

IBM

Data Processing

IBM 1402

CARD READ PUNCH  
Wiring Diagram

CONTENTS

IBM 1402  
READER-PUNCH  
WIRING-DIAGRAM

# 20611

PART NO	SECTION	DESCRIPTION	ENGINEERING CHANGE LEVEL					
			800972Q	801424G	801424R	801424S	801755	801765
609400		CONTENTS	800972Q	801424G	801424R	801424S	801755	801765
			801902C	801902F	801906C	802200		
609802	1-2	POWER SUPPLY	800972Q	801755	801765	801902C	801906C	802200
609803	3-4	START AND RUN	800972Q	801424G	801424R	801755	801765	
609804	5-6	CLUTCH	800972Q	801424S	801755	801765	801906C	
609805	7-8	READ	800972Q	801755	801906C			
609806	9-10	START AND RUN	800972Q	801424G	801424R	801424S	801765	801906C
609807	11-12	CLUTCH	800972Q	801424S	801755	801765	801902F	801906C
609808	13-14	READ AND PUNCH	800972Q	801424S	801755	801902C	801902F	
609809	15-16	C. E. AID	800972Q	801902C	801906C			
609810	17-18	1403 INTERLOCKS	800972Q	801424G	801906C			
609811	19-20	SWITCH LOCATIONS	800972Q	801755	801906C			
609812	21-22	GENERAL	800972Q	801424G	801906C			
609813	23-24	TIMING	800972Q	801424R	801755	801765		
609814	25-26	CAM LOCATIONS	800972Q	801906C	802200			
609815	27-28	TIMING	800972Q	801424R	801424S	801755	801765	801906C
609816	29-30	TIMING	800972Q	801765				
609817	31-32	CONNECTOR LOCATIONS	800972Q	801755	801765	801902C	801906C	802200
609818	33-34	RESISTORS, CAPACITORS, AND DIODES	800972Q	801424G	801424S	801755	801765	801902C
609819	35-36	RELAY GATE	800972Q	801424G	801755	801765	801902C	
609820	37-38	RELAY LOCATION	800972Q	801424G	801424S	801755	801765	801902C
609823	39-40	MECHANICAL TIMINGS	800972Q	801906C				

READER

PUNCH

REFERENCE

PART NO 609400 COMPLETE SET 1402 WIRING DIAGRAMS

DATE	EC	DATE	EC	DATE	EC
4-25-60	800972Q	2-9-61	802200		
5-24-60	801424G				
6-15-60	801424R				
6-21-60	801424S				
8-18-60	801755				
9-19-60	801765				
10-17-60	801902C				
12-20-60	801902F				
12-30-60	801906C				

E.C. 802332 B/M 605219  
 802334 B/M 605256  
 802336 B/M 605258  
 801983A 609008  
 802542 605298  
 802538 605263  
 801983 PL. 17 timing change  
 per eng letter 5/19/66

Tom  
 John Schape  
 Bruce Brooks  
 Al Miller

INTERNATIONAL BUSINESS MACHINES CORP					
NAME	WIRING DIAGRAM--				
READER, PUNCH					
DESIGN	JS	8-7-59	MODEL	1402	
DETAIL	OJB	8-7-59	SCALE	NONE	
CHECK	JS	8-7-59	DRAW	CES	1-9-60
APPRO	ADM	8-7-59	CHECK	LJF	1-11-60

11.01.11.1

CHANGE NO	800972 0
	801755
	801765
	801902 C
	801906 C
	802200

EC 804773  
CEM 93

B/m 605412

B/m 635619  
Ec 809274

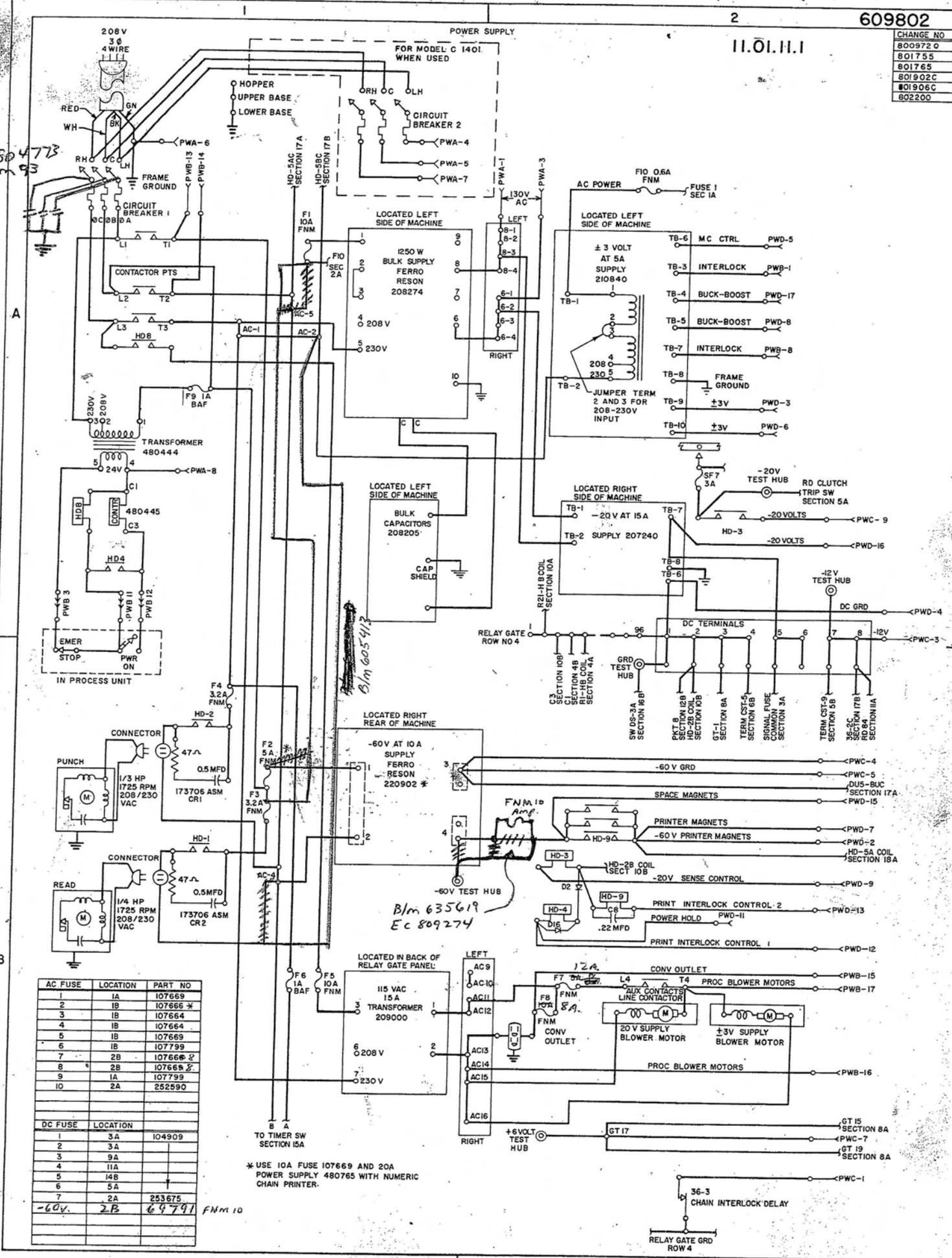
FNM 10

AC FUSE	LOCATION	PART NO
1	1A	107669
2	1B	107666 *
3	1B	107664
4	1B	107664
5	1B	107669
6	1B	107799
7	2B	107666 *
8	2B	107666 *
9	1A	107799
10	2A	252590

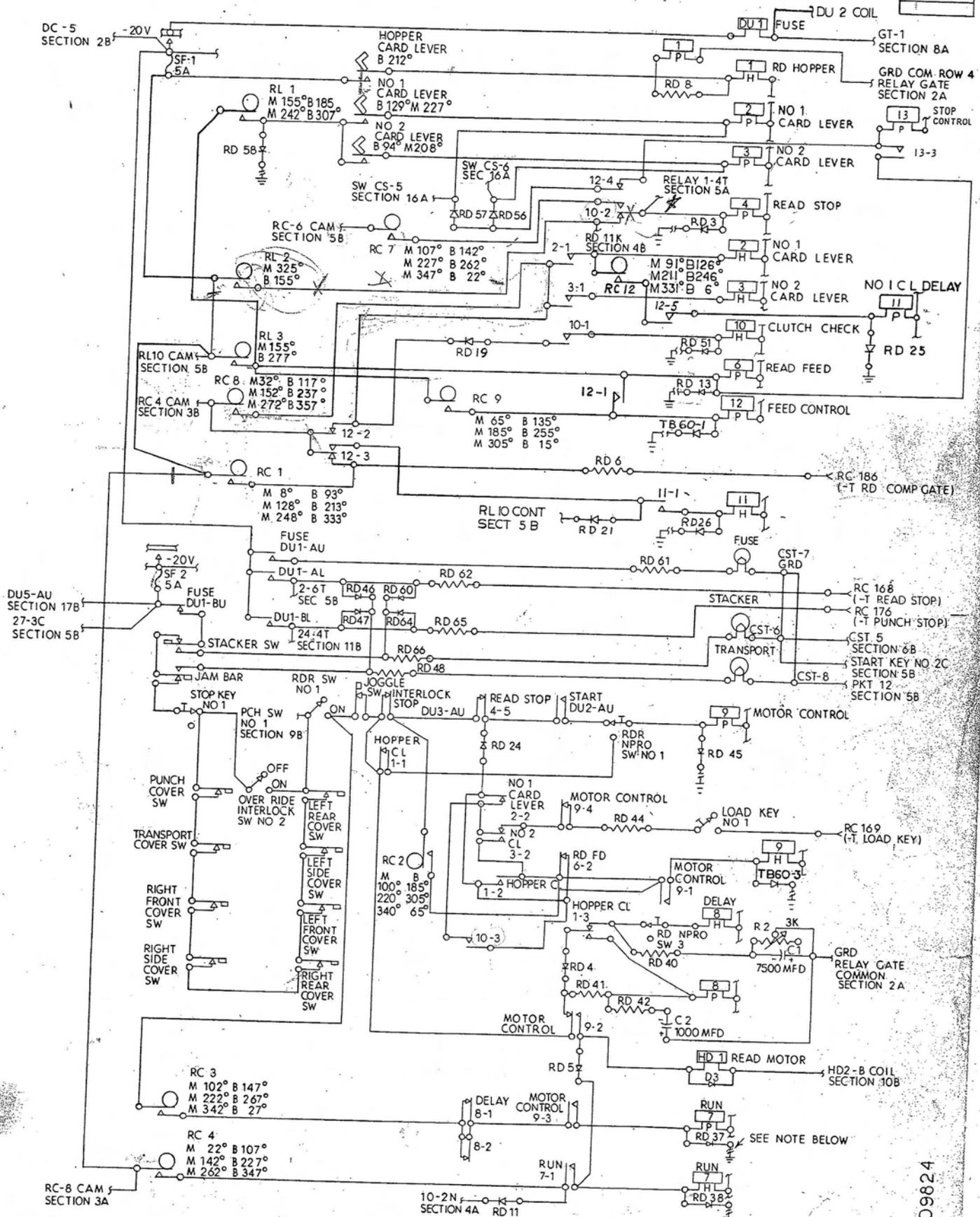
  

DC FUSE	LOCATION	PART NO
1	3A	104909
2	3A	
3	9A	
4	11A	
5	14B	
6	5A	
7	2A	253675
-60V	2B	69791

\* USE 10A FUSE 107669 AND 20A POWER SUPPLY 480765 WITH NUMERIC CHAIN PRINTER.



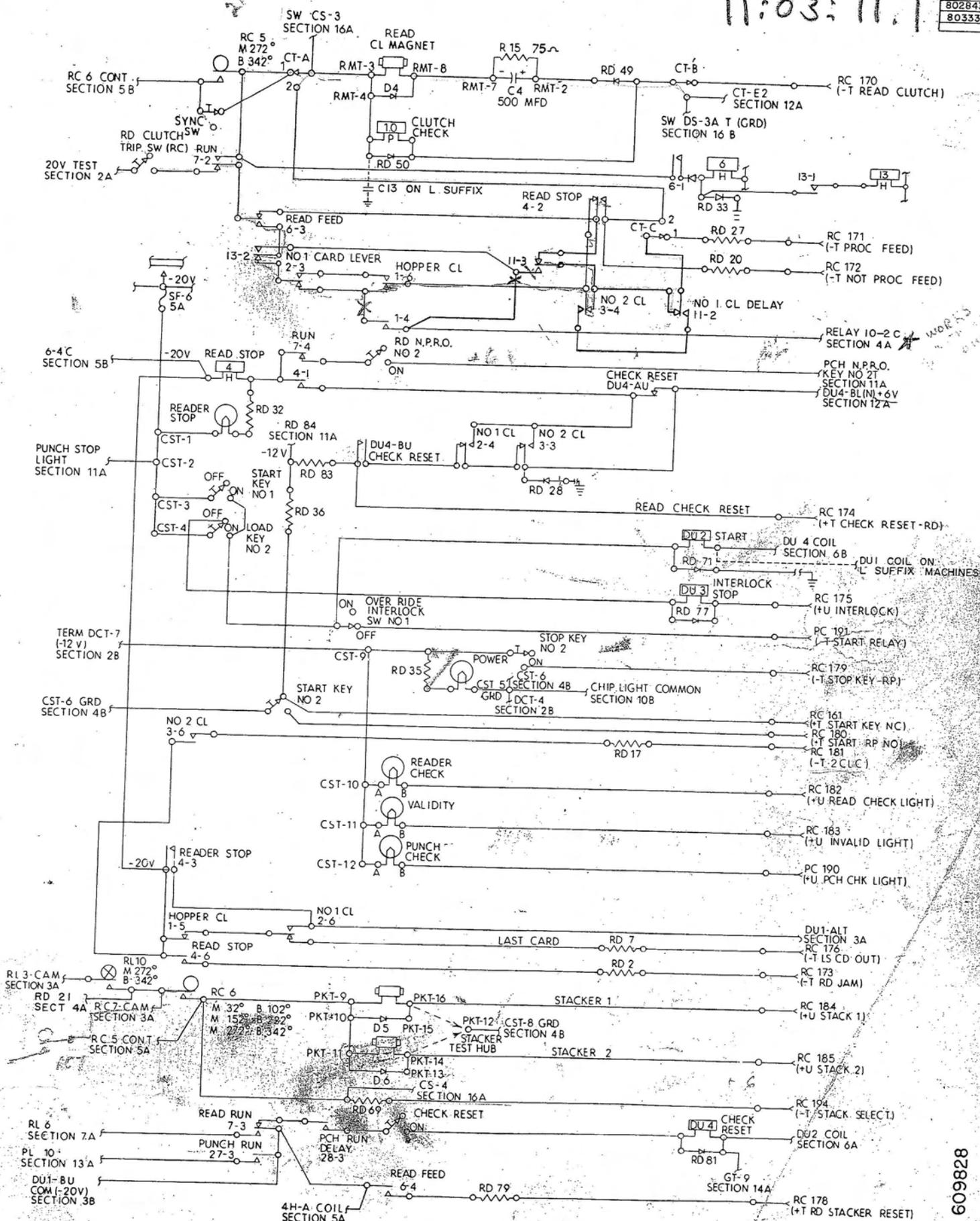
CHANGE NO.
802620E
802928
802843A



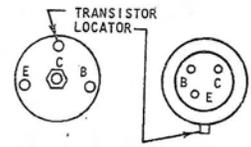
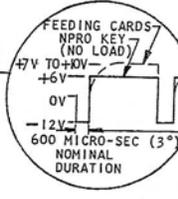
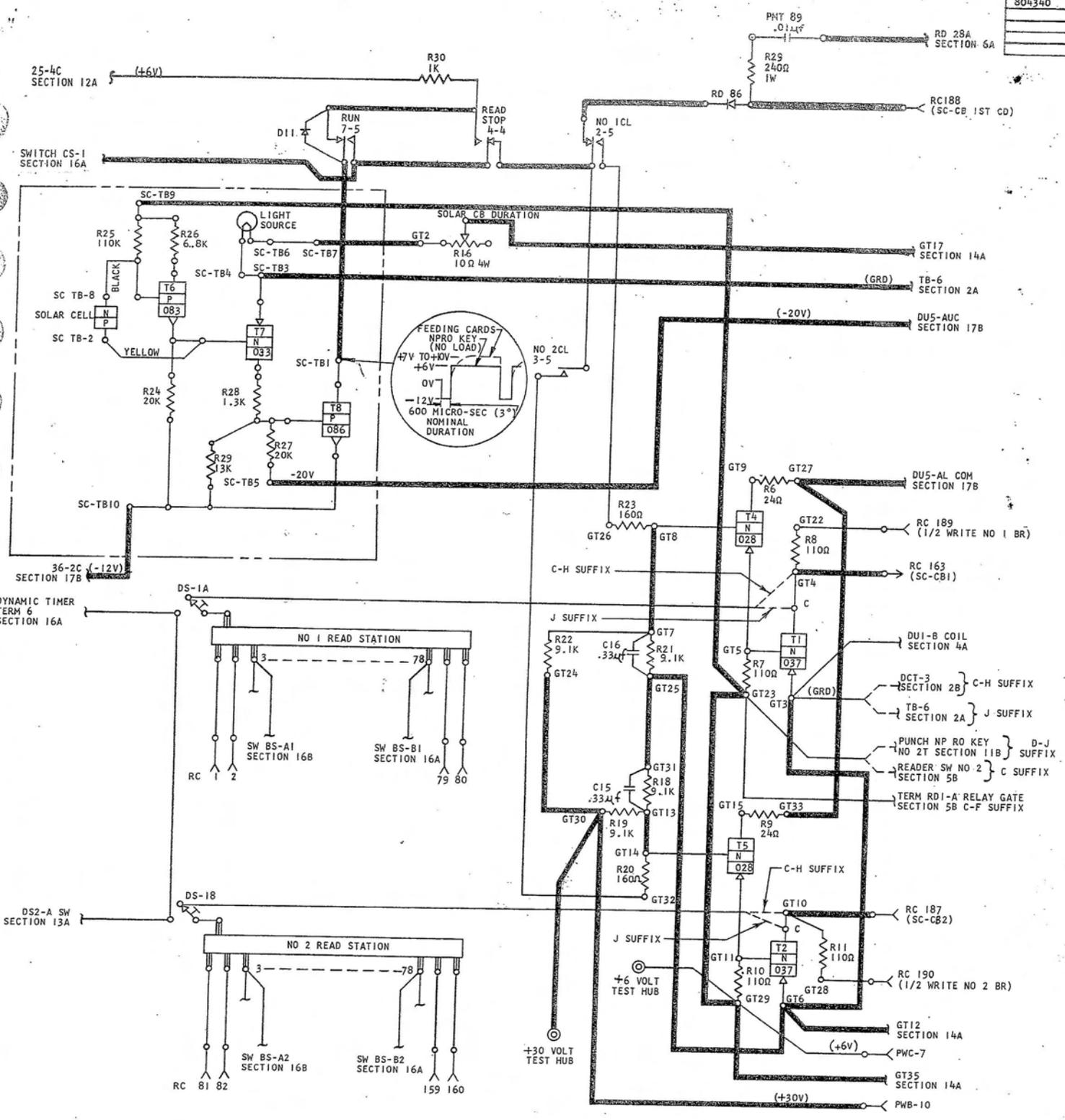
NOTE  
WHERE DIODE GROUNDING IS INDICATED, ALL RD DIODES ARE  
PLUGGED TO GROUND COMMON ON ROW 4 OF RELAY GATE,  
WHICH IS RETURNED TO SYSTEM GROUND

CHANGE N
802620 B
802843 A
803330

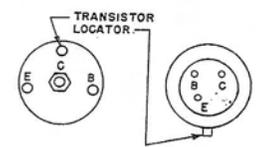
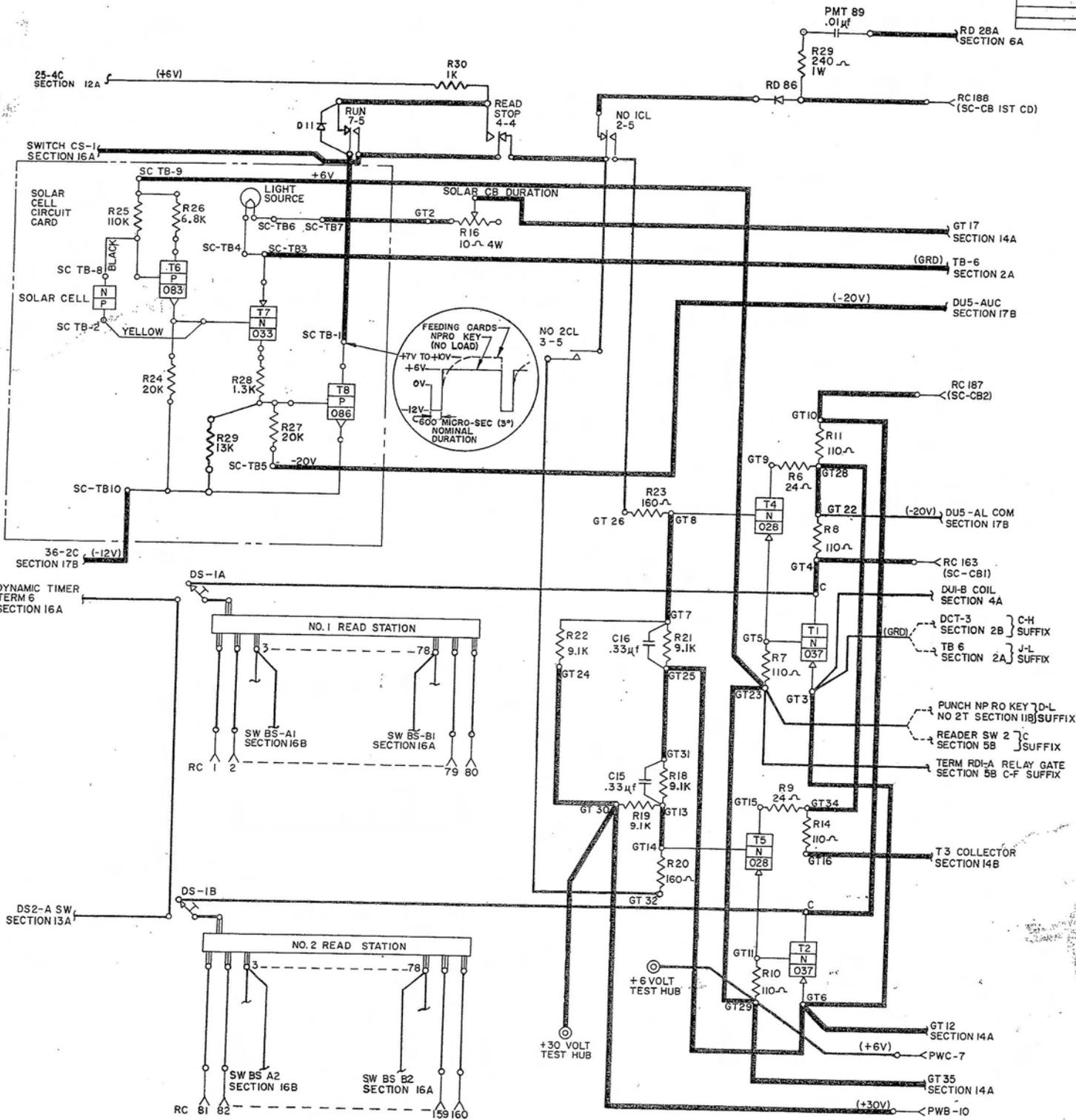
11:03:11.1



