EPSON MX-80 AND 100 TRAINING

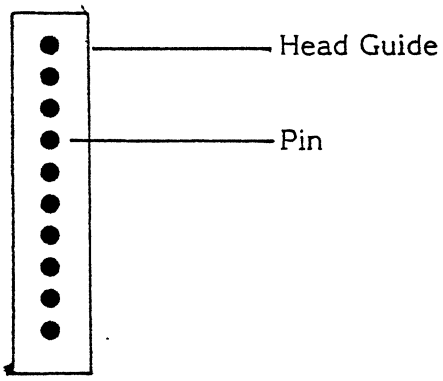
03/17/83

This course is designed on the Epson MX-80 printer.
The differences between MX-80 and MX-100 will be discussed at completion of the course.

The intent of the course is to discuss troubleshooting procedures and mechanical adjustments which will result in effective repair of the Epson printers. Detailed discussion as to operation and signal names has purposely been omitted and replaced with functional methods. Simply stated what to do to correct the problem.

WHAT IS A DOT MATRIX PRINTER ?

The term refers to method of printing a character. The head contains 9 wires (or pins) positioned in a vertical row.



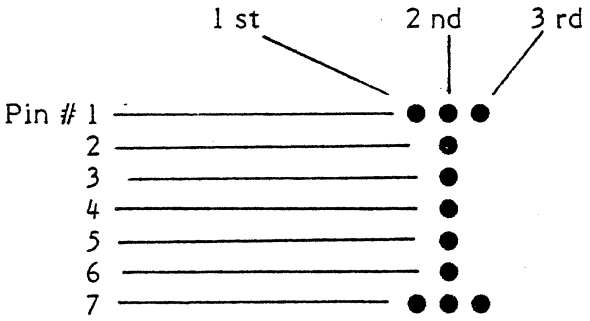
Head travels left/right

Each pin is driven by a small independent electro-magnet that fires when instructed to. Every character has a set of instructions contained in ROM on the controller board which will fire one or a series of pins to form the character.

Following is an example describing the upper-case letter I being formed.

A. First pins 1 and 7 fire.
B. Second the carriage moves and pins 1 thru 7 fire.
C. Third the carriage moves again and pins 1 and 7 fire completing the letter.

Firing Positions



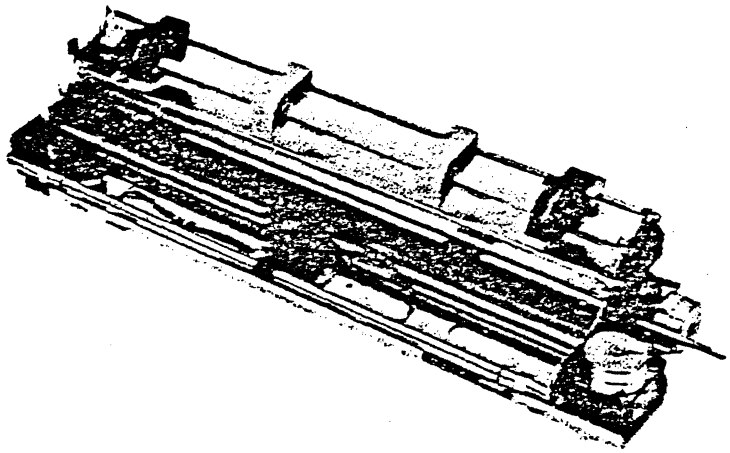
That briefly describes the printing method known as dot matrix. Most upper-case letters are formed by the top 7 pins. Some lower case letters have descenders that extend below the normal line ie. y,p. These descenders are formed by firing pins 8 and 9. These same two pins are used to underline words.

MAJOR COMPONETS

The Epson printers can be broken down to four major componets.

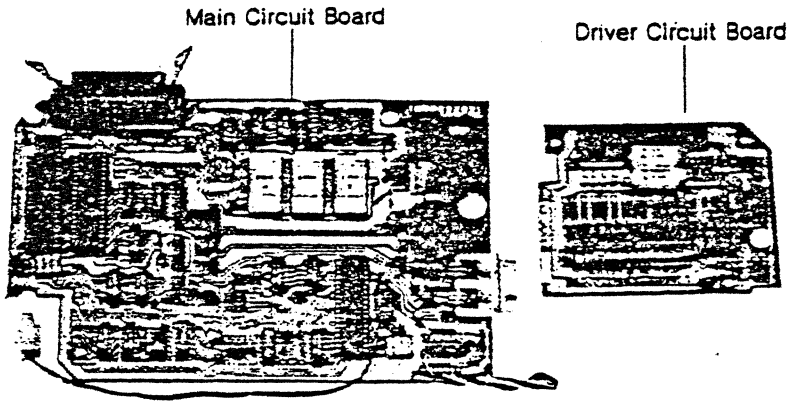
The printer mechanism

This mechanism is an assembly of all the mechanical functions and consists mainly of two stepper motors, a print head, a ribbon feeding mechanism, a carriage assembly, sensors and a frame section. One stepper motor fuctions as the print head carriage motor, while the other works as the paper feeding motor.



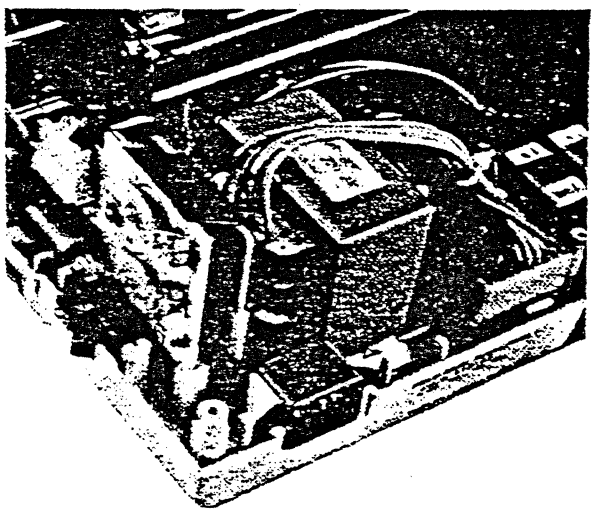
Circuit boards

The Epson is provided with two printed circuit boarbs as the standard equipment. One printed circuit board functions as a main circuit board (control circuit board) with an LSI 8049 for printer control. The other printed circuit serving as a driver circuit circuit is secured with two screws. The printer is controlled through the 28-pin connector attached to the driver board.



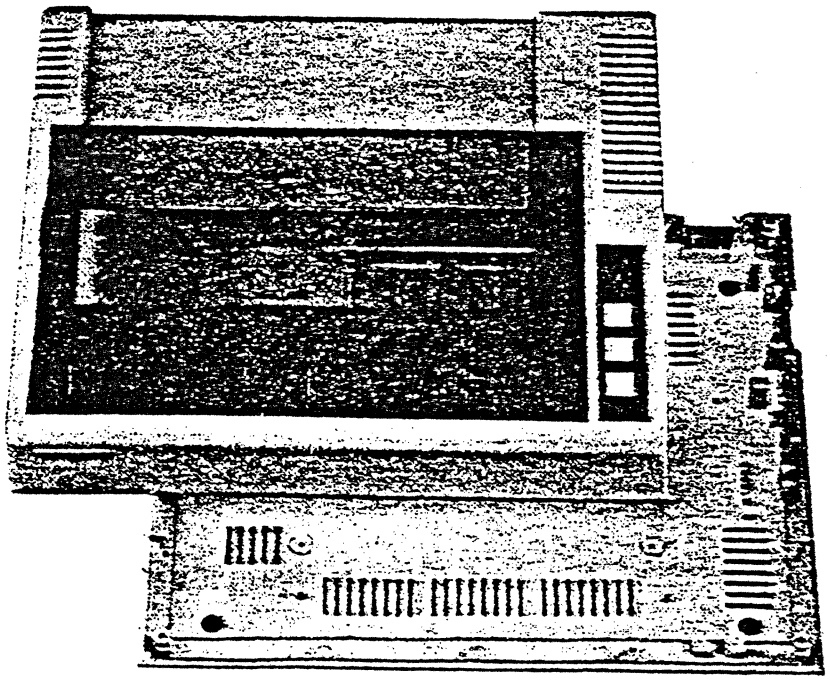
Power Supply Circuit

The power supply circuit is partially located on the main circuit board. However, the power transformer and line filter are mounted separately on the lower case. The power supply circuit supplies all the voltages required for the entire unit. The line filter consisting of capacitors blocks noises to and from an external source.



Housing

The housing consists of an upper case and a lower case,and accommodates all the componets previously described. All of the componts attach to the lower case.



Operation of Printer

* Insert a sheet of paper.

* Turn printer on (the power switch is located on the right side of lower case)

* View the control panel, located on the top right side of upper case. With paper in and unit turned on the following conditions should exist:
  Power ON green
  Ready ON green
  Paper out OFF red
  On Line ON green
  Also carriage should have gone through a restore.

* Press on-line button. Notice ready light and on-line light go out. This indicates we have turned off connection to host computer. Press on-line again and leave it on-line.

* Now press LF (line feed). Now FF (form feed). Nothing happened because in an on-line condition these controls are sofware controlled.

* Press on-line again. This time leaving it OFF. Press LF. Notice paper advances. Press FF. Paper will drive untill paper out lamp/buzzer activates.

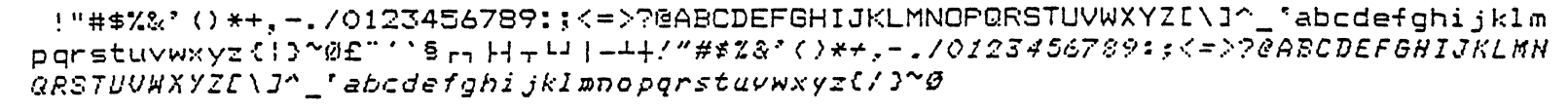
Self-test

* Insert a sheet of paper.
  Turn power off.
  Hold down LF button and turn power on.
  The printer will continue to print self-test data as long as you hold down LF button.

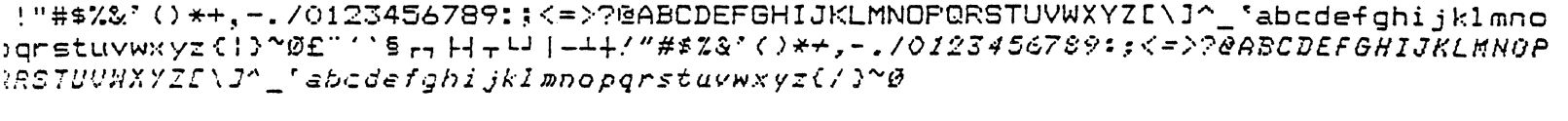
Compare your self-test to examples given.
Notice captions above each section.
By selecting various DIP switch settings we can self-test various print commands

SELF TEST USING SW1 & SW2 VARIATIONS

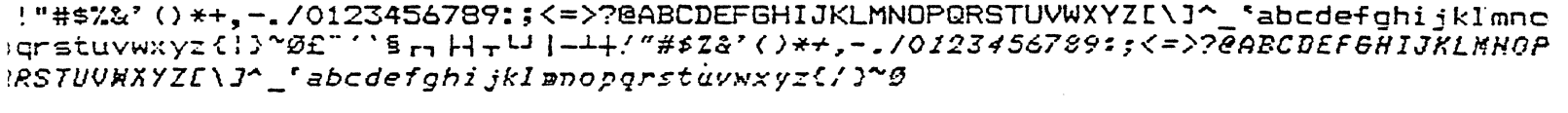
NORMAL

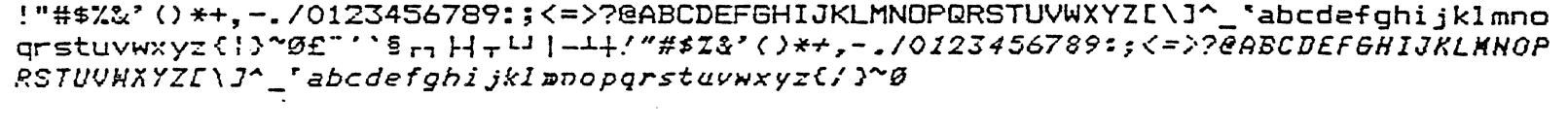


NORMAL

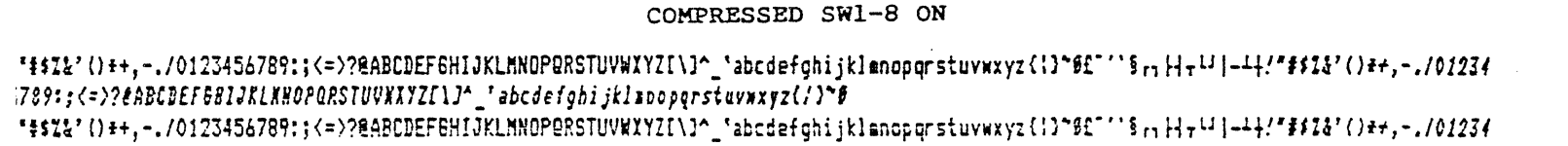


EMPHASIZED SW1-5 ON



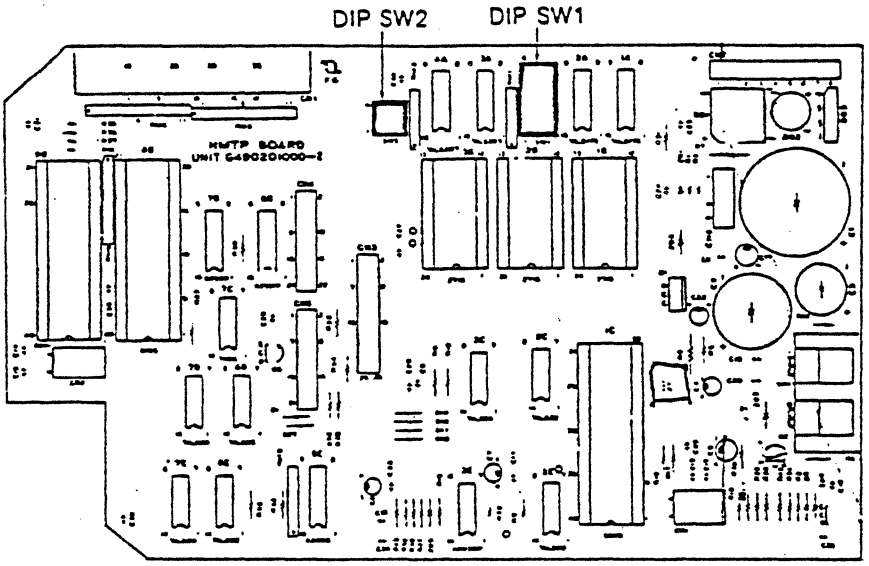


COMPRESSED SW1-8 ON



INTERNAL SWITCHES

"Never set the 12 internal DIP (dual in-line pin) switches with the power on. Turn both the printer and computer off."



CONTROL BOARD SHOWING DIP SWITCH LOCATION

Normal Settings:

SW2	SW1
	1-8 L
	1-7 R
	1-6 L
	1-5 R
2-4 R	1-4 R
2-3 R	1-3 R
2-2 R	1-2 R
2-1 R	1-1 R

Switch Function Description

SW1 - 8	Normal	On (L)	Off (R)
	On	Select Fixed	Select Not Fixed

When switch is on (L) printer is permanently selected and no external commands can alter its setting. The only time switch should be off is when host computer controls pin 36 on interface connector.

SW1 - 7	Normal	On (L)	Off (R)
	Off	Slashed Zero 0	Regular Zero 0

SW1 - 6	Normal	On (L)	Off (R)
	On		

Paper out buzzer also functions with ASC11 7 command.

SW1 - 5 Normal On (L) Off (R)
Off
Set in off position gives normal print characters. ON gives emphasized characters. Emphasized has priority over compressed mode. (SW1 - 1)

SW1 - 4 Normal On (L) Off (R)
Off
Determines print font. OFF gives normal characters. ON gives italic characters.

SW1 - 3 Normal On (L) Off (R)
Off
Paper out detection - with switch off, paper out signal terminates printing. Set ON printing sontinues without paper.

SW1 - 2 Normal On (L) Off (R)
Off Not Used

SW1 - 1 Normal On (L) Off (R)
Off
OFF gives normal print (10 characters per inch). ON gives compressed print (17.6 characters per inch). Emphasized mode (SW1 - 5) has priority over compressed.

SW2 - 4 Normal On (L) Off (R)
Off
When On gives automatic 1 inch skip over perforation. (computer paper) When OFF gives no skip.

SW2 - 3 Normal On (L) Off (R)
On
ON forces automatic line feed (LF) with each return. When OFF LF must be provided via software as needed.

