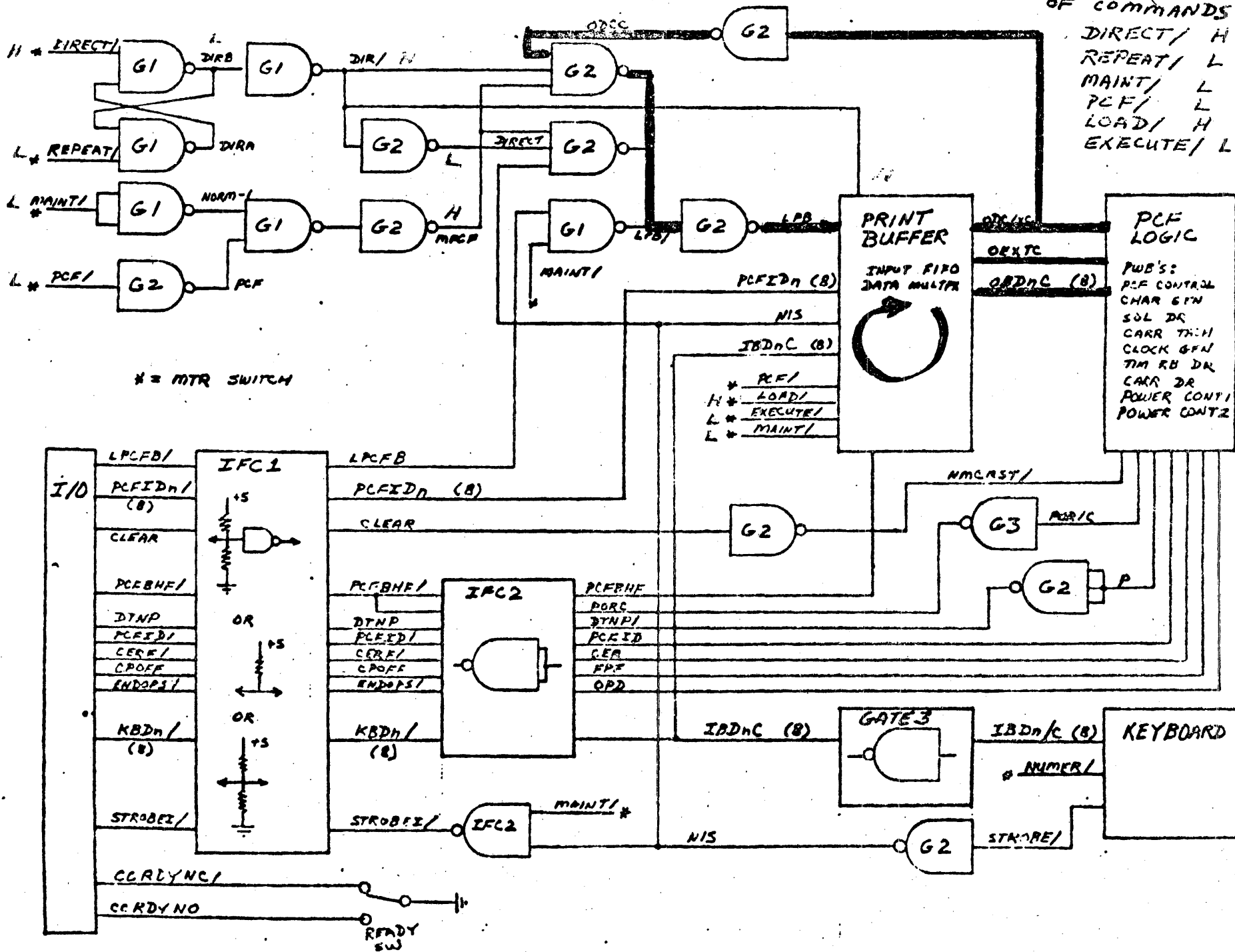


FIGURE 5
PCF CONTROL

MAINTENANCE
MODE
REPEAT EXECUTION
OF COMMANDS



DIRECT/ H
REPEAT/ L
MAINT/ L
PCF/ L
LOAD/ H
EXECUTE/ L

* = MTR SWITCH

PCF LOGIC
PUB'S:
PCF CONTROL
CHAR 67N
SOL DR
CARR TR/H
CLOCK GEN
TIM RB DR
CARR DR
POWER CONT1
POWER CONT2

