DOVER

General

The Dover is strip-down Xerox 7000 Reduction Duplicator. All optical system, electronics, contact relays, top harness, control console and related components are eliminated from the Xerox 7000. The paper feeder, paper transports, engines, solenoid, paper path sensing switches and related components are not disturbed. The list below are the basic components the at has been eliminated and added.

ELIMINATED	ADDED
Optical System	Laser System
Control Logics	Engine Control Module
Contact Relay	Solid State Relay
Control Console	New Control Console
Top Cover	New Top Cover
Top Harness	New Top Harness
+24V PWS	+5V,-5V,+15V,-15V,+28V PWS
	Transformer (30 to 88VAC)
	Chassis
	Adapter Module (2)

Specification

Temperture: 60 to 90 degree F.
Humidity Range: 15 to 85%
Maximum Elevation: 5000 feet above lsea level.
Copy Page: The machine uses 20-pound long grain bond paper. The paper size is 8 1/2 by 11 inch
Expendable Material: Toner and Silcone Oil.

DOVER COMPONENTS

A-1	Photo Cell

MOTORS

B-1	Elevator (Paper Tray) Drive Motor
B-2	Main Drive Motor
B-3	Dev. Drive Motor
B-4	Brush Drive Motor
B-5	Brush Vac. Motor
B-6	Brush Vac. Motor
B-7	'A' Transport Vac.
B-8	'B' Transport Vac.
B-9	Air Pump
B-10	Toner Dispenser Motor
B-11	Lower Cooling Fan
B-12	Upper Cooling Fan (Left)
B-13	Compressor
B-14	
B-15	
B-16	Oil Dispenser Drive Motor
B-17	Fuser Curl Motor
B-18	Upper Cooling Fan (Right)

CAPACITORS

C-1	Starting B1
C-2	Starting B2
C-3	Starting B3
C-4	Starting B13
C-7	B1 Anticoast Assy.
C-14	Starting B4

CIRCUIT BREAKERS

CB-1	Over Current Protection (Main Power)
CB-2	Over Current Protection (Fuser)

RECTIFIERS

CR-1	Surge Protect (C3)
CR-3	Rectifier (B1 Anti Coast)
CR-5	Surge Protect (C3)

CYCLE CONTROL SWITCHES

CS-5	Cycle Control Sw (Paper Feed/Timing)
CS-12	Cycle Control Sw (Puffer)

LAMPS

DS-1	Ready
DS-2	Not Ready
DS-3	Check
DS-4	Paper Tray
DS-5	Paper Path
DS-6	Remote

DS-7	Local
DS-8	Laser On
DS-9	Laser On
DS-10	Drum Discharge Lamp

FUSES

F-1	Motor Driver
F-3	Convenience Receptacle
F-5	Cooling Fans

CIRCUIT BOARDS

PCB-CA	Command Adapter
PCB-EC	Engine Control
PCB-MD	Motor Driver
PCB-RB	Relay Board
PCB-VA	Video Adapter

PLUGS/JACKS

P/J-1	Control Cons/Top Harness
P-2	Top Harness/Engine Control Board
J-2	Top Harness/Relay Board
J-3	Top Harness/Relay Board
P/J-3	Register Stop Drawer
P/J-4	Upper Cooling Fans
P/J-5	B8 ('B' Trans. Vac.)
P/J-6	LS-38
P-6	Logic Pwr to Mother Board
J-7	80v to Mother Board/Output to Poly Drive
P/J-7	Developer Housing
P/J-8	B3(Dev. Drive Motor)
P/J-9	B2(Main Drive Motor)
P/J-11	'A' Transport
P/J-12	B1 (Index Motor)
P/J-13	B1 (Anti Coast Ass.)
J-13	Up Har to P/J-3
P/J-14	LS-9
P/J-15	Photocell
P/J-16	Puffer Sol.
P/J-17	B4 (Brush Motor)
P/J-18	PS2
P/J-19	El Strip
P/J-23	Oil Disp. Motor
P/J-24	Thermistors/R-1
P/J-25	RT8
P/J-28	Cycle Control
P/J-30	Laser Power Supply
P/J-34	80v Transformer In
P/J-35	80v Transformer Out
P/J-36	80v Transformer In

P/J-39	Modulator Driver
P/J-57	Top Harness To Lower Harness
P/J-58	Paper Tray To Lower Harness
P/J-90	L-S 26 Drum Interlock

RELAYS

K-1	Main Power
K-6	Print
K-8	Motor Brake

SOLENOIDS

L-1	Paper Feed Sol.
L-4	Reject Sol.
L-5	Fuser Pressure Roll Up
L-8	Puffer

SWITCHES

LS-1	Jam Detector (Reg. Stop Mod.)
LS-2	Left Top Cover Interlock
LS-3	Mispuff Detector
LS-4	Low Paper
LS-8	Count/Reject Delay
LS-9	Multi Sheet Sensor
LS-13	Developer Interlock
LS-14	Sensing Bar
LS-15	Paper Tray Down
LS-19	Door Interlock
LS-20	Door Interlock
LS-21	Under Pressure
LS-22	Drawer Interlock
LS-24	Back Up Bar Interlock
LS-26	Drum Interlock
LS-27	'A' Transport Jam Detector
LS-31	Sensing Bar Down
LS-38	Fuser Jam
LS-61	Developer Front Interlock

METERS

M1	Total Copies Meter
M2	Billing Meter

POWER SUPPLIES

PS-1	Corotron Power Supply
PS-2	Fuser Controller
PS-3	Developer Power Supply
PS-4	Logic Pwr. Sup.
PS-6	Motor Brake
PS-7	Laser Power Supply
PS-39	Modulator Driver

RESISTORS

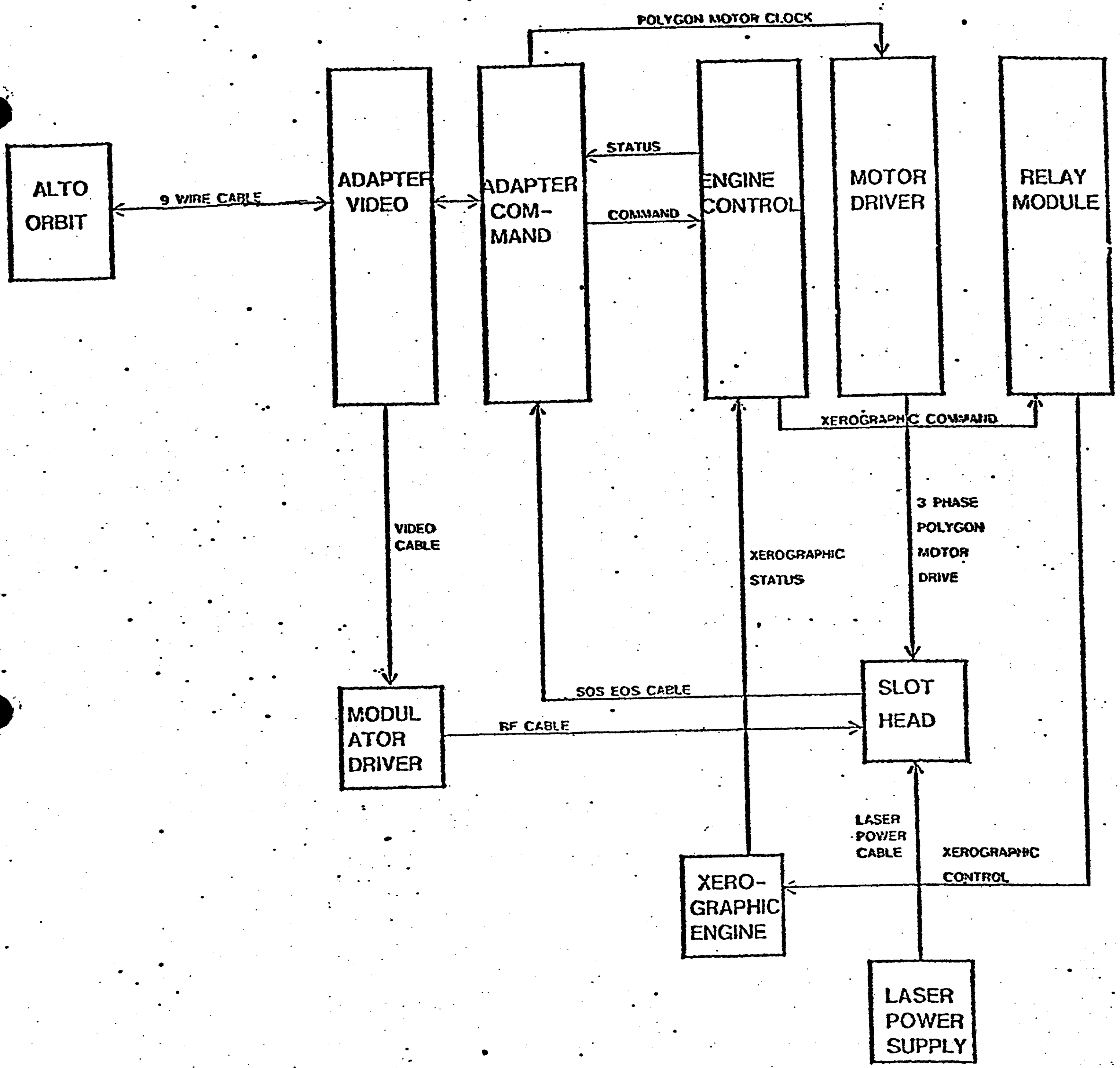
R-1	Fuser Roll Heater
R-2	Phase Shift (B-1)
R-4	B1 Anti Coast Assy.
RT-1	Fuser Controller Thermistor
RT-8	Fuser Over/Under Temp.

MANUAL SWITCHES

S-1	Power On/Off Console
S-2	Start Print
S-3	Stop Print
S-4	Local/Remote
S-5	
S-6	Paper Tray Position (Up/Down)
S-8	Developer Houseing On/Off
S-9	Toner On/Off
S-11	Corotron Test Sw.
S-14	Laser On (Key)
S-33	Logic Power On

TRANSFORMERS

T-1	Fuser Roll Control
T-2	80 Volt
T-3	Motor Brake
T-4	Anti Static Bar



FILE- DOVERMODULES

3. The Dover Printer

The Dover printer is a Xerox 7000 copier, modified to substitute a ROS module for the optics and to incorporate an *engine controller* that permits the printing operations to be controlled adequately by the adapter. This section describes the standard Dover engine, which operates at a paper speed of 10 inches/second. Dover can be "extended" in an experimental setting to run at 5 inches/second. The timing for the extended Dover is *very* different than the timing described here.

3.1 Engine Parameters

Several engine parameters were mentioned in the adapter section. The values for Dover are:

p	10 inches/second
f	32 facet polygon
r	24 clocks/revolution
d	.90 scan-line duty cycle
h	12.5 inches

Typical settings in the T adapter for *S=B=*350 bits/inch are:

BitRate=17 * 10^6
MotorRPS=109.38
MotorSpeed=1707
MotorScale=7
BitClock=3002
BitScale=7
LineSyncDelay=4046 (3008 for entire line for graph paper)
PageSyncDelay=3971 (3596 on Dover II)
VideoGate=3352

3.2 Engine timing

The engine timing for Dover is somewhat intricate, as there is a substantial "pipeline" effect in the paper path. The philosophy used in designing the engine control electronics has been to make them simple, and to require the EIP program controlling the engine responsible for sorting out most of the timing details.

There is only one signal used to instruct the Dover engine: a PrintRequest signal that is generated by a 0-to-1 transition of the low order bit of ExternalCommand1. Thus two successive adapter commands (first 60001b, and then 60000b) are normally used to cause the PrintRequest signal. The PrintRequest signal is used by Dover to feed sheets; be warned, however, that initiating and terminating a printing sequence are both a bit tricky, and require careful thinking (more on this below).

Dover generates only one timing signal of interest: CS-5, which is transmitted to the adapter as the PageSync signal. All timing information relevant for paper-path motion is derived from this signal. For purposes of discussion, it is helpful to "number" each of the CS-5 pulses generated by the engine, starting with CS-5(0), the first to be generated as the machine cycles up.

We shall describe the operation of Dover by describing the various sequences involved: (a) a cold start assuming the motor is presently off (PrintMode is off); (b) the "inner loop," in which paper is happily flowing through the engine, and page after page is being printed; (c) the runout shut-down sequence; and (d) the malfunction shut-down sequence.

Inner loop. We shall begin by describing the inner loop, as it is the simplest sequence. Refer to Figure 3-1 for an illustration of the timing. Let us assume that CS-5(n) has just occurred. Approximately 250 ms. later, the adapter should begin sending video to the ROS that will correspond to the leading edge (left-hand edge) of the paper. This time will vary a little from machine to machine, and can be controlled with the help of the PageSyncDelay register in the adapter. Imaging the page persists for about 850 ms. Approximately 896 ms. after CS-5(n), the Count-H status signal is generated and persists until the next CS-5 (Empercically, Count-H is on for only about 20ms. in older adapters; it is much wider in Dover II adapters. Special provisions in the standard microcode provide help in detecting this signal reliably.) This signal indicates that paper was successfully fed to hold the image for the page that is being imaged on the drum. If Count-H does not appear at the proper time, it is likely that some malfunction has, or is about to, occur. Within 990 ms. after CS-5(n), it is necessary to issue a new PrintRequest (i.e., to send the adapter a "set External Command 1" command) if another sheet is to be fed (i.e., if you desire to keep printing at high speed).

Cold start. In order to initiate printing, the EIP issues a PrintRequest (again, by issuing the "set External Command 1" command to the adapter). PrintMode should come on, verifying that power has been applied to the main motor. About 250 ms. after the print request, CS-5(0) is generated. This first CS-5 identifies a machine cycle that will ***not*** result in an output page: if you were to interpret CS-5(0) in the fashion described above for the inner loop, the first image you delivered would not be blessed with a sheet of paper to receive it. However, if you issue a second PrintRequest within 990 ms. of CS-5(0), the machine will cycle again, and generate CS-5(1). *This* CS-5 does in fact correspond to a sheet of paper -- now you may enter the inner loop.

A convenient way to think of the cold start sequence is to start the inner loop with CS-5(0), with two additional features on the first page imaged: (1) it will not be transferred to paper, and should therefore be "white" (in order to insure the bit clock servo is running properly), and (2) the Count-H signal will not be generated, because no sheet of paper was actually fed.

Runout shut-down. Dover begins shut-down whenever it fails to receive a PrintRequest in time (i.e., within 990 ms. of a CS-5). The machine must continue to operate for some time, however, in order to allow the last sheet of paper to be fused and transported to the output hopper. There will be 7 gratutitous CS-5 pulses generated after the last CS-5 that was produced by a PrintRequest. At the end of this sequence, PrintMode is turned off, indicating that paper path motion has stopped. In order to re-start the machine, a cold-start sequence is required.

If you wish to resume printing before the 7th CS-5 has passed, you may resume issuing PrintRequests, just as if you were in the inner loop (i.e., the first CS-5 after your PrintRequest will be blessed with a corresponding sheet of paper).

Malfunction shut-down. When a malfunction is detected, the Dover printer shuts down immediately, and does not wait for paper to be transported out of the machine. An appropriate malfunction status bit will be turned on (see next section), and the machine will halt (PrintMode goes away; no more CS-5's will happen). After an operator has corrected the problem, the machine must be restarted with the cold-start sequence.

3.3 Engine status indications

Dover may report up to 32 bits of status to the EIP via the adapter. Most of these bits are unused. The table below gives the name of each status bit and a short description of its purpose. The various malfunction indications are followed by a quoted string in italics; this is the recommended operator message for the condition (adherence to standard messages simplifies the job of the trouble-shooter).

Word	Bit	Signal
8	3	Count-H. This signal is raised if a sheet has been successfully fed to receive the image for the page being imaged. Count-H comes on 896 ms. after CS-5 and persists until the next CS-5.
8	5	PTDisorder. This signal is active when the paper tray is not in the up position or when the paper tray cover is open. It persists until the condition is corrected. This is the "or" of (not LS4) and (not LS24&LS31). *"Paper tray open."*
8	8	* LS4. This signal is active when there is adequate paper in the paper tray. A zero value will also assert PTDisorder.
8	10	LS27. This signal is active when progress from the A transport to the register stop module is not normal. It persists until the paper is cleared. *"Jam--paper feed."*
8	11	* LaserOn. This signal is active when the laser power supply is on, and the beam is available for use. *"Laser is off."* (Applies when the status bit is *not* present.)
8	12	* LS22. Malfunction Reset. Left as an exercise to the reader.
8	13	ReadyTemp. This signal is active when the fuser temperature is above 285 degrees F. This corresponds to the minimum temperature needed to fuse the toner to the paper. *"Fuser not warm."* (Applies when the status bit is *not* present.)
8	14	LostPower. This signal is active when machine power is turned off when PrintMode was active (i.e., the main drive motor was energized). It persists until the paper is cleared. *"Lost engine power."*
8	15	* ModeCont. This signal is active if the machine is set to run in its "extended", or half-speed, configuration.
9	1	PhotoCellOut. This signal is active when a sheet of paper has not been knocked off the drum during machine operation. It persists until the paper is cleared. *"Jam--paper on drum."*
9	2	PreSeq. This signal is active if a malfunction occurs before the first page is imaged (i.e., during the power-up sequence). *"Jam--startup sequence."*
9	4	* LS9. Two pieces of paper were fed. *"Jam--two sheets fed."*
9	5	ACMonitor. This signal is active when the machine is powered up. It is possible to have ReadyTemp-H active even though the ACMonitor-H is not. *"Engine not powered up."* (Applies when status bit is *not* present.)
9	6	LS38. This signal is active when a sheet of paper is jammed on the fuser roll. *"Jam--paper on fuser roll."*
9	8	* LS1. B Transport Jam. *"Jam--B Transport."*
9	9	Malfunction. This is a general-purpose signal that is the "or" of all the possible error indications given above (PTDisorder, LS27, LS22, LostPower, PhotoCellOut, PreSeq, LS38, LS1, LS3).
9	10	LS3. This signal is active when a sheet is not knocked off the drum and PhotoCellOut-H does not catch it. It persists until the paper is cleared. *"Jam--paper on drum."*
9	13	* LS24&LS31. Paper tray is up and sensing bar is in place. Normally active. A zero value will also assert PT-Disorder.

* Meaningful for Dover II adapters only.

4. Performance

This section gives preliminary results on the performance of Orbit in actual printing runs. The basic test is to place as many characters of a given size on a page as possible before Orbit "gets behind." Orbit will get behind when the demands of composing video for a complex page exceed the speed capacities of the Alto and Orbit.

For these tests, Orbit is attached to a Dover printer running at 10 inches per second, 350 scan-lines per inch, 350 bits per inch. The Alto II driving Orbit is perfectly standard--the "disk" it uses is a Diablo Model 31. The fonts used are all versions of Helvetica, scan-converted from spline representations. The tests reported here use the "standard" Orbit microcode, and do not resort to trickery of any kind. Orbit is flexible enough to do quite a bit more than is reported here.

Bandwidth Capacity

Character point size	Nominal chars/page	With disk	Without disk
Portrait:			
6	>11632*	>11632*	>11632*
8	8748	>10260	11137
10	5460	>7560	7980
12	3618	>6300	<6365
14	2622	>4503	4731
Landscape:			
6	>14000*	>14000*	>14000*
8	8576	>11008	<11124
10	5508	>8214	8724 <9030
12	3735	>5058	>5516
14	2652	>4900	>5035

Explanation. The nominal number of characters per page is the number of characters of the given size that fit comfortably (without squeezing or overprinting) on a page. These numbers compare reasonably well with typical pages printed on EARS. The third and fourth columns give Orbit's measured capacity. The third column is measured with disk activity present (the assumption is that while printing a page of a given complexity, you must be reading from the disk into another buffer a description of the next page, so that printing at the given capacity can continue uninterrupted). The fourth column is measured with disk activity absent. Note that absence of disk activity increases capacity only slightly. (Starred items exceeded character sort size in my test program.)

Storage capacity

Character point size	Font storage in words/character
Portrait:	
6	24.3
8	39.8
10	59.1
12	83.7
14	111.
Landscape:	
6	23.9
8	39.4
10	58.6
12	82.9
14	111.

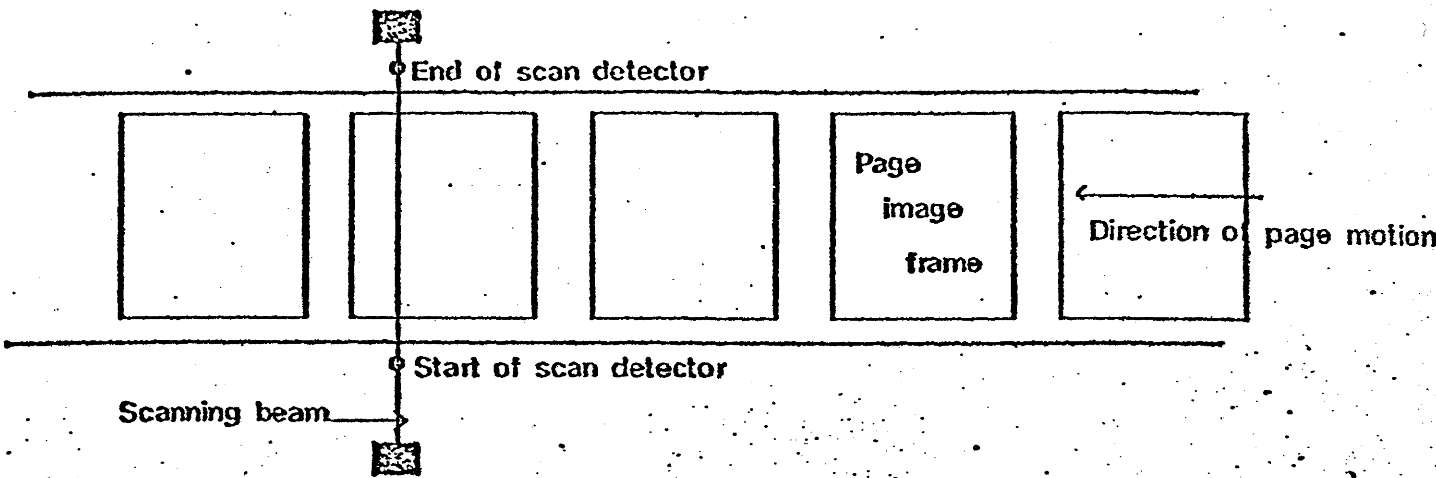
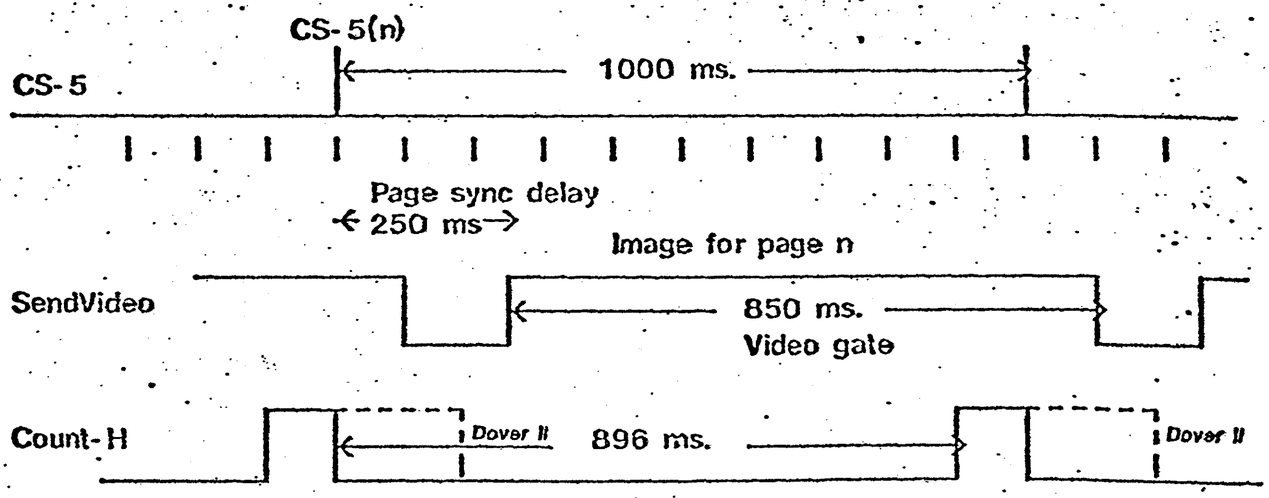


Figure 2-1: Conceptual model of the imaging process



SendVideo is generated in the adapter by counting PageSyncDelay after CS-5 arrives, and then counting VideoGate before terminating SendVideo. All counting is done in terms of scan-lines.

Figure 3-1: Dover printer timing

701 South Aviation Boulevard
El Segundo, California 90245
213 679-4511

XEROX

Material List

ML	Drawing No. 216600	Rev. C

Drawing Title

ASSEMBLY, PRINTER (DOVER)

Model No.	Date	Sheet
EWO 390101	3/18/77	6 of 7

Rev. | Drawing No. 216600 | ML

Item No.	Drawing Title	Drawing No.	No. Req.	Remarks
1	Assy, Printer (Modification)	216603	1	
2	Assy, Chassis - Card Cage	216571	1	
3	Assy, Top Harness (Printer)	216599	1	
4	Assy, Bottom Harness (Printer)	216602	1	
5	Assy, Control Panel	216537	1	
6	Assy, Plate - Control Panel Mtg	216604	1	
7	~~Hinge, Cover (Left)~~	~~216463-001~~	~~2~~	
8	~~Hinge, Cover (Right)~~	~~216463-002~~	~~2~~	
9	Catch, Keylock Arm	216476	4	
10	Relay	101S1093	1	(K8)
11	~~Bracket, Air Spring (Left)~~	~~216509~~	~~1~~	
12	~~Bracket, Switch Mtg~~	~~216501~~	~~1~~	
13	Assy, Cable - Laser Pwr Supply	216598	1	
14	Tray, Mtg - Laser Pwr Supply	216533	1	
15	Strap, Hold Down - Laser Pwr Sup	216535	1	
16	~~Bracket, Mtg - Power Supply~~	~~216531~~	~~1~~	
17	Power Supply, ±5V, ±15V, +28V 350W (PS4)		1	MM251-1Y3Y3Y6Y/115 (6)
18	Assy, Cable - Modulator Driver	216597	1	
19	Air Spring		2	#01111A-45 Pounds (7)
20	Angle, Relay Mtg	216482	1	
21	Stud, Ball	186099-606	2	
22	Assy, TTL ROS Adapter (Dover II)	217183	1	(11)
23	Assy, Cover (Right)	216605	1	
24	Assy, Cover (Left)	216606	1	
25	Assy, Cable - Logic Pwr Supply	216580	1	
26	Spec, Procurement- Slot Head	216607	1	
27	~~Assy, Cable - Transformer~~	~~216579~~	~~1~~	
28	Assy, Cable - 80 Volts Interface	216589	1	
29	~~Support, Rear Frame~~	~~216612~~	~~1~~	
30	~~Channel, Support~~	~~216613~~	~~1~~	
31	Nameplate, Self Adhesive #A5-5375 (Avery)		1	(1) (2)
32	Stud, Ball, 5/16-18 Thread		4	#9505-2 (7)
33	Clip, Wire Safety		4	#9501-2 (7)

105B(3/73)

ox Corporation
South Aviation Boulevard
Segundo, California 90245
679-4511

XEROX

ML	Drawing No. 216600	Rev. C

aterial List

Drawing Title

ASSEMBLY, PRINTER (DOVER)

Model No.	Date	Sheet
EWO 390101	3/18/77	7 of 7

216600 ML

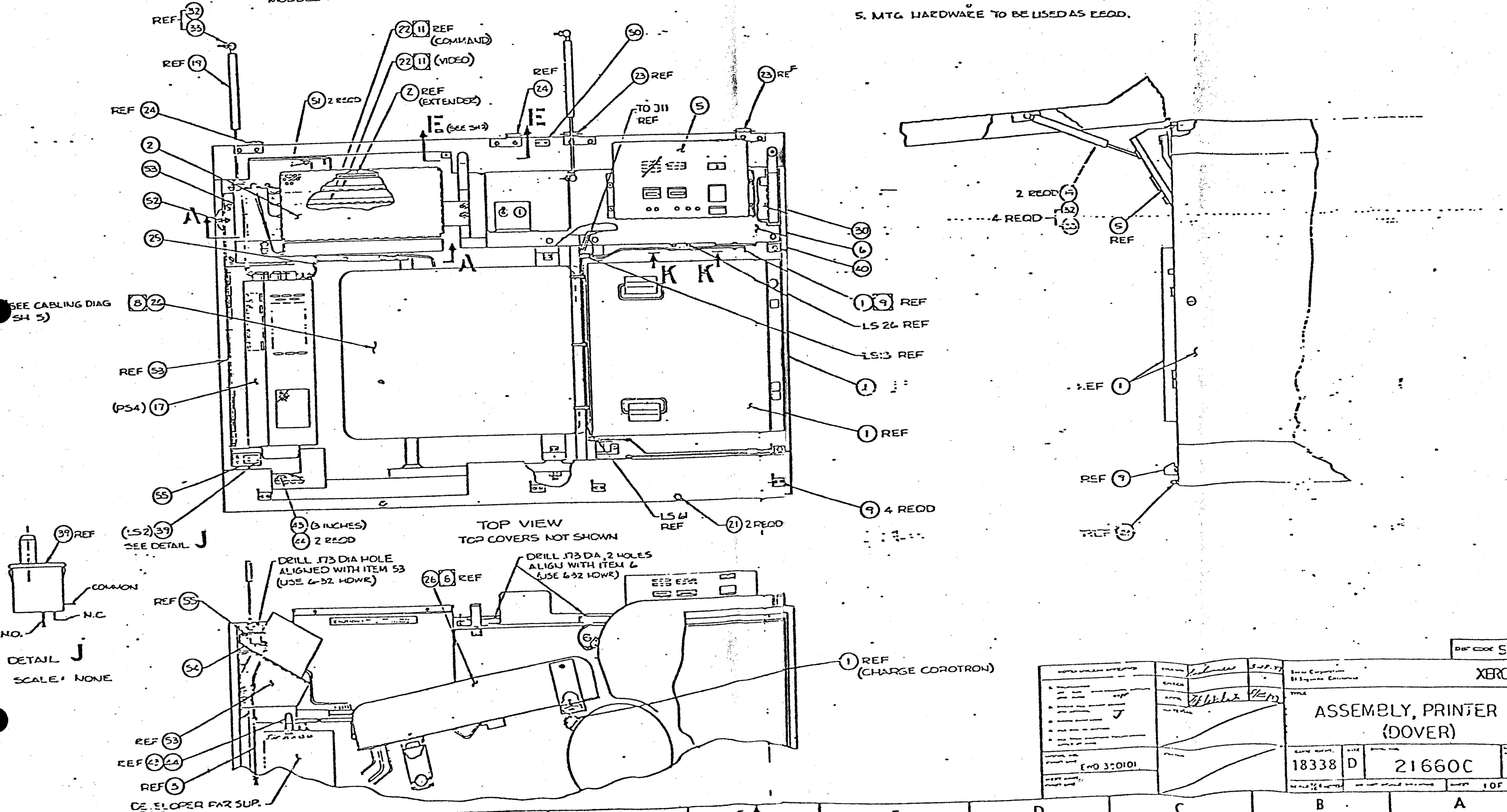
Item No.	Drawing Title	Drawing No.	No. Req.	Remarks
34	Assy, Cable - Photocell	217182	1	18
35	Filter, Blower	53P223	1	
36	Housing, Filter	2S5206	1	
37	Clamp, Hose McMaster-Carr #5415K21		2	10
38				
39	Switch, Interlock	110P1248	1	LS2
40	Angle, Locking - Right Cover	216631	1	
41	Assy, Cable - Paper Tray Noise Suppressor	216630	1	
42				
43	Wire, Str Ins 18 AWG (Brown)		A/R	MIL-W-16878/7
44	Terminal, Push On	155337-	9	LS61,13,26,J1,J2
45	Terminal, Tab (Male) Amp #42460-1		3	J17,25,5
46	Housing, Tab Amp #480053-3		3	J17,25,5
47	Tubing, Shrinkable, Ins	100744-009	A/R	15
48	Terminal, Ins Ring Tongue	100988-003	1	17
49	Strap, Cable Tie	158555-003	A/R	
50	Guide, Top Covers	217163	1	
51	Nut, Flanged, Locking 1/4 - 20		2	#90571A029 19
52	Ball Stud Tinnerman #P116		1	
53	Bracket, Support - Pwr Supply	217159	1	
54	Plate, Power Supply (Hinged)	217162	1	
55	Plate, Switch (Interlock)	217161	1	
56				
57	Connector, 2 Pin Housing AMP #1-480319-0		1	J11
58	Connector, 3 Pin Housing AMP #1-480305-0		1	J90
59	Contact, Pin AMP #60616-3		5	J11,90
60	Sheet, Insulator	217186	1	
61	Washer, Shoulder - Nylon	155208-010	6	
62	Connector Housing AMP #87631-4		1	P2 20
63	Contact, Recpt AMP #87046-1		6	20
64	Resistor, 2K ±5%, 1W	110996-202	1	R1
65	Tubing, Ins, Shrinkable	100744-109	A/R	
66	Installation Dwg, Printer (Dover)	216601	REF	

NOTES: UNLESS OTHERWISE SPECIFIED

1. ADHERE NAMEPLATE (ITEM 51) ON SURFACE INDICATED. TYPEWRITE PART NUMBER.
2. MAY BE PURCHASED FROM AVERY LABEL CO, AZUSA, CALIFORNIA. VENDOR PART NUMBER.
3. MODIFY PRINTER FRAME (ADD MTG. HOLES) PER SHEET 4.
4. FOR MATERIAL LIST SEE SH 6 & 7.
5. MTG HARDWARE TO BE USED AS REQD.
6. MAY BE PURCHASED FROM L H RESEARCH INC. IRVINE, CALIF. VENDOR NO. MM25I-Y3Y3Y6Y/I15.
7. MAY BE PURCHASED FROM GAS SPRING CORP, MONTGOMERYVILLE, PENN. VENDOR PART NUMBER.
8. INSTALL ITEM 26 TO ITEM 1 USING SUPPLIED MTG BRACKETS & HARDWARE SUPPLIED WITH ITEM 26.
9. INSTALL DEVELOPER INTERLOCK ARM (ITEM 1) TO ITEM 6 USING EXISTING HARDWARE.
10. MAY BE PURCHASED FROM MCMASTER-CARR SUPPLY CO. LOS ANGELES, CALIF. VENDOR PART NUMBER.
11. INSTALL ITEM 22 AS SHOWN: VIDEO ADAPT. MODULE IN LOC J1, COMMAND ADAPT. MODULE IN LOC J2.

NOTES CONT'D SH 5

LTR	DESCRIPTION		
A	ENGRG RELEASE		EW
B	ADDED SLOT HD & PHOTOCELL CABLING DIAGRAM		
C	RELOCATED GAS SPRINGS. ADDED ATTENUATOR ON VIEW E-E. REVISED WIRE LIST ON SH 5. REVISED HOLE PATTERN ON SH 4. ADDED ATTENUATOR TO CABLING DIAGRAM. [illegible]		EW



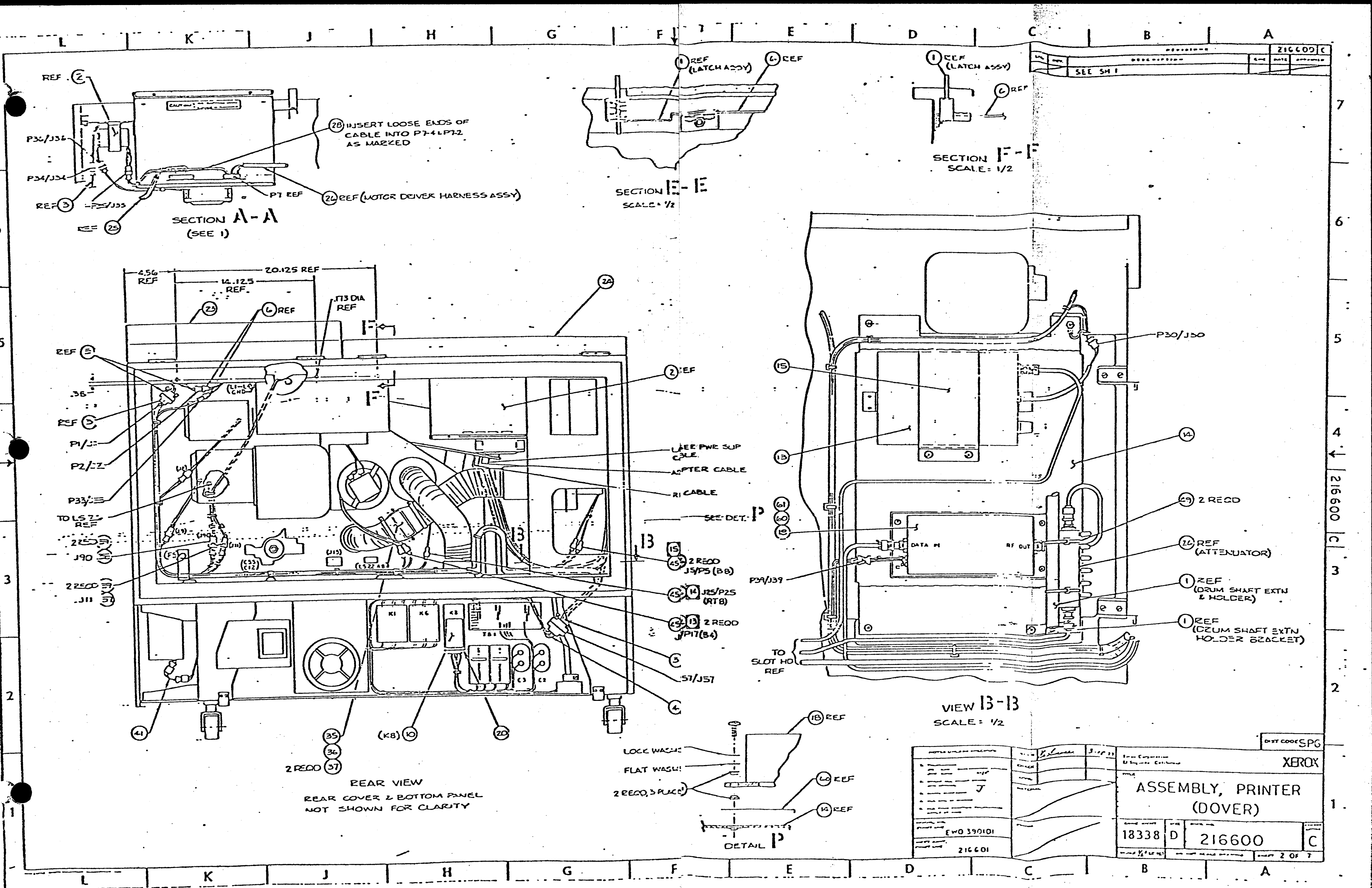
XEROX

ASSEMBLY, PRINTER (DOVER)

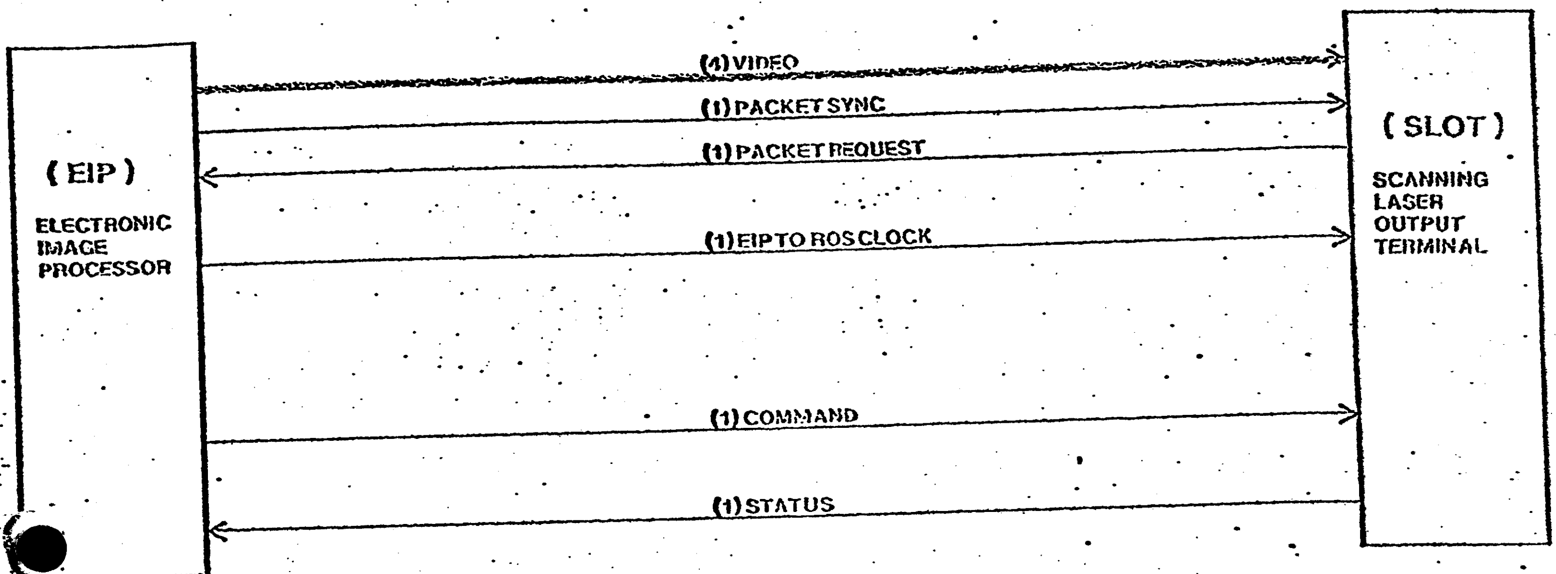
CODE IDENT.	SIZE	DWG NO.	REV
18338	D	21660C	C

EWO 320101

SHEET 1 OF 7


SECTION A-A
(SEE 1)
INSERT LOOSE ENDS OF CABLE INTO P7-1 & P7-2 AS MARKED
REF (MOTOR DRIVER HARNESS ASSY)
P7 REF
P36/J36
P34/J34
P35/J35
REF (LATCH ASSY)
SECTION E-E
SCALE: 1/2
SECTION F-F
SCALE: 1/2
20.125 REF
14.125 REF
4.56 REF
.173 DIA REF
SEE PWR SUP CABLE
ADAPTER CABLE
RI CABLE
SEE DET. P
2 REQD J5/P5 (B8)
J25/P25 (RT8)
2 REQD J/P17 (B4)
P57/J57
P1/J1
P2/J2
P33/J33
TO LS 23 REF
2 REQD
J90
J11
REAR VIEW
REAR COVER & BOTTOM PANEL NOT SHOWN FOR CLARITY
LOCK WASHER
FLAT WASHER
2 REQD, 3 PLACES
DETAIL P
P30/J30
P39/J39
DATA IN
RF OUT
2 REQD
REF (ATTENUATOR)
REF (DRUM SHAFT EXTN & HOLDER)
REF (DRUM SHAFT EXTN HOLDER BRACKET)
TO SLOT HO REF
VIEW B-B
SCALE: 1/2
SEE SH 1
216600 C
DIST CODE SPG
XEROX
ASSEMBLY, PRINTER (DOVER)
18338
D
216600
C
EWO 390101
216601
SHEET 2 OF 7

COMPONENTS OF THE 9 WIRE INTERFACE



Inter-Office Memorandum

To	Distribution	Date	June 2, 1976
From	R. E. Rider	Location	Palo Alto
Subject	ROS Interface Conventions	Organization	SDD/SD

XEROX

Filed on: <Rider>RosInterface.memo

This memo describes an interface convention for use between an EIP and a ROS and which is designed to allow interchangeability over a broad range of EIP and ROS modules. Specifically this convention should easily cover the range from ROS/3100 to ROS/9200. It is also designed to allow reasonable physical separation of the EIP and the ROS. The separation distance varies as a function of EIP and ROS bandwidths. For example, the maximum separation is 40 meters for a 100 megabit/second system and 400 meters for a 10 megabit/per second system. There are nine signals in the interface all of which are ECL. Each signal is a differentially driven, shielded, twisted pair (Alpha 6014 is suggested). The MECL III MC 1650 or MC1651 is suggested for a differential receiver because of its good common mode rejection and its general system compatibility. Any MECL 10,000 differential line driver is acceptable. These signals are described as true when A > B (see figure 1) and false when B > A. A description of the nine signals follows.

EipToRosClock is generated by the EIP and has a maximum frequency of 25 megahertz. This signal also doubles as a power on signal such that the adapter turns on when the clock is present and turns off when the clock is not present. This clock has a 50% duty cycle.

Command is a 33 bit long packet transmitted at a rate of EipToRosClock/4. The first bit is a flag bit that is always true. The flag is followed by two sixteen bits data fields. The first field is a sixteen bit command. The second field is the complement of the first field. This redundancy is provided as a simple method to ensure that only valid commands are executed at the ROS. There is a dead time (i.e. Command line = false) of atleast 48 bit times between packets. The following algorithm is suggested to decode the Command format.

1. The Command line is sampled by the EipToRosClock Three consecutive true samples are required for an acceptable flag bit. Isolated or paired true samples are assumed to be noise. If a noise sample is detected, a dead time of 48 false bits (i.e. 192 sample times) is required before looking for a new flag bit. (Note that noise can cause a command packet to be missed. For this reason a command should always be verified via the Status line.)

2. Once an acceptable flag has been detected, the 32 data bits are sampled. Each bit is four sample times long. Each bit is sampled during both the second and the third sample times (see figure 2). If the two sampled values are the same, the bit is good; otherwise, the command is marked as invalid. Even if bad bits occur, all 32 data bits of the packet are processed. After the first field has arrived, the second field is serially complimented and compared to the first field to provide final

verification of the command packet.

3. After the 32 data bits have arrived, a 48 false bit dead time is required. If the command is valid, it is executed during this dead period.

Status is continually transmitted to the EIP in 257 bit packets at a bit rate of EipToRosClock4. The first bit is a flag bit that is always true followed by 256 bits of status data. There is a dead time (i.e. Status line = false) of atleast 272 (i.e. 256 + 16) bit times between packets. The following algorithm is suggested to decode the Status format.

1. The Status line is sampled by the EipToRosClock Three consecutive true samples are required for an acceptable flag bit. Isolated or paired true samples are assumed to be noise. If a noise sample is detected, a dead time of 272 false bits (i.e. 1088 sample times) is required before looking for a new flag bit. (Note that noise can cause a status packet to be missed.)

2. Once an acceptable flag has been detected, the 256 status bits are sampled. Each bit is four sample times long. Each bit is sampled during both the second and the third sample times (see figure 2). If the two sampled values are the same, the bit is good and it is used to update the status buffer. If a bad status bit is detected the buffer is not updated and an error flag is set. Even if bad bits occur, all 256 data bits of the packet are processed.

3. After the 256 data bits have arrived, a 272 false bit dead time is required.

Note that the same type of redundancy error detection is not provided for Status as is provided for Command Error detection for Status can easily be provided in one of two way. For signals that do not require a rapid response, data in multiple status packets can be compared. For more time critical status, data can be transmitted on multiple bits of the same status packet.

PacketRequest is a signal from the ROS requesting a data packet from the EIP. If PacketRequest is true and the EIP is not currently transmitting a packet, the EIP sends a 5 by 16 packet to the ROS at a rate of EipToRosClock The 5 x 16 packet consists of a 1 x 16 packet carried on the signal PacketSync and a 4 x 16 packet carried on the signals RosData 0-3.

PacketSync is a signal from the Eip to the ROS which is used both to flag the beginning of a data packet and to identify the its type, either regular packet or last packet of scan line. The PacketSync packet always begins with a four bit true flag. These four bits are followed by an eight bit packet identifier: all true if last packet of scan line and all false if a regular packet. The last four bits of this 1 x 16 packet are always false. The redundancy on this line is designed to minimize the possibility of missing a packet, adding a packet, or missing the *last packet of scan line* identifier. The following algorithm is suggested for decoding the PacketSync format.

1. Two consecutive true bits flag the beginning of a packet. A single true bit is assumed to be noise.

2. Once a valid flag has been received the entire packet is stored in one of the data packet buffers. A count is maintained of the number of true bits in PacketSync and the result is interpretted as follows.

a. Normal values for true sum are 4 or 12. If neither of these values is encountered, a soft data error is recorded.

b. Mark the packet as *last packet of the scan line* if the true sum is greater than 8.

- RosData 0-3 contains video from the EIP to the ROS synchronized by PacketSync and EipToRosClock as definedabove. Bit 0 precedes bit 1 in the video stream.

This is intended only as a preliminary specification subject to some minor changes in the near future.

Distribution:

Bates
Green
Ellenby
Lampson
Liddle
Ornstein
Sproull
Starkweather
Swager
Thacker
Thompson

ExternalCommand1 ← command[4-15] (a register is set)

7 External command 2 (M version only)
ExternalCommand2 ← command[4-15] (a register is set)
Set video gate (T version only)
VideoGate ← command[4-15]

10b-17b Spare

2.4 Adapter status

The adapter constantly reports 256 status bits to the EIP. These bits are normally viewed as consisting of 16 16-bit words. The first 8 words of status are reasonably independent of the kind of adapter (T or M) or the exact kind of printer attached to the adapter:

Word	Bits	Function
0		Special status from the ROS
	0	SendVideo (sometimes called DelayedPageSync)
	1	PrintMode
	2	Local
	3	BeamEnable
	4	StatusBeamOn
	5	StatusPowerEnable (M version only)
1		Command register
	0-15	A copy of the command most recently received by the adapter
2		Bit clock
	0	VideoPolarity (the setting of a switch)
	1-3	BitScale (register set with command code 1)
	4-15	BitClock (register set with command code 2)
3		Motor speed
	0	SelectLeadEdge (the setting of a switch)
	1-3	MotorScale (register set with command code 1)
	4-15	MotorSpeed (register set with command code 3)
4		Line sync delay
	0	Switch3 (the setting of a switch)
	2	ExtendVideo (register set with command code 1 -- T version only)
	3	TestPageSync' (register set with command code 1)
	4-15	LineSyncDelay (register set with command code 4)
5		Page sync delay
	0	Switch4 (the setting of a switch)
	1	CommandLocal (register set with command code 1)
	2	CommandBeamOn (register set with command code 1)
	3	TestMode (register set with command code 1)
	4-15	PageSyncDelay (register set with command code 5)
6		External command 1
	0	LineNoise
	1	CompareError
	2	BufferUnderflow
	3	PacketsOK

	4-12	ExternalCommand1 (register set with command code 6)
7	0-3	LineCount
	4-15	ExternalCommand2 (register set with command code 7; M version only)
	4-15	VideoGate (register set with command code 7; T version only)

The remaining 8 words of status are normally used for external (engine) status of various kinds. The TTL adapter organizes these words as follows:

Word	Bits	Function
8	0-15	Special status bits 0-15 (see Dover section for interpretation)
9	0-15	Special status bits 16-31 (see Dover section for interpretation)
10	0-15	ID (16 bits). This identifies the engine type.
11	0-15	Serial number (16 bits). This specifies the serial number of the engine.

2.5 *Additional adapter features*

There are a number of additional adapter features, chiefly for providing various kinds of diagnostic and debugging help.

The ExtendVideo flag (T version only) can be used to override the action of the VideoGate counter. Once SendVideo comes on, it will stay on until ExtendVideo is turned off *and then* the VideoGate counter reaches zero.

There are two variations of "local" operation for checking out the printing engine. The machine may be switched to Local by a switch on the engine (and reported as a status bit), or may be set into this mode by setting CommandLocal. In the first case, the adapter extracts commands from a PROM that are intended to start paper motion and printing. Two switches (Switch3 and Switch4) govern the selection of one of four local command sequences that is extracted from the PROM. In both local cases, the adapter will generate "graph paper" video signals governed by the video gate counter (VideoGate) and the line sync delay register (LineSyncDelay). In order to see graph paper cover the page, VideoGate and LineSyncDelay must be set in such a way that they are counting as the beam passes all spots on the page.

To aid debugging the adapter itself, the TestMode bit may be set. This permits the crucial printer and ROS timing signals to be generated in the adapter rather than in the engine. If TestMode is set, PageSync is taken from the *complement* of the control bit TestPageSync', and line sync (analogous to start-of-scan) is generated by the motor control circuitry: on the M adapter, it will be on for (15/16) * (4096-MotorSpeed) / crystalClock seconds and off for (1/16) * (4096-MotorSpeed) / crystalClock seconds; on the T adapter, it will be a signal on for 4 * (4096-MotorSpeed) / crystalClock seconds and off for the same amount of time. The "on" portions of these signals simulate scan-lines of the corresponding durations.

The BeamEnable status bit means that the doors to the ROS housing and/or printing engine are closed, and the interlocks have engaged.

To force the laser beam on, and consequently to allow the servos to settle down, either CommandBeamOn or StatusBeamOn may be set. CommandBeamOn may be set by the EIP, and StatusBeamOn can be set with a switch in the ROS housing (M adapter).

STATROW 00

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ROS STATUS 00	SEND VIDEO	PRINT MODE	LOCAL	BEAM ENABLE	STAT BEAM ON	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
ROS STATUS 01	CAR 00	CAR 01	CAR 02	CAR 03	CAR 04	CAR 05	CAR 06	CAR 06	CAR 08	CAR 09	CAR 10	CAR 11	CAR 12	CAR 13	CAR 14	CA 15

STATROW 01

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ROS STATUS 02	VIDEO POL	BIT SCALE 00	BIT SCALE 01	BIT SCALE 02	BCR 00	BCR 01	BCR 02	BCR 03	BCR 04	BCR 05	BCR 06	BCR 07	BCR 08	BCR 09	BCR 10	BCR 11
ROS STATUS 03	SELECT LEAD EDGE	MOTOR SCALE 00	MOTOR SCALE 01	MOTOR SCALE 02	MSR 00	MSR 01	MSR 02	MSR 03	MSR 04	MSR 05	MSR 05	MSR 07	MSR 08	MSR 09	MSR 10	MSR 11

STATROW 02

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ROS STATUS 04	SW 3	XX	XX	TEST PAGE SYNC	LSDR 00	LSDR 01	LSDR 02	LSDR 03	LSDR 04	LSDR 05	LSDR 06	LSDR 07	LSDR 08	LSDR 09	LSDR 10	LSD 11
ROS STATUS 05	SW 4	CMND LOCAL	CMND BEAM ON	TEST MODE	PSDR 00	PSDR 01	PSDR 02	PSDR 03	PSDR 04	PSDR 05	PSDR 06	PSDR 07	PSDR 08	PSDR 09	PSDR 10	PSD 11

STATROW 03

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ROS STATUS 06	LINE NOISE	COMPR ERROR	BUFFER UNDER FLOW	PARTS OK	EXTERN CMND 00	EXTERN CMND 01	EXTERN CMND 02	EXTERN CMND 03	EXTERN CMND 04	EXTERN CMND 05	EXTERN CMND 06	EXTERN CMND 07	EXTERN CMND 08	EXTERN CMND 09	EXTERN CMND 10	EXTE CM 11
ROS STATUS 07	LINE COUNT 00	LINE COUNT 01	LINE COUNT 02	LINE COUNT 03	VGWR 00	VGWR 01	VGWR 02	VGWR 03	VGWR 04	VGWR 05	VGWR 06	VGWR 07	VGWR 08	VGWR 09	VGWR 10	VG 11

STATROW 04

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ROS STATUS 08	SS00 XX	SS01 XX	SS02 XX	SS03 COUNT	SS04 XX	SS05 PAPER TRAY	SS06 XX	SS07 XX	SS08 LOW PAPER	SS09	SS10 LS27	SS11 LASER ON	SS12 DRAWER INTLOCK	SS13 TEMP READY	SS14 LOST POWER	SS1 MO CO
ROS STATUS 09	SS16	SS17 PHOTO CELL	SS18 PRE SEQUEN	SS19 XX	SS20 LS09	SS21 AC MONITO	SS22 FUSER JAM	SS23 XX	SS24 LS24 LS31	SS25 MAL FUNC	SS26 LS0 MISFUF	SS27 XX	SS28 XX	SS29 PAPER FEED	SS30 XX	S3 X

STATROW 05

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ROS STATUS 10	SN12	SN13	SN14	SN15	SN08	SN09	SN10	SN11	SN04	SN05	SN06	SN07	SN00	SN01	SN02	SI
ROS STATUS 11	ID12	ID13	ID14	ID15	ID08	ID09	ID10	ID11	ID04	ID05	ID06	ID07	ID00	ID01	ID02	I

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ROS STATUS 12																

XEROX
PALO ALTO RESEARCH CENTER
Computer Science Laboratory
November 28, 1978

To	Spruce Users and Installers
From	Dan Swinehart
Subject	Spruce Reference Manual
Filed as	[Maxc]<Spruce>SpruceManual.Press

This document describes the procedures for printing Press files using the Spruce printing service on an Alto II/Orbit/Printer configuration. It is also a reference manual for the operation and installation of the Spruce program. Charts summarizing these procedures appear in appendices.

Spruce Operations

Capabilities

The Spruce software is capable of printing a subset of Press format files. It will print characters, rectangles, and the Alto resolution bit map output from Draw and Markup. It will not print bit maps at other resolutions, objects, half-tones, etc. Spruce does implement the "only on copy" feature.

Spruce runs on Dovers, Pimlicos (color printers), and Sequoias. It will also be available for the Puffin and Penguin printers. Recommended resolutions are in the range 300 to 384 bits/inch (most, if not all, current systems run at 384. See [Printing] for a fuller discussion of these options, and for details of Spruce configurations in Palo Alto.) Color pictures are currently printed by treating each group of three Press pages as the three color separations (magenta, yellow, cyan) for a single piece of paper. The ability to print bit maps is limited, especially on Dover, by memory and bandwidth limitations.

Spruce will run in a stand alone mode, printing Press files that reside on the Spruce disk. However, its intended use is as a server, receiving and printing Press files using the EFTP protocol. See [Printing] for a complete description of methods for transmitting files to Spruce servers.

A Spruce system may be configured to run with either one or two Diablo Model 31 disk drives, or with one Model 31 and one T80 drive (yielding considerable performance and capacity improvements). The single-drive system has only limited font and spooling capacity.

Spruce and Fonts

Unlike EARS, fonts may not be sent to a Spruce system, but must already reside in its local storage. When Spruce cannot find a requested font, it substitutes one that seems to have similar attributes, reporting a substitution on the break page. The substitution may or may not be acceptable to the user. See [Printing] for a typical set of Spruce fonts.

The Break Page

The break page contains a region reserved for comments about the user's Press file. Spruce inserts these to indicate that some font was not available, some entity could not be fully printed, etc. When there is a problem severe enough to suspend Press file processing, the user will be blessed with a lone break page containing the explanation. If the offending file does not even look like a Press file, the sender and file name will not be identified on the break page.

What To Do When it Crashes

If red lights are on on the printing machine, and Spruce is oscillating between a status report and a blank screen, *do not touch the keyboard* (except perhaps to disable printing -- see below). Arrange to get the offending condition cleared, and Spruce should continue normally.

If you find Spruce in Swat, or otherwise hopelessly lost, try to locate a Spruce maintenance person. Failing that, record the screen, and try <ctrl>P (proceed). The program should recover from the problem. If it does not (swats again, or does something really odd), boot the machine and restart Spruce.

Report all abnormal occurrances, hardware or software, in the nearby log book, if there is one. Otherwise, send a message to the appropriate authority. Please do not restart a Spruce server without submitting a report.

Important

If you have been using a printer system in stand alone mode, or for some other purpose, *always return it to server operation before leaving it*, unless something is broken.

The following sections describe the operator functions in both server and stand alone modes. Instructions for restarting Spruce are found in the stand alone section.

Spruce as a Server

To run Spruce as a server, be sure it is installed properly, then simply type:

Spruce Server^{CR} -- *But be sure to read the* <u>*Restarting*</u> *section on the next page!*

Commands

When Spruce is processing or printing a file, it must turn the display and keyboard off. Thus, it will only accept interactions with an operator when it is idle, or when it is receiving (spooling) a file from some remote user. You will be able to identify the interactive state because status entries for the last few documents to be handled will be visible on the screen.

There are only a few interactive Spruce server commands. Each is specified by typing one character. Some then require additional input.

S	start/stop spooling	When Spruce is started, it is set to accept Press files from remote users. It is sometimes convenient to disable spooling activities for a while (perhaps in preparation for taking the system down.) This command toggles the "spooling switch", and tells you the new state. After you disable spooling, one more file might arrive.
P	start/stop printing	This command toggles the "printing switch". Spruce is initially set to print files as they arrive. One should disable printing, for instance, in order to take the printer down for cleaning or other maintenance.
C	check queue	This prints identifying information for the last few Press files that have been received, along with their current status (pending, in progress, printed, etc.) This is a good first-level check that Spruce is up and operating normally.
V	verify queue	Performs the "check queue" operation, pausing after each line for a one-character confirmation. Type *P* to finish the list without further pausing.
R	reason	One must next type a line, terminated by carriage return, that will be sent with other status to remote users when spooling is disabled. This allows one to specify the reason that Spruce is unavailable.
M	modify queue	This command provides a limited repertoire of operations for reprinting documents, aborting troublesome ones, etc. See the *Queue Modification* section on the next page.
Q	quit	Causes Spruce to finish and return to the executive.

Status reporting

Spruce displays the remote host identifier, file name, sender, and internal numeric identifier for each Press file up to three times during its stay: when the file has been successfully received, when it has been printed, and when its contents have been overwritten by a newly arrived Press file. This information disappears when processing of the next file begins.

Spruce will also display a message when a problem is detected in the Press file or in program or printer operation. When the printer is in trouble, the system will cycle between a display-off state when it is checking to see if the problem has vanished, and a display-on state when it is reporting the problem. If you think the problem will take a while to fix, try to catch Spruce in the display on state and disable printing (and possibly spooling).

If Spruce requests that you notify maintenance personnel, please do so.

Special Server Functions

Queue Modification

This facility is currently in a particularly primitive state. Using it, one can request that a document which is still available but has already been printed be reprinted , or that a document that is scheduled for printing (or is already in progress) be marked *printed* (and thus be effectively aborted.) These activities apply only to the files that appear in response to the *C* (check queue) command, usually the last 25 or so that have been received.

To use this function, type "M" (for "modify queue".) The currently-queued files will be presented, one at a time. Respond with:

R	To cause the document to be reprinted.
A	To abort the printing of the document.
P	To complete the file listing without modifying any more files.
CR	To advance to the next file.

If the printing of documents is enabled when the *R* option is chosen, the selected document will be reprinted right away. Therefore, it is wise to disable printing (see the *P* command, above) before using the *M* command.

Interrupting the Printer

Although the keyboard functions are not available when the printing subsystem is running (the screen is blank except for a cursor), one may attract the attention of the spooling subsystem by pressing the ESC key. You may have to do this several times, especially if the printer itself is running. When the status legends appear, indicating a return to the spooler, you should toggle the printing switch (using the *P* command) to inhibit the return to the printer, which will otherwise occur within 10 seconds or so.

Restarting

Spruce saves sufficient information about the files it has queued for printing that it can be restarted, in most instances, without losing any files. This is true whether system operation terminated due to power failure, a crash in the printer or spooler subsystem from which manual continuation does not seem possible, or in response to the *Q* (quit) command. Restarting after the use of *Spruce/I* (see installation section) to change installation options does not currently work, although it is (errantly) permitted. Be sure to start over, using "Spruce Server", whenever you have performed any installation activity.

To invoke the restart action from the Alto Executive, simply type

    Spruce Restart^CR

Spruce should quickly bring up its status display. It will have both spooling and printing inhibited, so that you can use the *M* (modify queue) command to adjust the queue (perhaps to flush an offending file or to flush files that have been printed but not recorded.) Be sure to toggle both the spooling and printing indications before leaving the site. If this process does not seem to work well, quit or boot and do a cold start (via "Spruce Server".)

Spruce as a Stand Alone Printer

The Print Command

The basic command to Spruce is "Print," followed by a file name. Thus

>Spruce print memo-1.press

will invoke the process of printing the file "memo-1.press." The Spruce command words (e.g., "print" above) can be abbreviated as long as they remain unambiguous.

If you wish to override the number of copies specified in the Press file (usually 1), append the clause "copies n" to the end of the command:

>Spruce print memo-1.press copies 3

If you wish to print certain pages selectively, you may append the clause "page n" or "pages n to m" to the command:

>Spruce print memo-1.press page 2
>Spruce print memo-1.press pages 3 to 4

Spruce takes some time to format the files properly and begin printing. If you simply wish additional copies of a file you have just printed, you may avoid the formatting delay by using the "reprint" clause in place of the "print file" clause:

>Spruce reprint page 2
>Spruce repr cop 2

"Wrong" pages. If Spruce prints your document, but it doesn't seem to have the right things on it, it may be that the Press file was trivially invalid. You can run Spruce again, with the "verbose" mode enabled, and see if it indicates any problems. Use the /V switch:

>Spruce/V pri memo-1.press

In some configurations, "verbose" mode is the default. The /V switch will disable it.

Illegal Press files. If Spruce complains that your file is illegal, and you suspect the method used to generate the file, the program ReadPress (see the bibliography), which prints on your screen a quasi-intelligible dump of the Press file, may be helpful in tracking down the problem.

>ReadPress memo-1.press

will bless you with more information that you can handle!

Complete Command Description

The repertoire of Spruce commands offers several options when a file is printed. The format of the command line is:

>Spruce/switches option <arg> option <arg> ...

The "switches" govern the overall operation of Spruce; the "options" label the specific options being used and can be abbreviated as long as they remain unambiguous; most of the options take arguments.

Options:

Server	This command may appear alone, or in conjunction with a stand-alone command. It starts Spruce in server mode. To run Spruce as a server, type "Spruce server^{CR}" to the executive. See the previous section for subsequent operation. If another command appears, it will be obeyed before entering server mode.
Restart	Type "Spruce Restart" to attempt a recovery from catastrophic error or other spooler termination. Then adjust the queue as necessary and enable spooling and printing. If this fails, perform a cold start using the Server command.
Print	This is the main command to print a Press file. The argument is the name of the file to be printed. Example: "Spruce print memo-1.press".
Copies	The argument is a number, the number of copies of the document that should be printed. Default is "Copies 1."
Pages	This option governs which pages of a file will be printed. Standard use is with the "to" option: "Spruce print memo-1.press pages 2 to 3". If the page range does not match the page range of the Press file, the largest overlap of the two ranges is printed. Default is "pages 1 to 99999."
RePrint	The file most recently printed is re-printed, avoiding the scan-conversion processes. The "Copies" option applies to reprinting. Not available in server mode.
XOffset	This option allows the page to be displaced in the X direction on the page, by an amount given by the argument (in inches). This feature may be disabled.
YOffset	This is analogous to XOffset, but governs vertical displacement.
Resolution	This option allows a user to override the default setting of the resolution of the output device being used. Be warned that changing resolution will usually result in poor font matches from the font dictionary. The argument is the resolution, measured in bits per inch.
PowerOn	Used to set the printer's internal clocks and to stablilize them before running the printer. This function is usually performed adequately each time a document is printed, but it can be used alone to be sure things are set right before performing diagnostic tests, etc.
PowerOff	Not applicable to current Spruce printers.

There are two global switches that alter the use of Spruce: /V (verbose) gives better error messages. /D is equivalent to the Debug 32 (usually -- don't really print) option.

Debug The argument is a decimal number comprising the sum of several option codes. These are for use by Spruce maintenance people only:

1 The printing program (Sprint) pauses just before processing and printing a file. It pauses by entering Swat.

2 File processing and printing is inhibited, but the printing program (Sprint) is brought in.

4 Any printing program (Sprint) error condition is reported via Swat, before standard error recovery procedures are invoked. This function is inhibited if the code 512 (don't Swat) is also present.

8 The printing program will not monitor the Ethernet for spooling requests. It will therefore be totally unavailable while processing and printing files. It will not even respond to simple status requests.

16 The printing program will monitor the Ethernet (unless code 8 is also requested), and will respond to status requests, but it will not suspend processing or printing to accept additional files.

32 The printing program will process files, but will only pretend to print them. This is useful when one's Alto can only pretend to have a printer.

64 The printing program will call Swat when it has swapped in the processing overlay, but has not yet started processing.

128 The printing program will call Swat when it has swapped in the printing overlay, but has not yet started printing.

256 Spruce (the spooling program) pauses via Swat whenever it regains control, either on completion of printing several files, or due to some error detected by Sprint.

512 The printing program, Sprint, will never invoke Swat due to an error it detects. Instead, for otherwise fatal errors it will terminate printing the file and report the problem to the spooler. That file being processed will not be retried. System errors may still, at this writing, invoke Swat.

1024 Spruce will not invoke Swat. This feature is not implemented, so it is fortunate that Swat is rarely invoked in Spruce.

Spruce Installation

This section describes in detail the installation of a Spruce system for any of the currently supported printers.

Operating Files

Six files are needed to produce a Spruce system. Five may be obtained from the dump file [Maxc]<Spruce>Spruce.dm. They should all be placed on the server's DP0 disk:

File	Description
Spruce.Run	The spooling program
Spruce.Syms	
Sprint.Run	The printing program
Sprint.Syms	
Spruce.Errors	Error messages

In addition, one must obtain a version of the font dictionary, *Spruce.Fonts*, appropriate for the printer, the disk configuration, and other installation-dependent conditions. Each installation tailors the font directory to its own needs. A reasonable set, for starters, is available from Ron Pellar in PARC/Pasadena. Ron has played a major part in producing the current high-quality document fonts. For more information about font production, see [Fonts], [PrePress], and [Printing]. Also, please consult Ron or your local font experts. The following versions are available on [Ivy] in Palo Alto:

File	Suggested Disk	Resolution	Comment
<Dover>Spruce.Fonts	DP1	384	Reasonable config. for two model 31s
<Dover>Clover>Spruce.Fonts	T80	384	Extended version, suitable for T80 config.

Finally, several other files will be produced during installation. They will contain spooled Press documents, system state information, and intermediate results. They are:

File	Disk[1]	Size[2]	Comment
Spruce.Spool	any	option[3]	Spooled Press documents for server.
Spruce.Bands	any	option[4]	Intermediate file processing results
Spruce.CheckPoints	DP0	ca. 40	Holds installation values, file descriptions

1 DP0 -- DP0 only; any -- either M31 or T80.
2 In disk pages, for whichever disk is chosen -- 256 words each for M31s, 1024 words each for T80.
3 Supplied at installation time. This file must hold all documents that have been spooled but not yet printed. See the chart at the end of this section for typical values. For stand-alone systems, this file must exist, but may be made as small as is desired.
4 Supplied at installation time. This scratch file contains the results of the pre-scan pass over the Press file. Its size, for the largest Press file to be accommodated, must be roughly (2c + 4r + 80s) words, where c is the length of the Press file in bytes, r, the total number of rectangles, and s the total number of different font characters used in the file. Again, see the chart below for typical values.

It is important for correct operation that the various files be allocated contiguously, or at least nearly so. Therefore, the following procedure is recommended for initial installation.

Complete Spruce Installation ("from scratch")

First, obtain a disk whose current contents is not valuable. Use the "Ether boot" facility to obtain a new operating system. Install it using the long installation dialogue, erasing the disk first. *Do not install a password.* Provide the Alto's name as the user name: "Menlo", "Clover", etc., and a disk name of "Spruce Server" or "Spruce Dover Server".

Unless you are producing a T80 installation (whence space is not at a premium on DP0), you should immediately delete DMT.Boot and FTP.Run. Then use the "Ether boot" facilities to run Ftp, and obtain <Alto>Installswat.Run (from [Maxc] or your local IFS if it's there.) Run InstallSwat, then delete InstallSwat.run.

Get FTP back, then fetch the Spruce operational files from [Maxc]<Spruce>Spruce.dm, plus the appropriate *Spruce.Fonts* as described above. You should also get <Alto>Sys.Errors.

Now type "Sprint^{CR}". This will install the printing program. It should type the current Sprint version number, run for less than a minute, then exit.

Finally, type "Spruce/I^{CR}". This will produce the Spruce installation menu, whose use is described on the next page.

Subsequent Installations

Once-Only Procedure: When updating from Spruce 8.x or earlier to Spruce 9.y or later, delete the file Spruce.CheckPoints before proceeding. This is very important!

If you have fetched a new font file or either of the new run files, if you need to modify the size or location of any of the scratch files, or if you need to modify any of the printing parameters (see next page), you should first run Sprint (type "Sprint^{CR}"), then proceed to the installation sequence (via "Spruce/I^{CR}".) It is not strictly necessary to run Sprint unless Sprint.Run has changed, but it will never hurt anything, it is sometimes necessary to clean up messy situations, and it is always recommended.

Spruce, as distributed, contains defaults to install a Dover system at 384 bits/inch, with average printer-dependent adjustments (see below). On subsequent installations, unless the spooling program's version has changed, the most recently installed values will be used as defaults.

Version Numbers

Both the spooling program, *Spruce*, and the printing program, *Sprint*, contain a version number of the form *(major version)* . *(minor version)* (e.g., Spruce version 8.3). It is intended that Spruce version *n.x* will run successfully with Sprint version *n.y*, for any *x* and *y*. The system will refuse to start if the major versions differ. Fetch the most recent versions and continue.

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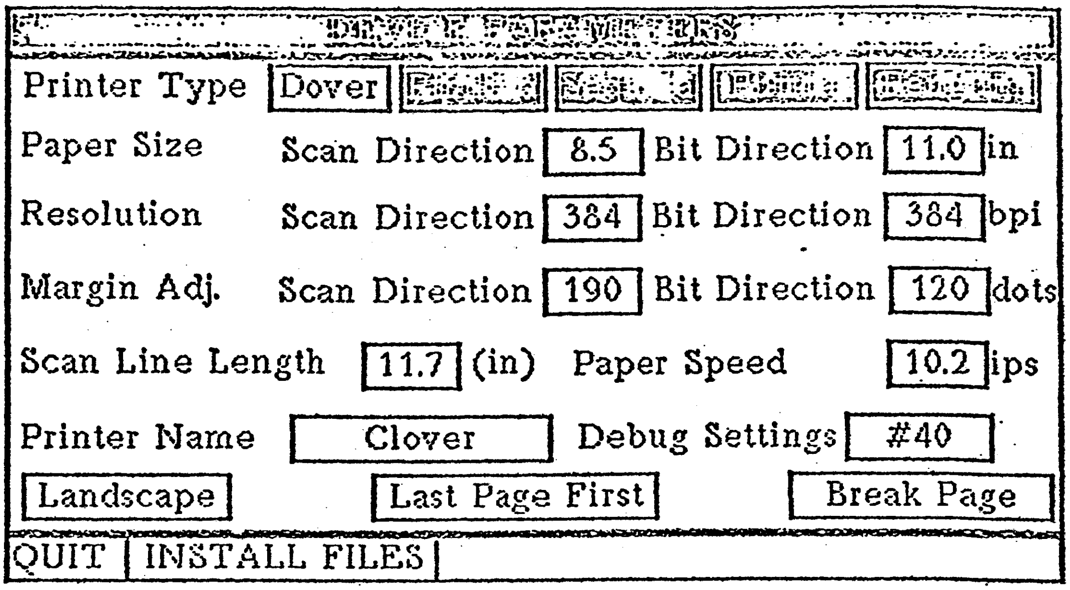
Printer Parameter Installation

When you enter spruce via "Spruce/I", you are presented with the following menu:



This is a typical menu-based presentation, using the ubiquitous menu package produced by Keith Knox (WRC). One or two words should suffice to describe it:

There are numerical (or string), selection, and boolean parameters.

> An example of a numerical parameter is the Scan resolution. One selects it by clicking any mouse button while the cursor is positioned over its box, then types the new quantity, terminated by CR -- standard sorts of editing operations also work.
>
> The printer type (Dover, Pimlico, etc.) is a selection parameter. For some perverse reason, the selected printer is displayed as black text on white background, while the rejected ones are shown in the inverse sense. Let me know how you would like that choice if you weren't already used to the opposite approach.
>
> There are two kinds of boolean parameters. The landscape/portrait mode option is an example of the first -- clicking the box toggles the underlying parameter and reflects the choice by modifying the legend. The other kind, seen only in the files menu (two pages hence), is *true if it is displayed as black text on a white background, false if inverted* -- again, a perverse reversal of the standard inversion scheme.

Description of Printer Parameters

If you haven't fetched a new version of the run files, all parameter settings will be remembered from installation to installation.

Printer Type. Select one of *Dover, Pimlico, Sequoia, Puffin,* etc. A number of the other parameters, described below, will now change to reflect typical default values for that kind of printer. You must now modify those to suit.

Resolution: The number of scan lines per inch and bits per inch for the device. This value depends on the capabilities of the device and on the resolution of characters in the current *Spruce.Fonts* dictionary. I believe that all current systems run at 384 dots/inch.

Paper Parameters, Printer Parameters: These are values that describe the physical parameters of the printing device and the paper it prints on. They are used to control the actions of the imaging hardware. See the chart at the end of this section for typical values.

Margin Adjustments. These numbers should be used to center the Press page image on the real page. The default values are approximately correct for Dover, although the actual values vary from printer to printer and from time to time. The printer-dependent values given in the appendix were once correct, but will probably not remain so. Use the file Align.Press, a cross whose arms are 5" long, and whose center is at the center of the page. Larger values for "scan margin adjust" move the image to the right. Larger bit values move the image towards the page top. On Pimlico and Puffin, scans move the image down and bits move it to the right. Obtain the alignment file from your local <Press> directory.

To adjust the length of the arms of the alignment cross to exactly 5", you can try modifying the scan line length and paper speed parameters. Scan line length can be adjusted in .1" units, paper speed in units of .01"/sec.

Break Page/No Break Page: Determines whether an informative title page will be issued as the first page of each document. Enable the break page unless your printer is very slow and is used by only a small number of people.

Landscape/Portrait Device: You should change the defaults only to obtain certain novel effects.

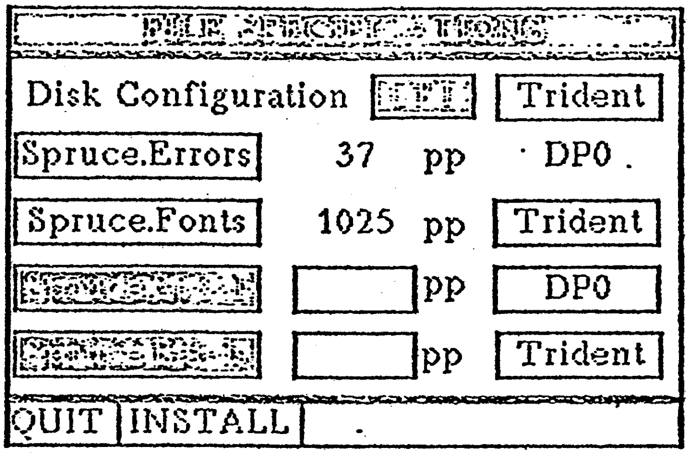
Printer Name: defaults to the disk installation name. This name will be used in display and status messages to the clients.

Debug Settings: This value provides the Debug argument to be supplied when the global "/D" switch is used. As distributed, it is 32 (40b): Spruce will not actually try to run the printer.

To abort the installation without changing any values, click the *Quit* menu item in the bar below the window. To accept the printer paramters and proceed to file installation, click *Install Files.*

File Parameter Installation

The second and final menu facing you looks like this:



Description of File Parameters

Disks. To produce a single-disk system, or a system where two model 31s are configured as one file system, do not change the default disk settings. When using two model 31s, however, it is preferable (because it minimizes head motion) to configure them separately, placing *Spruce.Fonts* and *Spruce.Bands* on DP1, everything else on DP0. By far the preferred configuration uses a T80 to hold the *Spruce.Fonts*, *Spruce.Spool*, and *Spruce.Bands*. When using this configuration, the second model 31 is legal, but relatively useless. Remember, *a disk is considered available if its menu entry is shown as black text on a white background.* The installer must explicitly toggle each disk entry to indicate interest in that disk. Spruce will refuse to consider a disk which is not currently connected, on line, and possessing a valid format.

Files. The menu contains one line for each file, with fields for specifying the file's size and disk location. Spruce will try to find each of the named files on the currently-specified disk. If successful, the file name will appear in black text on white background, and its size (in pages) will be indicated. Otherwise, the name field will remain inverted, with a null size field.

For each file, first select the desired disk by toggling the associated disk entry until the right name comes up. Spruce will try to find a matching file. Failing this, fill in the size field, then click the file name entry. Spruce will create a file of the appropriate size.

To place a file on a different disk, toggle the disk entry and repeat the above steps. To change the file's size, fill in a new size entry and click the file name entry. To cause Spruce to rebuild its structures representing a previously-installed file (black on white background), toggle the file name and wait for it to return to the installed state -- see *TroubleShooting*, below.

Finishing up. Finally, to accept the files as produced and modified, click the *Install* button, and wait for Spruce to finish. The system is now ready for operation. If you run into trouble along the way, click the *Quit* entry to return to the executive, fix the problem (see below), then repeat the installation sequence.

Trouble Shooting

If, during or after installation, there are zero or fewer free pages remaining on any of the disks, perform the whole process over, reducing the size of the bands or spooling file as needed. As a guideline, after running Sprint, the spooling and bands file sizes may be chosen to use up all but 257 of the remaining pages on DP0, and essentially all the pages on other disks. We suggest leaving at least

20 additional pages for breathing room -- to allow larger program files, small Press files to be printed in stand-alone mode, etc.

If, after Spruce has been successfully running for some time, things go bad and it looks like software, *try re-installing both Sprint and Spruce* before resorting to sterner measures. If Spruce seems to be having trouble accessing its files, try verifying each file, even if it appears to be properly installed, by toggling its name entry in the file parameter menu.

Never try to perform a "Spruce Restart" after an installation sequence. In a future release, this action will be either prohibited or made to work.

Typical Spruce Installation Values

Parameter	Dover	Pimlico	Sequoia	1 M31	2 M31s	1 M31, 1 T80
Bands File Size	--->	--->	--->	1100	2500	semi-infinite[3]
Spool File Size	--->	--->	--->	650	3000[2]	semi-infinite[3]
Debug Settings	32	32	32			
Print Break Page	Yes	No	Yes			
Landscape device	Yes	No	Yes			
Paper parameters: bit direction	11.0[5]	8.5	11.0[5]			
Scan direction	8.5	11.0	8.5			
Output Device	Dover	Pimlico	Sequioa			
Resolution in Bits/Inch	384	384	384			
Resolution in Scans/Inch	384	384	384			
First page at top of stack	No	Yes	No			
Paper Speed in Inches	10.20	4.00	3.40			
Scan line length in inches	11.7	10.2	11.5			
Scan margin adjust	350[6]	..[6]	..[6]			
Bit margin adjust	120[6]	..[6]	..[6]			

2 On DP1.
3 On T80 (by far the highest performance, for ALL scratch files). Expressed in 1024 word pages -- use at least 2000..
5 At resolution of 384, this must be reduced to 10.6.
6 These values vary somewhat from machine to machine, and from time to time. Use Align.Press to set precisely.

References

[Fonts] *Font Representations and Formats*, by Robert Sproull, March 5, 1977, [Maxc] < Gr-Docs > FontFormats.Press, 21 pp.

[PrePress] *PrePress*, by Robert Sproull, July 3, 1977, [Maxc] < Gr-Docs > PrePress.Press, 18pp.

[Press] *Press File Format*, by William Newman and Robert Sproull, [Maxc] < Gr-Docs > PressFormat.Press, about 15 pp.

[Printing] *Printing At Palo Alto*, by Dan Swinehart, Joe Maleson, and others, [Maxc] < Gr-Docs > Printing.Press), about 25 pp.

Spruce Printer Operation, by Robert Sproull, June 14, 1977, [Maxc] < Dover > SpruceOps.Press, 10 pp. -- the source for much of the information in this document.

Appendix A -- Summary of Spruce Operation

See Appendix B for current version (1st digits of Spruce and Sprint versions must agree)

Starting Spruce

Type Spruce Restart^{CR} to restart server without losing information. Failing that, or to start from scratch, type, e.g., Spruce Server^{CR} or Spruce Print xxx^{CR}.

Server Mode Commands

S start/stop spooling	Toggle "spooling switch".
P start/stop printing	Toggle "printing switch".
C check queue	Print description of current printing queue.
V verify queue	Same as C, but requires keystroke after each line; P to finish.
R reason	requires one input line -- reason for Spruce unavailability.
M modify queue	exhibits each queued file in turn. Respond with
R	reprint file
A	abort file
CR	no modification -- go on to next
P	proceed -- print rest of queue entries and finish command.
Q quit	Return to executive.

Stand Alone Mode Command Line Entries

Global Switches
/V verbose Print more diagnostics
/D debug Use standard debugging codes (currently 32, see below).

Command Line Options (e.g., Spruce/switches option <arg> option <arg> ...

Server	Starts Spruce in server mode. See above commands for interaction.
Restart	Restarts without destroying print queue. Not guaranteed to work.
Print	Arg is Press file name. File to print.
Copies	Arg is number of copies. Default is 1.
Pages	Arg is <first> [to <last>]. Pages to print. Default is whole file.
Reprint	Reprints last document printed. Copies option applies.
XOffset	Default 0.
YOffset	Default 0.
Resolution	Default 384.
Power	Arg is *on* or *off*. Power off is not applicable to any current printers.
Debug	Arg is sum of debugging codes:
1	Swat before file processing and printing.
2	Inhibit file processing and printing, but bring in printing program.
4	Swat on any error condition, unless also 512.
8	Do not monitor Ether for print, status requests.
16	Do not suspend processing and printing to accept more files.
32	Run printing code, but do not print. Do not try to use printing hardware.
64	Swat just prior to executing file processing code.
128	Swat just prior to printing the file.
256	Swat on return to spooler.
512	Report all printing program errors to spooler -- do not enter Swat.
1024	Spooler does not enter Swat on error, but tries to continue.

Trouble Shooting

Dover Ready light not on: Alto screen will (at intervals) contain further explanation (use P command to disable printing and freeze in display mode.) Clear printer condition, reenable Spruce printing if necessary.

Dover Ready light won't come on, but there's power to the machine: Push the "power on" button. If that doesnt' work, call maintenance personnel.

Program is in Swat, or is obviously misbehaving: log the trouble, try to find software maintenance people. Failing that, boot and restart server.

After any problem: log the problem in the adjacent log book, or send a message to an appropriate authority.

Please do not leave a functioning Spruce printer without restarting the server.

The Break Page

The break page contains a region reserved for comments about the user's Press file. Spruce inserts these to indicate that some font was not available, some entity could not be fully printed, etc. When there is a problem severe enough to suspend Press file processing, the user will be blessed with a lone break page containing the explanation. If the offending file does not even look like a Press file, the sender and file name will not be identified on the break page.

What To Do When it Crashes

If red lights are on on the printing machine, and Spruce is oscillating between a status report and a blank screen, *do not touch the keyboard* (except perhaps to disable printing -- see below). Arrange to get the offending condition cleared (don't forget to "power on" Dover after clearing a jam), and Spruce should continue normally.

If you find Spruce in Swat, or otherwise hopelessly lost, try to locate a Spruce maintenance person. Failing that, record the screen, and try <ctrl>P (proceed). The program should recover from the problem. If it does not (swats again, or does something really odd), boot the machine and restart Spruce.

Report all abnormal occurrances, hardware or software, in the nearby log book, if there is one. Otherwise, send a message to the appropriate authority. Please do not restart a Spruce server without submitting a report.

Important

Whenever a Spruce printer has been off or idle for some time, issue the "Spruce Poweron" command, then wait a full minute before starting the server or printing files in stand-alone mode. See below for the syntax.

If you have been using a printer system in stand alone mode, or for some other purpose, *always return it to server operation before leaving it,* unless something is broken.

The following sections describe the operator functions in both server and stand alone modes. Instructions for restarting Spruce are found in the stand alone section.

Spruce as a Server

To run Spruce as a server, be sure it is installed properly, perform the power on sequence described just above, then simply type:

Spruce Server^{CR}

Commands

When Spruce is processing or printing a file, it must turn the display and keyboard off. Thus, it will only accept interactions with an operator when it is idle, or when it is receiving (spooling) a file from some remote user. You will be able to identify the interactive state because status entries for the last few documents to be handled will be visible on the screen.

There are only a few interactive Spruce server commands. Each is specified by typing one character. Some then require additional input. This is a crude interface, folks.

S	start/stop spooling	When Spruce is started, it is set to accept Press files from remote users. It is sometimes convenient to disable spooling activities for a while (perhaps in preparation for taking the system down.) This command toggles the "spooling switch", and tells you the new state. After you disable spooling, one more file might arrive.
P	start/stop printing	This command toggles the "printing switch". Spruce is initially set to print files as they arrive. One should disable printing, for instance, in order to take the printer down for cleaning or other maintenance.
C	check queue	This prints identifying information for the last few Press files that have been received, along with their current status (not printed yet, in progress, printed, etc.) This is a good first-level check that Spruce is up and operating normally.
V	verify queue	This does the same thing as the *C* command, except it requires one to type a character after each line is presented. Typing *P* removes the pause condition.
R	reason	One must next type a line, terminated by carriage return, that will be sent with other status to remote users when spooling is disabled. This allows one to specify the reason that Spruce is unavailable.
D	debug	Causes Spruce to Swat.
Q	quit	Causes Spruce to finish and return to the executive.

Status reporting

Spruce displays the remote host identifier, file name, sender, and internal numeric identifier for each Press file up to three times during its stay: when the file has been successfully received, when it has been printed, and when its contents have been overwritten by a newly arrived Press file. This information disappears when processing of the next file begins.

Spruce will also display a message when a problem is detected in the Press file or in program or printer operation. When the printer is in trouble, the system will cycle between a display-off state when it is checking to see if the problem has vanished, and a display-on state when it is reporting the problem. If you think the problem will take a while to fix, try to catch Spruce in the display on state and disable printing (and possibly spooling).

If Spruce requests that you notify maintenance personnel, please do so.

Spruce as a Stand Alone Printer

The Print Command

The basic command to Spruce is "Print," followed by a file name. Thus

>Spruce print memo-1.press

will invoke the process of printing the file "memo-1.press." The Spruce command words (e.g., "print" above) can be abbreviated as long as they remain unambiguous.

If you wish to override the number of copies specified in the Press file (usually 1), append the clause "copies n" to the end of the command:

>Spruce print memo-1.press copies 3

If you wish to print certain pages selectively, you may append the clause "page n" or "pages n to m" to the command:

>Spruce print memo-1.press page 2
>Spruce print memo-1.press pages 3 to 4

Spruce takes some time to format the files properly and begin printing. If you simply wish additional copies of a file you have just printed, you may avoid the formatting delay by using the "reprint" clause in place of the "print file" clause:

>Spruce reprint page 2
>Spruce repr cop 2

"Wrong" pages. If Spruce prints your document, but it doesn't seem to have the right things on it, it may be that the Press file was trivially invalid. You can run Spruce again, with the "verbose" mode enabled, and see if it indicates any problems. Use the /V switch:

>Spruce/V pri memo-1.press

In some configurations, "verbose" mode is the default. The /V switch will disable it.

Illegal Press files. If Spruce complains that your file is illegal, and you suspect the method used to generate the file, the program ReadPress (see the bibliography), which prints on your screen a quasi-intelligible dump of the Press file, may be helpful in tracking down the problem.

>ReadPress memo-1.press

will bless you with more information that you can handle!

Spruce Installation

This section describes in detail the installation of a Spruce system for any of the currently supported printers.

Operating Files

Six files are needed to produce a Spruce system. Five may be obtained from the following sources, all currently on [IFS]:

File	Version[1]	Disk[2]	Description
<Spruce>Spruce.Run	5.0	DP0	The spooling program
<Spruce>Spruce.Syms		DP0	
<Spruce>Sprint.Run	5.1	DP0	The printing program
<Spruce>Sprint.Syms		DP0	
<Spruce>Spruce.Errors		any	

1 Current version number of most recent IFS version.
2 DP0 if file must reside on DP0; otherwise may be placed on any disk.

In addition, one must obtain a version of the font dictionary, *Spruce.Fonts*, appropriate for the printer, the disk configuration, and other installation-dependent conditions. A comprehensive description of font creation, distrubution, and directory creation policies and procedures will be available soon. Until then, see [Fonts], [PrePress], and [Printing], along with Appendix C for guidance in producing a font file. Also, please consult your local font experts. The following versions are available on [IFS] in Palo Alto:

File	Disk	Resolution	Comment
<Dover>Spruce.Fonts.onedisk.350.cp5345	any	350	Limited set, for single-disk systems
<Dover>Spruce.Fonts.350.cp150373	any	350	Standard for Palo Alto Dovers
<Dover>Spruce.Fonts	any	384	Limited set, used in Boca Raton
<Pimlico>Spruce.Fonts	any	384	Same, rotated and tuned for Pimlico
<Sequoia>Spruce.Fonts	any	384	Same, tuned for Sequoia

Finally, several other files must be produced during installation. They will contain spooled Press documents, system state information, and intermediate results. They are:

File	Disk[1]	Size[2]	Comment
Spruce.Spool	any	option[3]	Spooled Press documents for server
Spruce.Bands	M31	option[4]	Intermediate file processing results
Spruce.CheckPoints	DP0	ca. 40	Limited set, used in Boca Raton

1 DP0 -- DP0 only; M31 -- any model 31 disk; any -- M31 or T80.
2 In model 31 disk pages -- 256 words each.
3 Supplied at installation time. This file must hold all documents that have been spooled but not yet printed. See the chart in Appendix B for typical values. For stand-alone systems, this file must exist, but may be made as small as is desired.
4 Supplied at installation time. This scratch file contains the results of the pre-scan pass over the Press file. Its size, for the largest Press file to be accommodated, must be roughly (2c + 4r + 80s) words, where c is the length of the Press file in bytes, r the total number of rectangles, and s the total number of different font characters used in the file. Again, see Appendix B for typical values.

It is important for correct operation that the various files be allocated contiguously, or at least nearly so. Therefore, the following procedure is recommended for initial installation.

Complete Spruce Installation ("from scratch")

First, obtain a disk whose current contents is not valuable. Use the "Ether boot" facility to obtain a new operating system. Install it using the long installation dialogue, erasing the disk first. *Disable Sys.Log. Do not install a password.* Provide the Alto's name as the user name: "Menlo", "Clover", etc., and a disk name of "Spruce Server" or "Spruce Dover Server".

You should immediately delete DMT.Boot and FTP.Run (in multiple-disk systems, you might choose to retain FTP; be sure to fetch the latest version). Then use the "Ether boot" facilities to run Ftp, and obtain <Alto>Installswat.Run (from [Maxc] or your local IFS if it's there.) Run InstallSwat, then delete InstallSwat.run.

Get FTP back, then fetch the six Spruce operational files (five from <Spruce> plus the appropriate *Spruce.Fonts*) as described above. You should also get <Alto>Sys.Errors.

Now type "Sprint^{CR}". This will install the printing program. It should type the current Sprint version number, run for less than a minute, then exit.

Finally, type "Spruce/I^{CR}". This will initiate the Spruce installation dialogue. You will be asked to supply a number of file names, device names, size options, and the answers to some yes/no questions. Spruce will type a default answer along with each question, and will use that default if you type only CR as an answer. If spruce reports a version number whose major (first) component differs from Sprint's, the programs are inconsistent and should not be run together.

Spruce, as distributed, contains defaults to install a Dover system at 350 bits/inch, with average printer-dependent adjustments (see below). On subsequent installations using the same program files, the most recently installed values will be used as defaults.

When *Spruce* exits, installation is complete. The system is ready to use.

Description of Installation Parameters

Disks. Spruce will ask whether you are producing a multi-disk configuration, and if so, will ask you to describe it by answering the appropriate questions. It will verify the existence of the disks you request before continuing the installation process. If you have two model 31 disk drives, you may either configure it as a single two-disk file system, telling Spruce you have but one "disk", or you may produce a separate file system on each disk, again telling Spruce what you have done. The latter method is preferred, since it allows control over where each file will reside -- important for maximum efficiency.

Files. For each of the system files whose disk assignment or size is an installation option, *Spruce* will include questions in the installation dialogue. It will allow placement of files only on disks that are legal for those files, and only on disks that exist. You should distribute the files to maximize the size of *Spruce.Bands* and *Spruce.Spool*, once the size of *Spruce.Fonts* is determined. The chart in Appendix B gives typical values.

Debug Settings: This value provides the Debug argument to be supplied when the global "/D" switch is used. As distributed, it is 32: Spruce will not actually try to run the printer.

Print Break Page: Respond "yes" if you want a cover page printed that will start each printing run.

Landscape Device: Respond "no" for *Pimlico*, otherwise "yes". This setting was left explicit to aid in software development.

of the printing device and the paper it prints on. They are used to control the actions of the imaging hardware. See the chart in Appendix B for typical values.

Resolution: The number of scan lines per inch and bits per inch for the device. This value depends on the capabilities of the device and on the resolution of characters in the current *Spruce.Fonts* dictionary. All current systems run at 350/inch or 384/inch.

Margin Adjustments. These numbers should be used to center the Press page image on the real page. The default values are approximately correct for Dover, although the actual values vary from printer to printer and from time to time. The printer-dependent values given in the appendix were once correct, but are not guaranteed to remain so. Use the file Align.Press, a cross whose arms are 5" long, and whose center is at the center of the page. Larger values for "scan margin adjust" move the image to the right. Larger bit values move the image towards the page top. On Pimlico, scans move the image down and bits move it to the right. Obtain the alignment file from [Maxc]<Press> or [IFS]<Press>.

Trouble Shooting

If, during or after installation, there are zero or fewer free pages remaining on any of the disks, perform the whole process over, reducing the size of the bands or spooling file by 20 pages or so. As a guideline, after running Sprint, the spooling and bands file sizes may be chosen to use up all but 257 of the remaining pages on DP0, and essentially all the pages on other disks. We suggest leaving at least 20 additional pages for breathing room -- to allow larger program files, small Press files to be printed in stand-alone mode, etc.

If, after Spruce has been successfully running for some time, things go bad and it looks like software, *try re-installing both Sprint and Spruce* before resorting to sterner measures. Start at step 4 in the chart of Appendix B.

Updating Sprint (the printing program)

If you have not changed any of the font files, or do not need to change any of the spooling or scratch file sizes, it should be sufficient to fetch the new version and run "Sprint". If Sprint then prints a different major version number (e.g., 6.0) than Spruce prints when it starts (e.g., 5.3), you must also fetch a new Spruce and reinstall it. If things don't work after installing Sprint, you might then also try installing Spruce.

Updating Spruce (the spooling program)

Fetch the new version, and run "Spruce/I". Then start Spruce as a server. If Spruce types a version number (e.g., 6.0) when it is started that is different from the one that Sprint prints (the number that appears on the break page) (e.g., 5.8), you must also fetch a new Sprint and install it, then *reinstall* Spruce.

Appendix A -- Summary of Spruce Operation

See Appendix D for current version (1st digits of Spruce and Sprint versions must agree)

Starting Spruce

Issue the stand-alone command "Spruce PowerOn", then wait one minute. Only after power up, etc. Then simply type, e.g., Spruce Server^{CR} or Spruce Print xxx^{CR}.

Server Mode Commands

S start/stop spooling	Toggle "spooling switch".
P start/stop printing	Toggle "printing switch".
C check queue	Print description of current printing queue.
V verify queue	Same as C, but requires keystroke after each line; P to finish.
R reason	requires one input line -- reason for Spruce unavailability.
D debug	Swats. Please do not do this.
Q quit	Return to executive.

Stand Alone Mode Command Line Entries

Global Switches
/V verbose Print more diagnostics
/D debug Use standard debugging codes (currently 32, see below).

Command Line Options
(e.g., Spruce/switches option <arg> option <arg> ...

Server		Starts Spruce in server mode. See above commands for interaction.
Print		Arg is Press file name. File to print.
Copies		Arg is number of copies. Default is 1.
Pages		Arg is <first> [to <last>]. Pages to print. Default is whole file.
Reprint		Reprints last document printed. Copies option applies.
XOffset		Default 0.
YOffset		Default 0.
Resolution		Default 384.
Power		Arg is *on* or *off*. Power off is not applicable to any current printers.
Debug		Arg is sum of debugging codes:
	1	Swat before file processing and printing.
	2	Inhibit file processing and printing, but bring in printing program.
	4	Swat on any error condition, unless also 512.
	8	Do not monitor Ether for print, status requests.
	16	Do not suspend processing and printing to accept more files.
	32	Run printing code, but do not print. Do not try to use printing hardware.
	64	Swat just prior to executing file processing code.
	128	Swat just prior to printing the file.
	256	Swat on return to spooler.
	512	Report all printing program errors to spooler -- do not enter Swat.

Trouble Shooting

Dover Ready light not on: Alto screen will (at intervals) contain further explanation (use P command to disable printing and freeze in display mode.) Clear printer condition, reenable Spruce printing if necessary.

Dover Ready light won't come on, but there's power to the machine: Push the "power on" button. If that doesnt' work, call maintenance personnel.

Program is in Swat, or is obviously misbehaving: log the trouble, try to find software maintenance people. Failing that, boot and restart server.

After any problem: log the problem in the adjacent log book, or send a message to an appropriate authority.

Please do not leave a functioning Spruce printer without restarting the server.

Appendix B -- Spruce Installation Checklist

From Scratch

-- 1. Obtain an operating system from the Ethernet. Install: erase, disable Sys.log, no password. User name is Alto's name, disk name is "Spruce Server".

-- 2. Delete DMT.Boot, FTP.Run (optional in multi-disk systems). Obtain FTP from the Ethernet. Fetch <Alto>InstallSwat.Run and <Alto>Sys.Errors from a system that has an <Alto> directory. Run, then delete, InstallSwat.Run.

-- 3. Obtain FTP from the Ethernet. Fetch from the nearest IFS, directory <Spruce>: Spruce.Run, Spruce.Syms, Sprint.Run, Sprint.Syms, Spruce.Errors. Fetch Spruce.Fonts from appropriate location (see text).

Continuing Initial Installation, or After Updating one of the Run files, or to change file sizes

-- 4. If Sprint is new, or has changed, run Sprint. Major version must agree with Spruce.

-- 5. If Spruce is new or has changed, or to change file sizes (start from scratch to make one larger): Run Spruce/I, and answer the questions. The following are typical answers; bold values are supplied as defaults in the system as distributed:

Question	Dover	Pimlico	Sequoia	1 M31	2 M31s[7]	1 M31, 1 T80
Use Second Model 31	--->	--->	--->	No	Yes	No
Use Trident Disk	--->	--->	--->	No	No	Yes
Bands File Size	--->	--->	--->	1100	2500[1]	2500[3]
Spool File Size	--->	--->	--->	650	3000[2]	semi-infinite[4]
Debug Settings	32	32	32			
Print Break Page	Yes	No	Yes			
Landscape device	Yes	No	Yes			
Paper parameters: bit direction	10.6 ~~11.0~~[5]	8.5	11.0[5]			
Scan direction	8.5	11.0	8.5			
Output Device	Dover	Pimlico	Sequioa			
Resolution in Bits/Inch	~~350~~ 384	384	350			
Resolution in Scans/Inch	~~350~~ 384	384	350			
First page at top of stack	No	Yes	No			
Paper Speed in Inches	10.20	4.00	3.40			
Scan line length in inches	11.7	10.2	11.5			
Scan margin adjust	290[6]	**[6]	**[6]	360	[illegible]	
Bit margin adjust	120[6]	**[6]	**[6]	80		

1 On DP0 (optional).
2 On DP1.
3 On DP0 (mandatory -- bands may not be on T80).
4 On T80. Expressed in 1024-word pages. 1000 should be plenty.
5 At resolution of 384, this must be reduced to 10.6.
6 These values vary somewhat from machine to machine, and from time to time. Use Align.Press to set precisely. Current values for some of the printers are:
7 A two disk system may either be one two-disk file system (OS 14 and after) or two one-disk systems; the latter is recommended, so that files may be carefully allocated as recommneded in above notes.

	Menlo	Clover	Viola	Wonder	Kanji	Turkey
Scan adjust	350	--	--	--	--	--
Bit adjust	80	--	--	--	--	---

Trouble Shooting

Reduce file size if #pages le 0 after installation.
When restarting Spruce doesn't help, and it looks like software, *Reinstall both programs.*

XEROX
PALO ALTO RESEARCH CENTER
Computer Sciences Laboratory
June 14, 1977

To: Orbit and Dover owners and debuggers

From: Bob Sproull

Subject: Orbit/Dover Test Software

Filed on <DOVER>OrbitDebug.Press

This memo outlines the present software for testing and debugging Orbit and Dover. Although it is not extensive, it have proven adequate.

Orbit Hardware Diagnostic

An Orbit diagnostic program is saved on <DOVER> as the file OrbitTest.Run in the "dump file" <DOVER>OrbitTest.Dm. You will also need the file OrbitTest.Parameters from the same dump file.

The program, invoked with the command "OrbitTest," has a very simple user interface based on the mouse. You are first expected to enter a "test number" (see below for a description of each test). You may execute the test by "bugging" the item "single step" or "repeat" with any mouse button. When you are finished and wish to proceed to another test, bug the "test number" item, and provide a new number.

Many of the tests require that parameters be provided. A standard set of parameters is described on the file OrbitTest.Parameters, which the test program will read automatically. Bug the "parameter set" item, and provide the number of the parameter set--this simply avoids having to bug each parameter and type it separately. You may, of course, enter parameters by hand: simply bug the entry in the parameter window and type in the value: octal values are typed with a trailing "b", decimal values with a trailing ".". (If the value is printed in only one format, as in the test number, the default radix is the same as the printing format.)

Restarting tests. If you are obtaining funny results, you may wish to re-start the test by bugging the "test number" field and supplying the test number again. You will also need to re-establish the appropriate parameters. Re-starting the test will sometimes reset some Orbit or adapter state that is crucial to the proper operation of the test.

Adapter cable. Some of the tests require that the adapter cable be jumpered so that adapter commands are looped back as adapter status signals. It is helpful to have a connector handy with the jumpers permanently installed.

Test 0. This test checks whether Orbit can be reset properly, and requires that adapter power be off or that the cable be jumpered. It will signal an error if INCON≠0, BEHIND≠0, stableROS≠1, badROS≠0 or IACS≠0 after the reset. A tight loop will reset Orbit as fast as possible.

Test 1. Check the refresh timer and branch logic for discovering whether refresh is needed. The test prints out an estimate of the number of microseconds between "ticks" of the refresh timer (it is not very precise). If the refresh logic does not seem to operate properly, an error message is printed: Refresh timeout -- refresh needed indication is absent." This will occur if the refresh timer does not tick within 600 ms. The detailed test:

Do steps 1-2 1000 times in order to time it carefully:
1. Clear the refresh timer (CLRFRESH)
2. wait until OrbitHeight branches, indicating refresh needed

Test 2. Send individual commans to the adapter, and report status. If the cable is jumpered, you should expect status word 0 to be the same as the ROS command, status word 1 to be the complement of the command, and status words 2 to 11 to be 0. If the adapter is connected and powered up, the interpretation of the status bits will of course be determined by the adapter. Each time the loop is repeated, the XOR value is XORed with the ROS command. A tight loop will repeatedly send the command shown on the screen.

Test 3. Check adapter command/status logic with cable jumper installed. This test cycles 1000 times with random numbers, and expects the jumper to arrange that the status word 0=the command, status word 1=complement of the command, and the remainder of the status words are zero. If this condition is not met, an error is indicated. A tight loop will loop sending the command very fast.

Test 4. Check FA logic. This test lets you set various values of FA and make sure that the output addressing logic is working properly. FA values of 0 to 377b should check out properly. An error is indicated if the wrong number of words is read (should be (400b-FA)*16), or if BEHIND fails to set. The basic test is to set FA, and then read words with OrbitOutputData until a buffer switch happens.

Test 5. Read buffer memories and display on the screen. Each time the test is repeated, a different buffer is read. The main point of the test is to verify that, after several iterations, the memory becomes "white." An error is indicated if the buffers have switched at the wrong time (FA is set once whenever it changes, and thereafter Orbit is expected to stay in synchrony).

Test 6. Set height. This test simply sets the height register, and makes no error checks. A tight loop will set the register repeatedly.

Test 7. Set X, Y. This test simply sets the x and y registers, and makes no error checks. A tight loop will set the registers repeatedly.

Test 8. Set the Ink memory. This test sets the Ink memory from a vector of 16 values (vector no. 0 is all 0, vector no. -1 is all -1's, vector no. 1 is 16 words, each of which is 1 (i.e., 15 zeroes and 1 one bit)). A tight loop will set the memory quite fast, looping through all 16 x locations.

Test 9. Set DBC and width, and read them back. An error is indicated if the stored and re-read values do not match or if IACS does not come on. A tight loop will execute the register-setting command repeatedly.

Test 10. Reads DWC. The test resets Orbit, and then reads DWC. An error is caused if it reads a non-zero value. A tight loop will cause repeated reading. (Note: The proper counting of DWC is checked by test 12)

Test 11. Reads DBC and width, and displays them. A tight loop will cause repeated reading.

Test 12. This is the main test that checks the image-generation parts of Orbit. It is usually used in conjunction with the "parameter-setting" features to set up vast amounts of state. The input values are:

X:	X coordinate of first scan-line of character
Y:	Y coordinate of bottom of character
Width(minus1):	Width-1 of character
Height(negative):	-Height of character, in bits
FA:	Setting of FA for reading buffers back into Alto
FontVector:	"Vector" to use as font data
InkVector:	"Vector" to use as ink data
dX:	Amount by which X should be incremented each iteration
dY:	Similar increment for Y
Tasking:	See below

The tasking flag is 1 if Orbit is to be run in the normal fashion (TASK instructions executed in the inner loop as font data is being passed to Orbit) or 0 if it is to be run without tasking (helpful in certain cases for debugging because 'scoping is easier).

The test feeds the specified character to Orbit, and then reads back various registers (DWC, DBCWID, IACS) and checks to verify that they have the proper ending values. Finally, the test reads the *other* buffer memory (the one that does *not* contain the character most recently imaged) and displays it on the Alto screen. A tight loop will repeatedly ship the character to Orbit, and will not do checking or screen updating. After each iteration, the value of INCON displayed is the value when the character was shipped to Orbit (i.e., INCON=0 means that buffer A received the character, and B was displayed on the screen).

There are several "standard" parameter sets that are used with Test 12:

1. Upper case A which moves across the screen, changing X and Y as it goes.
2. Vertical line which moves to the left across the screen
3. Slanted line that moves to the left and up and down
4. 16x16 black square that moves to the left — memory.
5. 16x128 black rectangle that moves to the left
6. 16x16 black square that moves to the left (checks shifter)

Test 13. Adapter register test. This test (slowly) sends all possible commands to the adapter (requires 16 passes to complete a full cycle), and checks that the registers in the adapter are updated properly by checking the status coming back. (Warning: When the test stops, the "ROS Command" display contains the value of the command word that is *about to be sent*, whereas the status will show the last command actually sent.) An error will be caused if some register in the adapter is not responding properly.

Test 14. This test is designed to send the adapter a sequence of commands and to wait specified amounts of time in between commands. The "Command vector" is a vector of *pairs* of entries: the first of the pair is the command to send; the second is the number of milliseconds to wait before proceeding.

Test 15. This test is intended to exercise the adapter data-fetching logic. It puts the adapter in test mode, and therefore generates a fake line sync, a fake bit clock (with 4096 pulses/scan-line). The basic test loop is:

1. Do a buffer reset
2. Enable Orbit to send packets the adapter
3. Start page sync (with TestPageSync)
4. Wait for SendVideo to come on and then go off again, counting Orbit buffer switches as we go.

5. Disables Orbit sending of packets
6. Re-synchronizes Orbit buffers

The number of scan-lines that should be generated is 4*(4096.-VideoGate). Consequently, there should be (4*(4096.-VideoGate))/16 Orbit buffer switches.

Parameter File

Index of vectors:

Test	Number	What
all	0	16-word vector of words=0
all	-1	16-word vector of words=-1
all	1	16-word vector of words=1
12	64	128-word vector of words=-1
12	65	54-word vector for upper case A font (height=48, width=18)
12	66	54-word vector for 16x16 square in white (height=48, width=18)

Index of parameters:

Test	Number	What
4	1	FA=0
4	2	FA=370b
9	1	DBC=0, Width-1=0
9	2	DBC=17b, Width-1=7777b
12	1	Upper case A (height=48, width=13, x=0, y=7720b, FA=300b, FontVector=65, InkVector=-1, dX=1, dY=-1)
12	2	1-bit vertical (height=16, width=16, x=0, y=7760b, FA=100b, FontVector=1, InkVector=-1, dX=0, dY=-1)
12	3	1-bit slant (height=15, width=16, x=0, y=7760b, FA=100b, FontVector=1, InkVector=-1, dX=1, dY=-1)
12	4	16x16 square (height=16, width=16, x=0, y=7760b, FA=0, FontVector=-1, InkVector=-1, dX=0, dY=-16)
12	5	128-bit black slug (height=128, width=16, x=0, y=7760b, FA=0, FontVector=64, InkVector=-1, dX=0, dY=-16)
12	6	16x16 square (height=48, width=13, x=0, y=7720b, FA=0, FontVector=66, InkVector=-1, dX=0, dY=-1)

Format of OrbitTest.Parameters. The best way to see how it is put together it to look at it, and mimic its contents. An entry is preceded by the noun VECTOR: or PARAMETER:. Each is followed by two numbers: the first is the test number to which it applies (or ALL if it applies to all tests); the second is the identifying number of the parameter set (or of the vector set) within that test. Note that octal is the default radix for all numbers.

For a vector, we give the total number of elements in the vector, followed by the numbers that are to be placed in the vector.

For a parameter set, we provide pairs: parameter number, value. The parameter numbers are best discerned by looking at previous examples, or by consulting the function OrbitSetP in OrbitTestUtils.Bcpl, saved in OrbitTest.Dm.

Handy things to remember for now. Test 14, parameter set 1 should set up the adapter and Dover for 350 bit/inch operation (it also sets a large delayed line sync so that quad pattern printing works). The polygon motor should begin spinning, the bit clock should synchronize, etc. If you want to force the beam on for checking sync, send 17712 to the adapter (use Test 2 to send individual commands).

TEST -14, PART

STATUS ØB*

	1			6			5			7			3			5
Bits	1	1	1	0	1	0	1	1	1	1	0	1	1	1	0	1
Signals				COUNT		PAPER TRAY DISORDER					LS-1/LS27	LS2		READY TEMP	LOST PWR	

STATUS ØD*

	1			1			6			6			3			7
Bits	1	0	0	1	1	1	0	1	1	0	0	1	1	1	1	1
Signals		PHOTOCELL	PRESEQ			AC MONITOR	LS23		LS21	MALFUNCTION	LS3					

NOTE:* STATUS SHOWN IS NORMAL OPERATIONAL CONDITION.

COVER ENGINE
STATUS BITS ASSIGNMENT

DEFINITION:

(1) COUNT — COUNTS PAPER thru the MACHINE

(2) PAPER TRAY DISORDER — LOW P. OR PAPER TRAY LEFT-UP.

(3) LS27 — A TRANSPORT JAM

(4) READY TEMP — FUSER ROLLER UP TO TEMPERATURE (300°F) FOR NOR. OPERATION.

(5) LOST PWR — LOST (LINE 21) 115V during PRINTING.

(6) PHOTOCELL — PAPER ON THE DR. OR PHOTOCELL MALFUNCTION.

(7) PRESEQ — MALFUNCTION "IF LS1, OR LS3 or LS27 switch CONDITION ARE NOT NORMAL INSTANTLY WHEN PRINT IS REQUEST

(8) AC MONITOR — 115AC (LINE 21) IS NOT WORKING

(9) LS23 — FUSER JAM — PAPER ROLLED ON TO the fuser roller,

(10) MALFUNCTION — MACHINE IS NOT WORKING.

(11) ~~LS3~~ LS3 — MISPUFF DETECTOR.

(12) ~~LS21~~ LS24 → Back-up bar Interlock.

5

EIP TO ROS ADAPTER

E -- Electronic
I -- Image
P -- Processor
to
R -- Raster
O -- Output
S -- Scanner

I. NINE WIRE INTERFACE

A. Rate/Distance Characteristics

40 meters at 100 Mbit/second

400 meters at 10 Mbit/second

B. ECL Signals

Differentially Driven

Shielded Twisted Pairs

C. Nine Signals (develop direction as each is covered)

1. EIP to ROS clock -- Max freq. of 25 Mhz
(Alto is 5.88 Mhz.) ≈50% Duty Cycle

2. Command -- 33 bits long. Sent at rate of EIP to ROS clock/4

Flag	Command	Command'	
1	16	16	Min. of 48 bits dead time

a. Sampled by EIP to ROS Clock.
b. Three consecutive true bits required to detect flag.
c. Command bits are sampled in 2nd & 3rd periods.
d. Command, if valid, is executed during dead time.

3. Status -- 257 bits long. Sent at EIP to ROS clock/4

Flag	Status bits	
1	256	272 bits dead time min. (Dover uses 320)

a. Sampled by EIP to ROS clock.
b. Three consecutive true samples required for flag.
c. Status bits sampled during 2nd & 3rd periods.
d. Redundancy not used--can either compare against previous packet for slow data, or use multiple bits in packet for faster data.

4. Packet request -- Asks EIP to send a 5 x 16 packet

1 x 16 -- Packet sync at EIP to ROS clock rate

4 x 16 -- Packet data

5. Packet Sync -- Flags packet and indicates whether regular or last packet.

4	8	4
Always true	True if last packet	Always false
1		16

a. Two true bits = flag beginning of packet.
b. Count made of true bits should = 4 or 12. If neither, soft error is reported.
c. Last packet flagged if count >8.

6 - 9. ROS Data 0 - 3
Contains video info. from EIP -- synchronized by packet sync. Sampled by EIP to ROS clock. Bit 0 precedes bit 1 in stream.

II. ROS ADAPTER

A. Consists of two logic modules

1. Command - handles command decoding, control register initialization, etc. status mux.

2. Video -- provides video data buffers, bit clock source, ECL interface to nine wire convention, status multiplexer control.

B. Command Module

1. Receives "command" line (ECL to TTL converted in video module) and EIP to ROS clock line (also from video).

2. Command is detected, checked for errors, etc. by control & error detect.

3. Command is assembled in a serial in parallel out 16 bit shift register.

4. Motor speed register is a counter which is preset to a valve from the command assembly register (12 bits) clocked by 12.5 Mhz XTAL OSC.

5. Output of motor speed register drives two more counters whose outputs can be selected by a scaling register to select 1 or 8÷2 outputs.

   Output goes to drive polygon motor in laser scanner.

   Scaling register is also a register loaded with value to control division of bit clock.

6. Bit clock divider is similar to motor speed counters except can select bit clock plus 7 other ÷2 frequencies.

7. The scaled bit clock is divided by 4 (video nibble) and drives the scan line counter -- actually counts bits/scan line. Used to slew clock circuit to track line sync signal.

8. Video gate generator determines number of scan lines that video is enabled. Counted by line count/4.

9. External command register is used to control the print command in Dover to engine control.

10. Page sync delay is register used to delay video transfer from paper sensing switch (page sync -- CS5 in Dover) counted by line count/4.

11. Line sync delay is register used to delay start of video on a scan line. Is counted by scaled bit clock/4.

12. Local mode control -- PROM memory used to issue sequence of 8 commands to set up registers for local test pattern generation.

C. Video Module

13. Video control -- Selects video source & transfers data to the ROS head (laser modulator). Controls laser beam for SOS-EOS defection, etc. Serializes 4 bit video nibbles with a parallel to serial shift register shifting at scaled bit clock rate.

14. Data Buffers -- 4 16x4 bit RAM buffers each capable of holding a packet of video data.

    Data is input and output in a ring fashion by nibbles.

15. Write control -- Receives packets & packet sync and controls loading of packets into RAM buffers. Remembers last packet flag to control read transfers out of RAM.

16. Read control -- Synchronizes video transfer to start of scan line, sequences nibbles out of RAM buffer, senses when additional packets can be accepted and makes request to EIP.

17. Bit clock -- A slewable VCO which is used to track line sync signal and compensate for variance in polygon motor speed. Basic video bit rate on Dover.

18. Drivers and Receivers -- Provide ECL to TTL and TTL to ECL conversion. Provide TTL control signals to motor control & engine control modules.

19. Status control -- Located on video module provides sequencing logic to control status transfers. Basically a counter that enables transfer of 257 samples followed by 320 sample dead time.

20. Status multiplexer -- Majority is located on command module -- SN & ID come from video modules. 256:4 mux into 4 bit shift reg. Single line out to EIP shifted at EIP to ROS clock/4 rate.

STATROW 00

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
ROS STATUS 00	SEND VIDEO	PRINT MODE	LOCAL	BEAM ENABLE	STAT BEAM ON	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
ROS STATUS 01	CAR 00	CAR 01	CAR 02	CAR 03	CAR 04	CAR 05	CAR 06	CAR 06	CAR 08	CAR 09	CAR 10	CAR 11	CAR 12	CAR 13	CAR 14

STATROW 01

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
ROS STATUS 02	VIDEO POL	BIT SCALE 00	BIT SCALE 01	BIT SCALE 02	BCR 00	BCR 01	BCR 02	BCR 03	BCR 04	BCR 05	BCR 06	BCR 07	BCR 08	BCR 09	BCR 10
ROS STATUS 03	SELECT LEAD EDGE	MOTOR SCALE 00	MOTOR SCALE 01	MOTOR SCALE 02	MSR 00	MSR 01	MSR 02	MSR 03	MSR 04	MSR 05	MSR 06	MSR 07	MSR 08	MSR 09	MSR 10

STATROW 02

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
ROS STATUS 04	SW 3	XX	XX	TEST PAGE SYNC	LSDR 00	LSDR 01	LSDR 02	LSDR 03	LSDR 04	LSDR 05	LSDR 06	LSDR 07	LSDR 08	LSDR 09	LSDR 10
ROS STATUS 05	SW 4	CMND LOCAL	CMND BEAM ON	TEST MODE	PSDR 00	PSDR 01	PSDR 02	PSDR 03	PSDR 04	PSDR 05	PSDR 06	PSDR 07	PSDR 08	PSDR 09	PSDR 10

STATROW 03

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
ROS STATUS 06	LINE NOISE	COMPR ERROR	BUFFER UNDER FLOW	PARTS OK	EXTERN CMND 00	EXTERN CMND 01	EXTERN CMND 02	EXTERN CMND 03	EXTERN CMND 04	EXTERN CMND 05	EXTERN CMND 06	EXTERN CMND 07	EXTERN CMND 08	EXTERN CMND 09	EXTERN CMND 10
ROS STATUS 07	LINE COUNT 00	LINE COUNT 01	LINE COUNT 02	LINE COUNT 03	VGWR 00	VGWR 01	VGWR 02	VGWR 03	VGWR 04	VGWR 05	VGWR 06	VGWR 07	VGWR 08	VGWR 09	VGWR 10

STATROW 04

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
ROS STATUS 08	SS00 XX	SS01 XX	SS02 XX	SS03 COUNT	SS04 XX	SS05 PAPER TRAY	SS06 XX	SS07 XX	SS08 LOW PAPER	SS09	SS10 LS27	SS11 LASER ON	SS12 DRAWER INTLOCK	SS13 TEMP READY	SS14 LOST POWER
ROS STATUS 09	SS16	SS17 PHOTO CELL	SS18 PRE SEQUEN	SS19 XX	SS20 LS09	SS21 AC MONITOR	SS22 FUSER JAM	SS23 XX	SS24 LS24 LS31	SS25 MAL FUNC	SS26 LS3 MISQUE	SS27 XX	SS28 XX	SS29 PAPER FEED	SS30 XX

STATROW 05

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
ROS STATUS 10	SN12	SN13	SN14	SN15	SN08	SN09	SN10	SN11	SN04	SN05	SN06	SN07	SN00	SN01	SN02
ROS STATUS 11	ID12	ID13	ID14	ID15	ID08	ID09	ID10	ID11	ID 04	ID 05	ID 06	ID 07	ID 00	ID01	ID02

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
ROS STATUS 12															

XEROX
Information Technology Group
System Development Division

To: Distribution

From: Ken Pier X4521 –

Subject: ROS Adaptor Functional Description

Date: 12/29/76

Following is a brief functional description of the current implementation of the ROS adaptor. The reader should be familiar with memos authored by Ron Rider on July 16, 1976, subject 'Universal ROS Adapter,' and on June 2, 1976, subject 'ROS Interface Conventions,' both enclosed.

The ROS Adaptor (RA) is implemented using MECL 10,000 family integrated circuits wherever possible and is intended to reside on a D1 logic board. Pinouts for ECL to TTL and TTL to ECL converters, opto-isolators, and high current drivers will be created by reforming the ECL pinout configuration as required. Reforming should consist of breaking printed circuit power and ground lands and stichwelding appropriate connections.

In this description, signal names appear in boldface without tag fields. For example, signals RAddr.00, RAddr.01, RAddr.02, RAddr.03 are referred to as RAddr.

Command Receiver Control and Error Detection – 1

The command herald bit is detected and command sequencing initiated. Two errors are detected during command sequencing: a compare error exists if the second 16 bits are not the exact complement of the first 16 bits; a line noise error exists if the second and third samples in a bit are not identical.

The serial command stream is fed to a Hex D configured as a five bit shift register. The low true version Command' is used. Three sequential true bit samples are detected by Herald, which enables on the subsequent two clock cycles signals CmndReset and CmndBegin. All transitions occur on the rising edge of the clock from the EIP, EipToRosClock. This clock runs at four times the bit rate for the command bit stream.

CmndReset enables gate b17a and clears the two error detection flipflops LineNoise and CompareError. Signal CmndBegin then removes the error detection reset term by setting CmndTimeOn' to zero. This event signals the beginning of receipt of the actual command stream. During receipt, command bits are sampled every clock time and if the second and third sample in each bit are not identical, signal BitError is true and is recorded at the end of the bit time in flipflop LineNoise. Any line noise is remembered by tying a18a Q to D. After receipt of 16 bits of command information, the RA expects to receive the same 16 bits in opposite polarity. Signal Compare is true during this receive time and if a Mismatch is signaled, the CompareError flipflop is set and likewise remembered. See pages 2 and 3 for generation of these signals. Setting either error flipflop is only enabled when the command is being received and CmndIsIn' is inactive. When CmndIsIn' becomes active, the error conditions are no longer sensed and, if they are both inactive, the CmndExecute signal is issued. Finally, after the command is received and the subsequent required deadtime elapsed, signal CmndDeadTimeDone' is activated and captured by ff a17a. Clocking of all MC131 type ff on this page is only enabled every command bit time (not four times every bit time) by signal CmndClockEnable'.

Command Timing Register - 2

A counter is used to time the command sequence. Various states of the counter are decoded to indicate when to clock a command bit into the command assembly register, when the message comparison should occur, when the command is received, and when the command timing sequence is completed.

The command timing register is a nine bit binary counter which simply counts EipToRosClock occurences and decodes desired states as count increases. The counter is normally cleared and released at the beginning of command receipt by CmndTimerOn'. Every fourth clock is decoded by CmndClockEnable' activating which can then enable events to occur at the command bit rate. The counter counts at four times the command bit rate and when it reaches 77B, 16 command bits have been received. When the counter rolls over to 100B, the second sixteen inverted command bits are in progress and the Compare signal is true. When the compare time is complete, rolling to 200B indicates CmndIsIn' and the required dead time commences. When the counter reaches 500B, the dead time has been counted out and CmndDeadTimeDone' is activated.

During the dead time, i.e. between CmndIsIn' and CmndDeadTimeDone', if CmndStart' becomes active the command line was not quiescent. This situation is erroneous and is handled by simply restarting the dead time by parallel loading the value 200B into the counter.

Command Assembly Register - 3

A sixteen bit shift register is used to assemble the serial command. A command consists of an enable bit, three bits of command number, and 12 bits of command data. Once the command is received and ascertained error free, a command strobe and an external strobe are issued in that order.

The Car is a 16 bit shift register clocked at the command bit rate and shifting in data from the serial command bit SerialCmndBit'. As long as the RA is not in local mode, the command will be assembled in the shift register. At the top of the Car, an EXOR gate compares the output to the input and generates Mismatch, which is used by the error detector during the second 16 bits of the command message. All Car.ij outputs are tied to their respective inputs, so one simply parallel enables the register with CmndIsIn' to arrest shifting after receipt of the command. If signal CmndExecute appears, shift register e16 is released and bubbles a single "1" through itself. This register issues a CmndStrobe for one bit time duration. This strobe begins one bit time after CmndExecute appears. The strobe sets its flipflop and is remembered until the trailing edge of ExtStrobe. The high order four bits of the Car are decoded as one of eight commands with the highest order bit used as a low true enable to allow commands to be issued. The decoded command is issued during command strobe time if Car.00 is low. ExtStrobe will signal to the ROS the occurence of ExternalCmnd1 or ExternalCmnd2 as needed.

The command codes which appear in Car are:

Car.01-03	Command	Car.04-.06	Car.07-.09	Car.10-12	Car.13-.15
0	Buffer Reset	UNUSED			
1	Set Scales	BitScale	MotorScale	TPS'	CL,CBO,TM
2	Set Bit Clock	BIT CLOCK REGISTER			
3	Set Motor Speed	MOTOR SPEED REGISTER			
4	Set Line Sync Delay	LINE SYNC DELAY REGISTER			
5	Set Page Sync Delay	PAGE SYNC DELAY REGISTER			
6	External Command 1	EXTERNAL COMMAND 1			
7	External Command 2	EXTERNAL COMMAND 2			

where TPS' is TestPageSync', CL is CommandLocal, CBO is CommandBeamOn, and TM is TestMode.

If the command is SetScales, the four command bits shown at d16 are latched.

During local mode (see page 22), command strobing is performed by the LocalStrobe, while signal Local forces the Car clear.

Internal Status Multiplexers - 4 and 5

256 bits of status are continuously sent to the EIP. Drawings 4 and 5 simply enumerate each status input to the multiplexers which are sequentially addressed in four bit 'nibbles' by the status control register. These internal multiplexers attend to 128 of the 256 status bits. The remaining 128 bits are received from the external world on the bulk status port.

The format of the status stream sent to the EIP is:

Word	
0	Special Status from ROS-16
1	Command Register-16
2	VideoPolarity, Bit Scale-3, Bit Clock register-12
3	SelectLeadEdge, Motor Scale-3, Motor Speed register-12
4	Switch3, Unused-2, TestPageSync', Line Sync Delay register-12
5	Switch4, CmndLocal, CmndBeamOn, TestMode, Page Sync Delay register-12
6	Error Field-4, External Command 1-12
7	Line Count-4, External Command 2-12
8-15	External Status-128

Error Field is: Line Noise, Compare Error, Buffer Underflow, PacketsOK

Status Timing and Control - 6

A twelve bit counter is used to sequence the status logic. Various states of the counter are decoded to invoke addressing of the status multiplexers, enabling internal or external status, and performing parallel to serial conversion of the status nibbles.

A twelve bit counter, clocked by EipToRosClock, continuously sequences the status bits to the EIP. This counter preloads itself with 4000B to begin a status sequence by detecting the terminating counter state for the status dead time, 377B, and parallel enabling. Gate 116d decodes every fourth clock and enables the parallel to serial shift register to shift out a status bit every four clock times. The status address bits are bits 3 through 7 of this counter, and they change every 16 clock times (four status clock times) in order to address the status multiplexer and bring up a new status nibble. While StatusAddr.00 is low, the StatusRow. decoder is enabled and the internal status multiplexers gate status onto the StatusOut bus (128 bits, 32 x 4). This bus is captured in the SerialStatus shift register and shifted out to the EIP. When StatusAddr.00 rolls to TRUE, the internal multiplexers are no longer enabled and the bulk status port (see drawing 20) is enabled via RosStatusEnable to the StatusOut bus. RosStatusClockEnable is created by latching StatusAddr.00 (page 1). RosStatusClock' is issued every four status clock times. These two signals are sent to the ROS status control logic (page 19). The ROS returns 32 x 4 bits per status transmission.

After shifting out 256 status bits, the counter rolls to 6000B. This state is detected by an XOR gate which deactivates both RosStatusEnable and StatusGo', thus forcing both status sources to gate zeros onto the StatusOut bus and enforcing the dead time state. When the counter rolls over to 000, nothing changes. When the counter continues to 377B, this state is detected and the parallel load is activated, forcing 4000B into the counter and reinitiating the status transmission by jamming a '1' onto StatusOut.03. Dead time exists from counter states 6000B through 000 to 377B, or 320 status bit times.

Polygon Motor Speed Clock Generator - 7

A motor speed register is loaded with the desired value for driving the motor speed counter, which simply reloads the MSR value each time the counter overflows and continues counting.

When the SetMotorSpeed command is issued, the 12 bit value in Car is strobed into the motor speed register MSR. The twelve bit counter counts continuously when clocked by CrystalClock, which is a free running 25 MHZ oscillator. Whenever the counter counts to value 7777B, it reloads itself from the MSR by parallel enabling all counter chips via SpeedClockEnable'. Notice that the counter runs asynchronously with respect to the SetMotorSpeed command and it is thus possible to be changing the MSR contents and loading the MSR into the counter simultaneously. This can result in garbage being loaded into the counter for one counter cycle. This is a 'don't care' condition.

Polygon Motor Clock and Scaled Bit Clock - 8

Two counters are incremented by their respective clocks and the set scales register allows selection of a power of two division for each of the counter values. The Polygon motor clock runs continuously while the scaled bit clock counter is synchronized to the line rate with BitClockReset.

The SpeedClockEnable' from page 7 allows CrystalClock to increment an eight bit counter which provides divide by 2**n, n from 1 to 8, outputs to a multiplexer. The three bit MotorScale field is set whenever the SetScales command is issued, and simply selects which of the available divisions of the polygon motor speed counter are to be used as the PolygonMotorClock. This clock drives the laser scanner motor in the ROS. This counter provides the additional function, in TEST mode, of a programmable signal to serve as TestLineSync'. The motor clock is not required in TEST mode.

A similar counter is driven by BitClock. Divisions are selected by the BitScale field which selects a ScaledBitClock to drive the bit clocking mechanisms. This counter is synchronized to the ROS line scanning by resetting it at the beginning of every line with BitClockReset. Note that this counter only provides divide by 2**n, n from 1 to 7 instead of 1 to 8, and an undivided BitClock is available to be selected as the ScaledBitClock. Selection and gating of the undivided BitClock' is performed by a high speed MECL III gate in order to allow ScaledBitClock to be up to 100 MHz frequency. Also note that all fields of the SetScales register are loaded with every SetScales command. Setting of the scales register is completely asynchronous with repect to these counter clocks.

External Command Registers - 9 -

Two identical 12 bit external command registers are provided. They are cleared by IReset and loaded individually with two commands, ExternalCmnd1 and ExternalCmnd2. Their outputs are simply sent to the ROS and are unused by the adapter.

Page Sync Delay Register - 10

A programmable delay is loaded into the page sync delay register and provides a delay from the ROS supplied page sync to the start of a page service by the adapter.

Command SetPageSyncDelay loads the Car into the page sync delay register PSDR. A twelve bit counter and a separate four bit LineCount counter are released whenever PageSync' indicates page sync has been sent from the ROS. LineSync signals are then counted and the page sync delay counter is incremented every fourth LineSync. When the counter reaches 7777B, the DelayedPageSync occurs, and counting is arrested by wiring DelayedPageSync to the CE' of the lowest order counter chip. The counter remains unchanged until reset to 0000 and released by the toggling of PageSync'. The wire OR of all counter bits provides a low on PE' when the counter is at 0000, and the counter is loaded from the PSDR in preparation for the next page sync delay. Loading the PSDR is completely asynchronous with respect to delay register counting.

The counter is used in Local mode to generate quadrille paper by providing signal YLine' every 64 scan lines for the duration of four scan lines.

Line Sync Delay Generator - 11

A programmable delay is loaded into the line sync delay register and provides a delay from the ROS supplied line sync to the start of a line service by the adapter.

Command SetLineSyncDelay loads the Car into the line sync delay register LSDR. The counter is a copy of the page sync delay counter. It is cleared at the beginning of each scan line by BitClockReset, and clocked at one fourth the bit clock rate by ScaledBitClock/4. Upon reaching 7777B, counting is arrested and StartVideo' generated. StartVideo' is wire ORed with circuitry on page 16.

The counter is used in Local mode to generate quadrille paper by providing signal XLine' every 64 bit positions for the duration of four bit positions.

Bit Clock Register and Scan Line Counter - 12

A bit clock register is loaded with the value that determines the correct number of bits per scan line. A counter counts up from this value until it overflows, indicating end of line.

Command SetBitClock loads the Car into the bit clock register BCR. A twelve bit counter similar to the page and line sync delay counters is initialized by BitClockReset and counted up every ScaledBitClock/4. This counter records bit rate for a scan line, and when it reaches 7777B, signal EOLCount is generated, arresting counting. In addition, 64 bit times prior to EOLCount, the EndScanBeamOn flipflop is set (count 776xB is decoded) in order to force the laser beam on just before end of scan is to be detected. Again, BCR loading is asynchronous with EOL register counting.

Video Control Logic - 13

SOS and EOS are received from the ROS for Start of Scan and End of Scan line, respectively. Various printing engines provide either leading edge or trailing edge significance for these pulses; that is, the scan line is to be active from leading edge of SOS to leading edge of EOS or from trailing edge to trailing edge. The MC231 flipflops and associated gates produce a window pulse over both cases, LeadSync' and TrailSync'. The dual multiplexer uses SelectLeadEdge (a mechanically switched level) to create the desired LineSync', whenever TestMode is inactive. PageSync' is selected directly from the RosPageSync' as well. In TestMode, these signals are ignored and TestLineSync' and TestPageSync' are gated through the multiplexer. LineSync' is buffered and inverted and the inverted version drives two 50 nanosecond delay lines in series which produce LS50 and LS50', complementary versions of LineSync delayed by 100 nanoseconds. The time window between LineSync and LS50 is decoded to produce BitClockReset, which is fanned out to initialize all logic concerned with scan line activity.

The parallel Video bus provides four bit nibbles of video bit stream to the Video shift register, which serializes the nibbles at the ScaledBitClock rate. ScaledBitClock/4 is produced by clocking a four bit counter with ScaledBitClock and parallel loading 14B each time it overflows. This parallel load also loads the next Video nibble into the shift register. Note that ScaledBitClock/4 makes a positive transition at the same time that the Video bus is loaded into the shift register. Also note that when BitClockReset occurs, the counter and shifter are cleared to zero. The counter will count up to 14B and begin cycling normally during the line sync delay time.

By what means?

Signal TestVideo.00 is the normal video bit stream. It is wire ORed to the quadrille paper bit stream created by XLine' and YLine' whenever Local or CmndLocal is active and Local mode is entered. In local mode, the Video bus always sources zeroes. VideoPolarity is selected mechanically and may invert the sense of the video bit stream to create Beam. Beam may be forced to the active state by a CmndBeamOn from the EIP, a StatusBeamOn or PrintMode from the ROS, or by the requirement of EndScanBeamOn by the scan line control logic.

Data Buffers - 14

Packets are formatted as sixteen 4 bit video nibbles. In order to properly buffer and service these packets, a four element ring of buffers is implemented, each buffer capable of one packet of data. Data buffers all receive the BufData from the EIP, and may at any given time have either a read address RAddr or write address WAddr gated to them. Only one buffer at any time will have a write address gated by the Sel signal for the selected buffer. The write control logic provides the appropriate Sel signal and the corresponding WEnb signal. The read control cycles through the buffers acquiring video data for the Video bus. As each buffer is addressed, read select signals ReadSelect2 and ReadSelect1 multiplex the desired buffer output for the Video bus. Details of the write and read control logic appear on the next two drawings.

BLANK

Data Buffer Write Control - 15

The RcvdClock' from the EIP, running at the nibble rate, is delayed by approximately 8 nanoseconds and then buffered to provide LatchClock. The RcvdClock is fanned out adapter wide as EipToRosClock. The window formed by the trailing edge of RcvdClock to the trailing edge of LatchClock is WriteClock', the buffer write strobe. The trailing edge of LatchClock captures RosData and PacketSync' (page 17) in the ECL receiver latches. This data is then double buffered by two hex D flipflops. If two consecutive bits are detected on the PacketSync' line, the PacketFlag is raised to indicate the start of a packet.

As soon as a packet is flagged, the WAddr counter is enabled and counts up the write addresses each clock time. In addition, the RosData is transmitted to the BufData bus each clock time for writing into the selected buffer. Buffer selection is done by the Sel shift register configured as a simple ring with a single active bit in it at any time, pointing to a single active write buffer. This ring shifter is initialized by the BufferReset command to point to buffer 0. Buffer selects are unary decoded and gated with the WriteClock' to provide write strobes WEnb to each buffer.

As long as any WAddr bit is true, the write address counter continues incrementing and data is written into the currently selected buffer. When the last buffer word is being written (WAddr=17B), the Sel shifter is parallel enabled and the PacketError flipflop clock enabled. When the WAddr counter rolls to 00, the Sel shifts to the next buffer, write address incrementing ceases, and the PacketError flag is saved. PacketError occurs when not exactly 4 OR not exactly 12 bits were detected on the PacketSync' line during packet receipt. This is implemented with a four bit counter which is preloaded with 2 whenever WAddrCounting is inactive. When WAddrCounting is active, the counter is enabled to count whenever a bit is detected on the PacketSync' line. The three low order bits are checked for the value 4, and if not equal to 4 the error is set. PacketsOK is sent to the status multiplexers.

If the number of PacketSync' bits is eight or more, this signals the last packet in a sequence of packets. This fact is duly recorded in four flipflops, one for each buffer, so that the last buffer written into is known.

Data Buffer Read Address and Status Logic - 16

The buffer read addresses are simply created by counting two four bit counters, one to sequentially address the buffers with RAddr, the other to provide a two bit encoded read buffer number for the address comparison and multiplexing logic. Command BufferReset initializes the read address logic to select buffer 0. Every four bit times, ScaledBitClock/4 increments the address counter, and when it reaches 17B, the ReadSelect counter is enabled to count to the next buffer. This enable also allows the StartVideo' flipflop to detect the presence of a final packet (see below).

Three address comparisons are performed between the read and write addresses to control buffer sequencing and packet requesting. <u>If the write address is three ahead of the read address or if the write address is two ahead of the read address and is being filled</u> (WAddrCounting), then PacketRequest' is deactivated and the EIP should not transmit any more packets to the adapter. If the read and write addresses are equal, then data has not been supplied to the adapter rapidly enough by the EIP. This condition is signalled by BufferUnderflow. BufferUnderflow is only relevant during actual page transmission as windowed by DelayedPageSync'.

StartVideo' is provided to enable the video bit stream to the video serializer. The conditions for allowing the enable are a DelayedPageSync' signaling page in progress, a DelayedLineSync timeout (from page 11) indicating line in progress, a BitClockReset synchronizing the start of a line, and the legitimacy of video data in the current buffer. These conditions are implemented with the StartVideo' flipflop, which is released by DelayedPageSync', activated by BitClockReset; and deactivated at the end of a page or by detecting via the LastPacket multiplexer that the currently reading packet buffer is the last one transmitted from the EIP. A buffered version of BitClockReset is wire ORed onto StartVideo' as well. This assures that StartVideo' is inactive during BitClockReset and prevents a spurious enable to the RAddr counter while global resetting is in progress.

ECL Drivers and Receivers - 17

All ECL level signalsexcept short cable signals are received with MC1650 differential receiver/latches terminated with a 100 ohm resistor across the differential inputs. Receivers SOS, EOS, and Command' are always enabled; the EIP data receivers are controlled by LatchClock. Driver gates send PacketRequest and SerialStatus to the EIP and test data to the RIS or other testing device. Test data consists of a test version of LineSync, PageSync, BitClock, and Video nibbles. It is intended that the ROS adapter by able to simulate the output from a RIS or similar device in test mode.

An off board special bit clock is controlled by signals PumpUp, PumpDown, and BitClockReset. The bit clock is variable and is slaved to the SOS-EOS window time in order to provide the required bits per scan line for the particular printing engine attached. BitClockReset' is created (page 13) in the window between LineSync and LS50 and is used to shut the clock off at the beginning of each line. The clock is "pumped up" if EOLCount remains low after the trailing edge of LS50; this indicates that the bit clock counter did not terminate before the end of scan. However, if EOLCount' is activated while LS50' remains low, the bit clock is pumped down because the EOLCount was reached before end of scan occurred.

BitClock must be received with a high speed gate, MC10216, in order to run at a maximum 100 MHz.

ECL to TTL drivers - 18 and 19

External Commands 1 and 2, their strobes, and the TTL control signals for the ROS are level shifted and sent to the ROS. Serial video is provided in true and compliment form with high fanout 74S140 drivers.

Crystal Clock and TTL to ECL Receivers - 20

All TTL level signals are received differentially with opto-isolator gates in series with a 120 ohm resistor. The opto-isolators are open collector output which are each pulled up via 1 Kohm to +5 VDC. All signals are then converted to ECL levels with translator gates. The BulkStatus bus is wire ORed to the StatusOut bus when RosStatusEnable is issued by the status control logic.

A 25 MHZ oscillator is provided and converted to ECL level CrystalClock. This signal is used to clock counters which need to run continuously.

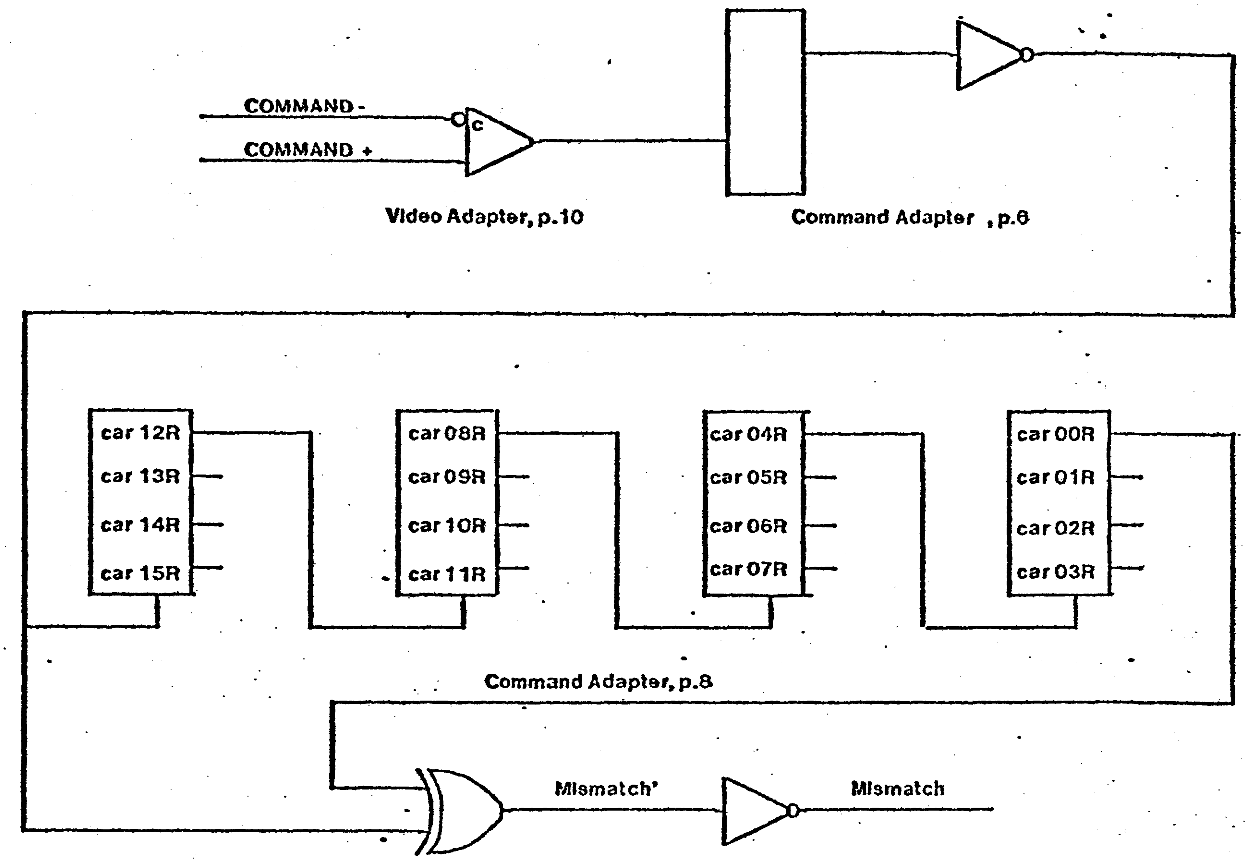
Power On Control Circuit - 21

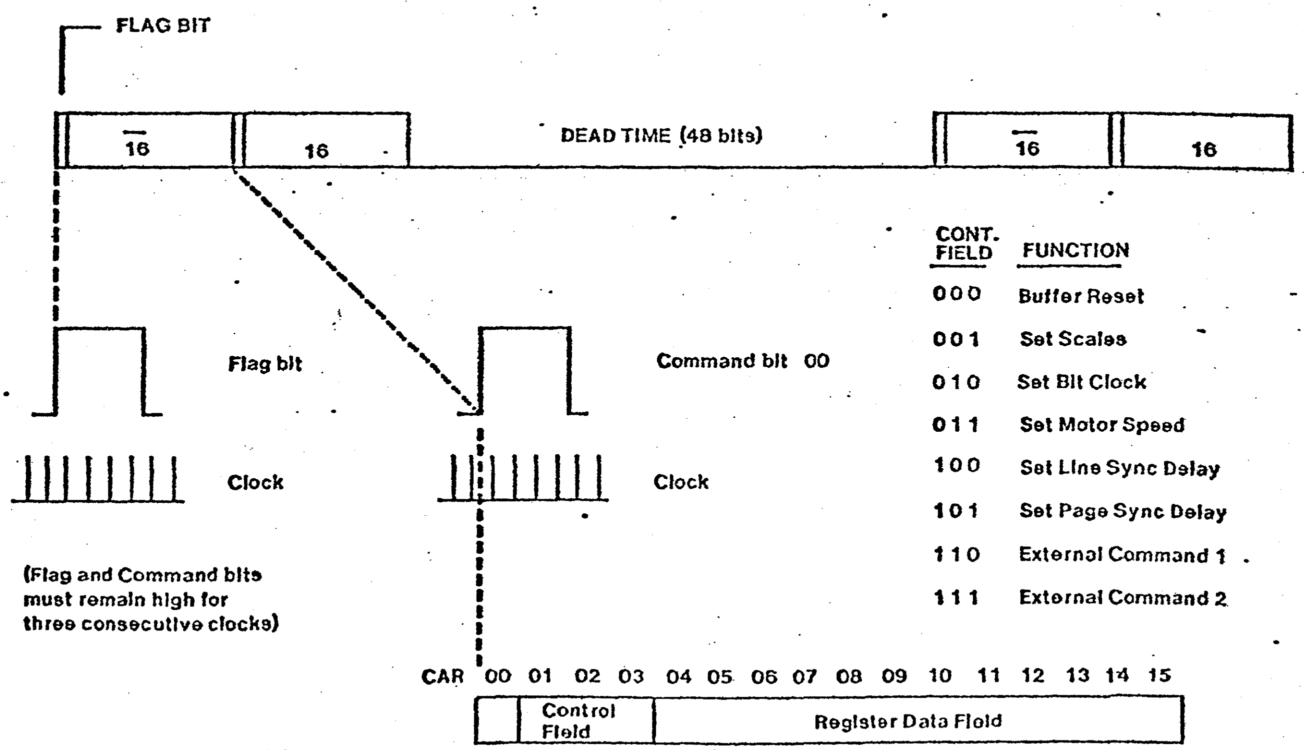
This circuit senses the presence of either EipToRosClock from the EIP or a PowerEnable status bit from the ROS and provides a PowerOn- signal (-5.2 VDC) intended to drive power up relays. Refer to the auxilliary schematic (page 23) for a schematic of this circuitry. All of this circuitry is intended to operate from a single standby power supply of -5.2 VDC which is on all the time.

EipToRosClock is differentially received and converted to RcvdClock after powering up. The MC10114 also receives the differential clock, and provides true and complement versions to two RC networks. Both of these networks should eventually charge to near -0.5 VDC when the clock is present. In addition, the center point of the EipToRosClock differential termination is applied to the base of a pnp transistor. When the clock is present, this point should average around -1.0 VDC and turn on the transistor. The transistor turn on will charge the output capacitor to near -0.3 VDC. Each of these levels is applied to the complement input of a differential receiver, MC10115, and when they are all in the detecting state, all the outputs will be low. The outputs are wire ORed, and when all are low the RC network attached to their outputs will eventually charge to near -1.7 VDC, thereby turning on the MC10114 to indicate Clocking. This receiver has a hysterises feedback for positive switching. Clocking is applied to a SN52111 differential comparator that will operate with the single standby power supply. It is turned on and -5.2 VDC applied to the PowerOn- signal.

A second 52111 is wired to the PowerOn- signal. It is activated on command from the ROS, PowerEnable. PowerEnable is received via a 120 ohm resistor (page 20) and sent to a special opto-isolator wired to work between GND and -5.2 VDC instead of, as the TTL level receivers, +5 VDC and GND. The isolated signal ECLPE is sent to a voltage divider which provides a correct ECL level signal to the PowerOn- generator.

A power up reset signal IReset is created by circuitry which detects the presence of VEE (-5.2 VDC) and VTT, the -2.0 VDC terminating voltage. At power up time, VEE comes on but VTT has not yet charged the RC network to negative potential. Thus, T1 is off and T2 turns on, placing GND at the top of the voltage divider (51-510) and providing an ECL true to the IReset differentiator input. IReset goes true until the VTT attached RC network charges sufficiently negative to turn T1 on, which in turn forces T2 off. The IReset input is inactivated.

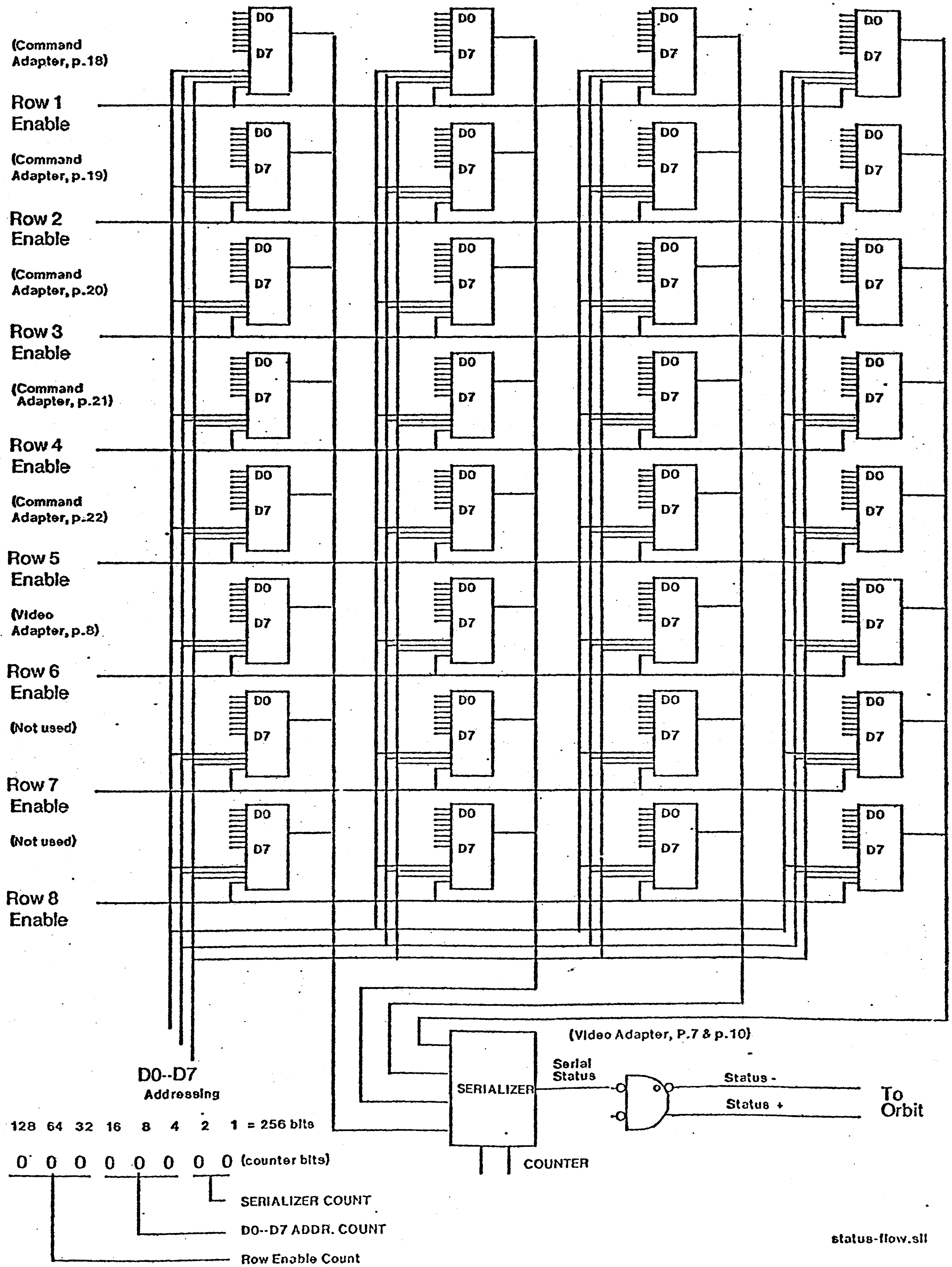




CONT. FIELD	FUNCTION
000	Buffer Reset
001	Set Scales
010	Set Bit Clock
011	Set Motor Speed
100	Set Line Sync Delay
101	Set Page Sync Delay
110	External Command 1
111	External Command 2

COMMAND INPUT TO ROS ADAPTER

st



ROS ADAPTER STATUS FLOW

Revisions					
LAL	Rev	Description	Chk	Date	Approved
X	A	ENGINEERING RELEASE	RLF	Jan78	

Dist Code SPG

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Notes Unless Specified

1. Tolerances
   .xx ± .03
   .xxx ± .010
   Angular ± 1/2°
2. Break All Sharp Edges .010 Approx
3. Mach. Surfaces $\overline{\sqrt{}}$
4. All Dim. In Inches

Drawn	R.FREEMAN
Check	
Appr.	
Material	

Xerox Corporation
El Segundo, California

XEROX

ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)

Model No. First Use	DOVER II	Finish	Code Ident	Size	Dwg. No.	Change Letter
			18338	A	217152	A

Next Assy.

Scale

Do Not Scale Drawing

Sheet 1 of

NOTES: UNLESS OTHERWISE SPECIFIED

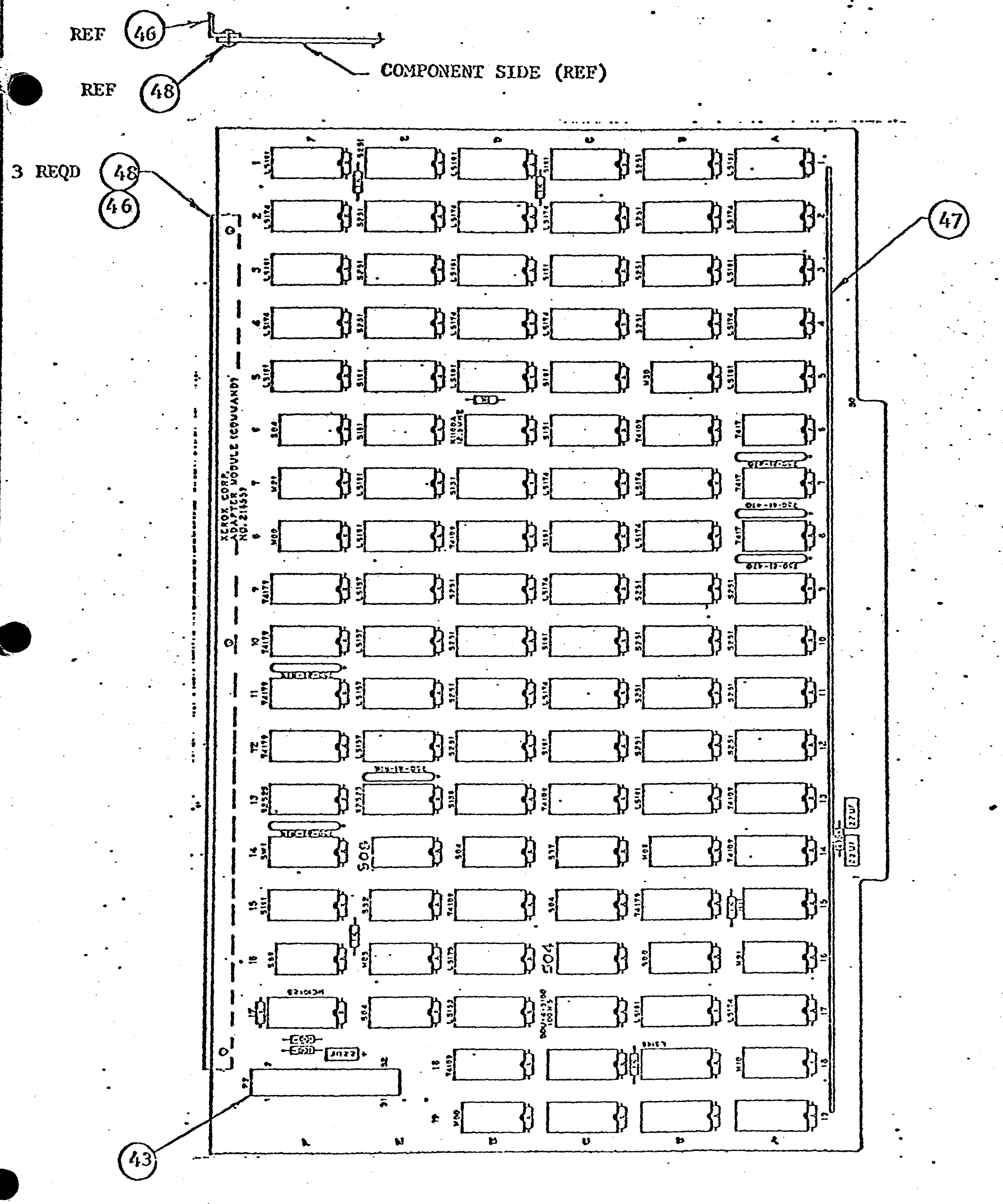
1. ASSEMBLE PER MODULE ASSEMBLY SPEC, DWG NO. 216207
2. ITEMS 30 AND 40 MOUNT DIRECTLY TO P.W. BOARD.
3. PROMS IN LOCATIONS 13E AND 13F SHOULD BE BLOWN

   FROM AN APPROPRIATE SET OF THE FOLLOWING FILES:

   DOVER II -- NDOVLOCA.PROM AND NDOVLOCB.PROM

   PIMLICO -- PIMLOCA.PROM AND PIMLOCB.PROM
4. DO NOT POPULATE SPARE LOCATIONS.

Title	Xerox Corporation El Segundo, California	XEROX
ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)	217152	A
	Sheet 2	Of



Title

ASSEMBLY, PRINTED WIRING

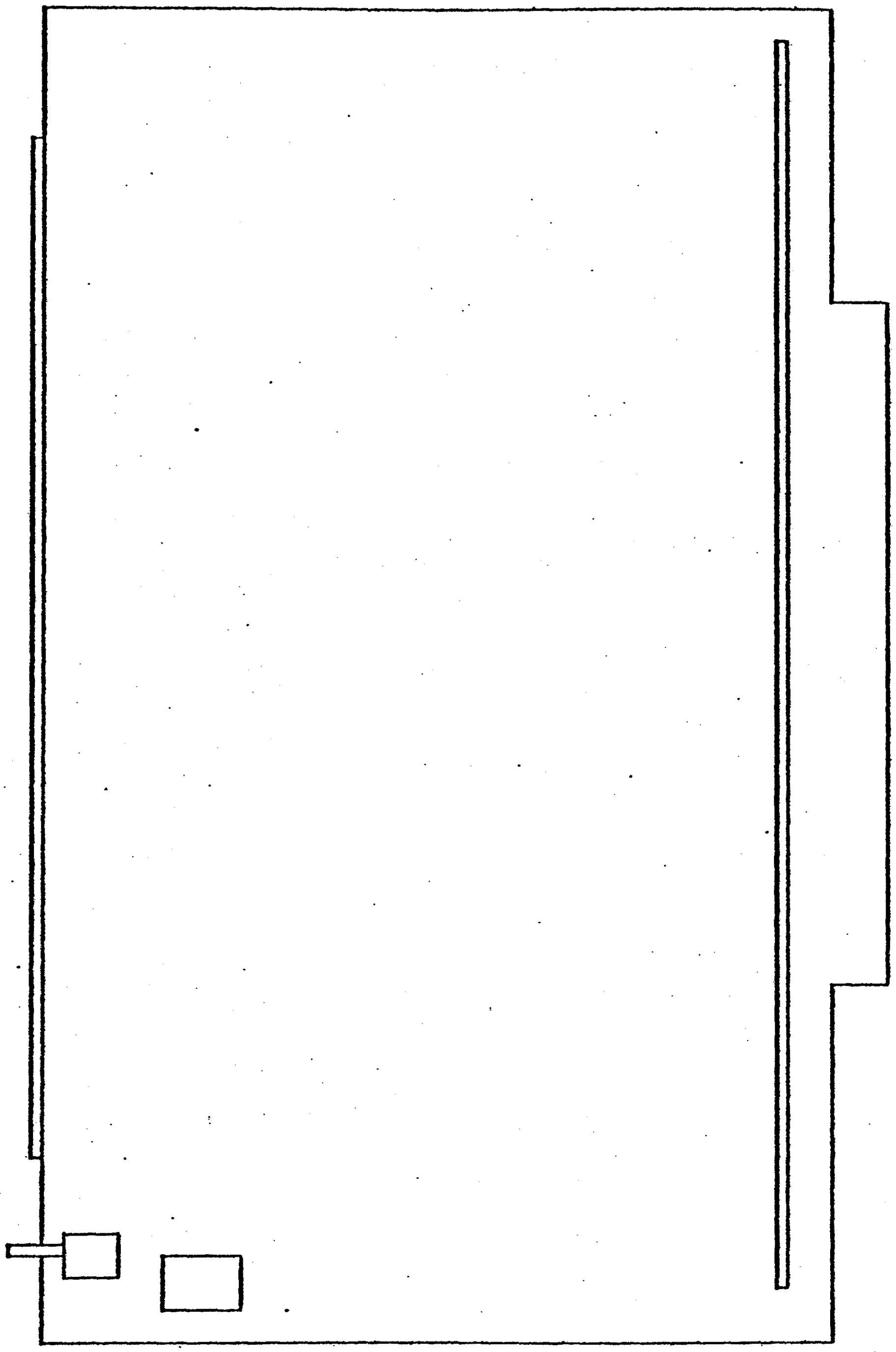
COMMAND ADAPTER

Xerox Corporation
El Segundo, California

XEROX

216559 D

Sheet 3 of



Title	Xerox Corporation El Segundo, California	XEROX
ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)	217152	A
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MATERIAL LIST

ML	Drawing No.	Rev.
ML	217152	A

Rev. A
Dwg. No. 217152
ML

Drawing Title

ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)

Model No.	Date	Sheet
DOVER II	1/12/78	4 Of

Item No.	Drawing Title	Drawing No.	No. Req.	Remarks
1	BOARD, P.W.	217153	1	
2				
3	MICROCIRCUIT, 74H00 (T.I.)		2	8F,19D
4	MICROCIRCUIT, 74S00		1	16B
5	MICROCIRCUIT, 74S04		5	6F,14D,15C,16C,17E
6	MICROCIRCUIT, 74S08		3	14B,14E,16E
7	MICROCIRCUIT, 74H10		1	18A
8	MICROCIRCUIT, 74H11		1	15A
9	MICROCIRCUIT, 7417		3	6A,7A,8A
10	MICROCIRCUIT, 74H21		2	7F,16A
11	MICROCIRCUIT, 74H30		1	5B
12	MICROCIRCUIT, 74S32		2	15E,19A
13	MICROCIRCUIT, 74S37		1	14C
14	MICROCIRCUIT, 74S86		1	16F
15	MICROCIRCUIT, 74109		8	6B,8D,13A,13C,13D,14A,15D,18D,19B
16	MICROCIRCUIT, 74S138		1	13D
17	MICROCIRCUIT, 74S151		1	7D
18	MICROCIRCUIT, 74LS153		1	17D
19	MICROCIRCUIT, 74LS157		4	9E,10E,11E,12E
20	MICROCIRCUIT, 74LS161		15	1A,1C,1D,3A,3C,3D,5A,5C,5D,7E,8E,13B,15F,17B,18B
21	MICROCIRCUIT, 74S161		6	1F,3F,5F,8C,10C,12C
22	MICROCIRCUIT, 74LS174		14	2A,2C,2D,2F,4A,4C,4D,4F,7B,7C,8B,9C,11C,17A
23	MICROCIRCUIT, 74LS175		1	16D
24	MICROCIRCUIT, 74179		5	9F,10F,11F,12F,15B
25	MICROCIRCUIT, 74S251 (T.I.)		20	1B,1E,2B,2E,3B,3E,4B,4E,9A,9B,9D,10A,10B,10D,11A,11B,11D,12A,12B,12D
26	MICROCIRCUIT, MC10125 (MOTOROLA)		1	17F
27	MICROCIRCUIT, K1100A (MOTOROLA) 12.5MHZ		1	6D
28	MICROCIRCUIT, 82S23 (SIGNETICS)		2	13E,13F NOTE3
29				

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MATERIAL LIST

ML	Drawing No. 217152	Rev. A

Rev. A

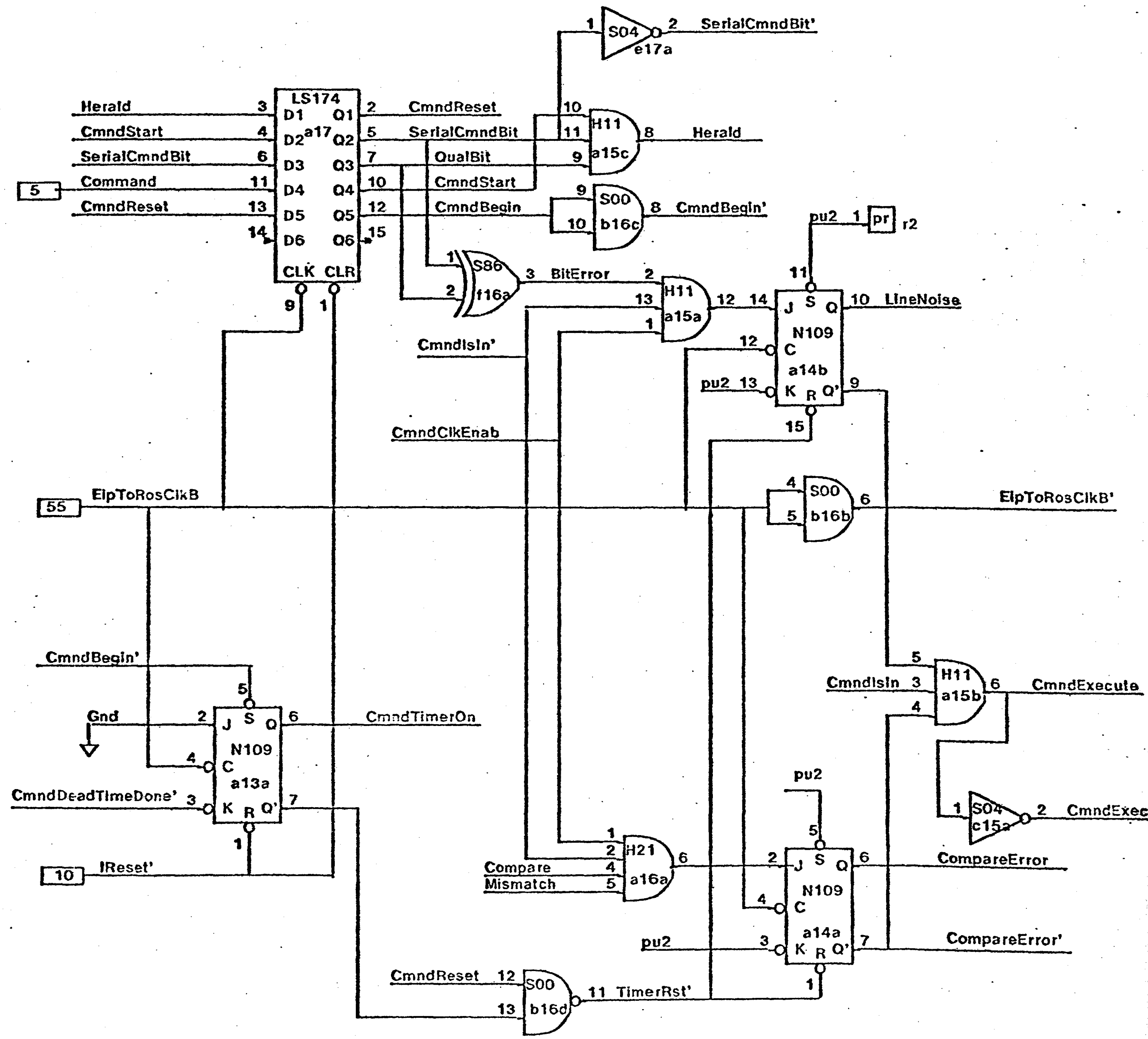
Dwg. No. 217152

ML

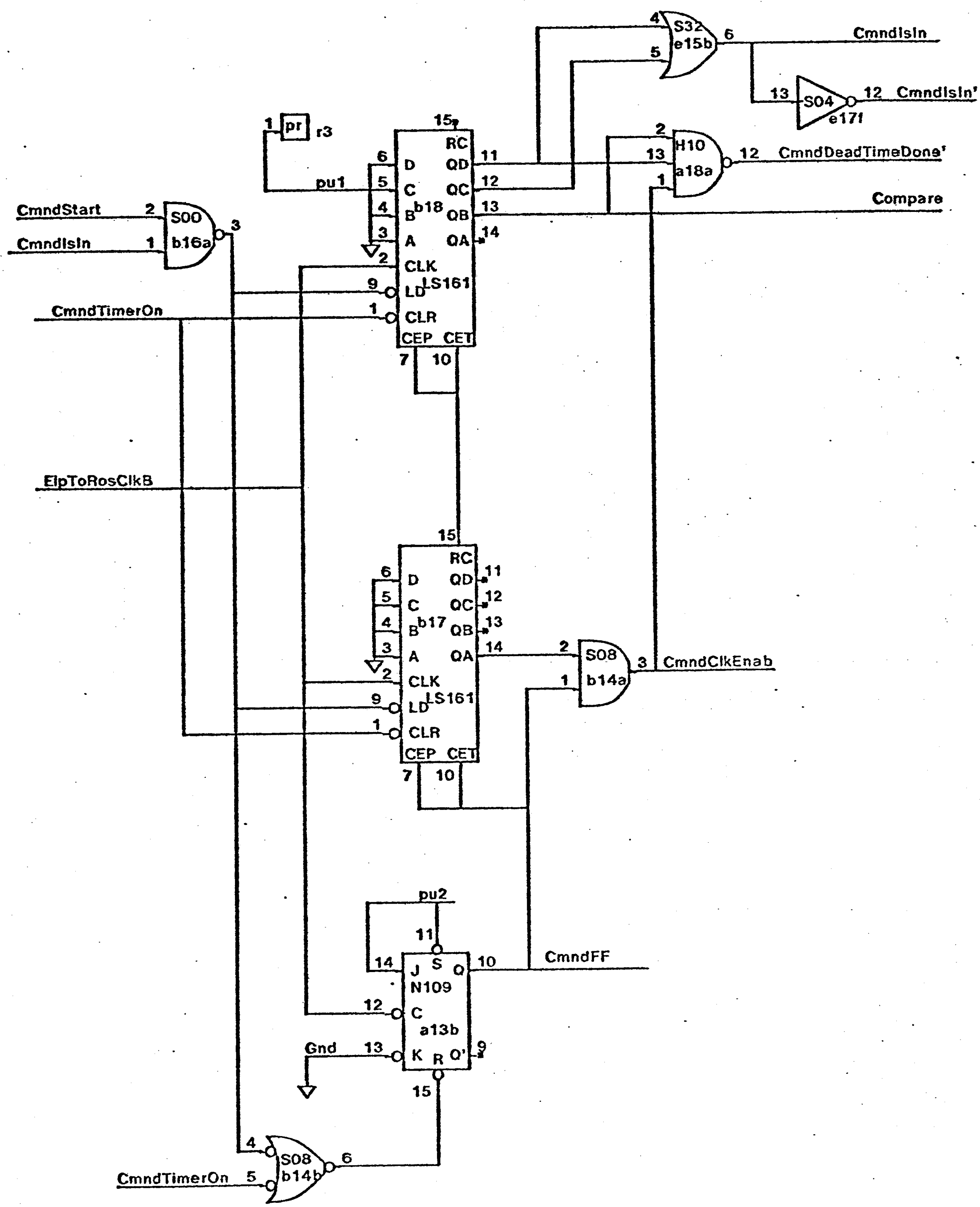
Drawing Title: ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)

Model No.	Date	Sheet
DOVER II	1/12/78	5 of

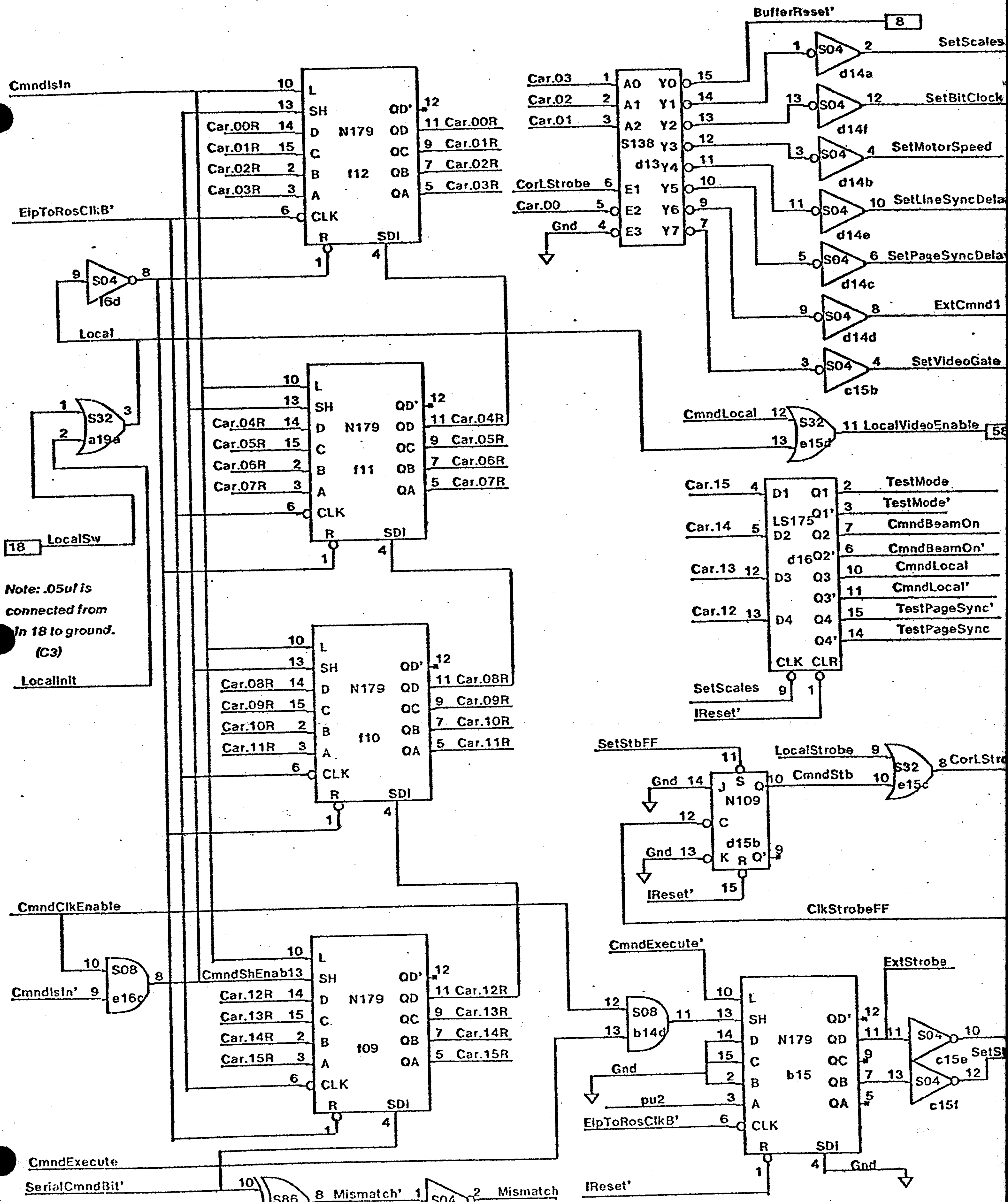
Item No.	Drawing Title	Drawing No.	No. Req.	Remarks
30	DELAY LINE #DDU-4-5100 (DATA DELAY DEVICES)		1	17C SEE NOTE 2.
31				
32	CAPACITOR, 330 PF, POLYSTYRENE	117160-331	1	C4
33	CAPACITOR, .01UF, CERAMIC	188483-001	111	C6-C116
34	CAPACITOR, 22UF TANTALUM	114491-226	3	C1,C2,C5
35	CAPACITOR, .05UF CERAMIC DISC, 10V.		1	C3 CENTRALAB #UK10-503
36				
37	SOCKET, 14 PIN DIP #514-AG11D (AUGAT)		24	SEE NOTE 4.
38	SOCKET, 16 PIN DIP #516-AG11D (AUGAT)		79	SEE NOTE 4.
39				
40	DIPSWITCH #206-8 (CTS)		1	14F SEE NOTE 2.
41	SWITCH, SPDT, #7101 (C&K)		1	S1
42				
43	CONNECTOR, CABLE, BOX #3-87516-4 (AMP)		1	P2
44				
45	TEST POINT,	114P80054	9	
46				
47	RESISTOR PACK, SIP, 470 OHMS, #750-81-R470 (CTS)		3	R12,R13,R14
48	RESISTOR PACK, SIP, 1K OHMS, #750-81-R1K (CTS)		3	R15,R16,R17
49				
50	RESISTOR, COMPOSITION, 1/4W, 5%, 100 OHMS	116447-101	2	R9,R10
51	RESISTOR, COMPOSITION, 1/4W, 5%, 470 OHMS	116447-471	1	R1
52	RESISTOR, COMPOSITION, 1/4W, 5%, 1K OHMS	116447-102	8	R2,R3,R4,R5,R6,R7,R8,R11
53				
54	HANDLE	216529	1	
55	STIFFENER	216530	1	
56	RIVET	156111-002	3	
57				
58				
59				



			ASSEMBLY, P.W.-COMMAND ADAPTER (DOVER II)		Drawing Number 217152	
XEROX SPG	Project TTL RosAdapt	Command Receiver Control and Error Detection	File AdapIIcm06.si	Designer Ron Freeman	Rev A	Date 1/5/78	Page 6

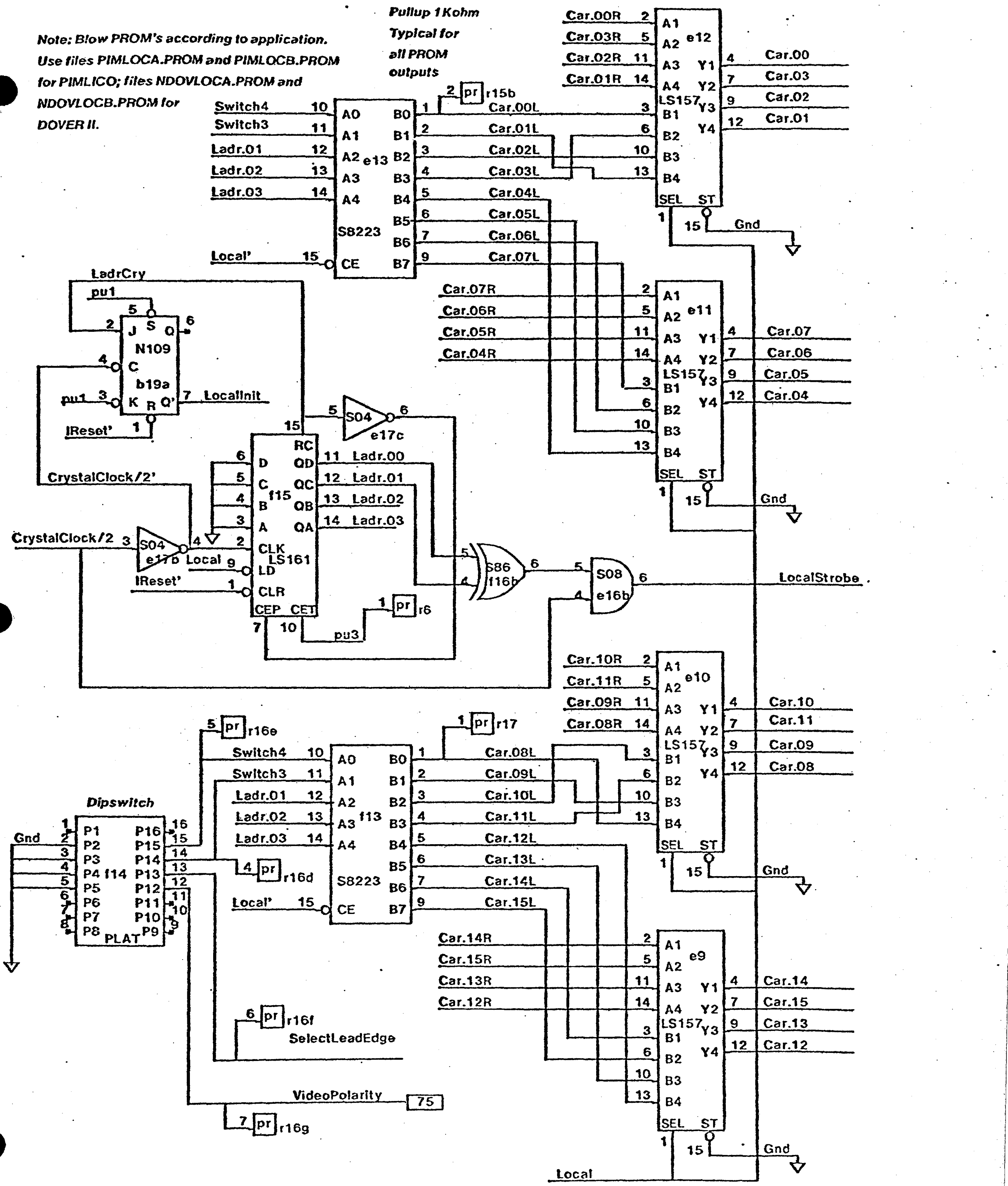


			ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)			Drawing Number 217152	
XEROX SPG	Project TTL	COMMAND TIMING REGISTER	File Adapllcm07.si	Designer Ron Freeman	Rev A	Date 1/5/78	Page 7

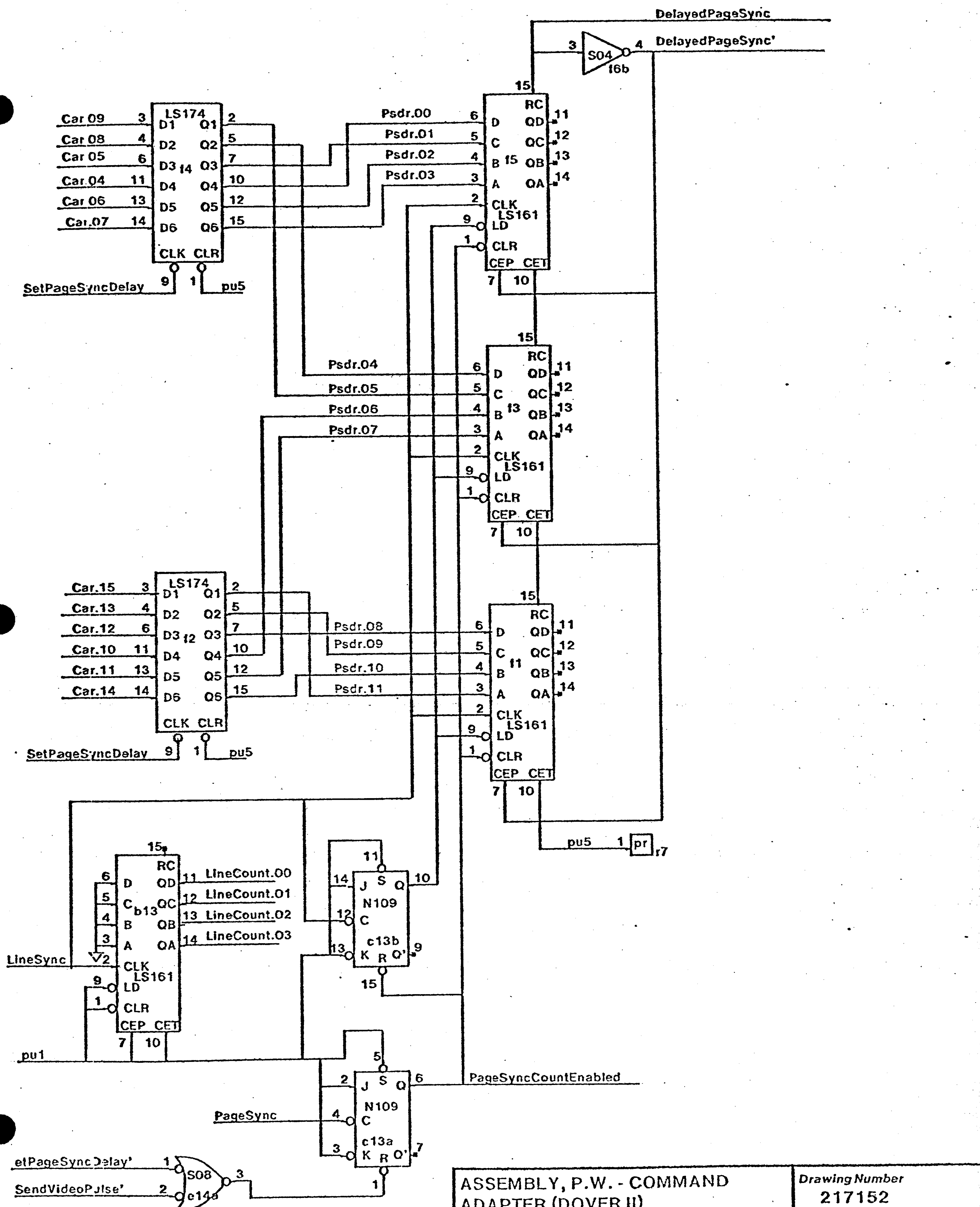


			ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)		Drawing Number 217152
XEROX SPG	Project TTL.	COMMAND ASSEMBLY REGISTER	File Adapllcm08.si	Designer Ron Freeman	Rev A	Date 1/5/78	Page 8

Note: Blow PROM's according to application. Use files PIMLOCA.PROM and PIMLOCB.PROM for PIMLICO; files NDOVLOCA.PROM and NDOVLOCB.PROM for DOVER II.