SW2 - 2 Normal On (L) Off (R)
Off Not Used

Sw2 - 1 Normal On (L) Off (R)
Off Not Used

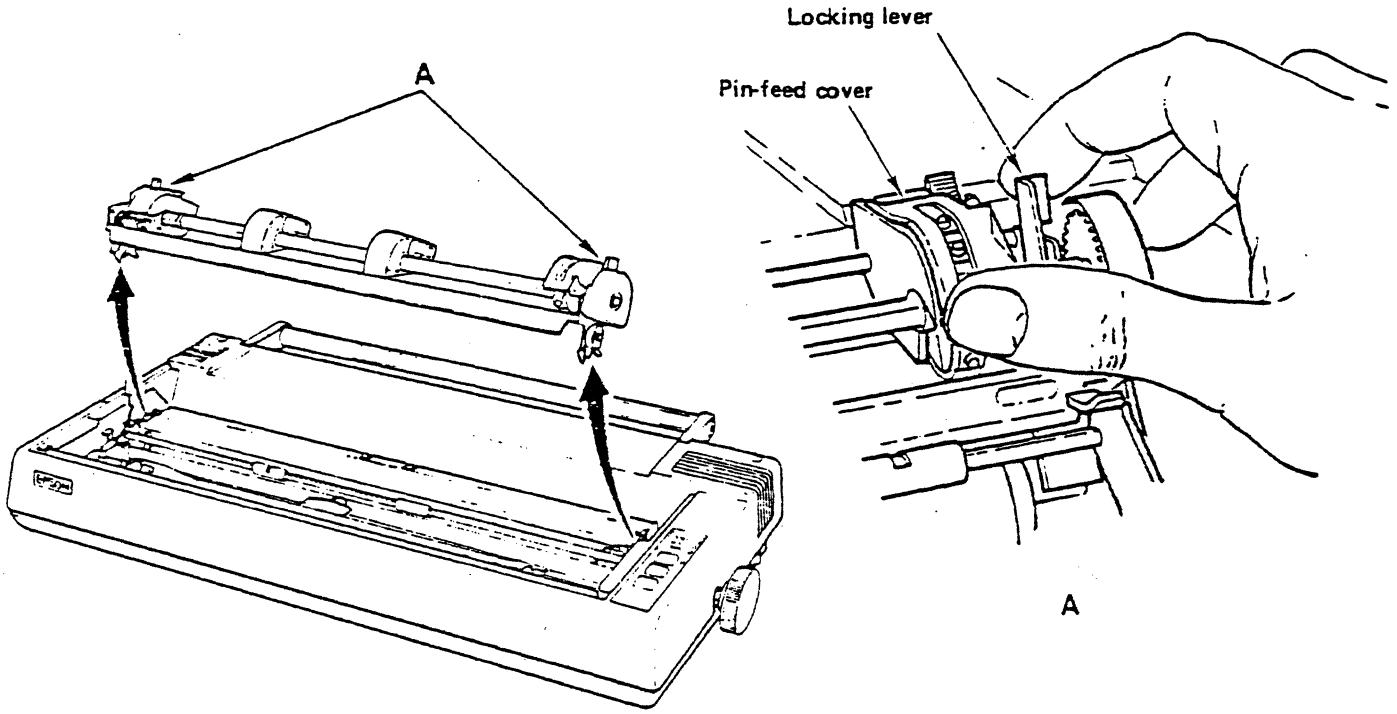
DISASSEMBLY

ASSEMBLY

ADJUSTMENTS

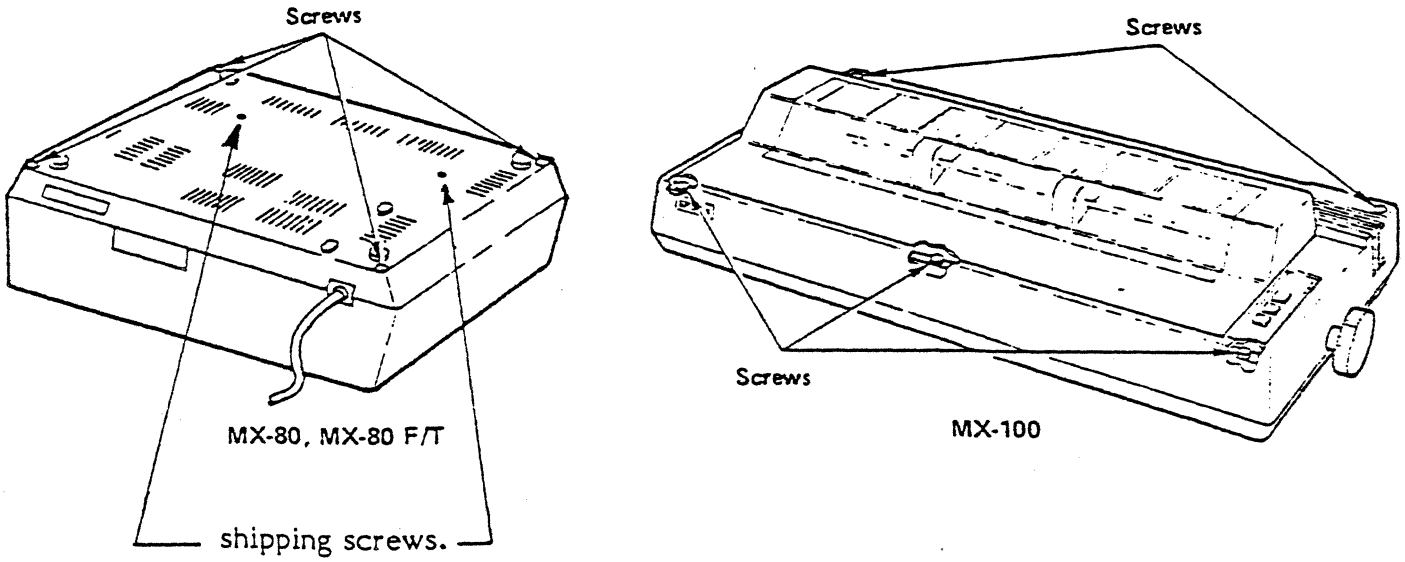
1. Remove the printer lid. Tilt up, then lift straight up.

2. Remove the sprocket unit assembly by pulling the sprocket mounting lever, then pivot the unit toward the rear and lift off as shown in figure below;



3. Remove the four case screws and two shipping scrwes from the bottom of lower case. Pull and remove the manual paper feeding knob.

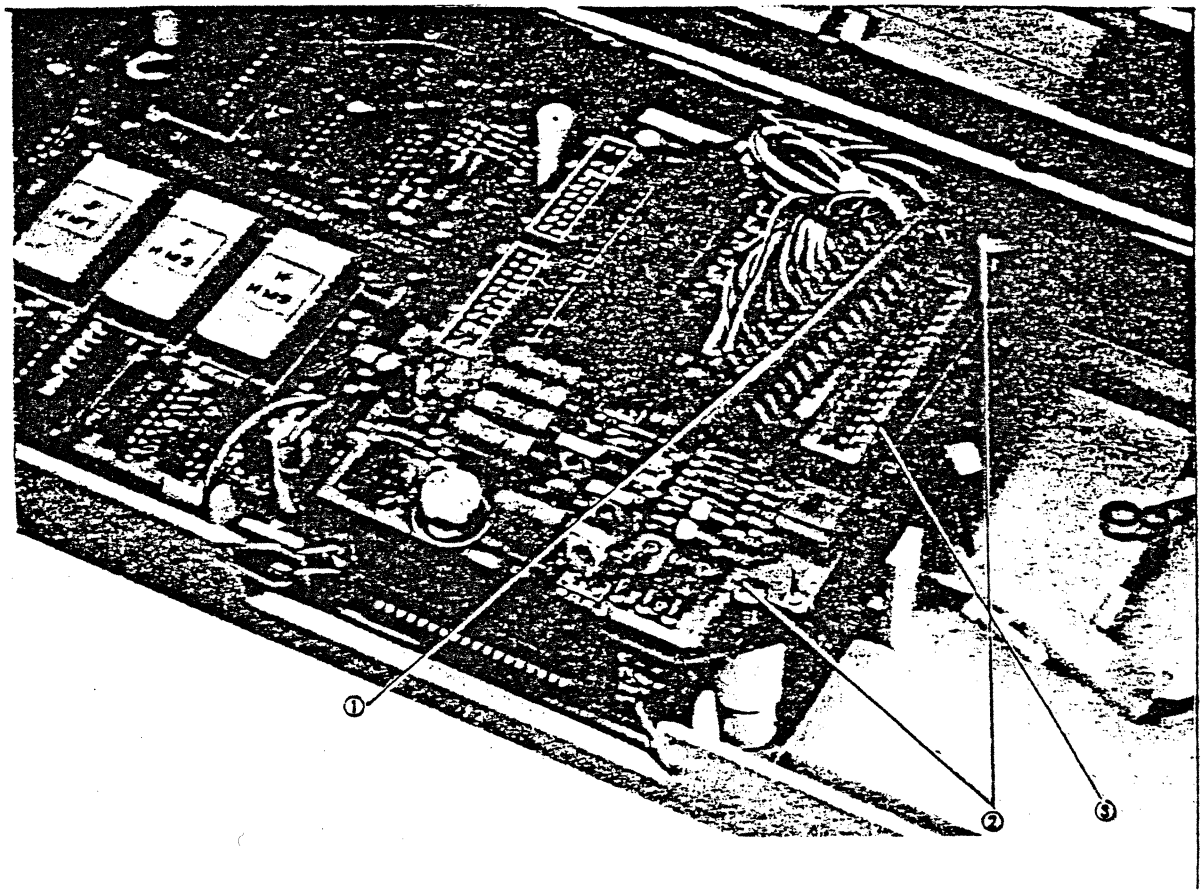
4. Gently lift upper case and remove connector from control panel.



4. Remove the diver board.

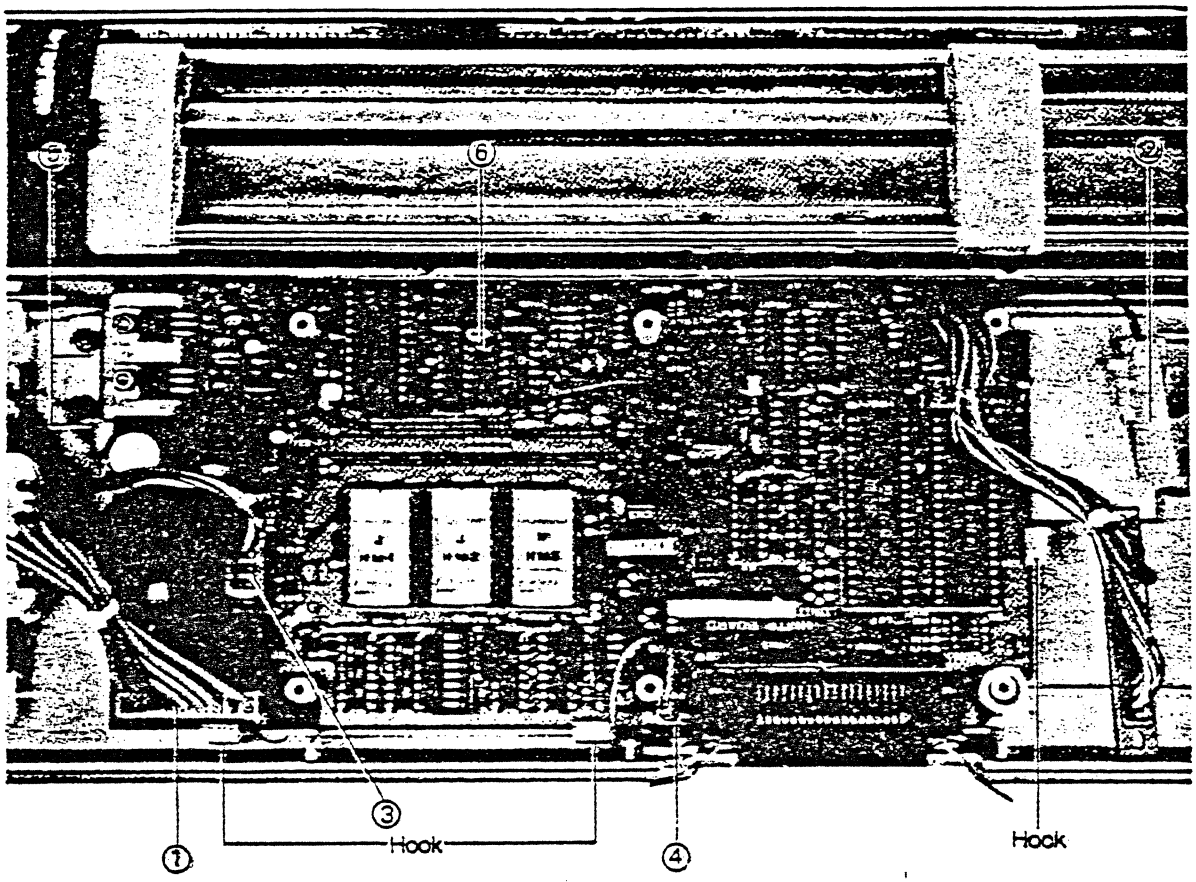
A) Disconnect the male plug connector (item 1 28-pin connector)
B) Remove the two screws. (item 2)
C) Gently lift and remove the driver circuit board.

NOTE: DRIVER BOARD SEATS ON HIDDEN CONNECTORS BELOW CN4



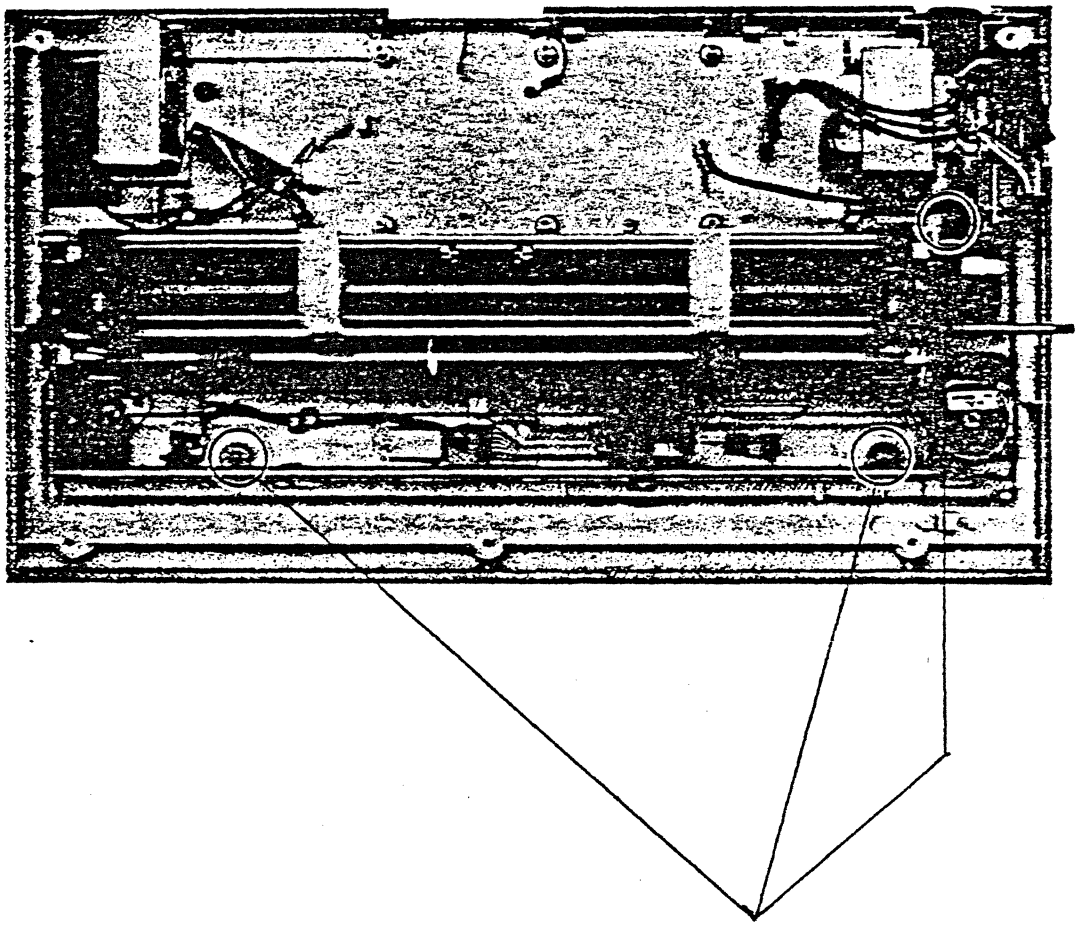
5) Remove the controll board.

A) Disconnect the connector from the power transformer item 1.
B) Discount the frame ground. item 4
C) Disconnect connector CN6. item 3
D) Remove screws from locations 5 and 6.
E) Release the control board from three plastic tabs and remove.