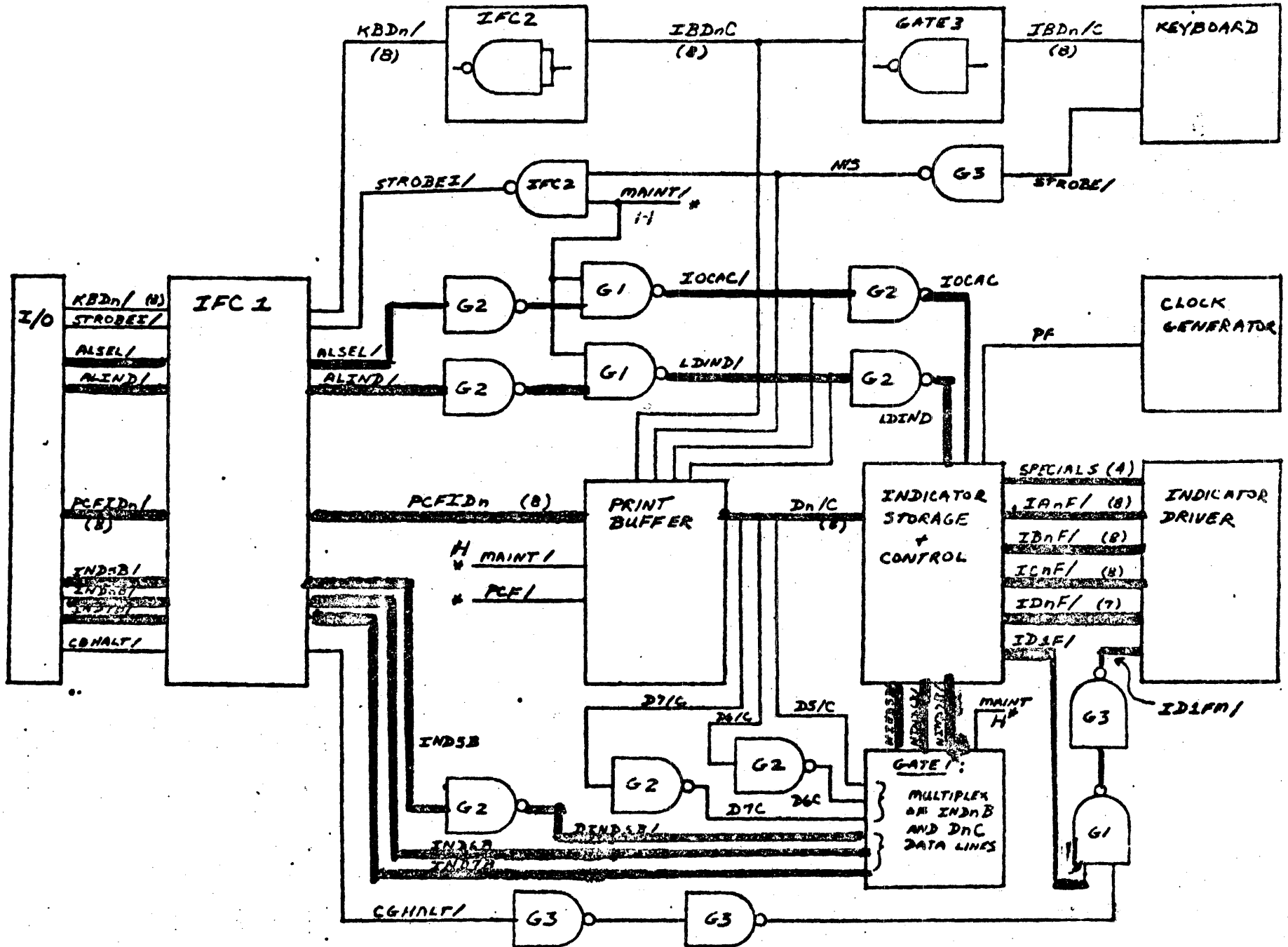
P.94

FIGURE 6
INDICATOR CONTROL

NORMAL MODE

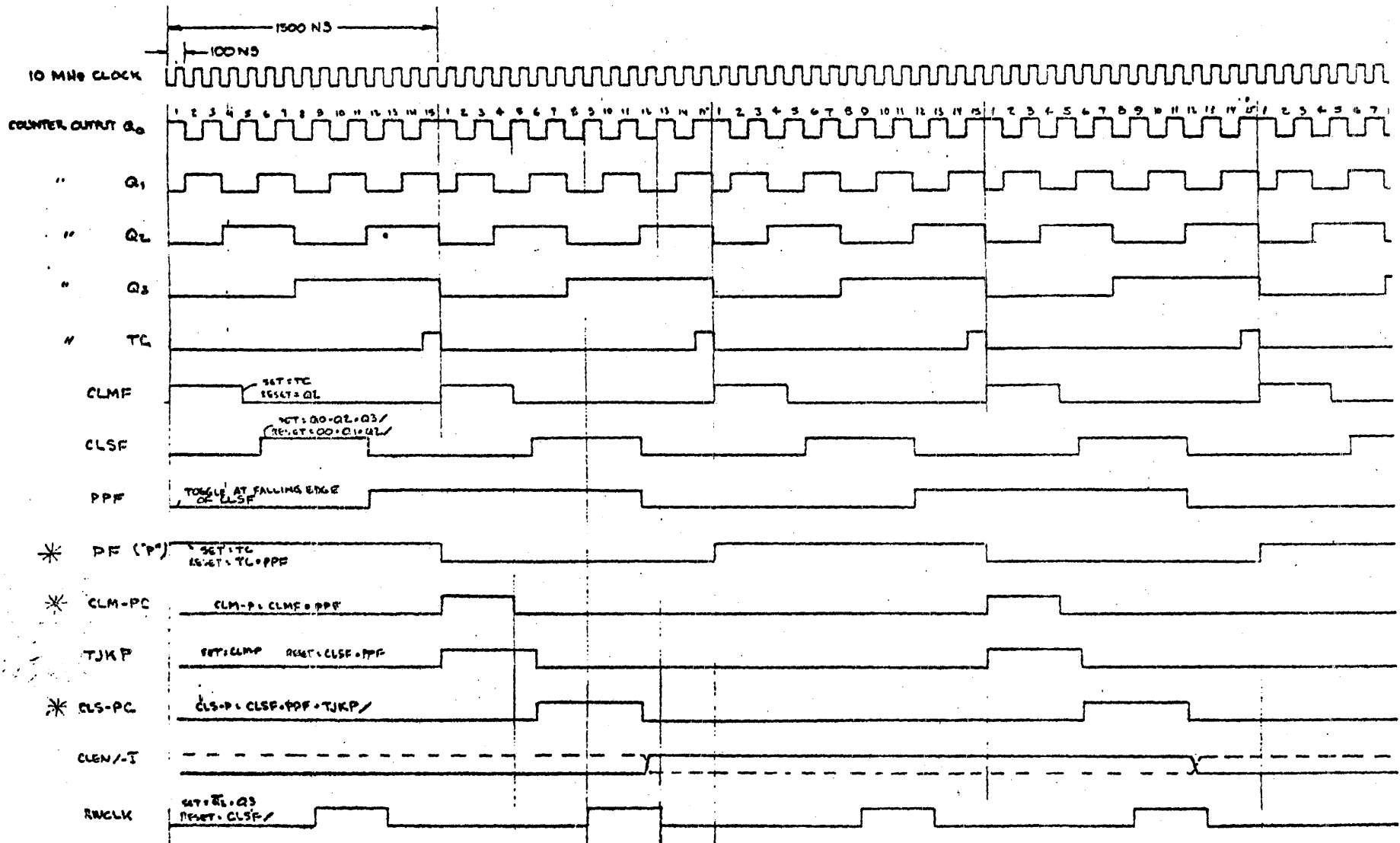
MAINT/ H

NUMER/ H



P. 95

FIGURE 8 CLOCK GENERATOR SIGNALS



* = SIGNALS USED IN B9343

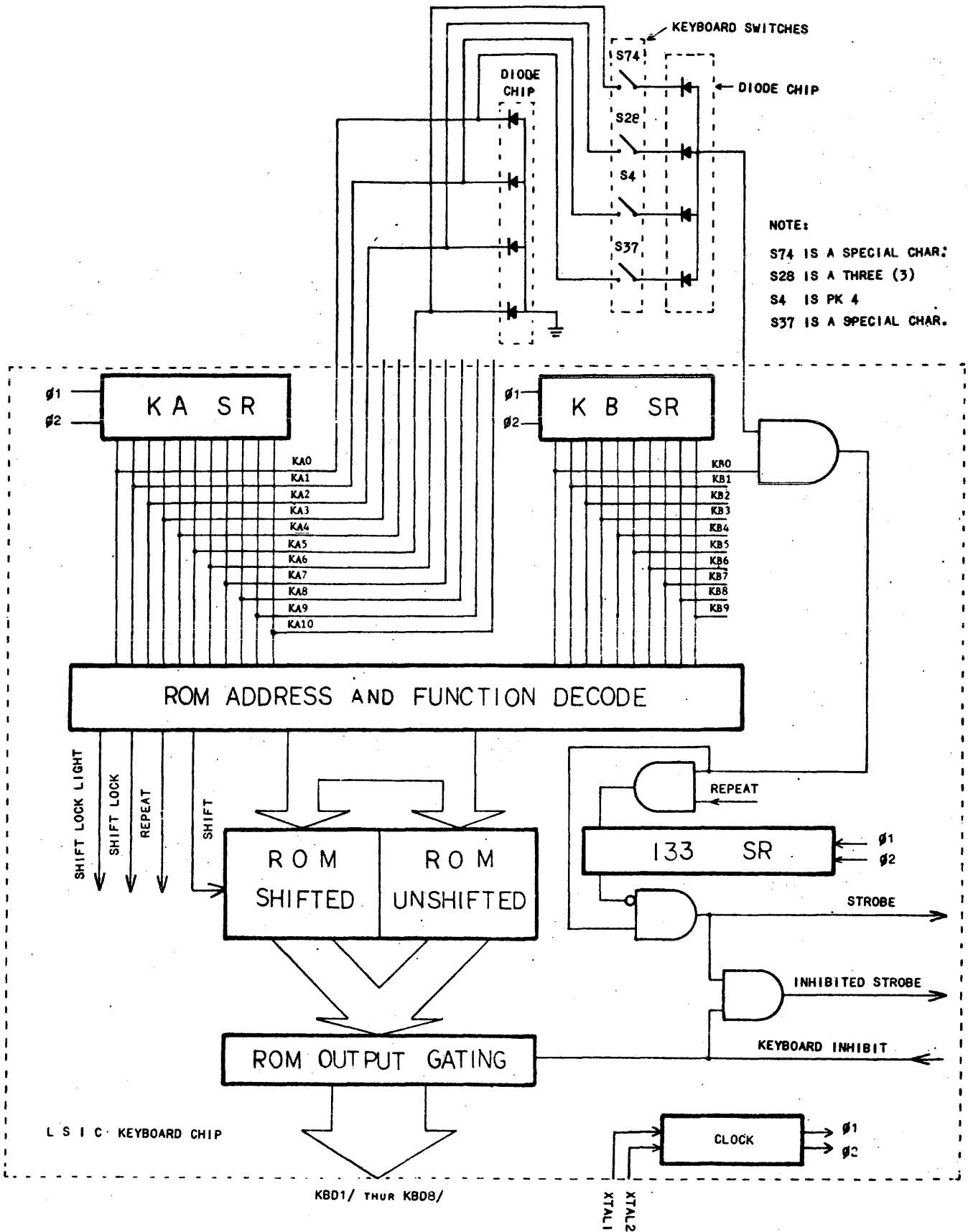
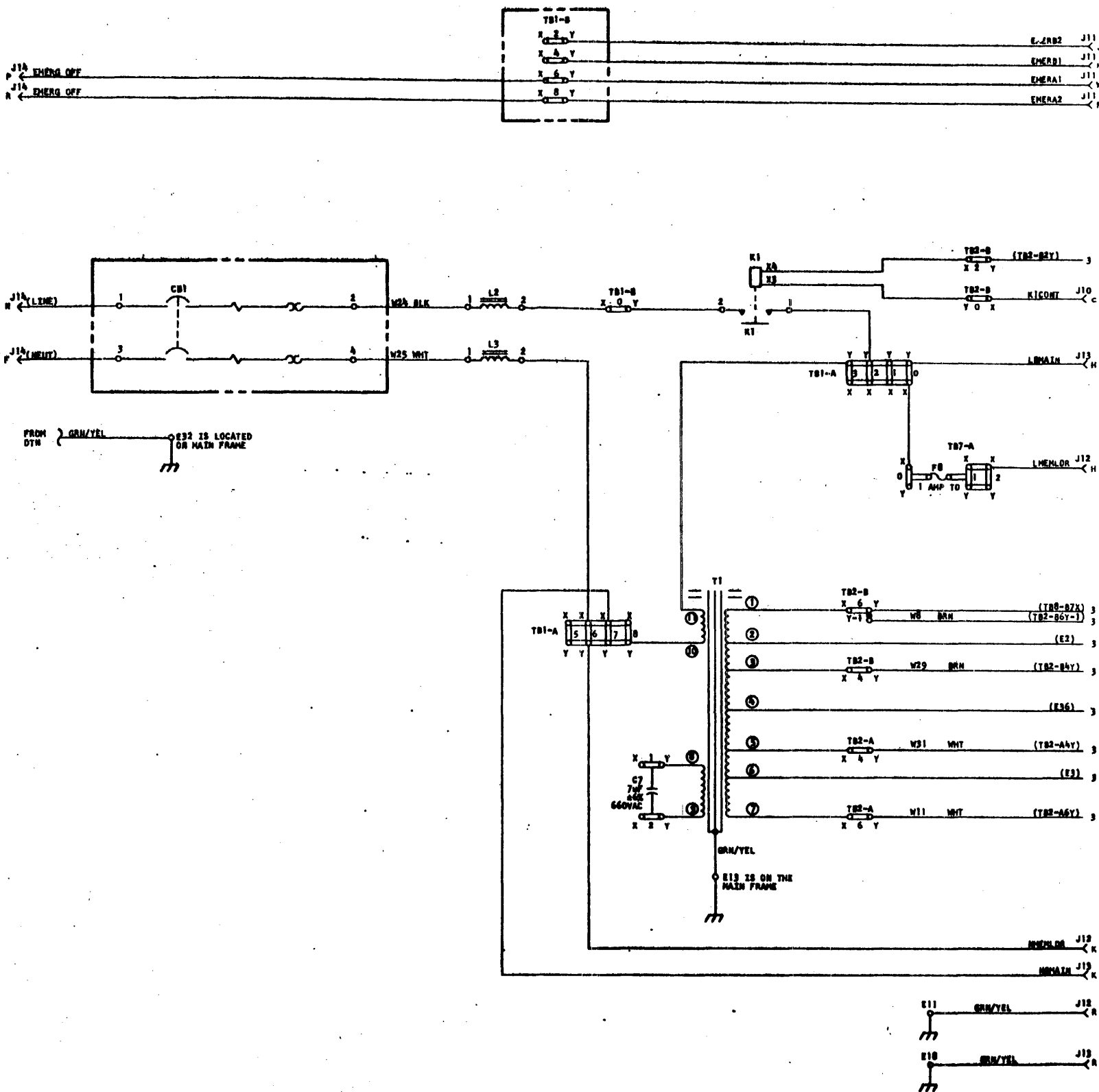