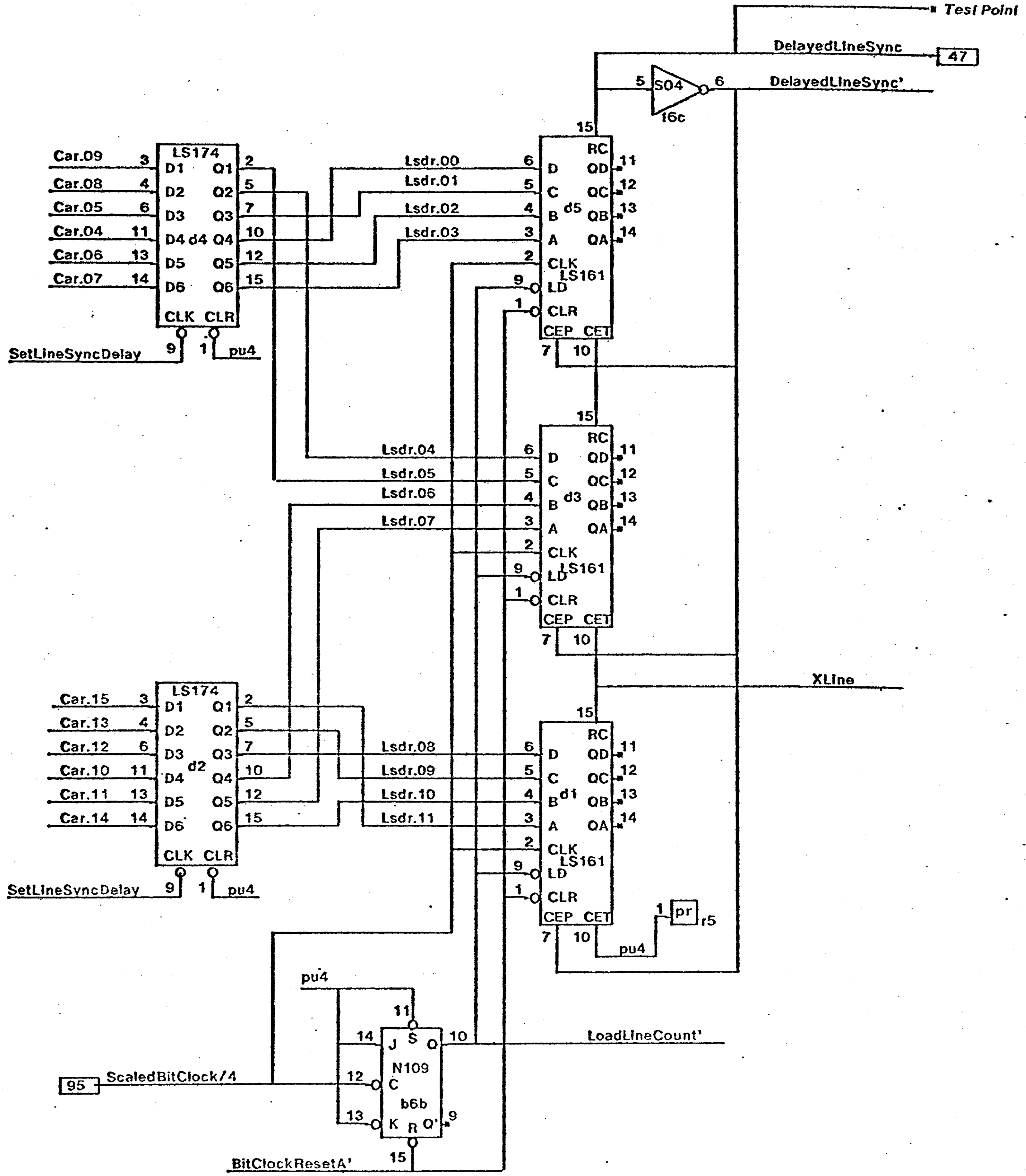


		ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)			Drawing Number 217152
XEROX SPG	Project TTL RpsAdapt	LOCAL MODE LOGIC AND COMMAND MULTIPLEXER	File Adapllcm09.si	Designer Ron Freeman	Rev A	Date 1/5/78	Page 9

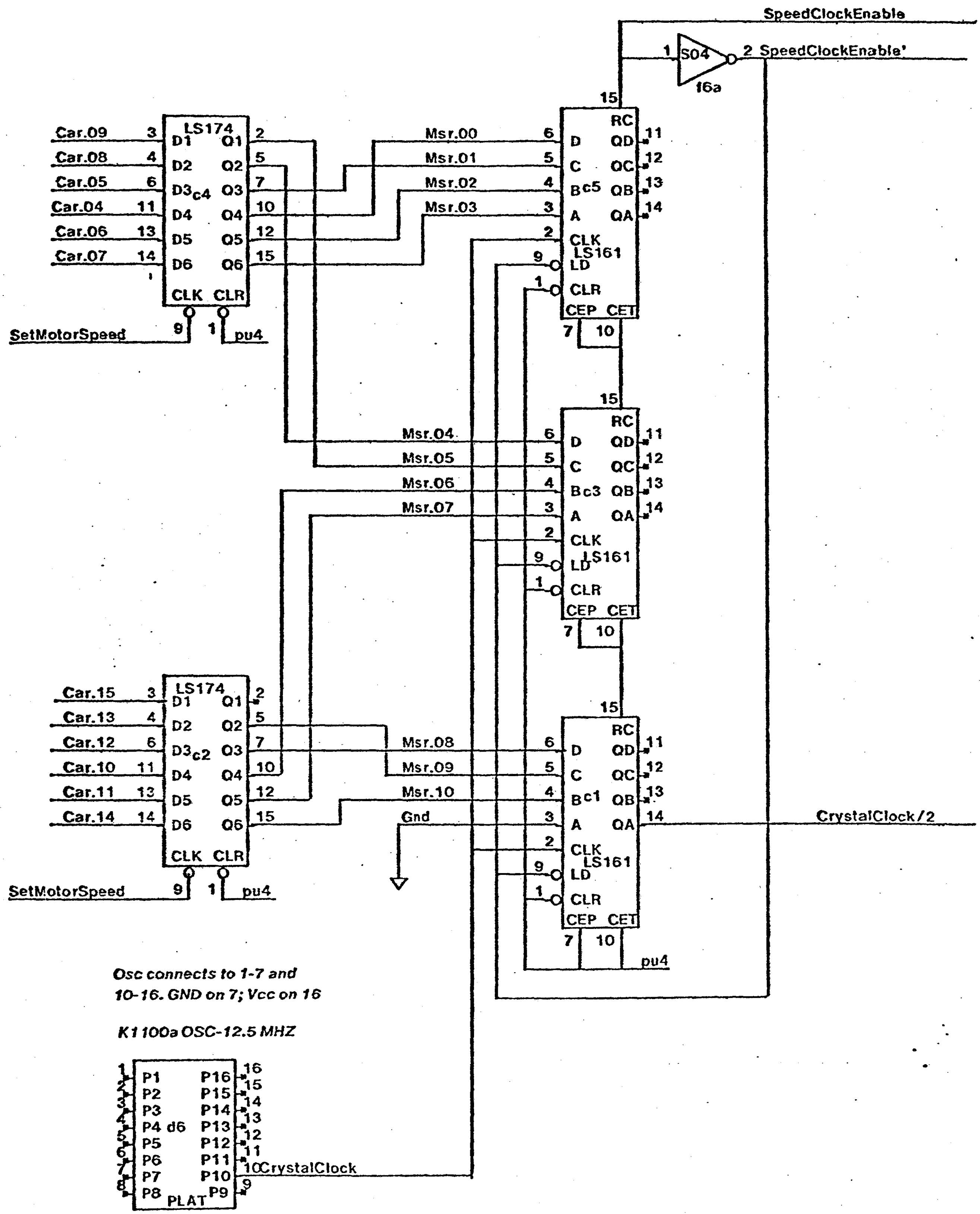


			ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)			Drawing Number 217152
XEROX SPG	Project TTL. RosAdapt	PAGE SYNC DELAY GENERATOR	File Adaplicm10.si	Designer Ron Freeman	Rev A	Date 1/5/78

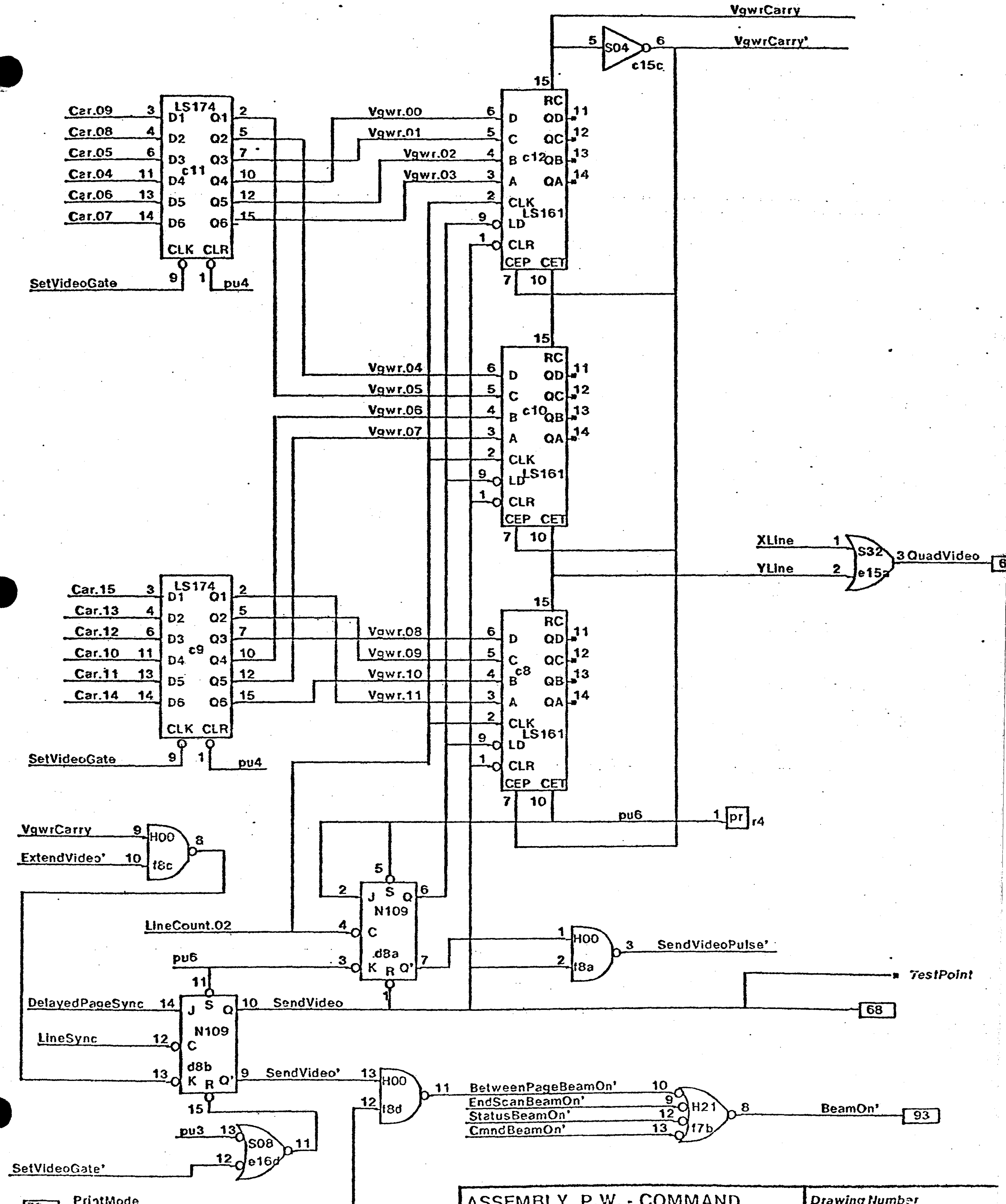
Page 10



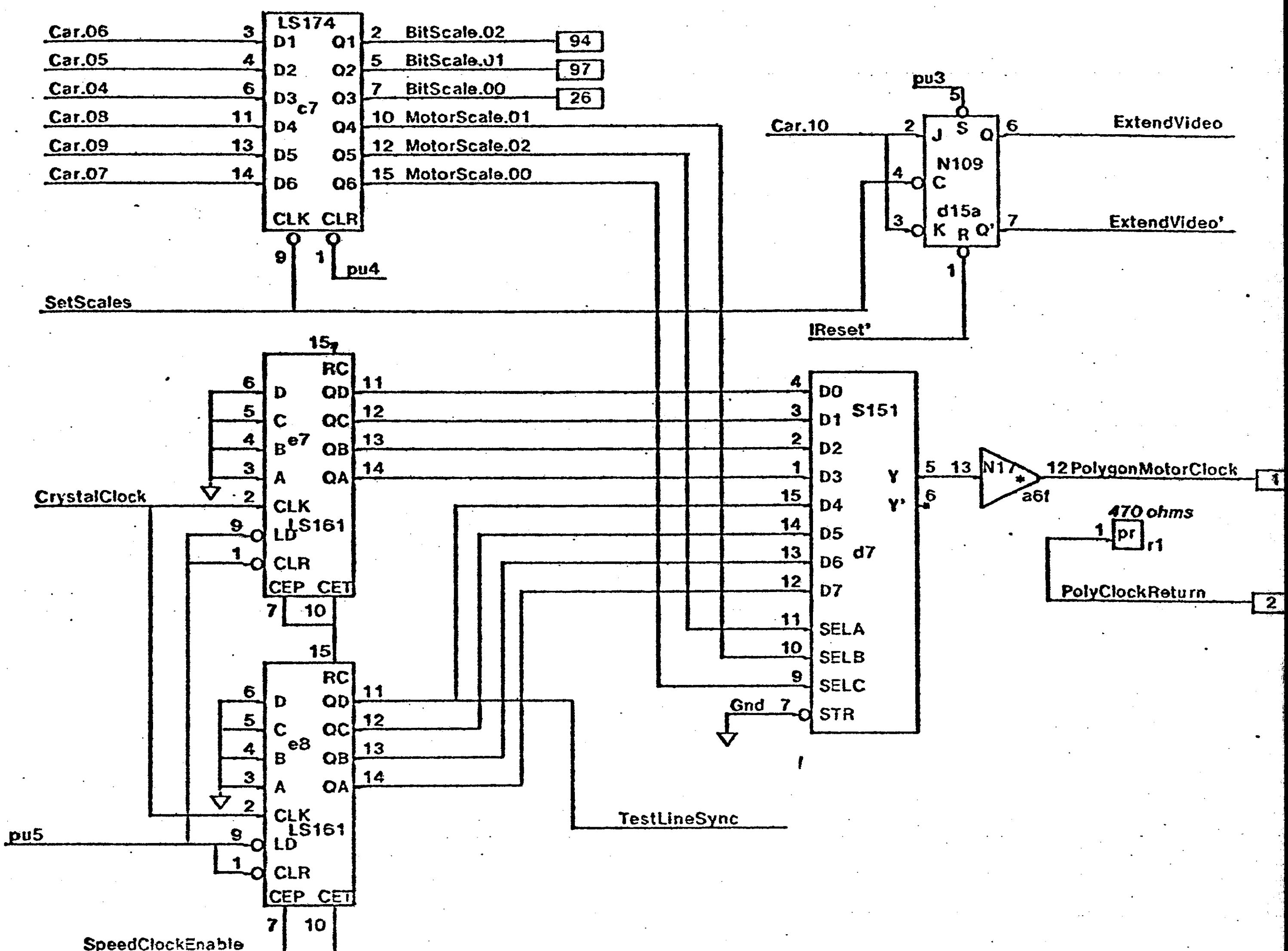
			ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)			Drawing Number 217152	
XEROX SPG	Project TTL RosAdapt	LINE SYNC DELAY GENERATOR	File Adaplicm11.si	Designer Ron Freeman	Rev A	Date 1/5/78	Page 11



			ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)			Drawing Number 217152
XEROX SPG	Project TTL. PosAdapt	MOTOR SPEED CLOCK GENERATOR	File Adapllcm12.si	Designer Ron Freeman	Rev A	Date 1/5/78	Page 12

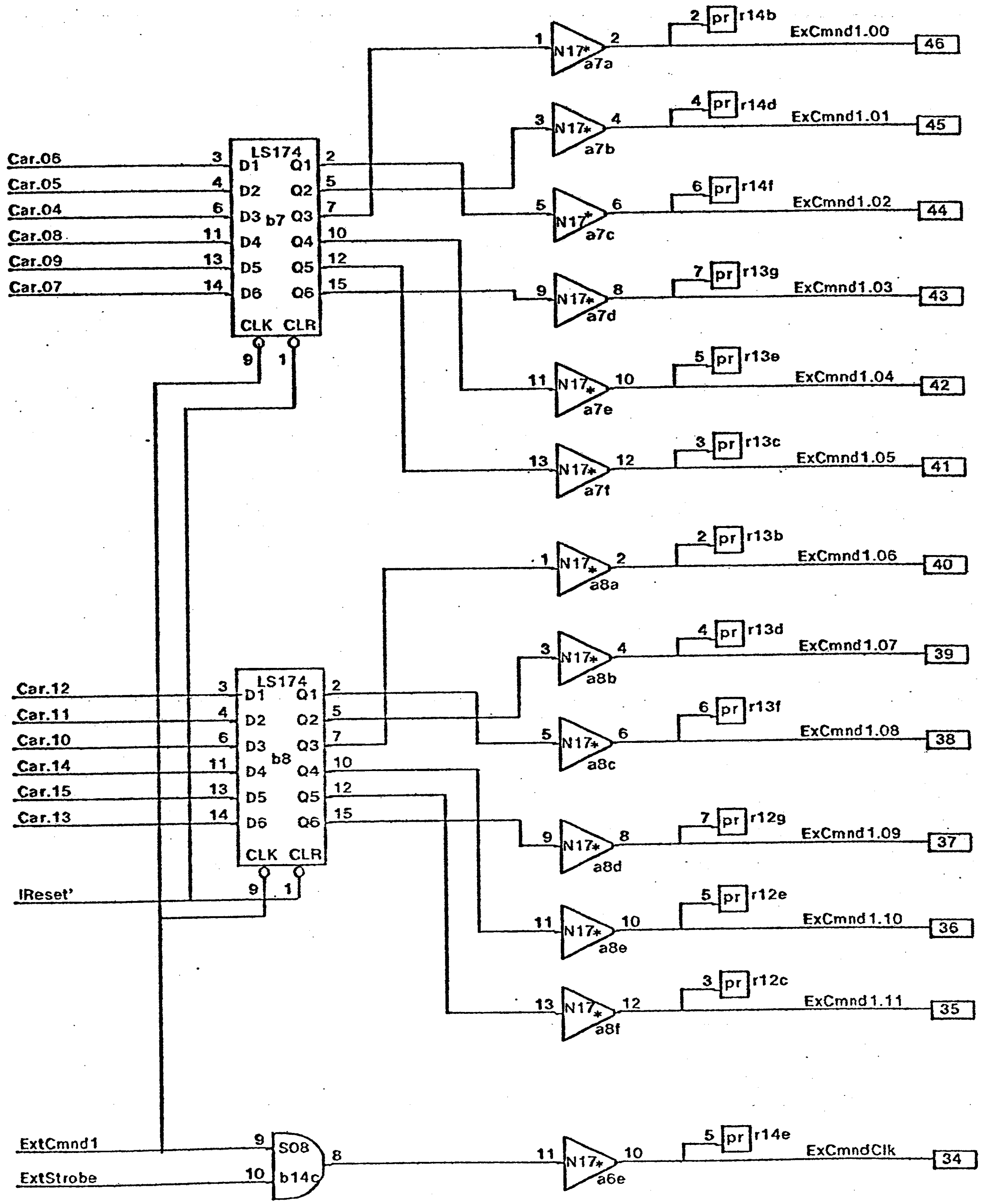


		ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)			Drawing Number 217152
XEROX	Project TTI	VIDEO GATE WIDTH	File Adaplicm13.si	Designer Ron Freeman	Rev A	Date 1/5/78	Page 13

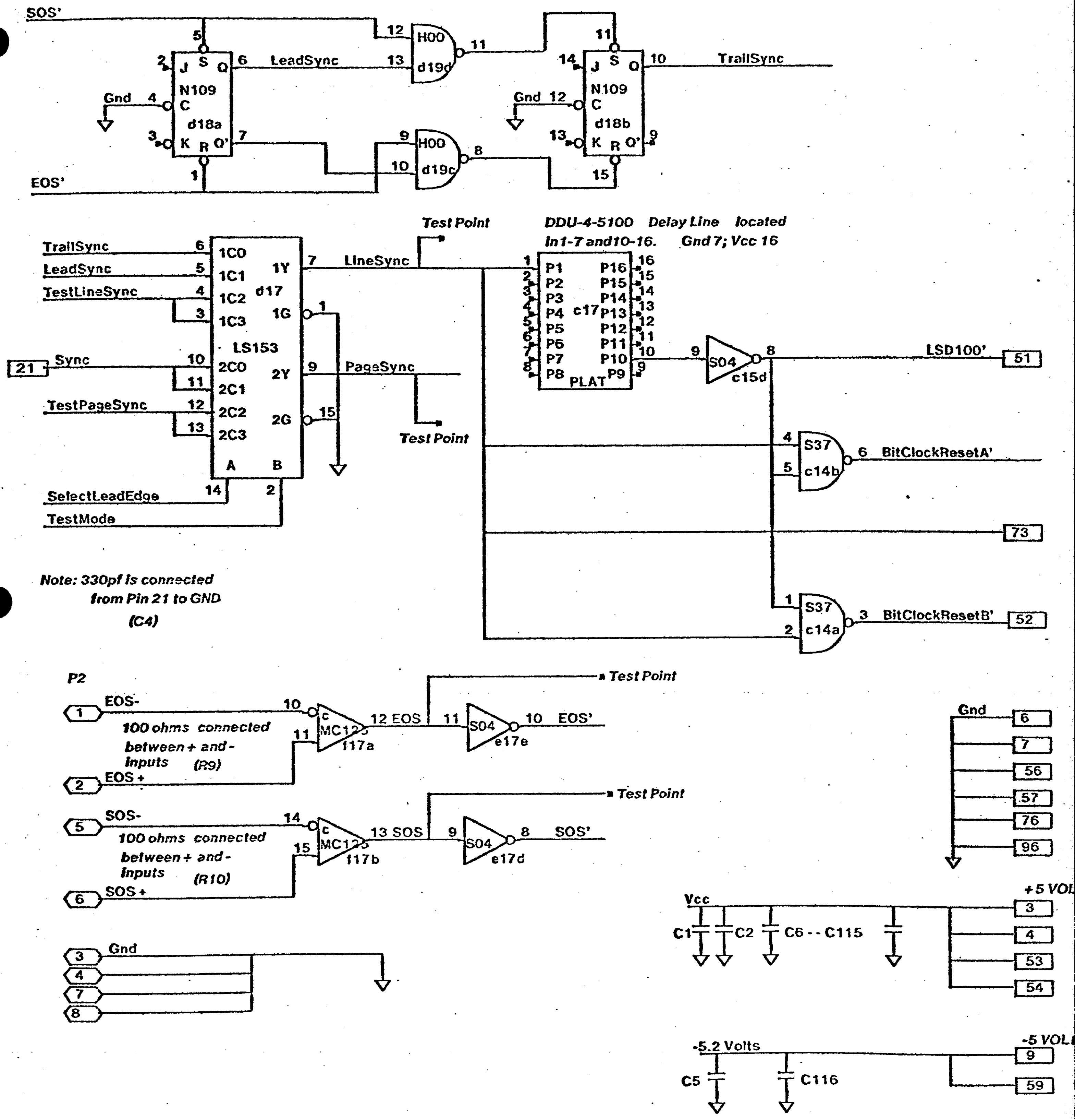


			ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)			Drawing Number 217152
XEROX SPG	Project TTL RosAdapt	POLYGON MOTOR CLOCK SCALING REGISTER	File Adapllcm15.si	Designer Ron Freeman	Rev A	Date 1/5/78	Page 15

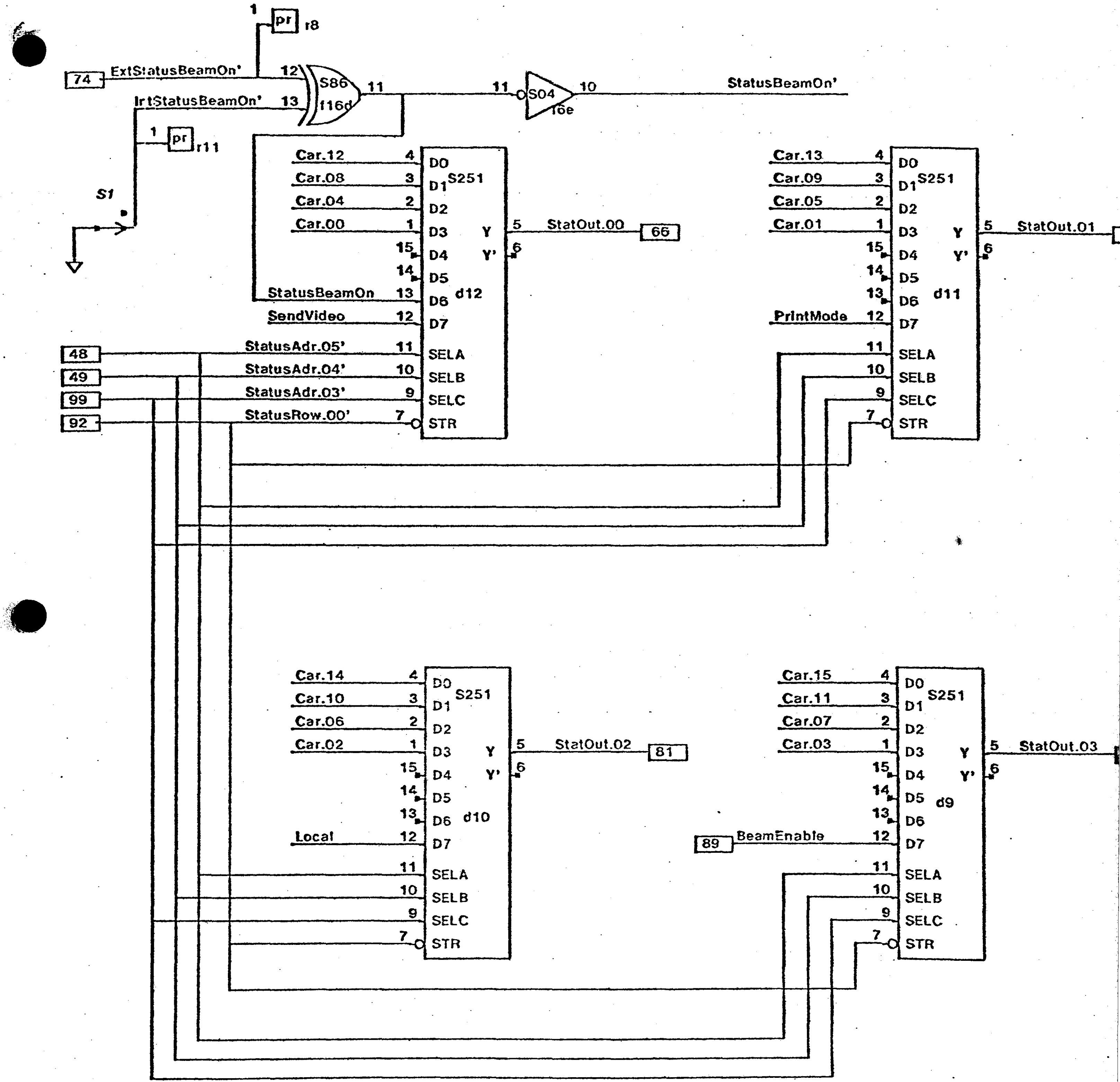
All pullups on 7417 outputs are 470 ohms



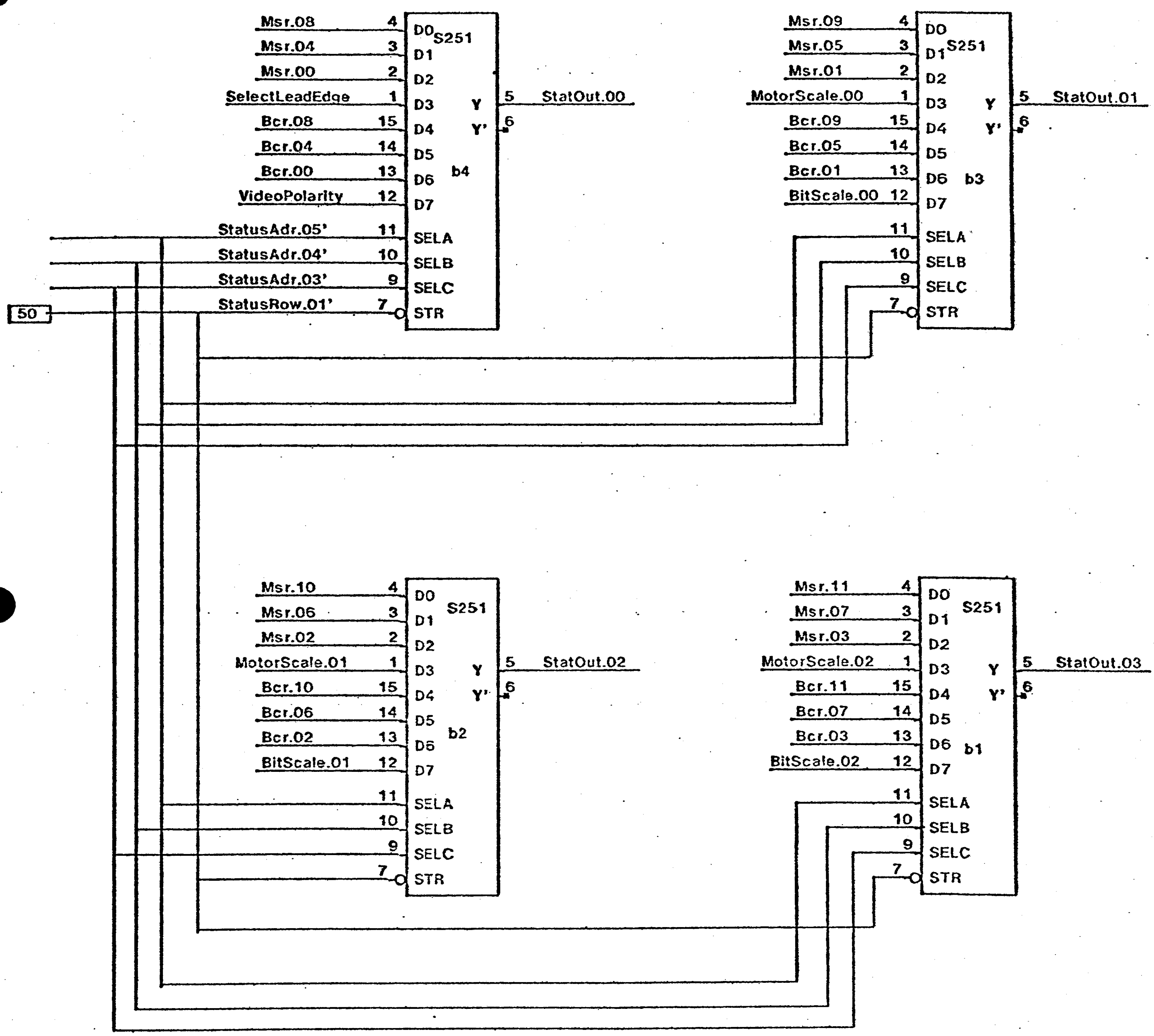
		ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)				Drawing Number 217152	
XEROX SPG	Project TTL.	EXTERNAL COMMAND REGISTER	File Adapllcm16.si	Designer Ron Freeman	Rev A	Date 1/5/78	Page 16



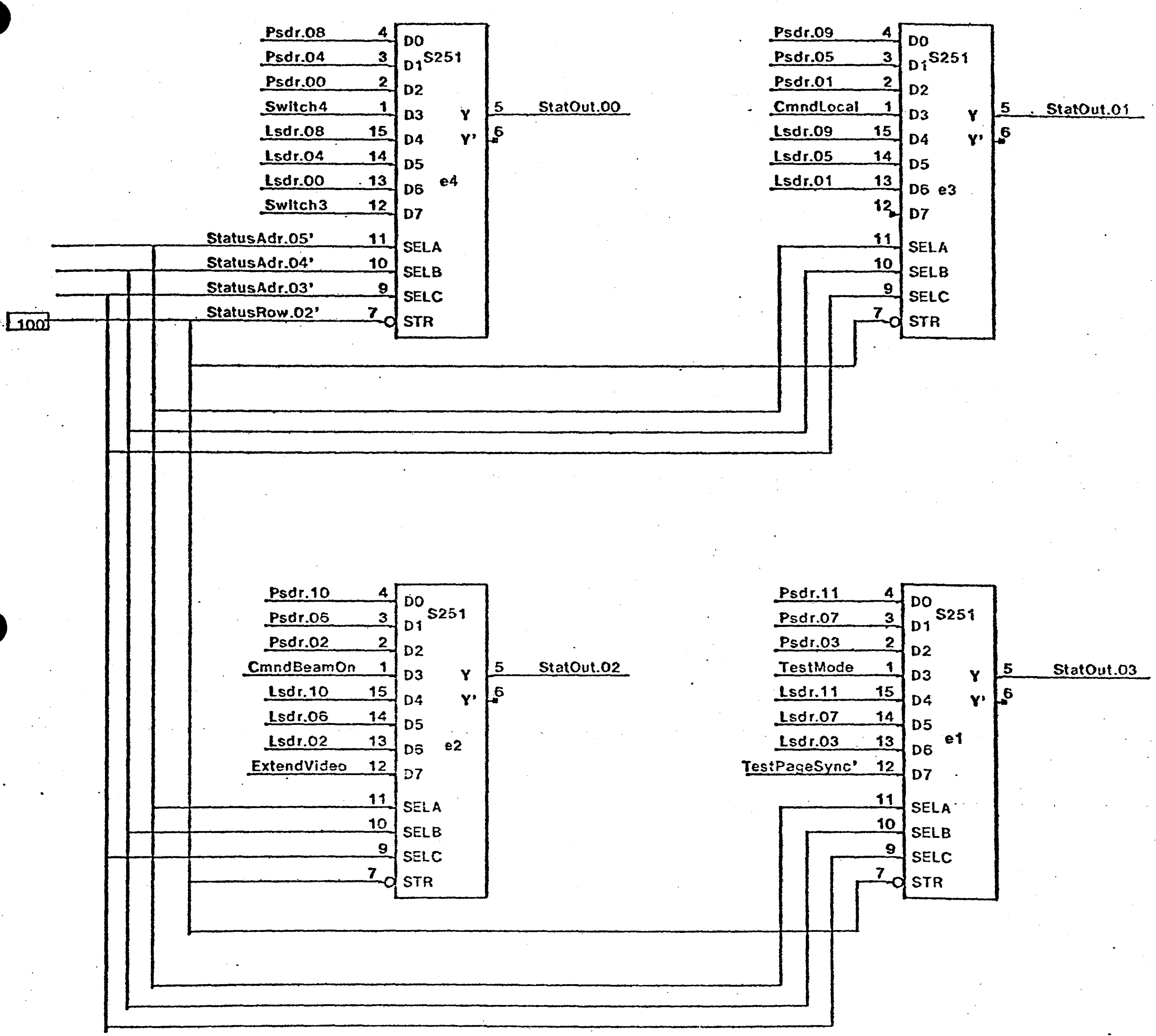
			ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)			*Drawing Number* 217152	
XEROX SPG	*Project* TTL	START OF SCAN-END OF SCAN DETECTION LOGIC	*File* Adapllcm17.si	*Designer* Ron Freeman	*Rev* A	*Date* 1/5/78	*Page* 17



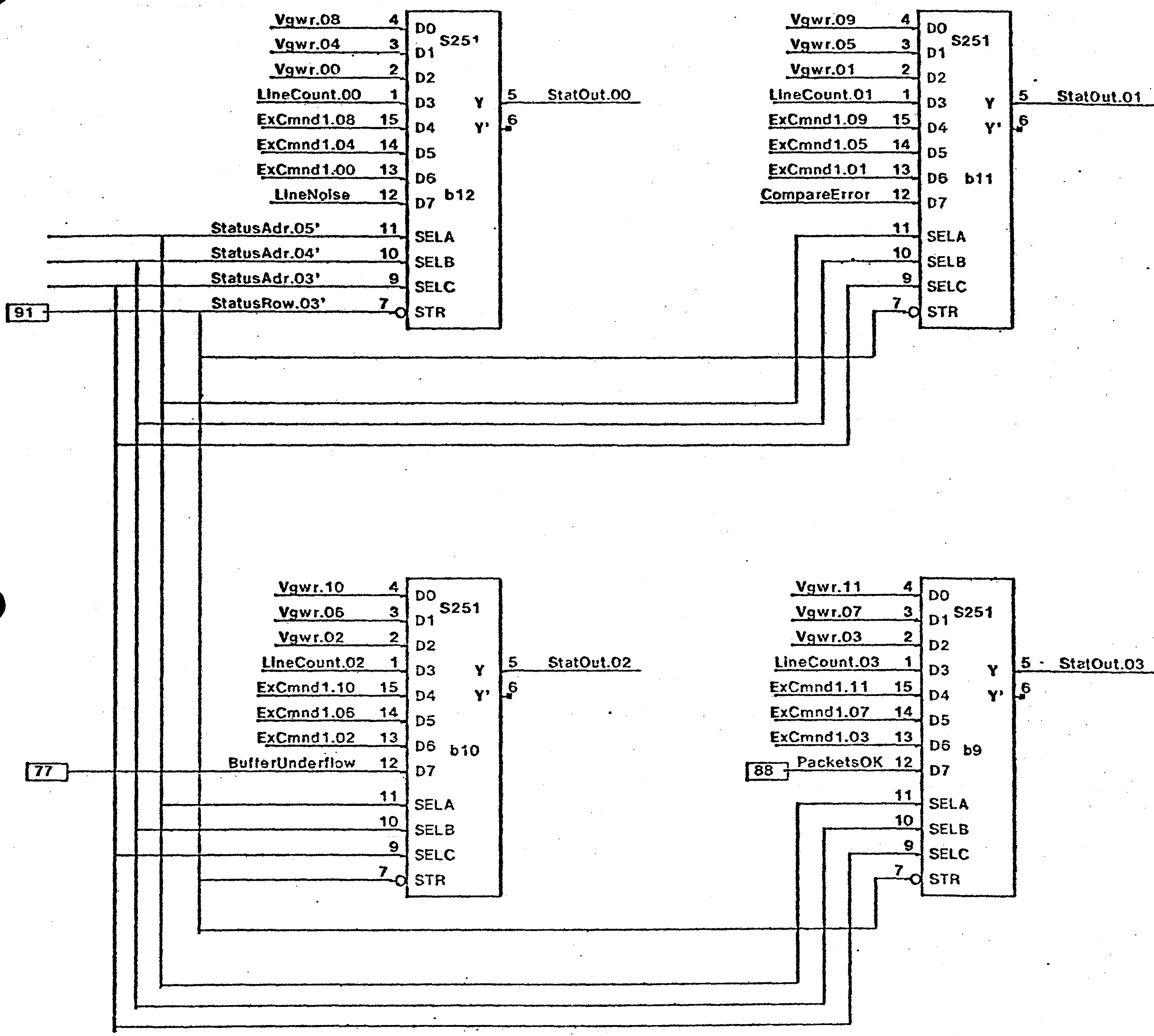
			ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)			Drawing Number 217152
XEROX SPG	Project TTL. PesAdapt	STATUS MULTIPLEXER ROW 00	File Adapllcm18.si	Designer Ron Freeman	Rev A	Date 1/5/78	Page 1



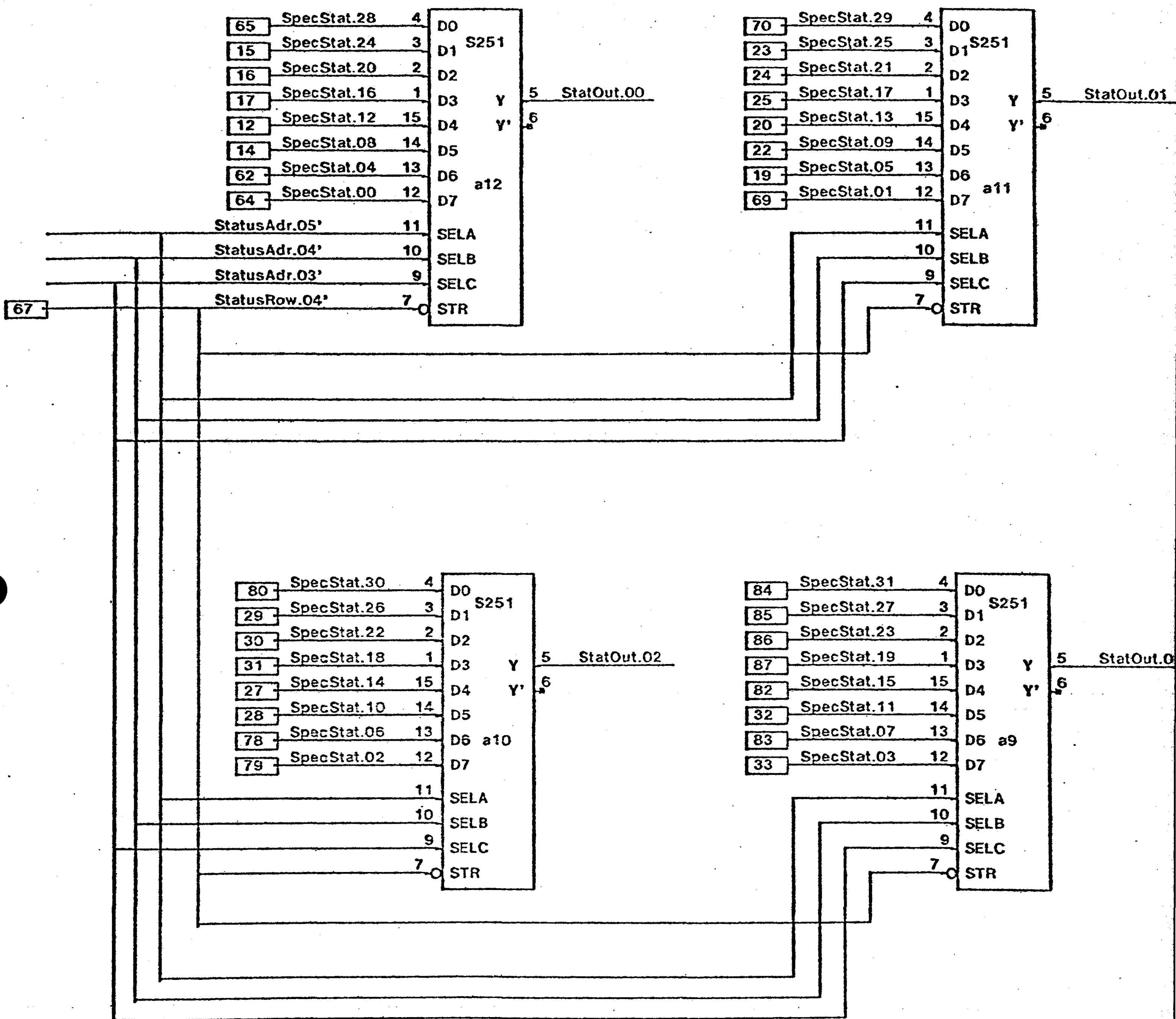
			ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER !!)			Drawing Number 217152	
XEROX SPG	Project TTL	STATUS MULTIPLEXER ROW 01	File Adapllcm19.si	Designer Ron Freeman	Rev A	Date 1/5/78	Page 19



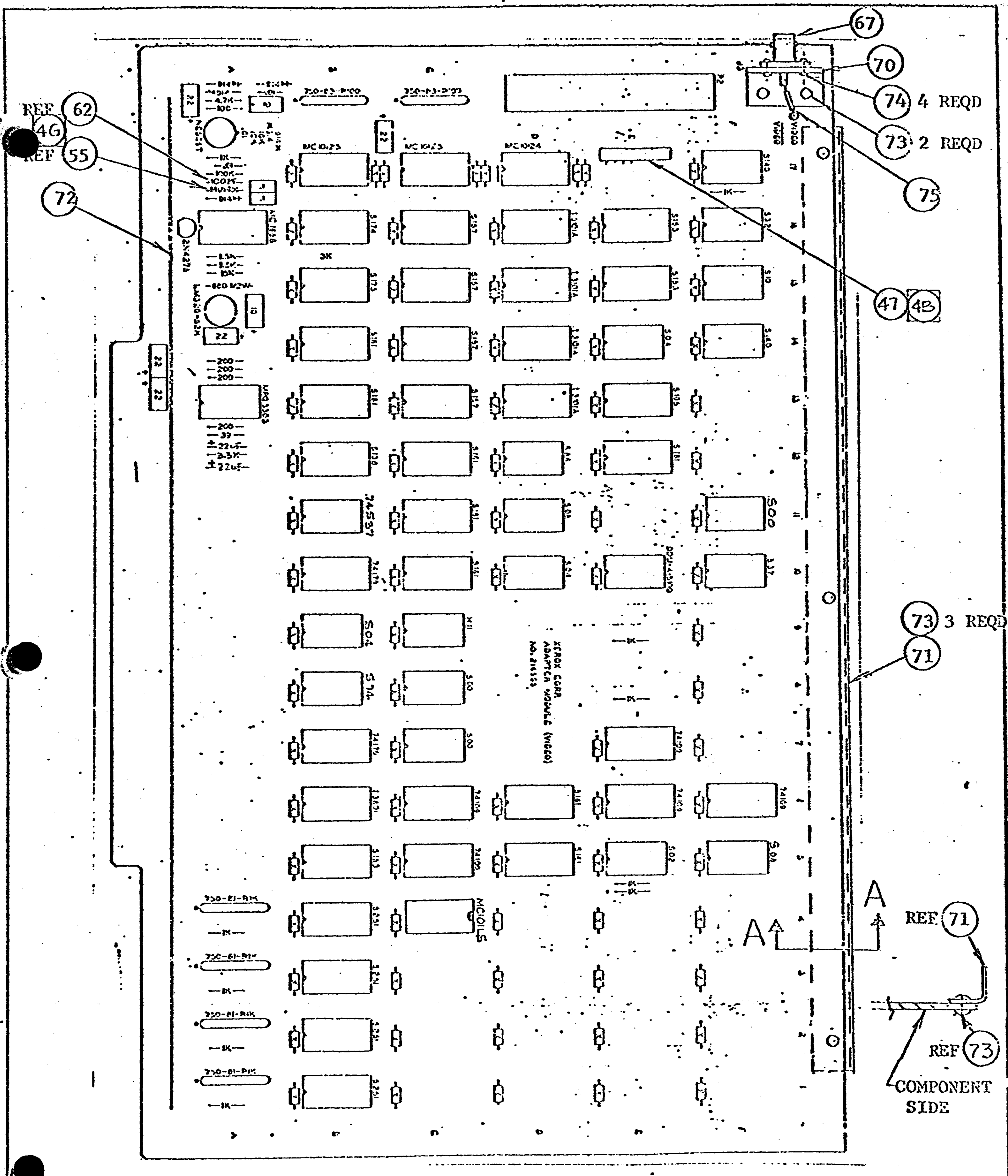
			ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)			Drawing Number 217152
XEROX SPG	Project TTL. RosAdapt	STATUS MULTIPLEXER ROW 02	File Adapllcm20.si	Designer Ron Freeman	Rev A	Date 1/5/78	Page 20



		ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)			Drawing Number 217152	
XEROX SPG	Project TTL RosAdapt	STATUS MULTIPLEXER ROW 03	File AdapIIcm21.si	Designer Ron Freeman	Rev A	Date 1/5/78	Page 21

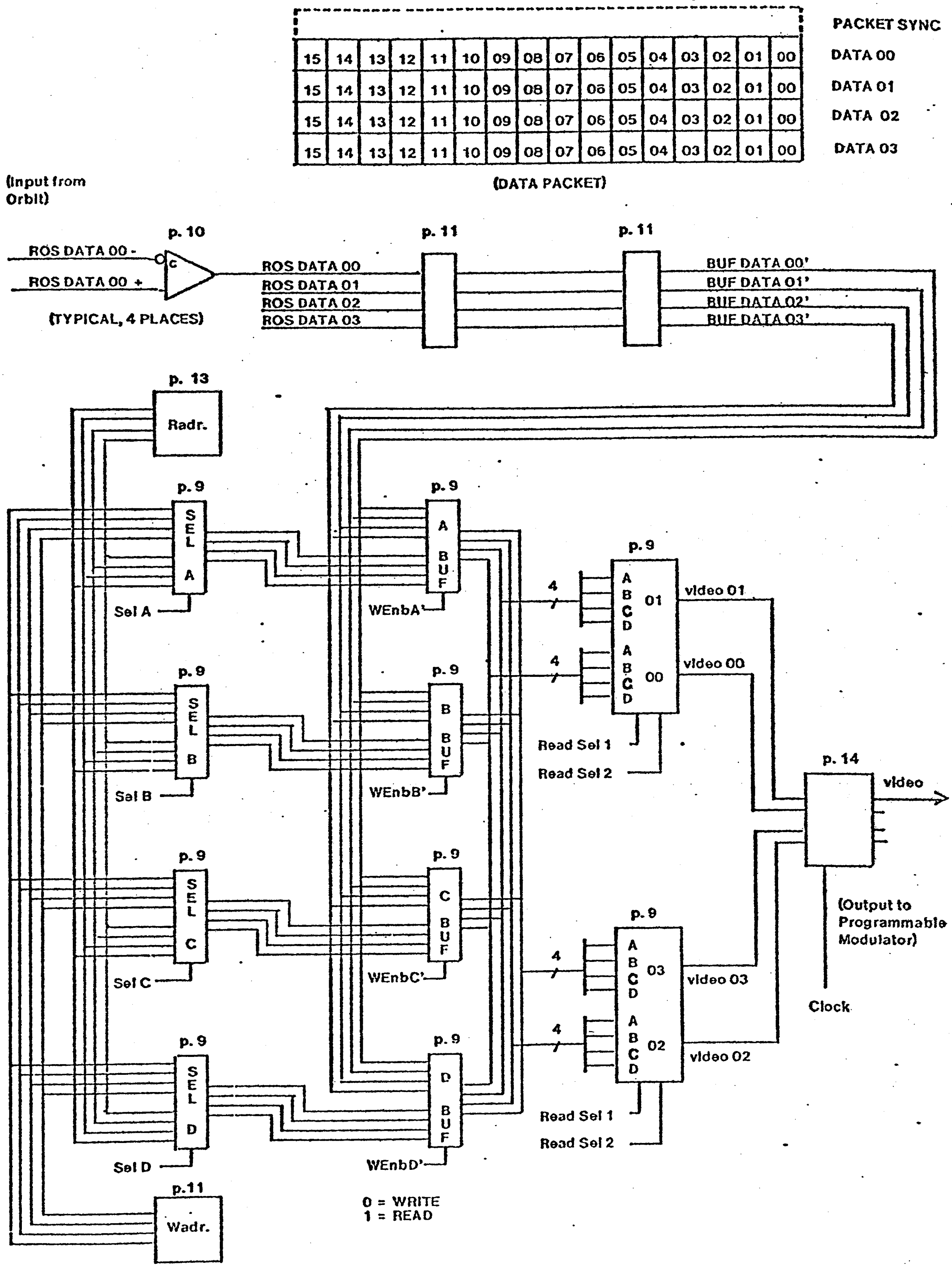


			ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)			*Drawing Number* 217152
XEROX SPG	*Project* TTL.	STATUS MULTIPLEXER ROW.04	*File* AdapIIcm22.si	*Designer* Ron Freeman	*Rev* A	*Date* 1/5/78	*Page* 22

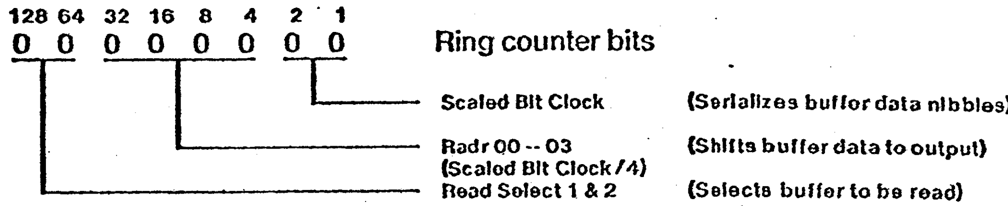


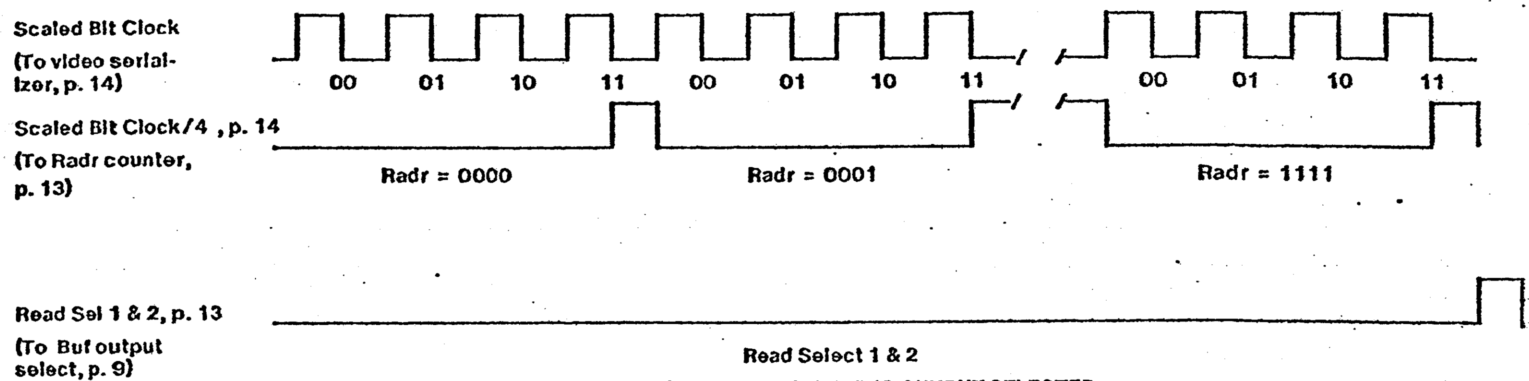
Title: ASSEMBLY, P W VIDEO ADAPTER	Xerox Corporation, El Segundo, California	XEROX
	216554	F
	Sheet 3 Of 16	

1585(3/73)



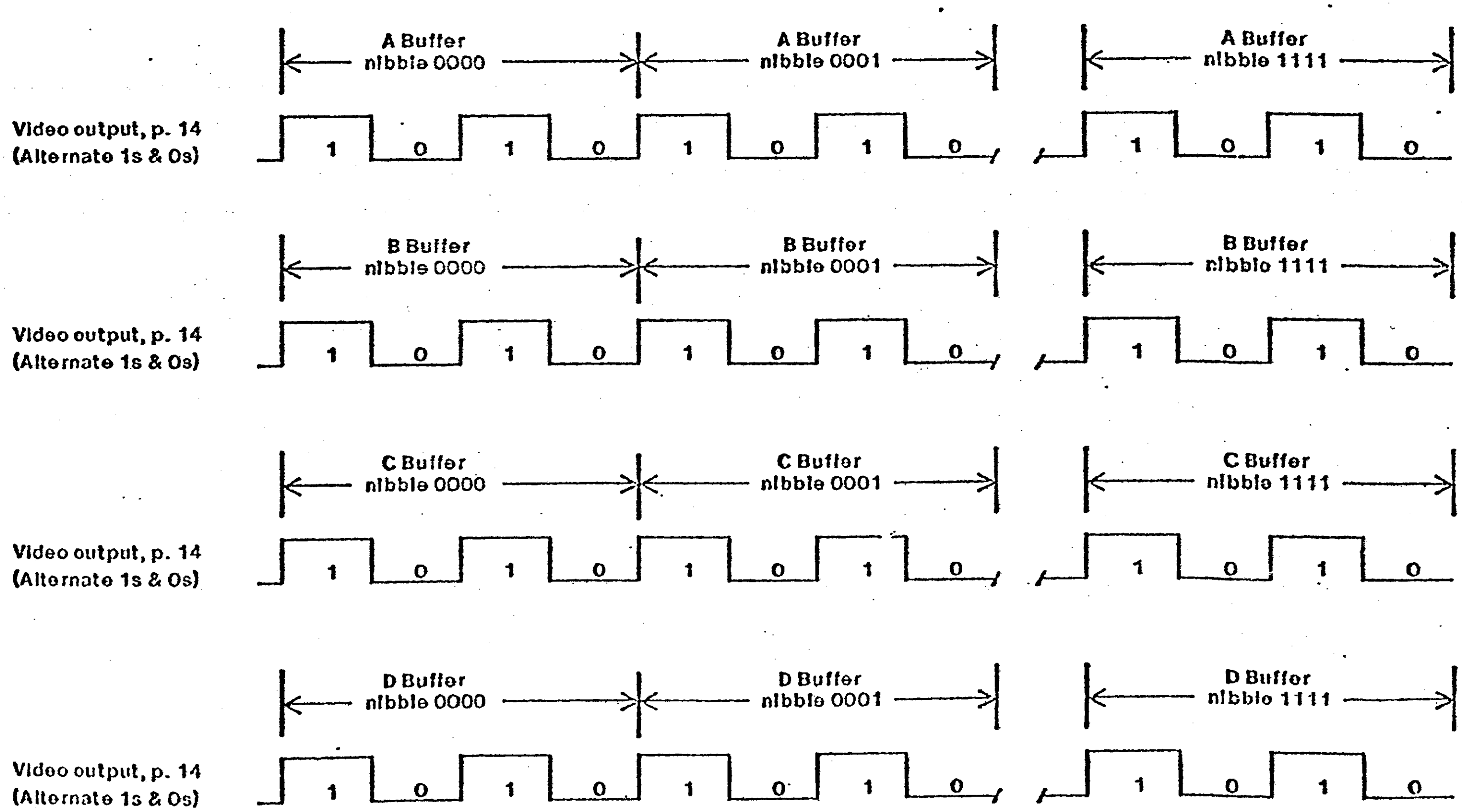
VIDEO ADAPTER DATA FLOW





Read Select 1 & 2

COUNT	BUFFER'S OUTPUT SELECTED
00	A
01	B
10	C
11	D



VIDEO ADAPTER DATA CONTROL

Revisions					217145	B
LAL	Rev	Description	Chk	Date	Approved	
	A	ENGINEERING RELEASE	RLF	Jan78		
X	B	REVISED M/L ITEMS 29, 34, 60, 62, 64. ADDED M/L ITEMS 66 AND 78. ADDED NOTE 5. REVISED SHEET 16 SCHEM.	RLF	29Mar 1978		

Dist Code SPG

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Model No. First Use DOVER II	Finish	Code Ident 18338	Size A	Dwg. No. 217145	Change Letter B
Next Assy. First Use		Scale	Do Not Scale Drawing		Sheet 1 of

NOTES: UNLESS OTHERWISE SPECIFIED

1. ASSEMBLE PER MODULE ASSEMBLY SPEC, DWG NO. 216207 .
2. ITEMS 29 AND 54 MOUNT DIRECTLY TO P.W. BOARD.
3. DO NOT POPULATE SPARE LOCATIONS.
4. PROM IN LOCATION 6B SHOULD BE BLOWN USING FILE ROSREAD.PROM.
5. RESISTOR R40 (100 OHMS, 1/4 W., 5%) IS MOUNTED ON ETCH SIDE OF BOARD BETWEEN 2D11 AND 3D6.

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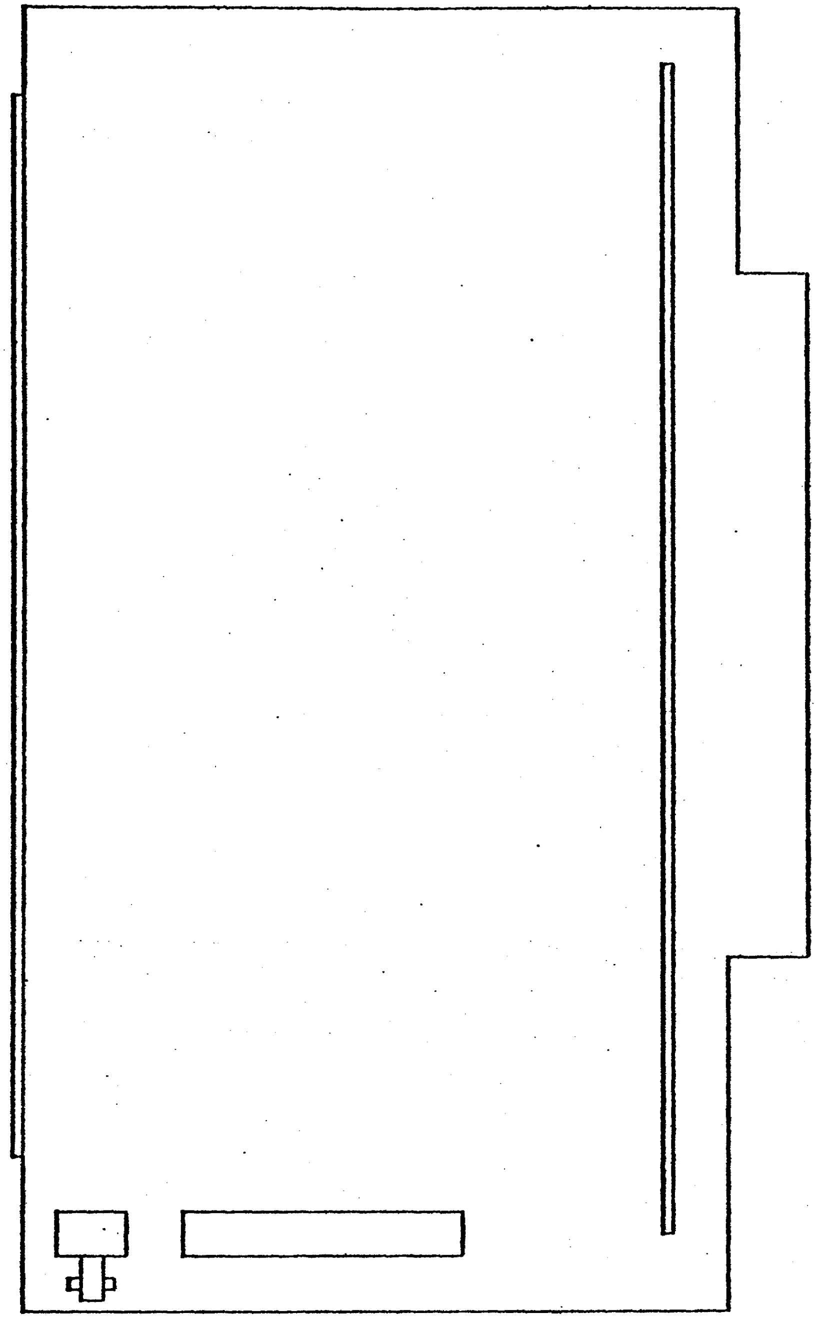

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Title	Xerox Corporation El Segundo, California XEROX	
ASSEMBLY, P.W. - VIDEO ADAPTER (DOVER II)	217145	B
	Sheet 3 Of	

Xerox Corporation
701 South Aviation Boulevard
El Segundo, California 90245

XEROX

MATERIAL LIST

ML	Drawing No. 217145	Rev. B

Rev. B

Dwg. No. 217145

Drawing Title

ASSEMBLY, P.W. - VIDEO ADAPTER

(DOVER II)

Model No. DOVER II | Date 1/11/78 | Sheet 4 Of

ML

Item No.	Drawing Title			Drawing No.	No. Req.	Remarks
1	BOARD, P.W. - VIDEO ADAPTER			217146	1	
2						
3	MICROCIRCUIT	I3101A	(INTEL)		4	13D,14D,15D,16D
4	MICROCIRCUIT	13601	(INTEL)		1	6B SEE NOTE 4
5	MICROCIRCUIT	MC10124	(MOTOROLA)		1	17D
6	MICROCIRCUIT	MC10125	(MOTOROLA)		3	2D,17B,17C
7	MICROCIRCUIT	74S00	(T.I.)		3	7C,8C,11F
8	MICROCIRCUIT	74S02			1	5E
9	MICROCIRCUIT	74S04			3	9B,10D,14E
10	MICROCIRCUIT	74S08			2	5F,11D
11	MICROCIRCUIT	74S10			1	15F
12	MICROCIRCUIT	74H11			1	9C
13	MICROCIRCUIT	74S32			1	16F
14	MICROCIRCUIT	74S37			2	10F,11B
15	MICROCIRCUIT	74S74			1	1D
16	MICROCIRCUIT	74S86			1	12D
17	MICROCIRCUIT	74109			5	5C,6C,6E,6F,7E
18	MICROCIRCUIT	74S138			1	12B
19	MICROCIRCUIT	74S140			2	14F,17F
20	MICROCIRCUIT	74S151			1	4C
21	MICROCIRCUIT	74S153			3	5B,15E,16E
22	MICROCIRCUIT	74S157			4	13C,14C,15C,16C
23	MICROCIRCUIT	74S161			10	2C,3C,5D,6D,10C,11C,12C, 12E,13B,14B
24	MICROCIRCUIT	74LS174			1	16B
25	MICROCIRCUIT	74LS175			1	15B
26	MICROCIRCUIT	74179			2	7B,10B
27	MICROCIRCUIT	74S195			1	13E
28	MICROCIRCUIT	74S251	(T.I.)		4	1B,2B,3B,4B
29	MICROCIRCUIT	MC1658	(MOTOROLA)		1	3D SEE NOTE 5
30	MICROCIRCUIT	NE536T	(SIGNETICS)		1	3F

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MATERIAL LIST

ML	Drawing No. 217145	Rev. B

Rev.	Drawing Title	
B	ASSSEMBLY, P.W. - VIDEO ADAPTER (DOVER II)	These drawings and specifications, and the data contained therein, are the exclusive property of Xerox Corporation and or Rank Xerox, Ltd. issued in strict confidence and shall not, without the prior written permissiOn of Xerox Corporation Rank Xerox, Ltd., be reproduced, copied or used for any purpose whatsoever, except the manufacture of articles for Xerox Corporation or Rank Xerox, Ltd.
Dwg. No. 217145	Model No. DOVER II	Date 1/12/78 — Sheet 5 Of
ML		

Item No.	Drawing Title	Drawing No.	No. Req.	Remarks
31	REGULATOR, LM320H5.2, (NATIONAL)		1	Q2
32				
33	RESISTOR, COMPOSITION, 1/4W, 5%, 39 OHMS	116447-390	1	R17
34	RESISTOR, COMPOSITION, 1/4W, 5%, 100 OHMS	116447- 101	2	R11, R40 SEE NOTE 5
35	RESISTOR, COMPOSITION, 1/4W, 5%, 200 OHMS	116447- 201	4	R13,R14,R15,R16
36	RESISTOR, COMPOSITION, 1/4W, 5%, 330 OHMS	116447- 331	1	R6
37	RESISTOR, COMPOSITION, 1/2W, 5% 680 OHMS	105220- 681	1	R12
38	RESISTOR, COMPOSITION, 1/4W, 5%, 1K OHMS	116447- 102	11	R4,R19,R20,R21,R22,R23,R24, R25,R26,R27,R28
39	RESISTOR, COMPOSITION, 1/4W, 5%, 1.5K OHMS	116447- 152	2	R8,R9
40	RESISTOR, COMPOSITION, 1/4W, 5%, 3.0K OHMS	116447- 302	1	R7
41	RESISTOR, COMPOSITION, 1/4W, 5%, 3.3K OHMS	116447- 332	1	R18
42	RESISTOR, COMPOSITION, 1/4W, 5%, 4.7K OHMS	116447- 472	1	R3
43	RESISTOR, COMPOSITION, 1/4W, 5%, 10.0K OHMS	116447- 103	2	R1,R2
44	RESISTOR, COMPOSITION, 1/4W, 5%, 15K OHMS	116447- 153	1	R10
45	RESISTOR, COMPOSITION, 1/4W, 5%, 100K OHMS	116447- 104	1	R5
46				
47	RESISTOR PACK, SIP, 100 OHMS #750-83-R100 (CTS)		2	R34,R35
48	RESISTOR PACK, SIP, 1K OHMS #750-81-R1K (CTS)		4	R30,R31,R32,R33
49	RESISTOR PACK, SIP, 470 OHMS #750-81-R470 (CTS)		2	R36,R37
50				
51	TRANSISTOR, 2N4275		1	Q1
52	TRANSISTOR, DIP PACK #MPQ3303 (MOTOROLA)		1	13A
53				
54	DELAY LINE #DDU-4-5100 (DATA DELAY DEVICES)		1	10E SEE NOTE 2
55				
56	DIODE 1N914		6	CR1,CR2,CR3,CR4,CR5,CR6
57	DIODE, TUNING #MV1401 (MOTOROLA)		1	CR7
58				
59	SOCKET, 14 PIN DIP #514-AG11D (AUGAT)		19	SEE NOTE 3
60	SOCKET, 16 PIN DIP #516-AG11D (AUGAT)		42	SEE NOTE 3

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MATERIAL LIST

ML	Drawing No. 217145	Rev. B

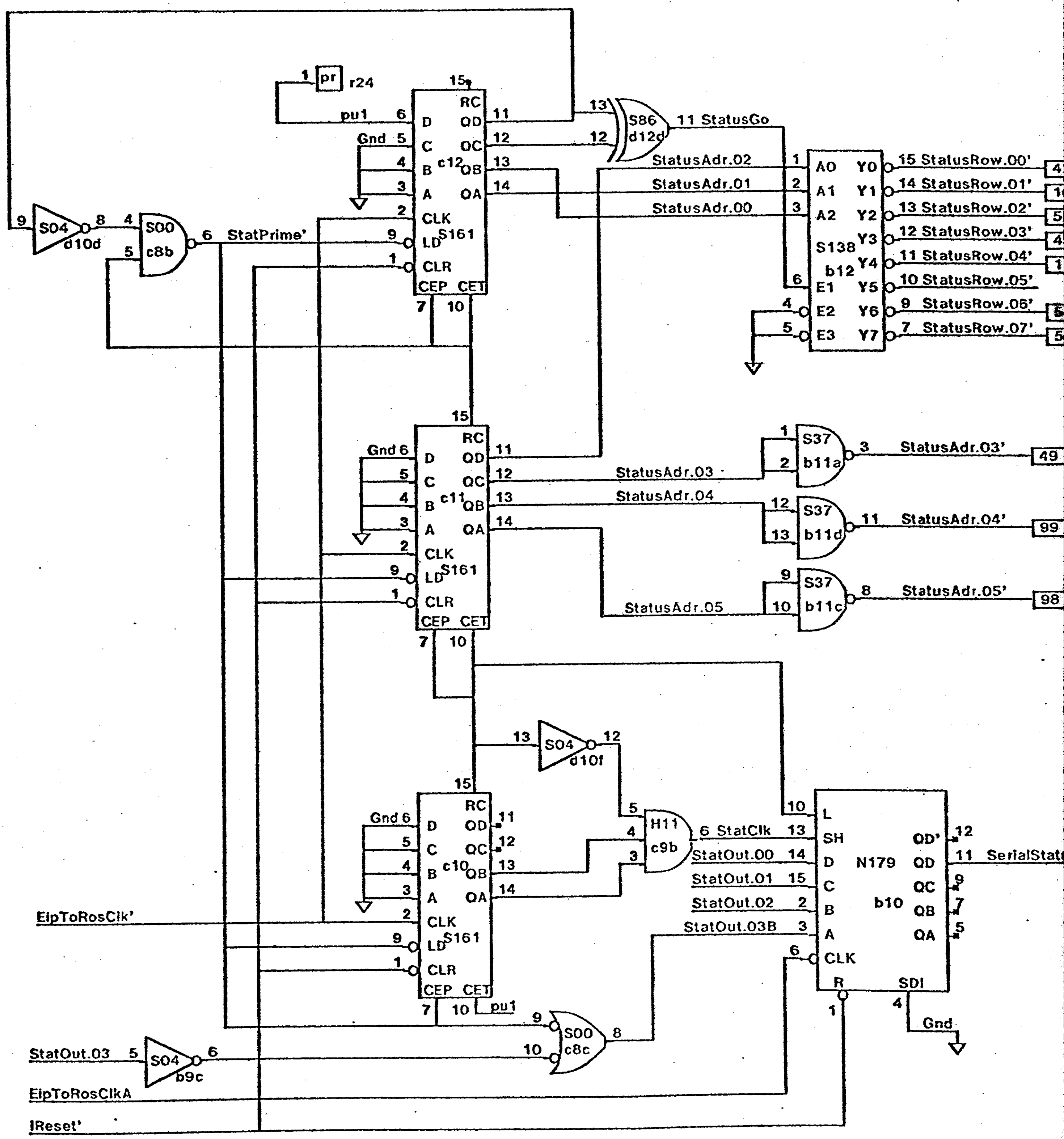
Rev. B
Dwg. No. 217145
ML

Drawing Title

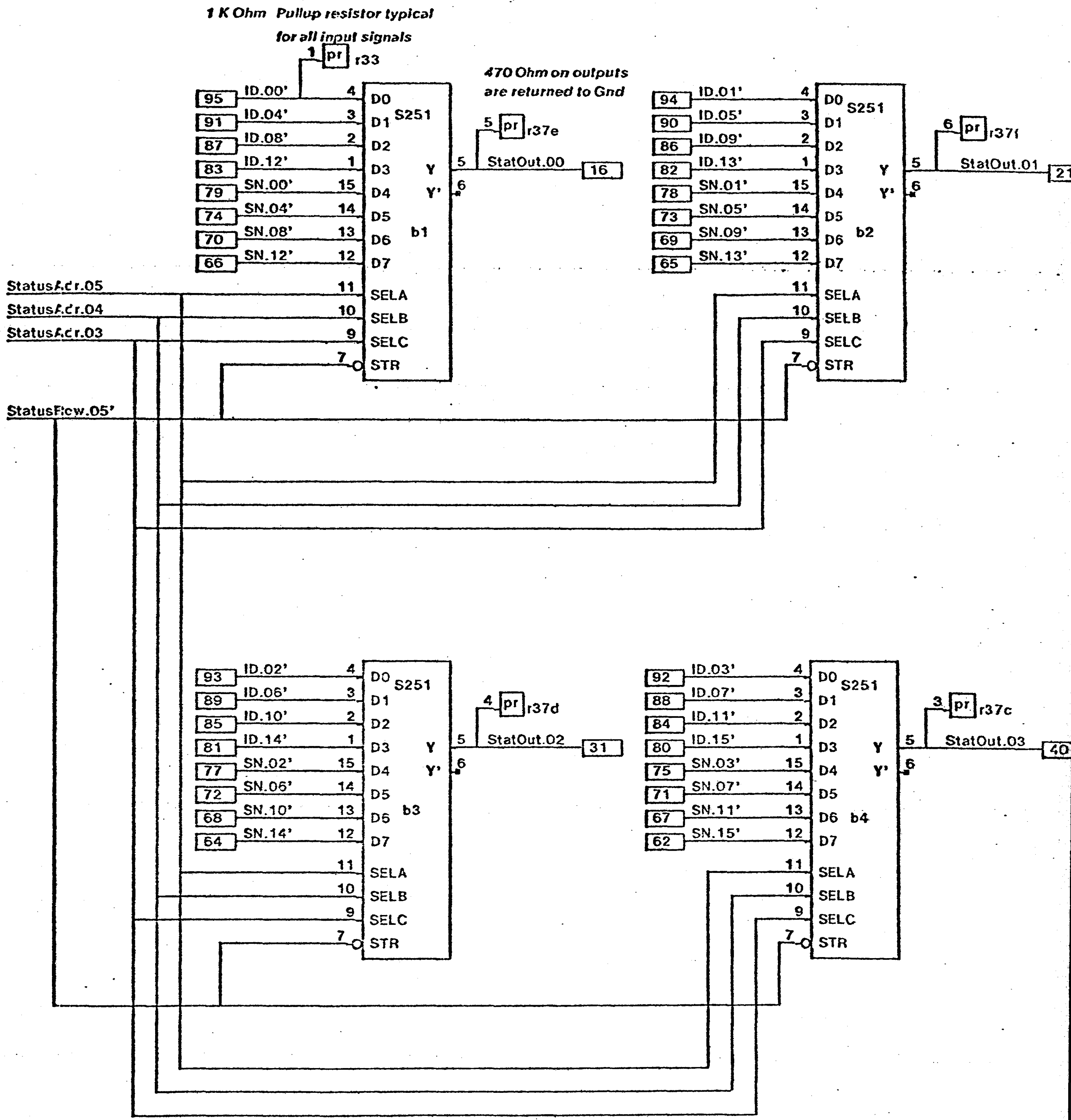
ASSEMBLY, P.W. - VIDEO ADAPTER
(DOVER II)

Model No.	Date	Sheet
DOVER II	1/12/78	6 Of

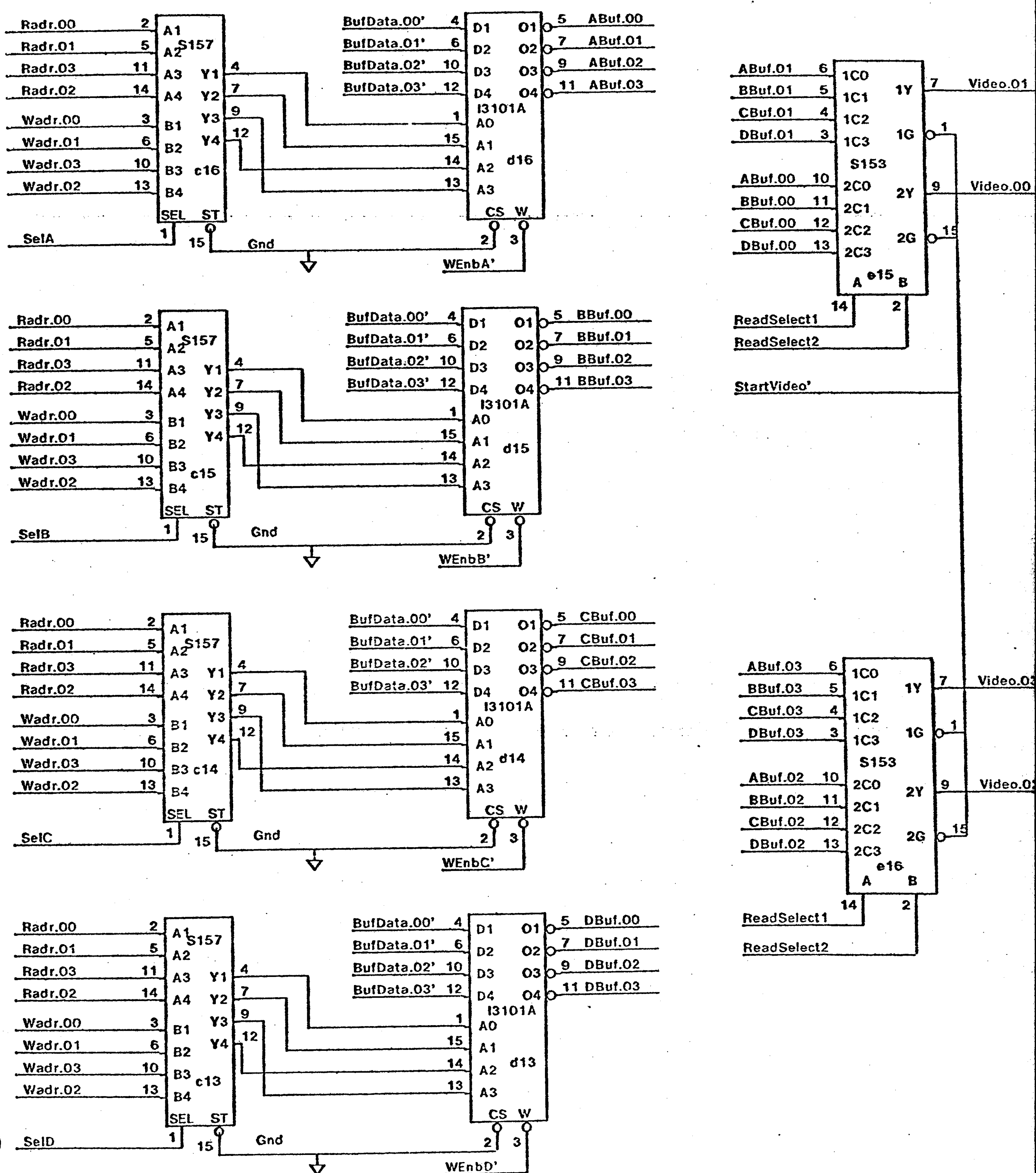
Item No.	Drawing Title	Drawing No.	No. Req.	Remarks
61	CAPACITOR, 100 PF, POLYSTYRENE	117160-101	1	C23
62	CAPACITOR, .01UF, CERAMIC	188483-001	75	C22,C24,C25--C97
63	CAPACITOR, .1UF, CERAMIC	159487-013	8	C10,C11,C12,C14,C15,C16 C17,C20
64	CAPACITOR, 22UF, TANTALUM	114491-226	11	C1,C2,C3,C4,C6,C7,C8,C9,C19 C13,C18
65	CAPACITOR, 47UF, TANTALUM	114491-476	1	C5
66	CAPACITOR, .01UF, 5%, 50V.	MD5R103J	1	ELPAC CORP.
67	CONNECTOR, BNC	101931	1	J3
68	CONNECTOR, CABLE #206817-1 (AMP)		1	P2
69				
70	TEST POINT	114P80054	5	
71				
72	ANGLE, BNC MTG	216544	1	
73	HANDLE	216529	1	
74	STIFFENER	216530	1	
75	RIVET	156111-002	5	
76	RIVET	156111-004	4	
77	WIRE, SOLID, INS 20 AWG	130123-920	A/R	
78	LOCKING POST ASSEMBLY	206514-1	1	AMP INC.



			ASSEMBLY, P.W. - VIDEO ADAPTER (DOVER II)			Drawing Number 217145
XEROX SPG	Project TTL RosAdapt	STATUS CONTROL LOGIC	File Adapllvm07.si	Designer Ron Freeman	Rev B	Date 1/6/78	Page 7



			ASSEMBLY, P.W. - VIDEO ADAPTER (DOVER II)			Drawing Number 217145
XEROX SPG	Project TTL. RosAdapt	MACHINE TYPE AND SERIAL NUMBER MULTIPLEXER	File AdapIIvm08.si	Designer Ron Freeman	Rev B	Date 1/9/78	Page 8



ASSEMBLY, P.W. - VIDEO ADAPTER (DOVER II)	Drawing Number 217145

XEROX	Project		File	Designer	Rev	Date	Page

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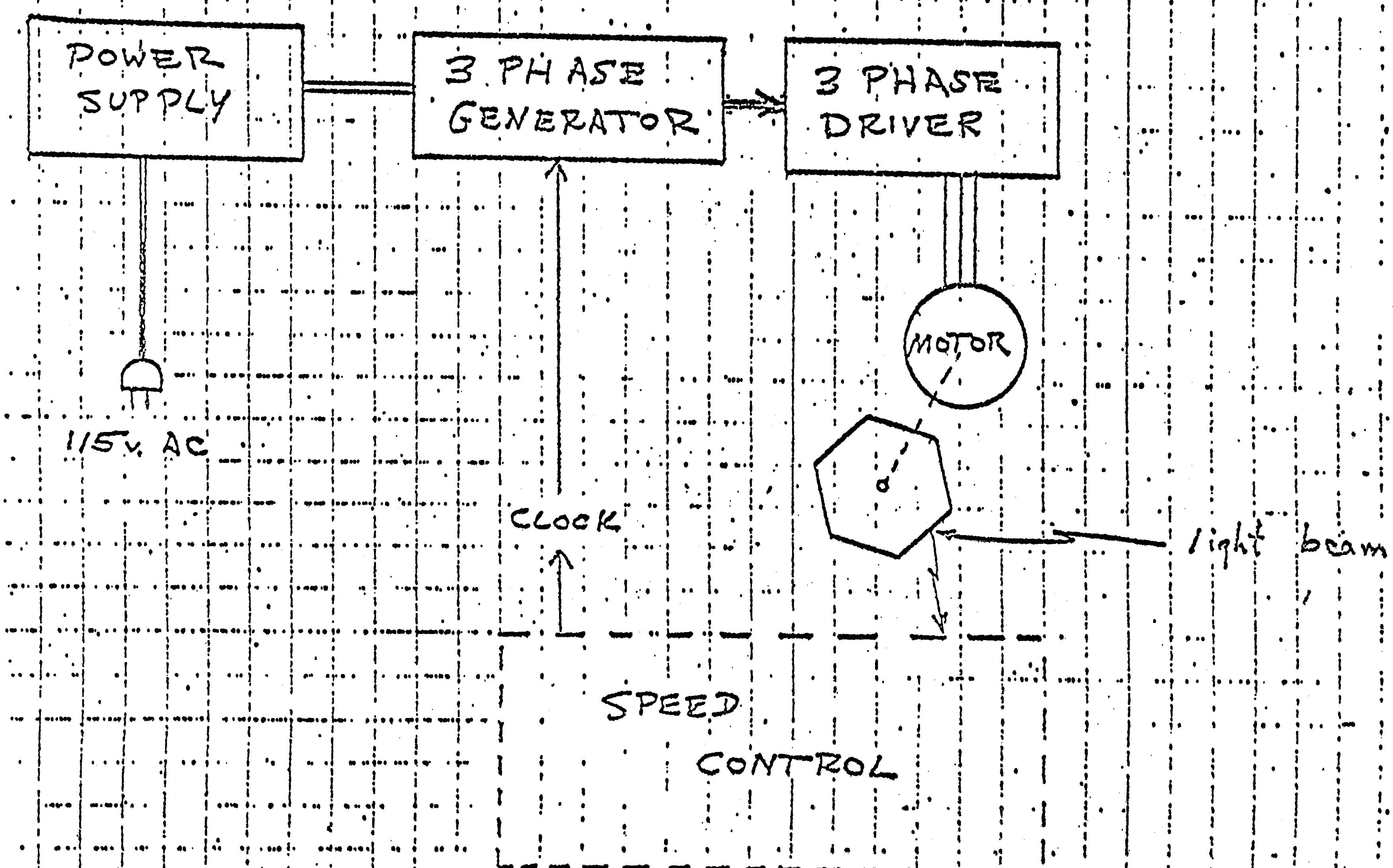

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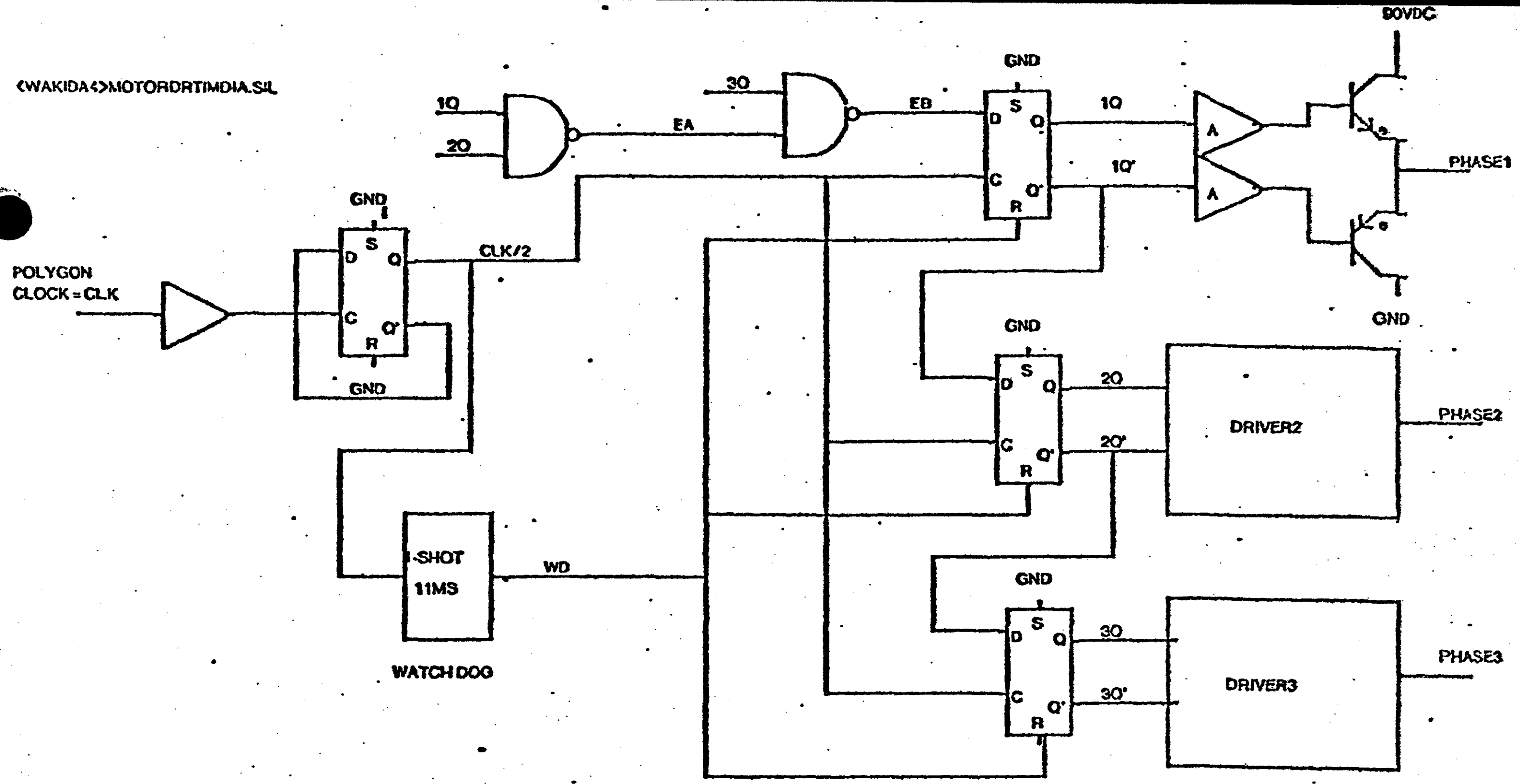

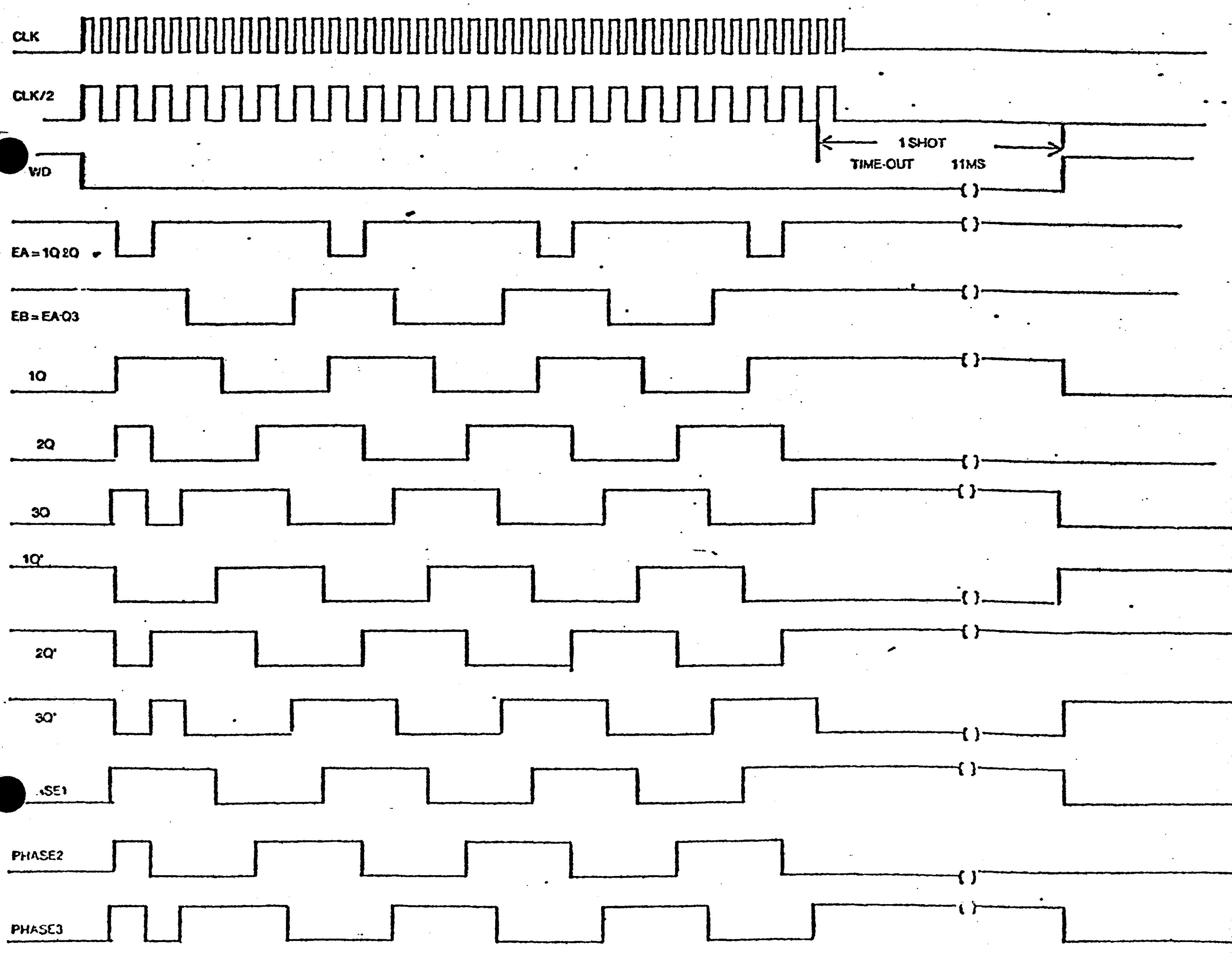

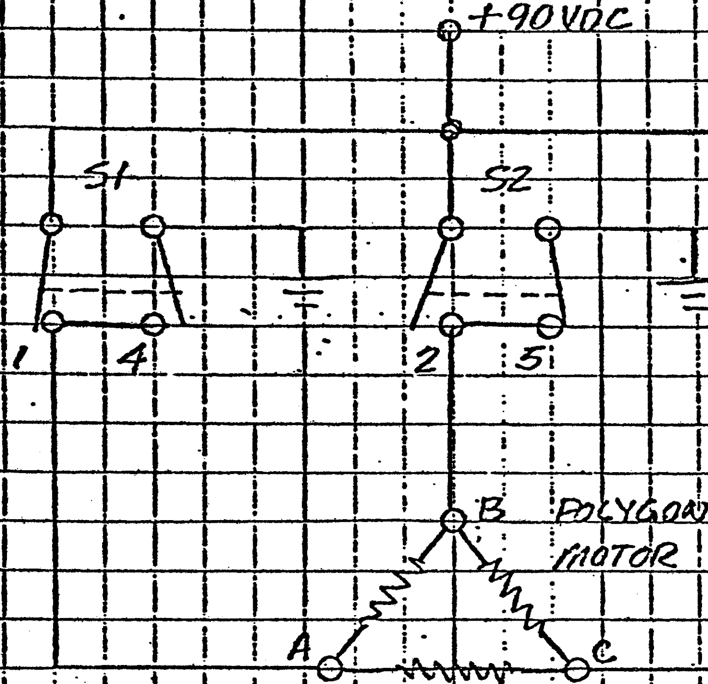
+90VDC
S1
S2
S3
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POLYGON
MOTOR
A
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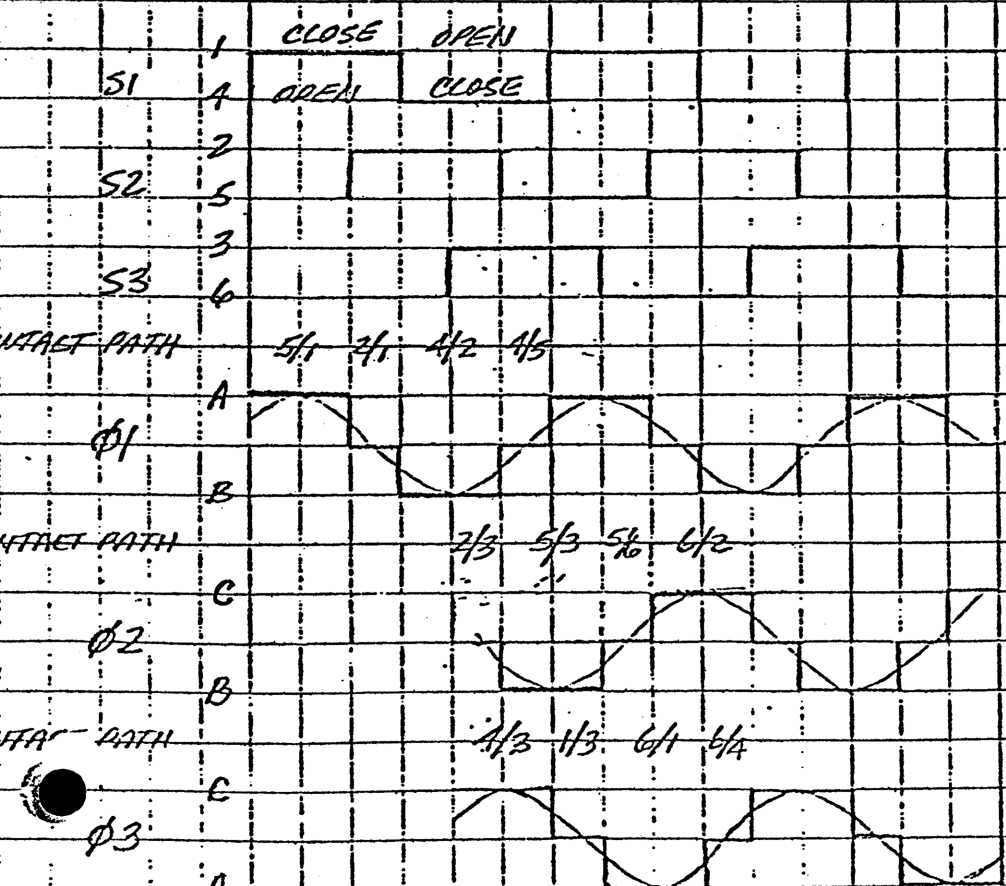
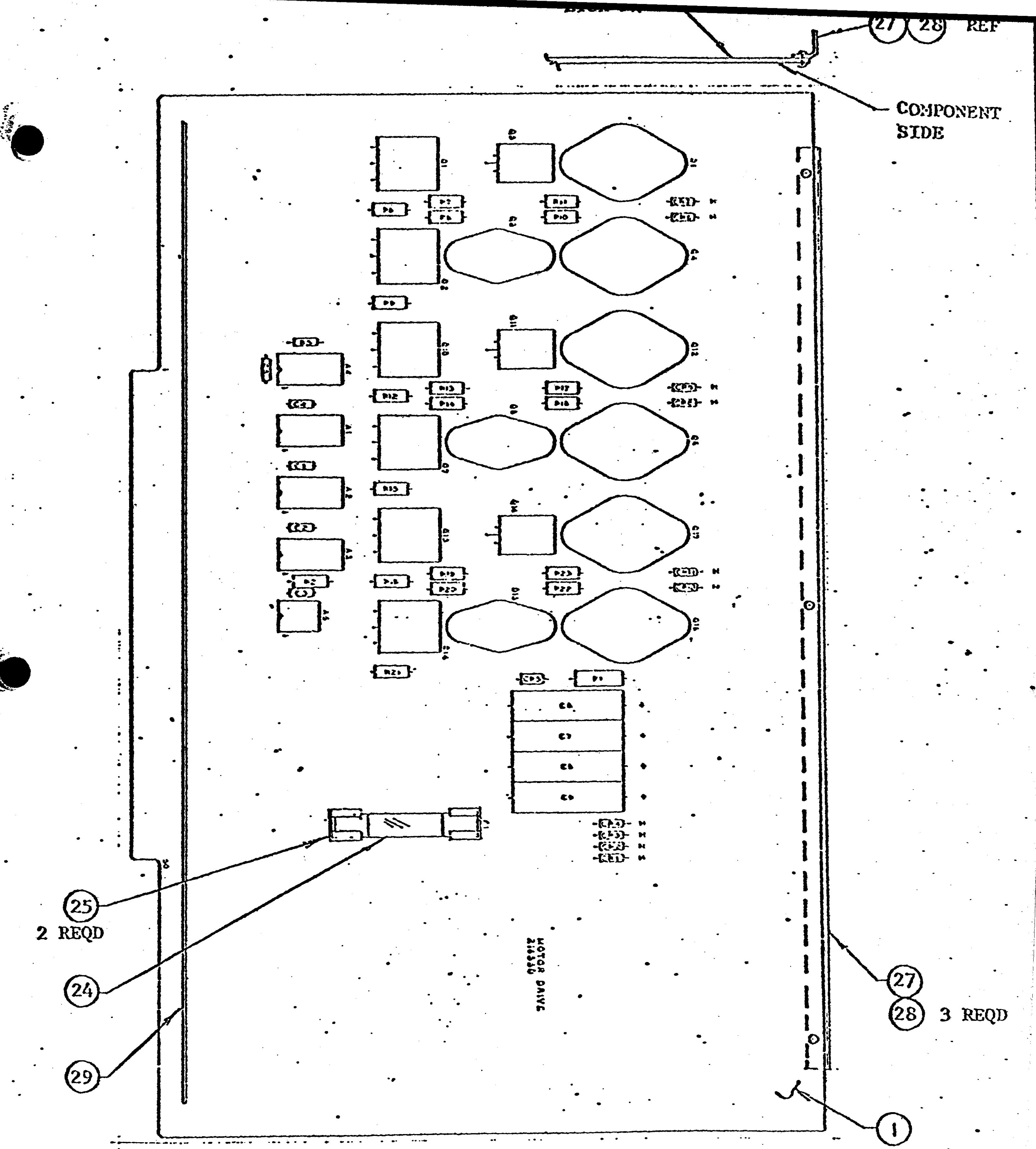

1 CLOSE OPEN
S1
4 OPEN CLOSE
2
S2
5
3
S3
6
NTACT PATH
5/1 2/1 4/2 4/5
A
φ1
B
NTACT PATH
2/3 5/3 5/6 6/2
C
φ2
B
PATH
4/3 1/3 6/1 6/4
C
φ3
A

J. MOORE
3/79



Title		
ASSEMBLY, PW- MOTOR DRIVER	Xerox Corporation El Segundo, California	XEROX
	216549	C
	Sheet 3 of 7	

1586(3/73)

El Segundo, California 90245
213 679-4511

Material List

ML	Drawing No. 216549	Rev. C

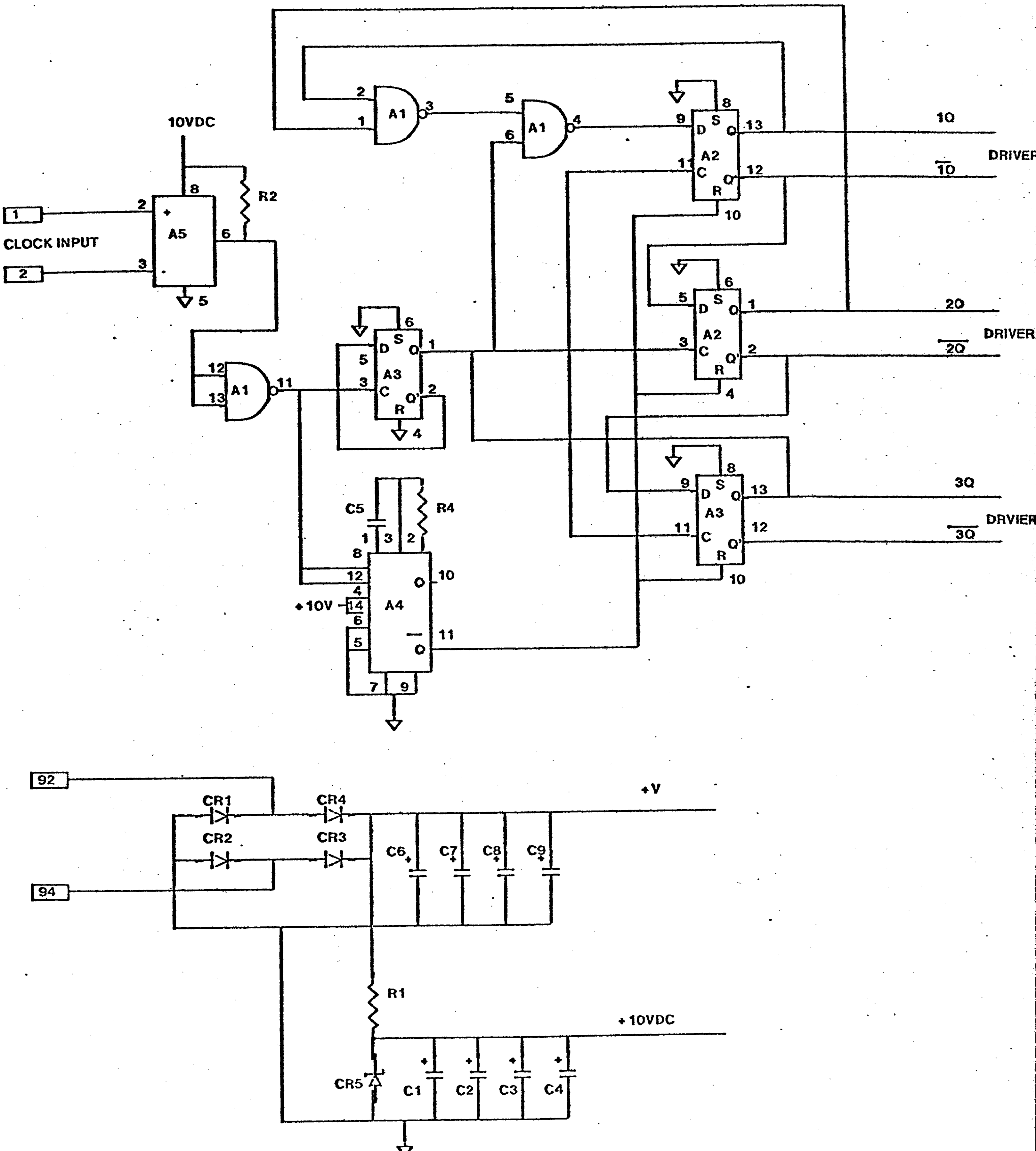
Drawing Title

ASSEMBLY, PRINTED WIRING
MOTOR DRIVER

Model No.	Date	Sheet
EWO 390101	2/24/77	4 of 7

Rev. C Drawing No. 216549 ML

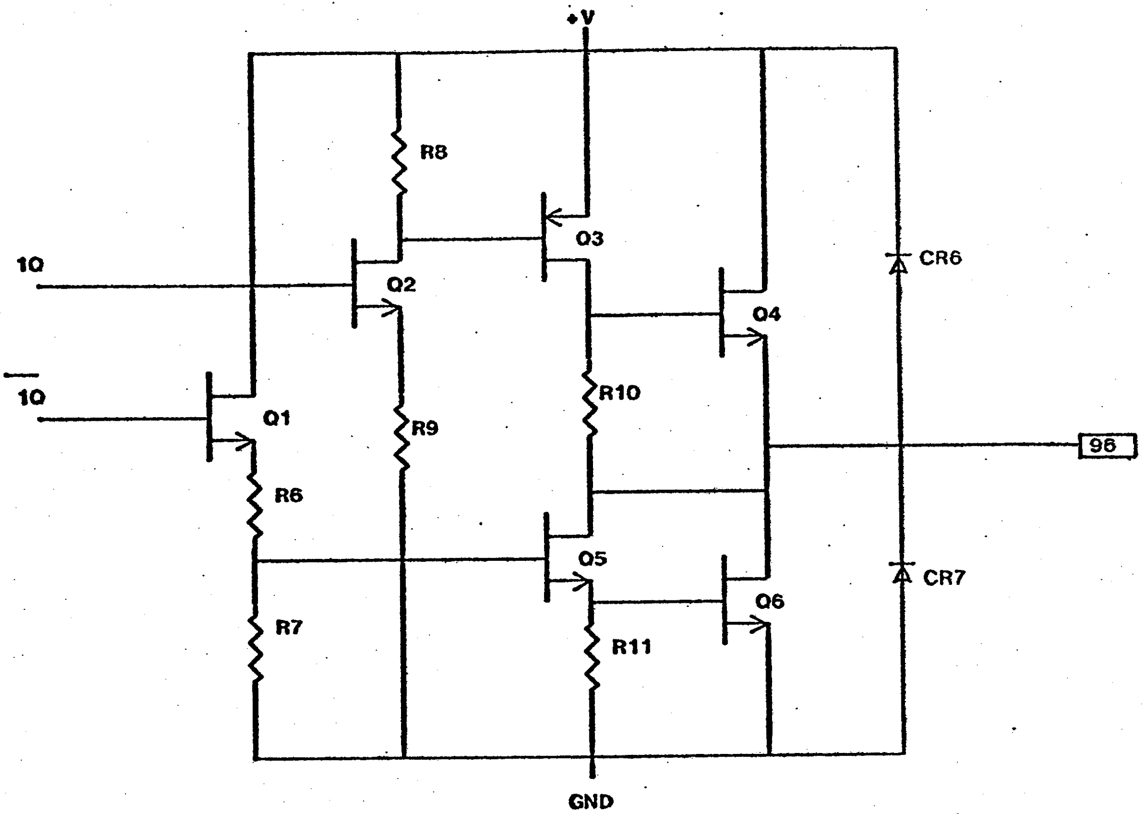
Item No.	Drawing Title	Drawing No.	No. Req.	Remarks
1	Board, PW - Motor Driver	216551	1	
2	Microcircuit RCA #CD4013AE		2	A2,3
3	Microcircuit RCA #CD4011AE		1	A1
4	Microcircuit RCA #CD4047AE		1	A4
5	Photo Isolator HP #5082-4350		1	A5
6	Zener Diode, 10VZ 1N961B		1	CR5
7	Diode Motorola #1N4005		10	CR1 THRU 4,6 THRU 11
8	Transistor, NPN TI #TIP51		6	Q1,2,7,10,13,14
9	Transistor, PNP RCA #2N6211		3	Q3,8,15
10	Transistor, NPN TI #TIP47		3	Q5,11,18
11	Transistor, NPN RCA #DTS410		6	Q4,6,9,12,16,17
12	Resistor, 960Ω 1/4 W	116447-961	1	R5
13	22Ω 1/2 W 100	100111-220	6	R10,11,16,17,22,23
14	100Ω 1/2 W	100111-101	3	R8,14,20
15	180Ω 1/2 W	100111-181	3	R7,13,19
16	330Ω 1/2 W	100111-331	3	R9,15,21
17	270Ω 1/2 W	100111-271	3	R6,12,18
18	4.7K 1 W	110996-472	1	R1
19	Resistor, 10K 1/2 W	100111-103	1	R2
20	~~Resistor, 470K 1/4 W~~	~~116447-474~~	~~1~~	~~R4~~
21	Capacitor, 0.01µF, 50V	188483	4	C1,2,3,5
22	Capacitor, 4.7µF, 50V	114491-475	1	C4
23	Capacitor, 20µF, 150V Mallory #TT150X20		4	C6,7,8,9
24	Fuse, 1 1/4 Amp, Littelfuse #3131.25-3AG		1	F1
25	Clip, Fuse Bussman #1A1119-5		2	
26				
27	Handle, Module	216529	1	
28	Rivet	156111-005	3	
29	Stiffener, PW Board	216530	1	
30				
31				
32				
33				

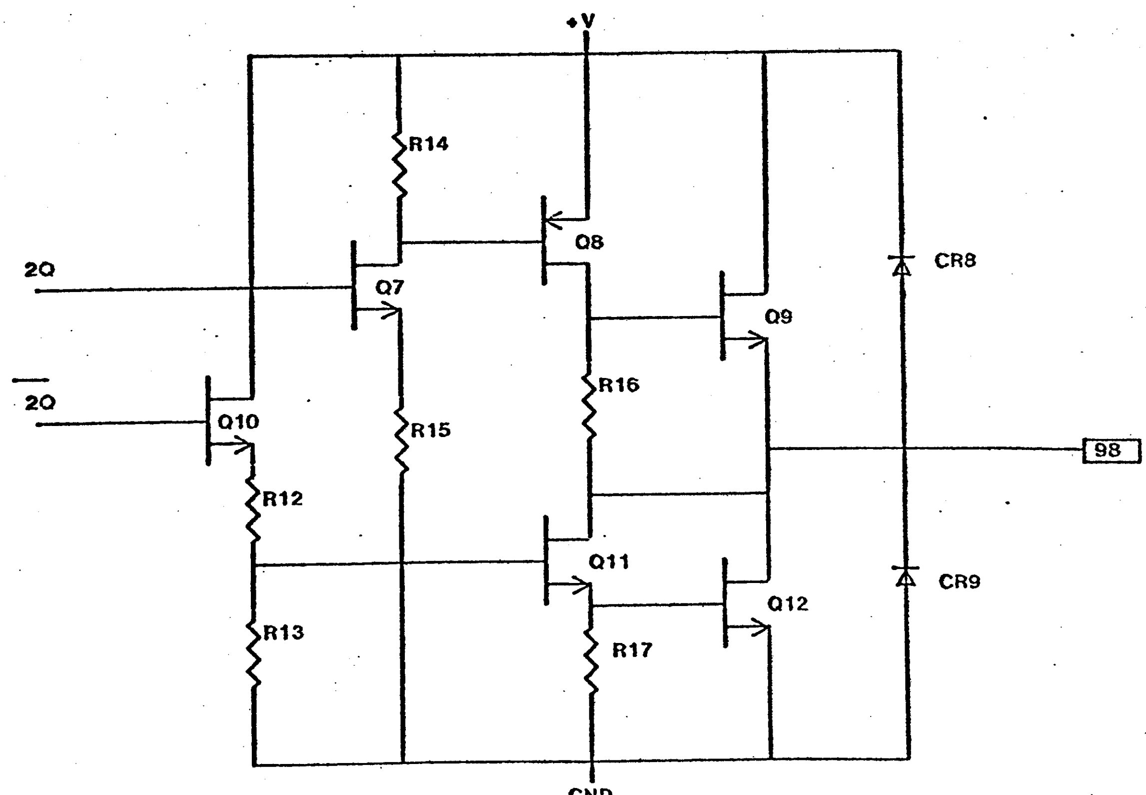


ASSEMBLY PW MOTOR DRIVE

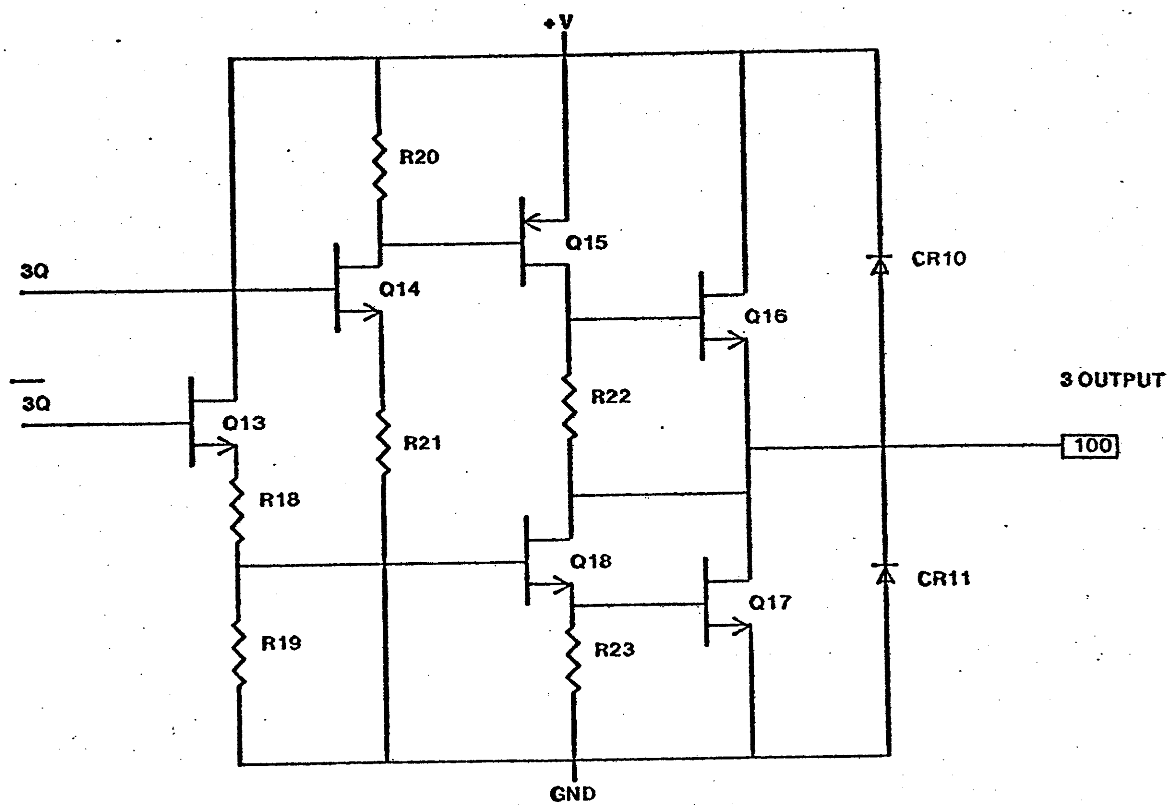
216549

XEROX PARC	Project DOVER	MOTOR CLOCK GEN.	File DOVER12	Designer ED.WAKIDA	Rev C	Date 5/12/77	Page 5 OF 7





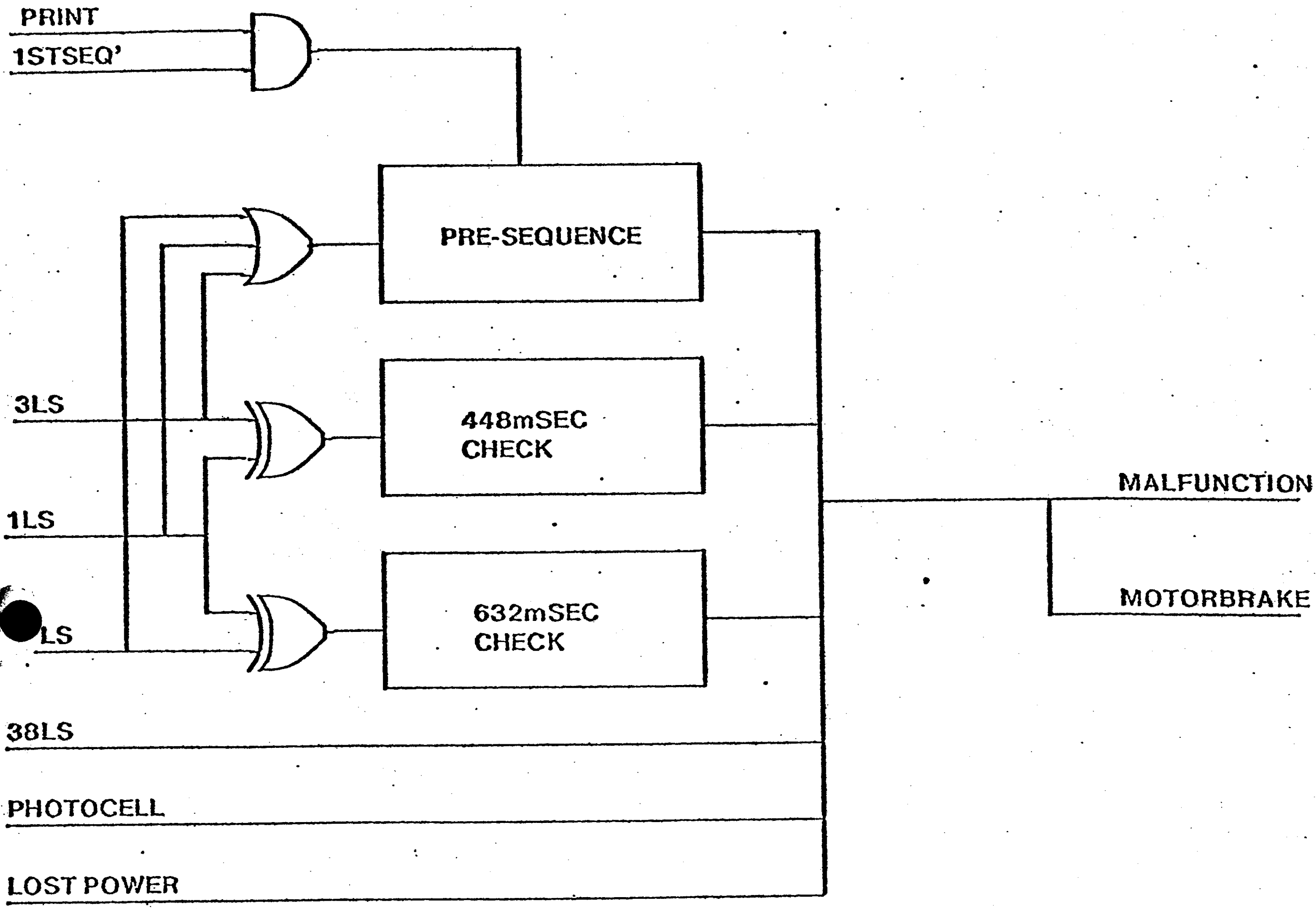
		POLYGON DRIVER	ASSY PW MOTOR DRIVE			216549
XEROX PARC	Project DOVER	MOTOR DRIVE	File DOVER 13	Designer ED WAKIDA	Rev C	Date 5/12/77	Page 6 OF 7



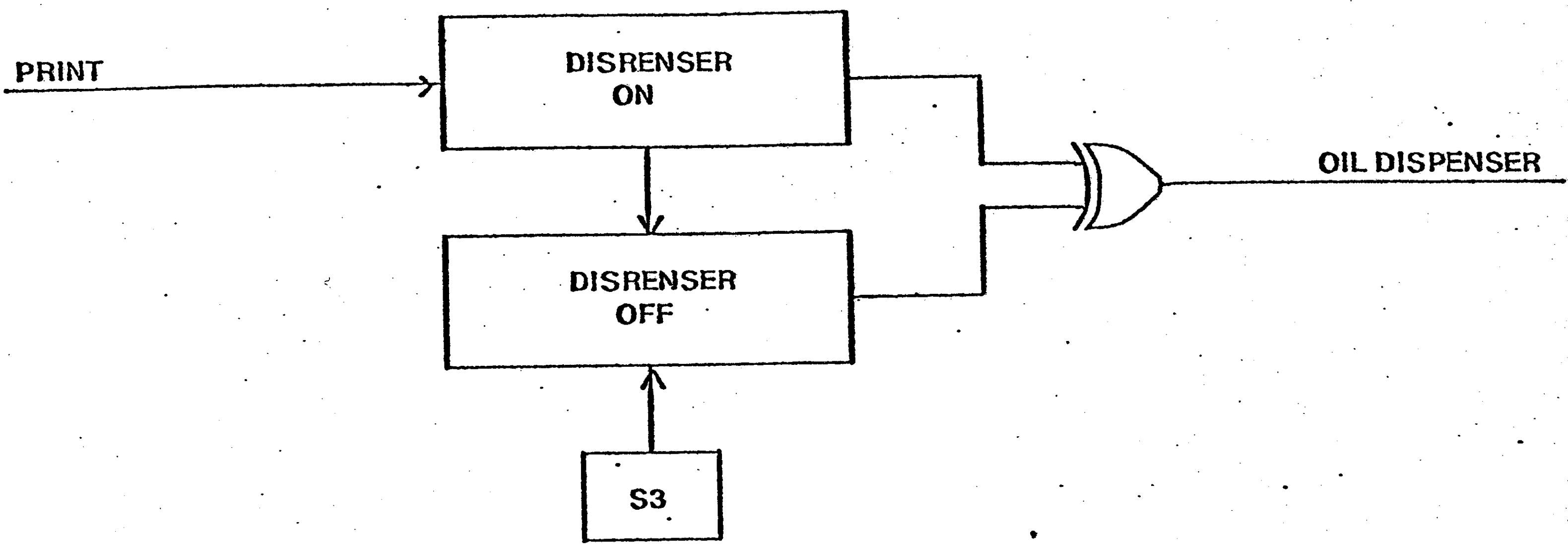
POLYGON DRIVER

			ASSY PW MOTOR DRIVER		216549		
XEROX PARC	Project DOVER	MOTOR DRIVER	File DOVER14	Designer ED WAKIDA	Rev C	Date 5/12/77	Page 7 OF

MALFUNCTION

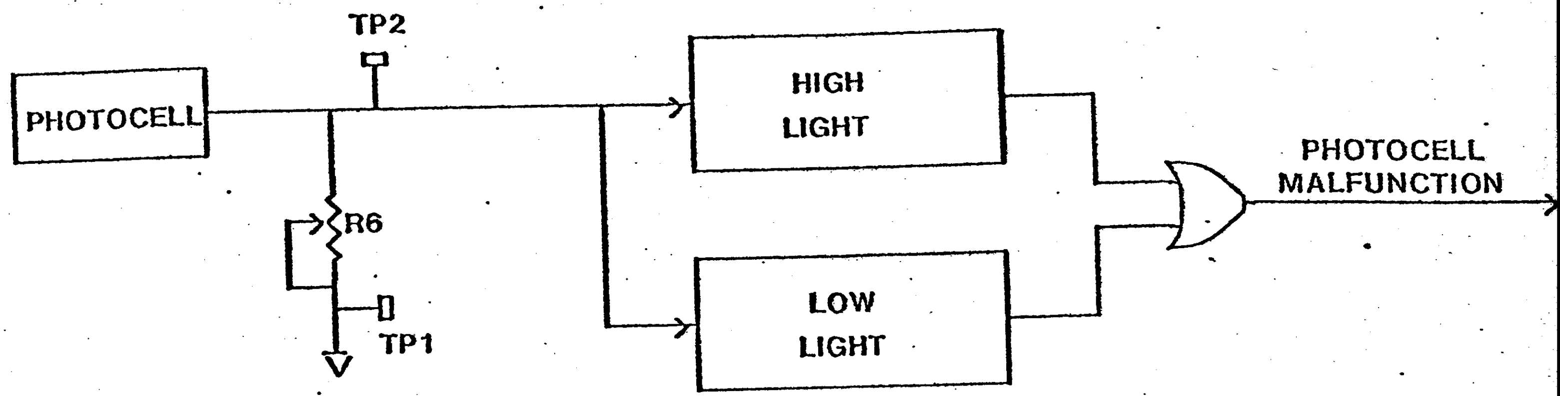


OIL DISPENSER

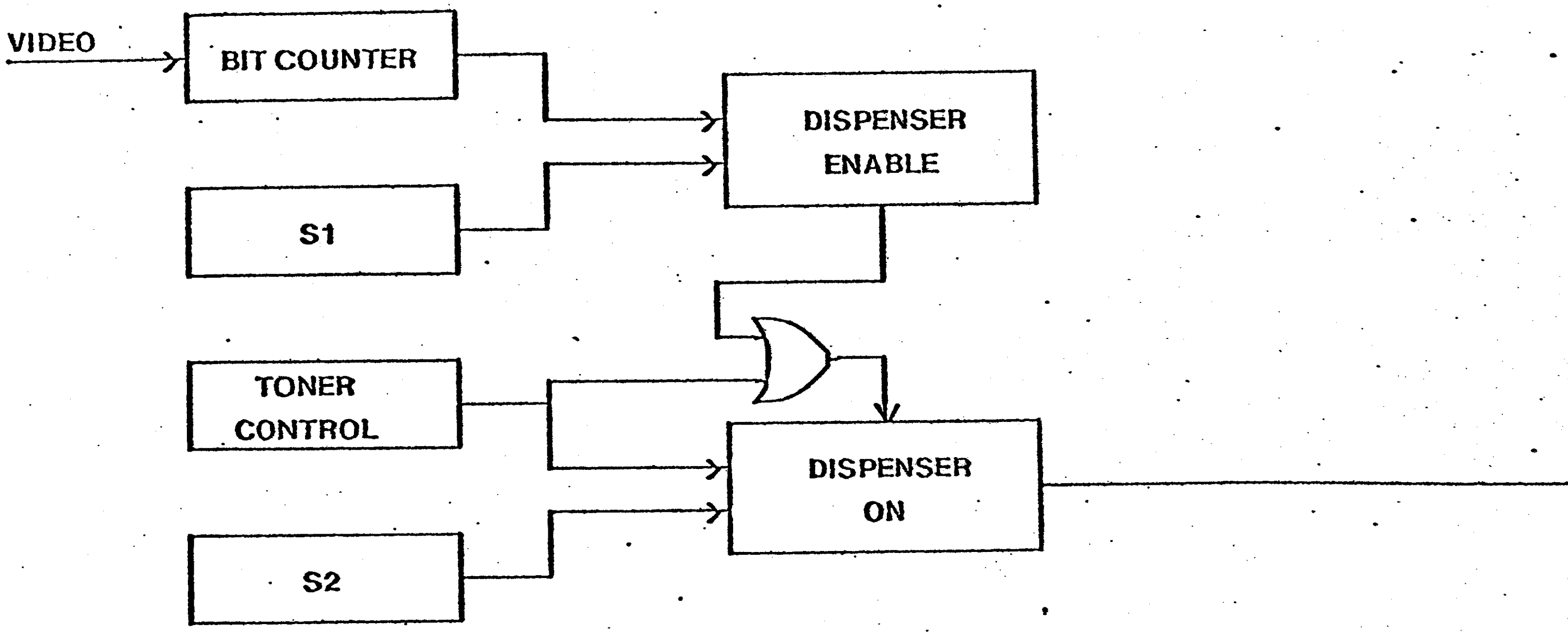


S3 on engine control board sets length of time oil dispenser motor runs.

PHOTOCELL



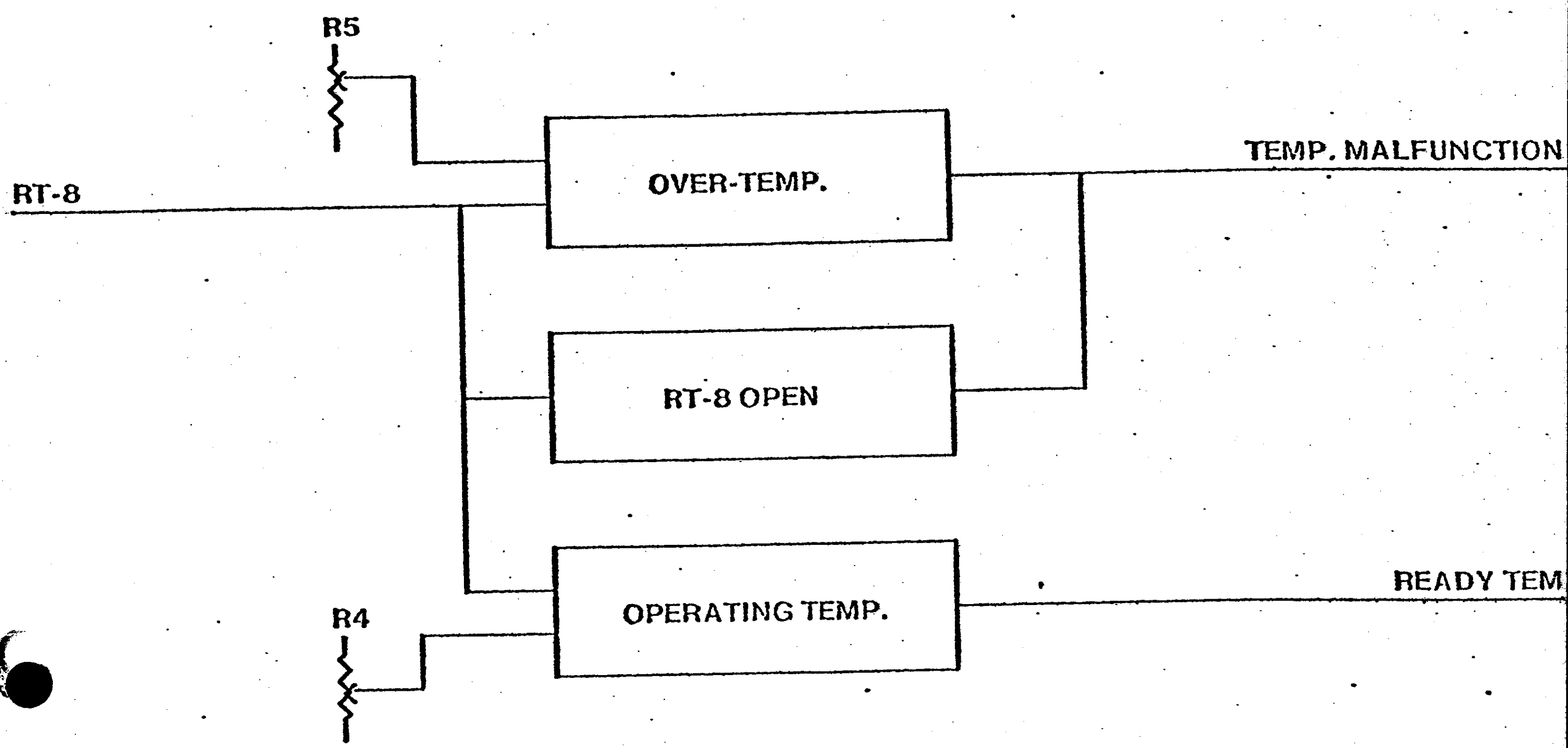
R6 on engine control board is adjusted for 6 VDC between TP1 and TP2.



S1 determins number of bits between dispensing times.

S2 determins amount of time toner is dispensed.

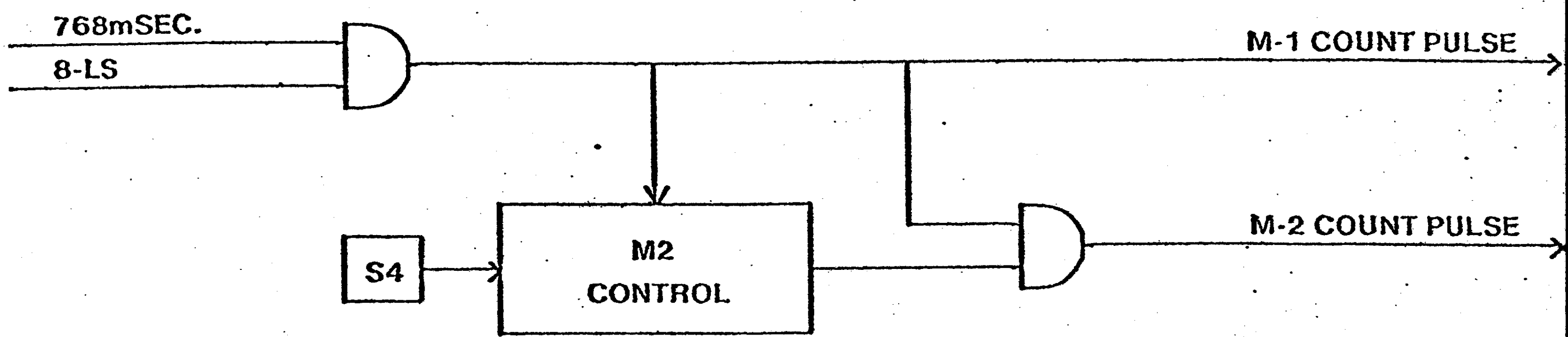
TEMPERATURE CHECK



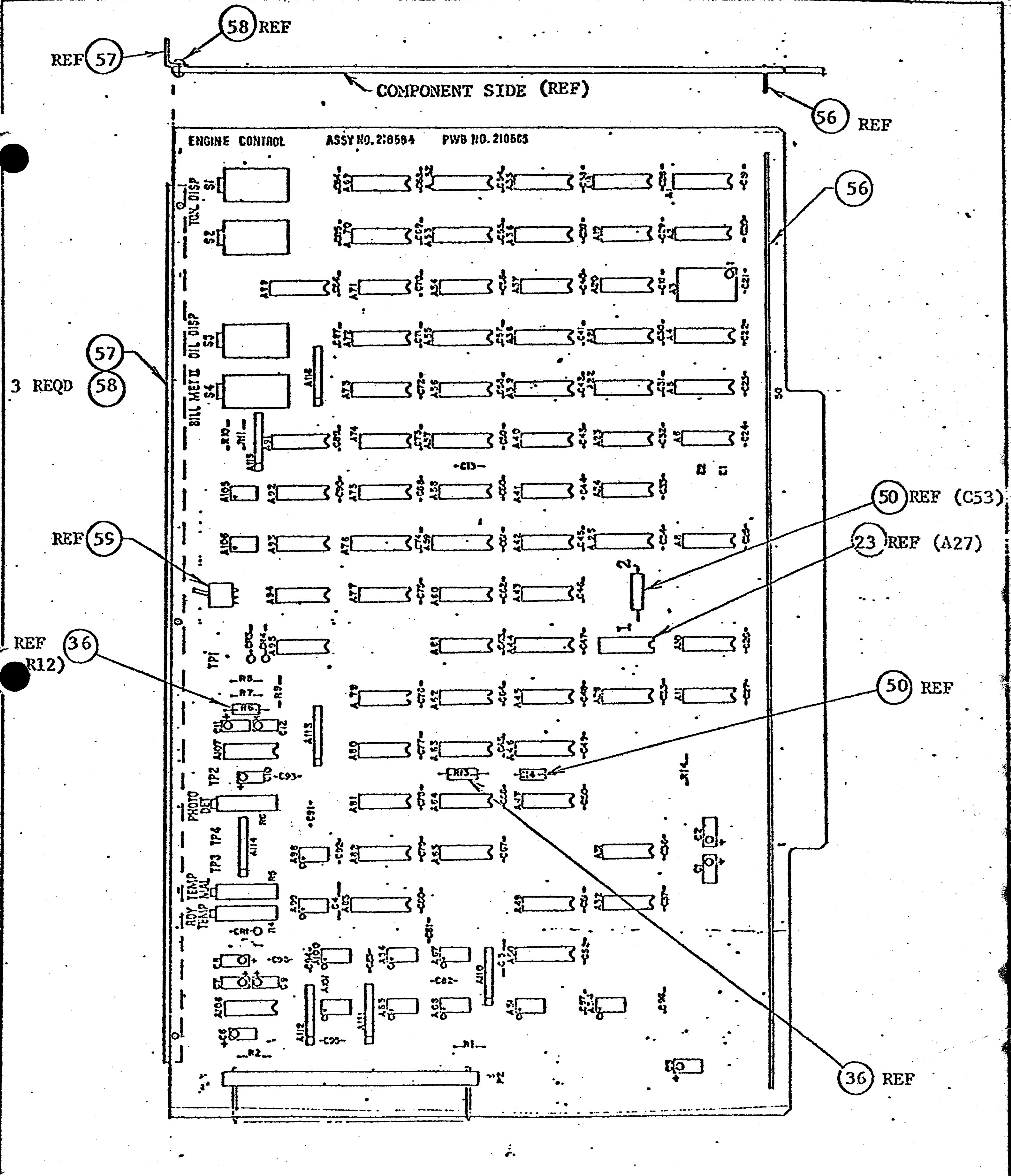
R4 On engine control board adjusted for ready temp. at 285-300 degres F.

R5 adjusted for temp. malfunction at 400 degres F.

METERS



S4 on engine control board determins when M-2 starts counting.



Title: ASSY, PRINTED WIRING ENGINE CONTROL

Xerox Corporation
El Segundo, California

XEROX

216564	B
Sheet 3 of 16	

1586(3/73)

A

Xerox Corporation
701 South Aviation Boulevard
El Segundo, California 90245
213 679-4511

XEROX

Material List

ML | Drawing No. 216564 | Rev. H

Drawing Title: ASSEMBLY, PRINTED WIRING-ENGINE CONTROL

Model No. EWO 390101 | Date 3/3/77 |

Drawing No. 216564 ML

Item No.	Drawing Title	Drawing No.	No. Req.	Remarks
1	Board, P W - Engine Control	216565	1	
2	Microcircuit, T.I. #SN7474N (2)		9	A40,64,62, .42,45, 71,54,92,58
3	SN74111N		1	A55
4	SN74161N		15	A1,5,18,22,35, ,39,52, 53,57,59,69,70,72,73,91
5	SN74390N		3	A4,38,21
6	SN7420N		2	A56,82
7	SN7408N		5	A74,65,28,61,20
8	SN7404N		6	A77,31,81,19,23,8
9	SN74164N		1	A79
10	SN7416N		2	A10,41
11	SN7432N		1	A63
12	SN7410N		1	A60
13	SN7400N		3	A47,75,37
14	SN7402N		1	A80
15	SN74157N		1	A2
16	SN74191N		4	A44,46,76,88
17	SN74174N		1	A25
18	SN7430N		3	A6,24,43
19	SN7425N		1	A49
20	SN7486N		1	A32
21	SN7417N		1	A11
22	Microcircuit, T.I. #LM2901 (2)		2	A107,108
23	Microcircuit, Motorola #MC14490VP (3)		5	A50,83,27,109,A33
24	Photo Isolator H.P. #5082-4364 (4)		10	A68,67,85,84,98,100, 101, 51,34,99
25	Photo Isolator Monsanto #MCT2 (5)		2	A105,106
26	Crystal Clock,1MHZ Motorola #K1114A-1MHZ		1	A3 (3)
27	Diode TN113	101154	2	CR3,4
28	Diode TN123	111516	1	ACROSS A34-7 & 6
29	Switch, Hexadecimal AMP #53137-1		4	S1,2,3,4 (6)
30	Relay Teledyne #643-1		3	A93,94,95 (7)
31	Terminal, Test Point CTC #2027-2		4	TP1,2,3,4 (8)
32	Resistor Network CTS #750-81-R3.3K		3	A111,112,114 (9)
33	Resistor Network CTS #750-81-R1.0K		4	A110,113,115,116 (9)

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XEROX

Material List

ML	Drawing No. 216564	Rev. H

Drawing Title

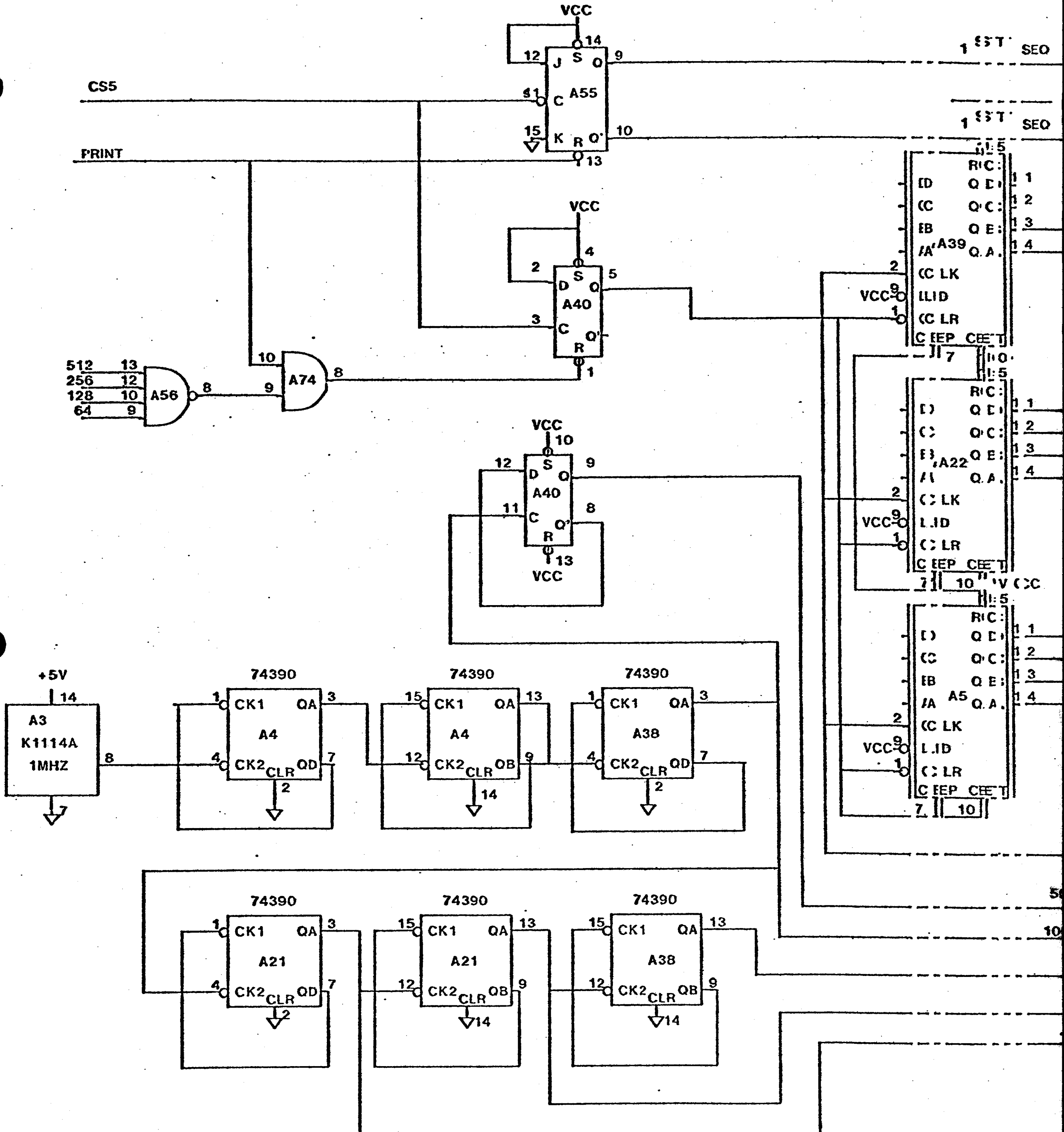
ASSEMBLY, PRINTED WIRING-

ENGINE CONTROL

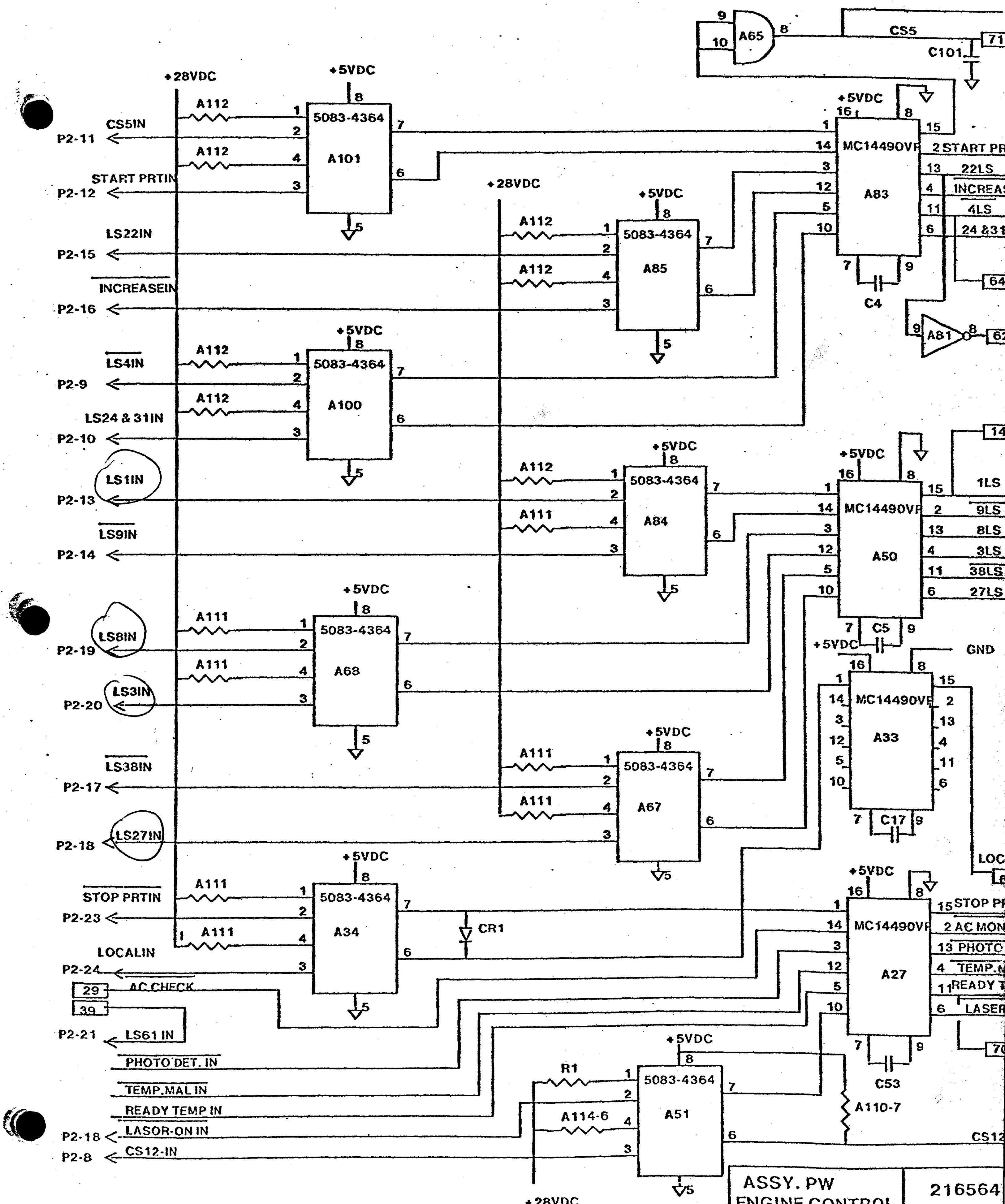
Model No.	Date	Sheet
EWO 390101	3/3/77	5 of 16

Drawing No. 216564 ML

Item No.	Drawing Title	Drawing No.	No. Req.	Remarks
34	Resistor, Variable, 10K	166956-010	2	R4,5
35	Resistor, Variable, 500K	166956-015	1	R6
36	Resistor, 1K, 1/4 W	116447-102	4	R8,12,14, R13
37	3.3K, 1/4 W	116447-332	1	R1
38	~~220Ω, 1/4W~~	~~116447-221~~	~~1~~	~~R13~~
39	5.6K, 1/4 W	116447-562	1	R2
40	~~10K, 1/4 W~~	~~116447-103~~	~~1~~	~~R3~~
41	150Ω,1/4W	116447-151	2	R10,11
42	200Ω, 1/4 W	116447-201	1	R7
43	~~2K, 1/4 W~~	~~116447-202~~	~~2~~	~~R15,16~~
44	Resistor, 1.8K, 1/4 W	116447-182	2	R9,15
45	~~Resistor, 51K, 1/4 W~~	~~116447-514~~	~~1~~	~~R15~~
46	Capacitor, Tant. 22µF ±20%, 15V	114491-226	2	C1,2
47	Capacitor, Tant. 4.7µF ±20%, 50 V	114491-475	8	C3,6-12
48	Capacitor, Ceramic 0.01 µF, 50V	188483-001	83	C18 - 52,54 - 99,16,100
49	Capacitor, Poly. 220 PF	117160-221	2	C13,C15
50	Capacitor, Poly. 1000 PF	117160-102	6	C4,5,14,17,53,101
51				
52	Connector, 24 Pin Amp #2-87655-4		1	P2 6
53	Wire, Solid Ins (28 AWG) Jumper	116741-928	A/R	E1 to E2
54	Socket, Microcircuit (14 Pin)		39	Augat #514-AG11D
55	Socket, Microcircuit (16 Pin)		28	Augat #516-AG11D
56	Stiffener, PW Board	216530	1	
57	Handle, Module	216529	1	
58	Rivet	156111-005	3	
59	Switch C&K #7101A		1	S5

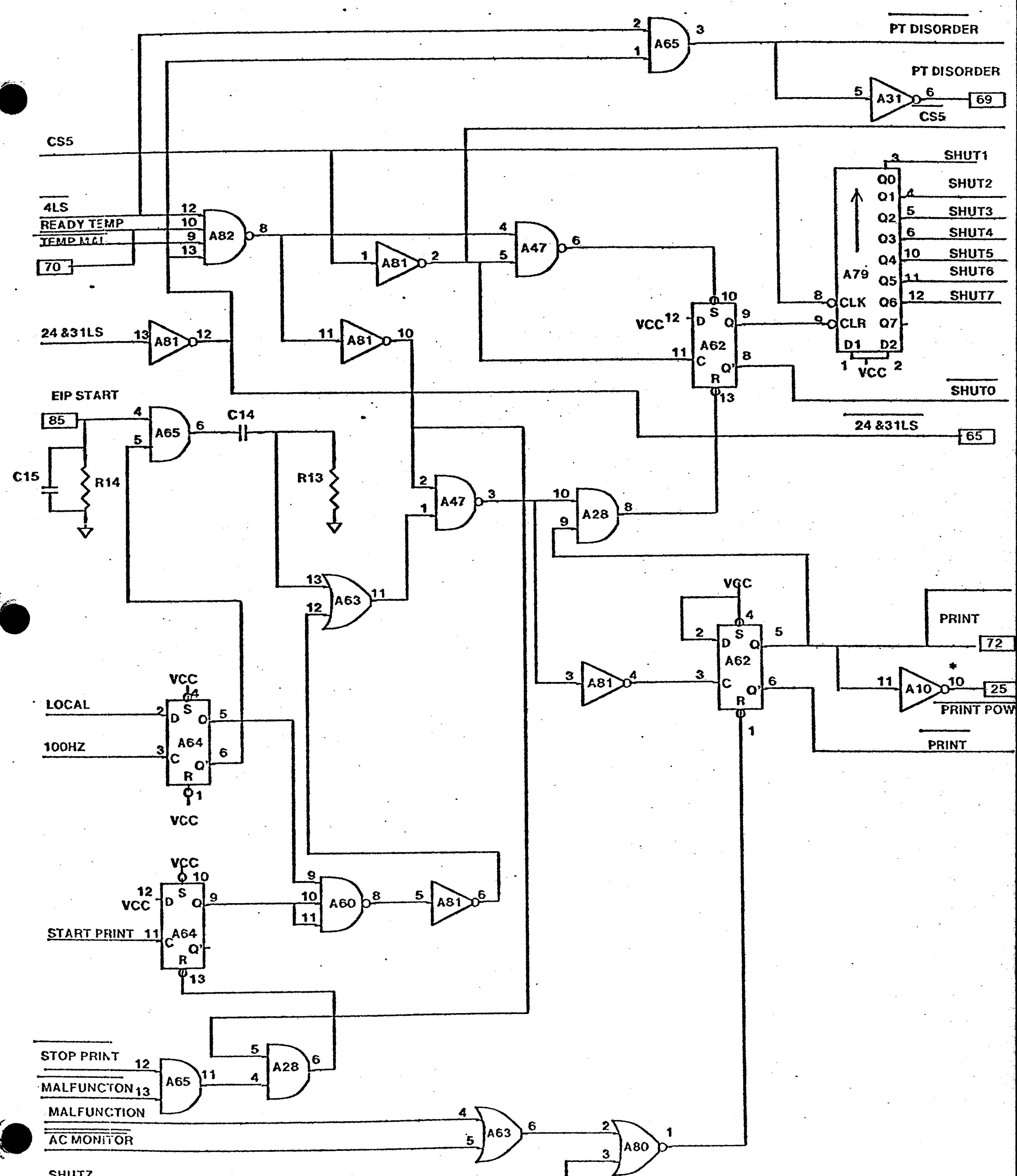


			ASSEMBLY, PW-ENGINE CONTROL			2 165 6-4	
XEROX PARC	Project DOVER	EVENT TIMING AND CLOCK GENERATION	File DOVER1D	Designer ED WAKIDA ew	Rev H	Date 3/7/77	Page 7 O

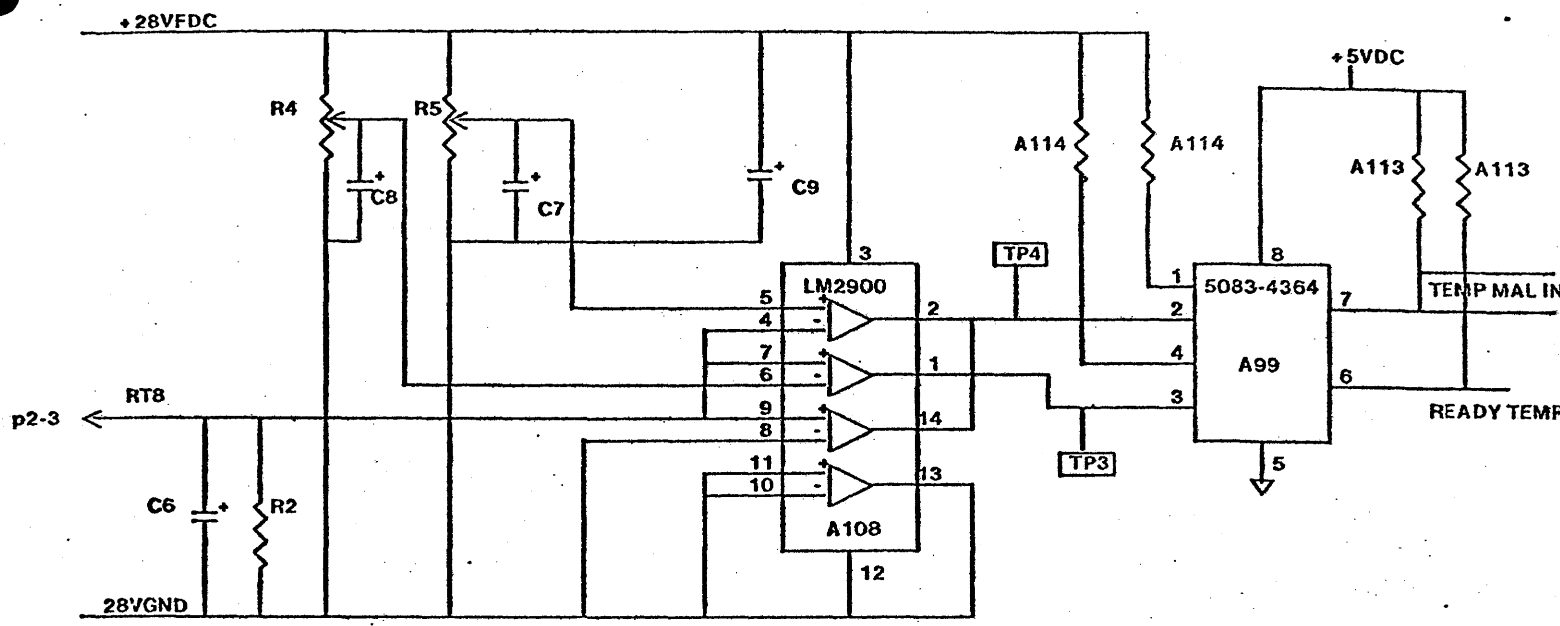


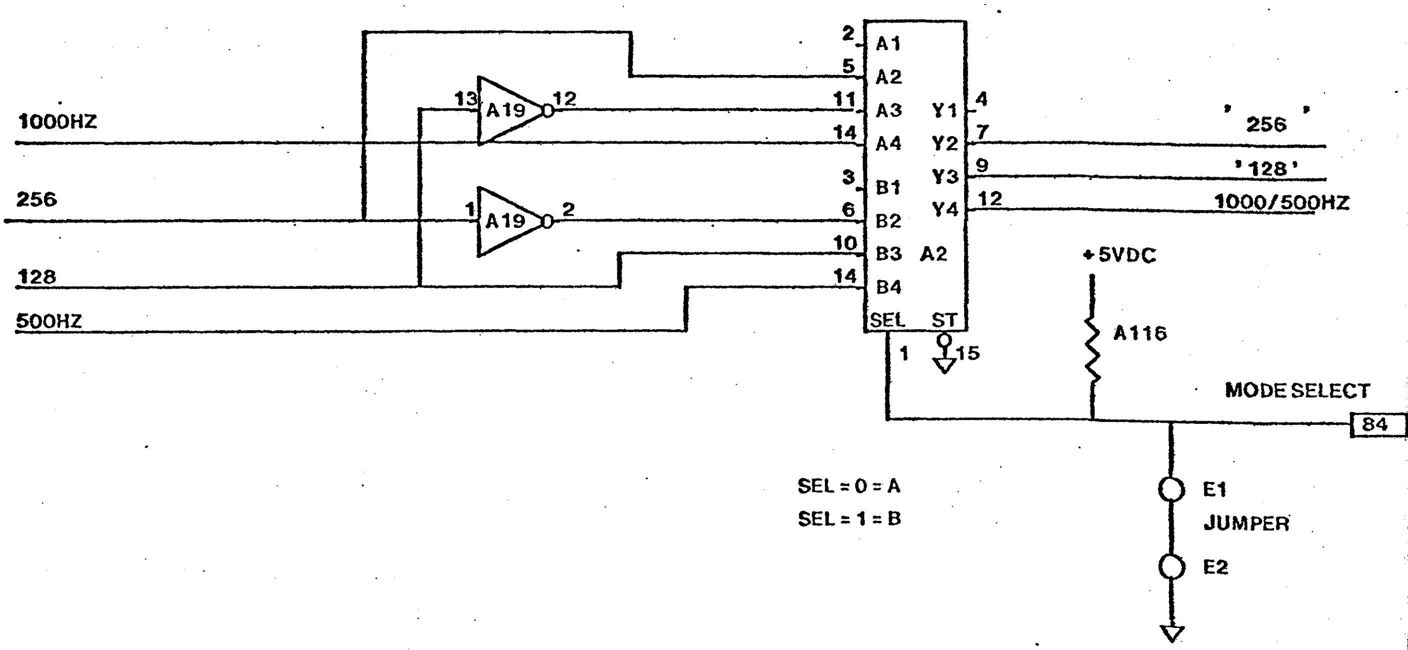
					ASSY. PW ENGINE CONTROL		216564
XEROX PARC	Project DOVER	ISOLATED & DEBOUNCE SIGNALS	File DOVER2C	Designer ED.WAKIDA	Rev H	Date 5/12/77	Page 8 OF 16

do

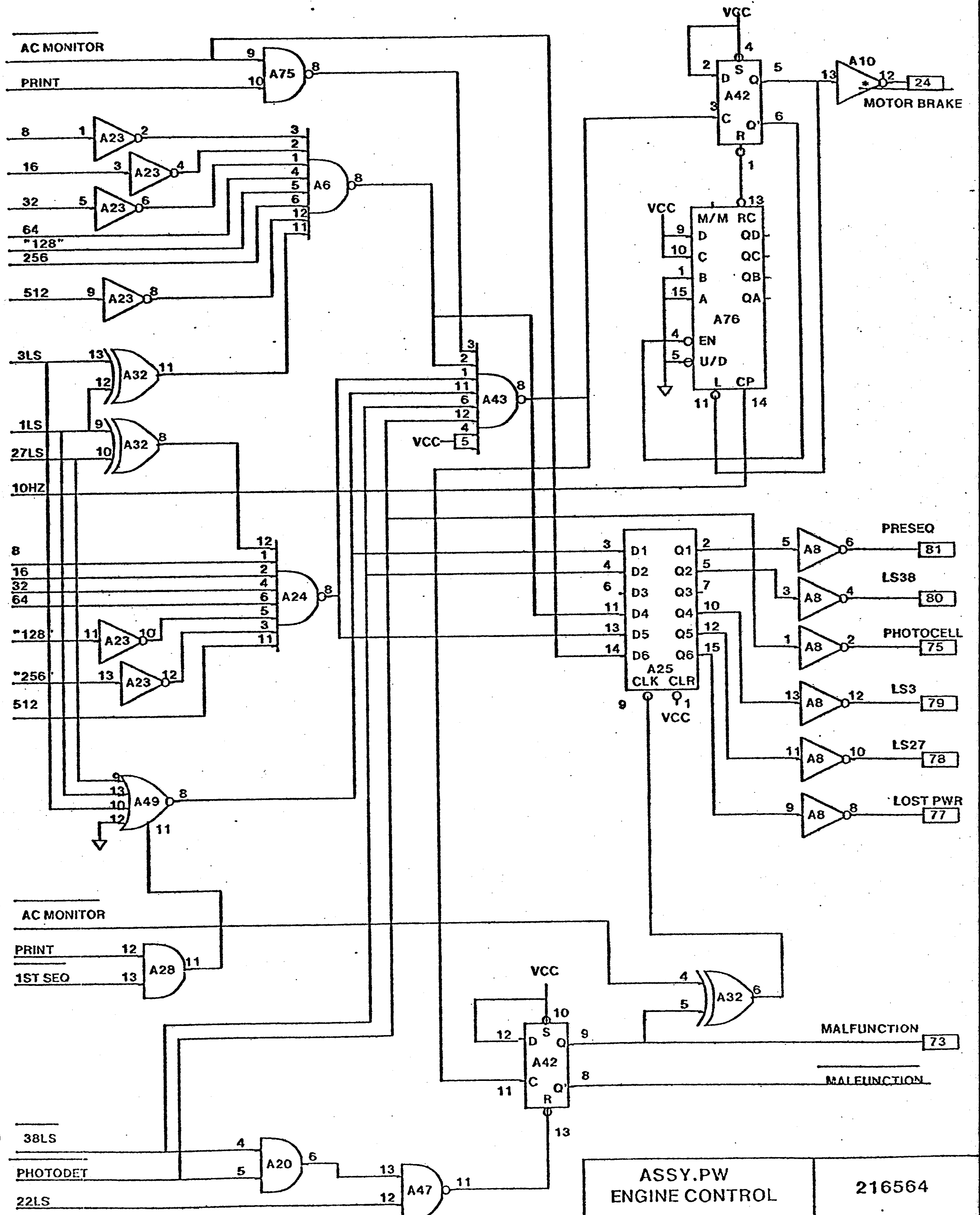


				ASSY. PW ENGINE CONTROL		216564
XEROX PARC	Project DOVER	START AND SHUTDOWN CIRUIT	File DOVER3B	Designer ED WAKIDA ew	Rev H	Date 5/12/77	Page 9 OF 16



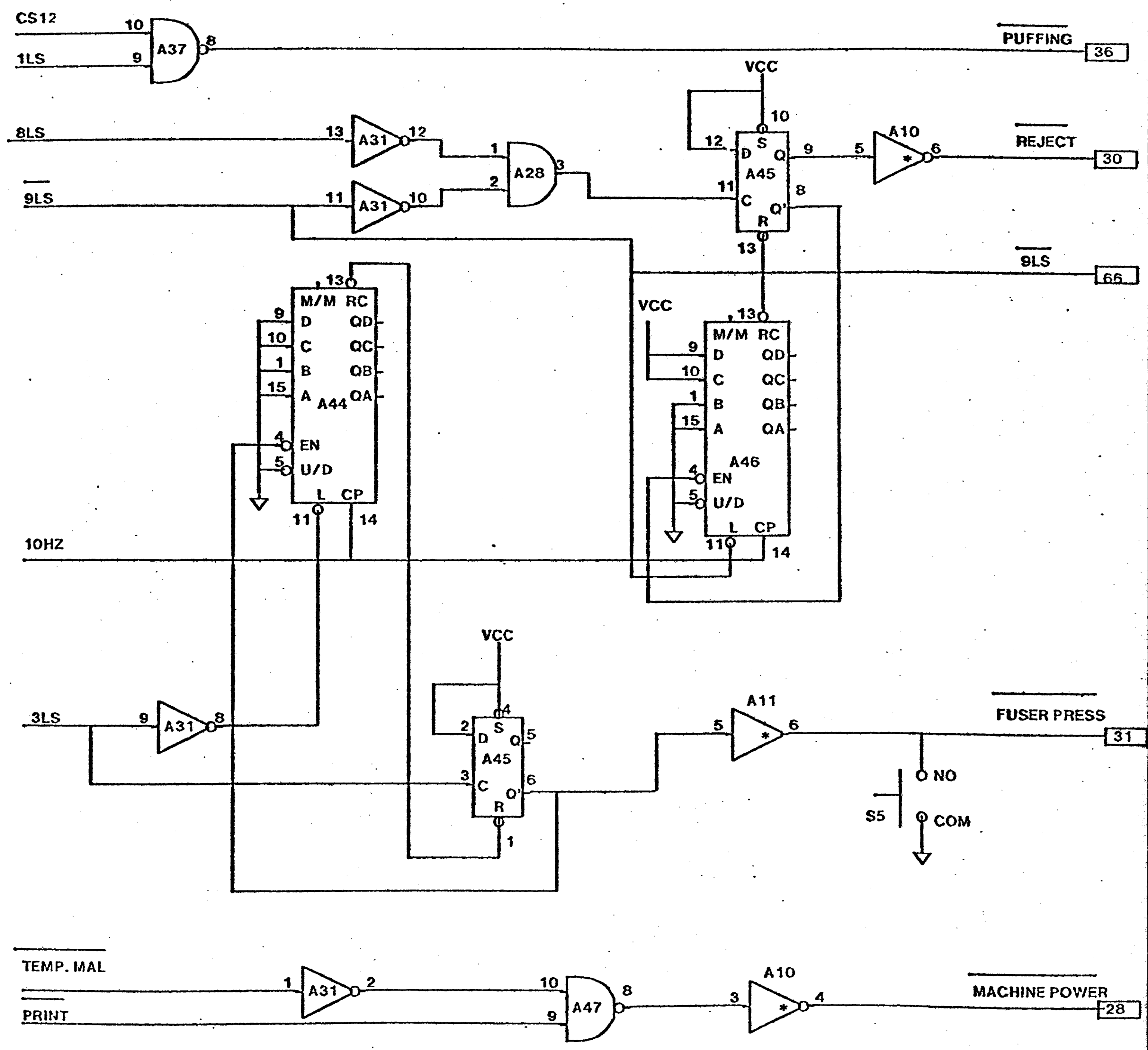


				ASSY. PW ENGINE CONTROL		216564	
XEROX PARC	Project DOVER	TEMP CHECK MODE CONTROL	File DOVER4B	Designer ED WAKIDA	Rev H	Date 3/14/77	Page 10 OF 1



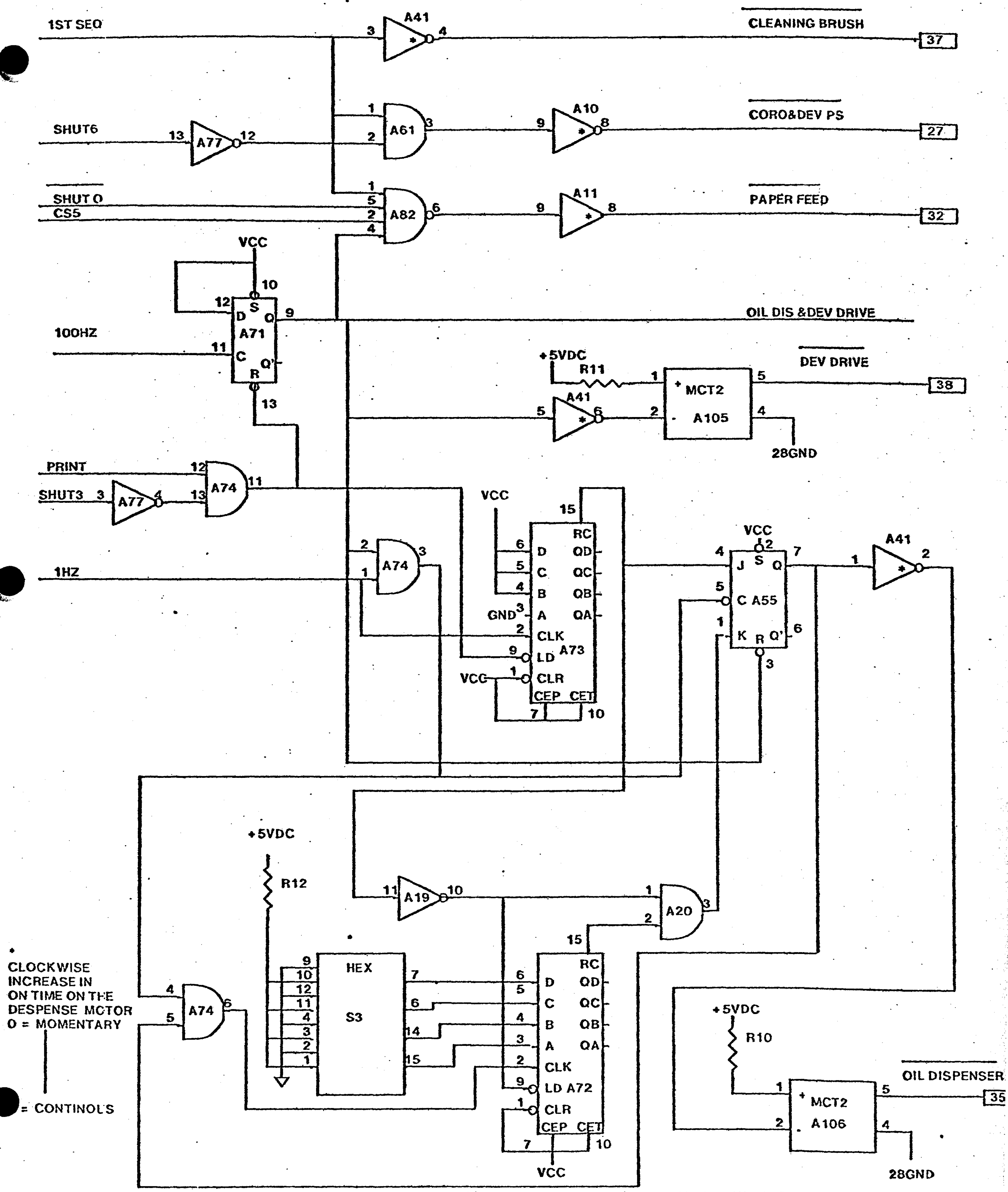
				ASSY.PW ENGINE CONTROL		216564
XEROX PARC	Project DOVER	MALFUNCTION DETECTOR	File DOVER5B	Designer ED WAKIDA	Rev H	Date 5/12/77	Page 11 OF 1

do



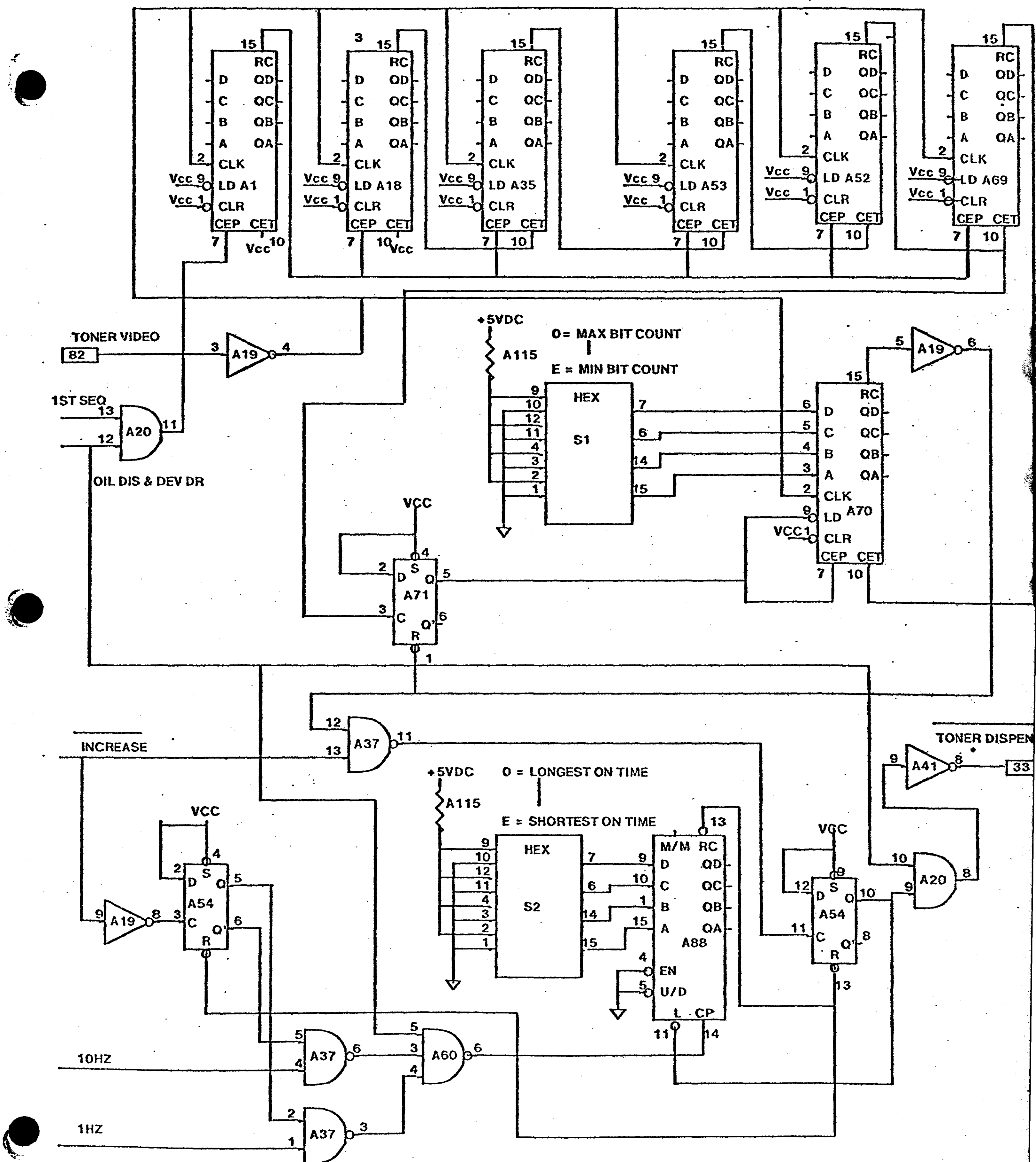
ASSY. PW ENGINE CONTROL	216564

XEROX PARC	Project DOVER	CONTROL CONPONENT	File DOVER9C	Designer ew ED WAKIDA	Rev H	Date 5/2/77	Page 12 OF1