CHANGE NO	605437
REV	02843R
DATE	804340



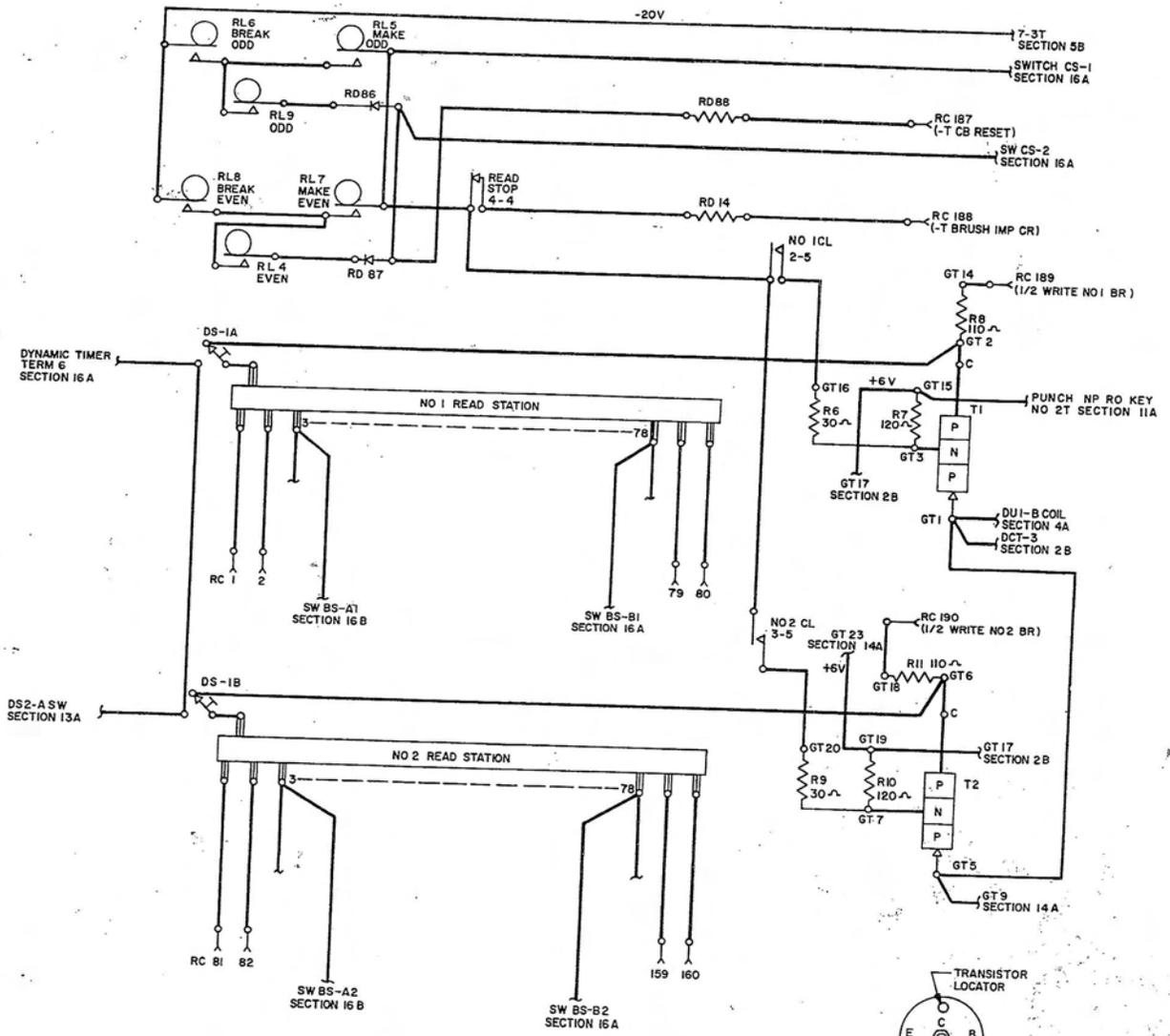
CHANGE NO.
802843 K
804340



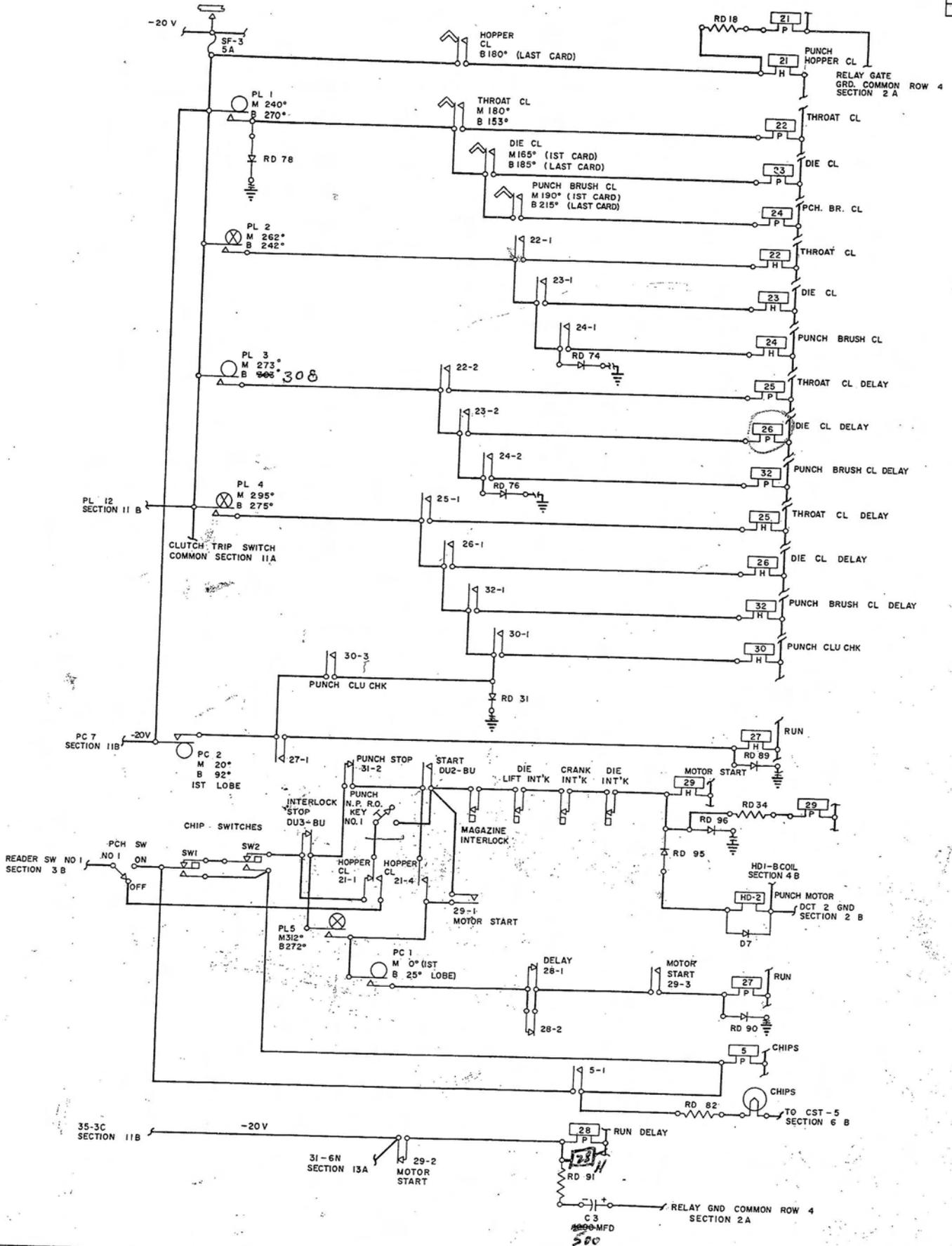
NOTE  
 X PRINT TO ENG. SPEC. 894924

11.04.11.1

CHANGE NO
800972 Q
801755
801906C



CHANGE NO	
800972 Q	
801424 G	
801424 R	
801424 S	
801765	
801906 C	

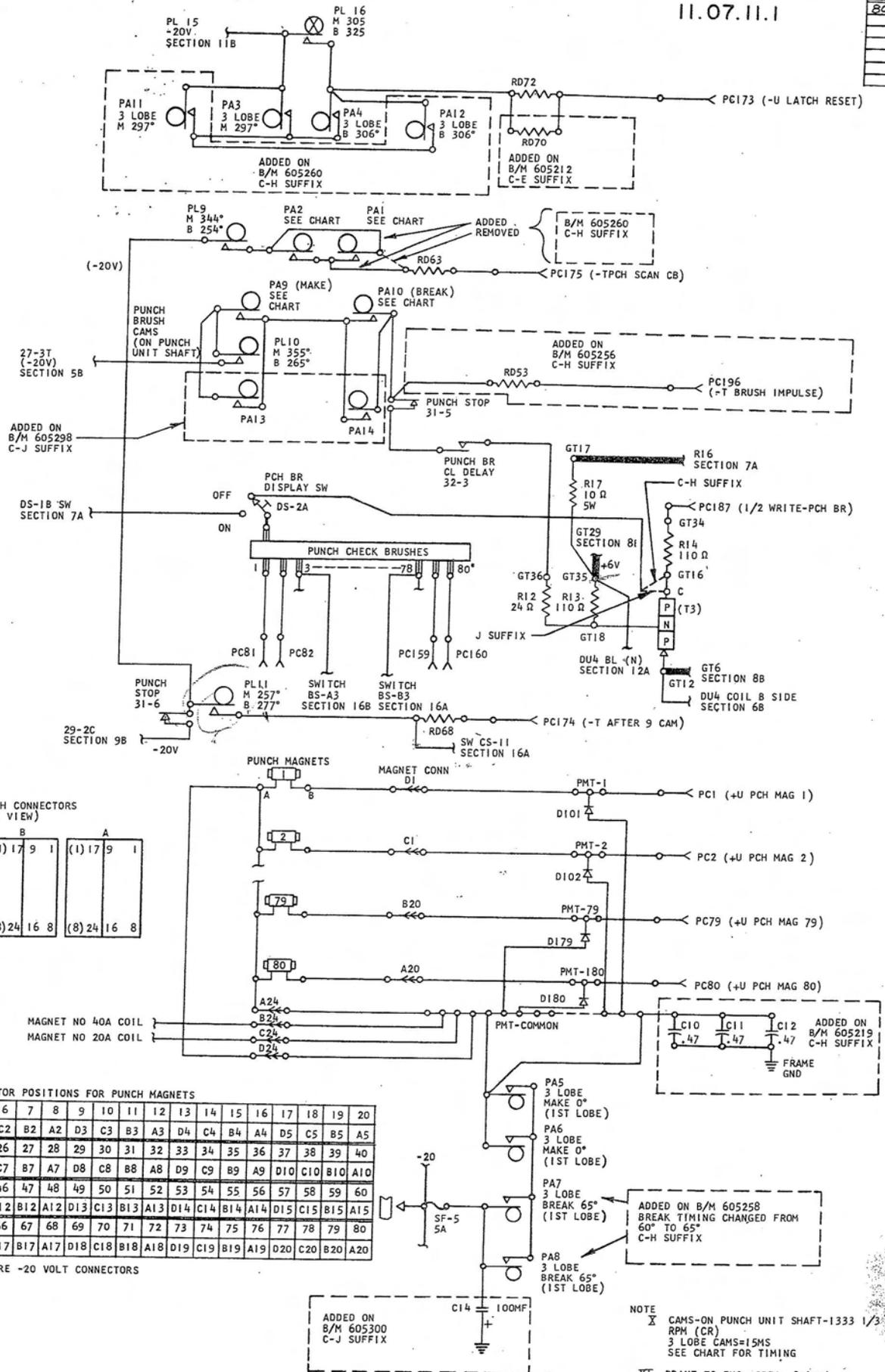




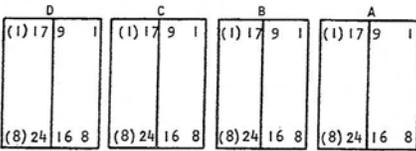
PUNCH READ AND PUNCH

11.07.11.1

CHANGE NO.
802843K



MINIATURE PUNCH CONNECTORS (FEMALE VIEW)



CONNECTOR POSITIONS FOR PUNCH MAGNETS

PCH MAG POS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
CONN POS	D1	C1	B1	A1	D2	C2	B2	A2	D3	C3	B3	A3	D4	C4	B4	A4	D5	C5	B5	A5
PCH MAG POS	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
CONN POS	D6	C6	B6	A6	D7	C7	B7	A7	D8	C8	B8	A8	D9	C9	B9	A9	D10	C10	B10	A10
PCH MAG POS	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
CONN POS	D11	C11	B11	A11	D12	C12	B12	A12	D13	C13	B13	A13	D14	C14	B14	A14	D15	C15	B15	A15
PCH MAG POS	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
CONN POS	D16	C16	B16	A16	D17	C17	B17	A17	D18	C18	B18	A18	D19	C19	B19	A19	D20	C20	B20	A20

CONN POS A24, B24, C24, AND D24 ARE -20 VOLT CONNECTORS

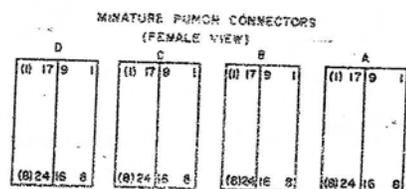
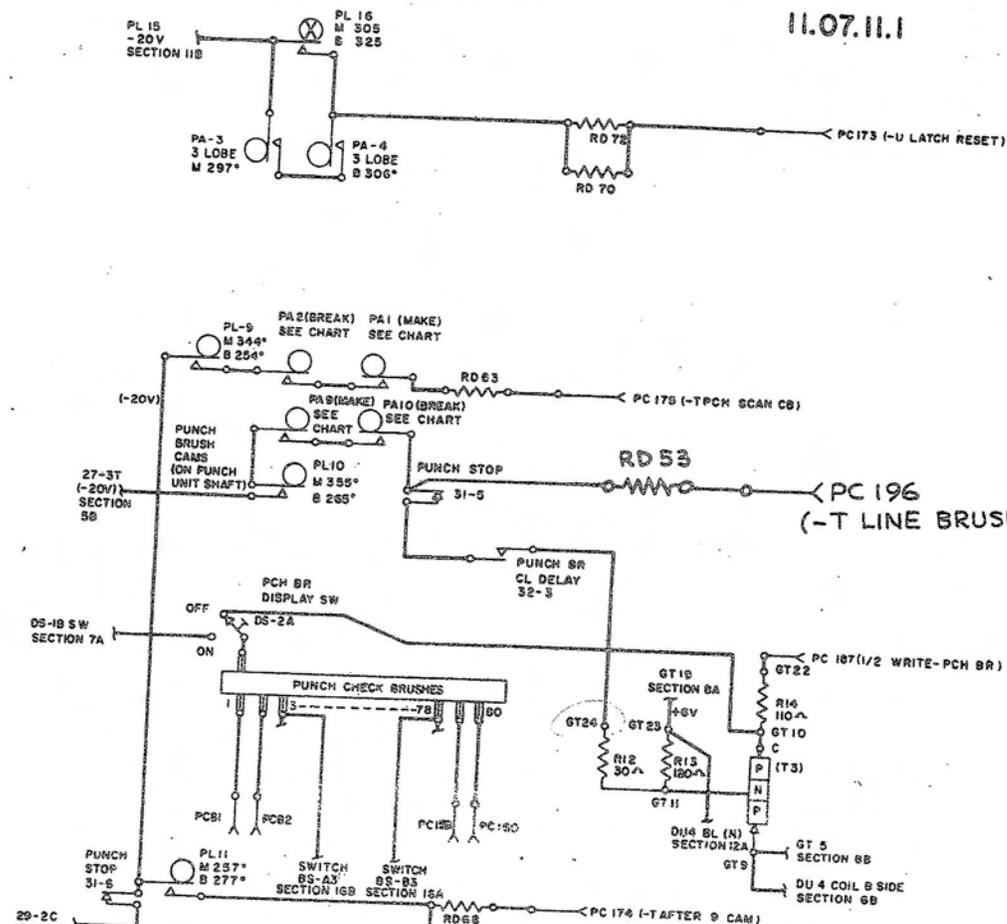
NOTE  
 X CAMS-ON PUNCH UNIT SHAFT-1333 1/3 RPM (CR)  
 3 LOBE CAMS=15MS  
 SEE CHART FOR TIMING

XI PRINT TO ENG. SPEC. 894924

11.07.11.1

CHANGE NO  
8009720  
8014246  
801735  
801902C  
801902F

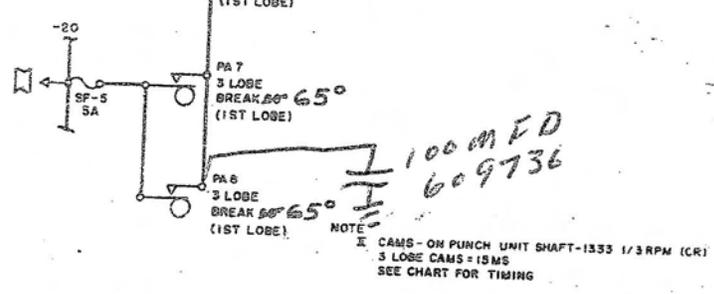
80233  
80233  
80233



CONNECTOR POSITIONS FOR PUNCH MAGNETS

PCH MAG POS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
CONN POS	D1	C1	B1	A1	D2	C2	B2	A2	D3	C3	B3	A3	D4	C4	B4	A4	D5	C5	B5	A5
PCH MAG POS	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
CONN POS	D6	C6	B6	A6	D7	C7	B7	A7	D8	C8	B8	A8	D9	C9	B9	A9	D10	C10	B10	A10
PCH MAG POS	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
CONN POS	D11	C11	B11	A11	D12	C12	B12	A12	D13	C13	B13	A13	D14	C14	B14	A14	D15	C15	B15	A15
PCH MAG POS	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
CONN POS	D16	C16	B16	A16	D17	C17	B17	A17	D18	C18	B18	A18	D19	C19	B19	A19	D20	C20	B20	A20

CONN POS A24, B24, C24, AND D24 ARE -20 VOLT CONNECTORS



100 MFD  
609736

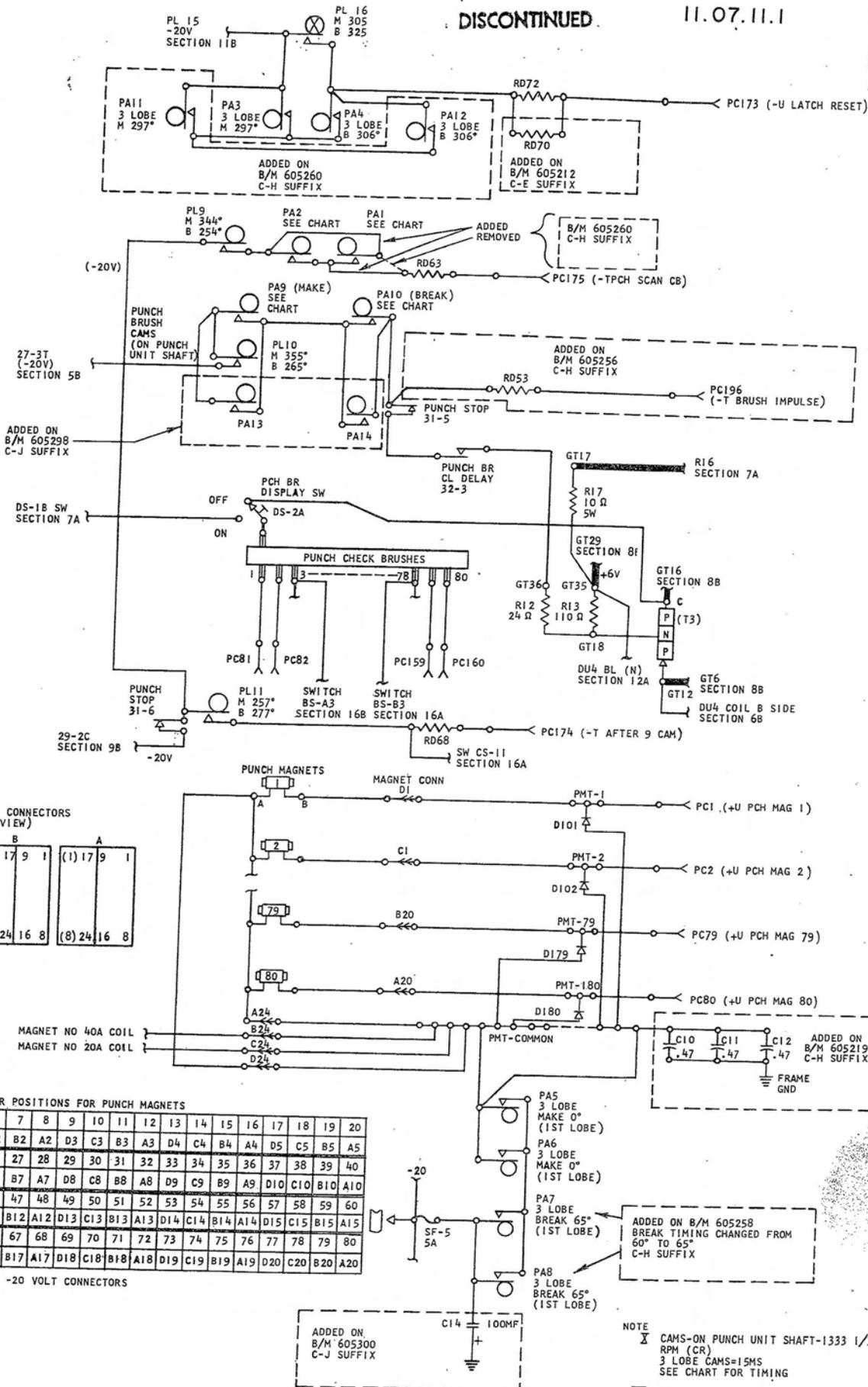
NOTE  
I. CAMS - ON PUNCH UNIT SHAFT - 1333 1/3 RPM (CR)  
3 LOBE CAMS = 15 MS  
SEE CHART FOR TIMING

PUNCH READ AND PUNCH

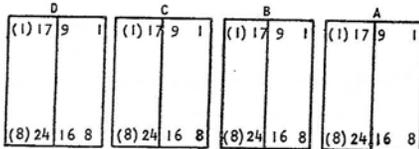
DISCONTINUED

11.07.11.1

CHANGE 802B43



MINIATURE PUNCH CONNECTORS (FEMALE VIEW)



CONNECTOR POSITIONS FOR PUNCH MAGNETS

PCH MAG POS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
CONN POS	D1	C1	B1	A1	D2	C2	B2	A2	D3	C3	B3	A3	D4	C4	B4	A4	D5	C5	B5	A5
PCH MAG POS	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
CONN POS	D6	C6	B6	A6	D7	C7	B7	A7	D8	C8	B8	A8	D9	C9	B9	A9	D10	C10	B10	A10
PCH MAG POS	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
CONN POS	D11	C11	B11	A11	D12	C12	B12	A12	D13	C13	B13	A13	D14	C14	B14	A14	D15	C15	B15	A15
PCH MAG POS	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
CONN POS	D16	C16	B16	A16	D17	C17	B17	A17	D18	C18	B18	A18	D19	C19	B19	A19	D20	C20	B20	A20

CONN POS A24, B24, C24, AND D24 ARE -20 VOLT CONNECTORS

NOTE  
 X CAMS-ON PUNCH UNIT SHAFT-1333 1/3 RPM (CR)  
 3 LOBE CAMS=15MS  
 SEE CHART FOR TIMING

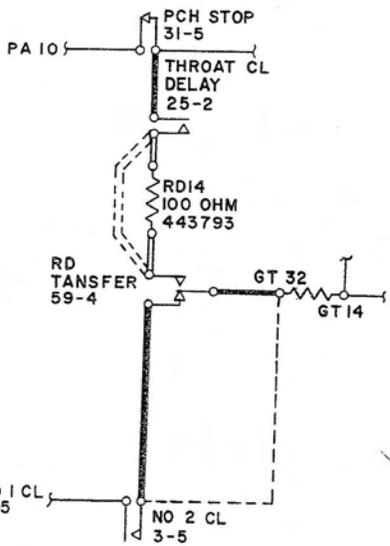
XI. PRINT TO ENG. SPEC. 894924

DATE	CHANGE N
7-20-62	802843K

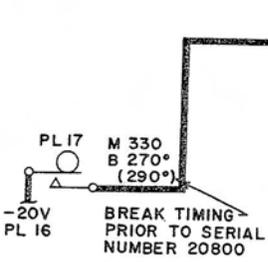
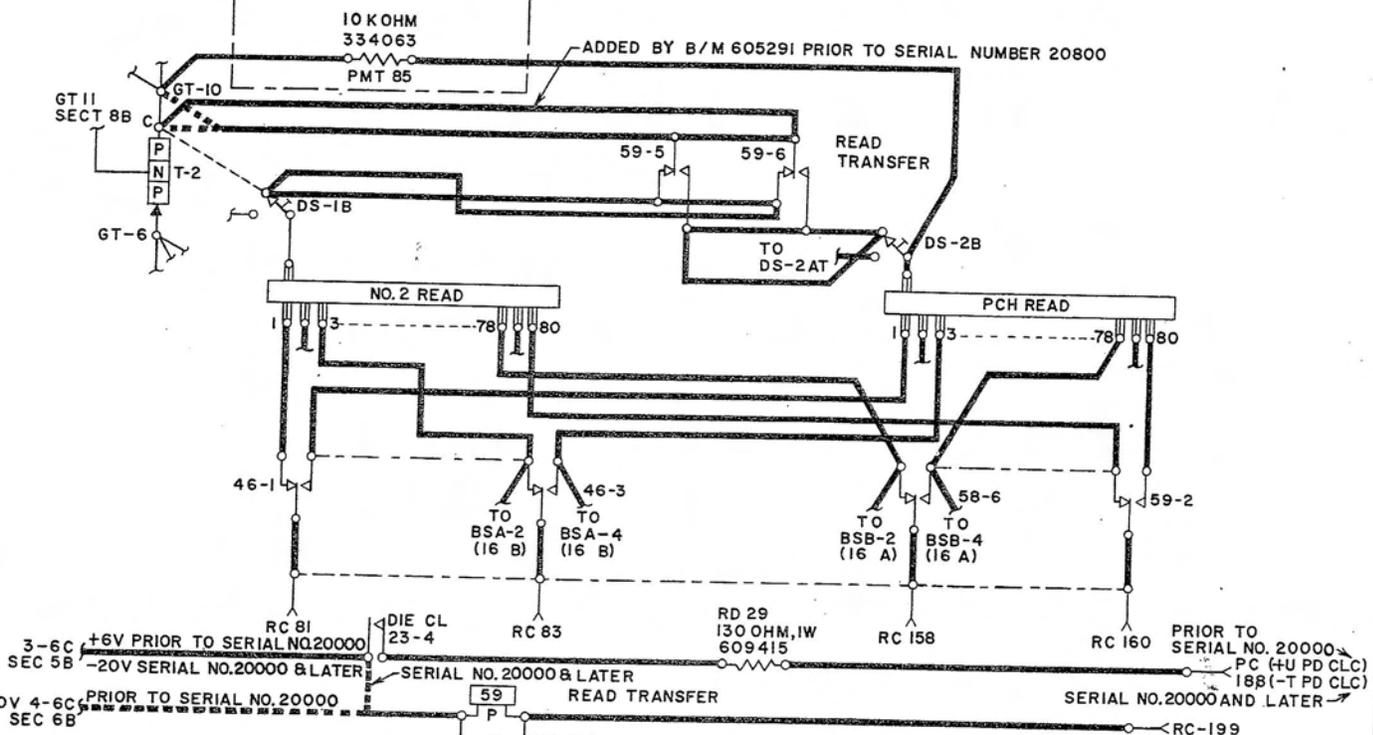
DISCONTINUED

PFR MACHINES ONLY

REL	RC	LOC	REL	RC	LOC	REL	RC	LOC
46-1	81	13AB	50-4	108	NS	55-1	135	NS
46-2	82	NS	50-5	109	↑	55-2	136	↑
46-3	83	13AB	50-6	110	↑	55-3	137	↑
46-4	84	NS	51-1	111		55-4	138	
46-5	85	↑	51-2	112		55-5	139	
46-6	86		51-3	113		55-6	140	
47-1	87		51-4	114		56-1	141	
47-2	88		51-5	115		56-2	142	
47-3	89		51-6	116		56-3	143	
47-4	90		52-1	117		56-4	144	
47-5	91		52-2	118		56-5	145	
47-6	92		52-3	119		56-6	146	
48-1	93		52-4	120		57-1	147	
48-2	94		52-5	121		57-2	148	
48-3	95		52-6	122		57-3	149	
48-4	96		53-1	123		57-4	150	
48-5	97		53-2	124		57-5	151	
48-6	98		53-3	125		57-6	152	
49-1	99		53-4	126		58-1	153	
49-2	100		53-5	127		58-2	154	
49-3	101		53-6	128		58-3	155	
49-4	102		54-1	129		58-4	156	Y
49-5	103		54-2	130		58-5	157	NS
49-6	104		54-3	131		58-6	158	4AB
50-1	105		54-4	132		59-1	159	NS
50-2	106	Y	54-5	133	Y	59-2	160	4AB
50-3	107	NS	54-6	134	NS	59-3	—	13AB
						59-4	—	14AA



ADDED BY B/M 605368 PRIOR TO SERIAL NUMBER 21800

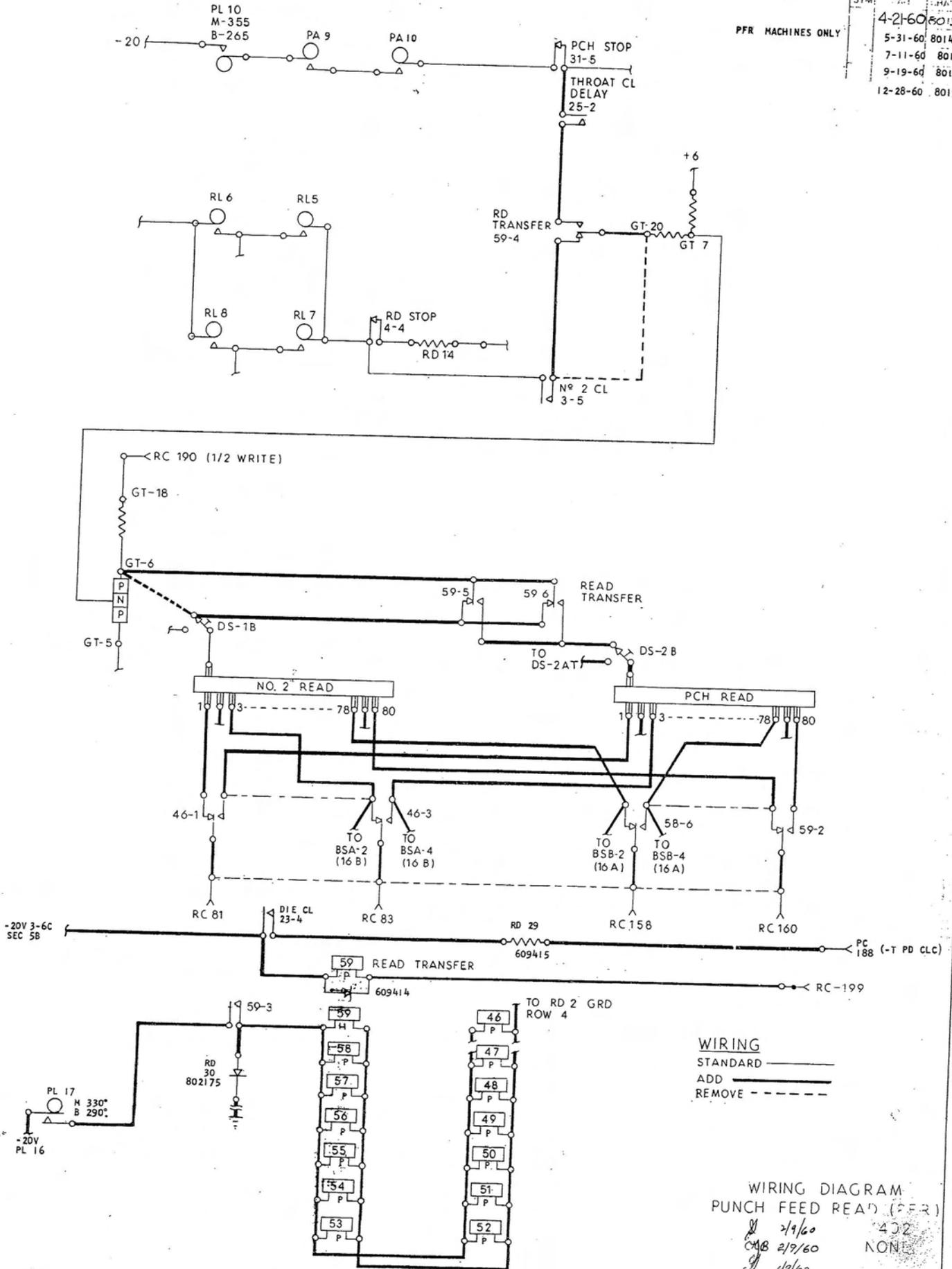


**WIRING**  
 STANDARD ———  
 ADD (PFR) ———  
 REMOVE (PFR) - - - -  
 ADD (SOLAR CB) ———  
 REMOVE (SOLAR CB) - - - -  
 ALTERNATE WIRING - - - -