Fig 9. ELECTRONIC KEYBOARD BLOCK DIAGRAM

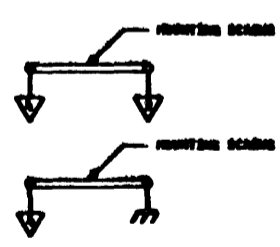
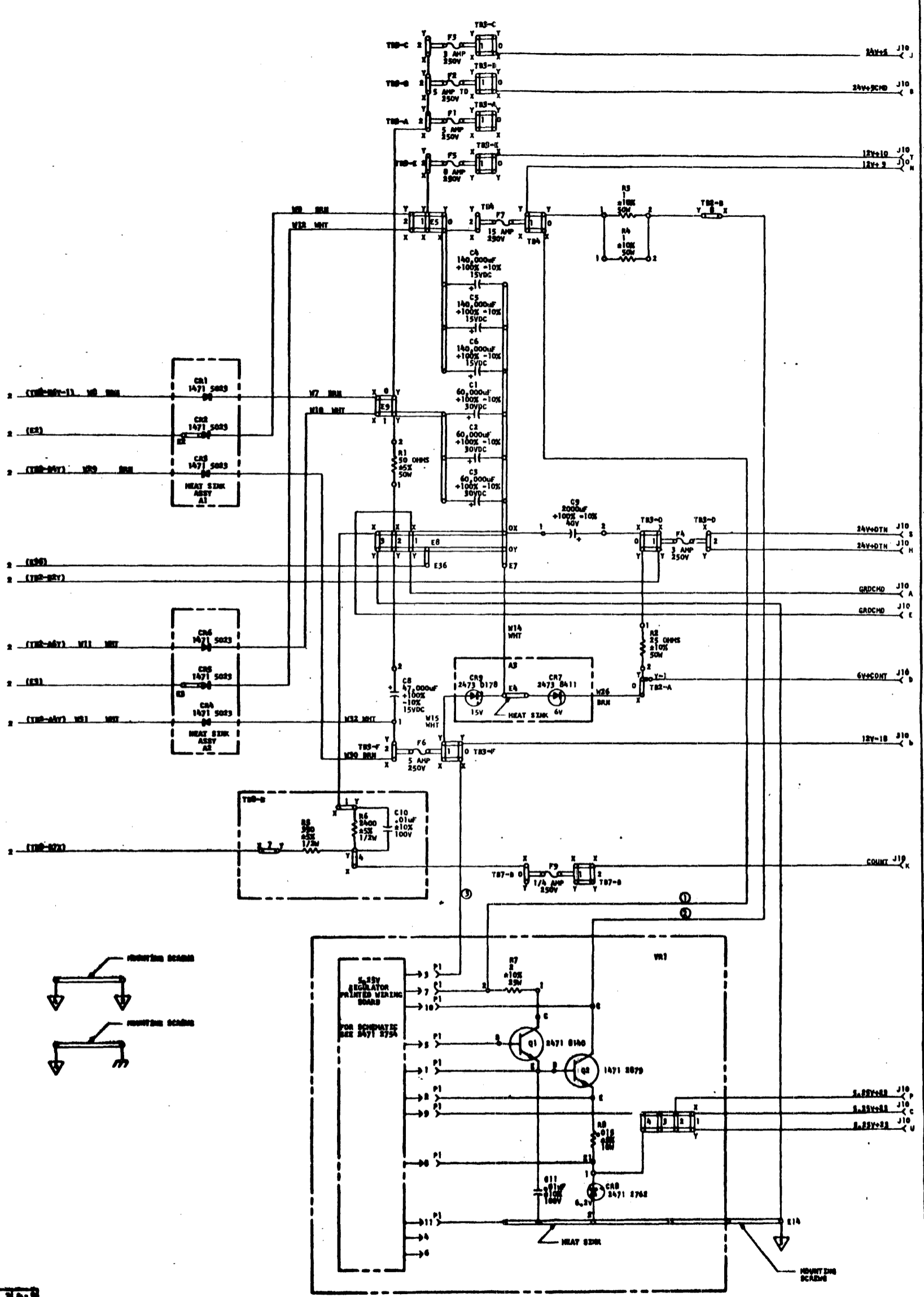


2481 2687
2

Surrughs Corporation SYSTEMS M & S GROUP PLYMOUTH, MICHIGAN 48170		PLYMOUTH PLANT U. S. AMERICA	
TITLE: WIRING SCHEMATIC, POWER SUPPLY (AC DISTRIBUTION, DOMESTIC) SYSTEM: 89343 60CPS			
DRAWN: DELANY 8-5-75 APPROVED:	CHECKED: HUNSMITH 8/5/75 RELEASED: 8-5-75	DWS NO.: 2481 2687	REV LETTER: A PAGE: 2

SCHMATIC

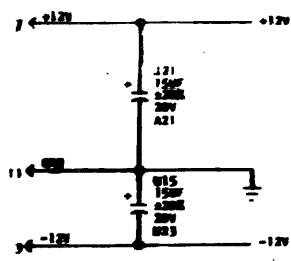
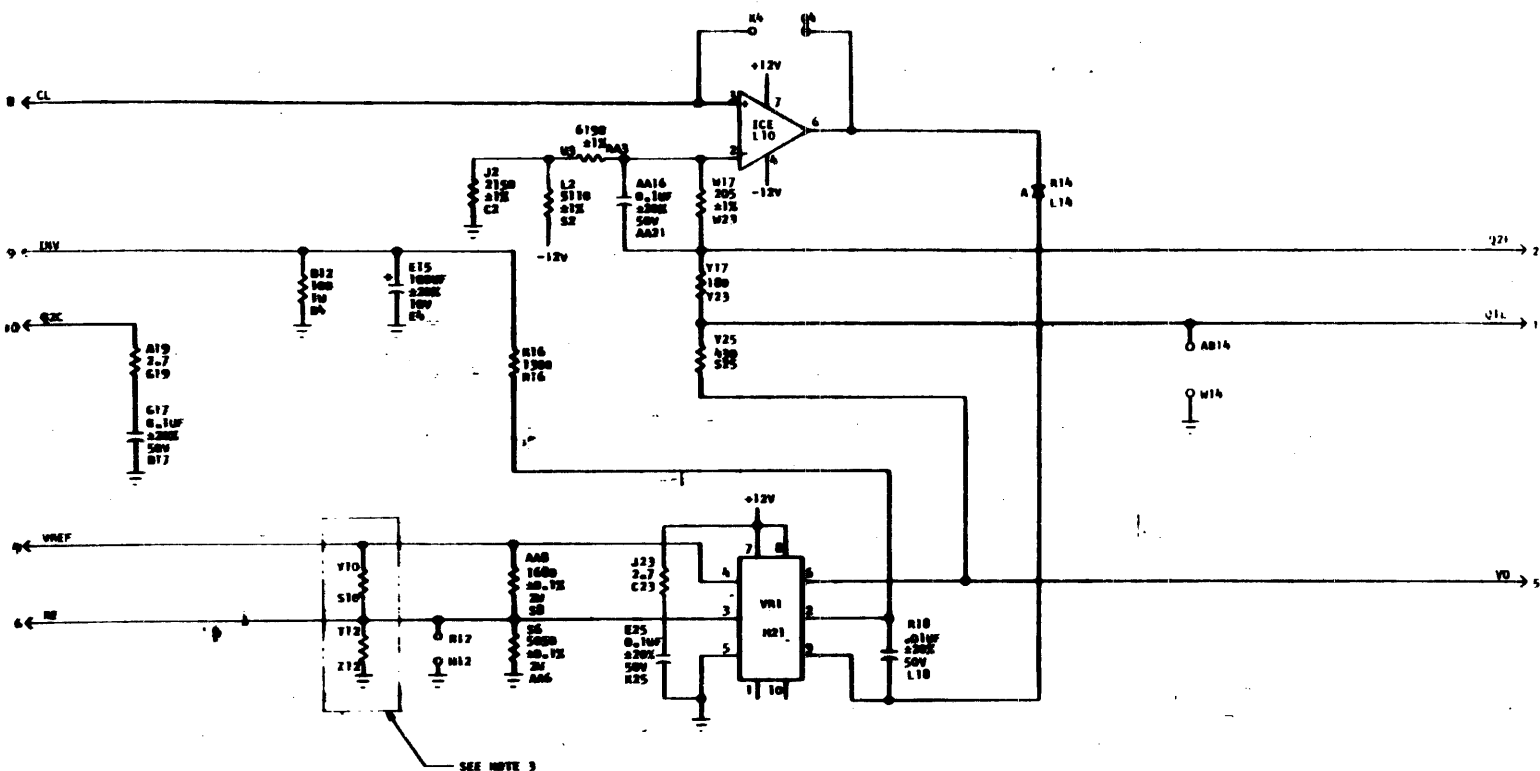
OUTPUT



Burroughs Corporation SMALL SYSTEMS GROUP PLYMOUTH PLANT PLYMOUTH, MICHIGAN 48170 U.S.A. AMERICA		TITLE: WIRING SCHEMATIC, POWER SUPPLY (DC DISTRIBUTION) SYSTEM: 895A3 60CP8 DRAWN: S. MAXFIELD 8-4-75 CHECKED: M. J. J. 8-5-75 RELEASED: 9-5-75 REV LETTER: A		DWG NO: 2481 2687 PAGE: 1
--	--	--	--	--

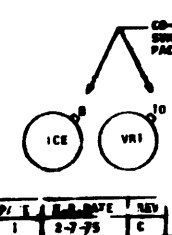
2481 2687
2

SCHMATIC



- NOTES:
- FOR ASSEMBLY SEE 2471 2754 (SERIES L) E.R. DATE 2-16-74
1537 8765 (DCT10) E.R. DATE 2-16-74
 - CODES FOR DENOTING COMPONENT PART NUMBERS ARE AS FOLLOWS:
I.C.'S DIODE
ICE - 1479 0273 A - 1471 4703
VRI - 1479 8011
 - CALCULATION RESISTORS PER T5A SPECIFICATION 2401 8001 (SERIES L) (5.25 VOLT) OR 1037 8700 (DCT10) (5.1 VOLT) MAY NOT BE PRESENT ON ALL BOARD ASSEMBLIES.