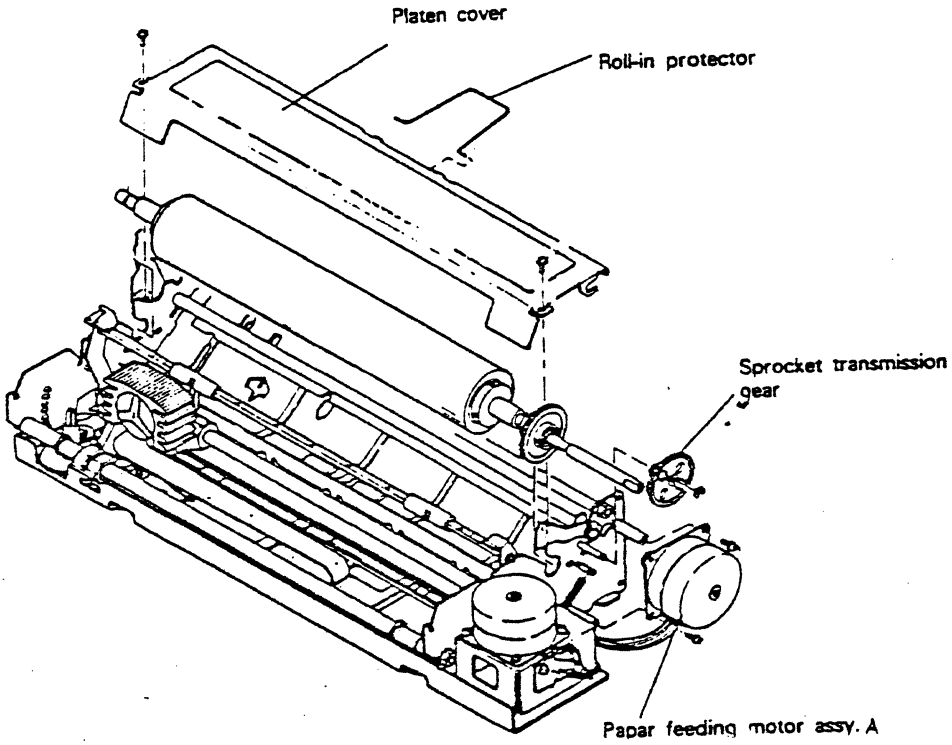


6) Remove the isolation spacer (brown cardboard)

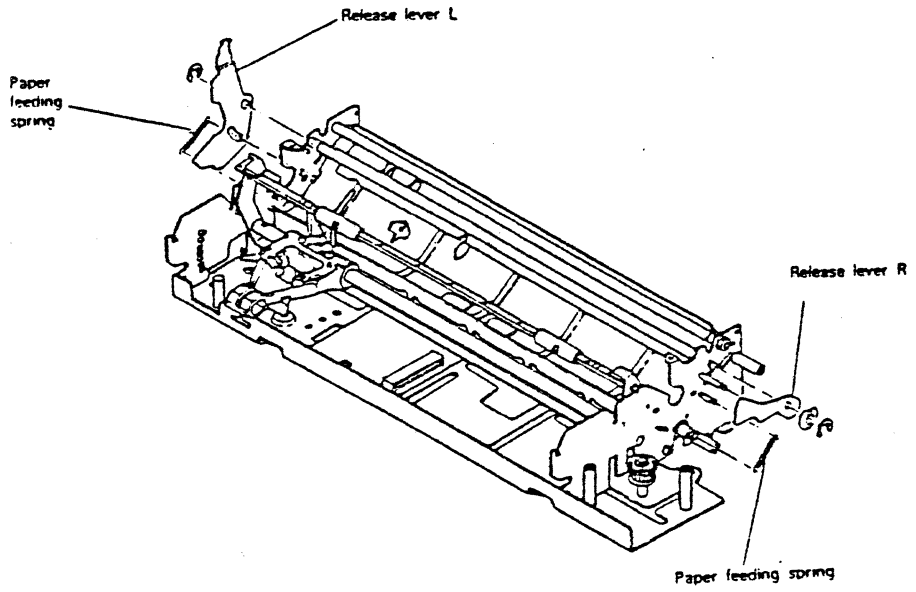
7) Remove the print mechanism:
A) Remove the three screws pointed out.
B) Pull forward and lift from the lower case.



8) Remove the platen cover by removing the 2 screws shown below
A) Remove the paper feed motor.
B) Remove the sprocket gear. Held in place by a C-clip.

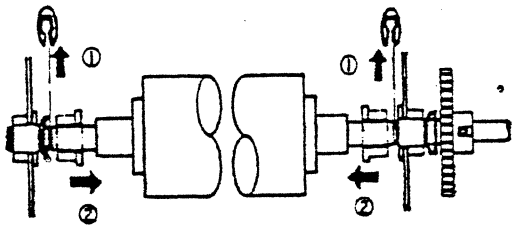


9) Remove the two paper feeding springs as shown.
10) Remove release lever L as shown and slide release lever shaft out to right.

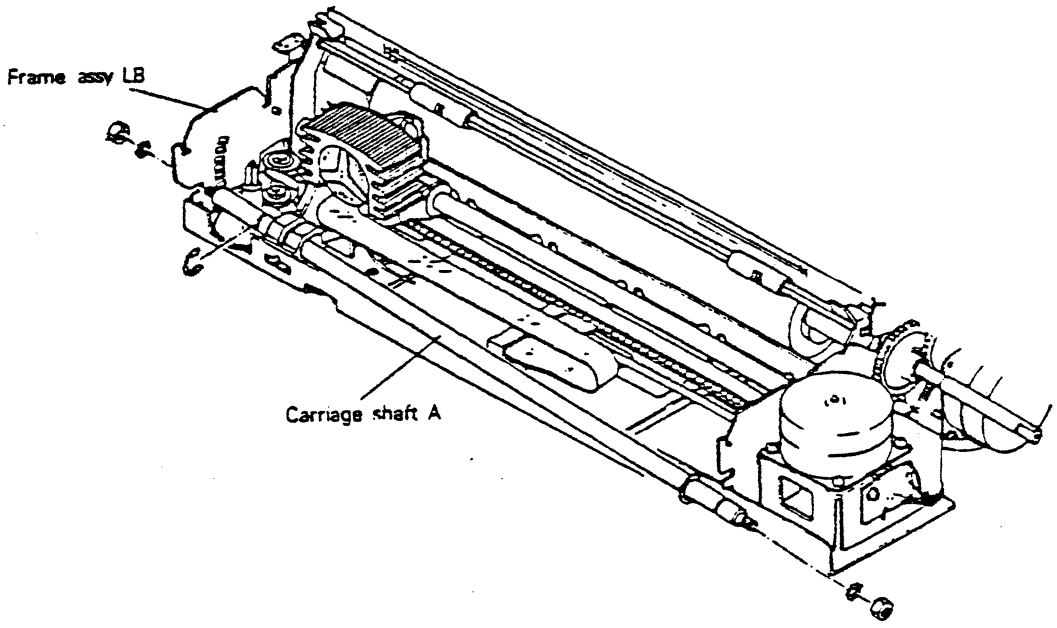


11) Remove the platen by removing the C-clips (1) then pushing the plane bearings inward (2) and lift the platen out.

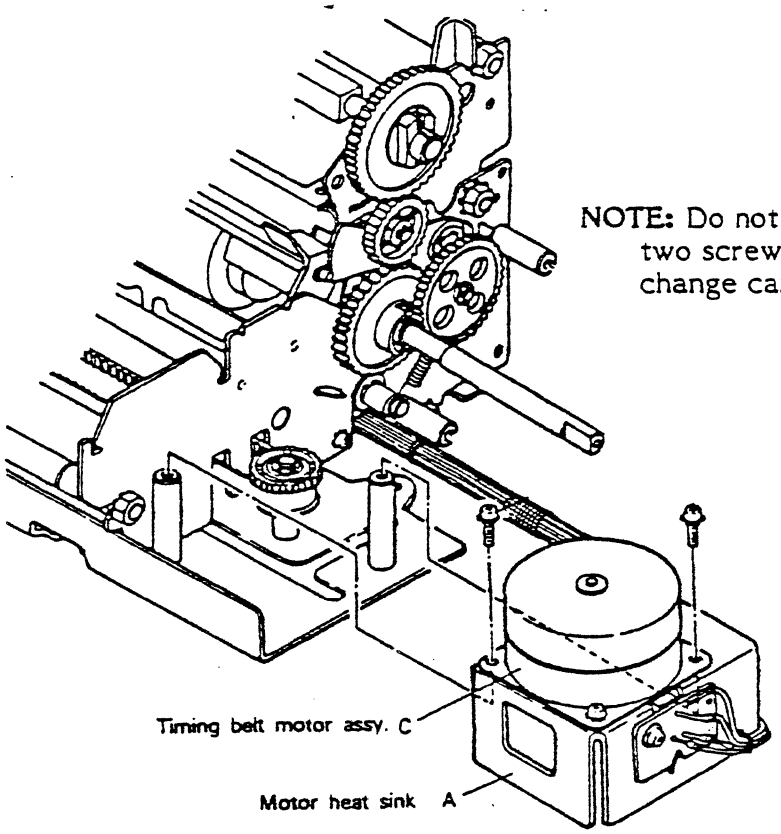
NOTE: When removing the platen assembly be careful not to bend ribbon guide (metal guide between print head and platen.)



12) Remove the left C-clip on carriage shaft A, slide the carriage assembly to extreme left, remove 7mm nut on the left end of shaft. Loosen the remaining nut so that you can pull the shaft towards you and slide the shaft out to your right.

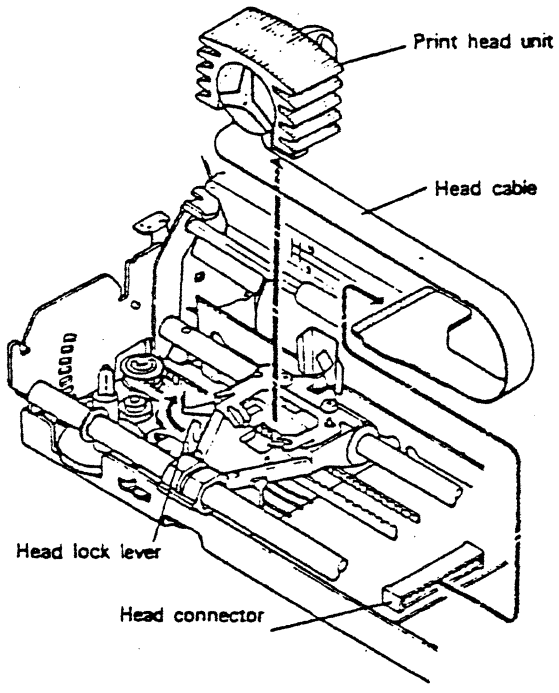


13) Remove the timing belt motor and motor heat sink by removing the left front and right rear screws on the timing belt motor.

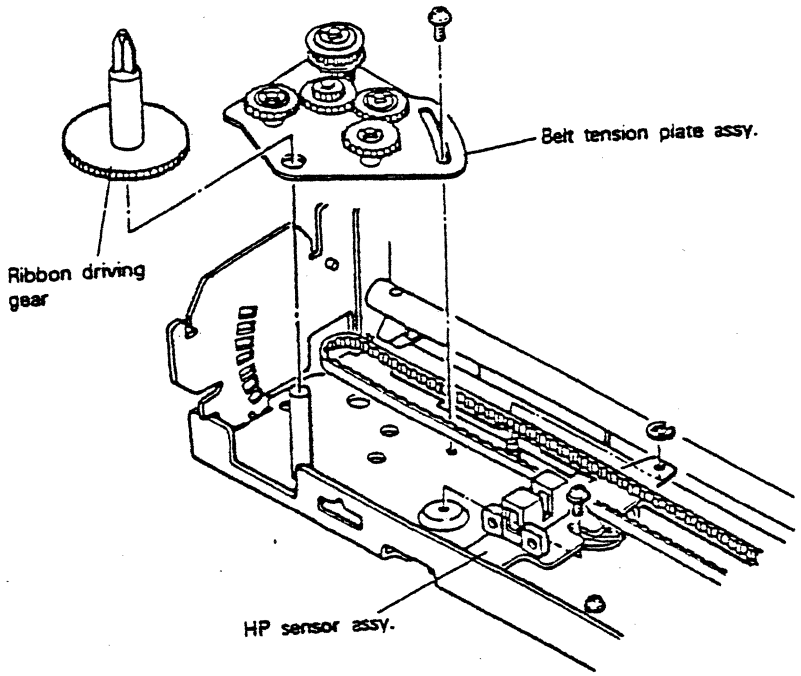


NOTE: Do not remove remaining two screws as this will change carriage speed.

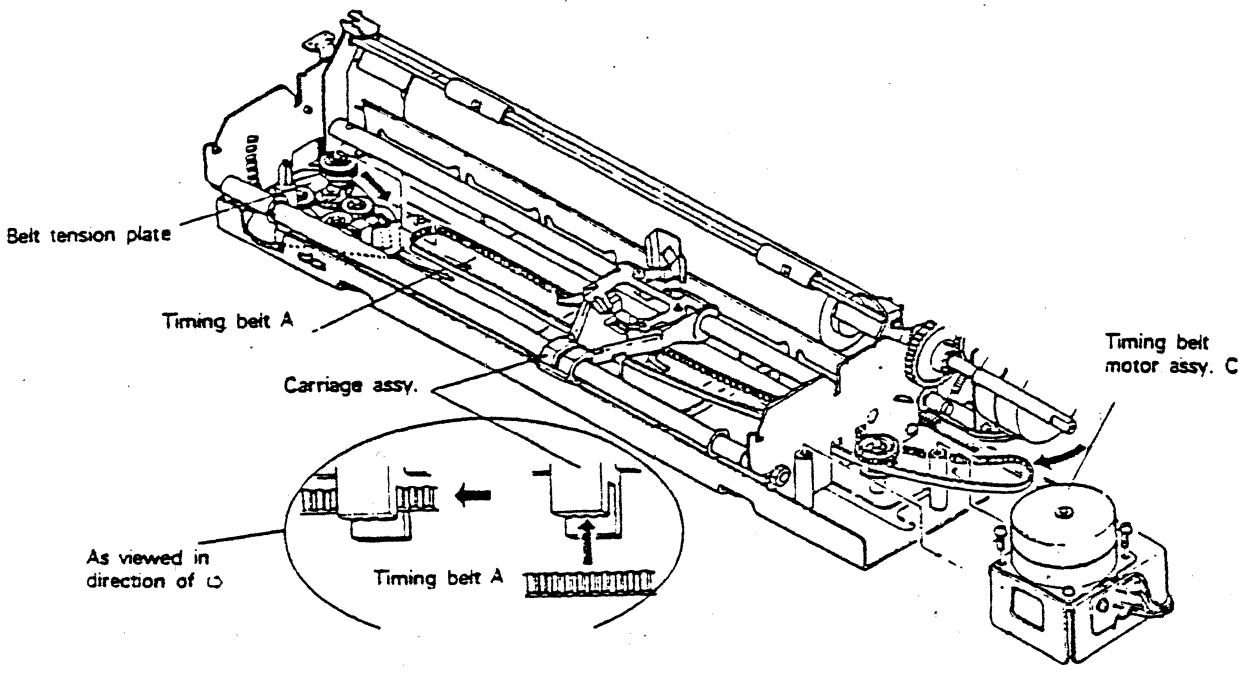
14) Remove the dot head assembly by releasing the head locking lever. Note: Grasp mylar strip under ribbon cable to remove cable from connector.



15) Remove the screw on the belt tension plate.

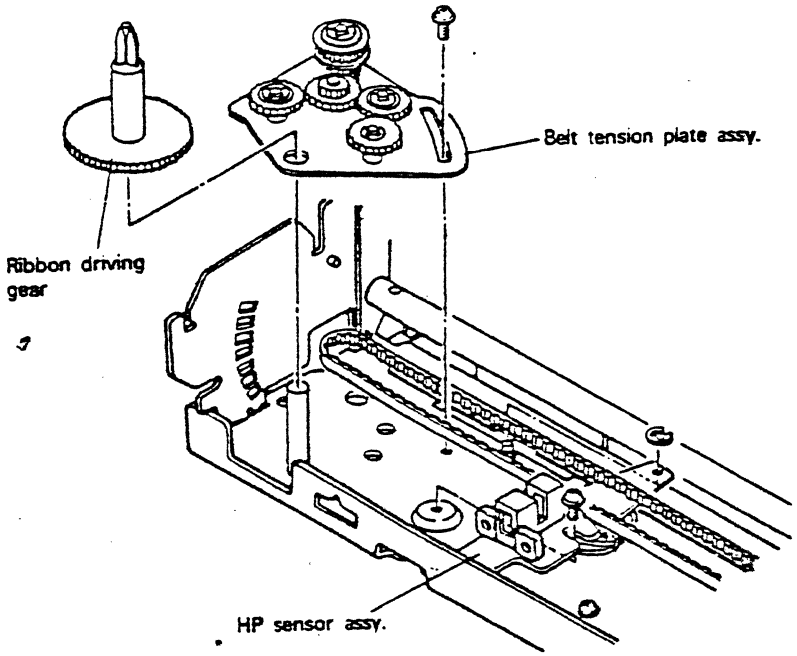


16) Remove the timing belt from belt drive pulleys. Slide the belt inward from the right side frame. Grasp the remaining part of the belt that is connected to the carriage on both ends and pull down. It is only a pressure fit but may feel very tight.