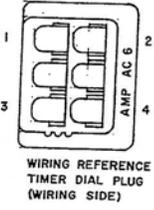
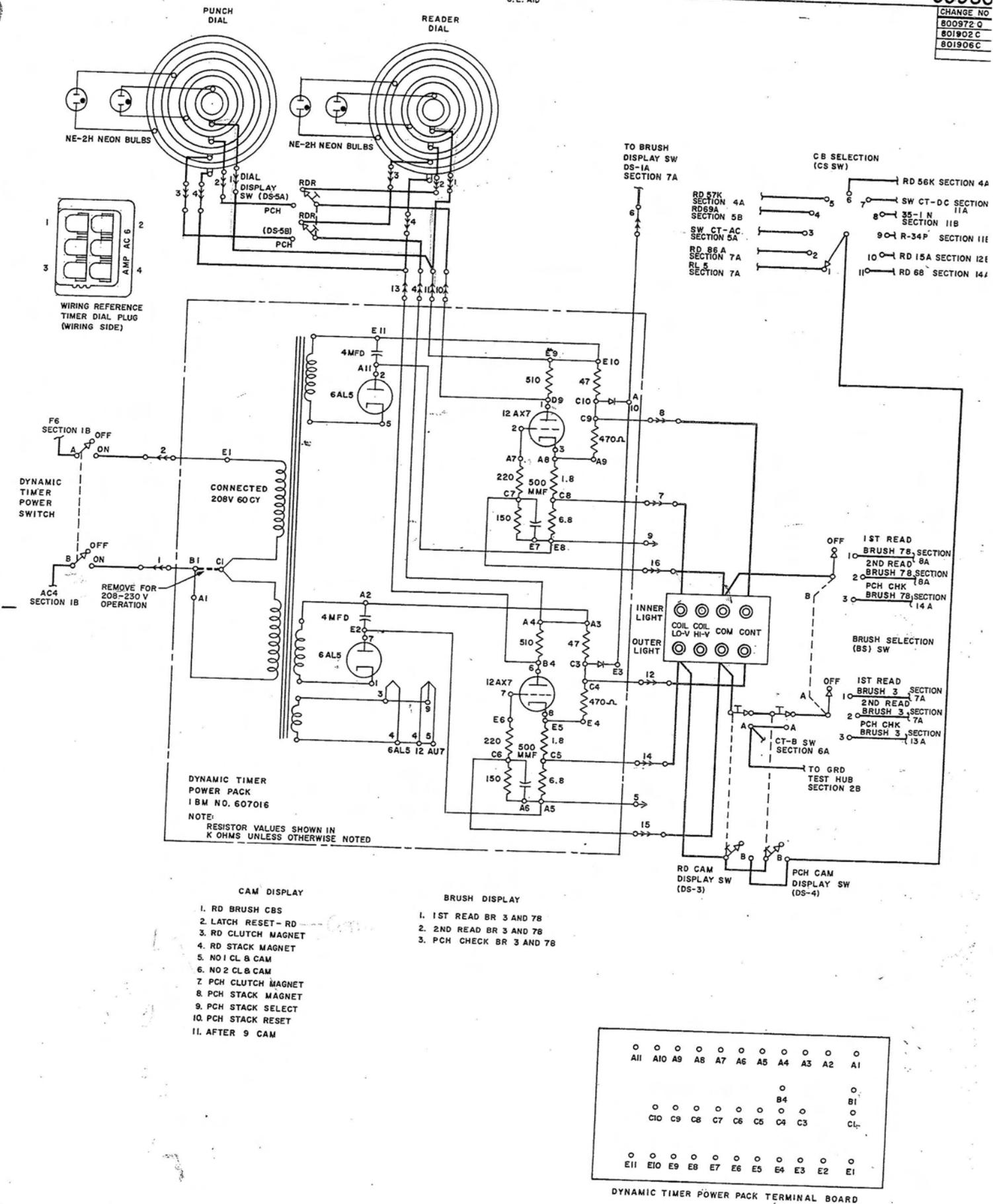
**NOTE**  
 X PRINT TO ENG. SPEC. 894924

PFR MACHINES ONLY

4-2-60	801375-R
5-31-60	801424F
7-11-60	801424S
9-19-60	801765
12-28-60	801906C

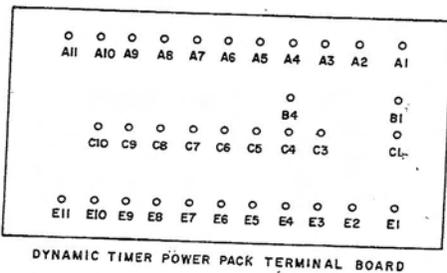


CHANGE NO  
 800972 Q  
 801902 C  
 801906 C



- CAM DISPLAY**
1. RD BRUSH CBS
  2. LATCH RESET- RD
  3. RD CLUTCH MAGNET
  4. RD STACK MAGNET
  5. NO 1 CL B CAM
  6. NO 2 CL B CAM
  7. PCH CLUTCH MAGNET
  8. PCH STACK MAGNET
  9. PCH STACK SELECT
  10. PCH STACK RESET
  11. AFTER 9 CAM

- BRUSH DISPLAY**
1. 1ST READ BR 3 AND 78
  2. 2ND READ BR 3 AND 78
  3. PCH CHECK BR 3 AND 78



**DYNAMIC TIMER POWER PACK**  
 1 BM NO. 607016

NOTE:  
 RESISTOR VALUES SHOWN IN  
 K OHMS UNLESS OTHERWISE NOTED

**DYNAMIC TIMER POWER SWITCH**

**WIRING REFERENCE  
 TIMER DIAL PLUG  
 (WIRING SIDE)**

**TO BRUSH  
 DISPLAY SW  
 DS-1A  
 SECTION 7A**

**CB SELECTION  
 (CS SW)**

RD 57K SECTION 4A  
 RD 59A SECTION 5B  
 SW CT-AC SECTION 5A  
 RD 86 A SECTION 7A  
 RL 5 SECTION 7A

RD 56K SECTION 4A  
 SW CT-DC SECTION 11A  
 35-1 N SECTION 11B  
 R-34P SECTION 11E  
 RD 15A SECTION 12E  
 RD 68 SECTION 14A

**1ST READ BRUSH 78 SECTION 14A**  
 1 1ST READ BRUSH 78 SECTION 14A  
 2 2ND READ BRUSH 78 SECTION 14A  
 3 PCH CHK BRUSH 78 SECTION 14A

**BRUSH SELECTION (BS) SW**

OFF 1ST READ BRUSH 3 SECTION 7A  
 1 1ST READ BRUSH 3 SECTION 7A  
 2 2ND READ BRUSH 3 SECTION 7A  
 3 PCH CHK BRUSH 3 SECTION 7A

**INNER LIGHT**  
**OUTER LIGHT**

COIL COIL COM CONT  
 LO-V HI-V

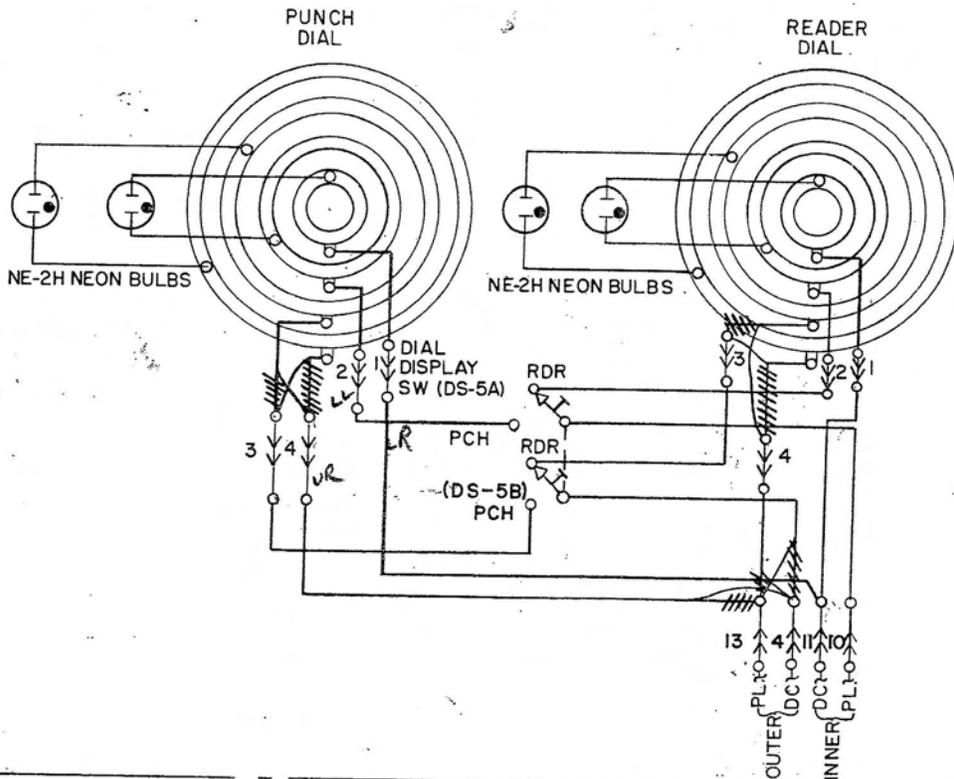
TO GRD TEST HUB SECTION 28

**RD CAM DISPLAY SW (DS-3)**

**PCH CAM DISPLAY SW (DS-4)**

605443

DISCONTINUED SECTION 15A C-L SUFFIX

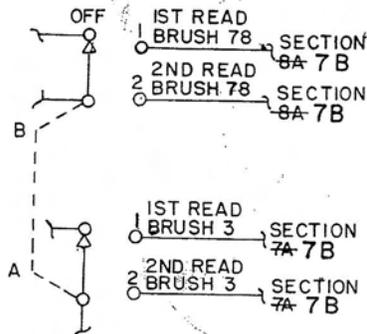


SECTION 15B C-L SUFFIX

CAM DISPLAY

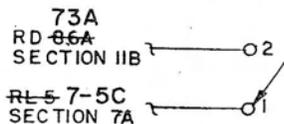
2 LATCH RESET RD-PCH STACK CL

SECTION 16A & B C-L SUFFIX

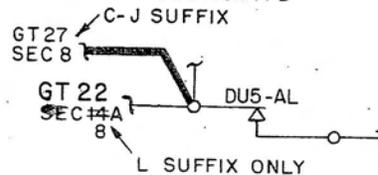


SECTION 16A C-L SUFFIX

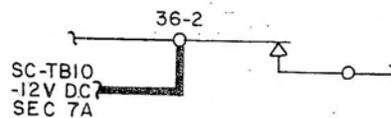
CB SELECTION (CS SW)



SECTION 17B

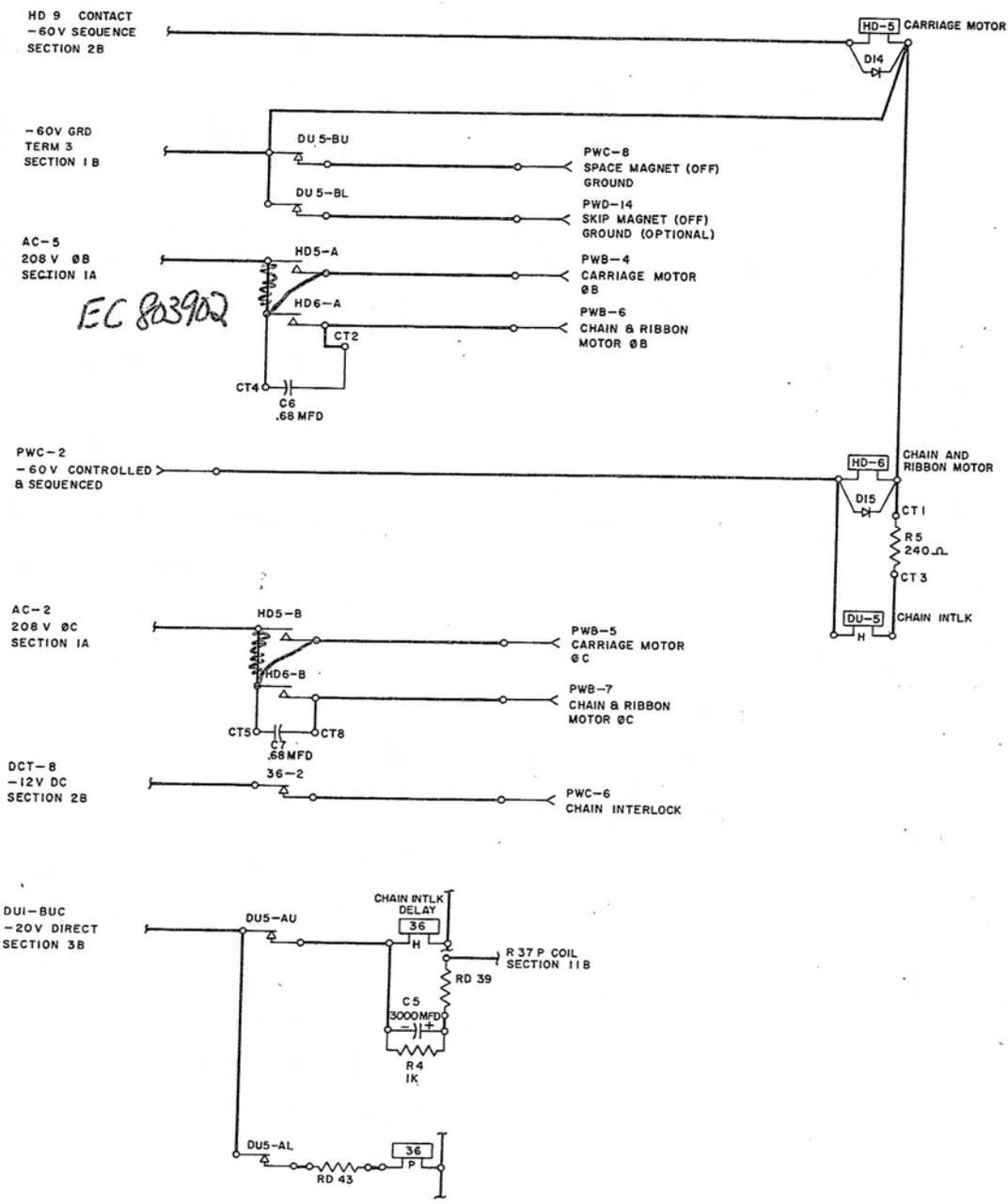


SECTION 17B C-L SUFFIX



INTERNATIONAL BUSINESS MACHINES CORP.				DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	SOLAR CB WIRING			7-20-62	802843K			X PRINT TO ENG. SPEC. NO. 894924	
	DIAGRAM CHANGES								
DESIGN	5-3-62	MODEL	1402-1					USED IN 605366	
DETAIL	7-6-62								
CHECK	7-6-62	DRAW							
APPRO	7-11-62	CHECK							
									605443

21.00.11.1



COVER INTERLOCKS

PUNCH	3 B
TRANSPORT	
RIGHT FRONT	
RIGHT SIDE	
LEFT REAR	
LEFT SIDE	
LEFT FRONT	
RIGHT REAR	

PUNCH INTERLOCKS

MAGAZINE	9 B
DIE LIFT	10 B
CRANK	10 B
DIE	10 B

MISCELLANEOUS SWITCHES

STACKER	3 B
JAM BAR	3 B
JOGGLE	4 B
CHIPS 1 & 2	9 B

CONTROL KEY AND LIGHT PANEL

LIGHTS		SWITCHES	
	LOC		LOC
PUNCH CHECK	5 B	PUNCH ON OFF	9 B
PUNCH STOP	11 A	PUNCH N PRO	9 B, 11 A
FUSE	4 A	START KEY	5 A, 5 B
CHIPS	10 B	CHECK RESET KEY	5 B
STACKER	4 B	STOP KEY	3 B, 6 B
POWER	5 B	LOAD KEY	4 B, 5 A
TRANSPORT	4 B	READ N PRO	4 B, 5 A, 4 B
VALIDITY	5 B	READER ON OFF	3 B
READER CHECK	5 B		
READER STOP	5 A		

VOLTAGE TEST-HUBS

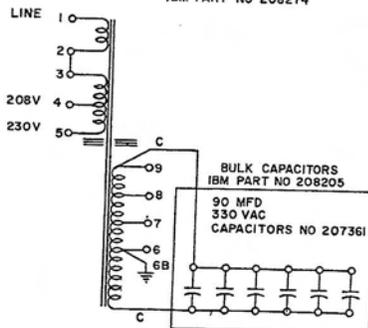
+6	2 B
-12	2 A
-20	2 A
-60	1 B
GND	2 B

SERVICE SWITCHES

NAME	TYPE	CIRCUITS	LOCATION	USE
DS-1	* MC	2	7 A	READ BRUSH DISPLAY
DS-2	MC	1	13 A	PUNCH BRUSH DISPLAY
DS-3	MC	2	16 B	READ CAM DISPLAY
DS-4	MC	2	16 B	PUNCH CAM DISPLAY
PC	MC	1	11 A	PUNCH CLUTCH TRIP
RC	MC	1	5 A	READ CLUTCH TRIP
DS-5	TOGGLE	2	15 A	DIAL SELECTION (READ OR PUNCH)
TIMER	TOGGLE	2	15 A	POWER ON TIMER
CS	ROTARY	1-11 POS	16 A	CAM SELECTION
BS	ROTARY	2-5 POS	16 A, 16 B	BRUSH SELECTION
CT	ROTARY	6-2 POS	5A, 6A, 6A, 11A, 12A	OFF LINE CARD FEED
SYNC	MC	1	11 A	SYNCS PUNCH CLUTCH PULSES
RS	TOGGLE	2	5 B, 3 B	OVER RIDE INTERLOCK SWITCH

\* MOMENTARY CONTACT

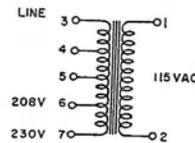
CIRCUIT DIAGRAM  
1250W BULK SUPPLY  
FERRO RESON  
IBM PART NO 208274



TRANSFORMER CONNECTIONS

PRIMARY CONNECTIONS  
TERMINALS 1-4 208 VAC - JUMPER 2 TO 3  
TERMINALS 1-5 230 VAC -  
OUTPUT CONNECTIONS TERMINALS 6 & 8 130 NOM  
SECONDARY TAPS 7 AND 9  
PROVIDE APPROXIMATELY  
±1.5% ADJUSTMENT

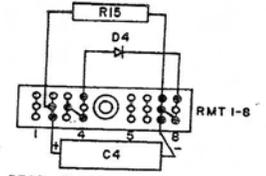
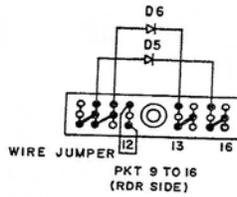
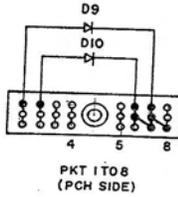
CIRCUIT DIAGRAM  
115 VAC, 15A TRANSFORMER  
IBM PART NO 209000



PRIMARY CONNECTIONS  
TERMINALS 3-6 208 VAC  
TERMINALS 3-7 230 VAC

PKT LOCATION	
1	12 B
2	12 B
3	-
4	-
5	-
6	12 B
7	12 B
8	12 B
9	5 B
10	-
11	-
12	-
13	-
14	-
15	-
16	5 B

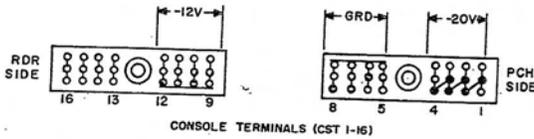
RMT LOCATION	
1	-
2	6 A
3	5 A
4	5 A
5	-
6	-
7	5 A
8	5 A



POCKET TERMINALS (PKT)  
(LOCATED ON FRONT SIDE FRAME)

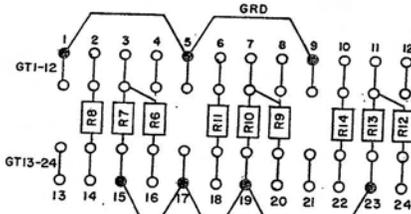
READ CLUTCH MAGNET TERMINALS  
(LOCATED ON REAR SIDE FRAME)

CST LOCATION	
1	5A
2	5A
3	5A
4	5A
5	6B
6	4B
7	4A
8	4B
9	5B
10	5B
11	5B
12	5B
13	-
14	-
15	-
16	-

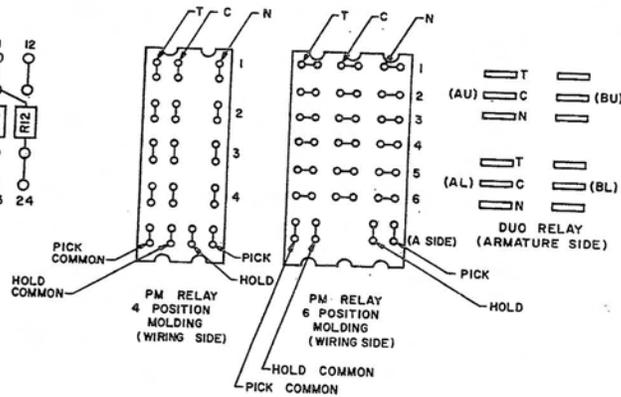


CONSOLE TERMINALS (CST 1-16)

TYPE	SIZE	PART NO	DESCRIPTION	NO	COIL RESISTANCE	
					PICK	HOLD
1	FOUR	719003	HIGH SPEED	719009	70±7Ω	700±70Ω
2	SIX	719007	STANDARD	719011	105±15Ω	600±60Ω
3	FOUR	719005	STANDARD	719010	126±12.6Ω	700±70Ω

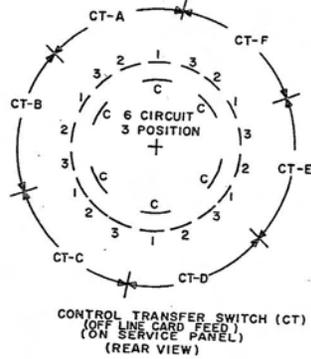


GATE TERMINALS (GT)  
(LOCATED ON RELAY GATE)

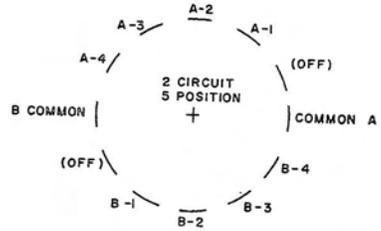


GT LOCATION							
1	8A	9	14A	17	2B		
2	8A	10	14A	18	8A		
3	8A	11	14A	19	8A		
4	-	12	-	20	8A		
5	8B	13	-	21	-		
6	8A	14	8A	22	14A		
7	8B	15	8A	23	14A		
8	-	16	8A	24	14A		

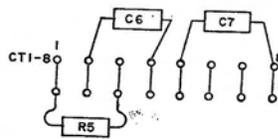
SEE METER  
B/M SHEET #  
635059 FOR  
SWITCH LAYOUT



CONTROL TRANSFER SWITCH (CT)  
(OFF LINE CARD FEED)  
(ON SERVICE PANEL)  
(REAR VIEW)



BRUSH SELECTION SWITCH (BS)  
(ON SERVICE PANEL)  
(REAR VIEW)  
SEE SEC 19 & 20 B FOR  
CIRCUIT LOCATIONS



CONTACTOR PANEL  
TERMINALS (CT 1-8)

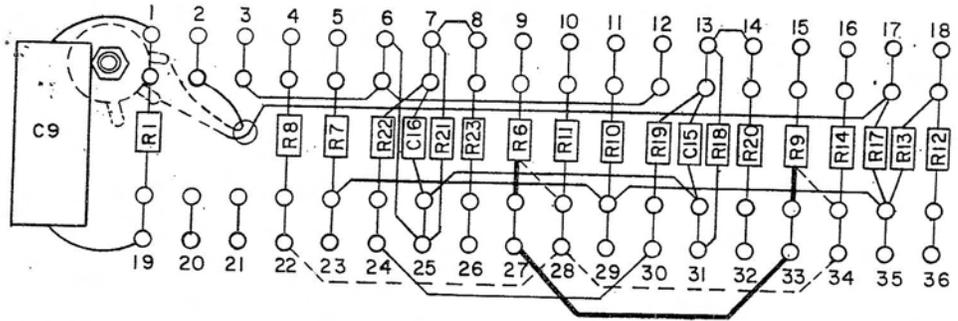
CT LOCATION	
1	18A
2	17A
3	18B
4	17A
5	17B
6	-
7	-
8	17B

SECTION 21 & 22 C-L SUFFIX

605445

DISCONTINUED

GATE TERMINALS (GT)  
(LOCATED ON RELAY GATE)



--- DOTTED WIRING FOR  
L SUFFIX OR C-J SUFFIX  
WITH B/M'S 605290  
605291, 605292 OR  
605293 (CARBON ROLLS  
WITHOUT HALF WRITE)  
--- HEAVY SOLID WIRING  
FOR C-J SUFFIX WITH  
HALF WRITE

GT LOCATION									
1	11B	9	8A	17	14A	25	8B	33	8B*
2	7A	10	8A	18	14A	26	8A*	34	8B
3	8B	11	8B	19	12B	27	8A	35	14A
4	8A	12	14A	20	—	28	8A	36	14A
5	8A	13	8B	21	—	29	8B		
6	8B	14	8B	22	8A	30	8B		
7	8A	15	8B	23	8B	31	8B		
8	8A	16	8B	24	8B	32	8B		

\* C-J SUFFIX (WITH HALF WRITE)

INTERNATIONAL BUSINESS MACHINES CORP.		DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	SOLAR CB WIRING	7-20-62	802843K			X PRINT TO ENG. SPEC. NO. 894924	
	DIAGRAM ADDITION						
DESIGN	88 5-3-62	MODEL	1402-1				
DETAIL	88 7-6-62						
CHECK	HCK 7-6-62	DRAW				USED IN	
APPRO	RLS 7-11-62	CHECK				*605366	605445