UNLESS OTHERWISE SPECIFIED,
RESISTANCE VALUES ARE IN OHMS, 5%, 1/2W



2471 2754
1 OF 1

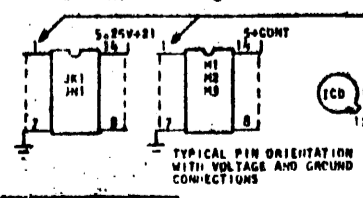
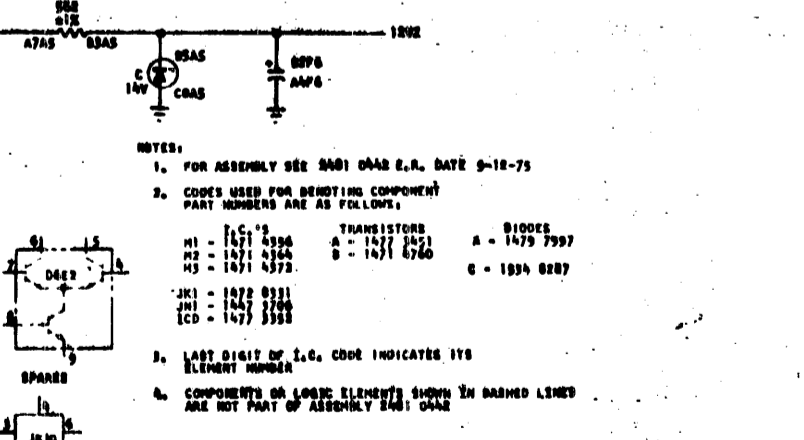
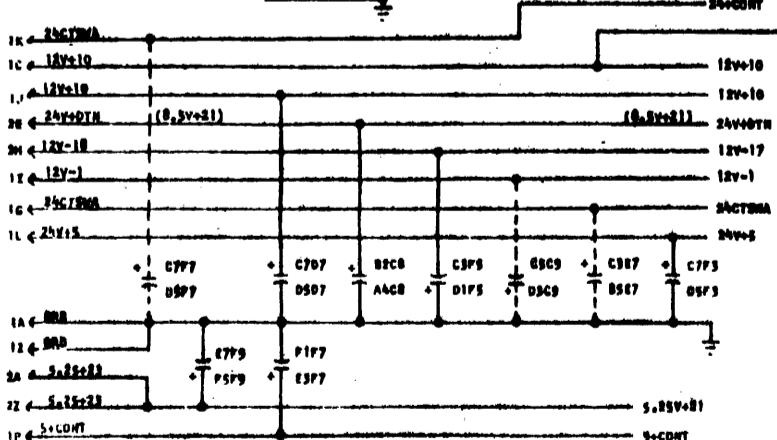
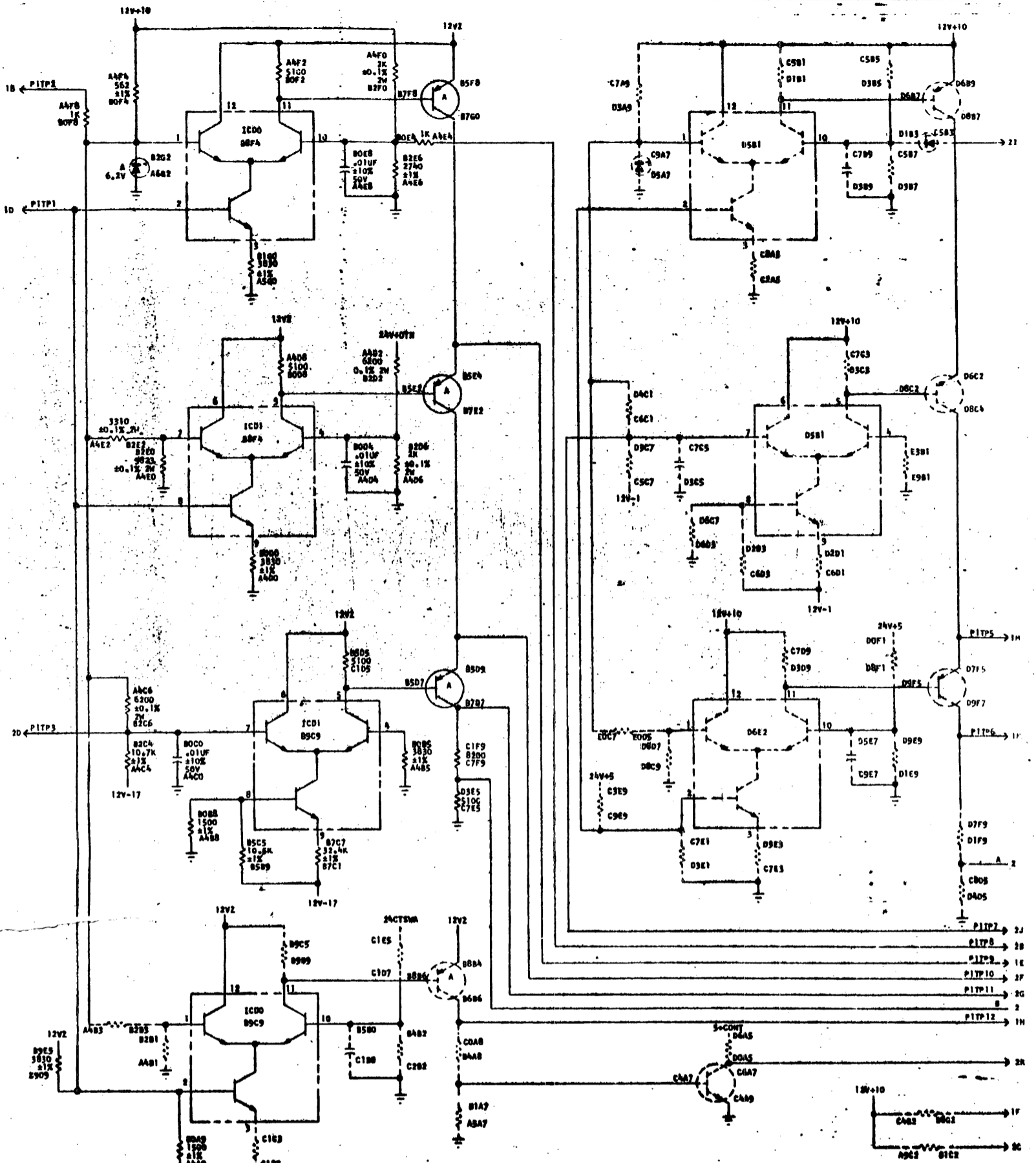
Burroughs Corporation SYSTEMS & DESIGN GROUP PHOENIX, ARIZONA		TITLE: SCHEMATIC, BOARD, 5 VOLT REGULATOR SYSTEM: L6000 & DCT10 DESIGNER: J.A. OLAN DATE: 7-20-74		DWG. NO.: 2471 2754 CHECKED: R. GLENN D-D-8 RELEASED: 5-9-71 REV. LETTER: C PAGE: 1 OF 1	
DATE: 2-7-75 REV: C	UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS, 5%, 1/2W				