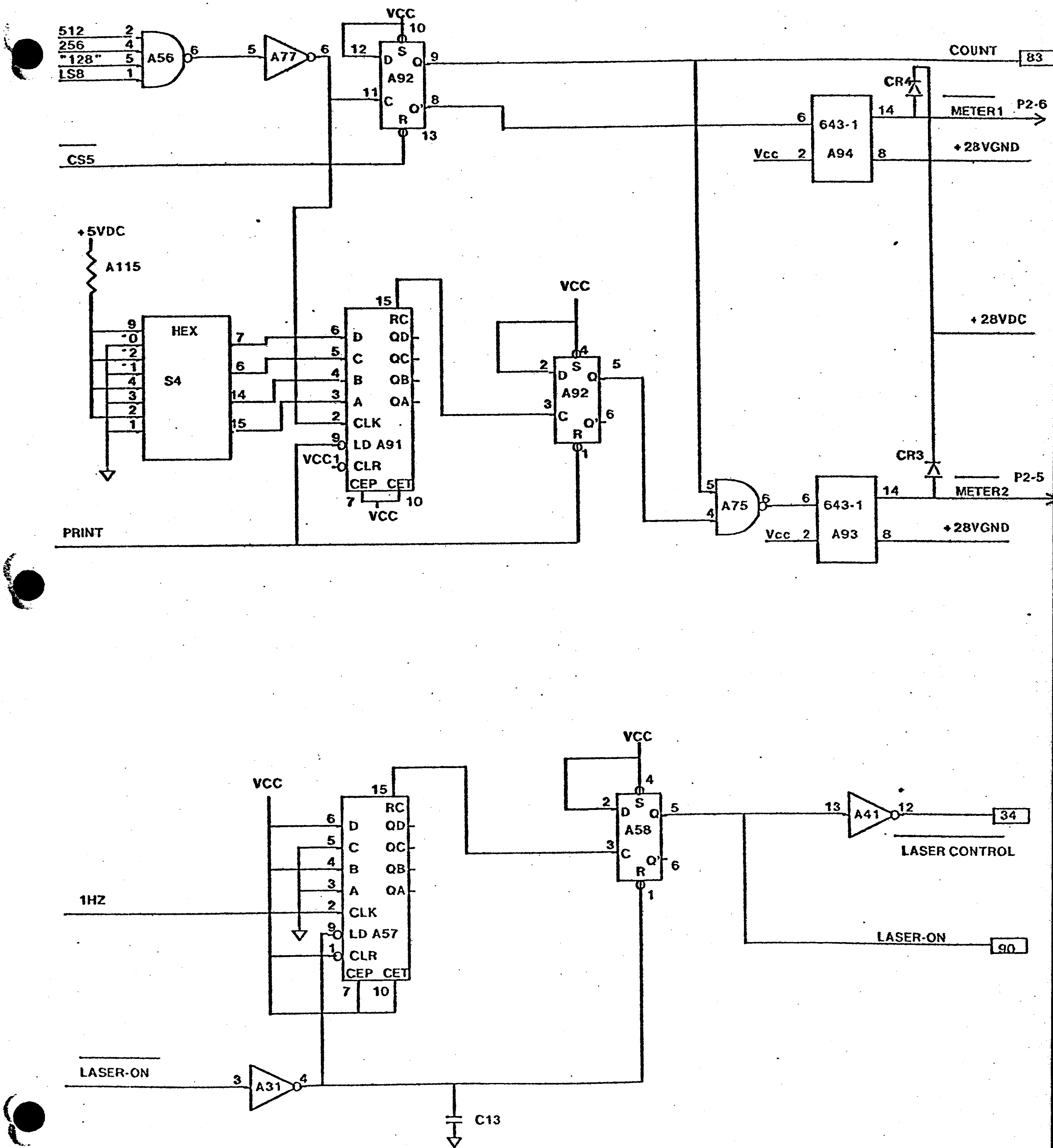


ASSY. PW -ENGINE CONTROL	216564

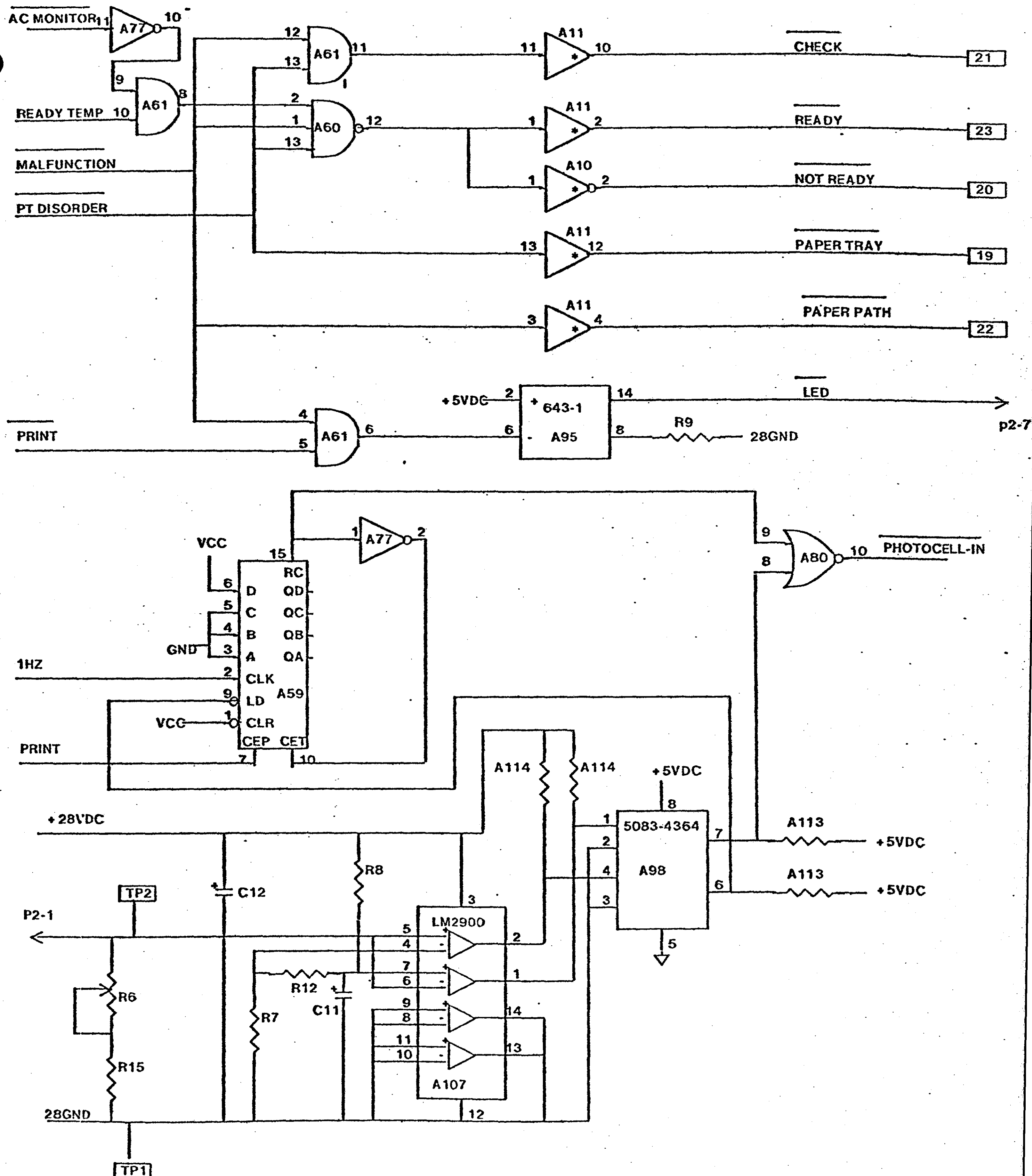
XEROX	Project	COMPONENT	File	Designer	Rev	Date	Page



ASSY. PW ENGINE CONTROL				216564		
XEROX PARC	Project DOVER	TONER DISPENSING	File DOVER6D	Designer ew ED WAKIDA	Rev H	Date 5/12/77	Page 14 OF1

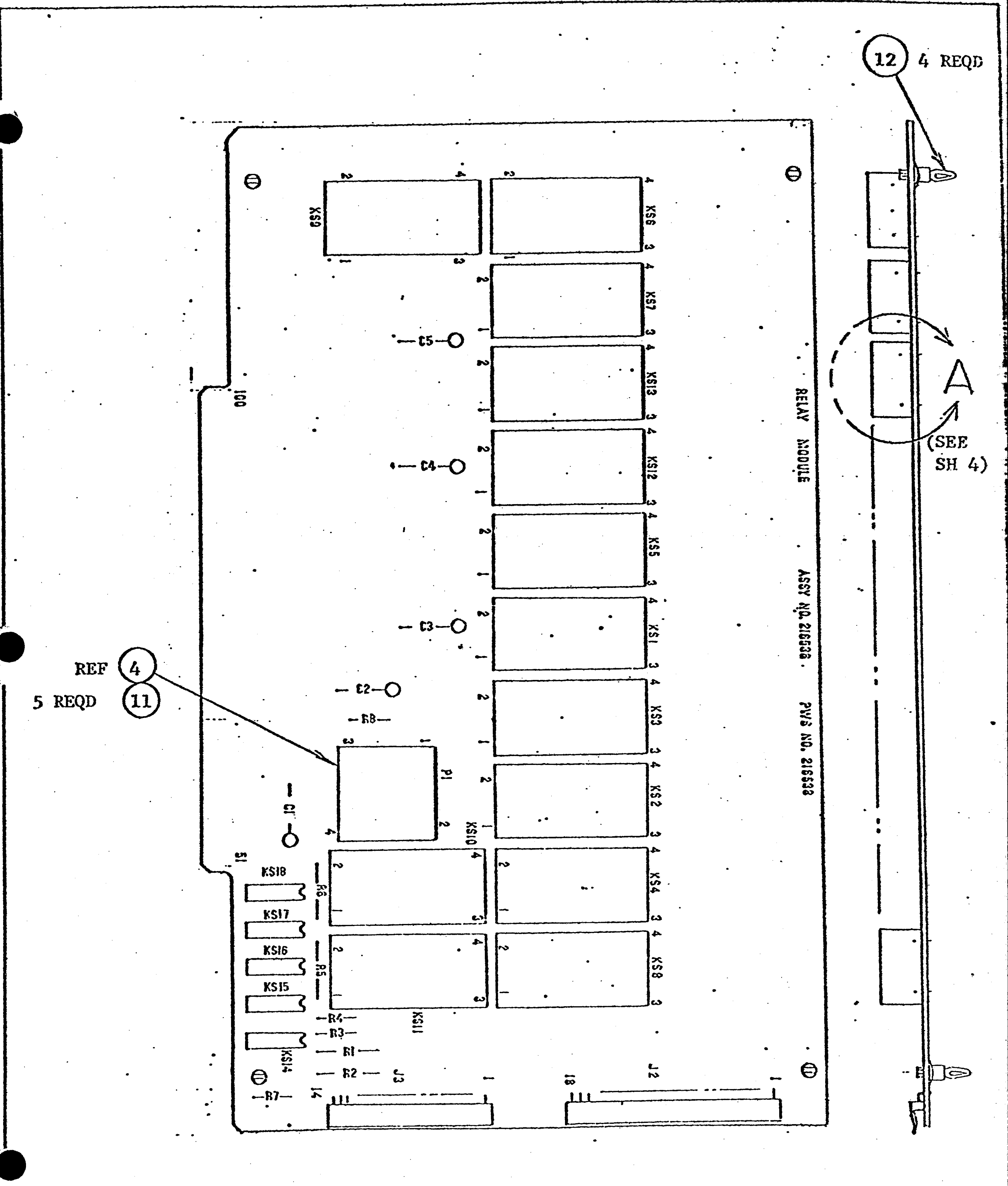


				ASSY PW ENGINE CONTROL		216564
XEROX PARC	Project DOVER	BILLING METER AND LASER CONTROL	File DOVER7C	Designer ew ED WAKIDA	Rev H	Date 5/12/77	Page 15 OF 1



			ASSY PW ENGINE CONTROL			216564
XEROX PARC	Project DOVER	INDICATOR DRIVER AND PHOTOCELL DETECT	File DOVER8C	Designer ED WAKIDA	Rev G	Date 5/12/77

Page
16 OF 1



Title

ASSEMBLY, PRINTED WIRING-
RELAY MODULE

Xerox Corporation
El Segundo, California

XEROX

216536

C

Sheet 3 of 6

Xerox Corporation
701 South Aviation Boulevard
El Segundo, California 90245
213 679-4511

XEROX

Material List

ML	Drawing No. 216536	Rev. C

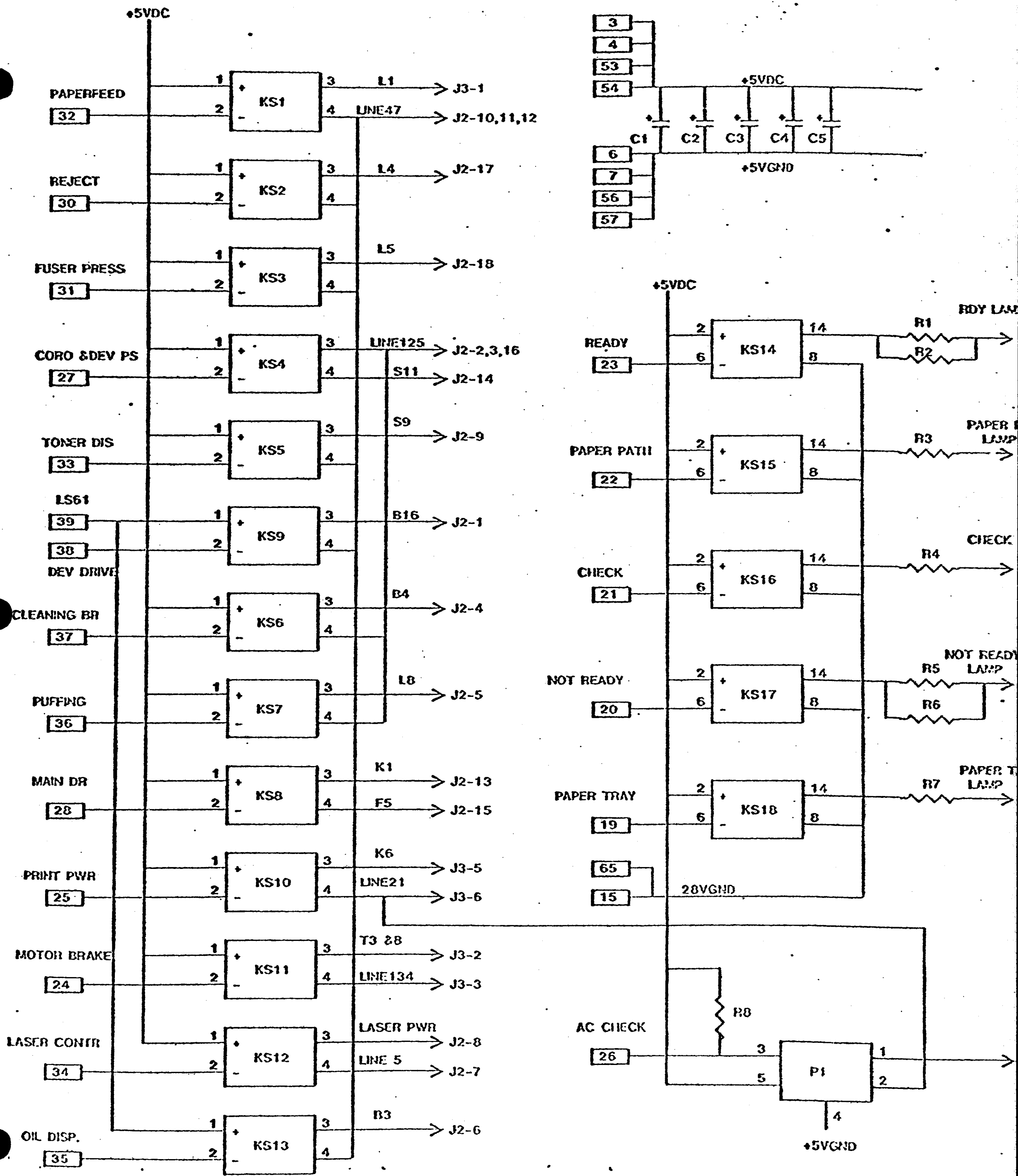
Drawing Title

ASSEMBLY, PRINTED WIRING-
RELAY MODULE

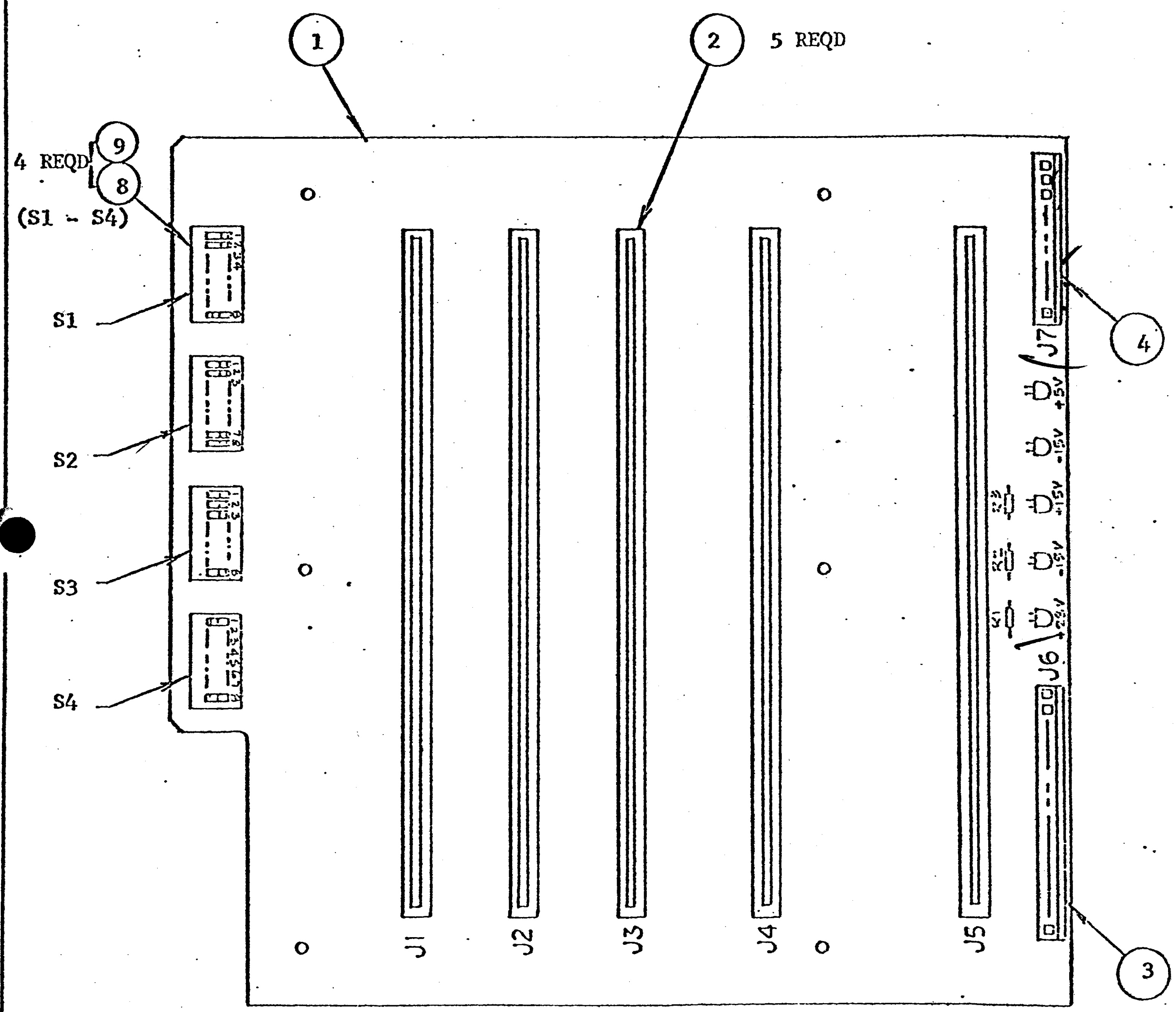
Model No.	Date	Sheet
EWO 390101	3/3/77	5 of 6

Rev. | Drawing No. 216536 | ML

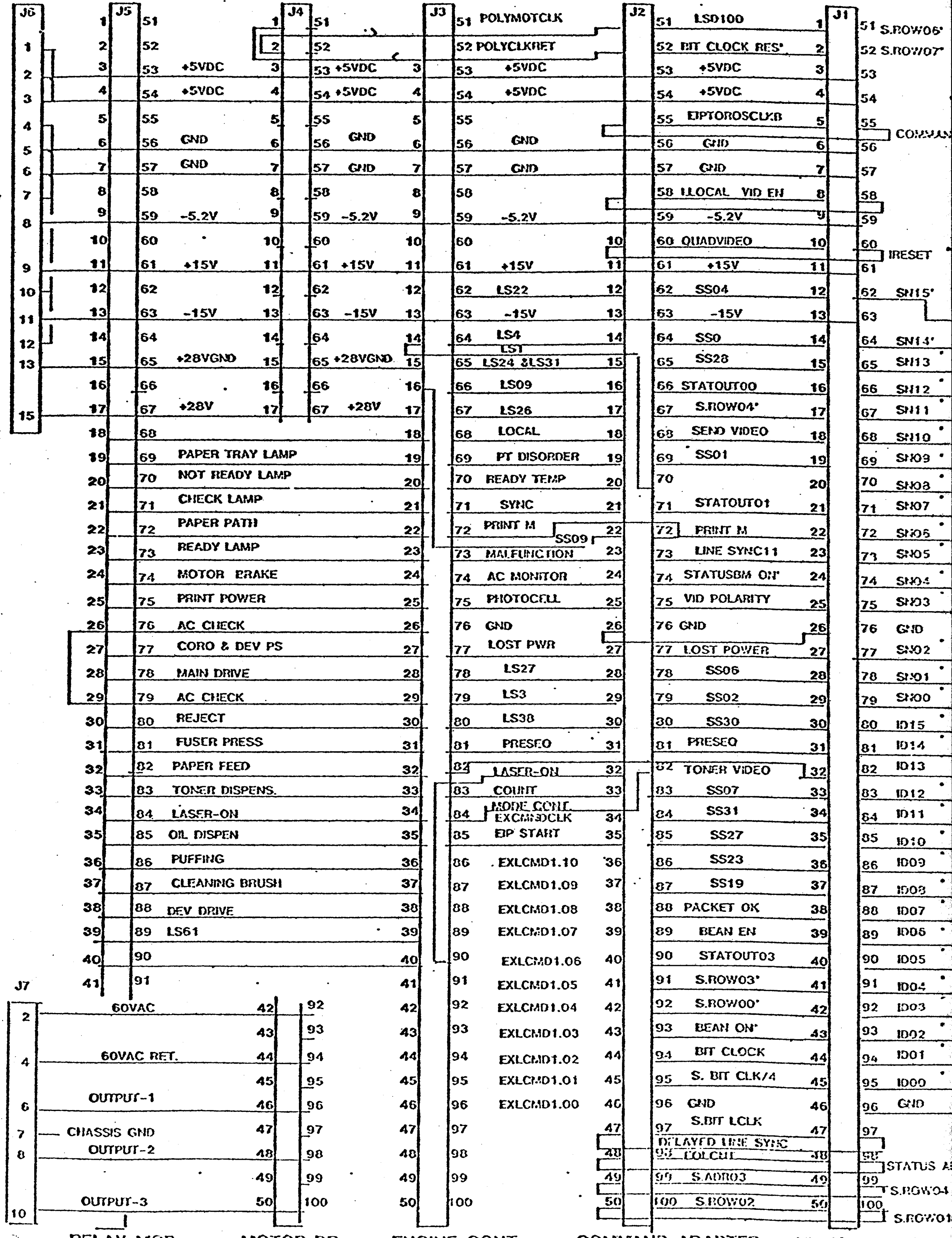
Item No.	Drawing Title	Drawing No.	No. Req.	Remarks
1	Board, P W - Relay Module	216538	1	
2	Relay Teledyne #601-1401P		13	KS1 thru 13 (2)
3	Relay Teledyne #643-1		5	KS14 thru 18
4	Relay Teledyne #675-1		1	P1 (2)
5	Capacitor, 22µF, 15 V	187720-005	5	C1 thru 5
6	Resistor, 510Ω, 1/4 W	116477-511	1	R8
7	Resistor, 51Ω, 1/2 W	100111-510	3	R3,4,7
8	Resistor, 220Ω, 2 W A.B.#HB-221-10		4	R1,2,5,6 (3)
9	Connector, 18 Pin Amp #1-87655-8		1	J2 (4)
10	Connector, 14 Pin Amp #1-87655-4		1	J3 (4)
11	Jack, Connector CTC #450-3718-01-03		57	(5)
12	Support, Circuit Board Richco #CBS-4N		4	(6)



				ASSY PW RELAY MODULE		216536
XEROX PARC	Project DOVER	RELAY MODULE	File DOVERRELAYC	Designer ED WAKIDA	Rev C	Date 5/12/77	Page 6 OF

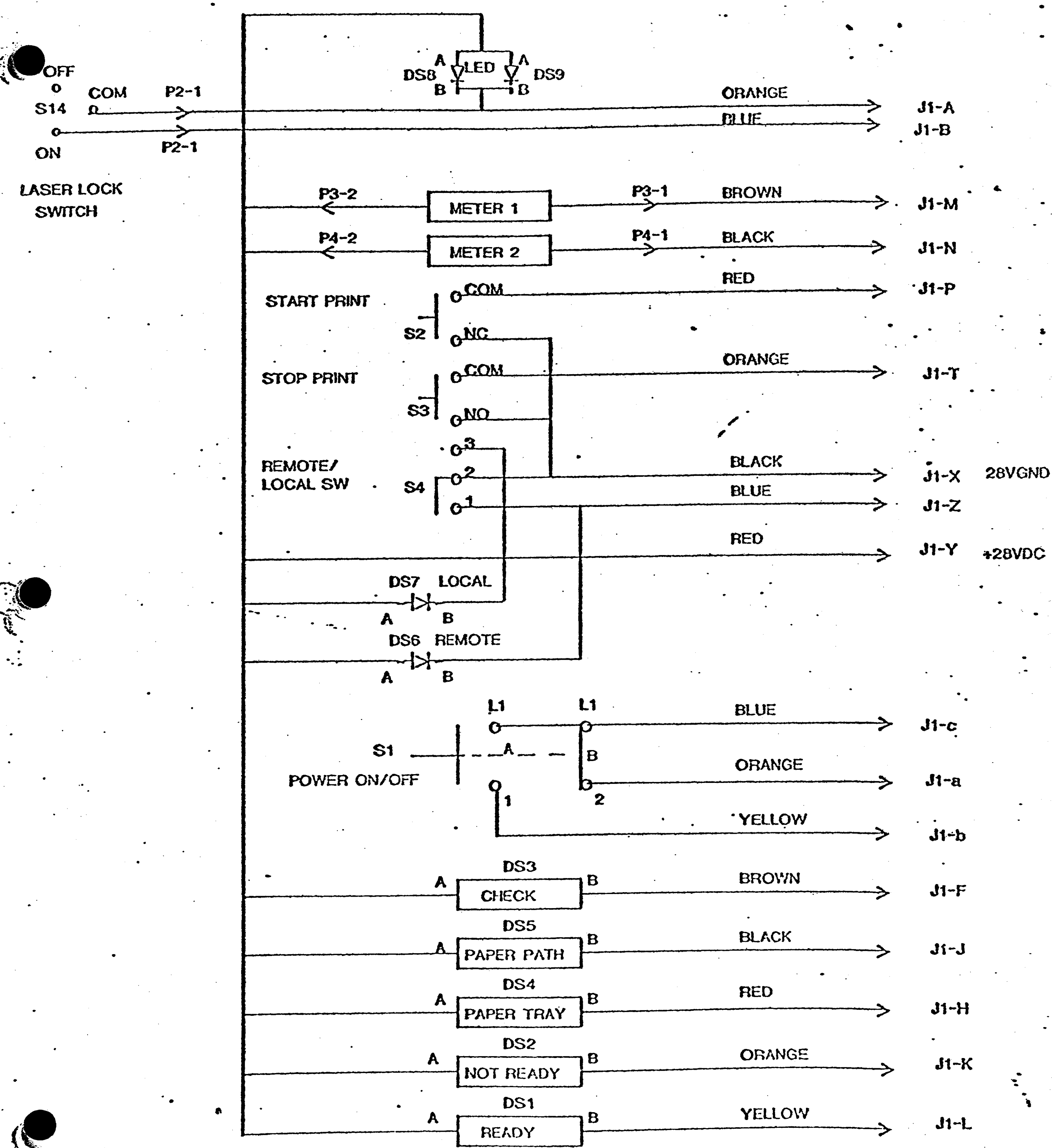


Title	Xerox Corporation El Segundo, California	XEROX
ASSEMBLY, PRINTED WIRING-- MOTHER BOARD	216572	D
	Sheet 3 of 5	



XEROX PARC	Project DOVER	MOTHER BOARD	File DOVER BKWIRING 1	Designer ED WAKIDA	Rev D	Date	Page

DOVER CONSOLE WIRING



FILE DOVERCONSOL

K | J | H | G | F

8. TIGHTEN ALL SCREWS 5 TO 12 INCH POUNDS.

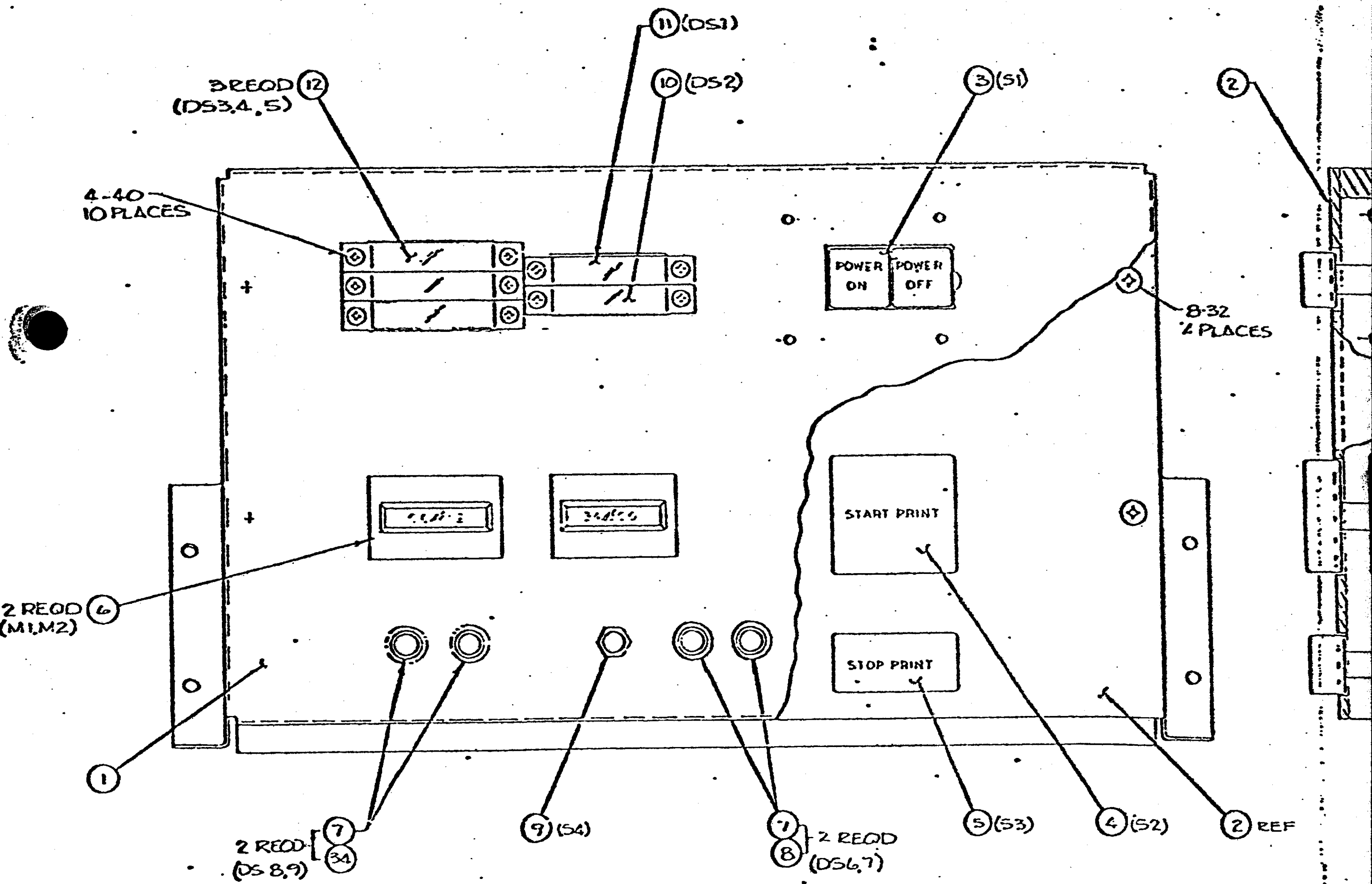
[9] MARK CHARACTERS .12 HIGH, BLACK PER XEROX SPEC 101624

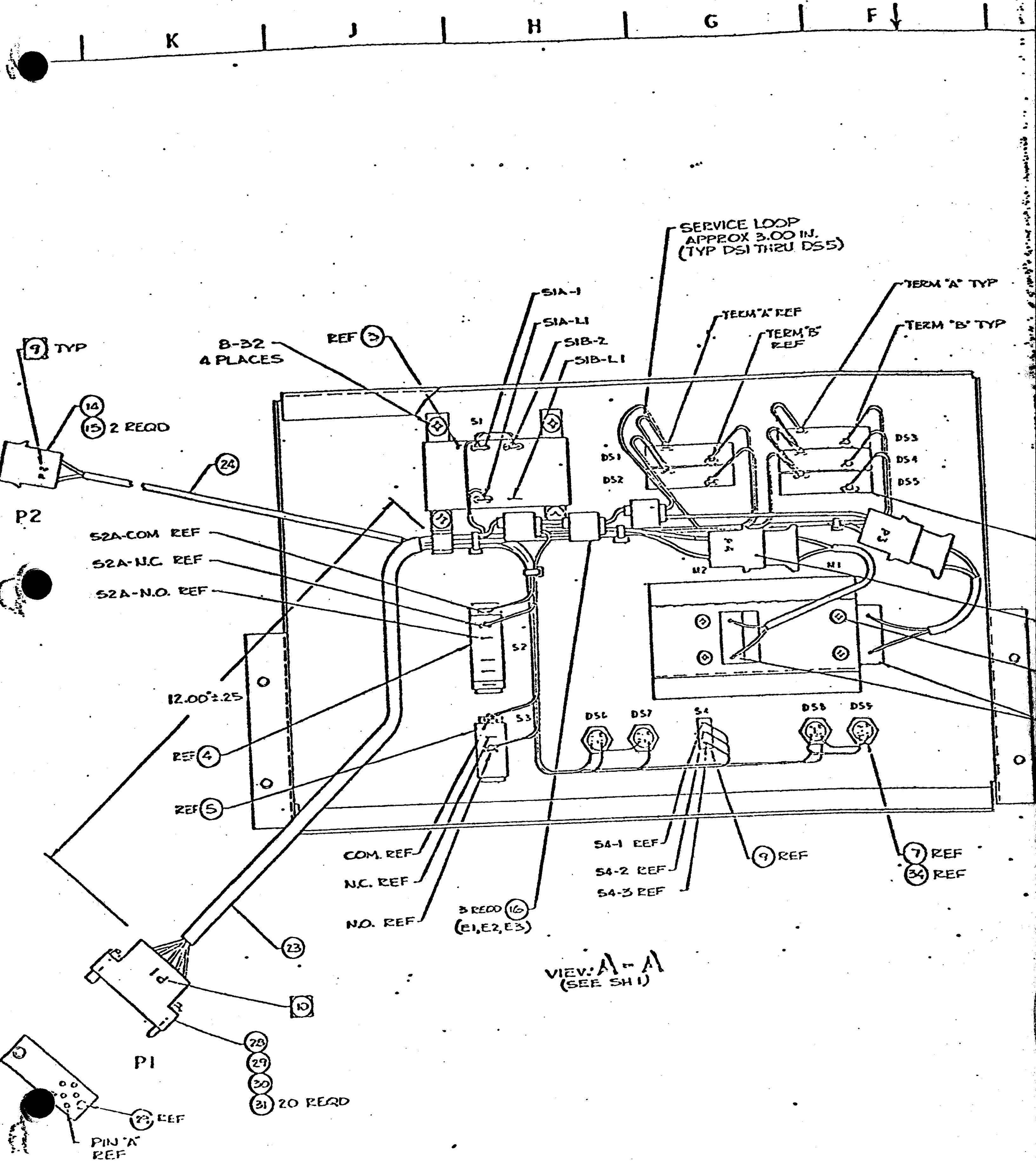
[10] MARK CHARACTERS .12 HIGH, WHITE PER XEROX SPEC 101624.

11. FOR MATERIAL LIST SEE SH 5.

12. FOR WIRE LIST SEE SH 4 & 5.

[13] MAY BE PURCHASED FROM 3M COMPANY ST PAUL, MINN, VENDOR PART NO.





K
J
H
G
F
SERVICE LOOP APPROX 3.00 IN. (TYP DS1 THRU DS5)
TERM "A" TYP
TERM "B" TYP
TERM "A" REF
TERM "B" REF
S1A-1
S1A-L1
S1B-2
S1B-L1
8-32 4 PLACES
REF 3
9 TYP
14
15 2 REQD
24
P2
S2A-COM REF
S2A-N.C. REF
S2A-N.O. REF
12.00"±.25
REF 4
REF 5
S1
DS1
DS2
DS3
DS4
DS5
S2
S3
DS6
DS7
S4
DS8
DS9
COM. REF
N.C. REF
N.O. REF
3 REQD 16 (E1,E2,E3)
S4-1 REF
S4-2 REF
S4-3 REF
9 REF
7 REF
34 REF
23
10
P1
28
29
30
31 20 REQD
PIN "A" REF
VIEW A - A (SEE SH 1)

Wire No.	Term	From	To	Term	Wire Type	Notes	Signal	Chg. Let.
1		DS8-A	DS9-A		17	RED	+28VDC	
2		DS8-A	DS7-A	31	17	RED	+28VDC	
3		DS8-B	DS9-B		18	ORANGE	LASER-ON IN	
4	15	P2-1	DS8-B		18	ORANGE	LASER-ON IN	
5		DS8-B	P1-A	31	18	ORANGE	LASER-ON IN	
6	15	P2-2	P1-B	31	19	BLUE	TOP COVER SW	
7	15	P3-1	P1-M	31	19	BLUE	METER 1	
8	15	P4-1	P1-N	31	19	BLUE	METER 2	
9		DS3-B	P1-F	31	20	BROWN	CHECK	
10		DS5-B	P1-J	31	21	BLACK	PAPER PATH	
11		DS4-B	P1-H	31	17	RED	PAPER TRAY	
12	26	DS1-B	P1-L	31	22	YELLOW	READY	
13	26	DS2-B	P1-K	31	18	ORANGE	NOT READY	
14		DS7-B	S4-3		19	BLUE	LOCAL LAMP	
15		S4-1	DS6-B		22	YELLOW	LOCAL - H	
16		DS6-B	P1-Z	31	22	YELLOW	LOCAL - H	
17	26	S2A-COM	P1-P	31	17	RED	START PRINT-H	
18	26	S3-COM	P1-T	31	18	ORANGE	STOP PRINT -L	
19	27	S1A-L1	S1B-L1	27	19	BLUE	S8-L1	
20	27	S1A-L1	P1-c	31	19	BLUE	S8-L1	
21	27	S1B-2	P1-a	31	18	ORANGE	LINE 134	
22	27	S1A-1	P1-b	31	22	YELLOW	LINE 5	
23								
24								
25								
26								

1. Ref Item No's In Applicable Material List.
2. Ref Designations Are Abbreviated. Prefix Each Designation With:

Title: ASSEMBLY, CONTROL PANEL

Xerox Corporation
El Segundo, California
XEROX

216537 | B

Wire No.	Term	From	To	Term	Wire Type	Notes	Signal	Chg. Let.
27		DS4-A	DS3-A	26	17	RED	+28VDC	
28		DS5-A	DS4-A	26	17	RED	+28VDC	
29		DS2-A	DS5-A	26	17	RED	+28VDC	
30		DS1-A	DS2-A	26	17	RED	+28VDC	
31		-	DS1-A	26	17	RED	+28VDC	
32	16	E1	DS6-A		17	RED	+28VDC	
33	15	P3-3	E2	16	17	RED	+28VDC	
34	15	P4-3	E3	16	17	RED	+28VDC	
35		-	P1-Y	31	17	RED	+28VDC	
36		DS6-A	DS7-A		17	RED	+28VDC	
37								
38		S4-2	S2A-NO	26	21	BLACK	+28VGND	
39		S2A- NC	S3-NO	26	21	BLACK	+28VGND	
40	26	S3-NO	P1-X	31	21	BLACK	+28VGND	

1. Ref Item No's In Applicable Material List.
2. Ref Designations Are Abbreviated, Prefix Each Designation With:

Title

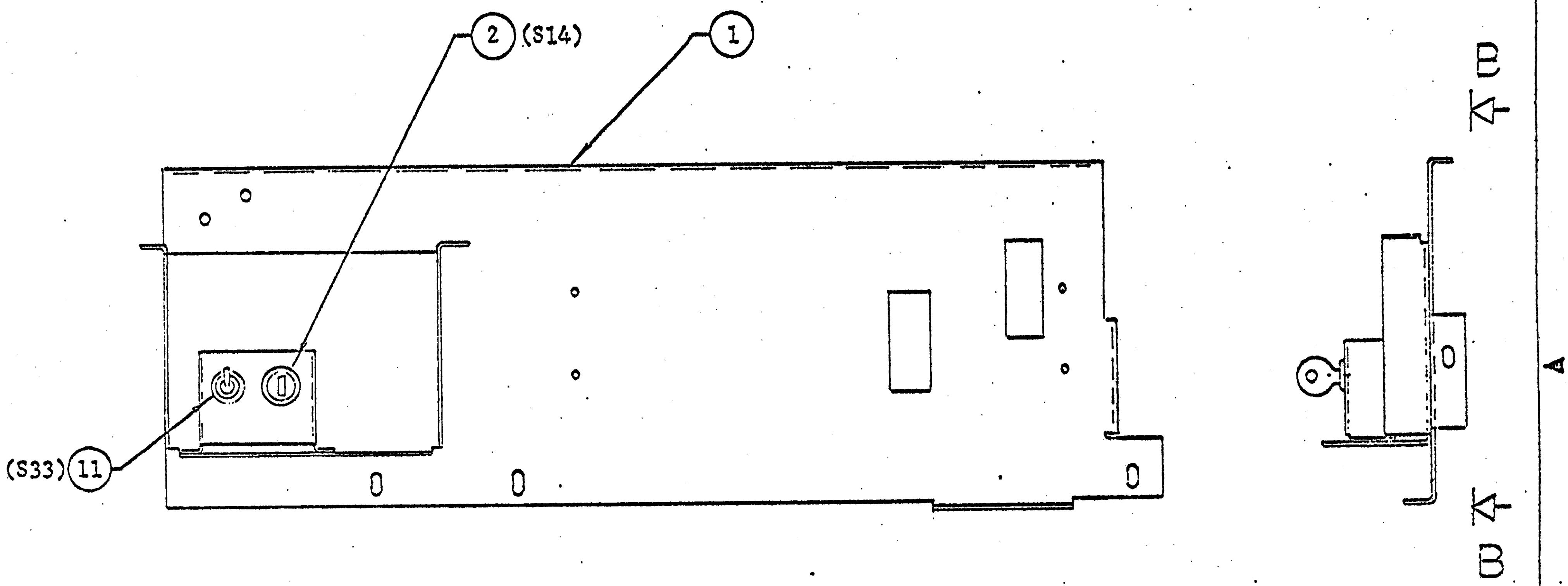
ASSEMBLY, CONTROL PANEL

Xerox Corporation
El Segundo, California

XEROX

216537 B

Sheet 5 Of 5



Title

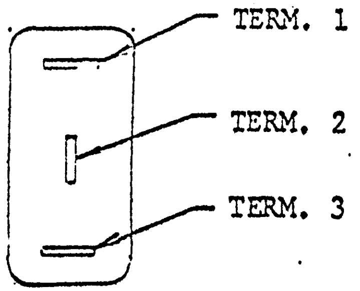
ASSEMBLY, PLATE - CONTROL PANEL MTG

Xerox Corporation
El Segundo, California

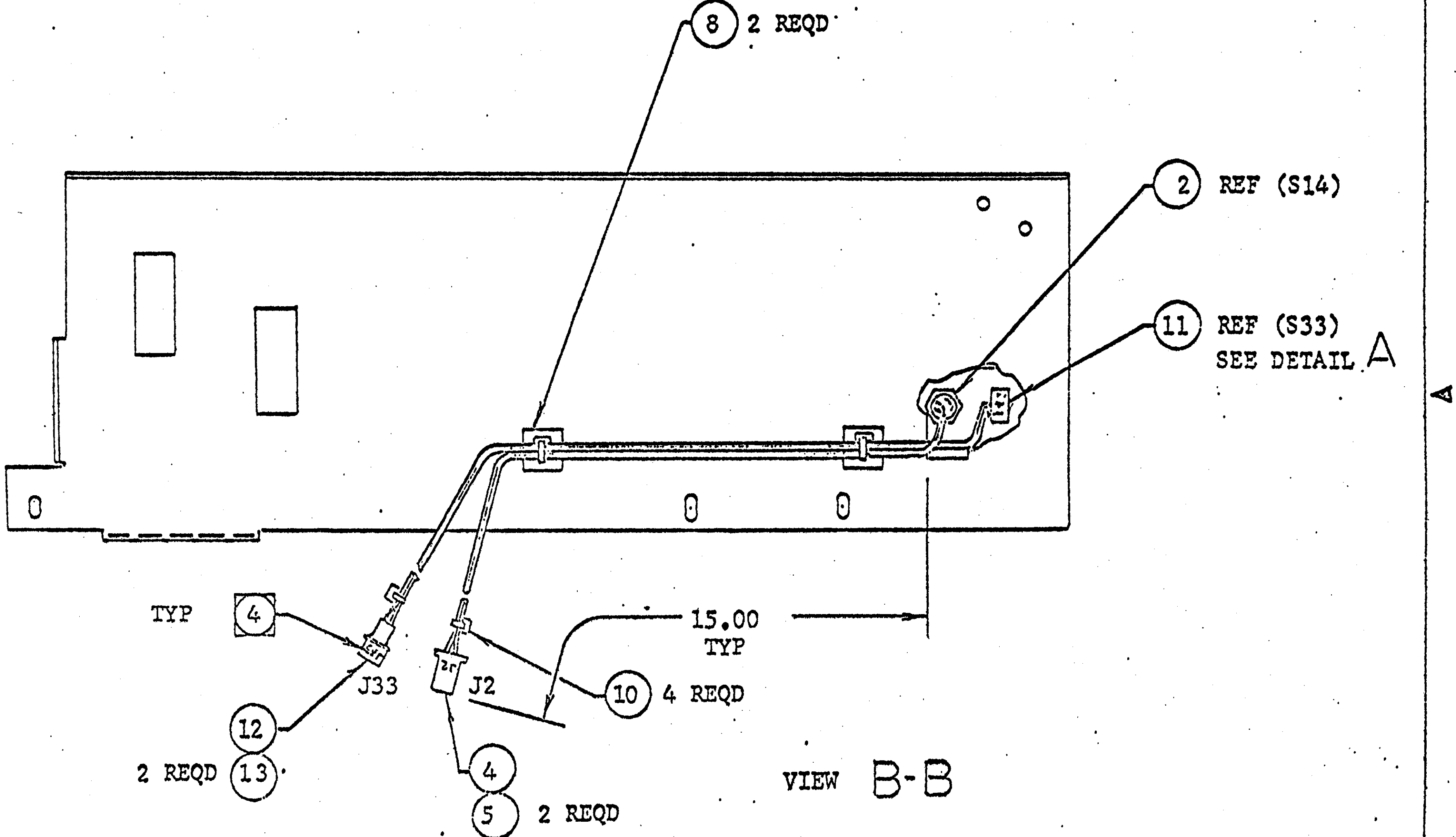
XEROX

216604 | 3

Sheet 3 of 5



DETAIL A



VIEW B-B

Title

ASSEMBLY, PLATE - CONTROL PANEL MTG

Xerox Corporation
El Segundo, California

XEROX

216604 B

Sheet 4 Of 5

NOTES: UNLESS OTHERWISE SPECIFIED

1. IDENTIFY PER XEROX SPEC 100198.
2. MAY BE PURCHASED FROM GRAYHILL INC, LA GRANGE, ILLINOIS. VENDOR PART NUMBER.
3. MAY BE PURCHASED FROM AMP INC, HARRISBURG, PENN. VENDOR PART NUMBER.
4. MARK CHARACTERS .12 HIGH, COLOR: BLACK, PER XEROX SPEC 101624.
5. MAY BE PURCHASED FROM STANDARD WIRE & CABLE CO. EL SEGUNDO, CALIF. VENDOR PART NUMBER.

WIRE LIST

WIRE NO.	FROM	TO	WIRE TYPE	REMARKS
1	S14 - COM	J2 - 1	6	(18 AWG)ORANGE
2	S14 - 2	J2 - 2	7	(18 AWG) BLUE
3	S33 - 2	J33 - 1	14	(16 AWG)WHITE
4	S33 - 3	J33 - 3	14	(16 AWG)WHITE

Title: ASSEMBLY, PLATE-CONTROL PANEL MOUNTING

Xerox Corporation. El Segundo, California — XEROX

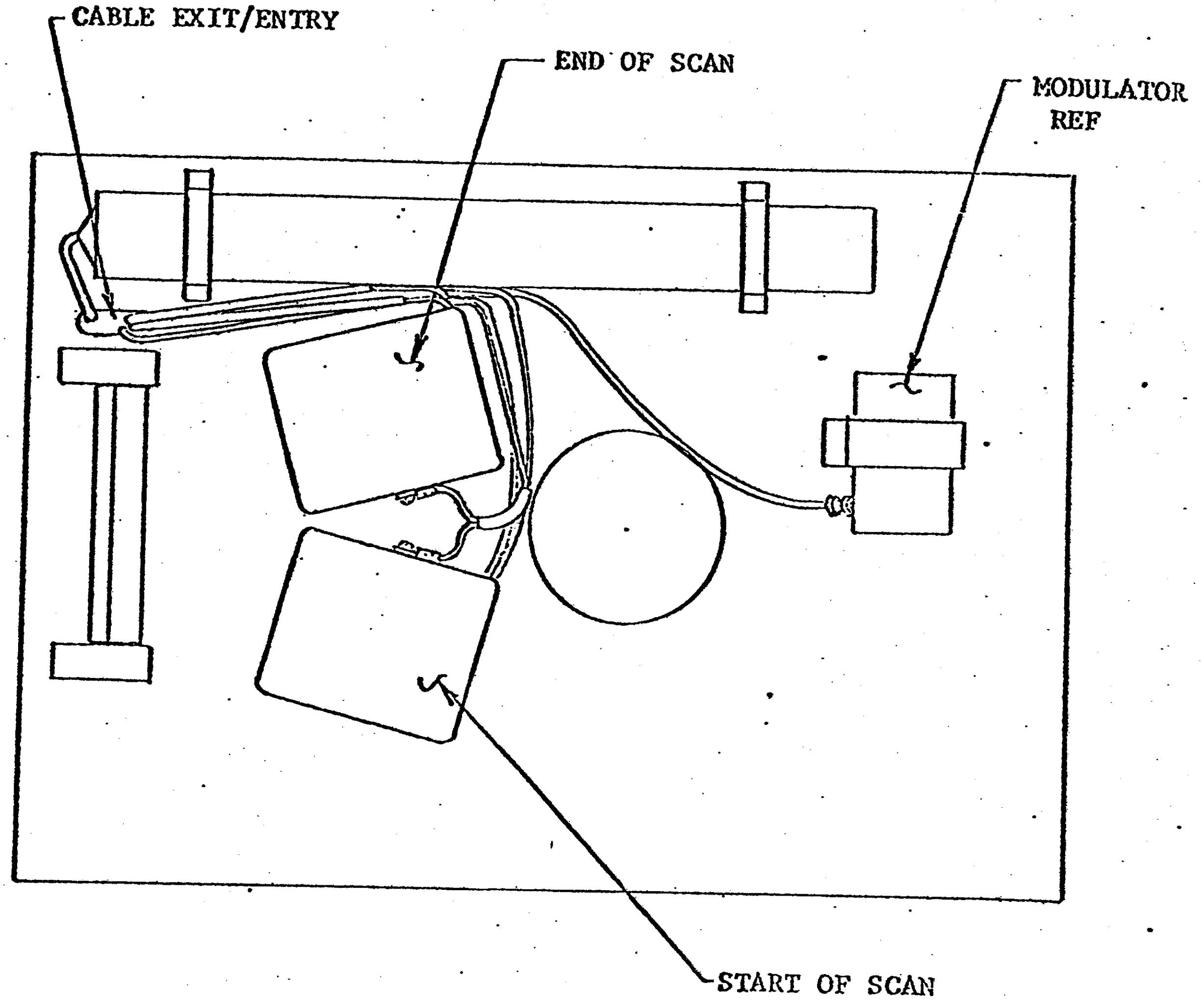
216604 — B

Sheet 2 Of 5

CAUTION

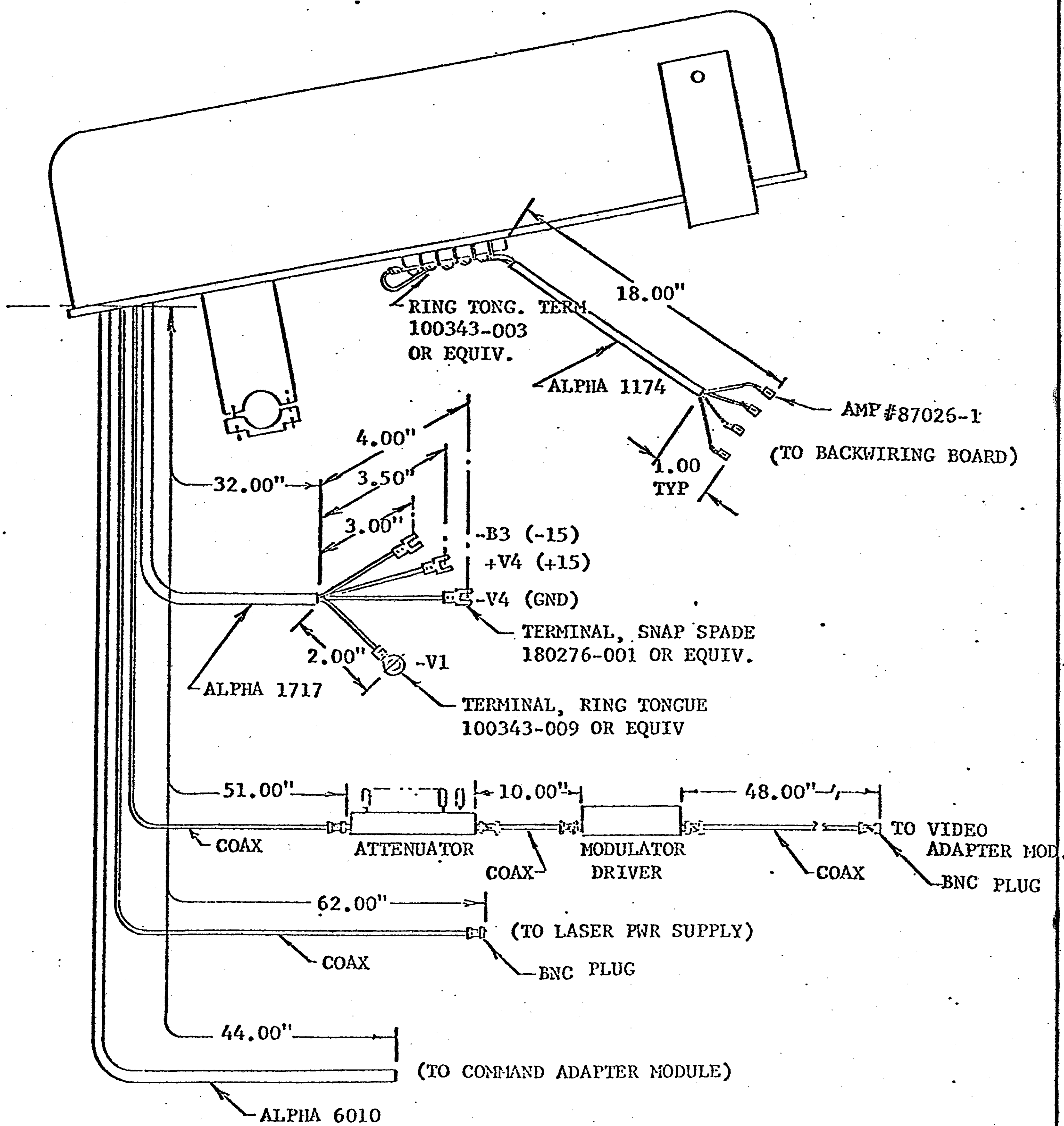
THE SLOT HEAD COVER IS TO BE REMOVED BY AUTHORIZED PERSONNEL ONLY.

REMOVAL OF COVER CAN ALLOW EXPOSURE TO LASER RADIATION.



TOP VIEW (COVER REMOVED)

Title: SPEC, PROCUREMENT- SLOT HEAD ASSEMBLY	Xerox Corporation El Segundo, California	XEROX
	216607	C
	Sheet 3 of 5	

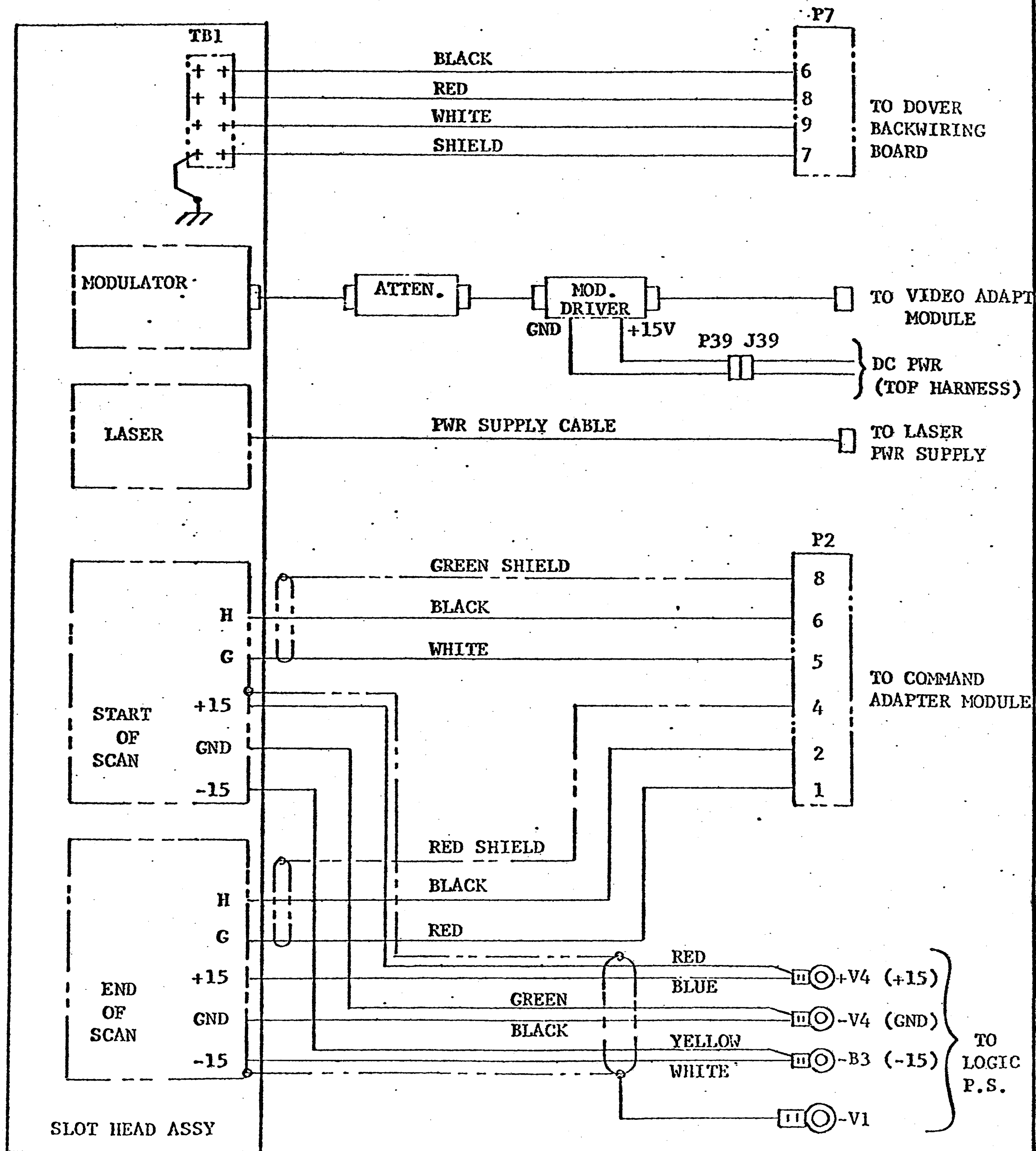


Title: SPEC, PROCUREMENT-
SLOT HEAD ASSEMBLY

Xerox Corporation
El Segundo, California

XEROX

216607 C



CABLING DIAGRAM

Title: SPEC, PROCUREMENT- SLOT HEAD ASSEMBLY	Xerox Corporation, El Segundo, California	XEROX
	216607	C
	Sheet 5 of 5	

DOVER

General

The Dover is strip-down Xerox 7000 Reduction Duplicator. All optical system, electronics, contact relay **s, top harness, control console and related components are eliminated from the Xerox 7000. The paper **feeder, paper transports, engines, solenoid, paper path sensing switches and related components are n **ot disturbed. The list below are the basic components the at has been eliminated and added.

ELIMINATED	ADDED
Optical System	Laser System
Control Logics	Engine Control Module
Contact Relay	Solid State Relay
Control Console	New Control Console
Top Cover	New Top Cover
Top Harness	New Top Harness
+24V PWS	+5V,-5V,+15V,-15V,+28V PWS
	Transformer (30 to 88VAC)
	Chassis
	Adapter Module (2)

Specification

Temperture: 60 to 90 degree F.
Humidity Range: 15 to 85%
Maximum Elevation: 5000 feet above lsea level.
Copy Page: The machine uses 20-pound long grain bond paper. The paper size is 8 1/2 by 11 inches.
Expendable Material: Toner and Silcone Oil.

ELECTRICAL DESCRIPTION

The Dover electrical control circuits are divided into six major modes of operation as shown below.

1. Circuit Breaker
2. Power- On and Warm-up
3. Print
4. Timed Shut-Down
5. Malfunction Shutdown
6. Toner Dispenser Circuit

Circuit Breaker

The Dover is equipped with two circuit breakers, CB1 and CB2, mounted on the rear off the housing. Thes **e breakers provide fault protection on each of the major input power lines. CB1 is for all machine ci **rcuits except the fuser, which is covered separately by CB2. In addition, most motors have internal **thermal protection to shut them down in the event of an overload.

Power-On and Warm-up

Pressing the POWER ON switch S1 (on the conrol console) energizes main power relays K1, cooling blowers **B11, B12 and B18 if following conditions are met:

1. Main Power S8 (on the developer housing) switched.
2. Front doors closed (actuate LS19 and LS20 switch)
3. Register Stop Drawer closed (actuates LS22 switch)
4. Fuse F5 is good.
5. LH Power Supply is On
6. Solid State Relay KS8 is energized by the control logic.

K1-1 closes and applies power to line 21 which energizes:

1. Conpressor B13 until the pressure actuates LS21

2.. Paper tray circuity
3. Start print circuitry

K1-3 and K1-4 close and apply power fo fuser transformer T1, Fuser controller PS2 and fuser element R1.

At this point, the fuser is warming up under the control of PS2 and RT1. The fuser wil continue to warm
** until RT1 senses the temperature to be 350 degrees. At this time PS2 will regulate the voltage to R
**T1 to maintain the temperature at 350 degees. When the fuser reaches 285 degrees the logic senses a
**ready condition and energizes the ready relay, turning off the NOT READY light and taurning on the REA
**DY lamp. This signifies that the machine had completed warm-up and is ready to make copies. At this
** time the machine can be put into a print condition.

Print

The machine functions during print are controlled by the the cycle control assembly and paper path switc
**hes. Prior to entering the print cycle and making a copy, certain interlock requirements must be met:
**

1. Laser Power ON Lock Switch must be on ON position.
2. Left Top Cover must be closed.
3. Drum and developer must be in place, acutating interlocks LS26, LS13, and LS61.
4. The paper tray must have sufficient paper and be in the UP position with the paper feeder top covero
**d closed.
5. Laser ON indicator should lite.
6. The READY light must be on, indicating the fuser is at operating temperature.

When a start command issued by the Alto II or pushing the Start Print switch S4, the Solid State Relay K
**S10 is energized by the control logic in the engine control module. KS10 energize DS1 and K6, closes
**K6-1 contact and applies power to line 47 which energizes the following:

1. Main Drive motor (B2)
2. A transport vacuum motor (B7)
3. Fuser curl motor (B17)
4. Antistatic transformer(T4)
5. Toner dispensermotor (B10)
6. Paper Feeder Solinoid (L1)
7. Reject Solinoid (L4)
8. Puffer Solinoid (L8)
9. Oil Despense and Developer Drive Motors (B16,B3)

K6-2 closes and applies power to line 125 which energizes:

1. Brush vacuum motors (B5,B6)
2. B transport vacuum motor (B8)
3. Air pump motor (B9)
4. Brush Drive Motor (B4)
5. Corotron Power Supply and Developer powcr supply (PS1,PS3)

K6-3 closes and runs the compressor (B13) constantly while in print.

At this time the machine is ready to feed paper as directed by the control logic.

Timed Shutdown

When the logic has been directed that enough paper has been fed the logic estarts shutting various comp
**nents off. At 7 seconds into shutdown K6 is deenergized which reverts the machine back into a stand-
** condition waited for the next print cycle.

Malfunction Shutdown

The purpose of the malfunction shutdown circuit is to stop the machine immediately if a jam occurs in t
**e paper path or a mispuff is detected.
The machine will begin a malfunction shutdown when any of the following paths are completed to energize
**the malfunction circuit in the engine control module.

1. A Transport Jam-the paper is actuating LS27, but has not reached LS1 within 760 MS.
2. Register Stop Module Jam- the paper is actuating LS1 but has not reached LS3 within 320 MS.
3. Redundant Mispuff Detector-the paper passes in front of the photocell energizing.
4. Fuser Roller Jam- the paper wraps around the fuser roller and actuates LS38.

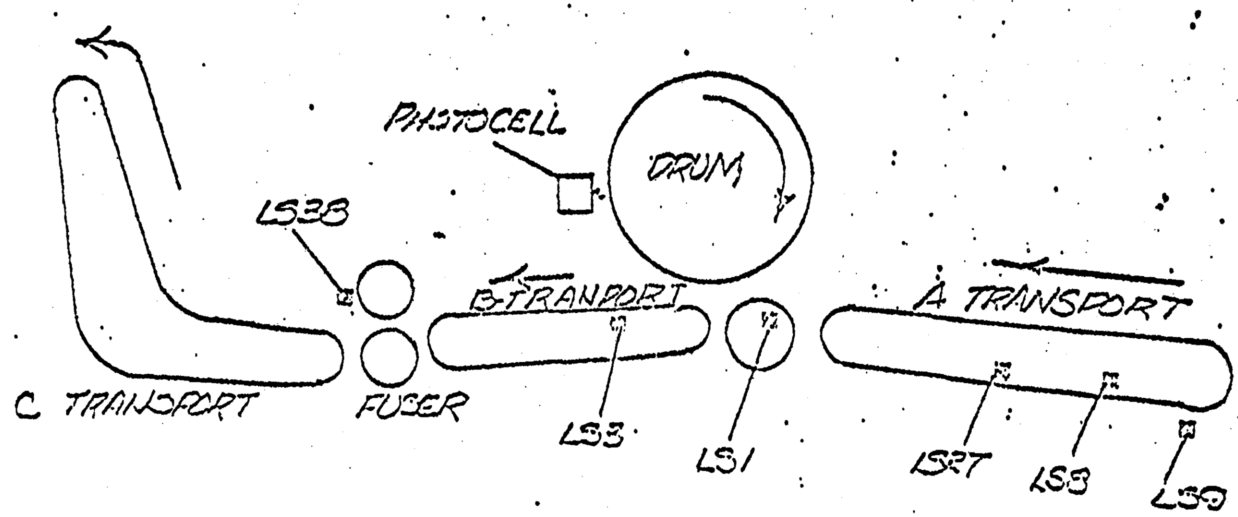
When the control logic has detected a malfunction condition K6 is deenergized and K8-T3 is monentarily
**nergized by KS11. This makes B2 stop instantly because of the D.C. being applied by K8.

Toner Dispensing Circuit

Ther are two modes of toner dispensing plus an OFF switch. The toner OFF switch S9 opens the path to th
**e toner dispenser motor B10 so that the motor cannot operate at all .

With S9 closed, the toner despenser motor operates under the control of the normal control from the cont
**rol logic in the Engine Control Module.

Increases toner is controlled by S7. This switch send command to the control logic to dispensing toner a
**ny timing tahe machine in the print cycle. This has the advantage of reducing the possibility of overt
**oning when the button is pressed accidentally. To initiate increase toner, S7 INCREASE button is press
**ed. It start to dispense toner for a certain period and returns to the control of the normal toner con
**trol.



(1) LS1 – MISFUFF/JAM RE
(REGISTER STOP DRIV

(2) LS3 – MISFUFF DETECT
(B-TRANSPORT)

(3) LS9 – MULTI-SHEET SEN

(4) LS8 – ENABLE COUNT

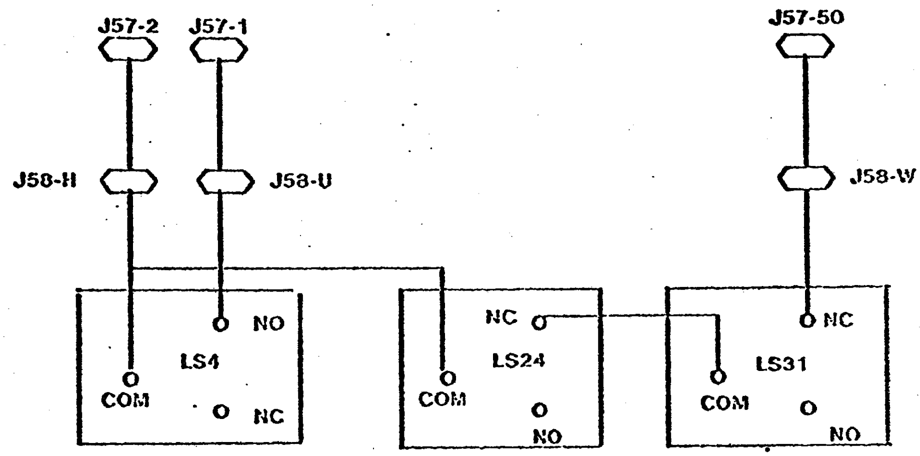
(5) LS27 – A TRANSPORT
JAM DETECTOR

(6) LS38 – FUSER JAM.

PAPER PATH SWITCHES.

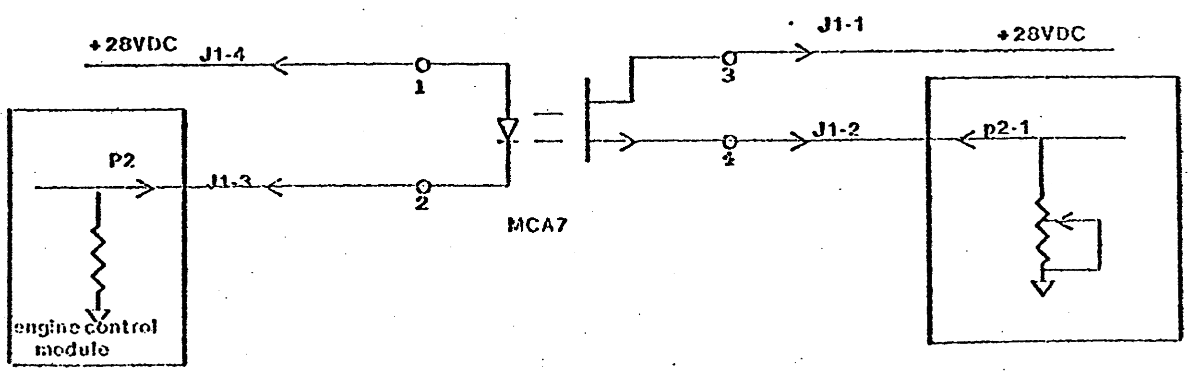
4

PAPERFEEDER SWITCH INTERCONNECT

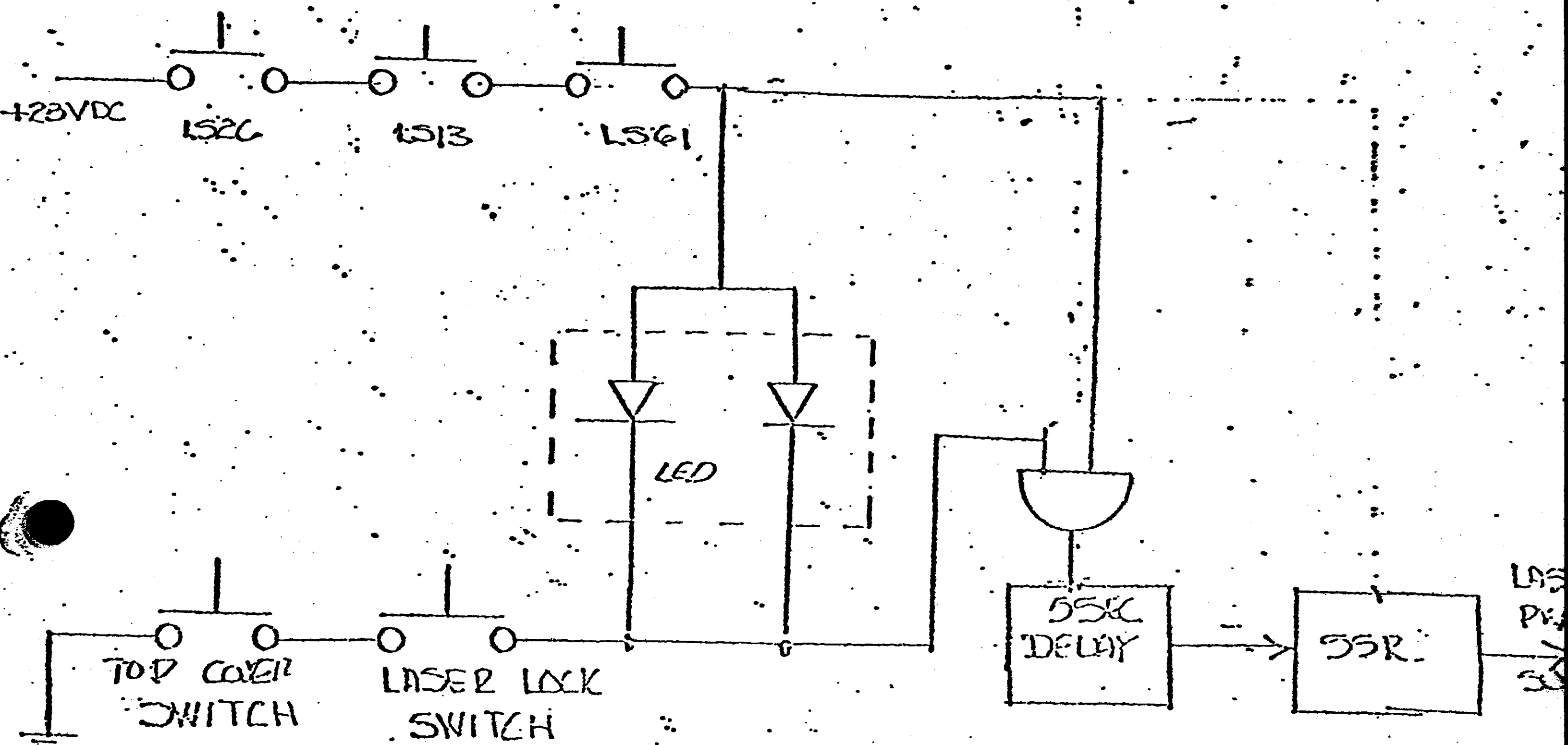


LS4 = LOW PAPER SWITCH
LS24 = BACK-UP BAR INTERLOCK
LS31 = SENING BAR DOWN

PHOTOSENOR



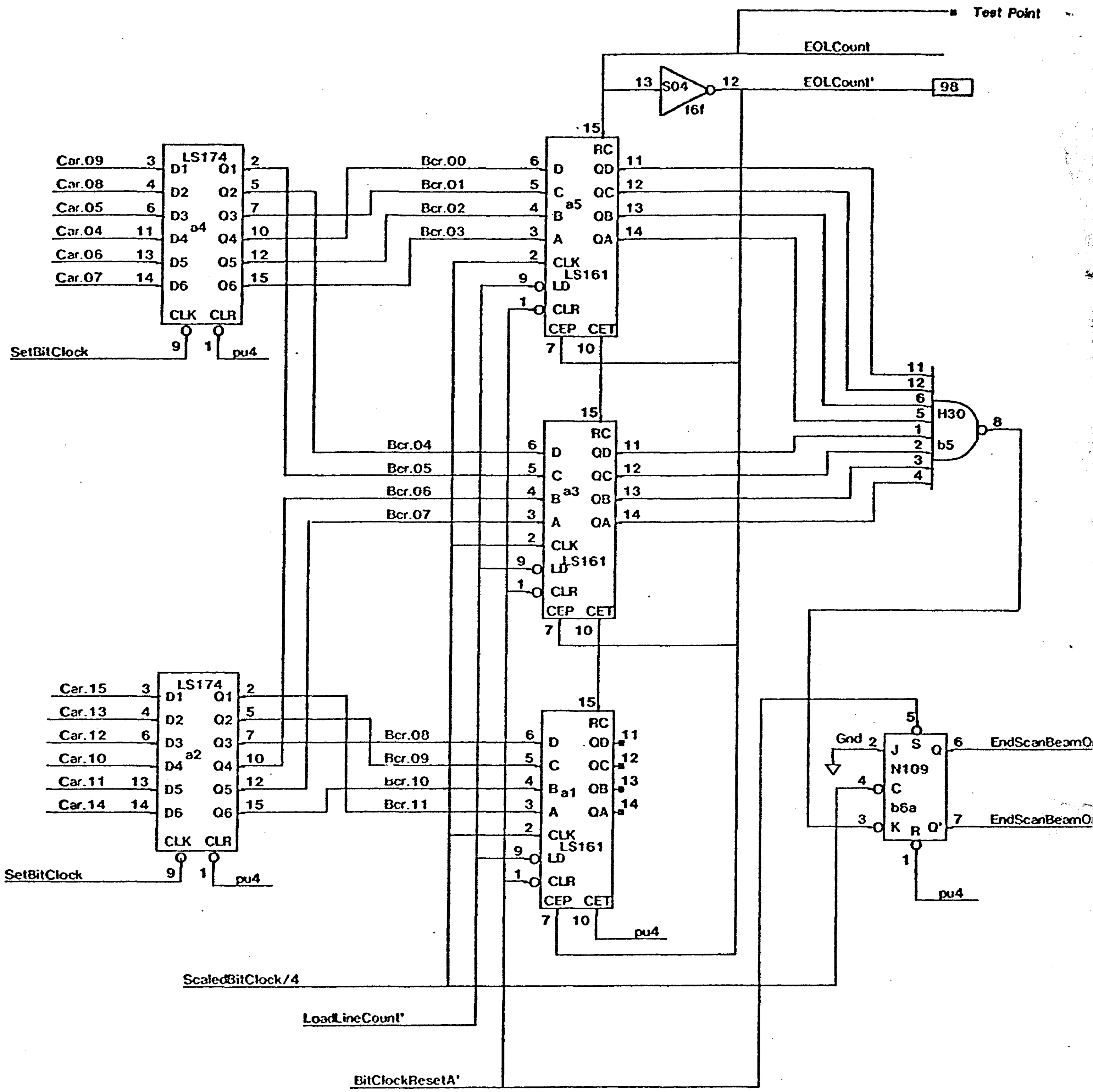
FILE DOVERIIPAPERFD



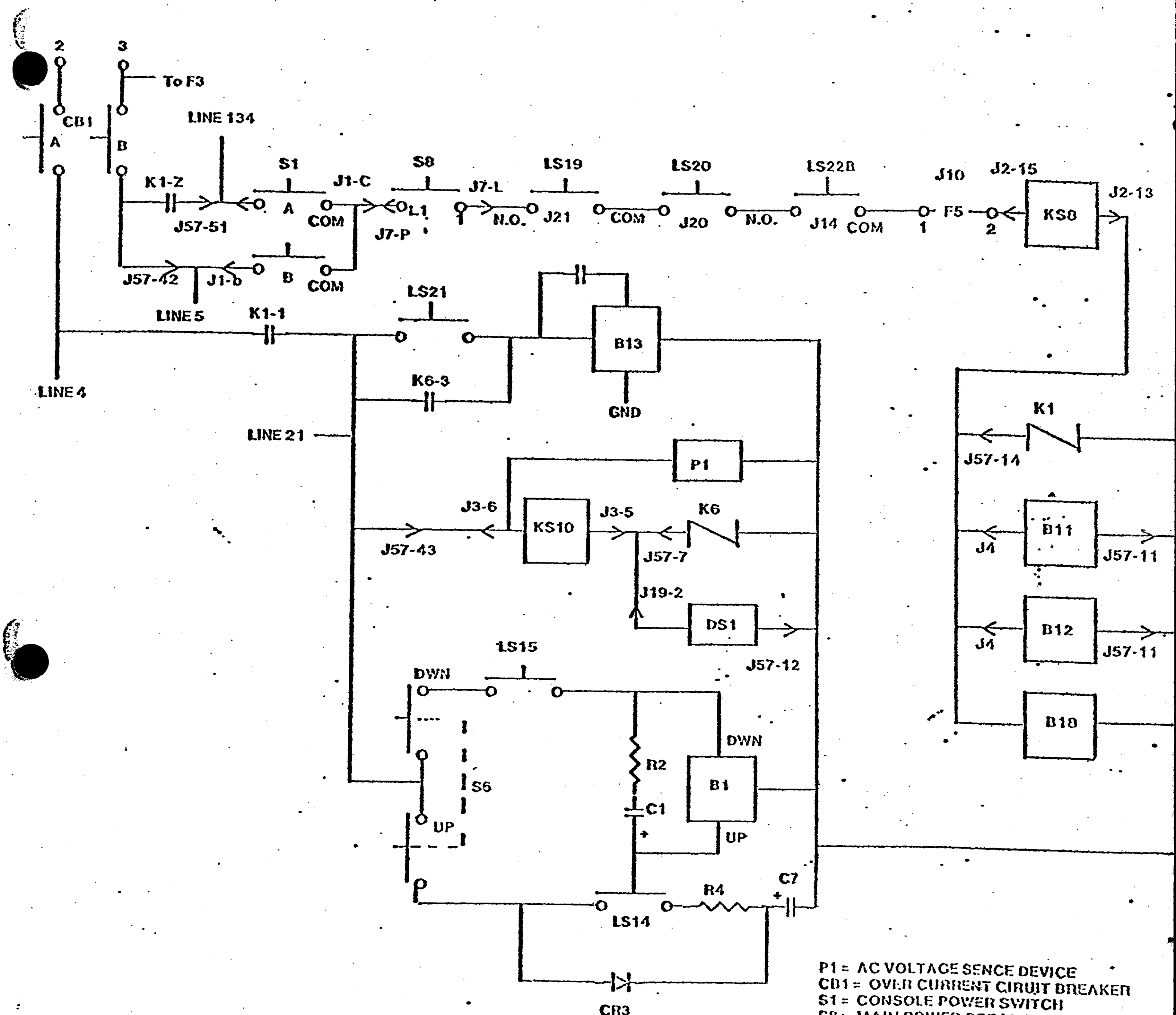
LASER POWER-ON
DELAY INTERCONNECT.

LS61 - DEVELOPER FRONT INTERLOCK
LS13 - DEVELOPER INTERLOCK
LS26 - DRUM INTELOCK

ED. MAKIDA

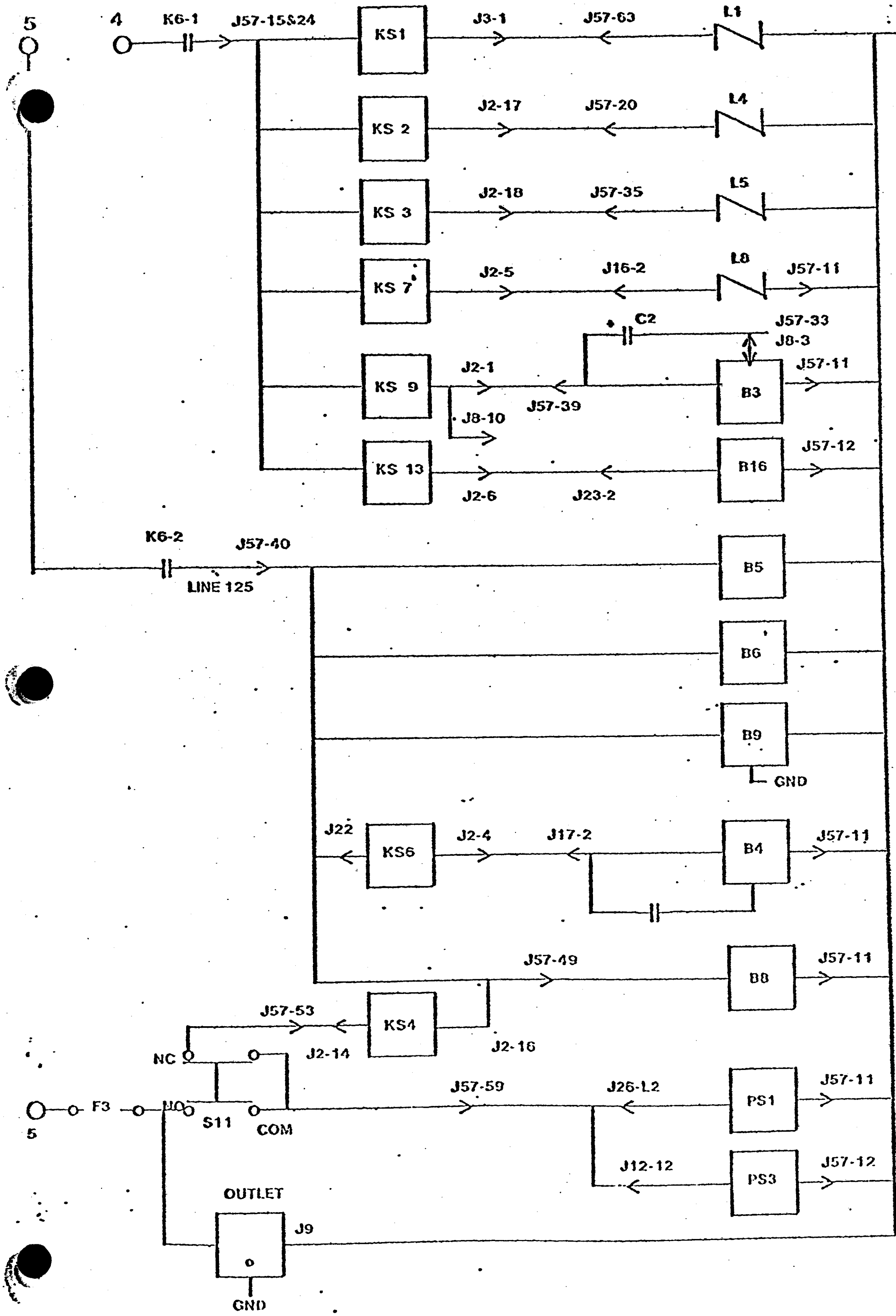


			ASSEMBLY, P.W. - COMMAND ADAPTER (DOVER II)		Drawing Number 217152
XEROX	Project TTL	BIT CLOCK REGISTER AND	File	Designer	Rev A	Date	Page



P1 = AC VOLTAGE SENCE DEVICE
CB1 = OVER CURRENT CIRUIT BREAKER
S1 = CONSOLE POWER SWITCH
S8 = MAIN POWER OFF/ON
S6 = PAPER TRAY POSITION (UP-DOWN)
LS14 = SENSING BAR SWITCH
LS15 = PAPER TRAY DOWN SWITCH
LS19 = DORR INTERLOCK
LS20 = DOOR INTERLOCK SWITCH
LS21 = UNDER PRESSURE SWITCH
LS22B = REGISTOR STOP DRAWER INTERLOC
K1 = MAIN POWER CONTACT
K6 = MAIN PRINT CONTACT
F5 = FUSE
B1 = ELEVATOR DRIVE MOTOR
B11 = COOLING BLOWER (LOWER)
B12 = COOLING BLOWER (UPPER LEFT)
B18 = COLLING BLOWER (UPPER RIGHT)
B13 = CONPRESSOR MOTOR
KS8 = SOLID STATE RELAY
KS10 = SOLID STATE RELAY
DS1 = ERASE LAMP
C7,CR3,R4 = ANTI-COAST ASSY.

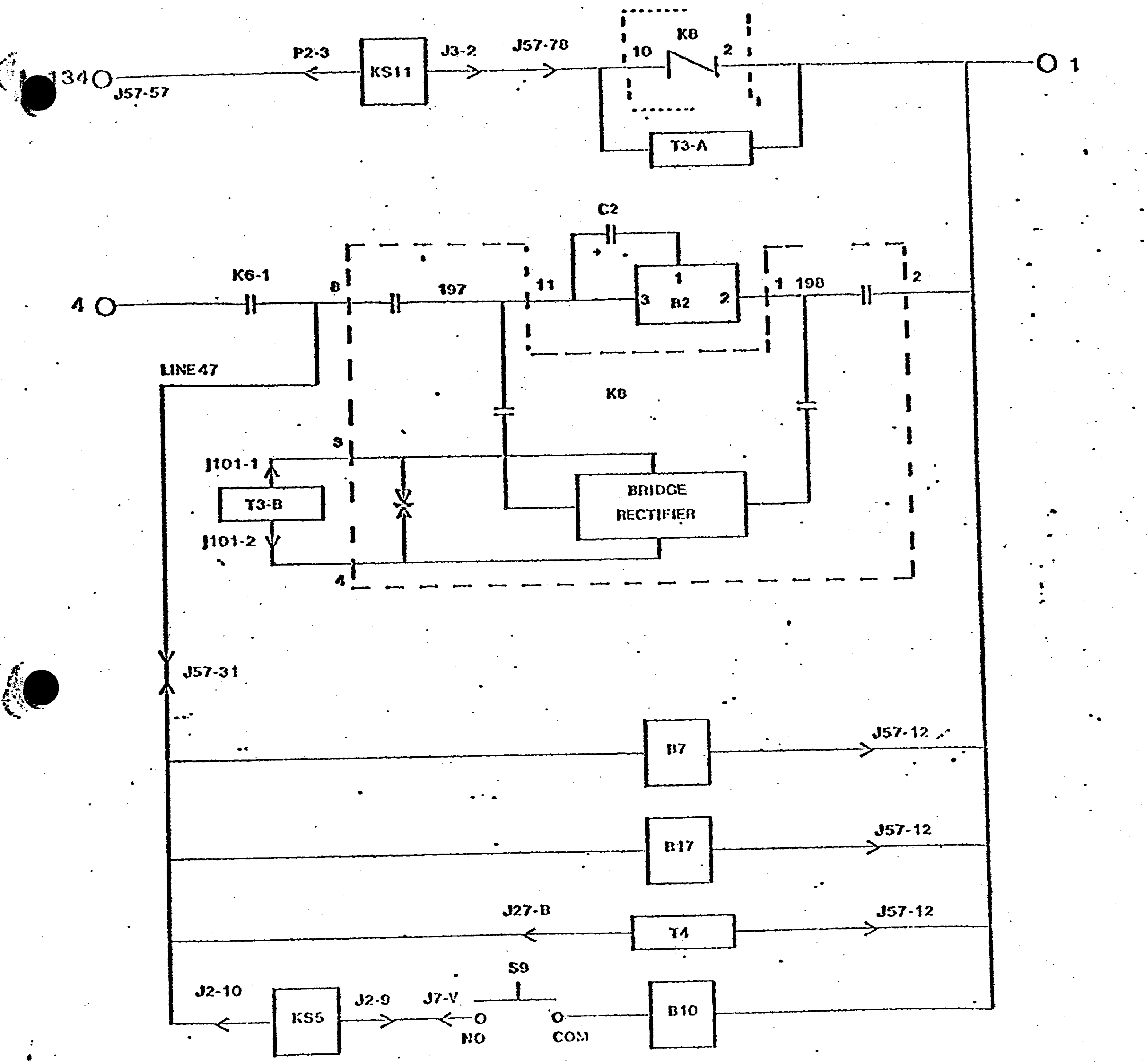
XEROX PARC	Project DOVER	LOWER HARNESS	File DOVER	Designer G CARLSEN	Rev	Date 123-15-78	Page 1 OF 4



KS1 = SOLID STATE RELAY
KS2 = SOLID STATE RELAY
KS3 = SOLID STATE RELAY
KS4 = SOLID STATE RELAY
KS6 = SOLID STATE RELAY
KS7 = SOLID STATE RELAY
KS9 = SOLID STATE RELAY
KS13 = SOLID STATE RELAY
L1 = PAPER FEEDER SOLENOID
L4 = REJECT SOLENOID
L5 = FUSER PRESSURE ROLLER SOLENOID
L8 = PUFFER SOLENOID
B3 = DEVELOPER DRIVE MOTOR
B4 = BRUSH DRIVE MOTOR
B5 = BRUSH VACUUM MOTOR
B8 = B TRANSPORT VACUUM
B9 = AIR PUMP MOTOR
B16 = OIL DISPENSER DRIVE M
PS1 = COROTRON POWER SU

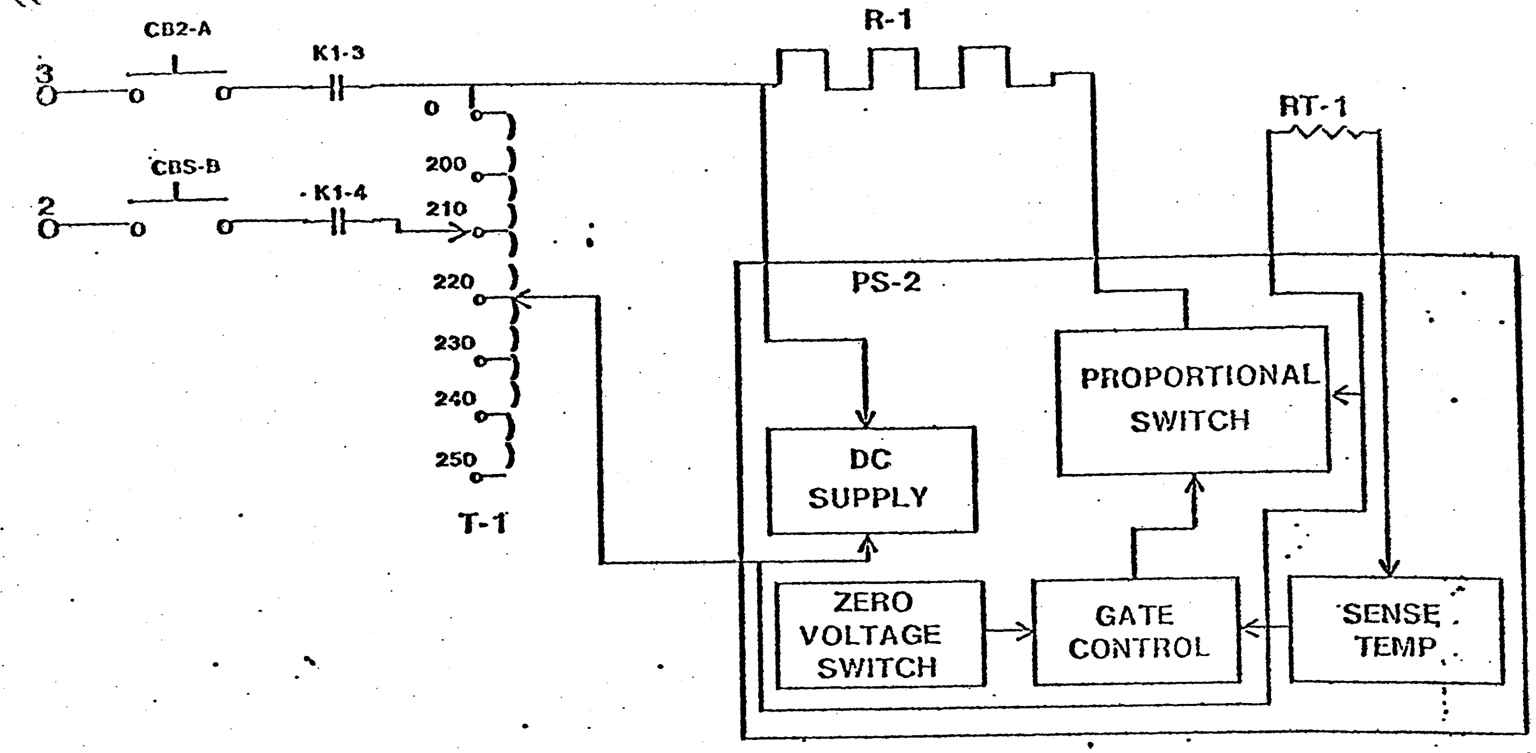
PS3 = DEVELOPER POWER SU
K6 = MAIN PRINT CONTACT
S11 = COROTRON TEST SWITC
F3 = FUSE

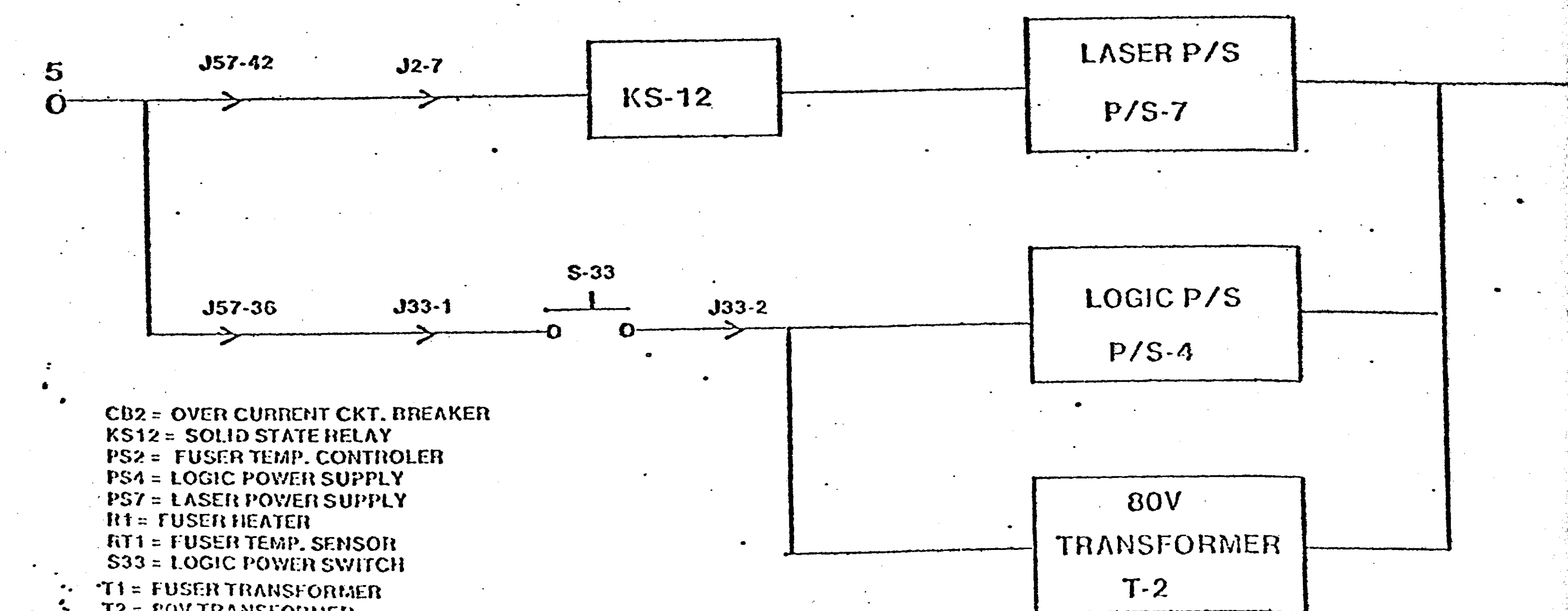
XEROX	Project		File DOVER	Designer C CARLSEN	Rev	Date	Page



C2 = STARTING CAPACITOR
K6 = MAIN PRINT
K8 = MOTOR BRAKE RELAY
T3 = MOTOR BRAKE TRANSFORM
B2 = MAIN MOTOR DRIVE
B7 = ALT TRANSPORT VACUUM MOTOR
B10 = TONER DISPENSER MOTOR
B17 = FUSER CURL MOTOR
T4 = ANTISTATIC BVAR TRANSFORMER
S9 = TONER CONTROL OFF/ON SWITCH
KS5 = SOLID STATE RELAY
KS11 = SOLID STATE RELAY

XEROX	Project	File DOVER	Designer	Rev	Date	Page





CB2 = OVER CURRENT CKT. BREAKER
KS12 = SOLID STATE RELAY
PS2 = FUSER TEMP. CONTROLER
PS4 = LOGIC POWER SUPPLY
PS7 = LASER POWER SUPPLY
R1 = FUSER HEATER
RT1 = FUSER TEMP. SENSOR
S33 = LOGIC POWER SWITCH
T1 = FUSER TRANSFORMER
T2 = 80V TRANSFORMER

DOVER COMPONENTS

A-1	Photo Cell

MOTORS

B-1	Elevator (Paper Tray) Drive Motor
B-2	Main Drive Motor
B-3	Dev. Drive Motor
B-4	Brush Drive Motor
B-5	Brush Vac. Motor
B-6	Brush Vac. Motor
B-7	'A' Transport Vac.
B-8	'B' Transport Vac.
B-9	Air Pump
B-10	Toner Dispenser Motor
B-11	Lower Cooling Fan
B-12	Upper Cooling Fan (Left)
B-13	Compressor
B-14	
B-15	
B-16	Oil Dispenser Drive Motor
B-17	Fuser Curl Motor
B-18	Upper Cooling Fan (Right)

CAPACITORS

C-1	Starting B1
C-2	Starting B2
C-3	Starting B3
C-4	Starting B13
C-7	B1 Anticoast Assy.
C-14	Starting B4

CIRCUIT BREAKERS

CB-1	Over Current Protection (Main Power)
CB-2	Over Current Protection (Fuser)

RECTIFIERS

CR-1	Surge Protect (C3)
CR-3	Rectifier (B1 Anti Coast)
CR-5	Surge Protect (C3)

CYCLE CONTROL SWITCHES

CS-5	Cycle Control Sw (Paper Feed/Timing)
CS-12	Cycle Control Sw (Puffer)

LAMPS

DS-1	Ready
DS-2	Not Ready
DS-3	Check
DS-4	Paper Tray
DS-5	Paper Path
DS-6	Remote

DS-7	Local
DS-8	Laser On
DS-9	Laser On
DS-10	Drum Discharge Lamp

FUSES

F-1	Motor Driver
F-3	Convenience Receptacle
F-5	Cooling Fans

CIRCUIT BOARDS

PCB-CA	Command Adapter
PCB-EC	Engine Control
PCB-MD	Motor Driver
PCB-RB	Relay Board
PCB-VA	Video Adapter

PLUGS/JACKS

P/J-1	Control Cons/Top Harness
P-2	Top Harness/Engine Control Board
J-2	Top Harness/Relay Board
J-3	Top Harness/Relay Board
P/J-3	Register Stop Drawer
P/J-4	Upper Cooling Fans
P/J-5	B8 ('B' Trans. Vac.)
P/J-6	LS-38
P-6	Logic Pwr to Mother Board
J-7	80v to Mother Board/Output to Poly Drive
P/J-7	Developer Housing
P/J-8	B3(Dev. Drive Motor)
P/J-9	B2(Main Drive Motor)
P/J-11	'A' Transport
P/J-12	B1 (Index Motor)
P/J-13	B1 (Anti Coast Ass.)
J-13	Up Har to P/J-3
P/J-14	LS-9
P/J-15	Photocell
P/J-16	Puffer Sol.
P/J-17	B4 (Brush Motor)
P/J-18	PS2
P/J-19	El Strip
P/J-23	Oil Disp. Motor
P/J-24	Thermistors/R-1
P/J-25	RT8
P/J-28	Cycle Control
P/J-30	Laser Power Supply
P/J-34	80v Transformer In
P/J-35	80v Transformer Out
P/J-36	80v Transformer In

P/J-39	Modulator Driver
P/J-57	Top Harness To Lower Harness
P/J-58	Paper Tray To Lower Harness
P/J-90	L-S 26 Drum Interlock

RELAYS

K-1	Main Power
K-6	Print
K-8	Motor Brake

SOLENOIDS

L-1	Paper Feed Sol.
L-4	Reject Sol.
L-5	Fuser Pressure Roll Up
L-8	Puffer

SWITCHES

LS-1	Jam Detector (Reg. Stop Mod.)
LS-2	Left Top Cover Interlock
LS-3	Mispuff Detector
LS-4	Low Paper
LS-8	Count/Reject Delay
LS-9	Multi Sheet Sensor
LS-13	Developer Interlock
LS-14	Sensing Bar
LS-15	Paper Tray Down
LS-19	Door Interlock
LS-20	Door Interlock
LS-21	Under Pressure
LS-22	Drawer Interlock
LS-24	Back Up Bar Interlock
LS-26	Drum Interlock
LS-27	'A' Transport Jam Detector
LS-31	Sensing Bar Down
LS-38	Fuser Jam
LS-61	Developer Front Interlock

METERS

M1	Total Copies Meter
M2	Billing Meter

POWER SUPPLIES

PS-1	Corotron Power Supply
PS-2	Fuser Controller
PS-3	Developer Power Supply
PS-4	Logic Pwr. Sup.
PS-6	Motor Brake
PS-7	Laser Power Supply
PS-39	Modulator Driver

RESISTORS

R-1	Fuser Roll Heater
R-2	Phase Shift (B-1)
R-4	B1 Anti Coast Assy.
RT-1	Fuser Controller Thermistor
RT-8	Fuser Over/Under Temp.

MANUAL SWITCHES

S-1	Power On/Off Console
S-2	Start Print
S-3	Stop Print
S-4	Local/Remote
S-5	
S-6	Paper Tray Position (Up/Down)
S-8	Developer Houseing On/Off
S-9	Toner On/Off
S-11	Corotron Test Sw.
S-14	Laser On (Key)
S-33	Logic Power On

TRANSFORMERS

T-1	Fuser Roll Control
T-2	80 Volt
T-3	Motor Brake
T-4	Anti Static Bar

A-1 (PHOTO CELL)

	COLOR	TO
A1-1	YELLOW	J15-4
A1-2	BLACK	J15-3
A1-3	BLACK	J15-2
A1-4	ORANGE	J15-1

B1 (INDEX MOTOR)

	WIRE NO.	COLOR	TO
1	30F1	BLUE	J12-6
2	1F3	WHITE	J12-5
3	32F1	BLACK	J12-1
3	32F2	BLACK	J12-2

B2 (MAIN DRIVE MOTOR)

WIRE NO.	COLOR	TO
97	BROWN	P9-1
197	BROWN	P9-3
198	BLACK	P9-2

B3 (DEVELOPER DRIVE)

WIRE NO.	COLOR	TO
1	WHITE	P/J8-1
99	RED	P/J8-2
100	ORANGE	P/J8-3

B4 (BRUSH DRIVE)

ICB/1W2	WHITE	P/J17-1/J57-11 WHITE
126AD/126	BLACK	P/J17-2/J17-2/FR J2-4

B5 & B6 (BRUSH VAC.)

1	WHITE	TB101
125	BROWN	TB1-125

B7 ('A' TRANSPORT VAC.)

1K4	WHITE TB1-1	
47K1	YELLOW	TB1-47

B8 ('B' TRANSPORT VAC.)

1	WHITE	PJ5-A
125	BROWN	PJ5-B

B9 (AIR PUMP)

	1	WHITE	P105-1
	232	BLACK	P105-2
	BND	GREEN	P105-3

BIO (TONER DISP. MOTOR)

	101	WHITE	P/J7-T
	21601	ORANGE	S9

B11 (LOWER COOLING FAN)

	1K3	WHITE P112-1	
	134K2	ORANGE	P112-2

B12 & B18 (UPPER COLING FANS)

	1N10	WHITE	P/J4-1
	134N3	ORANGE	P/J4-2

B13 (COMPRESSOR)

B13-1	-	-	C4 (-)
B13-2	-	-	C4 (+)
B13-3	1K5	WHITE	TB1-1
B13-GND	GND-2	GREEN	

B16 (OIL DISP. MOTOR)

	-	-	P23-1
	-	-	P23-2

C1 (B1 STARTING)

C1 (+)	30F1	BLUE	LS-14 COM
C1(+)	30F2	BLUE	P12-6
C1(-)	33F1	RED	R2

C2 (B2 STARTING)

C2(+)	197G1	BROWN	J57-21
C2(+)	197G2	BROWN	J57-25
C2(-)	97G1	BROWN J57-27	

C3 (B3 STARTING)

C3(+)	99	RED	P8-2
C3(+)	99G1	RED	J57-39
C3(-)	100	ORANGE	P8-3
C3(-)	100G1	ORANGE	J57-33

C-4 (STARTING B13)

C4(+)	25GZ	BROWN	TB1-25
C4(+)	-	-B13-2	B13-1
C4(-)	-	-	

C-7 (B1 ANTICOAST ASSY)

C7(+)	148	BLUE	R4
C7(-)	1	WHITE	E-1 PAPER FEEDER

CB-1

CB1-L1	2G1	BLACK	TB1-2
CB1-L2	3G1	RED	TB1-3
CB1-T1	4G1	ORANGEK1-1	
CB1-T1	4G2	ORANGE	K6-1
CB1-T2	5G1	YELLOW	K1-2
CB1-T2	5G2	YELLOW	K6-2

CB2

CB2-L1	G2	BLACK	TB1-2
CB2-L2	3G2	RED	TB1-3
CB2-T1	6G1	BLUE	K1-4
CB2-T2	7G1	BROWN	K1-3

DS-1 (READY)

DS1-A	30	RED	P1-Y
DS1-B	12	YELLOW	P1-L

DS-2 (NOT READY)

DS2-A	29	RED	P1-Y
DS2-B	13	ORANGE	P1-K

DS-3 (CHECK)

DS3-A	27	RED	P1-Y
DS3-B	9	BROWN	P1-F

DS-4 (PAPER TRAY)

DS4-A	27	RED	P1-Y
DS4-B	11	RED	P1-H

DS-5 (PAPER PATH)

DS5-A	28	RED	P1-Y
DS5-B	10	BLACK	P1-J

DS-6 (REMOTE)

DS6-A	32	RED	P1-Y
DS6-B	15/16	YELLOW	S4-1/P1-Z

DS-7 (LOCAL)

DS7-A	36	RED	P1-Y
DS7-B	14	BLUE	S4-3

DS-8 (LASER ON)

DS8-A	2	RED	P1-Y
DS8-B	4	ORANGE	P2-1

DS-9 (LASER ON)

DS9-A	1	RED	P1-Y
DS9-B	3	ORANGE	DS8-B/P2-1

L1 (PAPER FEED SOL)

	1F1	WHITE	3-1 (PAPER FEEDER)
	40F1	ORANGE	P58-33

L4 (REJECT SOL)

	1F1	WHITE	E-1 (PAPER FEEDER)
	341F1	YELLOW	P58-FF

L5 (FUSER PRESS)

	1	WHITE	P103-1
	332	BLACK	P103-2

L8 (PUFFER)

	-	-	J16-1
	-	-	J16-2

LS1

LS1-COM	47V1	YELLOW	P3-1
LS1-NC	12V	BLUE	P3-5
LS1-NO	262V1	BLACK	P3-6

LS2

LS3

LS3-COM	362V4	BLACK	P3-6
LS3-NC	354V1	BLUE	P3-3
LS3-NO	323V2	YELLOW	P3-2

LS4

LS4-COM	21F2	RED	J58-H/LS24-COM
LS4-NC	-	-	-
LS4-NO	27F1	RED	J58-U

LS8

LS8-COM	47F2	YELLOW	J11-A
LS8-NC	340F	ORANGE	J11-E
LS8-NO	112F	BLUE	J11-C

LS9

LS9-COM	-	-	J14-2
LS9-NO	-	-	J14-1

LS14

LS14-COM	30F1	BLUE	C1(+)
LS14-NC	149F1	BROWN	P/J13-A
LS14-NO	29F1	YELLOW	P/J13-F

LS15

LS15-COM	32F2	BLACK	P12-2
LS15-NC	31F1	BROWN	P58-HH

LS-21

LS21-COM	21K1	RED	TB1-21
LS21-NC	25K2	BROWN	K6-7

LS-24

LS24-COM	-	-	LS4-COM/J58-H
LS24-NC	-	-	LS31-COM

LS-26

LS26-COM	524T	BLUE	J90-1
LS26-NO	525M	BROWN	J90-2

LS-27

LS27-COM	12F	BLUE	J11-B
LS27-NO	11F	YELLOW	J11-D

LS-31

LS31-COM	-	-	LS24-NC
LS31-NC	-	-	J58-W

S1 (CONSOLE ON/OFF)

S1A-1	20	BLUE	P1-c
S1A-L1	22	YELLOW	P1-b
S1B-L1	19	BLUE	S1A-L1
SAB-2	21	ORANGE	P1-a

S2 (START PRINT)

S2A-COM	17	RED	P1-P
S2A-NO	38	BLACK	S4-2/
S2A-NC	39	BLACK	S3-NO/P1-X

S3 (STOP PRINT)

S3-COM	18	ORANGE P1-T	
S3-NO	40	BLACK	P1-X

S4 (LOCAL REMOTE)

S4-1	15	YELLOW	DS6-B
S4-2	38	BLACK	S2A-NO
S4-3	14	BLUE	DS7-B

S6 (PAPER TRAY UP/DOWN)

S6-L1	192F1	BLACK	P58-E
S6-1	348F1	BLUE	P58-K
S6-2	28F1	ORANGE	P58-P

S8 (DEV. HOUSING ON/OFF)

S8-L1	502	BLACK	P7-P
S8-1	315D1	RED	P7-L

S9 (TONER ON/OFF)

S9	338D1	BLACK	P7-V
	216D1	ORANGE	B10

S11 (COROTRON TEST SWITCH)

S11-COM	228C1	ORANGE	J57-59
S11-NO	283K1	YELLOW	F3-2
S11-NC	126C1	RED	J57-53

S14 (LASER ON)

S14-COM	-	-	P2 CONSOLE-1
S14-NO	-	-	P2 CONSOLE-2

P/J1 (CONTROL CONSOLE)

FROM			*TO*
P2-22	ORANGE	A	DS3-B
J32-No/P90-3	BLUE	B	P2-2(Cons) TOR COVER SW
		C	
		D	
		E	
J3-12	BROWN	F	DS3-B
J3-14	RED	H	DS4-B
J3-11	BLACK	J	DS5-B
J3-13	ORANGE	K	DS2-B
J3-10	YELLOW	L	DS1-B
P2-6	BROWN	M	P3-1(M-1)
P2-5	BLACK	N	P4-1 (M-2)
P2-12	RED	P	S2A-COM
		R	
		S	
P2-23	ORANGE	T	S3-COM
		U	
		V	
		W	
J57-38	BLACK	X	S3-NO/S2A-NC
(J31-+V5) 28VDC	RED	Y	VARIOUS
P2-24	YELLOW	Z	DS6-B
J57-51	ORANGE	a	S1B-2
J57-42	YELLOW	b	S1A-1
J7-P	BLUE	c	S1A-L1

P-2 (TOP HARNESS TO ENGINE CONTROL BOARD)

SIGNAL		
PHOTODETECTOR	1	J15-2
	2	
RT-8	3	J24-F
	4	
METER II	5	J1-N
METER I	6	J1-M
LED	7	J15-1
PUFFING	8	J23-CS12-NC
LS-4	9	J57-1
LS-24 & LS-31	10	J57-50
CS5	11	J23-CS5NC
START PRINT	12	J1-P
LS-1	13	J13-5
LS-9	14	J57-65
LS-22A	15	J14-COM CS-12
TONER INCREASE (S7)	16	P/J7-E
LS-38	17	P/J6-NO
LS-27	18	J57-77
LS-8	19	J57-71

LS-3	20	J13-3
LS-61	21	J11-28
LASER ON	22	J1-A
STOP PRINT	23	J1-T
LOCAL	24	J1-Z

J2 (RELAY BOARD)

DEV. DRIVE (B3)	1	J57-39 & J8-2
LINE 125	2	J57-40
LINE 125	3	J2-16
CLEANING BRUSH (B4)	4	J17-2
PUFFING (L8)	5	J16-2
OIL DISP. (B16)	6	J23-2
LINE 5	7	J57-42 & J1-B
LASER ON	8	J30-3
TONER DISP. (B10)	9	P/J7-V
LINE 47	10	J57-23
LINE 47	11	J57-24
LINE 47	12	
MAIN POWER (K1)	13	J57-14
S11 (COROTRON TEST)	14	J57-53
F5-0	15	F5-2
CORO. & DEV. P/S (PS1 &PS3)	16	J2-3
REJECT (L4)	17	J57-20
FUSER PRESS (L5)	18	J57-35

J3 (RELAY BOARD)

PAPER FEED (L1)	1	J57-63
MOTOR BRAKE	2	J57-78
LINE 134	3	J57-52
DS1	5	J57-7 & J19-2
LINE 21	6	J57-43
LINE 1	7	LINE 1A
	8	
	9	
"READY" LAMP	10	J1-L
"CLEAR"	11	J1-J
"CHECK"	12	J1-F
"NOT READY"	13	J1-K
"PAPER TRAY"	14	J1-H

P/J5 B8 ('B' TRANS. VAC.)

B8	WHITE	A	J57-11 & J7-T
B8	BROWN	B	J57-49

J6 (LS-38)

LS38-NO	ORANGE	1	P2-8
LS38-COM		2	28VGND

P-6 M.B. (LOGIC POWER TO MOTHER BOARD)

PIN NO.	*TO (PS-4)*
1	+V1 (+5V)
2	+V1 (+5V)
3	+V1 (+5V)
4	-V1 (+5V GND)
5	-V1 (+5V GND)
6	-V1 (+5V GND)
7	TB2-1/+V2 (-5.2V GND)
8	TB2-2/-V2 (-5.2V)
9	TB2-5/+V4 (+15VDC)
10	TB2-6/-V4(+15V GND)
11	TB2-4/-V3 (-15VDC)
12	TB2-3/+V3 (-15V GND)
13	TB2-8/-V5 (+28V GND)
15	TB2-7/+V5 (+28VDC)

JUMPER (-V4) + (-V5)

J11 DEVELOPER INTERLOCK

LS13 COM	RED	1	+38VDC
LS61 COM	BLUE	2	P2-21

J12 CORO. POWER SUPPLY

L1	WHITE	A	LINE 1A
L2	BROWN	B	J57-59/J26-B
CHAS GND		C	CHAS GND

P/J 11 ('A' TRANSPORT)

P58-J	A	LS8-COM
P58-T	B	LS27-COM
P58-N	C	LS8-NO
P58-BB	D	LS27-NO
P58-X	E	LS8-NC
	F	

P/J-12 INDEX MOTOR (B-1)

NOTE: PAPER TRAY NOISE SUPPRESSOR (DWR NO. 216630) INSERTS BETWEEN P-12 & J-12.

P-12		J-12
R2	1	B1-3
LS15-COM	2	B1-3
	3	
	4	
E1 (PAPER FEEDER)	5	B1-2
C1 (+)	6	B1-1

P/J-13 INDEX MOTOR BRAKE

P-13		J-13
R4	A	LS14-NC
C7 (-)	B	E1 (PAPER FEEDER)
	C	
	D	
CR3	E	P58-AA
CR3	F	LS14-NO

J13 (REAR OF P/J13)

J57-38	BLACK	1	LS-1 COM
N/A		2	LS-3 NO
P2-20		3	LS-3 NC
		4	
P2-13	BLACK	5	LS-1 NC
J57-38	BLACK	6	LS-3 COM/LS-1 NO
		7	
		8	

P/J14-(LS-9)

P14		J14
P58-CC	1	LS9-NO
P58-Y	2	LS9-COM

P/J 15 (PHOTOCELL)

J31-+V5	RED	1	+28VDC
P2-1	BLACK	2	PHOTO DET
P2-7	BROWN	3	LED
J31-+V5	RED	4	+28VDC

P/J 16 PUFFER SOL

L8	WHITE	1	LINE 1A
L8	BROWN	2	J2-5/CS12-NO

P/J 17 (B4 BRUSH DRIVE)

B4	WHITE	1	J57-11
B4	BLACK	2	J2-4

P/J 18 FUSER CONTROLLER (PS2)

PS-2	YELLOW	A	J57-41 (T1-230)
PS-2	BLUE	B	J25-1/J57-22 (R1, T1-0)
PS-2	BROWN	C	J24-B (RT1, RT8)
PS-2	BLACK	D	J24-D (RT1, RT8)
PS-2	RED	E	J24-C (RT1, RT8)

P/J 19 EL STRIP (DS1)

	WHITE	1	LINE 1B
	ORANGE	2	J57-7/J3-5 (K6-C1)

P/J 23 OIL DISP. MOTOR

B16-1	WHITE	1	J57-12
B16-2	BLUE	2	J2-6

P/J 24 (7-71) WICK

J24-B	124	A	R-1
J24-A	124	B	J18-C
RT1-RED	122	C	J18-E
RT1-RED	121	D	J18-D
RT8 BLUE	501	E	P2-3
RT8 BLUE	546	F	P2-3

P/J 73 CYCLE CONTROL

CS5-COM	BLACK	1	+28VGND
CS12-COM	BLACK	2	+28VGND
CS12-NC	BROWN	3	P2-8
CS5-NC	BLACK	4	P2-14

P/J 30 LASER POWER SUPPLY

WHITE	1	J57-8
	2	CHAS. GND
BROWN	3	J2-8

P/J 34 80V TRANSFORMER

T2	WHITE	1	J57-16
T2	YELLOW	22	PS4-AC

P/J 39 MODULATOR DRIVER (PS39)

PS39	1	PS4-+V4 (+15VDC)
PS39	2	
PS39	3	PS4--V4 (+15VGN)

PS-2

P/J-18

A	(T1-230)
B	(R1) P/J-25 (J57-22)
C	J24-B
D	J24-D
E	J24-C
F	

P/J57

P2-9	BLUE	1	RED	J58-U
28v GND	BLACK	2	BROWN	J58-M
J9-2	ORANGE	3	BLACK	K8-1
J35/J19-2	ORANGE	7	BROWN	K6-C1
J30-1	WHITE	8	WHITE	TB1-1
J31-ACC	WHITE	10	WHITE	TB1-502
J7-T	WHITE	11	WHITE	TB1-502
J26-L1	WHITE	12	WHITE	TB1-502
J2-13	RED	14	BROWN	K1-C1
J34-1	WHITE	16	WHITE	TB1-1
J3-7	WHITE	17	WHITE	TB1-1
J2-17	ORANGE	20	YELLOW	J58-FF
J9-3	RED	21	BROWN	C2(+)

J225-1/J18-B	BLUE	22	RED	T1-0
J2-10	YELLOW	23	YELLOW	TB1-47
J2-11	YELLOW	24	YELLOW	TB1-47
J9-1	BLACK	27	BROWN	C2(-)
J22-2	YELLOW	31	YELLOW	TB1-47
28v GND	BLACK	32	YELLOW	J58-BB
J8-3	BROWN	33	ORANGE	C3(-)
J27-B	YELLOW	34	YELLOW	TB1-47
J2-18	YELLOW	35	BLACK	L5
J33-NO	YELLOW	36	BLUE	J57-42
28v GND	BLACK	38	RED	J58-CC
J2-1/J28-2	BLUE	39	RED	C3(+)
J2-2	BROWN	40	BROWN	TB1-125
J18-A	YELLOW	41	YELLOW	T1-230
J1-6/J2-7	YELLOW	42	YELLOW	K6-2/J57-36
J3-6	RED	43	RED	TB1-21
28v GND	BLACK	44	ORANGE	J58-X
J5-B	BROWN	49	BROWN	TB1-125
P2-10	BROWN	50	ORANGE	J58-W
J1-a	ORANGE	51	ORANGE	TB1-134
J3-3	ORANGE	52	ORANGE	TB1-134
J2-14	BLACK	53	RED	S11-NC
J26-L2/J12-L2	BROWN	59	ORANGE	S11-COM
J3-1	RED	63	ORANGE	J58-EE
P2-14	BLACK	65	BROWN	J58-Y
P2-19	RED	71	BLUE	J58-N
P2--18	ORANGE	77	BLUE	J58-T
J3-2	BLUE	78	ORANGE	T3

P/J 58 (PAPER TRAY)

	A	TB1-134
	B	
P58-D	C	TB1-125
P58-C	D	J105-2
S6-L1	E	TB1-21
LS50-NO	F	J57-79
E-3 PAPER FEEDER	H	J57-2
P11-A	J	J57-71
S6-1	K	J57-73 (J58-HH)
LS50-NC	L	J57-4
E2 PAPER FEEDER	M	
P11-C	N	J57-71
S6-2	P	J57-56 (J58-AA)
LS50-COM	R	
E1 PAPER FEEDER	S	TB1-1
P11-B	T	J57-77
LS4-NO	U	J57-1
	V	
LS-31 NC	W	J57-50
P11-E	X	J57-44
P14-2	Y	J57-65
	Z	
J13-E	AA	J57-26 (J58-P)

P11-D	BB	J57-32
P14-1	CC	J57-38
	DD	
L1	EE	J57-63
L4	FF	J57-20
LS15-NC	HH	J57-5 (J58-K)

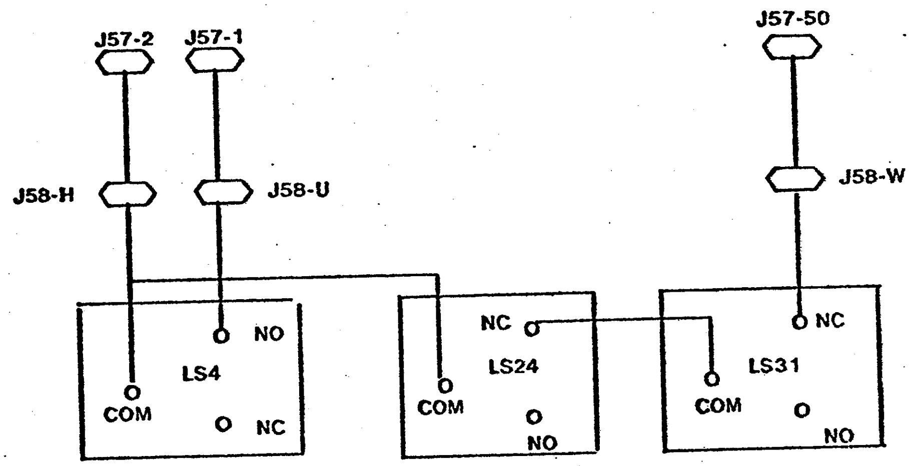
P/J 105 (AIR PUMP)

B9	WHITE	1	TB1-1
B9	BLACK	2	J58-D
B9	GREEN	3	GRND.

P/J 112 (LOWER COOLING FAN)

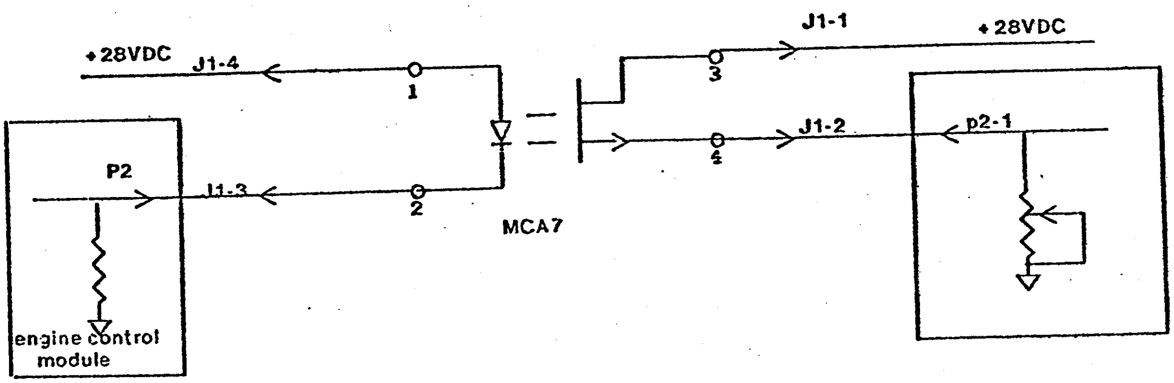
B11	1	TB1-1
B11	2	K1-C1

PAPERFEEDER SWITCH INTERCONNECT



LS4 = LOW PAPER SWITCH
LS24 = BACK-UP BAR INTERLOCK
LS31 = SENING BAR DOWN

PHOTOSENOR



FILE DOVERIIPAPERFD

J2

DEV DRIVE B3	1	J57-39&J8-2 BL
LINE 125	2	J57-40 BRN
LINE 125	3	J2-16 BRN
CLEAN.BRUSH B4	4	J17-2 RED
PUFFING L8	5	J16-2 BLU
OIL DISP B16	6	J23-2 BLU
LINE 5	7	J57-42&J1-b YEL
LASER ON	8	J30-3 BRN
TONER DISP S9	9	J7-V ORN
LINE 47	10	J57-23 YEL
LINE 47	11	J57-24 YEL
LINE 47	12	
MAIN POWER K1	13	J57-14 RED
S11-NC	14	J57-53 BLK
F5-2	15	J10-2 YEL
COR&DEV PS1,3	16	J2-3 J26-L2 J12-L2 BRN
REJECT L4	17	J57-20 ORN
FUSER PRESS L5	18	J57-35 YEL

J3

PAPERFEED	1	J57-63 RED
MOTOR BRAKE T3&T8	2	J57-78 BLU
LINE 134	3	J57-52 ORN
DS1	5	J57-7&J19-2 ORN
LINE 21	6	J57-43 RED
LINE 1	7	LINE 1A WHT
READY LAMP	10	J1-L YEL
CLEAR LAMP	11	J1-J BLK
CHECK LAMP	12	J1-F BRN
NOT RDY LAMP	13	J1-K ORN
PAPER TRAY	14	J1-H RED

P2

LOCAL	24	J1-Z YEL
STOP PRINT	23	J1-T ORN
LASER-ON	22	J1-A ORN
LS61-NO	21	J11-28 BLU
LS3	20	J13-3 RED
LS8	19	J57-71 RED
LS27	18	J57-77 ORN
LS38	17	J6-NO ORN
INCREASE S7	16	J7-E YEL
LS22A	15	J14-COMCS12 ORN
LS9	14	J57-65 BLK
LS1	13	J13-5 BLK
START PRINT	12	J1-P RED
CS5	11	J28-CS5NC
LS24 & LS31	10	J57-50 BRN
LS4	9	J57-1 BLU
LED	7	J15-1 BRN
METER I	6	J1-M BRN
METER II	5	J1-N BLK
RT8	3	J24-F BRN
PHOTO DET.	1	J15-2 BLK
PUFFING	8	J28-CS12-NC BRN

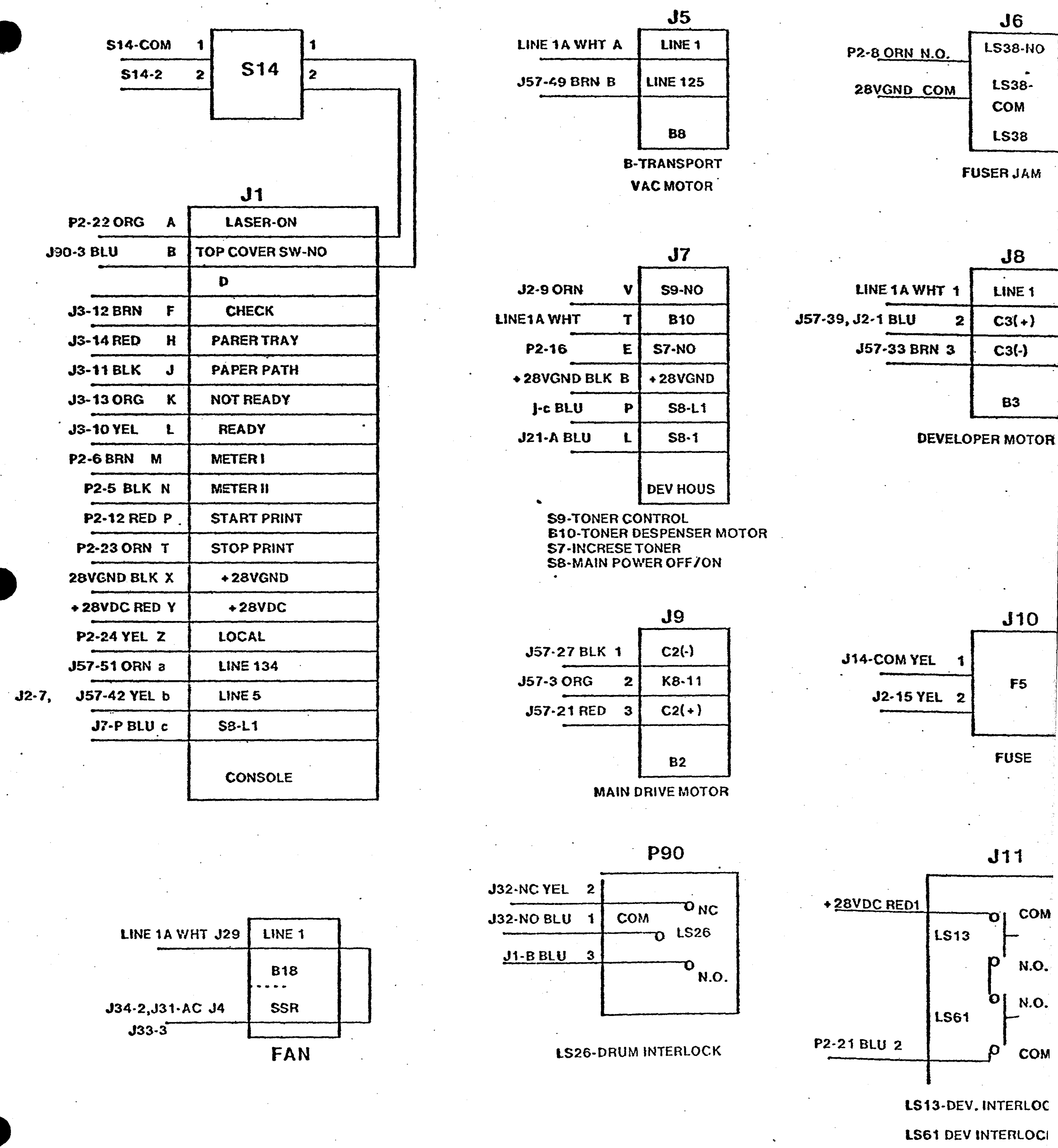
J57

LS4-NC	1	P2-9 BLU
LS4-LS24-COM	2	+28VGND BLK
K8-11	3	J9-2 ORN
K6-C1	7	J3-5&J19-2 ORN
LINE1	8	J30-1 WHT
LINE1	10	J31-ACC WHT
LINE1	11	LINE 1A WHT
LINE1	12	LINE 1B WHT
K1-C1	14	J2-13 RED
LINE47	23	J2-10 YEL
LINE1	16	J34-1 WHT
LINE1	17	J3-7 WHT
L4	20	J2-17 ORN
C2(+)	21	J9-3 RED
T1-0	22	J25(R1)-J18-B BLU
LINE47	24	J2-11 YEL
C2(-)	27	J9-1(B2) BLK
LINE28	28	
LINE47	31	J22-2(B17) YEL
LS27-NC	32	28VGND BLK
C3(-)	33	J8-3(B3) BRN
LINE47	34	J27-L2 YEL
L5	35	J2-18 YEL
LS9-NO	38	28VGND BLK
C3(+)	39	J2-1 & J28-2 BLU
LINE125	40	J2-2 BRN
T1-230	41	J18-A YEL
LINE5	42	J1-b & J2-7 YEL

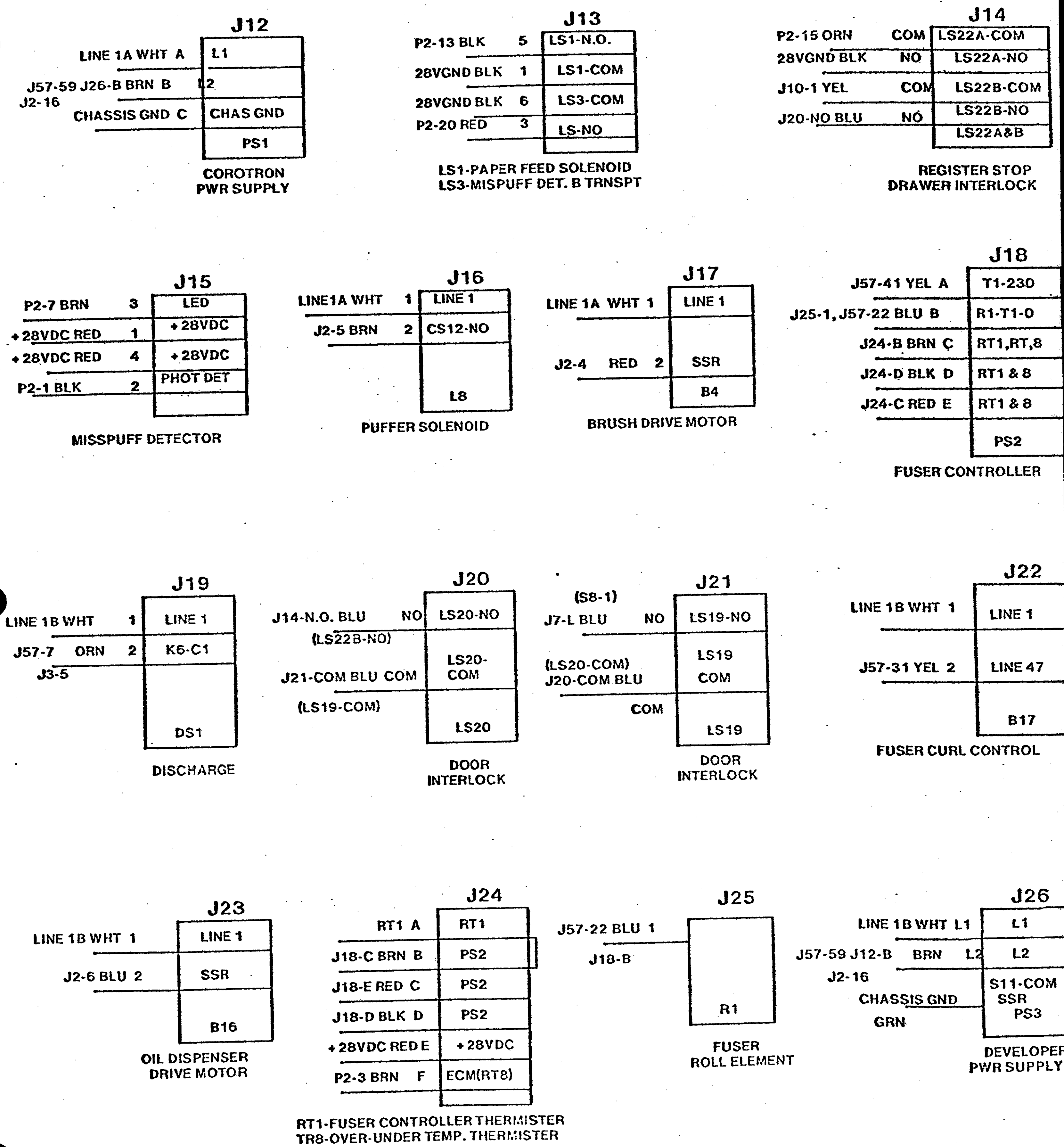
J57

LINE21	43	J3-6 RED
LS8-NC	44	28VGND BL
LINE125	49	J5-B BRN
LS31-COM	50	P2-10 BRN
LINE134	51	J1-a ORN
LINE134	52	J3-3 ORN
LINE5	36	J33-NO YEL
S11-NC	53	J2-14 BLK
LINE134	58	
S11-COM	59	J2-16 &J26-L2 &J12-L2 BRN
L1	63	J3-1 RED
LS9-COM	65	P2-14 BLK
LS8-COM	71	P2-19RED
LS27-COM	77	P2-18 ORN
T3 & K8	78	J3-2 BLU

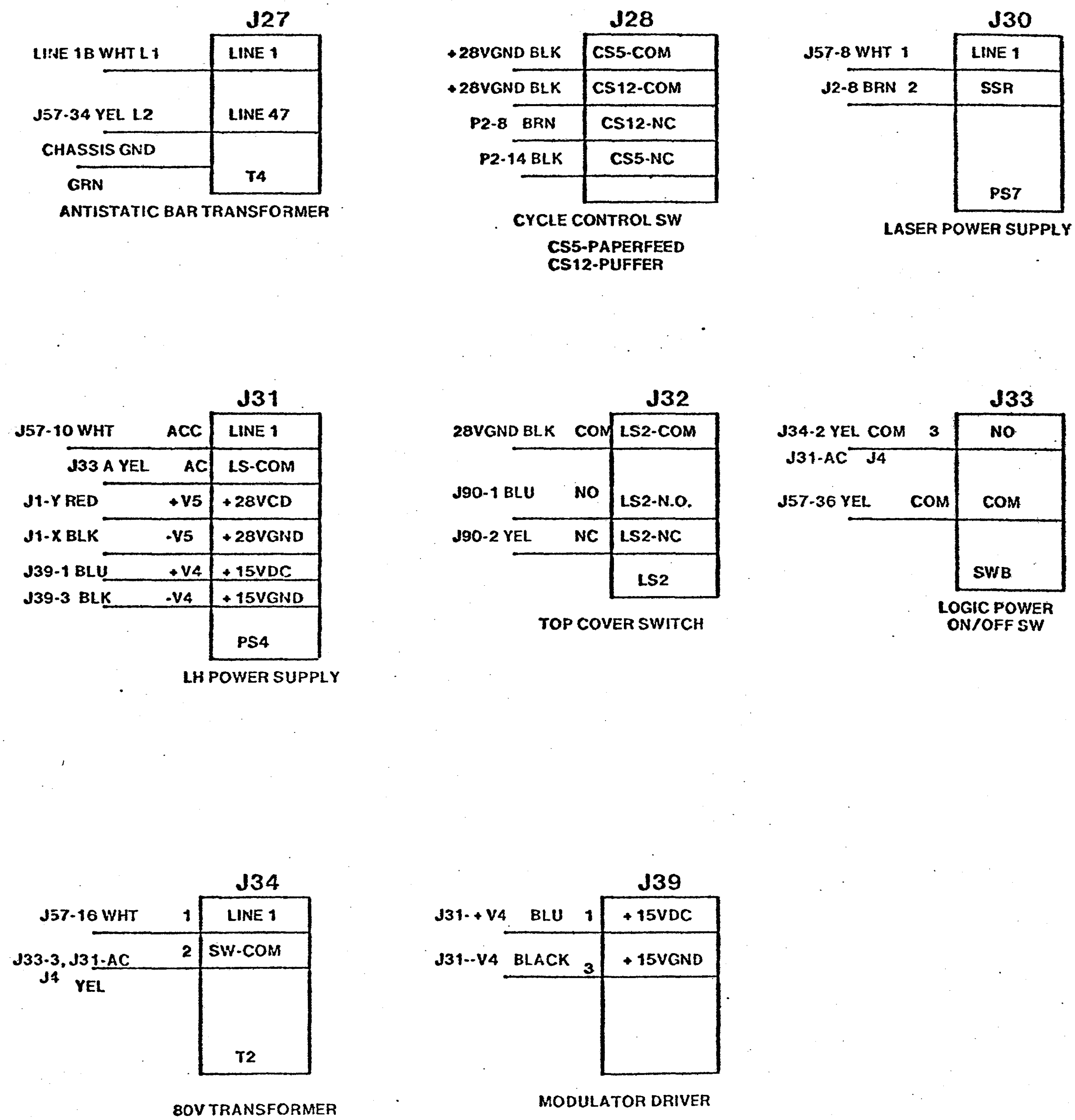
XEROX PARC	*Project* DOVER	TOP HARNESS	*File* DOVERIITOPHARA	*Designer* ED WAKIDA	*Rev* A	*Date* JUL 6, 1977	*Page* 1 OF 4



XEROX	Project	TOP HARNESS	File DOVERIITOPHARD	Designer	Rev	Date	Page



XEROX PARC	Project DOVER	TOP HARNESS	File DOVERIITOPHARB	Designer NISHIMURA	Rev A	Date JUL 7 77	Page 3 OF 4



XEROX PARC	Project DOVER	TOP HARNESS	File DOVERIITOPHARC	Designer ED WAKIDA	Rev A	Date JUL 7 77	Page 4 OF 4

DOVER PARTS

		DRW. NO.	PART NO.
ASSY, TOP HARNESS (printer)		216599	
CATCH, KEYLOCK ARM	4/Machine	216476	
RELAY (K8)			101$1093
POWER SUPPLY, +5V, ±15V, +28V 350W(PS4) MFG., LH RESEARCH INC., IRVINE CA			MM251-1Y3Y3Y6Y/115
AIR SPRING, MFG., GAS SPRING CORP., MONTGOMERYVILLE, PA	2/Machine		01111A-45 POUNDS
ASSY, CABLE-LOGIC POWER SUPPLY		216580	
ASSY, CABLE-80 VOLT INTERFACE		216589	
STUD, BALL, 5/16-18 THREAD MFG., GAS SPRING CORP., MONTGOMERYVILLE, PA			9505-2
CLIP, WIRE SAFETY MFG., GAS SPRING CORP., MONTGOMERYVILLE, PA	4/Machine		9501-2
ASSY, CABLE-PHOTOCELL		217182	
SWITCH, INTERLOCK (LS-2)			110P1248
ASSY, CABLE PAPER TRAY NOISE SUPPRESSOR		216630	
ASSY, CABLE, ORBIT		217165	
BOARD, EXTENDER MODULE		216545	
BOARD, COMMAND ADAPTER		217152	
BOARD, VIDEO ADAPTER		217145	
BOARD, MOTOR DRIVER		216549	
FUSE, MOTOR DRIVE 11/4 AMP, LITTELFUSE			3131.25-3AG
BOARD, ENGINE CONTROL		216564	
BOARD, RELAY MODULE		216536	
RELAY (KS1 THROUGH 13) TELEDYNE			601-1401P
RELAY (KS14 THROUGH 18) TELEDYNE			643-1
RELAY (P1) TELEDYNE			675-1
BOARD, MOTHER BOARD		216572	
LAMP, +5V, -5V, +15V, -15V, +28V			1911422-004

PANEL, CONTROL (OVERLAY)	216478	
SWITCH, POWER ON/OFF (S1)		110$743
SWITCH, START PRINT (S2)		110$745
SWITCH, STOP PRINT (S3)		110$741
METER, (M1, M2)		111P283
HOLDER, LAMP (DS6, 7, 8, 9)		1076899
LAMP, LED (DS6, 7) MFG., ELDEMA DIV., GENISCO TECH. CORP., COMPTON, CA		CD93-RCB-2810
SWITCH, LOCAL/REMOTE (S4) MFG., JBT INST., INC., NEW HAVEN, CT		PB-123
LAMP, 14V RED (DS2) MFG., PENN KEYSTONE CORP., ANSONA, CT		7541-2-2
LAMP, 14V GREEN (DS1) MFG., PENN KEYSTONE CORP., ANSONA, CT		7541-5-2
LAMP, 28V RED (DS3, 4, 5) MFG., PENN KEYSTONE CORP., ANSONA, CT		7541-2-3
LAMP, LED AMBER (DS8, 9) MFG., ELDEMA DIV., GENISCO TECH. CORP., COMPTON, CA		CD93-ACB-2810
ASSY, 80V TRANSFORMER	216579	
ASSY, ATTENUATOR MFG., HOPE ELECTRONICS, WANE, NJ		AT5-3-50 50 OHMS
SLOT HEAD ASSY. MFG., EOS PASADENA Consists of: Slot Head with motor driver harness Laser power supply Modulator driver assy. and cable	216607	
SWITCH, KEYED LASER POSER ON (S14) MFG., GRAYHILL INC., LAGRANGE, IL		50L60-01-02N
SWITCH, TOGGLE SPDT (S33)		132426
DRUM CLEANING BRUSH	~~[illegible]~~ 4R54	

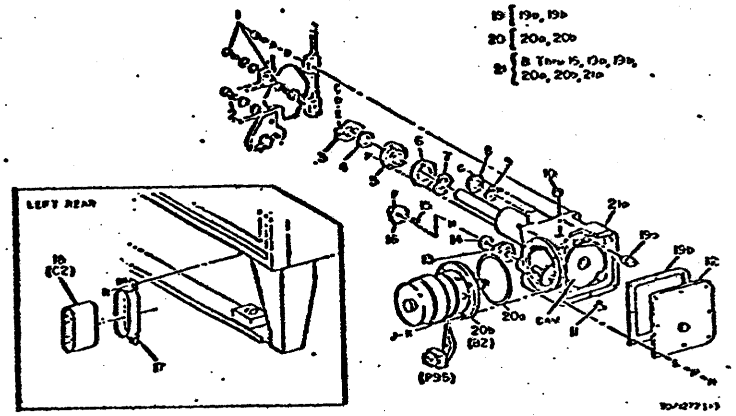
1 PARTS LIST

1. DRIVES AND CYCLE CONTROL

PL 1.1 Main Drive Motor and Gear Box

Ref. 226010

ITEM	PART	DESCRIPTION
1	26P1137	Screw
2	26P1138	Screw
3	19S473	Drum Clamp
4	14P1122	Spacer (0.080)
-	14P1123	Spacer (0.090)
-	14P1124	Spacer (0.100)
5	35S493	Seal
6	35P436	Gasket
7	28P412	End Play Washer
8	28P789	Shaft Retaining Ring
9	28P419	End Play Washer
10	3P694	Breather Plug
11	3P693	Drain Plug



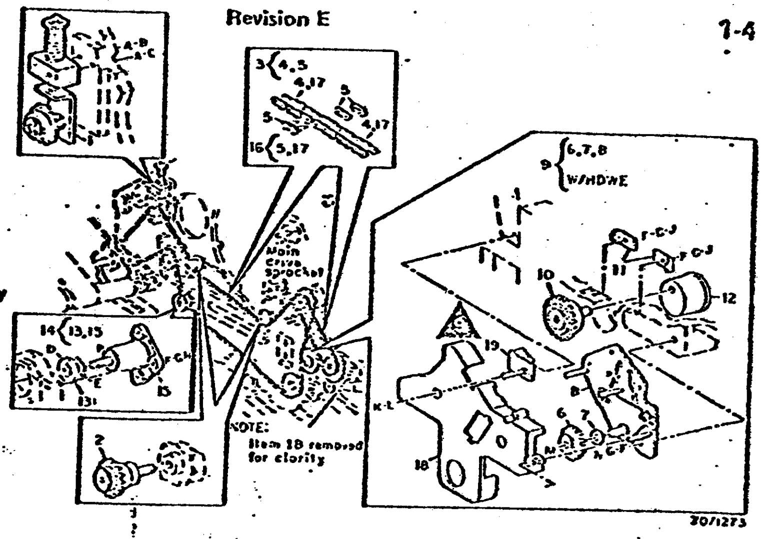
ITEM	PART	DESCRIPTION
12	2S1589	Gear Box Cover
13	35P651	Seal
14	28P518	Washer
15	29P638	Key
16	7P1158	Main Drive Sprocket
17	30P7635	Bracket (Includes Hardware)
18	702W02905	Main Drive Motor Capacitor (C2)
19	600S415	Scan Cam Follower Repair Kit
19a	—	Scan Cam Follower
19b	—	Gasket
20	600S1534	Main Drive Motor Repair Kit
20a	—	O-Ring
20b	—	Main Drive Motor
21	600S2991	Main Drive Motor and Gear Box Kit

ITEM	PART	DESCRIPTION
21a	—	Main Drive Motor and Gear Box Assembly
A	251W12102	Washer, Plain 3/8
B	256W12302	Lockwasher 3/8
C	132W29302	Capscrew, Allen Hd 10-32 x 1-1/4
D	256W11102	Lockwasher No. 10
E	251W22502	Washer, Plain No. 10
F	121W28401	Setscrew, Self-Lkg Cup Pt 10-32 x 1/4
G	113W16602	Screw, Mach Pan Hd 1/4-20 x 3/8
H	351W04303	Retaining Ring, Ext 7/16
J	131W38402	Capscrew, Hex Hd 5/16 x 7/8
K	256W11902	Lockwasher 5/16
L	251W10802	Washer, Plain No. 8
M	256W10902	Lockwasher No. 8

ITEM	PART	DESCRIPTION
N	113W23002	Screw, Mach Pan Hd 8-32 x 5/8
P	103W19802	Screw, Mach Flat Hd 8-32 x 1/2
R	112W36603	Screw, Mach Sems 8-32 x 3/8

PL 1.2 Main Drive Chain
Ref. 226011

ITEM	PART	DESCRIPTION
1	32S287	Spring-loaded Idler
2	7P768	L.H. Idler
-	7P1300	L.H. Idler (Alternate)
3	23S194	Main Drive Chain Assembly
4	—	P/O Item 3
5	23H18	Connecting Link *
6	7S1159	Sprocket Assembly
7	14P1668	Spacer
8	—	P/O Item 9
9	15S3115	Mounting Plate Assembly
10	7P2222	Idler Sprocket
11	19P437	Eccentric Cam Clamp
12	8P262	Eccentric Cam
13	5S1300	'B' Transport Sprocket



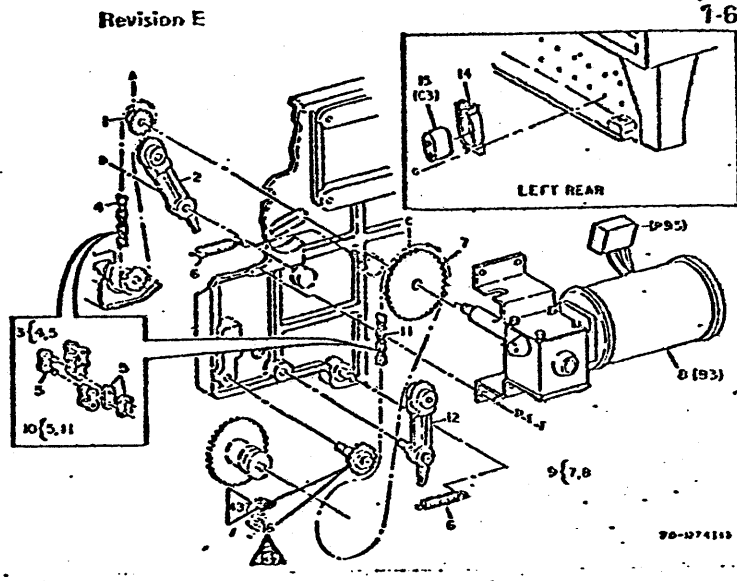
ITEM	PART	DESCRIPTION
14	2S3955	Housing Assembly
15	—	P/O Item 14
16	23S484	'A' Transport Chain Assembly
17	—	P/O Item 16
18	2P80655	Gear Cover *
19	19S1273	Cover Mounting Clip (Tag 9)
A	251W22502	Washer, Plain No. 10
B	132W29302	Capscrew, Allen Hd 10-32 x 1-1/4
C	132W29202	Capscrew, Allen Hd 10-32 x 3/4
D	141W22301	Setscrew, Allen Hd Cup Pt 8-32 x 3/16
E	141W22401	Setscrew, Allen Hd Cup Pt 8-32 x 1/4
F	251W11502	Washer, Plain 1/4
G	256W11502	Lockwasher 1/4

ITEM	PART	DESCRIPTION
H	113W32402	Screw, Mach Pan Hd 1/4-20 x 7/8
J	132W32202	Capscrew, Allen Hd 1/4-20 x 3/4
K	215W10502	Nut, Self-Lkg 4-40
L	251W21502	Washer, Plain No. 4
M	355W03203	E-Ring 5/16
N	113W32002	Screw, Mach Pan Hd 1/4-20 x 5/8
P	301W21301	Woodruff Key 1/8 x 3/8

*Requires 10S1273 for machine 226-010-724 and below.

PL 1.3 **Developer and Paper Feeder Drive**
Ref. 226012

ITEM	PART	DESCRIPTION
1	7P670	Developer Sprocket
2	31S558	Developer Idler Yoke
3	23S207	Developer Chain Assembly
4	—	Chain (P/O 3)
5	23H16	Connecting Link
6	9P752	Tension Spring
7	7P668	Paper Feeder Sprocket
8	—	Motor (P/O 9)
9	127S529	Developer/Feeder Drive Motor (B3) Assembly
10	23S206	Paper Feeder Chain Assembly
11	—	Chain (P/O 10)
12	31S559	Paper Feeder Idler Yoke



ITEM	PART	DESCRIPTION
[redacted]		[redacted]
14	30P7636	Mounting Bracket
15	102P252	Capacitor (C3 Developer Drive)
16	600S3712	Idler Sprocket (W/ TAG 437 and Bodine Motors Only)(See NOTE)
A	286W32204	Pin, Spirol 1/8 x 3/4
B	134W44001	Screw, Shld Allen Hd 10-24 x 1/2
C	286W29705	Pin, Spirol 1/8 x 1-1/8
D	251W10902	Washer, Plain No. 10
E	256W11102	Lockwasher No. 10
F	132W25802	Capscrew, Allen Hd 10-24 x 1/2
G	112W36603	Screw, Mach Sems 8-32 x 3/8

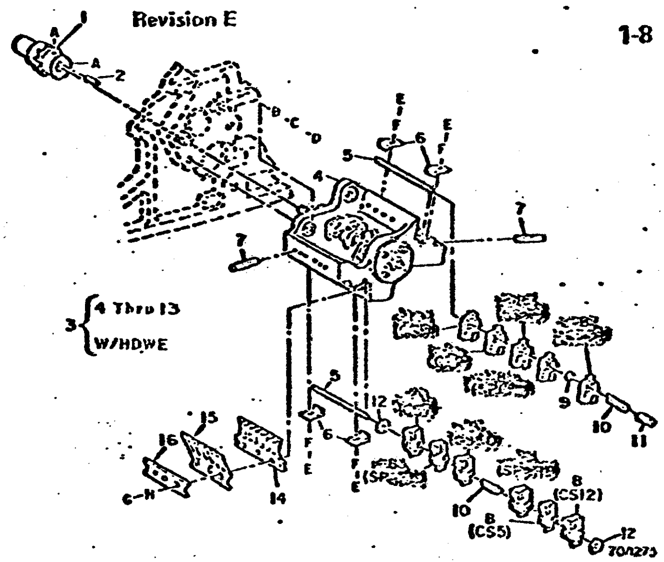
NOTE: This kit prevents developer/feeder motor shaft backup on duplicators containing Bodine (black) developer feeder drive motors.

1. DRIVES AND CYCLE CONTROL

PL 1.4 Cycle Control Assembly

Ref. 226013

ITEM	PART	DESCRIPTION
1	7P1579	Sprocket Assembly
-	7P977	Sprocket Assembly (Alternate)
2	29P815	Key
3	110S773	Cycle Control Assembly
4	—	P/O Item 3
5	24P144	Switch Mounting Rod
6	19P943	Rod Retaining Clip
7	26P836	Adjusting Screw
8	~~110P833~~ 110H111	Cycle Control Switch ~~[illegible]~~ CS5,CS12)
9	14P1162	Spacer
10	9P720	Switch Spring

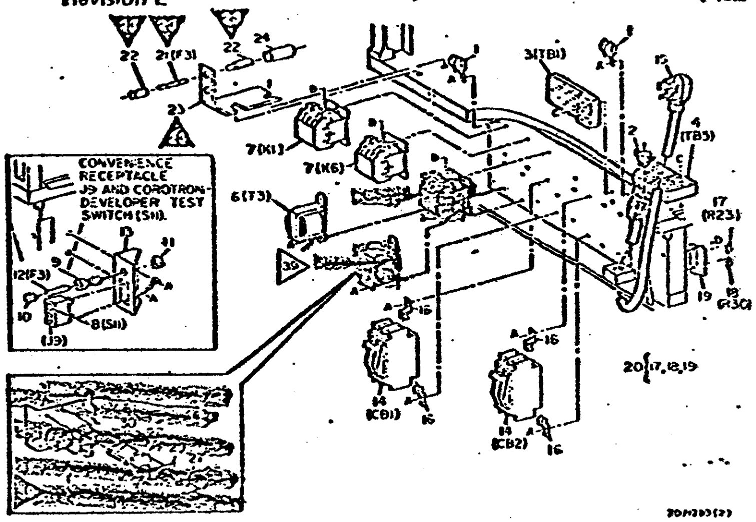


ITEM	PART	DESCRIPTION
11	14P1009	Spacer
12	118P257	Washer
~~13~~	~~[illegible]~~	~~Cycle Control Switch [illegible]~~
14	120P358	Switch Actuator
15	9P959	Switch Spring
16	19P750	Actuator Clamp
A	121W22602	Setscrew, Allen Hd Cup Pt 8-32 x 3/8
B	251W11502	Washer, Plain 1/4
C	256W11502	Lockwasher 1/4
D	132W32602	Capscrew, Allen Hd 1/4-20 x 1
E	256W10702	Lockwasher No. 6
F	132W19502	Capscrew, Allen Hd 6-32 x 3/8

2. CONTROL CONSOLE

PL 2.8 **Main Power Panel, Terminal Boards and Convenience Receptacle**

Ref. 226027



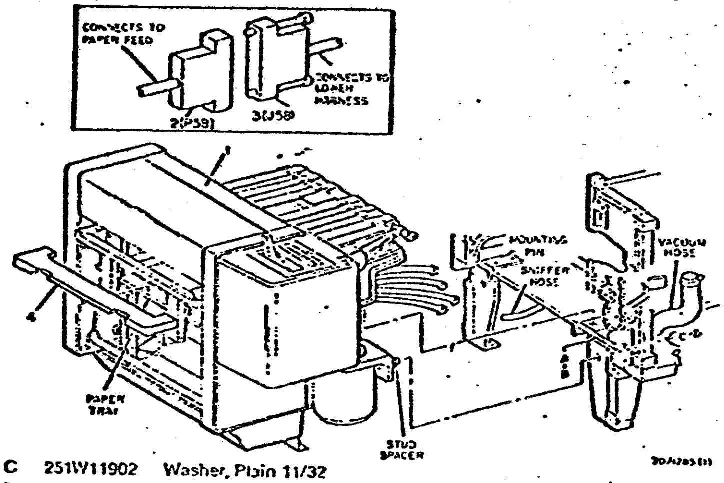
ITEM	PART	DESCRIPTION
1	120H121	Harness Clamp
2	120H14	Cable Clamp
3	116P1497	Terminal Block (TB1)
4	116P1525	Terminal Block (TB5)
~~[illegible]~~	~~[illegible]~~	~~[illegible]~~
6	105S190	Transformer (T3)
7	109P203	Relay (K1,K6~~[illegible]~~)
8	110P620	Convenience Receptacle (J9) and Corotron-Developer Test Switch (S11)
9	113P364	Fuse Holder Assembly
10	—	Cap (P/O 9)
11	—	Nut (P/O 9)
12	108P68	Fuse, 8 Amp (F3)
13	30P6828	Mounting Bracket
14	108S60	Circuit Breaker (CB1,CB2)
-	108P71	Circuit Breaker(Alternate)
-	108P72	Circuit Breaker(Alternate)
15	73S30	Power Cord
16	30P8990	Clip
-	19P1301	Clip (for alternate circuit breakers)
17	103S436	Resistor (R23)
18	103S435	Resistor (R30)
19	30P14074	Resistor Bracket
20	103S411	Resistor Assembly (R23 & R30)
21	708W02001	Fuse, 5 Amp (F3)(W/TAG 23)
22	113P354	Fuse Holder (W/TAG 23)
23	30P14374	Bracket (W/TAG 23)
24	118P80105	Shrink Tubing
~~25~~	~~[illegible]~~	~~[illegible] (W/TAG 39)~~
26	120P1150	Actuator-Switch (W/TAG 39)
27	110P1931	Switch (DC)(W/TAG 39)
28	110P1924	Switch (AC)(W/TAG 39)
29	--	Spacer-Mount (P/O 25) (W/TAG 39)
30	--	Spacer (P/O 25)(W/TAG 39)
31	--	Bracket, Timer-Switch (P/O 25)(W/TAG 39)
A	112W36503	Screw, Mach Sems 8-32 x 3/8
B	112W39603	Screw, Mach Sems 8-32 x 3/8
C	112W37403	Screw, Mach Sems 8-32 x 1-1/8
D	112W39310	Screw, Mach Sems 8-32 x 1/2
E	112W39610	Screw, Mach Sems 8-32 x 3/8

3. PAPER FEEDER

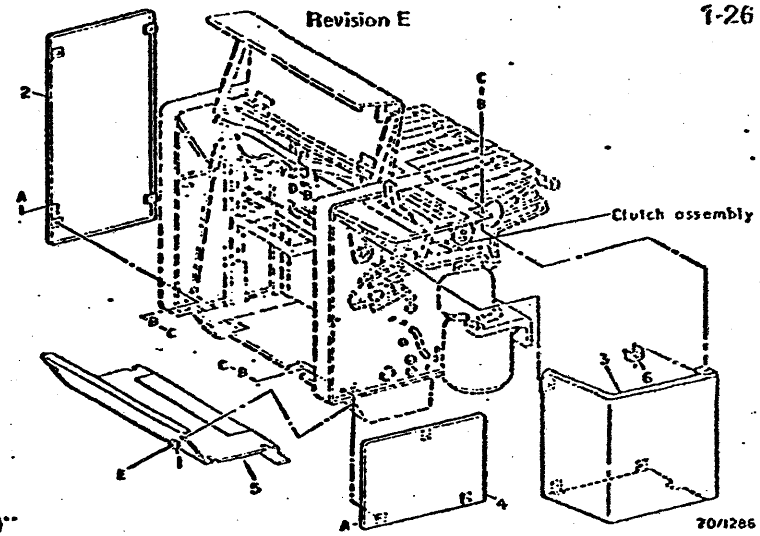
PL 3.1 Complete Paper Feeder

Ref. 226030

ITEM	PART	DESCRIPTION
1	22S1097	Paper Feeder Assembly (Includes 'A' Transport)
-	22S1930	Paper Feeder Assembly (Includes 'A' Transport) (Tag 21)
-	22S2026	Paper Feeder Assembly (Alternate)(Tag 21)
-	22S2027	Paper Feeder Assembly (Alternate)(With Texturec Panels)
2	713W40390	Connector (P58)
3	713W45390	Connector (J58)
4	600S60937	Paper Guide
A	251W12102	Washer, Plain 3/8
B	132W41502	Capscrew, Allen Hd 3/8-16 X 1
C	251W11902	Washer, Plain 11/32
D	131W38802	Capscrew, Hex Hd 5/16-18 x 1-1/4



PL 3.2 Side and Bottom Covers
Ref. 226031



ITEM	PART	DESCRIPTION
1	28P482	Washer
2	2P1662	Outboard Cover*
-	2P6334	Outboard Cover**
-	2P7422	Outboard Cover (Alternate)**
3	2S3293	Control Cover*
-	2S6307	Control Cover**
4	2P2251	Lower Inboard Cover*
-	2P6335	Lower Inboard Cover**
-	2P7423	Lower Inboard Cover (Alternate)**
5	2P2396	Bottom Cover*
-	2P6336	Bottom Cover**
-	2P7424	Bottom Cover (Alternate)**

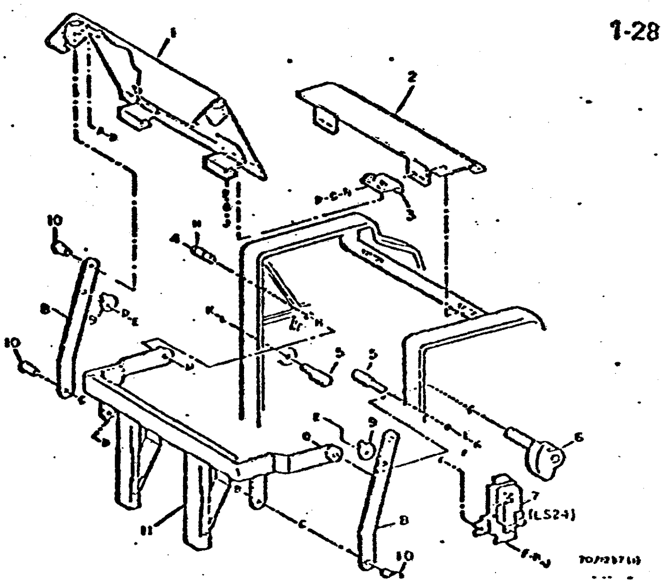
ITEM	PART	DESCRIPTION
6	27P276	Nut
A	233W10902	Nut, Tinnerman 8-32
B	251W10302	Washer, Plain No. 8
C	113W22702	Screw, Mach Pan Hd 8-32 x 7/16
D	113W23202	Screw, Mach Pan Hd 8-32 x 1-1/8
E	103W19603	Screw, Mach Flat Hd 6-32 x 3/8

*Smooth panels

**Textured panels

3. PAPER FEEDER

PL 3.3 Top Covers and Backup Bar
Ref. 226032



ITEM	PART	DESCRIPTION
1	2S2018	Top R.H. Cover*
-	2S6309	Top R.H. Cover**
2	2S2019	Top L.H. Cover*
-	2S6303	Top L.H. Cover**
-	2S7435	Top L.H. Cover (Alternate)**
3	30S4008	Bracket
4	6P1120	Shaft
5	29P694	Stop Pin
6	8S332	Cam Assembly
7	110S334	Backup Bar Interlock Switch (LS24)
8	12P162	Link
9	17P412	Eccentric

ITEM	PART	DESCRIPTION	ITEM	PART	DESCRIPTION
10	29P816	Pin	M	356W03102	Retaining Ring, Ext 5/16
11	30S4525	Backup Bar Assembly			
-	30S13327	Backup Bar Assy (Alternate)	N	251W22502	Washer, Plain No. 10
A	251W23102	Washer, Plain 1/4	P	113W23002	Screw, Mach Pan Hd 8-32 x 5/8
B	359W02503	Retaining Ring, Ext 1/4	Q	285W23005	Pin, Spirol 3/32 x 5/8
C	265W11502	Washer, Spring 1/4			
D	256W10702	Lockwasher No. 6	R	256W10302	Lockwasher No. 8
E	113W19502	Screw, Mach Pan Hd 6-32 x 5/16			
F	251W10802	Washer, Plain No. 8			
G	256W10902	Lockwasher No. 8			
H	355W03102	E-Ring 5/16			
J	113W22602	Screw, Mach Pan Hd 8-32 x 3/8			
K	113W23002	Screw, Mach Pan Hd 8-32 x 5/8			
L	256W11502	Lockwasher 1/4			

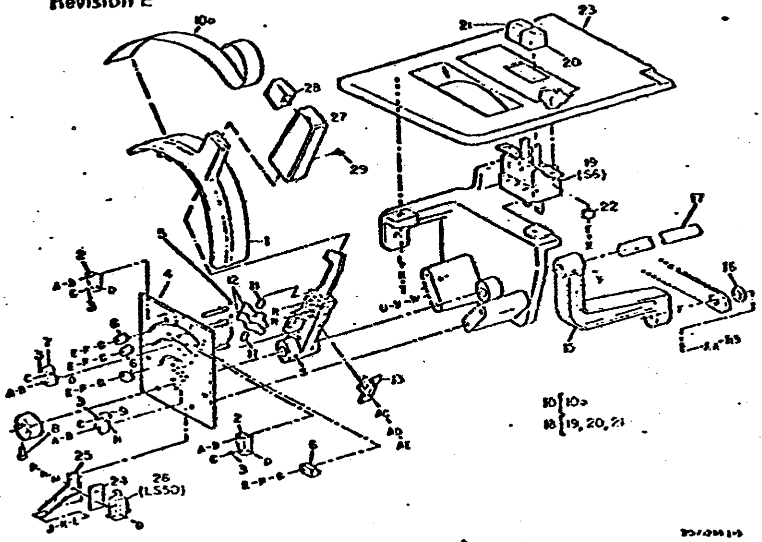
*Smooth Panels

**Textured Panels

3. PAPER FEEDER

PL 3.4 Paper Feeder Controls
Ref. 226033

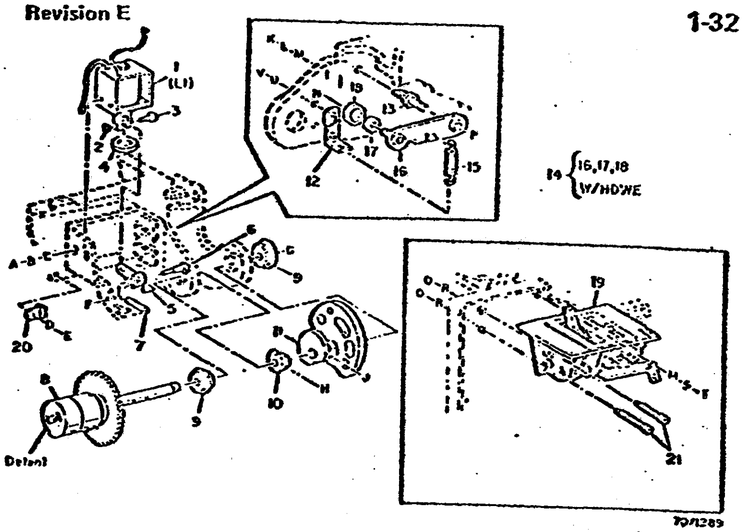
ITEM	PART	DESCRIPTION
1	18P186	Scale Segment
2	14P1189	Backup Block
3	3P257	Adapter Lock
4	15P1890	Stop plate
5	29P826	Stop Pin
6	14P1188	Adjusting Block
7	14P1187	Backup Block
8	5P866	Collar
9	14P1190	Backup Block
10	600S1937	Data Plate Kit (Contains 5 Data Plates)
10a	91P690	Data Plate
11	29P827	Pin
12	7P756	Pawl
13	9P947	Pawl Spring
14	—	DELETED
15	31P569	Linkage Arm



ITEM	PART	DESCRIPTION
16	14P1054	Shoulder Spacer
17	6P1050	Actuating Shaft
18	110S290	Up and Down Switch Assembly (S5)
19	—	P/O Item 18
20	3P767	Down Button
21	3P766	Up Button
22	14P1254	Spacer
23	56S193	Bezel
-	56S430	Bezel (Alternate)
24	140P860	Insulator
25	30P7927	Bracket
26	110P801	Legal-Letter Switch (LS50)
27	2P2209	Cover Handle
28	3P908	Button
29	26P1067	Screw
A	113W20202	Screw, Mach Pan Hd 6-32 x 3/4
B	258W10702	Lockwasher, Int Th No. 6
C	144W19401	Setscrew, Halfdog Pt 6-32 x 1/4
D	142W20502	Setscrew, Allen Hd Oval Pt 6-32 x 1
E	201W10702	Nut, Hex 6-32
F	256W10702	Lockwasher No. 6
G	251W10702	Washer, Plain No. 6
H	142W20202	Setscrew, Allen Hd Oval Pt 6-32 x 3/4
J	113W22702	Screw, Mach Pan Hd 8-32 x 7/16
K	256W10902	Lockwasher No. 8
L	251W10302	Washer, Plain No. 8
M	251W20802	Washer, Plain No. 2
N	256W10302	Lockwasher, No. 2
P	201W10302	Nut, Hex 2-56
Q	113W13302	Screw, Mach Pan Hd 2-56 x 1/2
R	141W16202	Setscrew, Allen Hd Cup Pt 4-40 x 1/8
S	286W29405	Pin, Spirol 1/8 x 5/8
T	113W23202	Screw, Mach Pan Hd 8-32 x 1-1/8
U	201W11302	Nut, Hex 10-32
V	251W10902	Washer, Plain No. 10
W	142W29802	Setscrew, Allen Hd Oval Pt 10-32 x 1-1/4
X	113W19602	Screw, Mach Pan Hd 6-32 x 3/8
Y	286W29205	Pin, Spirol 1/8 x 3/4
Z	—	DELETED
AA	256W11402	Lockwasher 1/4
AB	132W32202	Capscrew, Allen Hd 1/4-20 x 3/4
AC	251W11502	Washer, Plain 1/4
AD	256W10502	Lockwasher No. 4
AE	132W16402	Capscrew, Allen Hd 4-40 x 1/4

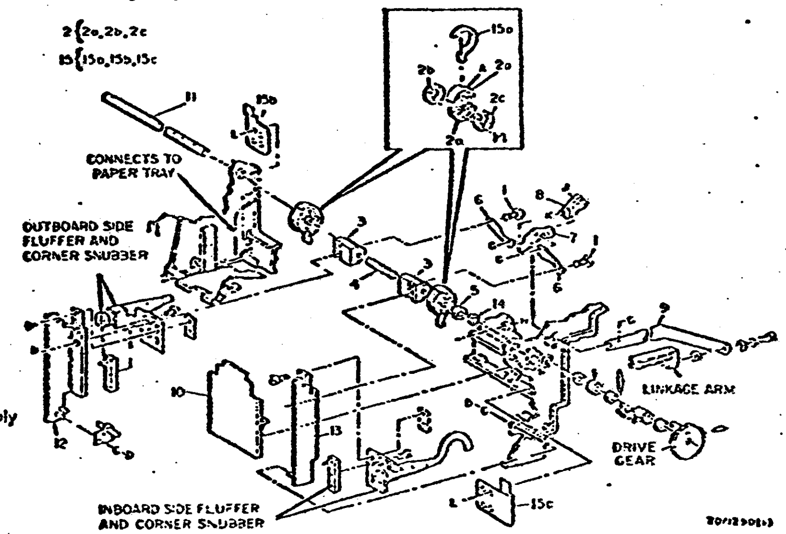
3. PAPER FEEDER

PL 3.5 Paper Feeder Cams and Clutch
Ref. 226034



3. PAPER FEEDER

PL 3.6 **Elevator Drive Shaft, Paper Guides and Length Adjusting Linkage**
Ref. 226035



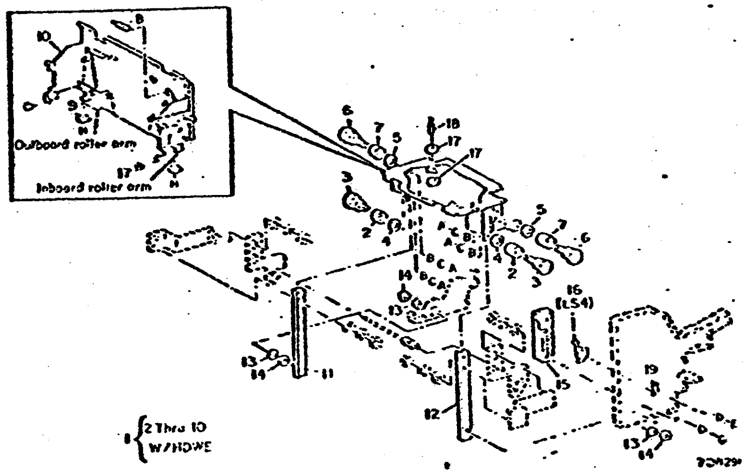
ITEM	PART	DESCRIPTION
1	26P898	Shoulder Screw
2	600S3697	Pulley Repair Kit (See NOTE)
2a	20P2044	Pulley (Two Halves)
2b	—	Ring Clamp
2c	—	Ring Clamp
3	10S363	Mounting Slide Assembly
4	9P767	Spring
5	5P798	Collar
6	12P286	Pivot Link
7	11S380	Pivot Lever
8	14S1803	Pivot Block
9	12P287	Adjusting Link
10	2S1657	Cover
11	6P1894	Elevator Drive Shaft
12	38S712	Outboard Paper Guide
13	38S711	Inboard Paper Guide
14	13H2100	Bearing
15	600S1528	Cable Retainer Kit
15a	28P929	Cable Retainer
15b	30P10590	Bracket - L.H.
15c	30P10589	Bracket - R.H.
A	286W23405	Pin, Spirol 3/32 x 7/8
B	115W28602	Screw, Mach Self-Lkg Pan Hd 10-32 x 3/8
C	256W11102	Lockwasher No. 10
D	201W11302	Nut, Hex 10-32
E	—	DELETED
F	—	DELETED
G	355W02503	E-Ring 1/4
H	354W04303	E-Ring 7/16
J	132W29202	Capscrew, Allen Hd 10-32 x 3/4
K	251W23102	Washer, Plain 1/4
L	112W26603	Screw, Mach Sems 6-32 x 3/8
M	113W19502	Screw, Mach Pan Hd 6-32 x 5/16

NOTE: If both pulleys fail, order two pulley repair kits.