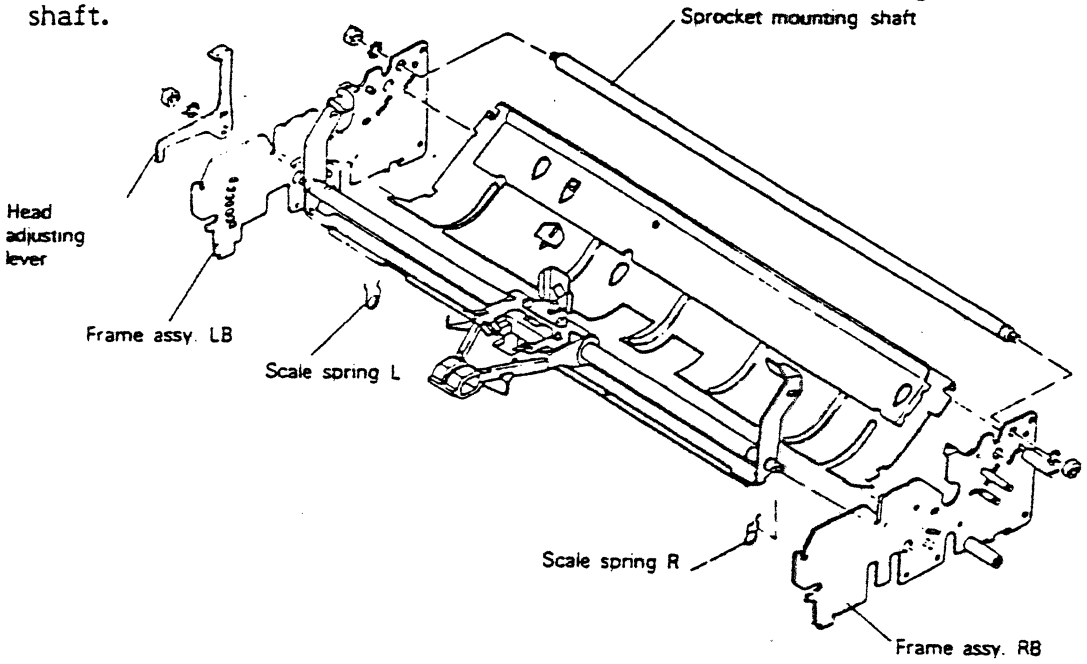
17) Remove the set screw and C-clip on the home sensor, and lift the home sensor off. (Be careful not to damage the solder connections.

18) Remove the belt tension plate with the ribbon drive gear.

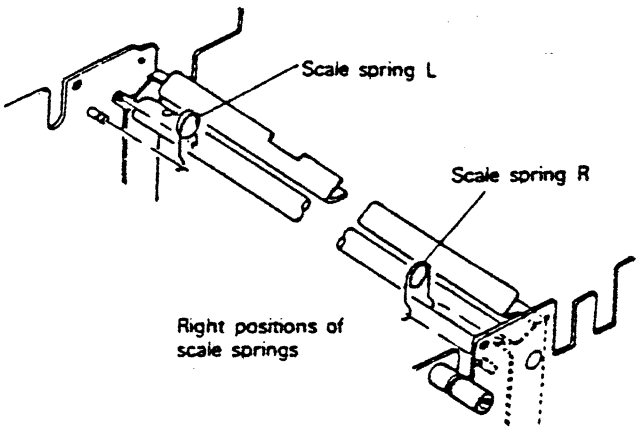


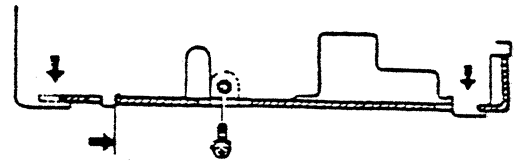
19) Remove the head adjusting lever by removing the 7mm nut and washer.

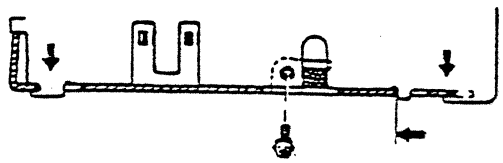
20) Remove the 7mm nuts and washers from the sprocket mounting shaft.



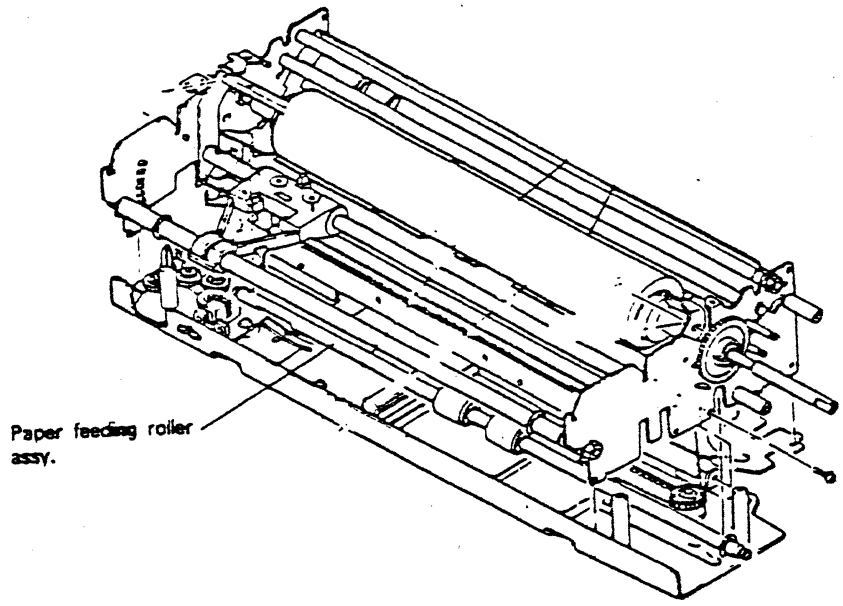
21) Remove the screws securing the side frames to the base frame and remove as shown.
A. Slide frames to rear and complete disassembly.
caution; The paper out switch is still sodered to terminal board




Frame LB side


Frame RB side

22) Remove the paper feeding roller assembly.



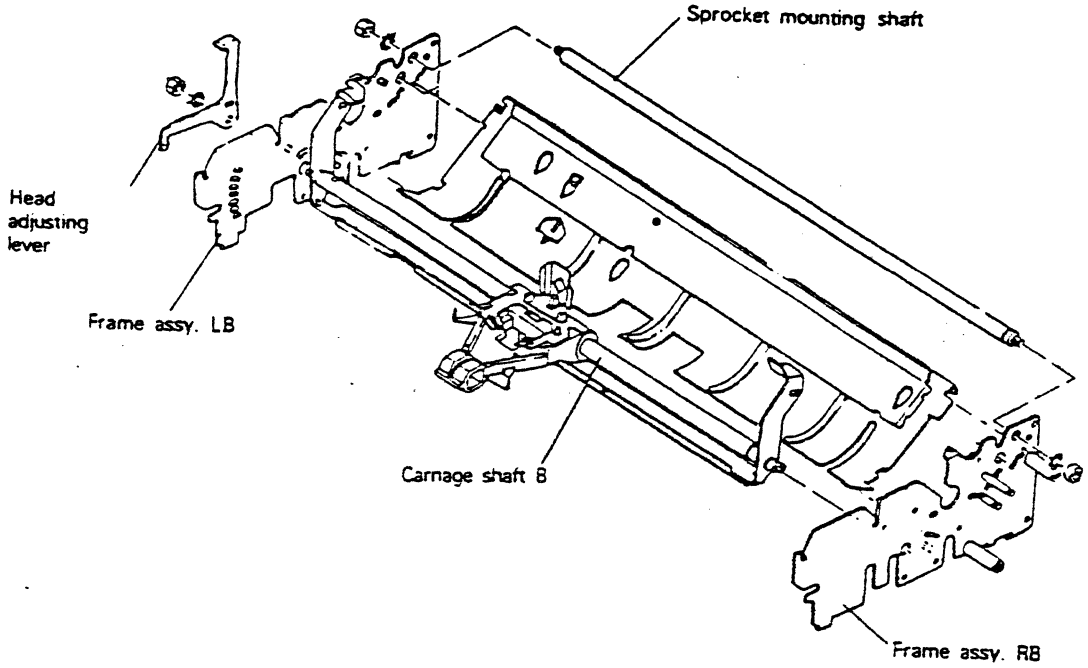
NOW YOU ARE READY TO REASSEMBLE THE PRINTER

REASSEMBLY

1) Assemble left and right side plates and and outer paper guide to base frame. Right side must be installed first.
NOTE: You may find it easier to reassemble this unit out of the base frame your option.

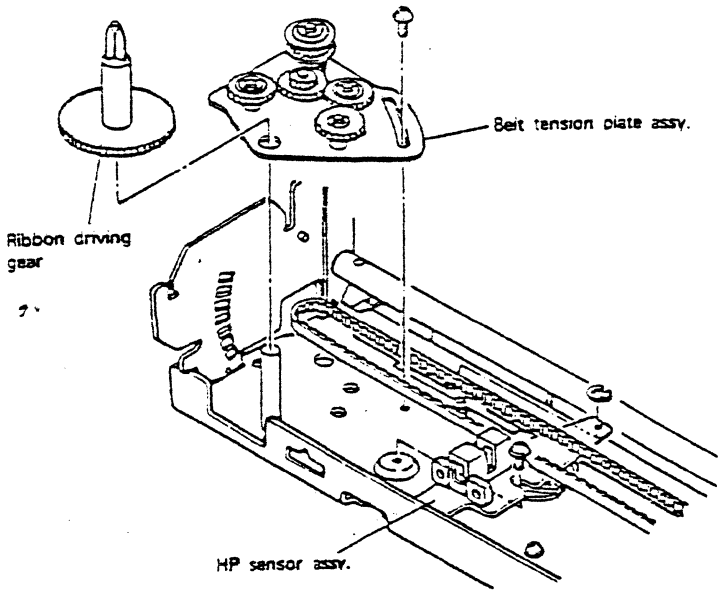
2) Install sprocket mounting shaft with 7mm nuts and washers. Do not tighten at this time.

3) Install paper bale on carriage shaft B. Install entire assembly inserting left side first. Install head adjusting lever and secure with 7mm nuts and washers.



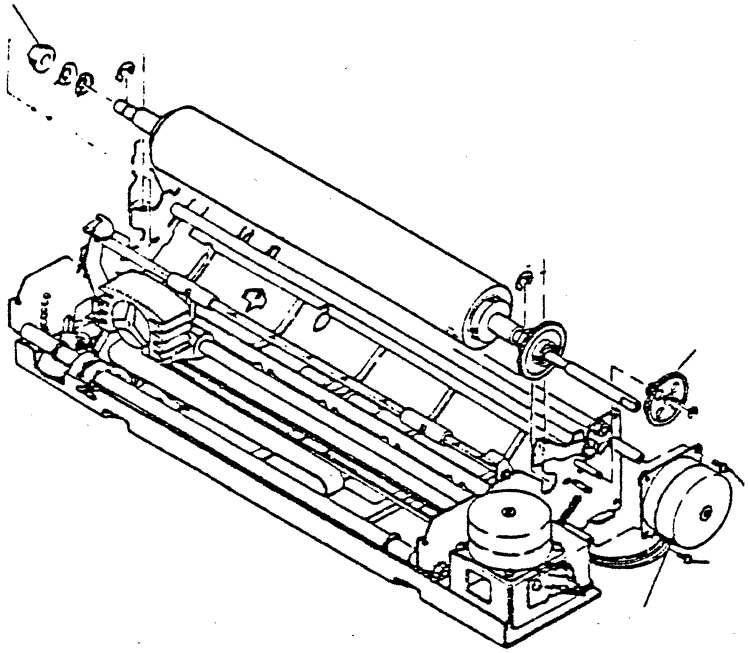
4) Install belt tension plate with ribbon drive gear. Do not tighten screw at this time.

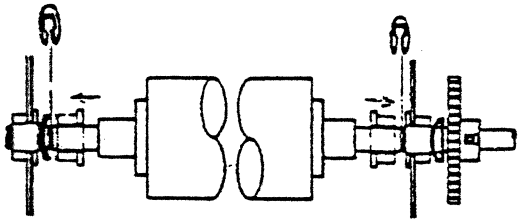
5) Install home sensor with C-clip and screw.



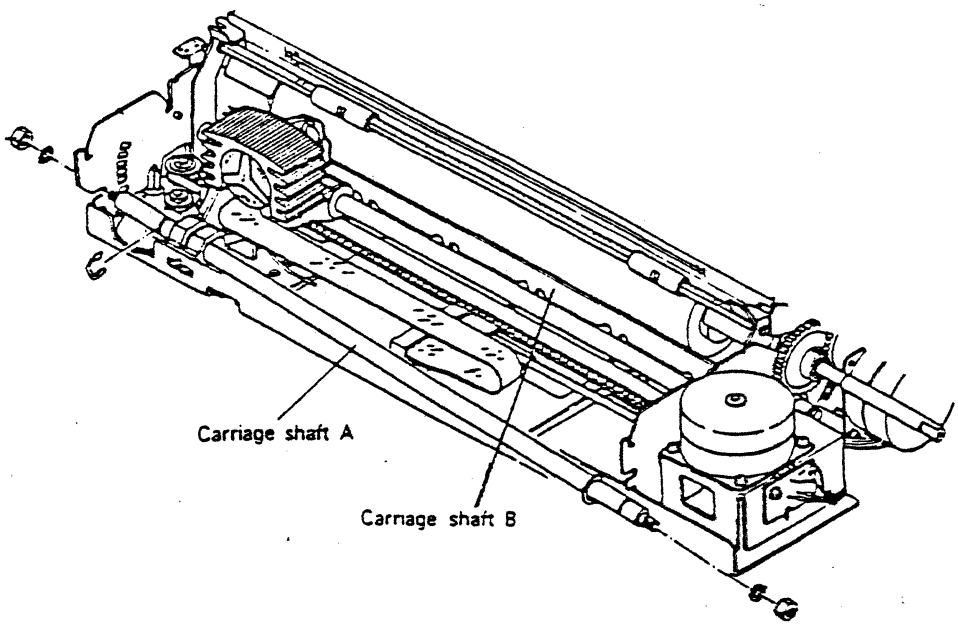
6) Install platen and sprocket gear. Ensure spring washer is in front of sprocket gear.CAUTION: Do not bend paper guide plate (copper strip mounted on base frame) or ribbon mask.

Plane bearing (platen)



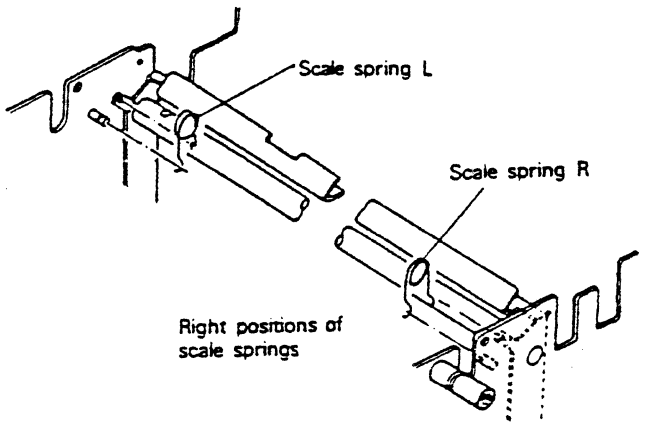


7) Install carriage shaft A and secure C-clips
NOTE: Move carriage to extreme left side. If carriage does not move freely adjust eccentric carriage shaft B.
When in place tighten hardware on shafts.

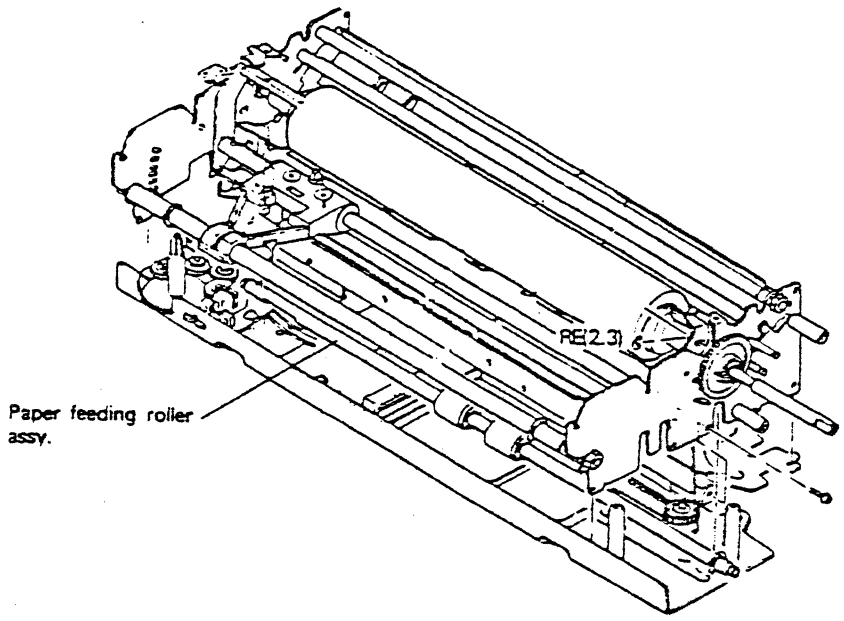


8) Slide entire assembly towards the rear and lift from base assembly. Note if you selected the alternate method this step does not apply.

9) Install scale springs. Dark color spring to left and **light** color spring to right.



10) Position paper feeding roller on base frame assembly to rear of paper guide plate. NOTE: Machined flat groove on the left, and right C-clip will be on outside of frame assembly.