L6-58

p.101

12

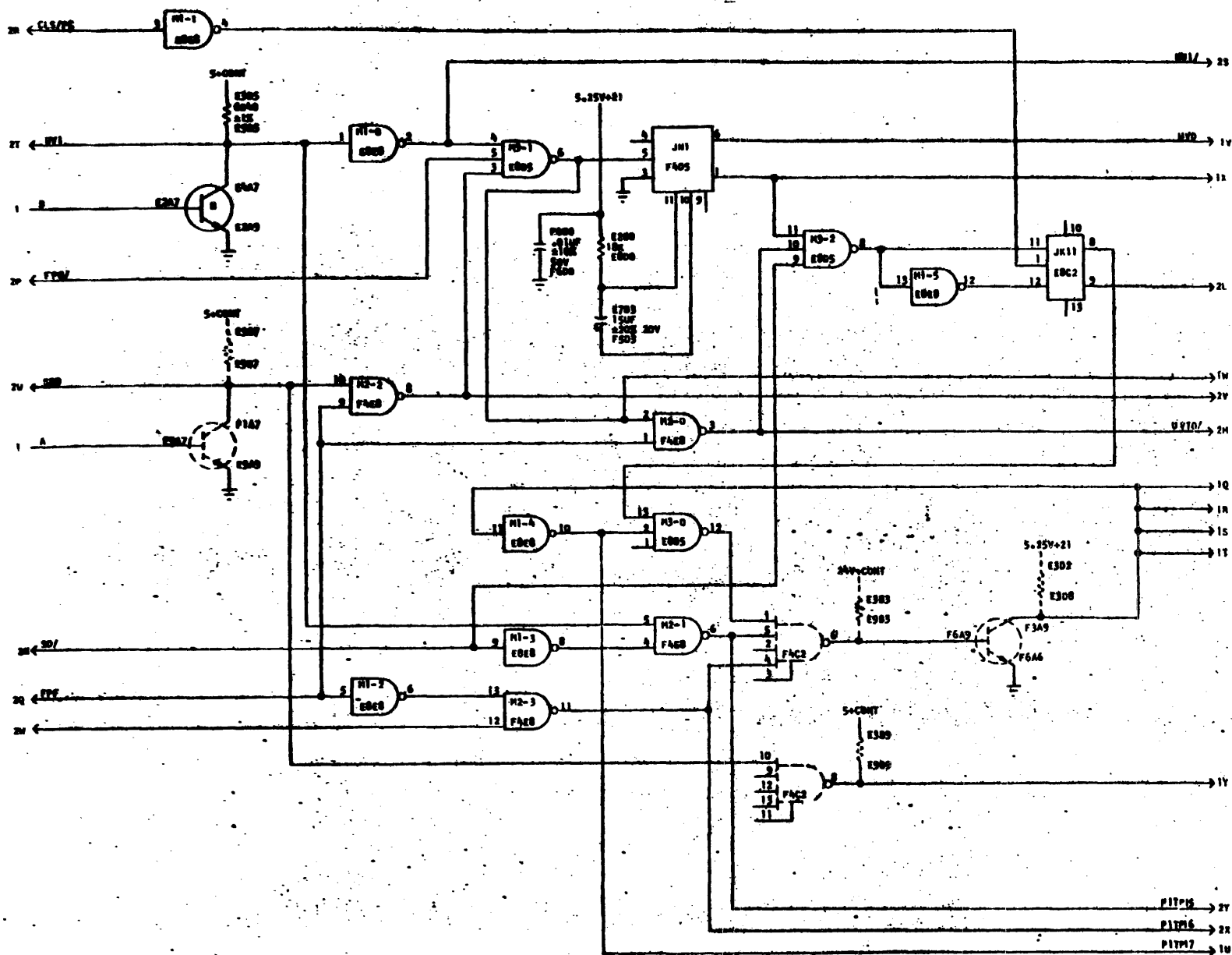
SCHEMATIC



Burrhead Corporation SYSTEMS & GROUP PLANT 11 U.S. AIR FORCE		TITLE SCHEMATIC, BOARD, POWER CONTROL 1	DRAWN 10/11/75 CHECKED 11/11/75	PART NO. 2401 0450
PROPRIETARY TO BURRHEAD CORP. - NOT TO BE REPRODUCED NOR USED FOR MANUFACTURING PURPOSES EXCEPT ON BURRHEADS ORDER ON PRIOR WRITTEN CONSENT		DATE 9-2-75	RELEASED 9-2-75	PAGE 2

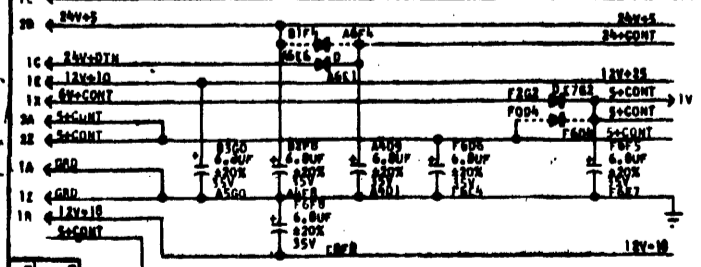
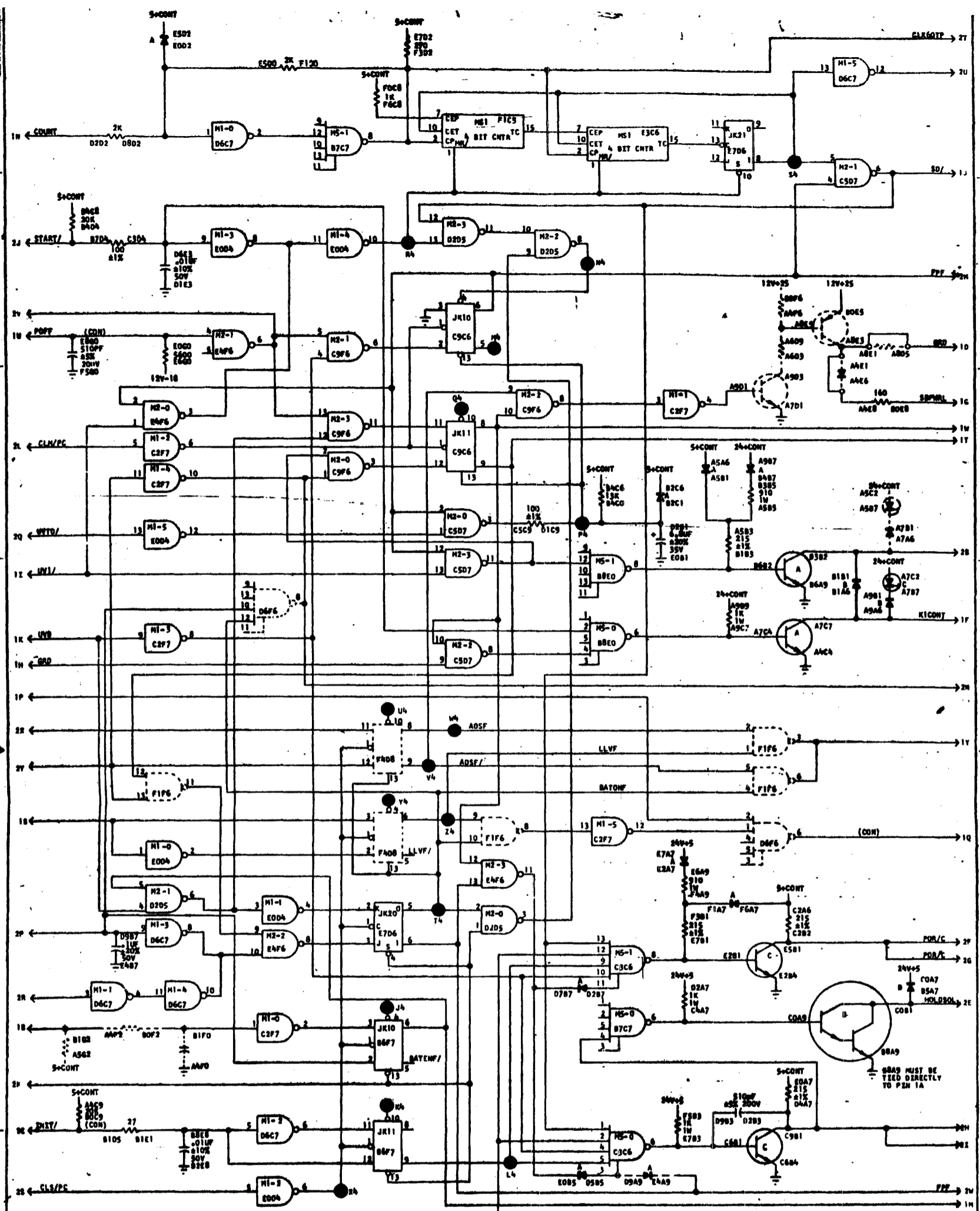
P.102

45



HK-2

General Electric GEORGE EASTMAN CORPORATION ELECTRONIC DEPARTMENT PITTSBURGH, PENNSYLVANIA 15106		TYPE SCHEMATIC, POWER CONTROL 1 SYSTEM DRAWN 1 OCTOBER 6-3-75 APPROVED		CHECKED J. A. SHIP 6-12-75 RELEASED 9-3-75 REV LETTER		DRAWING NO. 2481 0459 PAGE 2 OF 2	
--	--	---	--	---	--	---	--



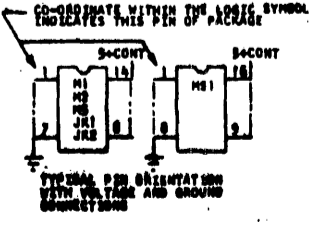
NOTES:

- FOR ASSEMBLY SEE 2481 0475 E.R. DATE 9-5-75
- CODES USED FOR IDENTIFYING COMPONENT PART NUMBERS ARE AS FOLLOWS:

L.C.'S	TRANSISTORS	DIODES
M1 - 1471 4966	A - 1472 0255	A - 1471 4709
M2 - 1471 4966	B - 1471 0829	B - 1471 4621
M3 - 1471 4966	C - 1476 1118	C - 1472 0604
JR1 - 1472 0331	D - 1471 0760	D - 1471 4737
JR2 - 1472 7731	E - 1479 0029	
M1 - 1447 3771		

- LAST DIGIT OF L.C. CODE INDICATES ITS ELEMENT NUMBER
- COMPONENTS OR LOGIC ELEMENTS SHOWN IN DASHED LINES ARE NOT PART OF ASSEMBLY 2481 0475

UNLESS OTHERWISE SPECIFIED:
ALL RESISTANCE VALUES ARE IN OHMS, 45K, 1/2W



2481 0475

Supreme Corporation

SYSTEMS & SERVICE GROUP PLYMOUTH PLANT, PLYMOUTH, MICHIGAN, U.S.A.