3. PAPER FEEDER

PL 3.7 Paper Tray
Ref. 226036

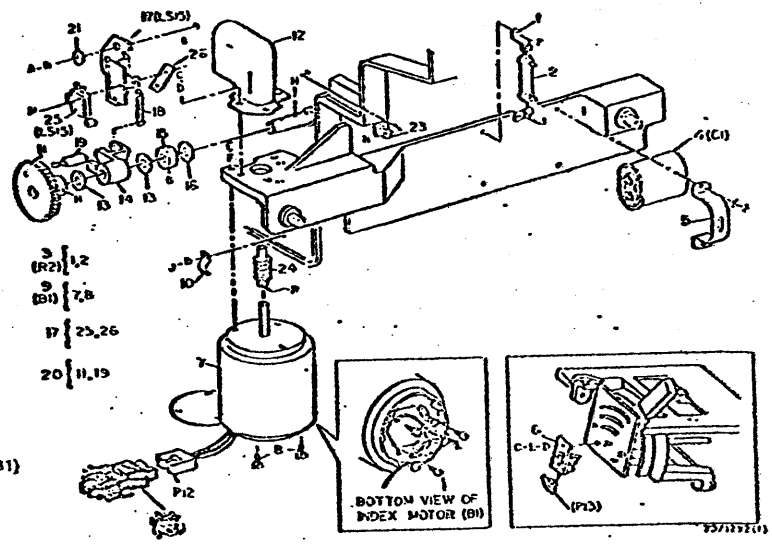
ITEM	PART	DESCRIPTION
1	50S590	Paper Tray Assembly
2	22P1160	Roller
3	29P1212	Eccentric Pin
4	28P748	Washer
5	28P747	Washer
6	29P1211	Pin
7	22P1161	Roller
8	9P801	Spring
9	20P519	Wheel
10	—	P/O Item 1
11	32S528	Outboard Tray Guide
12	32S527	Inboard Tray Guide
13	28P452	Washer
14	27P229	Nut
15	55S1160	Switch Shield



ITEM	PART	DESCRIPTION
16	110S705	Low Paper Switch (LS4)
17	27P222	Nut
18	12P277	Cable
19	15P1957	Plate
A	201W11102	Nut, Hex 10-32
B	256W11102	Lockwasher No. 10
C	251W22502	Washer, Plain No. 10
D	256W11102	Lockwasher No. 10
E	113W29702	Screw, Mach Pan Hd 10-32 x 1-1/8
F	251W22702	Washer, Plain No. 10
G	113W28802	Screw, Mach Pan Hd 10-32 x 1/2
H	354W01503	E-Ring 5/32

3. PAPER FEEDER

PL 3.8 Index Motor
Ref. 226037

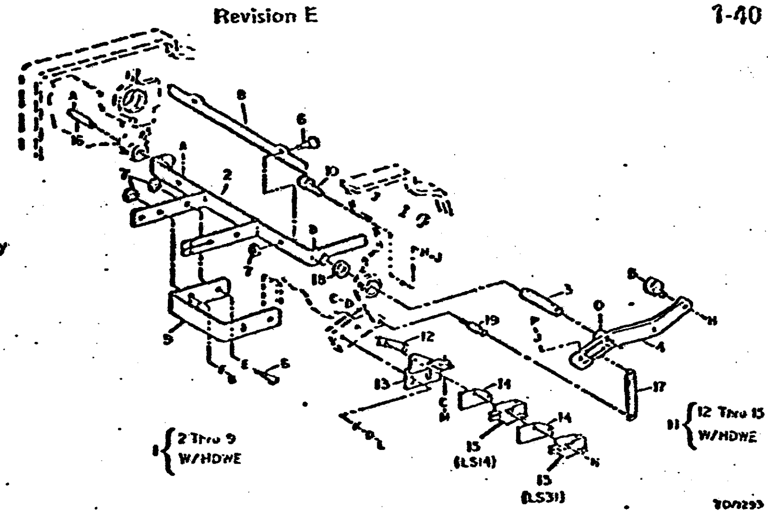


ITEM	PART	DESCRIPTION
1	–	Clip (P/O 3)
2	–	Resistor (P/O 3)
3	103P29	Resistor (R2)
4	702W09606	Capacitor (C1)
-	102P90	Capacitor (Alternate)
-	102P364	Capacitor (Alternate)
5	30P3174	Mounting Bracket
6	600S2318	Anti-Coast Kit (CR3,R4)(W/TAG 435)
7	–	Motor (P/O 9)
8	–	Screw (P/O 9)
9	127S538	Index Motor Assembly (B1)
10	120H145	Clamp
11	–	Gear (P/O 20)
12	2P5441	Cover

ITEM	PART	DESCRIPTION
13	28P445	Washer
14	31P654	Arm
15	5P754	Collar
16	13H280	Washer
17	110S289	Feeder Down Limit Switch Assembly
18	9P901	Spring
19	29P847	Pin
20	7S773	Gear Assembly
21	28P122	Washer
~~22~~	~~[illegible]~~	~~[illegible]~~
23	120H12	Cable Clamp
24	7P795	Worm Gear
25	110P207	Down Limit Switch (LS15)
26	–	Nut Plate (P/O 17)
A	113W28802	Screw, Mach Pan Hd 10-32 x 1/2
B	256W11102	Lockwasher No. 10
C	113W22602	Screw, Mach Pan Hd 8-32 x 3/8
D	251W10302	Washer, Plain No. 8
E	113W29202	Screw, Mach Pan Hd 10-32 x 3/4
F	251W22502	Washer, Plain No. 10
G	286W23605	Pin, Spirol 3/32 x 1
H	286W29205	Pin, Spirol 1/8 x 3/4
J	156W22602	Screw, Tapping Pan Hd 8-32 x 3/8
K	251W22202	Washer, Plain No. 8
L	259W10902	Lockwasher, Ext Th No. 8
M	153W17202	Screw, Tapping Pan Hd 4-24 x 3/4
N	112W20606	Screw, Mach Sems 8-32 x 3/8
P	156W19602	Screw, Tapping Pan Hd 6-32 x 3/8
R	286W22705	Pin, Spirol .094 x 7/16

3. PAPER FEEDER

PL 3.9 Sensing Bar
Ref. 226038



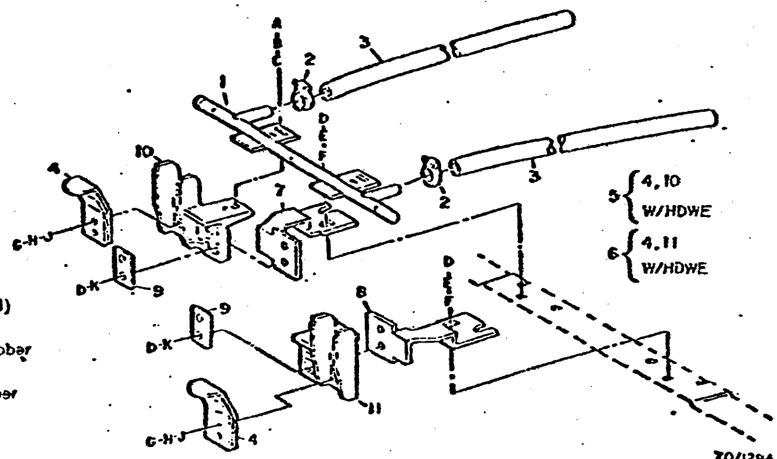
ITEM	PART	DESCRIPTION
1	25S384	Sensing Bar and Cam Follower Arm Assembly
2	--	P/O Item 1
3	--	P/O Item 1
4	--	P/O Item 1
5	8P293	Cam Follower
6	26P1518	Screw
7	27P291	Nut
8	25P255	Flutter Bar
9	17P607	Paper Tray Stop
10	8P505	Eccentric Cam
11	110S313	Switch Assembly
12	27H148	Nut Plate
13	--	P/O Item 11

ITEM	PART	DESCRIPTION
14	118P305	Switch Insulator
15	110P257	Switch (Tray Sensing Switch LS14 and Prevent Start Switch LS31)
16	6P1044	Shaft
17	9P764	Spring
18	13P536	Bearing
19	29P692	Pin
A	355W02503	E-Ring 1/4
B	286W32004	Pin, Spirol 1/8 x 5/8
C	201W11302	Nut, Hex 10-32
D	256W11102	Lockwasher No. 10
E	251W10703	Washer, Plain No. 6
F	251W22002	Washer, Plain No. 6
G	132W19602	Capscrew, Allen Hd 6-32 x 3/8
H	256W11402	Lockwasher 1/4
J	201W11502	Nut, Hex 1/4-20
K	251W10902	Washer, Plain No. 10
L	113W29002	Screw, Mach Pan Hd 10-32 x 5/8
M	113W29402	Screw, Mach Pan Hd 10-32 x 7/8
N	153W17702	Screw, Tapping Pan Hd 4-24 x 1-1/4
P	144W32201	Setscrew, Halfdog Pt 1/4-20 x 3/4
Q	286W32204	Pin, Spirol 1/8 x 3/4

3. PAPER FEEDER

PL 3.10 Welded Front Fluffer and Snubbers
Ref. 226040

ITEM	PART	DESCRIPTION
1	52S472	Paper Fluffer Tube Assembly
2	19P1173	Clamp
3	52P442	Hose
-	52S1094	Tube Assembly (Tag 21)
4	600S1454	Finger Support Kit
5	19S811	Outboard Flexible Snubber Assembly
6	19S812	Inboard Flexible Snubber Assembly
7	30S6701	L.H. Bracket Assembly
8	30S6702	R.H. Bracket Assembly



ITEM	PART	DESCRIPTION
9	15P2833	Washer Plate
10	—	P/O Item 5
11	—	P/O Item 6
A	113W19702	Screw, Mach Pan Hd 6-32 x 7/16
B	256W10702	Lockwasher No. 6
C	251W21902	Washer, Plain No. 5
D	113W28802	Screw, Mach Pan Hd 10-32 x 1/2
E	259W11102	Lockwasher, Ext Th No. 10
F	251W22202	Washer, Plain No. 8
G	113W15602	Screw, Mach Pan Hd 1/4-20 x 3/8
H	256W10502	Lockwasher No. 4
J	251W10402	Washer, Plain No. 4
K	256W11102	Lockwasher No. 10

3. PAPER FEEDER

PL 3.11 Welded Side Fluffers, Corner Snubbers and Roll Bar
Ref. 226041

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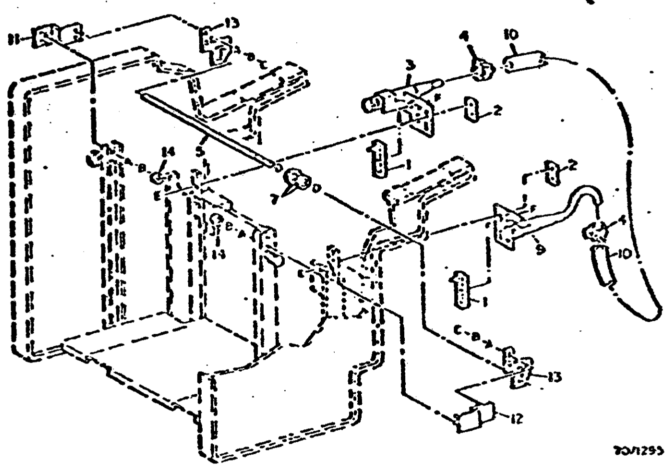


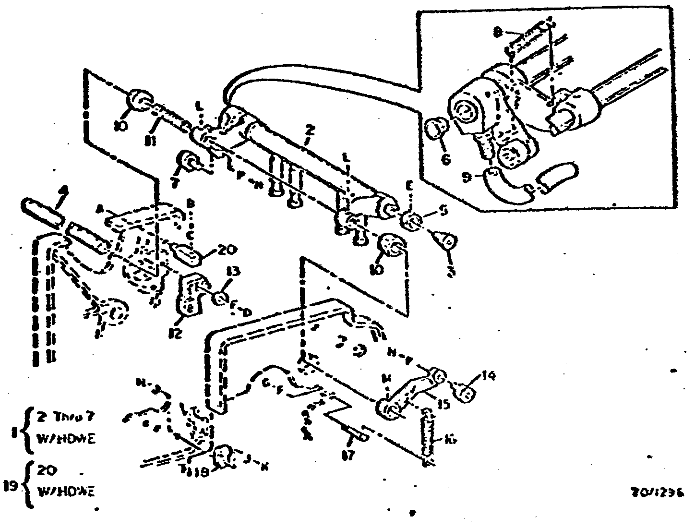
ITEM	PART	DESCRIPTION
1	17S559	Corner Snubber
2	15P2903	Nut Plate
3	52S901	Outboard Side Fluffer Tube Assembly
4	19P1173	Clamp
5	--	P/O Item 6
6	25S376	Rolling Bar Assembly
7	28P738	Washer
9	52S893	Inboard Side Fluffer Tube Assembly

ITEM	PART	DESCRIPTION
10	52P442	Hose
-	52S1034	Hose (Tag 21)
11	30S8240	Outboard Bracket Assembly
12	30S8241	Inboard Bracket Assembly
13	30P8237	Rolling Bar Bracket
14	27P291	Cap Nut
A	251W22002	Washer, Plain No. 6
B	256W10602	Lockwasher No. 6
C	201W10702	Nut, Hex 6-32
D	355W01203	E-Ring 1/8
E	103W19302	Screw, Mach Flat Hd 6-32 x 1/2
F	135W19201	Screw, Shld 4-40 x 1/4

3. PAPER FEEDER

PL 3.12 Sniffer
Ref. 226042

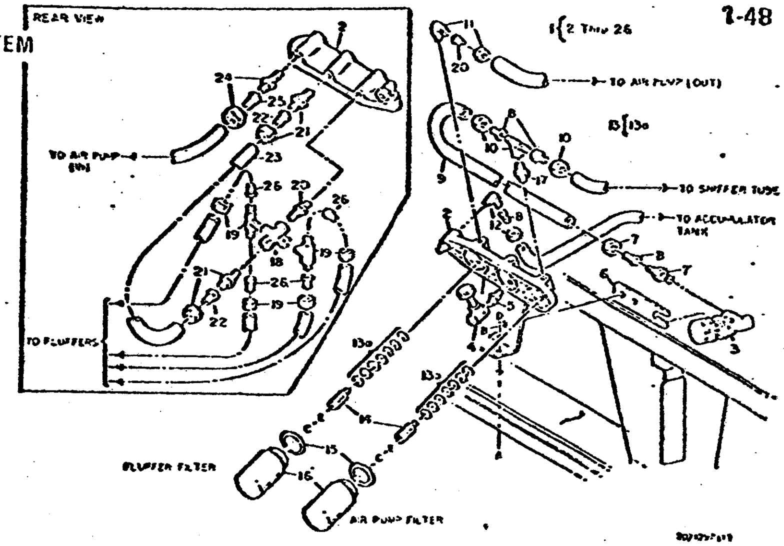
ITEM	PART	DESCRIPTION
1	52S799	Sniffer Assembly
2	—	P/O Item 1
3	3P1061	Plug
4	—	P/O Item 1
5	5P876	Collar
6	3P732	Plug
7	8P291	Cam Follower
8	9P769	Spring
9	52P568	Hose
-	52S1095	Hose (Tag 21)
10	13P542	Bearing
11	9P798	Spring
12	8P428	Right Angle Cam
13	28P122	Washer



ITEM	PART	DESCRIPTION
14	8P293	Cam Follower
15	31P567	Cam Follower Arm
16	9P765	Spring
17	29P693	Anchor Pin
18	120H12	Clamp
19	14S1407	Block Assembly
20	—	P/O Item 19
A	201W22302	Nut, Hex 3/8-16
B	142W35002	Setscrew, Allen Hd Oval Pt 1/4-28 x 1-1/2
C	201W12002	Nut, Hex 1/4-28
D	131W30002	Capscrew, Hex Hd 10-32 x 1-1/2
E	142W16201	Setscrew, Allen Hd Oval Pt 4-40 x 1/8
F	256W11102	Lockwasher No. 10
G	201W11302	Nut, Hex 10-32
H	233W10902	Nut, Tinnerman 8-32
J	251W10802	Washer, Plain No. 8
K	113W23002	Screw, Mach Pan Hd 8-32 x 5/8
L	286W32404	Pin, Spirol 1/8 x 7/8
M	286W32604	Pin, Spirol 1/8 x 1
N	201W11702	Nut, Hex 1/4-28
P	256W11402	Lockwasher 1/4

4. SNIFFER AND FLUFFER AIR SYSTEM

PL 4.1 **Fluffer and Air Pump Filter Bottles (Without Tag 21) Ref. 226043**



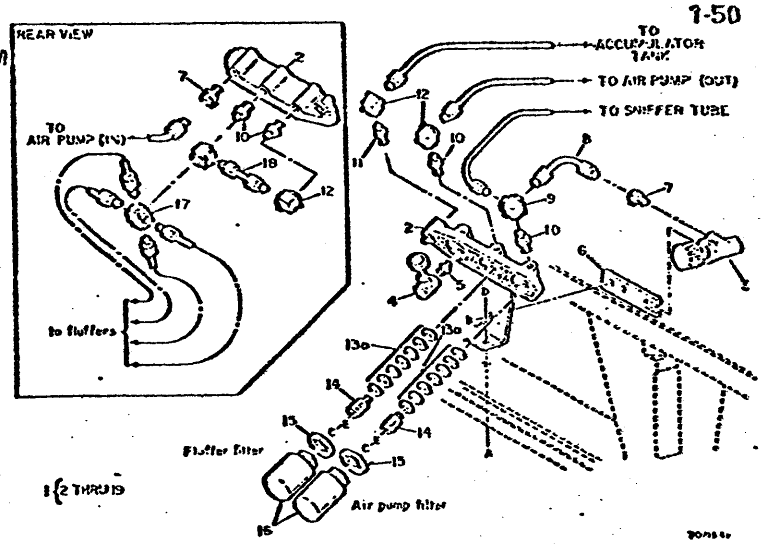
ITEM	PART	DESCRIPTION
1	53S175	Complete Air Filter Assembly
2	--	P/O Item 1
3	53P160	Sniffer Relief Valve
4	53P193	Fluffer Relief Valve
5	52P705	Adapter
6	30S7287	Bracket
7	52P328	Adapter (Includes nut)
8	52P355	Insert
9	52P838	Hose
10	52P839	Tee (Includes two nuts)

ITEM	PART	DESCRIPTION
11	52P724	Elbow (Includes nut)
12	52P527	Elbow (Includes nut)
•	52P731	(alternate)
13	600S536	Filter Kit (Contains 14 filters)
13a	52P63	Filter
14	52P448	Mounting Tube
15	35P524	Gasket
16	93P69	Filter Bottle
17	52P840	Adapter
18	52P734	Cross
•	52P943	Cross (Alternate)
19	52P338	Tee (Includes nuts)
20	52P326	Adapter
21	52P328	Adapter (Includes nut)
22	52P329	Insert
23	52P479	Hose
24	52P353	Adapter (Includes nut)
25	52P355	Insert
26	52P329	Insert

ITEM	PART	DESCRIPTION
A	112W52804	Screw, Mach Sems 10-32 x 1/2
		8-32 x 3/8
C	113W31602	Screw, Mach Pan Hd 1/4-20 x 3/8
D	220W11304	Nut, Self Lkg 10-32
E	251W23302	Washer, Plain 1/4

4. SNIFFER AND FLUFFER AIR SYSTEM

PL 4.2 **Fluffer and Air Pump Filter Bottles (With Tag 21) Ref. 226149**



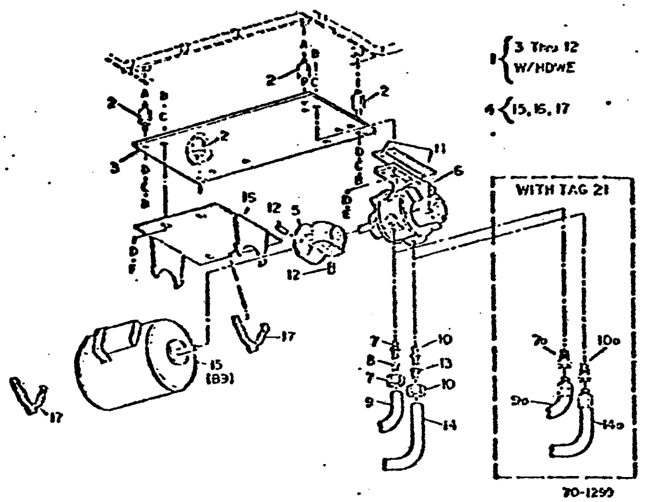
ITEM	PART	DESCRIPTION
1	53S234	Complete Air Filter Assy
2	--	Part of Item 1
3	53P160	Sniffer Relief Valve
4	53P193	Fluffer Relief Valve
5	52P706	Adapter
6	30S7287	Bracket
7	452W25602	Adapter (W/Spring Clip)
8	52S1098	Hose
9	452W34002	Tee
10	452W15602	Adapter (With O-Ring)
11	452W15702	Adapter (With O-Ring)
12	452W30502	Elbow (W/2 Spring Clips)

ITEM	PART	DESCRIPTION
13	600S536	Filter Kit (14)
•	52P63	Filter (One)
14	52P448	Mounting Tube
15	35P524	Gasket
16	93P69	Filter Bottle
17	452W52002	Cross Assy
18	52S1097	Hose
19	70P54	Lubricant
A	112W52804	Screw, Mach Sems 10-32 x 1/2
B	113W22602	Screw, Mach Pan Hd 8-32 x 5/8
C	113W31602	Screw, Mach Pan Hd 1/4-20 x 3/8
D	220W11304	Nut, Self Lkg 10-32
E	251W23302	Washer, Plain 1/4

4. SNIFFER AND FLUFFER AIR SYSTEM

PL 4.3 Air Pump and Motor
Ref. 226044

ITEM	PART	DESCRIPTION
1	127S965	Air Pump and Motor Assembly
2	4P135	Mounting Pad
3	--	P/O Item 1
4	127S613	Air Pump Motor (B9)
5	5P1034	Flexible Coupling
6	54P222	Air Pump
7	52P353	Adapter
7a	452W25602	Adapter (Tag 21)
8	52P355	Insert
9	52P346	Hose
9a	52S1101	Hose (Tag 21)
10	52P328	Adapter
10a	452W25602	Adapter (Tag 21)

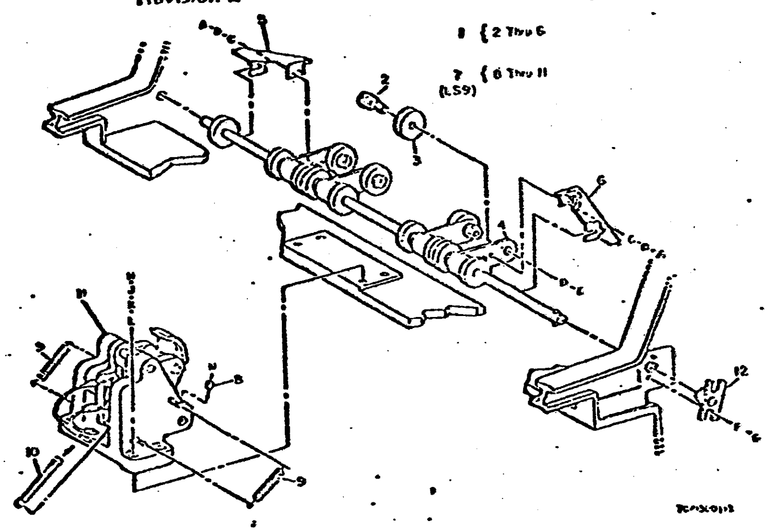


ITEM	PART	DESCRIPTION
11	14P1398	Shim
12	--	P/O Item 5
13	52P329	Insert
14	52P348	Hose
14a	52S1153	Hose (Tag 21)
15	--	P/O Item 4
16	--	P/O Item 4
17	--	P/O Item 4
A	251W23302	Washer, Plain 1/4
B	201W11502	Nut, Hex 1/4-20
C	256W11502	Lockwasher 1/4
D	251W11502	Washer, Plain 1/4
E	131W32302	Capscrew, Hex Hd 1/4-20 x 1-1/4
F	131W32202	Capscrew, Hex Hd 1/4-20 x 3/4

5. A TRANSPORT

PL 5.1 Pinch Wheels and Multi-Sheet Sensor
Ref. 226050

ITEM	PART	DESCRIPTION
1	6S1135	Pinch Wheel Assembly
2	26P895	Screw
3	13P649	Pinch Wheel
4	—	P/O Item 1
5	38S612	Inboard Paper Guide
6	38S613	Outboard Paper Guide
7	30S8210	Multi-sheet Sensor Assembly (LS9)
8	3P257	Lock
9	9P870	Spring
10	9P869	Spring
11	—	P/O Item 7
12	5P755	Flange

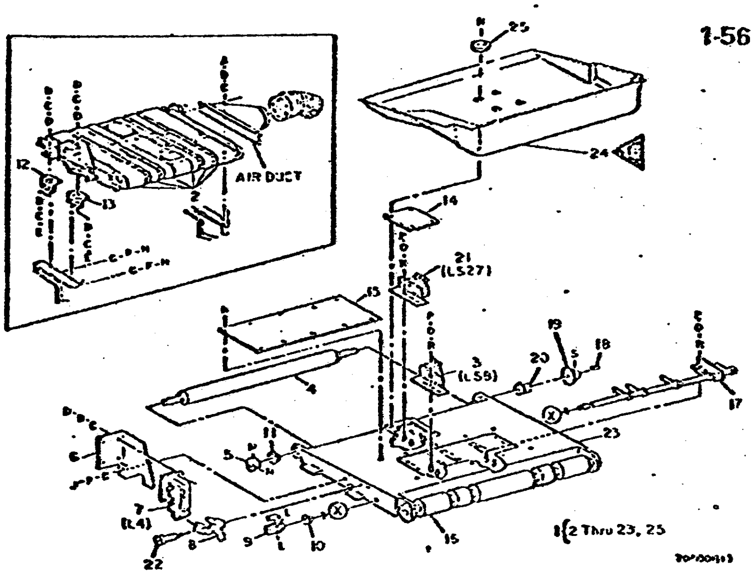


ITEM	PART	DESCRIPTION
A	113W16302	Screw, Mach Pan Hd 4-40 x 3/16
B	255W10402	Lockwasher, No. 4
C	251W21302	Washer, Plain No. 4
D	255W11502	Lockwasher 1/4
E	201W11702	Nut, Hex 1/4-28
F	251W80202	Washer, Plain No. 8
G	131W23002	Capscrew, Hex Hd 8-32 x 5/8
H	131W23202	Capscrew, Hex Hd 8-32 x 3/4
J	259W10902	Lockwasher, Ext Th No. 8
K	251W10502	Washer, Plain 5/32
L	251W11102	Washer, Plain 13/64
M	132W19602	Capscrew, Allen Hd 6-32 x 3/8

5. A TRANSPORT

PL 5.2 A Transport

Ref. 226051

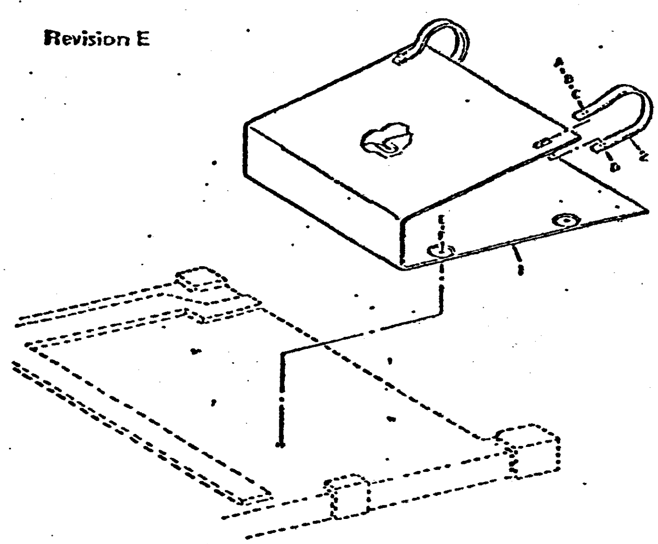


ITEM	PART	DESCRIPTION
1	22S1068	A Transport
2	600S1467	Belt Kit
3	110S506	Switch Assembly (Reject Count LS8)
4	22S666	Drive Roller
5	5P920	Collar
6	30P3727	Bracket
7	121P153	Reject Solenoid (L4)
8	31P621	Reject Arm
9	11S253	Reject Lever
10	13H2155	Bearing
11	13P632	Bearing
•	13P633	Bearing (Alternate)
12	30P3752	Mounting Bracket
13	30P3946	Mounting Bracket
14	2S2141	Cover
15	2S1520	Cover
16	--	P/O Item 1
17	6S1020	Reject Shaft Assembly
18	29P209	Key
19	7P976	Gear
20	13P1321	Bearing
21	110S506	Switch Assembly (Jam Detector LS27)
22	26P1086	Screw
23	--	P/O Item 1
24	50P745	Catch Tray
25	28P337	Washer
A	113W19302	Screw, Mach Pan Hd 6-32 x 1/2
B	256W10702	Lockwasher No. 6
C	251W10702	Washer, Plain No. 6
D	201W10702	Nut, Hex 6-32
E	132W20002	Capscrew, Allen Hd 6-32 x 5/8
F	256W11102	Lockwasher No. 10
G	251W10902	Washer, Plain No. 10
H	113W28802	Screw, Mach Pan Hd 10-32 x 1/2
J	113W25602	Screw, Mach Pan Hd 10-24 x 3/8
K	113W19602	Screw, Mach Pan Hd 6-32 x 3/8
L	141W19301	Setscrew, Allen Hd Cup Pt 6-32 x 3/16
M	150W16302	Setscrew, Self-Lkg Allen OP 4-40 x 3/16
N	153W22802	Screw, Tapping Pan Hd 8-18 x 1/2
P	191W19202	Standoff 6-32 x 1/8
O	256W10502	Lockwasher No. 4
R	251W10402	Washer, Plain No. 4
S	141W19201	Setscrew, Allen Hd Cup Pt 6-32 x 1/8

5. A TRANSPORT

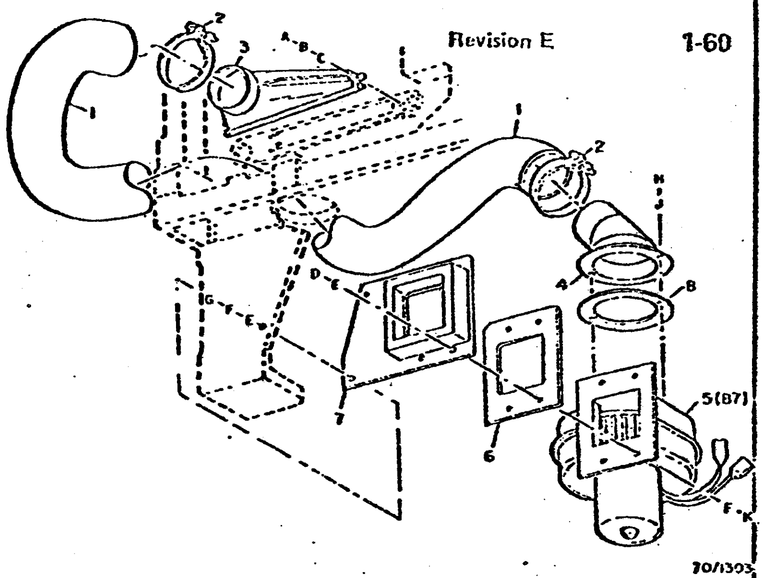
PL 5.3 Reject Tray
Ref. 226052

ITEM	PART	DESCRIPTION
1	50S867	Fire Retardant Reject Tray Assembly 14"
2	19P1798	Finger
A	201W10902	Nut, Hex 8-32
B	256W10802	Lockwasher No. 8
C	251W22202	Washer, Plain No. 8
D	113W22602	Screw, Mach Pan Hd 8-32 x 3/8
E	113W22502	Screw, Mach Pan Hd 8-32 x 5/16
F	251W10802	Washer, Plain No. 8



5. A TRANSPORT

PL 5.4 A Transport Vacuum
Ref. 226053



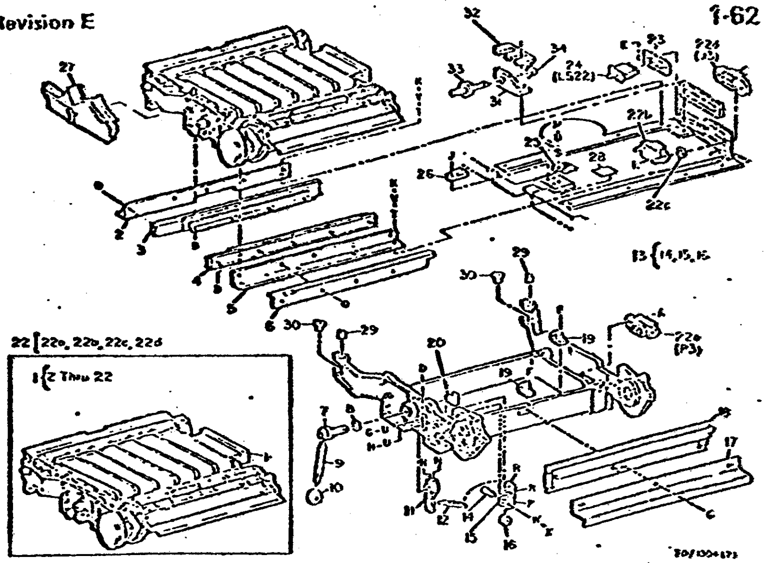
ITEM	PART	DESCRIPTION
1	52P1007	Vacuum Hose
2	19P514	Hose Clamp
3	54S262	Air Duct
4	54P220	Duct
5	127S751	'A' Vacuum Motor (B7)
6	35P479	Mounting Seal
7	15S3566	Mounting Plate
8	35P476	Duct Gasket
A	113W16602	Screw, Mach Pan Hd 1/4-20 x 3/8
B	256W10502	Lockwasher No. 4
C	251W10402	Washer, Plain No. 4
D	131W32202	Capscrew, Hex Hd 1/4-20 x 3/4

ITEM	PART	DESCRIPTION
E	251W11502	Washer, Plain 1/4
F	256W11502	Lockwasher 1/4
G	113W32002	Screw, Mach Pan Hd 1/4-20 x 5/8
H	113W22502	Screw, Mach Pan Hd 8-32 x 5/16
J	256W10902	Lockwasher No. 8
K	201W11502	Nut, Hex 1/4-20

6. REGISTER STOP DRAWER

PL 6.1 Complete Register Stop Drawer

Ref. 226060

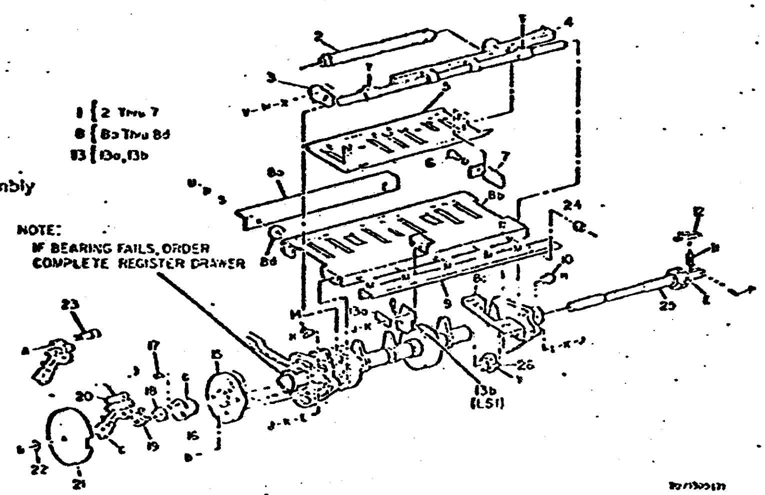


ITEM	PART	DESCRIPTION
1	17S772	Complete Register Stop Drawer
-	17S1008	Complete Register Stop Drawer (With Tag 22)
2	1P1586	L.H. Mounting Bracket
3	10S207	L.H. Slide
4	10S457	R.H. Slide
5	1P1587	R.H. Mounting Bracket
6	55S1529	Dust Shield
7	5P1743	Hub
8	28P529	Spring Washer
9	31P578	Locking Arm
10	3P739	Knob
11	8P400	Locking Cam
12	9P787	Spring
13	30S3226	Leveling Bracket Assembly
14	29P716	Axle
15	—	Leveling Bracket (P/O 13)
16	20P505	Leveling Wheel
17	55P1137	Dust Shield
18	55S712	Shield
19	120H10	Clamp
20	35P642	Frame Seal
22	600S1549	Register Stop Connector Kit
22a	—	P/O Item 22
22b	—	P/O Item 22
22c	—	P/O Item 22
22d	—	P/O Item 22
23	15P1719	Bracket
24	110P295	Drawer Interlock Switch (LS22)
25	17P386	Ramp
26	15P1720	Stop Plate
27	2S1888	Dust Cover
28	62P570	Mispull Mirror
29	13P583	Bearing
30	13P430	Bearing
31	1P1585	Pin Mounting Bracket
32	15P2141	Plate
33	29P793	Locating Pin
34	27P336	Nut and Washer
A	112W27110	Screw, Mach Sems 6-32 x 7/8
B	112W39510	Screw, Mach Sems 8-32 x 5/16
C	112W39703	Screw, Mach Sems 8-32 x 7/16
D	112W66710	Screw, Mach Sems 10-32 x 7/16
E	112W57810	Screw, Mach Sems 10-24 x 1/2
F	113W22702	Screw, Mach Pan Hd 8-32 x 7/16
G	113W28702	Screw, Mach Pan Hd 10-32 x 7/16
H	113W29402	Screw, Mach Pan Hd 10-32 x 7/8
J	132W26002	Capscrew, Allen Hd 10-24 x 5/8
K	132W32202	Capscrew, Allen Hd 1/4-20 x 3/4
L	112W25210	Screw, Mach Sems 6-32 x 7/8
M	133W25802	Capscrew, Button/Allen Hd 10-24 x 1/2
N	285W29405	Pin, Spirol 1/8 x 5/8
P	149W22602	Setscrew, Self-Lkg Allen FP 8-32 x 3/8
Q	215W11302	Nut, Self-Lkg 10-32
R	220W10904	Nut, Self-Lkg 2-56
S	251W10902	Washer, Plain No. 10
T	251W22602	Washer, Plain No. 10
U	251W23202	Washer, Plain 1/4
V	256W11102	Lockwasher No. 10
W	256W11502	Lockwasher 1/4
X	356W02503	Retaining Ring, Ext 1/4

6. REGISTER STOP DRAWER

PL 6.2 **Register Stop Module**

Ref. 226061



ITEM	PART	DESCRIPTION
1	38S741	Upper Paper Guide Assembly
2	6S2036	Pinch Wheel Assembly
3	--	Pinch Wheel Support (P/O 1)
4	--	Cam Follwer Arm (P/O 1)
5	38P661	Upper Paper Guide
6	26P1438	Screw
7	30P9549	Stop Bracket
8	600S476	B Transport Paper Guide Repair Kit
8a	38P554	Halo Guide
8b	38S556	Lower Paper Guide
8c	600S1027	Mounting Bracket Kit
8d	14P1528	Spacer

ITEM	PART	DESCRIPTION
9	38P392	Baffle
10	16P258	Housing Mounting
11	9P868	Spring
12	29P314	Key
13	600S418	Mispuff jam Detector Kit
13a	--	Plate
13b	--	Switch Assembly (LS1)
14	16P258	Housing Mounting
15	8P620	Registration Cam
16	7S788	Driven Gear Segment
17	29P713	Key
18	5P928	Spring Hub
19	9P910	Spring
20	7S789	Drive Gear Segment Assembly
21	2P1829	Gear Segment Cover
22	28P337	Washer
23	8P281	Cam Follower
24	27P407	Nut and Washer

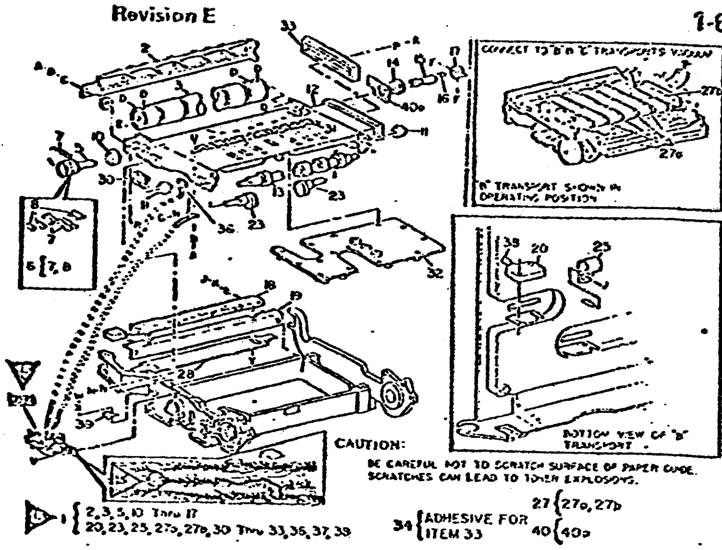
ITEM	PART	DESCRIPTION
25	6S1142	Inner Shaft Drive Assy
26	8S508	Pinch Wheel Lift Cam
A	215W11302	Nut, Self-Lkg 10-32
B	132W23001	Capscrew, Allen Hd 8-32 x 5/8
C	132W29402	Capscrew, Allen Hd 10-32 x 7/8
D	112W67203	Screw, Mach Sems 10-32 x 7/8
E	358W05203	Retaining Ring, Ext 5/8
G	121W22402	Setscrew, Self-Lkg Cup Pt 8-32 x 3/16
H	132W23802	Capscrew, Allen Hd 8-32 x 1-1/4
J	113W23002	Screw, Mach Pan Hd 8-32 x 5/8
K	256W10902	Lockwasher No. 8
L	251W22302	Washer, Plain No. 8
M	251W22202	Washer, Plain No. 8

ITEM	PART	DESCRIPTION
P	285W13703	Pin, Spring 1/16 x 7/16
Q	251W10602	Washer, Plain 9/64
R	256W10502	Lockwasher No. 6
S	251W10702	Washer, Plain No. 6
T	121W22602	Setscrew, Self-Lkg Cup Pt 8-32 x 3/8
U	113W19502	Screw, Mach Pan Hd 6-32 x 5/16
V	132W18802	Capscrew, Allen Hd 5-40 x 5/16
W	256W10102	Lockwasher No. 5
X	251W21602	Washer, Plain No. 5
Y	142W22401	Setscrew, Allen Hd Oval Pt 8-32 x 1/4

6. REGISTER STOP DRAWER

PL 6.3 **B Transport**
Ref. 226062

ITEM	PART	DESCRIPTION
1	22S2053	B Transport
-	22S1425	B Transport (W/TAG 15)
2	38S460	Paper Guide
3	22S1420	Drive Roller
5	6S3556	Shaft Assembly
6	23S191	Drive Chain
7	—	Chain (P/O 6)
8	23H16	Connecting Link
10	13P193	Bearing
11	13P1821	Bearing
12	—	Manifold Assy (P/O 1)
13	22P578	Idler Roller
14	13P1822	Bearing
15	6P1749	Drive Clutch Shaft

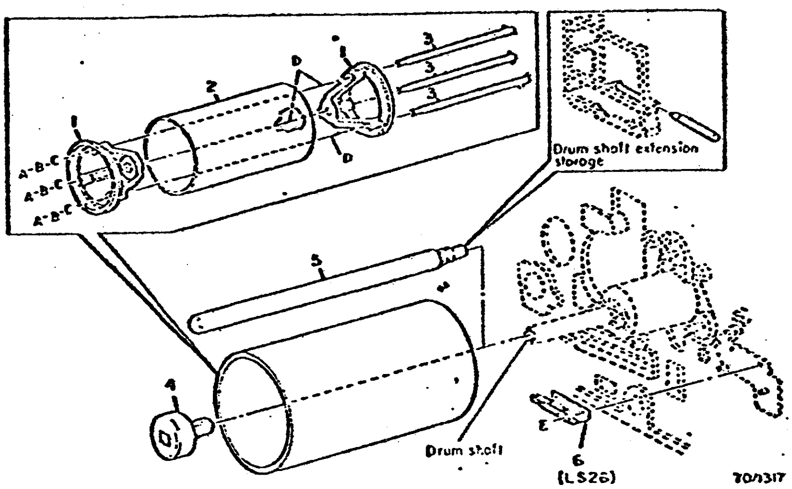


ITEM	PART	DESCRIPTION
16	29P587	Key
17	5P1297	Clutch Disc
18	42P58	Brush
19	30S9387	Brush Bracket
20	110S1459	Mispuff Detector Switch (LS3)
23	29P1231	Eccentric
25	120H8	Clamp
27	600S1543	Belt Kit
27a	23P685	Belt
-	23P824	Belt (Alternate)
27b	23P686	Belt (Perforated)
-	23P825	Belt (Perforated) (Alternate)
28	19P1353	Brush Clamp
29	—	DELETED
30	27P635	Clip Nut
31	1P3470	Strip Assembly
32	--	Plate (P/O 1)
33	35P1444	Seal
34	63H22	Adhesive
35	117S6528	Ground Wire Assembly
~~37~~	~~[illegible]~~	~~Spark Gap Block Assembly (W/TAG 3)(W/O TAG 17)~~
-	~~[illegible]~~	~~Spark Gap Block Assembly (W/TAG 15)~~
38	21P358	Glass Cap
39	120H7	Cable Clamp
40	600S3250	B Transport Kit
40a	--	Bracket Stiffener
A	201W10702	Nut, Hex 6-32
B	256W10702	Lockwasher No. 6
C	251W10702	Washer, Plain No. 6
D	133W31801	Capscrew, Button/ Allen Hd 1/4-20 x 1/2
E	355W03703	E-Ring 3/8
F	141W22401	Setscrew, Allen Hd Cup Pt 8-32 x 1/4
G	201W11302	Nut, Hex 10-32
H	255W11502	Lockwasher 5/16
J	113W22702	Screw, Mach Pan Hd 8-32 x 7/16
K	256W10902	Lockwasher No. 8
L	251W10802	Washer, Plain No. 8
M	134W32001	Screw, Shld Allen Hd 1/4 x 5/8
N	256W11502	Lockwasher 1/4
P	251W22002	Washer, Plain No. 6
Q	112W26710	Screw, Mach Sems 6-32 x 7/16
R	131W19802	Capscrew, Hex Hd 6-32 x 1/2
U	113W19502	Screw, Mach Pan Hd 6-32 x 5/16
V	112W66810	Screw, Mach Sems 10-32 x 1/2
W	112W63610	Screw, Mach Sems 10-32 x 3/8
X	259W11102	Lockwasher, Ext Th No. 10
Y	220W10704	Nut, Self-Lkg 6-32

8. DRUM AND COROTRONS

PL 8.1 Xerographic Drum and Interlock
Ref. 226110

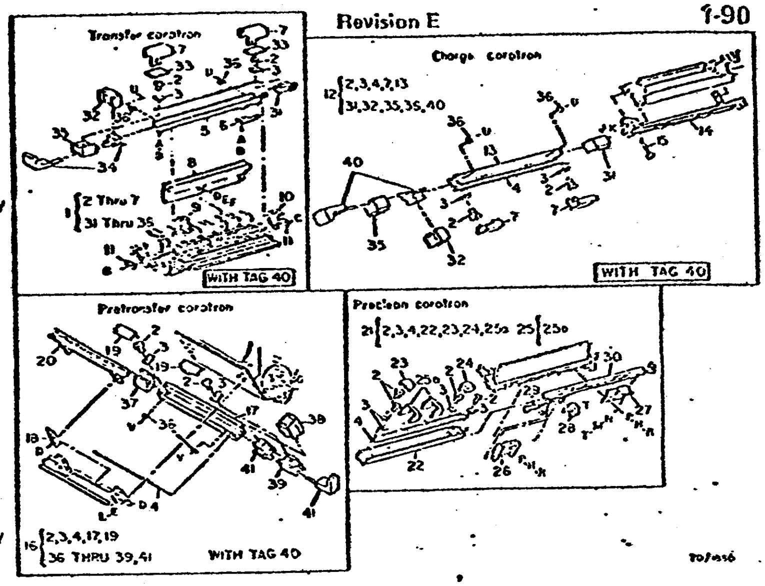
ITEM	PART	DESCRIPTION
1	5P717	Drum Hub
2	1R22	Alloy Drum
3	12S154	Tie Rod
4	3S1545	Knob Assembly
-	3S738	(alternate)
5	6P1117	Drum Shaft Extension
6	110S1396	Drum Interlock Switch (LS26)
7	95P501	Drum Cover (not Illustrated)
A	201W11902	Nut, Hex 5/16-18
B	256W11902	Lockwasher 5/16
C	251W11602	Washer, Plain 5/16
D	355W03103	E-Ring 5/16
E	114W20001	Screw, Mach Bdg Hd 6-32 x 5/8



8. DRUMS AND COROTRONS

PL 8.2A Corotrons (W/Tag 40)

ITEM	PART	DESCRIPTION
1	--	Transfer Corotron Assembly (TAG 40)
2	26P1099	Screw
3	19P977	Clamp
4	117P7419	Wire
-	117P2063	Wire (Carge and Transfer Corotrons Only)
5	--	Corotron Shield (P/O 1)
6	19P562	Clip
7	55P2565	Arc Shield (Alternate Part Item 19)
8	55S712	Shield
9	30S3480	Outboard Bracket
10	30P7196	Inboard Bracket
11	28P583	Plate
12	--	Charge Corotron Assembly (TAG 40)



ITEM	PART	DESCRIPTION
13	--	Corotron Shield (P/O 12)
14	1S3112	Channel Bracket
15	26P1565	Adjusting Screw
16	--	Pretransfer Corotron (TAG 40)
17	--	Corotron Shield (P/O 16)
18	30S6728	Bracket
19	55P2551	Arc Shield
20	1S2531	Channel Bracket
21	125S138	Preclean Corotron Assembly
22	--	Corotron Shield (P/O 21)
23	55P2563	Outboard Arc Shield
24	55P2564	Inboard Arc Shield
25	600S2325	Corotron Wire Shield Replacement Kit (Contains 20)
25a	--	Wire Shield
26	10S7691	Outboard Bracket
27	30P7648	Inboard Bracket
28	6P526	Eccentric Cam

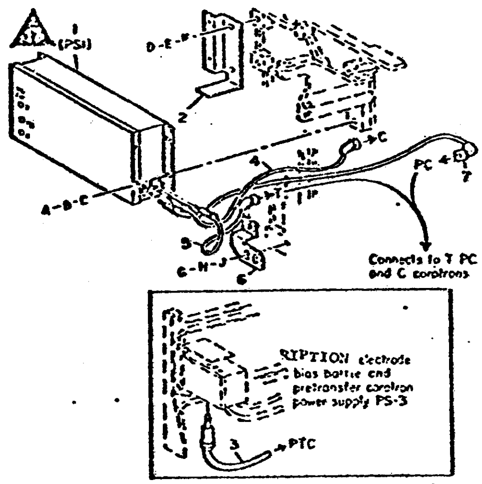
ITEM	PART	DESCRIPTION
29	26P1586	Shoulder Screw
30	1S2745	Channel Bracket
31	118S1267	End Block
32	21S476	Cap Assembly
33	35P2344	Seal
34	10S742	Slide Assy (TAG 40)
35	118S1266	End Block (TAG 40)
36	28P533	Washer (TAG 40)
37	118S1269	End Block (TAG 40)
38	21S478	Cap Assembly (TAG 40)
39	118S1270	End Block (TAG 40)
40	10S743	Slide Assy (TAG 40)
41	10S745	Slide Assy (TAG 40)
A	251W22002	Plain Washer No. 6
B	215W10702	Nut, Self-Lkg 6-32
C	112W28503	Screw, Mach Sems 6-32 x 3/8
D	251W10802	Washer, Plain No. 8
E	256W10902	Lockwasher No. 8
F	113W22702	Screw, Mach Pan Hd 8-32 x 7/16

ITEM	PART	DESCRIPTION
G	113W20202	Screw, Mach Pan Hd 6-32 x 3/4
H	256W10702	Lockwasher No. 6
J	132W42002	Capscrew, Allen Hd 3/8-16 x 1-1/2
K	251W10902	Washer, Plain No. 10
L	201W10902	Nut, Hex 8-32
M	256W10701	Lockwasher No. 6
N	251W22001	Washer, Plain No. 6
P	251W10702	Washer, Plain No. 6
R	113W19502	Screw, Mach Pan Hd 6-32 x 5/16
S	354W02103	E-Ring 7/32
T	201W10702	Nut, Hex 6-32
U	113W16402	Screw, Mach Pan Hd 4-40 x 1/4
V	113W16302	Screw, Mach Pan Hd 4-40 x 3/16

8. DRUM AND COROTRONS

PL 8.3 Adjustable Corotron Power Supply

Ref. 226112

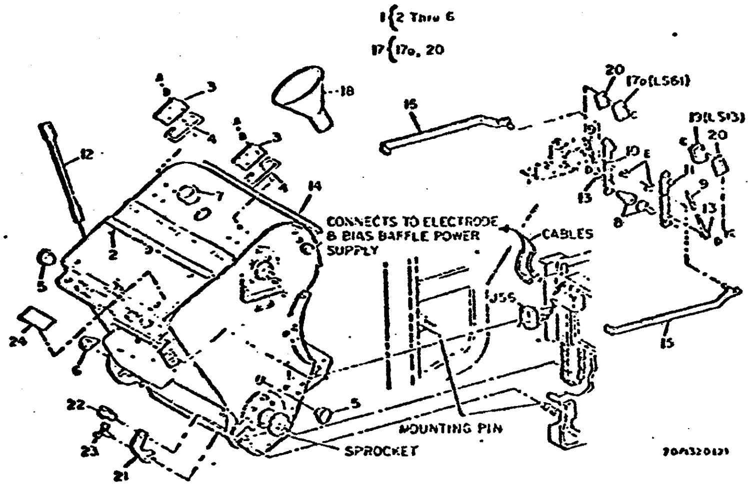


ITEM	PART	DESCRIPTION
1	101P1376	Corotron Power Supply (PS1)
2	30P7535	Bracket
3	117P5613	Pretransfer Cord
4	117P3117	Charge Cord
5	117P5595	Transfer Cord
6	30P3414	Cord Mounting Bracket
7	117P3118	Preclean Cord
A	113W28602	Screw, Mach Pan Hd 10-32 x 3/8
B	256W11102	Lockwasher No. 10
C	251W10902	Washer, Plain No. 10

ITEM	PART	DESCRIPTION
D	113W32202	Screw, Mach Pan Hd 1/4-20 x 3/4
E	256W11502	Lockwasher 1/4
F	251W11502	Washer, Plain 1/4
G	113W22802	Screw, Mach Pan Hd 8-32 x 1/2
H	256W10902	Lockwasher No. 8
J	251W10802	Washer, Plain No. 8

9. DEVELOPER

PL 9.1 Complete Developer Assembly
Ref. 226130



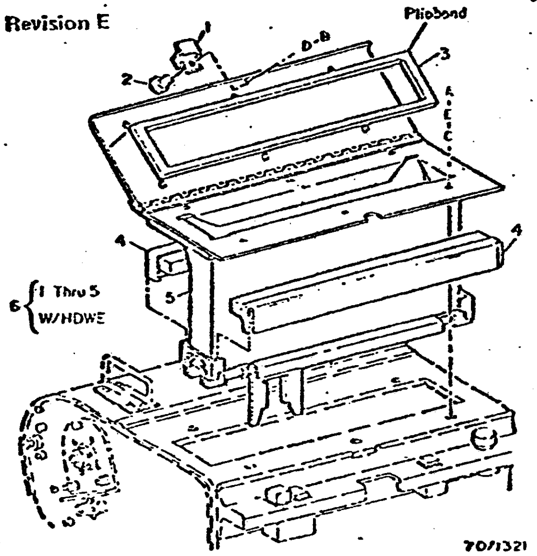
ITEM	PART	DESCRIPTION
1	2S3371	Developer Assembly
2	—	Cover (P/O 1)
3	30P3602	Bracket
4	3P851	Handle
5	3P705	Tapered Plug
6	3P876	Plug
7	3P1665	Tapered Plug
8	26P1042	Screw
9	9P832	Spring
10	3S1793	Outboard Latch
11	3S1794	Inboard Latch
12	33P49	Measuring Paddle
13	11S260	Clevis Latch
14	66P290	Light Seal

ITEM	PART	DESCRIPTION
15	31S1074	Arm
16	31S1073	Arm
17	600S1517	Developer Switch Kit
17a	110P971	Developer Interlock Switch (LS61)
18	502P30087	Funnel
19	110P813	Developer Interlock Switch (LS13)
20	57P72	Insulator
21	19P970	Locking Clamp
22	26P1298	Shoulder Screw
23	26P1457	Wing Screw
24	600S4055	Toner Developer Kit
A	113W22502	Screw, Mach Pan Hd 8-32 x 3/8
B	256W10902	Lockwasher No. 8
C	153W17202	Screw, Tapping Pan Hd 4-24 x 3/4
D	351W02301	Retaining Ring, Ext 15/64
E	355W02503	E-Ring 1/4

9. DEVELOPER

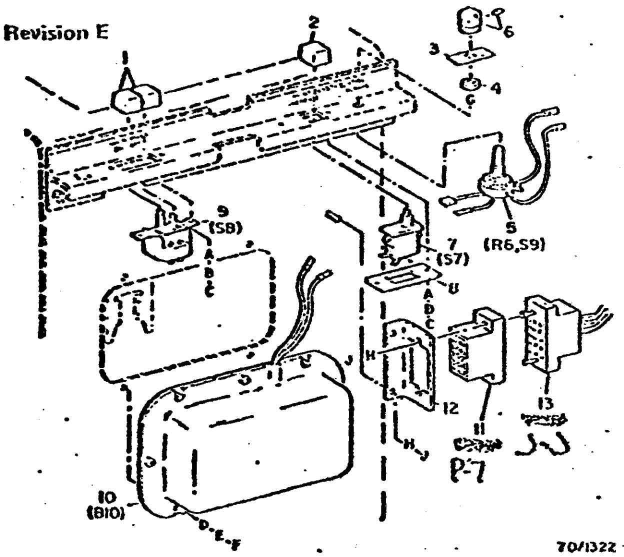
PL 9.2 Toner Dispenser
Ref. 226131

ITEM	PART	DESCRIPTION
1	19P470	Locking Clip
2	26P893	Screw
3	35P426	Gasket
4	55S1157	Shield Assembly
5	–	P/O Item 6
6	94S51	Toner Dispenser
A	113W22602	Screw, Mach Pan Hd 8-32 x 3/8
B	215W10902	Nut, Self Lkg 8-32
C	251W10302	Washer, Plain No. 8
D	251W10305	Washer, Plain No. 8
E	259W10002	Lockwasher, Ext Th No. 8



9. DEVELOPER

PL 9.3 **Toner Dispenser Motor and Controls**
Ref. 226132

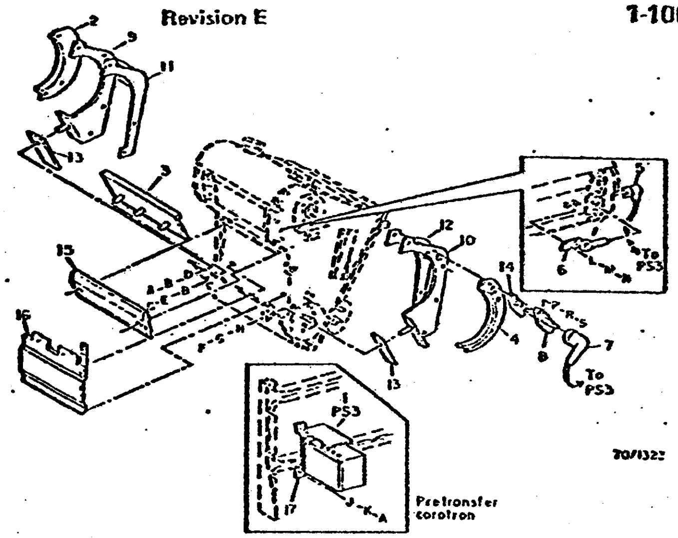


ITEM	PART	DESCRIPTION
1	3P892	Button
2	3P860	Button
3	91S660	Data Plate
4	27H171	Nut
5	103S281	Toner Control Potentiometer (R6,S9)
6	120P238	Knob
7	110P299	Increase Switch (S7)
8	15P1849	Switch Plate
9	110P271	Main Power Switch (S8)
10	127S530	Toner Dispenser Motor (B10)

ITEM	PART	DESCRIPTION
11	713W20590	Connector ~~(P7)~~ P-7
12	30P6771	Bracket
13	713W25490	Connector ~~(J7)~~ J-7
A	251W22002	Washer, Plain No. 6
B	256W10502	Lockwasher No. 6
C	113W19502	Screw, Mach Pan Hd 6-32 x 5/16
D	251W80202	Washer, Plain No. 8
E	256W10902	Lockwasher No. 8
F	113W22302	Screw, Mach Pan Hd 8-32 x 1/2
G	259W12301	Lockwasher, Ext Th 3/8
H	201W14401	Nut, Hex 3/4-15
J	201W11302	Nut, Hex 10-32

9. DEVELOPER

PL 9.4 **Baffles and Developer Electrode Ref. 226133**



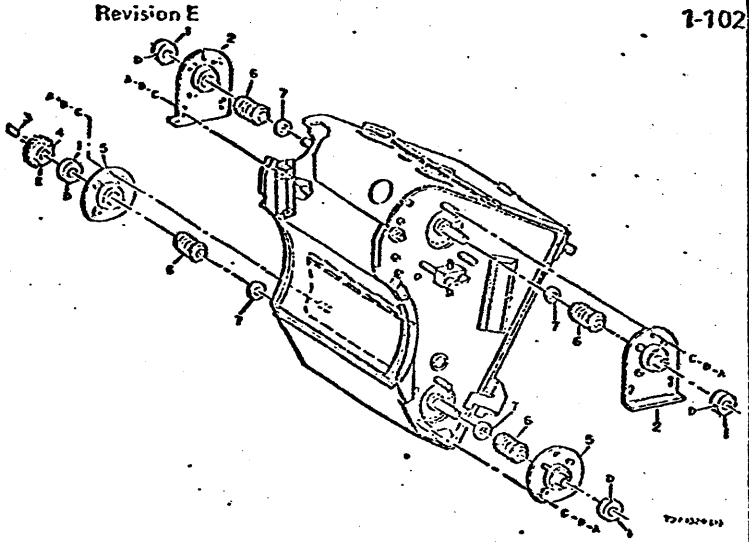
ITEM	PART	DESCRIPTION
1	101S1119	Electrode, Bias Baffle and Pretransfer Corotron Power Supply (PS3)
2	35S2377	Inboard Seal Assembly
3	55S1195	Pickoff Baffle
4	35S2378	Outboard Seal Assembly
5	117P4232	Bias Cord
6	114S34	Plug Assembly
7	117P4233	Electrode Cord
8	114S119	Connector Assembly
9	15S3521	Mounting Plate
10	15S3520	Mounting Plate
11	14S2105	Spacer Inboard

ITEM	PART	DESCRIPTION
12	14S2106	Spacer Outboard
13	35P1322	Seal
14	63P284	Mylar Tape
15	25S610	Plastic Shield
16	115S130	Developer Electrode
17	118P718	Insulating Strip
A	201W11502	Nut, Hex 1/4-20
B	256W11102	Lockwasher No. 10
C	201W11302	Nut, Hex 10-32
D	251W10902	Washer, Plain No. 10
E	251W22602	Washer, Plain No. 10
F	201W10902	Nut, Hex 8-32
G	256W10902	Lockwasher No. 8
H	251W10802	Washer, Plain No. 8
J	251W23102	Washer, Plain 1/4
K	256W11502	Lockwasher 1/4
L	251W10702	Washer, Plain No. 6
M	256W10702	Lockwasher No. 6
N	201W10702	Nut, Hex 6-32
P	256W10502	Lockwasher No. 4
R	251W10402	Washer, Plain No. 4
S	201W10502	Nut, Hex 4-40

9. DEVELOPER

PL 9.5 Developer Bearing Assemblies
Ref. 226134

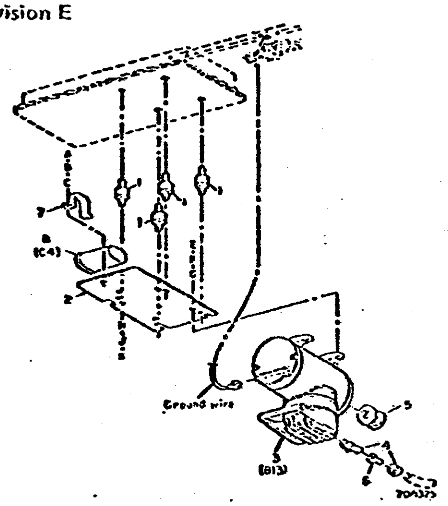
ITEM	PART	DESCRIPTION
1	5P850	Collar
2	13S673	Idler Bearing Assembly
3	29P658	Key
4	7P1423	Sprocket
5	13S672	Drive Bearing Assembly
6	35P775	Seal
7	28P559	Washer
A	201W11502	Nut, Hex 1/4-20
B	256W11102	Lockwasher No. 10
C	251W22602	Washer, Plain No. 10
D	142W31401	Setscrew, Allen Hd Oval Pt 1/4-20 x 1/4
E	141W31602	Setscrew, Allen Hd Cup Pt 1/4-20 x 3/8



10. COMPRESSOR AND PUFFER SYSTEM

PL 10.1 Compressor
Ref. 226080

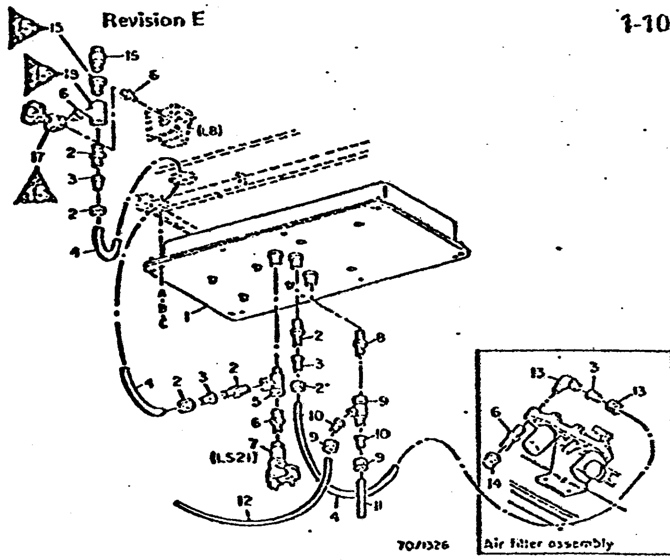
ITEM	PART	DESCRIPTION
1	4P135	Mounting Pad
2	15P1687	Mounting Plate
3	127P739	Compressor (B13)
4	52P328	Nipple
-	452W25602	Nipple (Tag 21)
5	53P73	Filter
6	52P329	Hose Insert
7	30P3174	Bracket
8	702W09305	Capacitor (C4)
-	120P35	Capacitor (C4)(Alternate)
A	113W19502	Screw, Mach Pan Hd 6-32 x 3/8
B	256W10702	Lockwasher No. 6
C	251W10702	Washer, Plain No. 6
D	--	DELETED



ITEM	PART	DESCRIPTION
E	113W25802	Screw, Mach Pan Hd 10-24 x 1/2
F	256W11102	Lockwasher No. 10
G	251W10902	Washer, Plain No. 10
H	251W11502	Washer, Plain 1/4
J	256W11502	Lockwasher 1/4
K	201W11502	Nut, Hex 1/4-20

10. COMPRESSOR AND PUFFER SYSTEM

PL 10.2 Accumulator Tank (Without Tag 21) Ref. 226081

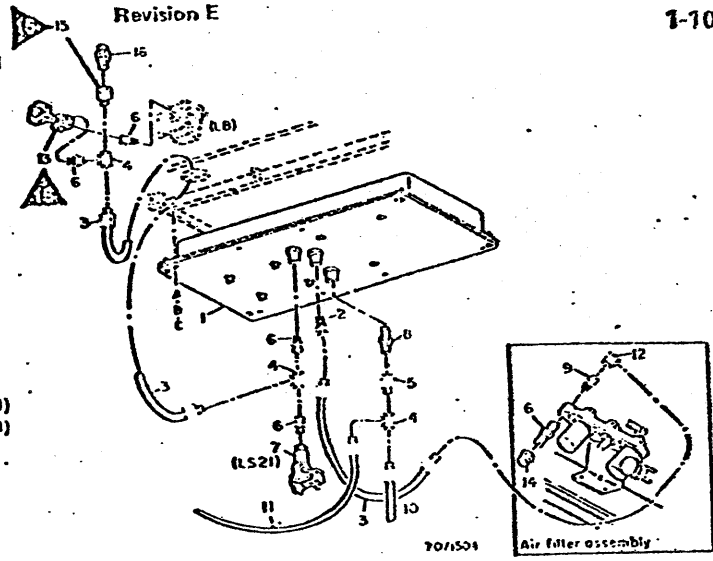


ITEM	PART	DESCRIPTION
1	51S103	Accumulator Tank
2	52P353	Adapter
3	52P355	Hose Insert
4	52P347	Air Hose
5	52P542	Tee
6	52P326	Adapter
7	110P1782	Under-Pressure Switch (LS21)
-	110P1069	Under-Pressure Switch (LS21)(alternate)
8	53P198	Check Valve
9	52P495	Tee
10	52P329	Hose Insert

11	52P351	Air Hose
12	52P524	Air Hose
13	52P724	Elbow
14	21P219	Cap
-	52H43	Cap (alternate)
15	52P403	Reducer
16	53P46	Relief Valve
17	53P210	Valve
18	52P824	Tee
A	251W11902	Washer, Plain 11/32
B	256W11902	Lockwasher 5/16
C	131W39705	Capscrew, Hex Hd 5/16-28 x 1-1/8

10. COMPRESSOR AND PUFFER SYSTEM

PL 10.2A **Accumulator Tank (With Tag 21) Ref. 226150**



ITEM	PART	DESCRIPTION
1	51S103	Accumulator Tank
2	152W25602	Adapter
3	52S1098	Air Hose
4	452W34002	Tee
5	452W20602	Adapter
6	452W15602	Adapter
7	110P1782	Under Pressure Switch (LS21)
-	110P1069	Under Pressure Switch (LS21) (Alternate)
8	53P198	Check Valve
9	452W15702	Adapter
10	52S1100	Air Hose
11	52S1102	Air Hose

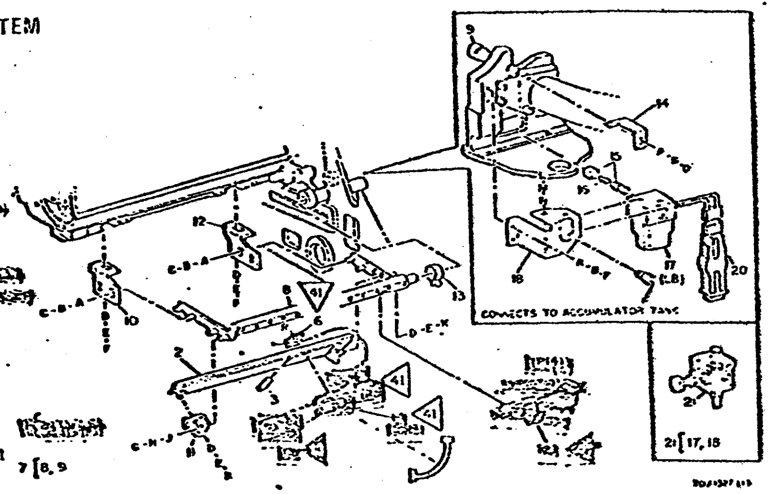
ITEM	PART	DESCRIPTION
12	452W30502	Elbow
13	53P210	Valve
14	21P219	Cap
-	52H43	Cap (Alternate)
15	452W20502	Adapter
16	53P319	Relief Valve
A	251W11902	Washer, Plain 11/32
B	256W11902	Lockwasher 5/16
C	131W33705	Capscrew, Hex Hd 5/16-28 x 1-1/8

10. COMPRESSOR AND PUFFER SYSTEM

PL 10.3 Puffer

Ref. 226082

ITEM	PART	DESCRIPTION
[illegible]	[illegible]	[illegible]
2	55S1505	Shield Assy
3	52P504	Hose
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
7	52S384	Puffer Tube Assembly
-	52S1111	Puffer Tube Assembly
8	—	P/O Item 7
9	52P490	Puffer Tube
-	52S1096	Puffer Tube (Tag 21)
10	30P3989	Outboard Puffer Bracket
11	30P4210	Shield Bracket
12	30P3590	Inboard Puffer Bracket

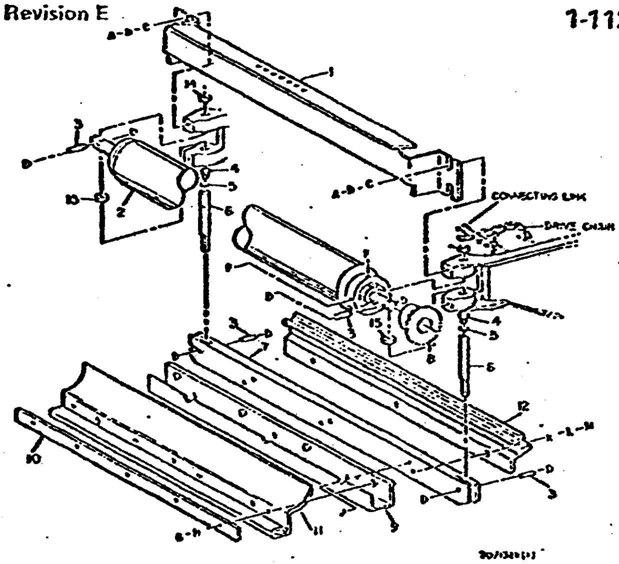


ITEM	PART	DESCRIPTION
13	19P1264	Clamp
14	30P4142	Bracket
15	52P328	Nipple
-	452W25602	Nipple (Tag 21)
16	52P483	Insert
17	121S278	Puffer Solenoid Valve (L8)
18	30P4013	Mounting Bracket
19	63P260	Seal
20	102S424	Capacitor (C37)
21	121S519	Puffer Solenoid Valve Assembly (L8)
[illegible]	[illegible]	[illegible]
A	251W10802	Washer, Plain No. 8
B	256W10902	Lockwasher No. 8
C	201W10902	Nut, Hex 8-32
D	251W22002	Washer, Plain No. 6
E	256W10702	Lockwasher No. 6
F	132W19602	Capscrew, Allen Hd 6-32 x 3/8
G	201W10502	Nut, Hex 4-40
H	256W10402	Lockwasher, No. 4
J	251W21502	Washer, Plain No. 4
K	201W10702	Nut, Hex 6-32
L	113W28802	Screw, Mach Pan Hd 10-32 x 1/2
M	256W11102	Lockwasher No. 10
N	251W10902	Washer, Plain No. 10
P	113W22802	Screw, Mach Pan Hd 8-32 x 1/2
Q	113W22902	Screw, Mach Pan Hd 8-32 x 9/16

11. FUSING

PL 11.1 Fuser Pressure Roller
Ref. 226070

ITEM	PART	DESCRIPTION
1	55S821	Fuser Paper Guide
2	22S2530	Fuser Pressure Roller
3	29P675	Retaining Pin
4	26P2212	Set Screw
5	27P186	Nut
6	12P148	Connecting Rod
7	25P251	Pressure Bar
8	7P732	Sprocket
9	30S4244	Support Assembly
10	1P1772	Strip
11	35P766	Felt Wiper
12	30S4245	Bracket
14	13P588	Bearing
15	13P490	Bearing

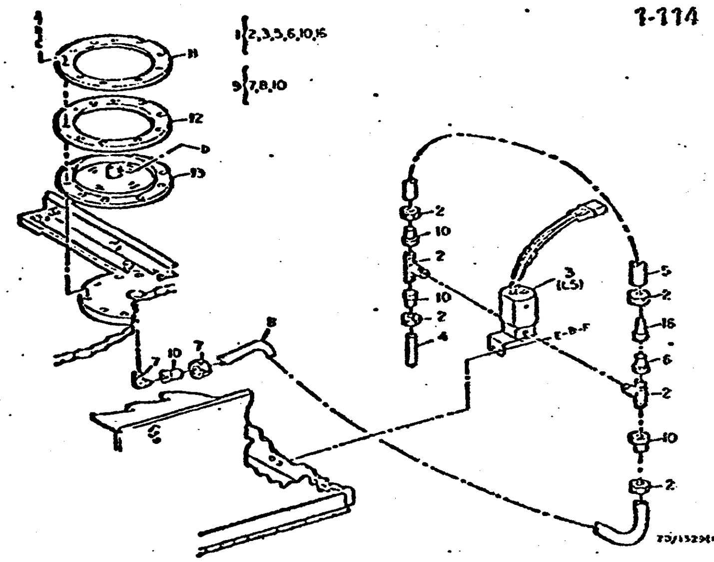


ITEM	PART	DESCRIPTION
A	113W19502	Screw, Mach Pan Hd 6-32 x 5/16
B	256W10702	Lockwasher No. 6
C	251W10702	Washer, Plain No. 6
D	354W01203	E-Ring 1/8
E	--	DELETED
F	141W22301	Setscrew, Allen Hd Cup Pt 8-32 x 3/16
G	113W19402	Screw, Mach Pan Hd 6-32 x 1/4
H	251W22002	Washer, Plain No. 6
J	133W28401	Capscrew, Button/ Allen Hd 10-32 x 1/4
K	251W22501	Washer, Plain No. 10
L	256W11001	Lockwasher No. 10
M	131W28802	Capscrew, Hex Hd 10-32 x 1/2

11. FUSING

PL 11.2 Pressure Disc Assembly (Without Tag 21)

Ref. 226071

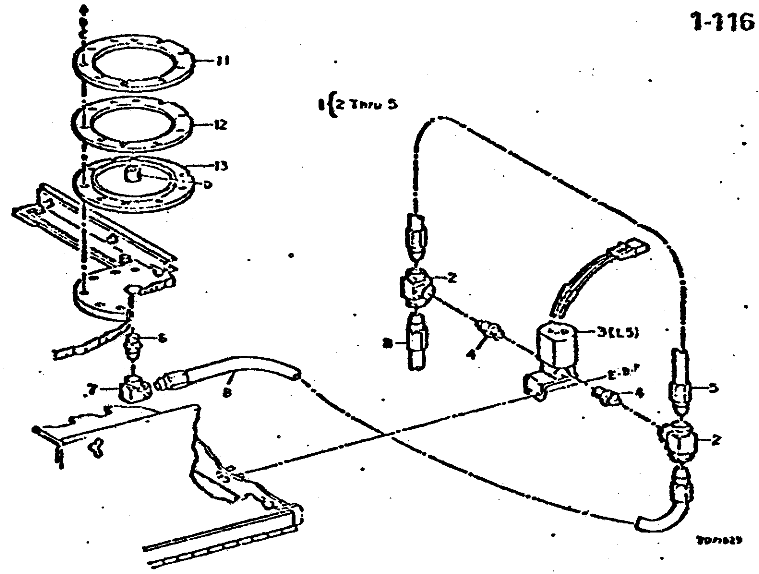


ITEM	PART	DESCRIPTION
1	121S332	Pressure Disc Solenoid Assy
2	52P338	Tee
3	121S328	Solenoid Valve Assy (L5)
-	121S329	Solenoid Valve Assy (L5) (Alternate)
4	52P524	Tube
5	52P703	Tube
6	52P911	Insert
7	52P330	Elbow
8	52P348	Tube
9	52S412	Tube Assy
10	52P329	Insert
11	5P651	Diaphragm Ring
12	35P696	Gasket

ITEM	PART	DESCRIPTION
13	35S2165	Pressure Disc Assy
16	53P208	Filter
A	131W26202	Capscrew, Hex Hd 10-24 x 3/4
B	256W11102	Lockwasher No. 10
C	251W10902	Washer, Plain No. 10
D	142W16201	Setscrew, Allen Hd Oval Pt 4-40 x 1/8
E	251W22502	Washer, Plain No. 10
F	201W11302	Nut, Hex 10-32

11. FUSING

PL 11.2A Pressure Disc Assembly (With Tag 21) Ref. 226151



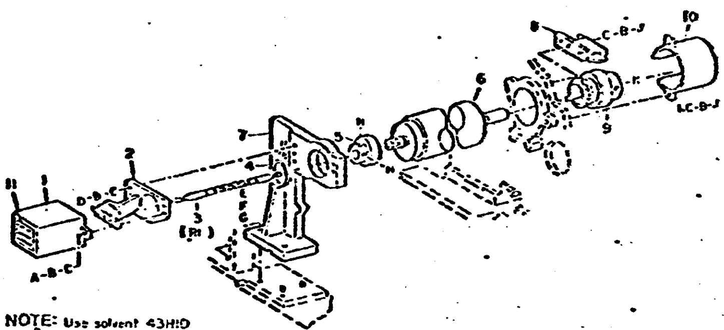
ITEM	PART	DESCRIPTION
1	121S620	Pressure Disc Solenoid Assembly
2	452W34002	Tee
3	121S328	Solenoid Valve Assembly (L5)
-	121S329	Solenoid Valve Assembly (L5)(Alternate)
4	452W15602	Adapter
5	52S1103	Tube Assembly
6	452W15502	Adapter
7	452W30502	Elbow
8	52S1162	Tube Assembly
9	–	DELETED
11	5P661	Diaphragm Ring

ITEM	PART	DESCRIPTION
12	35P696	Gasket
13	35S2165	Pressure Disc Assembly (Includes Hardware)
A	131W25202	Capscrew, Hex Hd 10-24 x 3/4
B	256W11102	Lockwasher No. 10
C	251W10902	Washer, Plain No. 10
D	142W15201	Setscrew, Allen Hd Oval Pt 4-40 x 1/8
E	251W22502	Washer, Plain No. 10
F	201W11302	Nut, Hex 10-32

11. FUSING

PL 11.3 Fuser Heat Roller
Ref. 226072

ITEM	PART	DESCRIPTION
1	2P5365	Outboard Socket Cover
2	113S142	Outboard Socket Assembly
3	126P155	Heater Rod (R1)
4	9P859	Spring
5	13P483	Outboard Bearing
6	22S1128	Fuser Heat Roller
-	22S1180	Fuser Heat Roller (Alternate)
-	600S60086	Arch Rag Bond Heat Roller Kit (Alternate)(See NOTE)
7	1S3545	Fuser Frame
-	1S3546	Alternate
8	113S141	Inboard Sprocket Assembly



NOTE: Use solvent 43HIO to affix label

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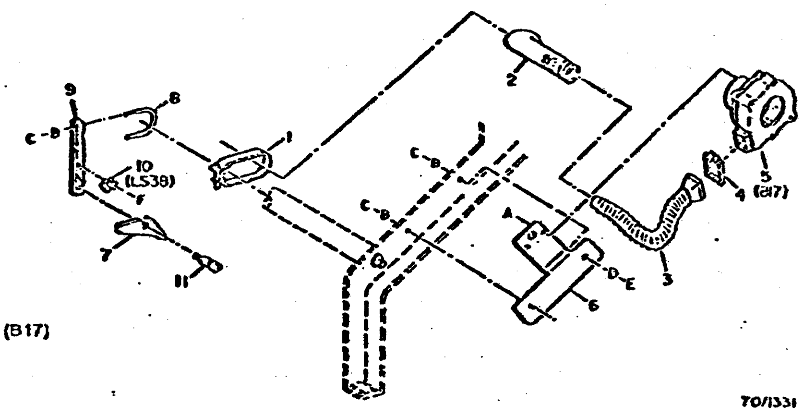
ITEM	PART	DESCRIPTION
9	7S817	Fuser Sprocket Assembly
10	2P1943	Inboard Socket Cover
11	91P742	Caution Label
A	113W23002	Screw, Mach Pan Hd 8-32 x 5/8
B	256W10902	Lockwasher No. 8
C	251W10802	Washer, Plain No. 8
D	113W22902	Screw, Mach Pan Hd 8-32 x 9/16
E	132W38802	Capscrew, Allen Hd 5/16-18 x 1-1/4
F	256W11902	Lockwasher 5/16
G	251W23402	Washer, Plain 5/16
H	141W28401	Setscrew, Allen Hd Cup Pt 10-32 x 1/4
J	113W22802	Screw, Mach Pan Hd 8-32 x 1/2
K	350W20503	Retaining Ring.

NOTE: To be used with Rag Bond Paper Only.

11. FUSING

PL 11.4 Curl Control and Stripping Finger
Ref. 226073



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ITEM	PART	DESCRIPTION
1	19P718	Clamp
2	54P344	Paper Curl Duct
3	52P819	Hose Duct
4	19P717	Clamp
5	127P297	Curl Control Blower (B17)
6	30S7760	Bracket
7	73S36	Stripping Finger
8	19P756	Clamp
9	30P4939	Finger Support
10	110S558	Fuser Jam Switch (LS38)
11	26P1485	Shoulder Screw

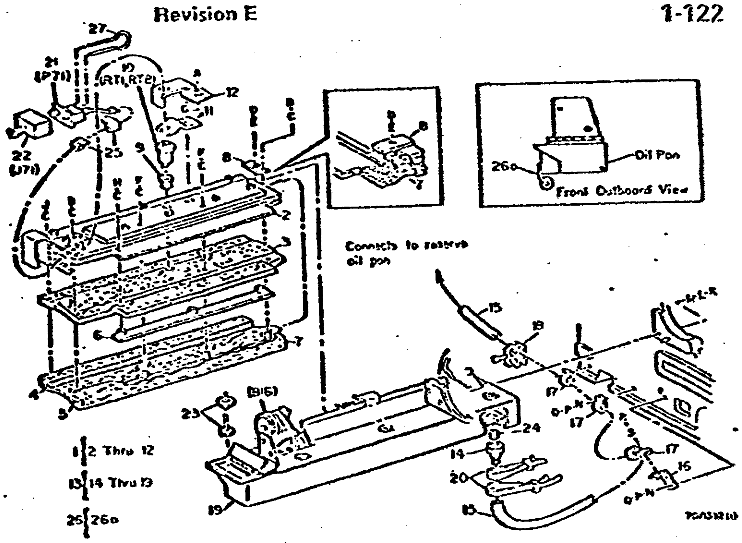
ITEM	PART	DESCRIPTION
A	112W56810	Screw, Mach Sems 10-32 x 1/2
B	256W10902	Lockwasher No. 8
C	201W10902	Nut, Hex 8-32
D	251W22202	Washer, Plain No. 8
E	113W23202	Screw, Mach Pan Hd 8-32 x 1-1/8
F	113W13802	Screw, Mach Pan Hd 2-56 x 1/2

11. FUSING

PL 11.5 Complete Oil Pan and Wick

Ref. 226074

ITEM	PART	DESCRIPTION
1	39S32	Lubricator Assembly
2	–	Cover (P/O 1)
3	39S79	Upper Wick
4	15S2982	L.H. Plate (Yellow)
5	15S2931	R.H. Plate (Black)
6	15S2004	Plate
7	39S33	Lower Wick
8	19P668	Plate
9	13P960	Bearing
10	103S242	Thermistor Assembly (RT1, RT8)
-	103S241	Thermistor Assembly (alternate)
11	9P1269	Spring



ITEM	PART	DESCRIPTION
12	30P9016	Bracket
13	50S553	Oil Pan Assembly
14	52S521	Fitting
15	52P508	Oil Hose
16	30S4276	Bracket
17	120H9	Clamp
18	26P1130	Hose Clamp
19	—	Oil Pan (P/O 13)
20	120S113	Cable Tie
21	713W00090	Connector (P71)
22	713W05190	Connector (J71)
23	600S1551	Fuser Oil Indicator Kit
24	3P2104	Plug
25	120P471	Clamp
26	600S60021	Transparency Smear Correction Kit
26a	--	Paper Hold Down Assy
27	117S5687	Wire
A	112W02503	Screw, Mach Sems 4-40 x 5/16

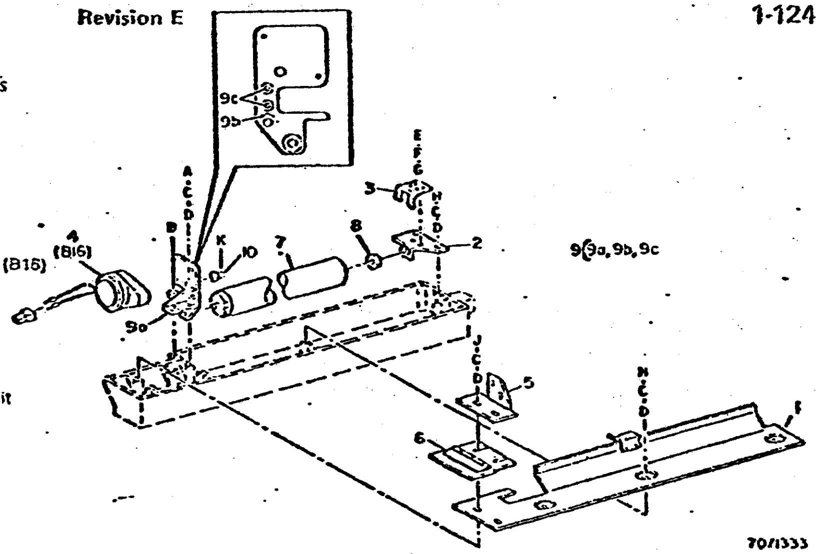
ITEM	PART	DESCRIPTION
B	113W17202	Screw, Mach Pan Hd 4-40 x 3/4
C	256W10502	Lockwasher No. 4
D	113W19502	Screw, Mach Pan Hd 6-32 x 5/16
E	256W10702	Lockwasher No. 6
F	113W17702	Screw, Mach Pan Hd 4-40 x 1-1/8
G	251W21401	Washer, Plain No. 4
H	113W16402	Screw, Mach Pan Hd 4-40 x 1/4
J	113W16902	Screw, Mach Pan Hd 4-40 x 9/16
K	113W23702	Screw, Mach Pan Hd 8-32 x 1-1/2
L	256W10902	Lockwasher No. 8
M	251W10302	Washer, Plain No. 8
N	251W22502	Washer, Plain No. 10
P	256W11102	Lockwasher No. 10
Q	113W25602	Screw, Mach Pan Hd 10-24 x 3/8

ITEM	PART	DESCRIPTION
R	113W22502	Screw, Mach Pan Hd 8-32 x 5/16
S	256W10302	Lockwasher No. 8
T	–	DELETED

11. FUSING

PL 11.6 Oil Pan Components
Ref. 226075A

ITEM	PART	DESCRIPTION
1	55P690	Oil Pan Baffle
2	30S4320	Bracket
3	9P929	Spring
4	127S487	Oil Dispensing Motor (B16)
5	30P3650	Mounting Bracket
6	2S1825	Access Cover
7	22S719	Dispensing Roller
8	5P949	Ring
9	600S1363	Oil Dispenser Motor Support Assembly Kit
9a	30S8885	Support Assembly
•	30S10205	upport Assembly (Alternate)
9b	7S1387	Gear (with Bushing)
9c	355W01503	Retaining Ring
10	7P798	Gear

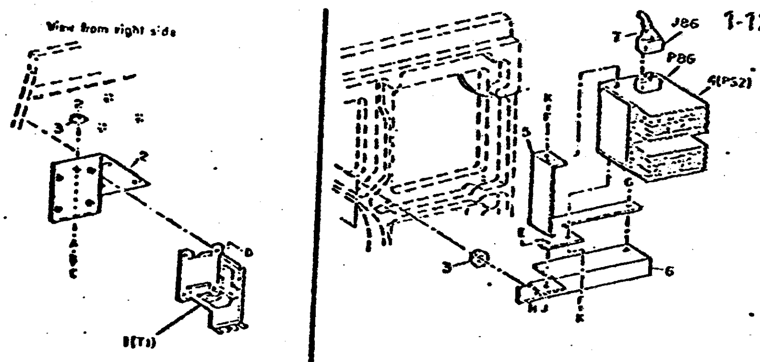


ITEM	PART	DESCRIPTION
A	113W23002	Screw, Mach Pan Hd 8-32 x 5/8
B	103W23002	Screw, Mach Flat Hd 8-32 x 5/8
C	256W10902	Lockwasher No. 8
D	251W10802	Washer, Plain No. 8
E	113W19502	Screw, Mach Pan Hd 6-32 x 3/8
F	256W10702	Lockwasher No. 6
G	251W10702	Washer, Plain No. 6
H	132W22802	Capscrew, Allen Hd 8-32 x 1/2
J	132W23002	Capscrew, Allen Hd 8-32 x 5/8
K	141W16201	Setscrew, Allen Hd Cup Pt 4-40 x 1/8

11. FUSING

PL 11.8 Transformer and Controller
Ref. 226076.

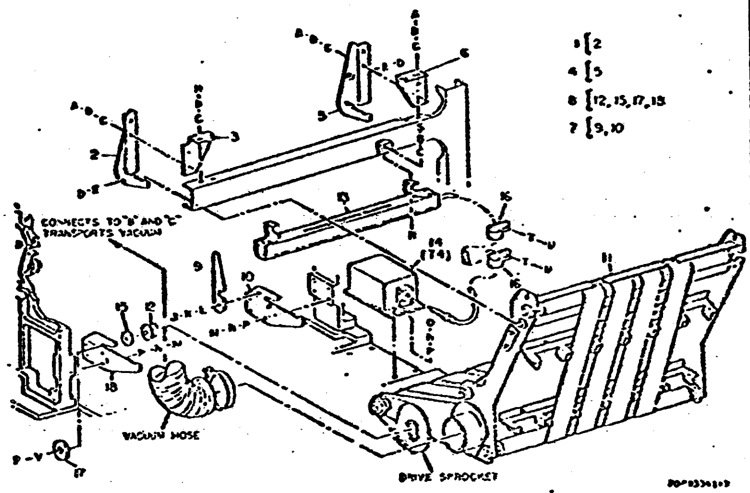
ITEM	PART	DESCRIPTION
1	105P58	Fuser Transformer (T1)
-	105P89	Fuser Transformer (T1) (Alternate)
2	30S7302	Bracket Assembly
3	14P1179	Spacer
4	109P412	Fuser Controller (PS2)
-	109P413	Alternate
5	30P7799	Bracket
6	30S7981	Bracket Assembly
7	713W09290	Connector (J86)
A	251W10902	Washer, Plain No. 10
B	255W11102	Washer, Spring No. 10



ITEM	PART	DESCRIPTION
C	201W11302	Nut, Hex 10-32
D	112W55910	Screw, Mach Sems 10-32 x 9/16
E	112W30602	Screw, Mach Sems 8-32 x 3/8
F	156W19502	Screw, Tapping Pan Hd 6-32 x 3/8
G	112W30502	Screw, Mach Sems 8-32 x 5/16
H	112W54610	Screw, Mach Sems 10-24 x 3/8
J	201W10902	Nut, Hex 8-32
K	251W22002	Washer, Plain No. 6

12. C TRANSPORT

PL 12.1 **Complete C Transport and Mounting**
Ref. 226090



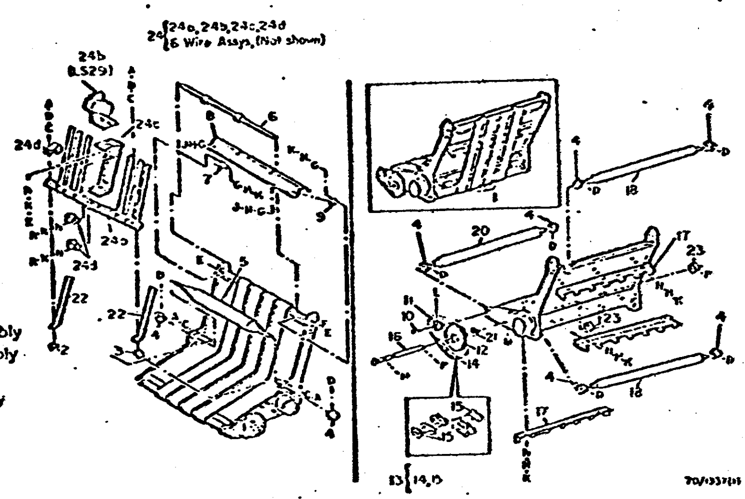
ITEM	PART	DESCRIPTION
1	30S3742	Upper Inboard Bracket Assembly
2	—	Bracket P/O Item 1
3	30P3339	Inboard Bracket Hanger
4	30S3741	Upper Outboard Bracket
5	—	Bracket P/O Item 4
6	30P3338	Outboard Bracket Hanger
7	15S1619	Lower Outboard Bracket Assembly
8	—	Lower Inboard Bracket Assembly
9	19P438	Retaining Clip
10	—	Bracket P/O Item 7

ITEM	PART	DESCRIPTION
11	22S887	'C' Transport Assembly
12	7S982	Drive Sprocket Assembly Quick Disconnect
13	25S253	Antistatic Bar
14	105P216	Transformer (T4)
15	28P623	Thrust Washer
16	120H14	Antistatic Cable Clamps
17	28P508	Washer
18	15P1521	Bracket
A	113W28502	Screw, Mach Pan Hd 10-32 x 3/8
B	256W11102	Lockwasher No. 10
C	251W10902	Washer, Plain No. 10
D	132W23202	Capscrew, Allen Hd 8-32 x 3/4
E	201W10902	Nut, Hex 8-32
F	201W11102	Nut, Hex 10-32
G	—	DELETED
H	113W25802	Screw, Mach Pan Hd 10-24 x 1/2
J	113W19402	Screw, Mach Pan Hd 6-32 x 1/4
K	256W10702	Lockwasher No. 6
L	251W10702	Washer, Plain No. 6
M	113W32002	Screw, Mach Pan Hd 1/4-20 x 5/8
N	256W11502	Lockwasher 1/4
P	251W11602	Washer, Plain 5/16
Q	113W32202	Screw, Mach Pan Hd 1/4-20 x 3/4
R	113W28802	Screw, Mach Pan Hd 10-32 x 1/2
S	201W11302	Nut, Hex 10-32
T	256W10902	Lockwasher No. 8
U	113W22602	Screw, Mach Pan Hd 8-32 x 3/8
V	259W11102	Lockwasher, Ext Th No. 10

12. C TRANSPORT

PL 12.2 C Transport Components
Ref. 226091

ITEM	PART	DESCRIPTION
1	600S535	C' Transport Belt Kit (4 Belts)
2	30S4071	Outboard Finger Bracket
3	30S4069	Inboard Finger Bracket
4	13P1822	Bearing Assembly
5	22P599	Belt Tension Roller
6	6S957	Pinch Wheel Shaft Assembly
7	30S4077	Outboard Bracket Assembly
8	55P681	Baffle
9	30S4075	Inboard Bracket Assembly
10	29P460	Key
11	7P619	Driven Sprocket
12	7S883	Drive Sprocket
13	23S187	Drive Chain Assembly



ITEM	PART	DESCRIPTION
14	--	P/O Item 13
15	23H15	Connector Link
16	6S1469	Shaft Assembly
17	32P289	Upper and Lower Belt Guides
18	22P598	Upper and Lower Idler Rollers
19	32P290	Center Belt Guide
20	22P600	Drive Roller
21	28P625	Thrust Washer
22	19P1122	Finger
23	5H15	Outboard Collar
24	600S585	'C' Transport Jam Detector Kit (See note)
24a	19S800	Finger Assembly
24b	110S510	Switch Assembly
24c	30S5022	Bracket Assembly
24d	--	Clamp

ITEM	PART	DESCRIPTION
A	113W22602	Screw, Mach Pan Hd 8-32 x 3/8
B	256W10902	Lockwasher No. 8
C	251W22302	Washer, Plain No. 8
D	140W23301	Setscrew, Sq Hd Cup Pt 10-32 x 3/16
E	113W19602	Screw, Mach Pan Hd 6-32 x 3/8
F	354W02103	E-Ring 7/32
G	251W22002	Washer, Plain No. 6
H	256W10702	Lockwasher No. 6
J	113W19402	Screw, Mach Pan Hd 6-32 x 1/4
K	201W10702	Nut, Hex 6-32
L	141W28301	Setscrew, Allen Hd Cup Pt 10-32 x 3/16
M	354W05003	E-Ring 1/2
N	251W10702	Washer, Plain No. 6

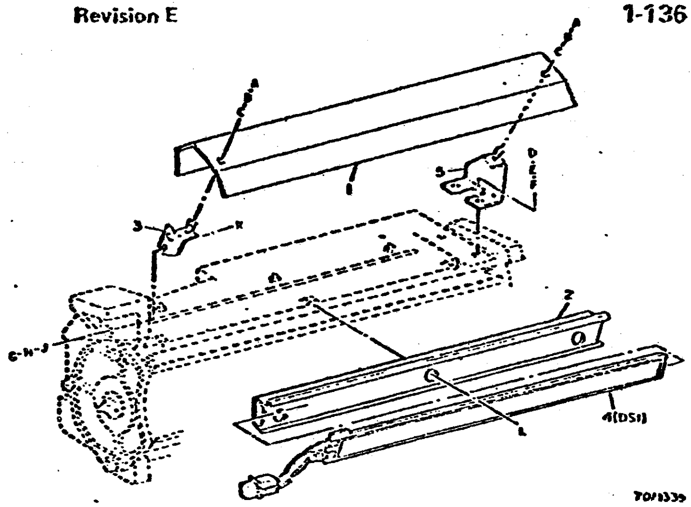
ITEM	PART	DESCRIPTION
P	132W17601	Capscrew, Allen Hd 4-40 x 1
R	215W10702	Nut, Self-Lkg 6-32

NOTE: For installation on machines with sorter,slitter-perforator, or ADF.

13. DRUM CLEANING

PL 13.1 Discharge Lamp, Lamp Shield and Ballast Ref. 226120

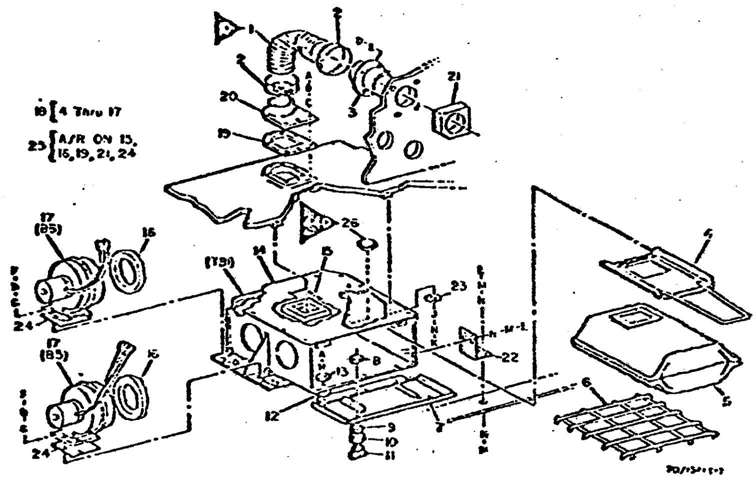
ITEM	PART	DESCRIPTION
1	55P632	Lamp shield
2	113P418	Lampholder (E.L. Side)
3	30S3642	Outboard Bracket
4	122P234	E.L. Strip (DS1)
5	30S3643	Inboard Bracket
A	201W10702	Nut, Hex 6-32
B	255W10702	Lockwasher, Int Th No. 6
C	251W22102	Washer, Plain No. 6
D	132W22703	Capscrew, Allen Hd 8-32 x 7/16
E	256W10902	Lockwasher No. 8
F	251W22302	Washer, Plain No. 8



ITEM	PART	DESCRIPTION
G	113W17202	Screw, Mach Pan Hd 4-40 x 3/4
H	256W10502	Lockwasher No. 4
J	251W21302	Washer, Plain No. 4
K	201W10502	Nut, Hex 4-40
L	112W39510	Screw, Mach Sems 8-32 x 3/8

13. DRUM CLEANING

PL 13.3 **Brush Cleaner Vacuum and Filter**
Ref. 226122



ITEM	PART	DESCRIPTION
1	52P999	Vacuum Hose
2	19P770	Clamp
3	54S255	Duct
4	50S242	Tray
5	53S331	Filter Bag
6	55P516	Guard
7	2S1542	Door
8	28P426	Retaining Ring
9	28P425	Nylon Washer
10	9P737	Spring
11	26P815	Lock Stud
12	14P996	Spacer
13	28P381	Mounting Washer

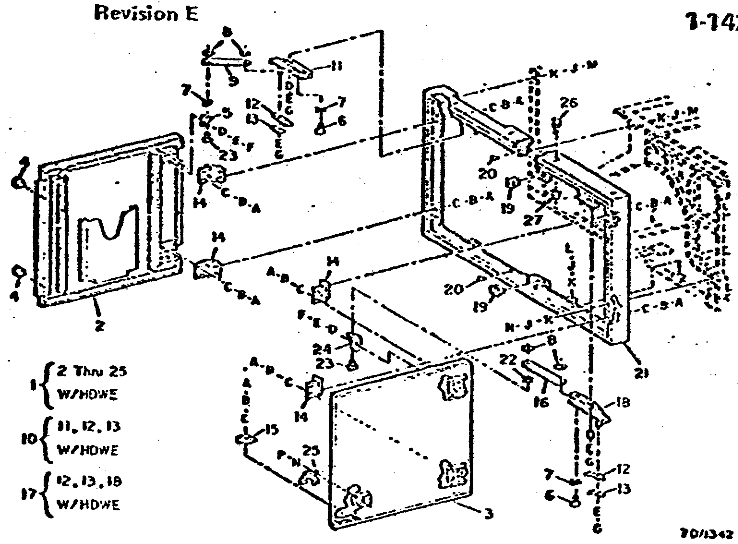
14	--	Filter Box Frame (P/O 18)	C	251W10502	Washer, Plain No. 8
15	35P402	Seal	D	131W25502	Capscrew, Hex Hd 10-24 x 1/2
16	35P404	Gasket			
17	127S745	Brush Vacuum Motor (B5,B6)	E	251W22702	Washer, Plain No. 10
18	60S134	Filter Box Assembly	F	201W11502	Nut, Hex 1/4-20
19	35P459	Gasket	G	251W11502	Washer, Plain 1/4
20	5P774	Flange	H	256W11102	Lockwasher No. 10
21	35P628	Gasket	J	251W22602	Washer, Plain No. 10
22	30P4200	Support Bracket	K	131W25002	Capscrew, Hex Hd 10-24 x 5/8
23	28P500	Washer			
24	35P406	Gasket	L	201W10702	Nut, Hex 6-32
25	63H22	Adhesive (A/R on Items 15, 16, 19, 21, 24)	M	256W10702	Lockwasher No. 6
			N	251W10702	Washer, Plain No. 6
26	600S2930	Pressure Disc Hose Replacement Kit (TAG 440) (See NOTE)			
A	113W22802	Screw, Mach Pan Hd 8-32 x 1/2			
B	256W11502	Lockwasher 1/4			

NOTE: This kit is to provide an access opening to the pressure disc hose and fittings without removing the filter box.

14. COVERS

PL 14.1 Front Doors and Frame Assembly
Ref. 226140

ITEM	PART	DESCRIPTION
1	1S2679	Front Doors and Frame Assembly
-	1S4122	Front Door and Frame Assembly (Alternate) **
2	2S3625	L.H. Door Assembly (Smooth)
-	2S6366	L.H. Door Assembly (Textured)
3	2S3626	R.H. Door Assembly (Smooth)
-	2S6364	R.H. Door Assembly (Textured)
4	4P154	Bumper



ITEM	PART	DESCRIPTION
5	30P7383	L.H. Arm Support
6	26P1050	Shoulder Screw
7	13P1377	Bearing
8	27P258	Speed Nut
9	31P936	L.H. Arm
10	30S7393	L.H. Spring Support Assembly
11	--	P/O Item 10
12	9P1321	Spring
13	17P616	Spring Stop
14	3S1538	Hinge
15	30P3851	Catch Stop Bracket
16	31P937	R.H. Arm
17	30S7402	R.H. Spring Support Assembly
18	--	P/O Item 17
19	3P503	Catch
20	4P132	Bumper
21	1S2678	Front Frame Assembly

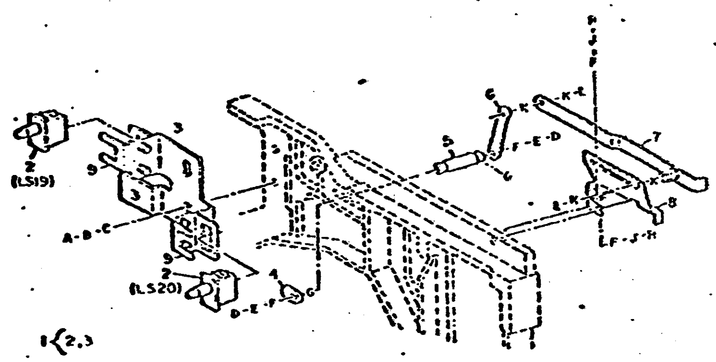
ITEM	PART	DESCRIPTION
-	1S4121	Front Frame Assembly (Alternate) **
-	1S4638	Front Frame Assembly (Alternate) **
22	13H2133	Bearing
23	26P1188	Shoulder Screw
24	30P7390	R.H. Arm Support
25	30S6282	Bracket Assembly
26	26P1705	Stud
27	28P455	Retainer
A	113W19502	Screw, Mach Pan Hd 6-32 x 3/8
B	255W10702	Lockwasher No. 6
C	251W21902	Washer, Plain No. 5
D	251W22202	Washer, Plain No. 8
E	256W10902	Lockwasher No. 8
F	113W22702	Screw, Mach Pan Hd 8-32 x 7/16

ITEM	PART	DESCRIPTION
G	201W10902	Nut, Hex 8-32
H	113W25702	Screw, Mach Pan Hd 10-24 x 7/16
J	256W11102	Lockwasher No. 10
K	251W10902	Washer, Plain No. 10
L	113W25802	Screw, Mach Pan Hd 10-24 x 1/2
M	201W11302	Nut, Hex 10-32
N	251W22202	Washer, Plain No. 8
P	153W22502	Screw, Tapping Pan Hd 8-18 x 5/16

**Textured Panels

14. COVERS

PL 14.2 Front Door Interlocks and Latch
Ref. 226141



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ITEM	PART	DESCRIPTION
1	30S7395	Door Interlock Switch and Support Assembly
2	110P1279	Door Interlock Switch (LS19,LS20)
3	--	P/O Item 1
4	3P778	Door Lock
5	24P249	Door Interlock Latch Rod
6	11S435	Door Interlock Handle
7	31S957	Arm
8	30P8813	Bracket
9	30P3283	Switch Bracket

ITEM	PART	DESCRIPTION
A	113W25902	Screw, Mach Pan Hd 10-24 x 1/2
B	255W11102	Lockwasher No. 10
C	251W10902	Washer, Plain No. 10
D	113W19502	Screw, Mach Pan Hd 6-32 x 5/16
E	255W10702	Lockwasher No. 6
F	251W10702	Washer, Plain No. 6
G	355W02503	E-Ring 1/4
H	113W25702	Screw, Mach Pan Hd 10-24 x 7/16
J	256W11101	Lockwasher No. 10
K	252W11201	Washer, Nylon No. 8
L	112W00510	Screw, Mach Sems

ITEM	PART	DESCRIPTION
12	30S9043	Mounting Bracket
13	30P9051	Bracket
14	30S9091	Receptacle
15	26P1581	Stud
16	91P1131	Xerox 7000 Name Tag
17	91P1499	Label-Reduction Chart
18	2S5491	R.H. Top Cover Assembly*
-	2S6377	R.H. Top Cover Assembly**
A	131W23092	Capscrew, Hex Hd 8-32 x 5/8
B	201W10902	Nut, Hex 8-32
C	112W35510	Screw, Mach Sems 8-32 x 5/16
D	112W02610	Screw, Mach Sems 4-40 x 3/8
E	256W10902	Lockwasher No. 8
F	251W22302	Washer, Plain No. 8
G	112W36610	Screw, Mach Sems 8-32 x 3/8

*Smooth Panels

**Textured Panels

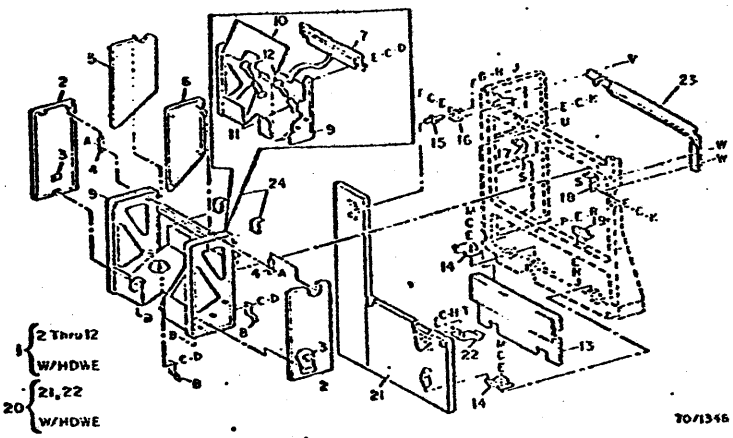
14. COVERS

14. COVERS

PL 14.5 Receiving Tray and Left-Hand Cover

Ref. 226144

ITEM	PART	DESCRIPTION
1	50S378	Receiving Tray Assembly
-	50S1001	Receiving Tray Assembly (Alternate)
2	2P1665	Outside Cover*
-	2S6333	Outside Cover**
-	2P7421	Outside Cover (Alternate) **
3	27P203	Nut
4	9P789	Mounting Spring
5	2S2221	Inboard Cover*
-	2S6289	Inboard Cover**
-	2S7429	Inboard Cover (Alternate)**
6	2S2222	Outboard Cover*
-	2S6290	Outboard Cover**



ITEM	PART	DESCRIPTION
-	2S7430	Outboard Cover (Alternate)**
7	30S12265	Support
-	30S13825	Support (Alternate) **
8	30P3235	Mounting Bracket
9	--	P/O Item 1
10	2P7449	Cover
-	2P7448	Cover (Alternate) **
11	9P936	Spring
12	10S657	Plunger
13	55S1220	Cover
14	30S3261	Support
15	26P926	Stud
16	30S7532	Mounting Bracket
17	30P4018	Inboard Mounting Bracket
18	30P3337	Outboard Mounting Bracket
19	30S3711	Bracket Assembly
20	2S1906	Left-Hand Cover Assembly*
-	2S6285	Left-Hand Cover Assembly**
21	3P868	Cover Catch
22	30S7656	Bracket Assembly

ITEM	PART	DESCRIPTION
23	30S765	Bracket Assembly
24	19P1243	Clips
A	201W10902	Nut, Hex 8-32
B	113W23202	Screw, Mach Pan Hd 8-32 x 1-1/8
C	256W11102	Lockwasher No. 10
D	113W29002	Screw, Mach Pan Hd 10-32 x 5/8
E	251W22502	Washer, Plain No. 10
F	113W26002	Screw, Mach Pan Hd 10-24 x 5/8
G	251W21902	Washer, Plain No. 5
H	255W10702	Lockwasher No. 6
J	201W10702	Nut, Hex 6-32
K	201W11302	Nut, Hex 10-32
L	251W10702	Washer, Plain No. 6
M	113W25802	Screw, Mach Pan Hd 10-24 x 1/2
N	--	DELETED
P	142W26201	Setscrew, Allen Hd Oval Pt 10-24 X 3/4

ITEM	PART	DESCRIPTION
R	201W11102	Nut, Hex 10-32
S	113W28802	Screw, Mach Pan Hd 10-32 x 1/2
T	113W19502	Screw, Mach Pan Hd 6-32 x 5/16
U	112W39510	Screw, Mach Sems 8-32 x 3/8
V	112W36510	Screw, Mach Sems 8-32 x 3/8
W	220W11504	Nut, Self-Lkg 1/4-20

*Smooth panels

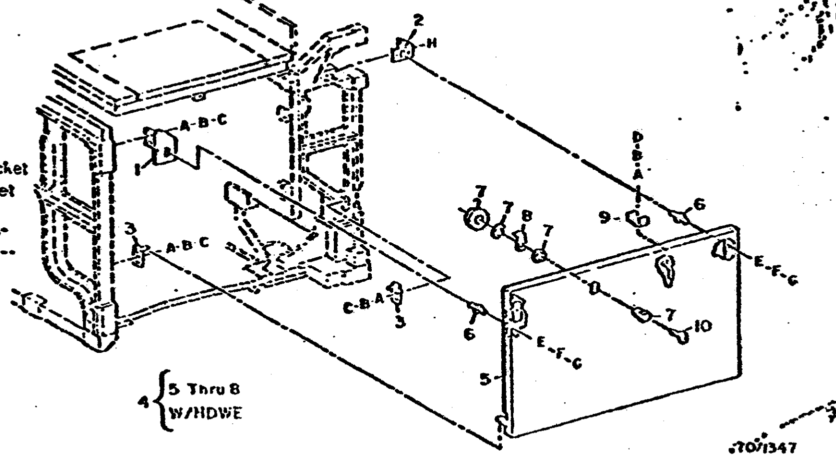
**Textured panels

14. COVERS

PL 14.6 Right-Hand Cover

Ref. 226145

ITEM	PART	DESCRIPTION
1	30S3314	Outboard Catch Bracket
2	30S7331	Inboard Catch Bracket
3	30S3310	Bracket
4	2S2409	R.H. Cover Assembly*
4	2S6292	R.H. Cover Assembly**
5	—	P/O Item 4
6	26P926	Stud
7	3P1005	Lock
8	8P313	Lock Cam
9	3P889	Cover Lock
10	3P1006	Key
A	251W10902	Washer, Plain No. 10
B	256W11102	Lockwasher No. 10
C	113W25702	Screw, Mach Pan Hd 10-24 x 7/16



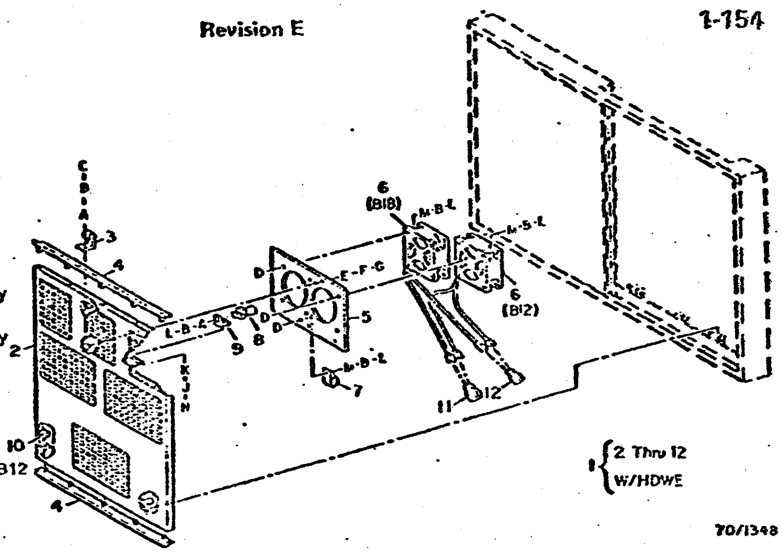
ITEM	PART	DESCRIPTION
D	113W28302	Screw, Mach Pan Hd 10-32 x 1/2
E	251W10702	Washer, Plain No. 6
F	256W10702	Lockwasher No. 6
G	201W10702	Nut, Hex 6-32
H	112W54710	Screw, Mach Sems 10-24 x 7/15

*Smooth panels

**Textured panels

14. COVERS

PL 14.7 Left-Hand Rear Door and Cooling Blower Motors
Ref. 226146



ITEM	PART	DESCRIPTION
1	2S3791	L.H. Rear Door Assembly (Smooth)
-	2S6358	L.H. Rear Door Assembly (Textured)
2	—	P/O Item 1
3	3P770	Latch
4	56S157	Trim
5	30P4878	Bracket
6	127S745	Cooling Blower Motor (B12 and B18)
7	120H8	Clamp
8	25P1055	Ball Stud

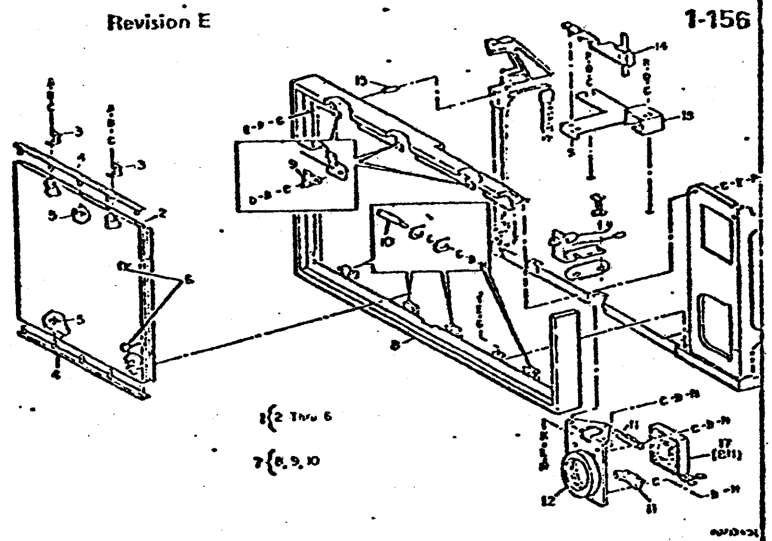
ITEM	PART	DESCRIPTION
9	30S3817	Bracket
10	27P211	Nut
11	117S4534	Connector
12	117S4535	Connector
A	251W10702	Washer, Plain No. 6
B	256W10702	Lockwasher No. 6
C	113W19702	Screw, Mach Pan Hd 6-32 x 7/16
D	113W20002	Screw, Mach Pan Hd 6-32 x 5/8
E	251W22502	Washer, Plain No. 10
F	256W11102	Lockwasher No. 10
G	113W28502	Screw, Mach Pan Hd 10-32 x 3/8
H	113W22602	Screw, Mach Pan Hd 8-32 x 3/8
J	256W10902	Lockwasher No. 8
K	251W10802	Washer, Plain No. 8
L	201W10702	Nut, Hex 6-32
M	251W22002	Washer, Plain No. 6

14. COVERS

PL 14.8 Right-Hand Rear Door, Cooling Blower Motor B11, and Rear Frame Assembly

Ref. 226147

ITEM	PART	DESCRIPTION
1	2S1952	R.H. Rear Door Assembly*
-	2S6293	R.H. Rear Door Assembly**
2	—	P/O Item 1
3	3P770	Latch
4	56S157	Trim
5	27P211	Nut
6	4P154	Bumper
7	1S2686	Rear Frame Assembly
-	1S4124	Rear Frame Assembly (Alternate)
8	—	P/O Item 7



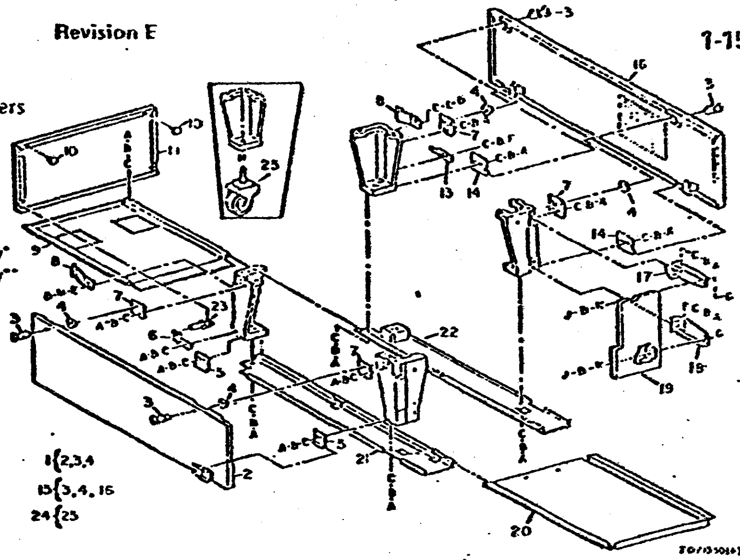
ITEM	PART	DESCRIPTION
9	3P751	Catch
10	24P151	Frame Mounting Rod
11	19P653	Clip
12	30S3303	Bracket
14	3S1636	Latch Assembly
15	14P1820	Frame Spacer
16	—	DELETED
17	127S744	Cooling Motor (B11)
18	30P7668	Bracket
A	113W19702	Screw, Mach Pan Hd 6-32 x 7/16
B	256W10702	Lockwasher No. 6
C	251W10702	Washer, Plain No. 6
D	113W19502	Screw, Mach Pan Hd 6-32 x 3/8
E	113W25802	Screw, Mach Pan Hd 10-24 x 1/2
F	256W11102	Lockwasher No. 10
G	251W10902	Washer, Plain No. 10
H	201W10702	Nut, Hex 6-32
J	113W25702	Screw, Mach Pan Hd 10-24 x 7/16
K	251W11502	Washer, Plain 1/4
L	256W11502	Lockwasher 1/4
M	113W32002	Screw, Mach Pan Hd 1/4-20 x 5/8
N	113W22502	Screw, Mach Pan Hd 8-32 x 5/16
P	201W11302	Nut, Hex 10-32
Q	256W11102	Lockwasher No. 10
R	132W25802	Capscrew, Allen Hd 10-24 x 1/2
S	220W11304	Nut, Self Lkg 10-32

*Smooth panels

**Textured panels

14. COVERS

PL 14.9 Lower and Bottom Covers
Ref. 226148



ITEM	PART	DESCRIPTION
1	2S1714	Lower Front Cover Assy*
-	2S6280	Lower Front Cover Assy**
2	--	P/O Item 1
3	26P925	Stud
4	28P455	Retainer
5	3P1649	Hinge
6	30S3710	Mounting Bracket
7	3S753	Catch
8	3P779	Mounting Catch
9	2S1959	Bottom L.H. Cover*
10	4P77	Bumper
11	2S4501	Lower L.H. Cover*
-	2S6288	Lower L.H. Cover**
13	30P3391	Mounting Bracket

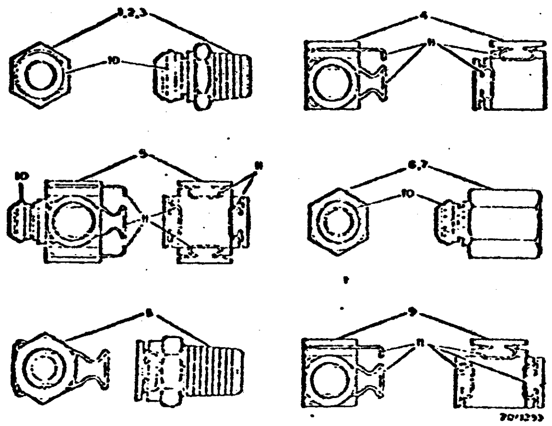
ITEM	PART	DESCRIPTION
14	3P793	Hinge
15	2S1709	Lower Rear Cover Assy*
-	2S6300	Lower Rear Cover Assy**
16	--	P/O Item 15
17	30P3344	Mounting Bracket
18	30P3345	Mounting Bracket
19	2S1706	Lower R.H. Cover*
-	2S6301	Lower R.H. Cover**
-	2S7434	Lower R.H. Cover (Alternate) **
20	2S1933	Bottom R.H. Cover
21	2S1680	Bottom Front Cover
22	2S1578	Bottom Rear Cover
23	26P1049	Stud
24	73S103	Caster (set of 4, includes hardware)
25	17P714	Caster (single)
-	17P633	Caster (alternate)
A	113W25802	Screw, Mach Pan Hd 10-24 x 1/2
B	256W11102	Lockwasher No. 10
C	251W10902	Washer, Plain No. 10
D	113W22602	Screw, Mach Pan Hd 8-32 x 3/8
E	251W10502	Washer, Plain No. 8
F	113W25702	Screw, Mach Pan Hd 10-24 x 7/16
G	113W28502	Screw, Mach Pan Hd 10-32 x 5/16
H	201W13102	Nut, Hex 1/2-13
J	201W11302	Nut, Hex 10-32
K	251W11002	Washer, Plain 13/64
L	256W10902	Lockwasher No. 8
M	251W11502	Washer, Plain 5/16

*Smooth panels

**Textured panels

MODULAR AIR FITTINGS

ITEM	PART	DESCRIPTION
1	452W15502	Adapter Assembly -Male to Male Pipe (1/4" - 1/8")
2	452W15602	Adapter Assembly -Male to Male Pipe (1/4" - 1/4")
3	452W15702	Adapter Assembly -Male to Male Pipe (1/4" - 3/8")
4	452W30502	Elbow Assembly (1/4")
5	452W52002	Cross Assembly with Side Part Stud (1/4")
6	452W20502	Adapter Assembly -Male to Female Pipe (1/4" - 1/8")
7	452W20502	Adapter Assembly -Male to Female Pipe (1/4" - 1/4")
8	452W25602	Adapter Assembly -Female to Male Pipe (1/4" - 1/4")
9	452W34002	Tee Assembly (1/4")
10	452W01102	O-Ring
11	452W00202	Spring Clip



SERVICE MANUAL

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REGISTRATION... SEE SPRUCE/ORBIT

1. SPECIFICATIONS

Machine Codes

Physical

Length: 65 in.
Width: 32 in.

Weight: 1250 pounds
Floor space required (Fig. 1-1):

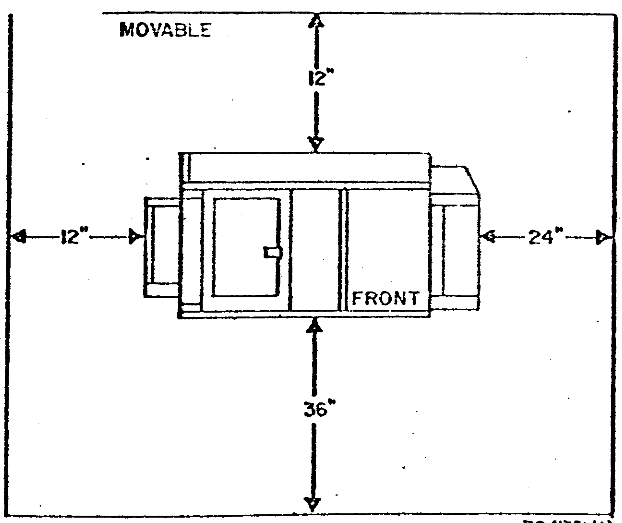

Fig. 1-1. Floor Space

Electrical

- Single Phase—Two fused conductors, neutral and ground
  Voltage: 120 V (nominal) line-to-neutral; 240 V (nominal) line-to-line, 60 Hz, AC
  Range: 107 V (min), 125 V (max) line-to-neutral; 214 V (min), 250 V (max) line-to-line
- Three Phase—Two wires and neutral of 4-wire, wye-connected system, plus ground
  Voltage: 120 V (nominal) line-to-neutral; 208 V (nominal) line-to-line; 60 Hz, AC
  Range: 107 V (min), 125 V (max) line-to-neutral; 185 V (min), 215 V (max) line-to-line
  Current: Standby Line 2 3A
  Line 3 5A
  Running Line 2 18.5A
  Line 3 18.5A
  Power Consumption (approximate values):
  Standby Line 2 300W
  Line 3 350W
  Running Line 2 1450W
  Line 3 1460W
  Not Ready 2000W
  Ready 532W
  Running 3600W
  Power Consumption (approximate values):
  Standby Line 2 300W
  Line 3 350W
  Line 2 1450W
  Line 3 1460W
  Power Factor (approximate values):
  Standby Line 2 88%
  Line 3 70%
  Running Line 2 65%
  Line 3 66%

Sole use of a fused, 30-ampere branch line termination in a switch box, located no more than 15 feet from the machine, is required. Refer to Fig. 1-2 for input line connectors.

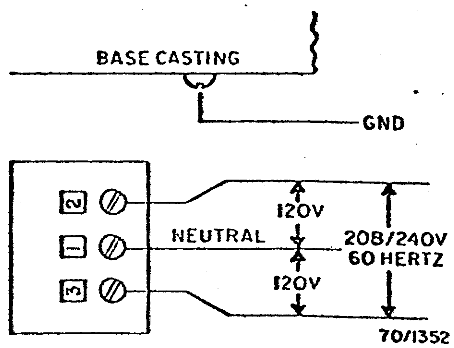

Fig. 1-2. Input Line Connectors

Environmental

Temperature: 60° to 90°F
Humidity Range: 15 to 85%
Maximum Elevation: 5000 ft. above sea level

Heat Emitted into Surrounding Air:
Standby 20 BTU per minute
Running 145 BTU per minute
Exhaust Air Flow 480 cubic feet/minute

600P81722

1. PREVENTIVE MAINTENANCE

General

Preventive maintenance is an important part of your work and should be carried out diligently. A planned program of maintenance ensures customer satisfaction by keeping the machine operating at maximum efficiency. Further, it not only balances your workload but also reduces emergency calls and machine downtime.

A list of parts required to perform the PM is provided in Table 2-1. You should check this list before each PM to be sure that you have all of the parts required.

The PM steps are presented in a manner calculated to avoid backtracking and repeat operations. The normal PM should be performed at intervals of 150,000 copies or as close to this as possible. Additional tasks are required at various copy intervals as noted throughout the procedures.

Remember, you are in the customer's office. Try not to disrupt his normal office operation. Keep your work space clean and as orderly as possible; do not scatter tools and parts around. Dispose of solvent soaked paper towels in proper receptacles.

CAUTION: Be careful not to spill Xerox cleaning solvent on floors or furniture.

Table 2-1. PM Material Check List

INTERVAL	QUANTITY	PART	DESCRIPTION
Every PM	1	600S2591	150,000 Copy PM Kit includes:
	1	35P1736	Paper Towel
	1	35P1737	Drop Cloth
	1	600P1547	Tech Rep PM Card
	1	611P45927	Reorder Label
	1	95P478	Vacuum Cleaner Bag
	14	53P63	Air Bottle Filter
	1	53P70	Air Filter
	2	53P68	Air Filter
	2	19P580	Cleaning Pad
	1	53S173	Filter Bag
	1	35P766	Fuser Roll Wiper
	1	42P58	B Transport Brush
	1	39S33	Lower Wick
	1	14P3229	Fuser Shim
Every PM	1	70H23*	LO-17 Oil
Every PM	1	70H44*	Lubriplate
Every PM	1	70H46*	Lubricant
Every PM	1	43H10*	Cleaning Solvent
Every PM	1	73S46	Meropa No. 3 Oil
Every 6th PM	3	39S14	Oilers

NOTE: The * items should be in your tool kit at all times.

PM Procedure

1. Open all doors and remove all covers.
2. Remove and cover the drum (8.2).
3. Disable the main drive motor by removing P96.
4. Remove leads from developer electrode and bias baffles.
5. Remove the corotrons.
6. Wash corotrons with soap and water using oval brush (600T79); Shake off excess water and set aside to dry.
7. Round off the corners of the preclean corotron if this has not already been done.
8. Lock developer assembly in place, cheat front door interlock switches, and drum interlock switch.
9. Dump developer (verify developer replacement with customer):
   c. Spread drop cloth (55H5) in front of machine.
10. Adjust the main drive chain (1.1). Replace chain every 10th PM (1.4).
11. Check and adjust A transport drive and chain (1.5).
12. Clean the drum brush housing, vacuum hose, and filter bag:
    a. Place paper on B transport. Remove the drum cleaning brush.
    b. Dial one copy. Push POWER ON switch, open developer interlock and push START PRINT button. (This will disable the developer/paper feeder drive motor, but will provide a vacuum to the filter system.)
    c. Thoroughly clean brush housing and vacuum hose.
    d. Push STOP PRINT button. Remove vacuum hose.
    e. Push START PRINT button. Clean out base casting, breaking loose caked toner with screwdriver.
    f. Reinstall hose. Open filter box, remove and discard filter bag. Clean filter box.
    g. Install brush and filter bag.
13. Clean the B transport:
    a. Remove and discard the B transport belt brush and fuser roll wiper.
    b. Clean B transport and belts. Clean toner off transport drive and idler roller. Using the six inch metal rule, loosen toner in recesses of B transport.
    c. Check B transport vacuum seal to see that it properly adheres to the vacuum manifold.
    d. Install new belt brush and fuser roll wiper.
    e. Remove B transport hose. Clean and reinstall.
14. Clean the register stop drawer. Thoroughly clean constant velocity arm, gear segment, and cam follower.
15. Remove air filter bottles and replace felt filters. Remove nipple and cap to drain air and moisture from accumulator.

CAUTION: Use wrench on nipple to prevent cracking filter assembly.

Replace compressor filter if required.

WARNING: Use a piece of cloth or similar protection when removing and installing the filter. The wire cage of the filter could injure your hands.

16. Clean entire machine:
 a. With the brush attachment on vacuum cleaner, throughly vacuum clean the A and B transports, pre-transfer corotron, and developer housing.
 b. With crevice tool attachment on vacuum cleaner, clean the drawer slides, reject tray, under base frame and under belts on transports.
17. Clean the mispuff window, check jets for air passage. Use a clean dry paper towel to wipe the window and the electroluminescent strip.
18. Remove lubricator assembly and clean lower wick:
 a. Disconnect thermistor connector.
 b. Remove lubricator assembly.

NOTE: Remove the thermistor and tuck it out of the way when cleaning the wick.

 c. Upend the wick in a wastebasket and clean all toner from it. Brush wick lengthwise with a suede brush to raise the nap.
19. Resaturate wick with fuser oil.
20. Clean fuser area using paper towels:
 a. Wipe oil from all accessible areas.
 b. Use solvent to clean Teflon surface of fuser heat roll. Make sure all surfaces are free of toner.

21. Install new duct filters. Install washed corotrons. Connect corotrons at PS1.
22. Reinstall air bottles, cap and nipple. Do not use sealant on the compressor. Turn filter bottles until handtight. Do not force.
23. Adjust corotron currents (8.10).

26. Fill fuser oil pan and auxiliary oil pan with silicone oil supplied in PM kit. If a little more oil is needed, use oil which was previously left at the account. When any oil is left over, pour it all in one can and leave it at the account; it could be stored in the filter box housing.
27. Check and lubricate the following assemblies as required:
 a. Check oil level of main drive motor. If necessary, fill to level mark with Meropa No. 3.
 b. Check oil level in gear box of developer/feeder drive motor. If necessary, fill to notch on dipstick with Meropa No. 3.
 c. Lubricate drive clutch of the register stop module with Lubriplate No. 630AA.
 d. Lubricate both surfaces of sensing bar and sniffer cam assembly (double cam) with Lubriplate No. 630AA.
 e. Lubricate the constant velocity arm and gear segment assemblies with Lubriplate No. 630AA.
 f. Lubricate drawer handle with two drops of LO-17

NOTE: Do not lubricate chains, sprockets, or drawer slides.

28. Every 6th PM, lubricate cooling blowers B11, B12, B18, using one oiler for each motor.

30. Every 12th PM, lubricate the following components using LO-17·

 c. Brush motor; 5-6 drops.
 d. Brush vacuum motor; 5-6 drops.
 e. A vacuum motor, 5-6 drops.
 f. B and C vacuum motor; 5-6 drops.
 g. Developer/feeder drive motor (rear bearing); 2-4 drops.
 h. Drive and driven cam springs (part of object mirror drive); 1 drop on side of bushing.
 i. Lubricate paper feeder clutch, in the area where it contacts the pawl, with Lubriplate No. 630AA.
31. Every 24th PM, lubricate the air pump with LO-17; 5 drops at coupling end, 12 drops at the other end.
32. Place developer housing in machine, but do not slide it into its 'home' position.
33. Reverse drum on shaft, reinstall.
34. Replace P96. Attach developer housing drive chain and lock housing in place. Connect leads to developer electrode and bias baffles. Reinstall and connect lead to transfer corotron.

CAUTION: Use extreme caution when replacing lubricator assembly; thermistor probes are imbedded in this wick.

NOTE: Make sure wick is completely saturated with silicone oil before installing.

35. Install lubricator assembly.
36. Block paper tray with unopened ream of paper, turn on machine. Start print cycle and install new developer.

CAUTION: Machine must be running while installing new developer.

37. Check snubber adjustment (3.3.9).
38. Check multisheet sensor clearance adjustment (5.9).
39. Lubricate sensing bar and cam follower with Lubriplate (70H44).

41. Check fuser temperature adjustment (11.9). Adjust if necessary.
    When the machine is turned on, the heater rod should initially be full on (bright). With machine in ready, lamp should either be off or pulsing on.
    If RT8 bead is broken:
    a. No READY light after 10 minutes.
    b. Infinite resistance will be read across the blue leads.
    c. Fuser temperature may be too high.
    If control bead is broken — RT1:
    a. Continual full power to the lamp, "over-temp." condition after approximately 15 minutes.
    b. Infinite resistance will be read across the leads.
    c. Check for lamp control before leaving machine (run 250 copies).
    If both beads are broken:
    a. No READY light.
    b. Continual power to lamp (no control).
    c. Check for lamp control before leaving machine.
42. Check contact arc adjustment (11.4).

NOTE: Do not run copies to heat the rollers, otherwise an inaccurate contact arc measurement will result.

43. Perform billing meter checks as outlined in the installation section.
44. Run blank copies. Record billing meter and copy counter readings.

NOTE: The customer cannot be charged for copies he does not receive. Also record readings at the end of PM and allow "copy credits." Load new ream of customer's paper in tray and run 50 copies with document cover down. Billing meter should have increased by 10 counts. Copy counter should have increased by 50 counts.

45. Check copy quality
    b. Position test pattern 82P101 on the platen and run print samples.
    c. Check copy quality, buckle, skew, resolution
46. Clean area around machine.
47. Remove cheaters from interlock switches.
48. Close all doors and replace all covers.
49. Complete PM shipping label.
50. Pack and mail conditionable parts. Be sure shipping label is properly applied to carton. Mail carton in accordance with Branch procedure.

52. Allow copy and paper credits to customer.

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2. TRIM PROCEDURE

Perform the following TRIM (Technique of Routine Interim Maintenance) procedures during each service call. The items included reflect checks in areas that, if performed, will maintain copy quality and machine performance at optimum levels between PMs.

CAUTION: Before performing TRIM procedures, remove and cover the drum.

1. Clean:

   e. Catch pan
   f. Reject tray

2. Clean or replace:
   a. Drum cleaning brush.
   b. B transport belt brush.
   c. Fuser pressure roll wiper.
3. Brush or wipe clean:
   a. All corotron wires, shields, and end blocks.
   b. Developer pick-off baffle.
   c. Electroluminescent strip.
   d. Face of curved electrode baffle.
   e. B transport and register stop module area.
   f. Redundant mispuff detector.
   g. Puffer tube.

4. Visual checks:
   a. Brush housing and developer housing for paper.
   b. Drum cavity and developer housing for foreign objects.
   c. Quantity of developer in catch tray. Adjust developer seals, if necessary.
   d. B transport manifold vacuum seal.
   e. B transport paper path switch actuator caps.
   f. B transport drive dog alignment (concentricity).
   g. Main drive chain for tension, rust, etc

   i. Check puffer orifices for blockage.
5. Fusing system checks:
   a. Remove lubricator assembly.
   b. Lightly scrape off any toner deposits, scraping in direction of roll rotation.
   c. Saturate with silicon oil.
   d. Replace assembly.
   e. Check fuser heat roller for visible defects such as cracks, blistering, peeling.
   f. Check and clean fuser stripper finger.
   g. Check oil level.

NOTE: Whenever a wick assembly is removed from a machine, the following check should be made when reinstalling the same, or a new, wick assembly:
1. Turn machine on.
2. After approximately three minutes, turn the machine off.
3. Separate the connector to the wick assembly (P/J71) and measure the resistance of the thermistor beads. The resistance measured in both cases should be less than 25K. If infinite resistance is measured, bead(s) is broken and must be replaced.

6. Checks made with machine in print:
   a. Billing circuit for proper billing.
   b. Oil dispenser motor operation.
   c. Paper travel through machine.

   e. Adequacy of fusing.
   f. Copy quality.
   g. Paper feed operation.
   h. Condition of drum.

7. As a machine approaches its PM interval or when paper gets into the brush housing, an excessive amount of toner builds up in the brush housing. Under these conditions, the drum brush vacuum system is not capable of removing the toner accumulation. As the toner builds up, some of it begins to fall out into the drum cavity and onto the preclean corotron. When this occurs, the drum cavity rapidly fills up with a cloud of fine toner particles that is readily combustible. An arcing corotron, especially the preclean, can ignite this cloud. Therefore, as part of your TRIM procedure on every service call, perform the following checks:
   a. Inspect brush housing and filter bag for an excessive accumulation of toner. Clean or replace as required.
   b. Check for paper in the brush housing.
   c. Make sure the Electroluminescent Discharge Strip is properly seated and securely in place. An improperly seated E.L. Strip can be pulled into the brush housing, where it can ignite toner and the brush.
   d. Round off the sharp corners on the center section of all preclean corotrons. Make sure that there are no burrs or sharp points remaining. An alternative to rounding a corner is to place a one-inch piece of electrical tape over the corner and pinch the ends of the tape together.
   e. Make sure the plastic insulating caps are on the corotron end blocks.
   f. Start the machine and run several copies. Check the preclean corotron during operation to ensure that arcing is not occurring. Arcing is most likely to occur at start up. If arcing is taking place, remove the sharp points that appear to be causing the arcing.
   g. Clean the photocell

8. Account condition:
   a. Inform customer of any Key Operator problem
   b. If necessary, complete an account resume form # 45812 and return it to your FSM.

3. INSTALLATION

This section covers installation procedures for the Xerox 7000 after it has been delivered to the customer's location, and uncrated. For information on unpacking, handling, placement and other preliminary procedures, refer to the Delivery/Removal Carrier's Handbook.

Before starting on the installation, verify that the following cartons have been shipped with the machine. Note all shortages on IQR form.

Carton 1. Initial Installation Kit

Containing:

a. Package containing keys
b. Drum knob
c. Drum bag
d. Drum flanges
e. Drum shaft extension
f. Stripper fingers
g. Measuring paddle
h. Absorbent pad
i. Paper towels
j. Developer dump bags, cartons and ties
k. Reduction chart labels
l. Power cord
m. Forbidden copy instruction
n. Machine log book
o. Two reams paper
p. Three drum tie rods
q. Forms (service log, PM and drum, key operator reference and retrofit log
r. Funnel
s. Brush
t. Key operator supplement
u. Mirror package
v. Machine dispatch label with fuser oil
w. Fuser oil
x. Fuser oil indicator kit 600S1551

Carton 2. Paper Catch Tray

Carton 3. Xerographic Drum

In addition to the above items, developer and toner are needed for installation. These are supplied by either the branch or the customer.

Prepare Machine For Installation

1. Remove tape and plastic cover.
2. Remove tape from front, rear, side and top covers.
3. Remove tape and ties from paper feeder area (Fig. 2-1).

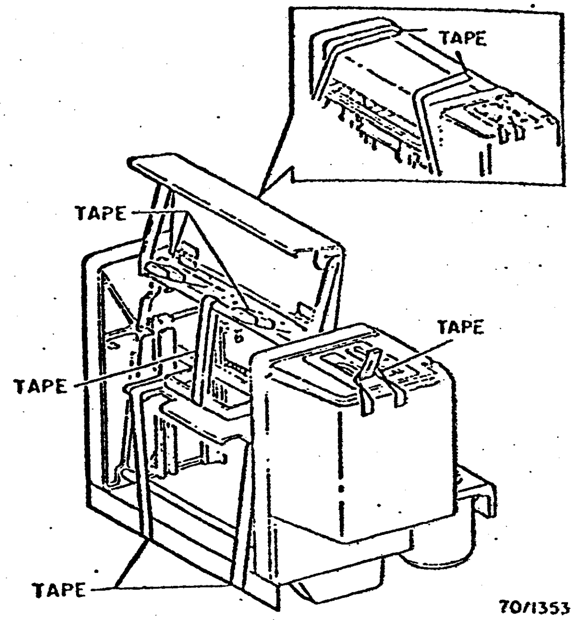


Fig. 2-1. Tape Locations on Paper Feeder

4. Unlock the developer cover. Loosen two top brackets on the right side cover to gain access to right top cover rear fastener. Remove right-side cover. Open front doors.

5. Unlatch developer assembly and remove developer ties (Fig. 2-3). Slide the developer back against its stops, and tighten the wing-nut on the inboard mounting bracket.

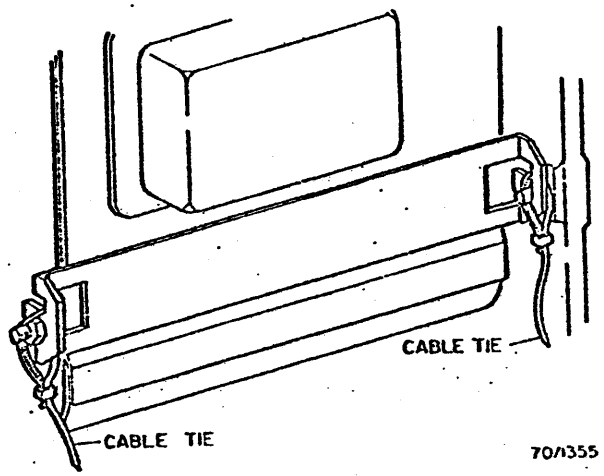


Fig. 2-3. Developer Tie-down Points

6. Open the register stop drawer and remove three cable ties shown in Fig. 2-4.

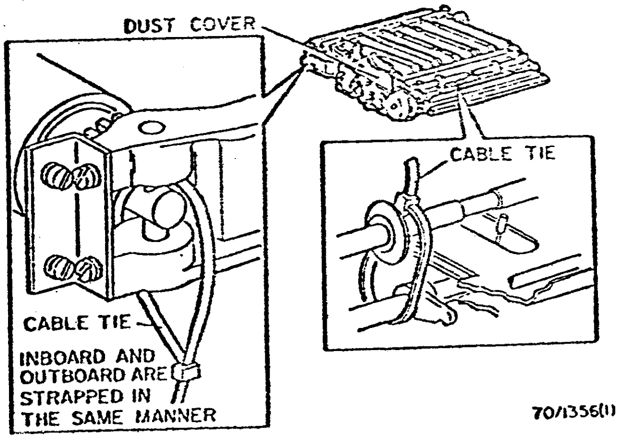


Fig. 2-4. Register Stop Drawer Tie-down Points

7. Remove tape and two cable ties from C transport (Fig. 2-5).

8. Remove left side cover

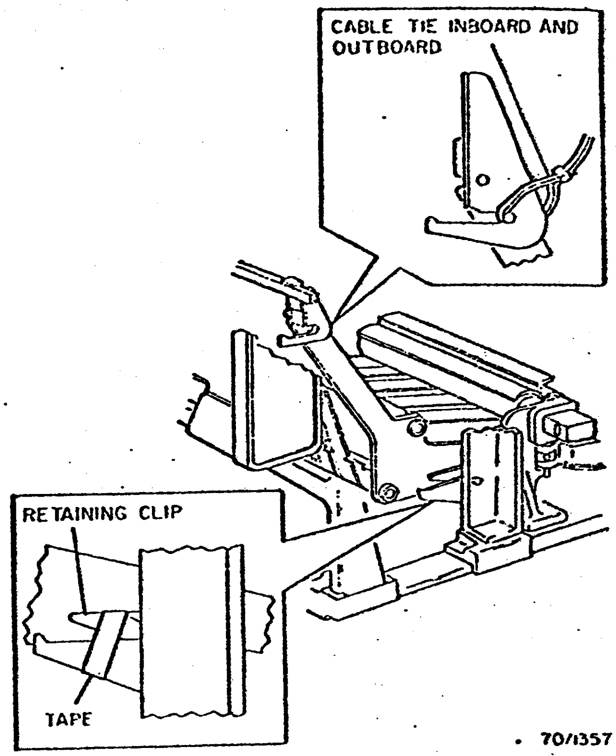
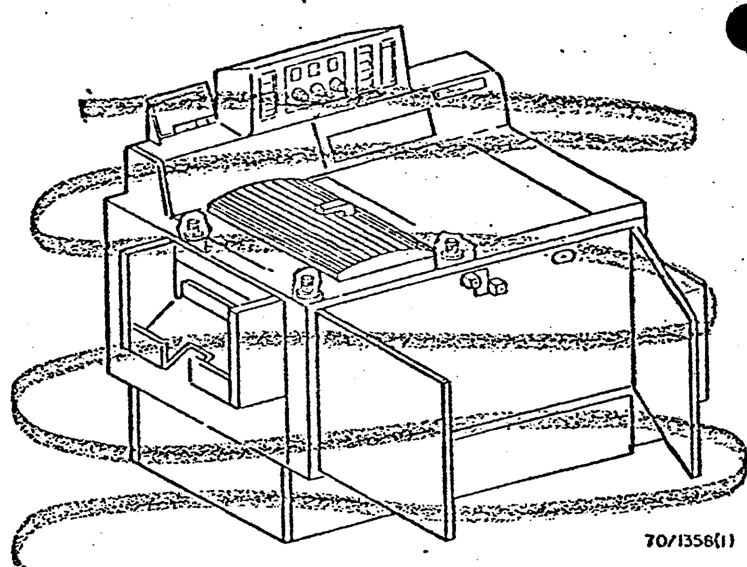


Fig. 2-5. "C" Transport Tie-down Points



~~Fig. 2-6. Removing Left Top Cover~~

10. Remove front and rear lower panels.
11. Install stripper fingers.
12. Unpack the lubricator assembly from the filter bag housing. Saturate new wick with oil before installing.

CAUTION: Eye irritation can occur if you rub your eyes after wetting your hands with silicone oil. This irritation is very mild and usually disappears within 24 hours. To prevent this discomfort, thoroughly wash your hands with soap and water after handling silicone oil. If you should happen to forget and experience some eye irritation, thoroughly flush your eyes with water.

13. Install the lubricator assembly. Check for broken thermistor beads by checking resistance between pins 'D' and 'C' and between pins 'E' and 'F' of J71. Resistance should be approximately 500 K ohms. Make certain P/J71 is connected properly, and the wick assembly spacer bracket has been positioned properly above the outboard fuser frame. If P/J71 is not connected properly, the NOT READY lamp will stay on and the fuser controller will not operate.

CAUTION: When installing the lubricator assembly, be careful not to break the thermistor beads or damage the hose from the fuser curl blower.

14. Install oil level indicator kit. Fill reservoir with oil to the level of the notch on the indicator.

Frame Alignment

Leveling the machine can twist its frame and cause the drum cavity components to be out of specification. This can result in drum damage. The following procedure permits a compromise between machine level and frame skew to provide normal machine operation. Perform this frame alignment procedure on new installations, on machines that have been moved from their installation position, and on problem machines—assuming the factory settings of both the lower pick-off baffle and the halo guide have not been changed. The maximum movement due to frame distortion is in the pick-off baffle area. If the factory settings of the pick-off baffle and the halo guide have been changed, the reference point for this procedure has been lost. Do not relevel a machine that is operating correctly.

1. Calibrate the mechanics level.
2. Adjust each caster to three turns from floor.
3. Place level on machined surface of outboard base frame (in front of A transport).
4. Level machine side-to-side.

CAUTION: Casters should be kept as close to the frame as possible. This will prevent the casters from slipping out of the base and caster stems from bending.

NOTE: When adjusting casters, turn them in equal increments so that full machine weight will be distributed on all four casters. For example, if one side of machine is low, raise it by adjusting casters at that side, but also lower the machine casters at the other side. If any caster requires much more turning force than the others, unequal weight distribution is indicated. Keeping equal weight distribution on the casters will minimize frame shift.

5. Place level on sniffer assembly shaft and level machine front-to-back. Maintain side-to-side level while performing this step.

NOTE: Steps 6 and 7 determine whether the machine frames are distorted. If distortion occurs, the outboard dimensions from the pick-off baffle, halo baffle, etc., to the drum shaft will decrease. The change in dimension is caused by a movement of the drum shaft towards the base frame, the maximum movement being toward the pick-off baffle area. This movement can be as much as 0.080 inch.

6. Assembly micrometer holder, micrometer, and 2- to 3-inch extension. Set micrometer to 0.117. Position micrometer holder on drum shaft and check outboard side of lower pick-off baffle.
7. If necessary, adjust left outboard caster to achieve 0.117 dimension of lower pick-off baffle.
8. Set micrometer to 0.144 and check to see if outboard side of halo guide is within ± 0.010.
9. If setting is within specification, proceed to step 13. If not, check left inboard caster. The caster should be supporting a share of the machine weight. As a rule of thumb, be sure caster is screwed out at least one full turn past the distance required to make it touch the floor.
10. Readjust left outboard caster to again achieve 0.117 setting of lower pick-off baffle.
11. Recheck halo guide. If setting is still incorrect, adjust the outboard left caster until the halo guide is within specification.
12. The lower baffle may now be out of specification. If so, loosen nuts and adjust baffle to 0.117 ± 0.005.

NOTE: Adjust both inboard and outboard ends of the pick-off baffle.

13. Recheck to make sure machine is still level side-to-side and front-to-back. At this time, at least one half the bubble must be within the outside lines of the level.
14. If one half of the bubble is not within the lines, adjust casters just enough to meet this specification.
15. Lock down casters after machine leveling is completed.

Drum Cavity Clearance

1. Remove dust cover assembly from register stop drawer.
2. Perform the drum cavity clearance checks (8.3).

Electrical Connection To Machine

1. Obtain power cord from installation kit.
2. Pass power cord through strain relief and connect to TB1 as shown in Fig. 2-7.

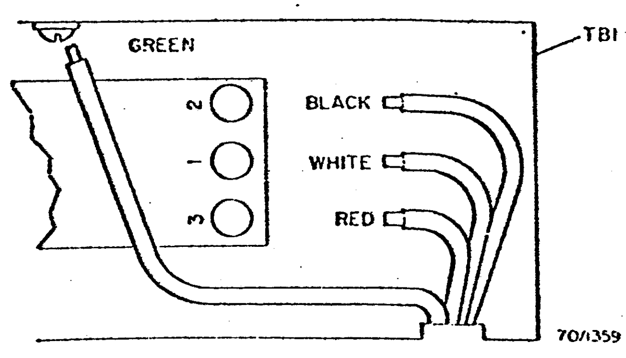


Fig. 2-7. Electrical Connection to Machine

NOTE: The electrical requirements for the 7000 are as follows:

The machine requires the sole use of a fused, 30-ampere branch line terminating at a wall receptacle. The customer's alternate installation may be a fused, 30-ampere branch line terminating in a switch box located no more than 15 feet from the machine and within sight of the operator.

A good ground must be provided.

The machine requires either a single-phase (three wires plus ground), or a three-phase (two wires plus neutral of a four-wire, wye-connected system), plus ground hookup.

3. Plug machine into wall outlet.
4. Cheat the front door interlocks.
5. Set VOM to 300 VAC scale. Measure voltages at TB1, pins 1 and 3. Reading should be 120 VAC.
6. Measure between pins 1 and 2. Reading should be 120 VAC.
7. Measure between pins 2 and 3. On a single-phase hookup reading should be 214 VAC to 250 VAC. On a three-phase hookup reading should be 185 VAC to 215 VAC.
8. Measure between pin 2 or 3 and ground. Reading should be 107 VAC to 125 VAC.
9. Measure between pin 1 and ground. Reading should be less than 5 VAC.
10. If readings are other than the ranges given, a defective circuit is indicated. Inform customer and have a local electrician check the wiring.

NOTE: Maximum voltage range is given in Table 2-2.

Table 2-2. Maximum Voltage Range

LINE-TO-NEUTRAL Pins 1-3 or 1-2	LINE-TO-LINE Pins 2-3	NEUTRAL-TO-GROUND Pins 1 to Ground
	SINGLE-PHASE	
Minimum 107	214	0
Nominal 120	240	0
Maximum 125	250	5
	THREE-PHASE	
Minimum 107	185	0
Nominal 120	208	0
Maximum 125	215	5

11. With VOM set to 300-volt scale, check reading between pins 2 and 3 on TB1 (Fig. 2-7). Record this voltage.

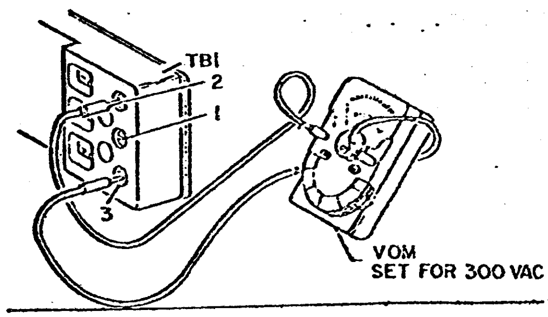
WARNING: Disconnect machine power cord from wall outlet before performing the next step.

12. Locate wire 8G1 onto the fuser autotransformer top that most closely matches the reading obtained in step 11. Plug power cord back into outlet. Turn on machine by pressing MAIN POWER button and console POWER ON button.

CAUTION: Be sure not to short meter leads when making the following checks.

13. Measure voltage between pins A and B of J86 at fuser controller or between input wires 9G1 and 123K1 at fuser autotransformer T1 (Fig. 2-8). The reading should be 230 ± 10 VAC. If not, relocate wire 8G1 to obtain 230 ± 10 VAC. Turn machine off when voltage has been checked to avoid fuser damage in case of malfunctioning thermistors.

NOTE: If no reading is obtained, check circuit breakers located under TB1.



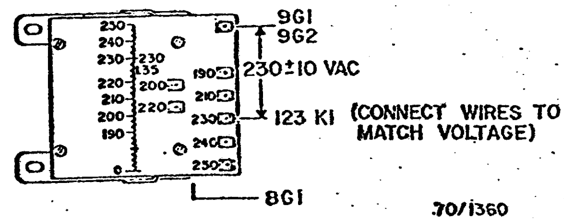


Fig. 2-8. Adjustment of Fuser Transformer T1 Output

Corotron Settings

Perform the corotron checks and adjustments (8.10).

Paper Path Check

1. Block the paper feeder by placing two unopened reams of paper under the sensing bar.
2. Tape down the drum interlock switch LS26. Turn MAIN POWER and console power on.
3. ... press START PRINT button and perform paper check procedures in the following sequence:

LS1

a) Initiate jam by inserting long screwdriver up under the right side of the register stop module (in the area of the reject tray) and actuating LS1.

NOTE: Be careful of wires near the switch.

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b) Machine should be in a jam condition with CALL KEY OPERATOR light flashing. (If not, replace LS1 or troubleshoot circuitry.) Clear jam by pulling out and replacing register stop drawer. Press POWER ON switch.

LS8

a) Press START PRINT.

b) Using long screwdriver in the reject tray area, actuate LS8 should increase count by 1.

METER

LS27

a) Press START PRINT.

b) Using long screwdriver, actuate LS27. Machine should jam.

c) Clear jam by pulling out and replacing register stop drawer. Press console POWER ON button.

LS38

a) While machine is running, trip one of the stripper fingers. The machine will jam.

b) Clear the jam by pulling out and replacing the register stop drawer.

c) Press console POWER ON.

LS9

a) Press START PRINT.

b) Manually actuate LS9. Reject finger solenoid L4 should actuate.

FUSER PRESSURE ROLLER

While machine is running, actuate LS3. Watch for rising of pressure roller.

TONER DISPENSER CHECK

a) While machine is running,

b) Insert toner measuring paddle into toner well

c) Press the Toner Increase button. Watch for paddle movement

Drum Installation

1. Remove drum flanges, tie rods and related hardware from installation kit.
2. Open carton and carefully remove drum.
3. Assemble drum (Fig. 2-10). Unlatch developer and slide back to stops.

CAUTION: Exposure to light fatigues the drum. Do not leave it uncovered. Be sure flanges are properly aligned with each other to prevent drum damage.

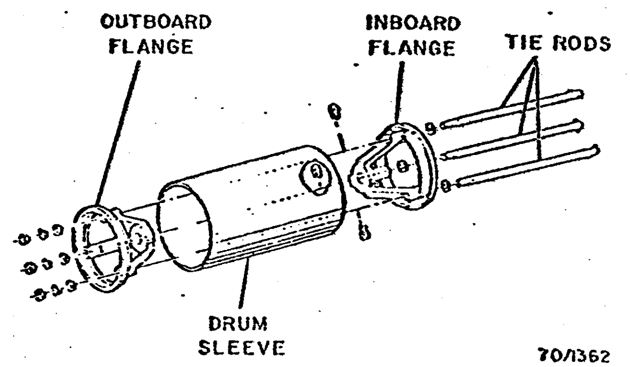

Fig. 2-10. Drum Assembly

4. Install drum extension shaft on drum shaft; then, install drum. Use drum locking nut which is packed in the installation kit.
5. Slide developer into position against the drum and latch.

Developer, Toner, Fuser Oil, and Paper Receiving Tray

1. Turn machine on.
2. Place unopened ream of paper in the paper tray and push UP button.
3. Turn toner control to LOW. Open toner dispenser cover and load approximately 1-1/2 pounds of toner. Close cover.
4. Remove developer filler plug.
5. When READY light comes on, press START PRINT button. While machine is running, carefully add developer. Replace filler plug.
6. Install oil level indicator kit.
7. Fill oil pan until the float ring rises to the second notch.

CAUTION: Eye irritation can occur if you rub your eyes after wetting your hands with silicone oil. This irritation is very mild and usually disappears within 24 hours. To prevent this discomfort, thoroughly wash your hands with soap and water after handling silicone oil. If you should happen to forget and experience some eye irritation, thoroughly flush your eyes with water.

8. Replace left end cover. Open paper receiving tray carton, remove tray. Remove tape from tray and install (Fig. 2-11).

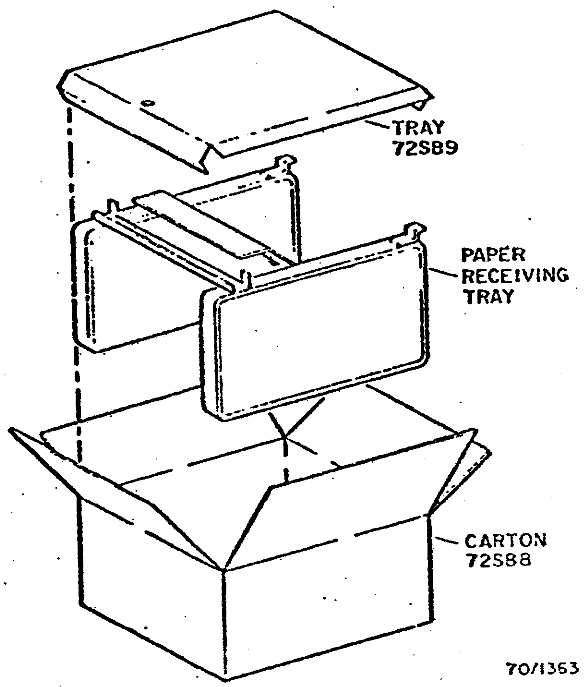

Fig. 2-11. Paper Receiving Tray Unpacking

Multi-Sheet Sensor Clearance

Perform the multi-sheet sensor adjustment (5.9).

Fusing System Temperature Check

Perform the fusing system temperature check adjustment (11.9).

Contact Arc Measurement

Perform the contact arc adjustment (11.4).

Final Installation Procedures

1. Check main drive motor for oil leaks.
2. Check fluffer relief valve. Under normal conditions the valve should be fully open (approx. 10 turns) to give the most reliable paper feeder performance.
3. Mount front, rear and left lower covers. Clean and wax top covers, if necessary.
4. Store the corotron cleaning brush between the cable tie and the frame near the serial number plate. If no cable tie is present, install one.

1. DRIVES AND CYCLE CONTROL

The location of drive and cycle control major components are shown in Fig. 3-1.

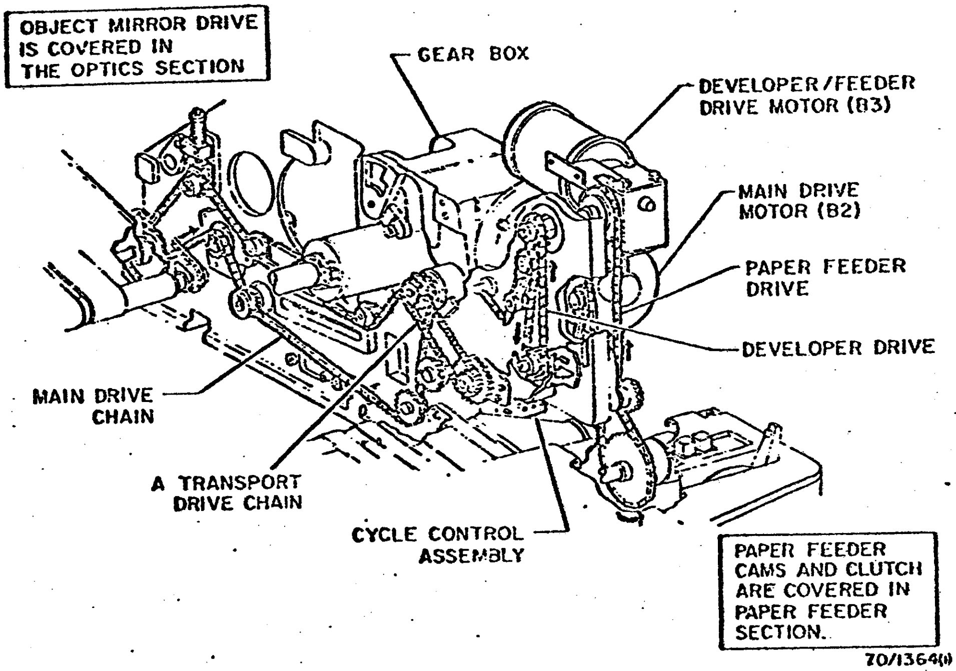

Fig. 3-1. Drives and Cycle Control, Location of Major Components

1.1 Main Drive Motor and Gear Box Assembly

Removal

1. Remove the developer assembly (9.1).
2. Remove the developer catch tray and the gear cover.
3. Using micrometer holder 600T753 and micrometer 600T52, take the measurements indicated in Fig. 3-2. Record the measurements.

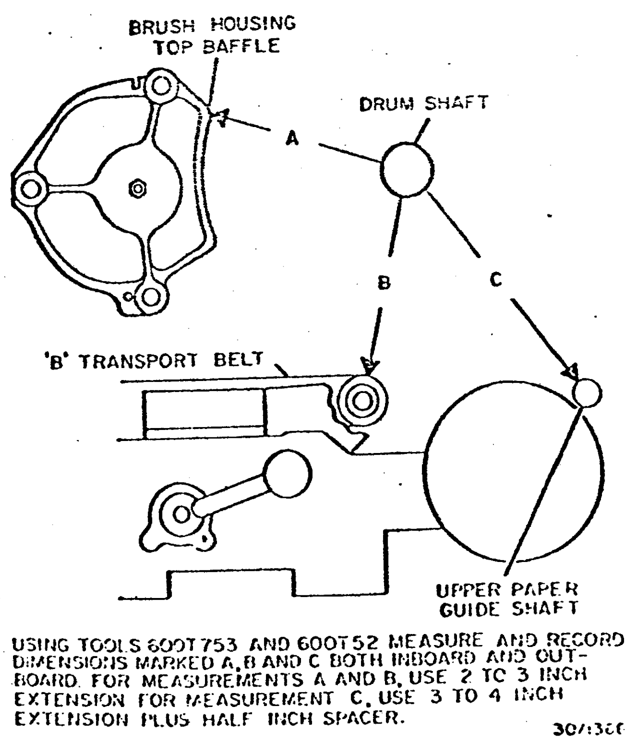

Fig. 3-2. Measurements of Drum Shaft Position

4. Disconnect the drive cam spring from the mirror drive cam (Fig. 3-3).

CAUTION: The edges of the scan tape are sharp.

5. Disconnect the scan tape.
6. Use 5/64 Allen key to remove the mirror drive cam.
7. To obtain slack in the main drive chain, loosen the spring-loaded idler, press down on the idler and retighten. Lift the chain off the main drive sprocket.
8. Remove the A transport drive chain.
9. Disconnect P/J96 from the main drive motor.

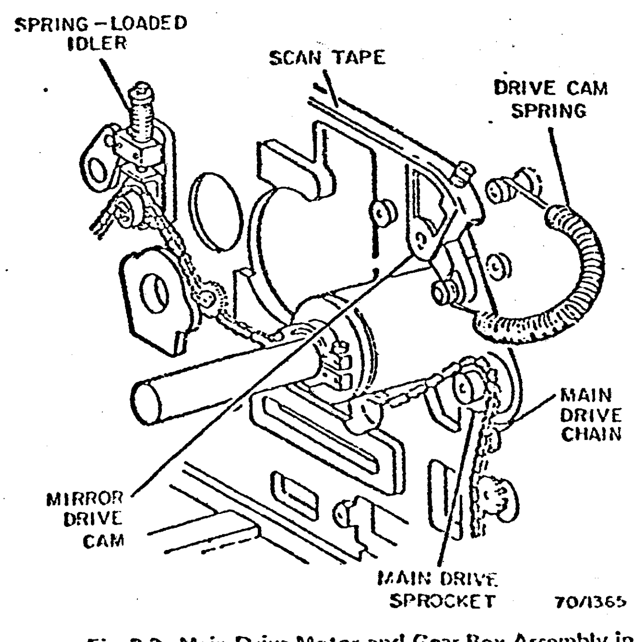

Fig. 3-3. Main Drive Motor and Gear Box Assembly in Operating Position

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CAUTION: The motor and gear box assembly weighs 30 pounds.

10. Remove the screws securing the assembly to the machine, and remove the assembly (from the rear of the machine).

Replacement

1. Install the assembly as shown in Fig. 3-4.

CAUTION: Severe machine damage will result if screws are replaced in the wrong holes. The short screw attaches as shown in Fig. 3-4.

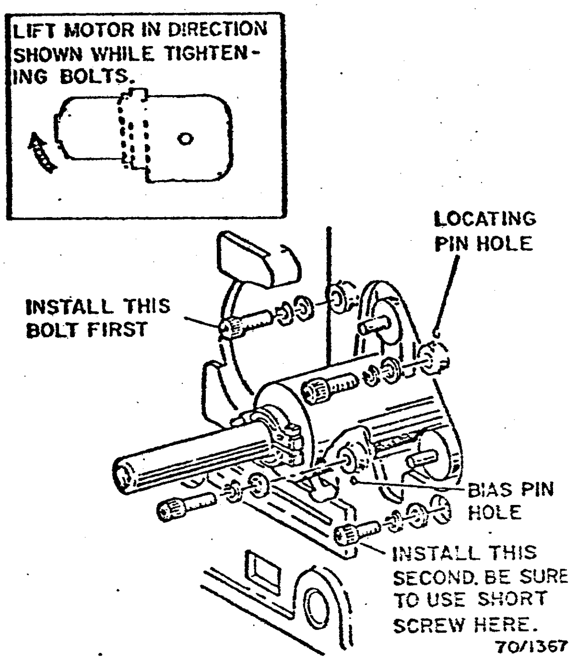

Fig. 3-4. Main Drive Motor and Gear Box Assembly Replacement

2. Re-connect P/J96 to the motor.
3. Repeat step 3 of the removal procedure. Compare the two sets of measurements.
4. If the new measurements are not within ± 0.002 inch of the original measurements, loosen the mounting bolts and use plastic shims to bring the assembly within the specified tolerance.
5. Install the mirror drive cam, scan tape, and drive cam spring (Fig. 3-5).
6. Adjust the drum clamp (8.5).
7. Replace and adjust the main drive chain (1.5). Replace and adjust the A transport drive chain (1.6). Replace the gear cover.
8. Adjust scan tape (15.1).
9. Adjust buckle (15.2), and registration (15.3).

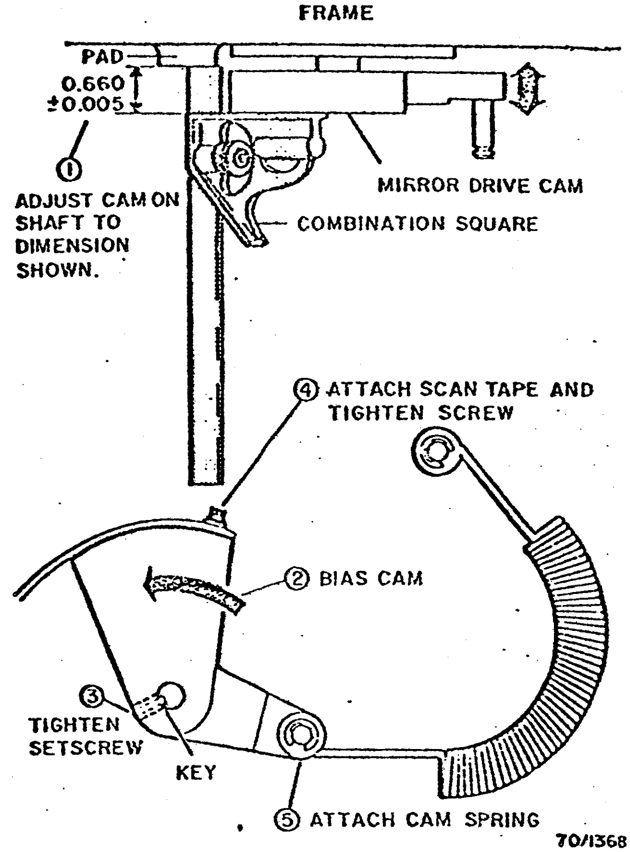

Fig. 3-5. Mirror Drive Cam

1.2 Main Drive Motor

Removal

1. Drain gear box by removing breather plug and drain plug (Fig. 3-6).

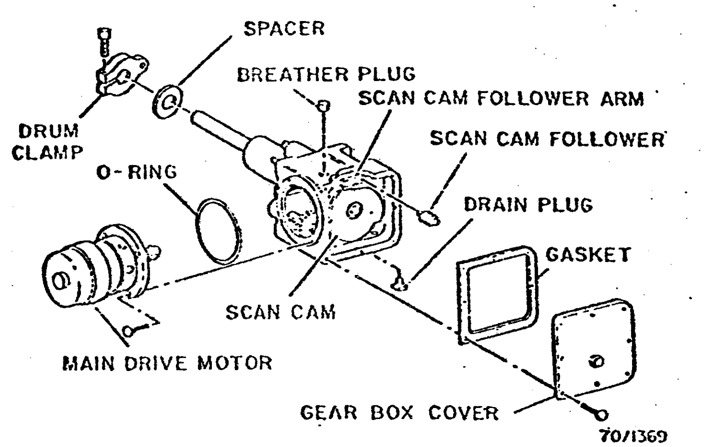

Fig. 3-6. Main Drive Motor and Gear Box Assembly

CAUTION: Place rags or paper towels under gear box to protect machine components from oil spill.

2. Disconnect P/J96 from the motor.
3. Remove screws securing motor to gear box.
4. Remove the motor and discard the O-ring.

Replacement

1. Install a new O-ring on the motor.

CAUTION: Seat the O-ring properly. Twist the motor to ensure that it mates properly with the flange on the gear box. If the motor moves freely, the O-ring is seated properly.

2. Replace and hand-tighten the mounting screws. Final-tighten the screws a turn at a time — in diagonally opposite pairs.
3. Check that the gears are properly meshed by observing the drum shaft while turning the motor shaft with a screwdriver.
4. Replace the drain plug, and add gear oil.
5. Replace the breather plug.
6. Reconnect P/J96 to the motor.

NOTE: If it becomes necessary to replace the main drive motor capacitor (part 102P252), make sure the replacement capacitor is the correct length — about 3.4 inches. Several capacitors shipped as replacements for part 102P252 have the correct electrical rating (10 MFD ± 10%, 370 V, 60 Hz), but are too long (approx. 4 inches) to allow the lower rear cover to be safely closed.

1.3 Scan Cam Follower

Removal

1. Drain gear box, as noted in main drive motor removal procedure (1.2).
2. Remove gear box cover and gasket (Fig. 3-6).
3. Raise scan cam follower arm and block in place.

CAUTION: Do not allow scan cam follower to strike scan cam.

4. Remove scan cam follower.

Replacement

1. After replacing scan cam follower, lower cam follower arm *gently* until follower contacts cam.
2. Replace gasket and gear box cover. Replace the drain plug, add gear oil, and replace the breather plug.

1.4 Main Drive Chain

Replacement (Unbroken Chain)

1. Remove the developer assembly (9.1). Remove the gear cover.
2. Manually rotate the main drive motor shaft counterclockwise until the chains connector link approaches the main drive sprocket and is in a position where it can easily be removed. Mark both the main drive sprocket and the cycle control sprocket exactly at the 12-o'clock position.
3. To obtain slack in the main drive chain, loosen the spring-loaded idler, press down on the idler and retighten.
4. Remove the connector link. Use it to attach the new chain to the old. Pull the old chain to thread the new chain into the machine.
5. Remove the old chain from the right side of the machine.
6. Connect the ends of the new chain, making sure that the marks on the sprockets are still in the 12-o'clock position.
7. Replace the gear cover. Adjust the chain. Check and ad just registration (15.4).

Replacement (Broken Chain)

1. Remove the drum and cover with black bag.
2. Remove the developer assembly (9.1) and developer catch tray (5.4).
3. Remove the gear cover. Open the register stop drawer.
4. Remove fuser heat roller (11.10) and the lubricator assembly (11.11).
5. Loosen the spring-loaded idler, press down on the idler, and retighten.
6. Thread one end of the chain to the left (Fig. 3-7), over the spring-loaded idler (1), and counterclockwise around the C transport sprocket (2), then thread the same end to the right, over the fuser sprocket (3), and under the B transport sprocket (4). Connect the chain ends with a connector link.

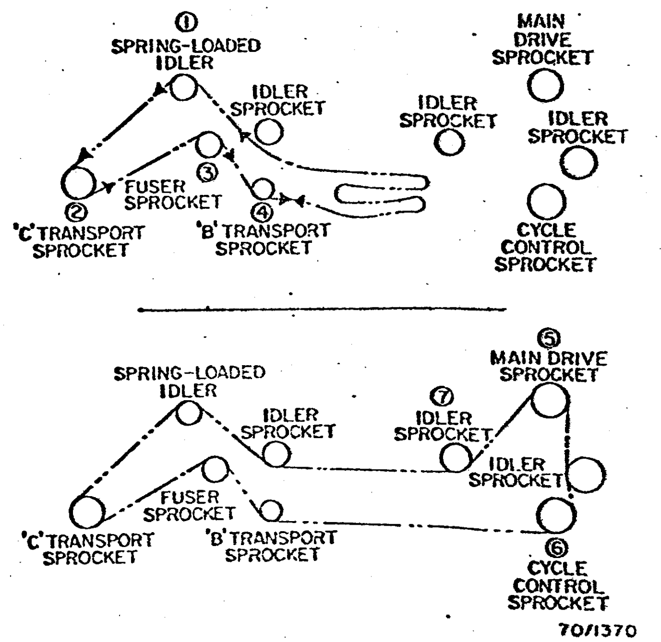

Fig. 3-7. Replacing Broken Main Drive Chain

7. Pull the connected chain to the right, around the main drive sprocket (5), around the cycle control sprocket (6), and under the idler sprocket (7).
8. Loosen the spring-loaded idler and manually rotate the main drive motor counterclockwise until the slack is removed. Retighten the idler.
9. Replace the A transport drive chain, and adjust (1.6). Replace the A transport gear cover.
10. Replace the developer catch tray, and adjust (5.4). Replace the developer assembly (9.1).
11. Replace the lubricator assembly (11.11) and fuser heat roller (11.10).
12. Replace the register stop drawer (6.1).
13. Check drum cavity clearance adjustment (8.1). Replace the drum (8.1). Check registration 15.4).

Adjustment

1. Loosen the spring-loaded idler and manually rotate the main drive motor counterclockwise until the slack is removed.
2. Retighten the idler.

NOTE: A new chain may stretch as much as 1/2- to 3/4-inch after use. Therefore, a new chain may require re-adjustment during the next service call.

1.5 A-Transport Drive Chain and Gear Mesh

Adjustment

1. Remove the developer assembly (9.1). Remove the gear cover.
2. Loosen the two nuts indicated (Fig. 3-8).
3. Grasp the double sprocket and pull down and to the right until chain is taut and there is only a slight amount of backlash between the gears. Retighten the nuts.
4. Manually rotate the main drive motor shaft CCW and insert one thickness of 20-lb. bond paper between the gears, as shown.
5. Continue to rotate the main drive motor to remove the paper.
6. Check the paper. When the drive is correctly adjusted, the paper will be well-corrugated by the gear teeth but untorn.
7. Replace the gear cover. Replace the developer assembly.

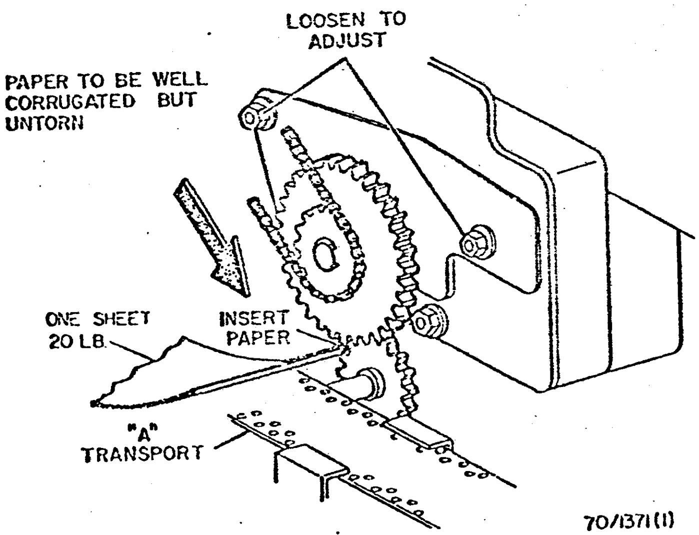

Fig. 3-8. A Transport Drive Chain Adjustment

1.6 Main Drive Sprockets
(Deleted)

1.7 B-Transport Sprocket Assembly

Removal

1. Remove drum and cover with black bag.
2. To obtain slack in the drive chain, loosen the spring-loaded idler, press down on the idler and retighten. Remove the chain from the B transport sprocket.
3. Remove the B transport sprocket and bearing housing (Fig. 3-9).