TIMING

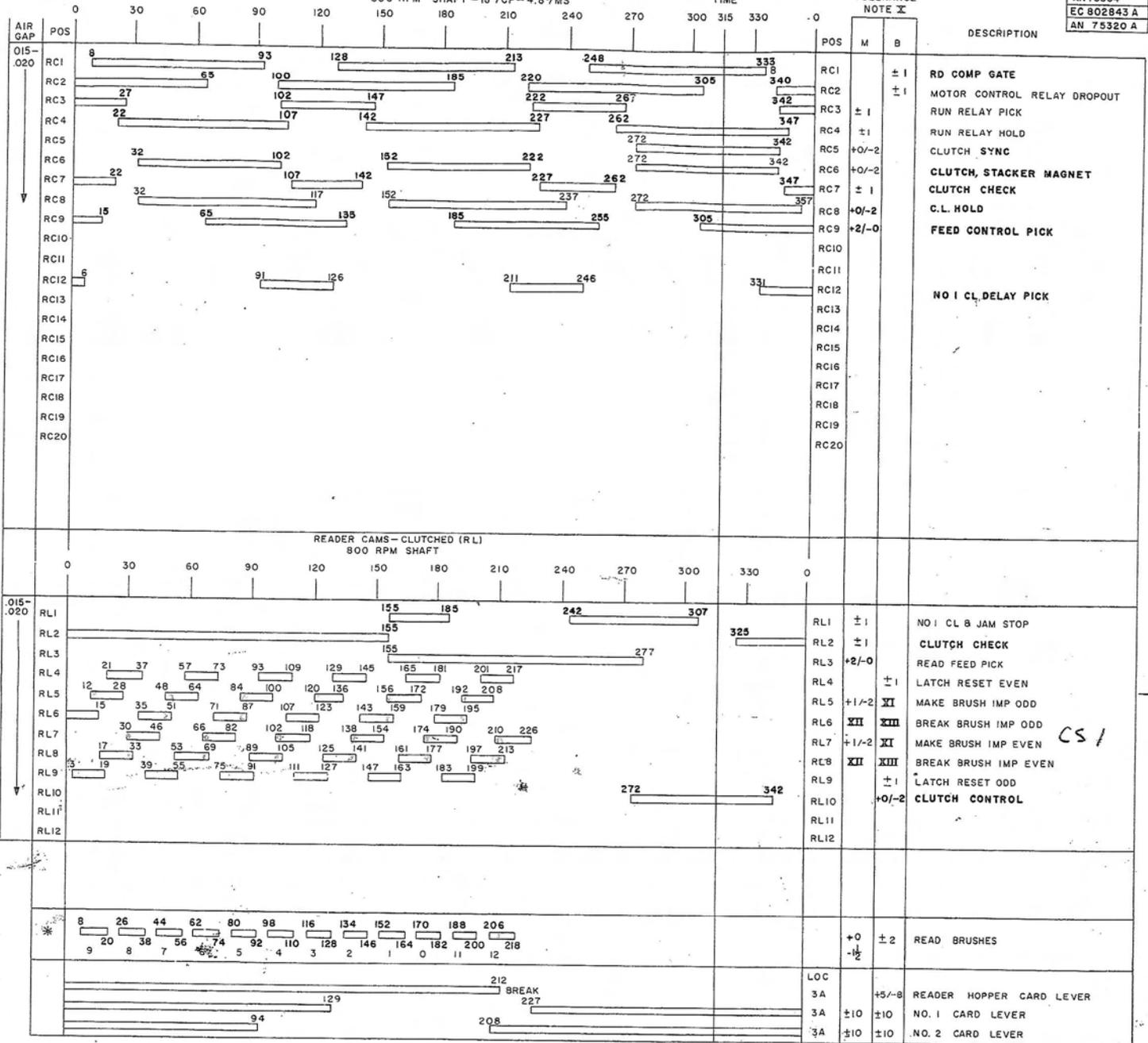
TIMING CHART

READER CAMS - CONTINUOUS RUNNING (RC)  
800 RPM SHAFT - 18°/CP - 4.8°/MS

CLUTCH LATCH TIME

TOLERANCE NOTE X

CHANGE NO
802620 B
AN 75282
EC 802928
AN 75364
EC 802843 A
AN 75320 A



\*BRUSH TIMING SHOWN REFLECT THE SHORT DURATION BRUSH TIMINGS AS RELEASED ON CEM 193

NOTES

- X TOLERANCE ON ALL CAMS TO BE ±2° UNLESS OTHERWISE NOTED
- XI RL5 AND RL7 BREAK ADJUSTED FOR 16° -0/+4 DURATION
- XII RL6 AND RL8 MAKE ADJUSTED FOR 16° -0/+4 DURATION
- XIII THE BREAK OF RL6 AND RL8 TO BE 3° ±2/-1 AFTER THE MAKE OF RL6 AND RL7 RESPECTIVELY. MAINTAIN A MINIMUM OF 12° BETWEEN ODD AND EVEN PULSES FROM THE SERIES COMBINATION OF RL 5-6 AND RL 7-8 CONNECTED AS PER SECTION 7 A

DISCONTINUED SECTION 23 AND 24 C-L SUFFIX

READER CAM-CLUTCHED (RL)  
800 RPM SHAFT

605444

	0	30	60	90	120	150	180	210	240	270	300	330	0	M	B	
RL1														RL1		
RL2														RL2		
RL3														RL3		
RL4		21	37	57	73	93	109	129	145	165	181	201	217	RL4	II	LATCH RESET EVEN
RL5		12	28	48	64	84	100	120	136	156	172	192	208	RL5	II-2	XI MAKE BRUSH IMP OD
RL6		15	35	51	71	87	107	123	143	159	179	195		RL6	XII	XIII BREAK BRUSH IMP OD
RL7		30	46	66	82	102	118	138	154	174	190	210	226	RL7	II-2	XI MAKE BRUSH IMP EV
RL8		17	33	53	79	89	105	125	141	161	177	197	213	RL8	XII	XIII BREAK BRUSH IMP EVEN
RL9		3	19	39	55	75	91	111	127	147	163	183	199	RL9	II	LATCH RESET ODD
RL10														RL10		
RL11														RL11		
RL12														RL12		
SGCB	9 □ 12-15		5 □ 84-87				12 □ 210-213							SC-CB	XI	XI SOLAR CIRCUIT BREAKER

XI PULSE DURATION CONTROL POTENTIOMETER ON RELAY GATE TRANSISTOR PANEL ADJUSTED FOR 700 +100 -0 MICROSECONDS (3 1/2 +1/2 -0 DEGREES) DURATION ON COLD (ROOM TEMPERATURE) MACHINE OR 600 +100 -200 MICROSECONDS (3 1/2 +1/2 -1 DEGREES) DURATION AT OPERATING TEMPERATURE. PULSES TO BE CENTERED ABOUT MIDPOINTS OF PULSE TIMINGS WITH ANY DEVIATION DISTRIBUTED EQUALLY ACROSS 9 THROUGH 12 INDEX TIMES THIS DEVIATION SHALL NOT EXCEED ONE DEGREE FROM THE NOMINAL TIMINGS SHOWN UNDER CONTINUOUS MACHIN FEEDING.

NOTES

- X TOLERANCE ON ALL CAMS TO BE ±2° UNLESS OTHERWISE NOTED
- ~~XI RL5 AND RL7~~ ±6° 0/14 DURATION
- ~~XII RL6 AND RL8 MAKE ADJUSTED FOR 16° 0/14 DURATION~~
- ~~XIII THE BREAK OF RL6 AND RL8 TO BE 3° ±2/1 AFTER THE MAKE OF RL5 AND RL7 RESPECTIVELY. MAINTAIN A MINIMUM OF 12° BETWEEN ODD AND EVEN PULSES FROM THE SERIES COMBINATION OF RL5-6 AND RL7-8 CONNECTED AS PER SECTION 7A~~

SECTION 19A C-L SUFFIX

VOLTAGE TEST-HUBS

+6	8B
+30	8B

INTERNATIONAL BUSINESS MACHINES CORP.				DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	SOLAR CB WIRING			7-20-62	802843K			X PRINT TO ENG. SPEC. NO. 894924	
	DIAGRAM CHANGES			11-13-62	804340				
DESIGN	AFD	5-3-62	MODEL	1402-1				USED IN 605366	
DETAIL	888	7-6-62							
CHECK	AKC	7-6-62	DRAW						
APPRO	RLS	7-11-62	CHECK						605444

CHANGE NO  
802620B  
802926  
802843A

READER CAMS  
CONTINUOUS RUNNING (RC)-1 1/16" DIA 800 RPM

POS	LOC	PART NO	DESCRIPTION		RETURN VOLTS	CAM JUMPER	
			LOBES	DUR		CAM SIDE	
RC 1	3A	609758	3	85°	-20		
RC 2	3B	609758	3	85°	-		
RC 3	3B	609759	3	45°	-		
RC 4	3B	609758	3	85°	-20		
RC 5	5A	602114	1	70°	-		
RC 6	9B	609760	3	70°	-		
RC 7	3A	609761	3	35°	-		
RC 8	3A	609758	3	85°	-20		
RC 9	4A	609760	3	70°	-		
RC 10							
RC 11							
RC 12	4A	609761	3	35°	--		
RC 13							
RC 14							
RC 15							
RC 16							
RC 17							
RC 18							
RC 19							
RC 20							

PUNCH CAMS  
CONTINUOUS RUNNING (PC)-2" DIA 250 RPM

POS	LOC	PART NO	DESCRIPTION		RETURN VOLTS	CAM JUMPER	
			LOBES	DUR		CAM SIDE	
PC 1	9B	255425	4	25°	-		
PC 2	9B	255472	4	72°	-20		
PC 3	11A	255430	4	30°	-		
PC 4	11A	255030	1	30°	-		
PC 5	11A	255430	4	30°	-		
PC 6	11B	255440	4	40°	-20		
PC 7	11B	255430	4	30°	-20		
PC 8							
PC 9							

CONTINUOUS RUNNING (PA)-1" DIA 1333 1/3 RPM

POS	LOC	PART NO	DESCRIPTION		RETURN VOLTS	CAM JUMPER	
			LOBES	DUR		CAM SIDE	
PA 1	13A	609029	3	25°	-		
PA 2	13A	609029	3	25°	-		
PA 3	13A	609029	3	25°	-		
PA 4	13A	609029	3	25°	-		
PA 5	14B	607592	3	70°	-		
PA 6	14B	607592	3	70°	-		
PA 7	14B	607592	3	70°	-20		
PA 8	14B	607592	3	70°	-20		
PA 9	13A	609029	3	25°	-		
PA 10	13A	609029	3	25°	-		
PA 11	13A	609029	3	25°	-		
PA 12	13A	609029	3	25°	-		
PA 13	13A	609029	3	25°	-		
PA 14	13A	609029	3	25°	-		

CLUTCHED CAMS (RL)-1 1/16" DIA 800 RPM

POS	LOC	PART NO	DESCRIPTION		RETURN VOLTS	CAM JUMPER	
			LOBES	DUR		CAM SIDE	
RL 1	3A	609326	2	30/65°	-20		
RL 2	3A	602122	1	190°	-20		
RL 3	3A	602118	1	122°	-20		
RL 4	7A	602132	6	16°	-		
RL 5	7A	602132	6	16°	-		
RL 6	7A	602132	6	16°	-20		
RL 7	7A	602132	6	16°	-		
RL 8	7A	602132	6	16°	-20		
RL 9	7A	602132	6	16°	-		
RL 10	5B	602114	1	70°	-20		

NOTE X  
RL CAMS 4 THROUGH 9 REMOVED ON "M" SUFFIX MACHINES.  
REPLACED BY SOLAR EMITTER

CLUTCHED CAMS (PL)-1 1/16" DIA-250 RPM

POS	LOC	PART NO	DESCRIPTION		RETURN VOLTS	CAM JUMPER	
			LOBES	DUR		CAM SIDE	
PL 1	9A	607114	1	30°	-20		
PL 2	9A	602129	1	340°	-20		
PL 3	9A	607114	1	30°	-20		
PL 4	9A	602129	1	340°	-20		
PL 5	9B	602128	1	320°	-		
PL 6	11A	607114	1	30°	-20		
PL 7	11A	607730	1	20°	-20		
PL 8	12A	607114	1	30°	-		
PL 9	13A	608607	1	270°	-		
PL 10	13A	608607	1	270°	-		
PL 11	13A	607730	1	20°	-		
PL 12	11B	607730	1	20°	-20		
PL 13	11B	607114	1	30°	-20		
PL 14	11B	602129	1	340°	-20		
PL 15	11B	602119	1	134°	-20		
PL 16	13A	607730	1	20°	-20		
PL 17							
PL 18							
PL 19							
PL 20							

DISCONTINUED SECTION 25 AND 26 C-L SUFFIX  
CLUTCHED CAMS (RL)-1 1/16" DIA 800 RPM

INSTRUCTION

605446

POS	LOC	PART NO	DESCRIPTION		RETURN VOLTS	CAM JUMPER	
			LOBES	DUR		CAM SIDE	
RL1	3A	609326	2	30/65°	-20		
RL2	3A	602128	1	320°	-20		
RL3	3A	602113	1	50°	-20		
RL4	7A	602132	6	16°			
RL5	7A	602132	6	16°			
RL6	7A	602132	6	16°	-20		
RL7	7A	602132	6	16°			
RL8	7A	602132	6	16°	20		
RL9	7A	602132	6	16°			
RL10							

SECTION 29 AND 30 C-L SUFFIX  
CB SELECTOR SWITCHES (REFERENCE ONLY)

POS	LOC
1	7A
2	7A IIB
3	5A
4	5B
5	4A
6	4A
7	IIA
8	IIB
9	IIB
10	12B
11	14A

0 30 60 90 120 150 180 210 240 270 300 330 0

130 225

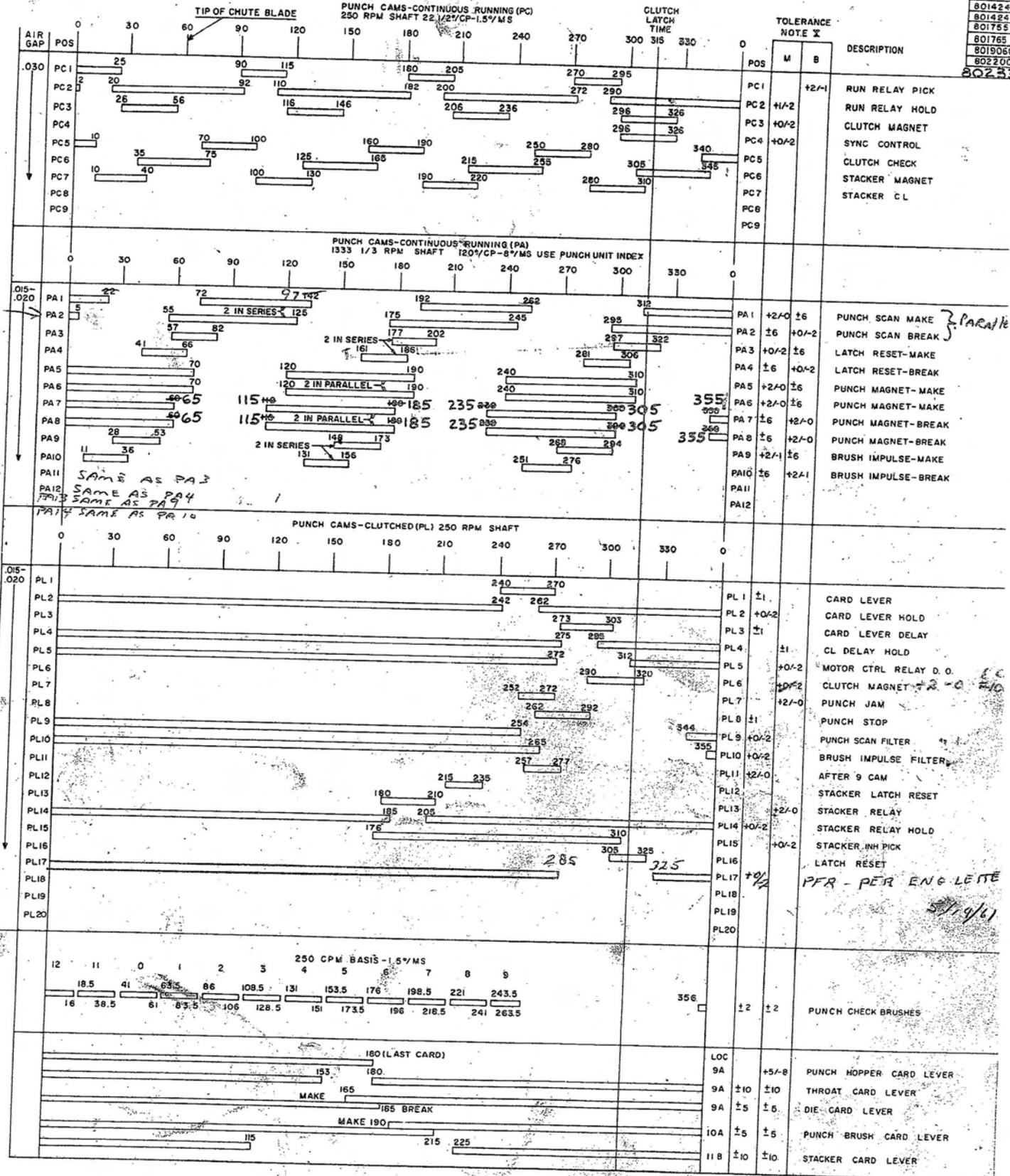
3 21 39 57 75 93 111 129 147 165 183 201  
~~16 33 51 69 87 105 123 141 159 177 195 213~~

INTERNATIONAL BUSINESS MACHINES CORP.		DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME SOLAR CB WIRING		7-20-62	802843K			X PRINT TO ENG. SPEC. NO. 694924	
DIAGRAM CHANGES							
DESIGN	JFB 5-3-62	MODEL	1402-1				
DETAIL	JFB 7-6-62						
CHECK	HEK 7-6-62	DRAW					
APPRO	RCS 7-11-62	CHECK				USED IN 605366	
							605446

INSTRUCTION

CHANGE
800972
801424
801424
801755
801765
801906C
802200
80231

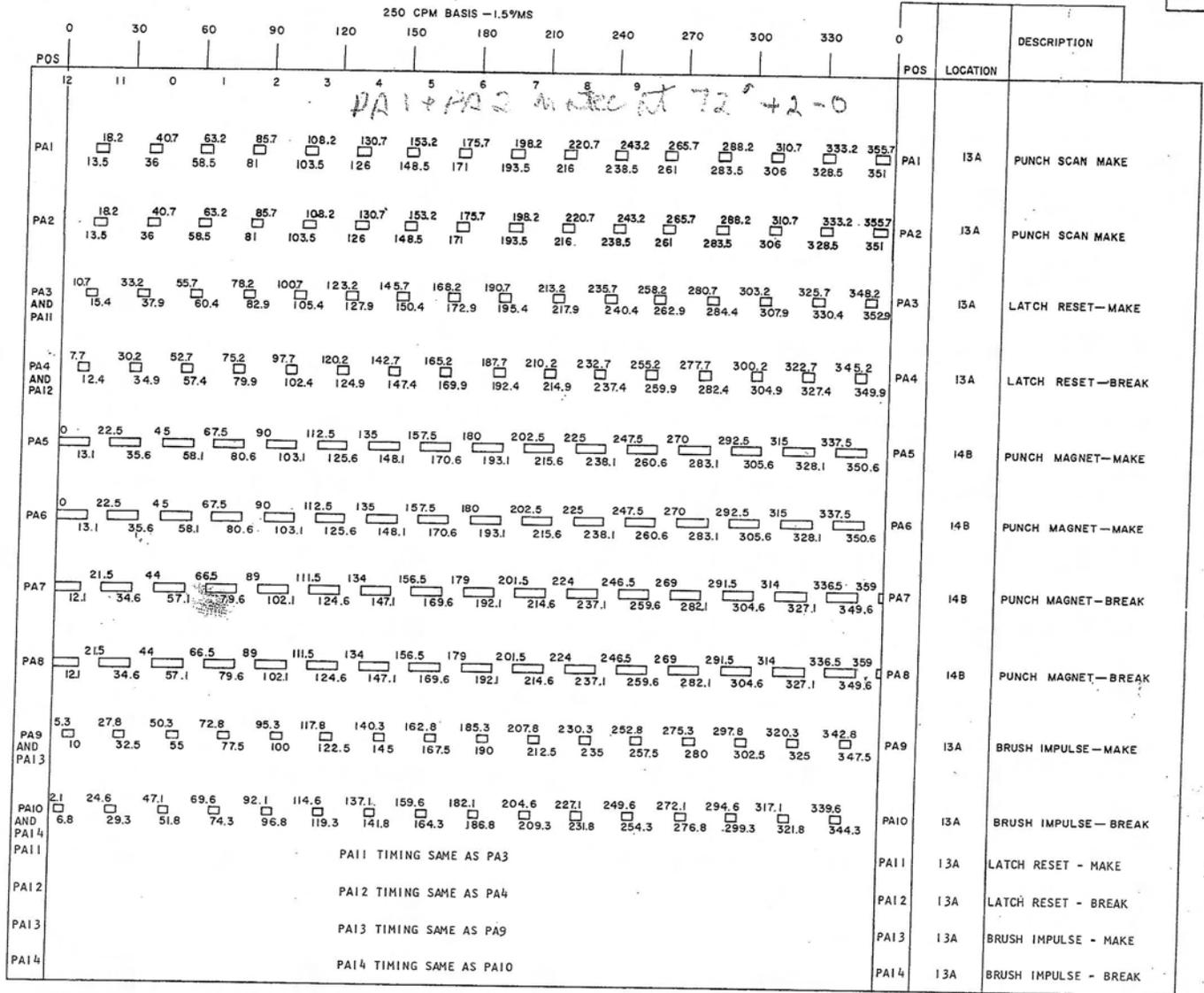
TIMING CHART



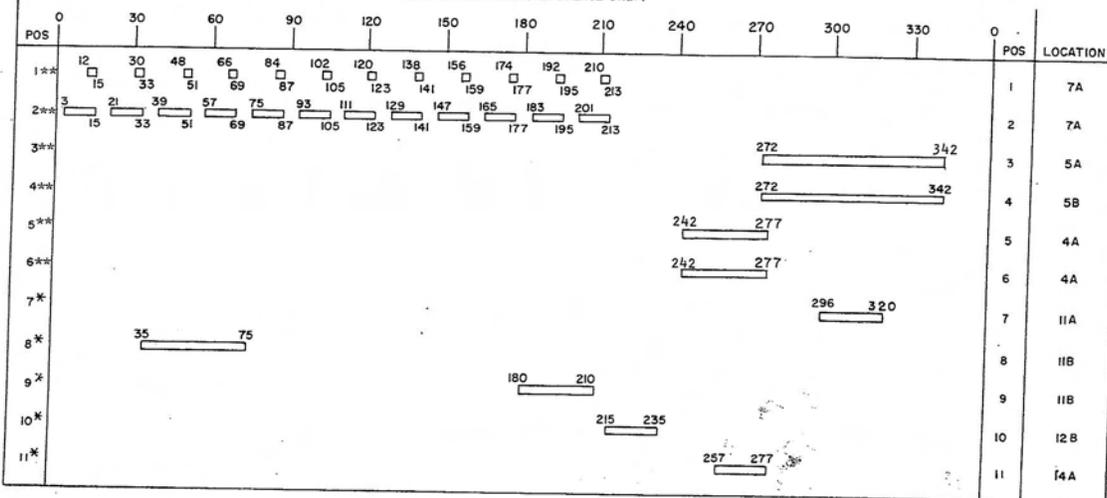
NOTE  
X TOLERANCE ON ALL CAM TO BE ±2°  
UNLESS OTHERWISE NOTED

CHANGE NO
802620B
80292B

PUNCH COMPARISON TIMING CHART (REFERENCE ONLY)



CB SELECTOR SWITCHES (REFERENCE ONLY)



SEE INDIVIDUAL CAM TIMING FOR CAM TOLERANCES  
 \*USE PUNCH SYNC SWITCH FOR CORRECT TIMING  
 \*\*USE READ SYNC SWITCH FOR CORRECT TIMING

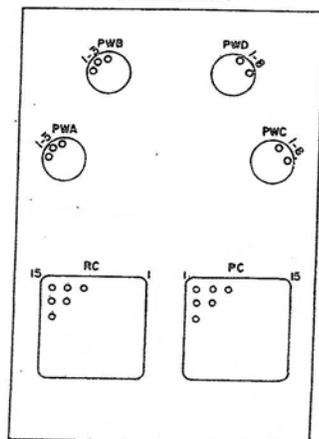
READER CONNECTOR WIRES (RC)

CONNECTOR POS (RC)	WIRE DIAGRAM LOC	LOGIC REF	DESCRIPTION
1 TO 80	7A-8A		COL 1 TO 80-NO 1 READ BRUSH
81 TO 160	7B-8B		COL 1 TO 80-NO 2 READ BRUSH
161	6B	36.19.11.1	START KEY NC(+START KEY NC)
162			
163			
164			
165			
166			
167			
168	4A	36.18.11.1	READ STOP (-T READ STOP)
169	4B	36.10.11.1	LOAD KEY (-T LOAD KEY)
170	6A	36.10.11.1	READ CLUTCH (-T RD CLUTCH)
171	6A	36.10.11.1	PROCESS FEED (-T PROC FEED)
172	6A	36.10.11.1	NOT PROC FEED (-T NOT PROCESS FEED)
173	6B	36.02.11.1	READ JAM (-T RD JAM)
174	6A	36.02.11.1	READ CHECK RESET(+T CHECK RESET RD)
175	6A	36.02.11.1	INTERLOCK STOP (+U INTERLOCK STOP)
176	6B	36.16.11.1	LAST CARD (-T LS CD OUT)
177			
178	3A	36.50.11.1	READ STACKER RESET (+T RD STACKER RESET)
179	6B	36.02.11.1	STOP KEY-ON (-T STOP KEY RP)
180	6B	36.19.11.1	START KEY (+T START KEY RP NO)
181	6B	36.01.31.1	NO 2 CL (-T 2 CL C)
182	6B	36.18.11.1	READ CHECK LIGHT (+U READ CHECK LIGHT)
183	6B	36.18.11.1	INVALID LIGHT (+U INVALID LIGHT)
184	6B	36.50.11.1	RD STACK MAG 1 (+U STACK 1)
185	6B	36.50.11.1	RD STACK MAG 2 (+U STACK 2)
186	4A	36.01.31.1	READ COMPLETE GATE (-T RD COMP GATE)
187	8A	36.12.21.1	BRUSH CB RESET (-T CB RESET)
188	8A	36.12.21.1	BRUSH IMP CB(-TBRUSH IMP CB)
189	8A	β1A1G16A	1/2 WRITE-NO 1 BRUSH
190	8A	β1A1G16B	1/2 WRITE-NO 2 BRUSH
191			
192	SPARE		
193	SPARE		
194	6B	36.50.11.1	STACK SELECT (-T STACK SELECT)
195			
196			
197			
198			
199			
200			

PUNCH CONNECTOR WIRES (PC)

CONNECTOR POS (PC)	WIRE DIAGRAM LOC	LOGIC REF	DESCRIPTION
1 TO 80	14B	36.29.11.1	COL 1 TO 80 PUNCH MAGNETS (+U)
81 TO 160	13A-14A	36.29.51.1	COL 1 TO 80 PUNCH BRUSHES
161			
162			
163			
164			
165			
166			
167			
168			
169			
170			
171			
172			
173	14A	36.19.11.1	(-U LATCH RESET)
174	14A	36.22.11.1	(-T AFTER 9 CAM)
175	14A	36.21.11.1	(-T PCH SCAN CB)
176	4A	36.18.11.1	(-T PCH STOP)
177	12A	36.24.11.1	(-T PUNCH CLUTCH MAGNET)
178	12A	36.24.11.1	(-T PROCESS PUNCH)
179	12A	36.24.11.1	(-T NOT PROCESS PUNCH)
180	12A	36.25.11.1	(-T PUNCH JAM)
181	12A	36.25.11.1	(+T CHECK RESET PUNCH)
182	12B	36.21.11.1	DIE C L DELAY (-T PD CLD)
183	12B	36.50.11.1	(-T STACKER LATCH RESET)
184	12B	36.50.11.1	STACKER RELAY (+U STACK 4)
185	12B	36.50.11.1	STACKER RELAY (+U STACK 8)
186	SPARE	36.16.11.1	1/2 WRITE- PUNCH BRUSHES
187	14A	β1A1G26A	1/2 WRITE- PUNCH BRUSHES
188			
189	12B	36.50.11.1	STACK INHIBIT (+U STACK INH)
190	6B	36.18.11.1	(+U PUNCH CHECK LIGHT)
191	6B	37.01.11.1	(-T START RELAY)
192			
193			
194			
195			
196	14A	36.21.11.1	(-T LINE BRUSH IMP)
197			
198			
199			
200			