DATE: 9-5-75

REVISION: 1

2481 0475

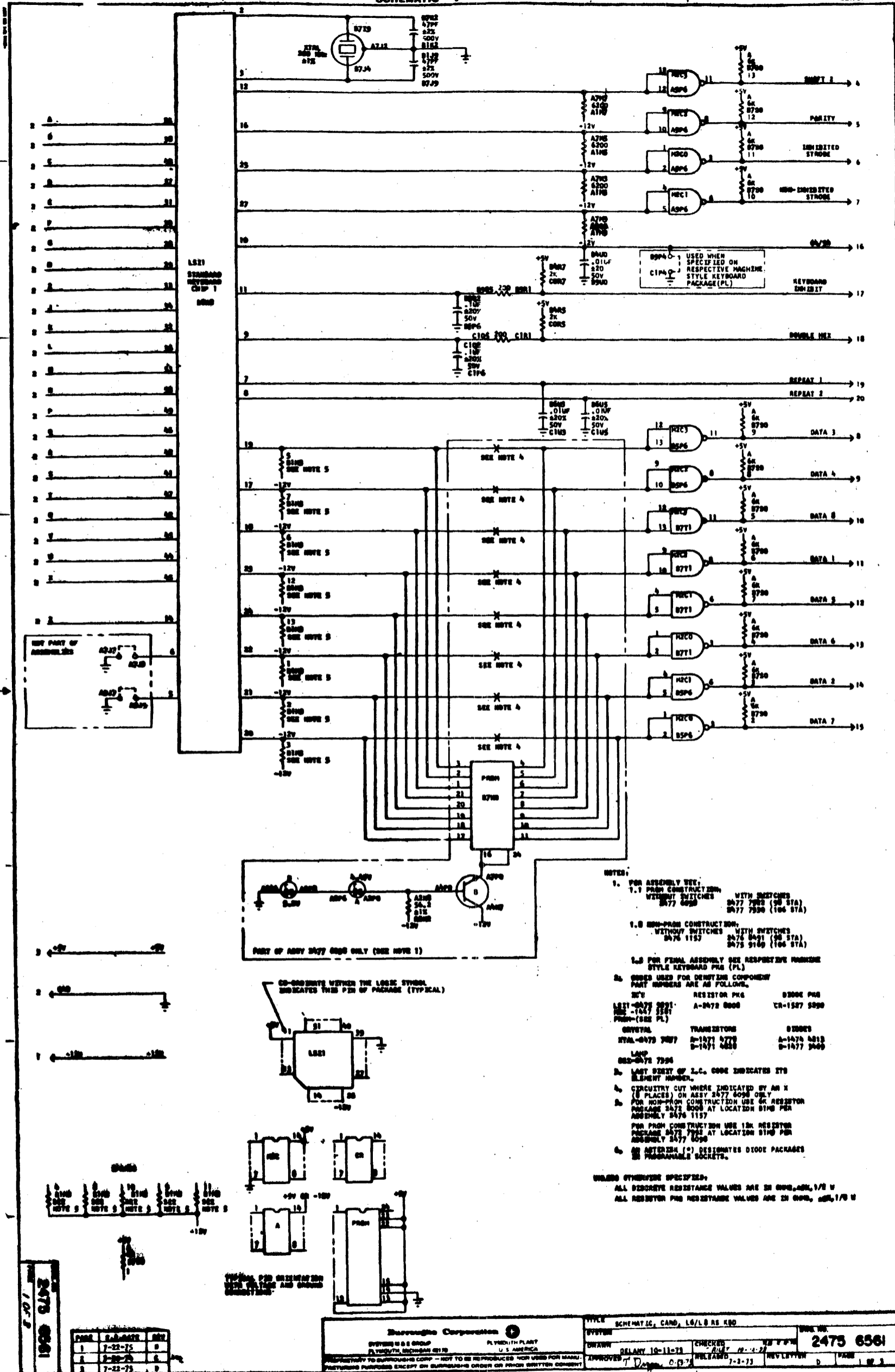
1 OF 1

p. 104

47

SCHEMATIC

REVISED



- NOTES:**
- FOR ASSEMBLY USE:
1.1 PRM CONSTRUCTION:
WITHOUT SWITCHES: 2477 7923 (28 STA), 2477 7930 (106 STA)
WITH SWITCHES: 2475 9169 (106 STA)
 - 1.2 NON-PRM CONSTRUCTION:
WITHOUT SWITCHES: 2476 1157
WITH SWITCHES: 2475 8431 (28 STA), 2475 9169 (106 STA)
 - 1.3 FOR FINAL ASSEMBLY SEE RESPECTIVE MACHINE STYLE KEYBOARD Pkg (PL)
 - RESISTORS USED FOR IDENTIFY COMPONENT PART NUMBERS ARE AS FOLLOWS:

RESISTOR	RESISTOR Pkg	80000 Pkg
LS21-2475 2001	A-2472 8008	CR-1527 5090
RES-1047 1561		
PRM-8778 (SEE PL)		
 - TRANSISTORS:

TRANSISTOR	80000	80000
2476-2473 7927	2-1071 6778	A-1476 4813
2476-2473 7934	2-1071 6778	B-1477 5069
 - LAST DIGIT OF L.C. CODE INDICATES ITS ELEMENT NUMBER.
 - CIRCUITRY CUT WHERE INDICATED BY AN X (6 PLACES) ON ASSY 2477 4036 ONLY.
 - FOR NON-PRM CONSTRUCTION USE OR RESISTOR PACKAGE 2475 8008 AT LOCATION 8148 PER ASSEMBLY 2476 1157.
 - FOR PRM CONSTRUCTION USE 12K RESISTOR PACKAGE 2475 7923 AT LOCATION 8148 PER ASSEMBLY 2477 4036.
 - AN asterisk (*) DESIGNATES DIODE PACKAGES IN PROGRAMMABLE SOCKETS.
- UNLESS OTHERWISE SPECIFIED:**
 ALL DISCRETE RESISTANCE VALUES ARE IN OHMS, 1/8 W
 ALL RESISTOR Pkg RESISTANCE VALUES ARE IN OHMS, 1/8 W

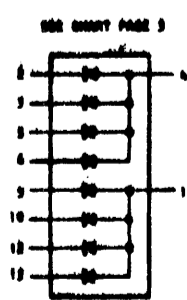
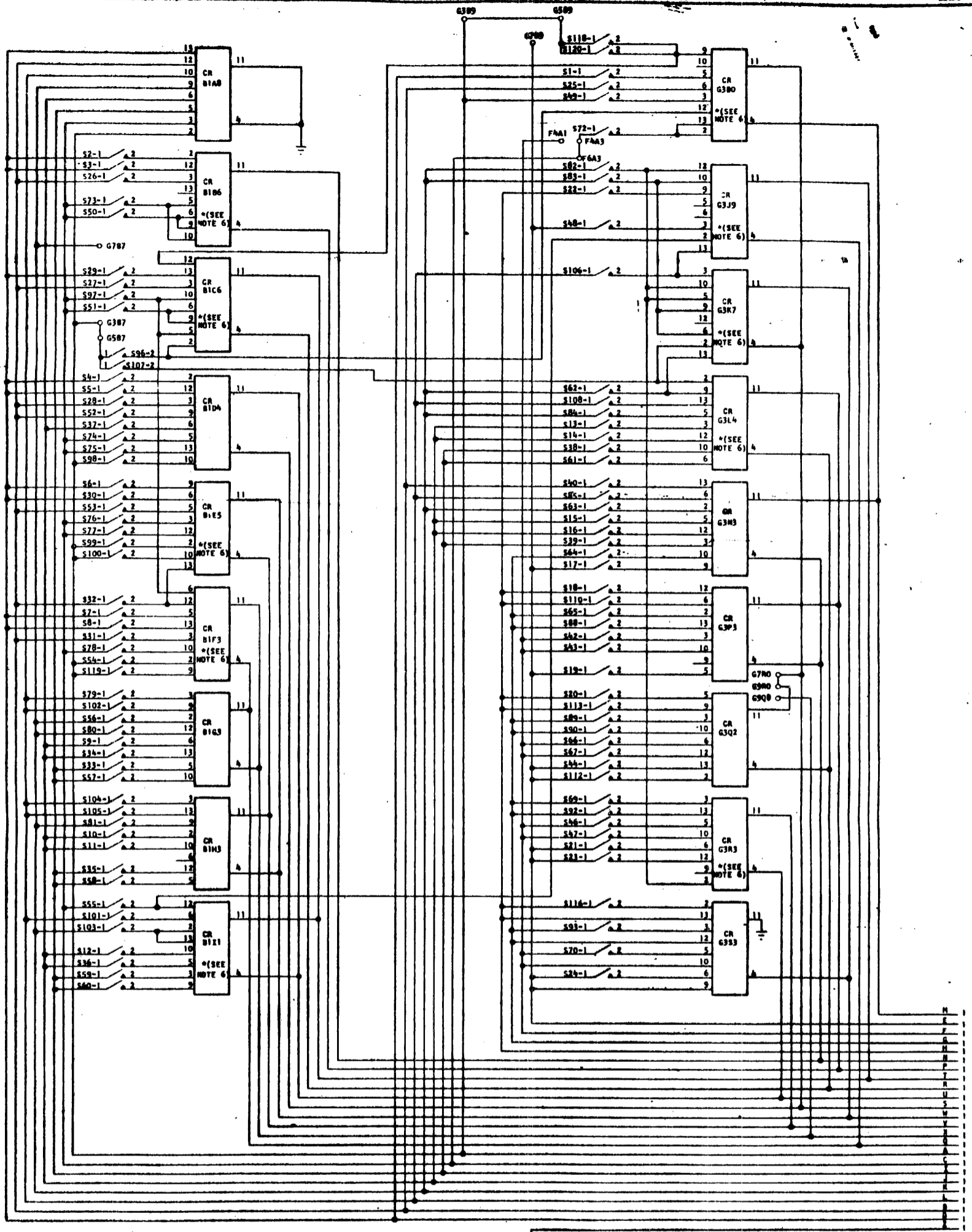
REV	DATE	BY
1	7-22-75	D
2	7-22-75	D
3	7-22-75	D

Shorrock Corporation
 SYSTEMS & SERVICE DIVISION
 PLYMOUTH PLANT
 PLYMOUTH, MASSACHUSETTS 01962
 U.S. PATENT & TRADEMARK OFFICE

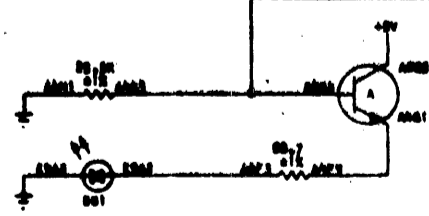
TITLE: SCHEMATIC, CAND, L6/L8 RE 400
 DRAWN: DELANY 10-11-73
 CHECKED: [Signature]
 APPROVED: [Signature]
 DATE: 7-2-73
 PART NO: 2475 6561
 PAGE: 1 OF 3