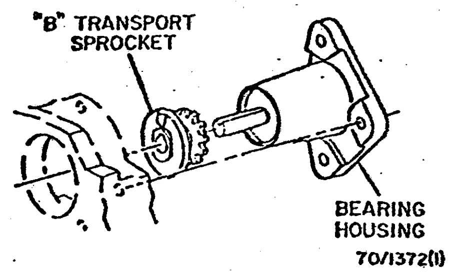

Fig. 3-9. B Transport Sprocket

Replacement

Before replacing the B transport sprocket assembly, adjust sprocket concentricity (see below).

Adjustment
(Sprocket Concentricity)

1. With the B transport sprocket assembly removed, set the distance between the bearing housing flange and the inside of the sprocket to the proper dimension (Fig. 3-10).

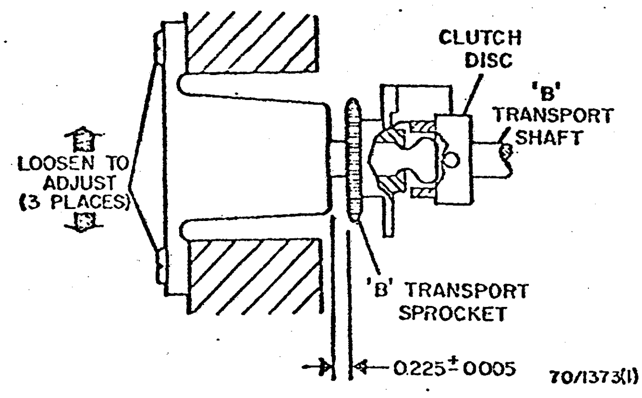

Fig. 3-10. Concentricity of B Transport Sprocket Assembly

2. Install the sprocket assembly, but do not tighten the mounting screws.
3. With the register stop drawer in its operating position, center the ball on the sprocket shaft within the socket of the clutch disc. When the ball is centered, the shaft will turn freely until the dogs touch. Tighten the mou[nting] screws of the bearing housing.
4. Fold a 2-inch-wide strip of paper 2 inches from one end. Lay the paper on the B transport so the folded end covers the socket of the clutch disc. Gently close the register stop drawer until the socket reaches the ball — but does not tear the paper.

5. Open the drawer and check the paper. When the sprocket is correctly adjusted, the impression made by the ball will be concentric with the impression made by the sprocket.
6. Check the clutch disc gap, adjust if necessary (6.18).

1.8 Developer/Paper Feeder Drive Motor

Removal

1. Remove developer assembly (9.1).
2. Follow procedure given in Fig. 3-11.

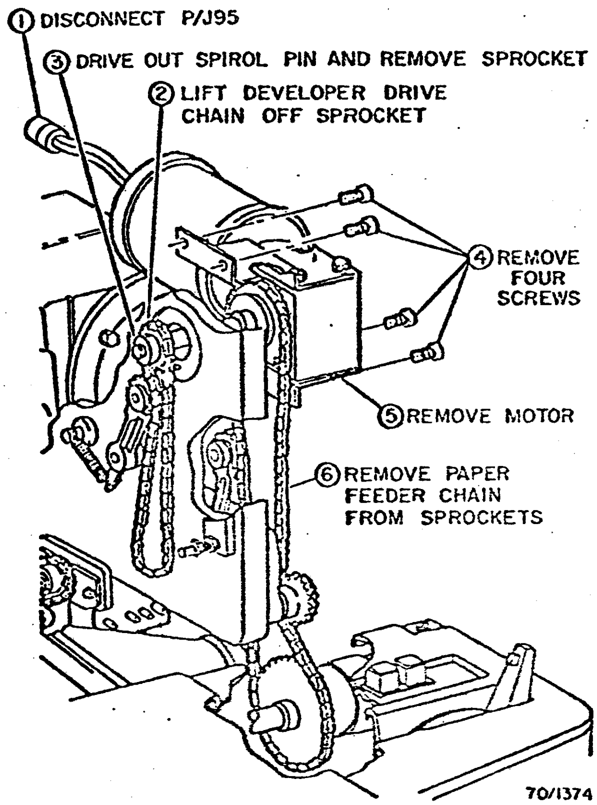

Fig. 3-11. Developer and Paper Feeder Drive Motor

Replacement

Reverse the procedure to replace the motor, but only finger-tighten the mounting screws. Adjust as prescribed below.

Adjustment

1. Check for a minimum of 3/16-inch clearance between the closest points of each chain (Fig. 3-12).
2. Reposition the motor, if necessary.
3. Tighten mounting screws.

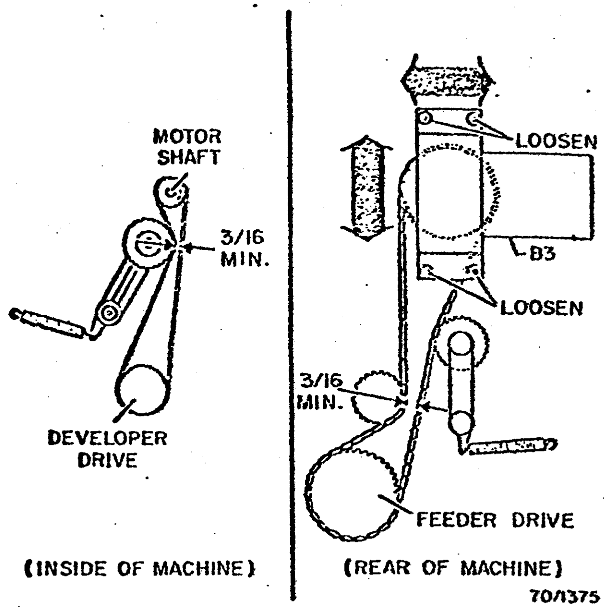

Fig. 3-12. Developer/Paper Feeder Drive Motor Adjustment

1.9 Cycle Control Assembly

Removal

1. Remove the drum and cover with black bag.
2. Remove the developer assembly (9.1).
3. Remove the gear cover. Mark both the main drive sprocket and the cycle control sprocket exactly at the 12 o'clock position.
4. To obtain slack in the main drive chain, loosen the spring-loaded idler, press down on the idler, and retighten.
5. To facilitate replacement, outline, with a scribe, the position of the cycle control assembly on the main frame boss.
6. If necessary, loosen the sprocket assembly and key on the cycle control assembly drive shaft (Fig. 3-13).
7. Remove three mounting screws. Remove the cycle control assembly.

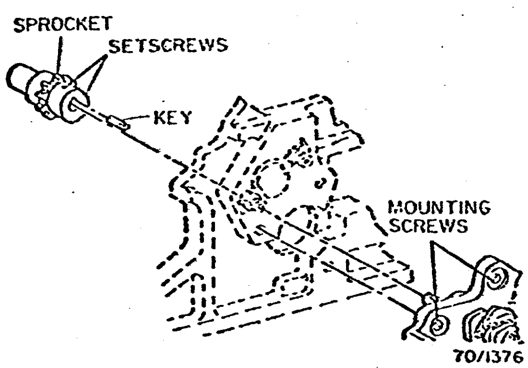

Fig. 3-13. Cycle Control Assembly

Replacement

1. Replace the cycle control sprocket (if it has been removed) taking care that the key is completely seated in the keyway. Reinstall the cycle control assembly in alignment with the scribed marks on the main frame boss. Tighten the mounting screws only enough to hold the cycle control assembly firmly in position.
2. Check the position of the sprocket on its shaft by banking a ruler against an adjacent sprocket. If the sprocket is not aligned, loosen the setscrews, realign, and tighten the setscrews.
3. Adjust cycle control concentricity.
4. Replace R5. Replace the gear cover. Replace the developer assembly and drum.
5. Loosen the spring-loaded idler and manually rotate the main drive motor CCW until the slack in the chain is removed. Retighten the idler.
6. Adjust registration (15.4).

Adjustment
Cycle Control Concentricity

1. Refer to Fig. 3-14. Fold a 2-inch-wide strip of paper about 2 inches from one end. Lay the paper on the register stop module so the folded end covers the inboard end of the keyed shaft.
2. Gently close the register stop drawer until the shaft and sprocket emboss the paper, but do not tear it.
3. Open the drawer and check the paper. When the cycle control assembly is properly positioned, the impression made by the shaft will be concentric with the impression made by the sprocket. Reposition, if necessary.
4. Tighten the mounting screws on the cycle control assembly.

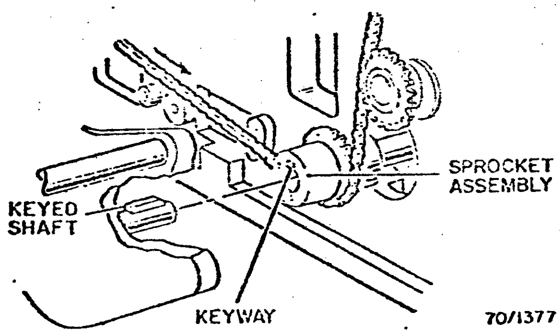

Fig. 3-14. Cycle Control Assembly Adjustment

1.10 Cycle Control Switches (Left or Right Bank)
Removal

1. Loosen the screws on the affected switch bank, and swing the retaining clips aside (Fig. 3-15).
2. Use the handle of optional spring removal tool (600T35) to simultaneously pry all switches away from the overtravel adjusting screws. Remove the switch bank, being careful that the switches do not spring off the rod.

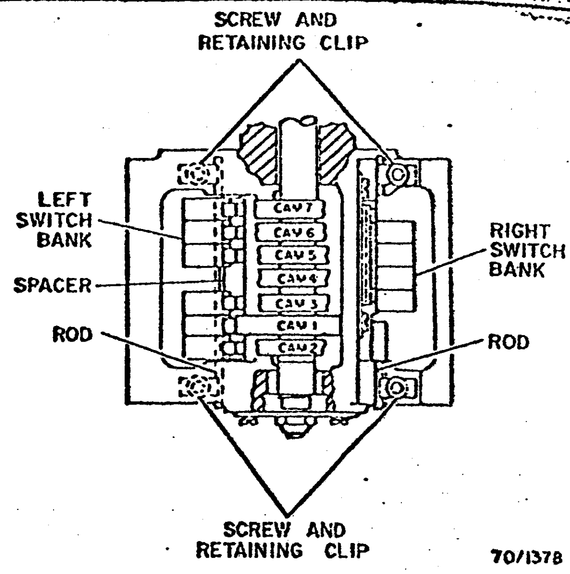

Fig. 3-15. Cycle Switch

CAUTION: Each bank of switches is spring-loaded on its rod.

3. Remove the faulty switch being careful to note the order in which switches are removed.
4. Remove the wires from the faulty switch being careful to note which switch contact each wire is connected to.

Replacement
After replacing the faulty switch, perform overtravel adjustment.

CAUTION: Pry individual switches away from overtravel adjusting screws when reseating the switch bank.

1.11 Cycle Control Switches Overtravel
Adjustment

1. Use a screwdriver to rotate the main drive motor shaft counterclockwise until the cam is centered on the switch actuator (Fig. 3-16).
2. Back the adjusting screw off, then screw it in clockwise until the switch just actuates; now turn the screw an additional three-fourths of a turn clockwise.

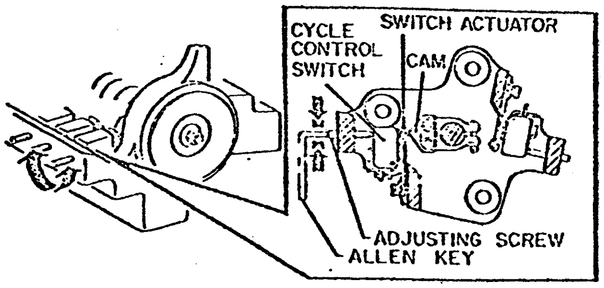

Fig. 3-16. Cycle Control Switches Overtravel

3. Check adjustment (timing) of cycle control switch cam (1.12).

2.1 BILLING METER

The billing meter is controlled by S4 (on engine control board). The 16 position switch can be adjusted so that the billing meter counts on the 1st copy (position "O") to the 16th copy (position "E"). Most have been set by manufacturing to count on the 3rd copy.

2.2 PHOTO CELL CHECK

1. Open top cover.
2. Put printer in local.
3. Open front doors and override door interlocks.
4. Remove back covers and cheat relief valve.
5. Turn printer on.
6. When ready, run one sheet of graph paper. Photo cell jam should occur.
7. Remove jam.
8. Unplug photo cell assy. (J15 in back of printer).
9. Restore relief valve to normal operation.
10. Run graph paper, printer should jam after approximately six copies.
11. Plug photo cell assy. back in.
13. Replace panels and return printer to operation.

2.3 PHOTO CELL ELECTRICAL ADJUSTMENT

1. Open top covers.
2. Remove card cage cover.
3. Override left top cover interlock.
4. Put machine in local mode.
5. Connect meter to read voltage between TP1 and TP2 on engine control board.
6. While running graph paper adjust R6 on engine control board for 10 voc between TP1 and TP2. 6-7
7. Stop print.
8. Remove meter.
9. Replace card cage cover.
10. Perform photo cell check (2.2).

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3. PAPER FEEDER

The Repair Data for the paper feeder is divided into four main categories as follows:

Paper Feeder Repair (3.1); contains the procedures for removing, replacing, and adjusting parts of the paper feeder.

Unilever Adjustments (3.2); contains the procedures required to establish the correct relationship of the paper guides to each other and to the optical center of the machine.

Paper Feeder Systematic Alignment (3.3); contains the checks and adjustments required for setting up the paper feeder to reliably feed 20-pound bond paper.

Paper Feeder Custom Tuning (3.4); contains two methods for setting up the paper feeder to handle paper other than 20-pound bond.

The Paper Feeder Interdependency Diagram (Fig. 3-22) shows which adjustments are affected when any paper feeder part is adjusted. For example, if A transport parallelism is adjusted, then the Gear Mesh and the Multi-Sheet Sensor must be checked.

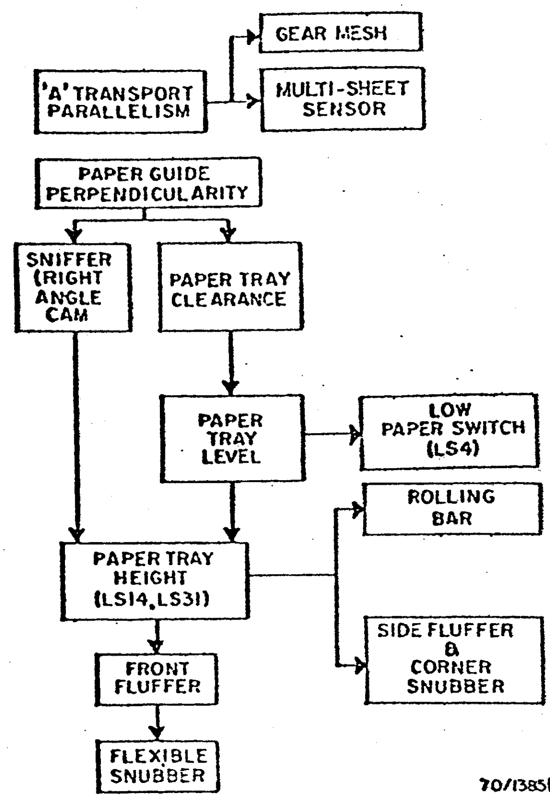

Fig. 3-22. Paper Feeder Interdependency Diagram

3.1 Paper Feeder Repair

The locations of the paper feeder major components are shown in Fig. 3-23.

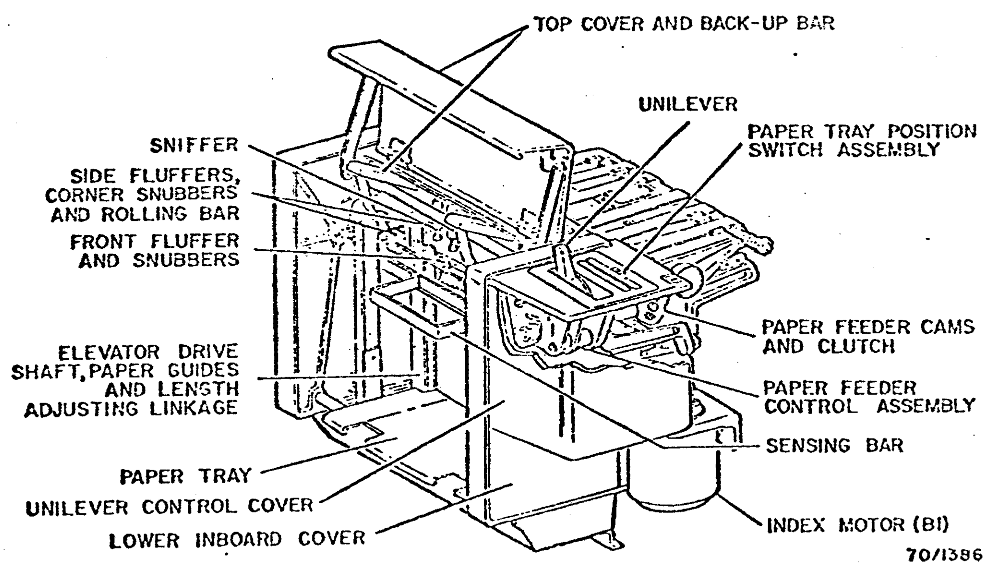

Fig. 3-23. Paper Feeder, Location of Major Components

3.1.1 Complete Paper Feeder

WARNING: Removal of the paper feeder requires two men.

Removal

1. Remove the developer assembly (9.1) and developer catch tray (5.4).
2. Remove the A-transport gear cover.
3. Loosen the A-transport drive sprocket assembly.
4. Remove the connector link of the paper feeder drive chain, and remove the chain.
5. Disconnect the A-transport vacuum hose.
6. Disconnect P/J58.
7. Disconnect the wires from the reject solenoid and tuck the wires and adjacent connector out of the way, under the A-transport.
8. Disconnect the fluffer and sniffer hoses from the air filter assembly.
9. Remove the two bolts securing the paper feeder to the right legs of the machine.
10. Remove the four capscrews securing the paper feeder to the main frame base.
11. Lift the paper feeder up and out from the right side of the machine.

Replacement

1. Place the paper feeder in the frame, making sure to engage the two mounting pins.

CAUTION: Be careful not to damage the aluminum side frames.

2. Ensure that two stud spacers (Fig. 3-24) are in firm contact with the frame leg. Hold each spacer with a wrench while tightening its mounting bolt.
3. Replace the four capscrews securing the paper feeder to the main frame base.
4. Reverse the procedures in steps 1 through 8 of the removal procedure.

CAUTION: Be careful not to kink the hoses.

5. Perform systematic alignment procedures described in Par. 3.3 in the sequence shown in Fig. 3-50.
6. Check for clearance between lead-in baffle and A-transport belts.
7. Operate the machine to check paper feeder operation, particularly the multi-sheet sensor, reject/count switch LS8, and jam detector switch LS27.

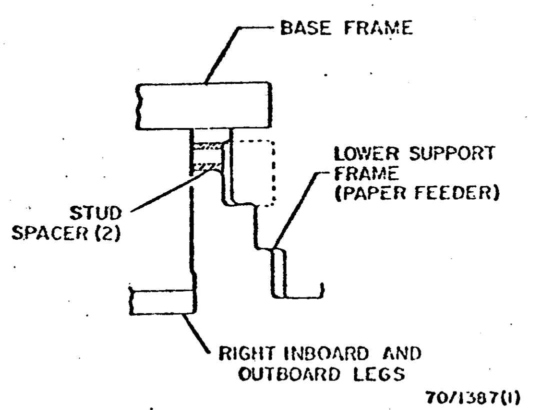

Fig. 3-24. Lower Support Assembly of Paper Feeder

3.1.2 Back-up Bar

Removal

1. Remove the unilever control cover.
2. Disconnect the links from the back-up bar.
3. Remove the pin and retaining ring from the end shafts. Move the cam shaft inboard. Remove the back-up bar.

Replacement

Orient the cam assembly properly with respect to LS24 before replacing the pin.

CAUTION: When replacing the pin, ensure that the pin does not hit the boss on the paper feeder frame.

Before replacing the retaining ring, adjust the back-up bar end play and check the adjustment of the back-up bar interlock switch (3.1.3); adjust if necessary.

Adjustment

Back-up Bar End-Play

1. Insert a 0.003 shim between the cam and side frame, and push outboard on the cam (Fig. 3-25).
2. Install the retaining ring tight against the back-up bar.

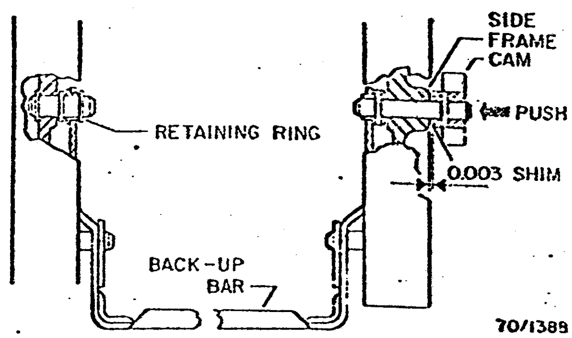

Fig. 3-25. Back-up Bar End-Play

Paper Deflector Position

1. With the top right cover closed, the bend in each paper deflector should be at the maximum up position.
2. Remove the unilever control cover and the outboard cover from the paper feeder.
3. Turn the inboard and outboard eccentrics to the maximum up position (Fig. 3-26).
4. Check the alignment of the top right cover.
5. Check the back-up bar interlock switch LS24 adjustment (3.1.3).

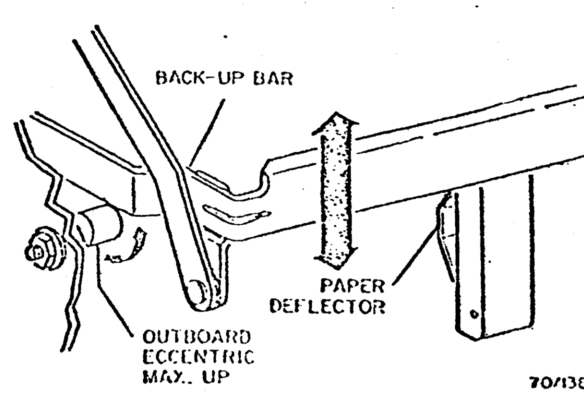

Fig. 3-26. Paper Deflectors

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3.1.3 Back-up Bar Interlock Switch LS24

Adjustment

1. Remove the unilever control cover, and raise the top right cover to the maximum up position.
2. Adjust the switch bracket so the switch actuates with 0.020 to 0.040 overtravel (Fig. 3-27).

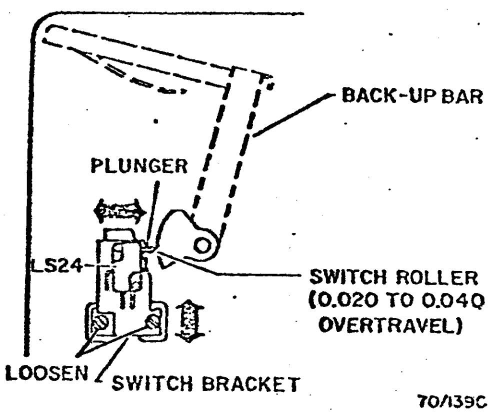

Fig. 3-27. Back-up Bar Interlock Switch

3.1.4 Sensing Bar and Cam Follower Arm

Removal

1. Remove unilever control cover. Remove outboard cover from paper feeder.
2. Drive out the spirol pin from the inboard sensing bar shaft.
3. Remove the retaining ring from the outboard sensing bar shaft. Remove the shaft.
4. Slide out the cam follower arm with the shaft attached, and lift out the sensing bar.

Adjustment

1. Refer to Interdependency Diagram (Fig. 3-22) and perform required adjustments.
2. To verify proper operation of the complete paper feeder, perform the Systematic Alignment Procedure (Fig. 3-50).

3.1.5 Tray Sensing Switch LS14 and Prevent Start Switch LS31

Removal

Remove the unilever control cover to gain access to the tray sensing switch or prevent start switch.

Adjustment

1. Refer to Interdependency Diagram (Fig. 3-22) and perform required adjustments.
2. To verify proper operation of the complete paper feeder, perform the Systematic Alignment Procedure (Fig. 3-50).

3.1.6 Paper Tray and Guide Tracks

Removal

1. Remove the unilever control cover, inboard and outboard paper tray covers.
2. Set the unilever to the minimum paper length setting.
3. Lower the paper tray to the maximum down position.
4. Remove the cable retainers (if present on machine).
5. Remove the two nuts securing the outboard guide track to the paper feeder frame. Back off the guide track adjusting nuts on the inboard side of the outboard frame.
6. Manually lift the tray, and remove the cables from the pulley sockets. Remove the tray.
7. Remove the rolling bar. Remove the outboard guide track.
8. Remove the two nuts securing the inboard guide track to the paper feeder frame. Remove the inboard guide track.

Adjustment

1. Refer to Interdependency Diagram (Fig. 3-22) and perform required adjustments.
2. To verify proper operation of the complete paper feeder, perform the Systematic Alignment Procedure (Fig. 3-50).

3.1.7 Cables

NOTE: Before replacing broken cable(s), identify the cause of the problem and correct it. Also, the entire paper feeder should be examined for damaged parts other than the cable(s).

Adjustment

1. Refer to Interdependency Diagram (Fig. 3-22) and perform required adjustments.
2. To verify proper operation of the complete paper feeder, perform the Systematic Alignment Procedure (Fig. 3-50).

3.1.8 Low Paper Switch LS4

Removal

Remove the unilever control cover and the switch cover to gain access to the low paper switch. After replacement, adjust the switch (3.3.6) and switch cover.

3.1.9 Tray Down Limit Switch LS15

Removal

Remove the unilever control cover to gain access to the tray down limit switch.

Replacement

1. When replacing the switch, position the switch bracket as high as possible.
2. Adjust the switch.

Adjustment

1. Position the tray (left view of Fig. 3-28) by jogging the paper tray position switch.

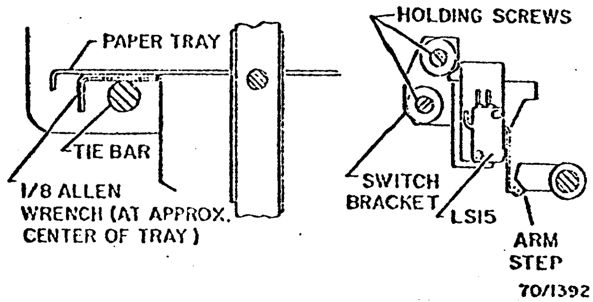

Fig. 3-28. Tray Down Limit Switch

2. Loosen the switch bracket and adjust the switch so it actuates on the lower portion of the arm step.
3. Secure the switch bracket.

3.1.10 Roller Arms

Removal

1. Remove the paper tray (3.1.6).
2. Remove roller arms.

Replacement

1. Replace roller arms and adjust.
2. Replace paper tray and adjust (3.1.6).

Adjustment

1. Position the paper guides for maximum length of copy paper, and adjust the outboard roller arm to obtain the dimension shown in the left view of Fig. 3-29.
2. Position the paper guide for minimum length of copy paper, and adjust the outboard roller arm to obtain the dimension shown in the right view of Fig. 3-29.
3. Repeat steps 1 and 2 for the inboard roller arm.

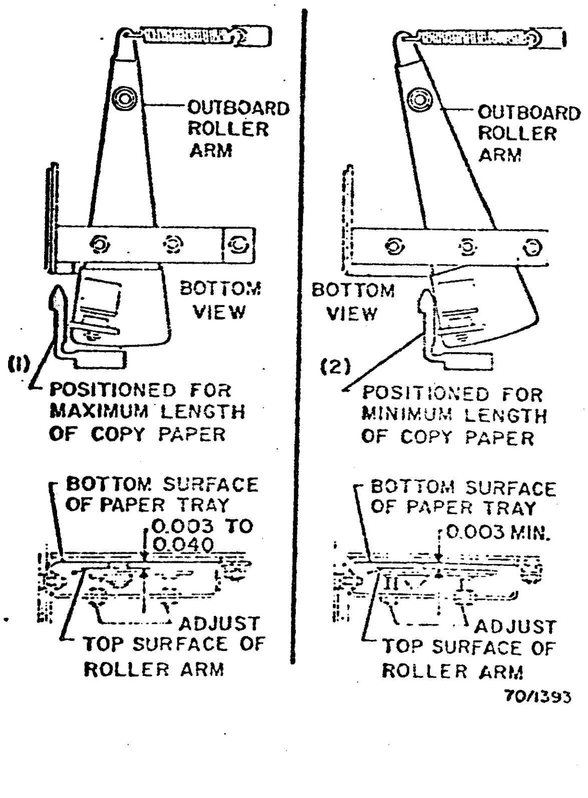

Fig. 3-29. Roller Arms

3.1.11 Inboard and Outboard Paper Guides

Adjustment

1. Refer to Interdependency Diagram (Fig. 3-22) and perform required adjustments.
2. To verify proper operation of the complete paper feeder, perform the Systematic Alignment Procedure (Fig. 3-50).

3.1.12 Elevator Drive Shaft

Removal

1. Remove the right rear door, lower rear cover, right cover, front picture frame assembly, outboard paper feeder cover, unilever control cover, and lower right cover (covering the index motor).
2. Remove the components shown in Fig. 3-30.

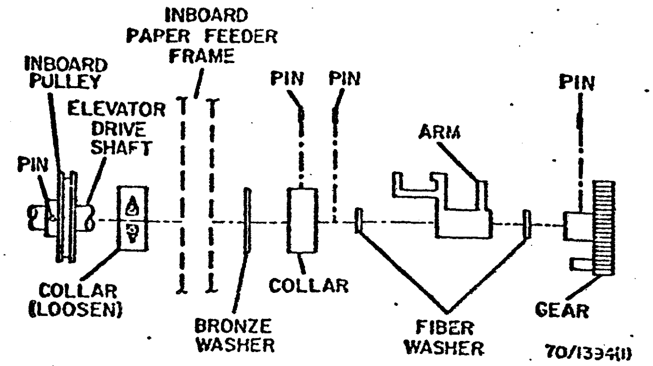

Fig. 3-30. Elevator Drive Shaft

3. Drive out the pins securing the pulleys to the elevator drive shaft.
4. Remove the shaft from the outboard end of the paper feeder.

NOTE: To remove the shaft from some machines, it may be necessary to file a small radius in the bottom of the main frame so the shaft will clear the frame.

Replacement

When replacing the gear (Fig. 3-31), ensure that the spring is reconnected, and that the threaded pin in the gear lies just above the arm lobe, with the tray in the maximum down position. Before tightening the collar, adjust the end play of the drive shaft.

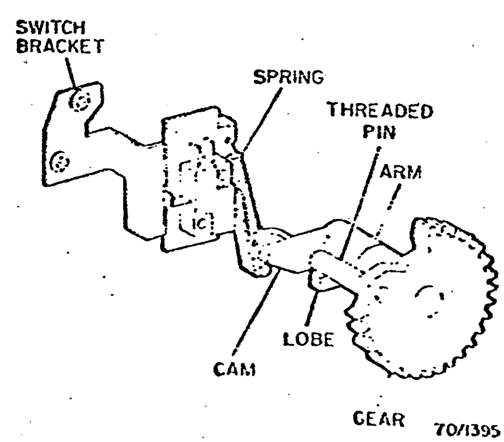

Fig. 3-31. Gear Pin and Arm

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Adjustment

Elevator Drive Shaft End-Play

1. Unlock collar A (Fig. 3-32).
2. Insert a 0.010 shim between collar (B) and the bearing. Push outboard on the shaft.
3. Slide collar (A) against the inboard frame and lock in place.

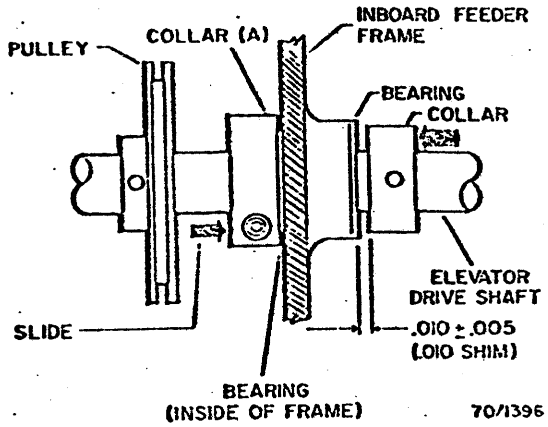

Fig. 3-32. Elevator Drive Shaft End-Play

4. Refer to Interdependency Diagram (Fig. 3-22) and perform required adjustments.
5. To verify proper operation of the complete paper feeder, perform the Systematic Alignment Procedure (Fig. 3-50).

3.1.12A Elevator Drive Shaft Pulley

Removal

1. Lower paper tray and observe position of pulley collar roll pin. Stop tray at lowest position that pulley collar roll pin is in a horizontal position.
2. If replacing inboard pulley, remove upper inboard paper guide mounting screws and move the guide for maximum access to pulley.
3. If replacing outboard pulley, remove upper outboard guide mounting screws and move the guide for maximum access to pulley. If additional access space for removing the roll pin is required, remove outboard paper tray guide.
4. Remove cable retainer from pulley and note pulley and cable retainer mounting hole position for reference.
5. Remove pulley cable and pulley retaining roll pin.
6. If a solid plastic pulley is to be replaced, remove pulley by breaking it off the shaft.
7. If a divided pulley is to be replaced, remove pulley from the shaft by removing pulley clamp retaining screws.

Replacement

1. If an inboard pulley is to be replaced, prepare one half (B, Fig. 3-32A) of pulley as shown in A of Fig. 3-32B. Insert screws just enough to connect both clamps and to allow maximum space between clamps. Note that threaded clamp is on the pulley's inboard side and unthreaded clamp is on the pulley's outboard side.

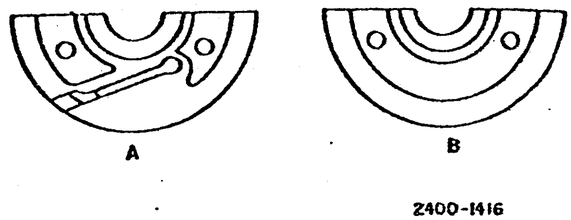

Fig. 3-32A. Divided Pulley, Side View

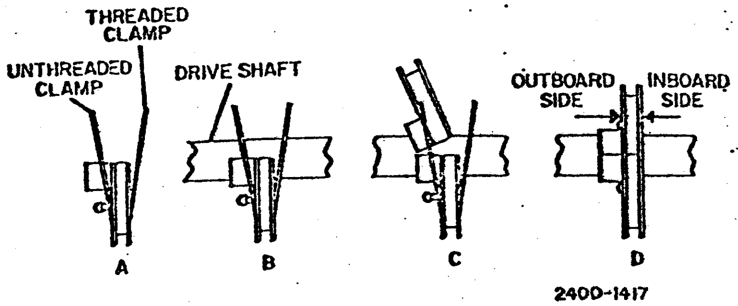

Fig. 3-32B. Inboard Pulley, Edge View

2. If an outboard pulley is to be replaced, prepare one half (B, Fig. 3-32A) of pulley as shown in A of Fig. 3-32C. Insert screws just enough to connect both clamps and to allow maximum space between clamps. Note that threaded clamp is on pulley's outboard side and unthreaded clamp is on pulley's inboard side.

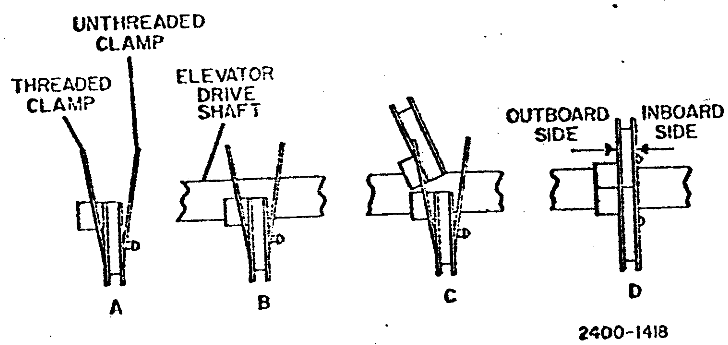

Fig. 3-32C. Outboard Pulley, Edge View

3. Position the half pulley prepared in step 1 or step 2 under the elevator shaft as shown in B of Fig. 3-32B or 3-32C.
4. Position the other half pulley (A, Fig. 3-32A) above the shaft as shown in C of Fig. 3-32C. Insert the collar at a slight angle into the clamp space so that the half pulley will fall into place forming the complete pulley.
5. Install the two remaining clamp retaining screws and hand tighten.
6. Squeeze both half pulleys together and tighten ring clamp retaining screws (D, Fig. 3-32B or 3-32C).
7. Position the pulley as noted in Removal, step 4. Ensure that pulley cable retainer mounting holes are in the same relative position as for the pulley already on the shaft.
8. Secure pulley to shaft by inserting pulley — retaining pin.

9. Reposition paper guide. Ensure that guide is in proper position (Fig. 3-32D) and kept snug against the mounting slide. Install guide mounting screws.
10. Replace outboard paper tray guide, if removed.
11. Install paper tray pulley cable and cable retainer.
12. Perform the required paper tray clearance adjustments.

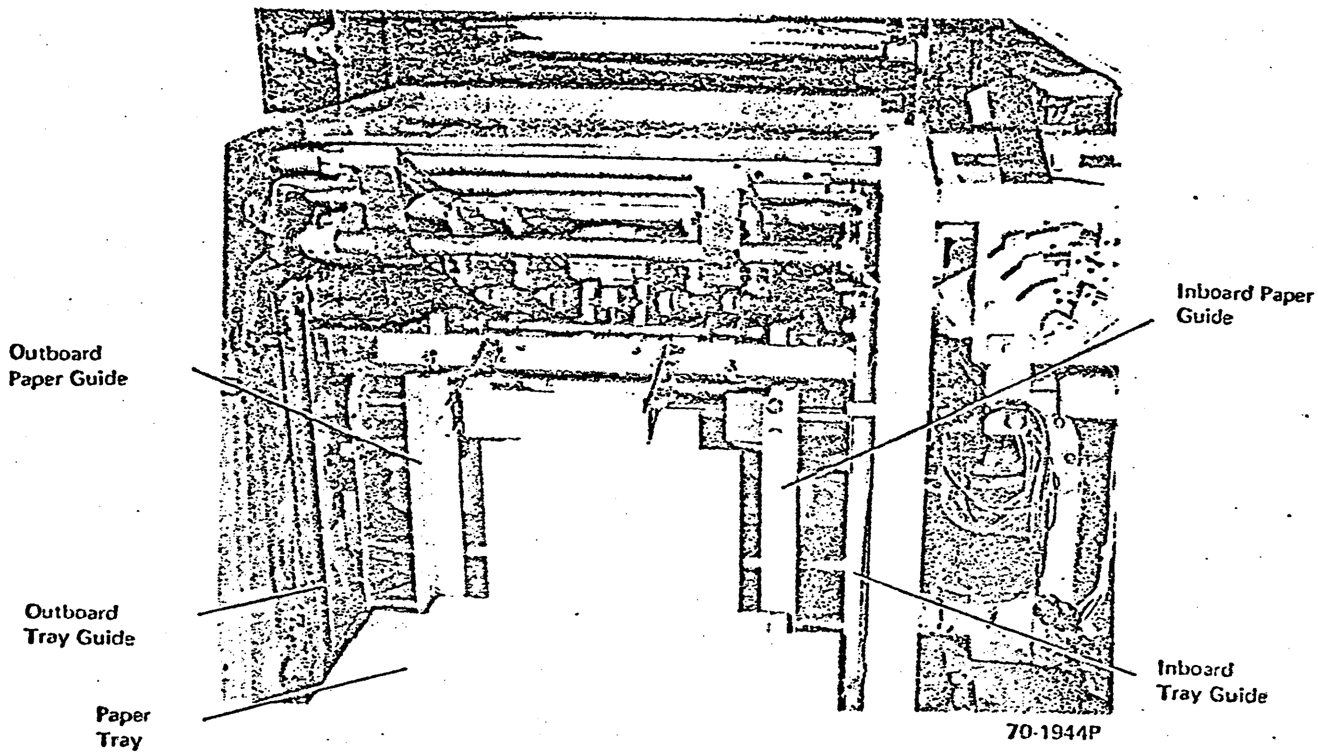

Fig. 3-32D. Paper Feeder, Right Side View

3.1.13 Sniffer

Removal

1. Remove the outboard paper feeder cover, unilever control cover, and bezel. Remove the developer assembly (9.1).
2. Remove the three screws securing the paper feeder control assembly to the paper feeder frame. Do not loosen or remove the capscrew securing the adjusting link to the linkage arm.
3. Shift the paper feeder control assembly out of the way.
4. Remove the hose from the sniffer assembly. Remove the spring from the right-angle cam follower arm.
5. Remove the spirol pins securing the cam follower arm.
6. Remove the two spirol pins securing the sniffer assembly to the shaft. (On some machines, solid taper pins are used — make sure to drive tapered pins in the proper direction.)
7. Remove the shaft from the outboard side of the paper feeder.
8. Remove the sniffer assembly from the left over the top of the A-transport.

Replacement

CAUTION: When replacing the hose, adjust the hose support so the sniffer moves freely but does not bounce, and the hose is not crimped.

Adjustment

1. Adjust the bezel (3.1.19).
2. Refer to Interdependency Diagram (3-22) and perform required adjustments.
3. To verify proper operation of the complete paper feeder, perform the Systematic Alignment Procedure (Fig. 3-50).

3.1.14 Fluffers

Adjustment

1. Refer to Interdependency Diagram (Fig. 3-22) and perform required adjustments.
2. To verify proper operation of the complete paper feeder, perform the Systematic Alignment Procedure (Fig. 3-50).

3.1.15 Flexible Snubbers

Adjustment

1. Refer to Interdependency Diagram (Fig. 3-22) and perform required adjustments.
2. To verify proper operation of the complete paper feeder, perform the Systematic Alignment Procedure (Fig. 3-50).

3.1.16 Paper Feeder Control Assembly

Removal

1. Remove the unilever control cover and bezel.
2. Remove the capscrew and shoulder spacer securing the connecting link to the linkage arm.
3. Remove the three screws securing the paper feeder control assembly to the inboard paper feeder frame.
4. Remove the 14-inch paper switch and the harness clamps securing the harness to the paper feeder control assembly frame. Remove the paper feeder control assembly.

Adjustment

1. Move the unilever to the maximum paper length setting.
2. Loosen the screw securing the shoulder spacer.
3. Adjust the shoulder spacer to obtain the 0.690 dimension (Fig. 3-33).
4. Secure the shoulder screw while maintaining the dimension.
5. Perform the unilever adjustment (3.2).
6. Adjust the bezel (3.1.19).
7. Refer to Interdependency Diagram (Fig. 3-22) and perform required adjustments.
8. To verify proper operation of the complete paper feeder, perform the Systematic Alignment Procedure (Fig. 3-50).

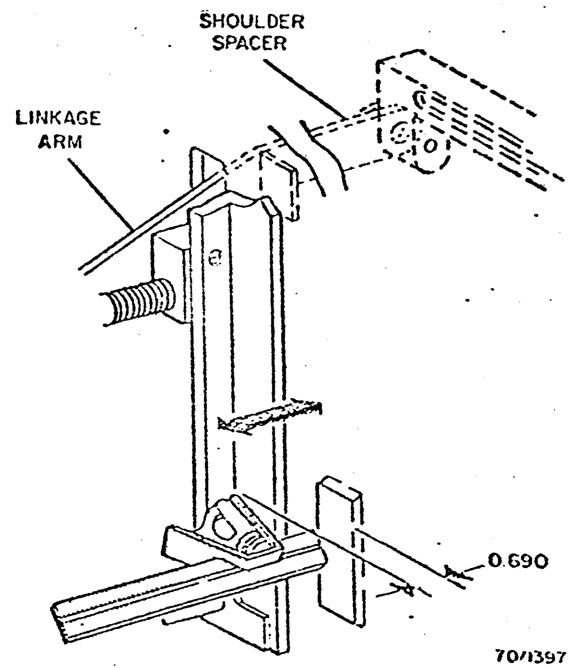

Fig. 3-33. Linkage Arm

3.1.17 Unilever Stop Plate

Removal

NOTE: Unless absolutely necessary, do not disturb the settings of the adjusting blocks.

1. Remove the unilever control cover.
2. Remove the collar from the unilever shaft. Remove the screws securing the stop plate to the paper feeder control frame.
3. Remove Legal-Letter switch LS50 and the stop plate.

Replacement

NOTE: When replacing stop pins, ensure that the flats on new pins are facing the outboard side.

Adjustment

1. Check collar (3.1.18) and unilever adjustment (3.2).
2. Replace and adjust Legal-Letter switch LS50 (3.2.4).

3.1.18 Unilever Assembly

Removal

1. Remove the unilever control cover and bezel.
2. Remove the collar from the unilever shaft. Remove the stop plate.
3. Remove the pins securing the unilever handle to the shaft. Remove the unilever.

Adjustment

1. Orient the flat of the collar as in Fig. 3-34, then set the gap between the collar and the stop plate to the dimension shown, using 0.002 shim stock. (Bias the unilever handle to the right.)
2. Check that the collar does not interfere with the back-up block at any point throughout the full travel of the unilever.
3. Refer to Interdependency Diagram (Fig. 3-22) and perform required adjustments.
4. To verify proper operation of the complete paper feeder, perform the Systematic Alignment Procedure (Fig. 3-50).

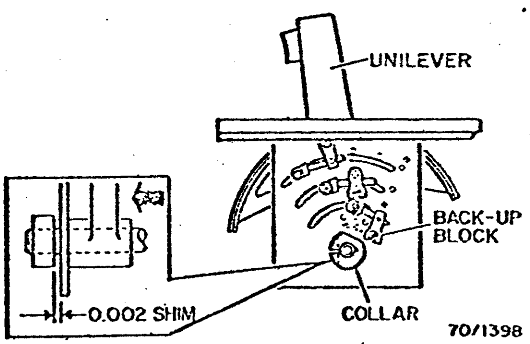

Fig. 3-34. Collar

3.1.19 Bezel

Removal

Removing the paper feeder drive chain idler sprocket will facilitate bezel removal.

Adjustment

1. Use 1/16 Allen wrench to check for adequate clearance between the unilever and the right edge of the opening in the bezel. Check with the unilever in maximum and minimum paper length position.
2. Loosen the hardware and adjust if necessary (Fig. 3-35).

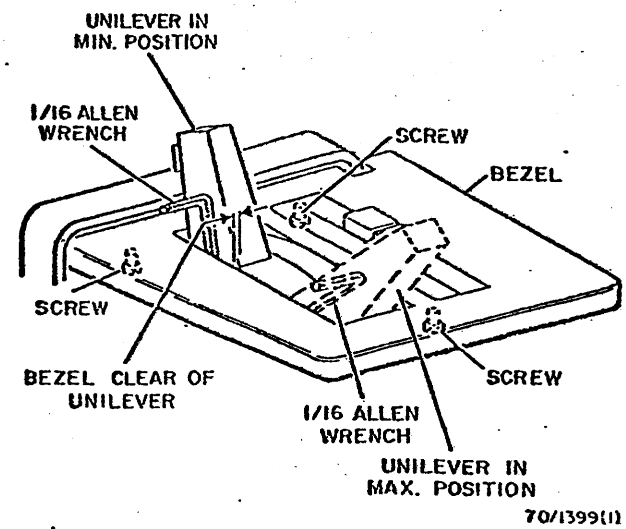

Fig. 3-35. Bezel

3. Perform Paper Tray Position Switch S6 Adjustment 3.1.20.

3.1.20 Paper Tray Position Switch S6

Removal

1. Remove the unilever control cover and bezel.
2. Remove switch S6.

Adjustment

1. Adjust the paper tray position switch to obtain equal gap between the switch buttons and the bezel (Fig. 3-36).
2. Refer to Interdependency Diagram (Fig. 3-22) and perform required adjustments.
3. To verify proper operation of the complete paper feeder, perform the Systematic Alignment Procedure (Fig. 3-50).

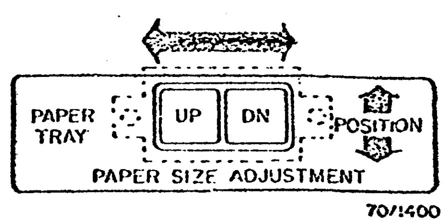

Fig. 3-36. Paper Tray Position Switch

3.1.21 Paper Feed Solenoid

Removal

1. Remove the unilever control cover.
2. Remove the two in-line connectors from the paper feeder solenoid.
3. Remove the retaining ring and stud from the solenoid shaft.
4. Remove the screws securing the solenoid to the paper feeder control frame. Remove the solenoid.

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Adjustment

1. Loosen the solenoid mounting screws (Fig. 3-37).
2. Rotate the clutch to locate the hub at the closest point to the pawl (Fig. 3-37).
3. While holding the solenoid plunger up, position the solenoid to obtain clearance.

NOTE: Keep the solenoid absolutely vertical during adjustment, otherwise the clearance will be incorrectly measured and binding will occur.

4. Refer to Interdependency Diagram (Fig. 3-22) and perform required adjustments.
5. To verify proper operation of the complete paper feeder, perform the Systematic Alignment Procedure (Fig. 3-50).

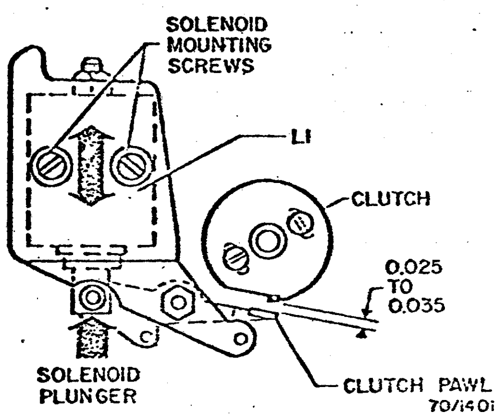

Fig. 3-37. Paper Feed Solenoid

3.1.22 Paper Feed Clutch Assembly and Cams

Removal

1. Remove the paper feeder control assembly (3.1.16).
2. Note the position of cams, shaft, and clutch pawl for reference during reassembly.
3. Remove the spirol pins securing the cams to the shaft.
4. Scribe the position of the solenoid mounting bracket on the frame. Remove the solenoid mounting bracket.
5. Slide the clutch, sprocket, and shaft out of the housing.

Replacement

NOTE: The relative position of the sensing bar and sniffer cam assembly to the paper feed clutch is critical.

1. Refer to Fig. 3-38 and reassemble all components in paper feeder.

Adjustment

1. Adjust paper solenoid (3.1.21).
2. Adjust unilever assembly (3.2).
3. Adjust bezel (3.1.19).
4. Adjust paper feeder clutch.

Because of the interdependency of the paper feeder components, whenever any repair or adjustment must be made to the clutch, the entire paper feeder clutch adjustment procedure must be performed in the sequence shown in Fig. 3-39 to ensure proper paper feeder operation.

The paper feeder clutch adjustment procedure is used to synchronize the sniffer tubes to the deenergization of the paper feeder clutch (L4).

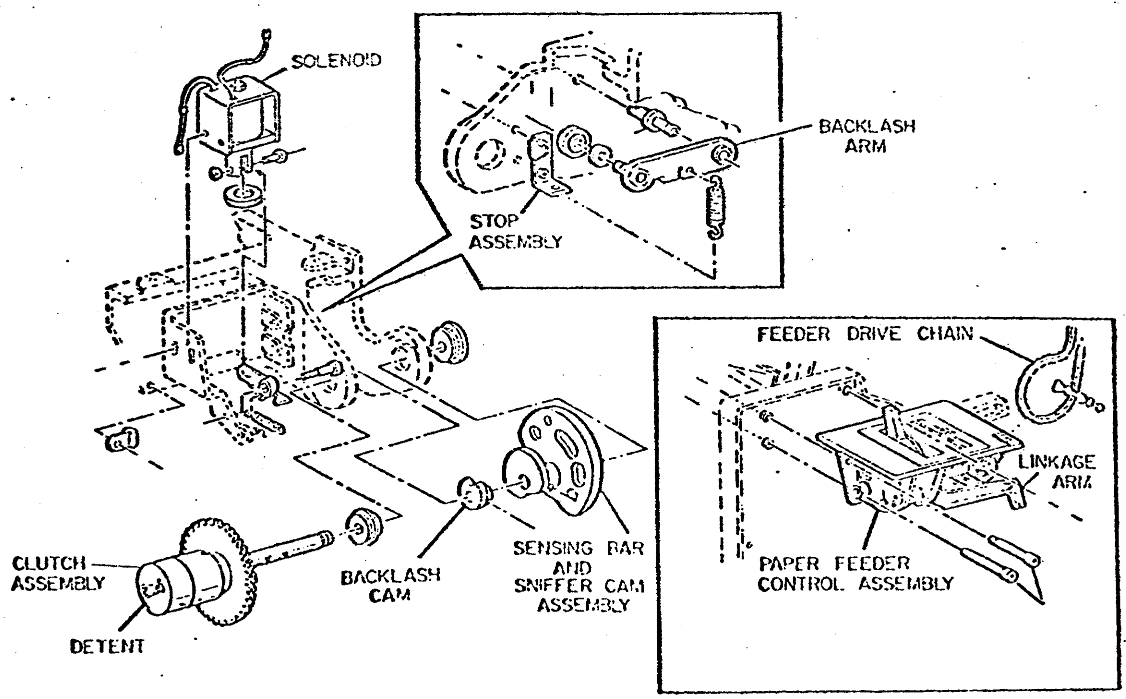

Fig. 3-38. Paper Feeder Clutch Assembly and Cams 70/2037

PAPER FEEDER CLUTCH ADJUSTMENT PROCEDURE

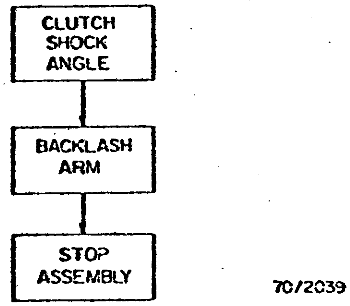

Fig. 3-39.

Clutch Shock Angle
Adjustment

1. Remove the lower inboard cover and the unilever control cover.
2. Refer to A of Fig. 3-40. Loosen the hub screws and rotate the hub to locate the scribed line on the sleeve.

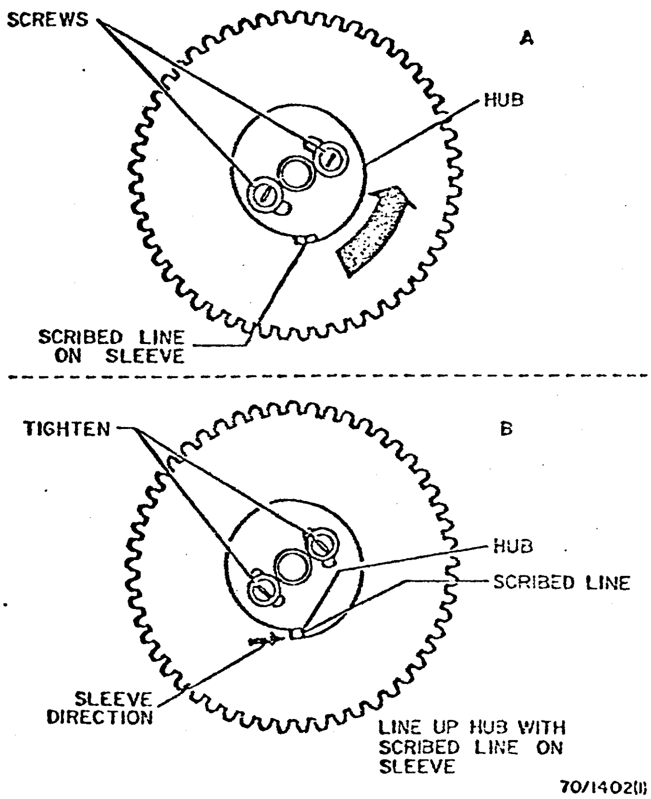

Fig. 3-40. Clutch Shock Angle

3. Refer to B of Fig. 3-40. Push the sleeve in the direction shown to remove play without causing the hub to move, and adjust the hub to line up with the scribed line. Tighten the hub screws.
4. Adjust the bezel (3.1.19).

Backlash Arm
Adjustment

1. Hand rotate the clutch (Fig. 3-41) in opposite direction of drive. Continue to rotate until the backlash arm cam follower seats in the V of the backlash cam (home position).

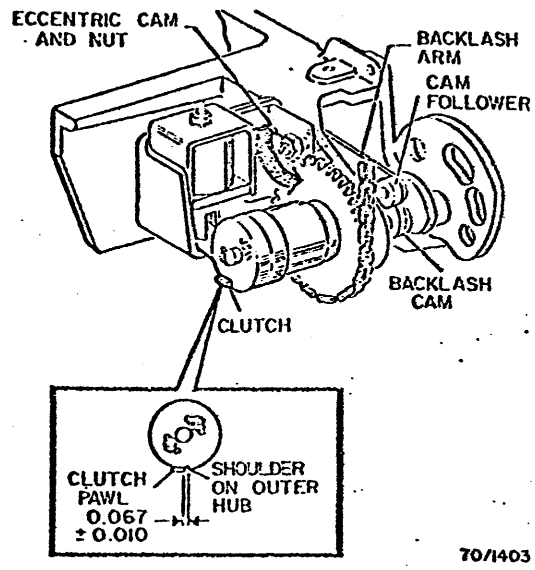

Fig. 3-41. Backlash Arm

2. Check the gap between the clutch pawl and the shoulder or outer hub for the dimension shown in Fig. 3-41. If adjustment is required, loosen the nut on the eccentric cam and turn the cam to increase or decrease the gap as necessary.
3. After adjustment, recheck the gap by rotating the clutch in the opposite direction of drive to the home position.

Stop Assembly
Removal

1. Remove the unilever control cover and bezel.
2. Remove the bottom end of the spring from the stop assembly.
3. Remove the retaining ring, and slide the backlash arm off the shaft.
4. Remove the chain from the paper feeder sprocket.
5. Position the sprocket so that the access holes are aligned with the stop assembly mounting screws, and remove the mounting screws.
6. Remove the stop assembly.

Adjustment

1. Position the V in the backlash cam approximately 90 degrees from the vertical (Fig. 3-42).
2. Position the stop assembly to just touch the backlash arm.
3. Check the bezel adjustment (3.1.19).

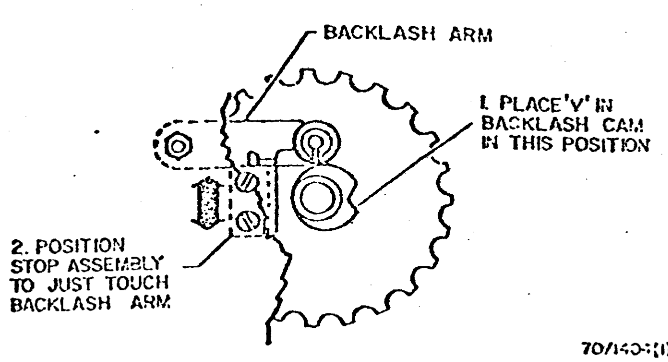

Fig. 3-42. Stop Assembly

3.1.23 Index Motor

Removal

1. Remove the lower rear cover, lower right cover, unilever control cover, and right rear door.
2. Remove the index motor gear cover.
3. Disconnect index motor connector P/J8.
4. While supporting the motor, remove the hardware securing the motor to the frame. Remove the motor.

3.2 Unilever Adjustments

3.2.1 Paper Guide Check

1. Place the unilever to the maximum paper length setting.
2. Set combination square to 0.690. Bank the square against the inboard paper guide and check for proper dimension to the lower milled pad (Fig. 3-43).

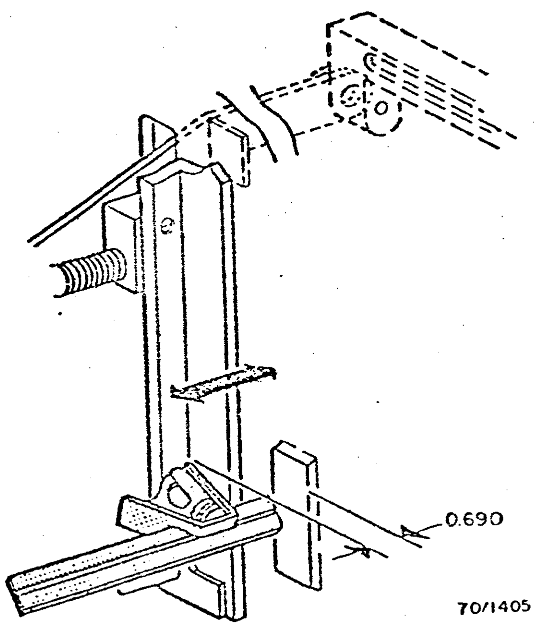

Fig. 3-43. Inboard Paper Guide

3. Place a ream of the customer's 14-inch paper in the paper tray. Raise the tray until the top of the paper stack is half way up the mounting blocks on the elevator drive shaft.
4. Bank the paper against the inboard paper guide. Check for 0.040 gap between the outboard paper guide and the paper stack (Fig. 3-44). If it is necessary to adjust either paper guide, refer to 3.2.2.

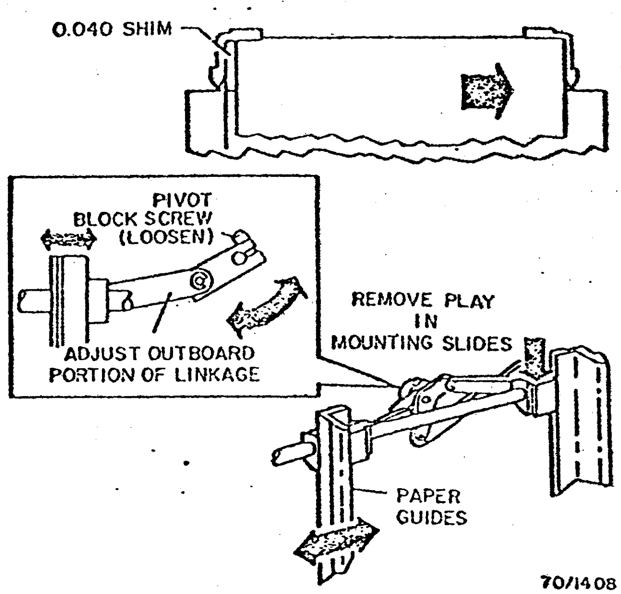

Fig. 3-44. Outboard Paper Guide

3.2.2 Maximum Paper Length Setting

NOTE: The maximum paper length setting establishes the correct relationship of the paper guides to each other and to the optical centerline of the machine. This also serves as a reference for optional paper length settings.

1. Lower the paper tray to its mid-range position.
2. Remove the unilever control cover. Place the unilever handle in the maximum paper length position.
3. Set the combination square to 0.690. Bank the square against the inboard paper guide so the end of the square is facing the lower milled pad on the inboard paper feeder frame (Fig. 3-43).

Fig. 3-45. (Deleted)

4. Loosen the locking screw and back-up screw on the lower back-up block (Fig. 3-46).
5. Loosen the nut on the maximum paper length adjusting block (Fig. 3-46).
6. With the square in position, move the adjusting block to obtain 0.690 dimension. Tighten the nut on the adjusting block.

NOTE: The bottom of the paper guide has some lateral play. Keep the guide perpendicular while obtaining the 0.690 dimension. If 0.690 cannot be obtained, adjust linkage arm (3.1.16).

7. Turn the backup screw in until it just touches the adjusting block.
8. Tighten the locking screw.
9. Raise the tray approximately mid-way in its vertical travel.
10. Place a ream of 14-inch paper in the tray. Bank the paper against the inboard paper guide. Place a 0.040 shim against the outboard side of the ream (Fig. 3-47).
11. Loosen the pivot block screw and adjust the outboard paper guide to just contact the shim. Tighten the pivot block screw securely.

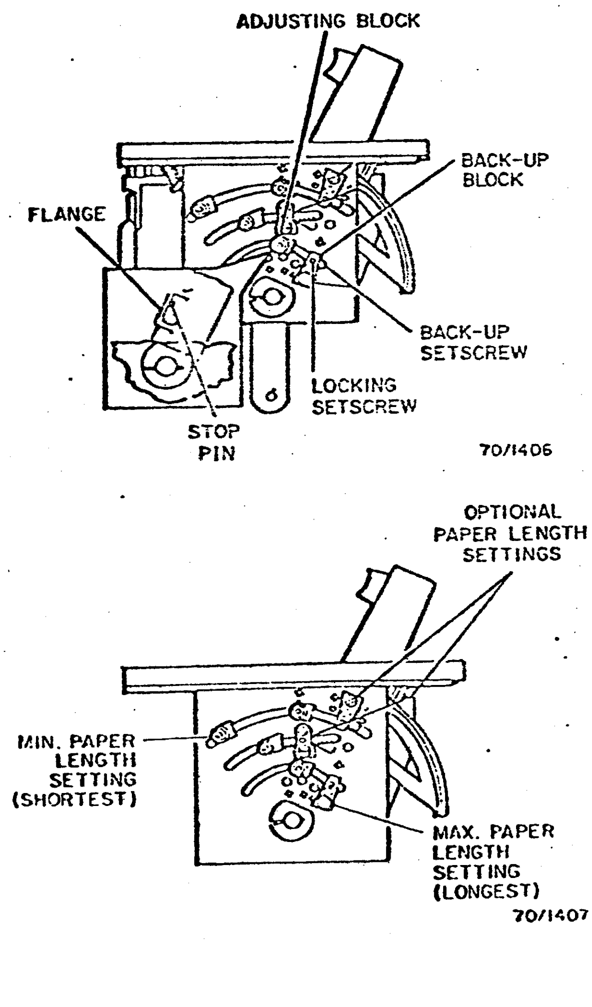

Fig. 3-46. Unilever and Stop Plate Components

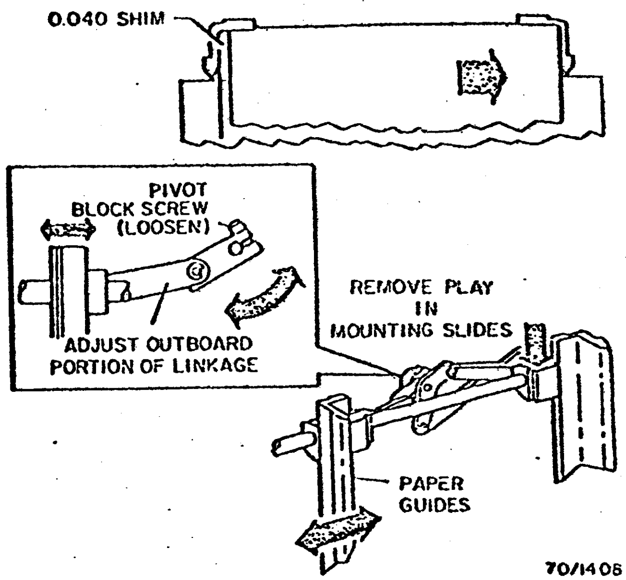

Fig. 3-47. Outboard Guide – Maximum Paper Length

3.2.3 Optional Paper Length Settings

The unilever can be adjusted to accommodate any paper length from 10 to 14 inches. The lever has four positions, each determined by the location of an adjusting block. To adjust the blocks so the paper feeder will accommodate the optional paper lengths preferred by the customer, proceed as follows:

1. Check adjustment of maximum paper length setting (3.2.2).
2. With the paper tray positioned approximately mid-way in its vertical travel, place a ream of the desired size paper in the tray. Bank the paper against the inboard paper guide. Place a 0.040 shim against the outboard side of the ream (Fig. 3-48).

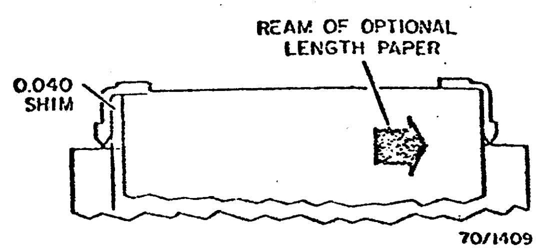

Fig. 3-48. Outboard Guide – Optional Paper Length

3. Move the unilever handle so it latches on the appropriate stop pin.
4. Loosen the locking screw and back-up screw on the appropriate back-up block (Fig. 3-46).
5. Loosen the nut on the appropriate adjusting block.
6. Move the adjusting block until the paper guides just touch the ream of paper and shim (Fig. 3-48), then tighten the nut on the adjusting block.
7. Turn the back-up screw in until it touches the adjusting block.
8. Tighten the locking screw.

3.2.4 Legal–Letter Switch Adjustment

Adjust switch to actuate with unilever in 13- to 14-inch positions and to deactuate with unilever in all positions less than the 13-inch (Fig. 3-49).

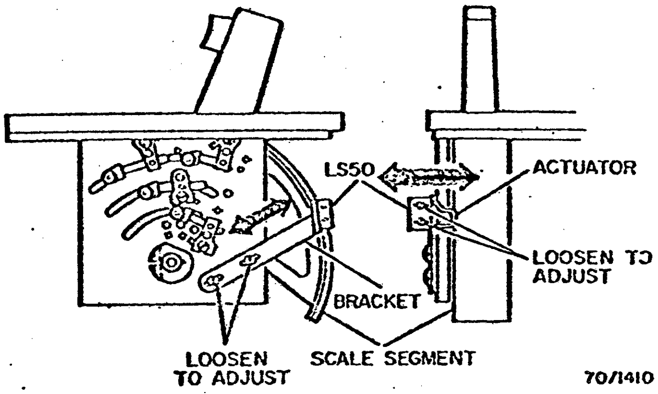

Fig. 3-49. Legal–Letter Switch Adjustment

3.3 Paper Feeder Systematic Alignment

Because of the interdependency of the paper feeder components, whenever any repair or adjustment must be made, the entire systematic alignment procedure must be performed in the sequence shown in Fig. 3-50, to ensure proper paper feeder operation.

PAPER FEEDER SYSTEMATIC ALIGNMENT PROCEDURE

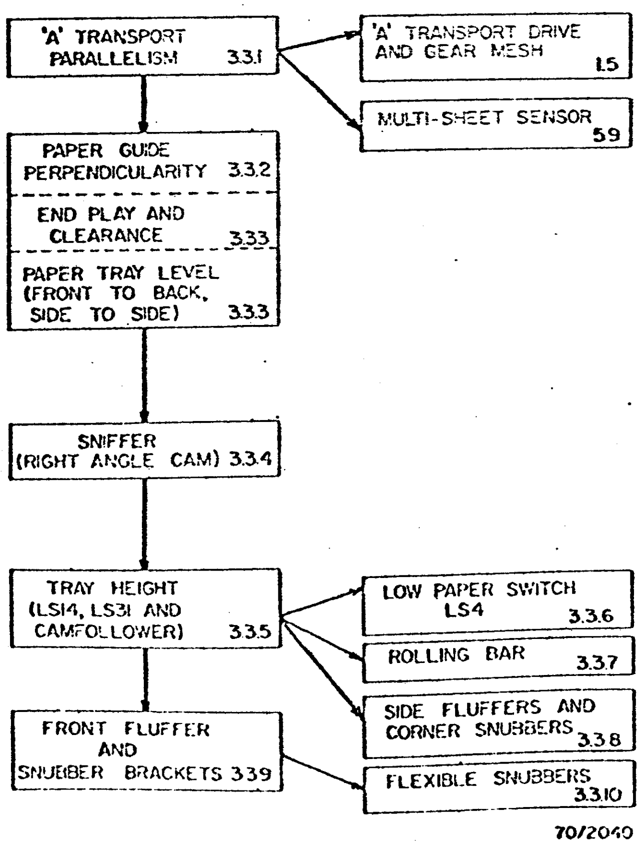

Fig. 3-50.

B Parallel Bar Preparation (See Fig. 3-51)

The parallel bars (600T588) are required for the sniffer che[ck]. Prepare the scribe lines for each parallel bar as follows:

1. Scribe one line 0.845 from the side, extending to about one inch from each end. Make the scribe line as accurately as possible.
2. Scribe the other line in the same manner, but at a dimension of 0.925.

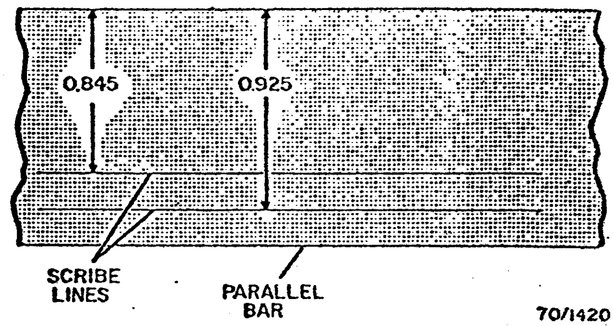

Fig. 3-51. Sniffer Scribe Lines

3.3.1 A-Transport Parallelism

Check

1. Remove the developer assembly (9.1) and developer catch tray (5.4).
2. Slide the belts aside.
3. Set the level on the sniffer tube to obtain a refer[ence] reading (Fig. 3-52).
4. Lower sniffer tube to down position and set the level on the drive roller, then on the idler roller (to one side of the knurling).
5. If the readings on the A-transport do not agree with the reading taken on the sniffer tube, adjust the A-transport.

Adjustment

1. Adjust the mounting brackets until the level readings taken on the rollers agree with the reading taken on the sniffer tube.
2. Check the multi-sheet sensor (5.9).
3. Restore machine.

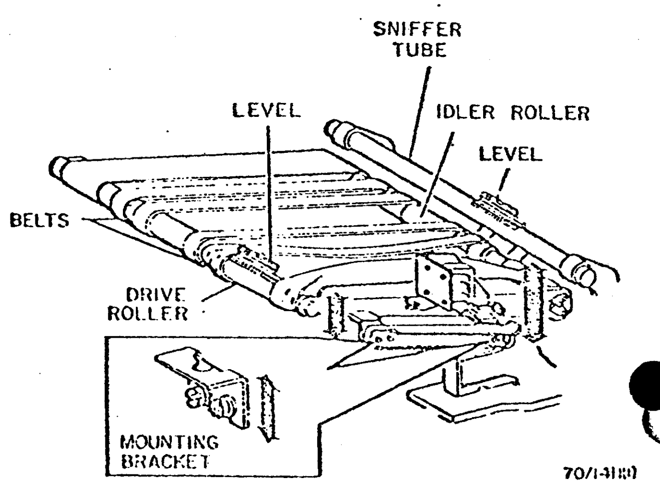

Fig. 3-52. A Transport Parallelism

3.3.2 Paper Guide Perpendicularity

Check

1. Set the combination square to 0.345. Bank the square against the paper guide (Fig. 3-53). The end of the rule should contact the tie bar.

Adjustment

1. Adjust as necessary to obtain the 0.345 dimension.
2. Repeat the above procedure for the outboard paper guide.

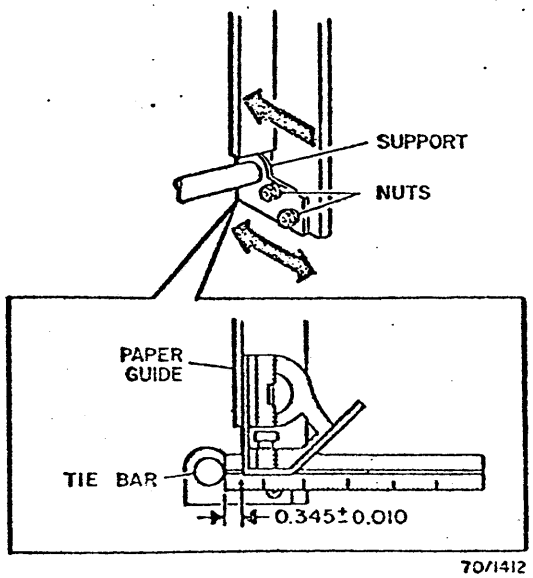

Fig. 3-53. Paper Guide Perpendicularity

3.3.3 Paper Tray End-Play, Clearance, and Level

Ⓐ Paper Tray End-Play

Check

1. Move the paper tray so that it touches the inboard guide track (Fig. 3-54). Check for end play.

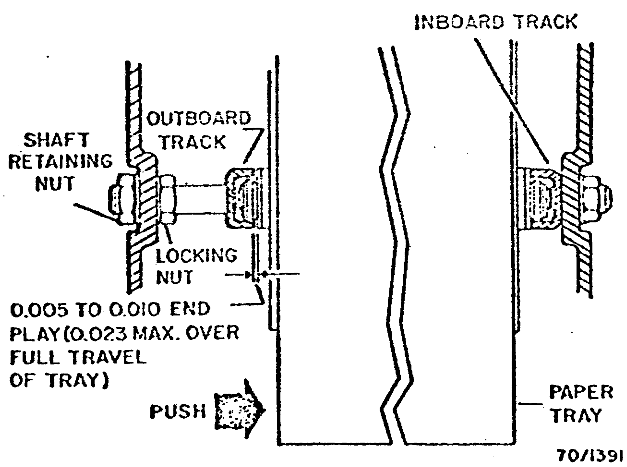

Fig. 3-54. Paper Tray End Play

Adjustment

1. Adjust the locking nut and the shaft-retaining nut so that the end play at the points of closest contact is between 0.005 and 0.010, as shown.

Ⓑ Paper Tray Clearance

Check

1. Lower the paper tray. Using a 5/32-inch Allen wrench, check the clearance between the paper tray and the paper guide at both inboard and outboard locations (Fig. 3-55).

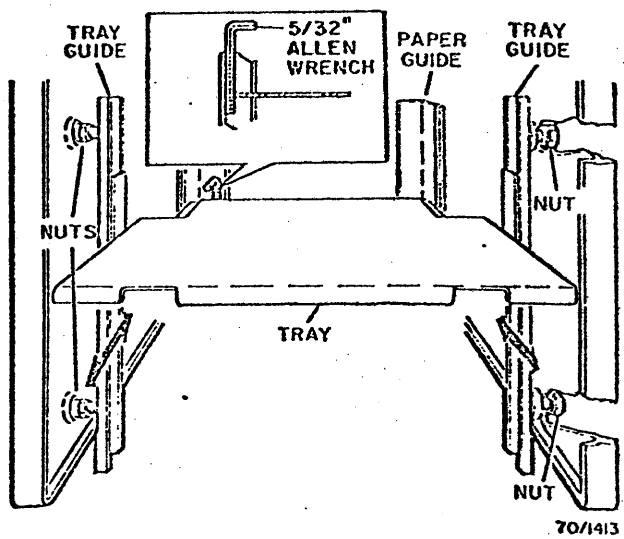

Fig. 3-55. Paper Tray Clearance

NOTE: Hold unilever at minimum while checking clearance. Ensure that the check is made to the paper tray itself, and not to the roller arms.

2. Raise the paper tray. Repeat step 1. Clearance should be the same through full travel of tray.

Adjustment

To adjust, loosen the nuts holding the paper tray rails and move tray in the required direction.

600P81722

0 Paper Tray Level

Check

1. Place the parallel bars on the tray in stack height position (Fig. 3-56).

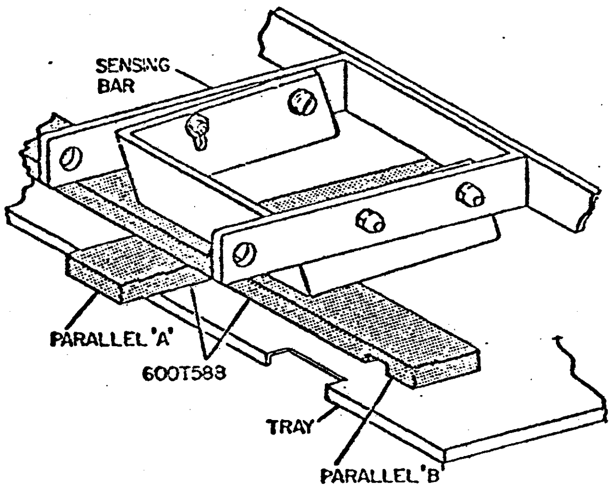

Fig. 3-56. Parallel Bars in Stack Height Position

2. Raise the tray until it stops; turn off the machine.
3. Lower the sniffers to the maximum down position.
4. Place the parallel bars as in Fig. 3-57.
5. While maintaining the balance of bar B on A, slide the parallel bars beneath the sniffer tubes.

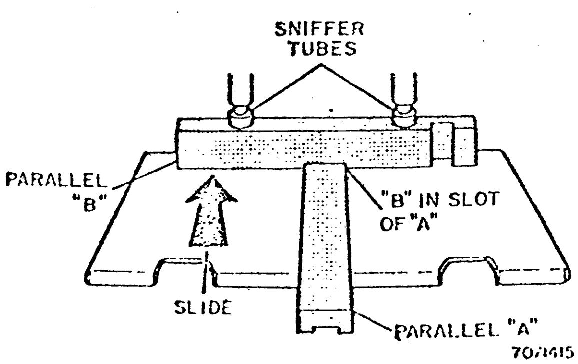

Fig. 3-57. Parallel Bars in Tray Level Check Position

NOTE: If the tray stops too high to slide the parallel bars under the sniffer tubes, lower the tray; then jog the paper tray up by inserting the toner dipstick between the sensing bar arm and the actuator of LS14.

NOTE: Parallel bars must not raise the sniffer tubes.

Adjustment

1. Adjust the paper tray cable nuts to obtain equal clearance (Fig. 3-58) if the clearance between parallel B and the inboard and outboard sniffer tubes is not equal.

NOTE: Exert slight downward pressure on the tray to take up any slack in the cables.

2. Note the reading of the level at the mounting pad (Fig. 3-58).

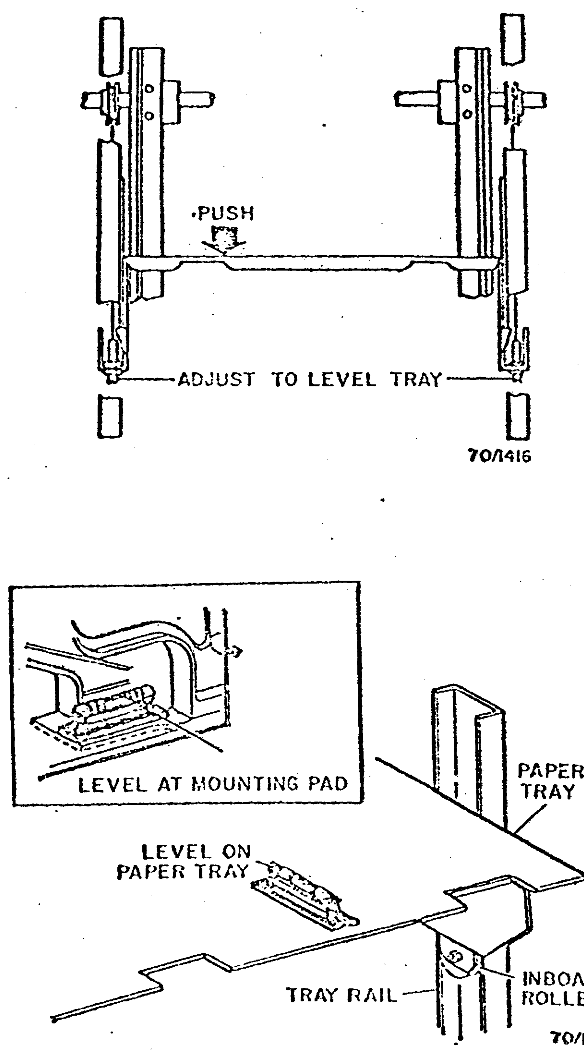

Fig. 3-58. Paper Tray Level

3. Place the level on the paper tray as shown. The level should read the same as in step 2. Adjust as required.
4. To adjust, alternately move the inboard and outboard eccentric rollers until the level reads correctly.

3.3.4 Sniffer (Right Angle Cam)

The sniffer is checked at three positions: maximum down, maximum rise, and maximum up.

In the maximum down position, the sniffer is positioned a certain distance away from the lead edge of the paper. This distance ensures that the correct amount of paper extends beyond the sniffer tube during feed to the A transport.

The maximum rise position is the highest point to which the sniffer rises before it changes direction and moves toward the A-transport.

The maximum rise position affects two things: 1) the distance that the sniffer backs away from the paper guide, and 2) the height of the lead edge of the sheet with respect to the nip between the A-transport belts and the pinch wheels.

The position of the sniffer in the maximum up (home) position determines how far the lead edge of the sheet is inserted into the nip between the A-transport belts and the pinch wheels.

NOTE: The datum sniffer tube (second tube from the front) must be used as a reference for all sniffer adjustments. The manufacturing specification for sniffer tube alignment with respect to the datum tube is ±0.060. If one of the other tubes were used, an error of 0.060 could result.

Checks

● Down Position (Sniffer Released)

1. Set the unilever to the minimum paper length setting.
2. Place the sniffers in the maximum down position.
3. Place the parallel bars on the tray as shown in Fig. 3-59.

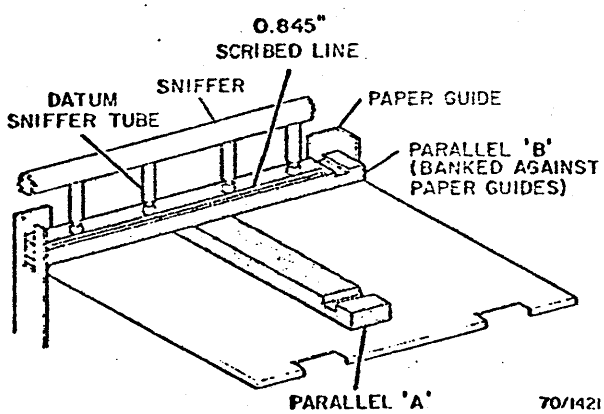

Fig. 3-59. Sniffer Down

WARNING: Use only the toner dipstick or some other non-conductive material; LS14 has 120-volt AC connected to it.

4. Jog the paper tray up by inserting the toner dipstick between the sensing bar arm and the actuator of LS14.

NOTE: Parallel bars must not raise the sniffer tubes.

5. Turn the machine off.
6. Datum sniffer tube should be on the 0.845 line (Fig. 3-60).

● Maximum Rise Position

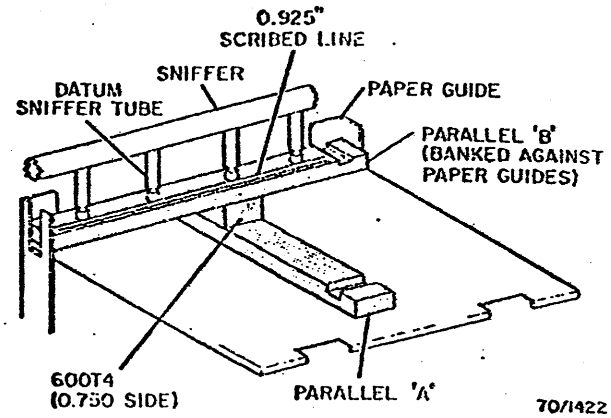

Fig. 3-60. Sniffer Rise Height and Back-up

1. Refer to Fig. 3-60. Lift and hold the right-angle cam follower into the corner of the right-angle cam. Slide the parallel bars and tool 600T4 under the sniffer tubes and bank bar B against the paper guides. The datum tube should be just touching bar B at the 0.925 line.

● Maximum Up Position (Home)

1. Rotate the sniffer cam and place the sniffer tubes in "home" position.
2. Refer to Fig. 3-61. Hold the six-inch rule against the A-transport belts and check for a dimension of 0.000 to 0.060 inches between the edge of the rule and the small part of the sniffer tube.

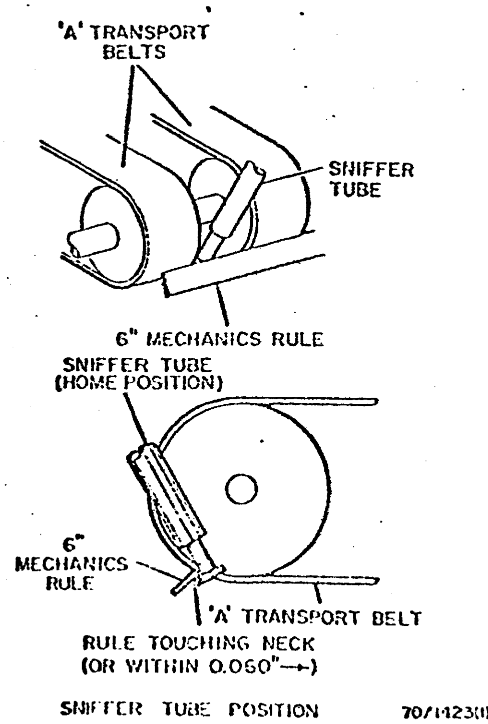

Fig. 3-61. Sniffer Tube Position

If any of the sniffer checks are not as specified, the right-angle cam must be adjusted to satisfy them. Whenever the right-angle cam is moved, perform all sniffer checks to verify that they have not changed.

Adjustment

1. Remove the paper feeder top covers.
2. Remove the unilever control cover and bezel.
3. Place the eccentric cam follower in the middle of the adjustment range (Fig. 3-62).
4. Perform the Sniffer Checks procedure again.

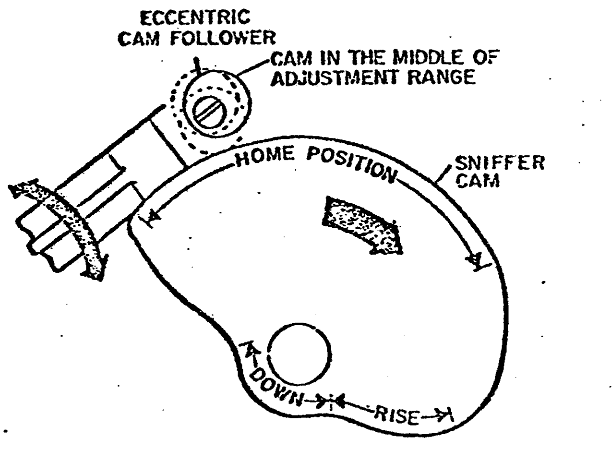

Fig. 3-62. Sniffer Cam in Mid-Range Position

5. Refer to Fig. 3-63. Loosen locking nut and back off the right-angle back-up screw.
6. Loosen the right-angle cam mounting screws just enough to be able to move the right-angle cam by hand.
7. Place the parallel bars and tool 600T4 on the tray (1 of Fig. 3-64).
8. With the left hand moving the cam, and the right hand pressing the cam follower into the corner of the cam, position the cam so the datum sniffer tube is in the maximum rise position and just touching bar B. Tighten bottom screw.
9. Refer to 2 of Fig. 3-64. Pivot cam to obtain .025 position. Tighten the top mounting screw to hold cam in position.

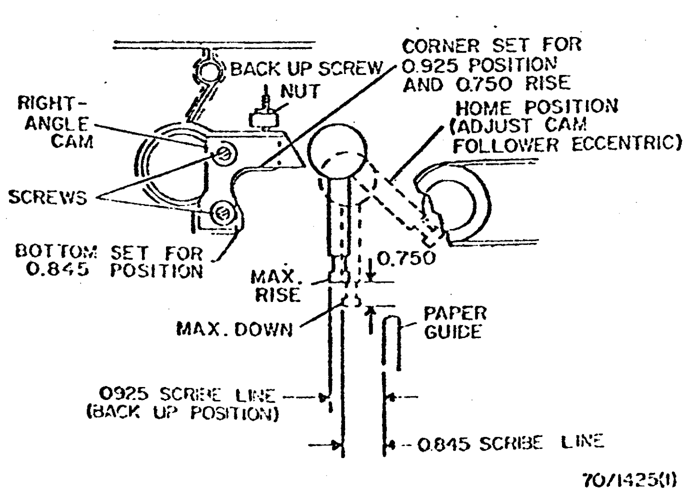

Fig. 3-63. Right Angle Cam

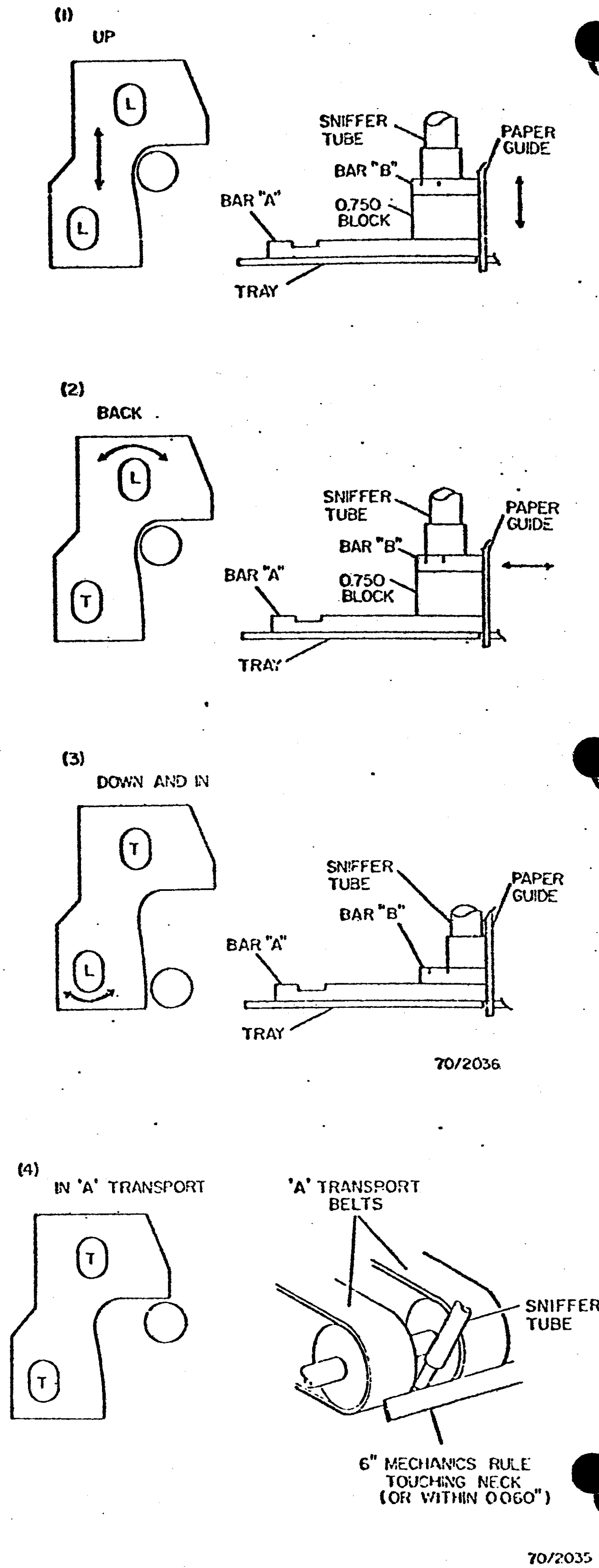

Fig. 3-64. Sniffer Right Angle Cam

10. Place parallel bars as shown in (3 of Fig. 3-64).
11. The datum sniffer tube should just touch bar B on the 0.845 line. If necessary, slightly loosen bottom screw, gently tap the bottom of the cam to satisfy the requirement. Tighten the bottom mounting screw.

NOTE: If the right-angle cam has been positioned correctly, step 11 will not have changed the maximum rise height and back-up position (0.925).

12. Recheck the maximum rise height and back-up (0.925).

NOTE: Make sure the mounting screws are tight enough so that you do not move the cam while moving the cam follower to the corner of the cam. If these two adjustments are performed in the order given, it should not be necessary to readjust. If readjustment is necessary, start over and perform the steps beginning with step 5. After a little expertise is gained in this manner, these two adjustments can be made without any problem.

13. Tighten the mounting screws securely and recheck the adjustments.
14. Place the sniffer tubes in the "home" position.
15. Place a six-inch rule on the belts and check the sniffer tube position (4 of Fig. 3-64).
16. If necessary, adjust the sniffer tube "home" position by moving the sniffer cam follower eccentric slightly.

NOTE: A small movement of the cam follower results in a comparatively large movement of the sniffer tubes. When the adjustment is correctly made, the majority of the cam follower lobe will be toward the left side of the machine.

17. Perform all sniffer checks to verify that you have not disturbed the other adjustments.
18. Tighten the locking nut on the back-up screw.

3.3.5 Paper Tray Height (LS14, LS31, and Cam Follower) Check

1. Place the parallel bars under the sensing bar (Fig. 3-65) and raise the tray until it stops. Turn the machine off.

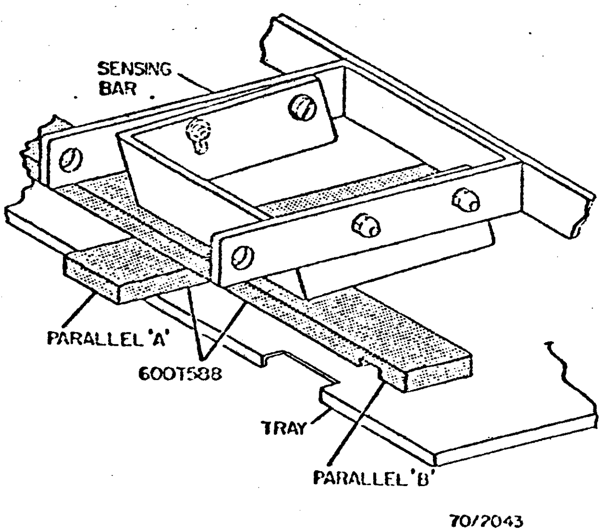

Fig. 3-65. Parallel Bars in Stack Height Position

2. Lower the sniffers to the maximum down position.
3. Place bar B in slot of bar A and slide the parallel bars under the sniffers (Fig. 3-66). Clearance between the sniffer tubes and parallel B should not exceed 0.015.

Adjustment

1. To adjust LS14, move the adjustable sensing bar to its mid-range position.
2. Place the sniffers in the down position.
3. Place the parallel bars as in Fig. 3-66 and "jog" the paper tray into the proper position using the toner dipstick to actuate LS14.

NOTE: Parallel bars must not raise the sniffer tubes.

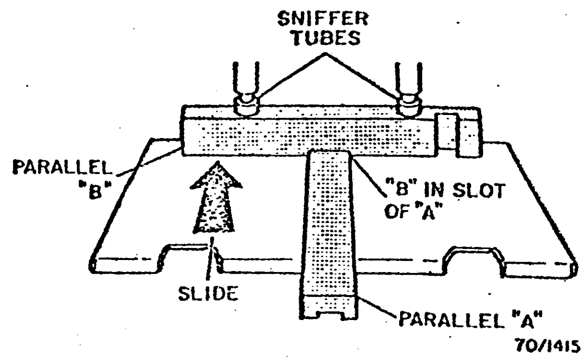

Fig. 3-66. Paper Tray Height

4. Turn the machine off.
5. Place parallel bars as in Fig. 3-65.
6. Place the sniffers in the "home" position.

NOTE: Before adjusting LS14, ensure that there is some clearance between the cam follower and sensing bar cam. If there is no clearance, back off cam follower eccentric.

7. Loosen the locknut on the stop screw, then back off the stop screw (Fig. 3-67).

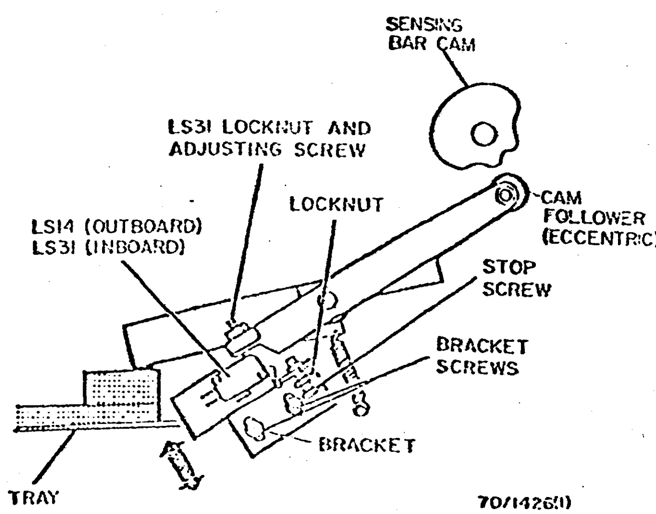

Fig. 3-67. Sensing Bar Switch LS14

8. Loosen and back off the LS31 locknut and adjusting screw.
9. Adjust the switch bracket until LS14 just actuates, then back it off until LS14 just deactuates. Tighten the switch bracket mounting screws securely.

NOTE: The LS31 actuating screw must remain centered over the LS31 switch actuator.

10. Repeat the paper tray height check. Readjust if necessary.
11. To adjust LS14 overtravel, remove the parallel bars and return the sniffer to the "home" position.
12. Place 0.020 shim stock between the sensing bar arm and the stop screw (Fig. 3-68).

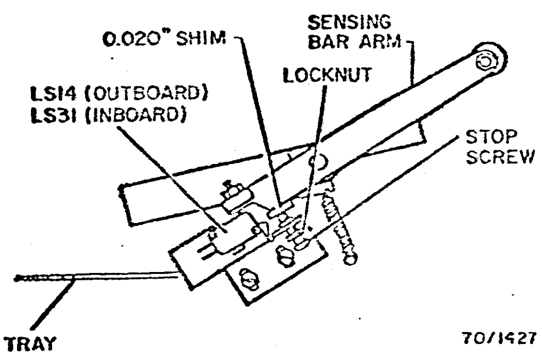

Fig. 3-68. Sensing Bar Switch LS14 Overtravel

13. Screw in the stop screw until LS14 deactuates, then back the screw off until LS14 just actuates. Tighten the locknut.
14. Remove the shim stock.
15. To adjust LS31, place 0.010 shim stock between the sensing bar arm and the stop screw.

NOTE: Sniffers should be in the "home" position and the sensing bar should be hanging free.

16. Screw in the LS31 adjusting screw until LS31 just actuates.
17. Tighten the LS31 locknut. Remove the 0.010 shim.

18. To adjust the sensing bar cam follower, place the sniffer to the "home" position. Back off the locknut on the sensing bar cam follower eccentric, and adjust the eccentric to obtain minimum clearance between the sensing bar cam and the cam follower (Fig. 3-69). Tighten cam follower locknut.

NOTE: If the sensing bar eccentric stop is removed, the cam follower can be reached more easily. Be careful not to bend the inboard side fluffer when raising the sensing bar with the eccentric stop removed (14-inch position).

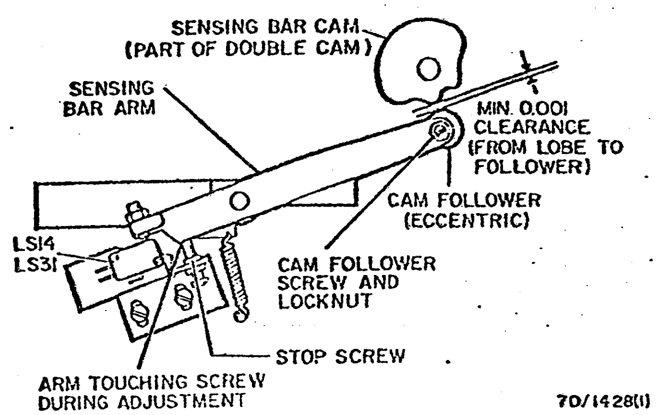

Fig. 3-69. Cam Follower

3.3.6 Low Paper Switch LS4

1. Lower the paper tray. Lay a 1/4 and a 7/32 Allen wrench on the tray (Fig. 3-70).

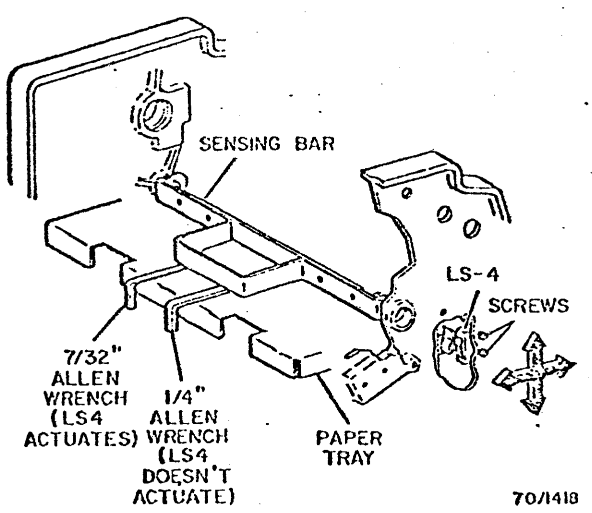

Fig. 3-70. Low Paper Switch

2. Raise the tray. The tray should stop at its maximum up position (LS4 should not actuate).
3. Slide the 1/4 Allen wrench out from under the sensing bar. The low paper switch should actuate, causing the tray to descend.
4. If the above conditions are not met, lower the tray, turn the power off, remove the switch cover, and back the switch off enough so it cannot be actuated by the paper tray.
5. With the 7/32 Allen wrench in the same position as before, turn the power on and raise the tray until it stops.
6. Turn the power off. Adjust the switch until it just actuates. Tighten the switch mounting screws (being careful not to move the switch while tightening).
7. Turn the power on (the tray should descend).
8. Repeat steps 1 through 3 to check the adjustment.
9. Replace the switch cover. Adjust the switch cover for clearance at the upper and lower limits of paper tray travel (Fig. 3-71). Check the clearance throughout the full travel of the tray.

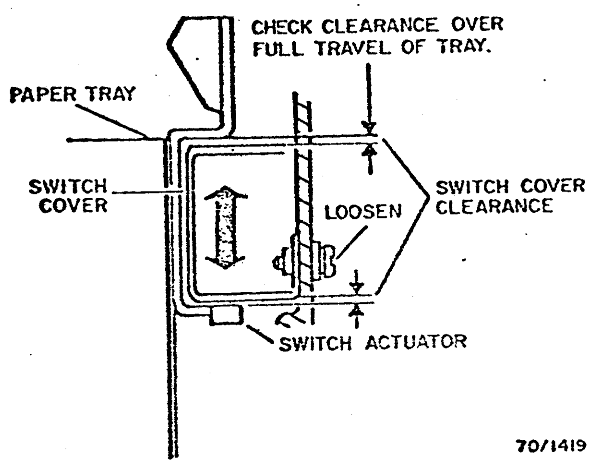

Fig. 3-71. Low Paper Switch Cover

3.3.7 Rolling Bar

1. Adjust the rolling bar, raise the tray to the correct paper tray height.
2. Set the combination square to 2.480 inches.
3. Bank the end of the rule against the paper guide (Fig. 3-72). The rolling bar should contact the combination square head. Check both ends of the rolling bar and adjust the rolling bar brackets if required.

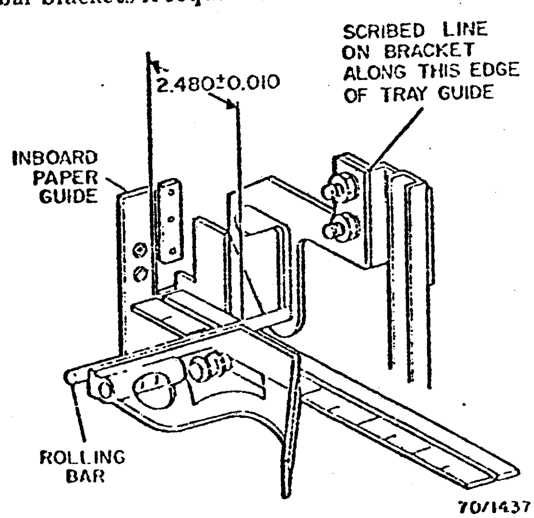

Fig. 3-72. Rolling Bar Bracket

4. After adjusting the rolling bar brackets, scribe a vertical line inside both brackets. This will aid in maintaining the correct distance from the paper guide when adjusting the vertical height.
5. To check the rolling bar height, place the parallel bar as in Fig. 3-73). The rolling bar should fit just below the cutout in parallel B. Adjust if necessary.

NOTE: Some early machines have a one-piece rolling bar bracket that cannot be adjusted for height. On these machines, it may be possible to adjust for height by tipping the brackets slightly.

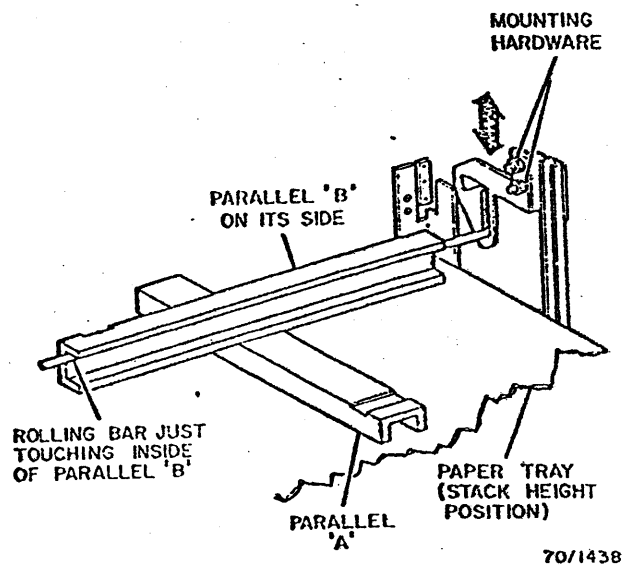

Fig. 3-73. Rolling Bar Height

3.3.8 Side Fluffers and Corner Snubbers

1. Before adjusting the side fluffers, use 6-inch scale to check the side fluffer slots (Fig. 3-74).

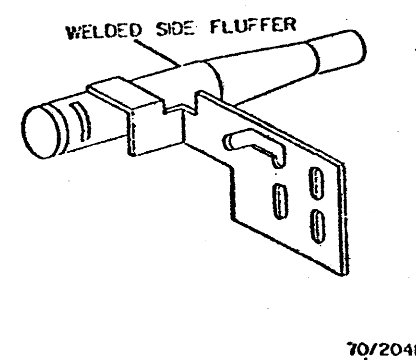

Fig. 3-74. Side Fluffer

2. Use the end of the 6-inch scale to check the opening of the slot. The slots should be free of dirt and burrs. If both slot openings are not approximately the same, replace the side fluffers.

3. To adjust the side fluffers and corner snubbers, raise the tray to the correct paper tray height. (Perform steps 1, 2, and 3 of 3.3.7.)
4. Position the parallel bars as shown in Fig. 3-75.

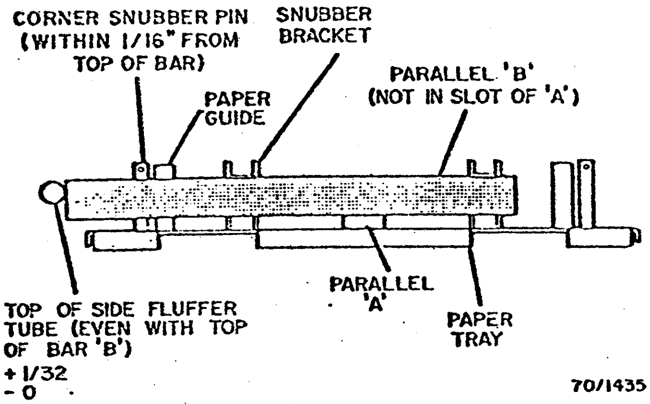

Fig. 3-75. Side Fluffers and Corner Snubbers

5. The side snubber pin should be within 1/16-inch above parallel bar B.
6. The top of the side fluffer tube should be even with the top of parallel B (+1/32, −0).
7. To adjust, loosen the fluffer bracket screws. Obtain both dimensions shown in steps 5 and 6 by moving the bracket.
8. Check the fluffer slots (Fig. 3-76). If necessary, adjust by tilting the brackets until the slots are parallel to the paper guides. Recheck fluffer height and ensure that the snubbers move freely throughout their full travel.

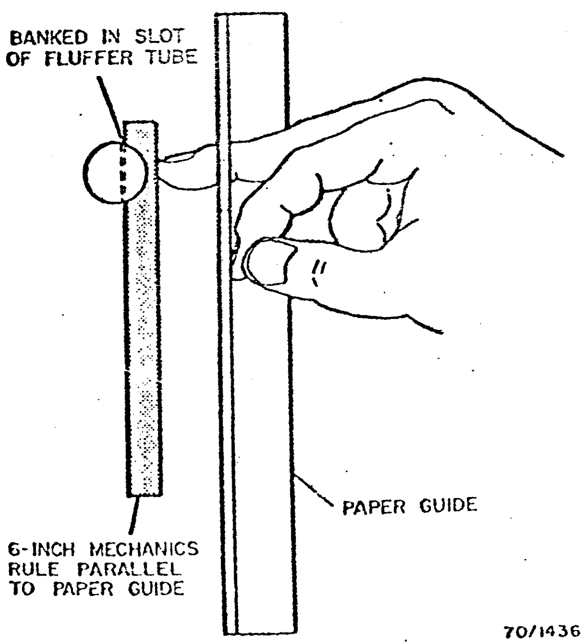

Fig. 3-76. Fluffer Slot

3.3.9 Front Fluffer and Snubber Brackets Check

1. Place sniffer tubes in the "home" position.
2. Set the combination square to 1/2-inch.
3. Bank the square against the paper guide (Fig. 3-77). The fluffer tube should be within 0.010 of the end of the rule.
4. Check both ends of the tube.

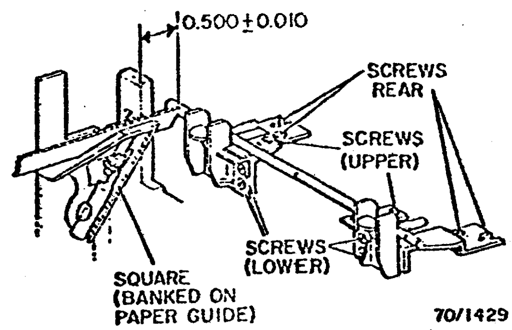

Fig. 3-77. Front Fluffer and Snubber Brackets

5. Check that the snubber brackets are centered between the sniffer tubes within 0.020 (Fig. 3-78).

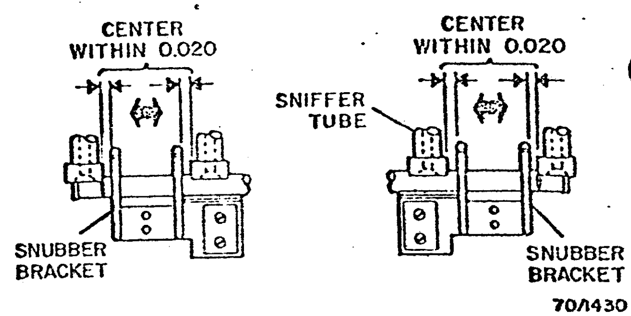

Fig. 3-78. Snubber Bracket

6. Check that the end slots of the fluffer tube extend equally past the edge of both snubber brackets within 0.060 (Fig. 3-79).

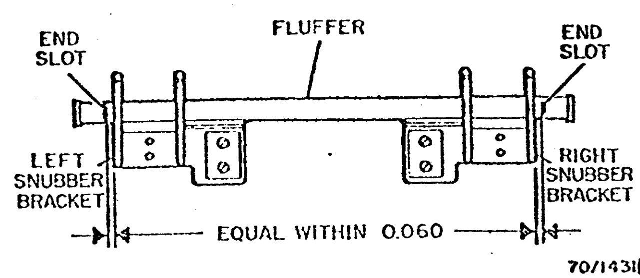

Fig. 3-79. Fluffer Tube

7. Place the parallel bars under the sensing bar (Fig. 3-80) and raise the tray until it stops. Turn the machine off.

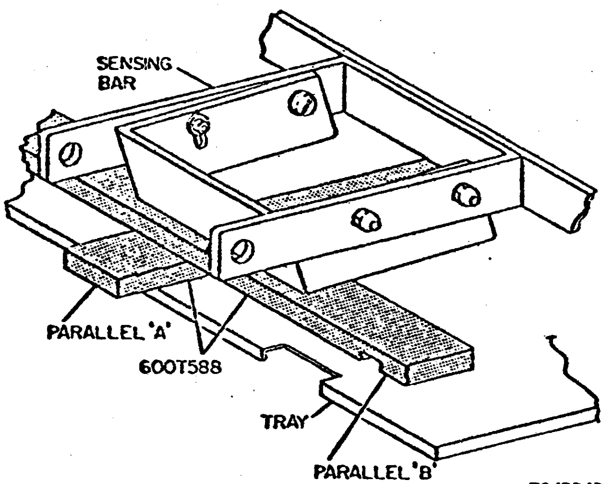

Fig. 3-80. Parallel Bars in Stack Height Position

8. Lower the sniffers to the maximum down position. Place parallel B in the slot of parallel A and slide the parallel bars under the sniffers (Fig. 3-81). Clearance between sniffer tubes and parallel B should not exceed 0.015.

NOTE: This ensures that the tray is at the correct height for making the fluffer checks.

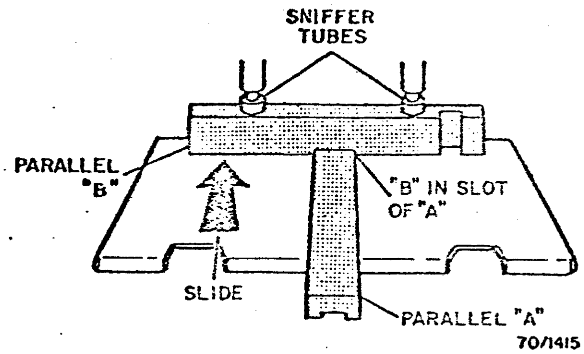

Fig. 3-81. Parallel Bars in Correct Tray Height Position

9. Place the parallel bar and tool 600T4 as in Fig. 3-82. The bottom of the fluffer tube should be flush with the top of 600T4 within 0.030.

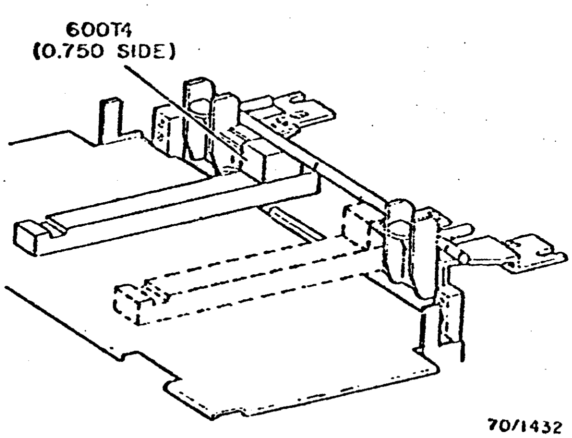

Fig. 3-82. Front Fluffer Height

Adjustment Procedure

1. Adjust the snubber brackets to obtain the 1/2-inch dimension using the rear screws (Fig. 3-77).
2. Adjust the assembly to the correct height (Fig. 3-82) and secure the lower four screws (Fig. 3-77).

NOTE: While making adjustment, maintain centering of the snubber brackets between sniffer tubes.

3. Center the fluffer tube (Fig. 3-79), using the upper two screws (Fig. 3-79). Tighten the upper two screws.

3.3.10 Flexible Snubbers

1. To adjust the flexible snubbers, raise the tray to the correct paper tray height.
2. Loosen the snubber mounting screws (Fig. 3-83).
3. Place the parallel bars on the tray as in Fig. 3-83. Check that the snubbers lie flat on parallel B and the snubber ends are even with the edge of the parallel bar. Remove and reform the snubbers if necessary.
4. Tighten the mounting screws.

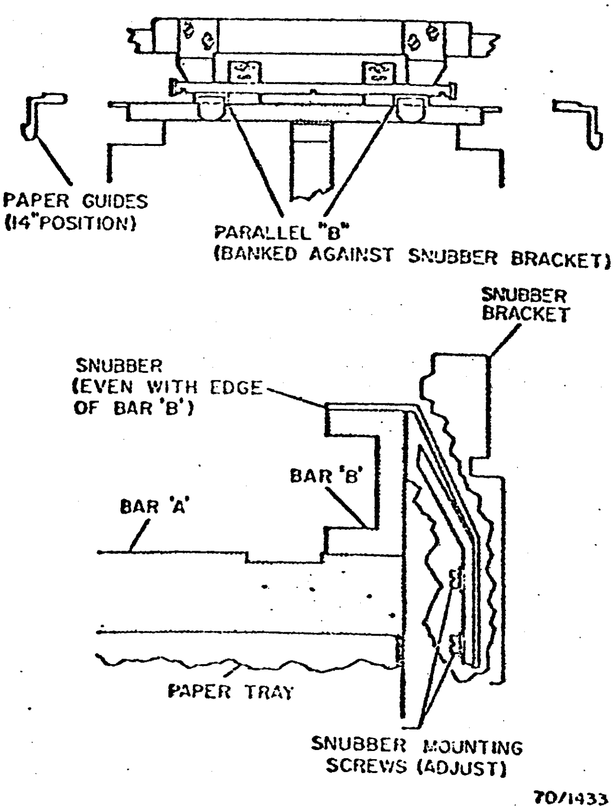

Fig. 3-83. Flexible Snubber

3.3.11 Sniffer Vacuum

1. Check the filter bottles for dirty filters and leaks. Check the air hoses for kinks and leaks.
2. Disable the developer drive motor by raising the outboard developer latch.
3. Rotate the paper feeder cam so the sniffer is positioned at maximum down.

4. Connect vacuum gauge 600T429 to the outboard sniffer and block the other sniffers (Fig. 3-84). Press the START PRINT button. Sniffer vacuum should be 12 $\pm$ 0.5 inches.

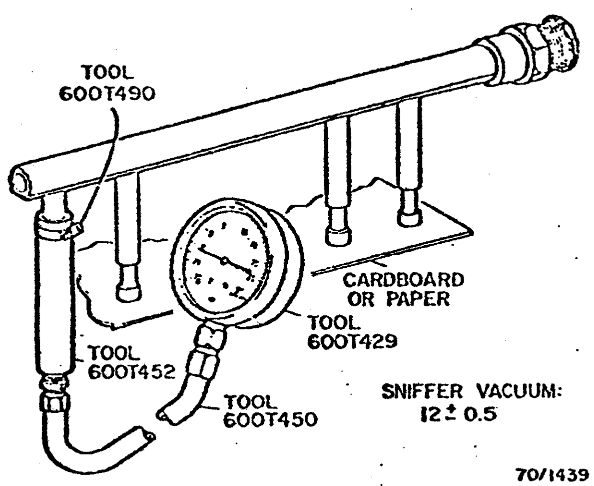

Fig. 3-84. Sniffer Vacuum

5. If the gauge does not read as specified, adjust the sniffer relief valve (located to the right of the filter bottle assembly).
6. If the correct vacuum cannot be obtained by adjusting the relief valve, inspect the valve for leaks, dirt, and damage.

NOTE: The sniffer air path may become blocked by dirt around the spirol pin that attaches the cam follower arm to the sniffer tube (Fig. 3-85.) If necessary, remove the plug and hose, and clean with a paper clip.

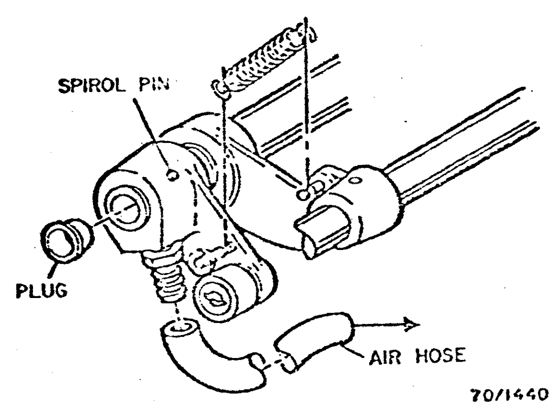

Fig. 3-85. Sniffer Tube, Outboard End

3.4 Paper Feeder Custom Tuning

3.4.1 Introduction

This subsection explains the modifications of specifications to optimize the feeding of papers other than Xerox 4024.

Paper weight, stiffness, cut, curl, and finish are all characteristics which may affect paper feeding reliability.

Some papers will feed less reliably regardless of what adjustments are made. If you are working with poorly cut paper (burred or crushed edges and varying sizes) you can expect problems. The cut of the paper sometimes causes fed sheets to be skewed. Paper cut with a dull or nicked guillotine blade which crimps the sheets together prevents proper fluffing of the sheets. Fanning will help this situation. In fact, everyth put into the paper tray should be fanned (even 4024).

Paper feeding problems caused by excessive curl can sometimes be reduced by turning the paper over in the tray.

Greater paper feeding reliability for papers whose weight, stiffness, and finish differ from 4024 can be achieved by custom tuning the machine.

Areas of Custom Tuning

Many paper feeders have been customized in a variety of ways in an attempt to improve feeding. You will find, however, that in most cases you will optimize paper feeding with any given paper if you limit customizing to two areas — sniffer vacuum and fluffing.

NOTE: Custom tuning should not be attempted until after performing the Paper Feeder Systematic Alignment procedures (3.3).

Sniffer Vacuum

The correct sniffer vacuum will vary between different papers depending on various characteristics. For example, the porosity of paper varies, and with the more porous paper, the sniffer vacuum (at a given pressure) will have a greater tendency to attract the second sheet in the stack as well as the first. Even if this does not result in a complete double pick, it can cause enough of a pick to pull the second sheet over one or both of the snubbers. (This is known as second-sheet advancement.) In most cases, second-sheet advancement ends up as a skewed feed. Other parameters that directly influence the sniffer vacuum setting are the stiffness and thickness of a sheet of paper.

Fluffing

To optimize fluffing, it is necessary to achieve two things:

1. The top several sheets in the stack must have good separation at the corners as well as in the center of the stack. This separation is fairly easy to see and achieve in the center of the stack. At the corners, however, it is a little more difficult, primarily because the degree of separation is less, and this makes it harder to determine whether or not the top sheets are matted under the snubbers.
2. The top sheets in the stack should be level with respect to the sniffer, so all four sniffers can pick the top sheet equally. This also helps to achieve proper separation. Levelness is assured when the top sheet is being blown up against all four snubbers, assuming, of course, that snubber height is correct. (It is common practice to run 13- and 14-inch paper with the corner snubbers out of the system for better reliability.) It is recommended, however, that when you are checking or adjusting the fluffing, you leave the corner snubbers in place. Some things that can cause the top sheet not to be level are as follows:
   a. Kinked fluffer hoses which restrict air flow.
   b. Undersize or uneven slots in the side fluffers.
   c. Side fluffer slots not perpendicular to the paper stack within five degrees.
   d. A front snubber bracket too close to the lead edge of the paper stack so that the sheets drag against it.

On the 7000 there are two ways to adjust fluffing: lower or raise the stack height, or adjust the amount of fluffer air. The most common fluffing problem is that the side fluffers are too low (or the stack is too high), causing the top sheets to mat under the corner snubbers. This condition can be corrected either by adjusting the sensing bar to lower stack height, or by adjusting the fluffer relief valve to reduce the amount of fluffer air.

NOTE: Check that the plastic fluffer bar operates smoothly and is free of burrs. If the bar binds, replace it.

3.4.2 Sniffer Vacuum

Porous papers allow air to bleed through the top sheet and attract the second sheet during pickup by the sniffer. To reduce this effect, you must lower the sniffer vacuum when using porous papers. On the other hand, you must increase the sniffer vacuum when using heavy weight or very stiff papers to allow the top sheet to be picked up. To custom tune the sniffer vacuum, use the sniffer vacuum relief valve (located to the right of the filter bottle assembly) to decrease the vacuum until the feeder mispicks a sheet; then turn the valve in the opposite direction about one-half turn.

3.4.3 Fluffing

Checking Fluffer Operation

1. Load the customer's paper. Press the START PRINT button.
2. Between sniffer cycles, raise the paper tray cover and use inspection mirror and light to observe the separation of the top sheets.

NOTE: Make sure the inspection mirror does not block the fluffer air.

Proper Fluffing

With proper fluffing, the top six to ten sheets should have good separation. Check the fluffing at both side fluffers and across the lead edge of the paper stack. Check the contour of the top sheet of paper. It should neither sag nor arch, but rather should slope from the snubber back to the rolling bar as shown in Fig. 3-86A.

The lower photo, Fig. 3-86B, shows that the paper should be flat and level across the lead edge of the paper stack. The paper should contact all snubbers, with no fluttering of the paper at the point where it contacts the snubbers.

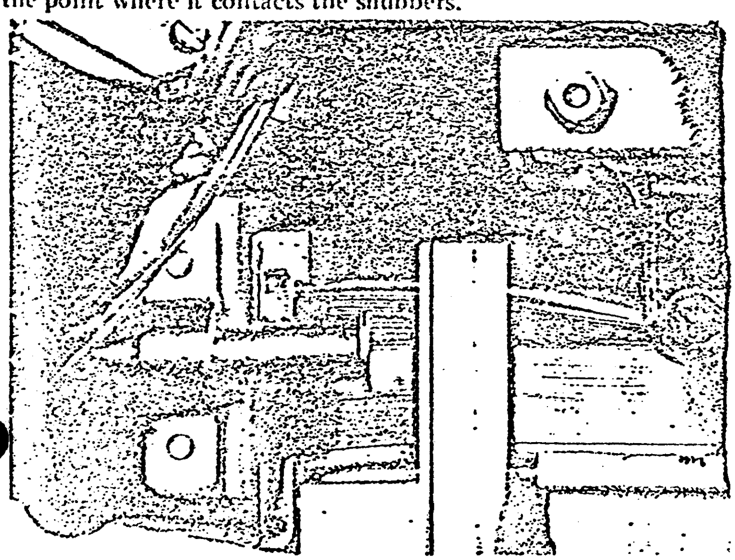

Fig. 3-86A. Proper Fluffing -- Outboard View

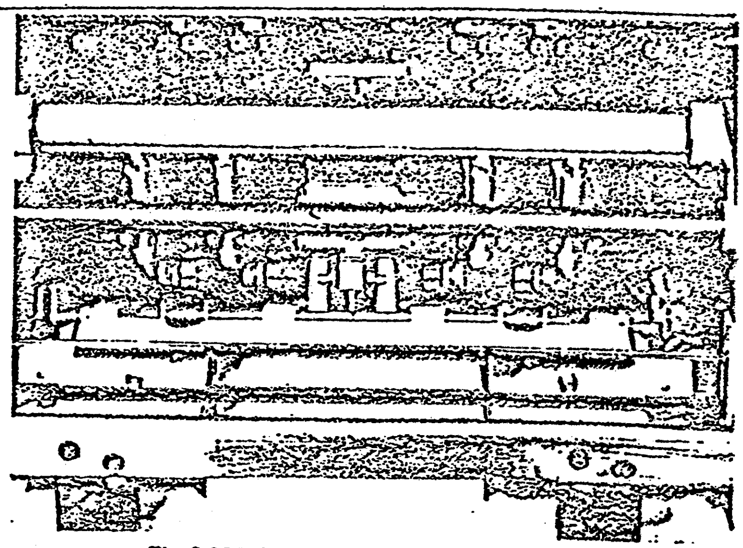

Fig. 3-86B. Proper Fluffing — Front View

Overfluffing

With overfluffing, several sheets of paper are matted together under the snubbers. The contour of the top sheet has a high arc between the snubber and rolling bar (Fig. 3-87A. Overfluffing also causes a definite paper peak between the flexible snubbers (Fig. 3-87B).

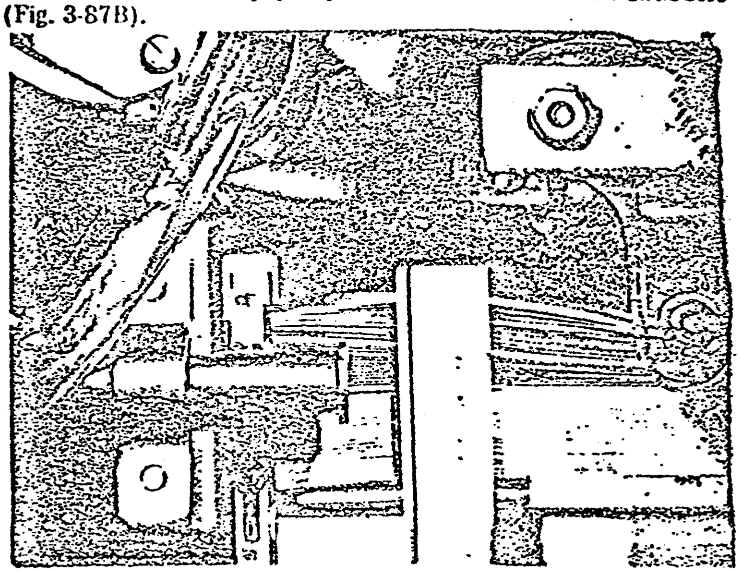

Fig. 3-87A. Overfluffing — Outboard View

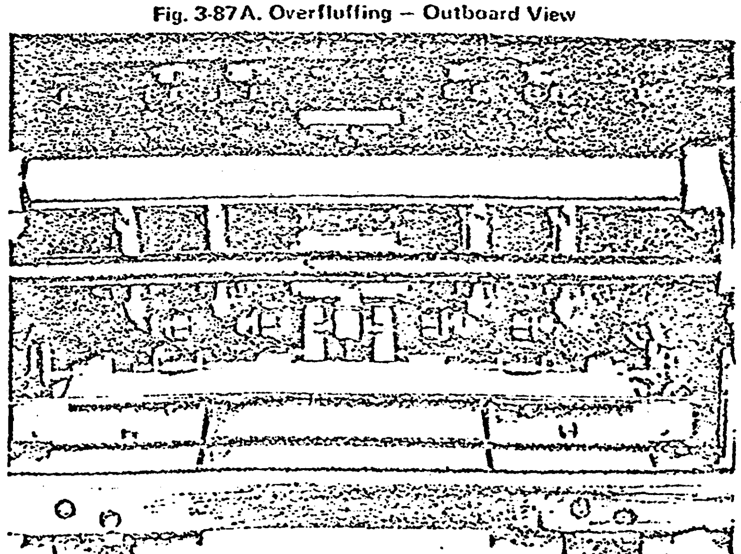

Fig. 3-87B. Overfluffing — Front View

Underfluffing
Underfluffing can be recognized by observing the paper stack with the inspection mirror. Only a few sheets will be separated, as in Fig. 3-87C, and the contour of the top sheet sags from the snubber to the rolling bar. The top sheet also tends to flutter against the snubbers.

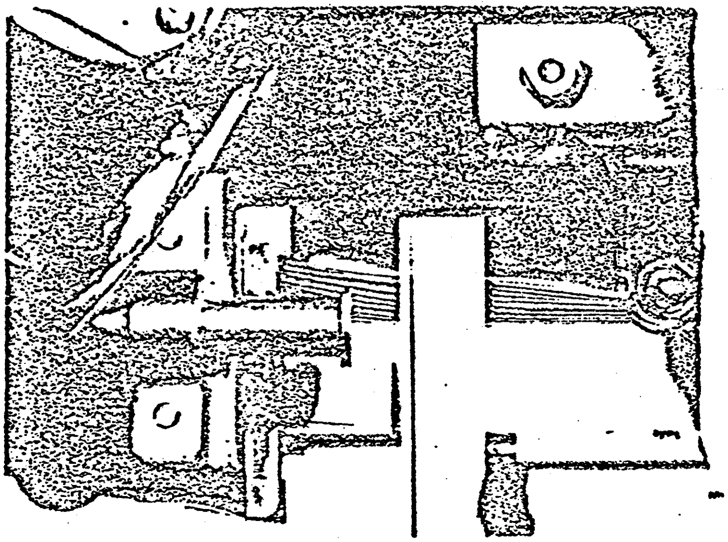

Fig. 3-87C. Underfluffing — Outboard View

Correct Overfluffing — 7000
To correct overfluffing in the 7000, lower the paper stack adjusting the sensing bar. If proper fluffing cannot be obtained, open the fluffer relief valve located to the left of the filter bottle assembly to decrease the flow of fluffer air.

Correcting Underfluffing — 7000
To correct underfluffing in the 7000, raise the paper tray by adjusting the sensing bar. If proper fluffing cannot be obtained, close the fluffer relief valve to increase the fluffer air flow.

4. SNIFFER AND FLUFFER AIR SYSTEM
The major components of the sniffer and fluffer air system are shown in Fig. 3-88.

4.1 Fluffer and Air Pump Filter Bottles and Fluffer Relief Valve
1. Removal procedures are obvious.
2. When removing a fluffer or air pump filter bottle, retain the gasket for re-use. When replacing a filter bottle, hand-turn until it is snug. Do not force.
3. Adjust fluffer relief valve to achieve conditions in Fig. 3-86A/3-86B for proper fluffing.

4.2 Sniffer Vacuum Valve
1. Removal procedures are obvious.
2. After replacing the sniffer vacuum valve, adjust the valve (3.3.13).

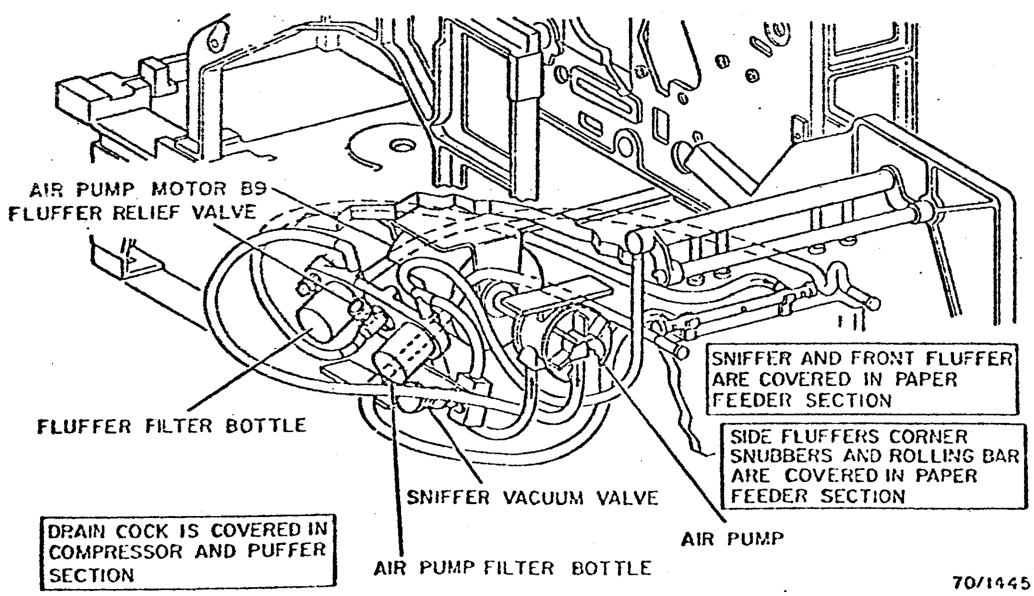

Fig. 3-88. Air Pump, Location of Major Components

4.3 Air Hose Fitting (Without Tag 21)
Replacement

1. When replacing, insert hose into nut (Fig. 3-89).
2. Push insert into hose.
3. Firmly seat insert into fitting, then finger-tighten nut 1-1/4 turns.

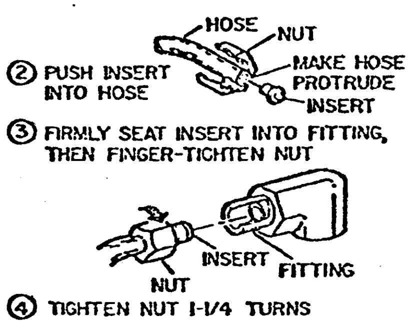

Fig. 3-89. Air Hose Fitting (Without Tag 21)

4.4 Modular Air Hose Fittings (With Tag 21)
Machines with Tag 21 have the modular air fittings pictured in Fig. 3-90. With these fittings, all nuts, nipples and inserts used with pre-Tag 21 are eliminated.

NOTE: The O-ring and spring dip used on Tag 21 modular fittings are field replaceable. (See Field Reference Manual, Chapter 1).

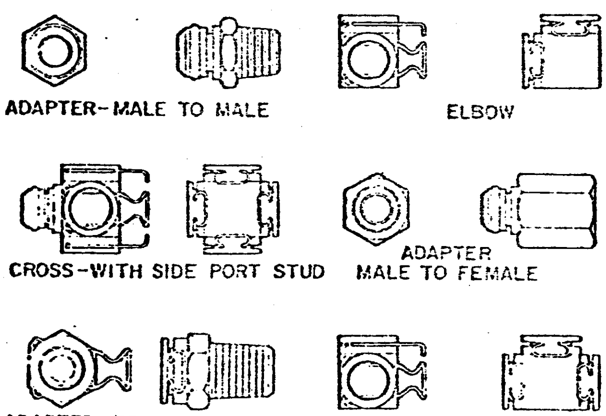

Fig. 3-90. Modular Air Fittings (With Tag 21)

4.5 Air Pump Motor (B9)
Removal

NOTE: Motor B9 can be replaced without removing the entire air pump and motor assembly.

1. Remove the sniffer hose, then remove the air filter assembly.
2. Disconnect all wires from the motor.
3. Place an unopened ream of paper under the motor for support.
4. Loosen the shaft setscrews inside the flexible coupling, and slide the flexible coupling toward the air pump (Fig. 3-91).
5. Support the motor with one hand, loosen and remove both motor clamps, then lower the motor onto the ream of paper.

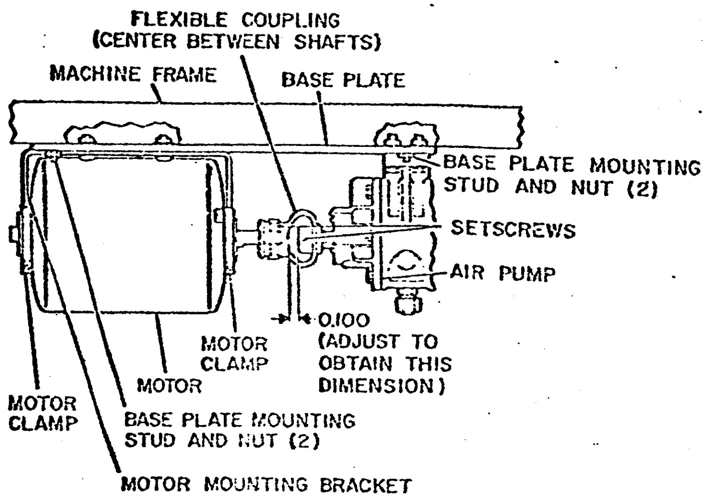

Fig. 3-91. Motor, Coupling, and Air Pump

Replacement
1. Align motor properly before re-tightening motor clamps. Make sure the flexible coupling is properly adjusted (4.6).

Adjustment
1. Loosen the screws of the motor clamps.
2. Rotate the motor to obtain 0.810 ± 0.060 between the capacitor clamp and base plate as shown in Fig. 3-92.

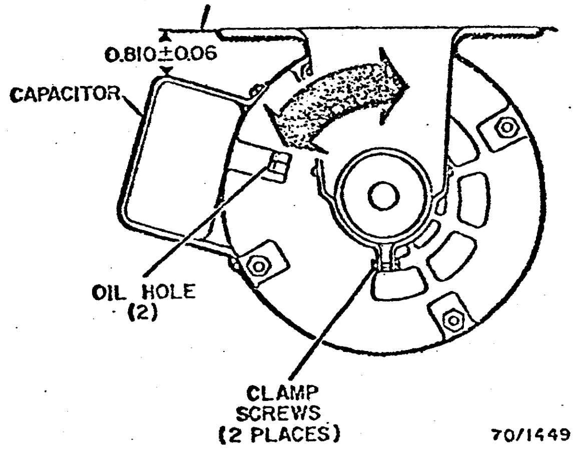

Fig. 3-92. Motor Oil Holes Alignment

4.6 Flexible Coupling

Adjustment
1. Loosen the setscrews on the coupling, and center the coupling on the motor and air pump shafts (Fig. 3-91).
2. Making sure the setscrews are over the flats of the shafts, deform the coupling to obtain the indicated 0.100 minimum clearance shown. Tighten the setscrews to 60-65 in/lbs.

NOTE: Internal rusting of the pump can occur while the machine (or the pump itself) is stored in high humidity conditions. This rusting may eventually result in binding.

An effective and reliable repair procedure is to turn the pump shaft with a wrench until the shaft turns freely. Normal machine operation will prevent any reoccurrence of the binding and no reduction in pump efficiency will result.

CAUTION: Under no circumstances should oil or any other lubricant be used in the air pump. Oil tends to gum up under normal operation, causing the carbon vanes of the pump to fracture. If that happens, the air pump has to be replaced.

4.7 Air Pump and Motor Assembly

Removal

1. Remove the sniffer hose, then remove the air filter assembly. Disconnect the hoses from the air pump. For easier handling of the air pump and motor assembly the motor may be removed first (3-92).
2. Loosen the inboard hardware and remove the outboard hardware from the base plate and remove the assembly.
3. Set the motor back into its mounting bracket. With the aid of a combination square scribe a line on the base plate parallel to the motor shaft. Remove the motor and scribe a line parallel to the air pump shaft. The air pump and/or motor mounting bracket may now be removed from the base plate (Fig. 3-93 and Fig. 3-94).

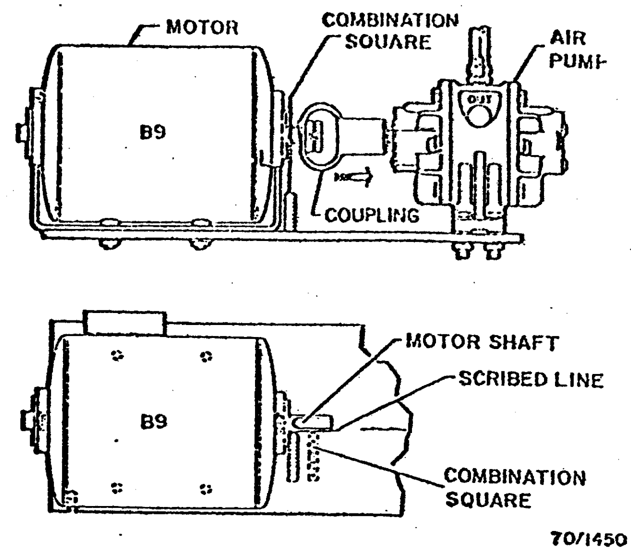

Fig. 3-93. Orientation of Pump and Motor

Replacement

1. When replacing the motor and the air pump use a combination square to align their shafts with the scribed lines on the base plate. Tighten the air pump and the motor mounting bracket. The motor may now be removed from its mounting bracket for easier assembly replacement.
2. Lift the assembly into the machine; engage the slots of the base plate with the inboard hardware. Install the outboard hardware and tighten the base plate.
3. Replace the coupling and the motor and adjust both components (Fig. 3-92 and Fig. 3-93). Connect the air pump hoses.
4. Replace the fluffer and air pump filter bottle assembly.

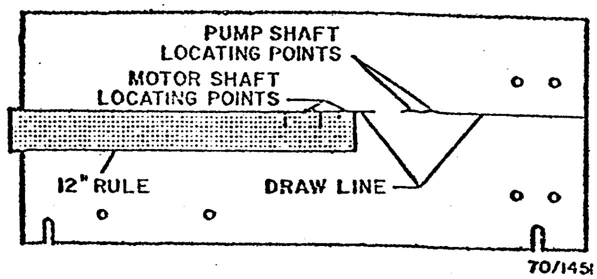

Fig. 3-94. Pump and Motor Location Template

4.8 Reversing the Base Plate

The slots in the base plate of the air pump and motor assembly should be toward the inboard side of the machine. If they are not the base plate must be reversed while the assembly is out of the machine (Fig. 3-95).

1. Locate the motor shaft: Scribe 2 points at 2.630 ± 0.020 from the outboard side of the base plate with the aid of a combination square.
2. Locate the pump shaft: Scribe 2 points at 2.661 ± 0.020 from the outboard side of the base plate with the aid of a combination square.
3. Align the shafts of the air pump and motor with their outboard sides directly over the scribed points of the base plate.

TO LOCATE MOTOR SHAFT, SCRIBE TWO POINTS AT 2.630±0.020. USE 12" RULE AND SCRIBE LINE.
TO LOCATE PUMP SHAFT, SCRIBE TWO POINTS AT 2.661±0.020.USE 12" RULE AND SCRIBE LINE
THEN, REPLACE.

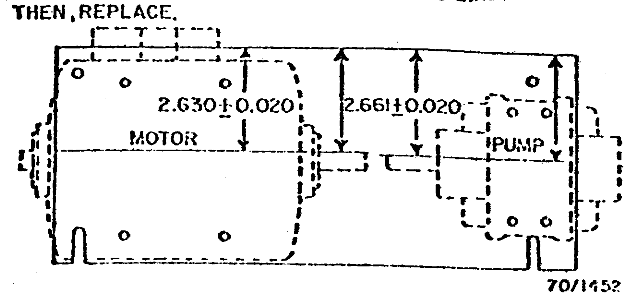

Fig. 3-95. Relocating Pump and Motor

5. A TRANSPORT

The major components of the A transport system are shown in Fig. 3-96.

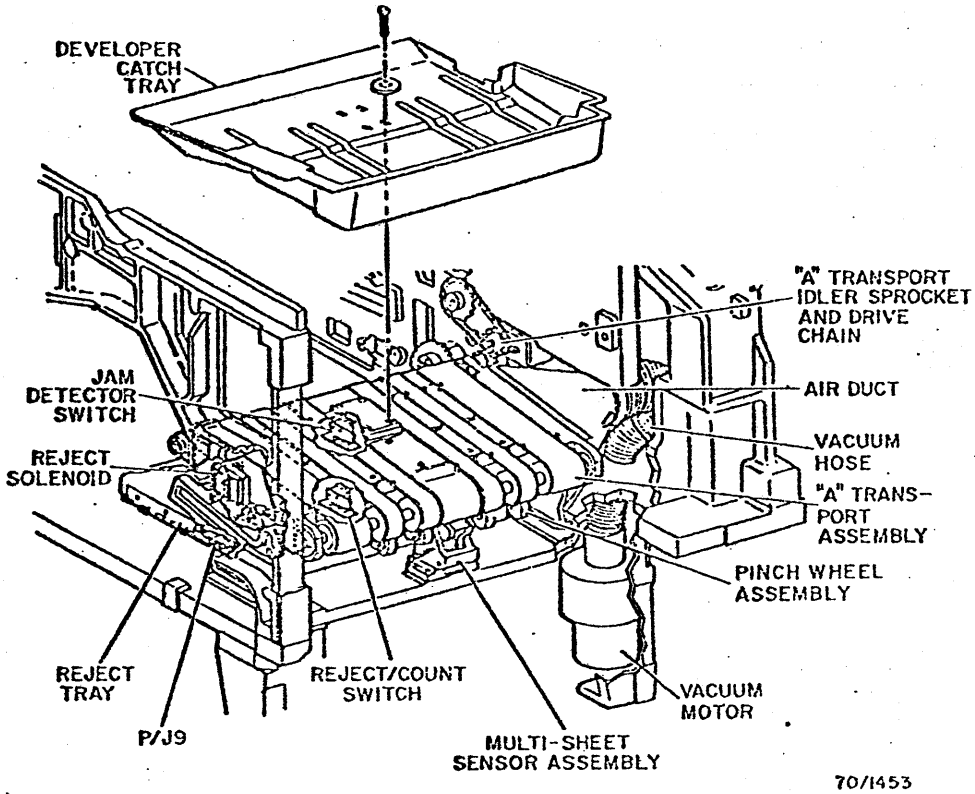

Fig. 3-96. A Transport System, Location of Major Components

5.1 A Transport Assembly

Removal

1. Remove the developer assembly (9.1). Remove the rear doors.
2. Remove the developer catch tray.
3. Disconnect the vacuum hose and remove the air duct to gain access to the inboard mounting hardware.
4. Disconnect the wires from the reject solenoid.
5. Disconnect P/J 11.
6. Remove the mounting hardware and remove the A transport assembly.

Replacement

CAUTION: The A transport frame is made of aluminum. Do not over-torque mounting screws, or mounting holes will be stripped.

When replacing the A transport assembly:

1. Adjust A transport assembly parallelism (5.2).
2. Adjust drive sprocket (1.5).
3. Adjust developer catch tray (5.4).
4. Adjust lead in baffle on register stop module (6.11).
5. Adjust multisheet sensor assembly clearance (5.9).

5.2 A Transport Assembly Parallelism Adjustment

1. Remove the developer assembly (9.1).
2. Remove catch tray.
3. Calibrate the mechanic's level.
4. Slide the belts aside.
5. Set the level on the sniffer tube to obtain a reference reading (Fig. 3-97).
6. Set the level on the idler roller, then on the drive roller (to one side of the knurling).
7. Adjust the mounting brackets until the level readings taken on the rollers agree with the reading taken on the sniffer tube.
8. Check the multi-sheet sensor (5.9).

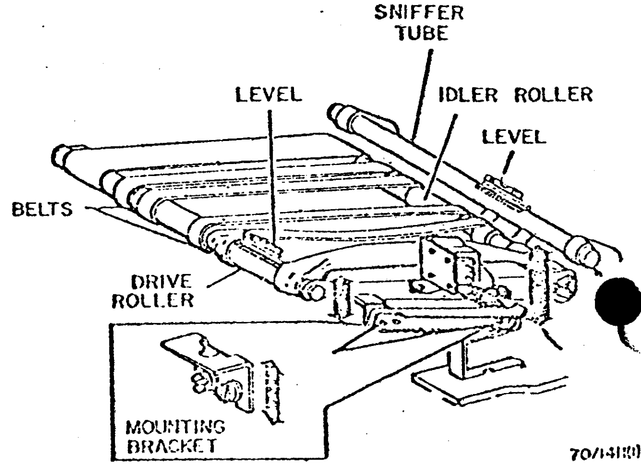

Fig. 3-97. A Transport Parallelism

5.2A A-Transport Chain and Gear Mesh

Adjustment

1. Remove the developer assembly (9.1). Remove the gear cover.
2. Loosen the two nuts indicated (Fig. 3-97A).
3. Grasp the double sprocket and pull down and to the right until chain is taut and there is only a slight amount of backlash between the gears. Retighten the nuts.
4. Manually rotate the main drive motor shaft CCW and insert one thickness of 20-lb. bond paper between the gears, as shown.
5. Continue to rotate the main drive motor to remove the paper.
6. Check the paper. When the drive is correctly adjusted, the paper will be well-corrugated by the gear teeth but untorn.
7. Replace the gear cover. Replace the developer assembly.

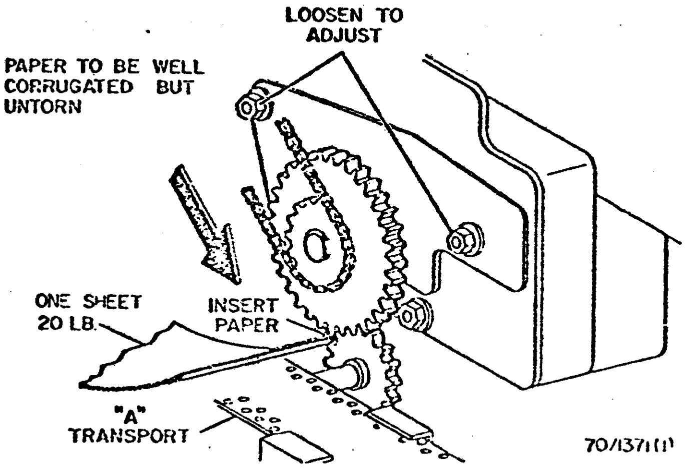

Fig. 3-97A. A Transport Drive Chain Adjustment

5.3 Drive Roller

Adjustment

1. Loosen setscrew on bearing.
2. Using combination square, push sprocket so the end of the shaft is 1.340 inches ± 0.005 from 'A' transport frame. Tighten setscrew.
3. Loosen setscrew on collar and shim to 0.005 as shown (Fig. 3-98). Tighten setscrew.

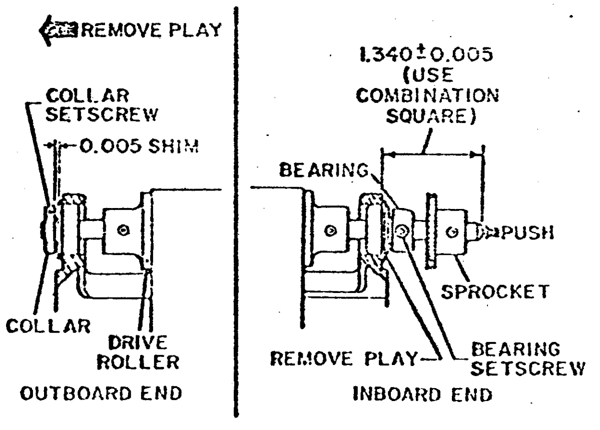

Fig. 3-98. Drive Roller

5.4 Developer Catch Tray

Removal

1. Remove the developer assembly. Remove the catch tray mounting screws and remove the catch tray.

Replacement

1. Replace catch tray and adjust (below).

Adjustment

1. Use micrometer holder 600T753, micrometer 600T52, and 2 to 3 inch extension 600T53 to adjust the catch tray relative to the drum shaft.
2. Adjust the tray to the dimension shown (both inboard and outboard) in Fig. 3-99.
3. Tighten the mounting screws and re-check the distance between the tray and the drum shaft. Re-adjust if necessary.

NOTE: The multi-sheet sensor bead guard (55P754) has been cancelled. When it was issued, the bead guard prevented stray developer beads from falling on the center of the A Transport and actuating the multi-sheet sensor. With the cut-in of the Developer Catch Tray (50P745), the bead guard has not only become superfluous, but in some cases, it has been deflected into the roller by the tray and has caused rejects. Make sure it has been removed when you are installing or adjusting the Developer Catch Tray.

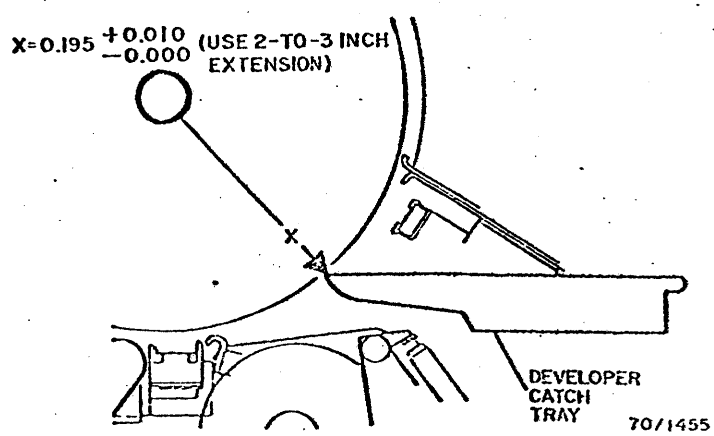

Fig. 3-99. Developer Tray

5.5 Reject/Count Switch LS8 and Jam Detector Switch LS27

Removal

1. Remove the developer assembly (9.1).
2. Remove the catch tray (5.4).
3. Remove the appropriate cover on the A transport, unsolder the switch wires, and remove the switch.
4. After replacement adjust the switch (below).

Adjustment

NOTE: Adjustment is same for switches LS8 and LS27.

1. Position the actuator within the clearance slot as in Fig. 3-100.

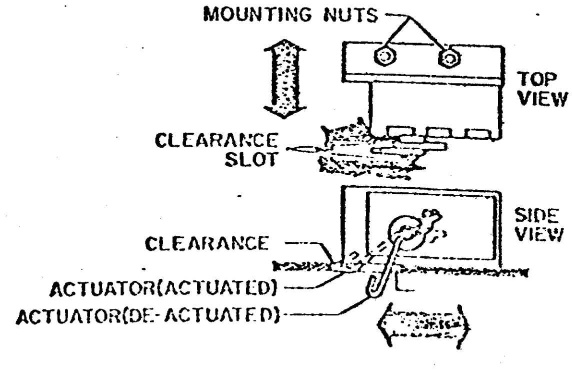

Fig. 3-100. Reject/Count Switch (LS8) or Jam Detector Switch (LS27)

5.6 Pinch Wheel Assembly

Removal

1. Slide the developer back. Remove the drum.
2. Remove the reject tray.
3. Remove the multi-sheet sensor (5.7).
4. Remove the hardware and slotted flange from the outboard end of the pinch wheel shaft. Remove the shaft through the drum cavity.

NOTE: Individual pinch wheels can be removed from the assembly and replaced without affecting any adjustments.

Replacement

1. Replace the pinch wheel assembly.
2. Adjust pinch wheel assembly parallelism.
3. Adjust pinch wheel shaft end-play.

Adjustment

- Pinch Wheel Shaft Parallelism—Adjust as in Fig. 3-101.

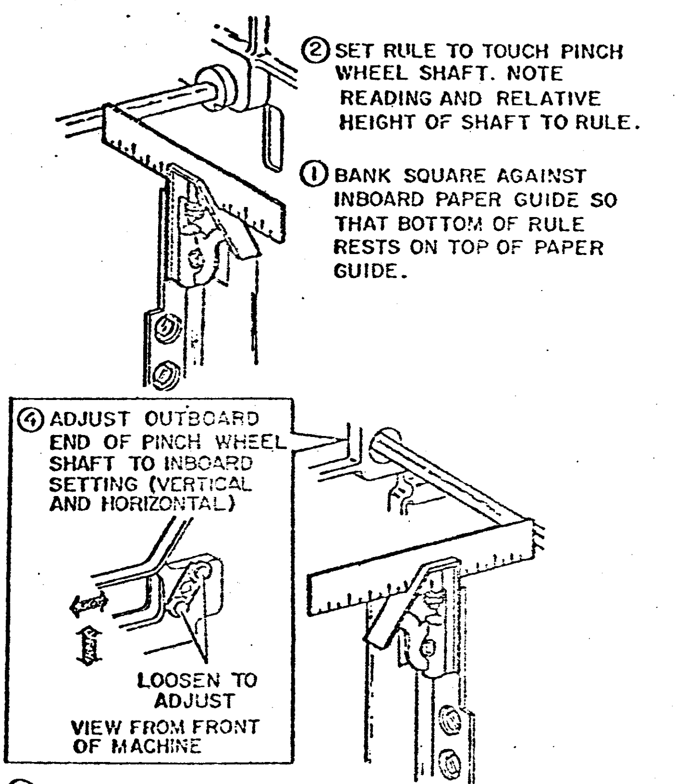

Fig. 3-101. Pinch Wheel Shaft Assembly Parallelism

5.7 Pinch Wheel Shaft End Play

Adjustment

1. Loosen setscrew in collar (Fig. 3-102).
2. Remove play in shaft by sliding shaft outboard.
3. Insert a 0.003 shim between frame and collar. (Maximum gap allowable is 0.005 inch.)
4. Tighten setscrew.
5. Remove shim.

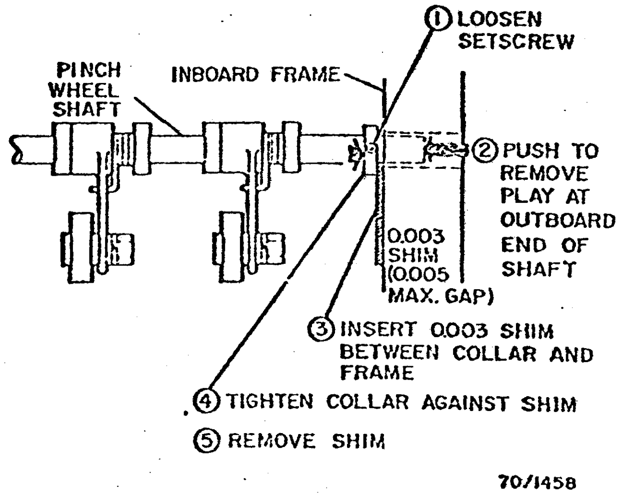

Fig. 3-102. Pinch Wheel Shaft End-Play

5.8 Paper Guides

Removal

1. Remove the pinch wheel assembly (5.6) to gain access to the paper guides.
2. Remove the paper guides.

Replacement

1. Replace in reverse order of removal.
2. After replacing the paper guides, replace the pinch wheel assembly.

Adjustment

1. Loosen the screw securing the support to the pinch wheel shaft. Slide the paper guide support on the shaft to obtain a 3/32-inch separation between the paper guide and the adjacent pinch wheel, as in the upper view of Fig. 3-103.
2. While maintaining the 3/32-inch separation, pivot the paper guide support until the paper guide is parallel with the A transport belts, as in the center view of Fig. 3-103. Retighten the screw.

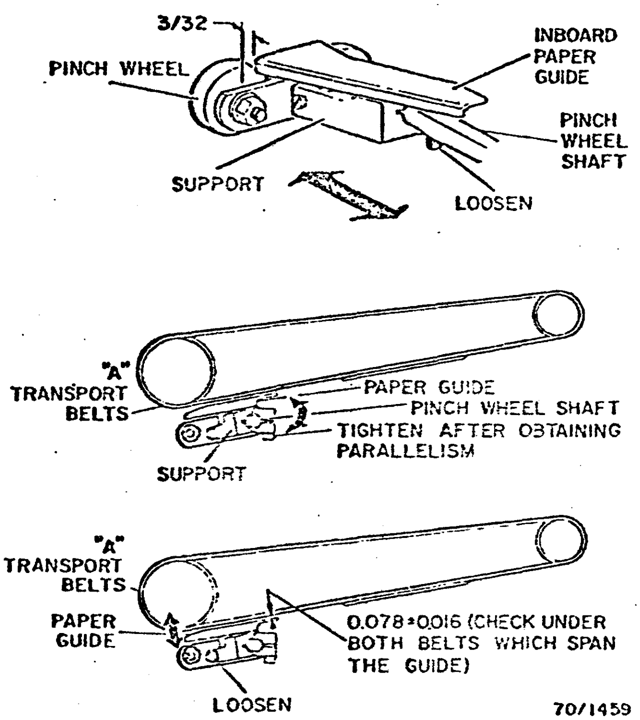

Fig. 3-103. Paper Guide

3. Loosen the screw indicated in the lower view of Fig. 3-103. Vertically adjust the paper guide to obtain 0.078 ± 0.016-inch separation between the paper guide and the belt. Retighten the screw.
4. Repeat steps 1 through 3 for the other paper guide.

5.9 Multi-Sheet Sensor Assembly

NOTE: Springs on the multi-sheet sensor assembly can be removed and replaced without removing the assembly or affecting adjustments.

Removal

1. Lower paper tray and remove copy paper.
2. Disconnect power from machine.
3. Remove developer assembly (9-1) and xerographic drum assembly (8.2).
4. Remove reject tray.
5. Disconnect multi-sheet sensor connector.
6. Remove four sets of mounting hardware (Fig. 3-104). (Access to the hardware can be obtained from both the paper feeder side and reject side of the multi-sheet sensor).
7. Turn the multi-sheet sensor 90 degrees to clear pinch wheel assembly and remove through reject tray area.

Replacement

1. Install multi-sheet sensor and finger tighten the mounting hardware.
2. Re-connect multi-sheet sensor connector.
3. Adjust the multi-sheet sensor position side-to-side by centering anvil at the knurled portion of the A transport roller (Fig. 3-104).

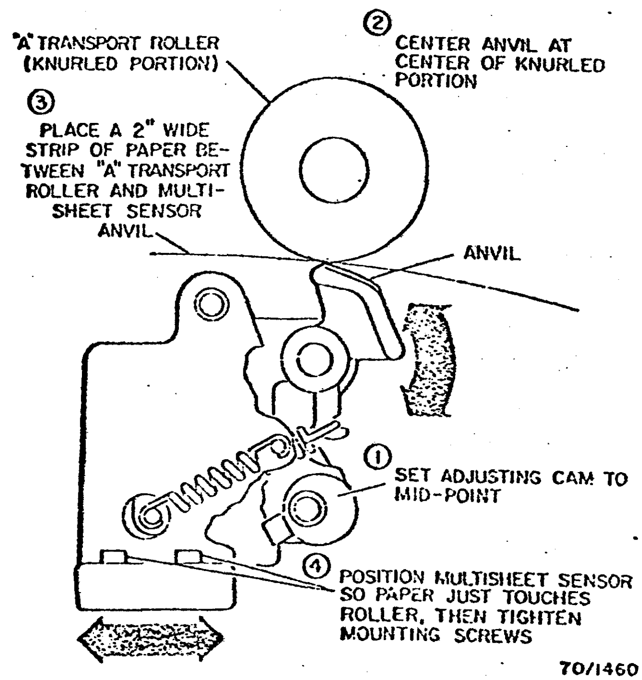

Fig. 3-104. Multi-sheet Sensor (Side-to-Side Adjustment)

4. If it was necessary to loosen pinch roller hardware adjust the pinch roller shaft (5.6 and 5.7). Then check adjustment of the paper guides.
5. Replace and adjust reject tray.

NOTE: Check that wires from LS9 are not strained by reject tray.

6. Replace xerographic drum and developer assembly.
7. Connect power to the machine.
8. Adjust multi-sheet sensor clearance.

Adjustment

1. Check position of anvil. Refer to Replacement.
2. With machine power on, turn the NORMAL knob of the PRINT DENSITY CONTROL CCW until it clicks off.
3. Remove the copy paper from the paper tray. Position the tray approximately midway in its vertical travel.
4. Lift the sensing bar to light READY indicator. Press START PRINT. Lift the paper tray cover.
5. If the reject solenoid does not energize, loosen the locking setscrew and turn the cam shaft slightly to decrease the clearance.
6. Repeat step 5 until the correct clearance is obtained.

NOTE: If the customer is using more than one brand or type of copy paper, multi-sheet sensor clearance should be checked for each thickness used.

5.10 Reject Solenoid Assembly

Adjustment

1. Loosen screws (two places) and nuts (four places) as shown in Fig. 3-106.
2. Set 3/8-inch dimension with reject arm in contact with reject lever, stop pin (on frame), and pin of solenoid plunger. Tighten two screws.
3. Adjust for 0.015 minimum clearance on each side of reject arm as shown in bottom view. Tighten four nuts.
4. Cut a 2- to 3-inch strip of customer's paper and fold it so that 2 inches from the end, the paper is single thickness and then becomes double thickness.
5. Insert the single thickness between the multi-sheet sensor anvil and the A-transport idler roller (Fig. 3-105). Feed the paper at the same speed and angles as paper is normally fed. Be sure that the paper does not buckle.
6. Check that solenoid is not energized with a single thickness but is energized with a double thickness.
7. Loosen locking setscrew (Fig. 3-105) and adjust as required. Tighten setscrew.

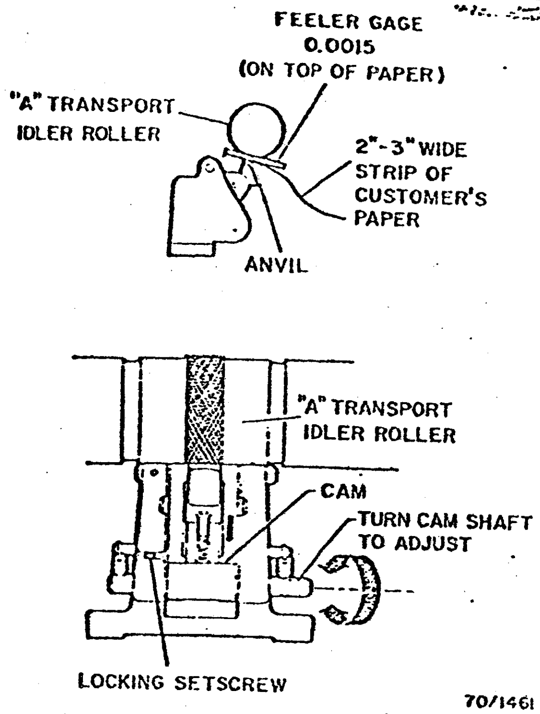

Fig. 3-105. Multi-sheet sensor

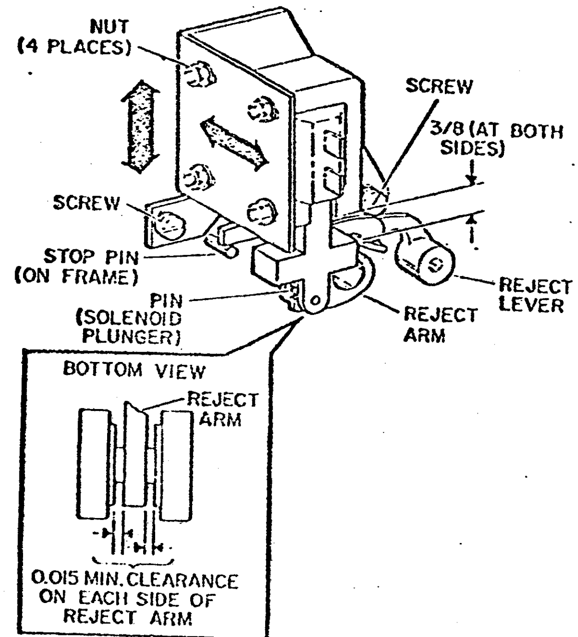

Fig. 3-106. Reject Solenoid (L4) Assembly Adjustment

5.11 Reject Shaft Assembly, Reject Lever, and Reject Arm

Removal

1. Remove the developer assembly (4.1). Remove the paper feeder control cover and the rear doors.
2. Disconnect the vacuum hose and remove the air duct.
3. Slide the belts aside. Remove the bead guard and the cover beneath the bead guard.
4. Remove the mounting hardware for the reject shaft assembly. Remove the reject lever and reject arm. Withdraw the reject shaft assembly from the rear of the A transport.

Replacement

1. Reinstall new reject shaft, reject arm, and reject lever but do not tighten hardware.
2. Check adjustment of reject lever and reject shaft bracket (see below).

CAUTION: When replacing the air duct, do not overtorque the mounting screws. The mounting holes in the aluminum frame of the A transport can easily be stripped.

Adjustment
(Reject Shaft Bracket)

1. Loosen bracket screws as shown (Fig. 3-107).
2. Position fingers equidistant from ends of slots.
3. Position bracket square with reject shaft.
4. Tighten screws loosened in step 1.
5. Check shaft for free rotation.

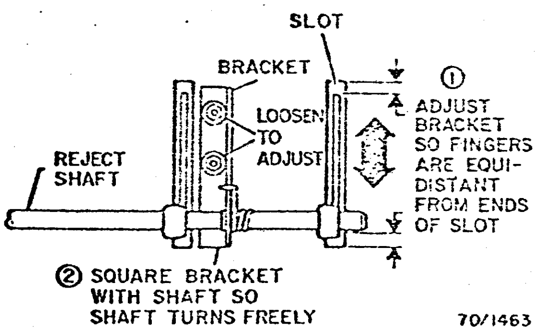

Fig. 3-107. Reject Shaft Bracket

Adjustment
(Reject Lever)

1. Loosen setscrews at end of shaft (Fig. 3-108).
2. Insure 0.015 minimum clearance between reject fingers and frame.
3. Bank reject arm on pin with reject lever contacting reject arm.
4. Insert 0.010 shim under fingers as shown and press down lightly.
5. Tighten setscrews loosened in step 1.

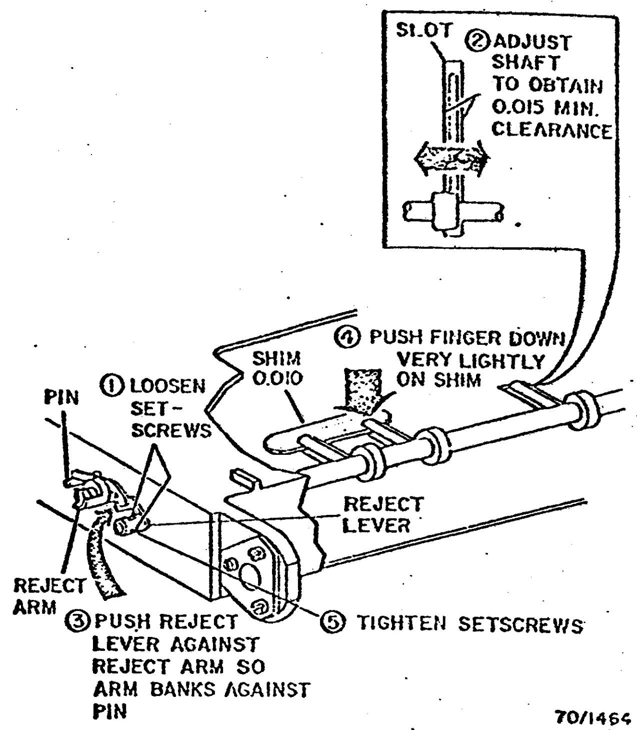

Fig. 3-108. Reject Lever

5.12 Reject Tray

Removal

1. Remove two outboard screws (Fig. 3-109).
2. Slide the register stop drawer open and loosen inboard screw, then remove the reject tray through the drum cavity.

Replacement

1. Reverse removal procedures.

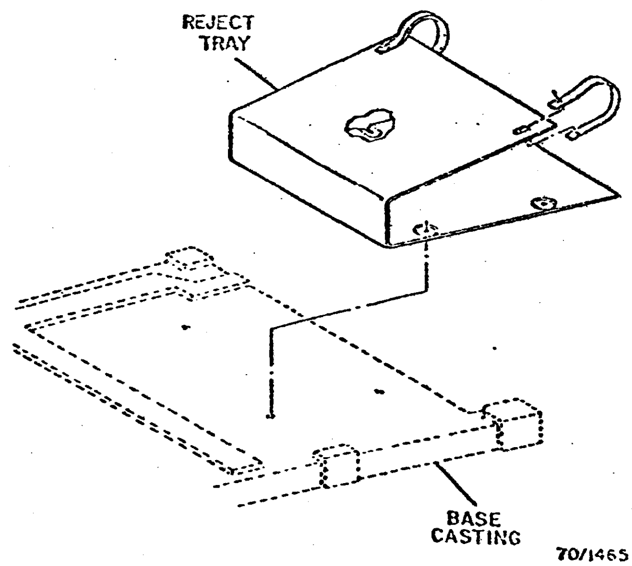

Fig. 3-109. Reject Tray

6. REGISTER STOP DRAWER

The major components of the register stop drawer are shown in Fig. 3-110.

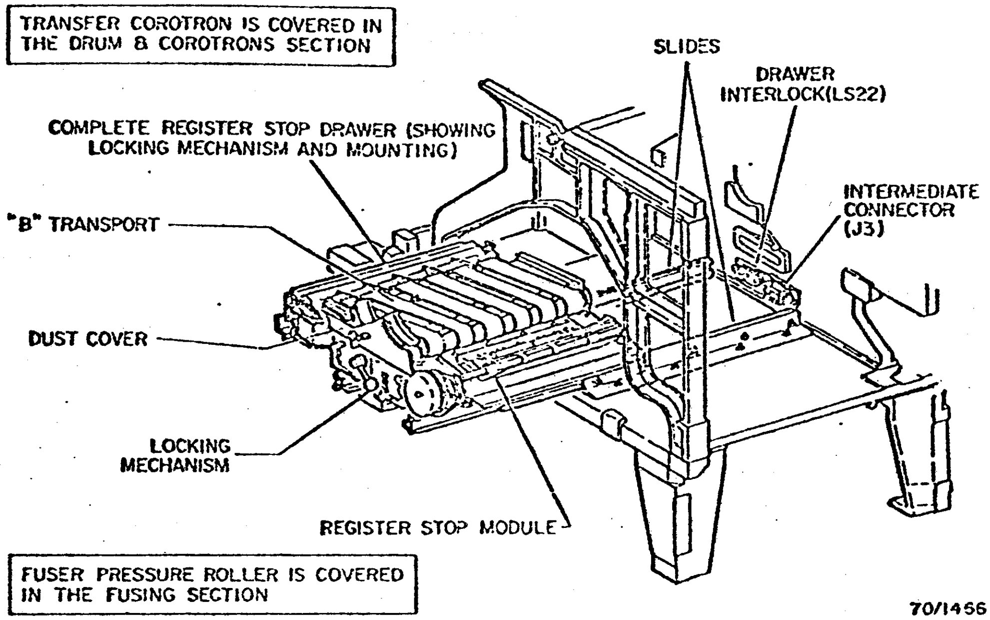

Fig. 3-110. Register Stop Drawer, Location of Major Components

6.1 Complete Register Stop Drawer

1. Pull out the register stop drawer. From the underside, loosen and remove the screws and washers securing the register stop drawer to the rails.

NOTE: Do not disturb the setting or mounting hardware of the rails.

2. Lift off the register stop drawer. For replacement purposes, note the number and position of any shims on the rails.

6.2 Drawer Slides and Bead Guard

Removal

CAUTION: Do not remove the slide mounting brackets. They cannot be properly adjusted in the field.

Before removing a drawer slide, measure (not adjust) and record the distance between the drum shaft and the inboard and outboard ends of the B transport idler roller. The measurement will be used to check the drawer position after replacement.

Also, before removing a slide, scribe the location of the slide on its mounting bracket, for reference during replacement.

NOTE: If both slides are to be replaced, work on one side at a time.

Replacement

1. Install the slide and tighten its mounting hardware just enough to permit vertical movement of the slides and to maintain any vertical position within the slots of the mounting bracket.
2. Set the slide to the previously scribed position.
3. Mount the register stop drawer on the slides and tighten the drawer mounting hardware.
4. Slide the drawer in and lock it in place. The drawer location pins will position the inboard end of the slide in its proper vertical position.
5. Slowly pull the drawer out just enough to allow access to the inboard set of hardware; tighten that set of hardware. Slide the drawer in to the home position.
6. Slowly slide out the drawer and tighten the remaining four sets of hardware.
7. Measure the distance between the drum shaft and the inboard and outboard ends of the B transport idler roller. Compare the measurement taken prior to slide removal. If necessary, adjust the drawer slides until the measurements are equal.
8. Check the bead guard adjustment (6.5). Check the halo guide adjustment (6.10) and the baffle adjustment (6.11). Check the transfer corotron and shield clearances (8.9, 8.11).
9. Check B-transport concentricity (6.16), clutch disc gap (6.18), and cycle control concentricity (1.9).

NOTE: The register stop drawer dust cover (2S1888) has revised to give clearance for the B transport adjusting screw on the 7000. If you should receive one of the old configuration parts for a 7000 machine, notch it out to provide clearance for the adjusting screw.

6.3 Hub Gap and Spring Mounting Screw Clearance

Adjustment

1. Loosen screws, remove spring, and perform necessary steps to bring clearance to that shown in Fig. 3-111.

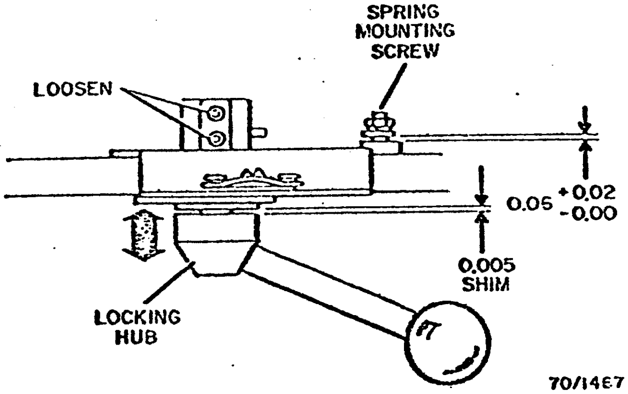

Fig. 3-111. Hub Gap and Spring Mounting Screw Clearance

6.4 Interlock Actuator

Adjustment

1. Adjust to agree with 19/32 ± 1/64-inch dimension as shown in Figure 3-112.

NOTE: To gain access to the actuator locking nut, remove the B transport.

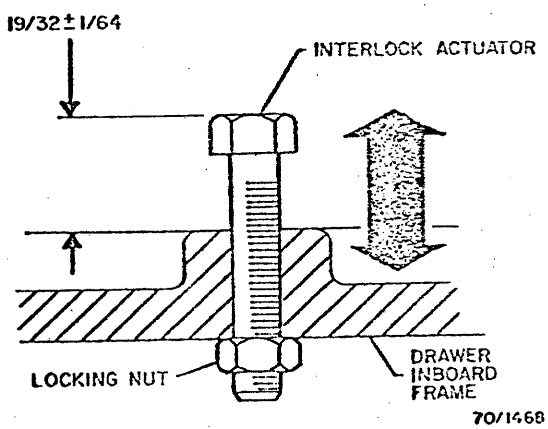

Fig. 3-112. Interlock Actuator Adjustment

6.5 Bead Guard

Adjustment

1. Loosen nuts shown, after pulling drawer out.
2. Use 0.040 shim to set dimension, shown in Fig. 3-113.
3. Tighten nuts loosened in step 1.