CONNECTOR PANEL



PWA	LOC	FUNCTION
1	2A	BULK SUPPLY
2	-	SPARE
3	2A	BULK SUPPLY
4	1A	TAPE DRIVE
5	1A	TAPE DRIVE
6	1A	AC GROUND
7	1A	TAPE DRIVE
8	-	SPARE

PWC	LOC	FUNCTION
1	2B	CHAIN INTERLOCK
2	17A	CHAIN RELAY PICK
3	2A	-12 VDC
4	2B	-60 V GROUND
5	2B	-60 V GROUND
6	18B	CHAIN INTERLOCK
7	2B	+6 VDC
8	18A	SPACE MAGNETS OFF
9	2A	-20 VDC

POWER CONNECTORS

PWB	LOC	FUNCTION
1	2A	INTERLOCK
2		
3	1A	EMERGENCY STOP
4	18A	CARRIAGE MOTORS
5	18B	CARRIAGE MOTORS
6	18A	CHAIN & RIBBON MOTORS
7	18B	CHAIN & RIBBON MOTORS
8	2A	INTERLOCK
9		
10		
11	1A	POWER ON SWITCH
12	1A	POWER ON SWITCH
13	1A	SYSTEM POWER
14	1A	SYSTEM POWER
15	2B	CONV OUTLET
16	2B	BLOWERS
17	2B	BLOWERS

PWD	LOC	FUNCTION
1	-	SPARE
2	2B	PRINTER MAGNETS
3	2A	MARGINAL CHECK
4	2A	DC GROUND
5	2A	MC CONTROL
6	2A	MARGINAL CHECK
7	2B	PRINTER MAGNETS
8	2A	BUCK BOOST
9	2B	-20V SENSE CONTROL
10	2B	-12V SENSE
11	2B	POWER HOLD
12	2B	PRINTER INTERLOCK CONT 1
13	2B	PRINTER INTERLOCK CONT 2
14	18A	SKIP OFF RELAY INTERLOCK
15	2B	SPACE MAGNETS
16	2A	CONTROL
17	2A	BUCK BOOST

DISCONTINUED SECTION 31 AND 32 C-L SUFFIX

605447

READER CONNECTOR WIRES (RC)

CONNECTOR POS (RC)	WIRE DIAGRAM LOC	LOGIC REF	DESCRIPTION
1 TO 80	B B 7* - 8*	42.40.51.1	COL 1 TO 80-NO 1 READ BRUSH
163	8A	36.10.21.2	SOLAR CB 1ST READ
187	8A	36.10.21.2	SC CB 2ND RD <del>BRUSH CB RESET (T CB RESET)</del>
188	8A	36.10.21.2	SC CB 1ST CD <del>BRUSH IMP CB (T BRUSH IMP CB)</del>

POWER CONNECTORS

PWB	LOC	FUNCTION
10	8B	+30V DC

INTERNATIONAL BUSINESS MACHINES CORP.		DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	SOLAR CB WIRING	7-20-62	802843K			X PRINT TO ENG. SPEC. NO. 894924	
DIAGRAM CHANGES							
DESIGN	SPB 5-3-62 MODEL 1402-1						
DETAIL	SPB 7-6-62						
CHECK	WCK 7-6-62 DRAW						
APPRO	RCS 7-11-62 CHECK					USED IN 605366	605447



605448

RESISTORS					
NO	DWG LOC	OHMS	WATTS	PART NO	PHYSICAL LOCATION

6	8A	24 <del>30</del>	5 <del>10</del>	610367 <del>609423</del>	RELAY GATE
7	8B <del>8A</del>	110 <del>120</del>	1 <del>2</del>	610369 <del>609422</del>	RELAY GATE

9	8B <del>8A</del>	24 <del>30</del>	5 <del>10</del>	609367 <del>609423</del>	RELAY GATE
10	8B <del>8A</del>	110 <del>120</del>	1 <del>2</del>	610369 <del>609422</del>	RELAY GATE

12	14A	24 <del>30</del>	5 <del>10</del>	610367 <del>609423</del>	RELAY GATE
13	14A	110 <del>120</del>	1 <del>2</del>	610369 <del>609422</del>	RELAY GATE
14	8B <del>14A</del>	110	2	609393	RELAY GATE

16	7A	10	4	610373	RELAY GATE
17	14A	10	5	603212	RELAY GATE
18	8B	9.1K	1/2	610372	RELAY GATE
19	8B	9.1K	1/2	610372	RELAY GATE
20	8B	160	1/2	317580	RELAY GATE
21	8A	9.1K	1/2	610372	RELAY GATE
22	8A	9.1K	1/2	610372	RELAY GATE
23	8A	160	1/2	317580	RELAY GATE
24	7A	20K	1/2	300723	READ FEED
25	7A	110K	1/2	317033	READ FEED
26	7A	6.8K	1/2	317025	READ FEED
27	7A	20K	1/2	300723	READ FEED
28	7A	1.3K	1/2	317429	READ FEED
29	7A	3K	1/2	334959	READ FEED
30	7A	1K	1	315970	RELAY GATE

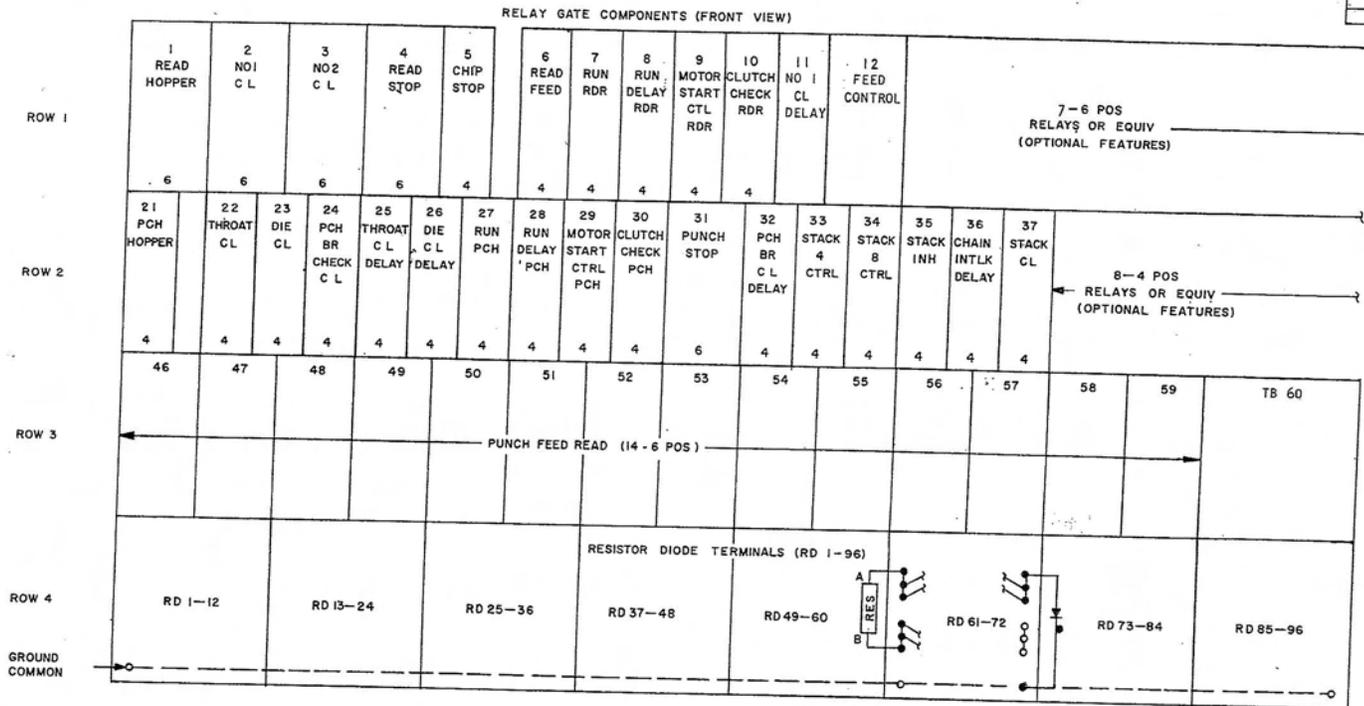
CAPACITORS					
NO	DWG LOC	MFD	VOLTS	PART NO	PHYSICAL LOCATION
15	8B	.33	100DC	610368	RELAY GATE
16	8A	.33	100DC	610368	RELAY GATE

DIODES			
NO	DWG LOC	PART NO	PHYSICAL LOCATION
11	7A	603793	RELAY GATE

ON RELAY GATE				
RESISTOR DIODES (RD 1-48)				
POS	LOC	OHMS	WATTS	PART NO
14	8A	130	+	-

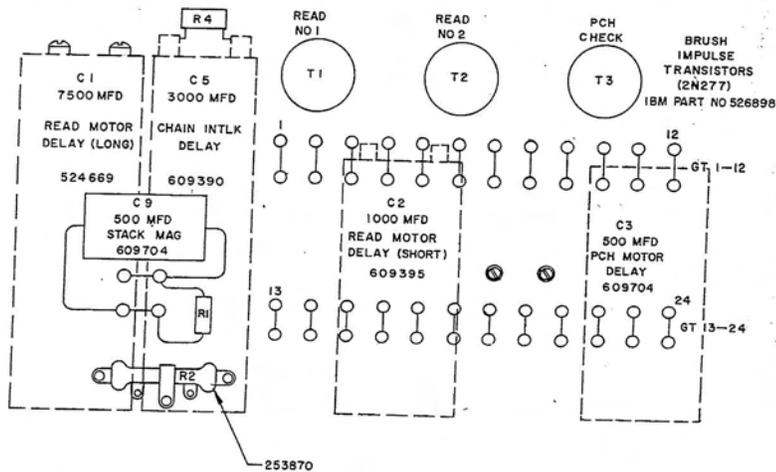
ON RELAY GATE				
RESISTOR DIODES (49-96)				
POS	LOC	OHMS	WATTS	PART NO
86	8A <del>7A</del>			609396
87	7A			<del>609396</del>
88	8A	130	+	-

INTERNATIONAL BUSINESS MACHINES CORP.		DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME SOLAR CB WIRING		7-20-62	802843K			X PRINT TO ENG. SPEC. NO. 894924	
DIAGRAM ADDITION		11-13-62	804340				
DESIGN	1-6 5-3-62 MODEL 1402-1					USED IN 605366	
DETAIL	1-6 7-6-62						
CHECK	1-6 7-6-62 DRAW						
APPRO	RLS 7-11-62 CHECK						
						605448	



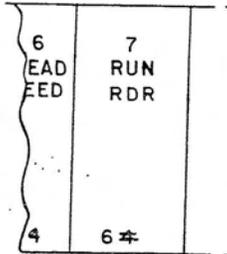
DUO RELAYS

(DU1) FUSE (20V) 609149	(DU2) START (20V) 609149	(DU3) INTLK STOP (20V) 609149	(DU4) CHECK RESET (20V) 609149	(DU5) CHAIN INTLK 124843
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605449

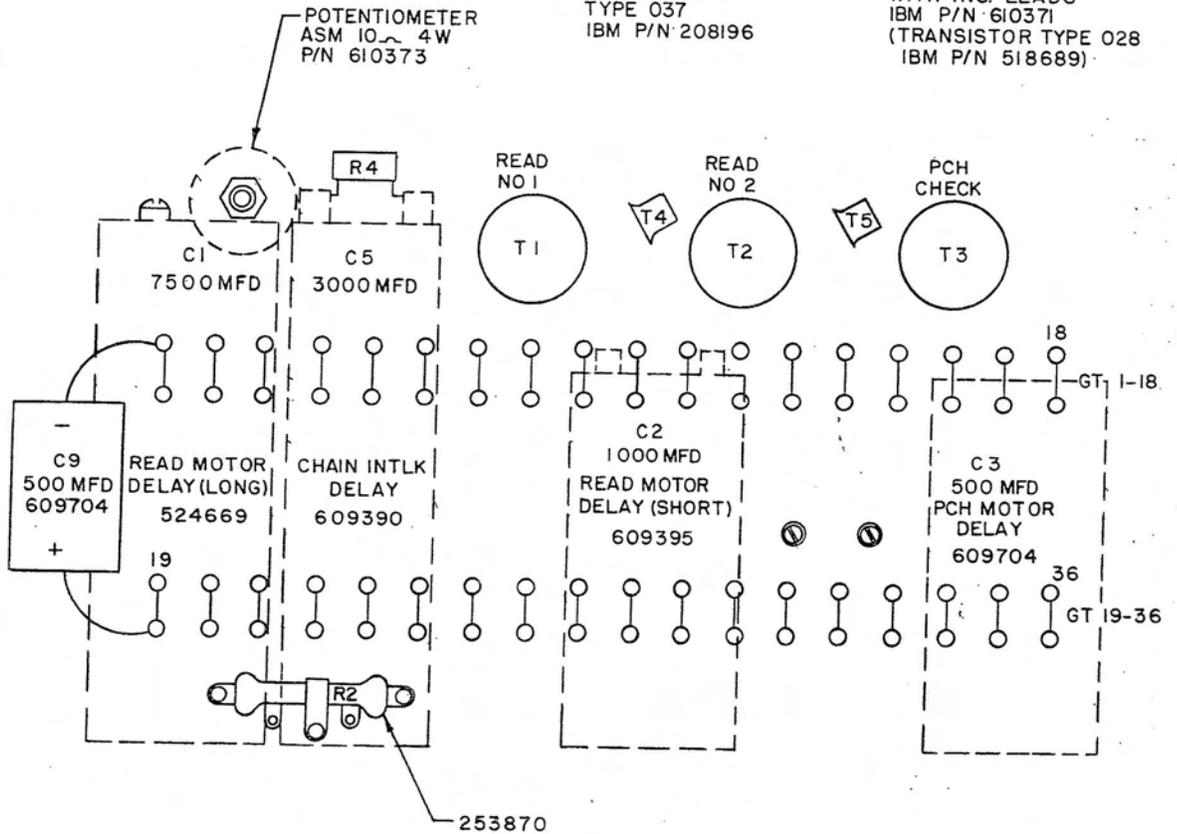
RELAY GATE COMPONENTS (FRONT VIEW)



ROW 1

T1, T2, T3  
BRUSH IMPULSE  
TRANSISTORS  
TYPE 037  
IBM P/N 208196

T4, T5  
DRIVER TRANSISTOR  
WITH INS. LEADS  
IBM P/N 610371  
(TRANSISTOR TYPE 028  
IBM P/N 518689)



INTERNATIONAL BUSINESS MACHINES CORP.				DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	SOLAR CB WIRING DIAGRAM ADDITION			7-20-62	802843K			X PRINT TO ENG. SPEC. NO. 894924	
DESIGN	DBB	5-3-62	MODEL	1402-1					
DETAIL	DBB	7-6-62							
CHECK	HEC	7-6-62	DRAW					USED IN 605366	
APPRO	RLS	7-11-62	CHECK						605449

35A-36A

RELAY LOCATIONS

LOC	OHMS	TOLERANCE	PART NO	DESCRIPTION
5A	3.3	±0.2	609005	READ CLUTCH MAGNET COIL
12A	11.0	±0.5	609073	PUNCH CLUTCH MAGNET COIL

CHANGE NO
802620B
80292B
802843A

HEAVY DUTY RELAYS

RELAY	COIL	CONTA	CONT B		PART NO	DESCRIPTION
HD 1	4B	1B	-		609154	READ MOTOR
HD 2	10B	1B	-		609154	PUNCH MOTOR
HD 3	2B	2A	-		76725	-12V SENSE
HD 4	2B	1A	-		76725	POWER HOLD
HD 5	18A	17A	17B		223642	CARRIAGE MOTOR
HD 6	18A	17A	17B		223642	CHAIN AND RIBBON MOTOR
HD 8	1A	1A	-		480443	CONVENIENCE OUTLET
HD 9	2B	2B	-		369244	PRINTER INTLK CONTROL

DUO RELAYS

RELAY	COILS		CONTACT POINTS				PART NO	DESCRIPTION
	P	H	AU	BU	AL	BL		
DU 1	4A	-	3A	3B	3A	3B	609149	FUSE
DU 2	6A	-	4B	9B			609149	START
DU 3	6A	-	3B	9B			609149	INTLK STOP
DU 4	6B	-	6A	5A	11A	12A	609149	CHECK RESET
DU 5	18B	-	17B	17A	17B	17A	124843	CHAIN INTLK

PM RELAYS

RELAY	COILS		CONTACT POINTS						DESCRIPTION	SIZE	TYPE
	P	H	1	2	3	4	5	6			
1	4A	4A	3B	4B	4B	5A	5B	5A	READ HOPPER CL	6	2
2	4A	4A	4A	4B	5A	5A	8A	5B	NO 1 CL	6	2
3	4A	4A	4A	4B	6A	6A	8A	5B	NO 2 CL	6	2
4	4A	5A	5A	6A	5B	7A	4B	5B	READ STOP	6	2
5	10B		10B	11B					CHIP STOP	4	3
6	4A	6A	5A	4B	5A	5B			READ FEED	4	1
7	4B	4B	4B	5A	5B	5A			RUN-READER	4	1
8	4B	4B	4B	4B					RUN-DELAY-READ	4	3
9	4B	4B	4B	4B	4B	4B			MOTOR CTRL-RDR	4	3
10	5A	4A	4A	4A	4B				READ CLUTCH CHECK	4	1
11	4A	4A	4A	6A	6A				NO 1 CLUTCH DELAY	4	1
12	4A		4A	3A	3A	4A	4A		FEED CONTROL	6	2
13	4A	6A	6A	5A	4A						
14											
15											
16											
17											
18											
19											
20											
21	10A	10A	9B	11A	11B	9B			PUNCH HOPPER CL	4	1
22	10A	10A	10A	9A	11A				THROAT CL	4	1
23	10A	10A	10A	9A	11A				DIE CL	4	1
24	10A	10A	10A	9A	11A	11B			PUNCH BR CL	4	1
25	10A	10A	9A		11A	12A			THROAT CL DELAY	4	1
26	10A	10A	9A	12A	11B	11A			DIE CL DELAY	4	1
27	10B	10B	9B	11A	5B	11A			RUN-PUNCH	4	1
28	10B		10B	10B	5B				RUN DELAY-PUNCH	4	4
29	10B	10B	9B	9B	10B				MOTOR START	4	3
30	12A	10B	10B	11A	9B	12A			PUNCH CLUTCH CHECK	4	1
31	12A	11A	11A	9B	12A	11A	14A	13A	PUNCH STOP	6	2
32	10A	10B	9B	11A	14A	11A			PUNCH BR CL DELAY	4	1
33	11B	12B	11B	12B					STACK 4 CTRL	4	1
34	11B	12B	11B	12B	12B				STACK 8 CTRL	4	1
35	12B	11B	11B	11B	11B	11A			STACKER INH	4	1
36	17B	17B		17B	2B				CHAIN INTLK DELAY	4	3
37	11B		11B	11A	11B				STACKER CL	4	1
38											
39											
40											

DISCONTINUED SECTION 37 AND 38 C-L SUFFIX

605450

PM RELAYS

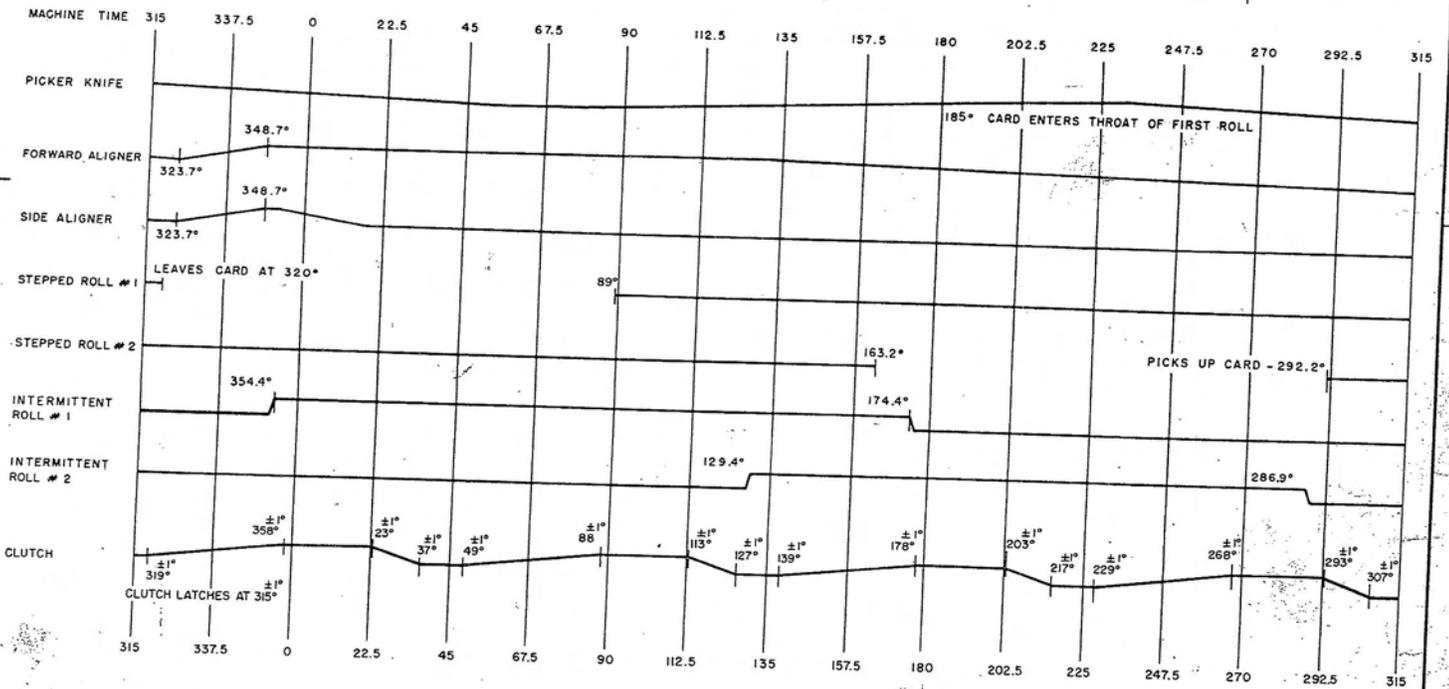
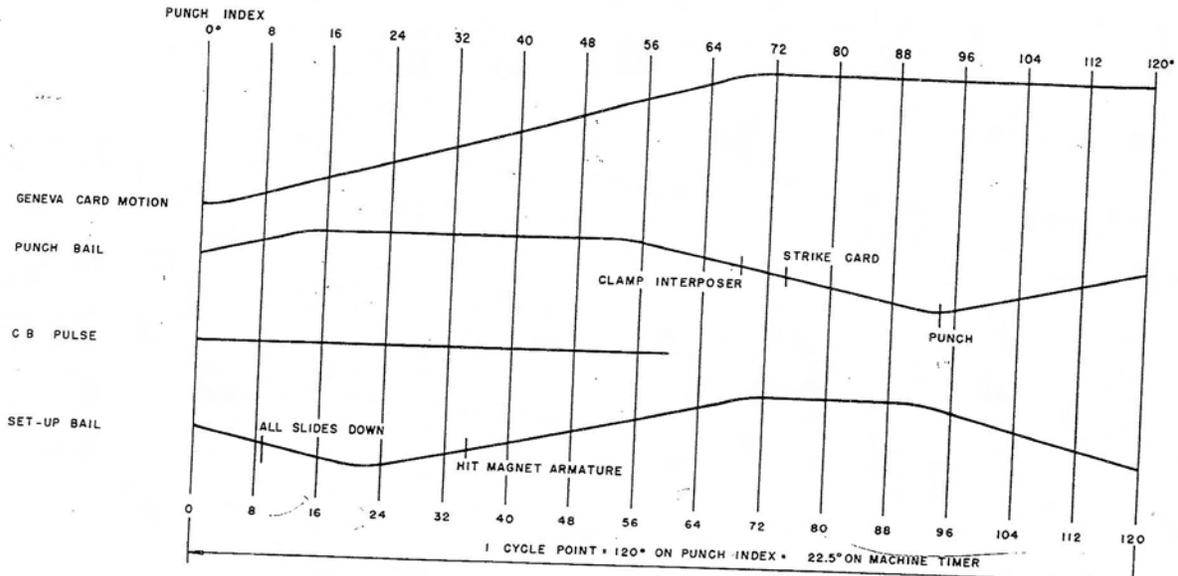
RELAY	COILS		CONTACT POINTS						DESCRIPTION	SIZE	TYPE
	P	H	1	2	3	4	5	6			
7								7A		46	2

INTERNATIONAL BUSINESS MACHINES CORP.				DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	SOLAR CB WIRING DIAGRAM CHANGES			7-20-62	802843K			X PRINT TO ENG. SPEC. NO. 894924	
DESIGN	89B	5-3-62	MODEL	1402-1				USED IN 605366	
DETAIL	DFB	7-6-62							
CHECK	RLC	7-6-62	DRAW						
APPRO	RLS	7-11-62	CHECK						
									605450

PUNCH MECHANICAL TIMINGS

CHANGE NO
800972 Q
801906 C

TIMING CHART - 1402  
 1333 1/3 RPM  
 1/3 REV = 1 CYCLE POINT

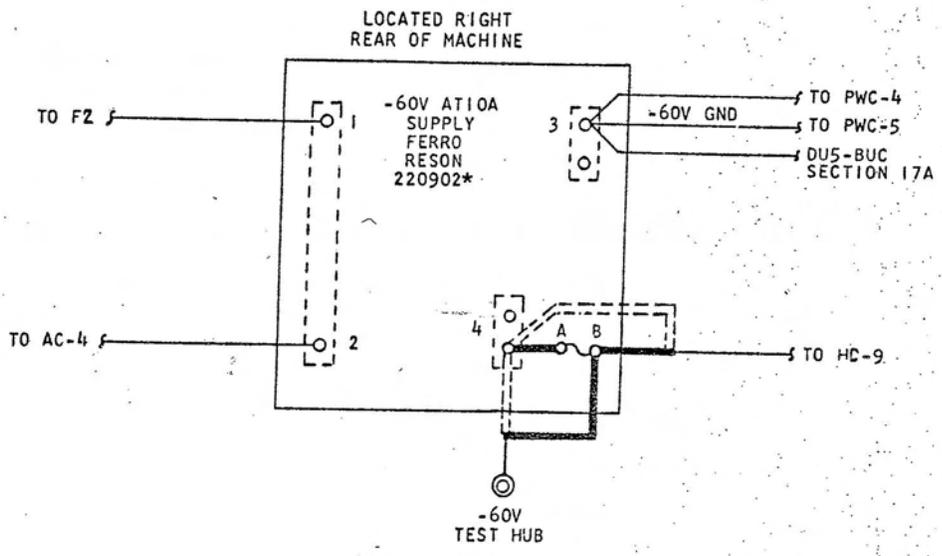


FIELD USE

635623

POWER SUPPLY  
 PARTIAL VIEW OF WIRING DIAGRAM (P/N 609802)  
 SECTION 1 & 2

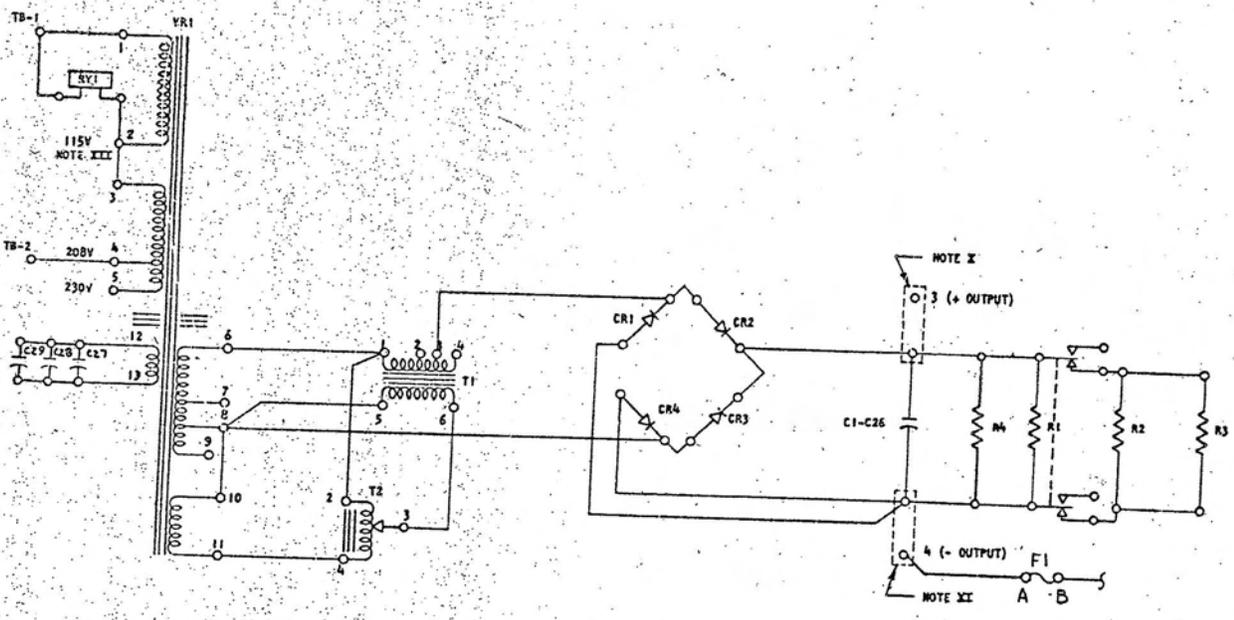
B/m 635619  
 EC 809274



\* USE 10A FUSE (P/N 107669) AND 20A POWER SUPPLY (P/N 480765) WITH NUMERIC CHAIN PRINTER.  
 USE INPUT TERMINAL 1 AND 4 FOR 208V, 1 AND 5 FOR 230V.