p105

SCHEMATIC



SCHEMATIC REPRESENTATION OF THE ABOVE DIODE PACKAGES

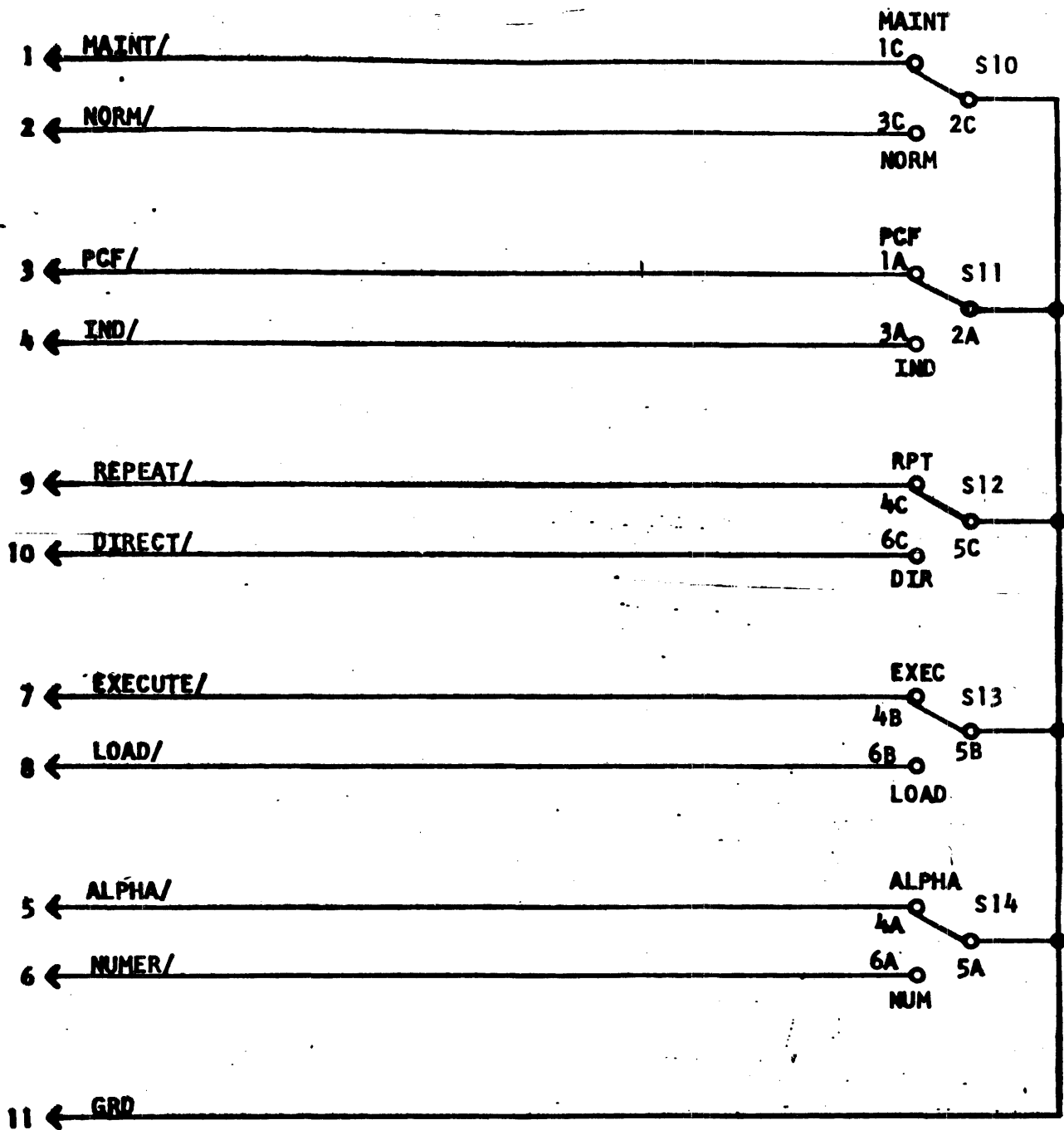


2475 6561
PAGE 2 OF 3

Burrhus Corporation SYSTEMS & GROUP PLYMOUTH PLANT PLYMOUTH MICHIGAN 48178 U.S. AMERICA		TITLE: SCHEMATIC, CARR. 10/18-73 SYSTEM:	DRAWN: T. DELANEY 10-18-73 APPROVED: [Signature]	CHECKED: T. DELANEY 10-22-73 RELEASED: 7-1-73	REV LETTER: C PAGE: 2 OF 3
PROPRIETARY TO BURRHOUS CORP. - NOT TO BE REPRODUCED OR USED FOR MANUFACTURING PURPOSES EXCEPT ON BURRHOUS ORDER OR PRIOR WRITTEN CONSENT			Dwg No: 2475 6561		

p.106

17



NOTES:

1. FOR ASSEMBLY SEE 2481 2802 ER DATE 9-5-75
2. CODES USED FOR DENOTING COMPONENT PART NUMBERS ARE AS FOLLOWS:

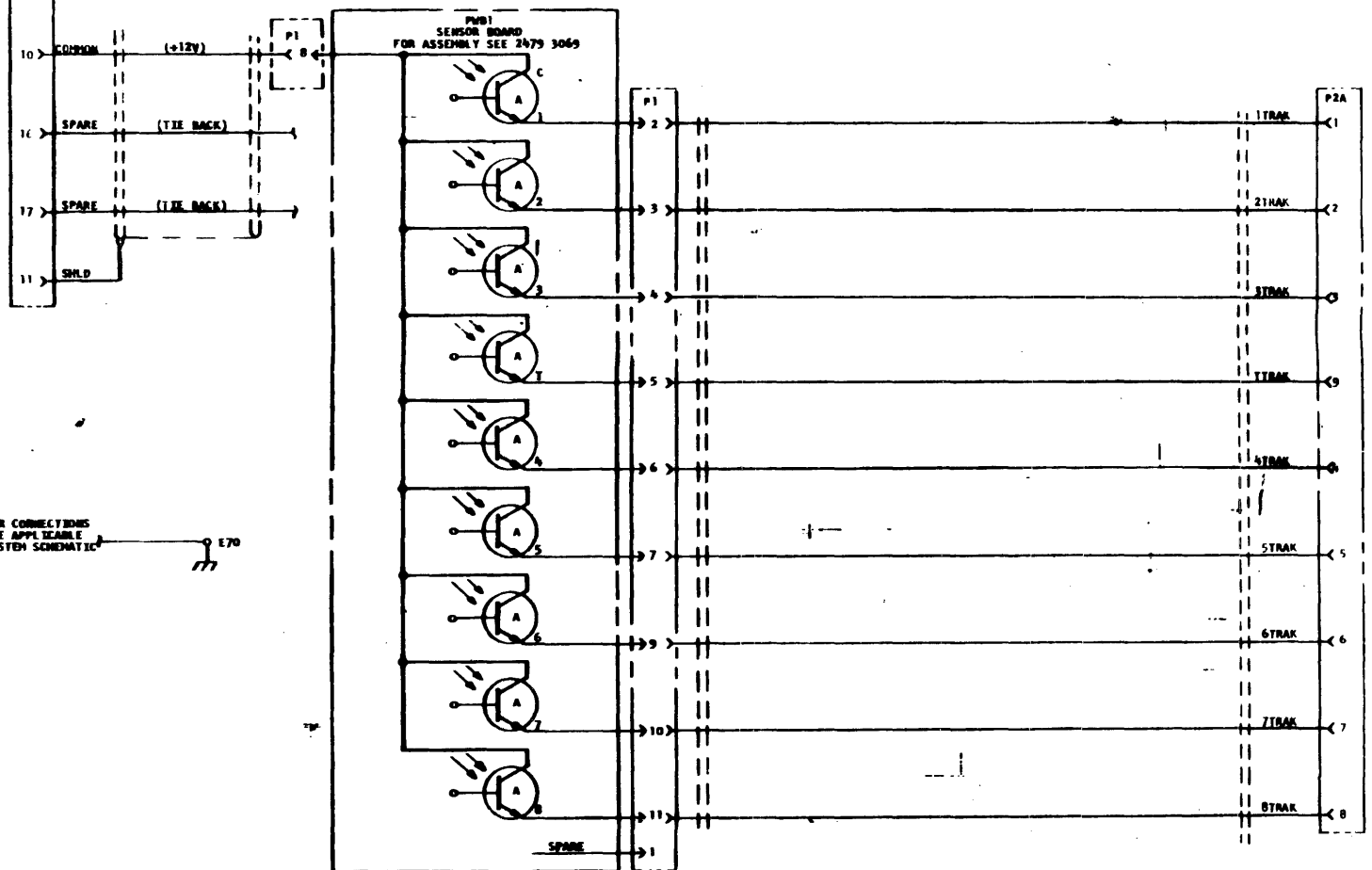
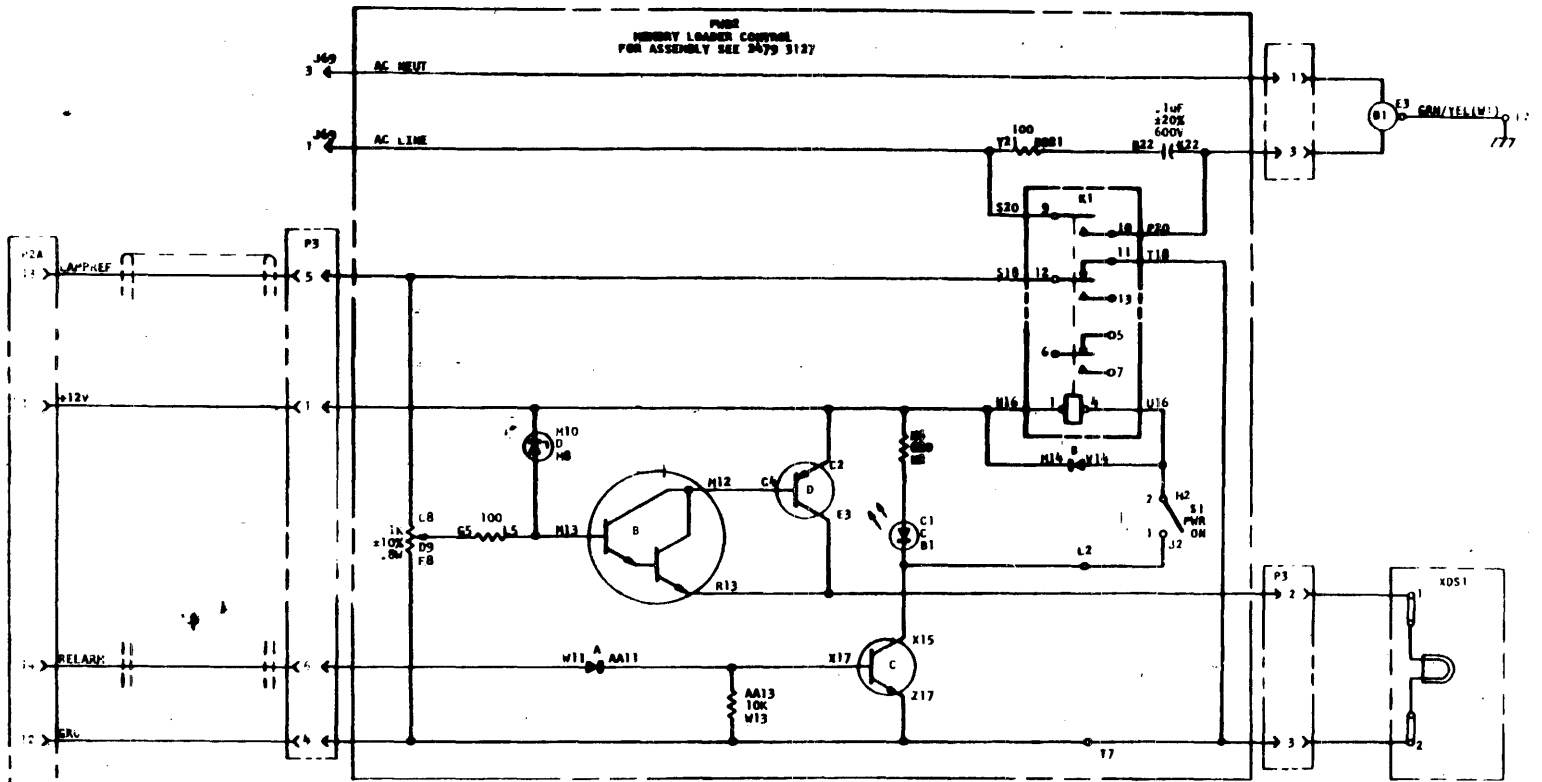
SWITCHES