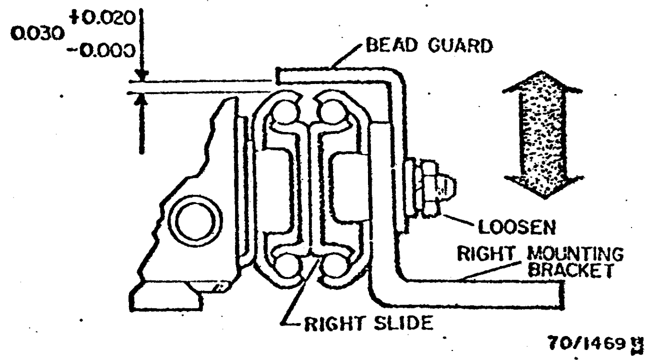

Fig. 3-113. Bead Guard

6.6 Stop Plate

Adjustment

1. Loosen mounting screws as shown in Fig. 3-114.

NOTE: The drawer must be firmly sealed on its location pins. Push in drawer while making adjustment.

2. Bank stop plate against cam with five pounds force.
3. Tighten and torque mounting screws to 22-27 inch-pounds.

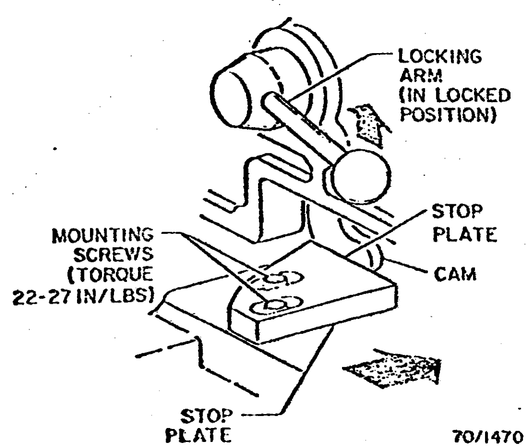

Fig. 3-114. Stop Plate Adjustment

6.7 Paper Guides, Halo Guide, and Baffle

1. Remove the upper paper guide (6.9) and upper pinch wheel assemblies (6.13) as a unit.
2. Remove the lower paper guide.
3. Check adjustments:
   a. upper paper guide (6.9).
   b. halo guide (6.10).
   c. baffle (6.11).

6.8 Lower Paper Guide

Adjustment

Having removed the upper paper guide and upper pinch wheel assemblies, adjust the lower paper guide as shown in Fig. 3-115.

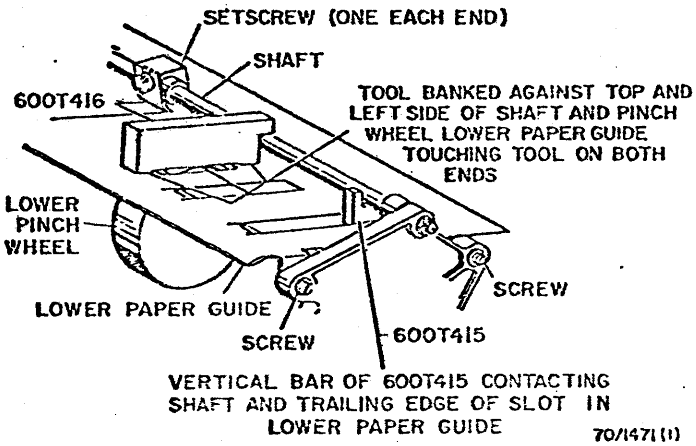

Fig. 3-115. Lower Paper Guide Adjustment

6.9 Upper Paper Guide

Adjustment

NOTE: When working on the upper paper guide, do not disturb the lower paper guide so as to avoid having to adjust it. After replacement of the upper paper guide, perform the upper paper guide adjustment.

1. Loosen screws A to set gap as shown in Fig. 3-116.
2. Loosen screws B.
3. Align slots in upper and lower paper guides.

NOTE: Press lightly on each end of guide. Tighten screws—A then B.

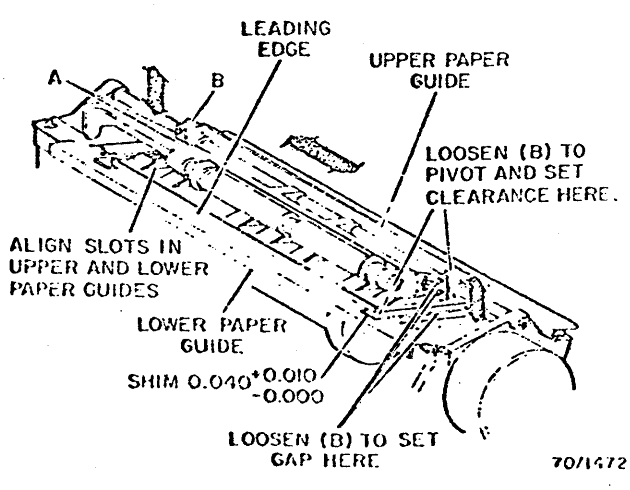

Fig. 3-116. Upper Paper Guide

6.10 Halo Guide (Fig. 3-117)

Adjustment

1. Assemble tools 600T583 and 600T52, using 2- to 3-inch extension. Set micrometer to 0.144.
2. Loosen nuts (two places).
3. Position tool approximately one inch from each end of guide.
4. To check: guide should be within ± 0.010 of tool setting.
5. To adjust: position guide to touch tool.
6. Tighten nuts.

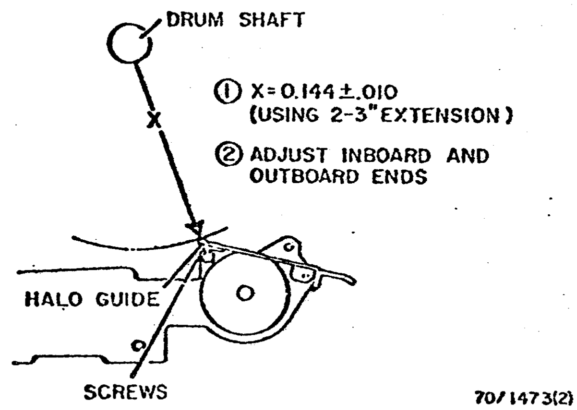

Fig. 3-117. Halo Guide Adjustment

6.11 Baffle and Paper Guide

NOTE: The spacer between the baffle and the lower paper guide assembly on the register stop drawer has been replaced with a standard flat number 8 washer. (The spacer issued earlier caused paper jams due to the large gap it produced.)

Adjustment

1. Loosen bolts as shown (five places). See Fig. 3-118.

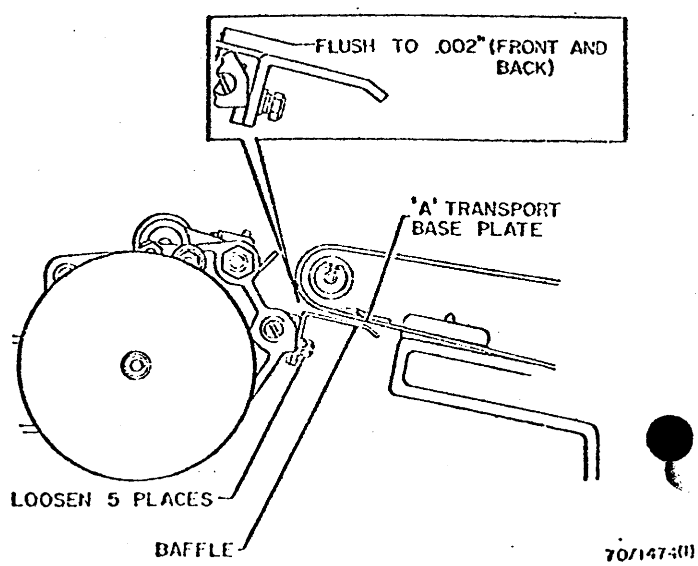

Fig. 3-118. Baffle Adjustment

NOTE: Slide out register stop drawer to set inboard end of baffle to outboard belt of 'A' transport. Recheck with drawer in place.

2. Adjust baffle so top surface is flush to 0.020 inches above top surface of lower paper guide assembly. Measure front and rear ends of the baffle.
3. Tighten bolts loosened in step 1.

NOTE: Paper jams will occur if the baffle is lower than the lower paper guide assembly.

6.12 Lower Pinch Wheels
Adjustment
1. Remove the upper pinch wheels and paper guides.
2. Assemble the micrometer holder 600T753, micrometer 600T52 and 3 to 4 inch extension 600T90, and install the assembled tools on the drum shaft.
3. Adjust the wheel on the leveling bracket assembly to just touch the ramp. Adjust the setscrew to just touch the wheel bracket (Fig. 3-119).
4. Check the distance to the inboard pinch wheel.
5. Check the distance to the outboard pinch wheel (Fig. 3-119). Adjust the ramp to obtain the same distance as in step 4 within 0.002 at the points of tangency.
6. Check the following and adjust if necessary: lower paper guide (6.8), upper paper guide (6.9), halo guide (6.10), baffle (6.11), transfer corotron, B transport idler roller parallelism (6.17), and contact arc (11.4).

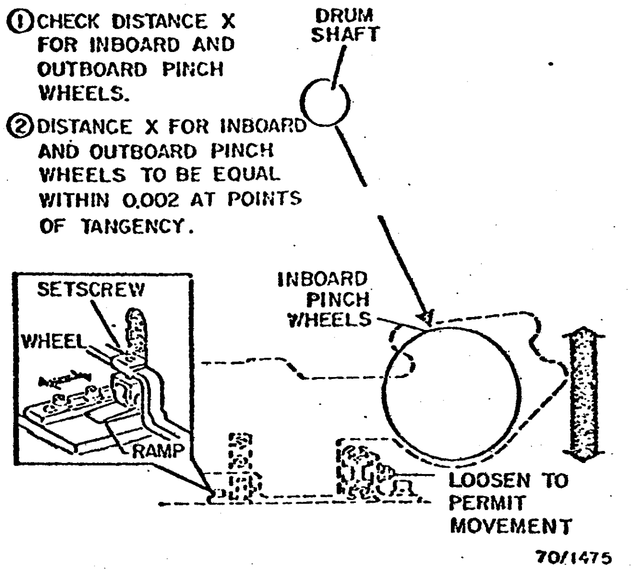

Fig. 3-119. Lower Pinch Wheel

6.13 Upper Pinch Wheels
Adjustment
1. Position the register stop shaft so the stop fingers are pointing straight up.
2. Place two 1-1/2-inch pieces of paper under the upper pinch wheels, but between the stop fingers. Line both papers up with the leading edge of the lower paper guide (Fig. 3-120).
3. Spin the upper pinch wheels rapidly in a clockwise direction.
4. While the pinch wheels are spinning, slowly turn the register stop shaft in a counter-clockwise direction until the pinch wheels start to drop.

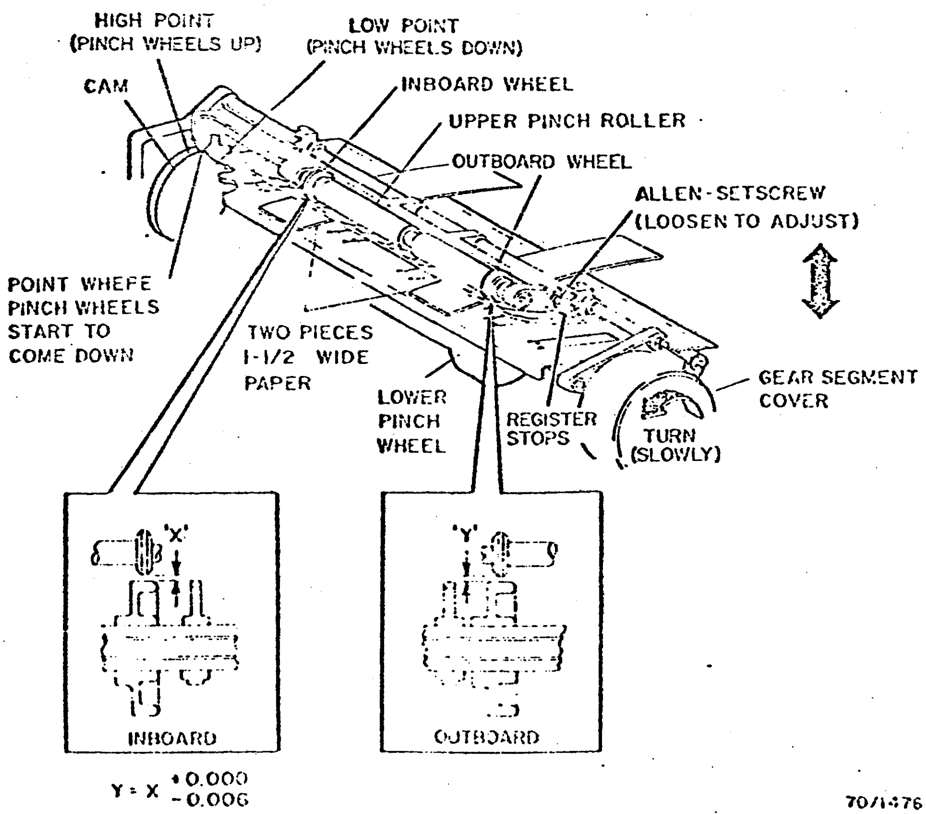

Fig. 3-120. Upper Pinch Wheel

NOTE: The following step must be done extremely slowly. To help accomplish this, brace one hand against the other.

5. Continue turning the shaft. As the spinning pinch wheels near the paper, one will start rubbing slightly against the paper, then cause the piece of paper to 'scoot' out from under it.

NOTE: In this manner, you can determine which pinch wheel touches the paper first. They should touch together.

6. To adjust, determine which pinch wheel is lower (touching the paper first). Only the outboard side of the pinch wheel assembly is adjustable.
7. If the inboard pinch wheel is hitting first, move the outboard side down. If the outboard pinch wheel is hitting first, move it up.

NOTE: Scribe a line on the outboard casting to aid in adjusting. Half the width of a scribed line will move the pinch wheel a paper thickness.

8. Repeat steps 1 through 5 until the pinch wheels are touching the paper simultaneously.

6.14 Registration Cam—Drive Gear and Driven Gear Segments
Removal
1. Remove the gear segment cover. Mark the position of the arm on the shaft with a pencil.

NOTE: The dot on driven gear segment is stamped on the back of the gear. Pencil mark the front of the gear to line up the dots.

2. Remove and disassemble the drive gear segment as required.
3. Remove the registration cam.
4. Install and adjust the driven gear segment (Fig. 3-121) and the drive gear segment (Fig. 3-123).

NOTE: The position of arm with relation to the inner shaft determines "paper buckle" and registration. Refer to Timing subsection (15) for paper buckle and registration adjustments.

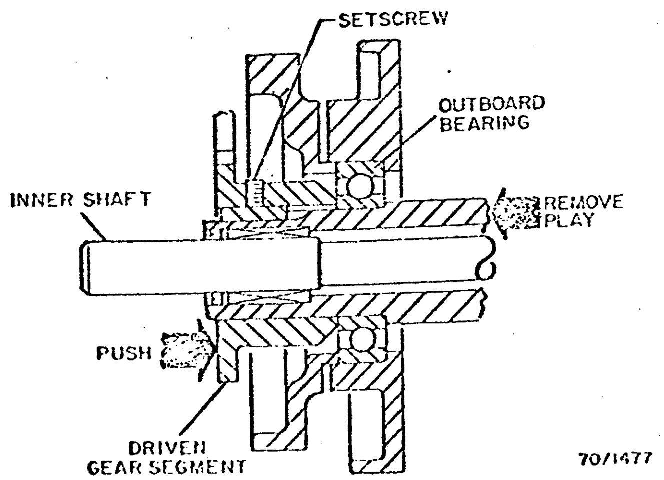

Fig. 3-121. Installation of Driven Gear Segment

Adjustment
Align and adjust the drive gear segment as in Fig. 3-123.

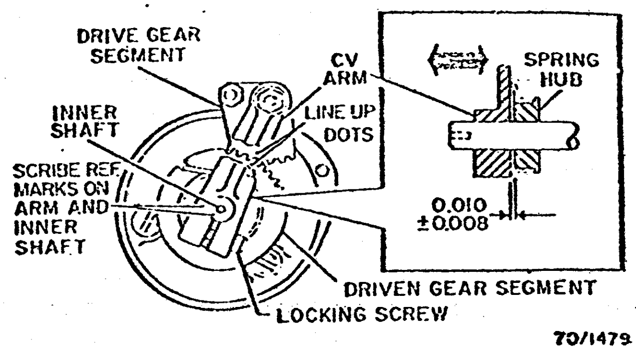

Fig. 3-123. Alignment of Drive Gear Segment

6.15 Mispuff/Jam Detector Switch LS1
Adjustment
(Adjust the switch as in Fig. 3-124.)

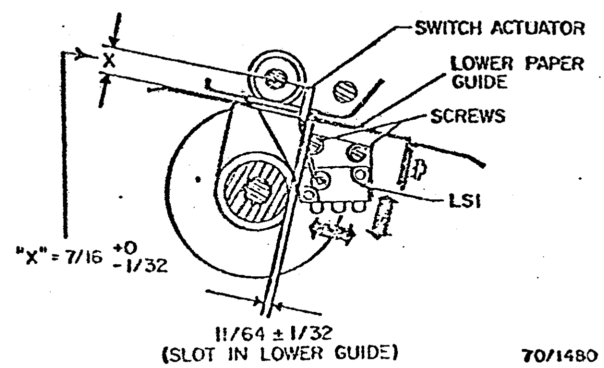

Fig. 3-124. Mispuff/Jam Detector Switch LS1

6.16 B Transport
Removal

CAUTION: Do not scratch the surface of the paper guide or B transport frame—they are treated with a special process to eliminate offsetting and toner spots.

1. Remove the master link from the lower fuser pressure roller drive chain. Remove the chain.
2. Remove the wire to the spark-gap block.
3. Loosen the locking nuts on eccentrics. Remove the mounting hardware.
4. Tip up the B transport and disconnect the in-line connectors to the switches. Remove the B transport.

CAUTION: When setting the B transport aside, prop it on its edge. Laying it down will damage switch actuators or tabs.

Replacement
After replacing the B transport, adjust the idler roller parallelism (6.17).

Adjustment (Refer to Fig. 3-124A)
(Sprocket Concentricity)

1. Loosen the three mounting screws.
2. With the register stop drawer in its operating position, center the ball on the sprocket shaft within the socket of the clutch disc. When the ball is centered, the shaft will turn freely until the dogs touch. Tighten the mounting screws of the bearing housing.
3. Fold a 2-inch-wide strip of paper 2 inches from one end. Lay the paper on the B transport so the folded end covers the socket of the clutch disc. Gently close the register stop drawer until the socket reaches the ball — but does not tear the paper.
4. Open the drawer and check the paper. When the sprocket is correctly adjusted, the impression made by the ball will be concentric with the impression made by the sprocket.
5. Check the clutch disc gap and adjust if required (6.18).

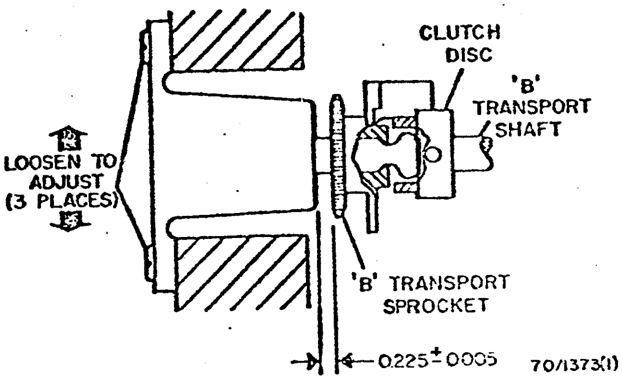

Fig. 3-124A. Concentricity of B Transport Sprocket Assembly

6.17 Idler Roller Parallelism
Adjustment

1. Assemble micrometer holder (600T753), micrometer (600T52) and the 2- to 3-inch extension. Setting on instrument should be as indicated on Fig. 3-125.
2. Take measurements on the two outer belts.
3. Loosen nuts on eccentrics and rotate eccentrics until each outer belt just touches tool. Both outer belts must be within ±0.010 of tool.

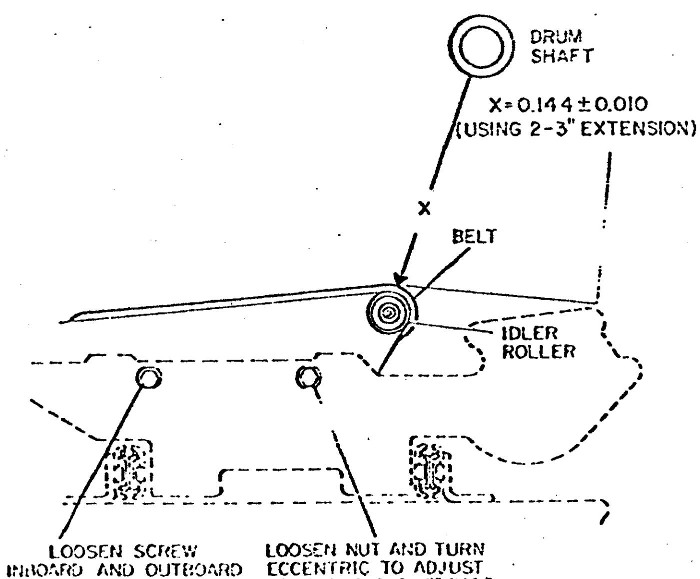

Fig. 3-125. Idler Roller Parallelism

6.18 Belts, Rollers, and Clutches
Removal

1. Remove the B transport from the register stop drawer (6.16).
2. Remove the paper guide to gain access to the belts.
3. Remove belts.
4. Remove rollers, bearings, and clutch as required.

NOTE: The idler roller bearings may require extra effort to remove; the aluminum shafts of the roller might have mushroomed where contacted by the setscrews.

Replacement
(Clutches)

1. Install drive clutch shaft as shown in Fig. 3-126.
2. Loosen shaft and collar setscrews and push shaft to bottom the slot against pin shown in Fig. 3-126.
3. Remove play in collar.
4. Tighten setscrews loosened in step 2.
5. Loosen the clutch disc setscrews and set 5/32-inch clearance between disc and collar.

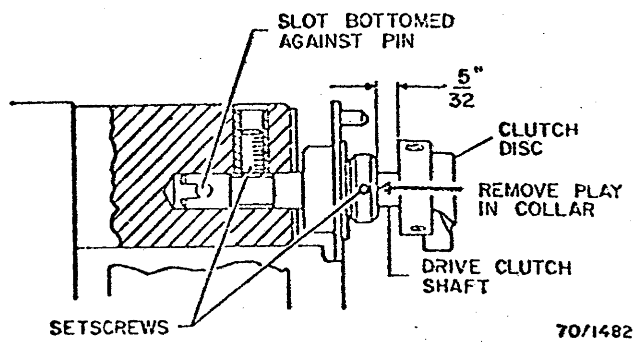

Fig. 3-126. Installation of Drive Clutch Shaft

NOTE: Check the override clutch before replacing it. If necessary, clean thoroughly.

6. Loosen two setscrews for override clutch shaft, shown in Fig. 3-127.
7. Bottom the slot in shaft against pin as shown.
8. Tighten setscrews loosened in step 6.
9. Perform clutch disc gap adjustment and idler roller position end play adjustment (see below). Check B transport concentricity (1.8) and adjust if necessary.

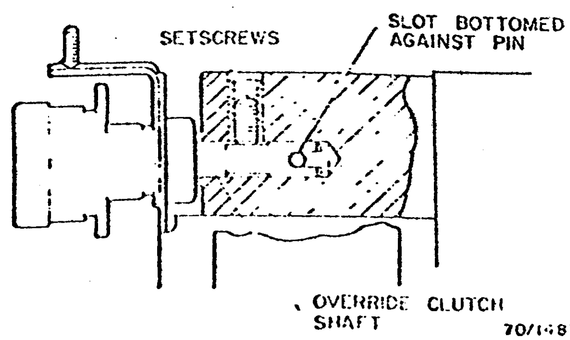

Fig. 3-127. Installation of Override Clutch Shaft

Adjustment
(Clutch Disc Gap)

1. Loosen setscrews and apply tool 600T581 as shown in Fig. 3-128.

NOTE: Do not use tool 121H27, which has a hole.

2. Slide drawer closed gently to allow clutch disc to be positioned 0.102 inch away from clutch plate. Carefully open drawer and tighten setscrews.

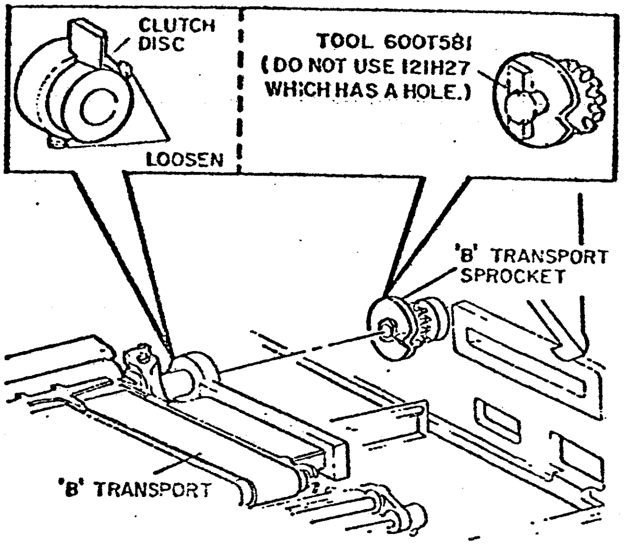

Fig. 3-128. Clutch Disc Gap Adjustment

Idler Roller Position And End Play

1. Loosen setscrew and using a square, adjust to the dimension shown on the right in Fig. 3-129.
2. Loosen setscrew and adjust to dimension shown on the left.

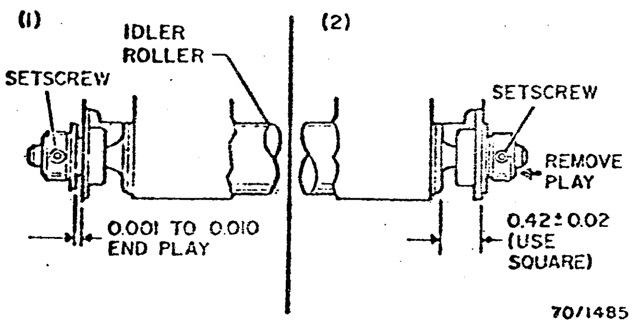

Fig. 3-129. Idler Roller Position and End Play Adjustment

6.19 Paper Guide
Adjustment

1. Loosen three screws and adjust paper guide to center fingers in reliefs in rollers (Fig. 3-130).
2. Loosen three nuts on brackets (two inboard, one outboard). Place rule as shown. Adjust paper guide until rule touches fuser pressure roller.

NOTE: Make adjustments with drawer pulled out on slide just both ends).

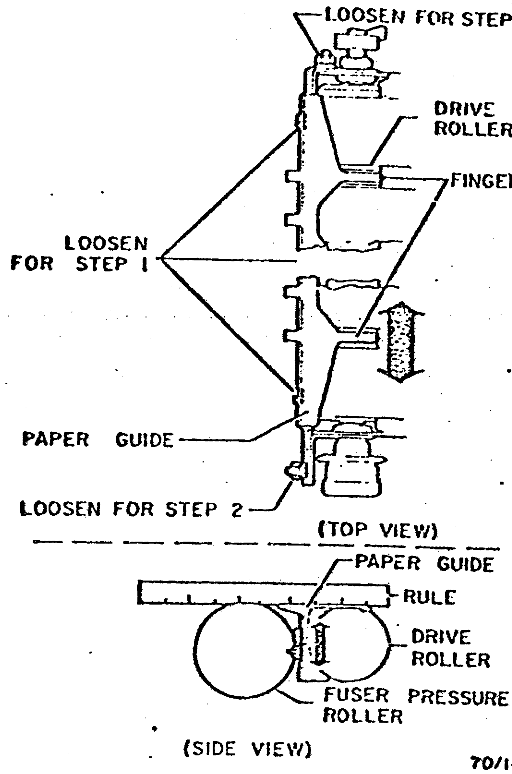

Fig. 3-130. Paper Guide Adjustment

6.20 Brush Bracket
Adjustment

1. Loosen screws and set combination square for one-half inch. Rest head of square on the bottom of the brush bracket.
2. Set the bottom of the brush bracket one-half inch from 'B' transport belts (Fig. 3-131). At this bracket setting the brush should interfere with the belts by one-sixteenth inch.

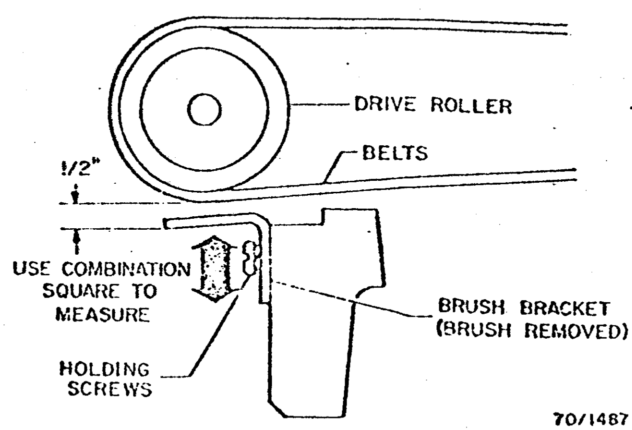

Fig. 3-131. Brush Bracket

6.21 Mispuff Detector Switch LS3

Adjustment

1. Loosen screws and position switch as shown in Fig. 3-132.
2. Tighten and torque screw-nuts to 3.7—5.3 inch-pounds.

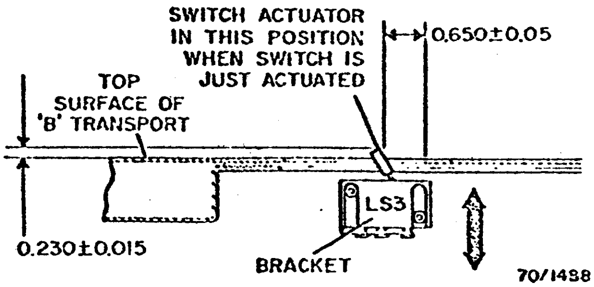

Fig. 3-132. Mispuff Detector Switch (LS3) Adjustment

6.24 Deleted

6.25 Gap Between Terminal Blocks

Adjustment

1. Place register stop drawer in "home" position.
2. Insert shim between spacers and frame to obtain proper gap (Fig. 3-136).

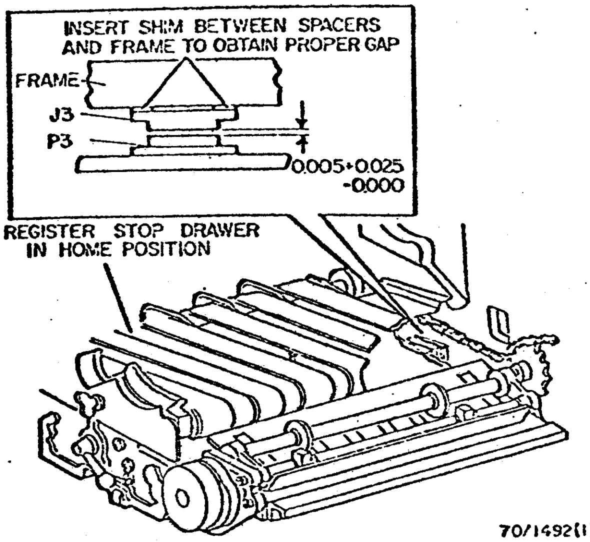

Fig. 3-136. Gap Between Terminal Blocks

7.0 OPTICS

The Optics section is divided into Optics Repair (7.1) and Optics Systematic Alignment (7.2).

Optics Repair contains procedures for Removal, Replacement, and Adjustment of individual components of the Optics System.

Optics Systematic Alignment contains the adjustments required to ensure proper operation of the machine optics as well as correct reduction and resolution.

8. DRUM AND COROTRONS

The major components of the drum and corotrons system are shown in Fig. 3-152.

8.1 Drum Handling Procedures

The drum, if exposed to room light, will develop a fatugue effect that reduces its copying ability. Black bags have been supplied with each machine in order to minimize the amount of exposure to light during service. Care should be taken to use these bags to eliminate the harmful effects of fatigue.

8.2 Xerographic Drum

Removal

1. Slide the developer assembly away from the drum.
2. Remove the dust cover assembly from the register stop drawer.
3. Remove the drum knob and screw the drum extension shaft into the drum shaft.
4. Slide the drum out of the machine, covering it as it is withdrawn from the cavity.
5. Fold top of cover over inboard flange and leave in this condition until drum is to be reinstalled in machine.

CAUTION: Never touch the drum coating with fingers. Always place the drum where it will be safe from scratches, dirt and oil.

Replacement

To replace, position drum on extension shaft (while still in the cover) and insert from cover into cavity.

NOTE: New drums are covered with black paper. Do not remove this paper until drum is being installed in the cavity.

After replacing new drum, perform machine setup with electrometer.

8.3 Drum Cavity Clearance Checks

1. Remove the drum (8.2).
2. Check drum cavity clearance using micrometer holder 600T753, micrometer 600T52, and 2 to 3 inch extension 600T53. Set the micrometer to 0.112 and swing it around in the drum cavity. If any component interferes, refer to Fig. 3-153 and the following chart and adjust as necessary.

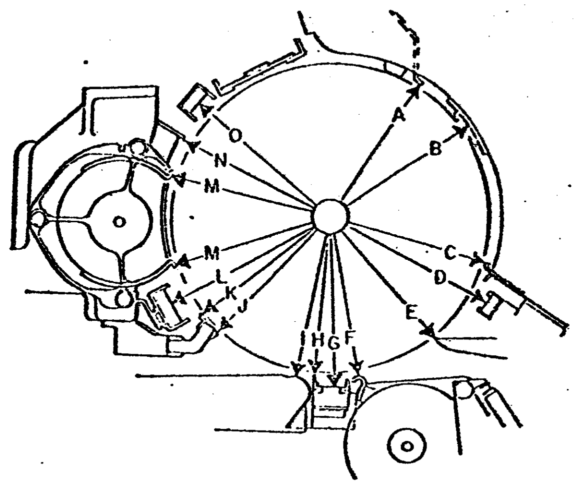

Fig. 3-153. Drum Cavity Dimensions

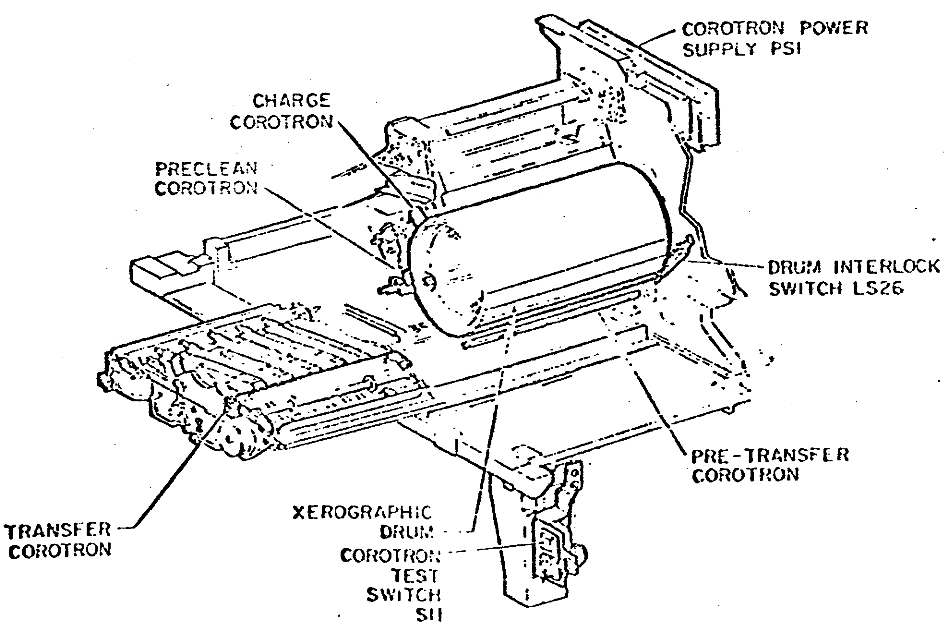

Fig. 3-152. Drum and Corotrons System, Location of Major Components

REF.	COMPONENT	MICROMETER SETTING	MEASURE TO
A	Top bias baffle	0.180 ± .005	1" in from each end
B	Developer seals	0.210 ± 0.010	1" in from each end
C	Lower pickoff baffle	0.117 ± 0.005	1" in from each end
D	Pretransfer (to wire)	(use 1/2" spacer) 0.084 ± 0.010	both ends
E	Catch tray	0.195 + 0.010 − 0.000	both ends
F	Halo guide	0.144 ± .010	both ends
G	Transfer	(use 1/2" spacer) .084 ± .005	both ends
H	Transfer corotron shield	0.149 ± .005	three places
I	B transport	0.144 ± 0.010	outer belts
J	Puffer	0.151 ± 0.010	outer orifices
K	Miss detector	0.145 + 0.005 − 0.000	1/8" from each end
L	Preclean (to wire)	(use 1/2" spacer) 0.084 ± 0.005	both ends both ends
M	Brush cleaner	0.139 + 0.005 − 0.000	closest point
N	Lamp Shield	0.125 + 0.005 − 0.000	full length
O	Charge (to wire)	0.052 ± 0.005 (use 1/2" spacer)	both ends

8.4 Drum Maintenance/Single Defect Repair

The Xerox 7000 drum, with its unique alloy 6 coating does not lend itself to pumicing as do other xerographic drums. Therefore, the following procedure is recommended when trying to correct a copy quality defect caused by the drum.

CAUTION: Do not expose the drum to light any longer than absolutely necessary.

1. To hide the most serious defect, or at least part of the defect, reposition the drum as follows: (see Fig. 3-154)
2. Remove drum and place pencil mark on drum arbor to coincide with location of defect.
3. Hand crank main drive motor until mirror drive cam is just past its maximum right travel and starting left.
4. Loosen bolt on drum clamp.

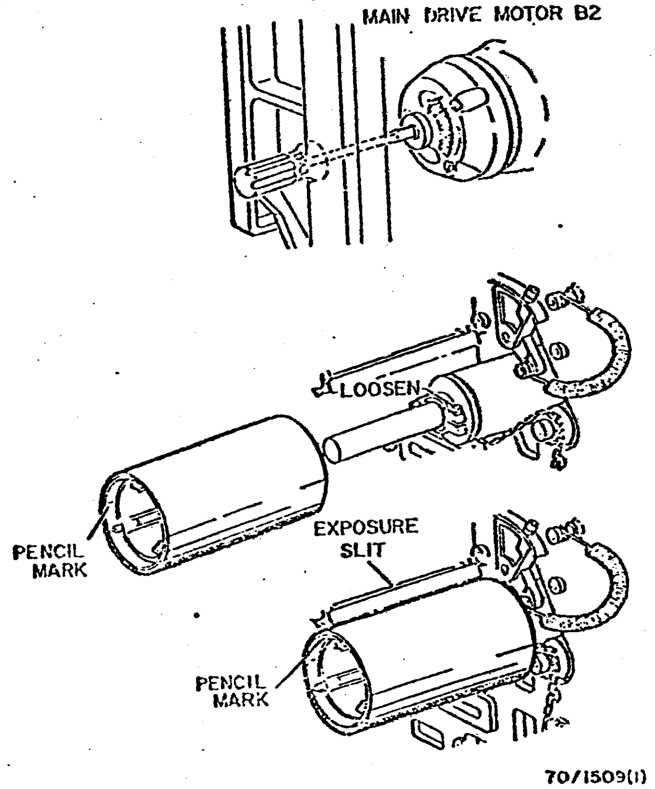

Fig. 3-154. Single Defect Drum Adjustment

5. Put drum back in machine and rotate drum and clamp so that pencil mark aligns with exposure slit.
6. Carefully remove drum and tighten drum clamp; reinstall drum.
7. The Magic-Rub eraser on light drum scratches as follows:
8. Obtain a Faber-Castell "Magic-Rub" eraser.
9. Lightly rub the eraser over the scratch until the scratch line has been minimized.
10. Brush away the eraser residue.
11. If, after performing the previous two steps, some defects are still causing problems, pumice the drum as follows:
12. Using Brasso and an absorbent pad, pumice *only* the defective area. DO NOT pumice the entire drum.
13. Clean the Brasso from the drum and buff the pumiced area to a deep shine.
14. Check the results of the above procedures by running copies in all modes. If the drum is still causing poor copy quality, replace it.

8.5 Drum Clamp

Adjustment

1. Set the combination square at 5.010 inches.
2. Hold 0.989 side of height gauge tool 600T268 against pad and butt end of combination square scale against height gauge. Outboard side of drum clamp should just touch head of square (Fig. 3-155).
3. Add or remove spaces as required to obtain step 2.

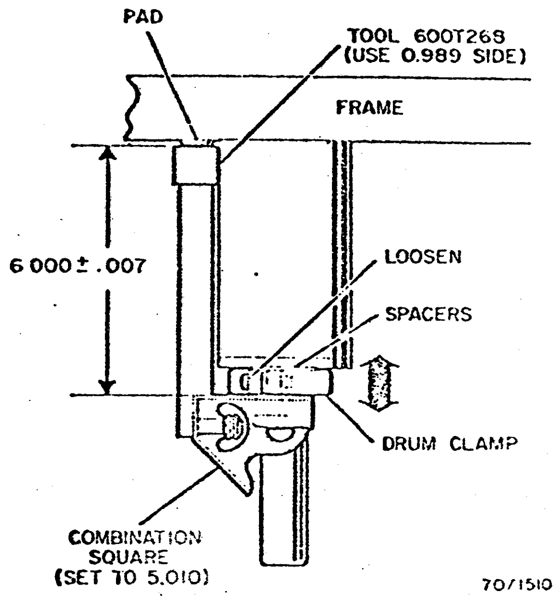

Fig. 3-155. Drum Clamp Adjustment

8.6 Drum Interlock Switch

Adjustment

1. Set the combination square to 4.580. Position the square as shown in Fig. 3-156, and check that the switch actuates.
2. Turn the adjusting screw until the switch actuates within 0.015 of the tool setting.

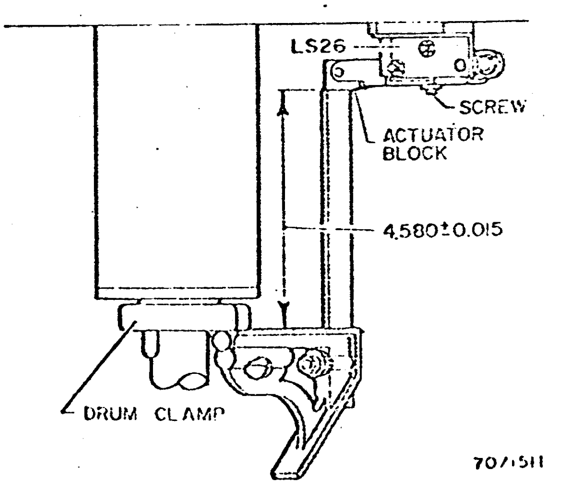

Fig. 3-156. Drum Interlock Switch (LS26) Adjustment

8.6A. Corotron End Blocks

Adjustment

Set end block gap as shown in Fig. 3-157A.

COROTRON	GAP
Charge	.030 + .005 − .000
Transfer	.030 + .005 − .000
Preclean	.030 + .015 − .000
Pretransfer	.030 ± .000

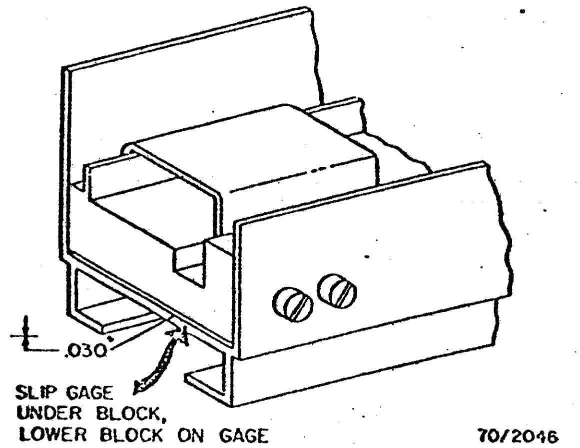

Fig. 3-157A. Corotron End Block Gap

8.7 Corotrons

Restringing of Charge, Pretransfer, Transfer, and Suppression Corotrons

1. Snap off the arc shields and loosen the screws. Ren the old wire, making sure all pieces are removed fr... under the clamps (Fig. 3-157B).

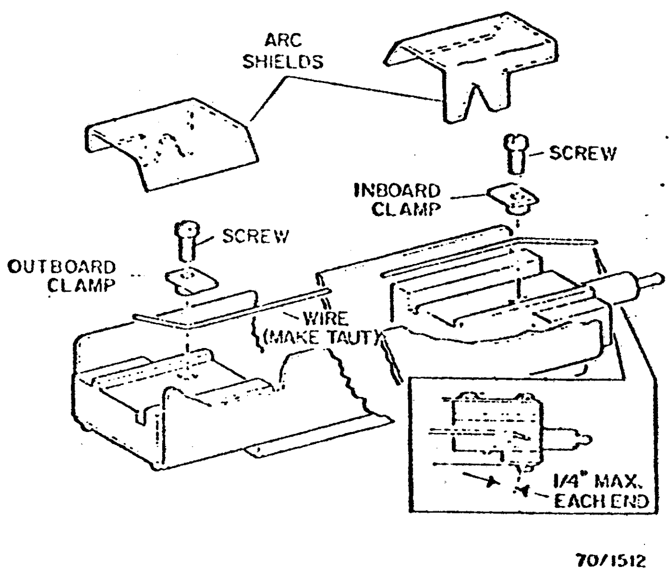

Fig. 3-157B. Restringing of Transfer, Pre-transfer, and Charge Corotrons

2. Place the end of a new wire under the flange of the outboard clamp. Tighten the screw.

NOTE: Do not kink or nick the corotron wire during installa...

3. Pull the other end of the wire with a 0.5 to 1.0-pound pull and secure it under the flange of the inboard clamp. Tighten the screw to make the wire taut.
4. Cut off excess wire, allowing 0.25 inch maximum to protrude from the edge of each clamp.

NOTE: To eliminate the possibility of key operator injury while removing paper jams, round off all top corners of the transfer corotron with a file.

8.8 Restringing of Preclean Corotron

1. Snap off the arc shields and loosen the screws. Remove the old wire, making sure all pieces are removed from under the clamps (Fig. 3-158).

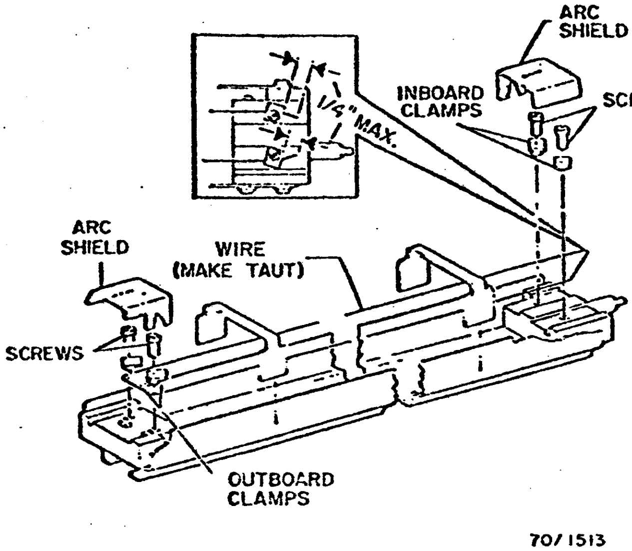

Fig. 3-158. Restringing of Preclean Corotron

2. Place one end of the new wire under the flange of the right inboard clamp. Tighten the screw.
3. While maintaining tension on the wire, bring the wire around the two outboard clamps, and then under the flange of the left-hand inboard clamp; tighten the screw to make the wire taut. Then tighten the two outboard screws.
4. Cut off excess wire, allowing 0.25 inch maximum to protrude from the edge of the inboard clamps.

8.9 Corotron (With Corotron Test Switch) Adjustment

NOTE: Ensure that the register stop drawer is firmly latched in its "home" position when taking current readings. When the drawer is pulled out, the transfer corotron is disconnected from the power supply. This will affect current readings of all corotrons.

1. Remove the drum (8.2). Return the developer assembly to its home position.
2. Push the MAIN POWER OFF button (S8); leave the machine plugged in.
3. Remove the three high-voltage developer baffle leads.
4. Assemble micrometer holder 600T753, micrometer 600T52, 2 to 3 inch extension 600T53, and 1/2-inch spacer 600T104.
5. Set the micrometer to 0.084 for the preclean, pretransfer and transfer corotrons; 0.052 for the charge corotron.
6. For each corotron, loosen the outboard end and adjust until the wire just touches the tip of the micrometer; reverse tool and do the same for the inboard end (Figs. 3-159 through 3-162).
7. After cleaning and mechanical adjustment, perform corotron current adjustment (8.10).

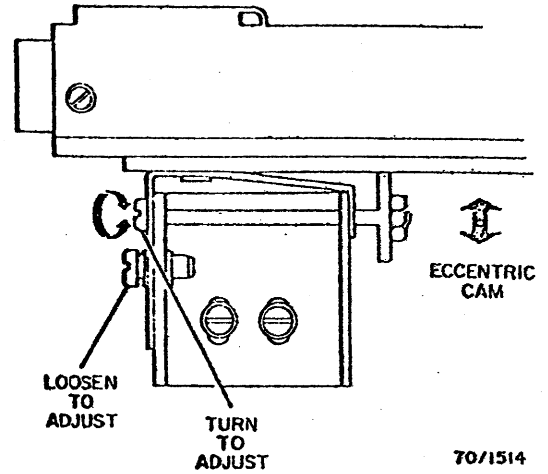

Fig 3-159. Preclean Corotron Mechanical Adjustment

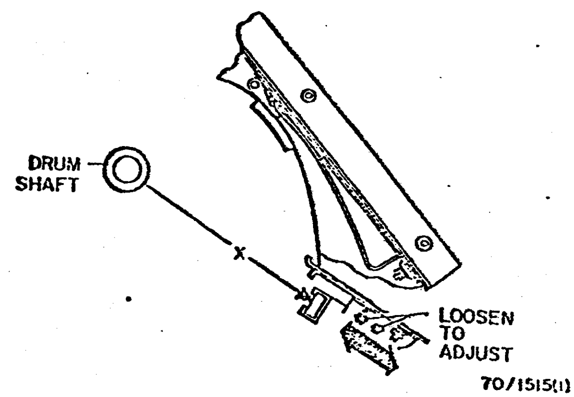

Fig. 3-160. Pretransfer Corotron Mechanical Adjustment

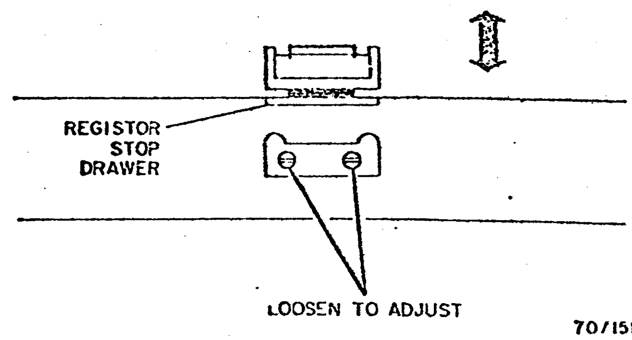

Fig. 3-161. Transfer Corotron Mechanical Adjustment

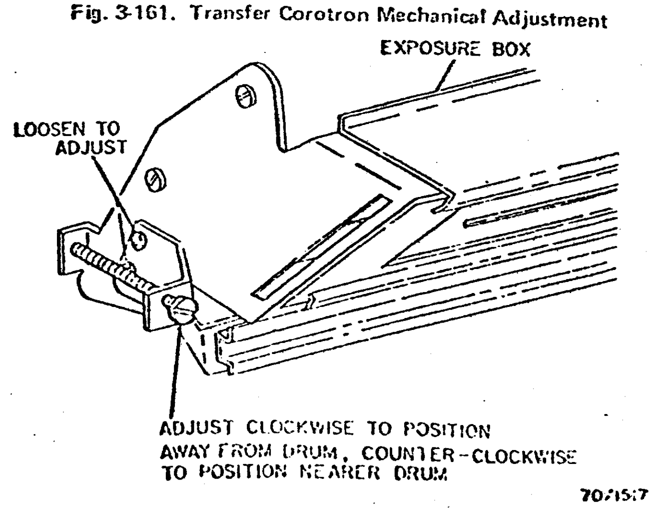

Fig. 3-162. Charge Corotron Mechanical Adjustement

8.10 Corotron Current Adjustment

1. Depress the MAIN POWER OFF switch and remove the high voltage leads from the developer housing.
2. Connect the meter and current shoe as in Figure 3-163 for the corotron to be tested. Set meter switches as indicated in Tables 3-2, 3-3, 3-4.

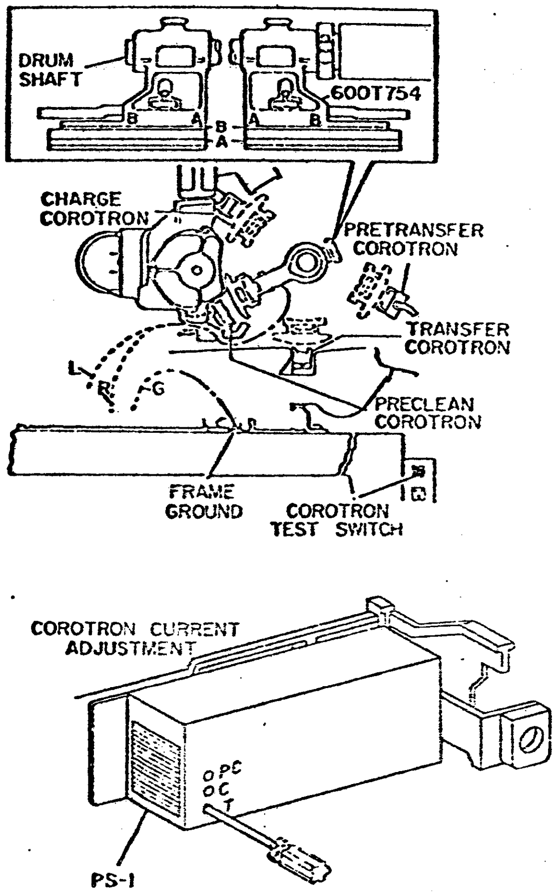

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Fig. 3-163. Checking Corotrons Electrically

3. Push the corotron test switch (S11) and note readings for the inboard and outboard halves of the corotron. The current readings should be equal. If the current readings are not equal, move the outboard end of the corotron until the current readings are equal.
4. When the current readings are equal, adjust the appropriate potentiometer on PS1 to obtain the current reading specified in Tables 3-2, 3-3, 3-4.

NOTE: Pretransfer corotron current can be adjusted using potentiometer on PS3. PS1 does not supply power to this corotron.

5. Using micrometer tool, check outboard end of any corotron that had to be mechanically adjusted to be sure it is still within mechanical adjustment tolerance.

Corotron Currents and Meter Settings

Table 3-2 Corotron Currents Using Meter 600T422

Corotrons	Switch Positions +	Switch Positions –	Switch Positions Range	Meter Readings (Half Shoe)
Charge	+		90 uA DC	30.0
Transfer	+		90 uA DC	16.0
Pretransfer	+		30 uA DC	9.0
Preclean			90 uA DC	16.5

Tools: Universal Half Shoe—600T754
Meter —600T442

Table 3-3 Corotron Currents Using Meter 600T786

Corotrons	Switch Positions Pushbutton	Switch Positions Range	Meter Readings (Half Shoe)
Charge	+DC	150 uA	90.5±3.0
Transfer	+DC	150 uA	48.0±2.0
Pretransfer	+DC	30 uA	8.5±1.0
Preclean	AC	150 uA	46.5±2.5

Tools: Multimeter —600T786
Universal Half Shoe —600T754

Table 3-4 Corotron Currents Using Meter 600T860

Corotrons	Switch Positions Pushbutton	Switch Positions Range	Meter Readings (Half Shoe)
Charge	+DC	150 uA	91±3.0
Transfer	+DC	150 uA	48±2.0
Pretransfer	+DC	30 uA	9±1.0
Preclean	AC	150 uA	50±2.5

Tools: Multimeter —600T860
Universal Half Shoe —600T754

8.11 Transfer Corotron Shield Adjustment

1. Assemble micrometer holder 600T753, micrometer 600T52 and 2 to 3 inch extension 600T53. Set the micrometer to 0.147 and attach tools to drum shaft.
2. Loosen the three screws and adjust the shield to just touch the tool (one inch in from each end) as in Fig. 3-164.
3. Tighten screws and check settings. Tolerance is +0.005 —0.005 at ends and +0.010 —0.005 at center.

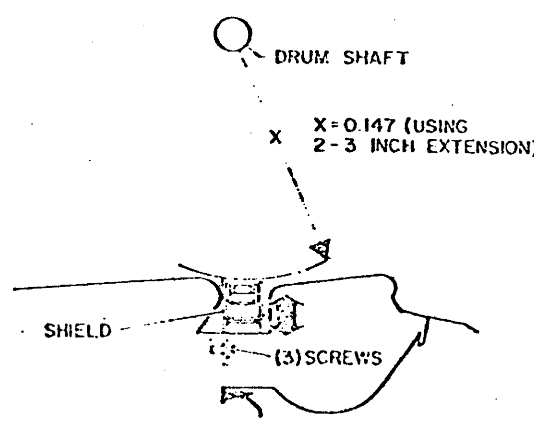

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Fig. 3-164. Transfer Corotron Shield Adjustment

9.6 Bias Baffle and Developer Electrode Resistance Check

1. Remove the drum. Remove the bias baffle cord and the developer electrode cord.
2. Zero the VOM on the ohms x 1 scale, and connect the meter as shown in Fig. 3-170.
3. Check the resistance between the top bias baffle and its plug, and between the developer electrode and its plug. If the resistances exceed 10 ohms, clean and tighten the connections.
connections.

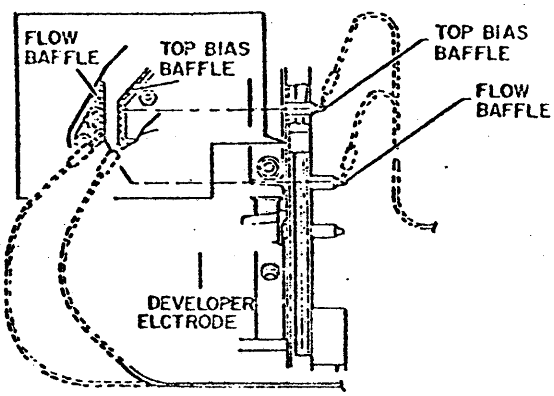

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Fig. 3-170. Bias Baffle and Developer Electrode Resistance Check

9.7A Developer Electrode Voltage Check (Meter 600T72)

1. Unlatch the developer assembly and slide it back. Remove the drum.
2. Remove wire 228 to PS1.
3. Set up VOM 600T72. Attach the black lead to the COM socket; attach high voltage probe 600T145 to the VOM socket. Position the range selector at 3 VDC. Connect the black lead to ground (Fig. 3-171).
4. Press the corotron test switch, touch the high voltage probe lead to the developer electrode and read the voltage. The reading should be between 1800 to 2000 VDC between 1.8 and 2.0 on the 3 VDC scale multiplied by 1,000).

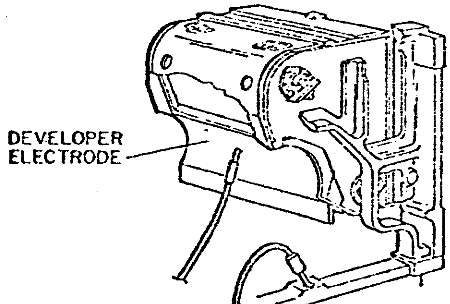

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Fig. 3-171. Developer Electrode Voltage Check

9.7B Developer Electrode Voltage Check (Meter 600T860)

1. Unlatch the developer assembly and slide it back. Remove the drum.
2. Remove wire 228 to PS1.
3. Set up VOM 600T860. Attach the black lead to −GND socket; attach the red lead to the 3KVDC socket. Position the range selector switch at KV. Connect the black lead to ground (Fig. 3-171).
4. Press the corotron test switch, touch the high voltage probe lead to the developer electrode and read the voltage. The reading should be between 1800 and 2000 VDC (18 to 20 on the 30VDC scale X100).

WARNING: Approximately 3000 power supplies (Electrode, Bias Baffle and PTC Power Supply—PS3) may have been manufactured with an internal fault that could result in a high potential being present at the metal adjusting screw (PTC).

It is very important that you be able to recognize and to check out these power supplies, which carry part number 105P357, and are manufactured by Xerox Corporation, El Segundo, California.

To check for the defect, measure the voltage between the metal adjusting screw and machine ground. If you read a voltage, the power supply is faulty and must be replaced. When performing this check, keep in mind that the meter could be damaged if the high potential causes a violent needle deflection.

9.8 Developer Baffles

NOTE: Only the lower pickoff baffle is field-replaceable. After replacement, perform the lower pickoff baffle mechanical adjustment (9.11).

9.9 Top Bias Baffle Mechanical Adjustment

1. Use micrometer holder 600T753, micrometer 600T52, and 2 to 3 inch extension 600T53 to adjust the top bias baffle relative to the drum shaft.
2. Adjust the baffle to the dimension shown in Fig. 3-172.

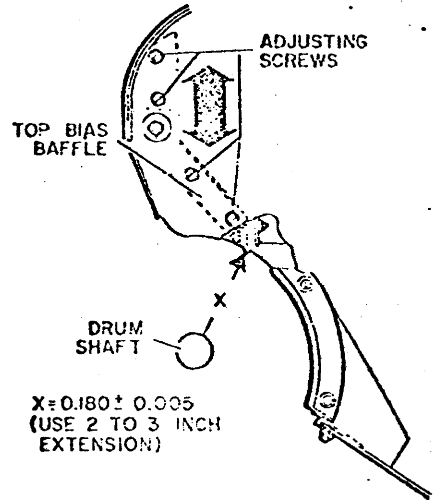

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Fig. 3-172. Top Bias Baffle

9.10 Flow Bias Baffle Mechanical Adjustment

Adjust the flow bias baffle as in Fig. 3-173.

NOTE: The top bias baffle must be within specifications (9.9) before performing this adjustment.

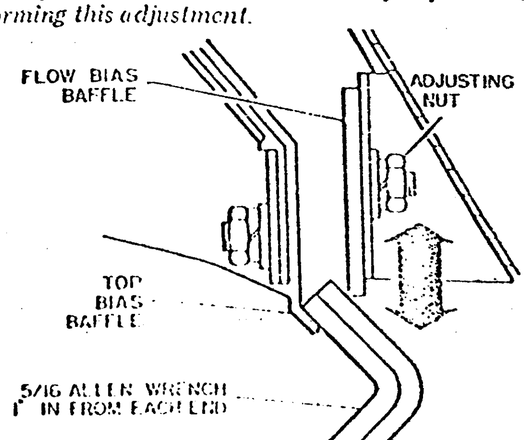

Fig. 3-173. Flow Bias Baffle

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9.11 Lower Pickoff Baffle Mechanical

1. Use micrometer holder 600T753, micrometer 600T52 and the 2 to 3 inch extension 600T53 to adjust the lower baffle relative to the drum shaft.
2. Adjust the baffle to the dimension shown in Fig. 3-174.

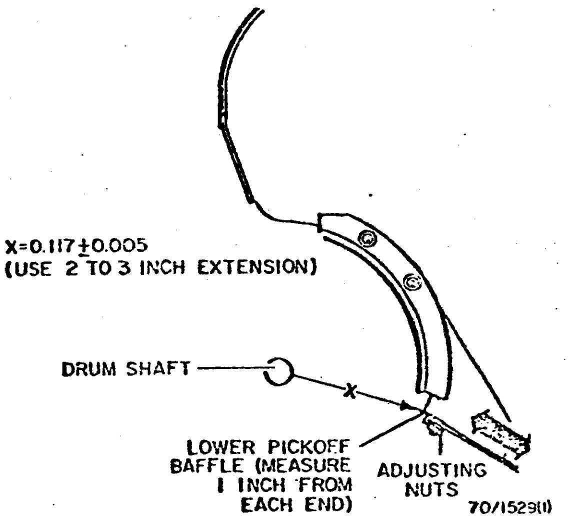

Fig. 3-174. Lower Pickoff Baffle

9.12 Top Bias Baffle or Flow Bias Baffle Resistance Check

1. Turn the machine off. Lift and latch the developer access cover. Remove the right cover. Raise the inboard and outboard developer assembly latches. Slide the developer assembly to the right slightly. Remove the drum (8.2).
2. Connect the meter as in Figure 3-175.

	Leads		Switches	
Meter	Red	Black	Range	Mode
600T72	V-O-M	COM	OHMS−X1	−
600T786 or 600T860	+R	−GND	Ω −X1	Ω(Down)

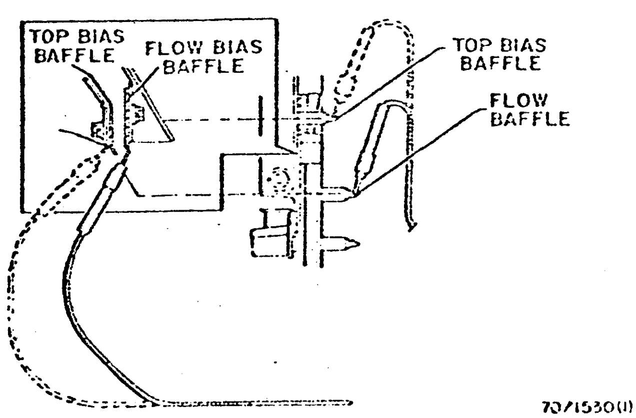

Fig. 3-175. Top Bias or Flow Bias Baffle Resistance

3. The meter should read 10 ohms or less. If the meter reads more than 10 ohms, refer to troubleshooting.

9.13A Top Bias Baffle Voltage Check (Meter 600T72)

1. Unlatch the developer housing and slide it back. Remove the drum.
2. Remove wire 228 to PS1.
3. Set up VOM 600T72: Attach the black lead to the COM socket; attach the red lead to the 1200 VDC socket. Position the range selector at 300 VDC. Connect the black lead to ground and the red lead to the top bias baffle (Fig. 3-176).
4. Press corotron test switch and read voltage at the baffle. The reading should be between 700 and 900 VDC (between 7 and 9 on the 12 VDC scale multiplied by 100).

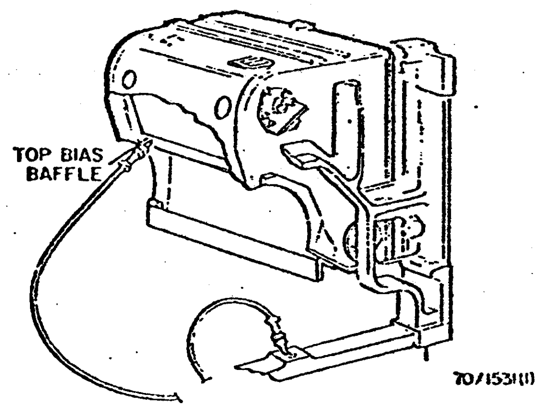

Fig. 3-176. Top Bias Baffle Voltage Check

9.13B. Top Bias Baffle Voltage Check (Meter 600T860)

1. Unlatch the developer housing and slide it back. Remove the drum.
2. Remove wire 228 to PS1.
3. Setup VOM 600T860: Attach the black lead to the −GND socket; attach the red lead to the 3KV socket. Position the range selector to KV. Connect the black lead to ground and the red lead to the top bias baffle (Fig. 3-176).
4. Press corotron test switch and read voltage at the baffle. The reading should be between 700 and 900 VDC (7 and 9 on 30VDC scale X100).

9.14 Toner Dispenser

Removal

1. Raise the developer access cover and latch it.
2. Unlatch the locking clip on the dispenser and raise the cover.
3. Remove the screws securing the toner dispenser, and remove the dispenser from the developer assembly.

NOTE: If emptying a cancelled machine, or returning used developer for a branch refurbish, use the Steel Shot Developer Return Kit (60052005).

Replacement

1. If the toner dispenser yoke or the toner dispenser motor eccentric position has been disturbed, manually rotate the eccentric to the maximum inboard position. Push the dispenser slide to the maximum inboard position and replace the dispenser, making sure that the yoke engages the eccentric. This will ensure proper engagement of the yoke without dropping the inboard ends of the rods out of their guide blocks.
2. If toner is still not dispensing properly, perform the toner dispenser slide gap adjustment (9.15).

9.15 Toner Dispenser Slide Gap
Adjustment
1. Adjust the toner dispenser slide gap in accordance with Fig. 3-177.
2. Adjust to the dimension shown at each side and at both ends of the toner dispenser. When checking one end of the dispenser, slide the yoke to the opposite end.

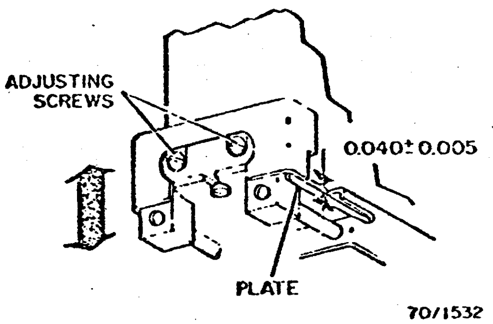

Fig. 3-177. Toner Dispenser Slide Gap

9.16 Toner Dispenser Drive Motor
Removal
1. Disconnect the wires to the motor.
2. Remove the four sets of mounting hardware.
3. Remove the motor.

Replacement
1. Engage the eccentric of the motor with the toner dispenser yoke.

NOTE: To ensure that the eccentric on the motor engages the yoke on the toner dispenser, set both the yoke and the eccentric to their maximum inboard positions (9.14).

2. Check that the motor turns freely by observing movement of the slide in the toner dispenser. If necessary, insert a dipstick into the toner well to feel the motion of the slide.

9.17 Toner Control Potentiometer
Removal
1. Loosen two setscrews and remove the knob. Peel off the data plate.
2. Disconnect the wires leading to the potentiometer.
3. Remove the mounting hardware. Remove the potentiometer.

Replacement
1. Replace the potentiometer, orienting the shaft so the pin engages the locating hole. Replace the mounting hardware.
2. Activate the adhesive on the back of a new data plate, using cleaning solvent 43H10. Attach the new data plate. (As an alternative, 63H101 can be used as an adhesive—but make sure none of it leaks around the edge of the data plate.)
3. Replace the knob and orient it so that the off position is at 6 o'clock, between LOW and HI on the data plate.
4. Reconnect the wires to the potentiometer.

9.18 TONER CONTROL ADJUSTMENT
Toner dispensing is controlled by the engine control board. The toner dispenser controls (S1 & S2 on the engine control board) are initially set to S1=0, S2=6.

S1 determines the number of bits printed between toner dispensing periods.

S2 determines the length of time toner will be dispensed.

Normally S2 should be used to adjust toner level until either extreme is reached (i.e. "O" or "E") at which time S1 should be: incremented one position if S2 is at "E", decremented one position if S2 is at "O", and S2 should be moved to the opposite extreme, and adjusted from that point.

9.15 Toner Dispenser Slide Gap Adjustment

1. Adjust the toner dispenser slide gap in accordance with Fig. 3-177.
2. Adjust to the dimension shown at each side and at both ends of the toner dispenser. When checking one end of the dispenser, slide the yoke to the opposite end.

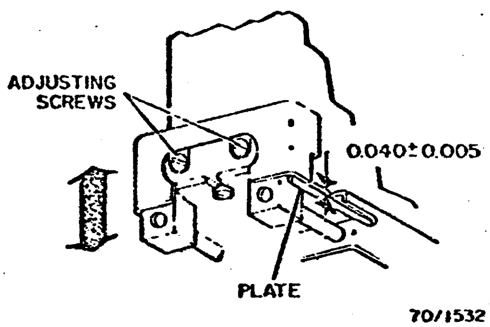

Fig. 3-177. Toner Dispenser Slide Gap

9.16 Toner Dispenser Drive Motor

Removal

1. Disconnect the wires to the motor.
2. Remove the four sets of mounting hardware.
3. Remove the motor.

Replacement

1. Engage the eccentric of the motor with the toner dispenser yoke.

NOTE: To ensure that the eccentric on the motor engages the yoke on the toner dispenser, set both the yoke and the eccentric to their maximum inboard positions (9.14).

2. Check that the motor turns freely by observing movement of the slide in the toner dispenser. If necessary, insert a dipstick into the toner well to feel the motion of the slide.

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Removal

1. Loosen two setscrews and remove the knob. Peel off the data plate.
2. Disconnect the wires leading to the potentiometer.
3. Remove the mounting hardware. Remove the potentiometer.

Replacement

1. Replace the potentiometer, orienting the shaft so the pin engages the locating hole. Replace the mounting hardware.
2. Activate the adhesive on the back of a new data plate, using cleaning solvent 43H10. Attach the new data plate. (As an alternative, 63H101 can be used as an adhesive—but make sure none of it leaks around the edge of the data plate.)
3. Replace the knob and orient it so that the off position is at 6 o'clock, between LOW and HI on the data plate.
4. Reconnect the wires to the potentiometer.

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Toner dispensing is controlled by the engine control board. The toner dispenser controls (S1 & S2 on the engine control board) are initially set to S1=0, S2=6.

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10. COMPRESSOR AND PUFFER SYSTEM

The location of the compressor and puffer system major components are shown in Fig. 3-178.

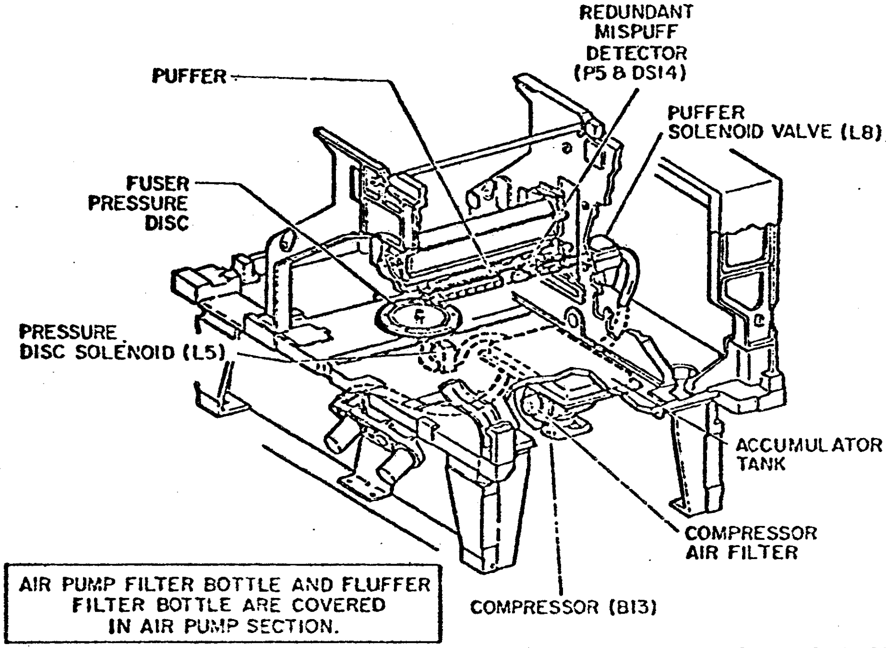

Fig. 3-178. Compressor and Puffer, Location of Major Components

10.1 Compressor

Removal

1. Disconnect the power cord from the AC receptacle, open the rear doors, remove the front and rear lower covers.
2. Open the drain cap on the air filter assembly and drain the accumulator tank.
3. Loosen cooling blower motor B11. Disconnect the air hose to puffer solenoid valve L8. Remove cooling blower motor B11.
4. Disconnect the A transport vacuum hose. Remove A transport vacuum motor B7 and its mounting plate.
5. Disconnect the wire from capacitor C4 and the wires from compressor B13.
6. Disconnect the compressor air hose at the compressor. Loosen four sets of mounting hardware at the compressor. Place a ream of paper under the compressor to support it.
7. Remove the mounting hardware from B13 and slide the compressor out from the rear of machine. Remove the compressor from its mounting plate.

Replacement

After replacement, check adjustment of compressor pressure.

NOTE: Be sure the compressor does not cycle on and off more than once every 15 minutes during standby condition. If it does, check for leaks in the system, and repair as necessary.

Adjustment

1. Check the compressor pressure in accordance with Fig. 3-179.

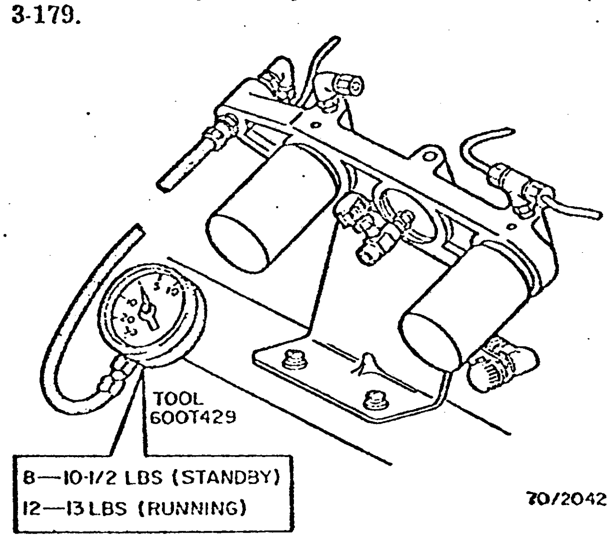

Fig. 3-179. Compressor Pressure

10.2 Filter

CAUTION: Use a piece of cloth or similar protection when removing and replacing the filter. The wire cage of the f[illegible] sharp.

1. Disconnect the power cord from the AC receptacle; open the rear doors, remove the front and rear lower covers.
2. Reach in under the A transport vacuum motor, and up to the front of the compressor. Unscrew and remove the filter.

10.3 Accumulator Tank

1. Remove compressor B13 (10.1).
2. Disconnect the wires from fuser transformer T1. Disconnect the wires from under pressure switch LS21.
3. Disconnect the air hose from the fuser solenoid at the tee. Disconnect the air hose to the air filter assembly from the accumulator tank.
4. Remove the hardware from the accumulator tank and remove the tank from the rear of the machine.
5. If the tank is defective, remove all fittings from the old tank, apply sealant, and install the fittings on the new tank; also transfer transformer T1 from the old tank to the new one.
6. After completing installation, check adjustment of compressor pressure (10.1).

10.4 Under-Pressure Switch LS21

1. Unscrew the switch from the accumulator tank.
2. Apply sealant to threads of fitting before replacing on accumulator tank.
3. Check compressor pressure (10.1).

10.5 Puffer Manifold

Removal

1. Remove the drum (8.2).
2. Remove the preclean and suppression corotrons.
3. Disconnect four wires to the redundant mispuff detector.
4. Loosen the puffer clamp.
5. Remove four sets of hardware and lift the puffer manifold out of machine.
6. Remove the miss detector shield from the puffer manifold.

Replacement

1. After replacement, adjust the puffer manifold (see below) and the miss detector shield (10.7).

Adjustment

1. Remove the developer assembly (9.1). Remove the drum clamp and spacer.
2. Calibrate mechanics level 600T31. Check the level of the machine on the machined surfaces of the base frame, but do not level the machine. Use as reference only.
3. Loosen the puffer manifold mounting brackets.
4. Set micrometer 600T52 at .151 and install 2 to 3 inch extension 600T53. Insert the micrometer in the outermost hole of micrometer holder 600T753.
5. Position the micrometer holder on the drum shaft so the micrometer rod is aligned with the outboard orifice of the puffer manifold (Fig. 3-180).

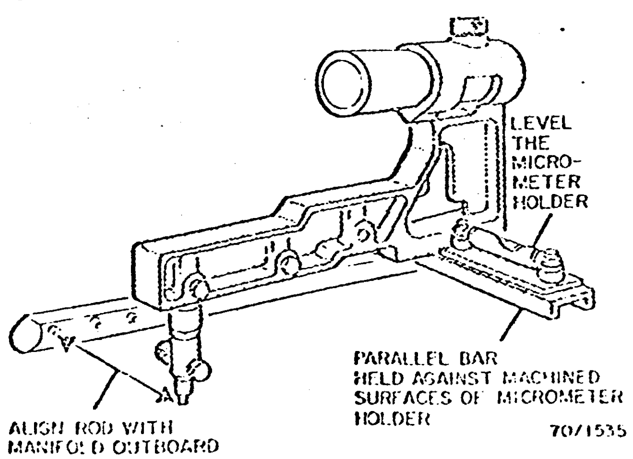

Fig. 3-180. Aligning Micrometer Holder

6. While maintaining this relative alignment, rotate the micrometer holder so the micrometer rod points down.
7. Hold parallel bar 600T588 against the machined surface of the micrometer holder.
8. Place the level on the parallel bar. Adjust the micrometer holder until the level indicates that the micrometer holder is level with respect to the base frame; then lock the micrometer holder onto the drum shaft.
9. Manually rotate the main drive motor counterclockwise 9.6 turns. The top of the micrometer rod will indicate the point where the outboard orifice of puffer manifold should be (Fig. 3-181).

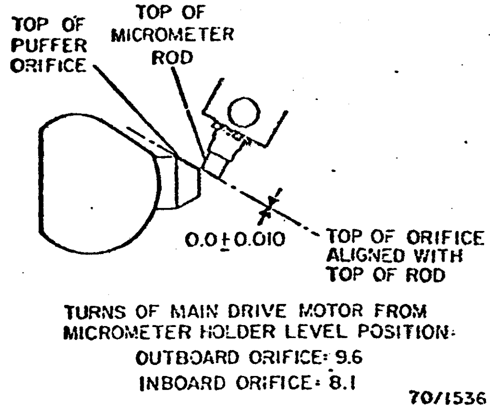

Fig. 3-181. Alignment of Puffer Orifice

10. If necessary, adjust the outboard end of the manifold so the top of the micrometer rod and the outboard orifice are aligned.
11. Remove the scale from the combination square, adjust the angle of the manifold (Fig. 3-182) by placing one end of the scale on the upper flat of the manifold, aligned with the orifice edge of the manifold at the 10th orifice in from the outboard end.
12. Rotate the manifold until the scale comes into contact with the drum shaft.

NOTE: When the angle of the manifold is properly set, the scale will be properly set, the scale will be in full contact with the manifold, aligned with the orifice edge of the manifold at the 10th orifice in from the outboard end, and just in contact with the drum shaft.

13. Tighten the hardware for the mounting bracket at the outboard end of the manifold.
14. Reverse the micrometer holder on the drum shaft and position it so that the micrometer rod is aligned with the inboard orifice. Level the micrometer holder in the same manner as in steps 5 through 8.
15. Manually rotate the main drive motor counterclockwise 8.1 turns. The top of the micrometer rod will indicate the point where the inboard orifice of the puffer manifold should be (Fig. 3-181).
16. If necessary, adjust the inboard end of the puffer manifold so the top of the micrometer rod and the inboard orifice are aligned.
17. Tighten the mounting bracket hardware at the inboard end of the puffer manifold.
18. Recheck the outboard orifice setting and the angle of the manifold.
19. Perform the miss detector shield adjustment (10.5). Adjust the drum clamp (8.5). Check the puffer timing adjustment.

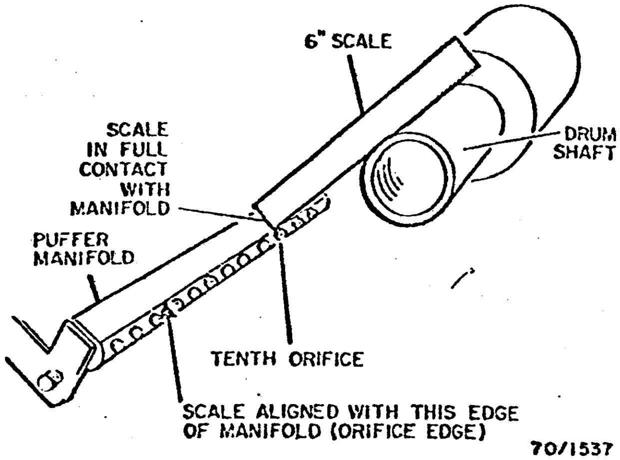

Fig. 3-182. Manifold Angle

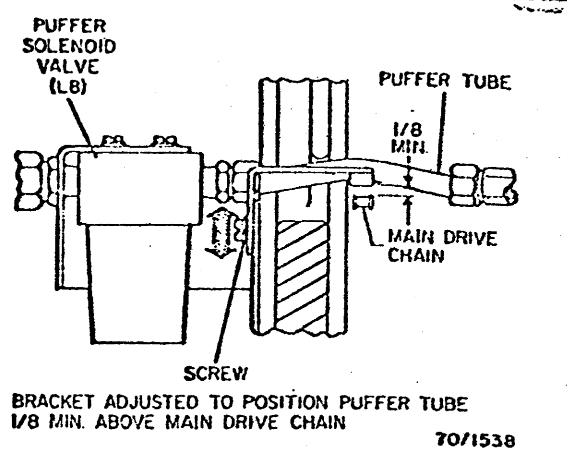

Fig. 3-183. Puffer Hose Clearance

10.6 Puffer Hose Clearance

Adjustment

Adjust the puffer hose clearance in accordance with Fig. 3-183.

NOTE: Adjusting the puffer hose clearance too high may cause the hose to kink, resulting in mispuffs.

10.7 Miss Detector Shield

1. Use micrometer holder 600T753, micrometer 600T52 and 2 to 3 inch extension 600T53 to adjust the miss detector shield relative to the drum shaft.
2. Adjust the shield to the dimension in Fig. 3-184, taking measurements 1/8-inch from both the inboard and outboard edges of the shield.

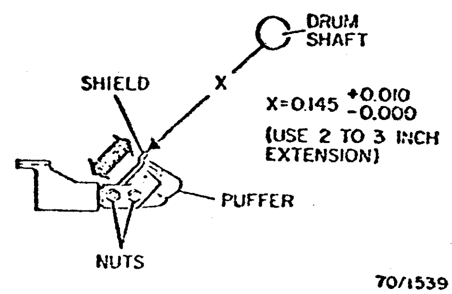

Fig. 3-184. Miss Detector Shield

10.9 Puffer Regulator Valve

Replacement

1. When replacing the puffer regulator valve, be certain to position it as shown in Fig. 3-185. Use sealant on all pipe threads.
2. Check for leaks by placing machine in "standby" and checking compressor cycling. If compressor cycles on and off, indicating a leak, turn the puffer regulator valve all the way in. If the leak stops, check the fittings and sealant between the valve and solenoid; if the leak continues, check the fittings and sealant between the valve and the tee.

Adjustment

1. To set the puffer control valve turn it completely CCW and then turn it one and one-half turns CW. This is a nominal setting and may require additional adjustment if puffer smear problems occur.

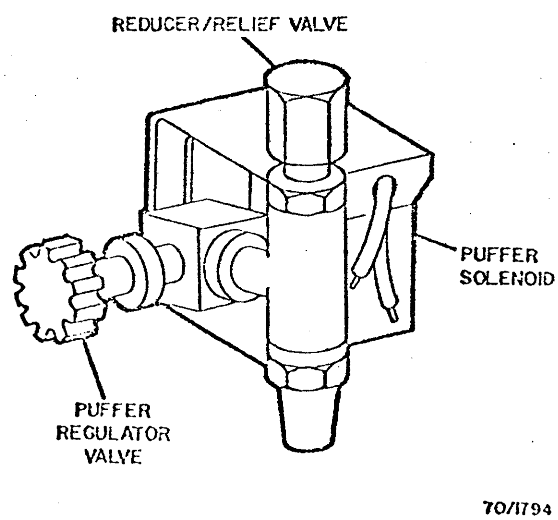

Fig. 3-185. Puffer Solenoid Valve Assembly

11. FUSING

The major components of the fusing system are shown in Fig. 3-185.

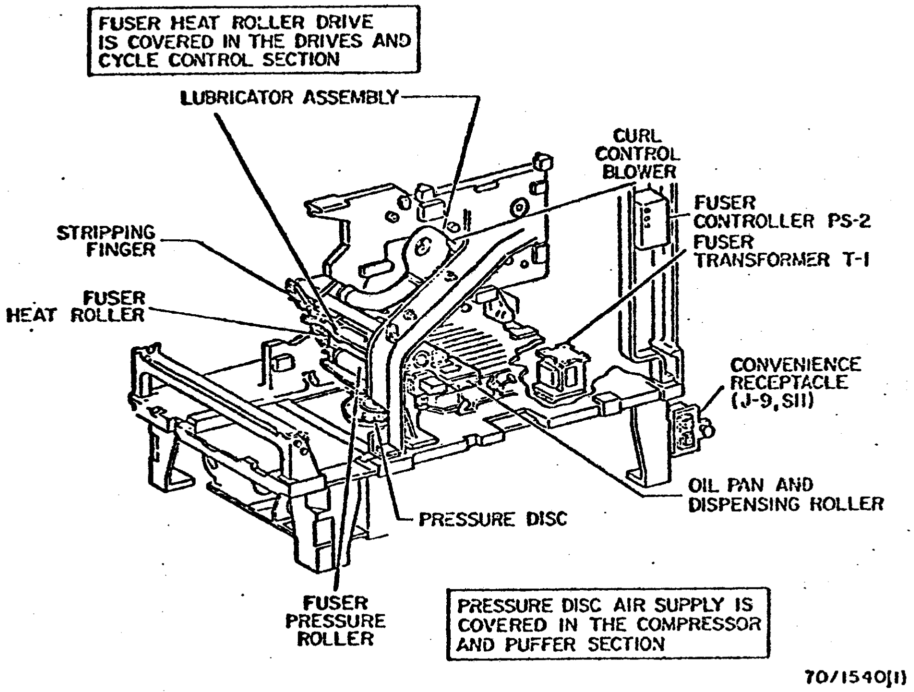

Fig. 3-185. Fusing, Location of Major Components

11.1 Fuser Pressure Roller and Fuser Paper Guide

Removal

1. Remove the fuser pressure roller drive chain.
2. Remove the fuser paper guide.
3. Support the pressure bar and remove the outboard retaining pin. Lower the pressure bar, move it outboard, and remove it.
4. Remove the pressure roller.

Replacement

NOTE: If the retaining pins are not secured mechanically, insert the retaining pin, then apply loctite to each end to keep the pin from vibrating loose.

1. After replacement, adjust fuser paper guide
2. If the pressure roller sprocket is removed or replaced, perform the sprocket alignment (11.2).
3. If the stopscrews have been disturbed or the pressure roller has been changed, adjust contact arc (11.4).

NOTE: The bearings in the register stop drawer that hold the connecting rod for the fuser pressure roller in place, are now field replaceable. This alleviates the problem of having to order a register stop drawer when one of these bearings wears out.

11.2 Fuser Pressure Roller Sprocket
Adjustment
1. Remove the drive chain.
2. Loosen the screws (Fig. 3-187) and remove play in the fuser pressure roller.
3. Align the sprockets.

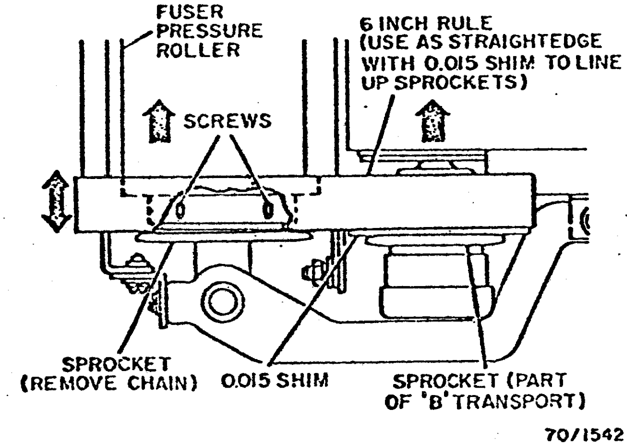

Fig. 3-187. Sprocket

11.3 Felt Wiper
Removal
1. Remove the fuser paper guide (11.1).
2. Support the pressure bar and remove the outboard retaining pin. Lower the pressure bar, move it outboard and remove it.
3. Remove the mounting hardware, strip, and felt wiper.

NOTE: To increase the efficiency of the wiper, position the extra flap so it just touches the underpart of the roller.

4. After replacement, adjust the felt wiper.

Adjustment
To adjust the felt wiper, loosen the nuts (Fig. 3-188) and push the bracket up until it is snug against the slot ends.

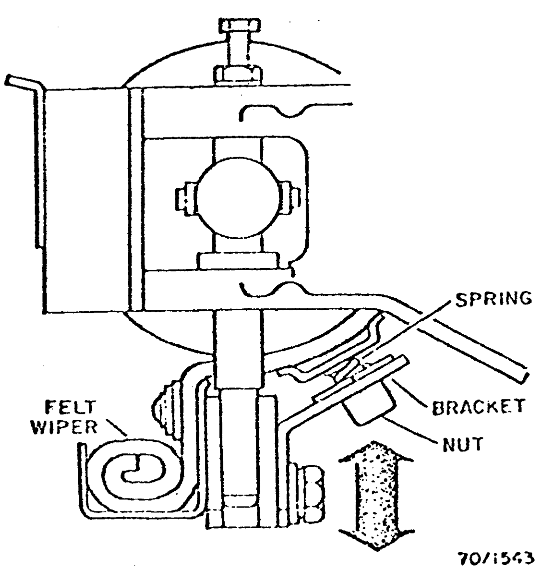

Fig. 3-188. Felt Wiper

11.4 CONTACT ARC ADJUSTMENT
1. Allow machine to reach READY condition.
2. Make two or three copies of graph paper.

CAUTION: Do not run more than two or three copies.

Complete the following steps as quickly as possible to prevent cooling of fuser roller:

3. Disable developer/feeder by placing LS-2 in *off* position.
4. Remove card cage cover.
5. Disconnect P/J-9 (main drive motor).
6. Lay a clean sheet of customer's paper on one of the graph paper copies made in step 2. Place the papers on the B transport so that some of the lines on the graph paper are on the pressure roller.
7. Close the register stop drawer. Turn the machine on.
8. Press START PRINT. Then press FUSER PRESS switch (S-5 on engine control module) and hold for approximately five seconds.
9. Measure the contact arc on the offset copy (customer's paper). Contact arc shall be:
   Red roller: 0.310--0.350
   Max. end-to-end deviation: 0.030

NOTE: To ensure proper measurement, draw a line with a straight edge on both sides of the transferred image and measure the arc width one inch from both ends.

10. If necessary, adjust the stopscrews and repeat steps 6 through 10 until the contact arc is correct.

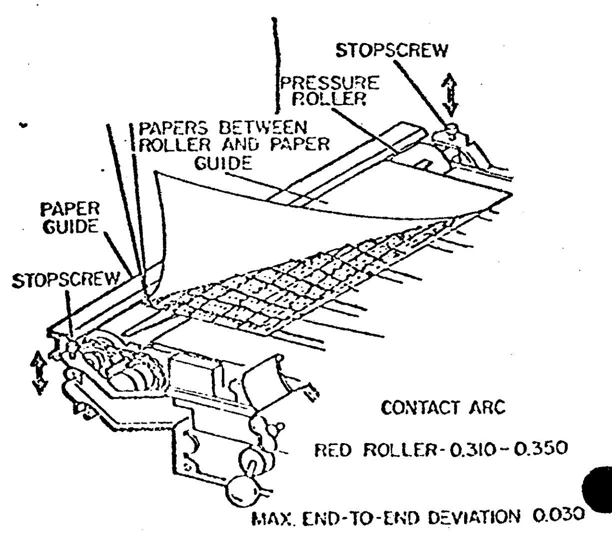

Fig. 3-189. Paper Placement for Contact Arc

11.5 Pressure Disc

Removal

1. Slide the register stop drawer out from the machine.
2. Carefully clean the area around the pressure disc to prevent foreign matter from contaminating the seal.

CAUTION: Never operate the machine with the register stop drawer removed and the interlock jumpered or the pressure will rupture the pressure disc.

3. Loosen the retaining hardware on the slotted side of the diaphragm ring. Remove the other retaining hardware from the ring. Slide the diaphragm and pressure disc to the left, then lift out.

Replacement

CAUTION: Steel shot developer can cause stripped threads. If it is difficult to tighten the hardware; do not force. Clean the threads with a 10-24 tap (600T161).

1. Place the diaphragm ring over the pressure disc, and slide both parts into the slot at the same time to avoid curling of the seal.
2. Tighten opposing screws a little at a time, in a manner similar to tightening nuts on a car wheel.
3. Perform the stud collar adjustment (11.7).

11.6 Pressure Disc Solenoid

Removal

1. Remove the lower front cover
2. Remove the drain cap on the sniffer-fluffer air filter assembly, and drain the accumulator tank.
3. Remove the two air hoses and two wires at the solenoid. Remove the mounting hardware and lift off the solenoid.

Replacement

1. Replace in reverse order of removal. Run several copies and observe the operation of the fuser pressure roller. Check the contact arc adjustment (11.4).

11.7 Stud Collar

1. Pull out the register stop drawer to make the following adjustments, then return it to the "home" position for the measurements.
2. Loosen the setscrew (Fig. 3-190) and with the pressure bar in the maximum down position, adjust for a gap of between 0.015 and 0.030.

NOTE: Access may be obtained from the left side of the machine, from under the C transport. (Make sure this area is free from steel shot.)

3. Put Locktite on the threads of the nut and setscrew.

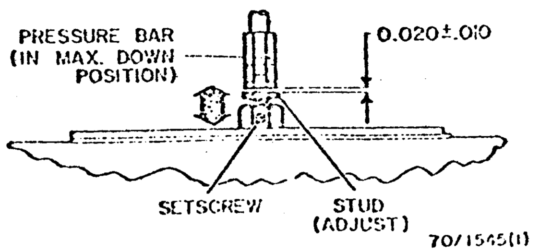

Fig. 3-190. Stud Collar

11.8 READY TEMPERATURE ADJUSTMENT, MALFUNCTION TEMPERATURE ADJUSTMENT

1. Open top covers.
2. Remove card cage cover.
3. Open front doors and override door interlocks.
4. Insert pyrometer probe between wick and fuser heat roller.
5. Turn printer on.
6. When fuser temp. reaches 285° - 300°F, adjust ready temp. pot (R4 on engine control board) so that ready light just comes on.
7. If temp. malfunction is not to be adjusted, proceed to step 12.
8. Turn fuser temp. adjustment on PS-2 to max (full clockwise).

***WARNING:** Fuser controllers with part number 109P266 or 109S269 have potentiometer shafts of varying lengths, or no shafts at all. This condition presents a serious shock hazard when a metal screwdriver is used to make the fuser adjustment, unless protective busing 16P917 has been installed. If you are working on one of these two controllers, and there is no protective busing on the shaft, order and install the busing and make the fuser adjustment with the MAIN POWER OFF.*

9. When fuser temp. reaches 400°F, adjust temp. mal. pot (R5 on engine control board) until the printer power drops out.
10. Turn fuser temp. adjustment on PS-2 to min. (counter-clockwise).
11. Allow fuser to cool and readjust fuser temp. (PS-2) to maintain 350°F. (Step 11.9)
12. Remove pyrometer.
13. Replace card cage cover.
14. Return printer to service.

11.9 Fusing System Temperature Adjustment

NOTE: The machine must be in a READY state before making the adjustment.

1. Turn off the power and open the front doors.
2. Cheat the door interlocks.
3. Disconnect the P/J connector on the fuser lubricator assembly. Connect calibration tool 600T884 to the jack connector.
4. Turn on the power.
5. Turn the PS2 control clockwise until the quartz fuser element comes on and begins pulsing. Now adjust the control counterclockwise (down) until the glow just disappears. PS2 is now properly adjusted.

WARNING: *Fuser controllers with part number 109P266 or 109S269 have potentiometer shafts of varying lengths, or no shafts at all. This condition presents a serious shock hazard when a metal screwdriver is used to make the fuser adjustment, unless protective bushing 16P917 has been installed. If you are working on one of these two controllers, and there is no protective bushing on the shaft, order and install the bushing and make the fuser adjustment with the MAIN POWER OFF.*

6. Turn off the power. Remove the tool and reconnect the connectors (or wires).
7. Turn on the power again. Allow the heater to stabilize and verify the temperature setting with PYROMETER

NOTE: If the controller system is not responding accurately. it may be necessary to readjust the controller slightly to bring the temperature to the proper temperature indication.

11.10 Heat Roller

Removal

1. Remove the lubricator assembly (11.15).
2. Disconnect wire 124M1 and remove the outboard socket cover.
3. Remove the outboard socket assembly and spring.
4. Carefully withdraw the heater rod with a clean dry cloth. Remove the stripping finger.
5. Leave the register stop drawer in. Remove the outboard fuser frame mounting hardware. Lift the fuser frame off its locating pins.
6. Use a towel to balance the heat roller on the pressure roller. Pull out the heat roller together with the register stop drawer.
7. Loosen the outboard bearing setscrews. Remove the outboard bearing and save for reuse.

Replacement

1. Leave the plastic wrapping material on the new fuser heat roller for protection during installation. Install the outboard bearing and tighten the setscrew.
2. Balance the new heat roller on the pressure roller, with the register stop drawer open.
3. Push the drawer and heat roller in as a unit, then engage the heat roller with its driving sprocket.
4. Slide the plastic wrapping material off the end of the heat roller.
5. Carefully insert the heater rod.
6. Replace the spring, then visually center the outboard socket contact over the end of the heater rod, and fasten the assembly.
7. Check continuity between the outboard socket and ground to be sure there is no short circuit.
8. Replace the outboard socket cover, wire 124AS, and lubricator assembly.
9. Replace the stripping finger.

11.11 Heater Rod and Outboard Socket Assembly

Removal

1. Disconnect wire 124M1 and remove the outboard socket cover.
2. Remove the outboard socket assembly and spring.

CAUTION: Use a clean dry piece of cloth (or other suitable material) to handle heater rod R1. Never touch the heater rod with your hand. Should any impurities such as body oil or silicone oil be transferred to the heater rod, the quartz (from which the rod is made) will deteriorate.

3. Roll a sheet of 13- or 14-inch paper into a tube. Slide the tube over the heater rod to prevent the rod from becoming contaminated during removal. Grasp the rod through the paper, and carefully remove the rod.

Replacement/Adjustment

When replacing the outboard socket assembly, visually center its contact over the end of the heater rod. Make a continuity check between the outboard socket contact and ground to be sure it is not shorted out.

11.12 Fuser (Heat Roller) Sprocket and Inboard Socket Assemblies

Removal

1. Release tension on the main drive chain by securing the spring-loaded idler in the "down" position. Pull out the register stop drawer; reach in and slide the main drive chain off the fuser sprocket.
2. The brush cleaner vacuum hose obstructs access to the parts which are to be removed. Disconnect the hose at the point where it connects to the brush cleaner assembly.
3. Remove the inboard socket cover.
4. Disconnect wire 134AS and remove the inboard socket assembly.
5. Remove the fuser sprocket assembly.

Replacement

1. Insert the fuser sprocket assembly, making sure the fuser sprocket properly engages the fuser heat roller.
2. Replace the main drive chain on the fuser sprocket. Release the spring loaded idler, put tension back on the chain, and secure the idler in the "up" position.
3. Replace the inboard socket assembly and visually center contact over the end of the heater rod. Make a continuity check between the outboard socket contact and ground to be sure it is not shorted out.
4. Replace inboard socket cover.

11.13 Fuser Transformer and Fuser Controller

Removal

Disconnect the power cord from its outlet prior to removing or replacing T1 and PS2.

Replacement/Adjustment

After replacement of T1, check adjustment of the fuser transformer output (11.14). Also, if PS2 has been replaced, adjust the fuser system temperature (11.9).

11.14 Fuser Transformer Output

1. Plug in the power cord. With the machine making copies, measure the voltage at TB1 (Fig. 3-193).
2. Remove the power cord from the outlet. Connect wire 8 to the lug corresponding to the meter reading.
3. Plug the power cord back into the outlet. Measure the voltage between input wires 123 and 9 on the fuser controller: 230±10 VAC should be obtained. If necessary, relocate wire 8 to obtain the specified voltage.

WARNING: Whenever voltage is being measured at wires 123 and 9 be careful not to touch the meter leads together.

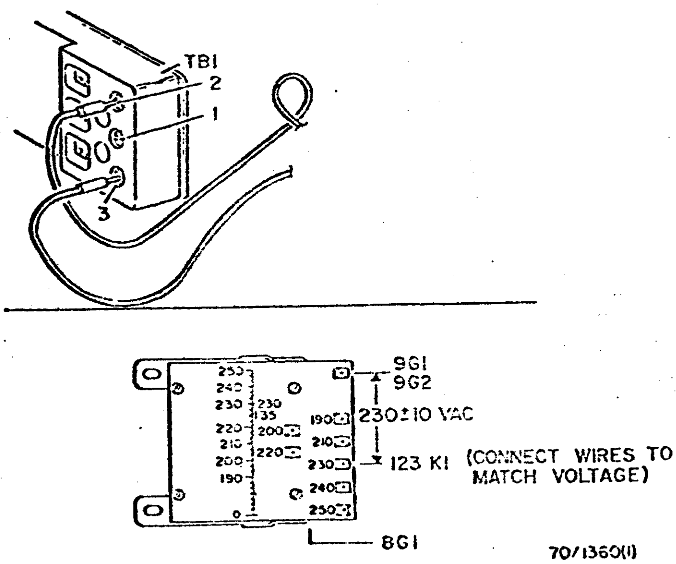

Fig. 3-193. Adjustment of Fuser Transformer T1 Output

11.15 Lubricator Assembly

Removal

1. Disconnect P/J71.
2. Loosen the retaining clip.
3. Remove the lubricator assembly from the machine.

Replacement

CAUTION: When replacing the lubricator assembly use care so as not to damage the thermistor beads.

1. Be sure the clip is seated on the fuser frame.
2. Re-connect P/J71.

11.16 Oil Pan Assembly

WARNING: Rubbing the eyes after touching silicone oil can cause eye irritation. This ittitation is very mild and usually disappears within 24 hours. Flush eyes with water to relieve eye irritation. As a precaution wash hands with soap after touching silicone oil.

1. Drain the oil out of the oil pan.

CAUTION: If the machine has a reserve oil tank, be sure to drain it completely or clamp its hose otherwise oil will overflow into the machine or onto the office floor.

2. Remove the lubricator assembly.
3. Disconnect the wires (or connector) to motor B16.
4. Open (or remove) the harness clamp.
5. Scribe a mark on the drum brush housing, adjacent to the oil pan outboard mounting bracket.
6. Remove one bolt from the inboard side.
7. Remove two screws from the outboard side. Remove the oil pan assembly.
8. When replacing, make sure the oil pan engages the two locating pins on the inboard frame and that the outboard end is lined up with the previously scribed line.
9. Check and adjust oil pan assembly height as necessary (11.17).

11.17 Oil Pan Assembly Height

1. Measure height at the inboard end (Fig. 3-194).
2. Loosen the screws and adjust the outboard end to the same height as the inboard end.
3. Tighten the screws.

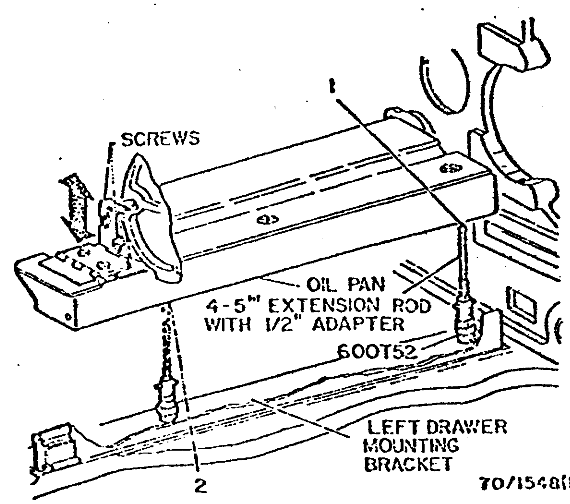

Fig. 3-194. Oil Pan Height

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11.18 Upper and Lower Wicks

New upper and lower wicks should be checked before installing them to assure sufficient and uniform saturation of silicone oil. There are two reasons for this check: The wick may have been undersaturated in manufacturing; and the improper storage of the wicks on end causes the silicone oil to run down to the lower end of the wick. Proceed as follows:

- Preliminary Procedure
  1. Before opening the plastic package containing the new wick, apply pressure to the wick with your fingers. Silicone oil should rise to the surface if the wick is properly saturated. Check the entire surface of the wick in this manner to check for proper and uniform saturation.
  2. If the wick is unevenly saturated, lay the wick (still in the plastic package) down on a flat surface. Using the drum extension shaft as a rolling pin, move the oil from the oversaturated end to the undersaturated end.
  3. If the wick is undersaturated, remove the wick from its plastic package and lay it on a flat surface. Pour a small amount of silicone oil lengthwise down the center of the wick. Using the handle of the screwdriver, apply a slight amount of pressure to the wick surface and distribute the oil evenly on the wick. Repeat this procedure until it is properly saturated.

NOTE: When replacing wicks, make sure the black plate is on the thickest side of the lubricator assembly (right side). When a new upper wick is installed, a break-in is necessary to establish proper oil flow through the lubricator assembly, and to allow the upper wick to conform to the fuser heat roller. Proceed as follows:

Replacement

1. Make sure the wick is saturated, as described above.
2. Install the lubricator assembly.

CAUTION: Always turn machine off when working on wick assembly. Disconnecting the P/J71 connector with power on can cause arcing and short circuits.

3. With machine power off, wedge the START PRINT button in the actuated position.

NOTE: It is very important that this step be performed in order to allow the machine to start making copies as soon as proper fuser temperature is reached. The copy paper should reach the fuser roll as quickly as possible so that it will absorb some of the heat and cut down the temperature overshoot, thus reducing the chance of burning the wick.

4. Place a blank sheet of paper on the platen and set machine for 200 copies. Press POWER ON and let the machine run out the full 200 copies. This will permit the wick and thermistor to become properly seated. Once the thermistor is properly seated in the wick, the warmup overshoot will be controlled automatically.

NOTE: A new Nomex upper wick has been issued to replace the white wool wicks currently in use. The new material will not scorch or burn at the temperature found in our machine. This will eliminate problems and complaints due to odors of scorched wool and should extend wick life greatly. When installing a Nomex wick, you will notice that one side has a "singed" appearance. This is caused by a flame treatment in manufacture and is done to improve oil retention properties. The wick should be installed with this "singed" side down or toward the fuser roll.

11.19 Oil Pan Baffle

Adjust the oil pan baffle as in Fig. 3-195.

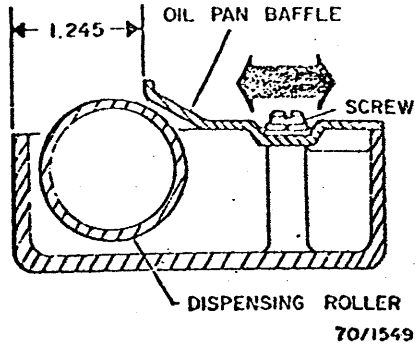

Fig. 3-195. Oil Pan Baffle

11.20 Dispensing Roller

Removal

1. Remove the oil pan assembly (11.16).
2. Scribe the position of the outboard mounting bracket on the baffle, for reassembly purposes.
3. Remove the baffle and bracket.
4. Remove one screw only from the inboard roller spring bracket, and scribe the position of the bracket around the screw hole on the casting.
5. Remove the other screw, then remove the inboard roller bracket without disturbing the position of the spring.
6. Slide the dispensing roller inboard and remove.

Replacement

1. To replace the dispensing roller, reverse the removal procedure. Line up the brackets on the previously scribed marks. If necessary, perform the dispensing roller adjustment (see below), oil pan baffle adjustment (11.19), and oil pan assembly height adjustment (11.17).

Adjustment

1. Adjust the dispensing roller as in Fig. 3-196.

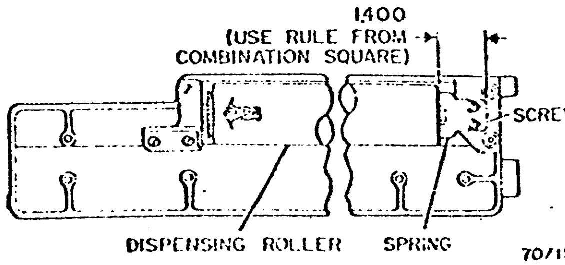

Fig. 3-196. Dispensing Roller

11.21 Oil Dispensing Motor

1. Remove the oil pan assembly (11.16).
2. Loosen the Allen setscrew securing the gear to the motor shaft. Remove the gear.
3. Remove the cap screws securing the motor to the casting. Remove the motor.

NOTE: When installing the gear, line it up in the middle of the idler gear.

ADJUSTMENT

Oil dispenser control (S3 on engine control board) is normally set to the "E" position. This provides maximum oil dispensing. If over oiling occurs, this setting may be decreased. It is recommended that the setting should not be changed more than one or two positions at a time, since it will take a long period of time for the effects to be evident.

S3

11.22 Center Stripping Finger Replacement

CAUTION: The tip of the stripping finger is delicate and can easily be damaged. Use caution when handling the stripping finger assembly.

If the stripping finger support has been disturbed, perform the center stripping finger adjustment (below).

Adjustment

1. Loosen the nuts, position the clamp at center of the tie bar and swing the stripping finger away from the fuser heat roller (Fig. 3-197).

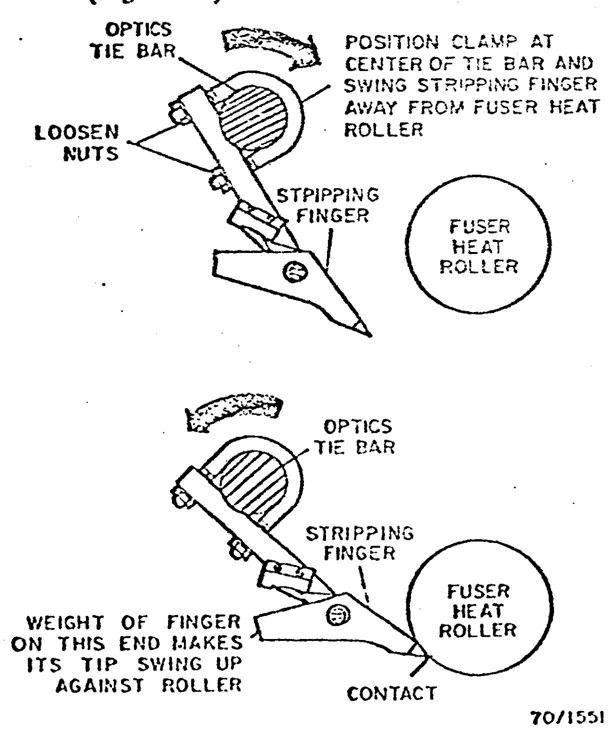

Fig. 3-197. Stripping Finger Assembly Adjustment

2. Pivot the assembly until the tip of the stripping finger contacts the roller at the 8-o'clock position (maintain the clamp at the optical centerline to prevent paper skew), then tighten.

11.23 Paper Curl Duct Adjustment

Adjust paper curl duct as in Fig. 3-198.

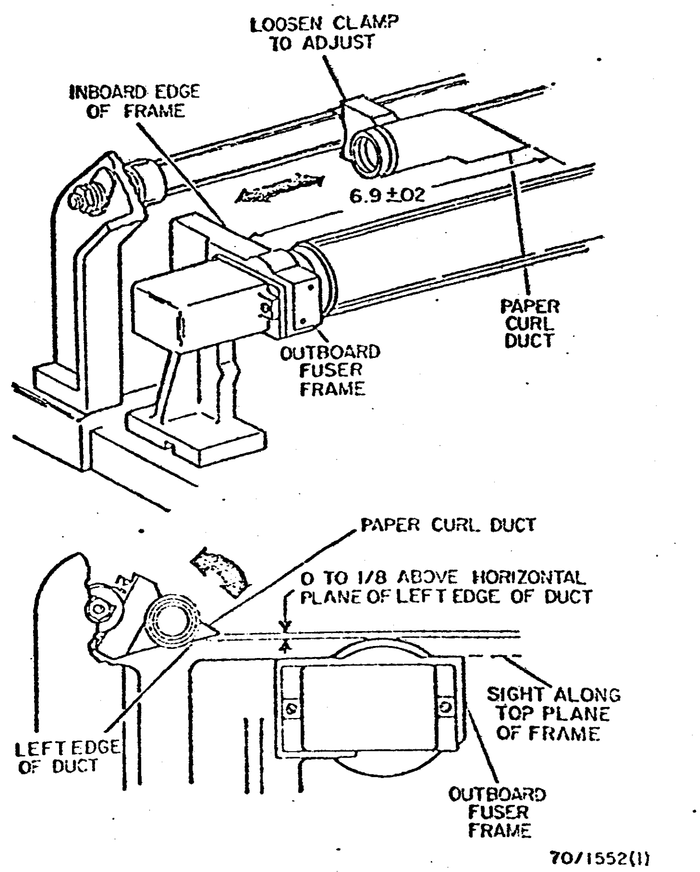

Fig. 3-198. Paper Curl Duct Adjustment

12. C TRANSPORT

The major components of the C Transport are shown in Fig. 3-199.

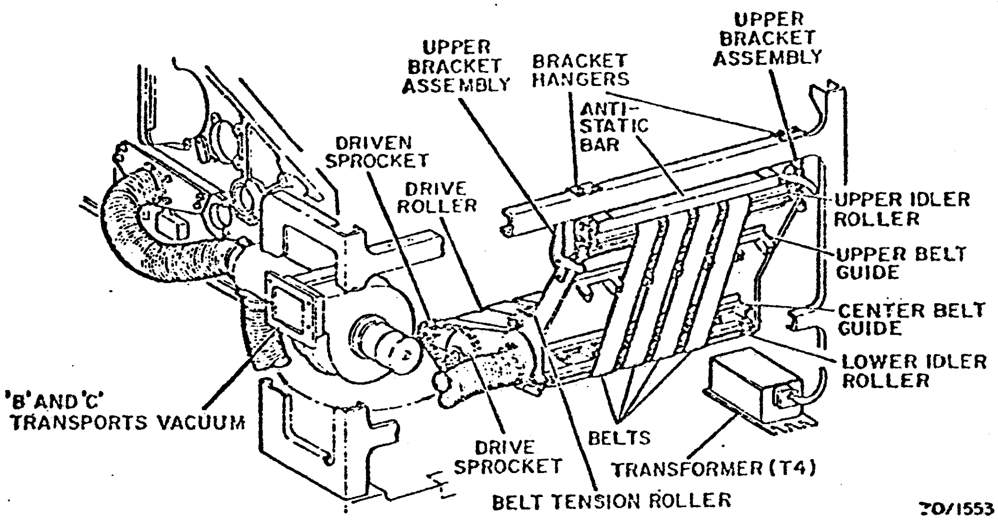

Fig. 3-199. C Transport System, Location of Major Components

12.1 C Transport Assembly

Removal

1. Remove the receiving tray, the left side cover, and the antistatic bar. (On some machines without a sorter the left top cover must be removed to gain access to the anti-static bar hardware.)
2. Back off the adjusting screws on the upper bracket assemblies. Remove the C transport vacuum hose. If the machine still has a reserve oil pan, remove and discard.

NOTE: Before removing a reserve oil pan, drain both oil pans, discard the oil hose, insert plug (3P2104) in the oil pan assembly, and refill the oil pan assembly.

3. Release the retaining clip on the lower outboard bracket assembly of the C transport.
4. Loosen the locking screw on the collar at the outboard end of the drive shaft, and slide the collar in against the C transport frame.
5. Move the exposure lamp harness outboard of the lower bracket assembly.
6. Place the right hand under the C transport and the left hand on the inboard side of the C transport. Press outboard with the left hand while lifting with the right hand. This will release the dogs from the drive sprocket cup.
7. Remove the C transport from the left side of the machine.

Replacement

1. Place the C transport in the machine with the outboard end of the drive shaft resting on the outboard lower bracket assembly, and with the upper mounting pins resting on the upper bracket assemblies.
2. Place the right hand under the C transport and the left hand on the inboard side of the C transport. Slide the C transport into the machine until the drive sprocket of the C transport lines up with the frame-mounted sprocket.
3. With the right hand, reach under the inboard end of the C transport and grasp the drive shaft. With the left hand the lower idler roller. Push inboard with the right hand while turning the idler roller until the dogs mesh with the sprocket. (When the dogs mesh, the C transport will move inboard slightly to the 'home' position.)
4. Latch the retaining clip on the lower outboard bracket assembly of the C transport.
5. Lock the C transport in the 'home' position by sliding the collar on the drive shaft outboard against the lower outboard bracket assembly. Tighten the setscrew on the collar.
6. Reconnect the C transport vacuum hose.

CAUTION: Make sure the C transport vacuum hose is connected properly. Loss of vacuum in the C transport can cause paper to back up and jam between the transport belts and the fuser roller.

7. Reposition the esposure lamp harness inboard of the lower bracket assembly.
8. Check the C transport vertical position adjustment (12.2). If necessary, perform the C transport clearance adjustment (12.3). Adjust the screws in the upper bracket assemblies to just contact the sides of the C transport frame.
9. Replace the antistatic bar and adjust (12.4).
10. Replace the left panel and the receiving tray.

12.2 C Transport Vertical Position

Adjustment

1. Remove the screws securing the top left cover. Swing the cover over against the platen—be careful not to strain the two platen interlock wires.
2. Remove the extreme inboard and outboard screws securing the bracket hangers.
3. Adjust both the inboard and outboard upper brackets in accordance with Fig. 3-200.

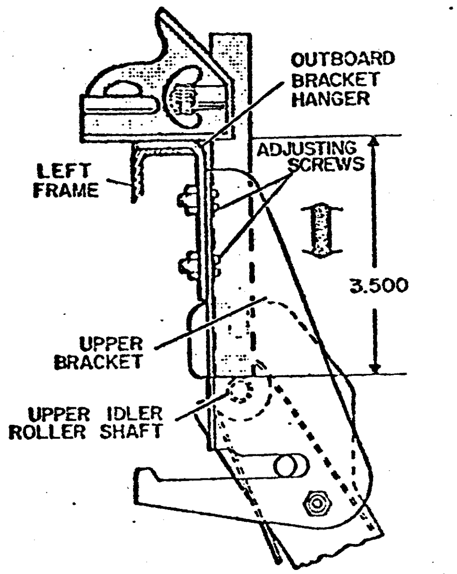

Fig. 3-200. C Transport Vertical Position

12.3 C Transport Clearance

Adjustment

1. Remove the screws securing the top left cover. Swing the cover against the platen—being careful not to strain the two platen interlock wires.
2. Adjust both the inboard and outboard upper brackets in accordance with Fig. 3-201.

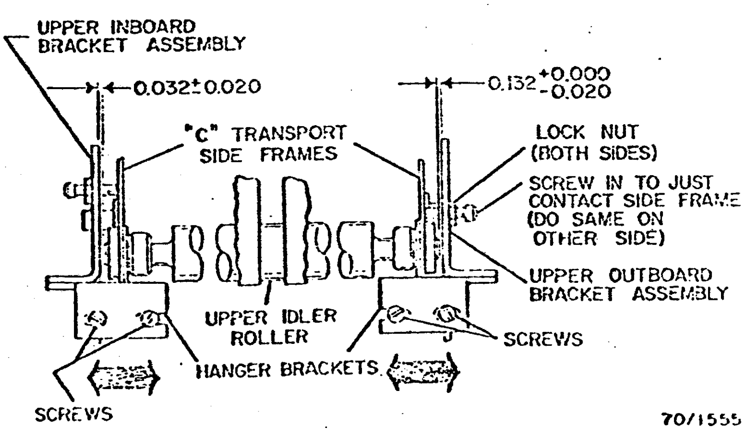

Fig. 3-201. C Transport Clearance

12.4 Antistatic Bar

Adjustment

1. Remove the receiving tray.
2. Adjust the antistatic bar in accordance with Fig. 3-202.

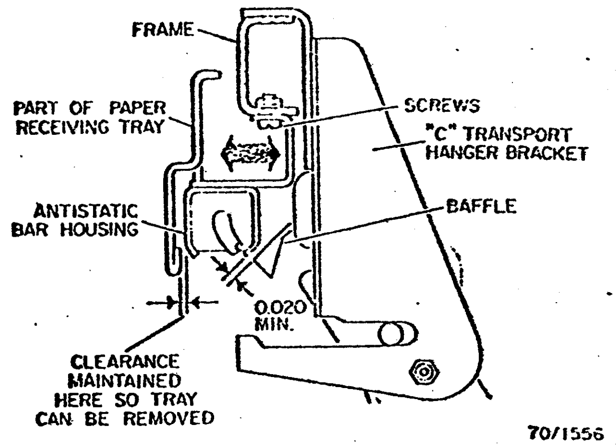

Fig. 3-202. Antistatic Bar

12.5 Finger Assembly

Removal

Remove the screws on the top side of the finger assembly, and remove the assembly.

NOTE: This procedure will not disturb any adjustments. However, if the brackets are moved, the finger assembly adjustment (below) should be checked.

Adjustment

Adjust the inboard and outboard ends of the finger assembly in accordance with Fig. 3-203.

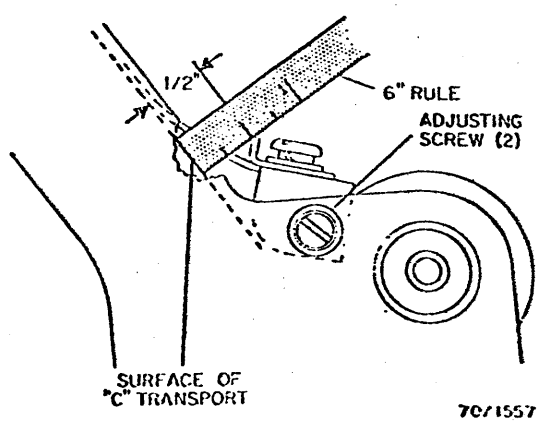

Fig. 3-203. Finger Assembly

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12.6 Belt Guides

Removal

Loosen the guide hardware and slip the guide out from under the belts.

CAUTION: Be careful that the sharp edges of the guide do not cut the belts.

Adjustment

Adjust as in Fig. 3-204.

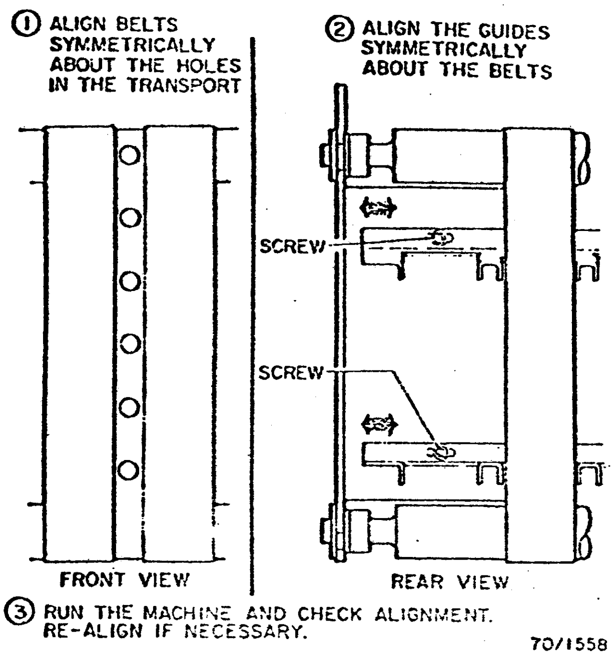


Fig. 3-204. Belts and Belt Guides

12.7 Sprockets, Belts, and Rollers

Removal

1. Remove the C transport assembly (12.1).
2. If the C transport drive chain or either sprocket requires replacement, remove the chain's connector link, then the chain. The drive sprocket is not secured to the shaft and can be slipped off. Loosen the setscrew to remove the driven sprocket.
3. Remove the pinch wheel shaft and baffle.
4. Remove the finger assembly (12.5).
5. Remove the bearing assemblies from each end of the belt tension roller. Remove the roller by sliding it to one side, then lifting it out of the frame.
6. Slip the belts off over the outboard side of the frame taking care that the sharp edges of the belt guides do not cut the belts.
7. Remove the drive roller or idler rollers as required.

12.8 Drive Roller

Adjustment

1. With the C transport assembly out of the machine, adjust the drive roller in accordance with Fig. 3-205.
2. Torque setscrews 28-34 inch-pounds.

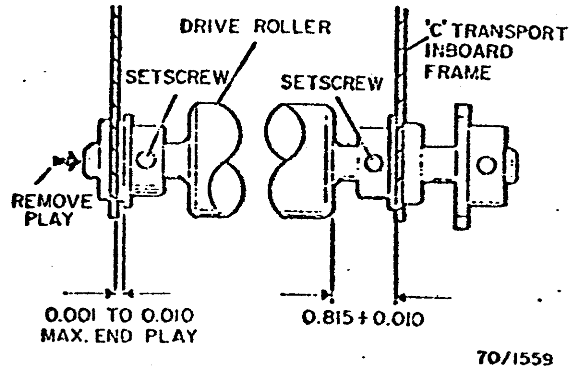


Fig. 3-205. Drive Roller

12.9 Upper Idler Roller

Adjustment

1. If the C transport assembly is installed in the machine, remove the receiving tray to gain access to the upper idler roller.
2. Adjust the roller in accordance with Fig. 3-206.

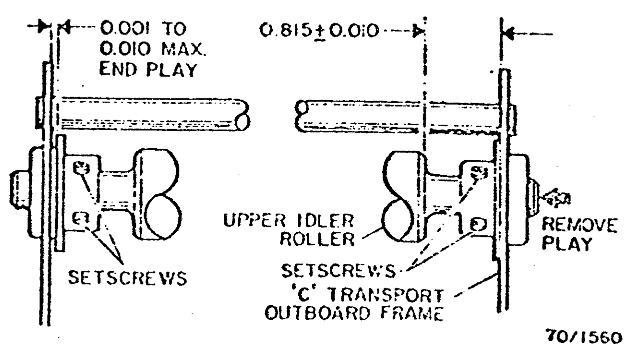


Fig. 3-206. Upper Idler Roller

12.10 Lower Idler Roller

Adjustment

1. If the C transport is installed in the machine, remove the receiving tray and left cover to gain access to the lower idler roller.
2. Adjust the roller in accordance with Fig. 3-207.
3. Torque setscrews 28-34 inch-pounds.

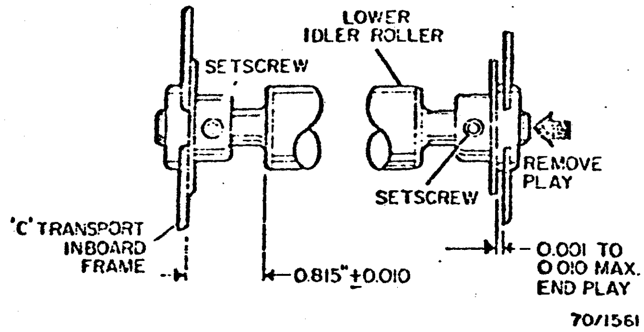


Fig. 3-207. Lower Idler Roller

12.11 Belt Tension Roller

Adjustment

1. If the C transport assembly is installed in the machine, gain access to the belt tension roller by removing the top left cover and disconnecting the hose molding for the lamp cooling blower.
2. Adjust the roller in accordance with Fig. 3-208.
3. Torque setscrews 28-34 inch-pounds.

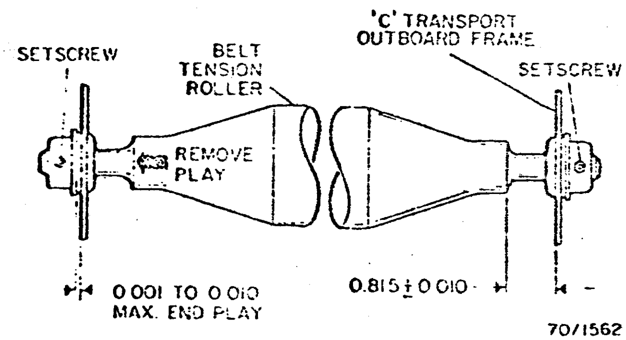


Fig. 3-208. Belt Tension Roller

12.12 Driven Sprocket Alignment

1. Loosen setscrews on both sprockets and locate combination square as shown; tighten setscrews on large sprocket (Fig. 3-209).
2. Use 6-inch rule as straightedge to line up the outside surface of drive sprocket with the outside surface of large drive sprocket.
3. Tighten setscrew.

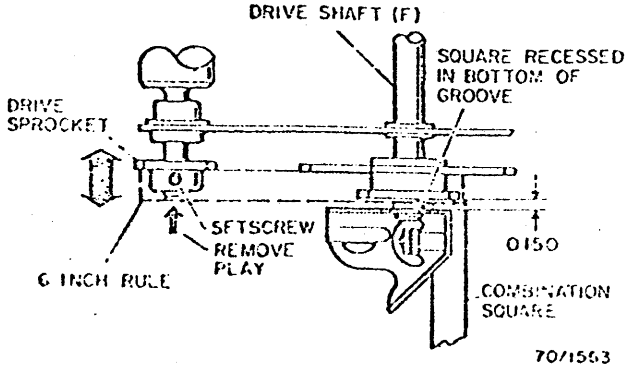


Fig. 3-209. Driven Sprocket Adjustment

12.13 Pinch Wheel

Adjustment

Relieve tension on retaining ring and adjust to dimension in Fig. 3-210.

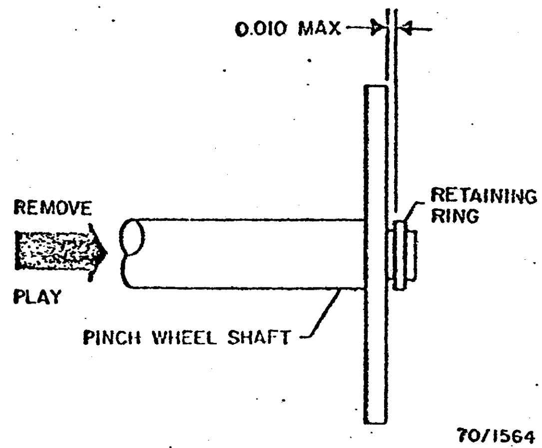


Fig. 3-210. Pinch Wheel Shaft Adjustment

12.14 C Transport Baffle

Adjustment

1. Loosen screws (two at each end of baffle).
2. Check baffle position at two points (Fig. 3-211).
3. Tighten screws loosened in step 1.

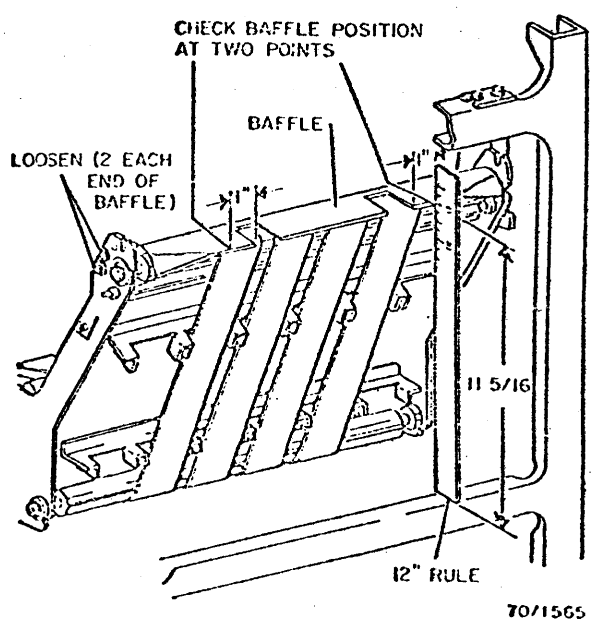


Fig. 3-211. Baffle Adjustment

13. DRUM CLEANING

The major components of the drum cleaning system are shown in Fig. 3-212.

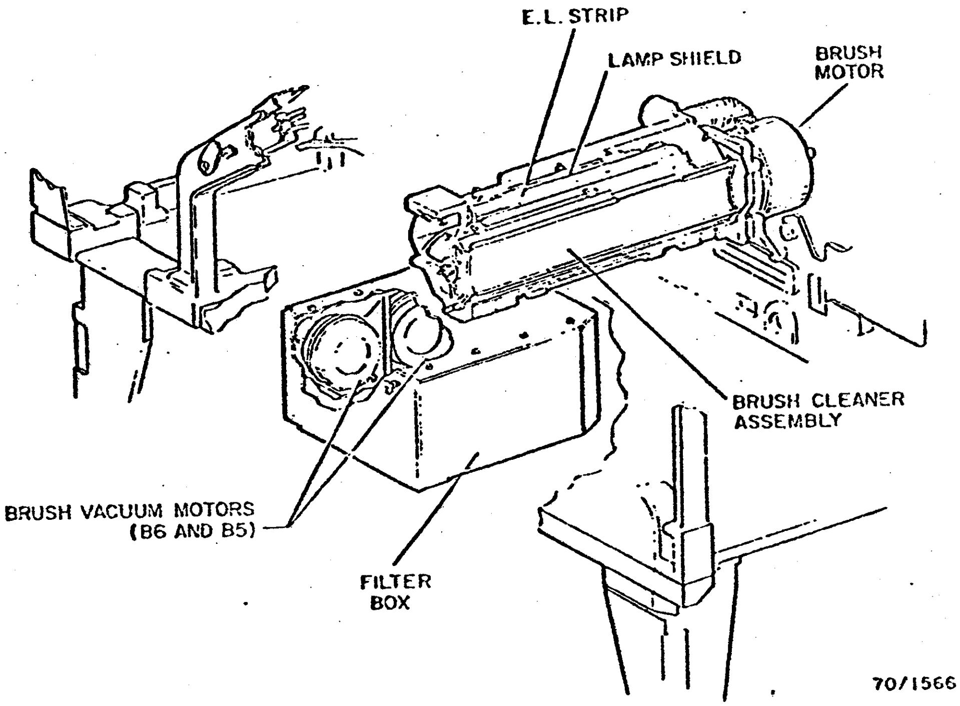


Fig. 3-212. Drum Cleaning, Location of Major Components

13.1 Electroluminescent (E.L.) Strip and Lamp Shield

Removal

1. Unplug the E.L. Strip and slide it out of the lamp holder (Fig. 3-213).
2. Clean with a soft cloth, or replace if necessary.

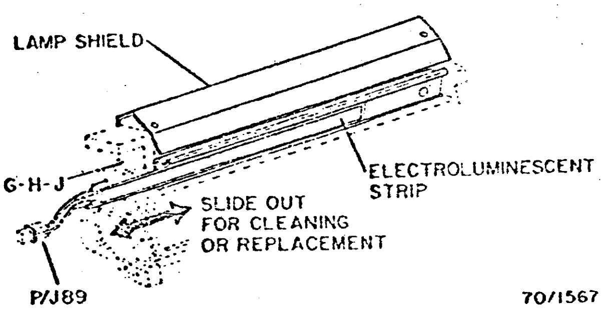


Fig. 3-213. Electroluminescent Strip and Lamp Shield

CAUTION: Reports have been received that Discharge lamp E.L. Strips which were not properly seated were being pulled into the brush housing and igniting the toner and brush. It is imperative that during each service call the Tech. Rep. make certain the E.L. Strip is in its proper position.

Under no circumstances should a customer remove the Discharge lamp E.L. Strip to clean it. Customers taking part in the O.C.M. program should only clean the E.L. Strip by brushing it off while it is in place in the machine.

3. Before replacing E.L. Strip, check position of the lamp shield.

Adjustment
(Lamp Shield)

1. Remove the drum (8.2) and charge corotron.
2. Use micrometer holder 600T753, micrometer 600T52, and 2 to 3 inch extension 600T53 to adjust the lamp shield relative to the drum shaft.
3. Adjust the shield to the dimension shown in Fig. 3-214.
4. Check the dimension along the full length of the shield.

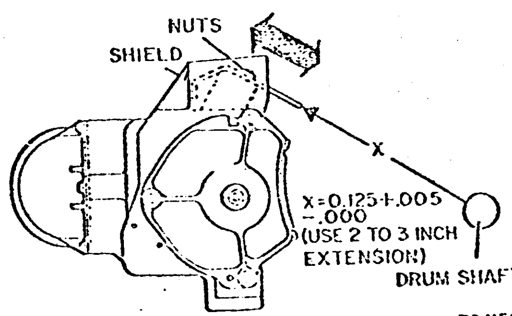


Fig. 3-214. Lamp Shield

13.2 Brush Housing Door

Removal

1. Loosen the three captive screws (Fig. 3-215) and lift off the brush housing door assembly.
2. Disassemble as required. If the outboard arbor shaft is disturbed, perform the outboard arbor shaft concentricity adjustment (13.5).

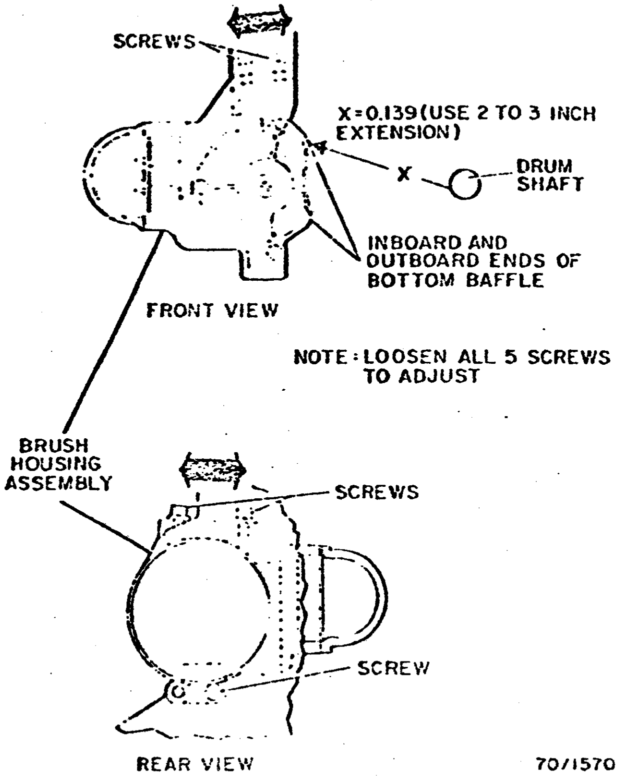


Fig. 3-215. Brush Housing Door

Replacement

1. When replacing the brush housing door assembly rotate the assembly CCW until the door slot banks against the locating pin. Tighten the captive screws.

13.3 Brush Housing

1. Use micrometer holder 600T753, micrometer 600T52 and 2- to 3-inch extension 600T53 to adjust the brush housing relative to the drum shaft.
2. Adjust the housing to the dimension shown in Fig. 3-215.
3. Check the lamp shield adjustment (13.1).

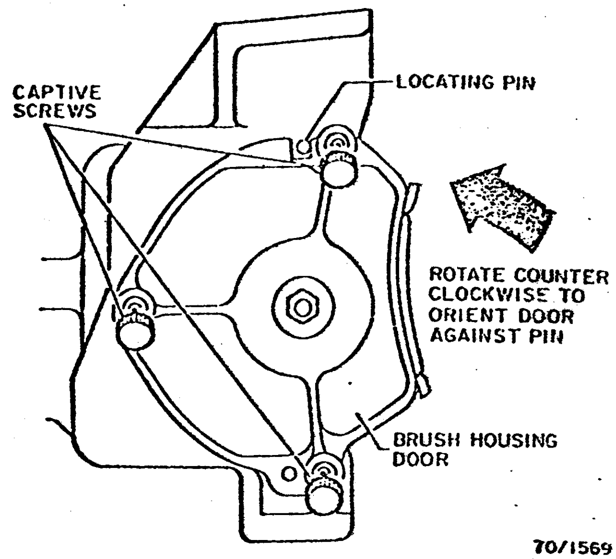


Fig. 3-216. Brush Housing

13.4 Brush Motor

Removal

1. Remove the drum (8.2). Remove the brush housing door assembly (13.2) and brush.

NOTE: If the brush is dirty, worn, or matted, replace it.

2. Loosen the setscrew securing the inboard brush arbor and remove the arbor.
3. Disconnect the two motor wires. Disconnect the screws securing the motor. Remove the motor.

Replacement

1. Replace the motor with the oil hole in the 11-o'clock position (viewed from the rear of the machine). Before tightening the mounting hardware, perform the brush motor shaft concentricity adjustment (13.7).
2. Replace the inboard brush arbor and adjust (13.6).
3. Replace the brush, brush housing door assembly, and drum.

13.5 Outboard Arbor Shaft Concentricity

1. Loosen the nut at the end of the arbor shaft.
2. Place the small diameter hole in tool 600T424 over the end of the arbor shaft—with the "GO—NO GO" gauging surface of the tool above the edge of the flicker bar (Fig. 3-217).
3. Adjust the shaft so that the gauging surfaces at all four corners of the tool are concentric with the housing. Tighten the nut securing the shaft.

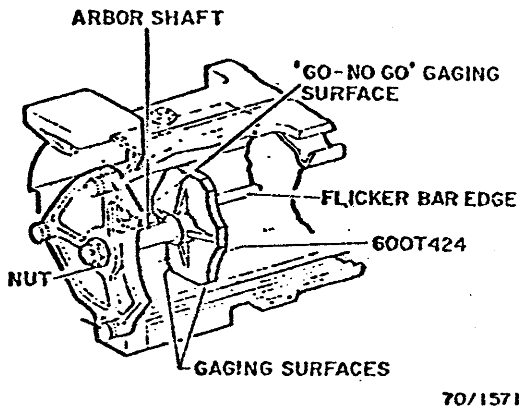


Fig. 3-217. Outboard Arbor Shaft Concentricity

13.6 Inboard Brush Arbor

Adjustment

1. Adjust the inboard brush arbor as in Fig. 3-218.

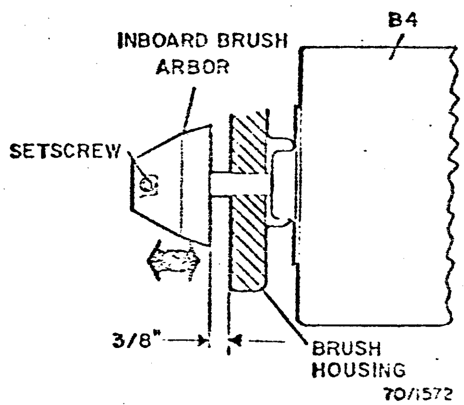


Fig. 3-218. Inboard Brush Arbor

13.7 Brush Motor Shaft Concentricity

1. Remove the inboard brush arbor. Loosen the motor mounting screws.
2. Place the large diameter hole in tool 600T424 over the end of the brush motor shaft—with the "GO—NO GO" gauging surface of the tool above the edge of the flicker bar (Fig. 3-219).
3. Adjust the shaft so that the gauging surfaces at all four corners of the tool are concentric with the housing. Tighten the motor mounting screws.
4. Replace then adjust the inboard brush arbor (13.6).

13.8 Flicker Bar

Removal

1. Remove the discharge lamp and lamp shield (13.1).
2. Remove the brush housing door assembly (13.2). Remove the brush.
3. Remove the hardware securing the flicker bar, and slide the flicker bar out of the machine (Fig. 3-220).

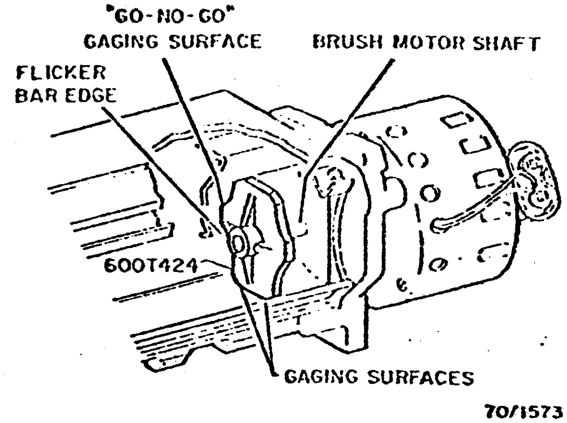


Fig. 3-219. Brush Motor Shaft Concentricity

Replacement

1. Replace the flicker bar, then adjust (see below).
2. Replace the lamp shield, then adjust (13.1).

Adjustment

1. Remove the discharge lamp and lamp shield.
2. Remove the outboard and inboard brush arbors.
3. Perform the outboard arbor shaft concentricity adjustment (13.5).
4. With tool 600T424 mounted on the outboard arbor shaft, check that the "GO" gauging surface clears the flicker bar edge (Fig. 3-217): Check that the "NO GO" gauging surface does not clear the flicker bar edge.
5. If necessary, loosen the nuts securing the flicker bar, adjust the flicker bar to meet the requirements of step 4.
6. Perform the brush motor shaft concentricity adjustment (13.7).
7. With tool 600T424 mounted on the brush motor shaft, check that the "GO" gauging surface clears the flicker bar edge (Fig. 3-219). Check that the "NO GO" gauging surface does not clear the flicker bar edge.
8. If necessary, adjust the flicker bar to meet the requirements of step 7.
9. If the flicker bar has been adjusted, retighten the mounting nuts and repeat steps 4 and 7.
10. Replace the outboard and inboard brush arbors. Adjust the inboard brush arbor (13.6).
11. Replace the brush and the brush housing door assembly.
12. Replace the discharge lamp and lamp shield. Adjust the lamp shield (13.1).

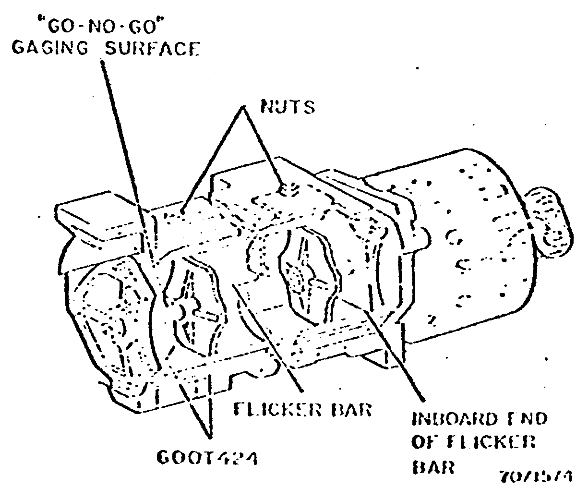


Fig. 3-220. Flicker Bar

13.9 Filter Bag

Removal

1. Remove the lower front cover from the machine. Twist the lock studs on the filter box door and open the door.
2. Grasp the tray handle and pull the tray and filter bag out of the machine.
3. Open the locking bar on the tray and pull the tray off the filter bag.
4. Remove a new filter from its plastic bag. Place the used filter in the plastic bag, and seal the plastic bag to prevent toner spill.

Replacement

1. Slip the tray under the cardboard portion of the new filter and close the locking bar. Make sure the filter and locking bars are properly seated.
2. Insert the tray in the tracks on the underside of the filter box top surface while inserting the filter bag in the filter box.

CAUTION: Be sure the filter bag is clear of the fan blades.

3. Close and lock the filter box—making sure both studs latch. Replace the lower front cover.

13.10 Brush Vacuum Motors

1. To remove either motor, remove the two wires connecting the motor to TB1.
2. Remove the mounting hardware.
3. Lift the motor off the frame.

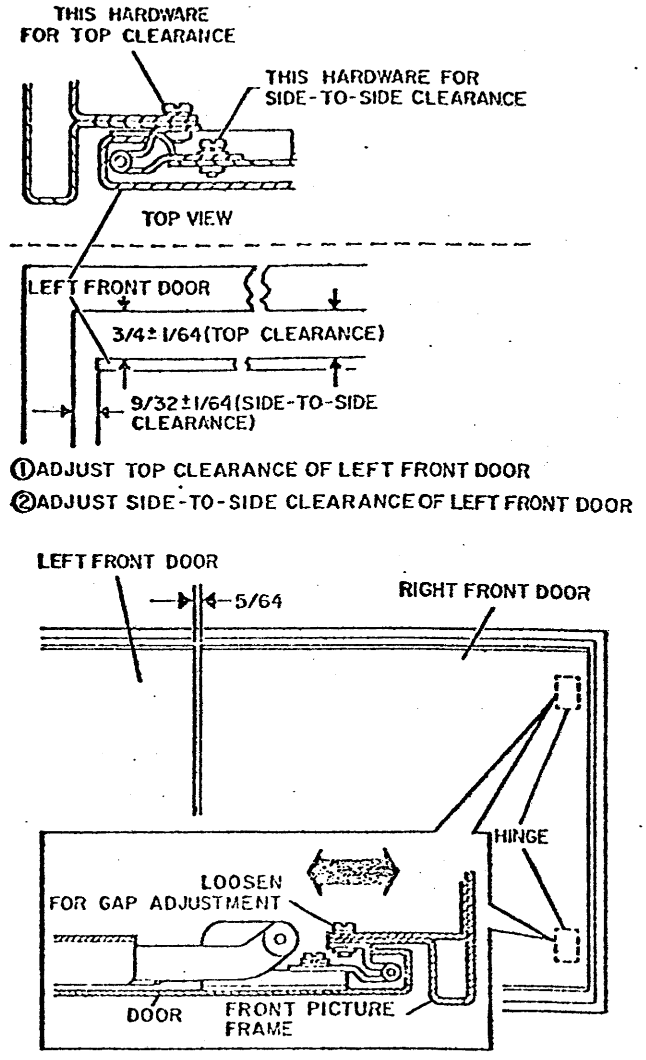
NOTE: Make sure the motor gasket is properly seated to prevent loss of vacuum.

14. COVERS

The principle doors, covers, panels and associated components are shown in Fig. 3-221.

14.1 Front Doors

1. Adjust top clearance of left front door (Fig. 3-222).
2. Adjust side-to-side clearance of left front door.
3. Align top of right front door with top of left front door.
4. Adjust gap between doors.



③ ALIGN TOP OF RIGHT FRONT DOOR WITH TOP OF LEFT FRONT DOOR

④ ADJUST GAP BETWEEN DOORS

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Fig. 3-222. Front Doors

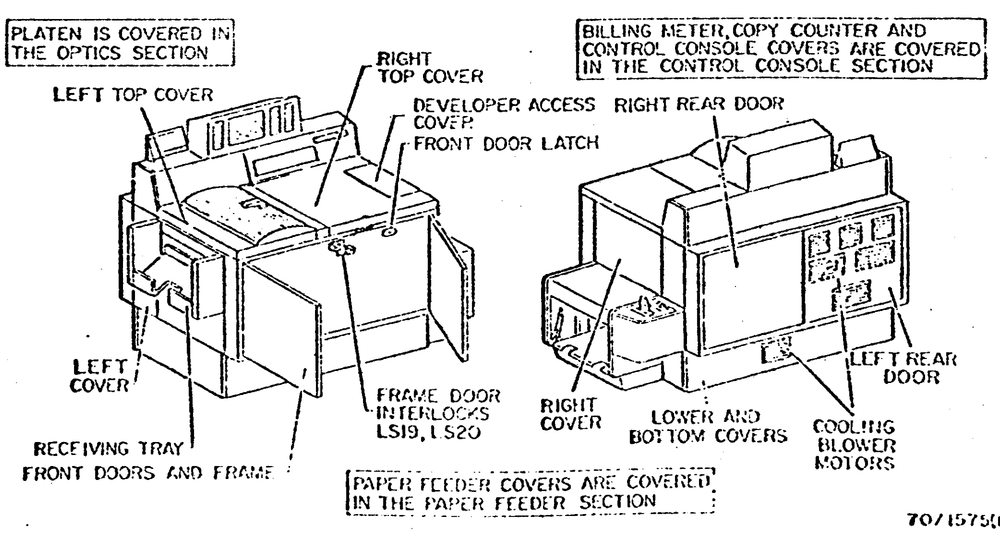

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Fig. 3-221. Covers and Cooling Fans, Location of Major Components

14.2 Catch Stop Bracket
Adjustment
1. Loosen screws (4) on upper and lower catch stop brackets (Fig. 3-223).
2. Adjust left and right doors until parallel when closed, then tighten screws.

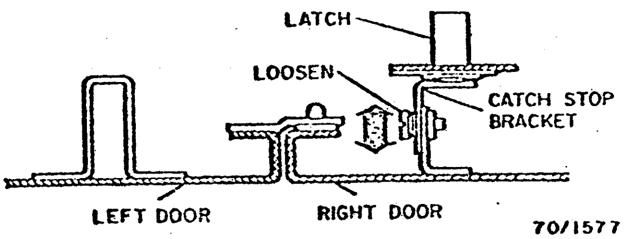


Fig. 3-223. Catch Stop Bracket Adjustment

14.3 Front Door Interlocks LS19 and LS20
1. Closing one door at a time, adjust door interlock bracket so that both actuators are centered in bracket cutouts.
2. One door at a time, adjust both switch brackets to dimension shown in Fig. 3-224. Check that closing door actuates switch but does not bottom switch plunger.

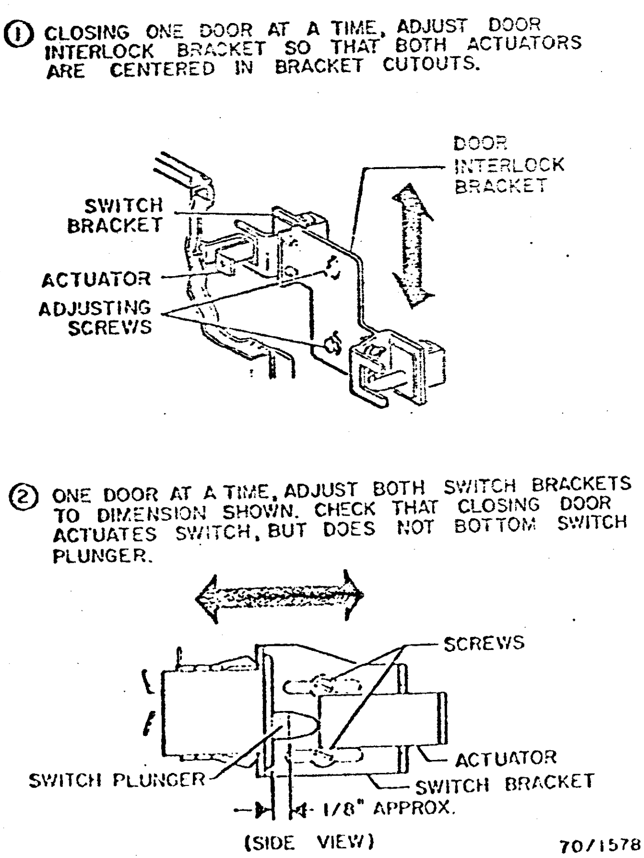


Fig. 3-224. Front Door Interlocks

14.4 Rear Doors
1. Adjust latches to obtain dimension shown in Fig. 3-225 for both rear doors.
2. Adjust frame mounting rods to obtain dimension shown for both rear doors.
3. Adjust ball-stud in left rear door to seat firmly in socket

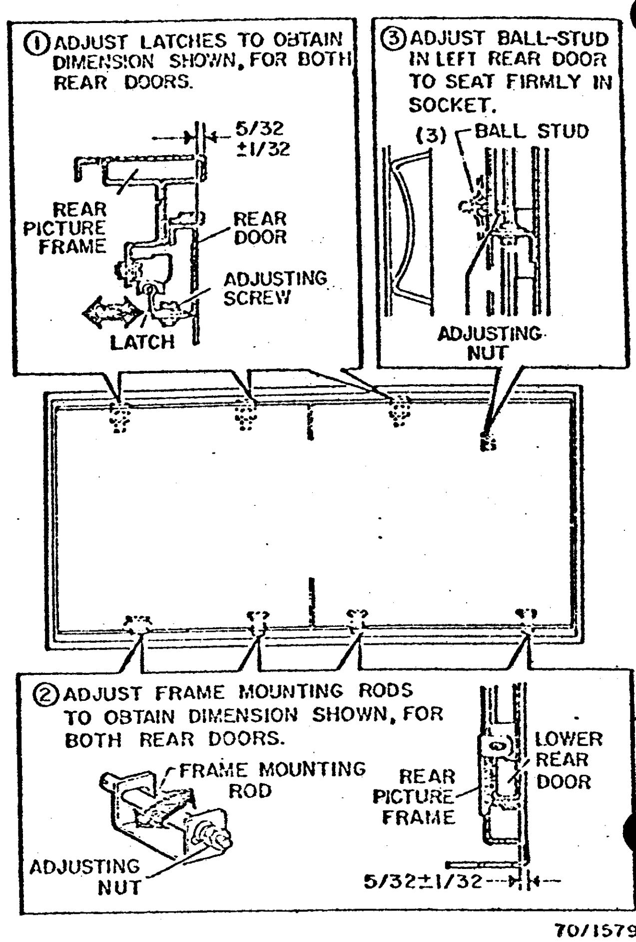


Fig. 3-225. Rear Door

14.5 Rear Door Trim
1. Adjust the rear door trim in accordance with Fig. 3-226.

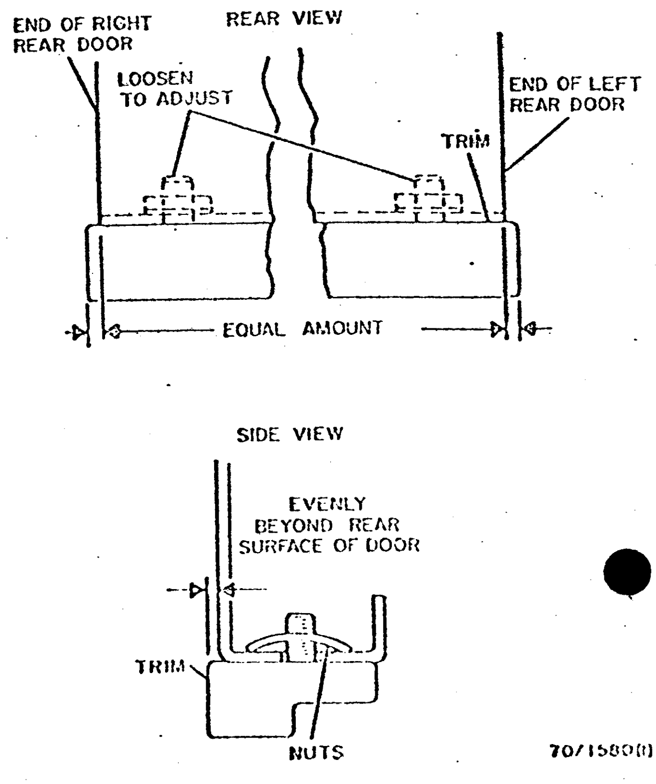


Fig. 3-226. Rear Door Trim

14.6 Front and Rear Lower Covers

1. Adjust hinges to center cover horizontally (Fig. 3-227).
2. Adjust catches to mate with studs on cover.

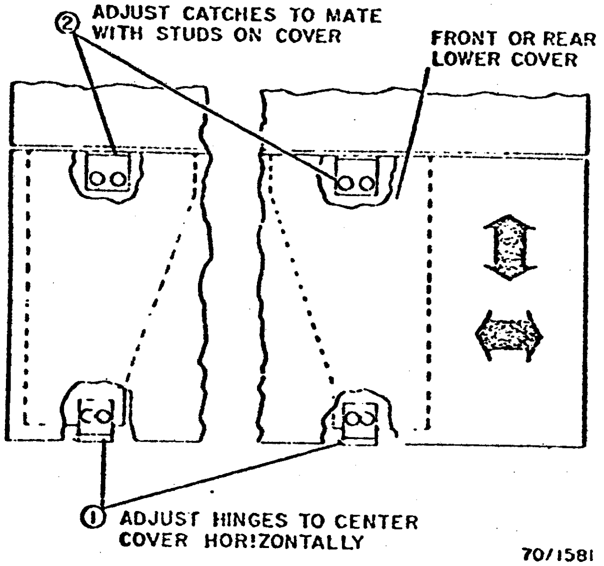


Fig. 3-227. Front and Rear Lower Covers

14.9 Left Cover Adjustment

1. Loosen screws holding mounting bracket (Fig. 3-230).
2. Adjust setscrew on frame and mounting bracket to obtain dimension of 0.060 ± 0.010 between cover and both picture frames.
3. Loosen stud on mounting bracket and screws holding inboard supports.
4. Adjust supports and stud for a parallel fit between picture frames and cover.

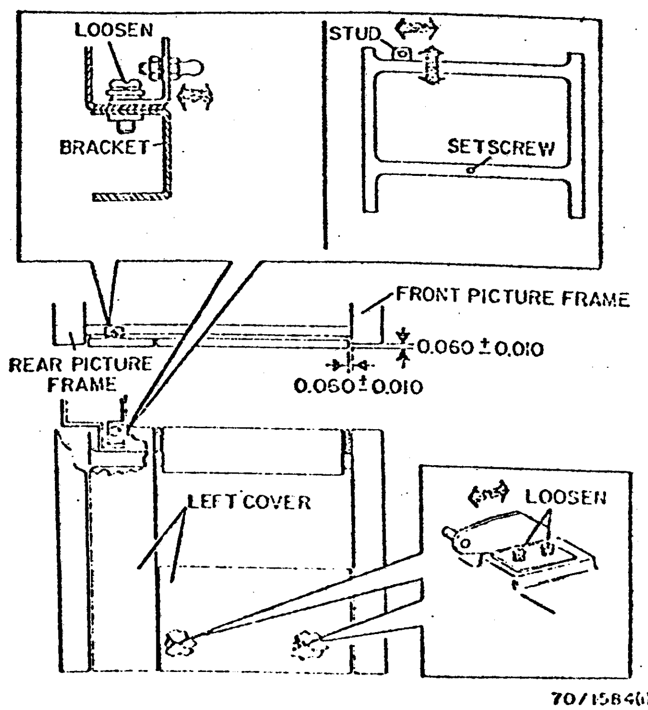


Fig. 3-230. Left Cover Adjustment

14.10 Right Cover
Adjustment

1. Loosen studs.
2. Adjust cover to seat in clips while maintaining parallel clearance of 0.060 ± 0.010 to front picture frame (Fig. 3-231).

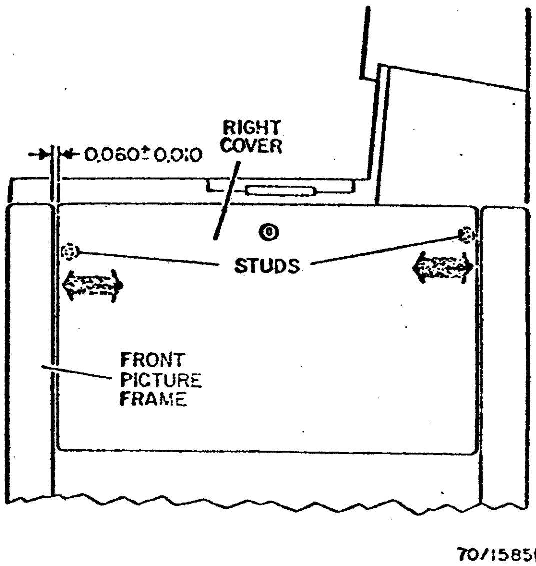


Fig. 3-231. Right Cover Adjustment

14.11 Lower Right Cover
Adjustment

1. Swing down lower rear cover to gain access to two sets of screws.
2. Loosen the screws and slide the mounting brackets in the required direction to obtain the dimension shown in Fig. 3-232. (Be sure the lower right-hand cover clears the paper tray drive gear.)

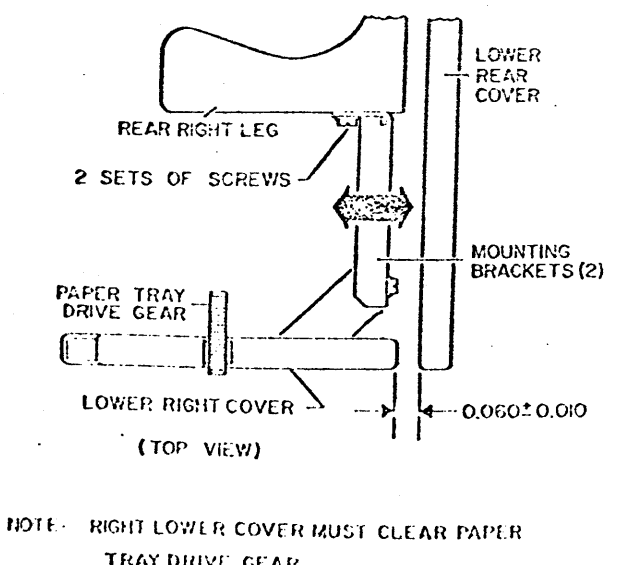


Fig. 3-232. Lower Right Cover Adjustment

14.12 Lower Left Cover
Adjustment

1. Adjust mounting catches (front and rear) and mounting brackets (front and rear) so panel is symmetrical with lower front and rear covers (Fig. 3-233).

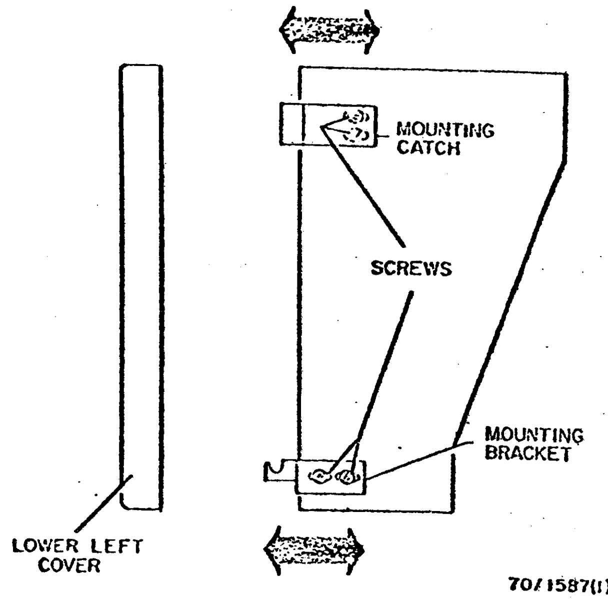


Fig. 3-233. Lower Left Cover Adjustment

14.13 Receiving Tray

NOTE: When replacing a receiving tray which has tray spring clips (19P1243) installed, ensure that the clips are under the idler roller of the C transport and clear of any belts. This will prevent the clips from catching on or changing the position of the belts, thus causing jams in the C transport area.

14.14 Paper Tray (In Receiving Tray)
Adjustment

1. Loosen three nuts on each side of receiving tray (Fig. 3-234).
2. Adjust the paper tray to obtain the settings shown.

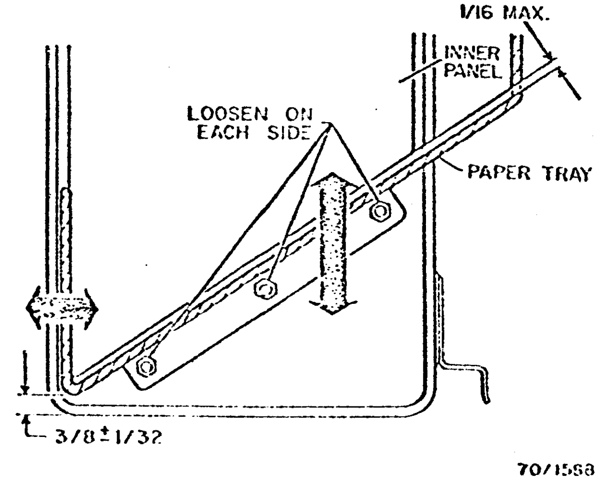


Fig. 3-234. Paper Tray Adjustment

14.15 Centering Of Support And Receiver Tray
Adjustment

1. Loosen the four screws holding the support.
2. Adjust the support to obtain the dimensions shown in Fig. 3-235.
3. Center the receiving tray assembly 1/64-inch in from the edges of the front frame and left-hand cover.
4. Re-tighten screws.

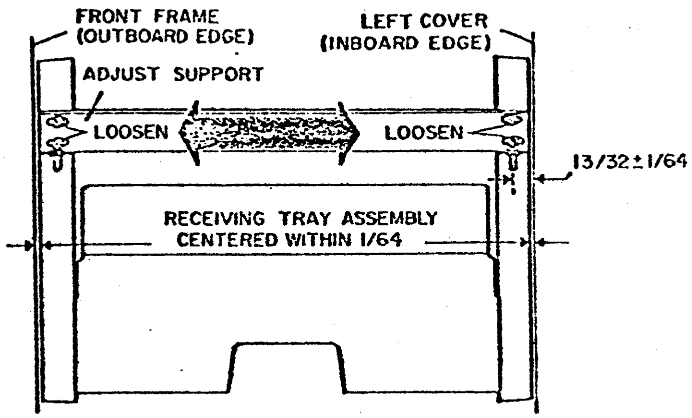
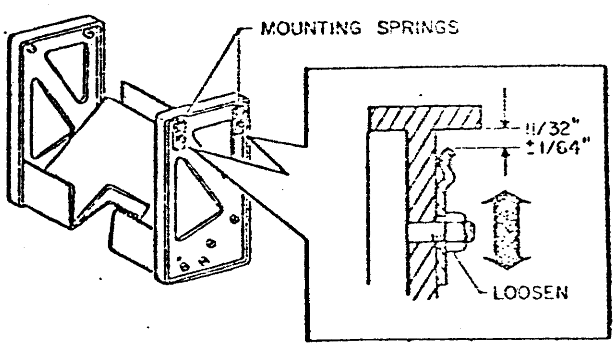


Fig. 3-235. Centering of Support

14.16 Mounting Springs
Adjustment

Loosen the nut on each spring and set it to the dimension shown in Fig. 3-236.



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15.2 Buckle (Rough)
Adjustment

1. Place test pattern 82P101 on the platen.
2. Turn main drive motor shaft manually counterclockwise until CS5 in the cycle control assembly just actuates. (Register stop drawer must be closed and locked.)
3. Remove cover from the gear segment on the register stop drawer.
4. Check the position of the CV arm (Fig. 3-244). Arm should be set so that the vertical centerline of the cam follower is approximately one-half inch from the right-hand mounting bracket.
5. If necessary, loosen the Allen screw and adjust the position of the CV arm on the shaft to obtain the one-half-inch dimension. Tighten Allen screw.

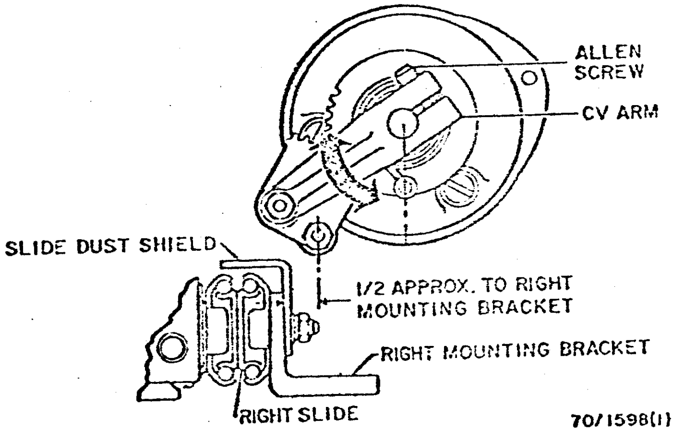

Fig. 3-244. Adjustment of CV Arm

6. Lock out the CV arm by inserting paper wad in the gear teeth as shown in Fig. 3-245. Rotate CV arm one revolution to be sure that cam follower does not contact drawer rail and paper wad does not cause interference.

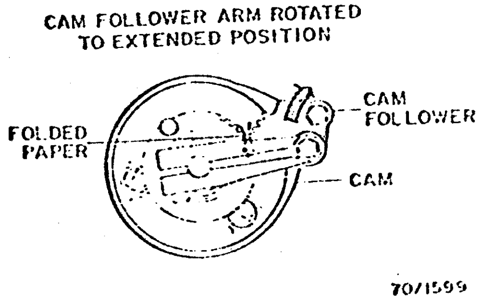

Fig. 3-245. Locking Out CV Arm

7. Make a test run of a few sheets. Then, remove the paper wad from the gear teeth and run a few more sheets.
8. Fine Buckle: Determine the actual buckle as follows:
   a. Measure the distance from the left edge of a test-run paper to the start of print, using a sheet run with the CV arm locked out.
   b. Measure again using a sheet run with the CV arm in the normal position.
   c. Subtract the two measurements. The difference is the buckle for the machine under test.
9. Compare the actual buckle with 0.250 ± 0.040. If the measure buckle is not within the tolerance allowed, adjustment is necessary. See Fig. 3-246. Adjust the CV arm position clockwise if the image is displaced LESS than called for; counterclockwise if the image is displaced MORE than called for. Tighten Allen screw and recheck results by running a few copies with the CV arm locked out and with the CV arm in the normal position.

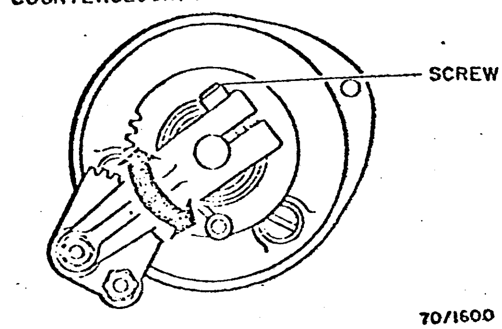

Fig. 3-246. Adjustment of Buckle

10. Check the clearance between the CV arm and spring hub. Dimension should be 0.010 ± 0.008. If required, adjust by loosening the Allen screw on the CV arm and reset on the shaft using thickness gauge. Be sure to maintain CV arm setting. See Fig. 3-247.
11. When replacing the gear segment cover, be sure to center the slot over the CV arm.
12. Check registration.

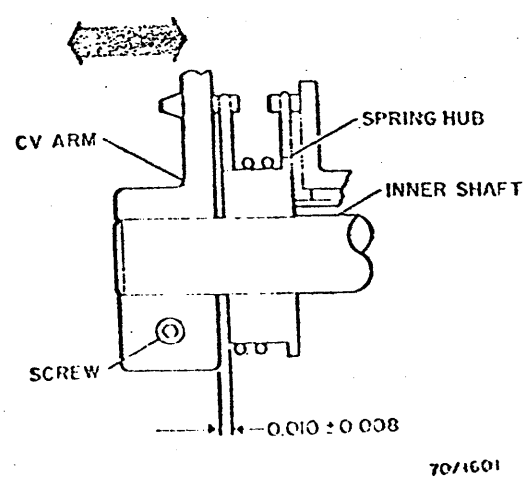

Fig. 3-247. Adjustment of CV Arm Gap

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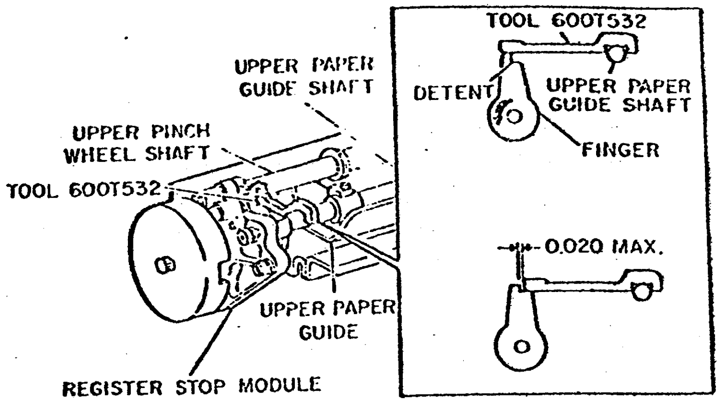

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Fig. 3-255. Positioning Register Stop Fingers For Actuation of CS12

NOTE: Refer to Fig. 3-256. The scale on the main drive motor is marked in tenths; distance between markings represent 0.1 turn of motor shaft, or 36 degrees. To obtain the required turns of motor shaft, use the screwdriver slot as a pointer; mentally divide increments on the scale into ten parts to read hundreds. These mental calculations will get you sufficiently close to the required motor shaft setting because of the large allowable tolerance (± 0.08).

5. Check that CS12 is actuated. If not, loosen screw holding CS12 cam on shaft and adjust cam until CS12 is actuated. See Fig. 3-257. After adjustment, tighten screw and recheck setting. Be sure not to overtighten screw.

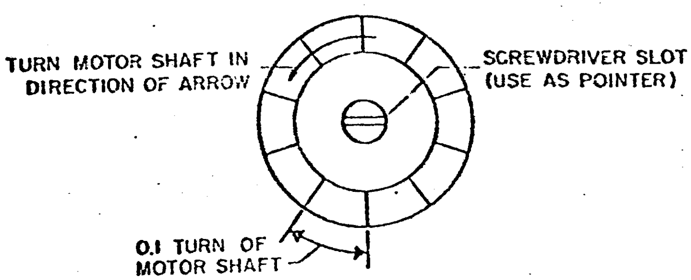

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Fig. 3-256. Setting the Main Drive Motor Shaft

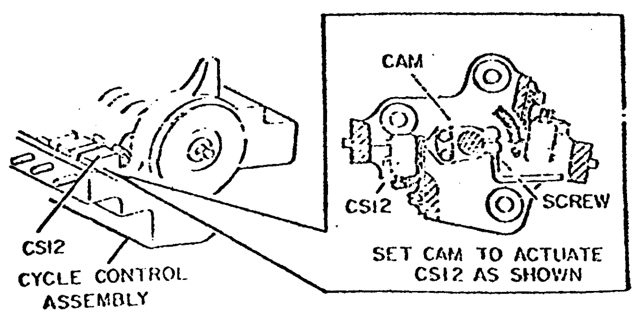

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Fig. 3-257. Adjustment of Cam For Cycle Control Switch CS12

15.6 Puffer Adjustment

NOTE: Before performing this adjustment, make certain that paper buckle is within tolerance allowed (0.250 ± 0.040).

1. Open front doors. Slide register stop drawer out and raise upper pinch wheel shaft.
2. Position tool 600T532 on outboard finger as shown, return upper pinch wheel shaft to operating position, and proceed as shown in Fig. 3-255.
3. Using a screwdriver, rotate the main drive motor until the tool (600T532) falls into the detent of the finger as shown in Fig. 3-255.
4. Remove tool 600T532. Using a screwdriver, rotate main drive motor shaft 11.5 turns in a counterclockwise direction.

direction.

DUPLICATOR ELECTROMETER REFERENCE MANUAL*

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*This manual replaces manual 600P81314.

CHAPTER 1. INTRODUCTION

This manual contains procedures for setting up duplicators using the electrometer. Information is also provided on care, maintenance and adjustment of the electrometer.

As you know, during the xerographic process, the drum is charged to a recommended voltage. It is then discharged by certain amounts and in certain areas as determined by the characteristics of the original document. In the past the output of the charge corotron was measured and adjusted using the current shoe, thereby controlling the amount of potential placed on the drum. This method however was imperfect since the actual potential placed on the drum is not directly related to the output of the charge corotron.

The electrometer, for the first time, provides a means of measuring the actual potential on the drum both after charge and after exposure, thereby making more accurate adjustment of the charge corotron possible. This offers the additional advantage of making possible a more optimum selection of the exposure and more accurate adjustment of the developer electrode voltage, since these things are dependent on the drum potential.

CHAPTER 2. GENERAL DATA

1. TRANSPORT

Always transport the electrometer in its case to avoid damaging the probe. If probe is damaged, and drum to probe shield spacing cannot be adjusted, return electrometer to the branch.

2. TERMINOLOGY (V_o and V_{bg})

V_o and V_{bg} are terms used to describe drum potentials measured with an electrometer. V_o (voltage at onset) refers to the charge voltage on the drum before exposure. V_{bg} (background voltage) refers to the voltage on the drum after exposure of a sheet of blank paper on the platen.

3. LIGHT SHOCK

Light shock to the drum is probably the major contributing factor toward problems when using the electrometer. A light-shocked drum becomes unstable and may take several hours to recover. No exact figures can be given for drum recovery time because it varies from drum to drum and according to the amount and type of light (sunlight, incandescent, flourescent, etc.). Any V_o setting made during the time the drum is unstable will be inaccurate. For example, if V_o is set at 900V on a light-shocked drum, the V_o reading be considerably higher when the drum recovers, and could ..bly reach 1200V. Such a high voltage can cause bead ..yover or drum damage.