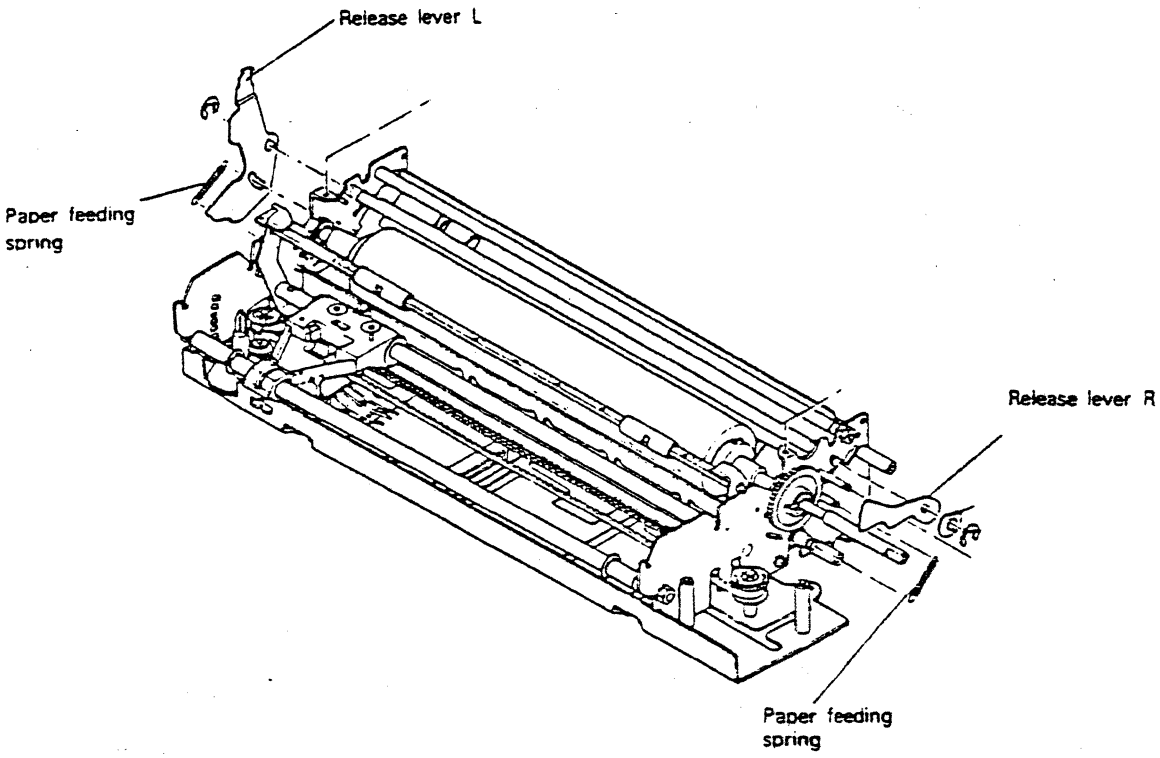
11) Lower left and right frame assembly to the base frame and slide forward to the locked position. NOTE: Paper guide plate will be in front of platen. Check that C-clip on paper feeding roller is on outside of right frame.

12) Install screws on left and right frame assembly.

13) Install release lever shaft. Slide shaft into frame assembly left to right side.

14) Install left release lever on release shaft and secure with C-clips.

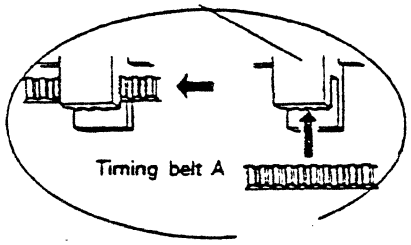
15) Install left and right paper feeding springs.

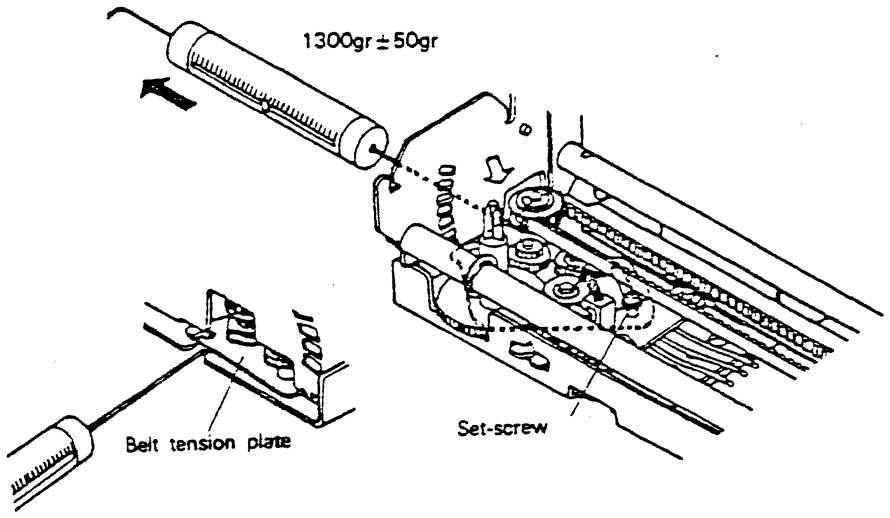


16) Slide the timing belt, from the outside to the inside, thru the right frame,under the carriage assembly and place it on the belt driven pulley.

17) Move the carriage assembly over the access hole, just to the right of center, in the base frame. Turn the mechanism over and place the timing belt back into the slot in the carriage assembly.

18) Carriage belt tension. Insert a tension gauge thru the hole left side frame. Loosen the screw holding belt tension plate and pull to obtain a tension of 1300gr +_ 50gr (or 2.9 lbs.) and tighten screw.





19. Loosely mount Carriage Motor and adjust as follows:

a. Carriage Motor

This adjustment is to allow a small amount of play between the metal gear on the Carriage Motor and the Plastic Belt Driving Pulley. Insert a finger through the front hole on the Carriage Motor Bracket and hold the Carriage Gear with upward pressure. Grasp the Carriage Assembly and move right and left gently. The Timing Belt should move very slightly and you should be able to feel the Plastic Gear move slightly. To adjust, loosen the two screws holding the Carriage Motor Bracket to the studs and move it forward or backwards to get the proper mesh between the gears Fig. 11. These screws must be tight when checking. This adjustment will affect vertical alignment. When adjusted properly, in standard printing (10 CPI), the vertical alignment between two adjacent lines will vary between 1/2 to 1 1/2 dot width.

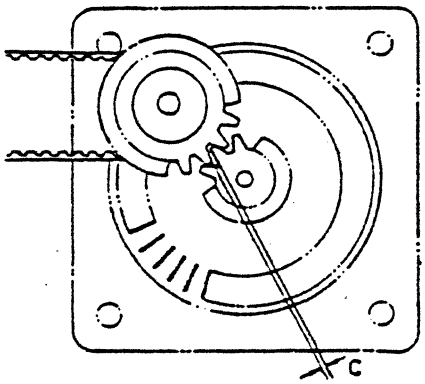


Fig. 11

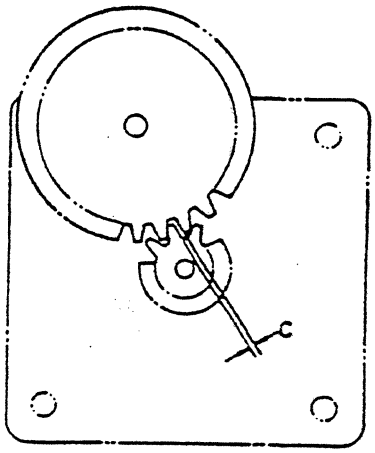


Fig. 12

20. Place the Sprocket Transmission Gear on and install the C-Clip. Place the Paper Feed Motor back on and do Mechanical Adjustment.

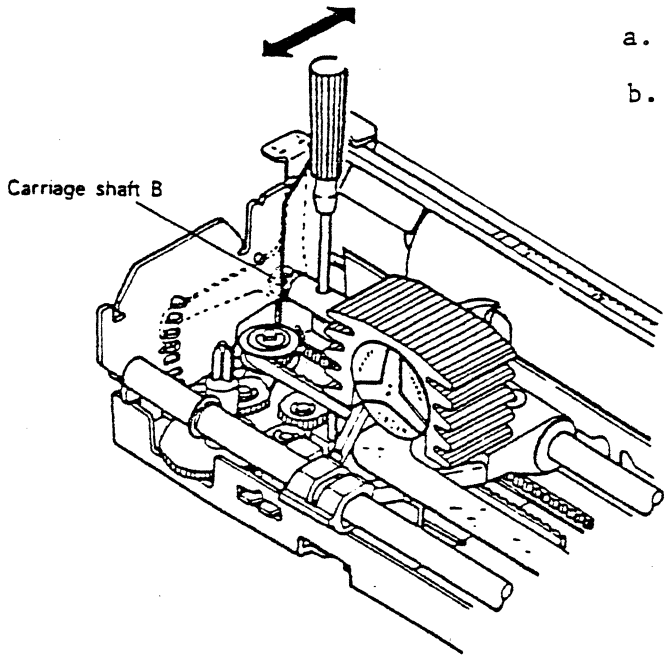
NOTE: Fig. 12 "C" should be minimal.

a. Paper Feed Stepper Motor

This adjustment is to allow a small amount of play between the metal gear on the motor and the Plastic Sprocket Transmission Gear. Place a finger below the motor and between the side plate and motor applying upward pressure on the gear so it does not move. Grasp the Paper Guide Roller with your other hand and rock gently back and forth. There should be a slight movement in the Sprocket Transmission Gear. To adjust loosen the two screws on the Motor and move up or down to get proper play. This adjustment affects spacing between lines. When done properly the spacing between lines will vary but the dots should not overlap.

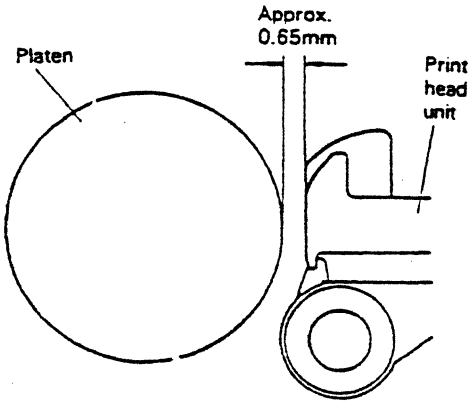
21) Install print head and secure it.

22) Print head to platen adjustment. The gap between the print head and platen should be .30mm with head adjustment lever in middle position. Insert a punch through the hole on left side of carriage shaft B and rotate shaft to obtain proper setting.



a. .30mm with ribbon guide

b. .65mm without ribbon guide



23) Install platen cover. NOTE: cover is adjustable so it will not rub on platen.

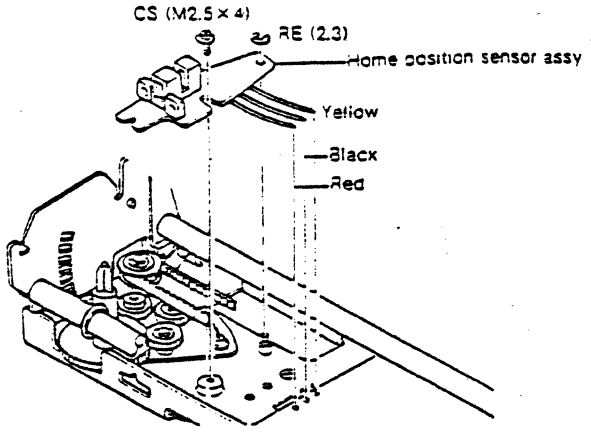
24) Place entire mechanism in lower case. Mechanism is installed on top of earth plate fingers. (serated edges located in base plate.) secure printer assembly.

25) Install ground strap screw. Install isolation spacer (fiber board)

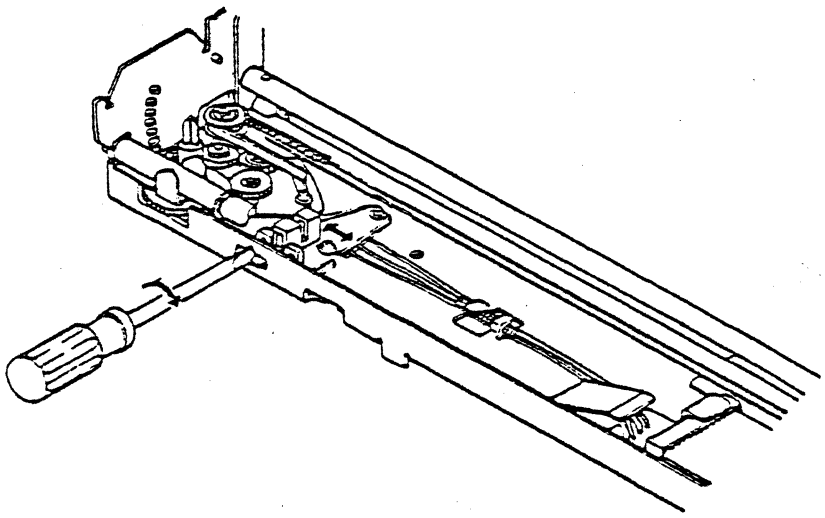
26) Install control and driver boards.

27) Connect control panel connector.

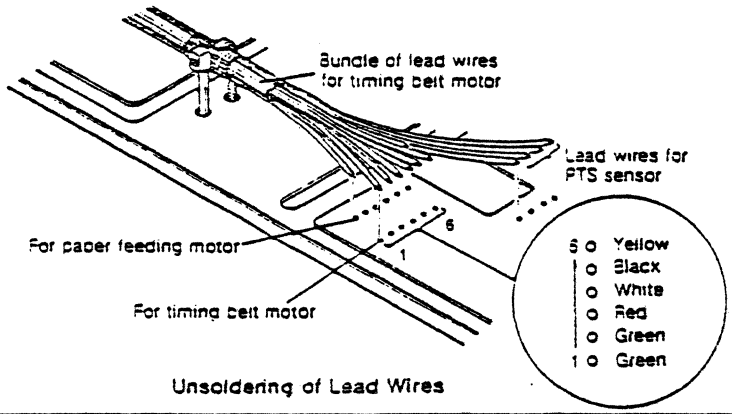
28) Leave upper cover off untill you have performed a self-test to verify reassembly and adjustments.



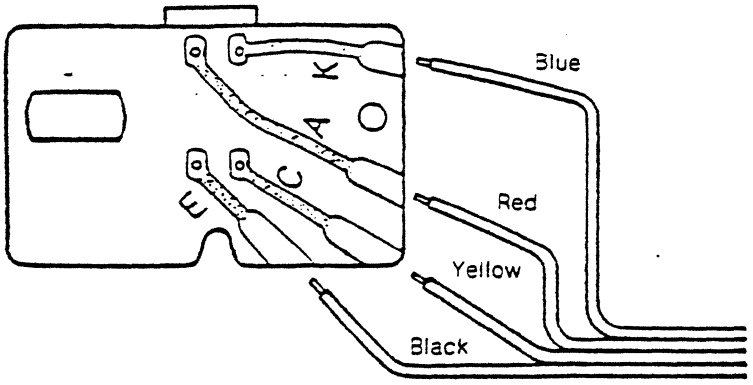
Dismounting of Home Position Sensor Assy