INTERNATIONAL BUSINESS MACHINES CORP.		DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME OVERCURRENT PROTECTOR		6-29-65	809274			X PRINT TO ENG. SPEC. NO. 894924	
-60V @ 10A AND 20A						WHERE USED	
DESIGN	WLZ 2-10-65	MODEL	1402-1			635619	
DETAIL	WLZ 2-10-65					635621	
CHECK	WEM 4-7-65	DRAW					
APPRO		CHECK					635623

DATE	CHANGE
10-22-59	105581G
1-14-60	105585B
3-11-60	105585S
1-3-61	111210
2-4-65	704772



COMPONENT CHART		
CODE	PART NO.	DESCRIPTION
VR1	221342	VOLTAGE REGULATOR
T1	221256	TRANSFORMER, BUCK-BOOST
T2	360310	TRANSFORMER, AUTO
C1-C26	208232	CAPACITOR 3500 MFD 75V DC
C27-C29	207361	CAPACITOR 15 MFD 330V AC
CR1-CR4	127324	DIODE
R1, R4	505798	RESISTOR 150 OHM 50W
R2	322739	RESISTOR 50Ω 50W
R3	208825	RESISTOR 25Ω 50W
RY1	242618	RELAY
F1	69791	FUSE 10 AMP

NOTES:  
 X = CAPACITOR BUS PLATE PART NUMBER 221982  
 XI = CAPACITOR BUS PLATE PART NUMBER 222011  
 XII = FOR 115V AC OPERATION CONNECT TAPS 1 TO 3 AND 2 TO 5 AND CONNECT INPUT TO 1 AND 2. REMOVE JUMPER 2 TO 3.

INTERNATIONAL BUSINESS MACHINES CORP.				
NAME	WIRING DIAGRAM - POWER SUPPLY -			
	60 V DC AT 10 APPS			
DESIGN	PECO	3-17-53		MISC
DETAIL	RLB	9-1-59	SCALE	NONE
CHECK	OPC	9-1-59	DRAW	
APPRO	RLV	10-22-59	CHECK	



605 314

RELAY 13 ADDITION AND ADDITIONAL NOISE SUPPRESSION

PRE-REQUISITES:

1. Bill of Material 605295 No. 1 Card Lever Delay
2. Bill of Material 605219 Punch Magnet Noise Suppression

SPECIAL TOOLS REQUIRED: None.

INSTALLATION TIME: 2 Hours.

PURPOSE:

1. To prevent card lever bounce or card jam from interrupting process feed before feeding is stopped.
2. To add arc suppression to prevent the drop of relays 2 and 3 from causing punch checks on reader runout.

DESCRIPTION: Under certain conditions of feeding or on a jam at the No. 1 card lever, it is possible to pick read stop relay #4 before processing of the card at second read has begun. This will result in the card at second read going to the stacker without being processed. Relay 13 is added to delay the pick of relay 4.

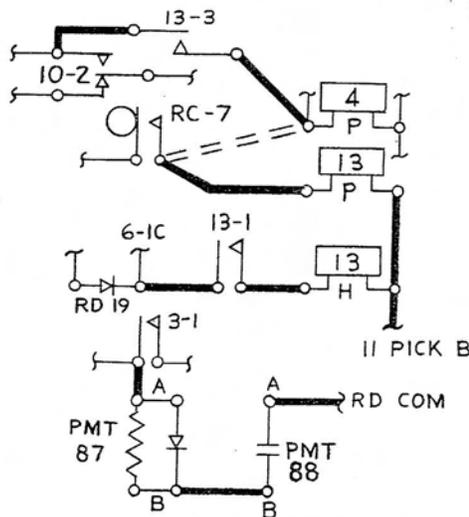
The arc suppression on relay 2 and 3 is added to suppress noise spikes on reader runout which may cause punch checks on a combined operation. RL-2 timing is advanced to compensate for the delayed drop of R2 and 3 caused by the arc suppression circuit.

INSTALLATION:

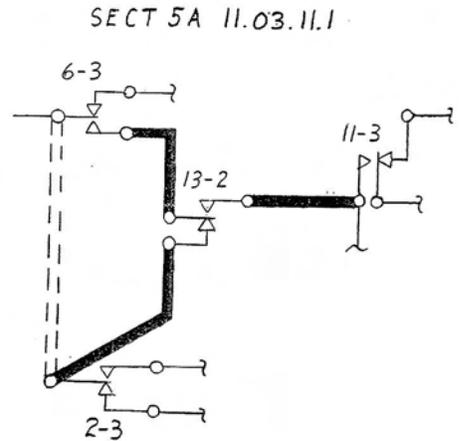
1. Remove all machine power.
2. Mount relay 13 on the top row of the relay gate directly over R-35 using the following parts: moulding 344599, clip 159944, screw 198363 (2), relay 719005, dust cover 602955.
3. Remove the wire from RC-7 to relay 4 pick at R4, remove the plug and pull the wire back through the lacing to terminate at R13 pick. Use plug 187243.
4. Remove the jumper from 6-3T to 2-3C.
5. Add the following wires using wire 601453 and plug 187243(10).
  - A. 2-3C to 13-2N
  - B. 6-3T to 13-2C
  - C. 3-1C to PMT 87A
  - D. RD19B to 13-1C
  - E. 13-3T TO 4 PICK A
6. Add jumper 129245 from 13-2T to 11-3T.
7. Add jumper 129245 from PMT 88A to the RD common row (Row 4 of relay gate).
8. Add jumper 129243 from PMT 87B to PMT 88B.
9. Add jumper 129243 from 13-1T to 13 hold A.
10. Add jumper 129245 from 13-3C to 10-2T.
11. Add brass jumper 205331 from 13 hold B to 13 pick B.
12. Add jumper 129245 from 13 hold B to 11 pick B.
13. Add resistor 315970 and diode 441318 from PMT 87 A to B. Positive end of diode to the B side.
14. Add capacitor 609746 to PMT 88, A to B. Note: On a limited number of "J" Suffix machines, diodes have been added to PMT 87 and 88 by Bill of Material 605307. If this is on the machine for PMT 87 and 88, remove the diodes and wiring.
15. Change timing of RL2 from M 286°, B 246° to M 270°, B 230°.

TESTING: Test for proper operation.

AFTER INSTALLATION: Fill out necessary forms and mark wiring diagram.



SECT 4A  
11.02.11.1



SECT 5A 11.03.11.1

INTERNATIONAL BUSINESS MACHINES CORP.				DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	RELAY 13 ADDITION							X PRINT TO ENG. SPEC. NO. 894924	
DESIGN	RPC	11-2-61	MODEL	1402-1	2-27-62	802669-G			
DETAIL	RPC	11-2-61							
CHECK			DRAW					WHERE USED: 605 311	
APPRO			CHECK						605314

INSTRUCTION

609779D

INDEX  
1402-1 FEATURE WIRING DIAGRM  
INSTALL EARLY READ FEATURE

SECTION	NAME	PART NUMBER	ENGINEERING CHANGE NO.
3-4	CIRCUITS (C SUFFIX)	609837	802843-A
3-4	CIRCUITS (D-H SUFFIXES)	609824	802843-A
3-4	CIRCUITS (J-L SUFFIXES)	609825	802928
3-4	CIRCUITS (M SUFFIX)	610303	802843-A
5-6	CIRCUITS (C-D SUFFIXES)	609826	803330
5-6	CIRCUITS (E-F SUFFIXES)	609827	803330
5-6	CIRCUITS (G-L SUFFIXES)	609828	803330
5-6	CIRCUITS (M SUFFIX)	609829	802843-A
23-24	TIMINGS (C-L SUFFIXES)	609830	802843-A
23-24	TIMINGS (M SUFFIX)	610304	802843-A
25-26	LOCATIONS (C-M SUFFIXES)	609831	802843-A
29-30	TIMINGS (C-L SUFFIXES)	609832	802928
29-30	TIMINGS (M-SUFFIX)	609781	803330
33-34	LOCATIONS (C-K SUFFIXES)	609833	802928
33-34	LOCATIONS (L SUFFIX)	609794	802928
33-34	LOCATIONS (M SUFFIX)	610306	802843-A
35-36	LOCATIONS (C-L SUFFIXES)	609834	802620-B
35-36	LOCATIONS (M SUFFIX)	609795	802843-A
37-38	LOCATIONS (C-L SUFFIXES)	609835	802843-A
37-38	LOCATIONS (M SUFFIX)	609799	802843-A

INTERNATIONAL BUSINESS MACHINES CORP.				DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	INSTALL EARLY READ			11-1-61	802620-B	7-19-62	803330-F	X PRINT TO ENG. SPEC. NO. 894924	
	FEED								
DESIGN	HCK	7-12-62	MODEL 1402-1	12-27-61	802928				
DETAIL	HCK	7-12-62		2-9-62	802928-A				
CHECK	DEB	7-12-62	DRAW	3-16-62	802843-A				
APPRO	RLS	7-13-62	CHECK	6-15-62	803330				
									609779-D

605379

DISCONTINUED  
INSTRUCTIONS

PREVENT CAPACITOR DISCHARGE NOISE

PRE-REQUISITES:

1. 605219 PUNCH MAGNET NOISE SUPPRESSION ON MACHINES PRIOR TO "J" SUFFIX
2. 605263 ON MACHINES PRIOR TO SERIAL #20760.

SPECIAL TOOLS REQUIRED: NONE

INSTALLATION TIME: .5 HOURS

PURPOSE: TO PREVENT CAPACITOR DISCHARGE ON A COMBINED OP FROM CAUSING EXTRA READ CLUTCH CYCLES.

DESCRIPTION: A CAPACITOR HAS BEEN INSTALLED ON RD 50 TO PREVENT NOISE SPIKES FROM THE READ CLUTCH MAGNET FROM CAUSING PUNCH CHECKS ON A COMBINED READ PUNCH OP. (B/M 605263 WAS ISSUED FOR FIELD MACHINES) IT HAS SINCE BEEN FOUND THAT THE DISCHARGE OF THIS CAPACITOR CAN, UNDER SOME CONDITIONS, CAUSE THE READ FEED TRIGGER TO TURN ON AND MAY OCCASIONALLY CAUSE AN EXTRA READ CYCLE. A RESISTOR IS ADDED IN SERIES WITH THE CAPACITOR TO PREVENT THE RAPID DISCHARGE OF THIS CAPACITOR.

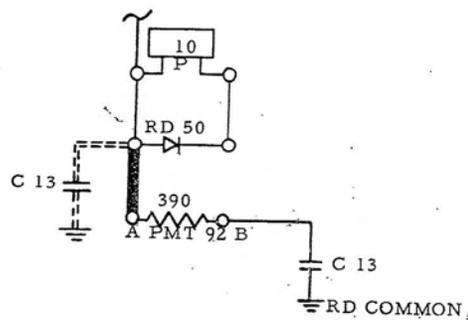
INSTALLATION:

1. REMOVE MACHINE POWER.
2. REMOVE CAPACITOR RD 50 PART # 609746.
3. ADD 390 OHM RESISTOR 2114246 TO PMT 92 POSITION. A TO B TERMINALS. (ROW 5 ON RELAY GATE)
4. ADD JUMPER WIRE FROM RD 50 A TO PMT '92A. USE WIRE 601453 AND CLIPS 187243 (2).
5. REINSTALL CAPACITOR 609746 FROM PMT 92B TO THE RD COMMON TERMINAL. (ROW 4 ON RELAY GATE).

TESTING: TEST ON A COMBINED READ-PUNCH OP.

AFTER INSTALLATION: MARK W/D AND FILL OUT NECESSARY FORMS.

SECT 5 A 11.03.11.1



INTERNATIONAL BUSINESS MACHINES CORP.		DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	PREVENT CAPACITOR	2-1-62	802949			X PRINT TO ENG. SPEC. NO.	
DISCHARGE NOISE						894924	
DESIGN	KPC 1-18-62					WHERE USED:	
DETAIL	KPC 1-18-62					605378	
CHECK	DEB 1-18-62						
APPRO	KLS 1-22-62						605379

605413

DISCONTINUED

INDEX

1402-1 FEATURE WIRING DIAGRAM

CURRENT BALANCE CORRECTION MACHINES 609400-C TO 609400-M.

<u>SECTION</u>	<u>NAME</u>	<u>PART NUMBER</u>	<u>ENGINEERING CHANGE NO.</u>
INSTRUCTION	INSTRUCTION	605414	803330-D

<b>INTERNATIONAL BUSINESS MACHINES CORP.</b>		<b>DATE</b>	<b>CHANGE NO.</b>	<b>DATE</b>	<b>CHANGE NO.</b>	<b>NOTE</b> X PRINT TO ENG. SPEC. NO. 894924	<b>DEVELOPMENT NO.</b>
<b>NAME</b>	CH 609400-C THRU M FOR CURRENT BALANCE CORRECTION	9-21-62	803330-D				
<b>DESIGN</b>	RJT 6-15-62 MODEL						
<b>DETAIL</b>	RJT 6-15-62						
<b>CHECK</b>	HAL 6-21-62 DRAW						
<b>APPRO</b>	DEB 9-12-62 CHECK						605413

INDEX

5/2/63  
HBK

605414

DISCONTINUED

INSTRUCTIONS

CURRENT BALANCE CORRECTION: MACHINES W/D 609400-C TO W/D 609400-M.

PRE-REQUISITES: NONE

SPECIAL TOOLS REQUIRED: NONE

INSTALLATION TIME: .5 HOURS

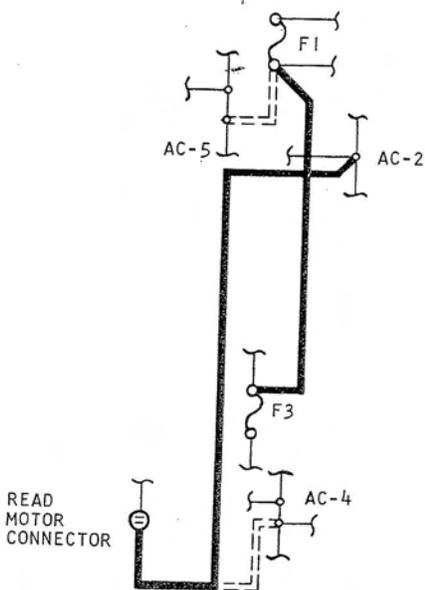
PURPOSE: TO CORRECT UNDESIRABLE CURRENT UNBALANCE ON THE A. C. INPUT SOURCE ON ALL MACHINES.

DESCRIPTION:

THE LOAD ON EACH OF THE THREE PHASES IS REDISTRIBUTED TO ACHIEVE A BALANCED LINE CURRENT BY RECONNECTING THE READER MOTOR AND FERRO RESONANT INPUT.

INSTALLATION:

1. REMOVE ALL POWER TO MACHINE DURING INSTALLATION.
2. DISCONNECT AND TAPE BOTH ENDS OF THE CABLE LEAD CONNECTING FUSE 1 (SCREW TYPE FUSE) CENTER POST TO TERMINAL AC 5 (LOCATED ON LOWER LEFT BEHIND FUSE PANEL). SEE DRAWING.
3. INSTALL JUMPER 512533 BETWEEN FUSE 1 CENTER POST AND FUSE 3 CENTER POST.
4. MOVE THE READ MOTOR LEAD AT TERMINAL AC 4 TO TERMINAL AC 2. SEE DRAWING.



DRAWN IN

WD 609400 SECTION IA & B

TESTING: CHECK FOR PROPER OPERATION

AFTER INSTALLATION: MARK WIRING DIAGRAM AS IN DRAWING.

INTERNATIONAL BUSINESS MACHINES CORP.				DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	CURRENT BALANCE CORRECTION WD609400 C-M			9-21-62	803330-D			X PRINT TO ENG. SPEC. NO.	
DESIGN	RJT	6-15-62	MODEL 1402-1						
DETAIL	RJT	6-15-62							
CHECK	DEB	6-21-62	DRAW					WHERE USED	
APPRO	DEB	9-12-62	CHECK					605413	605414

605366 E

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FIELD USE

INDEX

1402-1 FIELD B/M  
READER SOLAR CB

SECTION	NAME	PART NO.	E. C. NO.
INSTRUCTION	SOLAR CB INSTALLATION	605429	809773
INSTRUCTION	SOLAR CB INSTALLATION	605430	804340
INSTRUCTION	PARTS CATALOG ADDITION	605431	809773
INSTRUCTION	SOLAR CB INSTALLATION	605432	804795
INSTRUCTION	SOLAR CB INSTALLATION	605433	804795
INSTRUCTION	REF MANUAL ADDITION	605434	804340
INSTRUCTION	SOLAR CB INSTALLATION	605436	802843-K
7-8	W/D RDK RD 1/2 WRITE	605437	804340
7-8	W/D RDK RD	605438	804340
13-14	W/D PCH RD & PCH 1/2 WRITE	605439	802843-K
13-14	W/D PCH RD & PCH	605440	802843-K
13A-14A	W/D PCH RD FEATURE	605441	802843-K
INSTRUCTION	W/D CHANGES	605442	802843-K
INSTRUCTION	W/D CHANGES	605443	802843-K
INSTRUCTION	W/D CHANGES	605444	802843-K
21A-22A	W/D ADDITION	605445	804340
INSTRUCTION	W/D CHANGES	605446	802843-K
INSTRUCTION	W/D CHANGES	605447	802843-K
23A-34A	W/D ADDITION	605448	804340
35A-36A	W/D ADDITION	605449	802843-K
INSTRUCTION	W/D CHANGES	605450	802843-K

INTERNATIONAL BUSINESS MACHINES CORP.				DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	READER SOLAR CB			7-20-62	802843-K	8-18-65	809773	K PRINT TO ENG. SPEC. NO. 894924 USED IN 1402-1	
DESIGN	DEP	5-3-62	MODEL	1402-1	11-13-62	804340			
DETAIL	DFB	7-6-62			4-9-63	804795			
CHECK	HK	7-6-62	DRAW		3-3-64	805464A			
APPRO	RCS	7-11-62	CHECK		4-2-65	809268			

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605366 E

G. W. CO. NO. 1402-1

605429

FIELD USE

SOLAR CIRCUIT BREAKER

PREPARATION:

- A. READ INSTRUCTIONS COMPLETELY AND STUDY INSTRUCTION DRAWINGS, TO BECOME AQUAINTED WITH PROCEDURES AND PARTS USED.
- B. CHECK BILL OF MATERIAL FOR BOTH THE 1401 AND 1402 INVOLVED IN THIS CHANGE TO DETERMINE THAT ALL PARTS WERE RECEIVED. PROCURE ANY MISSING PARTS BEFORE BEGINNING INSTALLATION. RUN READ, PUNCH, (AND PFR IS APPLICABLE) TESTS BEFORE STARTING INSTALLATION.

PRE-REQUISITES:

B/M 605312 REAR MACHINE SAFETY COVER, B/M 605218 3V POWER SUPPLY INPUT (ON.W/D 609400G ONLY MAKES PWB 10 AVAILABLE), AND ONE OF FOLLOWING APPLICABLE 1401 BILLS OF MATERIAL, TO BE INSTALLED CONCURRENTLY WITH SECTION III OF THIS BILL OF MATERIAL: 485753, 485754, 485755, 485756, OR 485922.

SPECIAL TOOLS AND/OR MATERIALS REQUIRED:

LARGE HACK SAW, ELECTRIC DRILL WITH 1/4" BIT

INSTALLATION TIME:

A TWO MAN TEAM IS RECOMMENDED FOR INSTALLATION OF THIS B/M AND THE COMPANION 1401 B/M. SECTIONS I AND II CAN BE DONE SIMULTANEOUSLY OR INDEPENDENTLY OF EACH OTHER. NORMAL 1402 OPERATION CAN BE RESUMED AFTER SECTIONS I AND II ARE INSTALLED. SECTION III HOWEVER, MUST BE INSTALLED CONCURRENTLY WITH THE 1401 COMPANION B/M. SEE SECTIONS I, II, AND III TO DETERMINE ESTIMATED INSTALLATION TIME.

PURPOSE:

TO PROVIDE IMPROVED READING RELIABILITY AND TO REDUCE THE MAINTENANCE REQUIREMENTS OF THE 1402 READER.

DESCRIPTION:

READ IMPULSE CAMS RL4, 5, 6, 7, 8, AND 9 ARE REPLACED WITH THE SOLAR CB UNIT TO PROVIDE UNIFORM BOUNCE-FREE READ IMPULSES. A LIGHT BEAM IS ALLOWED TO STRIKE A SOLAR CELL AT INDEX POINTS 9 THROUGH 12 BY A SLOTTED DISC MOUNTED ON THE READ PICKER KNIFE SHAFT. THE PULSE GENERATED IS FED INTO A THREE STAGE TRANSISTOR AMPLIFIER LOCATED IN THE SOLAR CELL UNIT WHICH IN TURN FEEDS A NEW TRANSISTOR PANEL MOUNTED ON THE RELAY GATE. CB TIMING IS CONTROLLED BY THE RELATIONSHIP OF THE DISC SLOTS TO THE LIGHT BEAM. THE DURATION IS CONTROLLED BY A POTENTIOMETER ON THE RELAY GATE TRANSISTOR PANEL. THE DYNAMIC TIMER CIRCUITRY IS ALSO CHANGED TO MINIMIZE DELAY IN NEON LAMP IGNITION TIME AND TO PROVIDE PUNCH STACKER CARD LEVER TIMING INDICATION.

INSTALLATION:

SECTION I

SOLAR CB MECHANICAL HARDWARE-INSTALLATION TIME: 1.0-1.5.

1. REMOVE ALL MACHINE POWER.
2. REMOVE RIGHT END, REAR AND REAR MACHINE SAFETY COVERS. REMOVE THE CAST HOPPER FILLER AND RIGHT FEED COVERS AS SEPARATE PARTS. (THIS ELIMINATES NEED TO REMOVE JOGGLER). REMOVE DRIVE PULLEY 602496, DRIVE BELT, BEARING RETAINER, RETAINER MOUNTING SCREWS, AND FILE FEED JOGGLER SPRING STUD.
3. USE HACK SAW TO CUT 7/8" ± 1/32" OFF THE REAR END (OPPOSITE END FROM RLCS'S) OF THE PICKER KNIFE CAM SHAFT.  
CAUTION: PROTECT LOWER BASE POWER SUPPLIES, ETC. FROM FALLING METAL CHIPS.
4. INSTALL SUPPORT CASTING 610740 AND O-RING 194989 USING NEW BEARING RETAINER SCREWS, WASHERS AND FILE FEED JOGGLER SPRING STUD. REINSTALL PICKER KNIFE DRIVE PULLEY 602496 SIMULTANEOUSLY WITH SUPPORT CASTING.
5. REMOVE PICKER KNIFE SHAFT END PLAY IN EXCESS OF .008" WHEN POSITIONING PICKER KNIFE DRIVE PULLEY. REINSTALL DRIVE BELT.
6. INSTALL SPINDLE 610376 WITH SET SCREWS 123639(2), REFERENCE: INSTRUCTION DRAWING 605431.  
REFERENCE: INSTRUCTION DRAWING 605431.
7. REMOVE THE PLASTIC COVER FROM THE EMITTER ASSEMBLY 610350 AND PRE-ASSEMBLE SET SCREWS 257976(3) INTO THE ADAPTER PLATE. REFERENCE: INSTRUCTION DRAWING 605431.
8. INSTALL THE EMITTER ASSEMBLY WITH TERMINAL BLOCK UP AND CENTERED OVER THE EMITTER SPINDLE AND ONTO THE MOUNTING PINS IN SUPPORT CASTING.

INTERNATIONAL BUSINESS MACHINES CORP.		DATE	CHARGE NO.	DATE	CHARGE NO.	NOTE	DEVELOPMENT NO.
NAME	READ SOLAR CIRCUIT BREAKER INSTALLATION	7-20-62	802843K			X PRINT TO ENG. SPEC. NO. 894924	
DESIGN	808 5-10-62	MODEL	1402-1	3-3-64	805464A		
DETAIL	808 7-6-62				809268		
CHECK	RLS 7-6-62	DRAW		8-18-65	809773	USED IN 605366	
APPRO	RLS 7-11-62	CHECK					605429

INSTRUCTION

G. P. CO. NO. 42799

605430

DISCONTINUED

SECTION I (Cont'd)

- POSITION ADAPTER PLATE TIGHT AGAINST THE THREE MOUNTING STUD SHOULDERS AND TIGHTEN THE THREE SET SCREWS.
- 9. INSTALL THE EMITTER DISC 610378 WITH SCREW 34512 AND WASHER 22478. POSITION THE EMITTER DISC SQUARELY AGAINST THE SHOULDER ON THE END OF EMITTER SPINDLE TO AVOID MISALIGNMENT AND/OR BREAKAGE. AVOID EXCESSIVE TIGHTENING OF THE SCREW TO AVOID DISC DAMAGE.
- 10. TRIP READ CLUTCH AND ROTATE FEED TO "9" TIME (12°). CENTRALLY LOCATE EMITTER DISC IN EMITTER SLOT BETWEEN SOLAR CELL AND LAMP BY SLIDING EMITTER SPINDLE ON SHAFT. ALSO ROTATE DISC TO A POINT WHERE THE 9 TIME SLOT IS APPROXIMATELY OPPOSITE THE SOLAR CELL OR LAMP. THIS GIVES A ROUGH TIMING ADJUSTMENT. TIGHTEN SPINDLE SET SCREWS AT THIS POINT.
- 11. REMOVE THE PORTION OF REAR MACHINE SAFETY SHIELD FOR CLEARANCE TO THE SOLAR CB UNIT AND RE-INSTALL SAFETY SHIELD.

SECTION II MISCELLANEOUS ELECTRICAL CHANGES-INSTALLATION TIME 1.5-2.0 HOURS.