If the drum is removed from the machine prior to setting V_o, the drum will probably be light shocked. With a light-shocked drum, it may not be possible to obtain the specified V_o even with the charge corotron potentiometer on PS1 set at its maximum position. If the specified V_o can be obtained, but only with the charge corotron potentiometer set near maximum, this too is an indication of light shock.

4. RECOMMENDED OPERATING PRACTICES

1. Always place the probe selector knob in the "ZERO" position when the electrometer is not in use.
2. Always place the power switch in the "OFF" position when the electrometer is not in use.
3. On Mod 2 electrometers, check calibration once every 25 to 30 uses.
4. If an electrometer cannot be zeroed, change the battery or batteries as described in Chapter 7.
5. Never have the probe selector knob in the HOLD position longer than the time needed to read the sampled voltage.
6. ..lways allow the electrometer to stabilize at least 30 ..econds before zeroing and use.
7. Recalibrate your electrometer whenever you recalibrate your meter or change meters.

5. NEW MACHINE INSTALLATION

1. Perform machine installation procedures up to, but not including, drum installation.

NOTE: It is recommended that you check and/or set corotron radial dimensions and currents. (Balance the charge corotron current, front to rear.)

2. Clean charge corotron.
3. Install new drum on end-bells, inside the black bag. (DO NOT remove from black bag.)
4. Install drum into machine.
5. Remove black bag from drum when sliding in it, and position electrometer into place.
6. Establish Vo.
7. Establish Vbg.

10. Check and/or adjust V_o, V_{bg}, developer electrode potentials on next service call.

6. INITIAL SETUP OF PREVIOUSLY INSTALLED MACHINE

1. Run sample copies/dustings and note defects.
2. Troubleshoot defects. (Do not remove or light shock drum.)
3. Clean charge corotron.
4. Establish V_o
5. Establish V_{bg}

7. Check copy quality, correct any remaining defects, and complete PM functions, if required.

NOTE: If drum is removed after V_o has been established and light-shocked causing light copies, DO NOT reset toner control or V_o. Copies will darken as drum recovers.

7. INSTALLATION OF NEW DRUM

1. Remove old drum from machine.

NOTE: It is recommended that you check and/or set corotron radial dimensions and currents. (Balance the charge corotron current, front to rear.)

2. Perform PM, if required.

3. Install new drum on end-bells, inside of black bag. (DO NOT remove from black bag.)

4. Install drum into machine.

5. Remove black bag from drum as you install it, and position electrometer into place.

6. Establish V_o.

7. Establish V_{bg}.

9. Set toner level, and complete machine installation.

10. Check and/or adjust V_o, V_{bg}, on next service call.

8. ONGOING USE OF ELECTROMETER

The electrometer is used when the following five conditions are present:

1. Light copies
2. Dark copies
3. Excessive background
4. At PM's
5. New drum

For any of these conditions, use the following procedure:

1. Run sample copies/dustings and note defects.

2. Troubleshoot defects (DO NOT remove drum).

3. Clean charge corotron.

4. Check and/or establish V_o.

5. Check and/or establish V_{bg}.

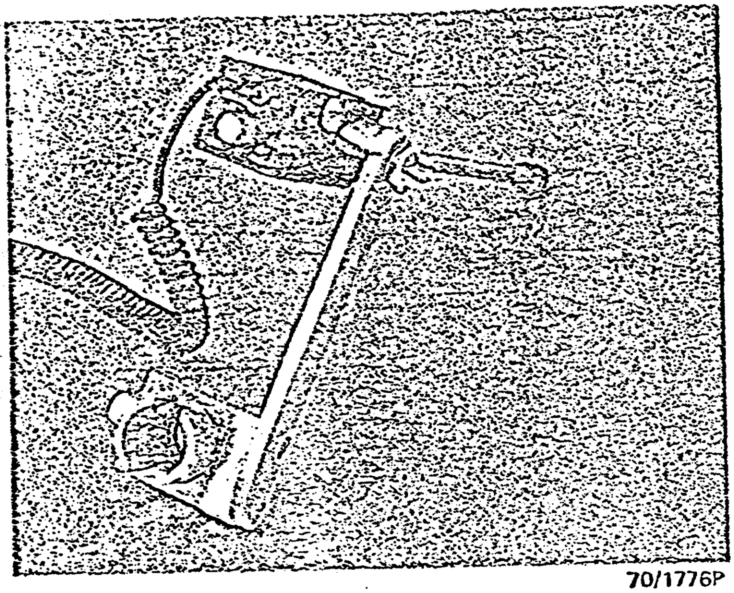
7. Check and/or set toner level.

8. Check copy quality, correct any remaining defects and complete PM functions, if required.

NOTE: If drum is removed after V_O has been established and lightshocked, causing light copies, DO NOT reset toner control or V_O. Copies will darken as the drum recovers.

CHAPTER 3. ELECTROMETER ASSEMBLY PROCEDURES

1. On Mod 2 electrometers, rotate the probe portion of the electrometer to the position required to install it into the duplicator and snug the thumb screw as shown in Fig. 1. On Mods 1X and 1A, attach the mounting bracket as shown in Fig. 2.



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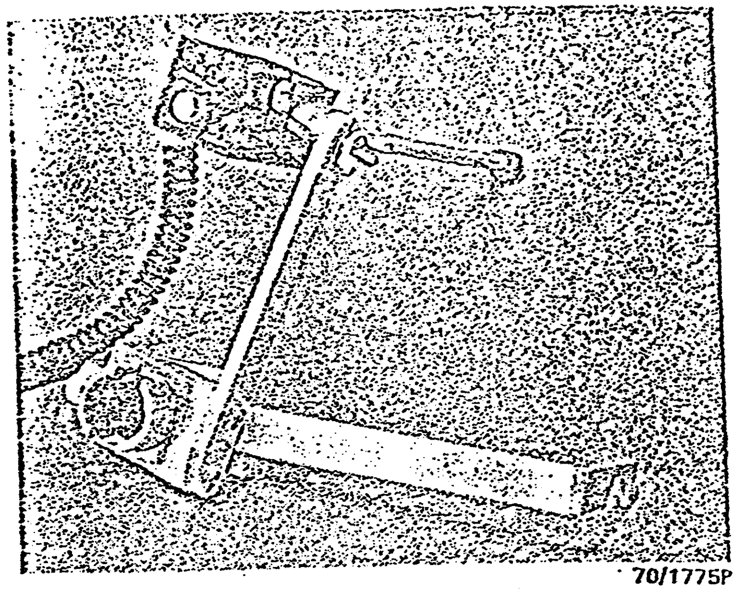

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3. Install the drum extension shaft in the duplicator.

4. Slide the probe spacer to the end of the probe. — See Fig. 5.)

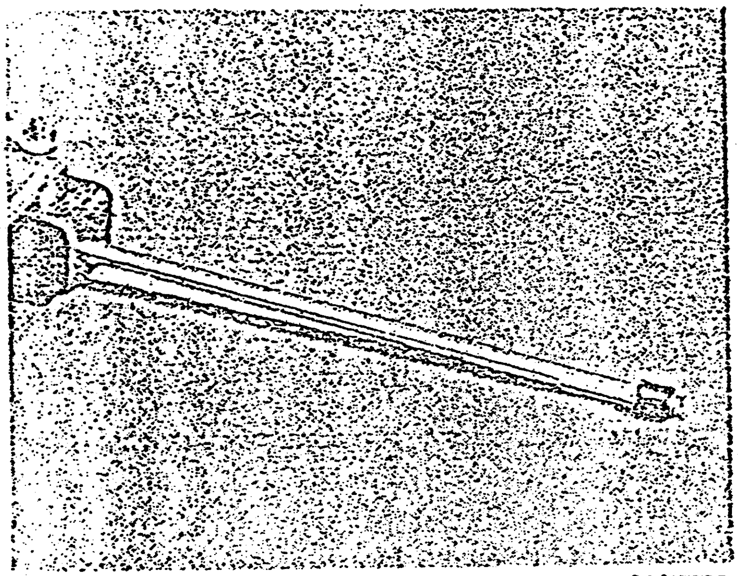

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Fig. 5. Mod 2 Electrometer, Showing Probe Spacer

5. Slide the electrometer onto the extension shaft and insert the tip of the probe up and in over the edge of the drum at approximately the 11:30 position, 3/4" in from the edge of the drum (Fig. 6).

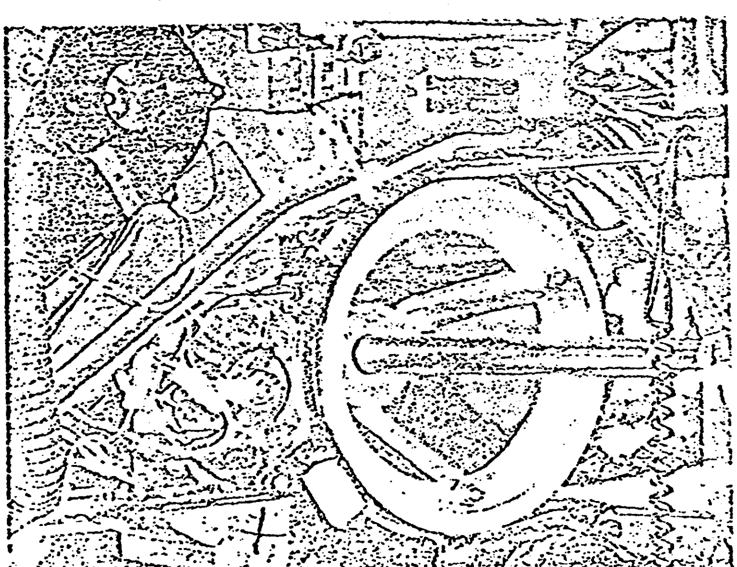

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Fig. 6. Mod 2 Electrometer, Showing Location of Probe Spacer on Drum

6. Tighten the mounting bracket, nylon thumb screw to maintain the position of the probe.

7. Bring the probe end down to contact the drum surface with the spacer and tighten the thumb screw This places the bottom of the probe shield at the required distance above the drum surface.

8. Loosen the mounting bracket nylon thumb screw and carefully slide out the electrometer far enough to slide the probe spacer to rear of the probe.

9. Slide the electrometer back into position over the drum until the electrometer box contacts the front of the vertical frame (Fig. 7).

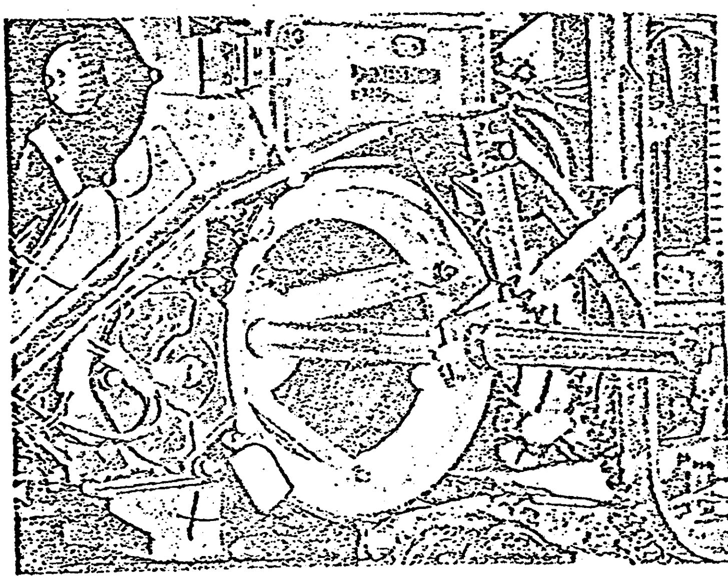

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Fig. 7. Installation of Mod 2 Electrometer on Duplicator

Finger tighten the mounting bracket nylon thumb screw to the shaft.

WARNING: Be sure the mounting bracket nylon thumb screw is tight enough to prevent any front-to-back rocking, or any side-to-side movement of the brass sleeve on the drum shaft, BUT LOOSE ENOUGH TO ALLOW YOU TO ROTATE THE ELECTROMETER AROUND THE SHAFT IN BOTH DIRECTIONS WITHOUT LOOSENING THE SHAFT FROM THE MACHINE. This maintains the electrometer position but also cllows the extension shaft to rotate when machine is in the print condition without loosening. If this exact procedure is not followed, the drum shaft and electrometer will fall out of machine.

11. Hold the mounting bracket in order to maintain the 11:30 position, and move the position bracket clockwise until it contacts the vertical frame (Fig. 9) and tighten its nylon thumb screw.*

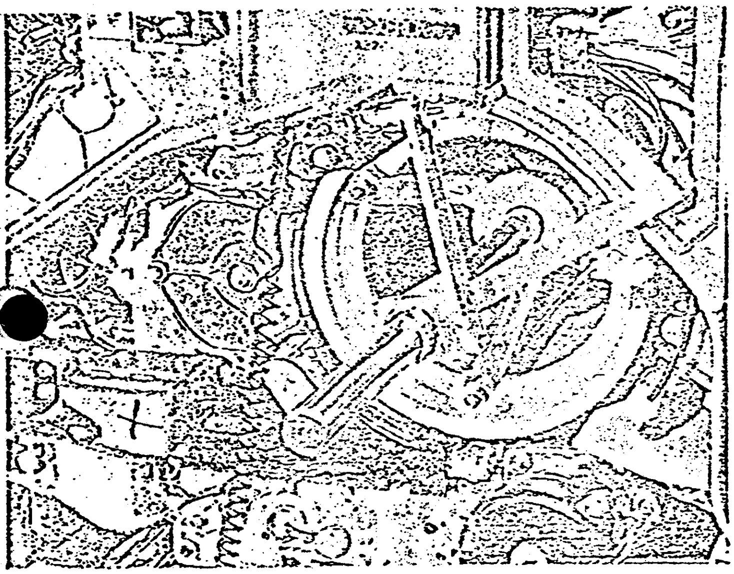

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Fig. 9. Mod 2 Electrometer, Showing Attachment of Position Bracket to Duplicator

NOTE: The inboard end of the probe is now approximately 5-1/2-inches from the front edge of the drum.

CHAPTER 4. ELECTROMETER CALIBRATION PROCEDURES

1. CALIBRATION OF MOD 2 ELECTROMETER

WARNING: Because of possibility of probe contamination, do the following before calibration or setup.

Zero Offset Check

-
- With the calibration box and probe plugged into the meter, connect calibration box jumper lead to machine frame (Mod 2).
- Press the +DC polarity mode switch on the meter and set the range switch to 30μA.
- Turn the electrometer on.
-

Turn the probe selector knob to READ position while observing the Weston meter. If the reading changes more than 20 volts, return the electrometer to your PTS for repair.

CAUTION: Be sure the electrometer is in the OFF position and, the probe selector knob is in the ZERO position, anytime you are not taking a reading, and when the tool is in transit.

The Mod 2 electrometer requires calibration every 25 to 30 uses.

1. Make three copies of the test pattern and retain.

2. Turn off duplicator at the developer, and disconnect the bias baffle lead from the developer housing.

4. Disable the developer housing by opening the developer interlock switch. Pull out the charge and preclean corotrons 2 to 3 inches. Unplug the pretransfer corotron, and pull the register stop drawer out far enough to unplug the transfer corotron.

5. With the Weston meter, connect a red meter lead from the meter 1.5KVDC socket to the bias baffle lead and another lead from the meter GND socket to a machine ground. Select the KV position on the meter, press the DC+ button, and use the 150 volt AC/DC scale (reading X10). Press the corotron test switch to read the output voltage at the bias baffle plug, and record the reading. This will be your reference voltage used to calibrate the electrometer. On the 7000 it should be in a range of 600 to 900 volts.

6. Move the red lead from the 1.5KVDC position to the 3KVDC position, then move the GND lead on the meter to the 1.5KVDC position. Set the Weston meter to the 30μa position, be sure the DC+ button is pressed, and use the same 150 volt AC/DC scale.

7. Insert the calibration box (with battery) into the meter −GND, and +R sockets with the probe hole toward the meter scale (See Fig. 10).

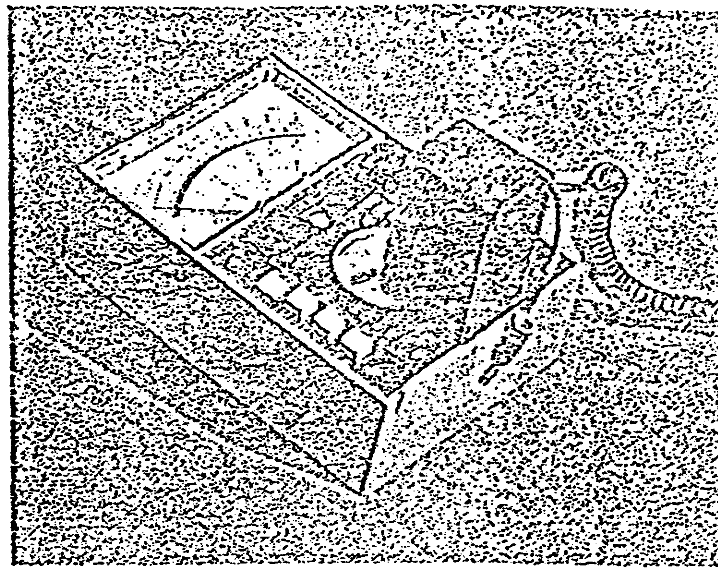

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Fig. 10. Connection of Mod 2 Electrometer Calibration Box To Meter in +R and GRD

8. Insert the electrometer probe into the probe hole at the top of the calibration box (with battery), and match the key on the end of the probe with the keyways in the calibration box.

9. Connect one end of a meter lead to a machine ground and the other end to the electrometer mounting bracket. Plug the jumper lead from the top of the calibration box to the reference voltage lead (red) in the 3KVDC socket on the meter. Leave the reference voltage lead (red) connected to the bias baffle lead.

10. Turn on the electrometer and be sure the probe selector knob is in the ZERO position. (If the electrometer cannot be zeroed, refer to Chapter 7.) The meter should read zero; if not, replace the battery. Press the corotron test switch and turn the probe selector to the READ position. Turn the CAL pot on the electrometer to obtain the same voltage recorded in step 5 (the voltage output from the developer bias baffle) if required.

NOTE: Be sure to re-zero any time an adjustment is made.

With these steps completed, the meter is calibrated and ready to use in optimizing the duplicator exposure and development areas for copy quality. Remove the meter leads and jumper, and remove the electrometer from the calibration box, leaving the calibration box plugged into the meter. Be sure to verify the mechanical radial adjustments in the drum cavity (especially the corotrons) before using the electrometer.

After calibration replace the following to their operating position.

1. All corotrons.
2. Register stop drawer.
3. Developer bias baffle lead.
4. Main drive motor (if disabled).

NOTE: If you are required to change meters, be sure to

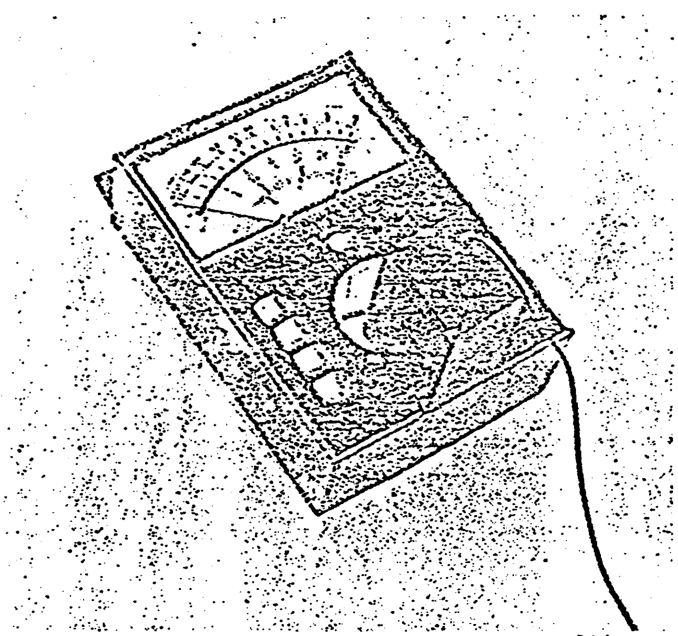

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Fig. 12. Connection of Mod 1A Electrometer to Meter +R and GRD

CHAPTER 5. MACHINE SETUP PROCEDURES

1. PREPARING MACHINE FOR SETUP

WARNING: Because of possibility of probe contamination, do the following before calibration or setup.

Zero Offset Check

- Connect a meter lead from the current shoe to the machine frame. (Mods 1X and 1A)
- With the calibration box and probe plugged into the meter, connect red calibration box jumper lead to machine frame (Mod 2).
- Press the +DC polarity mode switch on the meter and set the range switch to 30μA.
- Turn the electrometer on.
- Rotate the zero adjustment knob to position the meter needle to zero.

Turn the probe selector knob to READ position while observing the Weston meter. If the reading changes more than 20 volts, return the electrometer to your PTS for repair.

1. Before taking any reading with the electrometer, make sure it is at room temperature. Also make sure the drum is properly broken in and not light shocked (at least 200 copies on the drum). Make three copies of the test pattern and retain.

2. Remove main power and turn laser off (S14).

3. Disable the developer housing by unplugging the developer drive motor.

4. Verify mechanical and electrical adjustments of corotrons and drum cavity radial dimension before electrometer set-up is performed.

5. Set meter to 30μa scale, press DC+ button, and insert the calibration box into -GND and +R sockets on the meter. See Fig. 10.

6. Calibrate the electrometer if required, then install in the machine. Refer to 3. Preparing Machine for Setup in Chapter 8 for 3600-III.

7. Before starting the machine, cheat the front door interlocks and put a black shield (600T1198) over the drum cavity to prevent light shock to the drum.

8. Start the machine and press START PRINT and turn the electrometer to ON and READ position.

NOTE: If the drum needs pumicing, be sure to set the machine up with the electrometer first.

CAUTION: Do not touch or lean on the electrometer or extension shaft when taking readings. Moving either one will cause the sensor position to shift, giving erroneous readings. Read the 150 volt AC/DC scale X10.

2. ESTABLISHING V_0 (ONSET OR CHARGE VOLTAGE)

1. Be certain machine cycles for at least 90 seconds before any adjustments are made to allow the drum to reach stabilization.

2. Adjust charge corotron to give the V_o voltage specified below. Average the high and low readings to get true values.

7700, 7000, 3600-III 900 ± 25V

3. Cycle machine out by raising the paper feeder cover or by pressing STOP PRINT.

4. If excessive variation (50 volts or or greater) is seen when measuring V_o, check that electrometer is not moving or that drum run-out is not excessive. Typical voltage variation on test drum was ± 20V.

   To correct drum run-out, using a felt marker, put the machine in a print mode, mark the drum near the probe when the variation is at its greatest. Now tighten the drum rod nearest to the mark. Recheck. You may have to loosen or tighten the rod.

3. ESTABLISHING V_{bg} (BACKGROUND VOLTAGE)

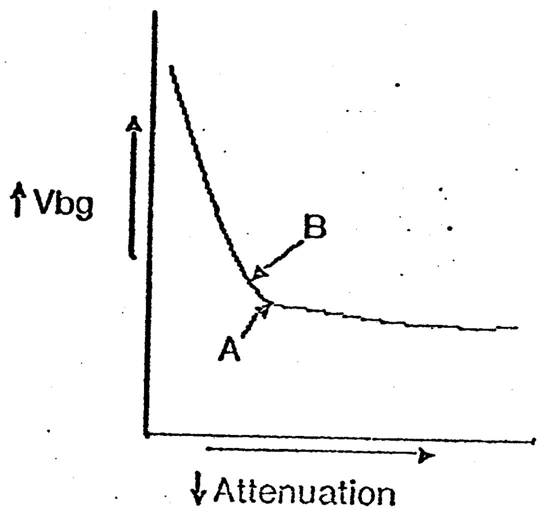
1. Turn laser on. Place S1 on command adapter board in the left position (free run).

2. Place all the switches on the video attenuator (under "C" transport) to the "IN" position.

3. press POWER ON and START PRINT and turn on the electrometer and zero it. Turn the probe selector knob to the READ position, and proceed to step 4.

Record the maximum and minimum readings, and the amount of video attenuation in. Cycle machine out.
5. Take out 0.2 db on the video attenuator and repeat steps 3 and 4.

At some point, when you remove attenuation, the amount of V_{bg} decrease will lessen and any further reduction in attenuation will only yield a small change in V_{bg}. This places you somewhere below point "A" on the curve (Fig. 13).



Attentuation (Fig. 13)

From your recorded data select the attenuation setting that corresponds to the point where V_{bg} slowed its rate of decrease (point B on curve) and return video attenuator to this setting.

NOTE: V_{bg} should be in the range of 150 - 400v.

4. COPY QUALITY DIAGNOSTICS WHERE V_O AND V_{BG} DO NOT MEET SPECIFICATIONS.

1. Check developer housing voltages.
2. Check drum ground.
3. Check corotron radials and end block spacing.
4. Check for drum contamination.
5. If V_o is within specifications and you can not get V_{bg} in specs., replace drum and try again.
6. If you have performed ALL other steps in this section and V_{bg} is still out of spec., the slot head is probably bad and will have to be replaced.

TROUBLESHOOTING USING THE ELECTROMETER

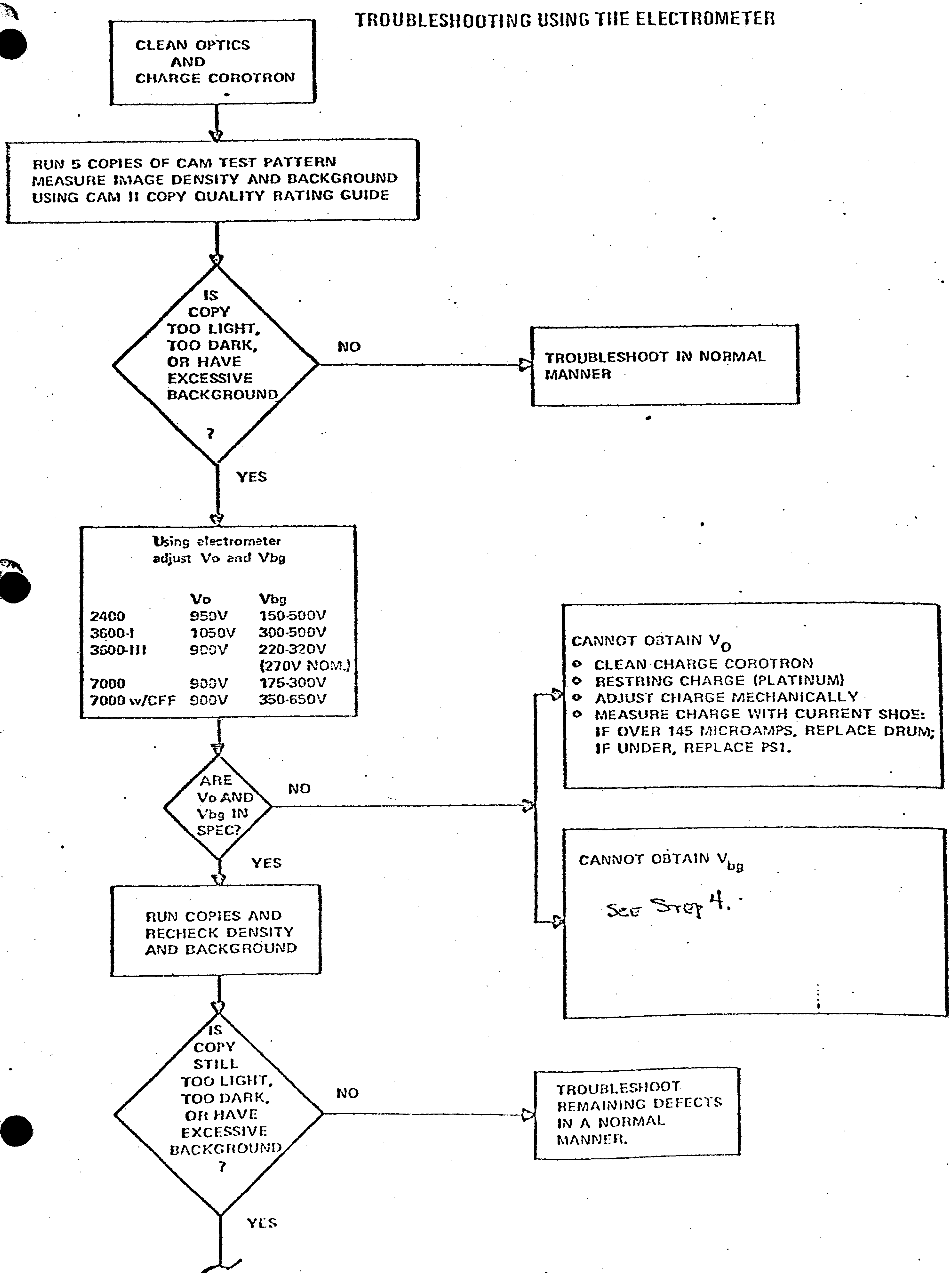


FIG-14

COPY TOO LIGHT

CHECK/ADJUST

- ALL OTHER COROTRON RADIALS AND CURRENTS
- DEVELOPER HOUSING RADIALS AND VOLTAGES
- DEVELOPER FLOW GAP
- CHECK FOR SHORTS CAUSED BY DEVELOPER BEADS, ETC. MONITOR DEVELOPER VOLTAGES WITH MACHINE RUNNING
- DEVELOPER LEVEL (BUCKETS SHOULD BE OVERFLOWING)
- TONER LEVEL
- TONER SETTING
- DEVELOPER AGE

COPY TOO DARK

CHECK/ADJUST

- ALL OTHER COROTRON RADIALS AND CURRENTS
- TONER SETTING
- DEVELOPER AGE

EXCESSIVE BACKGROUND

CHECK/ADJUST

- ALL OTHER COROTRON RADIALS AND CURRENTS
- DEVELOPER HOUSING RADIALS AND VOLTAGES
- TONER SETTING
- CHECK FOR SHORTS CAUSED BY DEVELOPER BEADS, ETC. MONITOR DEVELOPER VOLTAGES WITH MACHINE RUNNING
- DEVELOPER LEVEL (BUCKETS SHOULD BE OVERFLOWING).
- DEVELOPER AGE

5.7000 CUSTOM TUNING

In order to maximize copy quality for special customer applications, it may be necessary to perform the following procedure. This procedure will customize xerographic system variables if proper copy quality can not be obtained from a 900 volt V_o setup.

1. Increase V_o to 1050 volts.
2. Due to uncontrollable variables such as humidity and altitude, the increased V_o may not be obtainable at various geographic areas. In high altitude areas the current must not exceed 118µA. If current is higher than 118µA, current must be decreased to prevent drum damage due to charge fatigue. At lower altitudes the current may run much higher or even lower, but this is acceptable as long as there is no bead carryover or arcing.

   The 118µA spec given above is an engineering national base spec.
3. If steps 1 and 2 are met without charge corotron arcing to the drum, copy quality has been maximized. If arcing occurs, V_o must be decreased to an acceptable level or bead carryover may result.

NOTE: The increased V_o procedure should only be performed if copy quality parameters are not acceptable at 900 volt V_o setting.

4. Be sure to maintain the V_{bg} in the 150–400V range.

CHAPTER 6. CARE OF ELECTROMETER

Your electrometer is an adaptor for use with the Weston multimeter to enable you to measure actual voltage potential without inducing circuit loading.

Your Weston meter must be in good operating condition and should be calibrated at least every six months.

Your electrometer must have good batteries and their contacts should be clean. There are definite procedures that must be followed when changing batteries.

Care must be used to insure that the electrometer is not left where it will be stepped on or kicked or dropped. Proper alignment of the probe is essential for accurate operation. Transport and storage of the electrometer in its case is recommended.

1. CARE WHEN USING ELECTROMETER

1. Observe 0.125-inch spacing requirements for the probe. (Sensor spacing is 0.250 inch.)
2. Do not apply pressure to electrometer or extension shaft when taking readings.
3. The calibration and linearity should be checked every 25 to 30 times device is used on the Mod 2, and every 10 times the Mod 1, Mod 1A, or Mod 1X is used, or once a week.

TE: Calibration is also recommended after replacement of batteries.

2. CARE WHEN ELECTROMETER IS NOT IN USE

1. Do not leave electrometer leads connected to meter.
2. Keep electrometer in zero position. Failure to do so may cause a charge to build up on the sensor, which will ultimately destroy the internal circuitry. Leaving the sensor open will also cause dirt buildup inside the sensor, which will effect the reading.
3. Never remove top cover to expose circuitry. Touching certain components on the circuit may destroy the circuit.
4. Never touch the internal probe wire. The inner probe wire is very sensitive and the charge generated by touching the wire could destroy the unit.
5. Do not bend or distort the probe rod. Bending the shield will cause the internal spacing between the sensor and shield to shift causing erratic readings.
6. Do not short electrometer leads to case or any metal surface.
7. Make sure electrometer is in OFF position.

o not store electrometer without batteries in place.

9. When electrometer is not is use, keep it in the holding case.

CHAPTER 7. BATTERY REPLACEMENT

1. MOD 2, MOD 1A, AND MOD 1X ELECTROMETERS

(Located in calibration box (Mod 2) and in the blue boxes on the meter connector lead (Mod's 1X and 1A.))

1.1 Removal and Replacement Procedure

Use the following procedure when removing or replacing battery:

1. Place the ON-OFF switch in the OFF position.

CAUTION: Failure to do so may damage electrometer.

2. Place the probe selector in the ZERO position.
3. Remove the four screws holding the access cover to the calibration box and remove the battery.
4. Clean replacement battery contacts by rubbing them on a clean cloth.
5. Make sure the battery is clean.
6. Install new battery.
7. Replace the battery cover.

1.2 Recommended Battery Type

The accuracy of the electrometer can be severely impaired if the recommended battery is not used. Use a Mallory alkaline Duracell 9 volt battery or equivalent.

1.3 Battery Life

The battery in the electrometer will last for approximately 200 hours of continuous use. If the battery becomes weak, meter will read approximately 1/2 scale at turn-on with probe in ZERO position.

9. Remove the meter connector pins from contact with the case.

2.2 Recommended Battery Type

The accuracy of the electrometer can be severely impaired if the recommended batteries are not used. Use either Mallory TR-175 or Everyready E-175 batteries and always replace both batteries.*

2.3 Battery Life

The batteries in the electrometer will last for approximately forty hours of continuous use. If the batteries become weak you will notice one of the following symptoms:

1. It will be impossible to zero the electrometer or if it can be zeroed, the zero knob will be in its extreme clockwise or counterclockwise position.
2. The zero adjustment will not cause a deflection of the meter in either direction. This can also be caused by installing batteries with their polarity reversed.

CAUTION: The electrometer circuits can be damaged if the procedure is not followed in the proper sequence.

* Supplementary list of batteries that may be used:

First:	Burgess 2MN6 Eveready 222 Ray-O-Vac D1604
Second:	Bright Star 0920 Burgess 2U6 Eveready 216 Mallory M–1604 Marathon 1604 RCA VS323 Ray-O-Vac 1604 Sears 6417 Zenith Z216
Last:	Mallory MN 1604 * RCA VS1323 * Burgess H146X ** Eveready E146X ** Mallory TR–146X ** RCA VS146X ** Ray-O-Vac 1604M ** Sears 6416 ** Zenith Z146 **

* Alkiline
** Mercury

CHAPTER 9. ELECTROMETER TROUBLESHOOTING CHECK CHART

PROBLEM	CAUSE	REMEDY
1. The electrometer will not zero.	The batteries are defective	See battery replacement (Chapter 7)
	Incorrect polarity	
2. Electrometer readings fluctuates more than 100 volts on all machines. NOTE: Some fluctuation is normal because of drum run-out.	Slip screw too loose, causing electrometer probe to vary in distance from drum.	Tighten screw
	Set screw too loose allowing electrometer probe window to become mispositioned.	Return to your PTS
	Electrometer not grounded	Check for zero resistance between electrometer case and ground. If other than zero resistance is read, clean the mounting bracket.
	Drum extension shaft loose.	Tighten shaft.
	Excessive drum run out	Retorque end bells
3. Electrometer will zero but will not read voltage.	Conductive material shorting probe tube to probe sensor.	Disconnect electrometer from meter, rotate selector knob to READ, turn electrometer off and gently shake electrometer with window facing down.
	Weak batteries	See battery replacement (Chapter 7)
	Poor contact of circuit wiper to probe stud on probe selector	Return to your PTS
4. Electrometer will not return to zero after reading voltage.	Poor contact of circuit wiper to ground stud on probe selector.	Return to PTS
5. Electrometer pegs meter negative when turned on	Weak batteries	See battery replacement (Chapter 7)

(Continued)

CHAPTER 9. ELECTROMETER TROUBLESHOOTING CHECK CHART (Cont.)

PROBLEM	CAUSE	REMEDY
6. Electrometer pegs meter positive when turned on	Weak batteries	See battery replacement (Chapter 7)
	Poor contact of circuit wiper to ground stud on probe selector	Return to your PTS
7. Electrometer will not stabilize. Meter continues to drift in the zero position	Weak batteries	See battery replacement (Chapter 7)
8. Electrometer will not calibrate and reads under 400 volts	Weak batteries	See battery replacement (Chapter 7)
9. Electrometer will not calibrate and reads over 400 volts.	Probe is too close to current shoe	DO NOT BEND PROBE See probe space adj-ustment procedure
10. Short battery life.	Meter connector banana plugs shorted to case in storage	Insulate BOTH meter connector pins.
	Electrometer not turned off in storage	Turn electrometer off when not being used.

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Figure 1-2 shows that paper moves from the right end of the machine, under the drum, through the fuser, and out the left end. A sniffer assembly lifts a sheet by vacuum from the paper stack on the right end of the 7000 and feeds it sideways into the machine. The paper tray, which holds the paper stack, automatically raises a short distance about every seven sheets to keep the top of the stack at the proper feeding level.

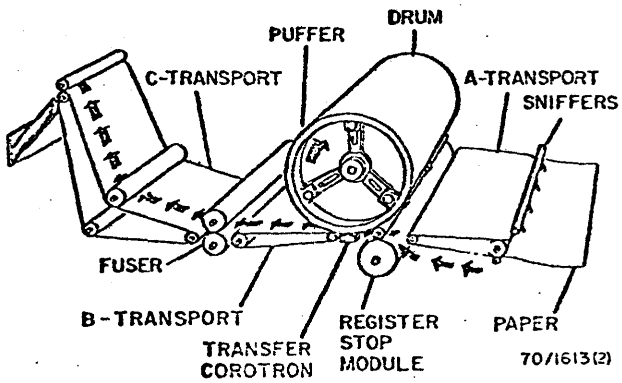

Fig. 1-2. Paper Path

After the sniffer assembly lifts each sheet from the top of the stack, the sheet is fed to the A-transport. Another vacuum system holds the sheet to the bottom of the A-transport as belts move the paper to the register stop module.

The register stop module slows the sheet almost to a stop, aligns it, and releases it at the right time for proper registration to the drum image. Then the transfer corotron transfers the image to the paper.

The sheet is removed from the drum by the puffer, and the B-transport then carries the sheet to the fuser. A third vacuum system holds the sheet to the B-transport.

The fuser consists of two rollers. The lower roller presses against the upper heated roller. As the sheet travels between the two rollers, the combination of heat and pressure fuses the toner to the paper.

When the sheet emerges from the fuser, it is carried by the C-transport up to the receiving tray. The sheet is held to the transport by a vacuum.

MACHINE AREAS

The 7000 is divided into thirteen functional areas (Fig. 1-3) plus machine timing and covers. The thirteen functional areas are briefly described on the following pages.

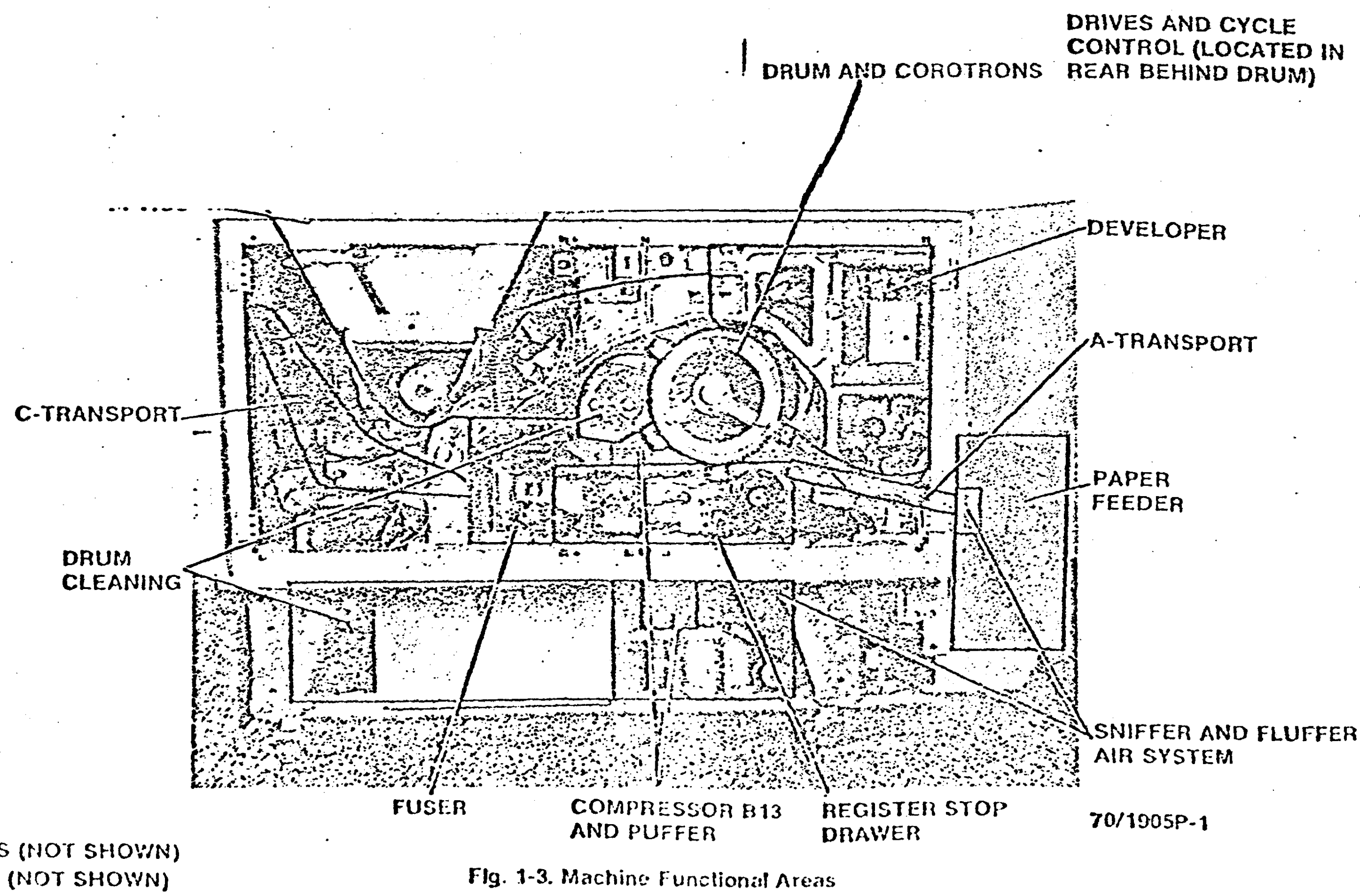

Fig. 1-3. Machine Functional Areas

1.1 DRIVES AND CYCLE CONTROL

Drives

The machine drives consist of two subsections: (1) the main drive and (2) the developer/feeder drive.

The main drive motor (Fig. 1-4) drives the main drive chain, which in turn drives the B-, and C-transports, register stop module, fuser, and cycle control assembly. The main drive motor also rotates the drum, the scan cam, and, through a gear and chain, the A-transport. A follower on the scan cam drives the object mirror.

The developer/feeder motor drives the paper feed clutch in the paper feeder and the bucket conveyor in the developer housing.

Cycle Control

The master timing device in the machine is the cycle control assembly (Fig. 1-4) which electrically controls operations such as paper feeding, puffing, and checking for paper jams. The cycle control assembly is mounted under the main drive gearbox, and consists of several switches that are cam-actuated three times for each revolution of the drum.

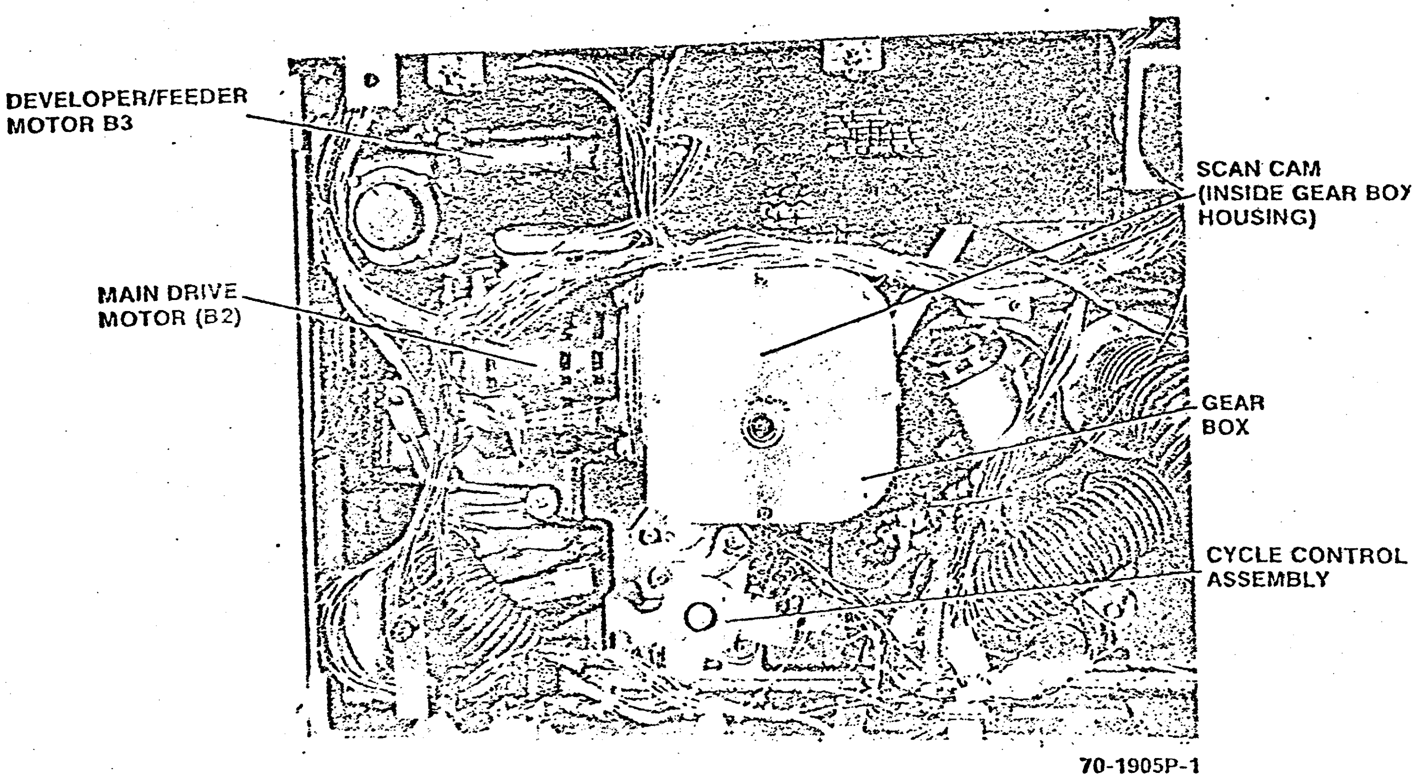

Fig. 1-4. Machine Drives and Cycle Control Assembly (Right Rear View)

1.3 PAPER FEEDER

The paper feeder consists of three subsections: (1) the paper tray and index motor, (2) the paper length control, and (3) the paper feed mechanism.

The paper tray (Fig. 1-6) stores up to 2,000 sheets and is raised and lowered by the index motor through a pulley and cable arrangement. A sensing bar above the paper stack monitors the height of the stack and energizes the motor to raise the tray as the stack diminishes.

The operator moves the paper length control, or "unilever," (Fig. 1-6) to position the paper guides to a particular paper length.

The paper feed mechanism consists of the sniffer assembly, and the paper feed clutch and cams. The developer/feeder motor drives the paper feed mechanism with a chain. The sniffer assembly uses vacuum to pick up a sheet and feed it to the A-transport.

1.4 SNIFFER/FLUFFER AIR SYSTEM

The sniffer-fluffer air system is operated by the air pump. The air pump draws air through the sniffer, creating the vacuum to pick up a sheet. The air pump then blows this air through the fluffer to separate the top sheets in the paper stack. The top sheets are blown upwards until they contact the snubbers, which hold the sheets at the proper feeding position.

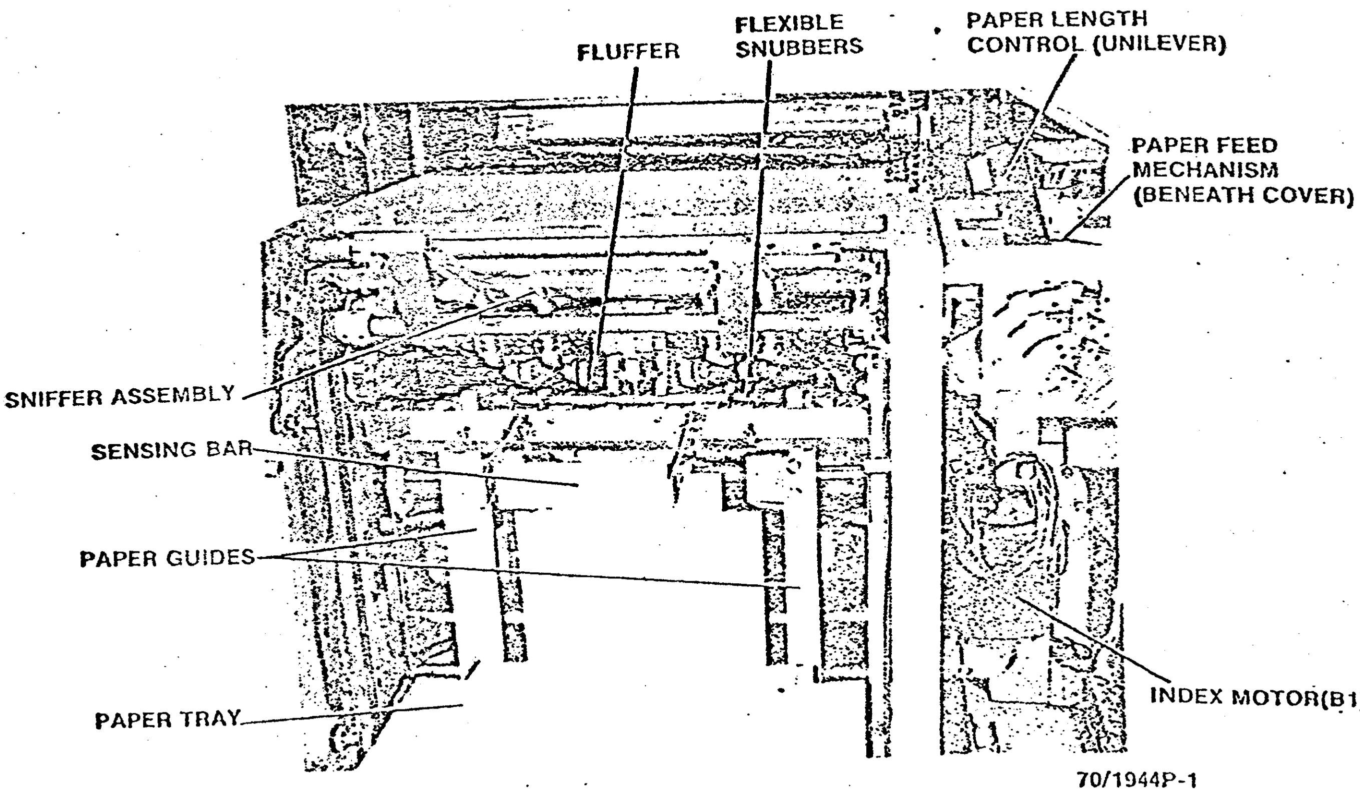

Fig. 1-6. Paper Feeder

1.5 A-TRANSPORT

The A-transport area has three subsections: (1) the A-transport, (2) the multi-sheet feed reject system, and (3) the A-transport vacuum blower.

The A-transport (Fig. 1-7) carries single sheets toward the register stop module and diverts multiple-fed sheets, or "multi-sheets," into a reject tray.

The multisheet sensor is located at the feed-in side of the A-transport. It detects the extra thickness of multiple-fed sheets, causing the A-transport reject fingers to divert the sheets into the reject tray.

The A-transport has its own blower, located near the right rear leg, which provides a vacuum for holding paper on the bottom of the transport. A developer catch tray is mounted on the A-transport.

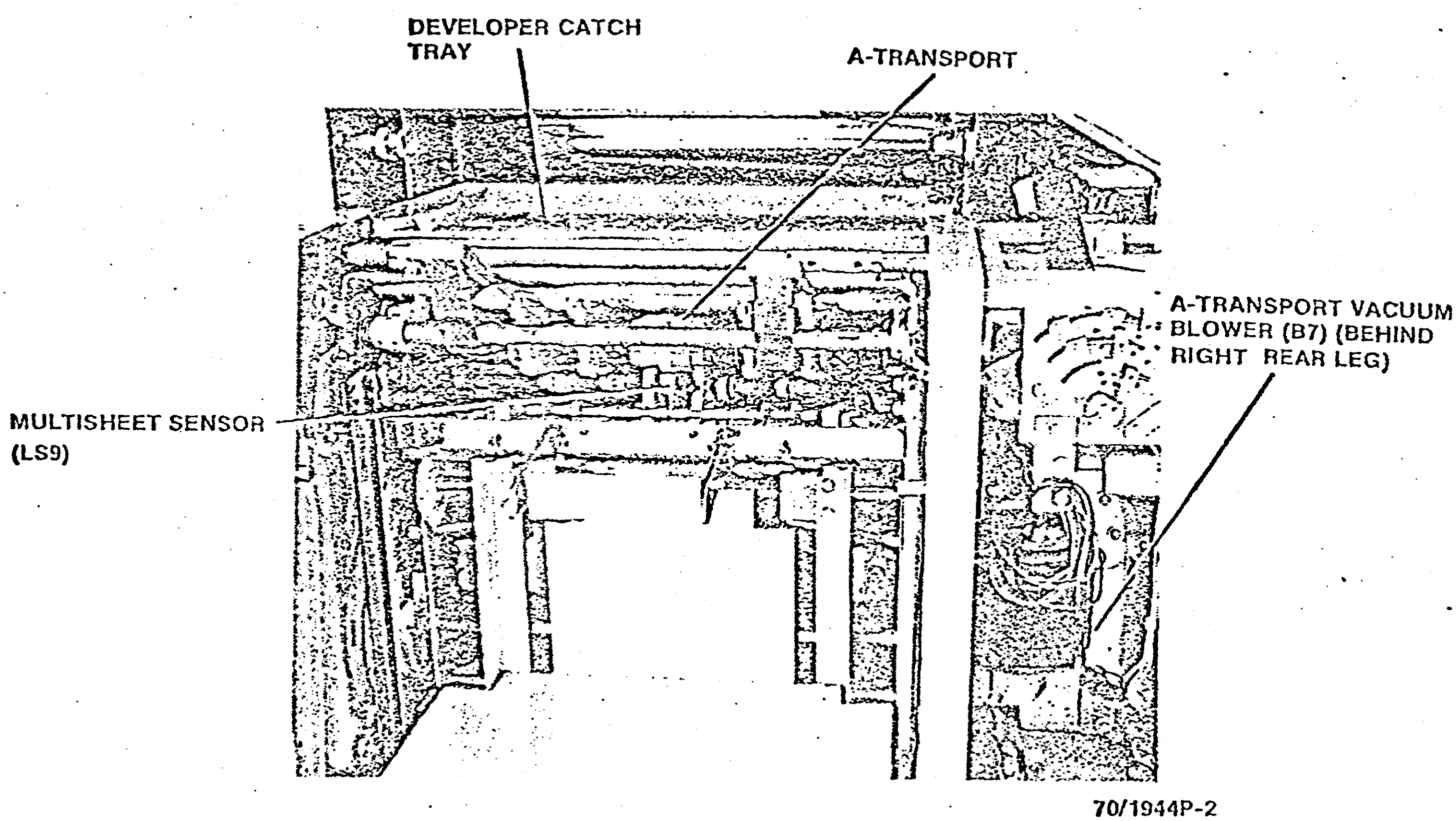

Fig. 1-7. A-Transport

1.6 REGISTER STOP DRAWER

The register stop drawer is a movable frame assembly that consists of four functional operating assemblies: (1) the register stop module, (2) the transfer corotron, (3) the B-transport, and (4) the fuser pressure roller.

The register stop module (Fig. 1-8) slows the sheet almost to a stop, aligns it, and releases it to the drum at the proper moment. After the puffer puffs the sheet from the drum, the B-transport carries it to the fuser.

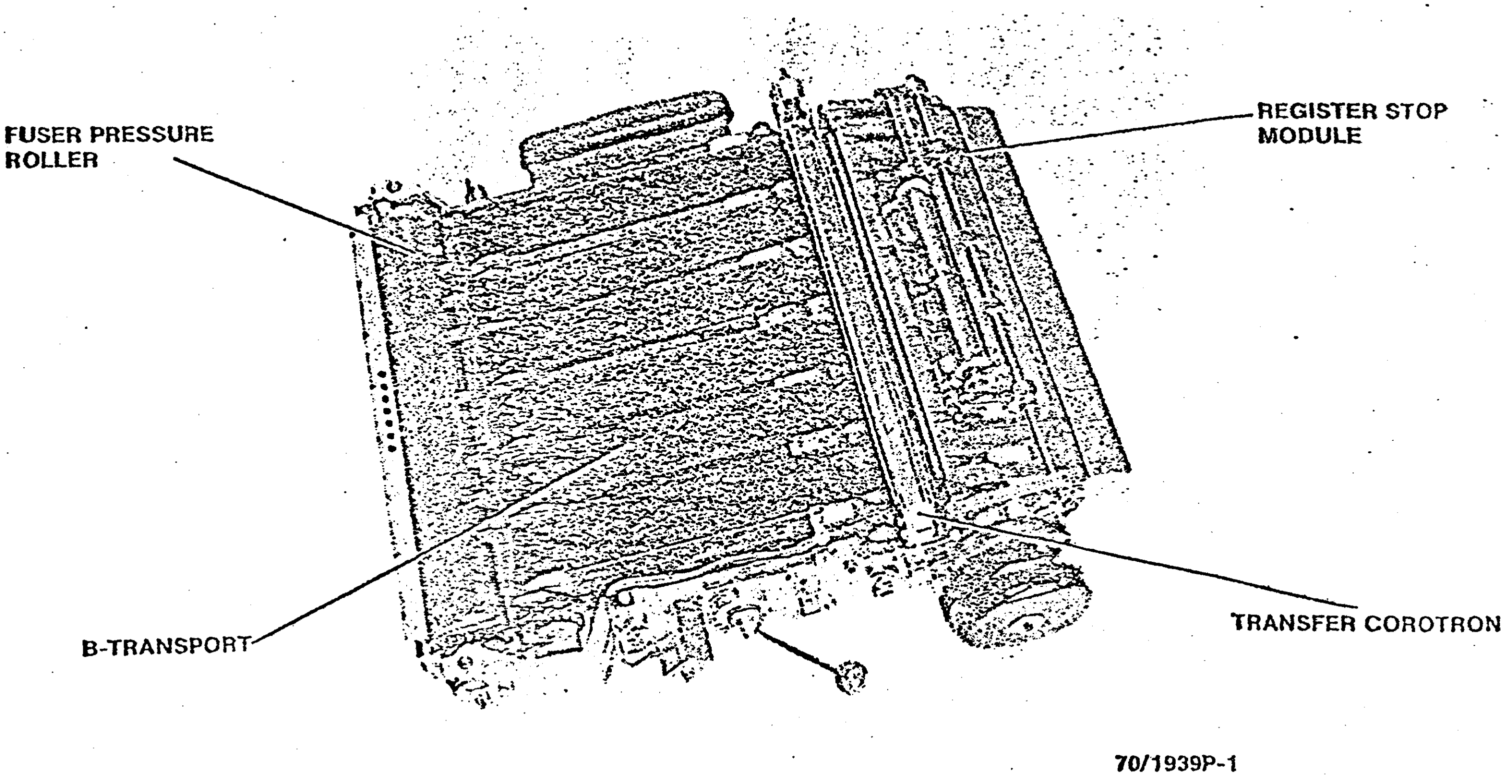

Fig. 1-8. Register Stop Drawer

1.8 DRUM AND COROTRONS

The drum in the 7000 is a highly sensitive type which must be protected from exposure to light.

Four corotrons are arranged around the drum. The preclean corotron (Fig. 1-10) uses AC to reduce the drum charge for more effective cleaning of the residual toner. The charge and transfer corotrons use positive DC. The charge, transfer, and preclean corotrons are energized by the corotron power supply, located on the rear of the machine. The pretransfer corotron uses positive DC to reduce copy background and is energized by the developer electrode power supply.

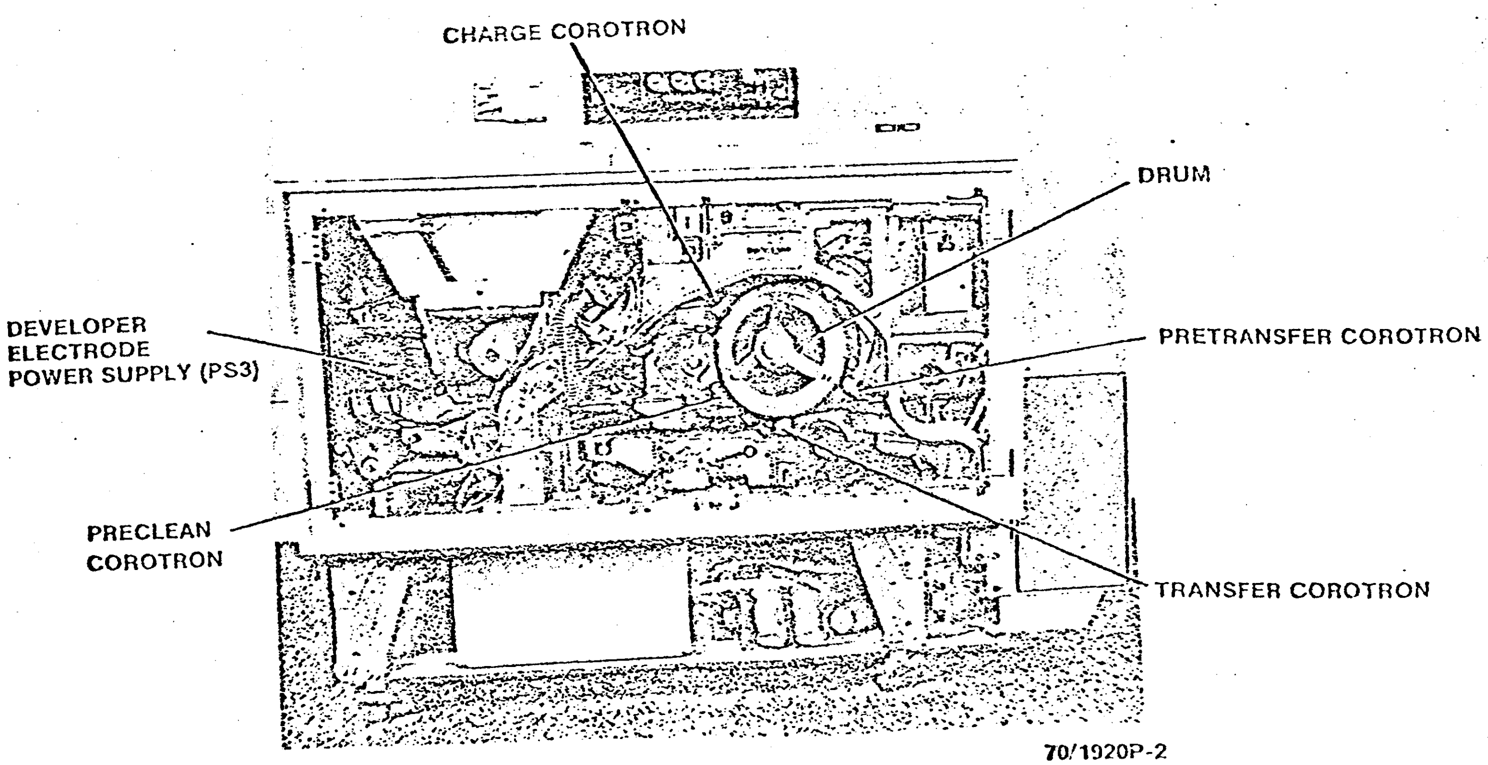

Fig. 1-10. Drum and Corotrons

1.9 DEVELOPER

The developer has three subsections (Fig. 1-11):

1. Developer Housing
2. Toner Dispenser
3. Developer Electrode Power Supply

The developer housing contains 25 pounds of steel shot developer. The toner dispenser has its own drive motor and is automatically and electronically controlled. The developer electrode power supply reduces the background level in high humidity operating conditions by furnishing high voltage to the developer electrode and to a biased baffle.

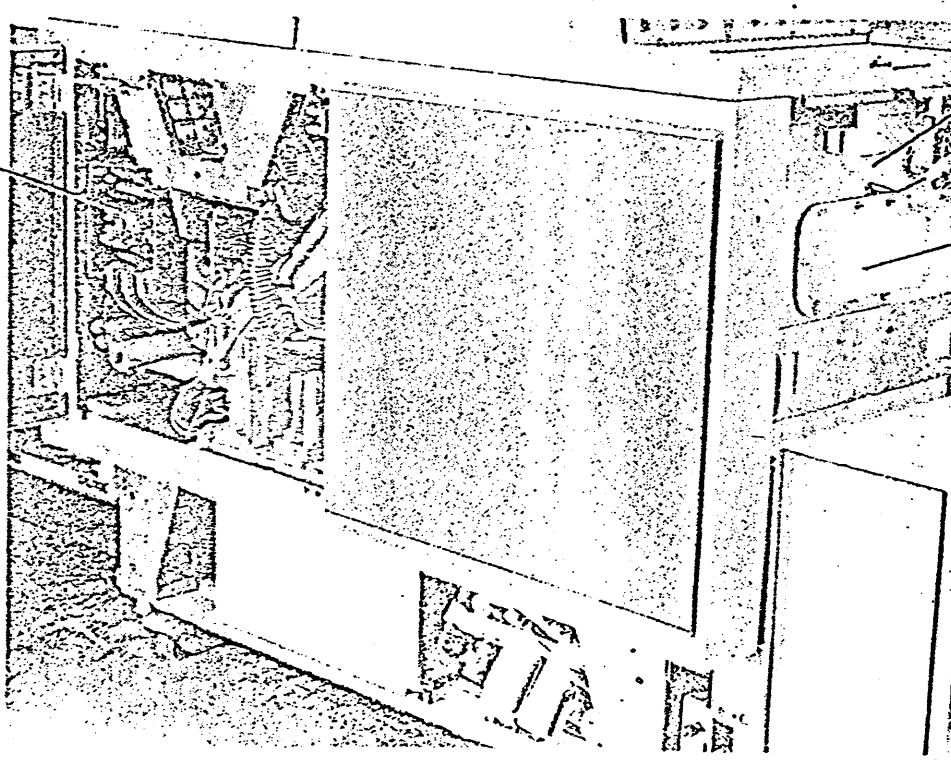

Fig. 1-11. Developer

1.10 COMPRESSOR AND PUFFER SYSTEM

The compressor (Fig. 1-12) supplies compressed air through a fuser pressure solenoid valve to a diaphragm and the fuser pressure disc, which lifts the fuser pressure roller up against the heat roller.

The compressor also furnishes air to the puffer, through the accumulator (storage) tank and the puffer solenoid valve.

When the puffer solenoid valve is opened, air is blown from the puffer to peel the sheet from the drum.

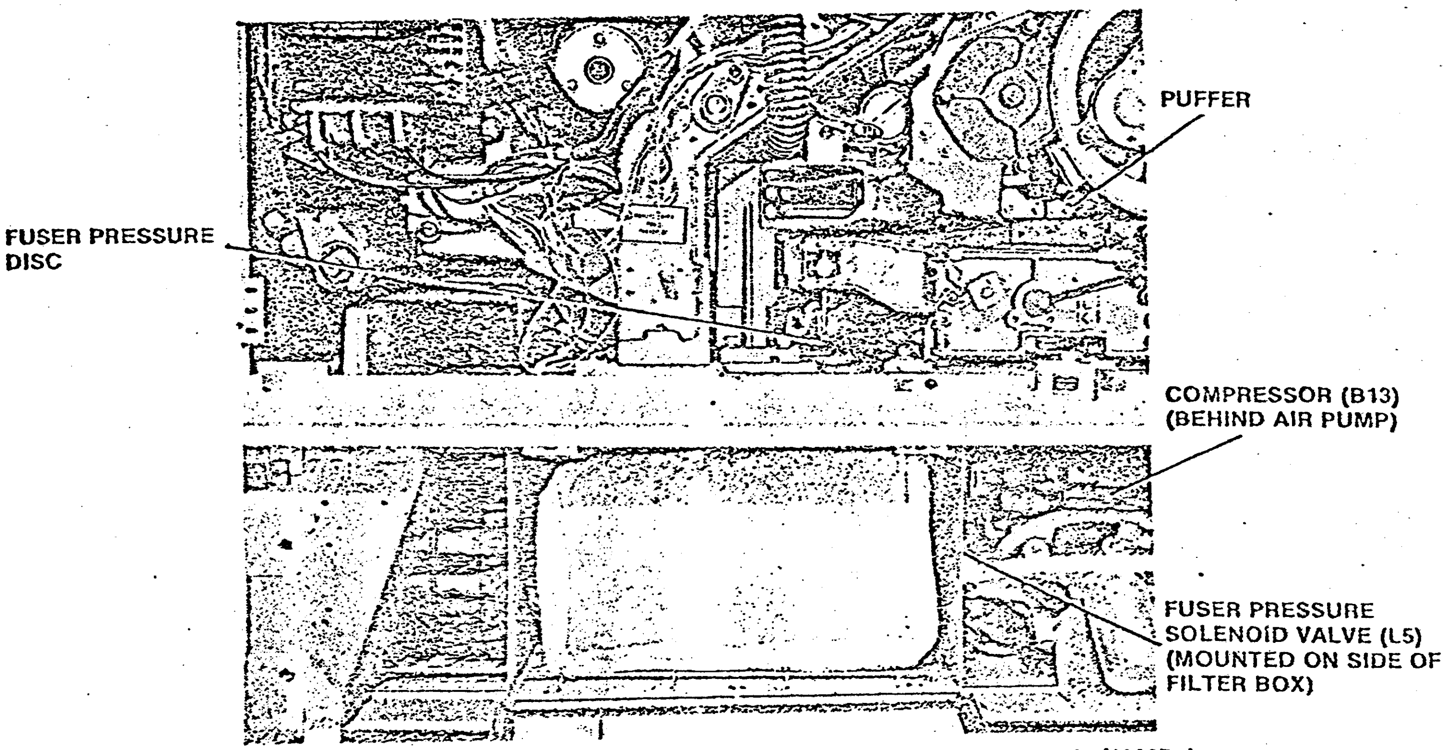

Fig. 1-12. Compressor and Puffer

1.11 FUSING

The fuser consists of (1) the fuser pressure roller, (2) the fuser heat roller and oil dispenser, and (3) the fuser controls.

The fuser pressure roller (Fig. 1-13) is located on the register stop drawer. When the machine is printing, the compressor furnishes air to force the pressure roller up against the fuser heat roller.

A fuser curl control blower directs a stream of air against the left side of the heat roller to force the sheet of paper onto the C-transport.

The heat roller encircles a stationary electrical heater rod, and is supplied with silicone oil from the fuser oil dispenser. This oil prevents the toner from adhering to the fuser rollers and offsetting on the copies.

The fuser controller electronically senses the temperature of the fuser heat roller. It maintains the fuser heat roller at a constant fusing temperature by varying the amount of electrical power furnished to the heater rod.

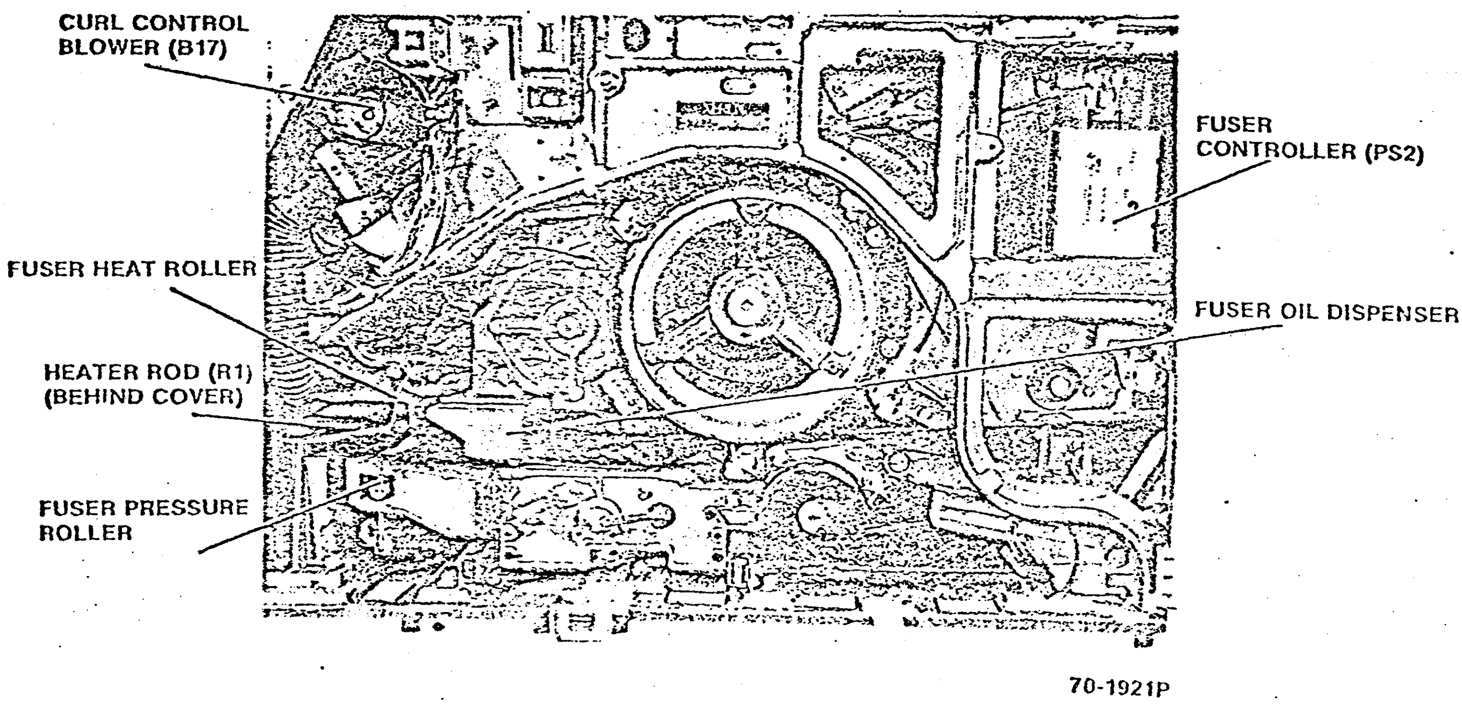

Fig. 1-13. Fuser

1.12 C-TRANSPORT

The C-transport (Fig. 1-14) carries paper from the fuser up to the receiving tray. The C-transport and B-transport share the same vacuum blower, which is located behind the C-transport.

Any static remaining on the copies is removed by the antistatic bar, for easier collation, before the copies drop into the receiving tray. The antistatic bar is supplied with high voltage AC from its own power supply, which is mounted to the base casting in front of the C-transport.

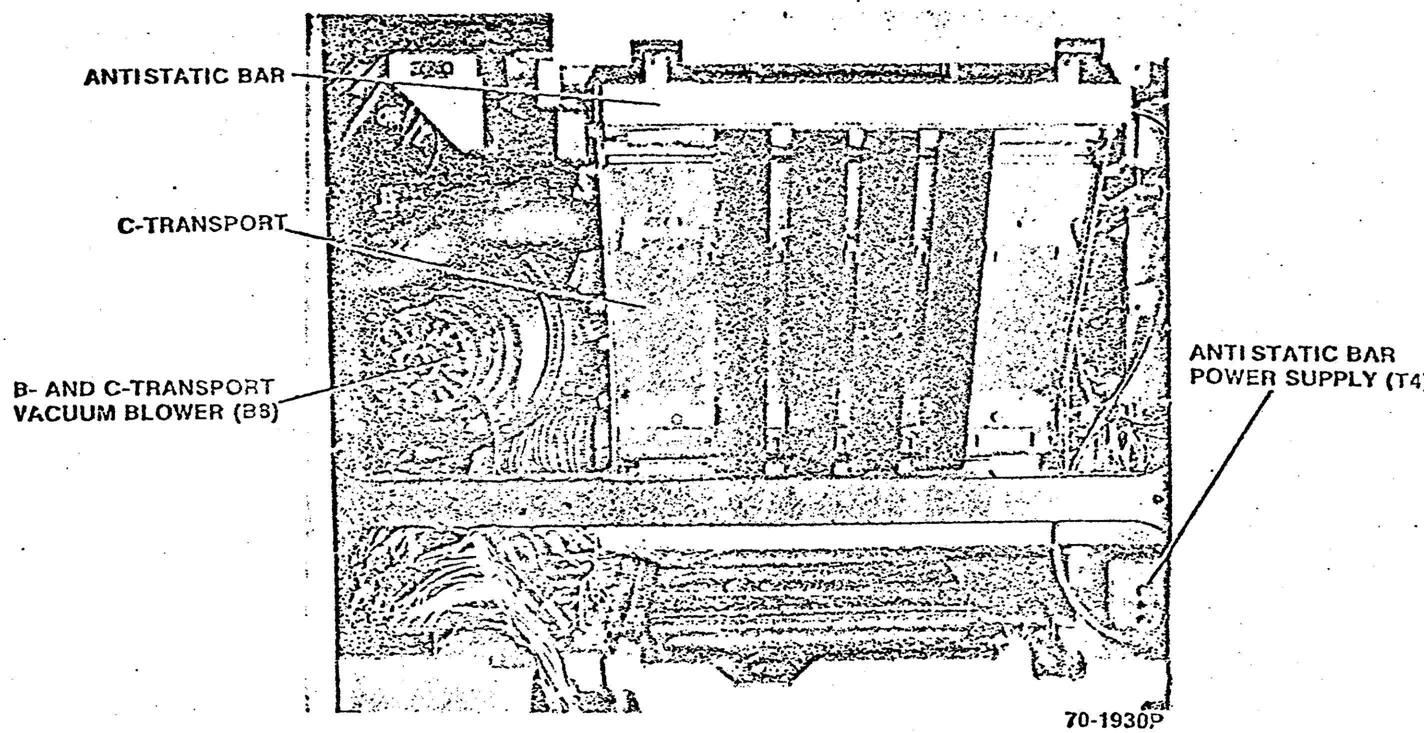

Fig. 1-14. C-Transport

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1.13 DRUM CLEANING

The drum cleaning system (Fig. 1-15) uses a drum brush located in a brush housing, a vacuum, an electroluminescent (EL) strip, and preclean corotron.

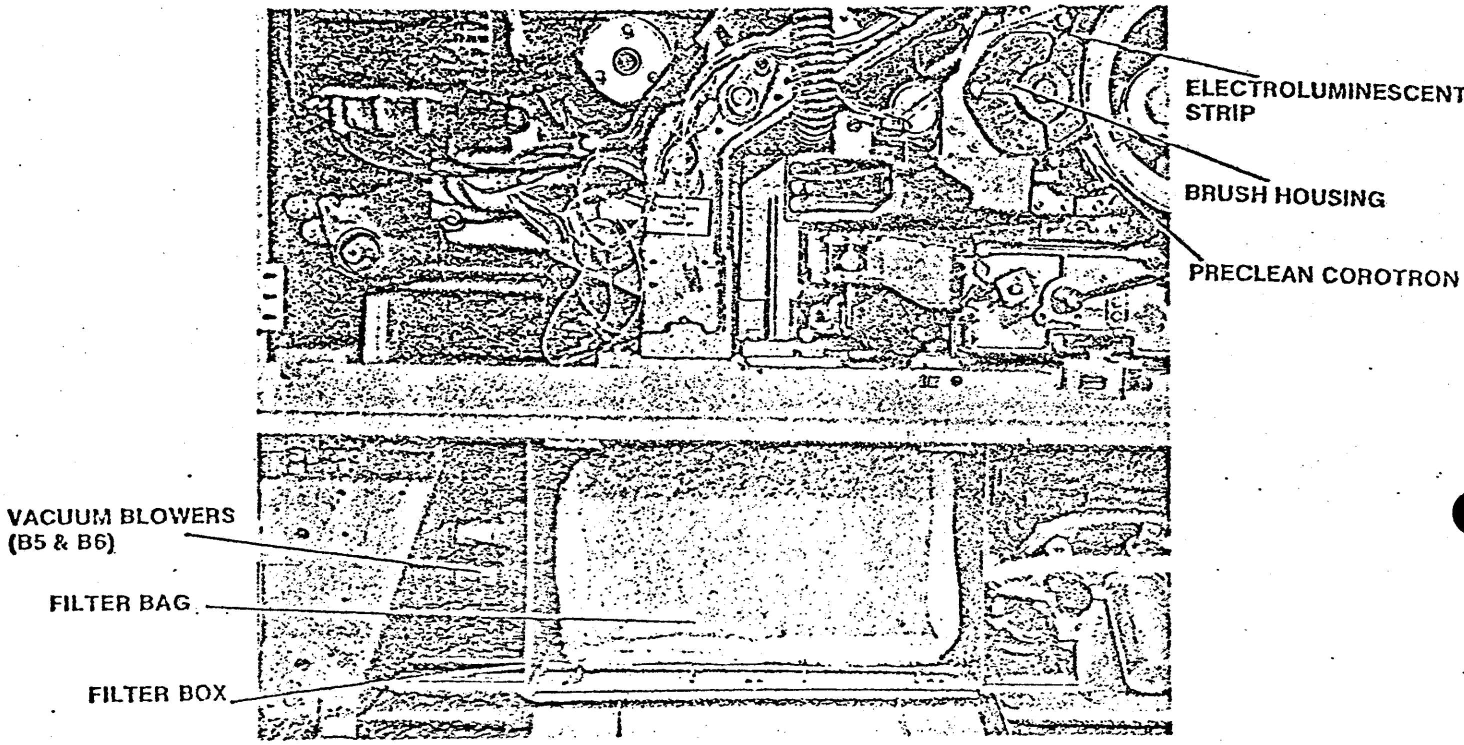

Fig. 1-15. Drum Cleaning

2.1 DRIVES AND CYCLE CONTROL

Main Drives

The main drive motor (Fig. 2-1) powers the gear box which has three outputs: the drum shaft, the scan drive shaft, which drives the scan mirror, and the main drive shaft (Fig. 2-2).

The main drive shaft turns the main drive sprocket. The main drive sprocket is a double sprocket which turns the A-transport drive chain and the main drive chain. The main drive chain turns the sprockets for the C-transport, the fuser heat roller, the B-transport and the cycle control. The cycle control sprocket turns both the cycle control assembly and the register stop module.

There are four idler sprockets in the path of the main drive chain: the left and right idlers, the eccentric idler and the spring-loaded idler (Fig. 2-2). The eccentric idler is used to adjust registration. The spring-loaded idler maintains proper chain tension and provides a means to slacken the chain to allow removal or adjustment of assemblies. For normal running, the spring-loaded idler is locked in place to prevent accidental slackening of the chain and, possibly, jumping the sprocket teeth or breaking the chain. Because the main drive chain will stretch slightly in time, the spring-loaded idler is periodically unlocked to take the slack out of the chain. The idler is then locked in the new position.

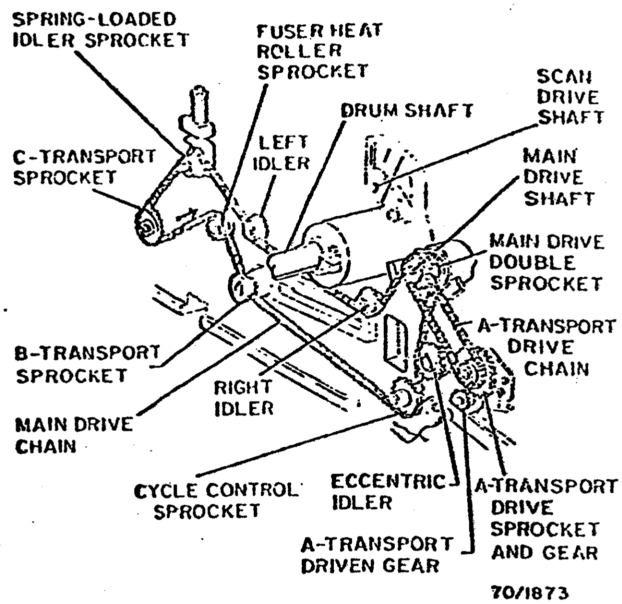

Fig. 2-2. Main Drive

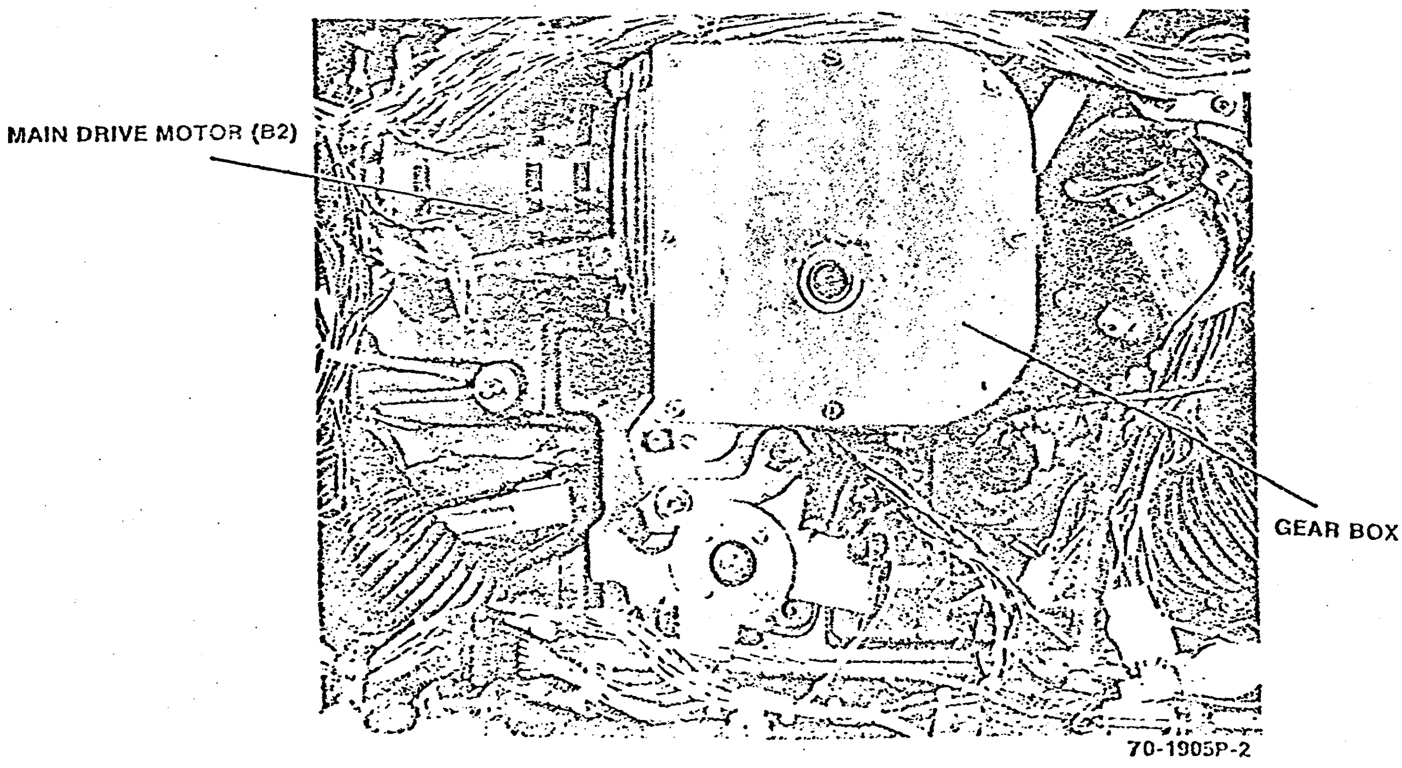

Fig. 2-1. Main Drive Motor

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The main drive motor (Fig. 2-3) is attached to the gear box by four screws. To prevent oil leaks, an O-ring fits in a groove between the motor and the gear box. A worm on the motor shaft drives a worm gear on the main drive shaft, which drives the main drive chain through a sprocket. This shaft also operates spur gears which drive the drum shaft. Both the drum and the scan cam are mounted on the drum shaft.

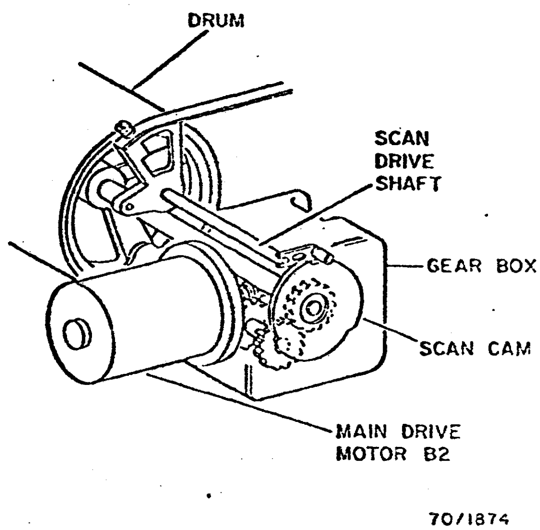

Fig. 2-3. Main Drive Motor and Gear Box Assembly

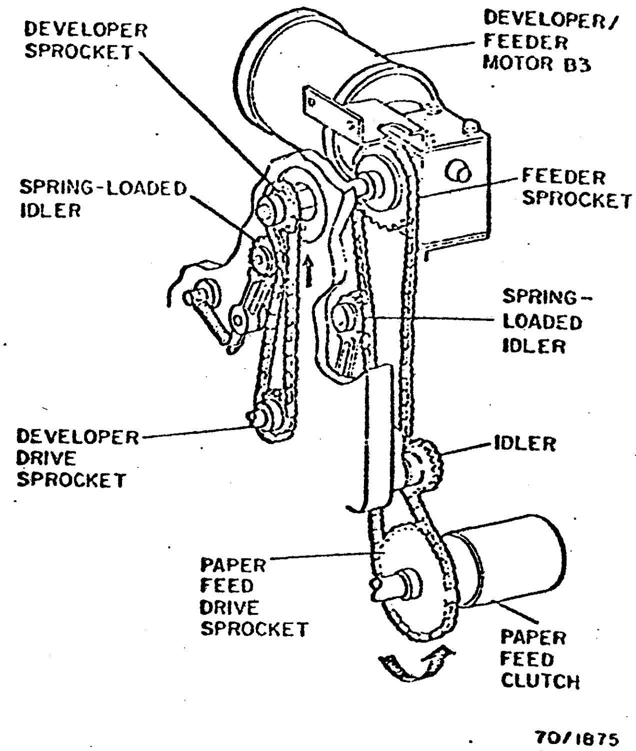

Fig. 2-4. Developer/Feeder Drive

Developer/Feeder Drive

The developer/feeder motor B3 turns a shaft which has two sprockets pinned to it. The feeder sprocket (Fig. 2-4) drives the paper feed clutch through a chain which has one fixed idler and one spring-loaded idler. The developer sprocket drives the developer conveyor through a chain which has one spring-loaded idler.

Cycle Control Assembly

The cycle control assembly consists of a frame and camshaft, seven cams, and eleven cycle control switches (Fig. 2-5) mounted in two groups, or banks. Some of the switches are operated by the same cams. Three switches are spares.

The cycle control switches and their functions are:

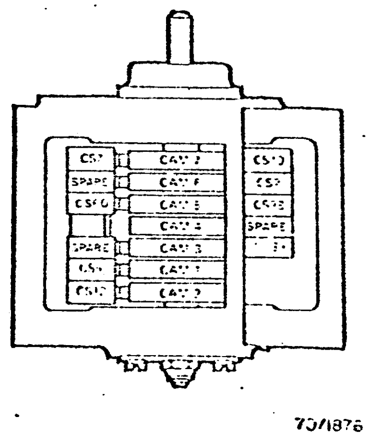

Fig. 2-5. Cycle Control Assembly

CS5

Paper Feed - supplies a pulse to the paper feed solenoid and also turns off the exposure lamps after the last document scan.

CS12

Puffer - supplies a pulse to the puffer solenoid L8 to puff the sheet off the drum.

2.3 PAPER FEEDER

The paper feeder is divided into three subsections:

1. paper length control (unilever)
2. paper feed mechanism
3. paper tray and index motor

The paper feeder is a rugged unit designed for reliable operation when adjusted properly.

The maximum total variations of the top-to-bottom shift of the image on the paper (vertical registration) should be within 0.024 inches on 95% of the copies and within 0.036 inches on all copies, providing the paper is uniformly cut and banked against the paper guides. Vertical registration will be improved by loading paper consistently against the inboard paper guide.

Long grain paper should be used; that is, the paper fibers lie parallel to the long dimension of the sheet. Paper should be placed on the tray wire side up (felt side down) to reduce paper curling in the fuser.

Paper Length Control (Unilever)

The function of the paper length control or unilever (Fig. 2-9) is to position the paper guides so that different lengths of paper can be used in the machine.

The position of the paper guides determines the top-to-bottom registration of the image on the paper. Because the document is placed on the center of the platen, the paper must be centered when it is fed into the machine. Maintaining the center position of the paper for different paper lengths is accomplished by simultaneously moving both the inboard and outboard paper guides equal distances from a center point. The paper guides are moved by a linkage arrangement which is operated by a long adjusting link connected to the unilever.

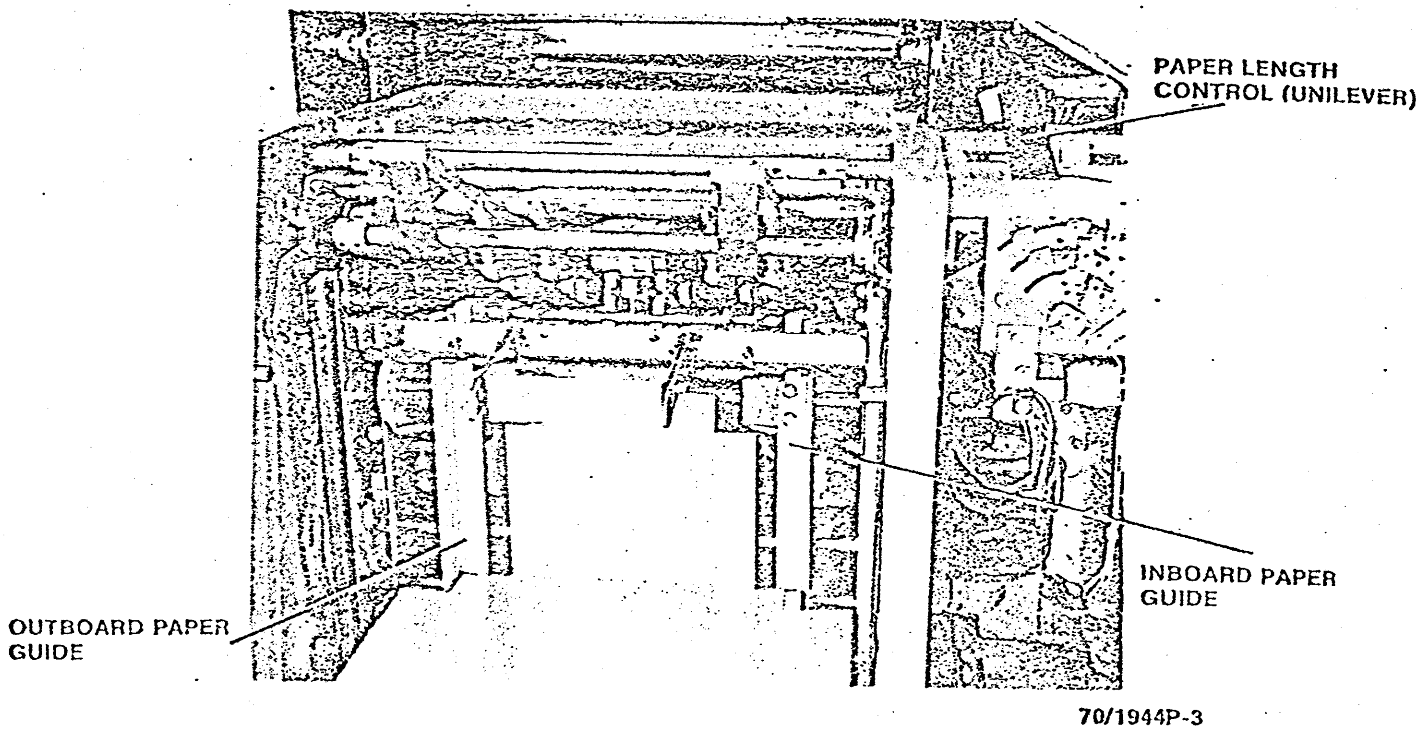

Fig. 2-9. Paper Feeder

The paper guides (Fig. 2-10) are attached to mounting slides on the elevator drive shaft. A coil-type, length-adjusting spring on this shaft tends to hold the paper guides apart and takes up play in the length-adjusting linkage. The outboard mounting slide is connected by the outboard pivot link to the pivot block. The pivot block is attached to the pivot lever. The inboard mounting slide is connected by the inboard pivot link to the top of the pivot lever, which is connected to the adjusting link and the unilever. Moving the unilever to the right moves the paper guides farther apart.

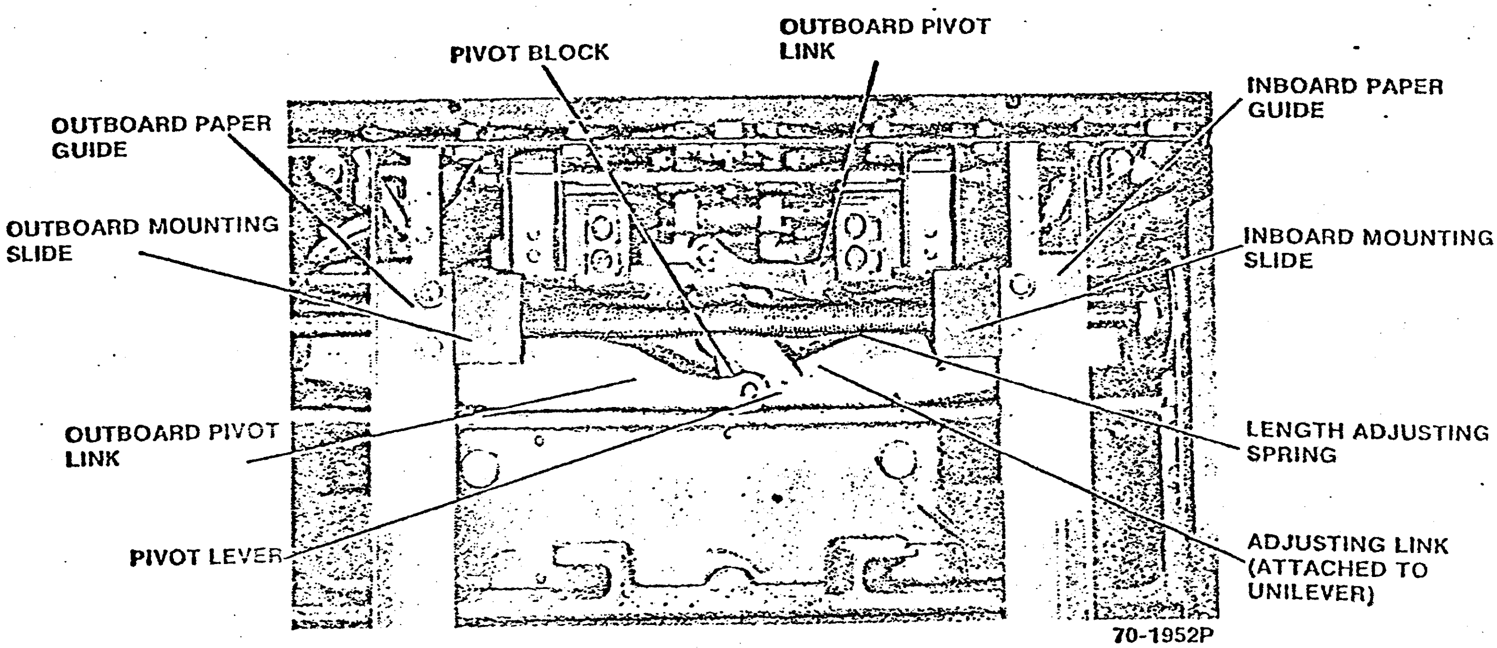

Fig. 2-10. Length Adjusting Linkage

The unilever (Fig. 2-11) has a pawl that latches in four preset positions against four stop pins. Pressing the button on the unilever pulls the pawl off the stop pin and allows the unilever to move the paper guides. The stop pins are factory set for paper lengths of 10 1/2 inches, 11 inches, 13 inches and 14 inches. However, the stop pins can be adjusted at installation anywhere between 10-1/2 inches and 14 inches depending on customer preference. The stop pins, which protrude inside the assembly, are mounted through the stop plate onto the adjusting blocks. Whenever the unilever is moved to the 13-inch or 14-inch position, the legal/letter switch (LS50) is actuated, turning on the LEGAL PAPER indicator on the control console. If the unilever is moved below the 13-inch position, the legal/letter switch (LS50) deactuates, turning on the LETTER PAPER indicator on the control console.

Fig. 2-11. Unilever

Paper Feed Mechanism

The function of the paper feed mechanism is to lift a sheet of paper from the paper stack and to feed the sheet to the A-transport.

The sniffer is driven by the developer/feeder motor B3 (Fig. 2-12) through a chain and drive sprocket, which is constantly rotating during print. The sniffer is stopped from moving by a pawl (Fig. 2-13) which prevents the single-revolution paper feed clutch from rotating.

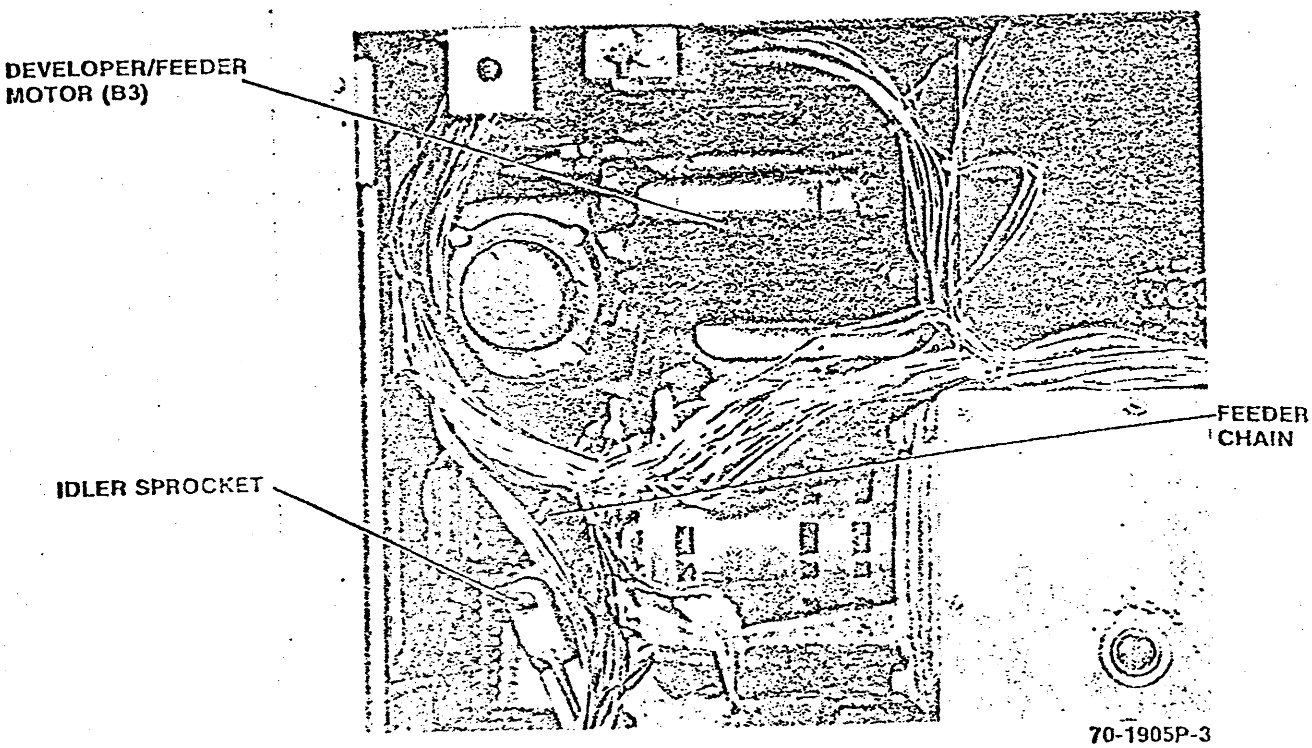

Fig. 2-12. Paper Feeder Drive (Rear View)

During print, cycle control switch CS5 energizes the paper feed solenoid L1 (Fig. 2-13) once each cycle. When the solenoid is energized, it pulls the clutch pawl away from a detent in the clutch. This allows the drive sprocket to turn the sniffer cam shaft. Attached to the cam shaft is the sniffer cam, which operates the sniffer cam follower and the sniffer.

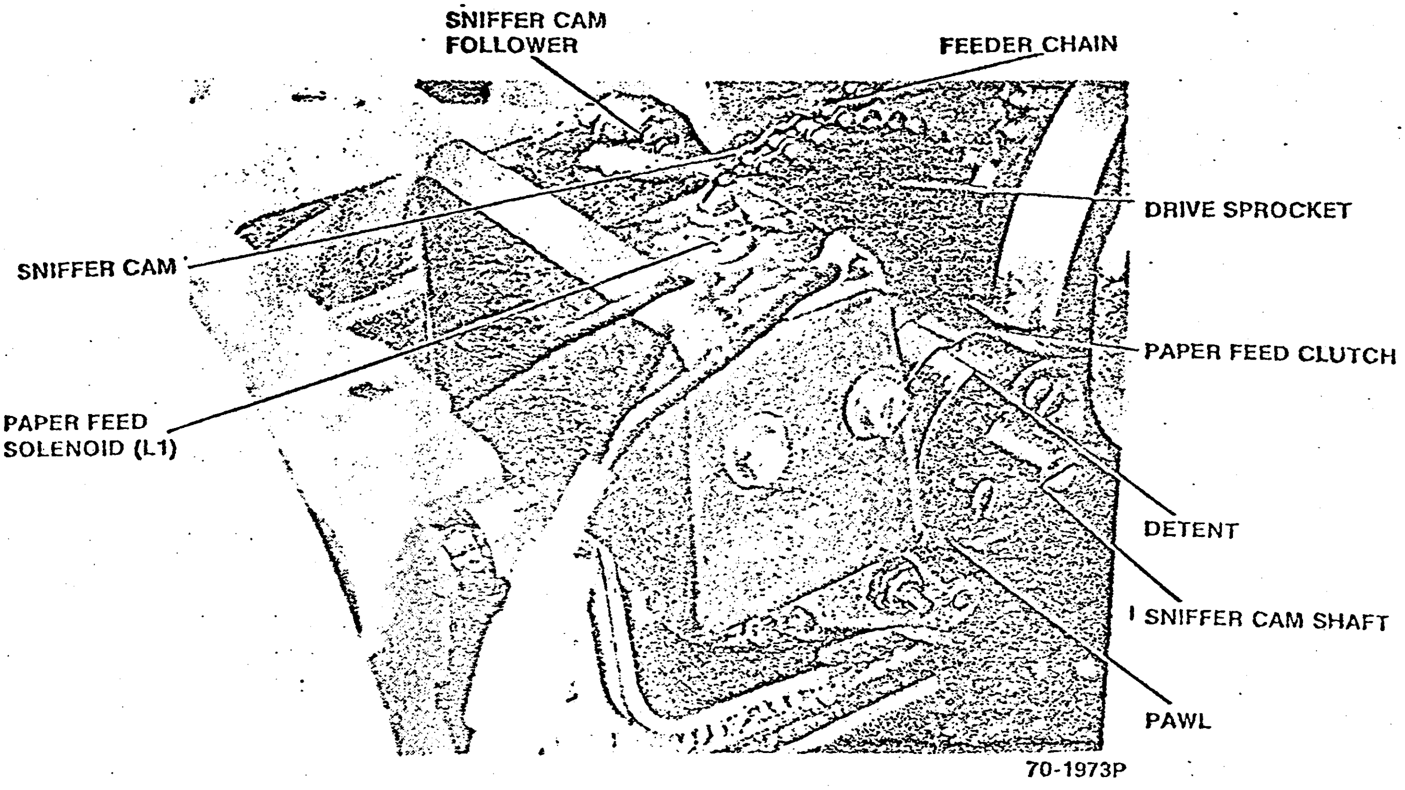

Fig. 2-13. Paper Feed Clutch

Figure 2-14 shows another view of the clutch and drive sprocket. Besides the sniffer cam, the sensing bar cam and the backlash cam are also attached to the sniffer cam shaft. The sniffer cam and the sensing bar cam are actually made as one part. The cams' respective followers are also shown in Fig. 2-14.

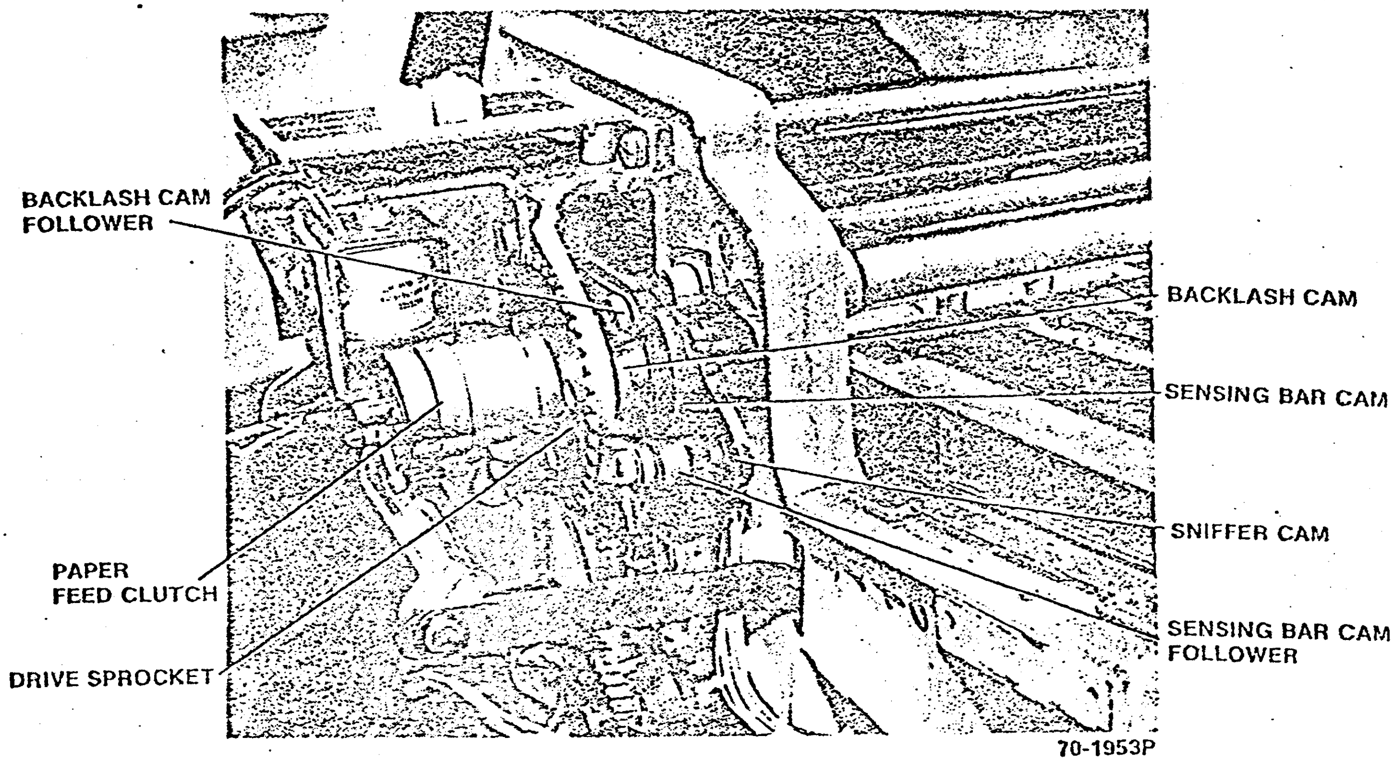

Fig. 2-14. Paper Feeder Drive

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Figure 2-15 shows a top view of the paper feed clutch and solenoid L1, the drive sprocket and the sniffer cam shaft. Also shown are the sniffer cam and its follower, the sensing bar cam, and the backlash cam follower. The sensing bar cam follower is located underneath its cam.

The paper feed solenoid is pulsed for about 35 milliseconds, and then the pawl drops back on the clutch. However, by the time the pawl has dropped back, the detent has rotated past the pawl, so the clutch continues to rotate for a full revolution.

The pawl then falls into the detent, stopping the clutch, until the next CS5 actuation.

After the solenoid is pulsed and the sniffer cam shaft begins to turn, the sensing bar cam first lifts the sensing bar off the paper stack. Then the sniffer cam drops the sniffer to the paper stack, lifts a sheet of paper, and feeds it to the A-transport. Next, the sensing bar cam drops the sensing bar to the paper stack again. The sniffer cam rotation is then stopped by the de-energized paper feed solenoid clutch pawl. If another copy is to be made, the paper feed solenoid is again pulsed and the cycle is repeated.

Lifting the sensing bar off the stack during feeding prevents the sensing bar from dragging on the sheet as the sniffer pulls it toward the A-transport. If the sensing bar were allowed to drag on the sheet, the increased friction would tend to pull the sheet off the sniffer, causing a misfeed.

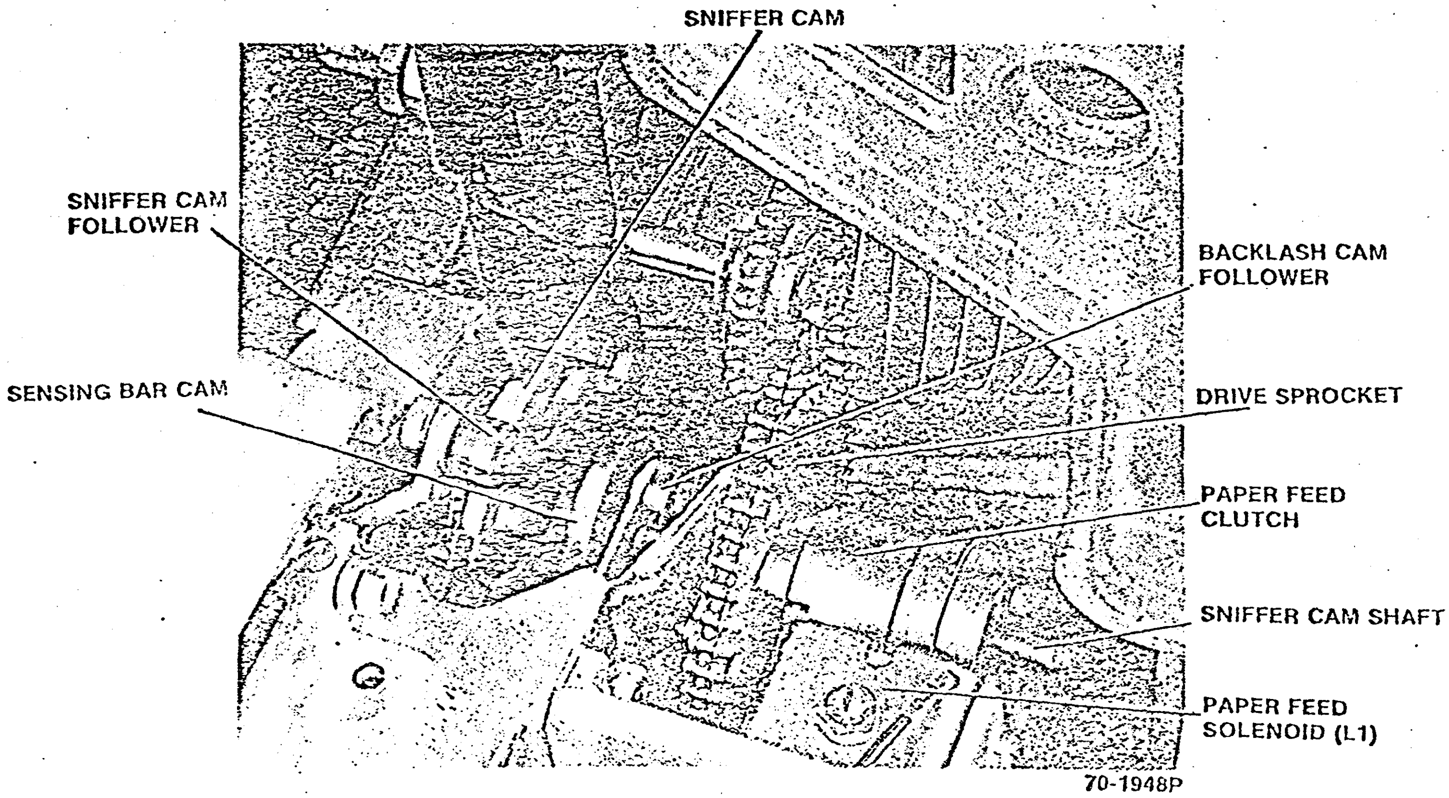

Fig. 2-15. Sniffer Cam Shaft (Top View)

The sniffer cam turns the sniffer actuating shaft (Fig. 2-16) to raise or lower the sniffer. The sniffer has a right-angle cam follower attached to it on its outboard side. This cam follower is spring-loaded against a right-angle cam. When the sniffer cam drops the sniffer to the stack and lifts a sheet up, the right angle cam follower is riding on the vertical contour of the right-angle cam (Fig. 2-17). When the sniffer reaches the top of the vertical contour of the right-angle cam, the sniffer cam follower has not yet reached the top of its lobe. As the sniffer cam continues to rotate, the sniffer follows the horizontal contour of the right-angle cam. This causes the sniffer to pivot forward to feed the sheet of paper to the A-transport.

The backlash cam stops the paper feed mechanism in the same place after each revolution to ensure that paper feeding is initiated at exactly the same time each cycle.

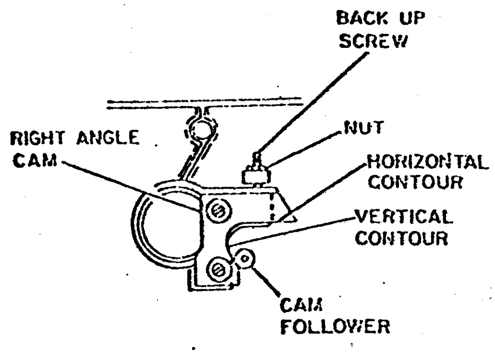

Fig. 2-17. Right Angle Cam

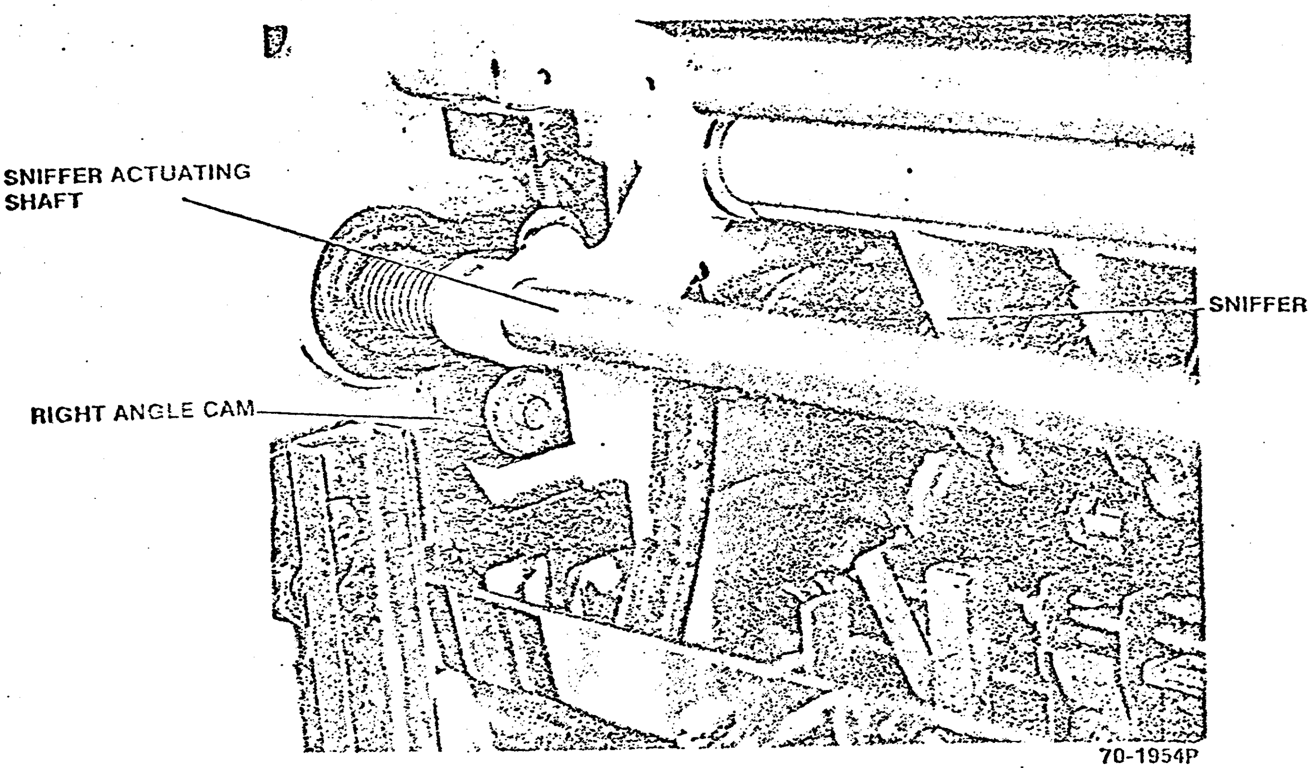

Fig. 2-16. Right Angle Cam

Paper Tray and Index Motor

The function of the paper tray (Fig. 2-18) is to store up to 2,000 sheets of paper from 10-1/2 to 14 inches in length. The function of the index motor B1 is to raise or lower the paper tray, and to maintain the top of the paper stack level and at the proper feeding position.

The sensing bar monitors the top of the stack and operates the index motor B1, which is mounted at the lower right rear of the machine. The motor rotates the elevator drive shaft to move the tray by a cable arrangement.

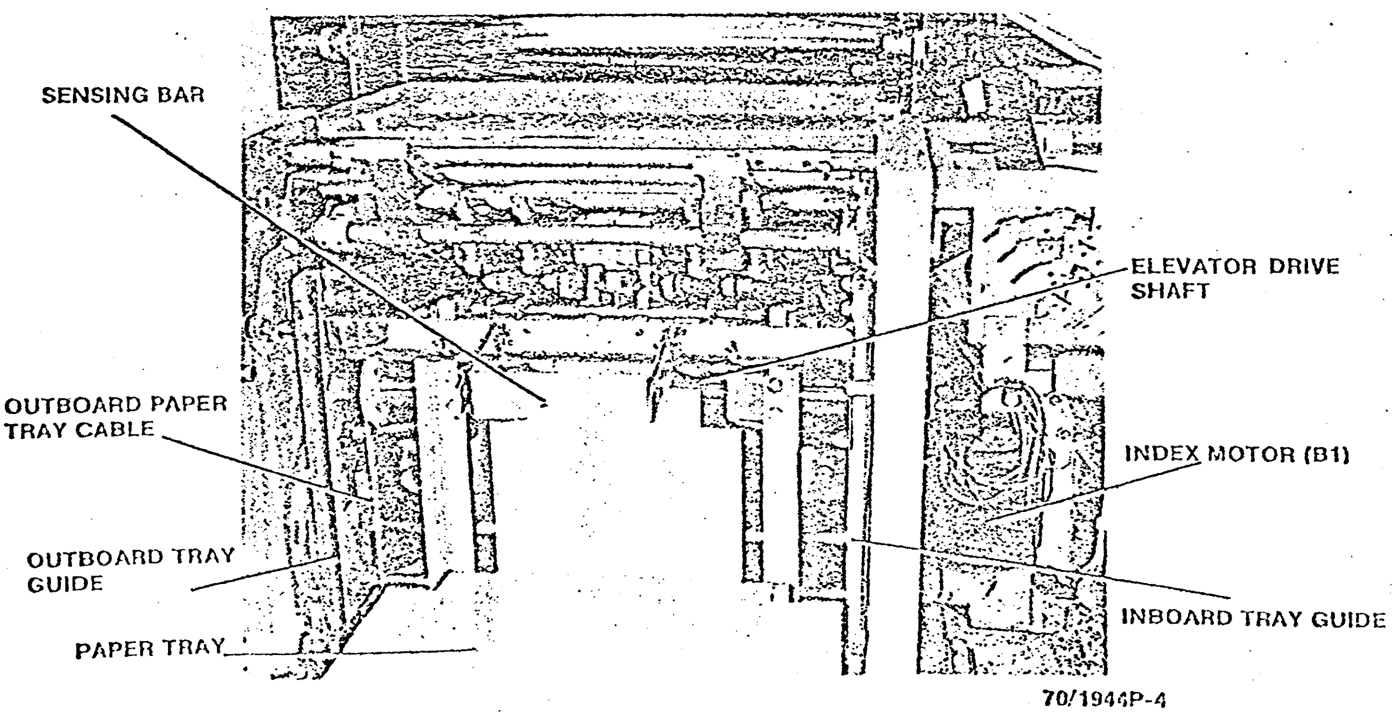

Fig. 2-18. Paper Feeder (Right Side View)

The paper tray rides in two vertical tray guides, one on each side of the tray. Two rollers attached to each side of the tray ride in the tray guides and allow the tray to move only up and down.

Figure 2-19 shows another view of the sensing bar and tray guides. Be careful not to confuse the paper tray guides with the paper guides, which hold the paper stack in place.

The paper tray is suspended by two cables, each attached to a pulley pinned to the elevator drive shaft. These pulleys, which are equally spaced from the feeder frames, raise and lower the tray when they are rotated.

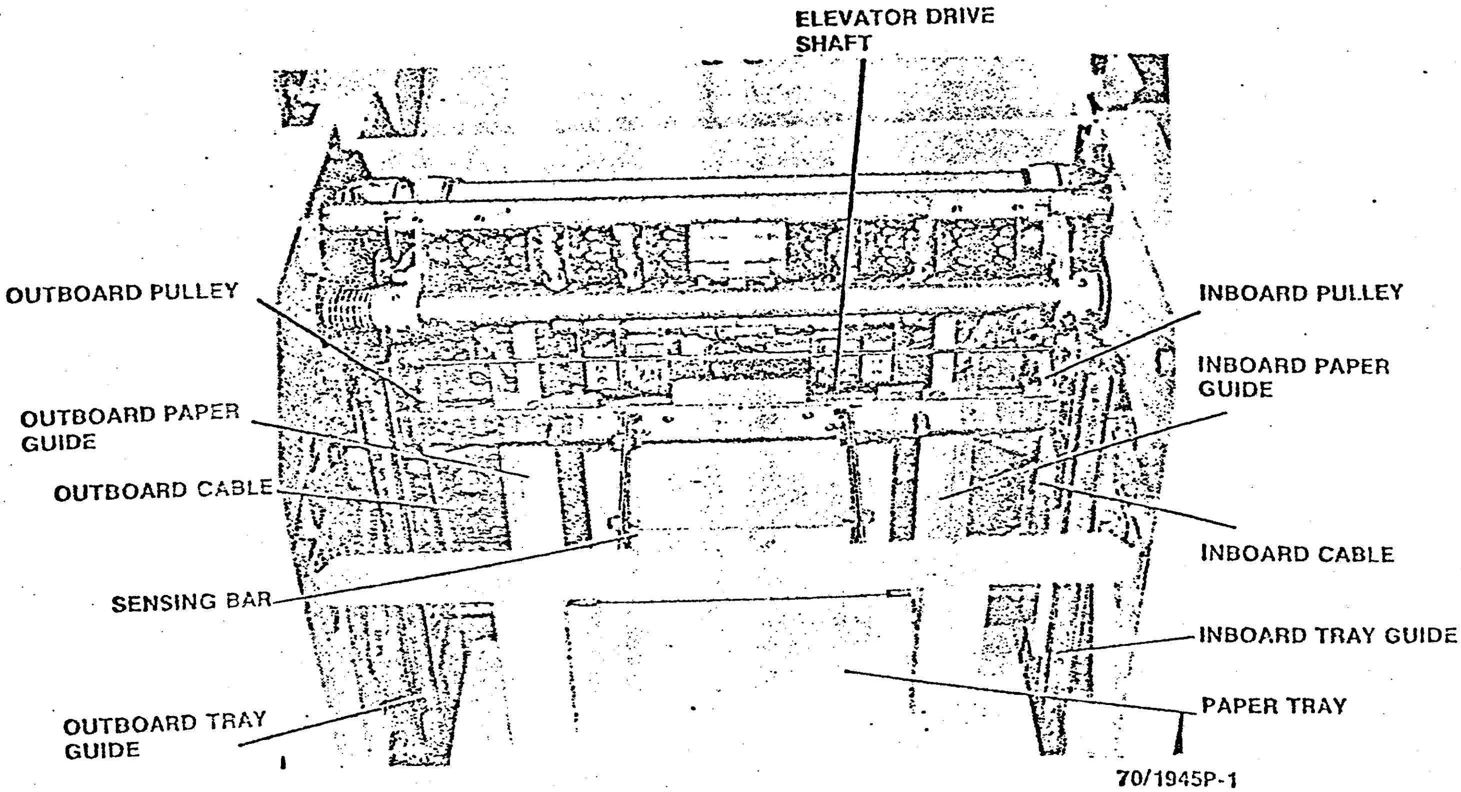

Fig. 2-19. Paper Feeder

The elevator drive shaft is turned by a helical worm gear (Fig. 2-20) pinned to its inboard end. This gear is driven by a worm gear on the index motor shaft. The reversible rotation motor has two separate windings which are energized individually to drive the paper tray either up or down. The index motor is operated by the sensing bar, which actuates LS14, and by two buttons, on the UP/DOWN switch S6.

The paper tray index circuits are controlled in part by sensing bar switches LS14 and LS31. In addition, LS15 actuates to stop the tray at its lower limit. Also, LS24 actuates when the paper tray cover and backup bar are raised.

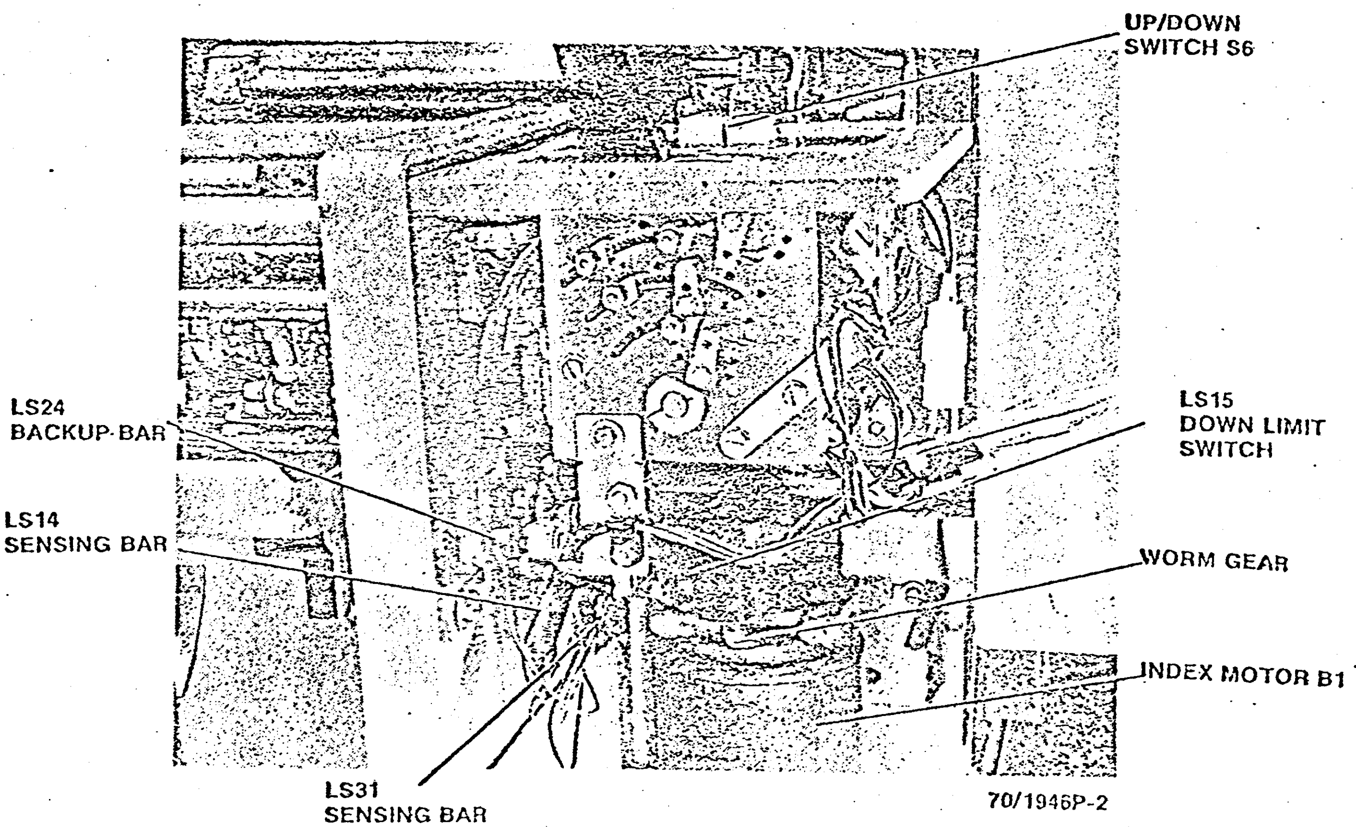

Fig. 2-20. Paper Feeder Controls

The paper tray is protected by a cover (Fig. 2-21) which prevents objects from being accidentally dropped on the paper and sniffer during operation. The cover is linked to a backup bar assembly. The backup bar has two spring-loaded paper deflectors which apply a small pressure to the stack of paper in the tray. Without the deflectors, the fluffer could blow the sheets slightly away from the snubbers when the sensing bar is lifted each cycle during printing.

Figure 2-21 also shows the location of LS4 low paper switch.

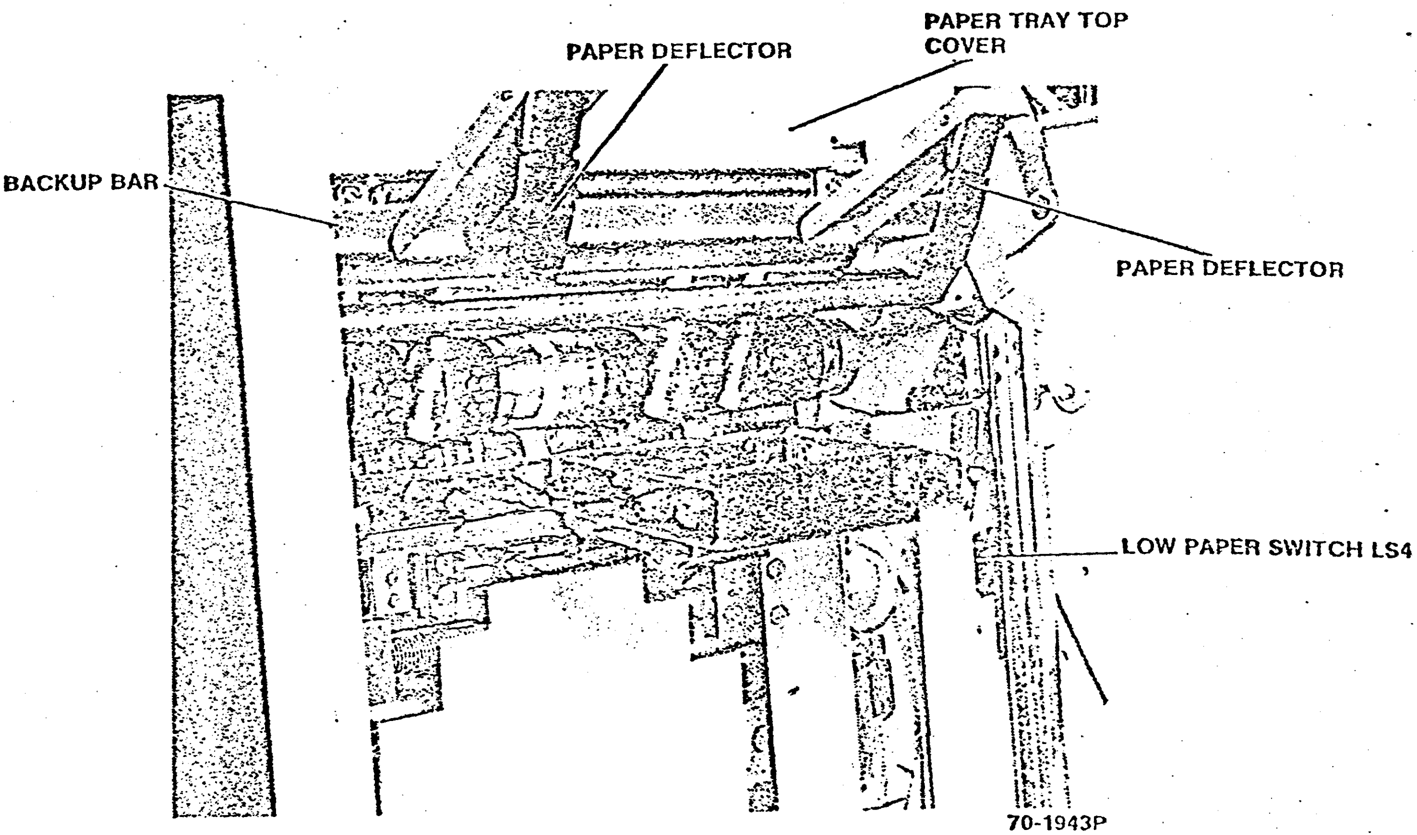

Fig. 2-21. Backup Bar and Cover in Raised Position

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The important features of the paper feeder are an adjustable sensing bar (Fig. 2-22), curved paper tray, side fluffers, corner snubbers, flexible center snubbers, a fluffer bar and a rolling bar. The adjustable sensing bar is used to optimize paper fluffing.

The paper tray is flat in the center but bowed, or "wedged," upward at the inboard and outboard ends. The curved tray forces all the sheets to assume an upward curl initially. This upward curl facilitates feeding of the longer paper lengths (13- and 14-inch) which would have a tendency to droop at the ends when picked up by the sniffer.

The side fluffers aid the front fluffer in separating the sheets. The side fluffers are especially useful when feeding long paper, stiff sheets, or dry paper that may tend to curl down at the corners. Without side fluffers, the center fluffer alone may not be able to separate the sheets.

Two corner snubbers are used to prevent the side fluffers from blowing the shorter paper lengths (under 13 inches) up too far at the ends. Each corner snubber consists of a small pin attached to a vertical block. The block, which is mounted to the top of the paper guide, is slotted and is free to move in a vertical direction. When blown up by the side fluffers, the sheets touch the pin on each corner snubber. Thus, the pins hold the top sheet in the correct feeding position. The corner snubbers should be pivoted out of operation before running 13- or 14-inch paper to allow higher fluffing at the ends. This will overcome the tendency of the paper to droop as it is lifted by the sniffer.

The two flexible snubbers, which are made of spring metal, are one of the most important features of the paper feeder. These snubbers improve paper feeding reliability, especially when stiffer paper is used. During feeding, the snubbers flex slightly and allow the lead edge of the top sheet to bend downward, pushing the second sheet away from the sniffer.

The fluffer bar, which is attached to the sensing bar, rests on the top of the paper stack. The function of the fluffer bar is to trap air being blown into the stack by the fluffer. The trapped air forces the top sheets up closer to the sniffer. The plastic fluffer bar is slotted so it can move freely in a vertical direction. This slotting is necessary to prevent binding of the paper on the fluffer bar if the paper stack swells during high humidity.

The rolling bar restrains the paper from being blown out from under the snubbers and from pivoting about the fluffer bar, which has trapped the fluffer air. The rolling bar holds the sheet down by its own weight and prevents the sheet from blowing up too far. The weight of the bar is not enough to keep the sheets against the stack. Instead, the top sheet is forced up by the air until a balance is achieved between the weight of the bar and the air pressure. At this point, the sheet extends straight back at the same level from snubbers to the rolling bar then down to the top of the stack and under the fluffer bar. Thus, the fluffer bar and the rolling bar work together to give the proper contour to the top sheet so that the sniffer always meets a flat, level surface.

The rolling bar is supported on each end by a support bracket attached to the tray guides.

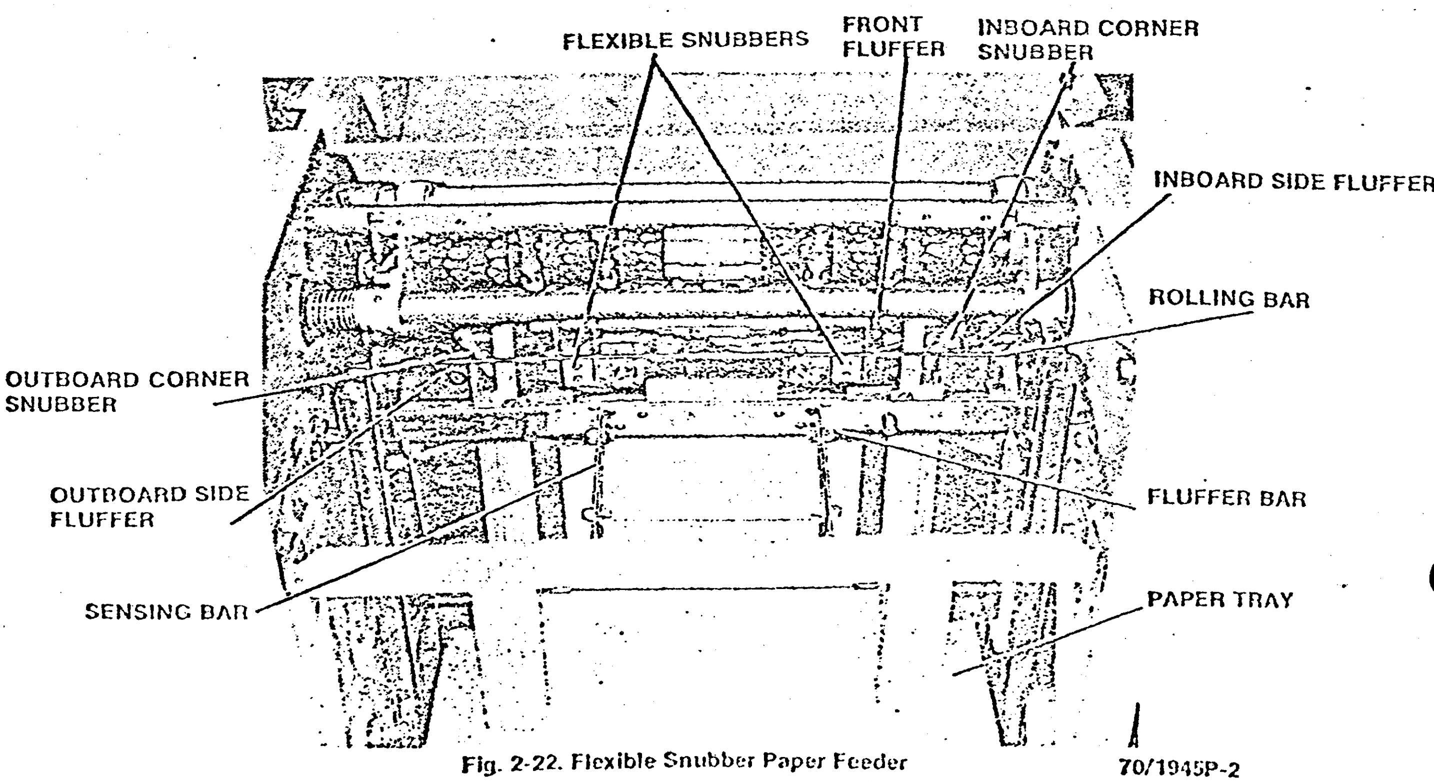

Fig. 2-22. Flexible Snubber Paper Feeder

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The rolling bar should be moved to its upper position before running 13- or 14-inch paper to facilitate fluffing of the longer, heavier paper.

2.4 SNIFFER/FLUFFER AIR SYSTEM

The function of the sniffer-fluffer air system is to supply vacuum to the sniffers and air to the fluffers. The carbon vane air pump (Fig. 2-23) is driven by a separate motor B9 through a coupling. The fluffer filter, air pump filter and fluffer control valve are mounted on a bracket in front of the air pump motor.

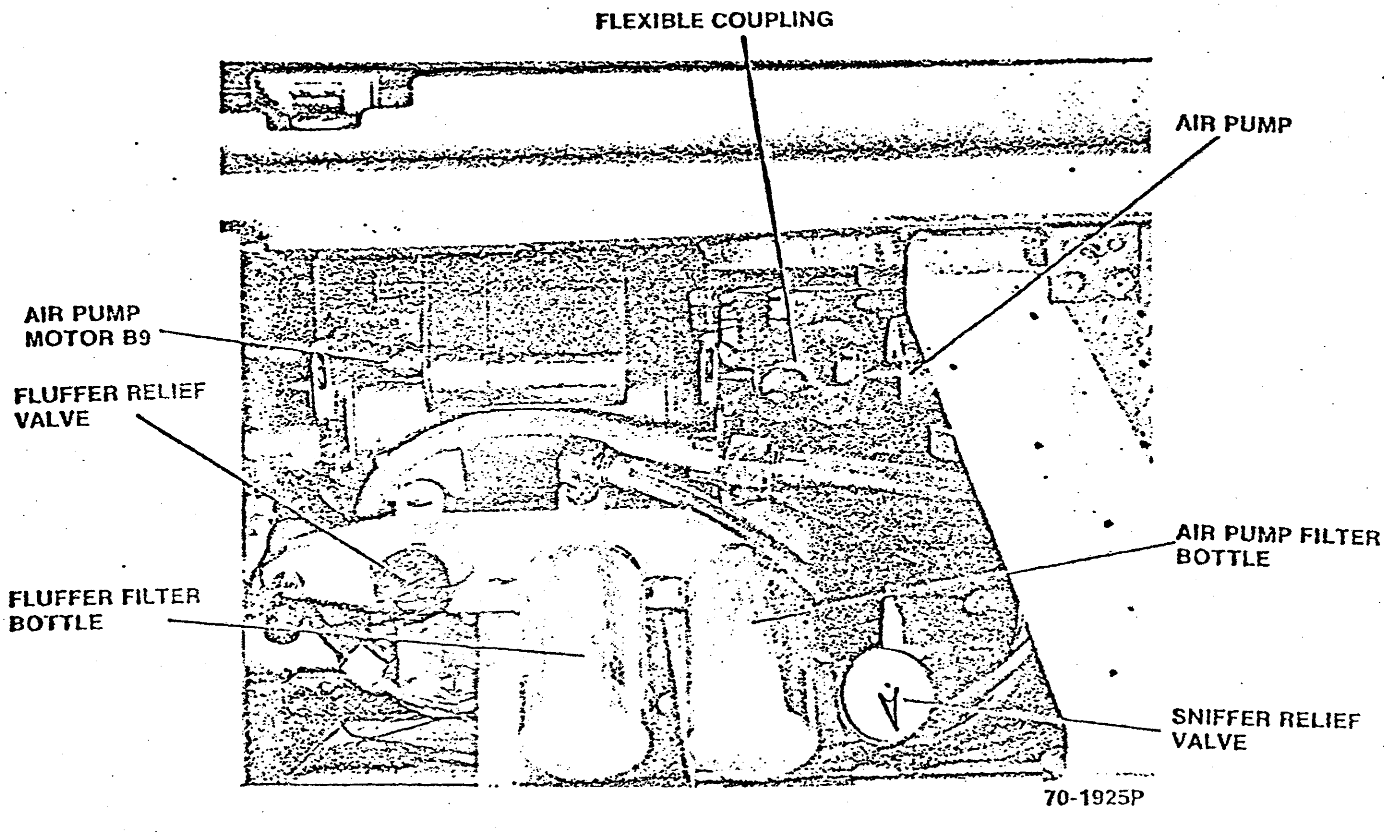

Fig. 2-23. Air Pump B9

Figure 2-24 shows the air pump motor attached to the air pump with the coupling. The air pump draws air from the sniffer and sniffer relief valve through the air pump filter bottle, which filters dirt and paper dust from the air. As the air leaves the pump, it goes through the fluffer filter bottle, which removes carbon particles picked up as the air goes through the pump. The air leaving this filter passes the fluffer relief valve and goes to a triple "tee" connection which divides the air between the fluffers. The adjustable fluffer relief valve is used to reduce the amount of air blowing out of the fluffers by allowing air to bleed off. Closing the fluffer valve would allow no air to bleed off and, thus, would force maximum air through the fluffers.

The air pump is operated during print. The fluffer system (Fig. 2-25) consists of three horizontal tubes: the front fluffer tube and two side fluffer tubes. The center fluffer tube has three slots which allows the air to blow against the lead edge of the paper at the top of the stack. Each side fluffer has one slot. The fluffer separates the sheets and blows the top sheet up against the flexible snubbers. When the sniffer lifts the top sheet, the flexible snubbers flick the edge of this sheet and separate it from the rest of the sheets on the stack.

The amount of vacuum at the sniffer is regulated by the sniffer relief valve. While the sniffer is picking up a sheet, the sniffer tubes do not allow air to go to the air pump. However, sufficient air is drawn through the sniffer relief valve to keep the fluffers in operation throughout the paper feed cycle.

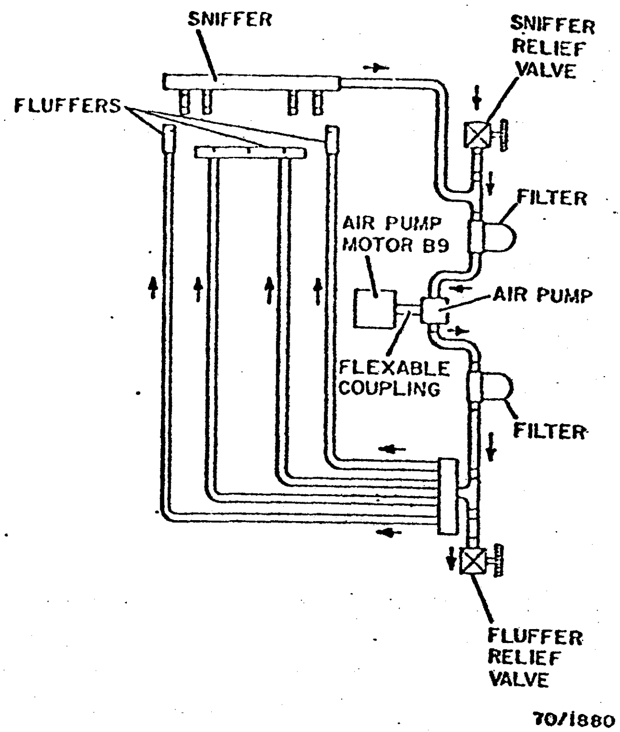

Fig. 2-24. Sniffer/Fluffer Air Flow

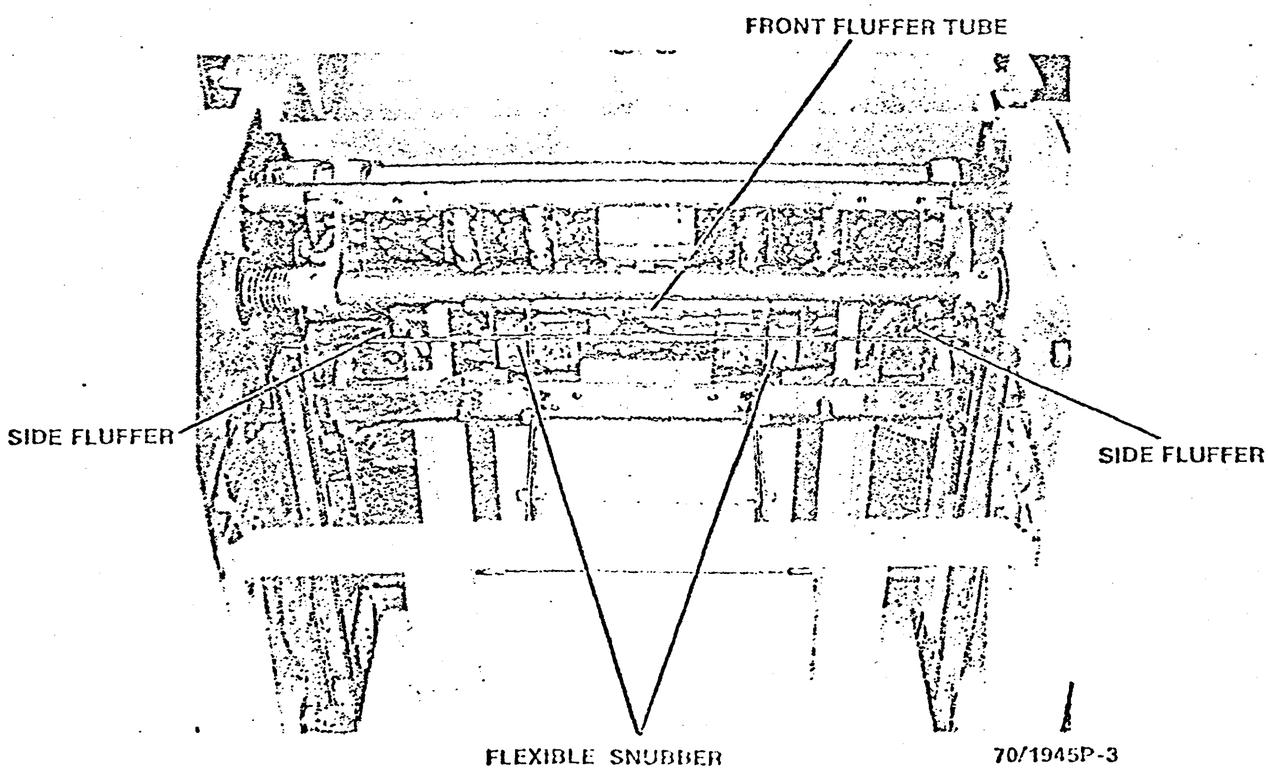

Fig. 2-25. Fluffers

2.5 A-TRANSPORT

The function of the A-transport assembly is to carry a sheet from the paper feeder to the register stop drawer and to sense and reject multi-sheets that are fed by the sniffer.

The A-transport (Fig. 2-26) consists of a housing, a drive roller, an idler roller, four small center belts, two larger outboard and inboard belts, and a vacuum system. Also mounted on the housing are the reject shaft with its five fingers, two paper path switches LS8 and LS27, and the reject solenoid L4. The drive roller has a drive gear mounted on its inboard end.

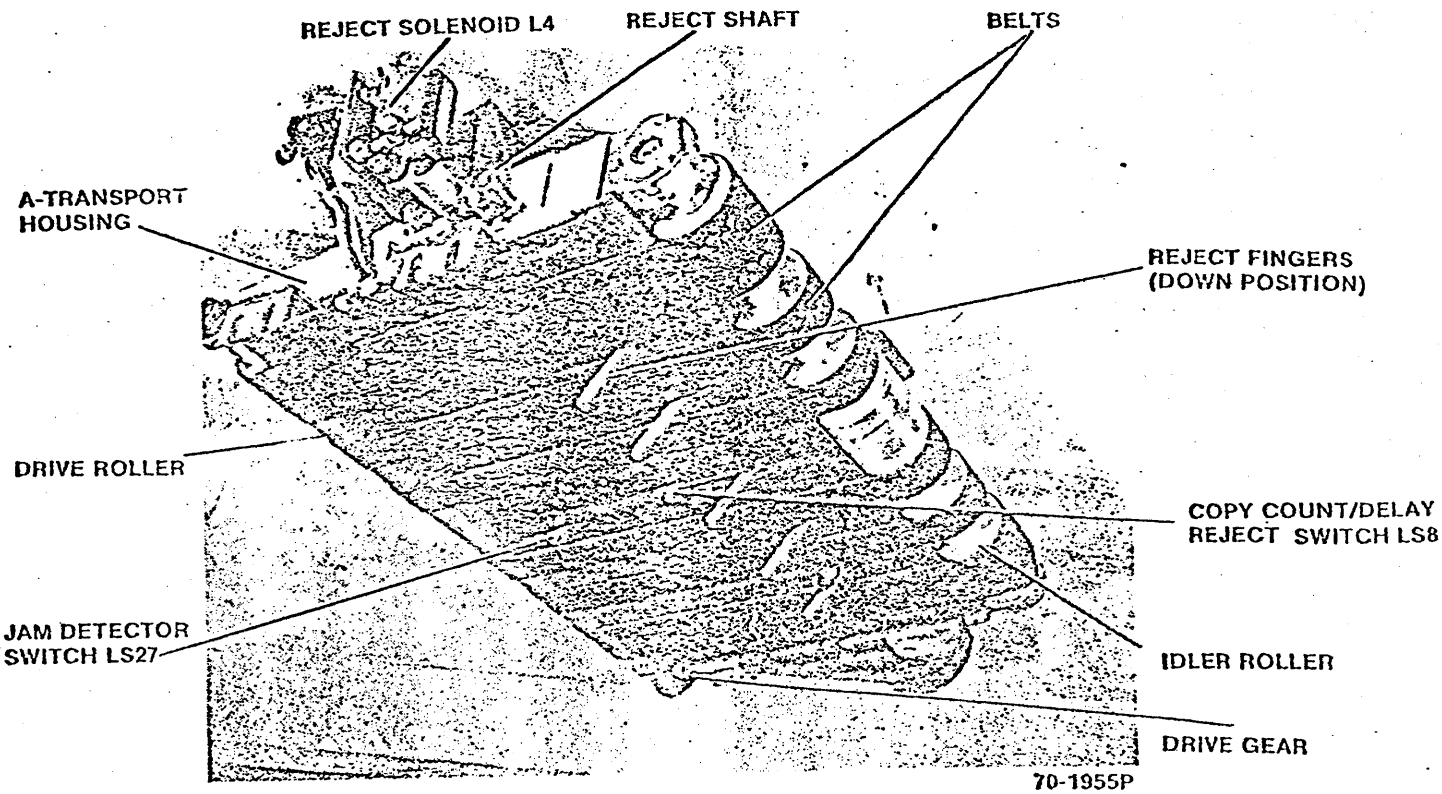

Fig. 2-26. A-Transport (Bottom View)

In operation, the sniffer feeds a sheet between the pinch wheels (Fig. 2-27) and the belts on the idler roller. The four metal pinch wheels are individually spring-loaded against the belts. The belts are kept tracking properly by the crowned idler roller. The paper is then held underneath the A-transport by a vacuum. The leading edge of a sheet first actuates switch LS8, and about 3 1/2 inches later, this sheet actuates LS27, which is about one inch away from the register stop module lead-in baffle.

Two small wing-shaped paper guides, mounted to the inboard and outboard pinch wheel shaft, help to guide the top and bottom ends of long or humid (limp) sheets against the transport belts and in contact with the vacuum. Holding the ends up against the belts keeps the sheet from hitting the pinch wheel shaft and, thus, prevents the corners of a sheet from folding. This reduces the possibility of malfunctions caused by folded corners.

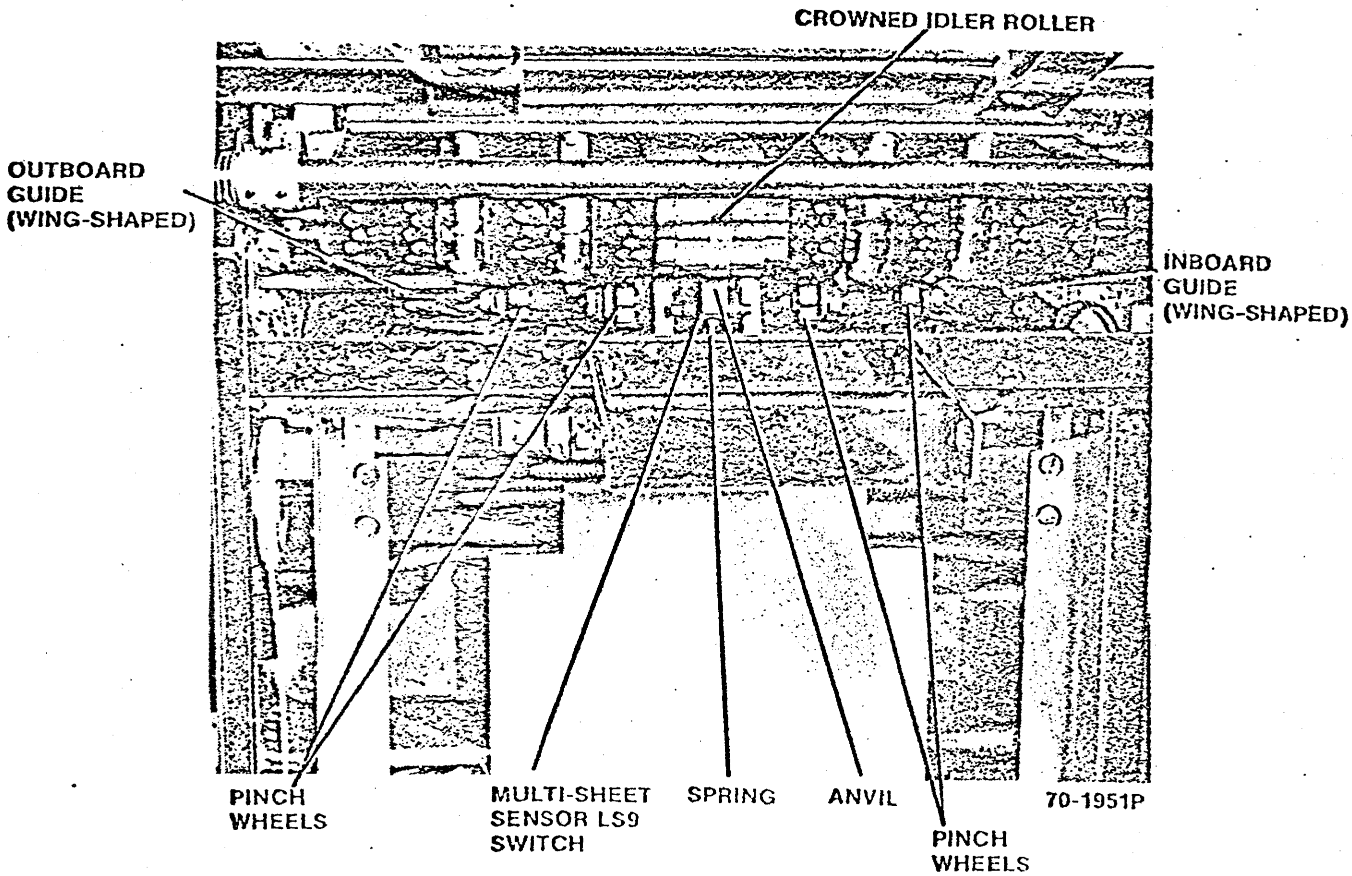

Fig. 2-27. A-Transport (Right End View)

The A-transport drive roller (Fig. 2-28) is driven by a sprocket and gear combination and a chain from the main drive double sprocket. The sprockets, gear and chain are covered with a bead guard (not shown in the figure) to prevent developer beads from accumulating and jamming in the gears.

If two or more sheets are fed to the A-transport by the sniffer, the extra thickness of paper will deactuate the multi-sheet sensor switch LS9. After a slight delay (to allow the previous sheet to pass the reject fingers) reject solenoid L4 (Fig. 2-29) energizes. This actuates the reject arm and lever to rotate the reject fingers downward and divert the multi-sheets into the reject tray (Fig. 2-30).

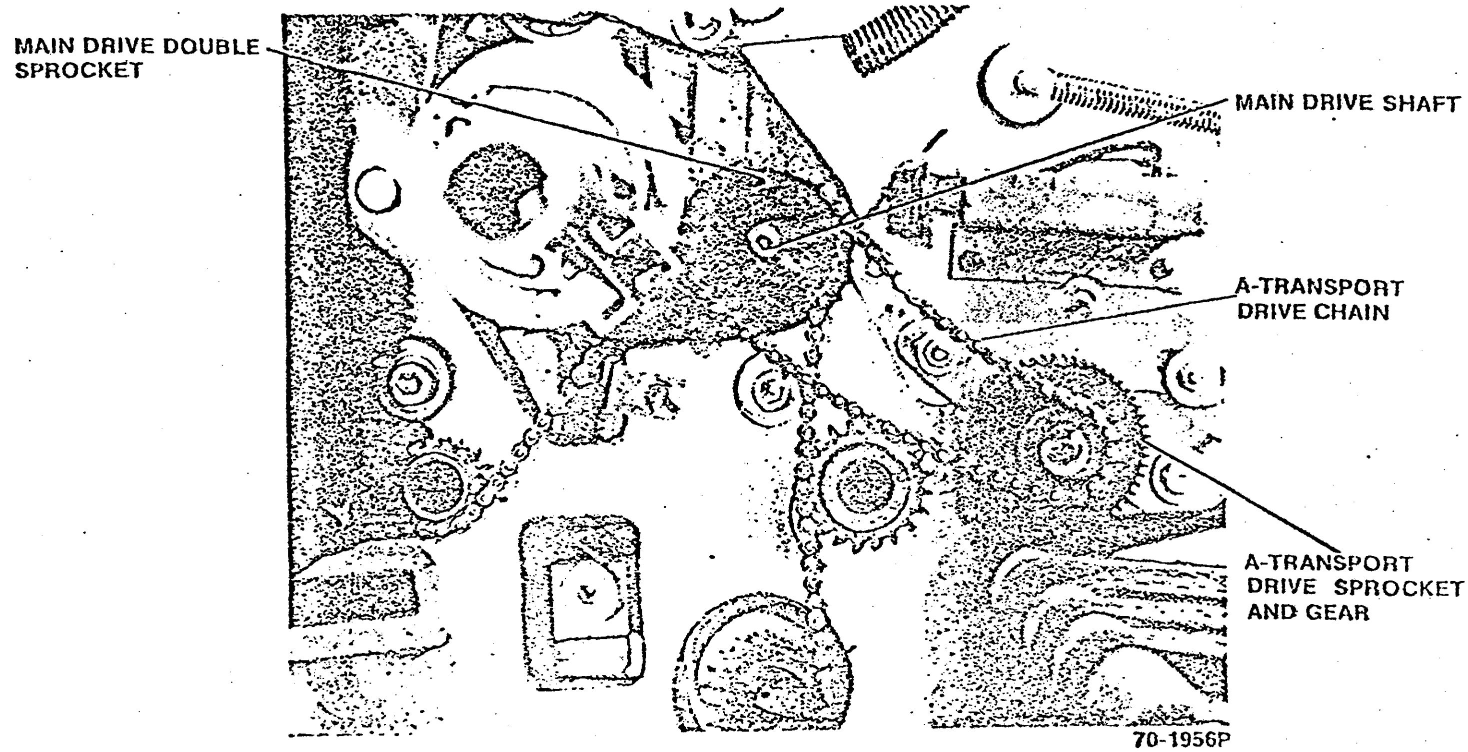

Fig. 2-28. A-Transport Drive

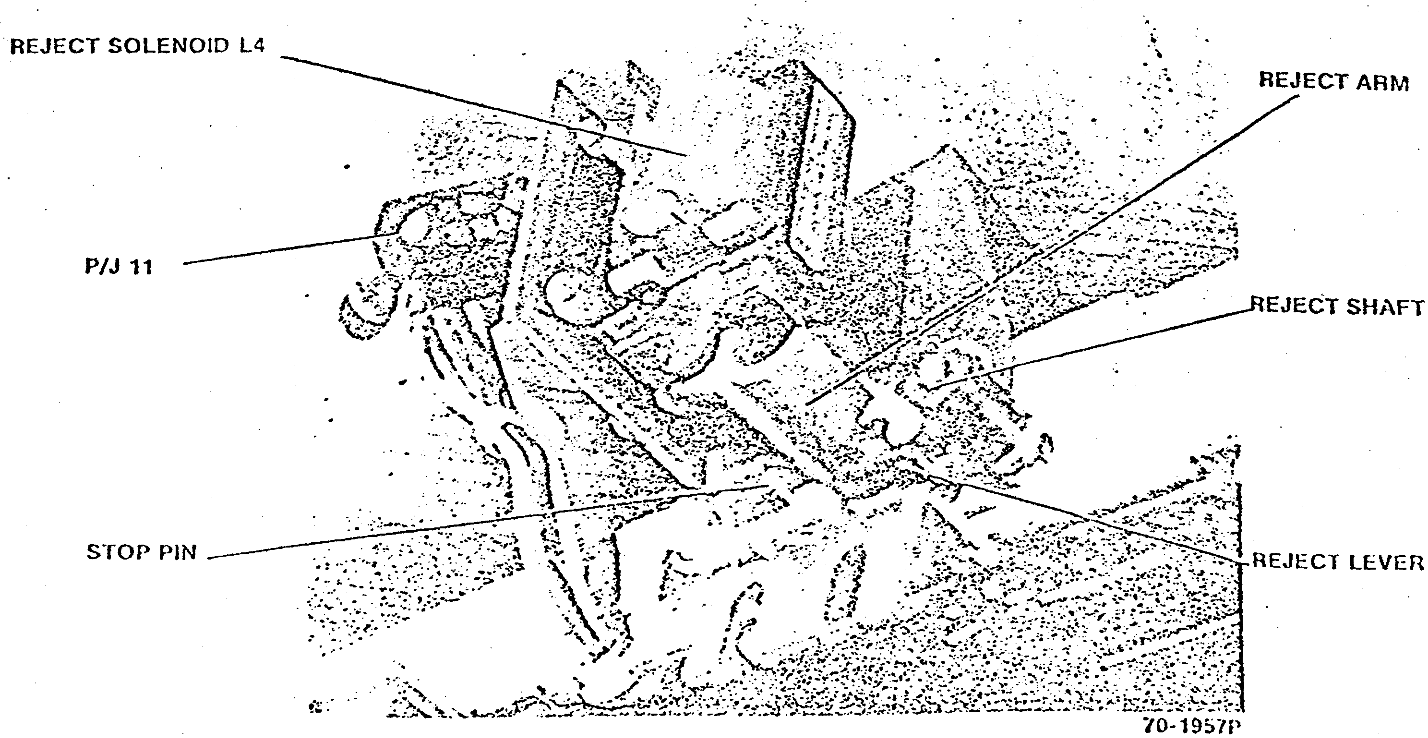

Fig. 2-29. Reject Linkage

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A developer catch tray is mounted on the A-transport (Fig. 2-30).

The A-transport has its own vacuum motor, B7, located near the right rear leg, which provides a vacuum for holding paper to the bottom of the transport (Fig. 2-31).

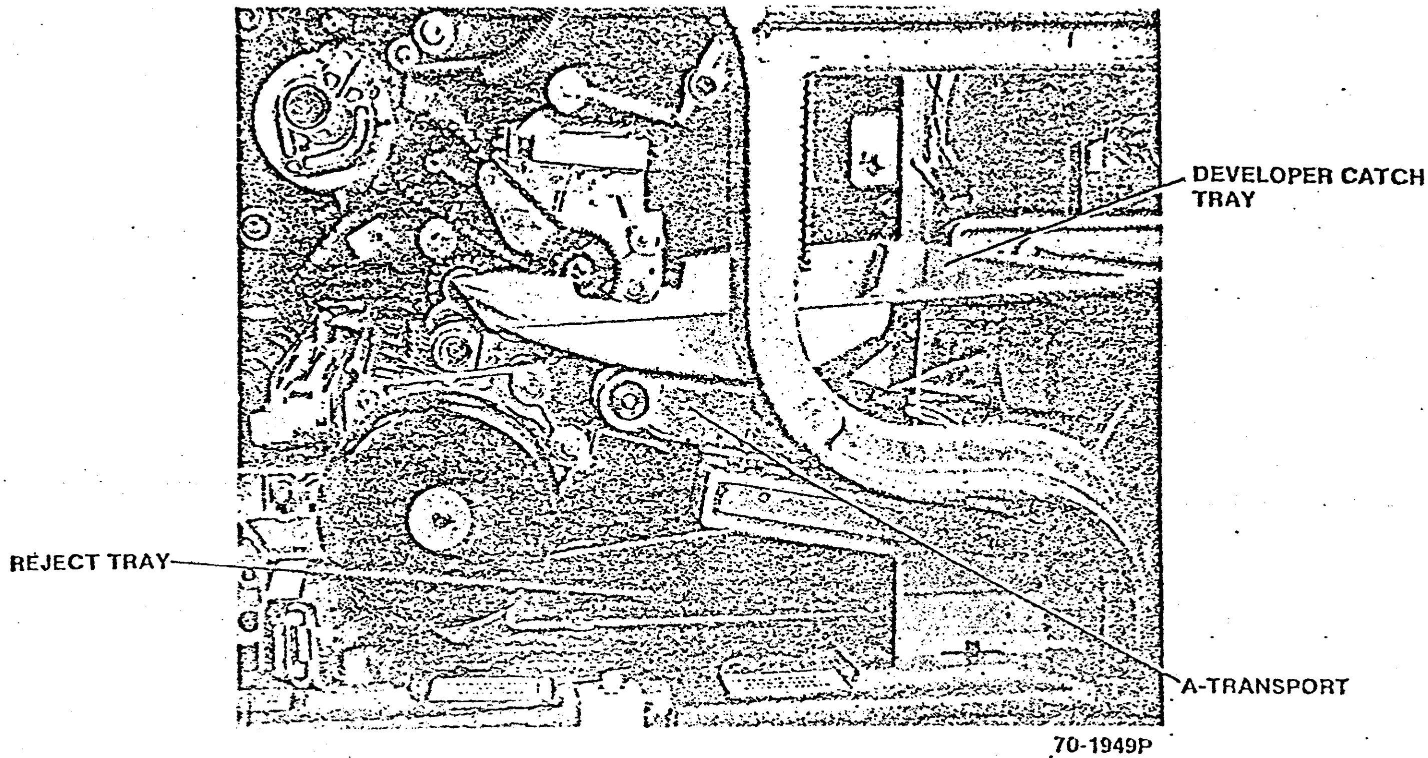

Fig. 2-30. A-Transport (Top View)

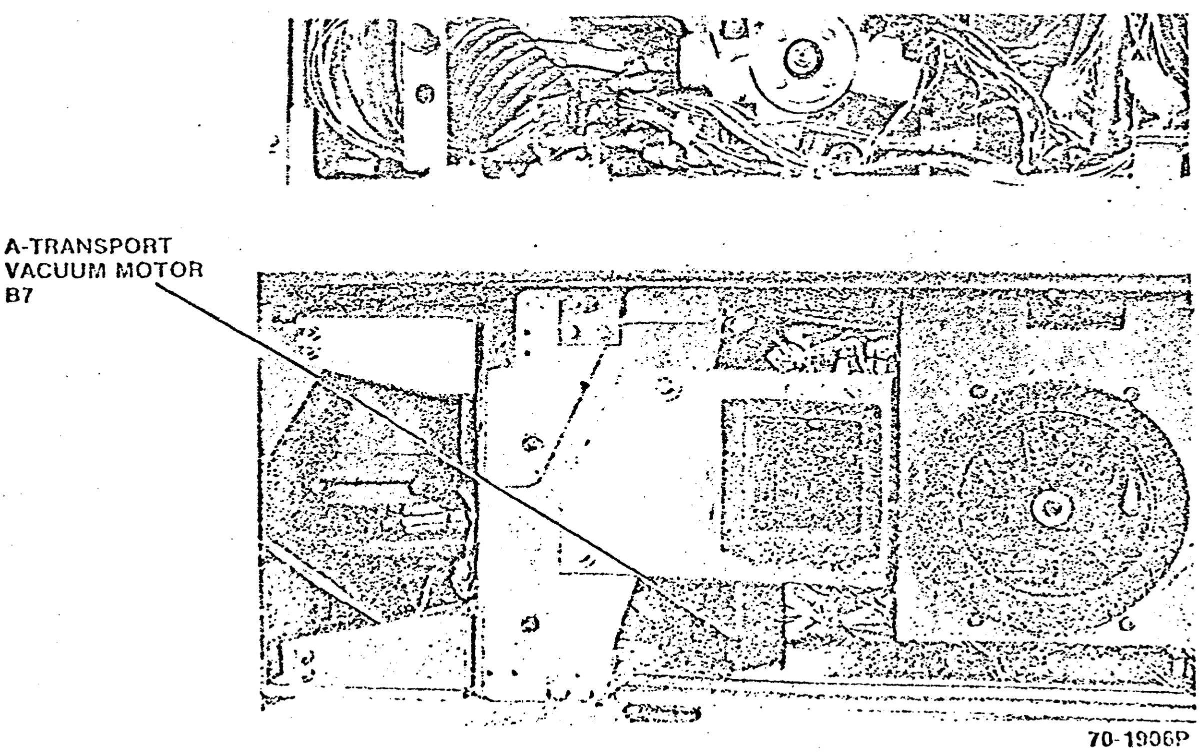

Fig. 2-31. A-Transport Vacuum Motor B7

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Register Stop Module

The register stop module has four functions: (1) it carries a sheet from the A-transport to the drum; (2) it registers the sheet by slowing it almost to a stop, by straightening it, and by releasing it to the drum to meet the image; (3) it checks for paper jams between the A-transport and the register stop module (between LS27 and LS1) and for mispuffs (LS1-LS3 combination); and (4) it permits puffing to occur if there is a sheet in the module (LS1-CS12 combination).

Paper feeding is affected by many factors which cause variations in the timing and in the skewing of sheets of paper fed into the machine. Some of these factors are humidity, line voltage, the way the paper is cut, and the mechanical tolerances of the paper feed mechanism.

To eliminate the effect of these variations in timing and skewing, each sheet must pass through the register stop module to be straightened and consistently registered with the drum image.

As a sheet of paper enters the module, it rides on top of the lead-in baffle (Fig. 2-33) and the lower paper guide and beneath the upper paper guide. The sheet actuates LS1 before it touches the registration fingers. After the sheet is straightened, the upper pinch wheels drop onto the sheet to keep the sheet straight as it moves toward the drum.

The halo guide directs the sheet to the drum. The sheet is then tacked to the drum by the transfer corotron. The pinch wheels then raise and the drum pulls the rest of the sheet through the register stop module.

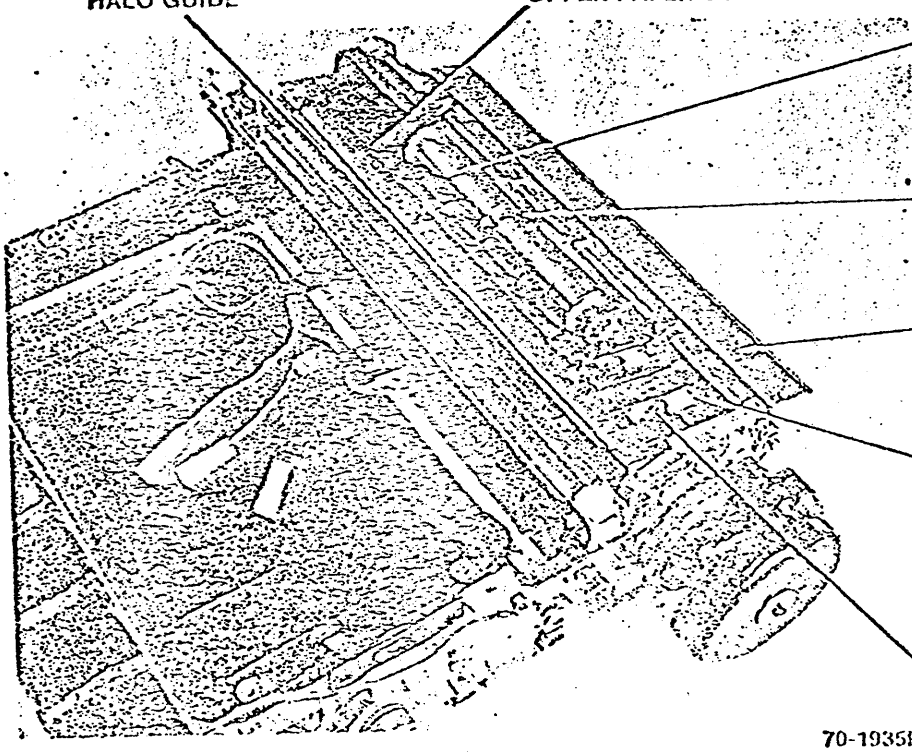

Fig. 2-33. Register Stop Module

2.6 REGISTER STOP DRAWER

The function of the register stop drawer (Fig. 2-32) is to support the register stop module, transfer corotron, B-transport, and fuser pressure roller. Because of its sliding capability, it also provides easy access for clearing paper jams.

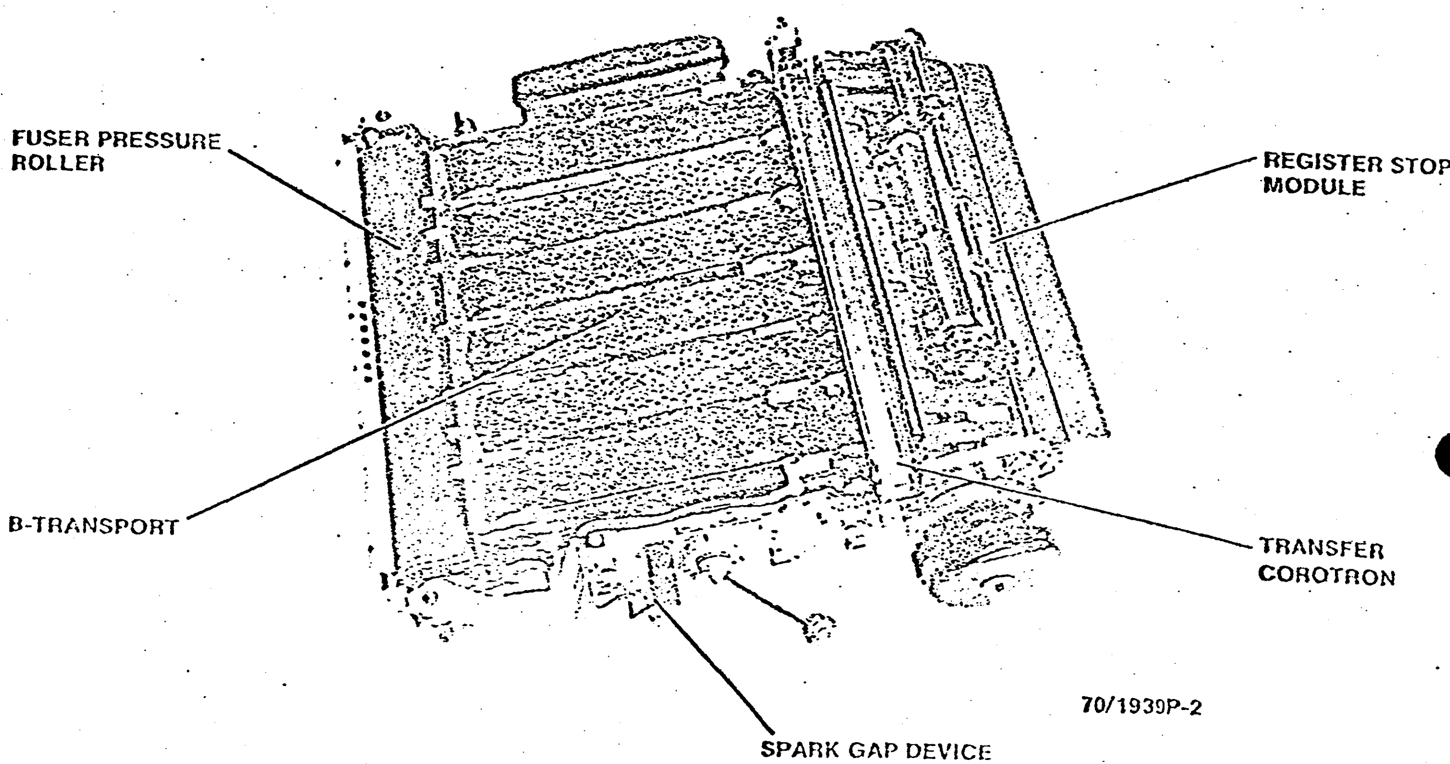

Fig. 2-32. Register Stop Drawer

The module's inner shaft has a drive clutch (Fig. 2-35) which is keyed to the cycle control sprocket driven by the main drive chain.