S10, S11, S12, S13 & S14 - 2479 6344

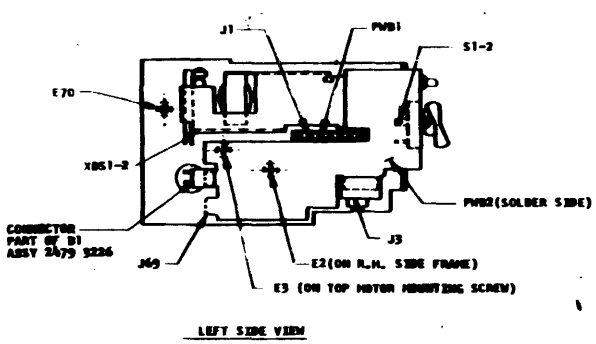
2481 3107

PAGE	ER DATE	REV

Burroughs Corporation <small>SYSTEMS & E GROUP PLYMOUTH PLANT PLYMOUTH, MICHIGAN 48178 U.S. AMERICA</small>		TITLE SCHEMATIC, BOARD, M.T.R. (SWITCHES) SYSTEM DATE 6-12-75 APPROVED <i>[Signature]</i> 7-22-75		DWS. NO. 2481 3107 CHECKED WINSHIP 6-17-75 RELEASED 9-5-75 REV LETTER	
<small>PROPRIETARY TO BURROUGHS CORP. - NOT TO BE REPRODUCED, NOR USED FOR MANUFACTURING PURPOSES EXCEPT ON BURROUGHS ORDER OR PRIOR WRITTEN CONSENT</small>			PAGE 1 OF 1		



FOR CONNECTIONS
SEE APPLICABLE
SYSTEM SCHEMATIC

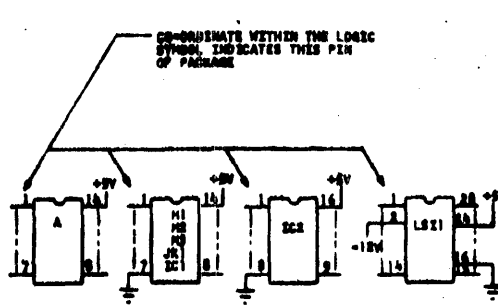
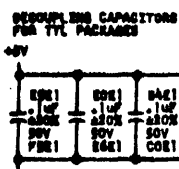
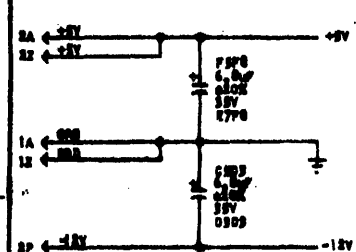
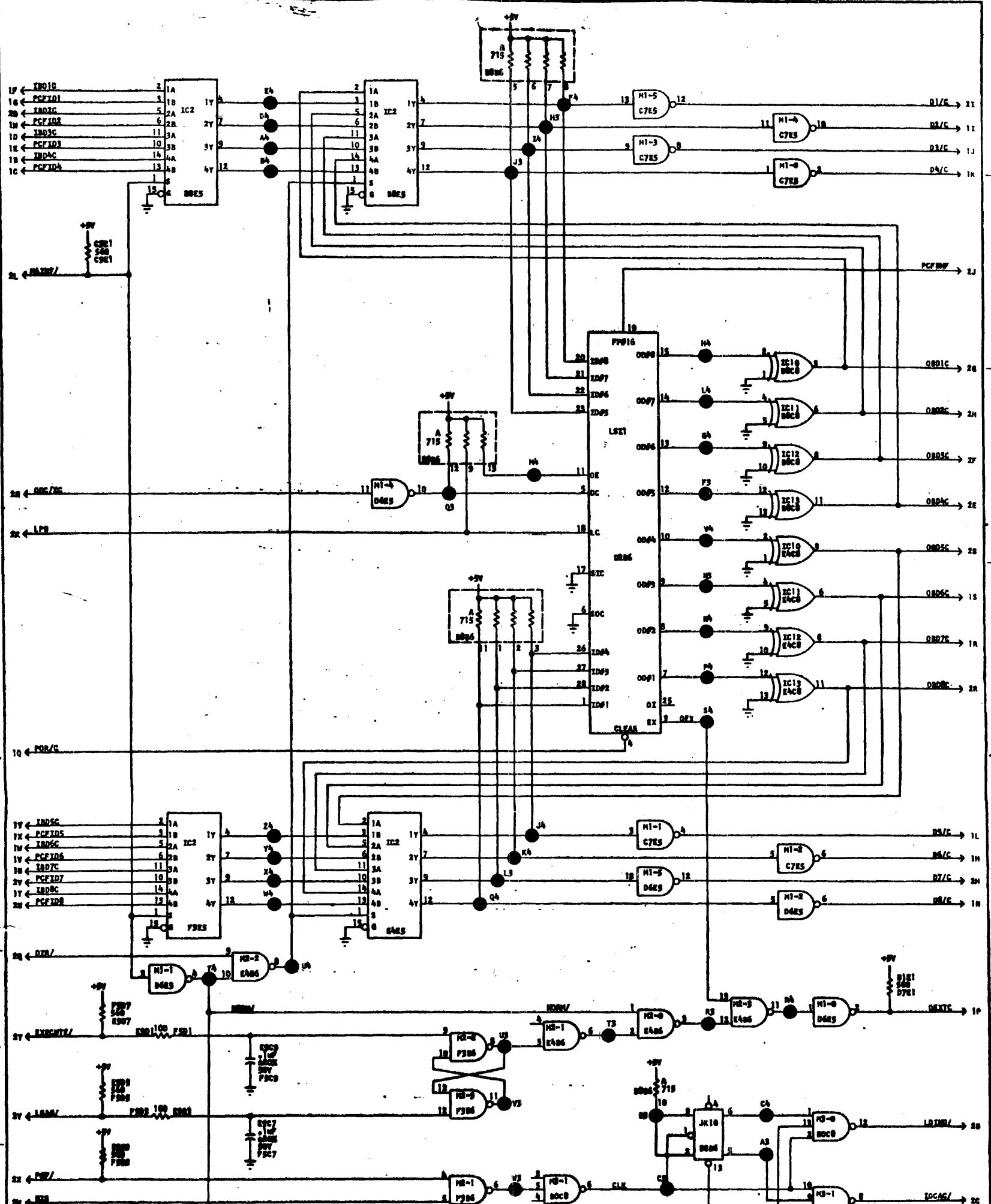


2479 3176
PAGE 2

Hughes Corporation DIVISION OF ELECTRONIC SYSTEMS GROUP		PWB1 HEAVY LOADER CONTROL (SCHEMATIC & VISUAL AIDS) VERSION 2-04-75 DRAWING NO. 2479 3176 REV. LETTER 11-16-75	
APPROVED: [Signature] DATE: [Date]		APPROVED: [Signature] DATE: [Date]	

SCHEMATIC

OUTPUT



- NOTES:**
- FOR ASSEMBLY SEE 2481 0426 I.R. DATE 9-9-75 FOR FINAL ASSEMBLY SEE 2481 0426(PL)
 - CODES USED FOR IDENTIFYING COMPONENT PART NUMBERS ARE AS FOLLOWS:

IC1-16	RESISTOR PKG
HI-1	A - 2478 9111
HI-2	
HI-3	
HI-4	
HI-5	
LS21	(QUAD 2 INPUT EXCLUSIVE-OR)
LS22	(QUAD 2 INPUT MULTIPLEXER)
LS21	A - 2478 9111
 - LAST DIGIT OF L.C. CODE INDICATES ITS ELEMENT NUMBER

UNLESS OTHERWISE SPECIFIED:
 ALL DISCRETE RESISTANCE VALUES ARE IN OHMS, RES. 1/M
 ALL RESISTOR PKG RESISTANCE VALUES ARE IN OHMS, RES. 1/M

CARD LOC FM6

2481 0426

Burroughs Corporation SMALL SYSTEMS GROUP PLYMOUTH PLANT PLYMOUTH, MASSACHUSETTS U.S.A.		TITLE SCHEMATIC BOARD PRINT MASTER SYSTEM DRAWN S. HANFIELD 5-27-75 APPROVED J. C. 7-23-75 RELEASED 3-3-75	DWS NO 2481 0426 REV LETTER PAGE 1 OF 1
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p.110

43