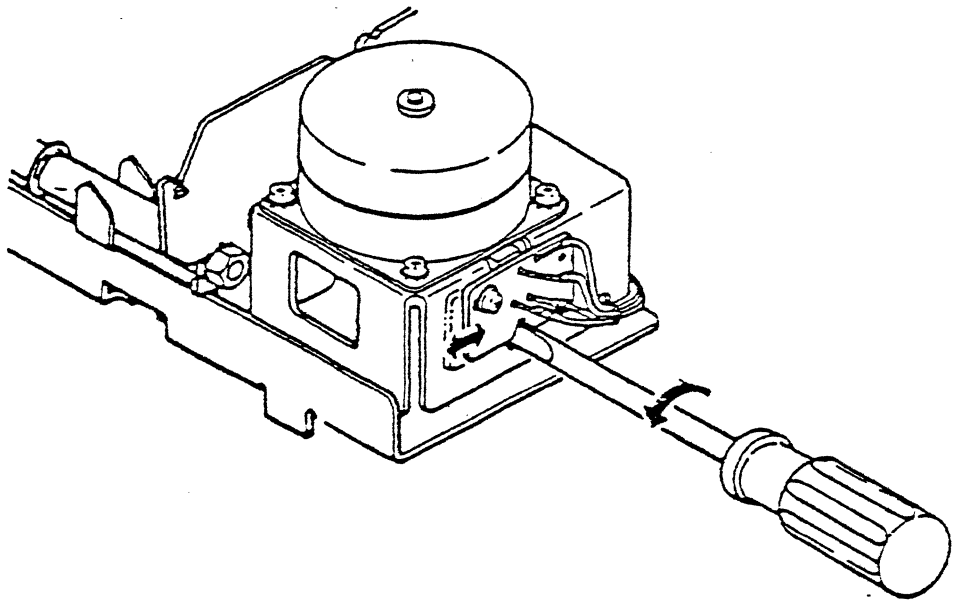
Adjustment of Home Position Sensor Assy



Unsoldering of Lead Wires



Unsoldering of Four Lead Wires

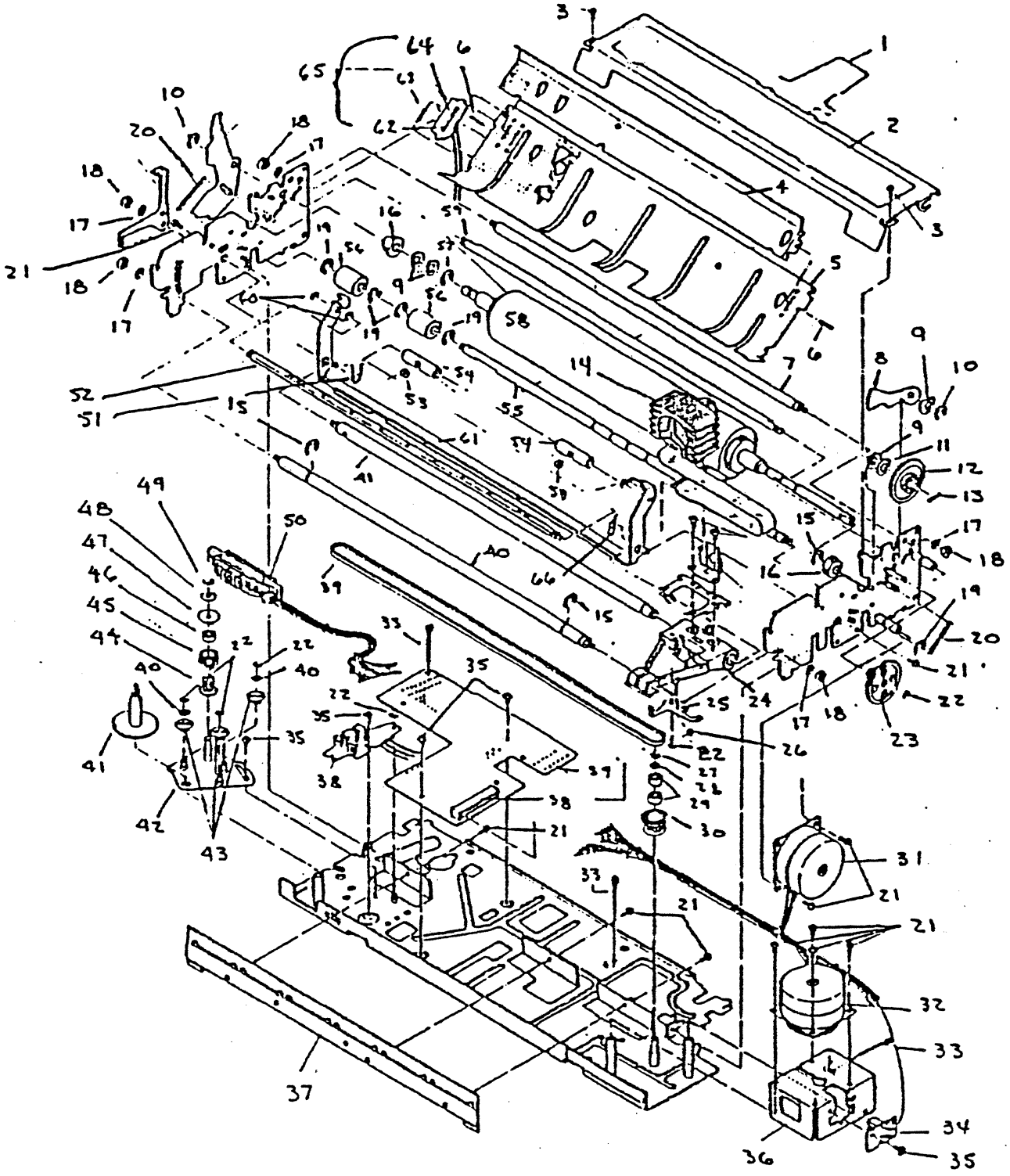


Adjustment of PTS Sensor Board

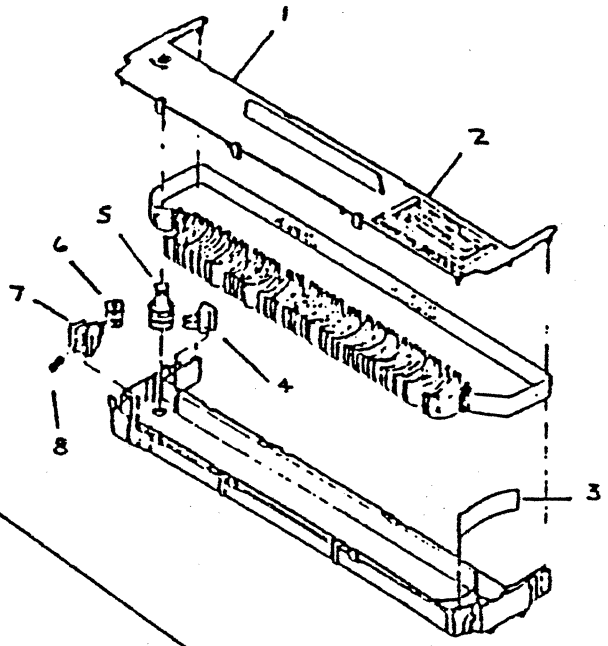
Goal of this adjustment is to have carriage travel at the same speed while traveling left or right.

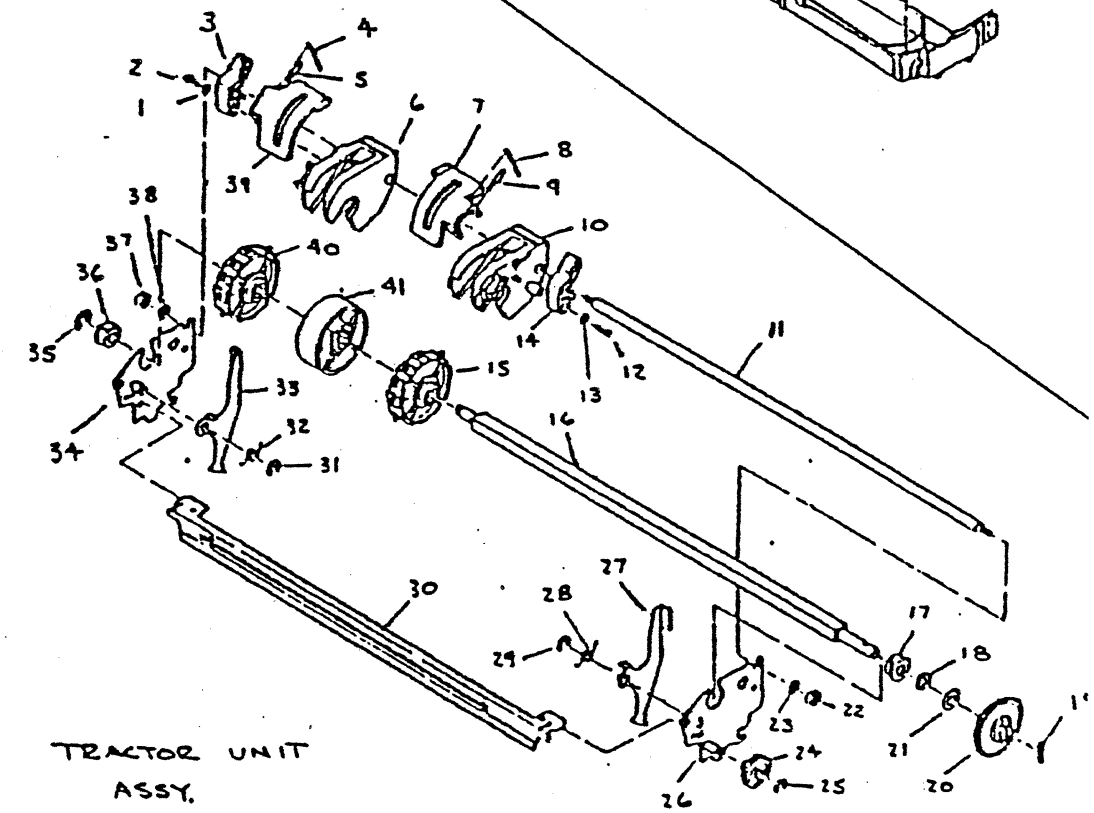
PARTS INFORMATION

PRINTER



MX-100 CARTRIDGE ONLY





TRACTOR UNIT ASSY.

MX-100 CARTRIDGE (ONLY)

Item No.	Part Name	Part Number
1	Cartridge Case Lid	F303352010
2	Ribbon Label	F303352090
3	Ribbon Brake Spring	F303352080
4	Ribbon Separator A	F303352050
5	Ribbon Feeding Knob	F303352030
6	Ribbon Pressure Roller	F303352040
7	Ribbon Separator B	F303352060
8	Ribbon Feeding Spring	F303352070

TRACTOR UNIT ASSY.

Item No.	Part Name	Part Number
1	E-Ring	B100150512
2	Screw	8011401611
3	Sprocket Lock Lever	F303011050
4	Cover Spring	F303011040
5	G-Pin	F303011060
6	Sprocket Frame L	F303036010
7	Paper Cover	F303037020
8	Paper Holding Spring	F303011040
9	G-Pin	F303011060
10	Sprocket Frame R	F303037010
11	Guide Shaft	F304101020
12	Screw	8011401611
13	E-Ring	B110150512
14	Sprocket Lock	F303011050
15	Sprocket Wheel	F303011020
16	Sprocket Shaft	F304104010
17	Plane Bearing	F304004020
18	Washer (Spring)	B101251490
19	Pin	B130103216
20	Sprocket Gear	F304104020
21	Washer	B100150812
22	Nut	8070100411
23	Star Washer	B090600912
24	Gear	F304101010
25	E-Ring	B150300611
26	Plate Assy. B	F304103000
27	Sprocket Lever R	F304101040
28	Spring	F304101060
29	E-Ring	B150300611
30	Plate	F304101050
31	E-Ring	B150300611
32	Spring	F304101060
33	Lever L	F304101030
34	Plate Assy. A	F304102000
35	E-Ring	B150300811
36	Bearing	F304004020
37	Nut	B070100411
38	Star Washer	B090600912
39	Cover L	F303036020
40	Wheel	F303011020
41	Guide Roller	F303010020

PRINTER ASSEMBLY

Item No.	Part Name	Part Number
1	Roll-In Guide	F304001070
2	Platen Cover	F304001060
3	Screw	B040450812
4	Paper Guide A	F304009020
5	Paper Guide	F304009011
6	Pin	B130102916
7	Shaft	F304001010
8	Lever R	F304001040
9	Spring Washer	B101251490
10	E-Ring	B150300711
11	Washer	B100154012
12	Platen Gear	F304004010
13	Pin	B130103216
14	Print Head	F401400000
15	E-Ring	B150300912
16	Nut	F304004200
17	Star Washer	B090600912
18	Nut	B090600912
19	E-Ring	B150300811
20	Spring	F304001020
21	Screw	B040450812
22	E-Ring	B150350111
23	Sprocket Gear	F303001080
24	Carr. Assy.	F303006000
25	Lever	F303005010
26	Spring	F303005020
27	E-Ring	B150300611
28	Washer	B100150412
29	Bearing	B210151490
30	Pulley	F303017000
31	Paper Motor	F303031000
32	Timing Motor	F303027000
33	Wire Wrap	A279950001
34	PTS Board	F304059000
35	Screw	B040301311
36	Motor Head A	F303026010
37	Guide Plate A	F303021001
38	Head Connector	A260112001
39	Terminal Board	F304056010
40	Carriage Shaft A	F303001010
41	Carriage Shaft B	F303001020
42	Belt Plate	F303019000
43	Gear	F303020020
44	Lever Assy.	F303020000
45	Pulley	F303018010

46	Bearing	B210151490
47	Flange	F303018020
48	Washer	B100152712
49	E-Ring	B150300611
50	Cable A	F304057000
51	Spring L	F303001060
52	Scale Shaft	F304008010
53	Spring	F304008030
54	Roller A	F304008020
55	Shaft	F304006010
56	Roller	F3100006010
57	E-Ring	B090600912
58	Platen	F3040050000
59	Shaft	F304001010
60	E-Ring	B160100112
61	Lever	F304007010
62	Paper-Out Board	F303009010
63	Spring	F303007020
64	Switch	A170202501
65	Paper-Out Assy.	F303009000
66	Spring R	F303001070

RECOMMENDED SPARE PARTS LIST

MX-SERIES PRINTER

PART NUMBER	DESCRIPTION	LIST PRICE	QTY	USAGE				
				MX-70	MX-80	MX-80FT	MX-100	TX-80
F303014010	Timing Belt A	9.120	4	X	X	X		
F310057020	Timing Belt D	14.520	4				X	
Y422021001	Grommet	0.980	20	X	X	X	X	
Y422020001	Rubber Pad A	0.840	5	X	X	X	X	
Y422020101	Rubber Pad B	0.840	5	X	X	X		
F303001092	Ribbon Mask	1.260	10	X	X	X		
F303001100	Head Sitting Plate	0.840	10	X	X	X		
F301151000	R Detector Assy	8.640	2					X
F303003000	Frame RA	7.680	2		X			
Y422036001	Board Spacing	0.840	10	X	X	X	X	
Y422026001	Board Cover	1.698	4	X	X	X		
B210151490	Ball Bearing	6.860	5	X	X	X		
F303011040	Paper Holding Cover Spring	0.182	25	X	X	X	X	
X510360010	Knob Spring	0.168	4	X	X	X	X	
F303001060	Scale Spring L	0.462	25	X	X	X	X	
F303001070	Scale Spring R	0.462	25	X	X	X	X	
F303007020	PE Lever Spring	0.322	25		X	X	X	
F303011060	G-Pin	0.140	25	X	X	X	X	
X000000004	Transportation Screw (4X12)	0.112	25		X	X	X	
B040303211	Cup Screw (3X16)	0.046	25	X	X	X		
B040302811	Cup Screw (3X10)	0.046	25	X	X	X	X	
B040301311	Cup Screw (2.5X4)	0.046	25	X	X	X	X	X
B040450511	C.P. Screw w/OW (3X6)	0.046	25	X	X	X	X	X
B040450812	C.P. Screw w/OW (2.5X5)	0.046	25	X	X	X	X	
B040450711	C.P. Screw w/OW (4X16)	0.046	25	X	X	X	X	X
B100162812	Plain Washer (4X0.7X17)	0.046	25	X	X	X		
B100150412	Plain Washer (4X0.2X6)	0.010	25	X	X	X	X	
B150350111	Retaining Ring Type-E (2.3)	0.011	25	X	X	X	X	X
B150300611	Retaining Ring Type-E (3)	0.011	25	X	X	X	X	X

RECOMMENDED SPARE PARTS LIST

MX-SERIES PRINTER

PART NUMBER	DESCRIPTION	LIST PRICE	QTY	USAGE				
				MX-70	MX-80	MX-80FT	MX-100	TX-80
B150300912	Retaining Ring Type-E (6)	0.011	25	X	X	X	X	
B150300311	Retaining Ring Type-E (1.5)	0.011	25		X	X	X	
B150300811	Retaining Ring Type-E (5)	0.011	25		X	X	X	
B700200011	Grease (40gr)	3.170	4	X	X	X	X	X
B710200001	Oil (40cc)	1.330	4	X	X	X	X	X
B730200100	Neji Lock #2 (G) (50cc)	5.160	4	X	X	X	X	X
B730300100	Locktite Adhesive (10cc)	9.000	4	X	X	X	X	X
M-TM-MX80	Tech Manual-Model MX-80	20.000	10		X			
M-TM-MX100	Tech Manual-Model MX100	20.000	10				X	

RECOMMENDED SPARE PARTS LIST

MX-SERIES PRINTER

PART NUMBER	DESCRIPTION	LIST PRICE	QTY	USAGE				
				MX-70	MX-80	MX-80FT	MX-100	TX-80
Y422205000	HMTP Circuit Board Unit	300.000	4		X	X		
Y426202000	HMTP Circuit Board Unit	300.000	3				X	
Y420201000	UMTP Circuit Board Unit	136.360	2	X				
Y403201000	Control Circuit Board Unit	284.038	1					X
Y422202000	MDRI Circuit Board Unit	98.400	4		X	X	X	
Y422203000	MPEL Circuit Board Unit	22.680	2		X	X	X	
Y422204500	Filter Circuit Board Unit	27.360	4		X	X	X	
F304059000	PTS Sensor Board Assy C	10.920	2	X	X	X	X	
F303030000	Home Position Sensor Assy	11.760	2	X	X	X	X	
F301055000	Motor Circuit Board Assy	14.560	2					X
X400081550	LSI (I/O Port)	25.440	4		X	X	X	
22800203	LSI (MPU) (8041-591)	27.240	4		X	X	X	
Y422800201	LSI (MPU) (8049-170)	31.800	4		X	X		
Y422800202	LSI (MASK-ROM)(2332-374)	45.480	4		X	X		
Y424800104	LSI (P-ROM)(2716 HM3-FO)	20.000	4				X	
Y426800101	LSI (P-ROM)(2716-HMI-C2)	20.000	4				X	
Y426800102	LSI (P-ROM)(2716-HMZ-C2)	20.000	4				X	
X400080390	LSI (MPU) (8039)	24.000	4				X	
Y422306000	Cable Set 844	5.880	5		X	X	X	
Y422305000	Cable Set 843	2.753	10		X	X	X	
Y426301000	Cable Set 855	2.380	4				X	
X502060020	Fuse (250V 2A)	0.602	10		X	X	X	X
Y422501100	Power Transformer Set	30.000	4		X	X	X	
F401400000	Print Head Unit	49.000	25		X	X		
F401500000	Print Head Unit	53.000	25				X	
F401300000	Print Head Unit	33.000	10	X				
F301651000	Print Head Unit	108.000	2					X
C904658000	Nose Assy (LA)	37.800	5					X
26501000	Fan Unit	63.720	2				X	