The module's inner shaft (Fig. 2-36) rotates the constant velocity arm at a constant speed. Attached to the arm is a drive gear segment and cam follower, which rides on the fixed registration cam. The cam follower is held against the cam by the torsion spring and hub. The lobe of the cam forces the cam follower to pivot the drive gear segment and the driven gear segment, which is attached to the outer shaft.

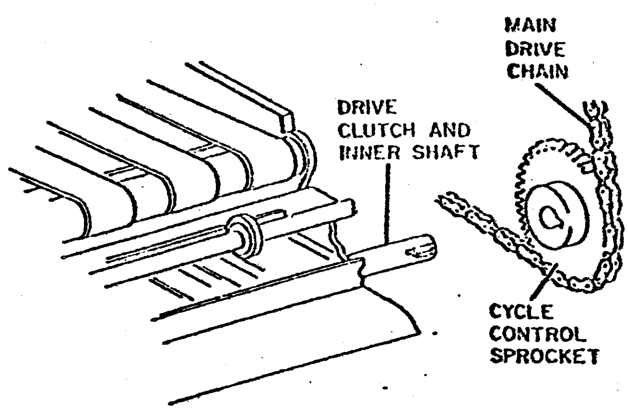

Fig. 2-35. Module Drive Clutch

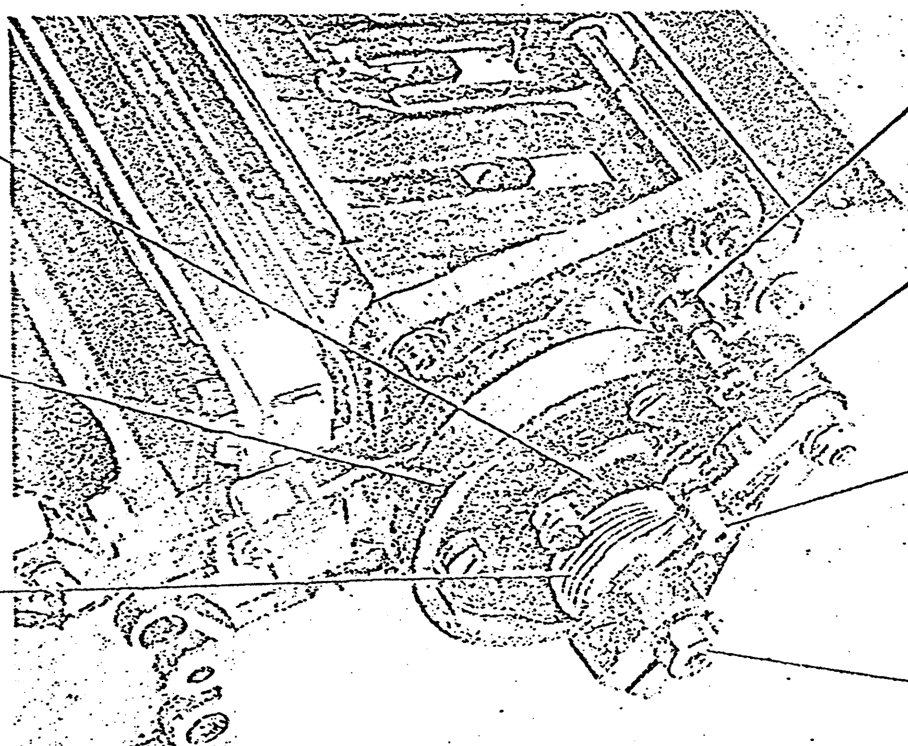

Fig. 2-36. Constant Velocity Drive

The upper pinch wheels (Fig. 2-34) are raised and lowered by a cam on the inboard end. A stop prevents the upper paper guide from being knocked out of adjustment when the key operator rotates the upper pinch wheel assembly clockwise to clear a jam.

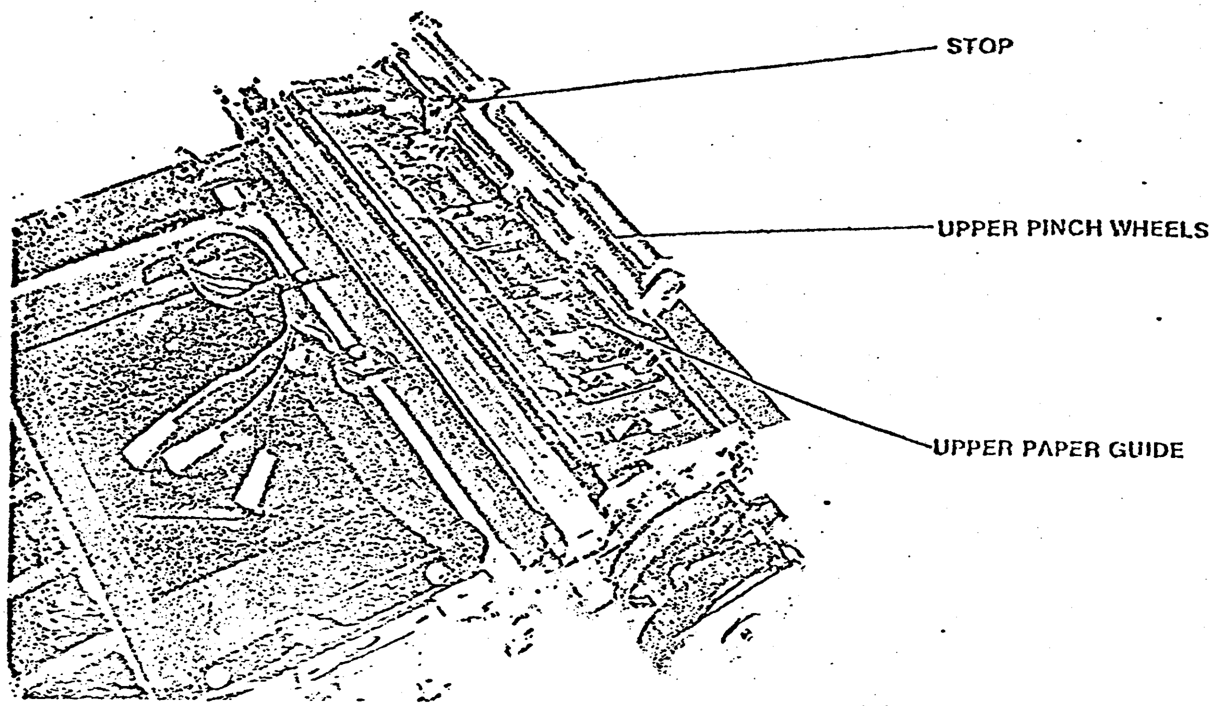

Fig. 2-34. Register Stop Module

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buckle insures that the leading edge contacts all the fingers and is straight. Figure 2-40 shows the paper buckling as the A-transport forces the sheet between the upper and lower paper guides and against the registration fingers. The lift cam is shown holding the upper pinch wheels raised. Switch LS1 is actuated.

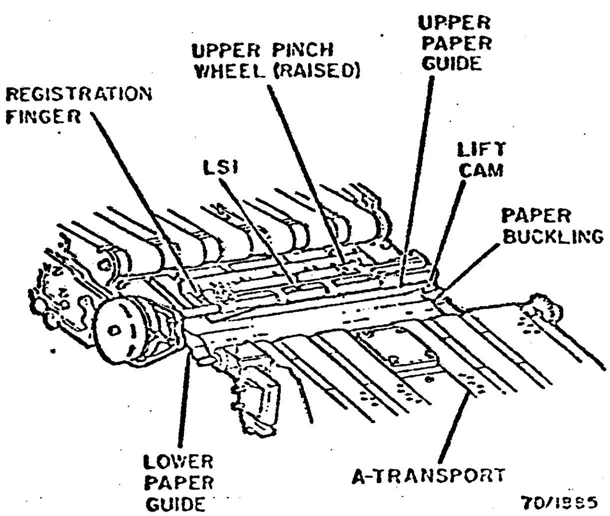

Fig. 2-40. Paper Buckling

After the sheet has buckled and the leading edge has been straightened, the lift cam drops the upper pinch wheels onto the sheet, against the lower pinch wheels. The pinch wheels hold the paper in its straightened position as the fingers rotate down, out of the way of paper travel.

The pinch wheels then feed the paper to the drum, where the sheet is attracted to the drum by the transfer corotron.

B-transport

The functions of the B-transport are: to carry the sheet from the drum to the fuser; to detect mispuffs; to bring the fuser pressure roller up to almost the same speed as the fuser heat roller at the start of printing; and to initiate the raising of the fuser pressure roller.

As a sheet is fed to the B-transport from the drum, it passes over the idler roller and onto six perforated belts that hold the paper by a vacuum system. The vacuum is needed to hold the paper because the belts will build up a static charge which repels the paper. These belts are identical to the wider of the two types of belts used in the A-transport. As the sheet travels approximately one-third of the way along the B-transport, it actuates the mispuff detector switch LS3 (Fig. 2-41). At the feed-out end of the transport, the sheet passes over the drive roller and over a teflon paper guide to the point where the two fuser rollers contact each other. Figure 2-41 also shows the override clutch and pressure roller drive chain. A spark gap device is used to eliminate belt-induced paper float (static charges) and is also located on the B-transport.

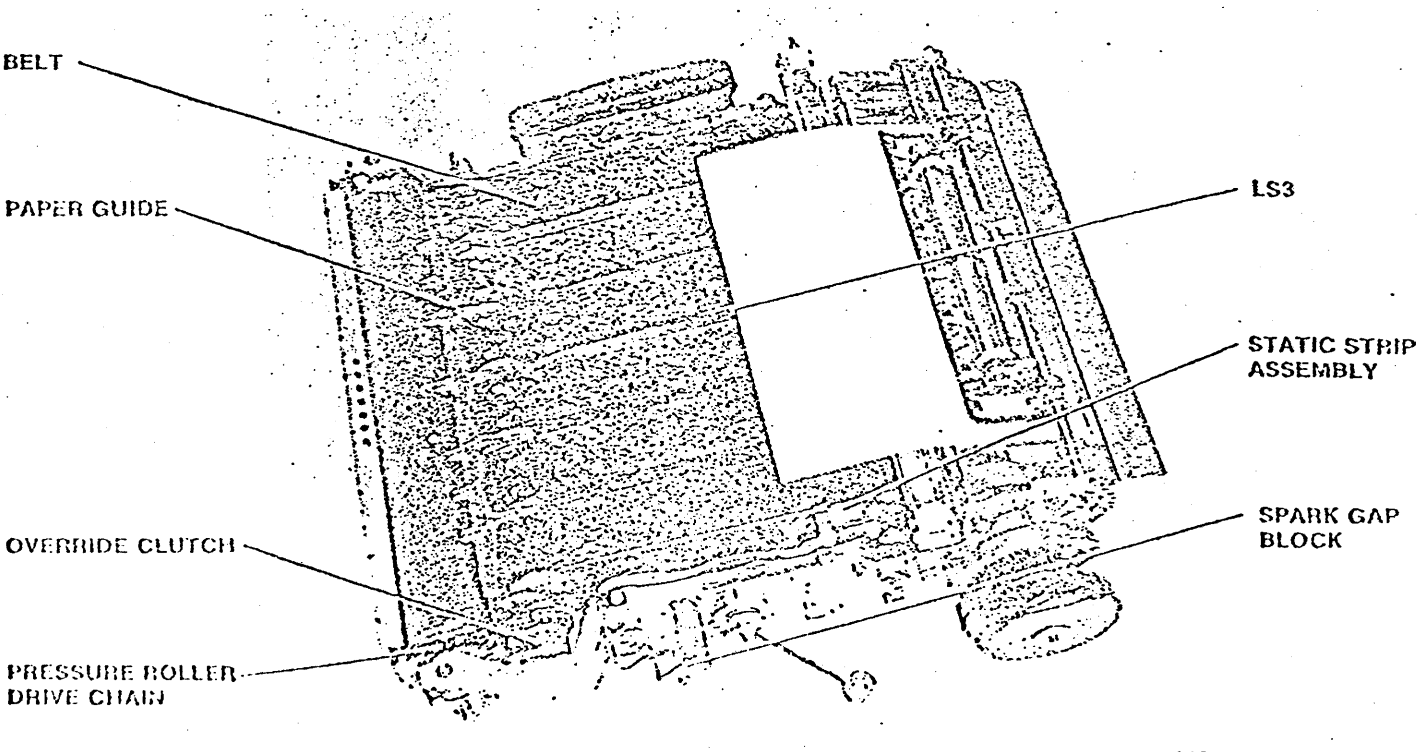

Fig. 2-41. B-Transport in Register Stop Drawer

The outer shaft (Fig. 2-37) is hollow and fits around the inner shaft. The shafts are held apart by a set of needle bearings in each end of the outer shaft. The shafts are supported on the outboard end by a ball bearing between the outboard frame and the outer shaft, whereas the support on the inboard end is provided by a smaller ball bearing between the inboard frame and the inner shaft.

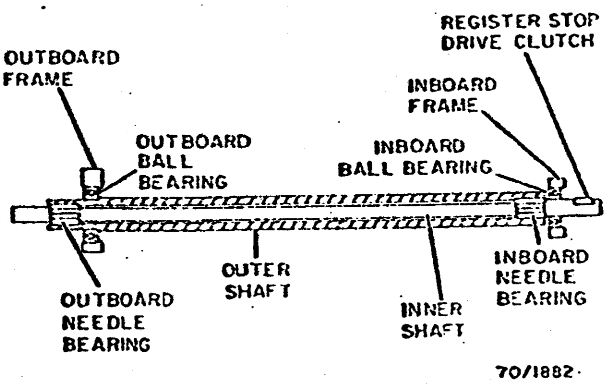

Fig. 2-37. Module Shaft Cross Section

Attached to the outer shaft (Fig. 2-38) are six registration fingers, which protrude through slots in the paper guides and interfere with the sheet's normal travel. Also attached to the outer shaft are two lower pinch wheels and a plastic lift cam. This lift cam raises and lowers the two upper pinch wheels. Figure 2-38 also shows the constant velocity arm and drive gear segment attached to the outboard end of the inner shaft, with the ball bearing shown on the inboard end of this shaft.

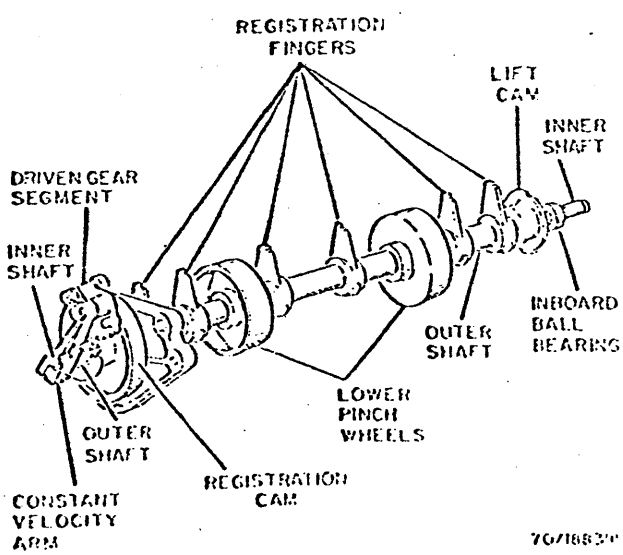

Fig. 2-38. Module Shaft Assembled

Slowing the Registration Fingers

As the cam follower travels along the constant radius portion of the registration cam, the inner shaft drives the outer shaft and its fingers at the same speed as the inner shaft.

However, as the follower travels up the lobe and is raised, it pivots the drive gear segment ahead, causing the outer shaft and fingers to speed up. As the follower passes over the top of the lobe, the drive gear does not pivot and the outer shaft and the inner shaft, therefore, are at the same speed for a few degrees of rotation.

As the follower travels down the lobe and is lowered, it pivots the drive gear segment backward, causing the outer shaft and fingers to slow down practically to a stop and make contact with the lead edge of the paper.

Registering a Sheet

Each sheet is fed by the A-transport to the top of the lead-in baffle (Fig. 2-39) between the upper and lower paper guides. As the sheet enters the guides, the lift cam raises the upper pinch wheels away from the lower pinch wheels, allowing the sheet to be straightened. Next, the sheet actuates LS1.

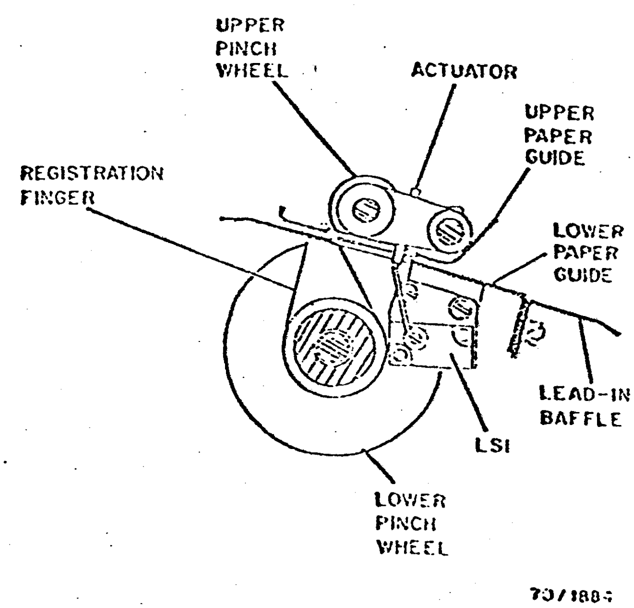

Fig. 2-39. Module Cross Section

As the registration fingers speed up so that they are ahead of the leading edge of the sheet, they rotate up through slots in the paper guides. Then they momentarily slow almost to a stop, while the sheet is forced against them by the A-transport. The A-transport vacuum holds the trailing end of the sheet tightly to the belts, and the transport forces the sheet against the fingers hard enough to buckle the sheet slightly. The

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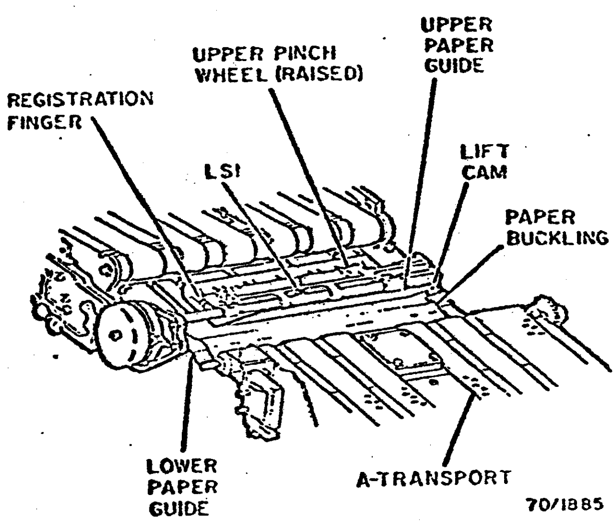
buckle insures that the leading edge contacts all the fingers and is straight. Figure 2-40 shows the paper buckling as the A-transport forces the sheet between the upper and lower paper guides and against the registration fingers. The lift cam is shown holding the upper pinch wheels raised. Switch LS1 is actuated.



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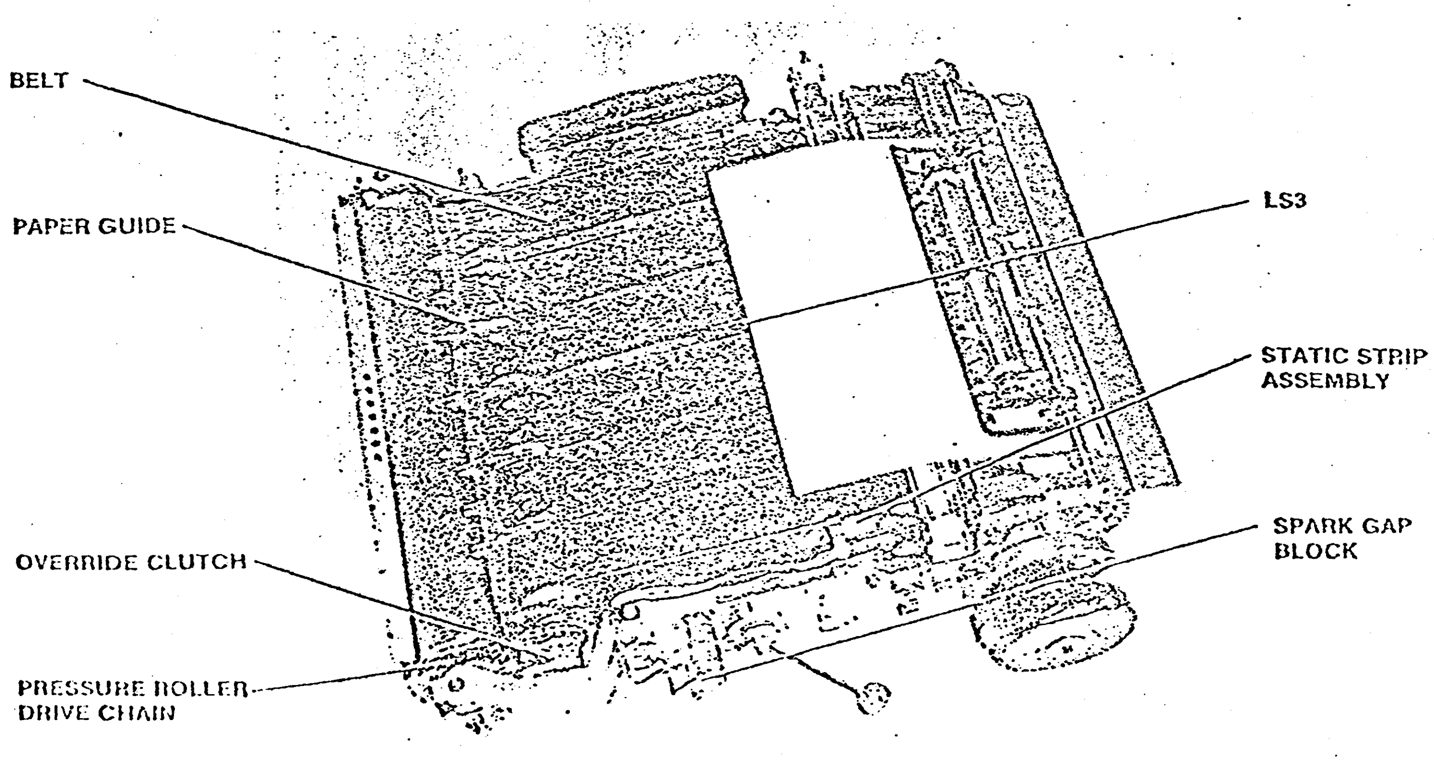

Fig. 2-41. B-Transport in Register Stop Drawer

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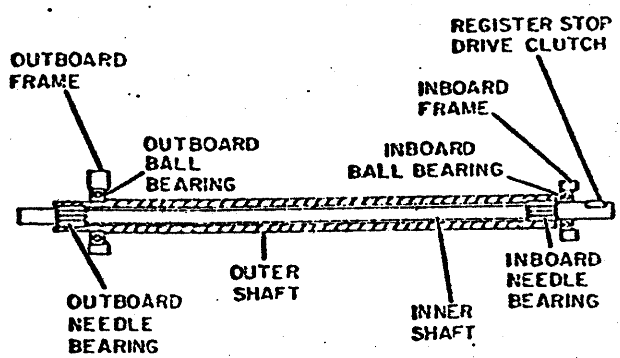

Fig. 2-37. Module Shaft Cross Section

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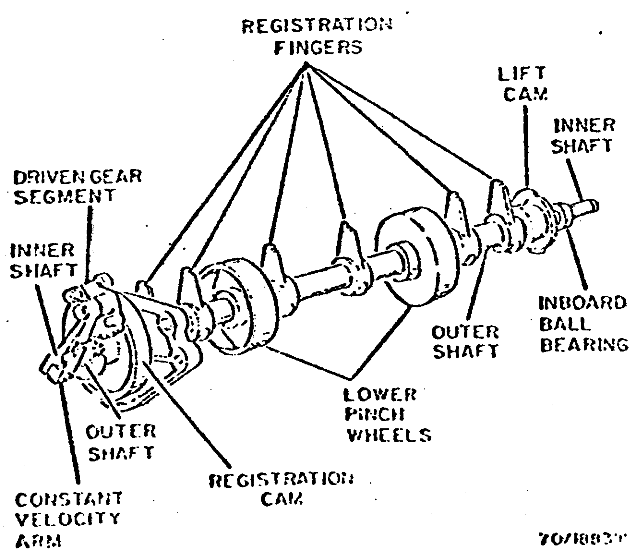

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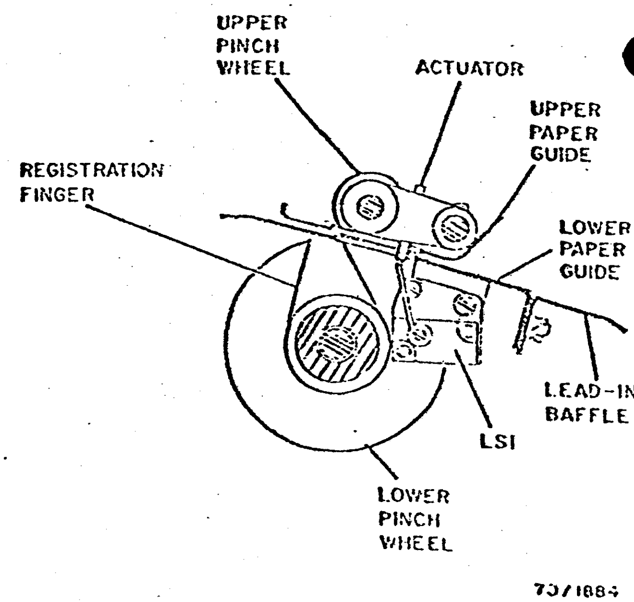

Fig. 2-39. Module Cross Section

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The override clutch (Fig. 2-43) on the outboard end of the drive roller is linked to the fuser pressure roller by a small chain. This clutch engages initially when the main drive motor starts turning, to bring the fuser pressure roller up to the same speed as the B-transport. Without the override clutch and chain, the pressure roller would slip when the rollers were brought together at the start of printing, and the first copy would be smudged. The fuser roller rotates slightly faster than the B-transport and, because the clutch is unidirectional, the fuser heat roller cannot turn the B-transport.

Figure 2-43 also shows a sheet passing over the paper guide and between the fuser rollers. The rollers are coated with oil to prevent paper and toner from sticking to them.

Both B-transport rollers are aluminum, except that the drive roller has a short steel shaft inserted in each end. The shafts are held in the roller by setscrews. The outboard shaft is part of the override clutch.

The B-transport is driven by the main drive chain and drive sprocket (Fig. 2-44) through a clutch disc (Fig. 2-45) on the inboard end of the drive roller.

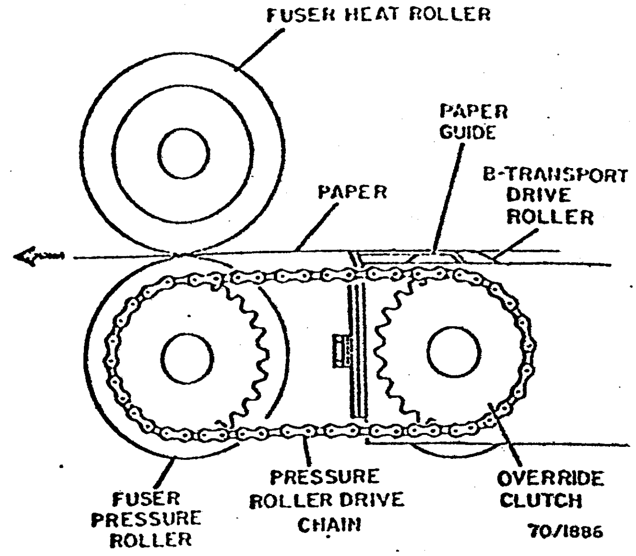

Fig. 2-43. Override Clutch

Alignment of the drive sprocket and clutch disc (concentricity) is critical to maintain constant B-transport speed.

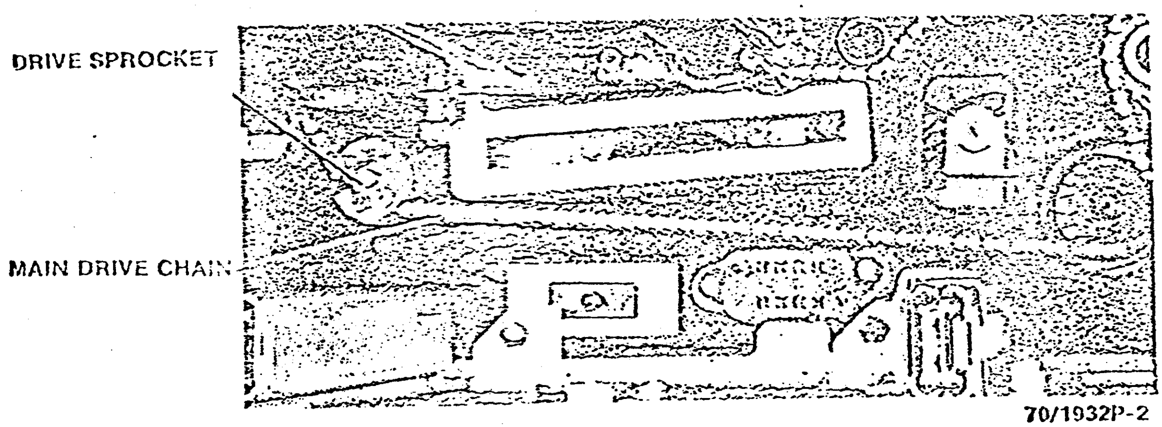

Fig. 2-44. Main Drive Chain and Drive Sprocket

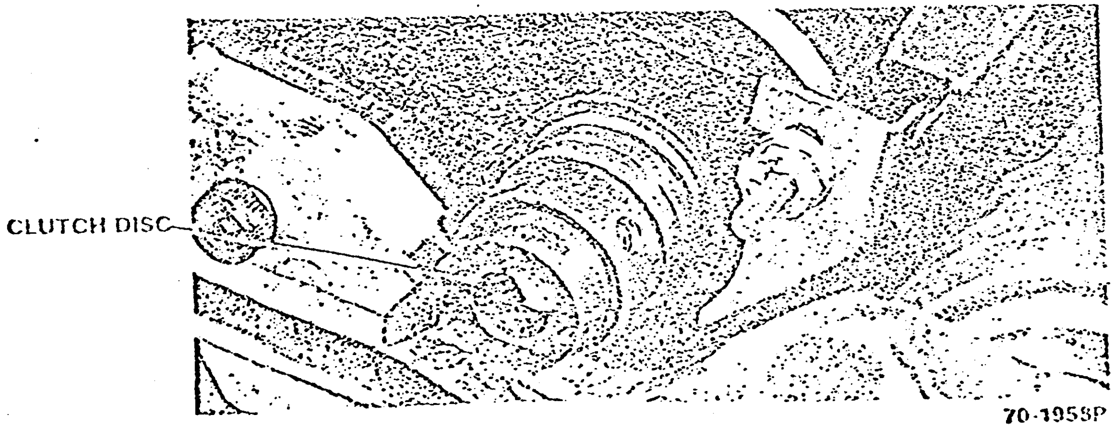

Fig. 2-45. Clutch Disc

Figure 2-42 shows the B-transport removed from the drawer, and another view of; the idler and drive rollers, LS3, paper guide, override clutch and sprocket. Since the B-transport is moving slightly slower than the drum, the paper forms a small buckle between the drum and the B-transport. This buckle reduces the possibility of pulling the sheet from the drum and smearing the image during transfer.

The right side of the B-transport is adjustable for distance and parallelism to the drum shaft. These dimensions are important, since positioning the B-transport too far away from the drum will result in a so-called puffer "smear." This smear occurs about three inches away from the leading edge of a sheet. The smear results when the puff of air blows the sheet completely off the drum at the point of transfer. This is frequently due to the improperly set gap between the B-transport and the drum. After the puff, when the transfer corotron "retacks" the sheet to the drum, the "smear," (actually a double-image) is produced.

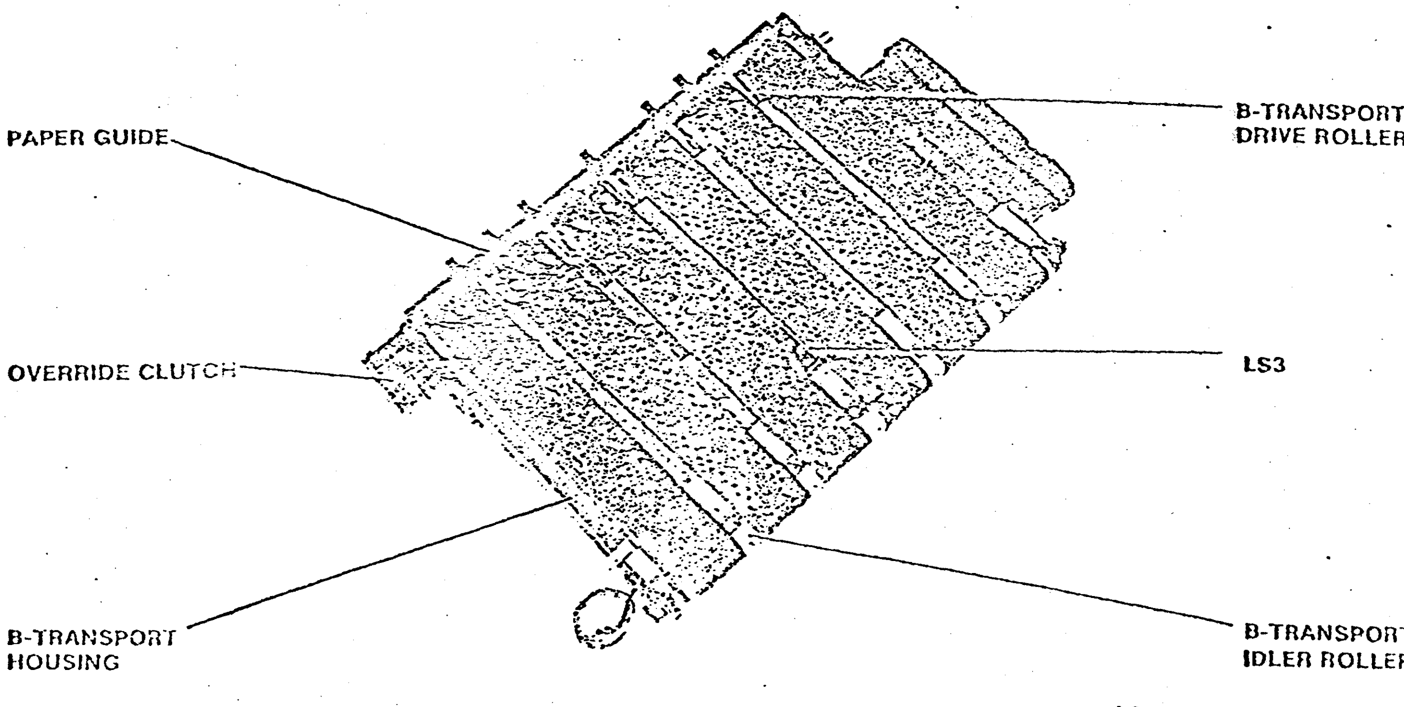

Fig. 2-42. B-Transport Removed

Drawer Frame and Accessories

The drawer is held in place by a locking mechanism. The locking arm (Fig. 2-47) and knob are attached to a hub and cam. The cam is lodged behind a stop plate when the drawer is in place. The locking arm is held in the "up" position by a spring. Pressing the arm down pivots the cam away from the stop plate and allows the drawer to be pulled out. To remove the locking mechanism, the B-transport must be removed first.

When the drawer is in place, it is aligned to the machine by three points. One of these points is the adjustable leveling wheel (Fig. 2-47) and ramp on the outboard side of the drawer. The other two points are locating pins which are mounted to brackets attached to the base casting on the inboard side. These pins fit into holes in the drawer frame.

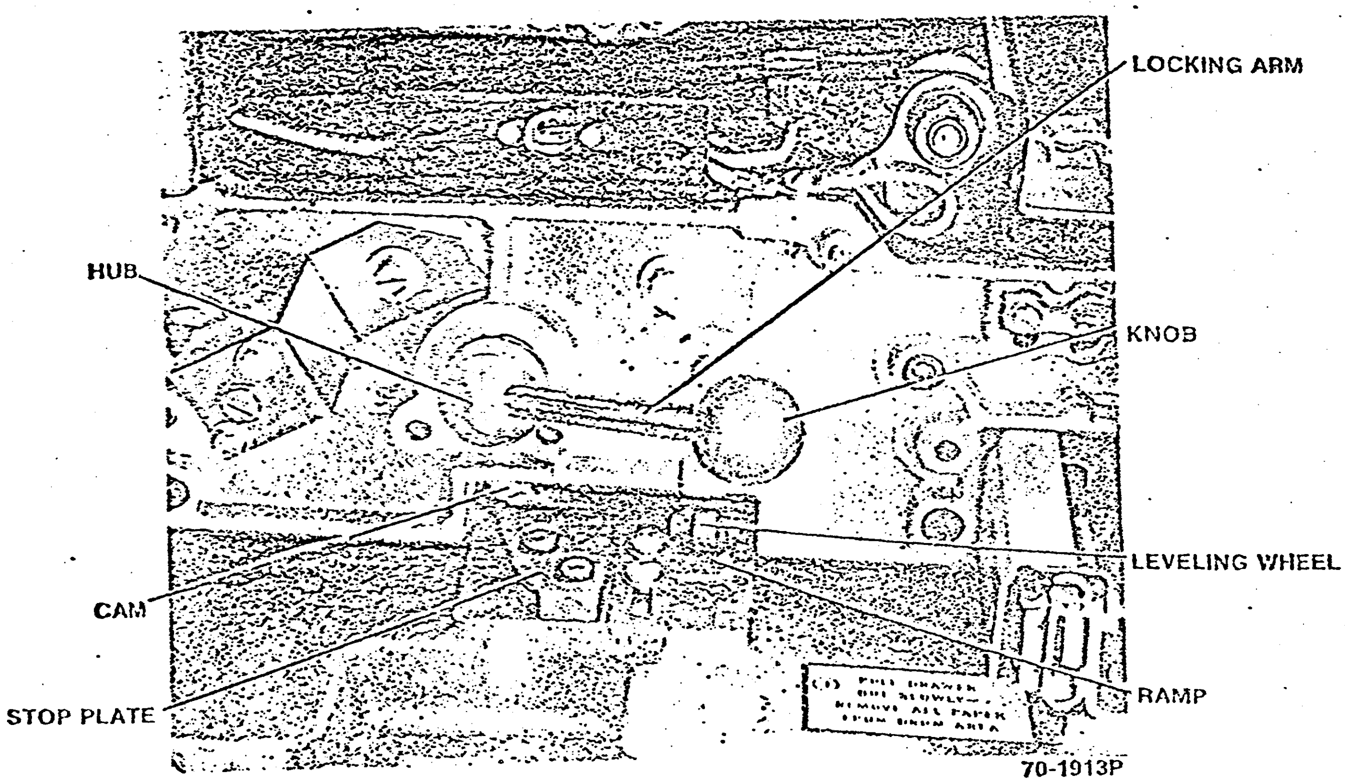

Fig. 2-47. Drawer Locking Mechanism

A flat, replaceable brush (Fig. 2-46) mounted under the drive roller removes toner which was blown onto the belts by the puffer. The figure also shows the drawer's electrical connector assembly J3.

The B-transport vacuum is supplied by the B- and C-transport vacuum blower B8 and is described in the C-transport section.

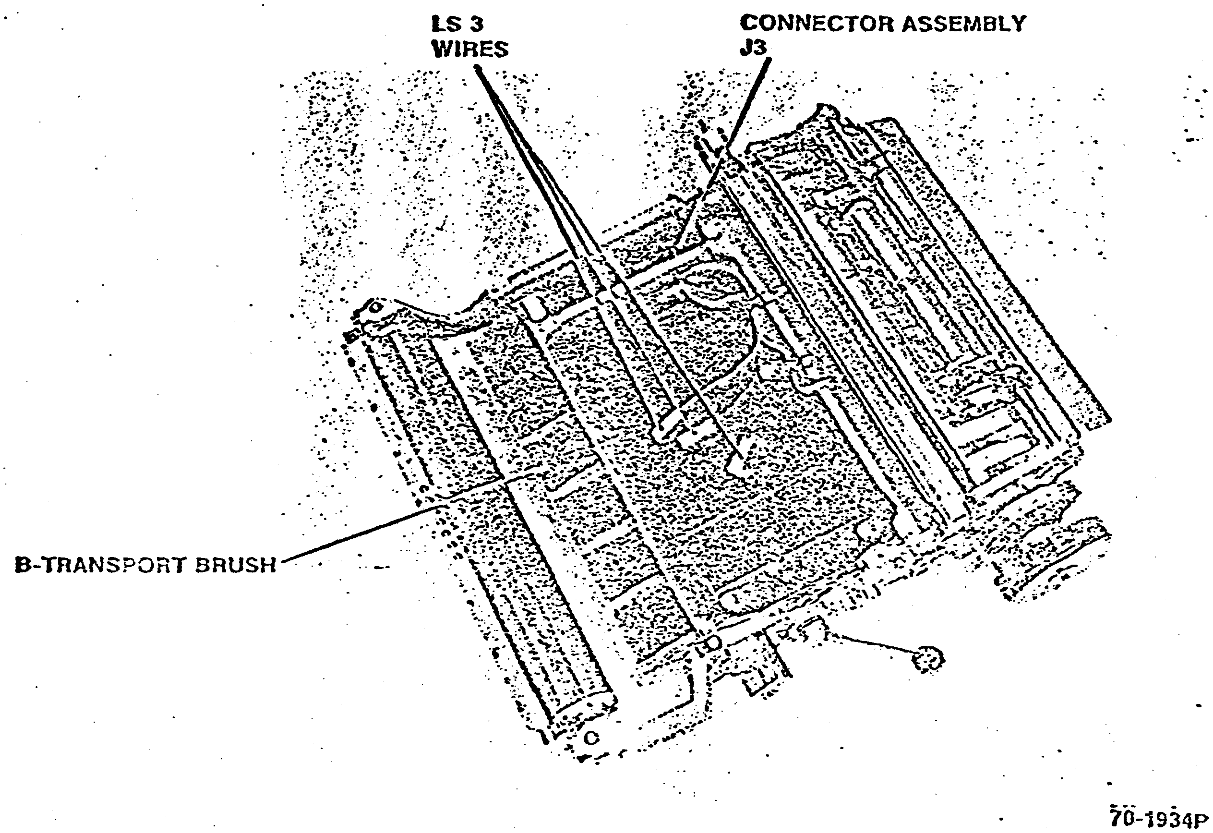

Fig. 2-46. Drawer with B-Transport Removed

A screw threaded through the rear of the drawer frame is the actuator for drawer interlock switch LS22 (Fig. 2-48). This screw is locked down by a nut on the inside of the frame.

The drawer is supported by two drawer slides. The right drawer slide is partially covered by a metal shield. This shield prevents developer beads from falling into the slide grooves.

When the drawer is in place, the drawer switches are electrically connected to the machine by connector assembly P3, which has eight sliding contacts.

Figure 2-48 also shows the main drive chain, the B-transport clutch disc and the register stop module drive clutch keyway in the cycle control sprocket.

The dust cover on the outboard side of the drawer prevents toner from the puffer area from dispersing around the machine.

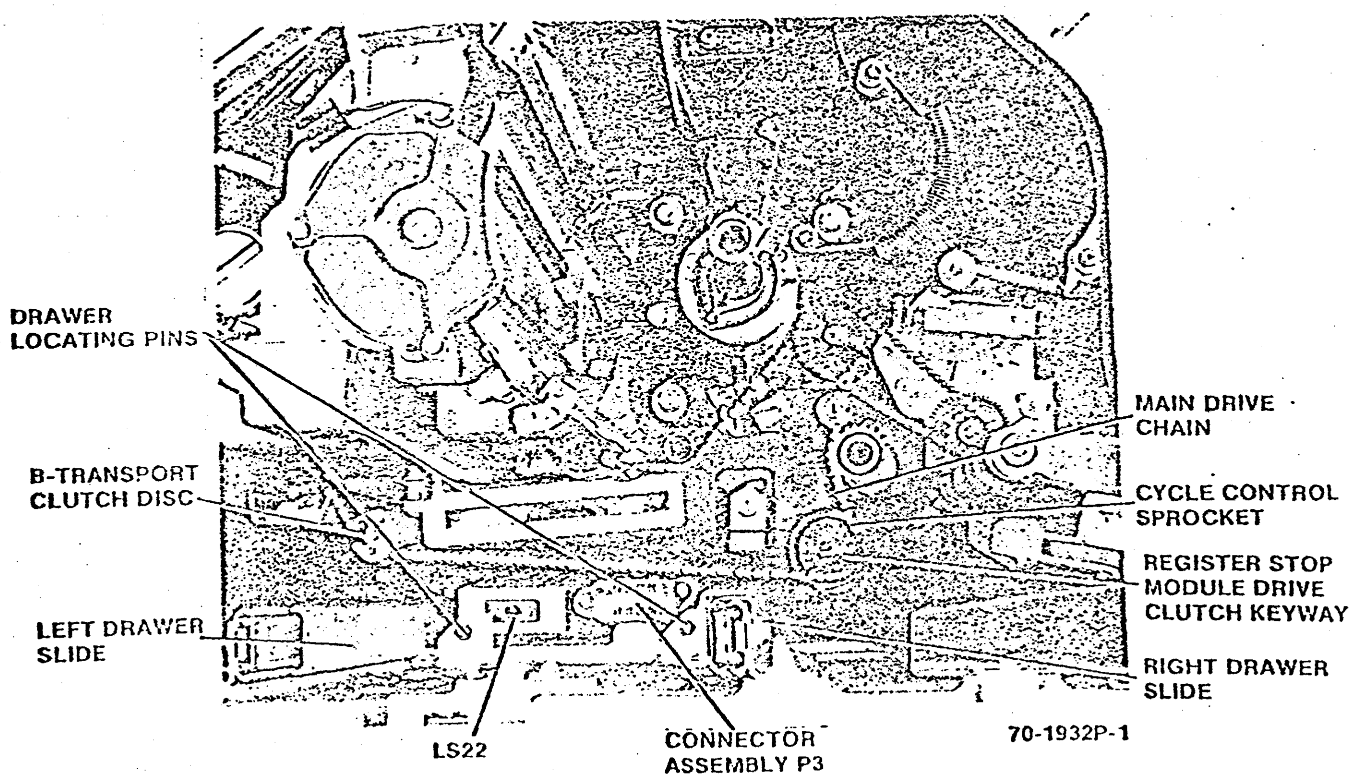

Fig. 2-48. Drawer Slides and Pins

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2.8 DRUM AND COROTRONS

Drum

One of the main features of the drum is that it can image three copies for each revolution. This permits the machine to operate at high speed without excessive drum wear and fatigue. The image placed on the drum will fall at the same spot every time. This allows positioning of the drum so that drum defects will fall between copies instead of printing out on the copy. The drum assembly is inserted on the drum shaft (Fig. 2-77) and rotated until a pin on the drum clamp fits into a hole on the drum assembly. Removing the drum assembly from the machine will open the drum interlock switch LS26 and prevent the developer/feeder motor from operating during the print condition, although the main drive motor will still operate.

The drum is highly sensitive and must be protected from exposure to light. The drum must be covered by a black bag whenever it is removed from the machine for any great length of time to prevent "light shock."

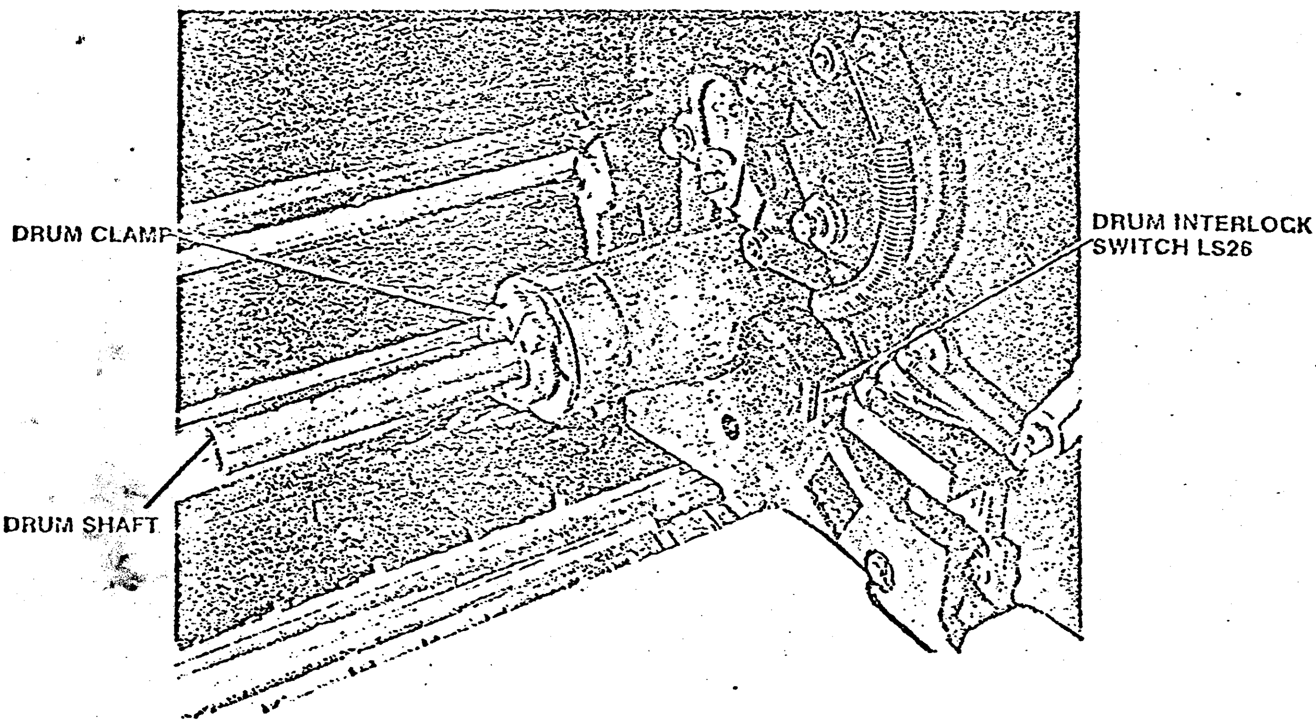

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Fig. 2-77. Drum Clamp

Corotrons

The positions of the corotrons around the drum are shown in Fig. 2-78. The corotrons are not interchangeable.

- **Charge Corotron**

The charge corotron is slid onto a channel attached to the exposure housing. It places a positive DC charge on the drum before exposure.

- **Pretransfer Corotron**

The pretransfer corotron is slid onto a channel with its jack outboard. The pretransfer corotron channel is mounted on the developer housing. The corotron uses a positive DC to charge the drum surface uniformly. The increased charge causes the toner to adhere more strongly to the drum. When the image is transferred to the paper, most of the background toner will stay on the drum, thus reducing background toner on the copy.

When making copies of low density (light) originals, the pretransfer corotron may be turned off by pressing the LIGHT ORIGINAL button on the control console.

With the pretransfer corotron turned off, more toner is attracted to the paper during transfer. This increases the image density of low density originals, but slightly increases background toner.

- **Transfer Corotron**

The transfer corotron is located beneath the drum on the register stop drawer, between the register stop module and the B-transport. It places a positive DC charge on the paper to attract the toner to the paper. The transfer corotron slips into its inboard bracket, but it is fastened to its outboard bracket with a nut. This nut should be tightened only when the drawer is all the way in and while pushing the corotron firmly into its socket. This will prevent damage to the socket.

If you should forget to lock the corotron down, closing the drawer will push it out of position so that it will not be seated in its connector.

The transfer corotron is shielded on its left side by a dirt shield, mounted on the register stop drawer between the corotron and the B-transport. This shield, which is teflon-coated, prevents loose toner in the puffer area from being attracted to the corotron. The distance between the shield and the drum is important to avoid scratching the drum, to allow adequate paper clearance and to keep toner out of the corotron.

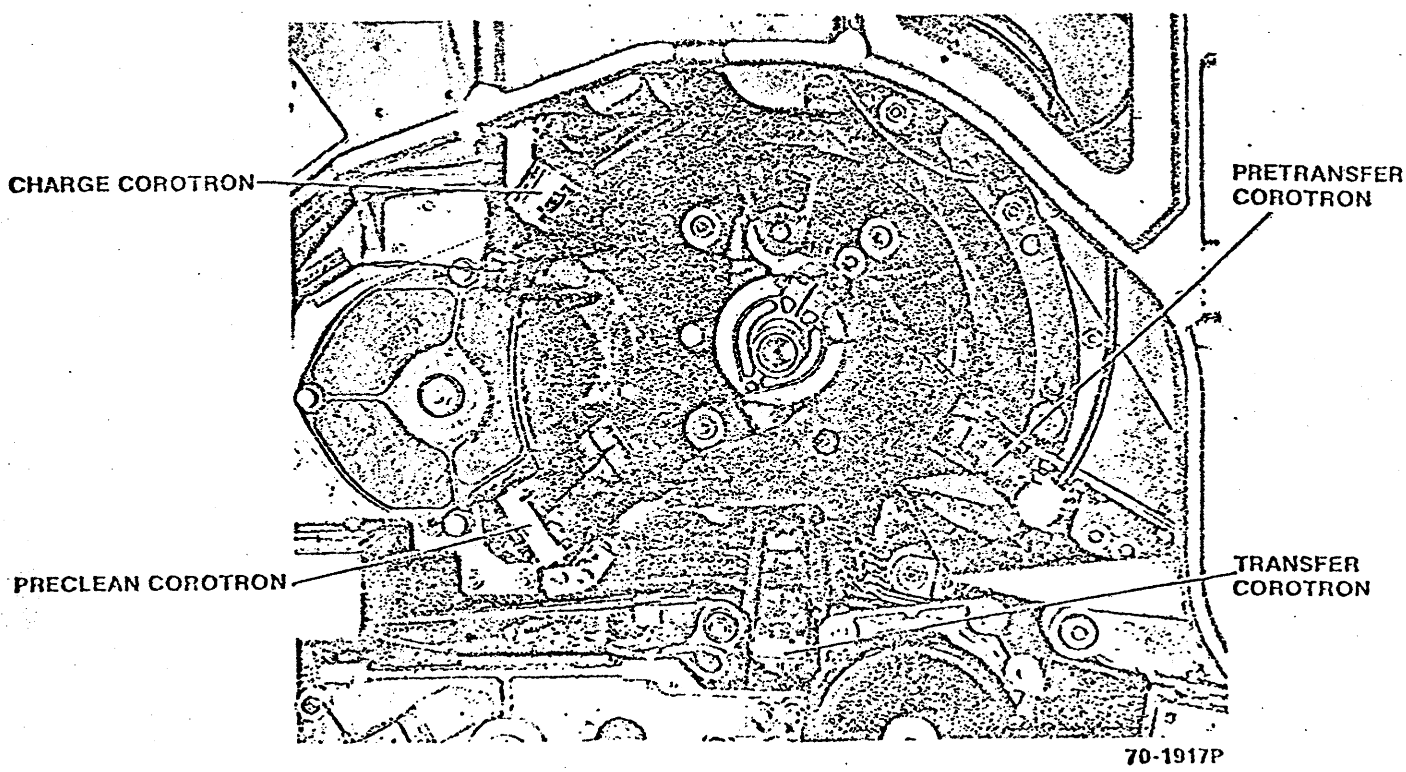

Fig. 2-78. Corotron Location

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• Preclean Corotron

The preclean corotron is slid onto a channel attached to the brush housing. Its function is to loosen the toner remaining on the drum after transfer before the drum image reaches the brush cleaner. AC is used so that the resulting charge on the drum is zero, for better cleaning. This is the widest of all the corotrons and has its corotron wire looped to form two corotrons in one unit, so that it provides a wider effective corona.

• Arc Shields

Each corotron has two arc shields. These plastic shields cover the corotron wire screws at each end of the corotron. When they are kept clean, they will prevent arcing between the screws and the drum.

• Corotron Cleaning

It is very important to keep the corotrons clean to obtain high quality copies. Dirt in the corotrons acts like an insulator, causing the drum current to change and copy quality to deteriorate. The corotrons may be brushed and washed out. Before using the machine it is necessary to thoroughly dry the crevices in the insulators to prevent arcing. Any white deposit that accumulates on the corotron wire must be removed by washing.

NOTE: If the corotron has a cleaner, pull out and push in on the cleaner twice to clean the corotron.

• Corotron Power Supply

The corotron high voltage power supply PS1 is located on the center rear of the machine under the control console (Fig. 2-79). This is a regulated supply which automatically holds the outputs constant, even though the input voltage may vary from 107 to 125 volts.

With the corotrons connected, the output voltage of the power supply at each corotron is roughly 6500 volts. With the corotrons disconnected, the maximum output voltage of the power supply at each high voltage lead is about 9000 volts. The maximum current that the power supply can deliver is 5 milliamperes. The power supply output is adjustable for each corotron.

When it is turned on, the power supply will reach its operating output voltage level within one second. The supply has a bleeder resistor network that dissipates the high voltage in less than three seconds after the power supply is de-energized.

PS1 supplies high voltage to the charge, transfer, and preclean corotrons.

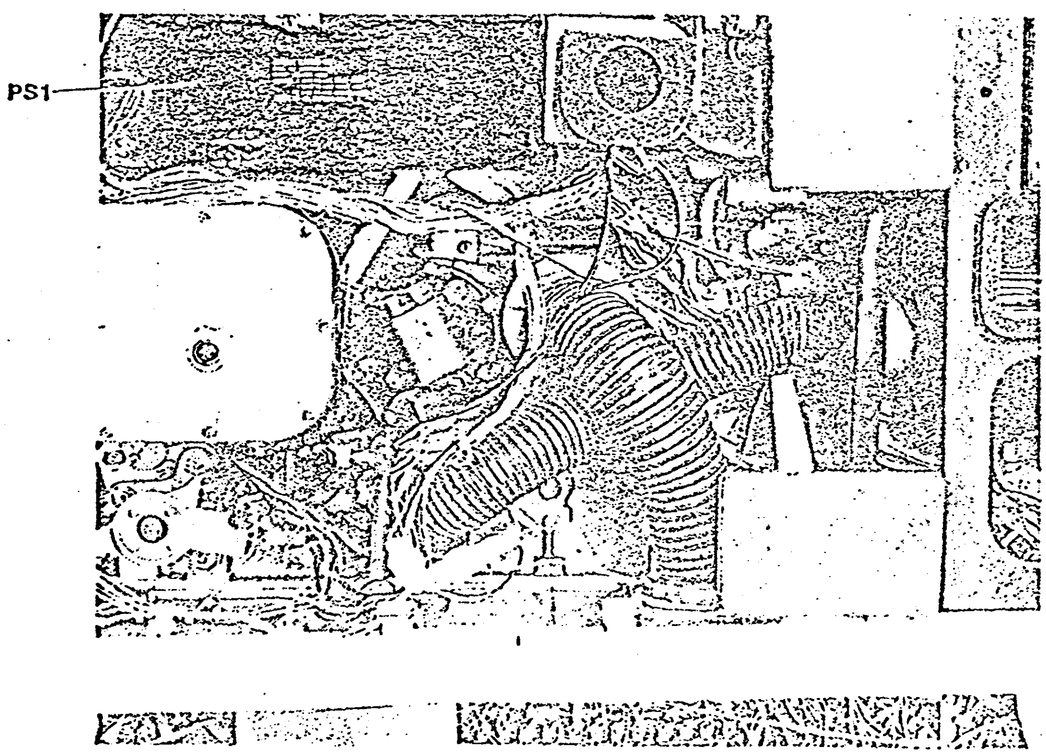

Fig. 2-79. Corotron Power Supply PS1

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The developer electrode power supply, PS3, is located on the left front of the machine, on the outboard side of the C-transport (Fig. 2-80). This regulated supply provides an adjustable positive DC output to operate the pretransfer corotron.

The charge and transfer corotrons are electrically connected inside the power supply. Thus, varying the drum current of either of these corotrons will disturb the current setting of the other. However, these corotrons are isolated from the preclean corotron by resistors inside the power supply, so that varying the preclean current will have relatively little effect on the charge and transfer currents, and vice versa.

The specifications for current settings of corotrons are arrived at through extensive testing. The corotrons should be set for the center of the nominal tolerances for optimum copy quality throughout the operating range and variations in machine tolerances.

The total current in each drum corotron is composed of drum current and shield current. Shield current amounts to about 75% of the total corotron current. As dirt accumulates inside the shield, the dirt acts as an insulator that reduces the shield current and therefore the total current. Since the total current is lower and less voltage is dropped across the internal power supply resistance, more voltage appears on the corotron wire, causing the drum current to increase. Also, since the corotron voltage is higher, arcing can result if corotron shields are dirty. If the corotron wire itself becomes coated with insulating particles, the total corotron voltage decreases, causing lower total drum current.

Due to the high volume of copies that the 7000 is capable of producing, the corotrons become dirty. Dirty corotrons may cause arcing and will upset the drum current levels, with a resultant degradation of copy quality.

Arcing is one of the major causes of premature drum failure. Arcing may occur intermittently with dirty or improperly adjusted corotrons, depending upon changes in ambient humidity levels. Thus, arcing may not necessarily occur during a service call. Arcing of the charge and transfer corotrons to their shields or to the drum will cause intermittent clear band deletions across the copy from top-to-bottom.

Do not attempt to measure the power supply high voltages by connecting any meter or oscilloscope directly to the corotron wires. This is extremely dangerous and can result in a severe shock due to internal arcing in the meter. This will also damage the meter.

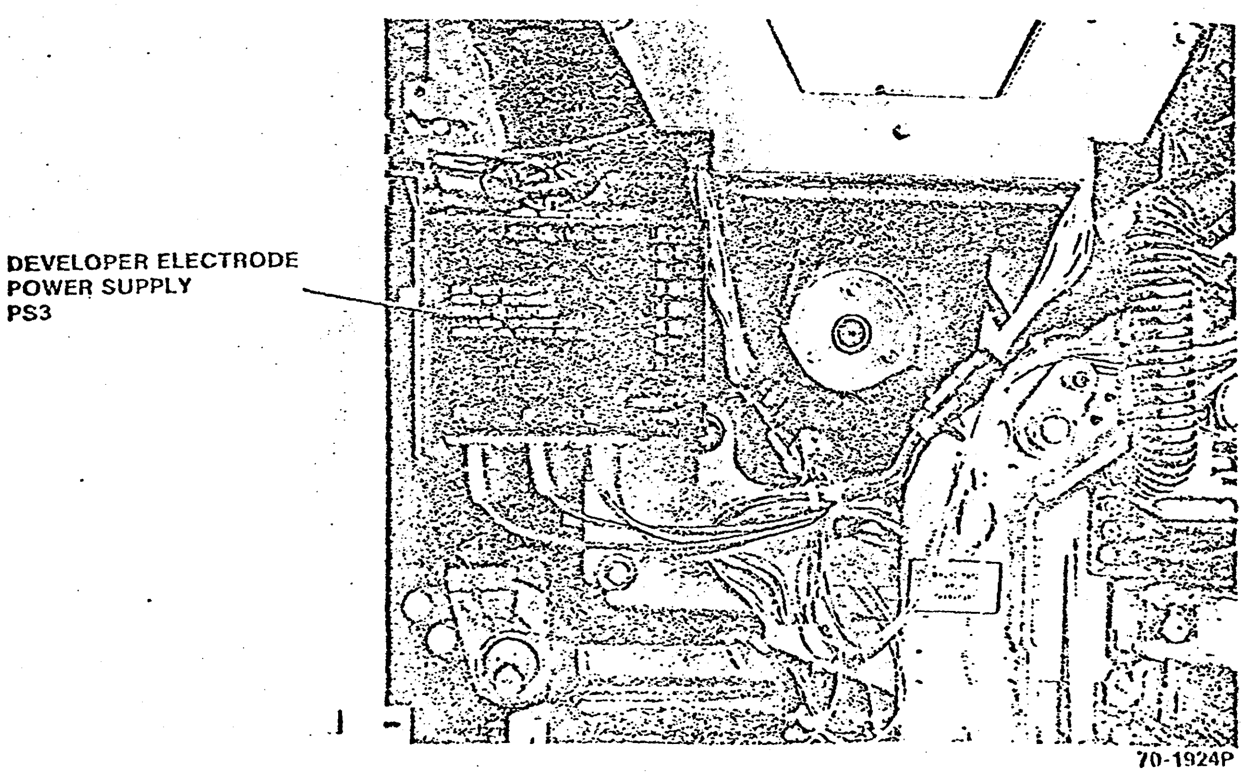

Fig. 2-80. Developer Electrode
Power Supply PS3

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2.9 DEVELOPER

The developer system consists of the developer conveyor and the toner dispenser. The developer housing has the capacity for 25 pounds of developer. The developer conveyor is driven by a chain from the developer/feeder motor.

Positively charged developer beads, carrying negatively charged toner powder, are transported by the bucket conveyor (Fig. 2-81) to the top of the housing. The cascading developer runs between the top and flow baffles to the drum, near the inside baffle and the developer electrode. The drum image area, which has a higher positive charge than the developer, attracts the toner from the beads to the image. The developer beads are in contact with the drum for about four inches of their travel. The beads are then caught and channelled to the sump by the lower pickoff baffle. Stray beads which miss the pickoff baffle drop into a plastic catch tray. Toner is replenished in the system by the toner dispenser and its motor.

Figure 2-82 shows another view of the baffle, and developer electrode.

A feature of the 7000 developer housing is the use of an electrically biased baffle and a developer electrode to reduce the copy background level in high humidity conditions.

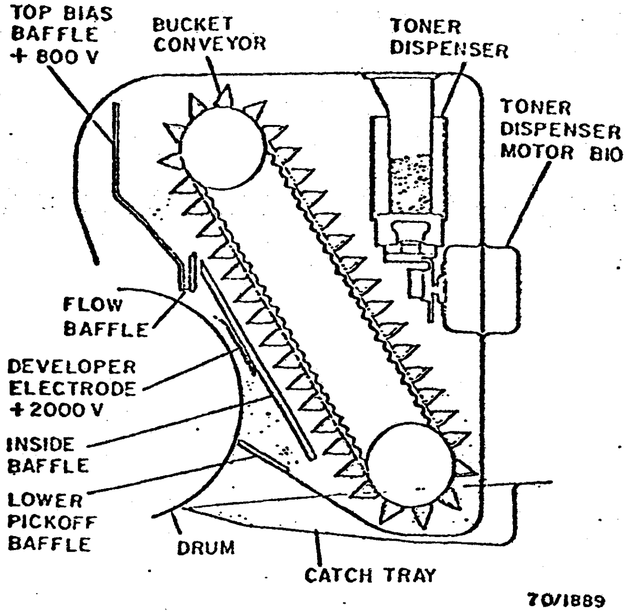

Fig. 2-81. Developer Housing

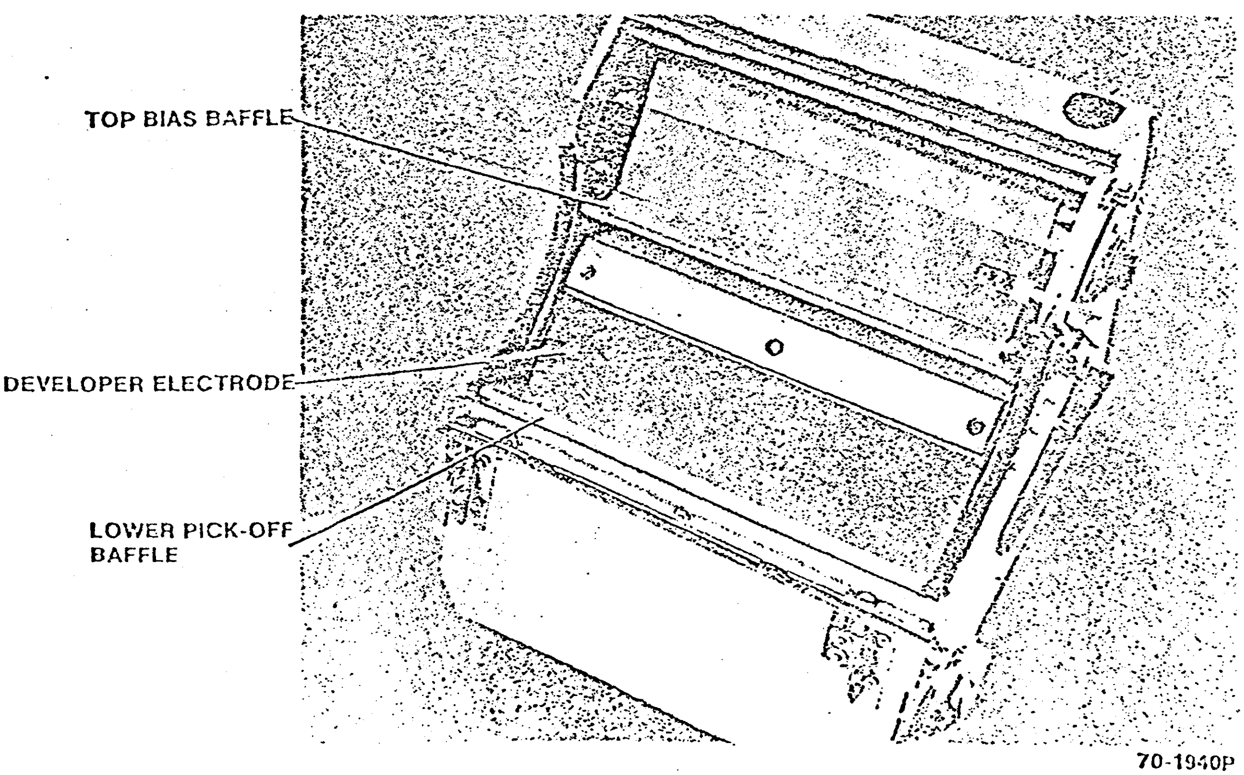

Fig. 2-82. Developer Housing

Biased Baffle

With high humidity, the positive charge on the developer beads decreases so much that the negatively charged toner is held very loosely to the beads. As a result, loose toner powder is mixed with the beads as they come out of the top and flow baffles and cascade across the drum.

Since the toner in this "powder cloud" is not held by the carrier beads, the powder is attracted strongly by the charge on the drum. As a result of this powder development across the drum, a dirty background appears on the copy under high humidity conditions.

To prevent development by this powder cloud, the top baffle is charged to a positive 800 volts. The drum is initially charged to a positive 900 volts on its surface. After exposure, the charge on the image areas has decreased to about 800 volts, but the background charge has dropped to about 250 volts. Although the static charge on the baffle is the same polarity as the drum charge, the baffle charge is weaker than the drum image charge and stronger than the drum background charge. The powder cloud is attracted away from the drum background and toward the baffle. Any toner that tends to collect on the baffle is wiped away by the cascading beads. Since a great deal of the image development occurs in the area near the top and flow baffles, elimination of powder cloud development around this area is very effective in reducing background.

Developer Electrode

To further reduce copy background, a developer electrode charged to 2000 volts is used. This electrode is located approximately two inches away from the biased baffle at a point where most of the development has been completed. At this point, most of the image has been coated with toner and an electrical equilibrium has been established between the drum charge and the developer bead charge. Because of this equilibrium, additional toner is not strongly attracted to the image. Any toner removed by "empty" beads is immediately replaced by succeeding beads (Fig. 2-83).

The effect of the charged developer electrode at this point is to shift the electrical equilibrium away from the drum and toward the beads. The static charge on the electrode extends around it so that, effectively, a greater positive charge exists in the area of the beads. This results in a greater ability of the beads to pull toner off the drum in the background areas, where the toner is not held strongly. This action is called "scavenging," and has no effect on the toner held to the drum by the strong fringe field at the edge of the image. The fringe field is caused by the potential difference between the image charge and the background charge.

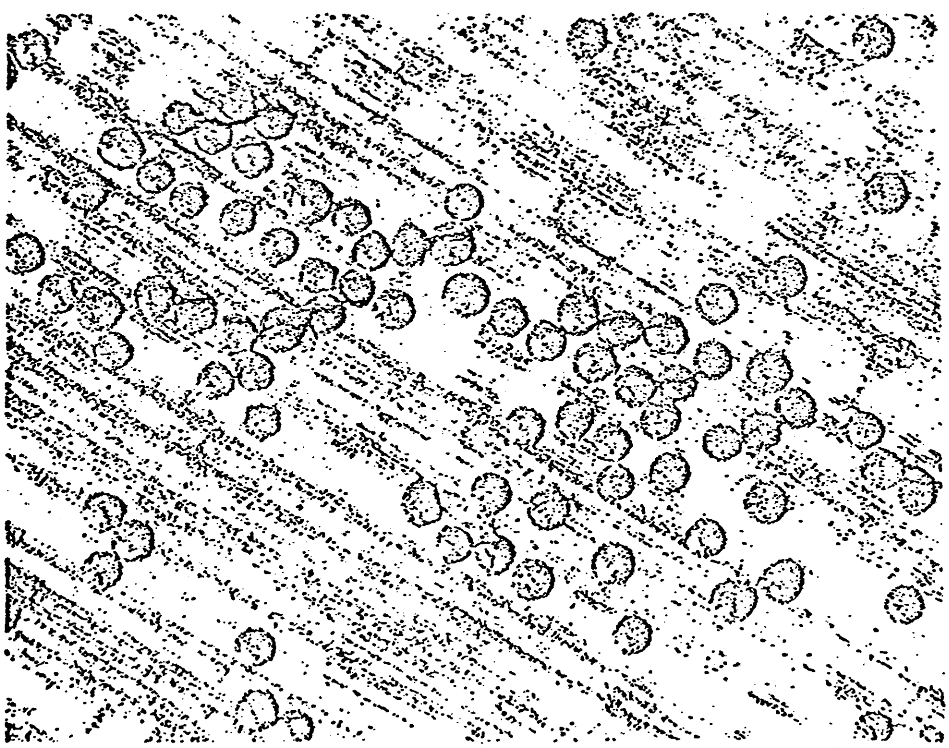

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Fig. 2-83. An Enlargement of an Image Being Developed as Developer Beads Carrying Toner Cascade Across the Drum

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The developer electrode is most effective for removing background toner and reducing copy background in relative humidity up to 65%, and the biased baffles are most effective for preventing powder cloud development from about 65% to 85%. Thus, the electrode and the biased baffle complement each other to reduce copy background within the 7000 humidity operating range.

High voltage is furnished to the top bias baffle and the developer electrode by the developer electrode power supply PS3.

PS3 is mounted to the left vertical frame in front of the C-transport.

PS3 supplies 2000 volts at 25 microamps to the developer electrode and 800 volts at 10 microamps to the top bias baffle. PS3 also supplies power for the pretransfer corotron. PS3 delivers full output voltage within one second after being energized. The supply has an internal bleeder resistor network that removes the output voltage within four seconds after the supply is turned off. The maximum current that the supply can deliver is 5 milliamperes, about the same as PS1.

Toner Dispenser

The toner dispenser will dispense toner only when it drive motor is operating. The dispenser motor B10 (Fig. 2-84), which is automatically controlled, is housed under a white plastic cover on the right side of the

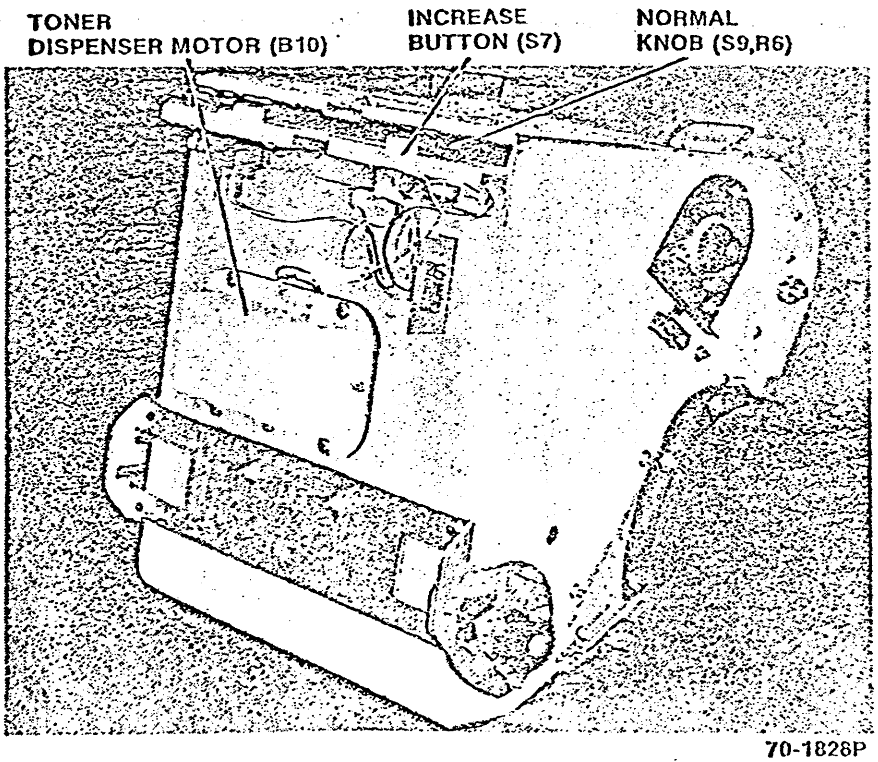


Fig. 2-84. Developer Housing

developer housing. An eccentric (Fig. 2-85) on the motor shaft fits into a yoke on the dispenser slide. When the motor shaft rotates, the slide is pushed back and forth, dispensing toner to the conveyor buckets.

The dispenser holds approximately 1-1/2 pounds of toner. It operates best when it is kept at least half full. A dip stick is provided so that the operator can measure the toner level conveniently.

"Toner grit," or small clumps of toner, may print as random black spots on the copy. Since these spots are random, they are easily distinguished from (1) toner impacted spots on the drum, which print in the same place on every third copy, and (2) dirt spots on the platen glass or optics, which print in the same place on every copy. To check for toner grit, run copies of the "E" chart. The "E" chart leaves the maximum charge on the drum which attracts toner grit. If toner grit is a problem, the developer beads should be removed and the toner dispenser should be removed from the top of the housing. Next, the developer and toner dispenser motor should be vacuumed thoroughly to remove any accumulation of toner or grit. After changing the developer, be careful that the system is not run at a high toner density, since overtoning increases the production of toner grit.

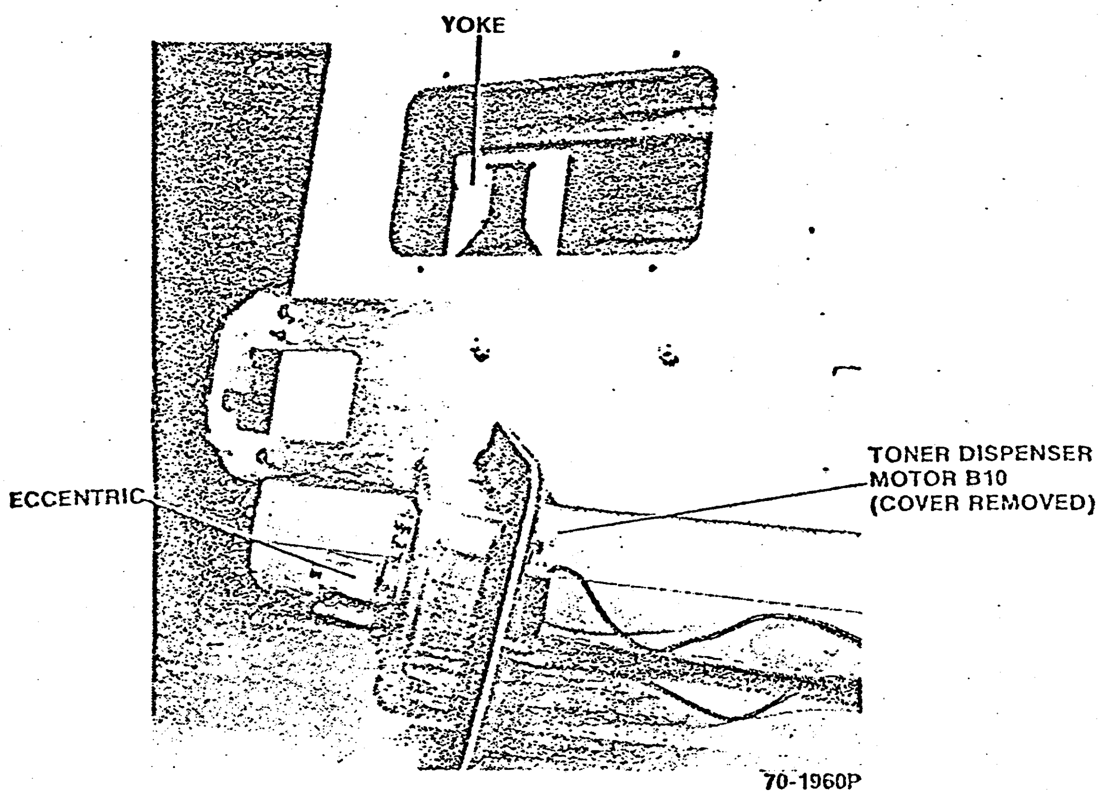


Fig. 2-85. Toner Dispenser Motor B10

2.10 COMPRESSOR AND PUFFER SYSTEM

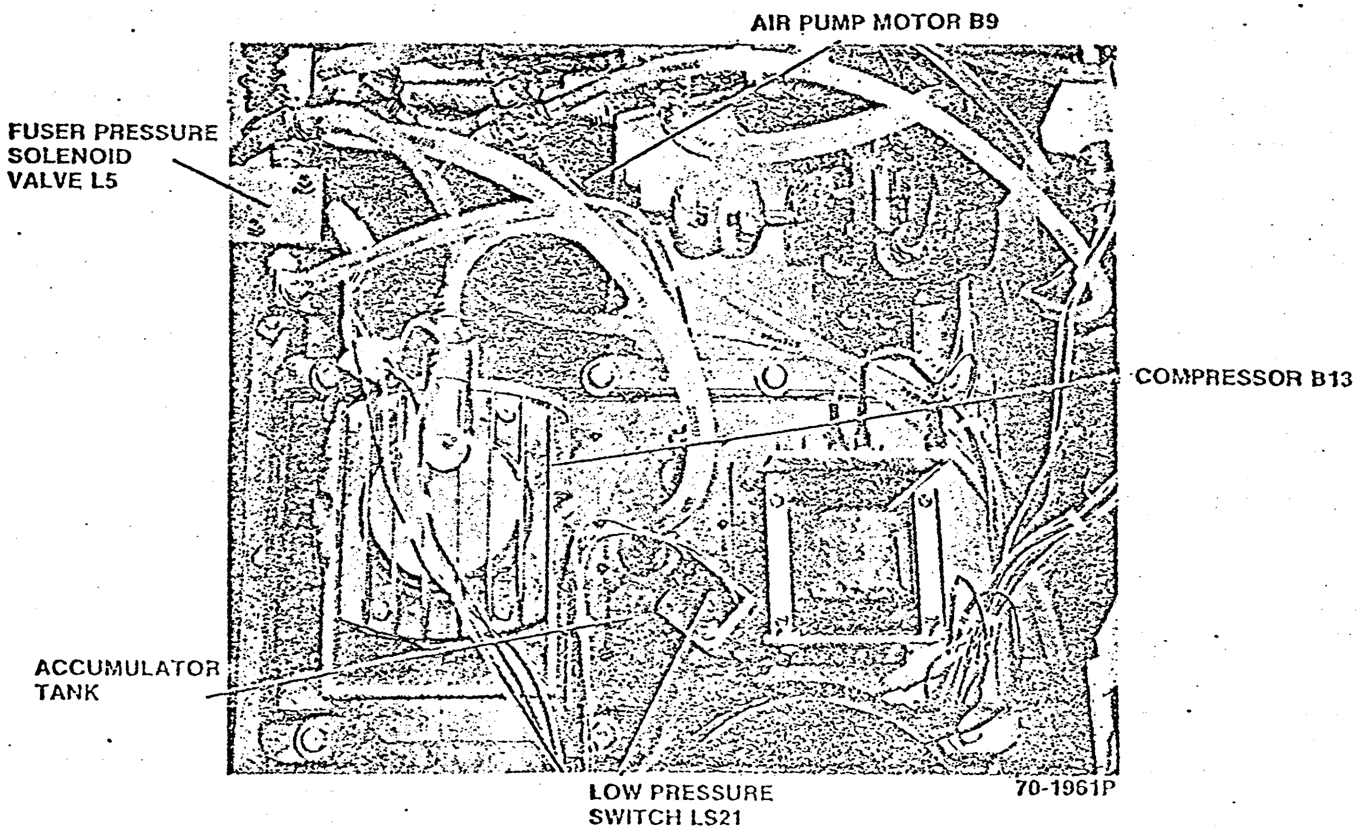
The function of the puffer system is to puff the sheet of paper from the drum with a puff of air. Air pressure required to operate the puffer is supplied by the accumulator tank. The accumulator tank gets its air supply from the compressor which also supplies air to the fuser pressure disc.

Throughout this discussion, typical operating pressures will be referred to so that the air system operation can be explained more clearly. However, the adjustment section should be consulted for actual operating pressures and tolerances.

Compressor

The diaphragm-type compressor B13 (Fig. 2-86) is attached to a plate that is shock-mounted to the accumulator tank.

The tank is attached to the bottom of the base casting of the machine. The function of the compressor is to supply air pressure to force the pressure roller against the fuser roller, and to supply air (through the accumulator tank) to puff paper off the drum. LS21 and fuser transformer T1 are also attached to the accumulator tank.



Whenever the compressor (Fig. 2-87) operates, air is drawn through an intake filter mounted on it and is pumped under pressure to the accumulator tank through a check valve, and to the fuser pressure solenoid L5. L5 is mounted on the right side of the brush cleaner filter box.

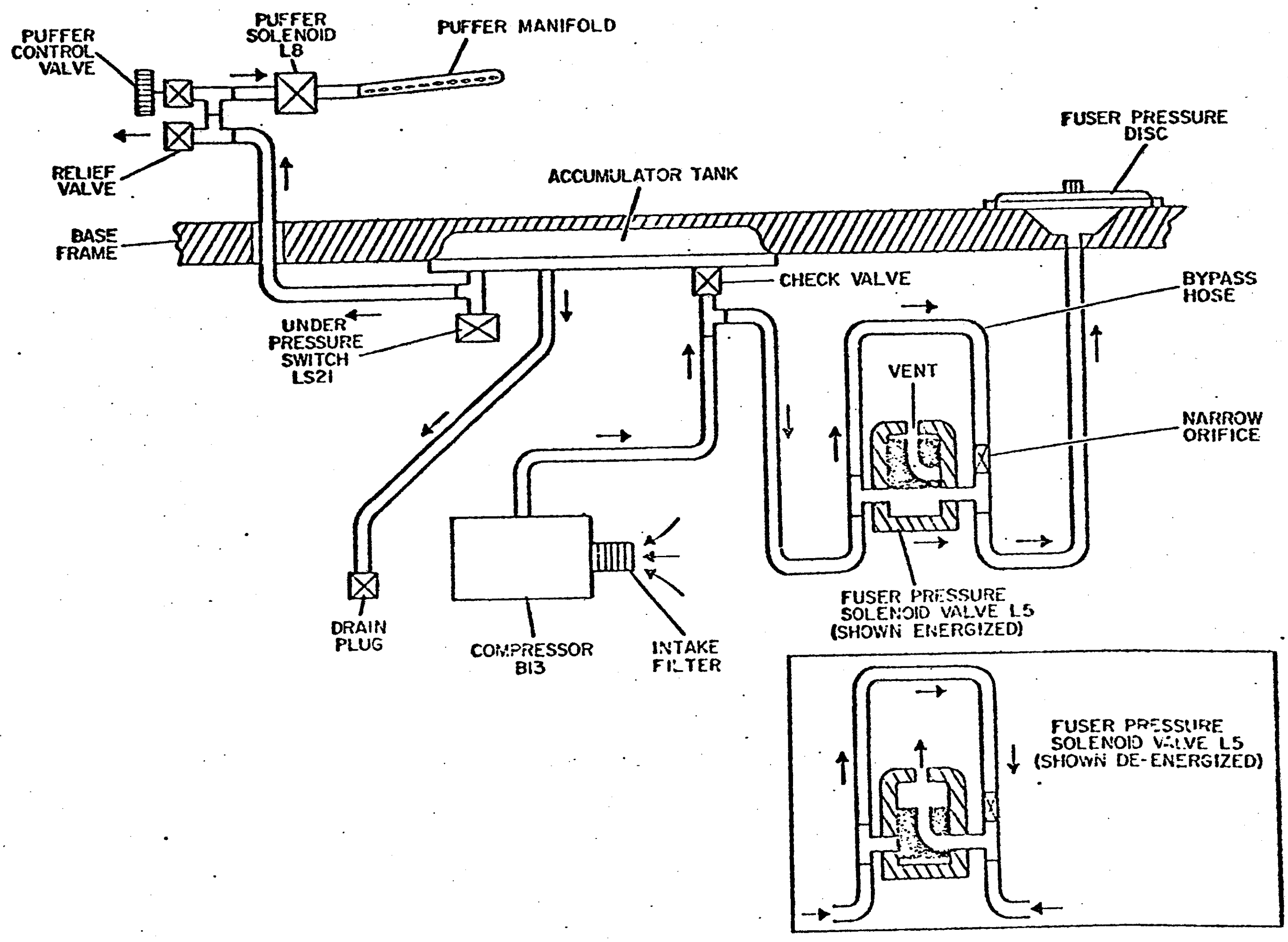


Fig. 2-87. Compressor and Puffer Air Flow System

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When the machine starts printing, the compressor builds up the accumulator tank pressure. L5, the fuser pressure solenoid, is de-energized at this time and no air can pass through it to the pressure disc (Fig. 2-88) and diaphragm. When the first sheet actuates LS3 on the B-transport, K38 energizes and, in turn, energizes L5. The core of L5 raises (Fig. 2-87) and allows air from the compressor to inflate the fuser diaphragm, which raises the fuser pressure disc and forces the fuser rollers together. The rollers are pressed together just before the sheet arrives to prevent an oily copy.

When the last copy of the print run is fused and K38 de-energizes, L5 de-energizes and allows the air in the hose to the fuser pressure disc to exhaust through the vent in L5. The air pressure decreases fast enough so that the fuser pressure roller drops away from the heat roller in less than one second.

Lowering the fuser pressure disc prevents flat spots from developing on the fuser rollers during standby, and allows the register stop drawer to be opened without scraping the fuser rollers.

When the compressor is turned off, the air pressure in the hose to the accumulator tank and the fuser pressure solenoid has to be reduced. The reason for reducing the air pressure in this hose is so that the compressor is not required to start against a head of air pressure when the machine starts another print run. A bypass hose, installed around the fuser pressure solenoid, allows this air to pass around the solenoid and exhaust through the vent in the solenoid. The bypass hose has an insert wi[th] a very narrow orifice which restricts the air flow. The air passing through the insert is not of sufficient pressure to raise the pressure disc.

The accumulator tank, which is composed of two metal pieces welded together, stores air and supplies it to the puffer when the puffer solenoid valve is pulsed. The function of the accumulator tank is to store enough air during standby so that the first sheet can be puffed off the drum when printing begins, and to minimize pressure variations caused by puffing.

During standby, the pressure switch LS21 turns the compressor on whenever the accumulator tank pressure drops below 8.25 psi (pounds per square inch), and the switch turns the compressor off when the tank pressure reaches 9.75 psi. This pressure is enough so that, when printing begins, only a small amount of time is required for the tank pressure to build up the minimum puffing pressure.

When the machine is first turned on for the day, the accumulator tank pressure will usually be low enough so that pressure switch LS21 is closed, causing the compressor to operate initially for about 10 seconds. As is typical of all pneumatic systems, this system has slig[ht] air leaks which allow the tank pressure to decrease slowly during standby. Thus, the pressure switch will periodically operate the compressor to maintain the

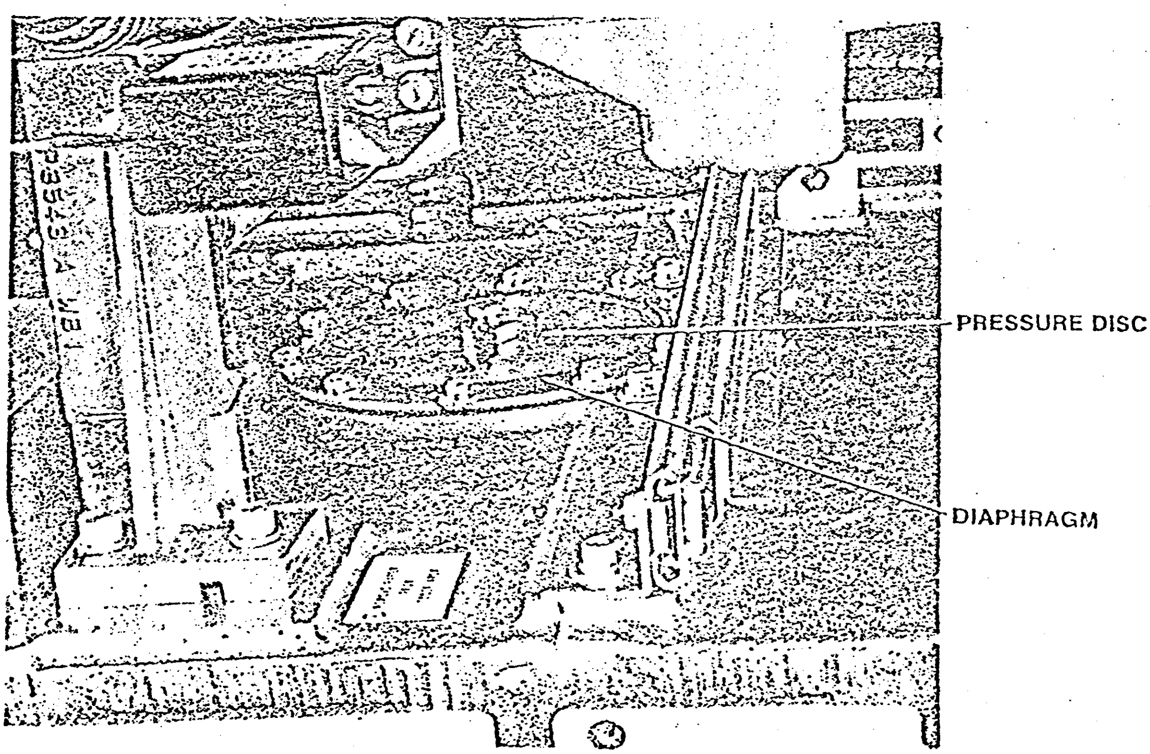

Fig. 2-88. Pressure Disc

tank pressure. However, the compressor should not operate more often than once every 15 minutes during standby.

During print, it is necessary to run the compressor continually to force the fuser rollers together and to provide air to the accumulator tank and puffer. Therefore, when the print cycle starts, K6-3 supplies power directly to the compressor B13.

To press the fuser rollers together with enough force for proper fusing, the compressor delivers about 17 psi to the pressure disc diaphragm. Since the area of the diaphragm is 20 square inches, a force of about 340 pounds is applied to the fuser rollers. Because of this force, keep your fingers clear when starting print.

The puffer requires between 12 and 13 psi for reliable puffing. Since this requirement is lower than the supply pressure, when the machine is printing, the accumulator tank pressure builds up until the ball-spring relief valve cracks open, at 12 psi. Due to the size of the check valve and relief valve, enough air is bled off to keep the tank pressure below 13 psi. The relief valve is mounted to the puffer control valve at the rear of the machine. The adjustable puffer control valve is mounted to the puffer solenoid L8.

When puffing occurs, the puffer solenoid L8 is pulsed. This lets a small volume of air out of the tank, causing the tank pressure to drop. However, the tank comes back up to its former pressure within one half second after puff. This pressure recovery time is sufficient because puffing occurs every second. Since the relief valve will not close until the tank pressure drops below 10 psi, this valve is open continually during print.

The function of the drain plug, which is located on the filter bottle assembly, is to allow moisture to be drained from the accumulator tank.

PUFFER

The puffer manifold (Fig. 2-89) is mounted on two brackets which are attached to the brush housing. The puffer tube puffs air onto the redundant mispuff detector photocell P5 and lamp DS14 to help keep them clean.

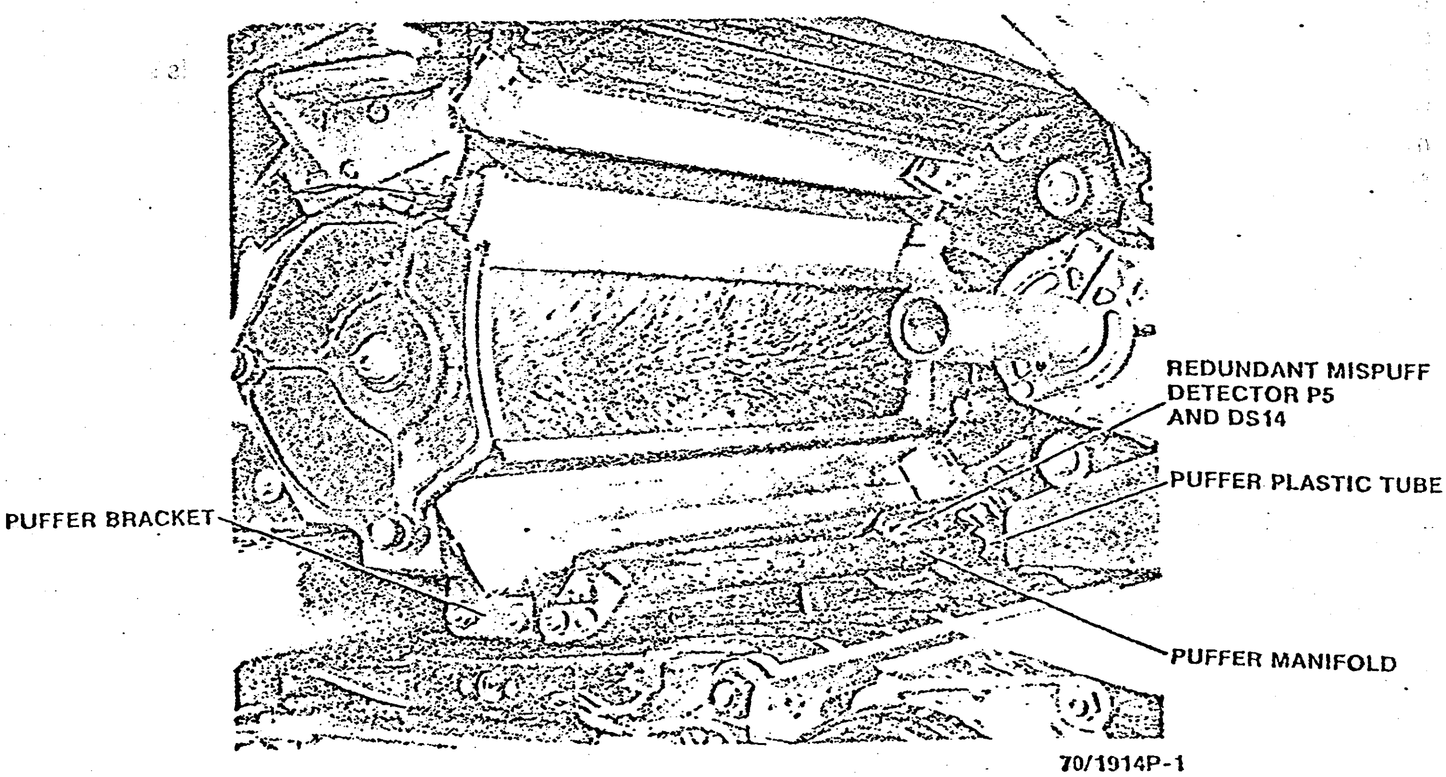

Fig. 2-89. Puffer

The puffer manifold is connected by a short plastic tube to the puffer solenoid valve L8. Figure 2-90 shows another view of the puffer, plastic tube and mispuff detector sensor. The puffer valve (Fig. 2-91), mounted on the rear of the machine next to the cycle control assembly, is attached to the relief valve, which is connected with a hose to the accumulator tank.

The puffer manifold is mounted at an angle to the drum, so that the outboard end is higher. This angle allows the paper to be peeled off the drum, beginning with the inboard corner, to result in more reliable puffing. Because there is a small time interval involved for the air to travel from one end of the puffer manifold to the other, mounting the puffer manifold on an angle permits

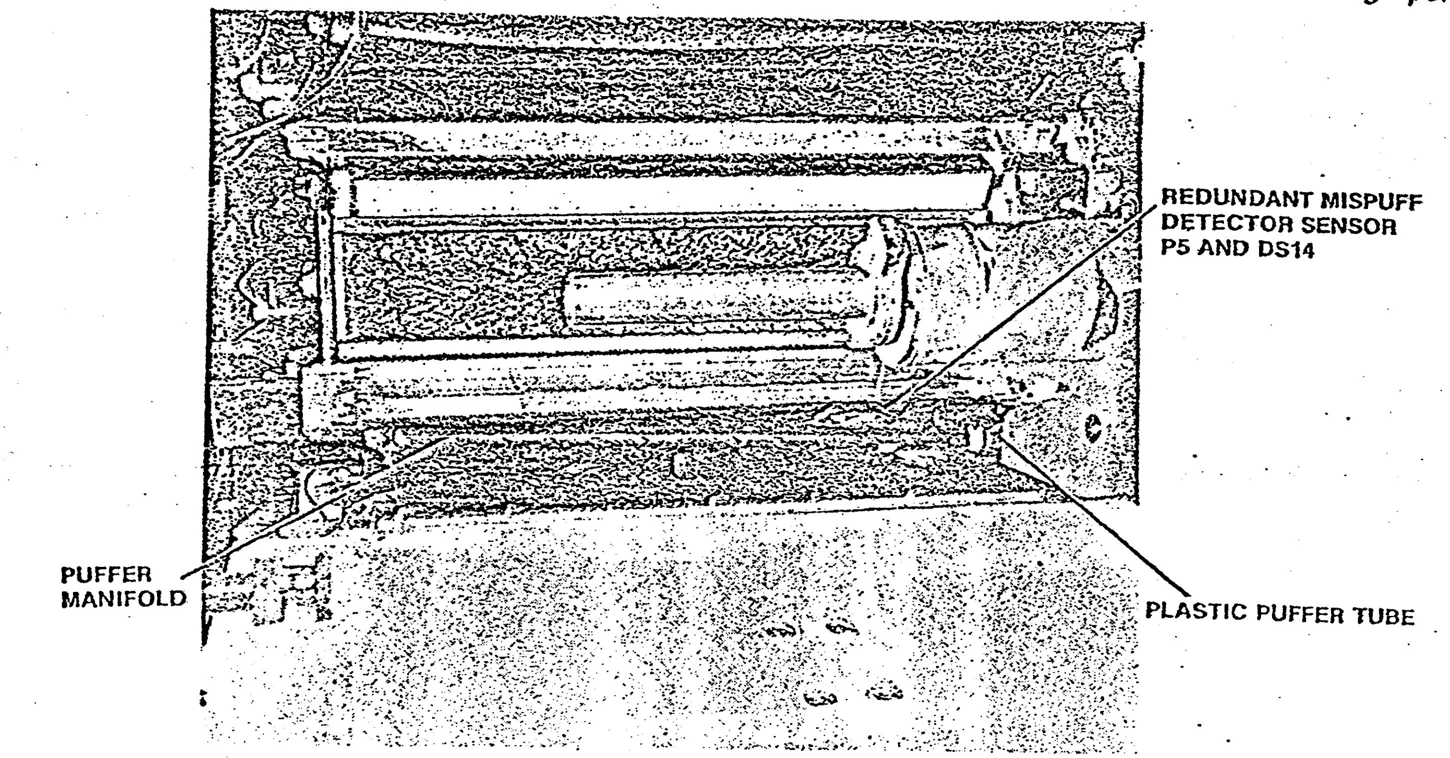

Fig. 2-90. Puffer 70-1915P

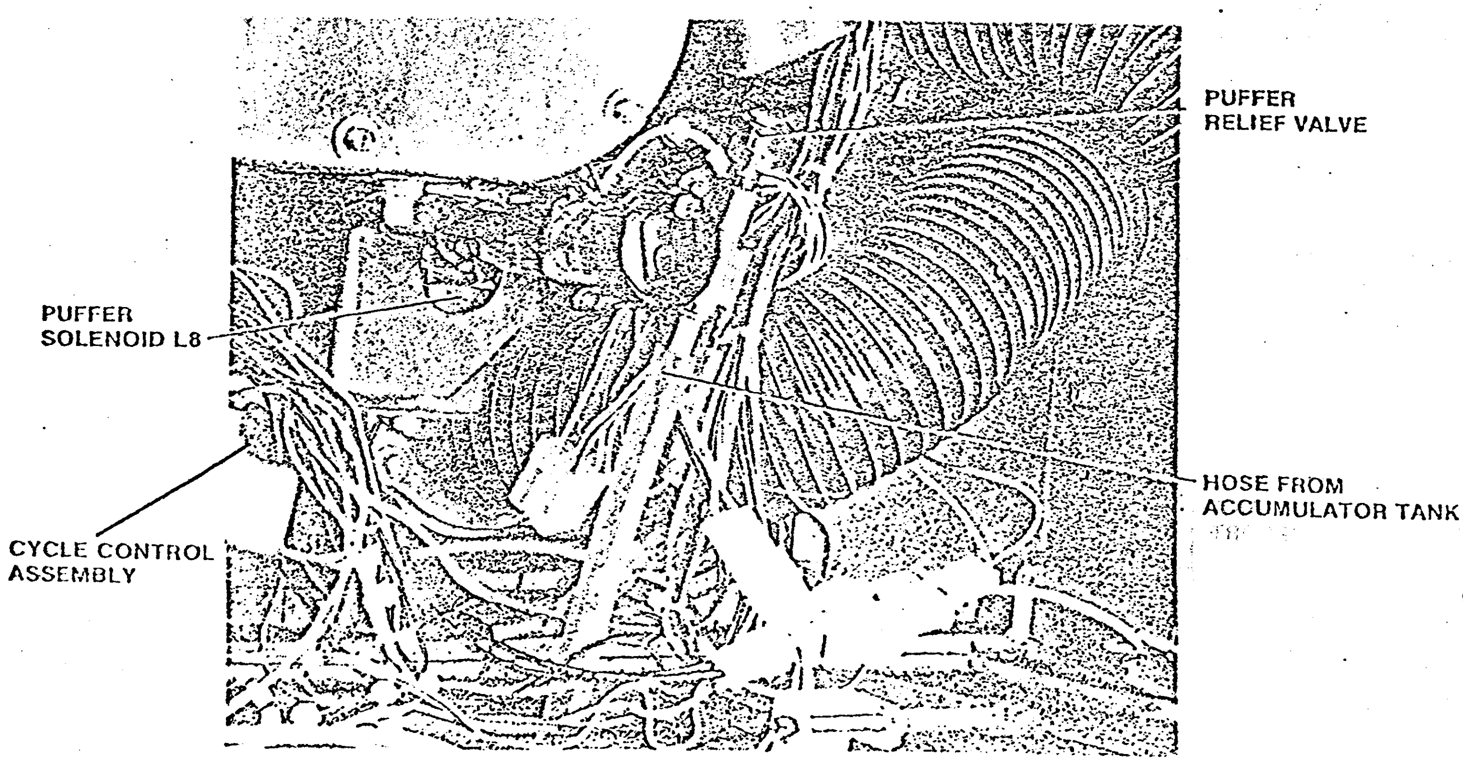

Fig. 2-91. Puffer Solenoid Valve 70-1910P

the air coming out each hole to meet the leading edge of the sheet as the drum turns.

The puffer operates only during the print cycle when there is a sheet of paper in the drum area. The puffer solenoid valve is operated by cycle control switch CS12 and the register stop module paper switch LS1. Although CS12 actuates every cycle, the puffer solenoid is energized only when the trailing part of a sheet is holding LS1 actuated. Puffing only when a sheet is in the drum area reduces the amount of toner blown around in the machine by puffing.

2.11 FUSING

Fuser Heat Roller and Oil Dispenser

The fuser consists of three subsections: (1) the fuser heat roller and oil dispenser, (2) the fuser controls, and (3) the fuser pressure roller.

The roller fusing method requires a combination of pressure and heat to melt toner into the paper. This method is better suited for high-speed printing than other types of fusing, since the heated roller comes in contact with the copy and heat is transferred more quickly by conduction than by radiation. Because of the faster heat transfer, less power is required, and the heat dissipated by the fuser is lower. If a sheet stops in the fuser, it will not burn, although it may discolor slightly.

The functions of the fuser heat roller and oil dispenser are: (1) to provide heat to fuse the toner to the paper and (2) to coat the fuser rollers with oil to prevent toner from sticking to the rollers.

The heat roller encircles the stationary quartz heater rod (R1). The normal tendency for melted toner to stick to a roller is minimized by the coating of both rollers with teflon. Also, wiping the heat roller with silicone oil, which has a very low surface tension, prevents toner from adhering to the roller. The oil is supplied from the fuser oil dispenser.

The heat roller (Fig. 2-92) is mounted between the inboard frame and the fuser frame. It is driven by the main drive chain which turns a sprocket on its inboard end. The heat roller is hollow, and heater rod R1 is inserted through its center. The rod extends beyond the roller and is suspended on both ends by sockets, which provide the electrical contacts and position the stationary rod in the center of the roller.

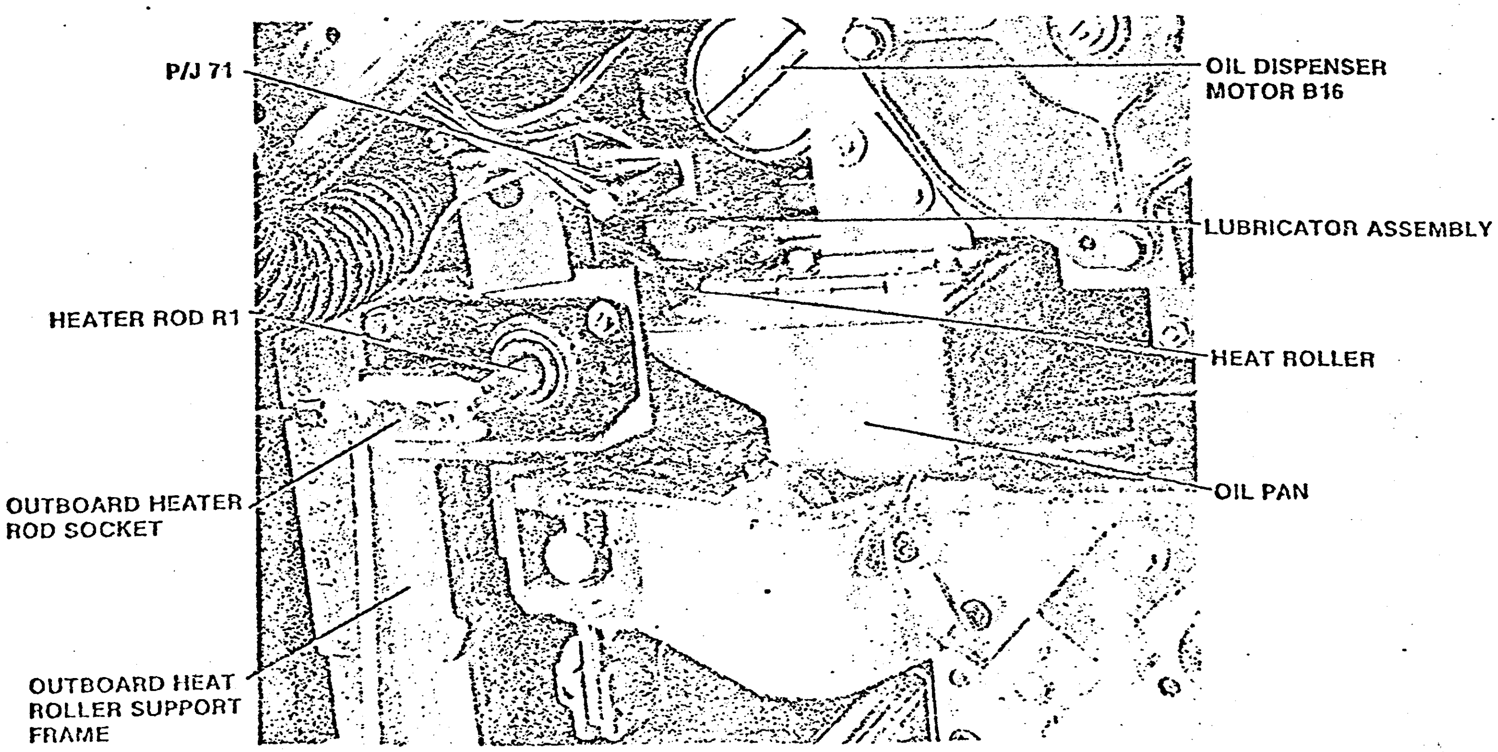

Fig. 2-92. Heat Roller

The inboard end of the heat roller has a slotted shaft which fits inside the drive sprocket (Fig. 2-93). This arrangement permits the roller to be changed without disturbing the drive chain. A spring between the outboard socket bracket and the roller biases the roller towards the sprocket.

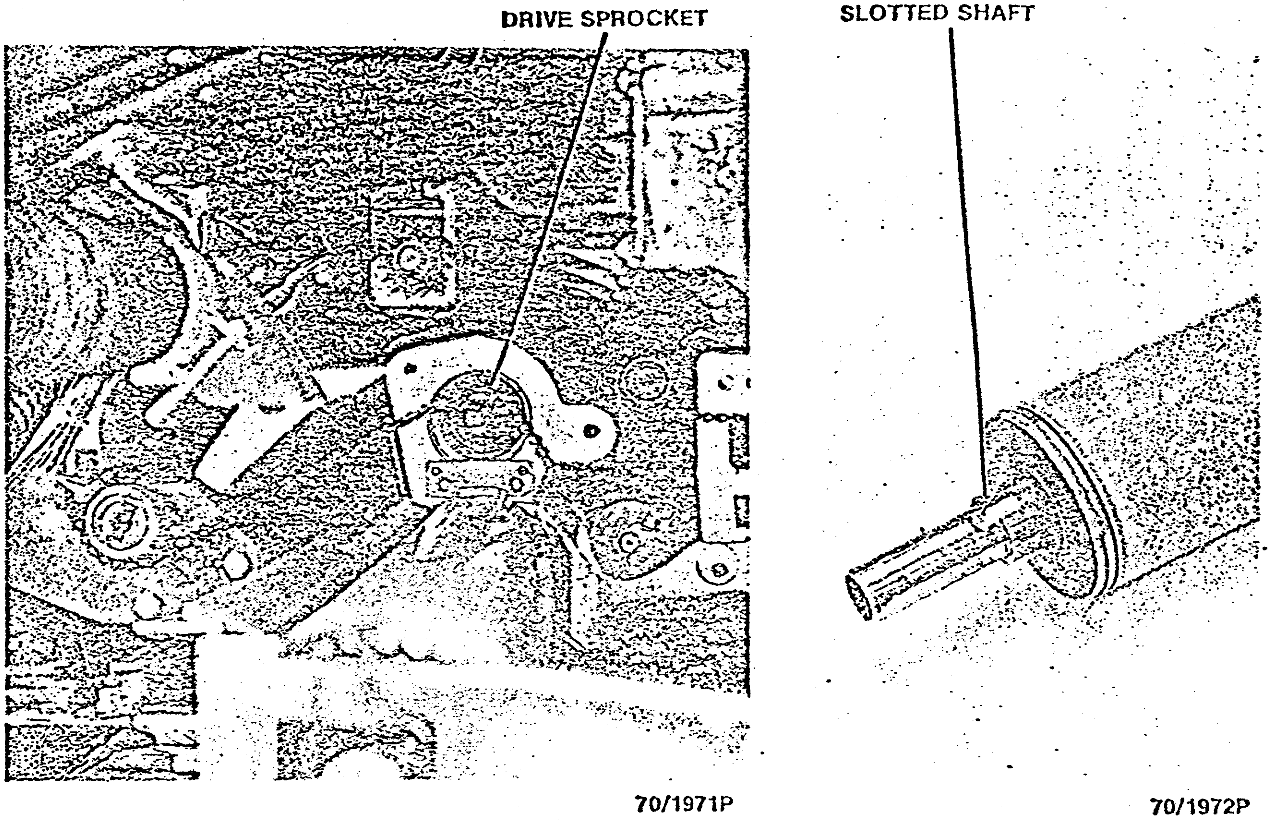

Fig. 2-93. Heat Roller Shaft and Drive Sprocket

On the right side of the heat roller is the fuser oil pan, containing silicone oil.

The oil is carried from the oil pan to the heat roller by the lubricator assembly, which contains a wick (Fig. 2-94).

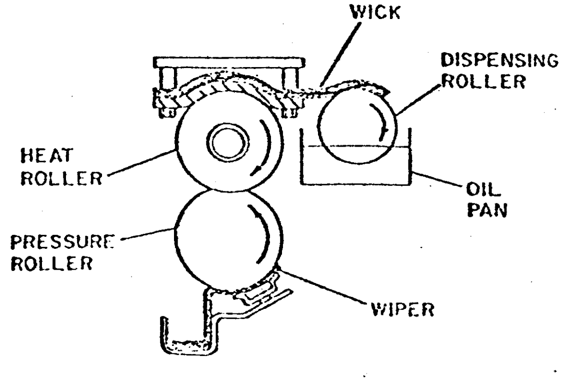

Fig. 2-94. Fuser Cross Section

The oil is picked up from the oil pan (Fig. 2-95) by the rotation of the dispensing roller, which is mounted in the pan. The oil is then carried by capillary action from the dispensing roller, through a two-piece wick to the top of the heat roller. The wick is wide enough to extend over both the dispensing roller and the heat roller.

The lubricator assembly (Fig. 2-96), which consists of the wick, a metal cover and a plate, weighs about five pounds. The oil dispensing rate is affected by the contact length of the wick on both rollers, and by the dispensing roller speed, or "metering."

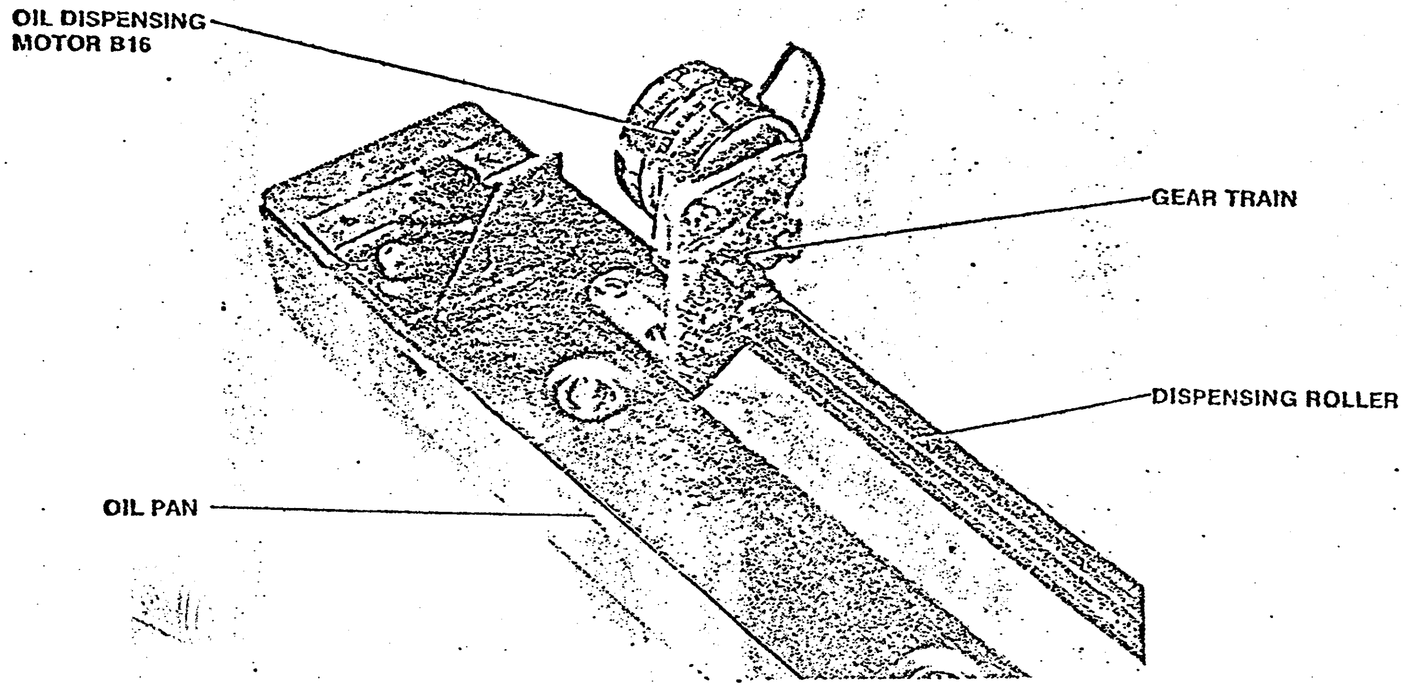

Fig. 2-95. Oil Pan 70-1963P-1

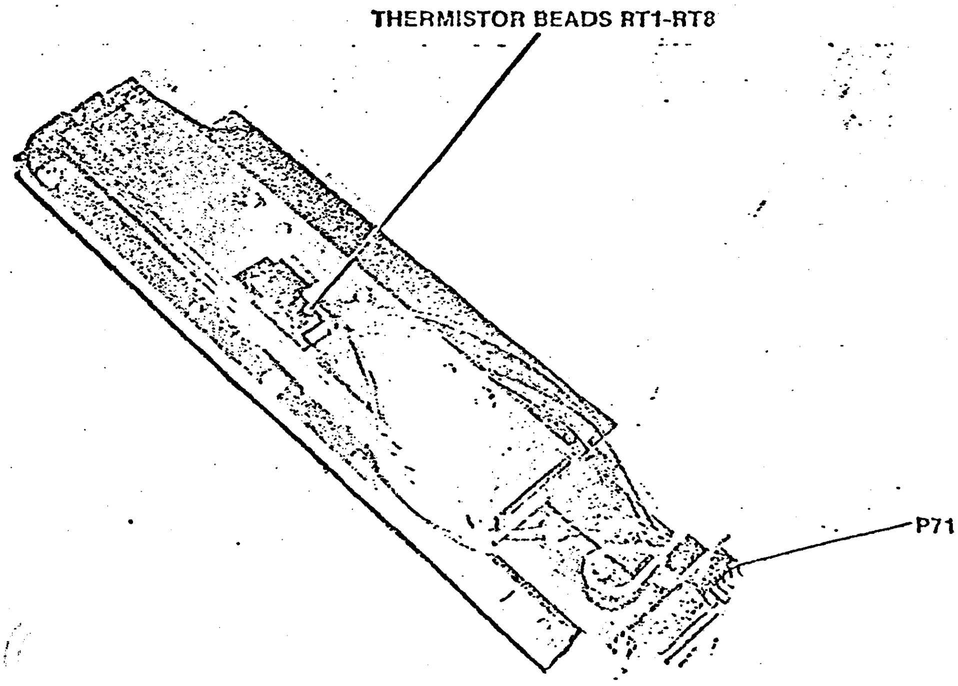

Fig. 2-96. Lubricator Assembly 70-1964P

The lubricator assembly lubricates the full length of the teflon-coated fuser roller. The RT8 and the RT1 thermistor beads are pressed directly on top of the teflon wick. The 7000 temperature control is accurate because the temperature is sensed at the center of the fuser roller. Sensing at this point also minimizes large overshoots in temperature.

The dispensing roller speed is fixed by the speed of the oil dispenser motor, B16 (Fig. 2-97). This motor is turned on when the START PRINT button is pressed, and it is turned off by K41-1 after two seconds of timed shutdown. B16 has an output of 1.5 RPM. The dispensing roller is driven on its outboard end by a gear train from the motor. Because of this gear train, the dispensing roller is driven at one revolution per 75 seconds.

Curling of copies coming out of the fuser can result in the sheets being folded as they go up the C-transport, or it can result in the sheets wrapping and jamming on the heat roller.

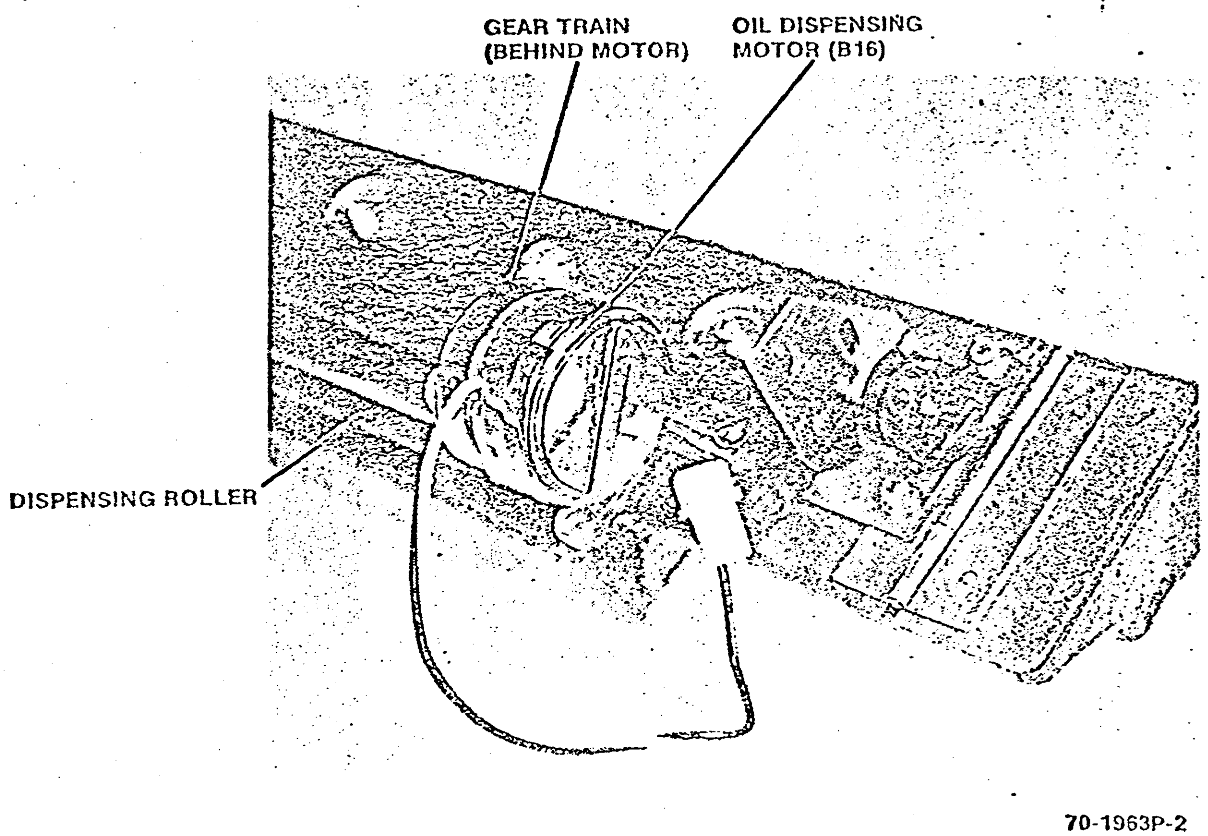

Fig. 2-97. Oil Dispenser Motor B16

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The tendency of copies to curl is reduced by fuser curl control blower B17 (Fig. 2-98). This blower, mounted on the outboard side of the optical assembly, directs a stream of air at the left side of the fuser heat roller. This air stream forces the sheet against the C-transport.

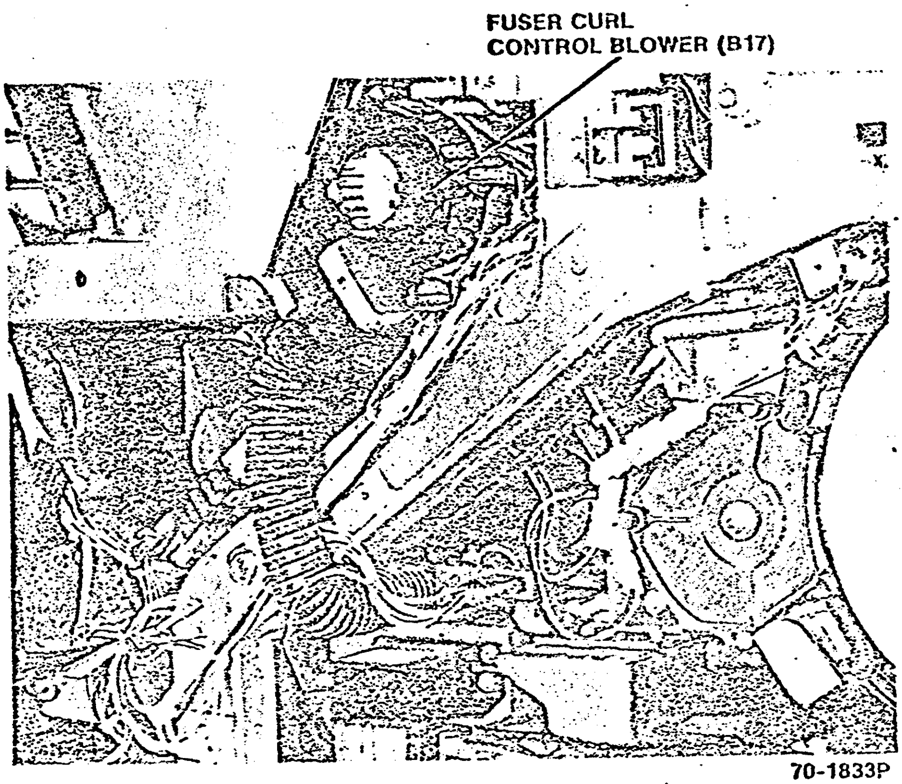

Fig. 2-98. Fuser Curl Control Blower B17

The fuser stripper finger helps to peel overtoned sheets off the fuser heat roller. The finger consists of a solid piece of teflon with a 0.004 inch radius at the point, which rides on the upper fuser roller (Fig. 2-99). The point is about the thickness of a sheet of paper and is so fragile that it is destroyed by an extended paper jam. If the stripper finger fails to strip the sheet off the roller, switch LS38 actuates, initiating a malfunction shutdown. Thus, LS38 prevents an extended fuser jam and also extends the life of the delicate finger.

Electronic controls sense the temperature of the fuser heat roller. These controls vary the amount of electrical power furnished to the heater rod, to maintain the fuser heat roller at a constant fusing temperature. Other controls sense the fuser temperature to turn on the READY light and permit printing to begin.

NOTE: The temperature values mentioned in this discussion are theoretical values, referred to so that the fuser operation can be explained more clearly. However, the Adjustment Section should be consulted for actual temperature readings and tolerances.

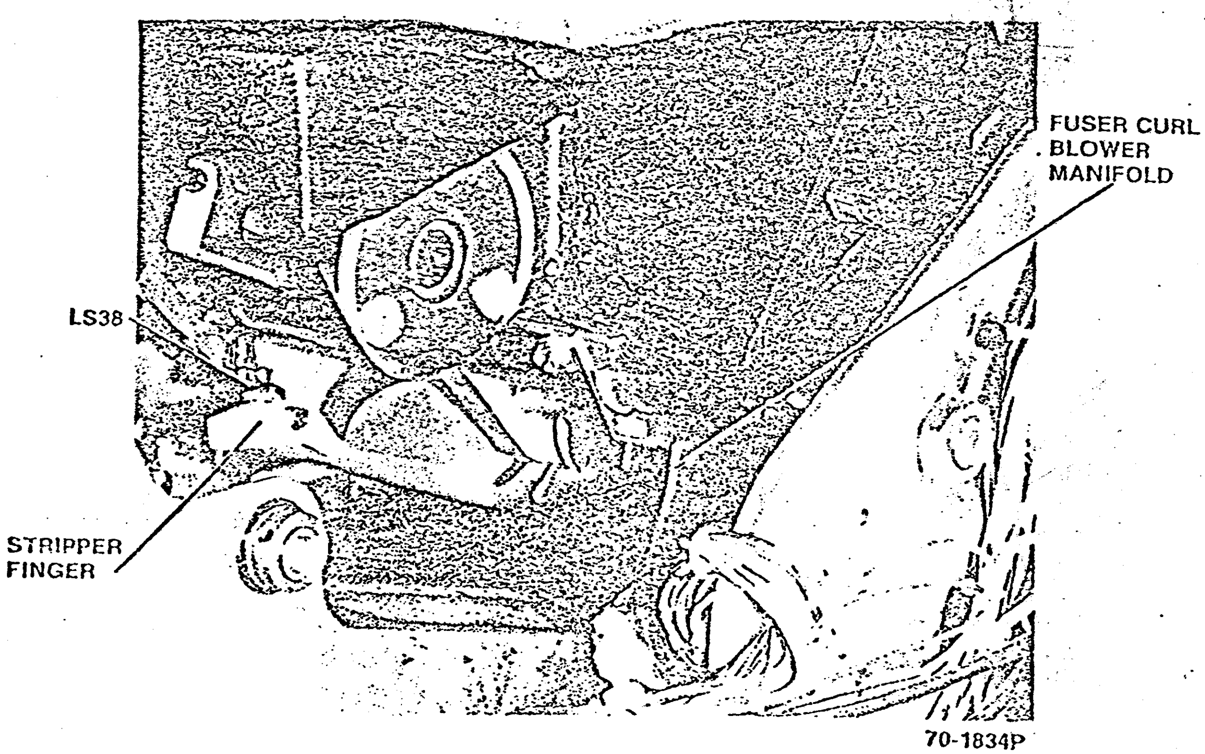

Fig. 2-99. Fuser Stripper Finger

Fuser Controls

The fuser controls consist of the fuser controller PS2, over-under temperature controller PS5 (PCB4), thermistor assembly RT1/RT8 and auto-transformer T1 (Fig. 2-100). There is no electrical connection between the fuser controller and the low temperature controller.

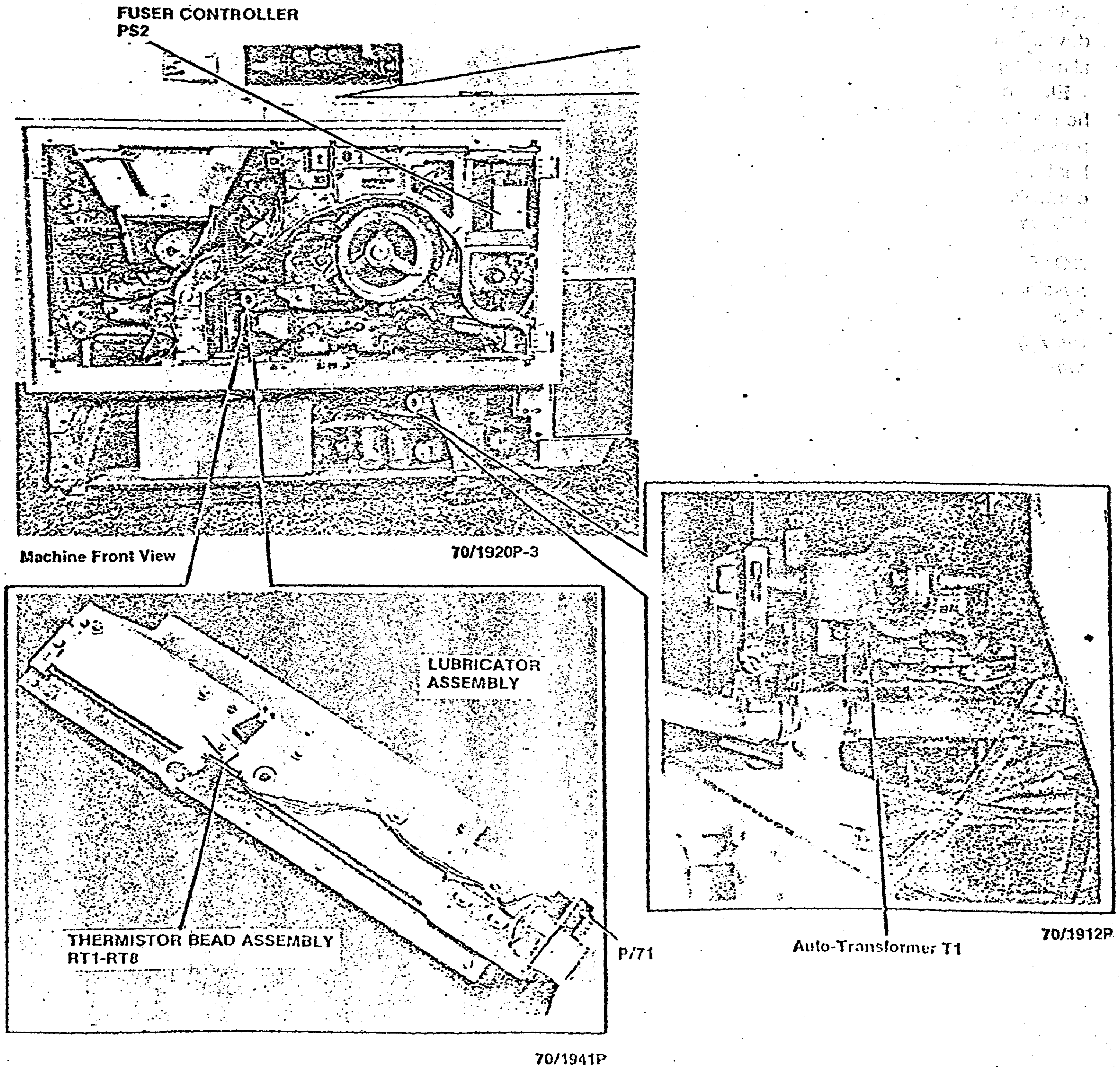

Fig. 2-100. Fuser Controls

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The fuser controller and the low temperature controller operation is determined by the heat roller temperature, which is sensed by the thermistor assembly. The thermistor assembly is a probe which contains two independent thermistors. A thermistor is a type of resistor whose resistance changes inversely with temperature (as the temperature increases, the resistance decreases). It does not operate like a thermostat, nor does it use a bimetallic strip. The thermistor probe is gently spring-loaded against the wick which rides on the fuser heat roller. The thermistors sense the temperature of the heat roller and convert the temperature into electrical signals.

The function of the fuser controller PS2 is to maintain the operating temperature of the fuser by varying the voltage applied to the heater rod R1. The rod is a clear quartz tube that encloses a coiled tungsten heating element. The heating element is terminated at both ends by a round ceramic insulator and contact. When the machine is on, the rod will produce a glow that varies from bright red to dull orange when it is heating. When the heat roller is up to operating temperature, the rod will pulsate.

Fuser controller PS2 controls the amount of voltage applied to the heater rod from fuser transformer T1. This transformer, located under the base casting below the A-transport, is an auto-transformer having seven input voltage taps (Fig. 2-101) in 10-volt increments from 190 volts to 250 volts. During installation, a wire is connected to the tap that matches the line voltage. The tap selection insures the required input voltage of 230 volts to PS2 (Fig. 2-102).

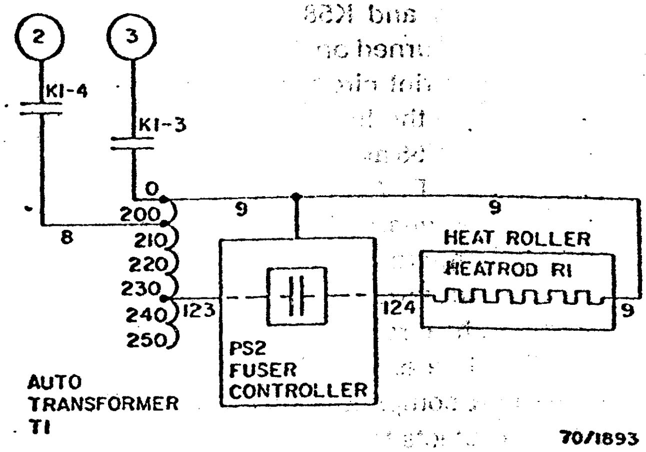


Fig. 2-102. Fuser Circuit

The voltage applied to the heater rod by PS2 is controlled by thermistor RT1 (Fig. 2-103). Whenever the fuser roller is below operating temperature, the thermistor causes the fuser controller to apply full voltage to the heater rod. When the fuser roller reaches operating temperature, the thermistor causes the fuser controller to open the path to the heater rod. The thermistor constantly monitors the temperature of the fuser heat roller and signals the fuser controller to maintain the proper operating temperature.

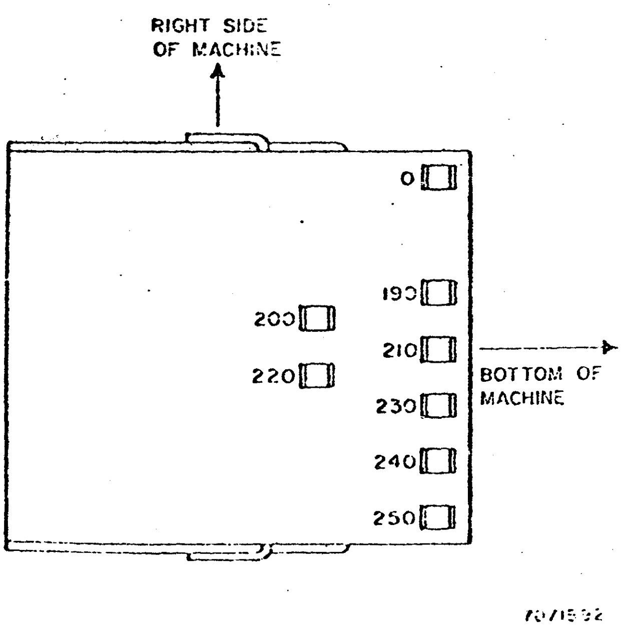


Fig. 2-101. Fuser Transformer T1 Taps (Bottom View)

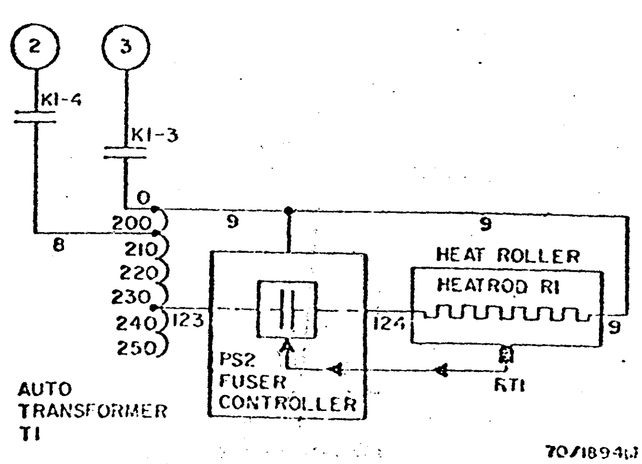


Fig. 2-103. Fuser Circuit

Refer to figure 2-104. Thermistor RT8 senses the temperature of the fuser roller. When the machine is first turned on, K44 and K58 are de-energized; the NOT READY light is turned on, the READY light is turned off, and the Start Print circuits are disabled, preventing a print run. When the fuser temperature reaches 320° F, relays K44 and K58 are energized; the NOT READY light is turned off, the READY light is turned on, and the Start Print circuit is enabled, to allow print run. If for any reason the temperature drops below 312° F, relays K44 and K58 de-energize again, preventing a print run.

If the fuser heat roller temperature goes above 400° F, then K46 will de-energize, causing K1 and K19 to de-energize and completely disable the machine (Fig. 2-104). This protects the machine from overheating if the fuser-controller fails and applies maximum voltage to the heater rod.

Fuser Pressure Roller

The function of the fuser pressure roller is to press the paper against the upper heat roller.

The fuser pressure roller is located in the register stop drawer. When the machine is printing, the pressure roller is forced up against the heat roller by the pressure disc.

Since the amount of heat transfer or conduction is determined by the force with which the paper contacts the heat roller, the pressure applied by the lower roller is very important for proper fusing.

During printing, the compressor inflates the diaphragm in the pressure disc (Fig. 2-105). A stud and

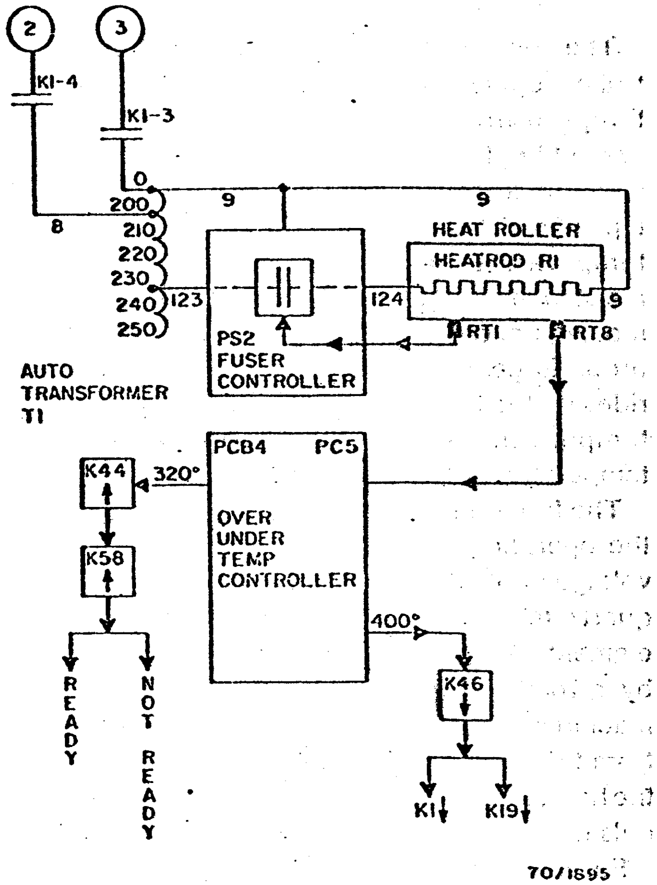


Fig. 2-104. Fuser Circuit

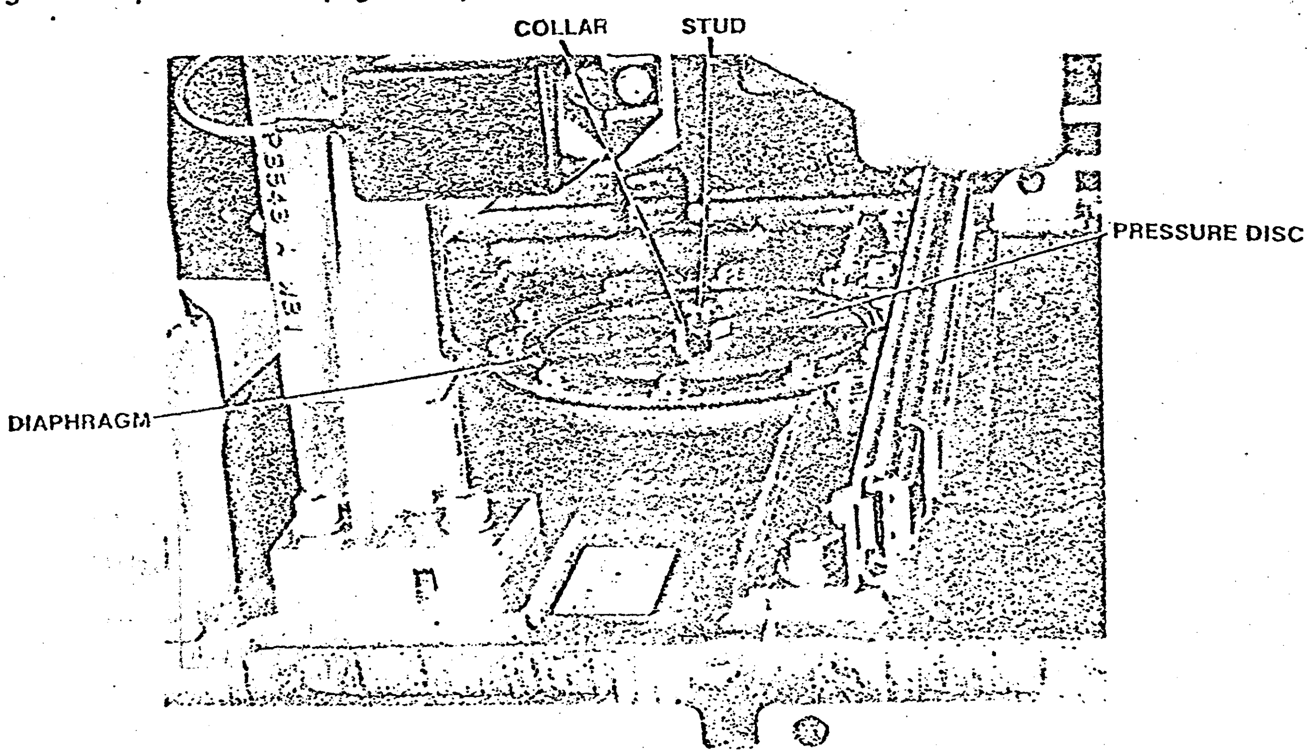


Fig. 2-105. Pressure Disc

collar, mounted to the pressure disc, forces the pressure bar (Fig. 2-106) upwards. This bar is connected to the ends of the pressure roller, and forces it against the heat roller.

The pressure roller has a rubber coating under its teflon sleeve. Because of this rubber coating, the pressure roller flattens against the firm heat roller when force is applied. The distance that the rollers are in contact with a sheet is called "contact arc." Contact arc is important for good fusing since it determines the length of time that the paper is in contact with the heat roller. Two stop screws, one mounted in the top of the connecting rod at each end of the pressure bar, control the distance between the centers of the pressure roller and the heat roller. Adjusting these screws will vary the force applied to the rollers and change the contact arc.

This contact arc allows the toner image to be compressed for a longer distance to compensate for the high speed of the paper through the fuser system.

Because of the pressure, the image is pressed into the surface of the paper.

When the last sheet leaves the fuser, air is removed from the pressure disc, which lowers the pressure roller.

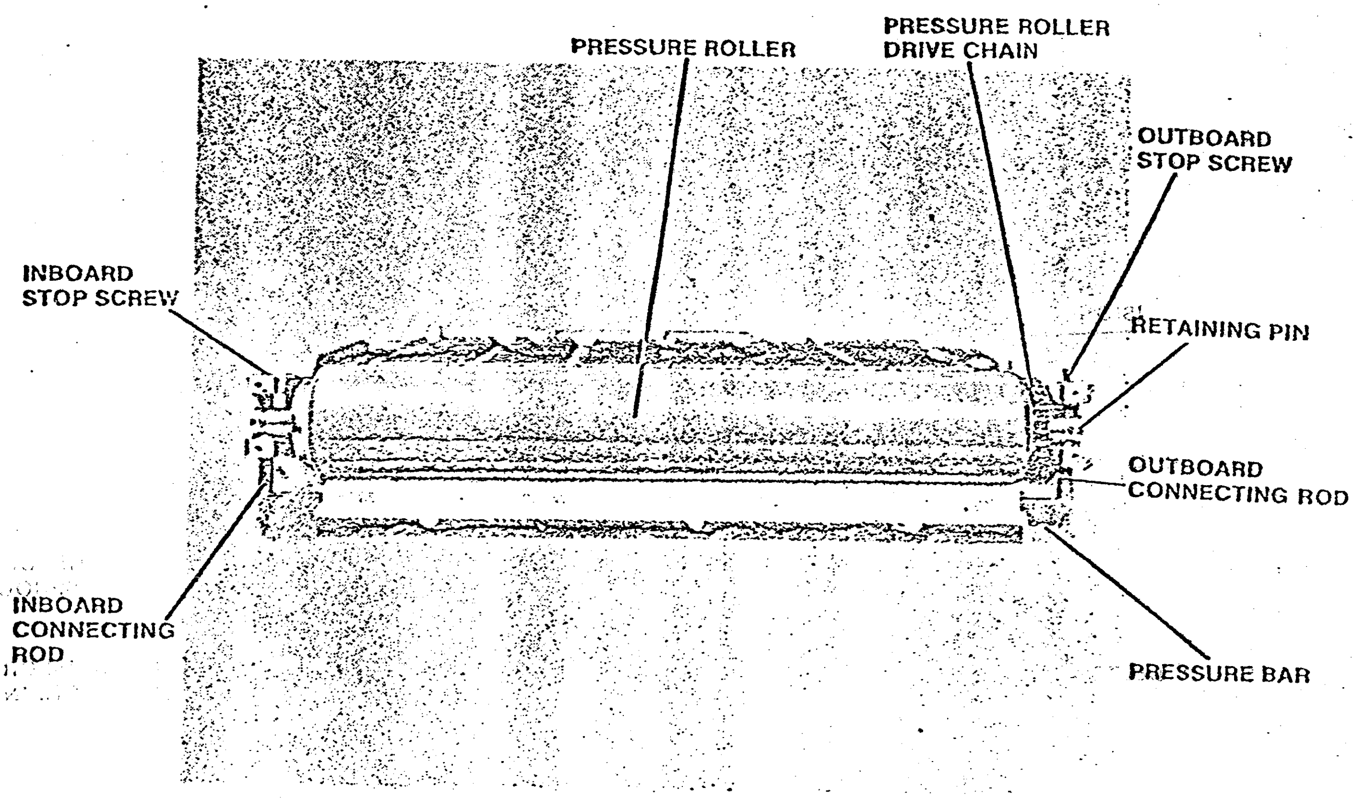


Fig. 2-106. Pressure Roller (Left Side View)

2.12 C-TRANSPORT

The function of the C-transport is to carry paper from the fuser to the receiving tray by means of a vacuum system.

Paper entering the transport from the fuser area is held to the four transport belts (Fig. 2-107) by a vacuum. This vacuum is furnished through holes in the top of the C-transport housing between the belts. The belts move the paper under the belt tension roller, under the finger assembly, and up to the top of the C-transport. The paper is then deflected by the feed out baffle and driven past the antistatic bar into the receiving tray by the pinch wheels mounted to the pinch wheel shaft.

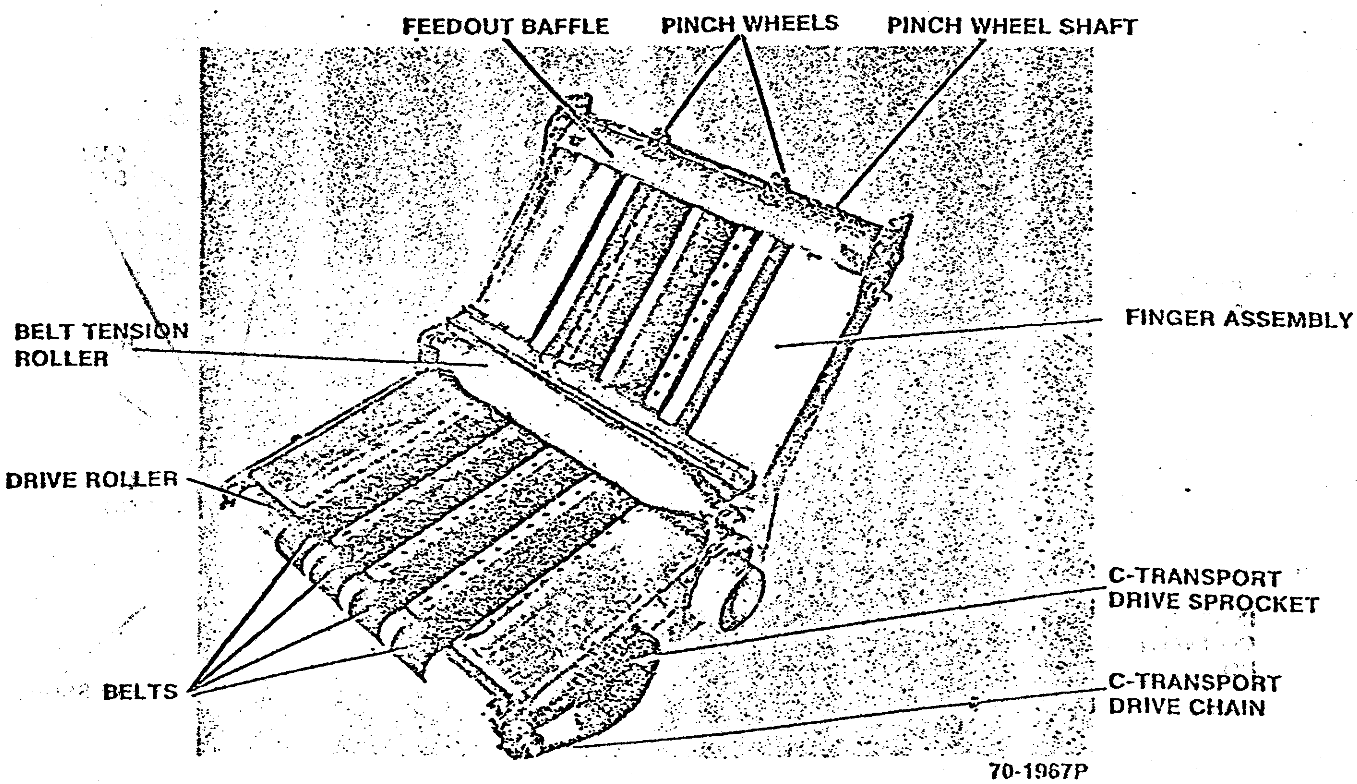


Fig. 2-107. C-Transport (Rear View)

The belts are driven by the drive roller, which is rotated by the drive chain and drive sprocket assembly located on the inboard end of the drive shaft (Fig. 2-108). The belts are mounted around the drive roller and the two identical idler rollers at the top and bottom left side of the transport. A fourth roller, which is the belt tension roller, maintains a fixed tension on the belts. The belts are kept tracking properly by the three belt guides on the left side and bottom of the transport.

A fine talcum powder is dusted on the inside surface of the belts, as on the A- and B-transports. The powder reduces excessive friction between the belts and the housing. Reducing the friction prevents the belts from deteriorating and sticking to the drive roller, causing belt jams between the roller and the housing.

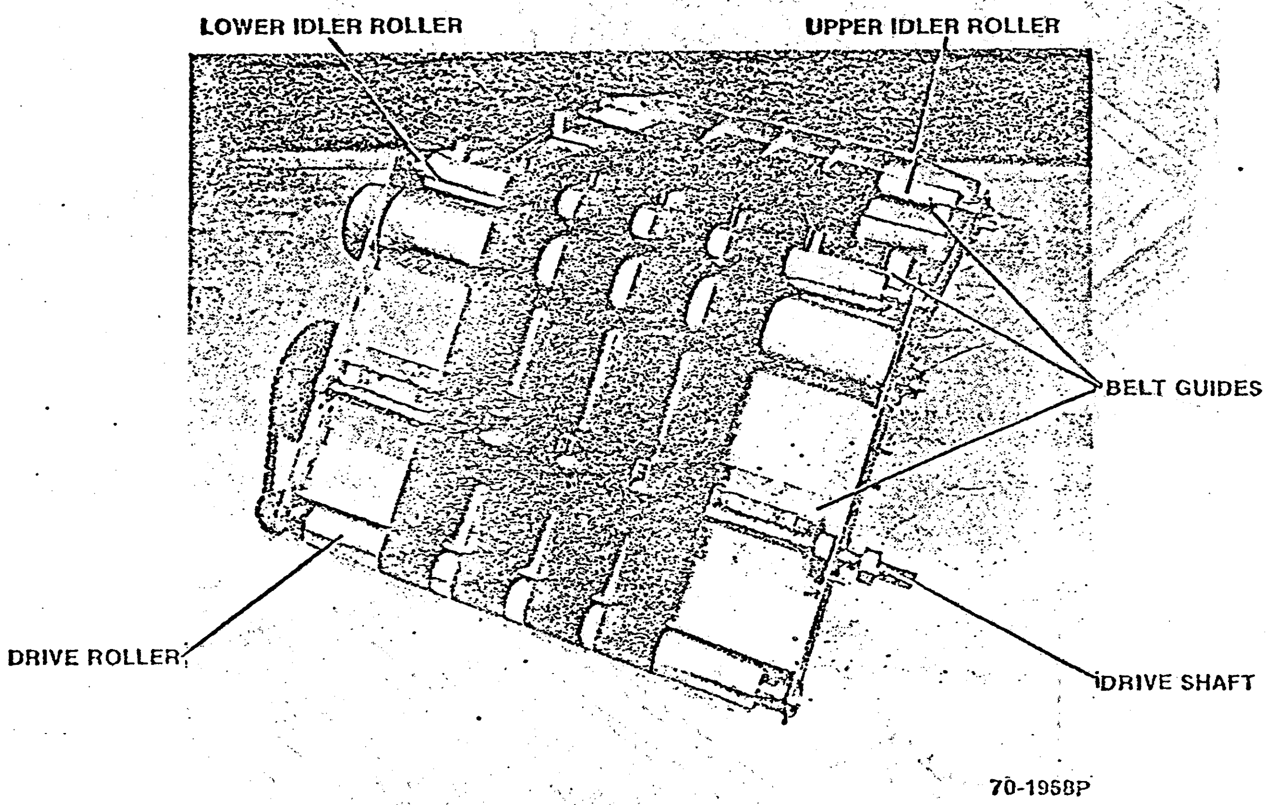


Fig. 2-108. C-Transport (Bottom View)

The C-transport is driven by the main drive chain (Fig. 2-109). A "quick disconnect" clutch allows easy removal of the C-transport. The main drive chain drives a sprocket attached to the lower inboard mounting bracket. This sprocket drives the drive sprocket on the C-transport. The drive sprocket chain drives the driven sprocket which turns the belt drive roller.

The drive shaft is not allowed to rotate. A pin in the outboard end of the shaft strikes a stud mounted on the transport, preventing rotation.

The function of the drive chain and sprocket assembly is to allow the C-transport belts to operate faster than the B-transport and fuser. This prevents the paper from buckling as it comes out of the fuser. It also increases the velocity of the paper so that stacking in the receiving tray is improved.

The pinch wheels mounted on the pinch wheel shaft (Fig. 2-110), are held against the belts by gravity. One clip holds the shaft in place. It is held loosely to permit free vertical movement of the shaft over the paper baffle.

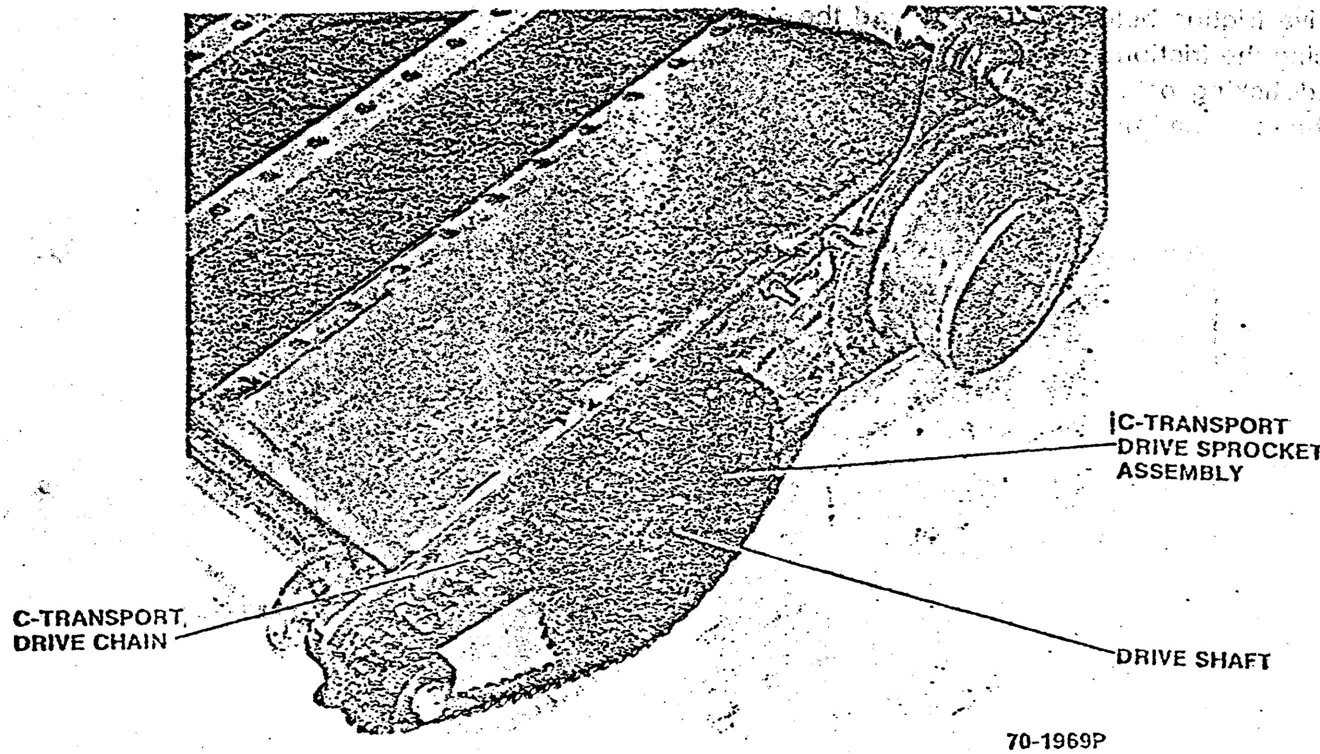
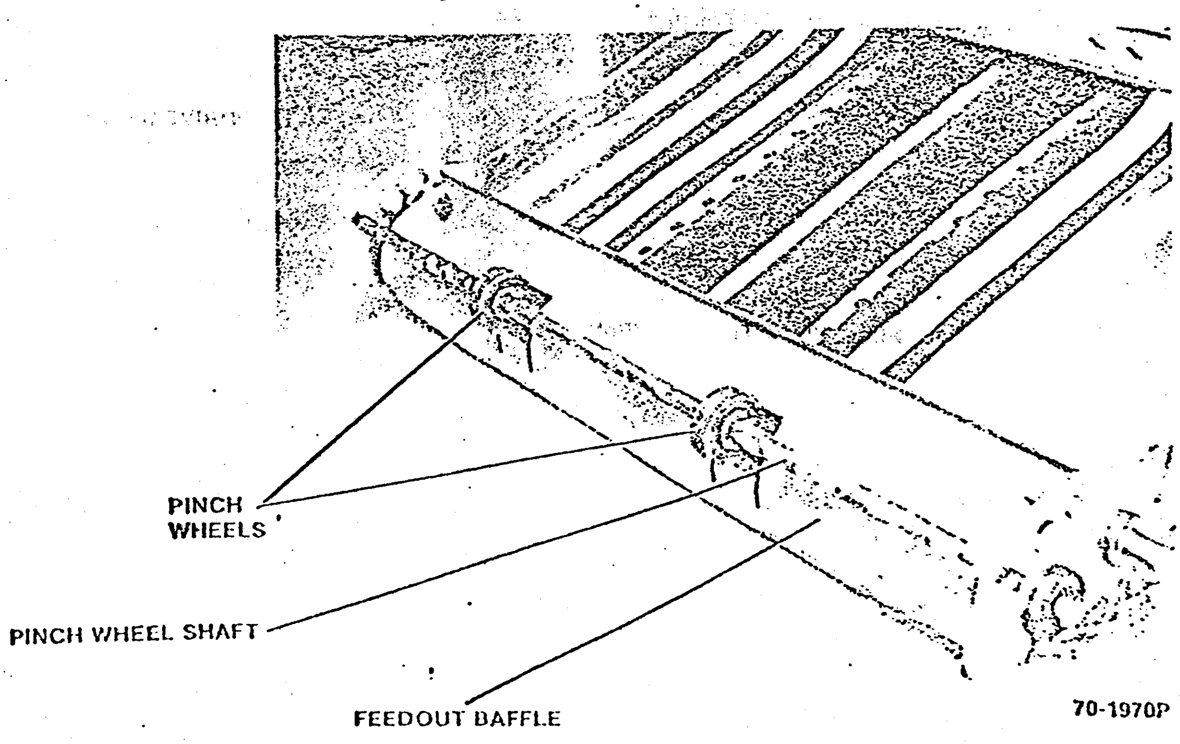


Fig. 2-109. Drive Sprocket Assembly



Receiving Tray

The receiving tray has a spring-loaded bottom that changes its angle as more copies accumulate (Fig. 2-111). The purpose of this variable-angle tray is to provide better paper stacking at the extreme environmental operating conditions.

Antistatic Bar

A special type of corotron called an antistatic bar, is located to the left of the C-transport, over the paper tray (Fig. 2-112). The function of the antistatic bar is to remove static from the paper, to permit easier collation of the copies. Removing static also improves the paper

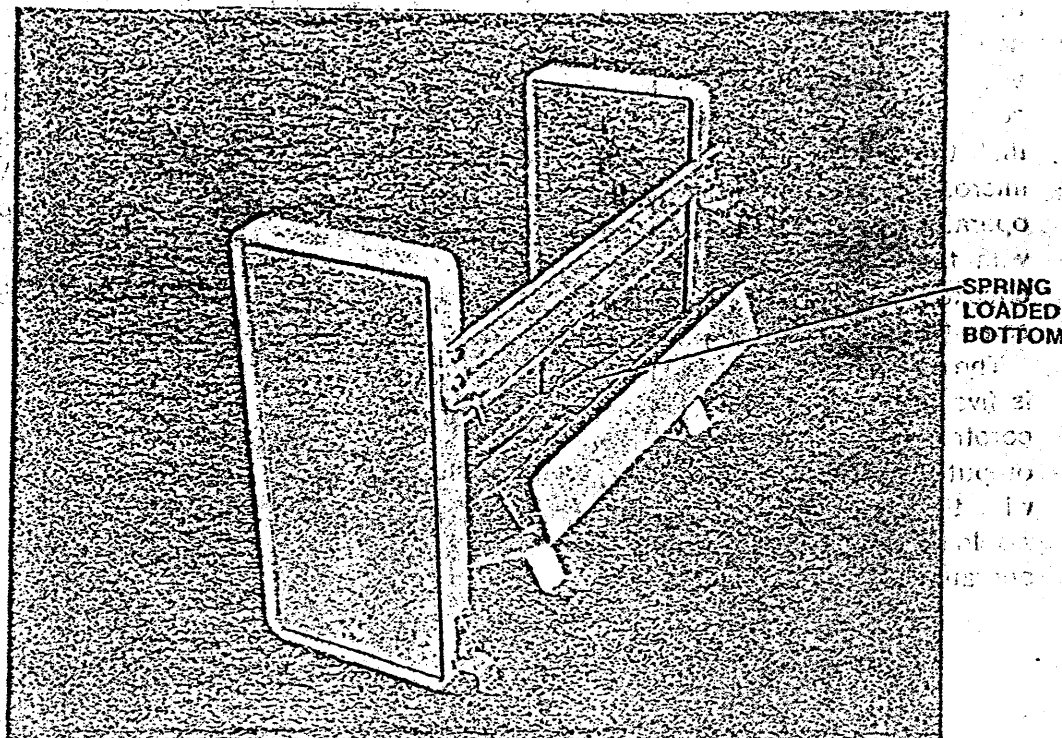


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Fig. 2-111. Receiving Tray

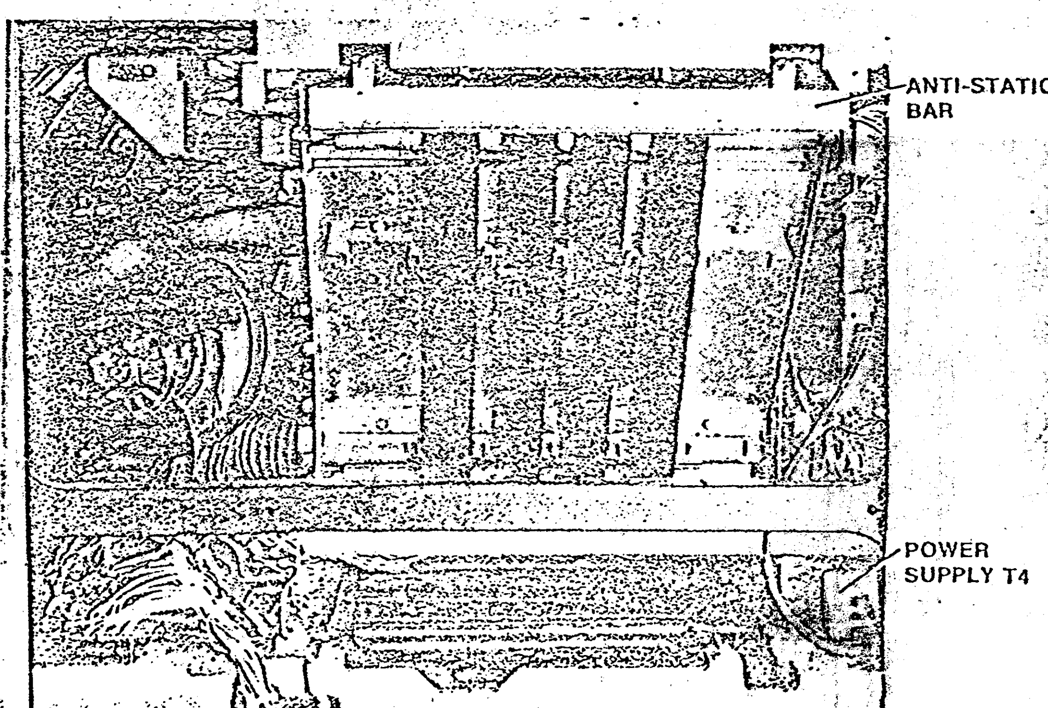

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Fig. 2-112. Anti-Static Bar and Power Supply T4 stacking in the receiving tray and reduces the chance of an operator being shocked by static on the paper. C-transport jams may also be caused by the antistatic bar not operating. In this case, static causes the copies to stick together and back up on the transport.

The antistatic bar is a point-discharge device driven with 7,000 volts AC from transformer T4, located on the base casting in front of the C-transport. The bar has needle points spaced about one inch apart. There is, effectively, a high-voltage, low-capacitance capacitor connected between the transformer and the points, so that the current at any needle point is about 10 microamperes. Consequently, the current is so low that operators will not feel the voltage by touching the points with their fingers. The presence of voltage may be checked by placing the leads of a small neon bulb (such as an NE-2) against the points of the antistatic bar.

The maximum current that the transformer can deliver is five milliamperes, which is about the same as the corotron power supply. Thus, if you were to unplug the output wire from the transformer and touch the terminal with the transformer energized, the resulting shock would be about the same as touching a corotron during operation.

B- and C-transport Vacuum

Paper is held to the B- and C-transports by a vacuum furnished by the B- and C-transport vacuum blower assembly (Fig. 2-113).

This assembly is located on the left rear side of the machine. It consists of a manifold and a squirrel cage operated by B8.

The manifold has two openings to which the hoses to the transports are attached. A shorter hose connects the manifold to the C-transport, which is located nearby. The longer hose is attached to a rectangular opening in the inboard frame. When the register stop drawer is in place, the B-transport housing presses against this rectangular opening. Air being drawn from the transports is exhausted through the rear of the machine.

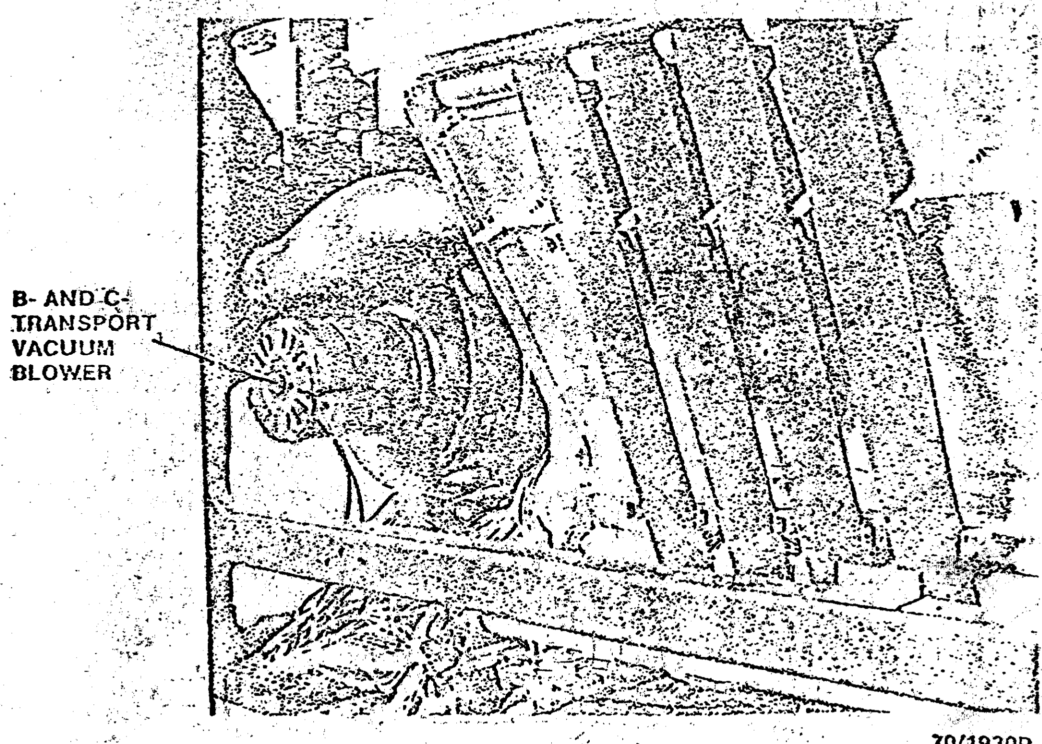

Fig. 2-113. B- and C-Transports Vacuum Blower B8

2.13 DRUM CLEANING

The functions of the drum cleaning system are to remove the toner left on the drum after transfer, to collect it in a disposable filter bag, and to remove any charge left on the drum after cleaning.

The drum brush is made with dynel, a synthetic fiber. After the preclean corotron (Fig. 2-114) has loosened the toner left on the drum after transfer, the brush counter-rotates against the drum to wipe off the toner. A flicker bar, mounted in the brush housing, knocks the toner off the brush. The brush is driven by its own motor, B4, and operates only during the print cycle. The brush is mounted on two arbors. The inboard arbor is attached to the brush motor shaft, and the outboard arbor is spring-loaded and mounted on the brush housing door.

In addition to the openings between the brush housing and the drum, another opening is provided in the top of the brush housing under the discharge lamp DS1 (Fig. 2-115). This allows a greater amount of air to clean the brush and brush housing and carry the toner into the filter bag.

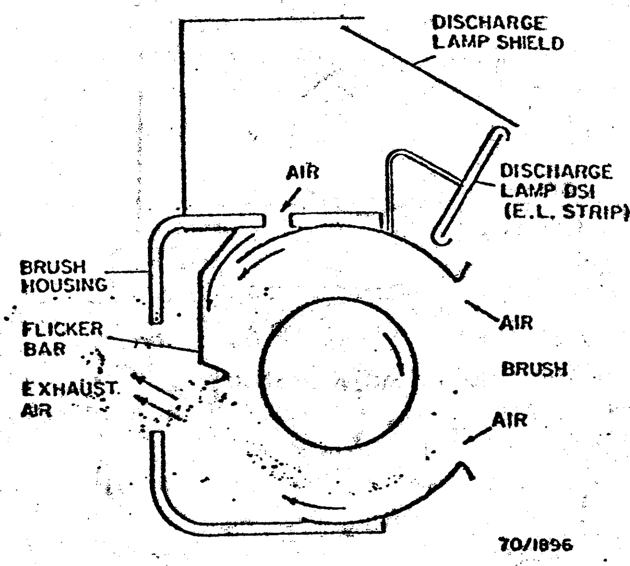

Fig. 2-115. Brush Housing (Cross-Section View)

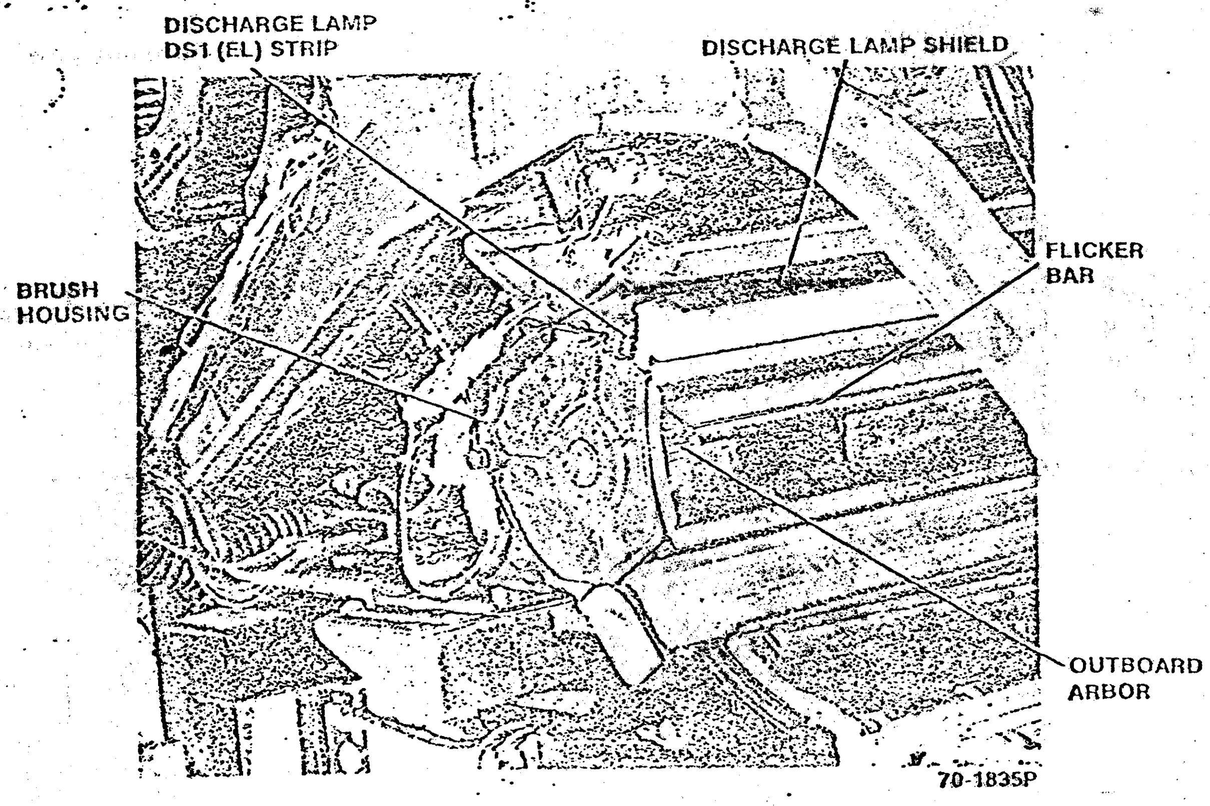

Fig. 2-114. Drum Cleaning