NOTE: STEPS 5 AND 6 MAY BE HANDLED AS AN INDEPENDENT SECTION TO BE INSTALLED BEFORE OR AFTER SECTION III.

- 1. REMOVE ALL POWER FROM MACHINE.
- 2. CHANGE THE 4 POSITION RELAY 7 TO 6 POSITION RELAY 719007 WITH MOULDING 344603 AND CLIP 159945. TRANSFER WIRES AND JUMPEKS FROM THE 4 POSITION MOULDING TO THE CORRESPONDING POSITIONS ON THE 6 POSITION MOULDING.
- 3. DRILL A 1/4 INCH HOLE .625 INCH TO RIGHT OF GRD HUB ON CE AID PANEL AND MOUNT PLUG 602627
- 4. CUT AND ATTACH THE ".430" PORTION OF LABEL 610385 UNDERNEATH TEST HUB ADDED IN STEP 3. ATTACH THE REMAINING "PUNCH STACK CL" PORTION TO COVER "LATCH RESET" ON THE CB SELECTOR SWITCH CHAK.
- 5. ON MACHINES PRIOR TO W/D 609400-L THE DYNAMIC TIMER PRIMARY CONNECTION REQUIRES CHANGING TO PREVENT MARGINAL OPERATION BY ASSURING THAT 230 VOLTS IS AVAILABLE ON BOTH 208 AND 230 VOLT SUPPLY LINES. REMOVE AND TAPE EACH END OF THE JUMPER RUNNING BETWEEN FUSE F6 AND FUSE F4 (SCREW TYPE FUSES). INSTALL 50 INCH JUMPER 610386 BETWEEN FUSE F6 AND TERMINAL 5(230 VOLT TAP) ON THE BULK SUPPLY LOCATED ON THE LEFT END OF THE MACHINE. ROUTE AND TAPE WIRE TO CABLES AS REQUIRED AT NECESSARY POINTS TO ELIMINATE POSSIBLE INSULATION ABRASION.
- 6. DECREASED DELAY OF NEON LAMPS FIRING IS ACHIEVED BY REDUCING THE CAPACITIVE LOAD ON THE DYNAMIC TIMER POWER SUPPLY. THIS IS DONE BY ASSURING THAT THE DIAL DISPLAY SWITCH COMMON RUNS TO THE PLATE SIDES OF THE 12AX7 LOAD RESISTORS CORRESPONDING TO THE INNER AND OUTER LIGHTS. IT IS NECESSARY TO CHANGE ONLY THE OUTER LIGHT WIRING. THIS IS ACCOMPLISHED BY THE FOLLOWING:
  - a. SEPARATE THE 16 POSITION DYNAMIC TIMER POWER SUPPLY CABLE CONNECTOR LOCATED AT THE RIGHT END OF THE MACHINE ABOVE AND TO THE REAR OF THE 20 VOLT POWER SUPPLY.
  - b. SEPARATE THE NYLON CABLE CONNECTOR PLUGS ON BOTH THE PUNCH AND READER DIAL CABLES ON 1402 ABOVE SERIAL 20000.
  - c. BACK OUT AND INTERCHANGE PRONGS 4 AND 13 ON THE FEMALE SIDE OF THE 16 POSITION CONNECTOR.
  - d. USING SMALLEST SCREW DRIVER TO DEPRESS RETAINER ON SIDE OF PRONG WHILE PULLING WIRE. BACK OUT AND INTERCHANGE THE TWO PRONGS AT BOTH THE READER AND PUNCH NYLON CONNECTOR PLUGS CORRESPONDING TO 4 AND 13 (STEP C ABOVE). THIS NECESSARY TO MAINTAIN NEON LAMP POLARITY WITH THE GLOWING ELECTRODE TOWARD THE FRONT. NOTE: RE-FORM THE NYLON CONNECTOR PRONGS AS REQUIRED PRIOR TO RE-INSERTION TO PREVENT BACKING OUT. ON 1402 MACHINES PRIOR TO 20000, REVERSE OUTER NEON WIRES AT READER DIAL TERMINAL BLOCK. UNTAPE, CUT, REVERSE AND SPLICE OUTER PUNCH DIAL NEON LEADS.
- 7. PLUS 30 VOLTS MUST BE AVAILABLE ON POWER CONNECTOR PWB10 IN THE 1402 BY CABLE WIRE FROM THE 1401. INSTALL IF NECESSARY THE JUMPER LEAD AS PROVIDED IN THE COMPANION 1401 BILL OF MATERIAL TO ACCOMPLISH THIS.
- 8. RC163 ON THE 1402 IS CONNECTED BY CABLE WIRE TO THE 1401 PADDLE CONNECTOR AT OIB4COIF. IF THIS CONNECTION DOES NOT EXIST, THE WIRE FROM RC163 WILL BE FOUND WITH THE REMAINING UNUSED WIRES (POSSIBLY IN FRAME CHANNEL) IN THE CABLE TO OIB4. FOLLOW THE CABLE FROM OIB4 CO1 TO LOCATE UNUSED ENDS AND ROUTE THIS WIRE TO THE VICINITY OF THE PADDLE CONNECTOR AT OIB4COIF, BUT DO NOT MAKE THE CONNECTION UNLESS THE NEXT SECTION OF THIS BILL OF MATERIAL WILL BE INSTALLED IMMEDIATELY.

INTERNATIONAL BUSINESS MACHINES CORP.		DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	READ SOLAR CIRCUIT BREAKER INSTALLATION	7-20-62	802843K			X PRINT TO ENG. SPEC. NO. 894924	
DESIGN	088 15-10-62 MODEL 1402-1	11-13-62	804340				
DETAIL	088 7-6-62					USED IN 605366	
CHECK	HCE 7-6-62 DRAW						
APPRO	RLS 7-14-62 CHECK						605430

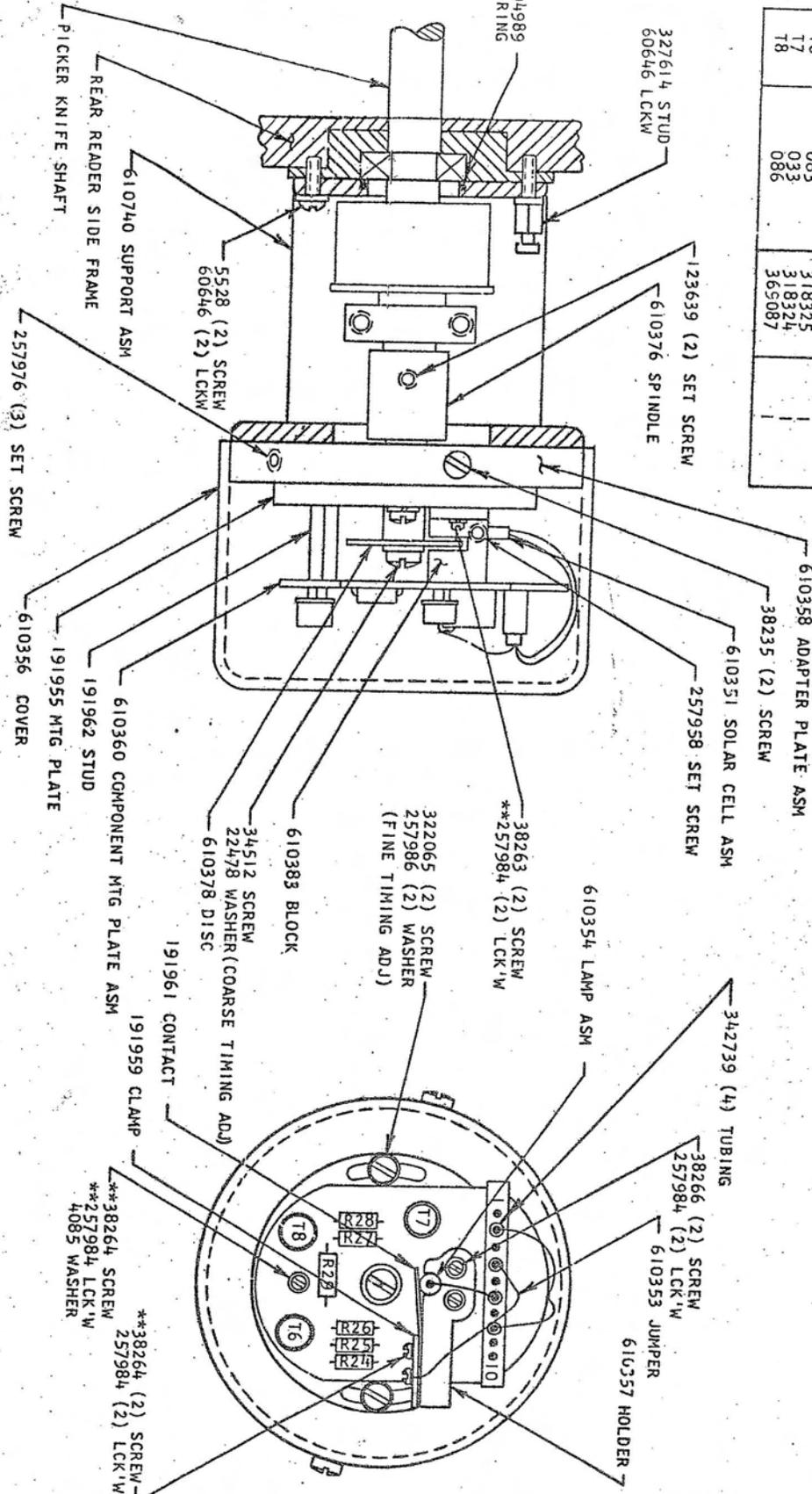
INSTRUCTION

U. S. GOV. NO. 13759-1

INSTRUCTION

LOC	DESCRIPTION	P/N	QUANTITY
R24	20K	300723	1
R25	110K	317033	1
R26	6.8K	317025	1
R27	20K	300723	1
R28	1.3K	317429	1
R29	13K	334959	1
T6	.50W	318335	1
T7		318324	1
T8		365087	1

FIELD USE



164509

\*\*MULTIPLE USAGE

INTERNATIONAL BUSINESS MACHINES CORP.				DATE		CHANGE NO.		NOTE		DEVELOPMENT NO.		INSTRUCTION
NAME	SOLAR CB			7-20-62	802843K			X PRINT TO ENG SPEC NO.				
PARTS CATALOG ADDITION				11-13-62	804340			894924				
DESIGN	DEB	5-3-62	MODEL	1402-1	3-3-64	805464A		USED IN:				605366
DETAIL	DEB	7-6-62			8-18-65	809773						
CHECK	HK	7-6-62	DRAW	CLW	4-9-62							
APPRO	PLS	7-11-62	CHECK									

DISCONTINUED

INSTRUCTIONS

605432

SECTION II (CONT D)

- 9. ON MACHINES WIRED TO 809400 J-L LEAD FROM PMT 94 TO GROUND IS IN A CABLE REMOVE AND INSULATE THIS LEAD AT BOTH ENDS. INSTALL JUMPER 809745 FROM PMT 94 TO GROUND. FOR CONNECTING TO GROUND, REPLACE THE PRESENT SCREW, WHICH IS ON THE FRONT SIDE OF RELAY CABINET AND IS THE MOUNTING SCREW FOR THE 20 VOLT POWER SUPPLY FAN HOUSING WITH SCREW (186758) AND WASHER (55901). WASHER SHOULD BE MOUNTED BETWEEN JUMPER CLIP AND PANEL TO INSURE GOOD CONTACT.

SECTION III SOLAR CB CIRCUIT CHANGE-INSTALLATION TIME 2.3-3.7 HOURS.

- 1. THIS SECTION MUST BE INSTALLED CONCURRENTLY WITH ONE OF THE 1401 COMPANION BILLS OF MATERIAL LISTED IN THE PRE-REQUISITES.
- 2. RUN READ AND PUNCH (AND PFR IS APPLICABLE) TEST PRIOR TO INSTALLING THIS SECTION TO REMOVE ANY BUGS PRIOR TO INSTALLATION.
- 3. IF THE 1402 IS EQUIPPED WITH POROUS BRONZE CONTACT ROLLS (W/D 609400C-J) MACHINE CONTAINS HALF WRITE CIRCUITRY, NEW TRANSISTOR PANEL 610370 MUST BE MODIFIED BY STEPS BELOW FOR MACHINES EQUIPPED WITH HALF WRITE. (OMIT STEPS BELOW FOR MACHINES WITHOUT HALF WRITE I.E. THOSE EQUIPPED WITH CARBON CONTACT ROLLS W/D 609400L AND 609400C-J WITH B/M 605290, 605291, 605292, OR 605293.)

RESISTOR 8 24 OHM	FROM	TO
RESISTOR 9 24 OHM	GT 9 TO GT 28	GT 9 TO GT 27
JUMPER	GT 15 TO GT 34	GT 15 TO GT 33
JUMPER	GT 34 TO GT 28	GT 33 TO GT 27
	GT 22 TO GT 28 (REMOVE)	

- 4. REMOVE MACHINE POWER
- 5. IDENTIFY THE LEADS TO THE CAPACITOR TERMINAL MINUS AND PLUS ACCORDING TO CAPACITOR POLARITY.
- 6. REMOVE THE ADJUSTABLE RESISTOR WITH LEADS IN TACT IN PREPARATION TO TRANSFER TO THE NEW TRANSISTOR PANEL IN PLACE OF RESISTOR INCLUDED ON THIS ASSEMBLY.
- 7. REMOVE THE OLD TRANSISTOR PANEL WITH LEADS STILL CONNECTED. INSTALL NEW PANEL 610370 WITH NEW SPACERS (4) 213940 AND SCREWS (4) 438579 PROVIDED. ADD RESISTOR REMOVED IN STEP 6 IN PLACE OF ADJUSTABLE RESISTOR ON NEW PANEL.
- 8. TRANSFER THE WIRES FROM OLD PANEL TO NEW PANEL ACCORDING TO THE TABLE BELOW FOR THE NEW TRANSISTOR GATE TERMINAL (GT) LOCATIONS. CAUTION: IT WILL BE NECESSARY TO SQUEEZE AND/OR TRIM SOME OF THE TERMINAL LUGS TO FIT THE NARROWER SPACE ON THE NEW GATE TERMINALS STRIP TO PREVENT BREAKAGE OF THE INSULATING BARRIERS BETWEEN TERMINALS.

REMOVE FROM OLD GT	INSTALL ON NEW GT
GT 1	GT 3
GT 2 OR 022 COL T1	GT 4 OR 037 COL T1
GT 6 OR 022 COL T2	GT 10 OR 037 COL T2
GT 9	GT 12
GT 10 OR 022 COL T3	GT 16 OR 037 COL T3
GT 14 WITH HALF WRITE ONLY	GT 22 WITH HALF WRITE ONLY
GT 15	GT 23
GT 16	GT 26
GT 17	GT 29
GT 18 WITH HALF WRITE ONLY	GT 28 WITH HALF WRITE ONLY
GT 20	GT 32
GT 22	GT 34 WITH HALF WRITE OR GT 22 WITHOUT HALF WRITE
GT 23	GT 35
GT 24	GT 36
CAP. C9 MINUS TERM	GT 1
CAP. C9 PLUS TERM	GT 19

- 9. REMOVE AND/OR TAPE THE ENDS OF THE FOLLOWING JUMPERS AND CABLE LEADS: REFER TO 1402 WIRING DIAGRAM SEC. 7 & 8 IF REQUIRED. ("A" REFERS TO UPPER RD TERMINAL, "B" REFERS TO LOWER RD TERMINAL).

FROM	TO
RC 187	RD 88 B
RC 188	RD 14 A
SW-CS-2	RD 88 A
RD 87 B	RL 4 OP
RD 86 B	RL 9 OP
SW-CS-1	RL 5 OP

INTERNATIONAL BUSINESS MACHINES CORP.		DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	READ SOLAR CIRCUIT BREAKER INSTALLATION	7-20-62	802843-K			X PRINT TO ENG. SPEC. NO. 894924	
DESIGN	DEH 5-10-62 MODEL 1402-1	4-9-63	804795				
DETAIL	DEB 7-6-62					USED IN 805366	
CHECK	HCK 7-6-62 DRAW						
APPRO	RLS 7-11-62 CHECK						

U.S. CO. NO. 8878W

605433

DISCONTINUED

9. (Continued)

FROM	TO
<del>4-4C</del>	<del>RL 7 OP</del>
<del>L7-3T</del>	<del>KL 6 OP</del>
<del>4-4N</del>	<del>LKD 1AB</del>
<del>LKD 86A</del>	<del>LKD 87A</del>
<del>LKD 87A</del>	<del>LKD 88A</del>

- 10. REMOVE RESISTORS RD 14 AND RD 88 AND DIODE KD 87.
- 11. ADD THE CABLE 610384 AS FOLLOWS:  
(SC TB REFERS TO SOLAR CELL TERMINAL BLOCK)

FROM	TO
SC TB1	7-3C
SC TB3	20V POWER SUPPLY TERM 6
SC TB5	DU5-AU COMM.
SC TB7	GT2
SC TB9	GT3
SC TB10	K36-2C
SW-CS-1	7-5T
SW-CS-2	KD 73A
30V PLUG	GT 30
RD 86B	2-5N
KC163	GT4
RC187	GT10
KC188	KD86A
PWB10	GT 30
RD28A	PMT89B

- FOR MACHINES WIRED TO 609400C-J WITHOUT CARBON ROLLS:  
MOVE THE WIRE AT PWC 9 TO PWD 1 AND CONNECT CABLE LEAD BETWEEN PWC 9 AND SIGNAL FUSE 7. SEE INSTRUCTION 605442 SECTION 2A. ON MACHINES WIRED TO 609400C-L WITH CARBON ROLLS THE PWC 9 AND SIGNAL FUSE 7 LEADS MUST BE TAPED UP.
- 12. MOVE JUMPER FROM 4-4C TO 4-4N WHICH CONNECTS TO 2-5C. THIS MAY ALREADY HAVE BEEN DONE IF B/M 605420 HAS BEEN INSTALLED.  
ADD THE FOLLOWING, REFERRING TO SEC 7A AND 8A OF 605437 OR 605438:  
  - JUMPER 129245 FROM 7-5T TO 4-4C.
  - CAPACITOR 610083 FROM PMT 89A (UPPER TERMINAL) TO PMT 89 B (MIDDLE TERMINAL)
  - RESISTOR 615390 FROM PMT 89A (UPPER TERMINAL) TO RD 86 A (UPPER TERMINAL).
  - JUMPER 12162 FROM GT27 TO DU5-AL COM ONLY ON W/D 609400C-J WITHOUT CARBON ROLLS.
  - DIODE 603793 FROM 7-5C TO 7-5N (POLARITY AS SHOWN).
  - JUMPER 129245 FROM 7-5N TO 4-4T
  - 1K RESISTOR 315970 FROM 4-4T TO 25-4C.
- 13. FOR MACHINES EQUIPPED WITH PUNCH FEED READ, REFER TO NEW PFR W/D SHEET 605441 AND MAKE THE FOLLOWING CHANGE: MOVE THE WIRE CONNECTING K59-41 AND K25-2T FROM 25-2T TO RESISTOR DIODE TERMINAL RD 14B. ADD JUMPER 129248 BETWEEN R14A AND TO 25-2T. INSTALL RESISTOR ASM 443793, IN POSITION RD 14.
- 14. WHEN BOTH THE 1402 AND 1401 PORTIONS OF THIS CHANGE ARE COMPLETED BRING UP SYSTEM POWER.
- 15. THE SOLAR CELL LAMP SHOULD NOW BE LIGHTED AND THE BRILLIANCE VARIABLE WITH THE POTENTIOMETER ON THE TRANSISTOR PANEL. SET POTENTIOMETER AT MAXIMUM CLOCKWISE SETTING.
- 16. REMOVE THE PLASTIC COVER OVER THE SOLAR CB ASSEMBLY. MEASURE VOLTAGES FROM THE C. E. AID PANEL "GROUND" HUB TO THE SC-TB TERMINALS, (THESE TERMINALS ARE NUMBERED 1-10 LEFT TO RIGHT FACING THE REAR OF THE MACHINE.) AS FOLLOWS:  
  - GROUND TO SC-TB 5-20 VOLTS
  - GROUND TO SC-TB 6 + 1 TO 2 VOLTS DEPENDING ON POTENTIOMETER SETTING
  - GROUND TO SC-TB 9 + 6 VOLTS
  - GROUND TO SC-TB 10-12 VOLTS
 IF THE FOREGOING VOLTAGES DO NOT EXIST REMOVE ALL MACHINE POWER AND CORRECT AND WIRING ERRORS.
- 17. SET CAM SELECTOR ON CE AID PANEL TO POSITION #1 (BRUSH SEL. SW OFF) THE DYNAMIC TIMER ON. DEPRESS NON-PROCESS RUNOUT AND OBSERVE PULSES ON THE READ TIMER DIAL. SET TIMING ACCORDING TO TIMING PROCEDURE 605434. CAUTION: DO NOT TURN MACHINE BY HAND WITH MOTOR CIRCUIT CRIPPLED WITH CARDS IN MACHINE AND START KEY DEPRESSED. REFER TO PROCEDURES IN REFERENCE MANUAL ADDITION 605434 FOR ANY TROUBLE DIAGNOSIS.
- 18. REMOVE RL CB'S 4 THROUGH 9 LEAVING CAMS ON SHAFT.

INTERNATIONAL BUSINESS MACHINES CORP.		DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	READ SOLAR CIRCUIT	7-20-62	802843-K			X PRINT TO ENG. SPEC. NO. 894924	
DESIGN	BREAKER INSTALLATION	11-13-62	804340				
DETAIL	DEB 5-3-62 MODEL 1402-1	4-9-63	804795				
CHECK	JK 7-6-62 DRAW					USED IN 605366	
APPRO	RLS 7-11-62 CHECK						605433

INSTRUCTIONS

605434

DISCONTINUED TIMING PROCEDURE INSTRUCTION  
 SOLAR CIRCUIT BREAKER PULSE DURATION VARIES WITH LIGHT SOURCE INTENSITY WHILE PULSE TIMING VARIES WITH THE RELATIONSHIP OF THE SLOTTED DISK TO THE LIGHT BEAM. USE EXTREME CAUTION TO AVOID TRANSISTOR DAMAGE FROM SCOPE OR METER LEAD SHORTS BETWEEN TX CARD TERMINALS.

1. ADJUST PULSE DURATION WITH POTENTIOMETER ON RELAY GATE TRANSISTOR PANEL FOR 700 + 100 - 0 MICROSECONDS (3 1/2 + 1/2 - 0 DEGREES) ON COLD (ROOM TEMPERATURE) MACHINE OR FOR 600 MICROSECONDS + 100 - 200 MICROSECONDS (3 + 1/2 - 1 DEGREES) AT OPERATING TEMPERATURE.
2. COARSE TIMING IS OBTAINED BY LOOSENING THE DISK RETAINING SCREW AND ROTATING TILL THE "9" TIME SLOT IS VISUALLY OPPOSITE THE LIGHT SOURCE WITH POWER REMOVED AND READER HAND-CRANKED TO "9" TIME.
3. FINE TIMING ADJUSTMENT IS MADE BY LOOSENING MOUNTING PLATE SCREWS TO ENABLE MOUNTING PLATE TO BE ROTATED WITHIN LIMITS OF SLOTTED HOLES. SEE DRAWING 605431. REPEAT STEP 2 IF MOUNTING PLATE SLOTTED HOLES ALLOW INSUFFICIENT ADJUSTMENT.

ADJUST SO THAT PULSES ARE CENTERED ABOUT MIDPOINTS OF PULSE TIMINGS WITH ANY DEVIATION DISTRIBUTED EQUALLY 9 THROUGH 12 TIMES. THIS DEVIATION SHALL NOT EXCEED ONE DEGREE FROM NOMINAL TIMINGS UNDER CONTINUOUS MACHINE RUNNING AS SHOWN ON THE WIRING DIAGRAM.

ADJUSTMENT PROCEDURE

1. CHECK FOR THE DISK BEING VISUALLY CENTERED Laterally IN THE SLOT IN THE SOLAR CELL MOUNTING BLOCK. ADJUST IF NECESSARY BY LOOSENING SET SCREWS AND REPOSITIONING SPINDLE ON PICKER KNIFE CAM SHAFT.
2. SET THE POTENTIOMETER TO GIVE 1.8 VOLTS ACROSS LAMP TERMINALS (SC TB 4 AND SC TB 6). THIS LAMP VOLTAGE IS A STARTING POINT ONLY WITH THE FINAL SETTING DEPENDENT UPON THE LAMP INTENSITY WHICH WILL PRODUCE A PULSE DURATION AS DESCRIBED IN STEP 1 OF TIMING PROCEDURE ABOVE.
3. REMOVE MACHINE POWER.
4. UNPLUG SOLAR CELL LEADS FROM SC TB 2 AND SC TB 8 AND CONNECT (YELLOW LEAD PLUS) TO METER SET ON A SCALE CAPABLE OF MEASURING VALUES FROM 0 TO 500 MICROAMPS (1/2 MA).
5. BRING UP POWER AND HAND CRANK READER WITH CLUTCH MANUALLY TRIPPED TO BRING DISK SLOT OPPOSITE SOLAR CELL. TURN THE MACHINE VERY SLOWLY TO AVOID PASSING INDEX POINTS WHERE METER DEFLECTION OCCURS. A MINIMUM OF 150 MICROAMPS SHOULD BE OBSERVED. ORIENT AND/OR REPLACE LAMP OR SOLAR CELL ASSEMBLIES AS DESCRIBED IN REMOVAL AND REPLACEMENT PROCEDURES TO OBTAIN THE REQUIRED OUTPUT.

REMOVAL AND REPLACEMENT

LAMP ASM

1. REMOVE MACHINE POWER.
2. LOOSEN TWO CONTACT STRAP SCREWS UNTIL LAMP CAN BE SLID OUT OF LAMP HOLDER. UNPLUG LAMP LEAD FROM SC TB 6 AND REMOVE.
3. TO REINSTALL, PLUG LAMP LEAD INTO SC TB 6 AND INSERT LAMP TO FULL DEPTH THROUGH LAMP HOLDER AND RETIGHTEN CONTACT STRAP SCREWS.
4. THE LAMP HOLDER MOUNTING SCREWS MUST BE LOOSENED TO PERMIT THE PLASTIC LAMP HOLDER TO BE SHIFTED. THIS WILL PERMIT THE LAMP BASE TO SEAT FIRMLY IN THE PLASTIC HOLDER WITH THE LENS END FULLY SEATED AGAINST HOLE IN SOLAR CELL MOUNTING BLOCK.
5. CHECK SOLAR CELL OUTPUT BY SETTING LAMP TERMINAL VOLTAGE AT 1.8 AND MEASURING A MINIMUM OF 150 MICROAMPS ACROSS CELL AT ANY INDEX POINT AS DESCRIBED IN STEP 5 OF ADJUSTMENT PROCEDURES. CELL OUTPUT MAY BE PEAKED BY ROTATING LAMP IN HOLDER. NOTE: DEPRESS END OF CONTACT STRAP TO RELIEVE PRESSURE TO PERMIT ROTATING AND/OR RESEATING LAMP. IT MAY BE NECESSARY IN SOME CASES TO REPOSITION LAMP HOLDER AFTER ROTATION AS IN STEP 4.

SOLAR CELL ASM

1. REMOVE MACHINE POWER.
2. LOOSEN SET SCREW AND REMOVE SOLAR CELL ASSEMBLY. UNPLUG SOLAR CELL LEADS FROM SC TB 2 AND SC TB 8.
3. TO REINSTALL, INSERT CELL INTO CELL MOUNTING BLOCK LEAVING APPROXIMATELY 1/4" OF THE METAL SLEEVE EXPOSED ABOVE THE CELL MOUNTING BLOCK. POSITION THE SCRIBED LOCATING MARK SO THAT IT POINTS TOWARD THE LIGHT SOURCE.
4. CONNECT SOLAR CELL LEADS TO METER. CHECK OUTPUT BY SETTING LAMP TERMINAL VOLTAGE AT 1.8. AT AN INDEX POINT MEASURE FOR A MINIMUM OF 150 MICROAMP ACROSS THE CELL AS DESCRIBED IN STEP 5 IN ADJUSTMENT PROCEDURE. TO AVOID DAMAGING CELL, USE CARE WHILE TIGHTENING CELL RETAINING SET SCREW.
5. PLUG SOLAR CELL LEADS INTO SC TB 2 (YELLOW LEAD) AND SC TB 8.