RECOMMENDED SPARE PARTS LIST

MX-SERIES PRINTER

PART NUMBER	DESCRIPTION	LIST PRICE	QTY	USAGE				
				MX-70	MX-80	MX-80FT	MX-100	TX-80
Y422307000	Earth Wire 8L	2.100	5	X	X	X	X	
Y422030001	Earth Plate D	1.680	2		X	X	X	
Y426030001	Earth Plate B	0.700	2	X	X	X	X	
Y422027201	Insulation D	0.560	25		X	X	X	
Y422027001	Insulation	0.462	10	X	X	X	X	
X521000020	Insulation Spacer (AC243)	0.103	10		X	X	X	
F303027000	Timing Belt Motor Assy C	49.080	2	X	X	X	X	
F303031000	Paper Feeding Motor Assy A	45.480	2	X	X	X	X	
F302256000	Tractor Drive Motor	54.400	2					
F303036010	Sprocket Frame L	4.560	5	X	X	X	X	
F303037010	Sprocket Frame R	4.560	5	X	X	X	X	
F303011020	Sprocket Wheel	2.660	5	X	X	X	X	
F303036020	Paper Holding Cover L	2.100	5	X	X	X	X	
F303037020	Paper Holding Cover R	2.100	5	X	X	X	X	
Y422015001	Knob	2.100	2	X	X	X	X	
Y422006007	Printer Cover A	20.880	4		X			
Y426006001	Printer Cover A	22.800	4				X	
Y423006001	Printer Cover F	22.000	4			X		
Y423024001	Separator E	12.720	5		X	X		
Y426024001	Separator	13.680	5				X	
Y422025001	Separator Roller	4.199	5	X	X	X		
F303010020	Paper Guide Roller	3.220	2	X	X	X		
Y426025001	Paper Guide Roller	7.720	5				X	
Y426029001	Roller Holder	0.644	6				X	
F303021001	Paper Guide Plate A	6.360	4		X	X		
F310051010	Paper Guide Plate	5.040	4				X	
F303018010	Belt Driven Pulley	0.700	5	X	X	X	X	
F303017000	Belt Driven Pulley Assy	0.840	2	X	X	X	X	
F303018020	Belt Driven Pulley Flange	3.220	2	X	X	X	X	

PIN ASSIGNMENTS ON CONNECTORS

CN1-Data exchange between epson and external computer

Signal Pin No.	Return Pin No.	Signal	Direction	Description
1	19	$\overline{\text{STROBE}}$	In	STROBE pulse to read data in. Pulse width must be more than 0.5μs at receiving terminal. The signal level is normally "HIGH"; read-in of data is performed at the "LOW" level of this signal.
2	20	DATA 1	In	These signals represent information of the 1st to 8th bits of parallel data respectively. Each signal is at "HIGH" level when data is logical "1" and "LOW" when logical "0".
3	21	DATA 2	In	
4	22	DATA 3	In	
5	23	DATA 4	In	
6	24	DATA 5	In	
7	25	DATA 6	In	
8	26	DATA 7	In	
9	27	DATA 8	In	
10	28	$\overline{\text{ACKNLG}}$	Out	Approx. 5μs pulse. "LOW" indicates that data has been received and that the printer is ready to accept other data.
11	29	BUSY	Out	A "HIGH" signal indicates that the printer cannot receive data. The signal becomes "HIGH" in the following cases: 1. During data entry 2. During printing operation 3. In OFF-LINE state 4. During printer error status.
12	30	PE	Out	A "HIGH" signal indicates that the printer is out of paper.
13	—	SLCT	Out	This signal indicates that the printer is in the selected state.
14	—	$\overline{\text{AUTO FEED XT}}$	In	With this signal being at "LOW" level, the paper is automatically fed one line after printing. (The signal level can be fixed to "LOW" with DIP SW pin 2-3 provided on the control circuit board.)
15	—	NC		Not used.
16	—	0V		Logic GND level.
17	—	CHASSIS-GND	—	Printer chassis GND. In the printer, the chassis GND and the logic GND are isolated from each other.
18	—	NC	—	Not used.
19 to 30	—	GND	—	TWISTED-PAIR RETURN signal GND level.

Signal Pin No.	Return Pin No.	Signal	Direction	Description
31	—	$\overline{\text{INIT}}$	In	When the level of this signal becomes "LOW", the printer controller is reset to its initial state and the print buffer is cleared. This signal is normally at "HIGH" level, and its pulse width must be more than 50μs at the receiving terminal.
32		$\overline{\text{ERROR}}$	Out	The level of this signal becomes "LOW" when the printer is in— 1. PAPER END state 2. OFF-LINE state 3. Error state
33	—	GND	—	Same as with Pin Nos. 19 to 30.
34	—	NC	—	Not used.
35				Pulled up to +5V through 4.7 kΩ resistance.
36	—	$\overline{\text{SLCT IN}}$	In	Data entry to the printer is possible only when the level of this signal is "LOW" (Internal fixing can be carried out with DIP SW pin 1-8. The condition at the time of shipment is set "LOW" for this signal.)

CN2-AC voltage to control circuit board (located on right side contr

Pin No.	Signal Name	Color of Lead	Purpose
1	+12V AC	Gray	For optional interfaces
2	+12V AC	Gray	
3	+25V AC	Orange	For stepper motor
4	+25V AC	Orange	
5	+9V AC	Red	For logic circuitry
6	+9V AC	Red	
7	+10V AC	Blue	For stepper motor
8	+10V AC	Blue	

CN3- Interface connector (refer to interface cable package) located in center of control board

Connector Pin No.	Signal Name	Description of Signal	Direction
1	$\overline{ERR}$	Error	Out
2	PE	Paper End	Out
3	D7	Data Bit 7	In
4	$\overline{RDY}$ (BUSY)	Ready	Out
5	D6	Data Bit 6	In
6	$\overline{ACK}$.	Acknowledge	Out
7	D5/PAR DIS	Data Bit 5/Parity Disable	In
8	$\overline{INIT}$	Initial	In
9	D4/O/E	Data Bit 4/Odd Parity Select/Even Parity Select	In
10	$\overline{STB}$	Strobe	In
11	D8/SI	Data Bit 8/Serial Signal Input	In
12	+12	+12V AC	Out
13	$\overline{R}$	Reset	Out
14	+12	+12V AC	Out
15	D3/B2	Data Bit 3/Bit Rate Select	In
16	+5	+5V DC	Out
17	D2/B1	Data Bit 2/Bit Rate Select	In
18	+24	+24V DC	Out
19	D1/8/7	Data Bit 1/8 Bit Select/7Bit Select	In
20	+12	+12V DC	Out
21	P/S	Parallel Select/Serial Select	In
22	–	–	–
23	$\overline{SELIN}$	Select In	In
24	GL	Ground	–
25	$\overline{PET\ TRS}$	PET/TRS Select	In
26	GL	Ground	–

CN4-Interface connector between driver board and control board
(located under driver board on control board)

Connector Pin No.	Signal Name	Description of Signal	Direction
1	GP	Ground Level	–
2	GP	Ground Level	–
3	–	–	–
4	–	–	–
5	GP	Ground Level	–
6	GP	Ground Level	–
7	H8	Head Solenoid Drive Signal	Out
8	H7	Head Solenoid Drive Signal	Out
9	H6	Head Solenoid Drive Signal	Out
10	H5	Head Solenoid Drive Signal	Out
11	H4	Head Solenoid Drive Signal	Out
12	H3	Head Solenoid Drive Signal	Out
13	H2	Head Solenoid Drive Signal	Out
14	H1	Head Solenoid Drive Signal	Out
15	H9	Head Solenoid Drive Signal	Out
16	(555Q)	–	In
17	$\overline{R}$	Reset	In
18	$\overline{PE}$	Paper End	In
19	CRB	Phase B for Carriage Stepper Motor Drive	Out
20	(132 Columns)	–	Out
21	(FP)	–	Out
22	CRA	Phase A for Carriage Stepper Motor Drive	Out

CN5-interface connector between driver board and control board
(located under driver board on control board)

Connector Pin No.	Signal Name	Description of Signal	Direction
1	CRD	Phase D for Carriage Stepper Motor Drive	In
2	LFB	Phase B for Paper Feed Stepper Motor Drive	In
3	$\overline{SLF}$	Line Feed Activate	In
4	CRC	Phase C for Carriage Stepper Motor Drive	In
5	($\overline{80 \text{ columns}}$)	—	Out
6	LFC	Phase C for Paper Feed Stepper Motor Drive	In
7	Head Trigger	Timer Triggering Signal	In
8	LFA	Phase A for Paper Feed Stepper Motor Drive	In
9	$\overline{RS}$	Home Position Signal	Out
10	LFD	Phase D for Paper Feed Stepper Motor Drive	In
11	$\overline{PTS}$	Clock Input	Out
12	GL	Ground	—
13	GL	Ground	—
14	+24	+24V DC	In
15	+24	+24V DC	In
16	+24	+24V DC	In
17	+24	+24V DC	In
18	+5	+5V DC	In
19	—	—	—
20	—	—	—
21	Vx	Power Failure Detection Signal	In
22	+14	+14V DC	In

CN6- Supplies control signals between printer and driver circuit board (located far left/top of driver board)

Connector Pin No.	Signal Name	Description of Signal	Direction
1	H1	Head Driving Signal	In
2	H2	Head Driving Signal	In
3	H3	Head Driving Signal	In
4	H4	Head Driving Signal	In
5	H5	Head Driving Signal	In
6	H6	Head Driving Signal	In
7	H7	Head Driving Signal	In
8	H8	Head Driving Signal	In
9	H9	Head Driving Signal	In
10	SOL	Solenoid common line +24V	In
11	SOL	Solenoid common line +24V	In
12	V+5	+5V	In
13	SCR	Carriage Stepper Motor Current Liimiting Signal	In
14	SLF	Paper Feed Stepper Motor Current Limiting Signal	In
15	GLED	Ground level	—
16	GPE	Ground level	—
17	GR	Ground level	—
18	$\overline{PE}$	Paper End Signal from Printer Mechanism	Out
19	$\overline{PTS}$	Timing Signal from Printer Mechanism	Out
20	$\overline{RS}$	Reset Signal from Printer Mechanism	Out
21	CRA	Carriage Drive Signal	In
22	CRB	Carriage Drive Signal	In
23	CRC	Carriage Drive Signal	In
24	CRD	Carriage Drive Signal	In
25	LFA	Paper Feed Drive Signal	In
26	LFB	Paper Feed Drive Signal	In
27	LFC	Paper Feed Drive Signal	In
28	LFD	Paper Feed Drive Signal	In

CONTROL PANEL CONNECTOR

Connector Pin No.	Signal Name	Description of Signal	Color of Lead
1	ON LINE LP	Signal for illuminating ON LINE indicator	Purple
2	PE LP	Signal for illuminating NO PAPER indicator	White
3	READY LP	Signal for illuminating READY indicator	Gray
4	ON/OFF LINE SW	ON LNE switch	Yellow
5	FF SW	FORM FEED switch	Orange
6	LF SW	LINE FEED switch	Blue
7	GL	Ground	Black
8	+12	+12VDC	Brown
9	BUZZER	Buzzer	Red

TROUBLESHOOTING

TROUBLE SHOOTING

A. PRINTER WILL NOT OPERATE AND NO INDICATOR LIGHTS ARE ON.

Cause of trouble	Check point	Repair method
1.) Control panel connector loose	Control panel	Reseat connector perform self-test
2.) Blown fuse	Fuse/filter board	If fuse is blown replace it. If replaced fuse blows go to step 3. If not perform self-test.
3.) Defective fuse/filter PCB	Disconnect CN2	Insure a good fuse is in place. Check input to transformer between white and black leads (connector on top of fuse/filter board) If below 115 VAC replace board and go to step 4.
4.) Defective power transformer	CN2 (output of transformer) pins 1 & 2:10VAC pins 3 & 4:25VAC pins 5 & 6:10VAC pins 7 & 8:16VAC	If any voltages are improper replace replace transformer and run self-test.

B. ALL INDICATORS ON CONTROL PANEL LIGHT BUT CARRIAGE ASSEMBLY DOES NOT OPERATE.

Cause of trouble	Check point	Repair method
1.)Broken drive belt	Carriage	Replace belt if damaged also check associated drive gears replace any damaged. Does carriage operate now ? Yes-self test No-go to step 2
2.) Defective home sensor	Home sensor	Blocked or broken adjust or replace
3.) Defective driver board	Driver board	Replace driver board. Does carriage operate ? Yes- self-test No-go to step 4
4.) Defective control board	Control board	Replace control board Does carriage operate ? Yes- self-test No- go to step 5
5.) Defective carriage motor	carriage motor	Replace motor Does carriage operate ? Yes- self-test No- go to step 6
6.) Defective PTO sensor	PTO sensor	Replace sensor Adjust sensor to have equal travel both directions

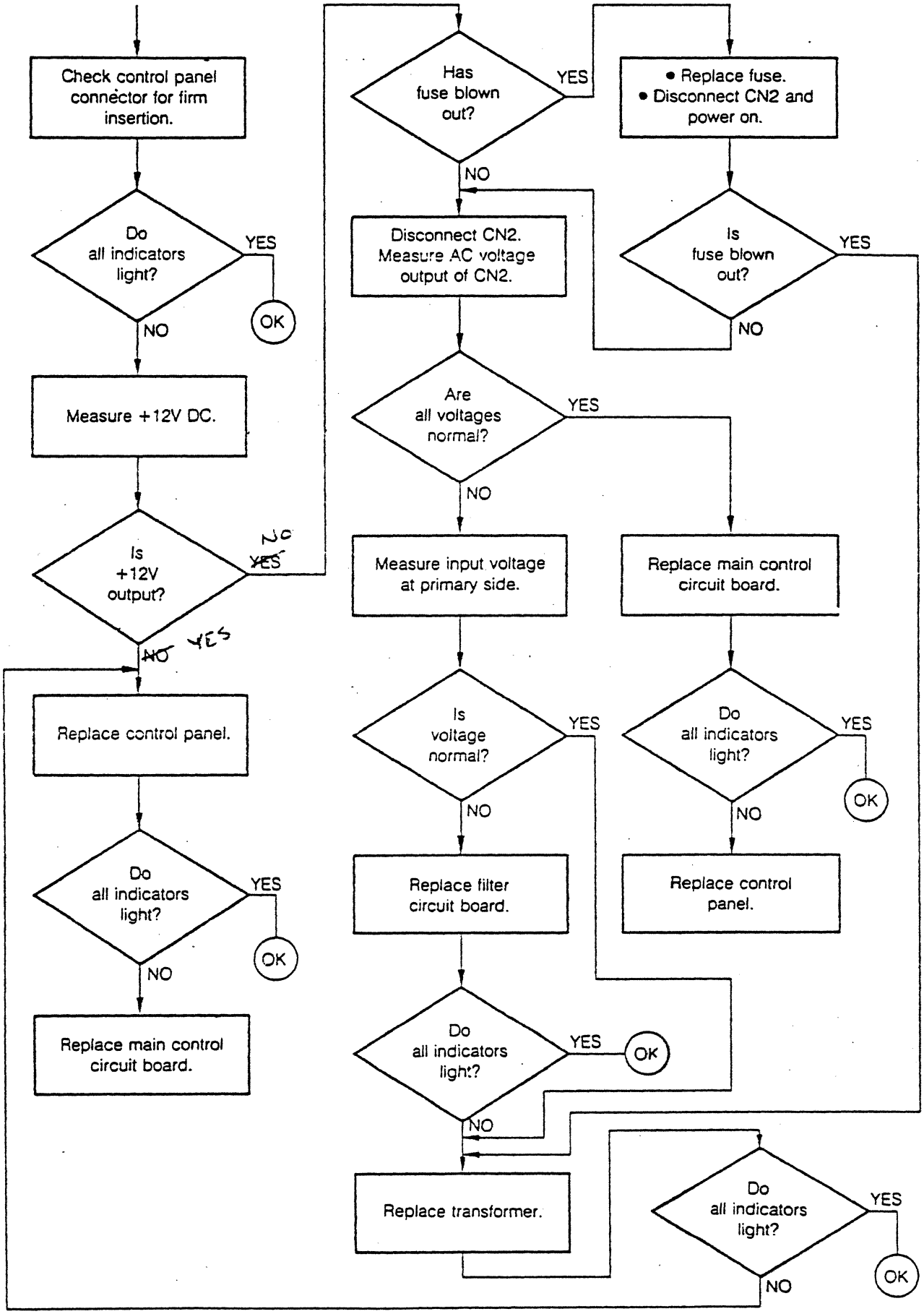
C.CARRIAGE ASSEMBLY OPERATE PROPERLY BUT CHARACTERS ARE NOT PRINTED PROPERLY OR AT ALL.