COMPONENT CARD ASM

1. REMOVE MACHINE POWER.
2. UNPLUG (IDENTIFY IF NECESSARY) THE LEADS IN THE SOLAR CELL TERMINAL BLOCK.
3. REMOVE THE LAMP HOLDER MOUNTING SCREWS AND LOWER COMPONENT CARD MOUNTING SCREW. REMOVE COMPONENT CARD ASSEMBLY.
4. TO REINSTALL, REPLACE LAMP HOLDER AND MOUNTING SCREWS. ADJUST LAMP FOR PROPER POSITION ACCORDING TO LAMP ASSEMBLY REMOVAL AND REPLACEMENT STEP 4.
5. PLUG ALL LEADS INTO TERMINAL BLOCK.

INTERNATIONAL BUSINESS MACHINES CORP.		DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	SOLAR CB REFERENCE	7-20-62	802843K			X PRINT TO ENG. SPEC. NO.	
MANUAL ADDITION		11-13-62	804340			894924	
DESIGN	DEB 5-3-2 MODEL 1402-1					USED IN 605366	
DETAIL	DEB 7-6-2						
CHECK	HCK 7-6-2 DRAW						
APPRO	RLS 7-11-2 CHECK						605434

INSTRUCTION

605436

DISCONTINUED

TESTING: RUN READ AND PUNCH (AND PFR IS APPLICABLE) TESTS.

AFTER INSTALLATION:

1. CHANGE 1402 WIRING DIAGRAM BY REFERING TO INDEX SHEET AND FOLLOWING INSTRUCTION.
  - a. PAGE REPLACEMENTS:-  
 FOR MACHINES WITH W.D. 609400C-J WITH BRONZE CONTACT ROLLS (WITH 1/2 WRITE) REPLACE PAGES AS FOLLOWS:  
 SECTION 7 - 8 WITH NEW PAGE 605437  
 SECTION 13 - 14 WITH NEW PAGE 605439  
 SECTION 13A - 14A WITH NEW PAGE 605441 IF MACHINE IS EQUIPPED WITH PUNCH FEED READ FEATURE, RETAIN REPLACED PAGES IN BACK OF WIRING DIAGRAM FOR REFERENCE PURPOSES.  
 FOR MACINES WITH W.D. 609400C-J WITH CARBON CONTACT ROLLS (INSTALLED BY FIELD B/M 605290, 605291, 605292, OR 605293) AND WITH W.D. 609400L, REPLACE PAGES AS FOLLOWS:  
 SECTION 7 - 8 WITH NEW PAGE 605438  
 SECTION 13 - 14 WITH NEW PAGE 605440  
 SECTION 13A - 14A WITH NEW PAGE 605441 IF MACHINE IS EQUIPPED WITH PUNCH FEED READ FEATURE. RETAIN REPLACED PAGES IN BACK WIRING DIAGRAM FOR REFERENCE PURPOSES.
  - b. MARKING CHANGES: (
 

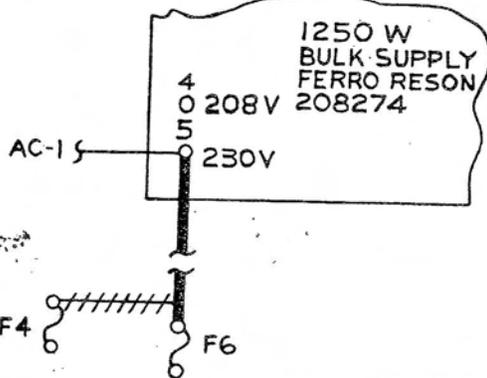
ON ALL MACHINES MARK CHANGES (PREFERABLY WITH A RED PENCIL) AS INDICATED ACCORDING TO WIRING DIAGRAM INSTRUCTIONS 605442, 605443, 605444, 605446, AND 605447.
  - c. PAGE ADDITIONS:  
 ON ALL MACHINES INSERT ADDITIONAL PAGES BEHIND ORGINAL PAGES AS FOLLOWS:  
 SECTION 21-22 FOLLOWED BY 21A-22A 605445  
 SECTION 33-34 FOLLOWED BY 33A-34A 605448  
 SECTION 35-36 FOLLOWED BY 35A-36A 605449  
 MARK "SEE B/M 605366 ADDTION" ON THE ORIGINAL SECTIONS 21-22, 33-34, AND 35-36 FOR REFERENCE PURPOSES.
  - d. PARTS CATALOG AND REFERENCE MANUAL ADDITIONS:  
 RETAIN PARTS CATALOG ADDITION 605431 AND REFERENCE MANUAL ADDITION 605434 WITH WIRING DIAGRAM.
2. REPORT INSTALLATION AS REQUIRED.
3. SCRAP LOCALLY ANY UNUSED OR REPLACED PARTS.

INTERNATIONAL BUSINESS MACHINES CORP.				DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	READ SOLAR CB			7-20-62	802843-K			X PRINT TO ENG. SPEC. NO. 894924  USED IN 605366	
	INSTALLATION								
DESIGN	DEB 5-3-6	MODEL	1402-1						
DETAIL	JRS 7-6-62								
CHECK	HCR 7-6-62	DRAW							
APPRO	CLS 7-11-62	CHECK							605436

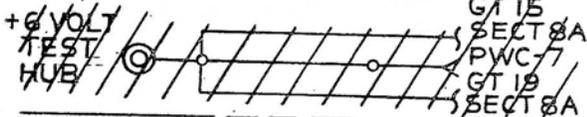
INSTRUCTIONS

605442

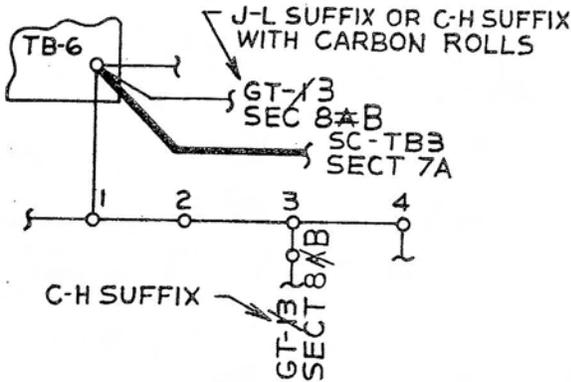
SECTION I C-J SUFFIX



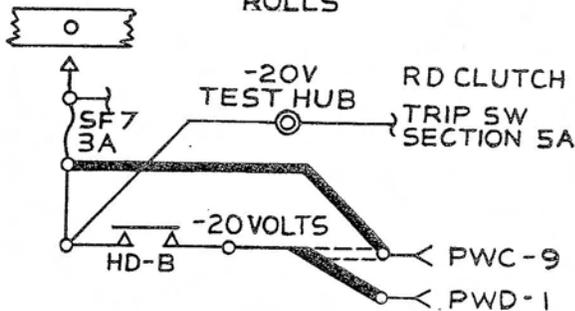
SECTION 2B C-L SUFFIX



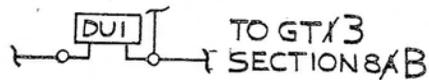
SECTION 2A



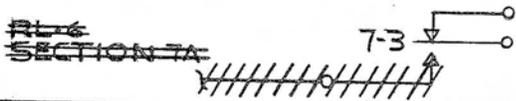
C-J SUFFIX WITHOUT CARBON ROLLS



SECTION 4A C-L SUFFIX



SECTION 5B C-L SUFFIX



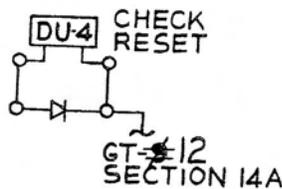
DISCONTINUED

INSTRUCTION

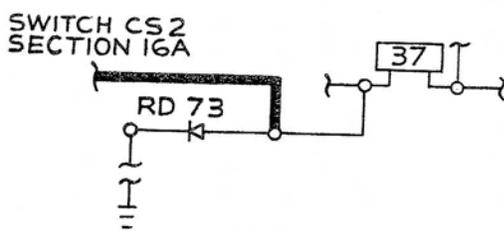
SECTION 6A C-L SUFFIX



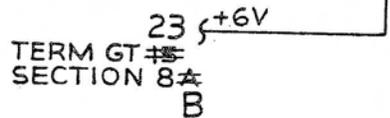
SECTION 6B C-L SUFFIX



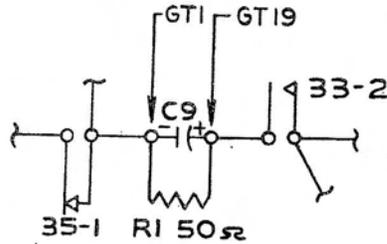
SECTION 11B C-L SUFFIX



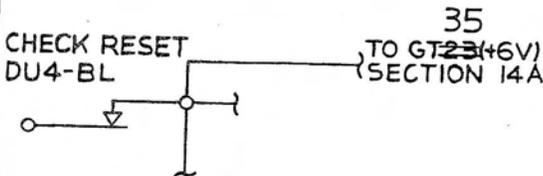
SECTION 11B D-L SUFFIX PCH NR. RO. KEY 2



SECTION 12B C-L SUFFIX



SECTION 12A C-L SUFFIX



INTERNATIONAL BUSINESS MACHINES CORP.				DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	SOLAR CB WIRING DIAGRAM CHANGES			7-20-62	802843K			X PRINT TO ENG. SPEC. NO. 894924	
DESIGN	898	5-362	MODEL	1402-1					
DETAIL	898	7-6-62						USED IN 605366	
CHECK	898	7-6-62	DRAW						
APPRO	898	7-11-62	CHECK						605442

INSTRUCTIONS

**FIELD USE**

INDEX

605893-B

INDEX

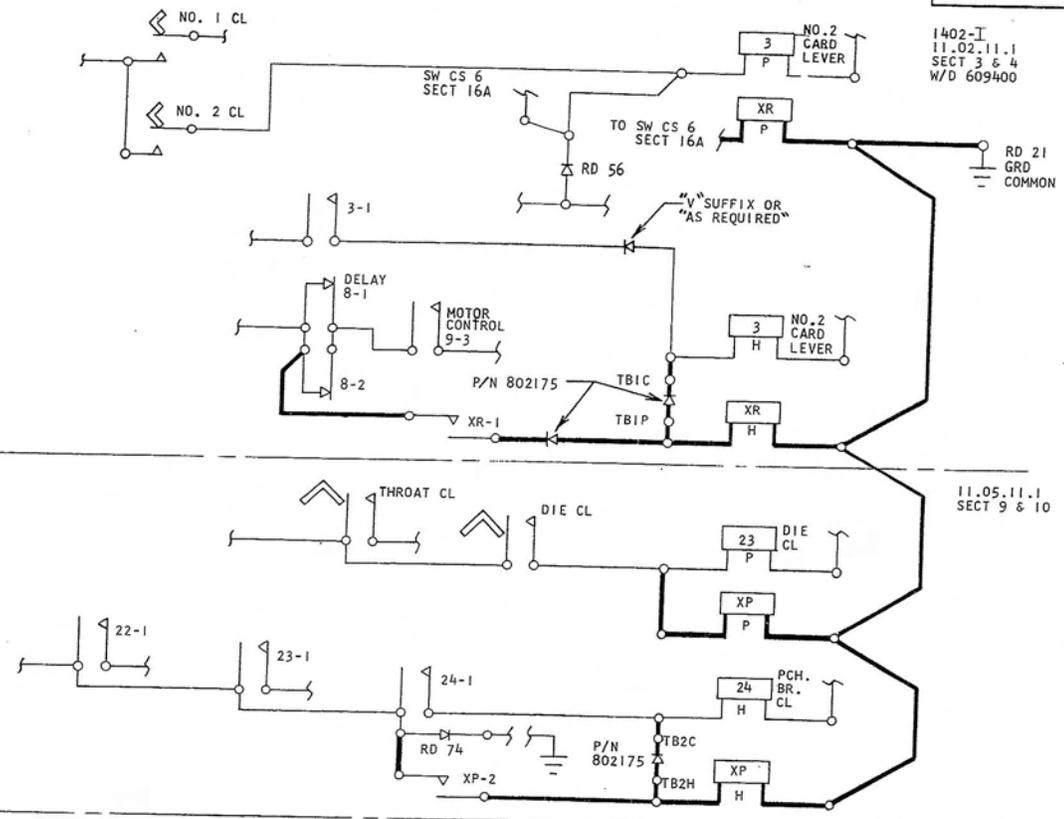
1402-1 FEATURE WIRING DIAGRAM

<u>SECTION</u>	<u>NAME</u>	<u>INSTALL PROCESS METER</u>	<u>PART NUMBER</u>	<u>ENGINEERING CHANGE NUMBER</u>
A				
INST.	W/D PROCESS METER		635057	805888-H
INST.	INSTRUCTION		635058	805888-H
	INSTRUCTION		635059	805888-E

INTERNATIONAL BUSINESS MACHINES CORP.		DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE X PRINT TO ENG. SPEC. NO. 894924	DEVELOPMENT NO.	INDEX
NAME	INSTALL PROCESS METER	9-16-63	805888A					
DESIGN	AGG 9-6-63 MODEL 1402-1	10-24-63	805888-E					
DETAIL	AGG 9-6-63	11-8-63	805888-H					
CHECK	HEM 9-11-63 DRAW							
APPRO	HEM 9-11-63 CHECK						605893-B	

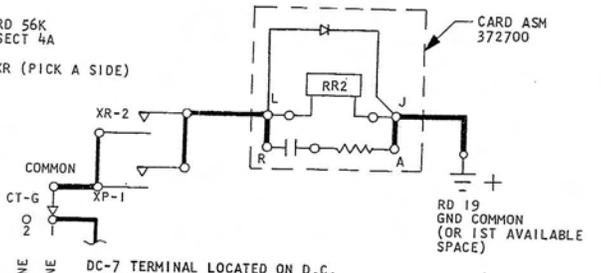
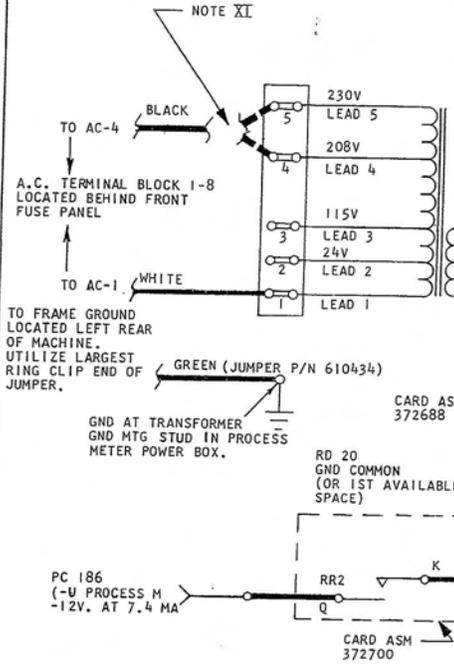
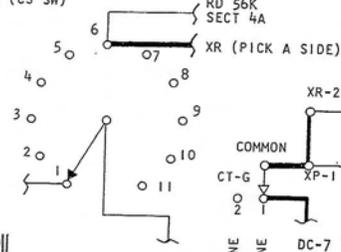
635057

1402-I  
11.02.11.1  
SECT 3 & 4  
W/D 609400

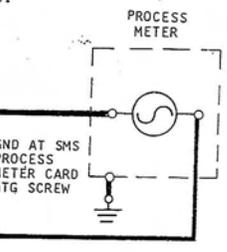


11.05.11.1  
SECT 9 & 10

C.E. AID  
CB SELECTION (CS SW)  
SECT 16A



DC-7 TERMINAL LOCATED ON D.C. TERMINAL BLOCK 1-8 ON RIGHT END OF MACHINE. -12 VOLTS



NOTES  
X FOR 12 VOLT OPERATION  
CONNECT 7 TO 8  
FOR 6 VOLT OPERATION  
REMOVE 12 VOLT CONNECTION AT INSTALLATION AND  
CONNECT 6 TO 7 AND 8 TO 9  
XI LEAD TO REMAIN ON TERM 1 FOR BOTH 208V AND 230V INPUT.  
FOR 208V AC USE TERMINAL 4 FOR 230V AC USE TERMINAL 5

INTERNATIONAL BUSINESS MACHINES CORP.		DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	PROCESS METER	9-16-63	805888 A			X PRINT TO ENG. SPEC. NO. 894924	
DESIGN	AGG 9-6-63	10-24-63	805888E				
DETAIL	AGG 9-6-63	11-7-63	805888H			WHERE USED 605893 AND 610436	
CHECK	HGM 9-11-63	DRAW	CDI 9-6-63				
APPRO	HGM 9-11-63	CHECK	LJW 9-6-63				

635057

# FIELD USE

INSTRUCTION

INSTRUCTION.  
PROCESS METER

635058

PREREQUISITES: NONE  
 SPECIAL TOOLS: SEE MECHANICAL INSTALLATION- SECTION A  
 INSTALLATION TIME: SECTION A 1.4 HOURS----SECTION B 2.1 HOURS----PREPARATION, TEST, UPDATING 1.0 HOURS. TOTAL INSTALLATION TIME 4.5 HOURS  
 PURPOSE: METERING  
 DESCRIPTION: INSTALL PROCESS METER; POWER BOX ASM AND CONTROLLING CIRCUITS.  
 INSTALLATION: REMOVE ALL POWER TO MACHINE DURING INSTALLATION OF ANY SECTION. THIS INSTRUCTION IS MADE IN TWO SECTIONS. THE SYSTEM MAY BE OPERATED NORMALLY UPON THE COMPLETION OF SECTION A.

- A. MECHANICAL INSTALLATION (NOTE: IF HOLES FOR MOUNTING METER HAVE PREVIOUSLY BEEN ADDED TO MACHINE COVER, REMOVE AND DISCARD SPECIAL FACE PLATE COVERING THE HOLES, OMIT SPECIAL TOOLS I.A. AND I.B. AND OMIT STEPS 3.B. THRU 3.G.)
1. SPECIAL TOOLS
    - A. 7/8 DIA PUNCH #460139
    - B. 3/8 DIA DRILL WITH 1/4 DIA SHANK #450371
    - C. #4 DRILL #450298
  2. POWER BOX MOUNTING
    - A. OPEN REAR MACHINE COVERS, AND REMOVE ALL SIGNAL AND POWER CONNECTING CABLES FROM CONNECTOR PANEL.
    - B. LOWER THE CONNECTOR PANEL.
    - C. TAPE TEMPLATE FIGURE #4 ON THE INSIDE OF THE CONNECTOR PANEL AS INDICATED ON THE TEMPLATE. NOTE THAT THE TEMPLATE IS TO BE LOCATED CENTRALLY BETWEEN THE PC AND RC CONNECTORS.
    - D. COVER PC AND RC CONNECTORS.
    - E. CENTER PUNCH THE THREE HOLES IN THE CONNECTOR PANEL AND DRILL THE HOLES WITH THE #4 DRILL.
    - F. MOUNT POWER BOX ON INSIDE OF PANEL WITH SCREW 186759 (3). BEFORE MOUNTING POWER BOX, WIRE TRANSFORMER. PRIMARY PER NOTE XI ON METER WIRING DIAGRAM.
    - G. IF NECESSARY, RE-ROUTE CABLES IN AREA TO CLEAR THE BOX AND TIE IN PLACE.
  3. METER MOUNTING (USE FIGURES ON REF. DWG. 610409)
    - A. REMOVE TOP BRIDGE COVER. BE CAREFUL ONLY TO REMOVE THE FOUR NUTS MOUNTING THE COVER TO THE BRACKET AND NOT THE NUTS THAT MOUNT THE BRACKET TO THE FRAME. REMOVING OR LOOSENING OTHER FASTENERS WILL AFFECT COVER POSITIONING AND WILL CAUSE PROBLEMS AT RE-ASSEMBLY.
    - B. TAPE PAPER TEMPLATE (FIGURE #1 ON DWG. 610409) ON COVER AS SHOWN IN FIGURE #2.
    - C. PLACE THREE BOXES OF USED IBM CARDS ON FLOOR AND LAY COVER OVER THE BOXES. THE CARDS WILL PROVIDE SUPPORT FOR OPERATIONS #D AND E.
    - D. CENTER PUNCH HOLES INDICATED ON FIGURE #1.
    - E. DRILL 3/8 DIA HOLE THROUGH ALL FIVE CENTER PUNCHED HOLES. THE 3/8 DIA HOLE ON THE THREE CENTER HOLES WILL ACT AS A GUIDE FOR PUNCHING THE FINAL 7/8 DIA HOLES.
    - F. PUNCH THE THREE 7/8 DIA HOLES AS INDICATED IN FIGURE #1. PUNCH THE TWO OUTSIDE HOLES FIRST AND THEN POSITION THE POINTS OF THE PUNCH ON THE REMAINING TABS TO BE CUT AND PUNCH OUT THE THIRD HOLE. (SEE FIGURE #5 FOR PUNCH POSITIONING).
    - G. FILE SHARP CORNERS OUT OF LARGE OPENING AS SHOWN ON FIGURE #1.
    - H. INSTALL METER BOX AS SHOWN IN FIGURE #3.
    - I. SOLDER AND CONNECT APPROPRIATE CABLE WIRES TO METER TERMINALS (REFER TO SECTION B.1.).
    - J. RE-INSTALL BRIDGE COVER.

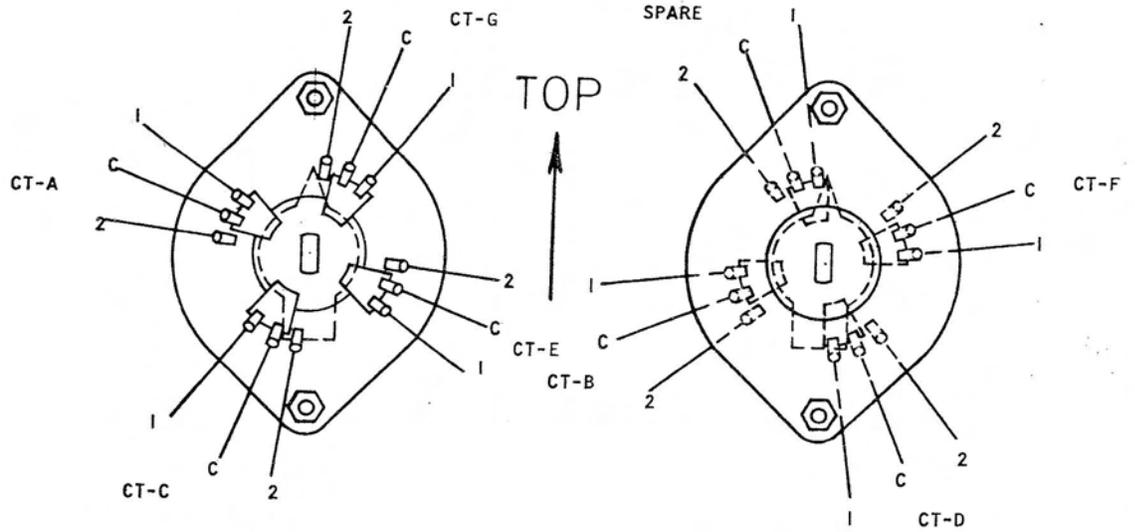
- B. ELECTRICAL INSTALLATION.  
 REFERENCE THE MACHINE W/D 609400 AND B/M DRAWINGS ETC. PROVIDED IN THIS PACKET DURING INSTALLATION. (USE VOLT - OHM METER ONLY, FOR TESTING)
1. WITH THE PROCESS METER POWER BOX AND CABLE ASM MOUNTED ON THE BACK OF THE REAR CONNECTOR PANEL, IN THE AREA INDICATED, ROUTE AND CONNECT THE REMAINING CABLES. REFER TO CABLE DRAWINGS 610412, 610415 AND THE PROCESS METER W/D 635057. INSTALL PROCESS METER CABLE IN CABLE CLAMP ON METER GROUND TERMINAL (SEE FIGURE #3) ON 610409. REMOVE BRADY LABELS FROM CABLE 610412 UPON INSTALLATION, TO CONFORM WITH SAFETY REQUIREMENTS.
  2. INSTALL ROTARY SWITCH P/N 610556 IN PLACE OF PRESENT ON LINE OFF LINE SWITCH, IF EXISTING SWITCH DOES NOT HAVE A VACANT CIRCUIT, UTILIZING EXISTING SWITCH MOUNTING HARDWARE. REFER TO INSTRUCTION SHEET 635059 FIGURES 1 AND 2 AND W/D 609400 SECTION 21 B WHEN TRANSPOSING WIRES.
  3. CHECK ALL WIRING AGAINST WIRING DIAGRAM. CLOSE CONNECTOR PANEL AND COVERS.

INTERNATIONAL BUSINESS MACHINES CORP.				DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.
NAME	PROCESS METER			9-16-63	805888A			X PRINT TO ENG. SPEC. NO. 894924	
DESIGN	AGG	9-6-63	MODEL	1402-1	10-24-63	805888E			
DETAIL	AGG	9-6-63			11-8-63	805888-H			
CHECK	WEM	9-11-63	DRAW					WHERE USED 605893	
APPRO	WEM	9-11-63	CHECK						635058

INSTRUCTION

635059

CONTROL TRANSFER "ON-LINE-OFF-LINE"  
SWITCH FOR 1402-1  
(VIEWED FROM BACK IN ON-LINE POSITION)



TOP SIDE DETAIL  
FIGURE 1

UNDER SIDE DETAIL  
FIGURE 2

REPLACEMENT PARTS LIST

NAME	PART NO.
TRANSFORMER	740473
SMS CARD	372700
REED RELAY (ON 372700 CARD)	765654
PM RELAY	719005
METER CARD	372688
REED RELAY (ON 372688 CARD)	767036
ETM CLOCK	740503

ELECTRICAL INSTALLATION (CONT.)

4. TEST-OPERATIONAL

A. THE METER WILL RECORD WHEN THE FOLLOWING CONDITIONS EXIST:

1. CPU
  - A- SIGNAL PRESENT
2. I/O UNIT
  - A- ON LINE- OFF LINE SWITCH SET TO "ON LINE"
  - B- FIRST CARD AT SECOND READ BRUSHES AND/OR FIRST CARD AT PUNCH STATION.

B. THE METER WILL HALT WHEN THE FOLLOWING CONDITIONS EXIST:

1. CPU
  - A- SIGNAL NOT PRESENT
2. I/O UNIT
  - A- ON LINE-OFF LINE SWITCH SET TO "OFF LINE"
  - B- LAST CYCLE WHEN CARD OR CARDS FEED OUT OF BOTH FEEDS.

C. AFTER INSTALLATION

1. RUN STANDARD SYSTEM PUNCH AND READ DIAGNOSTIC TESTS, RIPPLE READ, RIPPLE PUNCH AND PUNCH FEED READ ON MACHINES WITH PFR FEATURE, OBSERVING CORRECT PROCESS METER OPERATION AS OUTLINED IN STEP 4.
2. INSERT REF MATERIAL IN WIRING DIAGRAM BINDER.

INTERNATIONAL BUSINESS MACHINES CORP.				DATE	CHANGE NO.	DATE	CHANGE NO.	NOTE	DEVELOPMENT NO.	INSTRUCTION
NAME		PROCESS METER		9-16-63	805888-A			X PRINT TO ENG. SPEC. NO. 894924		
DESIGN	AGG	9-6-63	MODEL	1402-1	10-24-63	805888-E				
DETAIL	AGG	9-6-63						WHERE USED 605893		
CHECK	HGM	9-11-63	DRAW						635059	
APPRO	HGM	9-11-63	CHECK							