Cause	Check Point	Repair Method
1.) Defective Print Head	Print Head	Replace print head. Characters printed properly ? Yes- self-test No- go to step 2
2.) Defective Driver Board	Driver Board	Replace driver board. Characters printed properly ? Yes- self-test No- go to step 3
3.) Defective Control Board	Control Board	Replace control board and self-test

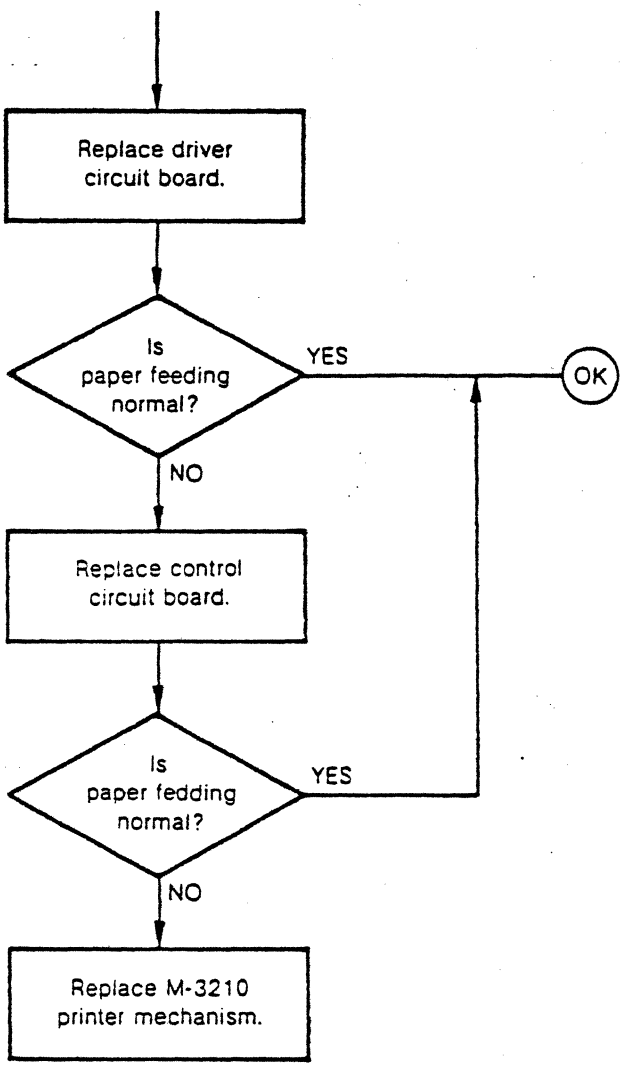
D. PAPER NOT FEEDING PROPERLY.

Cause	Check Point	Repair Method
1.) Improper DIP switch set	control board	See DIP switch setting for proper set-up procedure.
2.) Defective Printer Mechanism	printer mechanism	Inspect printer mechanical parts for broken or out of adjustment. Repair/replace
3.)Defective driver board	Driver Board	Replace Driver Board. Paper feeding properly ? Yes - self-test NO - go to step 4.
4.0 Defective Control Board	Control Board	Replace Control Board Paper feeding properly ? Yes - self-test No - go to step 5.
5.) Defective Paper Feed Motor	Paper Feed Motor	Replace motor . perform back-lach adjustment. perform self-test

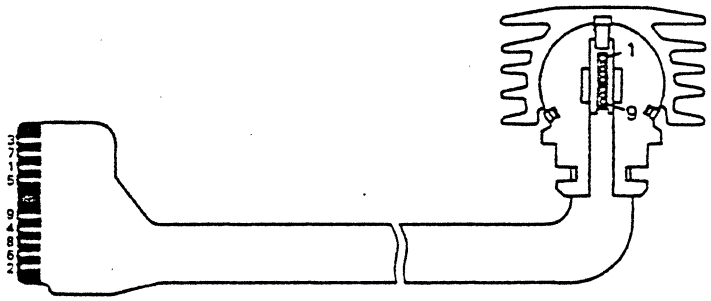
SYMPTOM 1
All the indicators on the control panel do not light when the power switch is turned on.



Paper is not fed at specified pitch or not fed at all.



All the indicators on the control panel light but the carriage assembly does not operate.



Measure all (9) coil resistances of print head.
Normal: 22Ω/coil

Are any coil resistances abnormal?
YES
NO

Are any of transistors Q1 to Q9 defective?
YES
NO

Replace print head unit.

Is printing normal?
YES
OK
NO

Are any of transistors Q1 to Q9 defective?
YES
NO

Replace print head unit.

Is printing normal?
YES
OK
NO

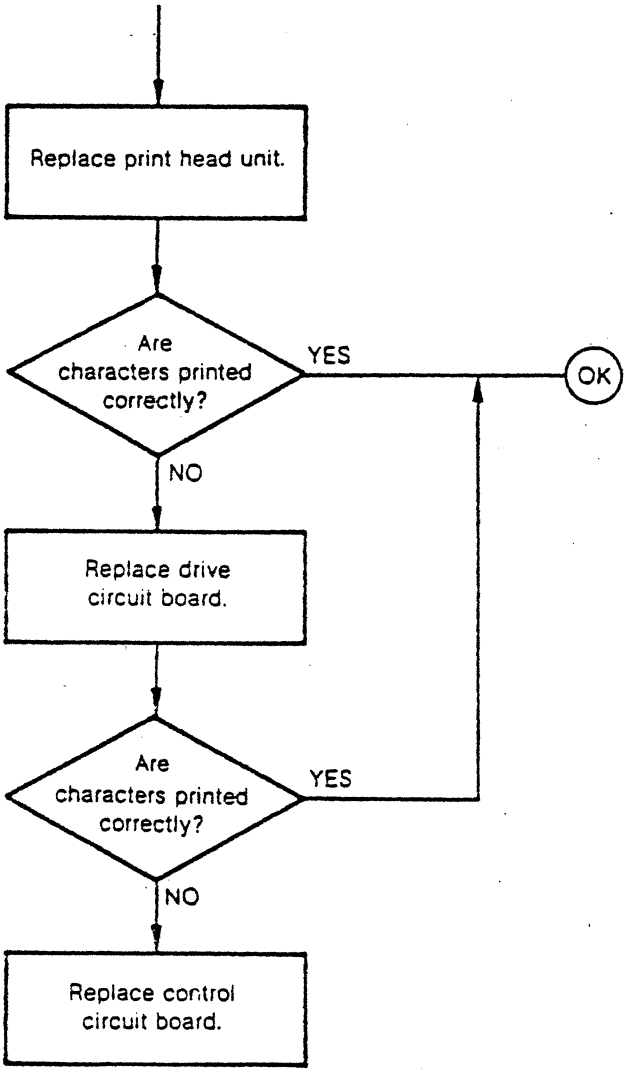
Replace driver circuit board.

Replace print head unit and drive circuit board.

Is printing normal?
YES
OK
NO

Replace main control circuit board.

The carriage assembly operates properly but characters are not printed correctly (i.e., omission of dots exists in the printed character).



INTERFACE INFORMATION

INTERFACE CABLES

ADDS - VIEWPOINT	SERIAL - 8150
ALTOS	SERIAL AND PARALLEL - 8150
AMPEX	SERIAL - 8150
APPLE II	SERIAL - 8150
APPLE III	SERIAL - 8150
ATARI	SERIAL AND PARALLEL - 8150
CALIF. COMP.	SERIAL - 8150
CROMEMCO	SERIAL AND PARALLEL - 8150
CYBER 300	SERIAL - 8150
DATAPOINT	SERIAL - 8150
DEC - LSI-11	SERIAL
DELTA	SERIAL - 8150
DRAKE THETA 7000E	PARALLEL
DYNABYTE	SERIAL AND PARALLEL
EXIDY SORCERER	PARALLEL
HARRIS 300	SERIAL - 8150
HEATH	SERIAL
INTERACT	SERIAL
INTERTEC SUPERBRAIN	SERIAL - 8150
IBC 40	SERIAL - 8150
I.B.M.	PARALLEL
INTEL	PARALLEL
INTELLIGENT SYS-3650	SERIAL - 8150
ITHICA	SERIAL AND PARALLEL - 8150
LEAR SIEGLER	SERIAL - 8151
NORTH STAR HORIZON	SERIAL AND PARALLEL
OHIO SCIENTIFIC	SERIAL AND PARALLEL - 8150
OSBORNE 1	SERIAL AND PARALLEL
PERKIN ELMER	SERIAL - 8150
QUAY	SERIAL - 8150
SD SYS. SBC-200	PARALLEL
SOL	PARALLEL
SONY TYPECORDER	SERIAL - 8150
SUPER SET	SERIAL - 8150
TEKTRONIX 4052	SERIAL - 8150
TEXAS INSTRUMENT	SERIAL
TRS-80, I, II, III	SERIAL
TRS-80, COLOR COMP.	SERIAL
TRS-80 II	PARALLEL
TELEVIDEO 920	SERIAL - 8150
VECTOR V_3	PARALLEL
VECTOR GRAPHIC	SERIAL - 8150
XEROX 820	SERIAL - 8150
ZENITH	SERIAL

INTERFACE PROBLEMS
CALL
JUSTIN, BILL
213-539-9140

INTERFACING THE MX-80 TO COMPUTERS

COMPUTER MODEL	INTERFACE BOARD/CABLE * CATALOG #'S	SPECIAL NOTES *
1. Apple II	8131 and 8230	(1) If using the I/F board made by Apple, data bit must be grounde
2. Apple III	8150 or 8141	(2) Check pin out configuration
3. TRS-80 Model 1 with expansion interface	8220 or Radio Shack 26-1401	
4. TRS-80 Model 1 without expansion interface	8120 and 8221 or Radio Shack 26-1411	(3) If using the 26-1411, +5v must b provided on pin 18.
5. TRS-80 Model II	Radio Shack 26-4401	
6. TRS-80 Model III	8220 or Radio Shack 26-1401	
7. Osborne 1	8150 or 8141	(4) Check pin out configuration
8. Atari 400	Macrotronics A4P-3	(5) Contact Macrotronics for additio information
Atari 400/800 with 850 interface	Macrotronics A850E	(6) Same as note (5)
* (A) SEE TABLE I (B) EPSON #'S OR AS SPECIFIED		
10. Vector Graphic		(7)
11. Exidy Sorcerer	Custom made cable	(8) Check pin out configuration
12. North Star Horizon	Custom made cable 8150 or 8141 (RS232)	(9) a) Check pin out conifguration PARALLEL b) Check pin out configuration RS-232
13. Intertec Superbrain	8150 or 8141 (RS-232)	(10) Check pin out configuration
14. Perk and Elmer	8150 or 8141 (RS-232)	(11) Check pin out configuration RS-232
15. Commodore VIC 20	N/A	(12) Not compatible
16. South West Tech	Custom made cable	(13) Check pin out configuration
IBC System 40	8150 or 8141 (only)	(14) Check pin out configuration
18. Cromemco	Parallel use custom cable	(15) Check pin out configuration

TABLE I

(1) On printer end of cable, cut wire from pin 9. Connect pin 9 to pin 16 (GRD)

(2) Apple III	Epson (Serial)-8141	Epson-8150
1	1 frame ground	1
3 (using modem elim)	3 RXD	3 (pin 2 of Apple)
4	20 DTR	20 (pin 6 of Apple)
7	7 signal ground	7
1200 Baud		1200 Baud

(3) If +5v is pulled from the printer it will void the warranty.

(4) Osborne 1	Epson-8141/8150	
1 frame ground	1	
2 RXD	2	8 bit word
3 TXD	3	300/1200 baud
7 signal ground	7 signal ground	
20 CTS	20 DTR	

(5) Vector Graphics

1 frame ground
3 TXD
7 signal ground

INTERFACE CABLES

APPLE III — RS232 — 8145/8150/8151

	APPLE III		MX
1	CG	1	CG
2	TXD	3	RXD
7	GG	7	SG
6	DSR	20	DTR

NOTE - 7 bit word, Apple II serial card will not handshake.

APPLE II — PARALLEL

If 8131 Interface is not used be sure MX pin #9 (D-8) is grounded. Also check for no connection on MX pin #14 (Auto Feed XT)

APPLE III — PARALLEL

8131 Interface can be used. Apple III must be run in Apple II emulation code.

ATARI — PARALLEL

	ATARI 850		MX
1	STROBE	1	STROBE
2	D-1	2	D-1
3	D-2	3	D-2
4	D-3	4	D-3
5	D-4	5	D-4
6	D-5	6	D-5
7	D-6	7	D-6
8	D-7	8	D-7
9	N/C		
10	N/C		
11	LOGIC GND	16	LOGIC GND
12	FAULT	32	ERROR
13	BUSY	11	BUSY
14	N/C		
15	D-8	9	D-8

NOTE - Sw 2-3 ON to force LF

NOTE:
Printer has to force line feed (switch 2-3 ON)

MACROTRONICS
1125 N. Golden State Blvd.
Turlock CA 95380
(209) 667-2888
The abovd cable is made by Macrotronics, their P/N is A850E $40.00

Macrotronics also provides cables that can plug directly into ports 3 and 4 of the Atari computers. The cables come with a special device driver.

Atari 400	A4P-3	$70.00
Atari 800	A8P-3	$70.00

ATARI 400/800 — RS232 — 8150/8145/8151

	PORT 4		MX
5	SG	7	SG
3	TXD	3	RXD
8	CTS	20	DTR

NOTE - May not be valid

INTERFACE CABLES

DEC - LSI - 11 RS232 8141,8150,8145,8151

	LSI - 11		MX
1	FG	1	FG
3	TXD	3	RXD
7	SG	7	SG
20	DTR	20	DTR

NOTE - 8 bit word, parity disabled, normal busy.

DELTA 8150,8145,8151

	DELTA		MX
1	FG	1	FG
2	TXD	3	RXD
7	SG	7	SG

NOTE - does not support busy handshake DTR, use 300 Baud.

DRAKE THETA 7000E PARALLEL

	DRAKE		MX
4	STROBE	1	STROBE
5	D-1	2	D-1
6	D-2	3	D-2
7	D-3	4	D-3
8	D-4	5	D-4
9	D-5	6	D-5
10	D-6	7	D-6
11	D-7	8	D-7
		9	D-8
15	SG	16	SG
2	READY	10	ACK

DYNABYTE PARALLEL

	DYNABYTE		MX
14	D-0	2	D-1
15	D-1	3	D-2
16	D-2	4	D-3
17	D-3	5	D-4
18	D-4	6	D-5
19	D-5	7	D-6
20	D-6	8	D-7
21	D-7	9	D-8
22	SG	16	SG
23	BUSY	11	BUSY
24	STROBE	1	STROBE

8 bit word

DYNABYTE RS232 8141,8150,8145,8151

	DYNABYTE		MX
3	TXD	3	RXD
7	SG	7	SG
5	RTS	20	DTR

NOTE - 8 bits, parity disabled, normal busy

INTERFACE CABLES

I.B.M. — PARALLEL

	IBM		MX
1	-STROBE	1	STROBE
2	+D-0	2	D-1
3	+D-1	3	D-2
4	+D-2	4	D-3
5	+D-3	5	D-4
6	+D-4	6	D-5
7	+D-5	7	D-6
8	+D-6	8	D-7
9	+D-7	9	D-8
10	-ACK	10	ACK
11	+BUSY	11	BUSY
12	+PAGE END		
13	+SELECT		
14	-AUTO FEED		
15	-ERROR	32	ERROR
16	-INITIATE		
17	-SELECTION		
18	SG	16	SG
25	SIGNAL GND		

IBC - #40 — RS232 — 8150,8145,8151

	IBC		MX
1	FG	1	FG
3	TXD	3	RXD
5	CTS	20	DTR
7	SG	7	SG

NOTE - Use inverted busy

INTEL — PARALLEL

	INTEL		MX
14	STROBE	1	STROBE
1	D-1	2	D-1
2	D-2	3	D-2
3	D-3	4	D-3
4	D-4	5	D-4
5	D-5	6	D-5
6	D-6	7	D-6
7	D-7	8	D-7
9	SG	16	SG
16	ACK	10	ACK
17	BUSY	11	BUSY
		9	D-8
		16	SG

INTELL. SYS. #3650 — 8150,8145,8151

	3650		MX
2	TXD	3	RXD
5	CTS	20	DTR
7	SG	7	SG

NOTE - 8 bit word, parity disabled

INTERFACE CABLES

OSBORNE 1

8141,8150,8145,8151

	OSBORNE		MX
1	FG	1	FG
3	TXD	3	RXD
7	SG	7	SG
20	CTS	20	CTS

NOTE - 8 bits, 300/1200 Baud, 600/2400 Junper inside unit
Needs special Osborne ROM that converts IEEE to Centronics parallel.
Cable by JMM Pat/Jim Morefield (714) 748-8329 $60.00

PERKIN ELMER

RS232

8150,8145,8151

	PE		MX	
1	FG	1	FG	Prints line termination
2	RXD	2	TXD	
3	TXD	3	RXD	1 Line Feed
5	CTS	20	DTR	6 @ (NULL)
7	SG	7	SG	1 Control X

QUAY

RS232

8150

	QUAY		MX
1	FG	1	FG
2	TXD	3	RXD
7	SG	7	SG
5	CTS	20	DTR
8	DCD		

NOTE - May have to run at 300
May not support busy handshake

SD SYSTEMS

PARALLEL

	SBC-200		MX
1	SG	16	SG
3	D-0	2	D-1
5	D-1	3	D-2
7	D-2	4	D-3
9	D-3	5	D-4
11	D-4	6	D-5
13	D-5	7	D-6
15	D-6	8	D-7
17	D-7	9	D-8
19	BUSY	11	BUSY
21	STROBE	1	STROBE

INTERFACE CABLES

NORTH STAR HORIZON — RS232 — 8141,8150,8145,8151

	NORTH STAR		MX
1	FG	1	FG
3	TXD	3	RXD
7	SG	7	SG
20	DTR	20	DTR

NOTE - 8 bits

OHIO SCIENTIFIC — PARALLEL

	OS		MX
1	D-8	9	D-8
2	D-7	8	D-7
3	D-6	7	D-6
4	D-5	6	D-5
5	D-4	5	D-4
6	D-3	4	D-3
7	D-2	3	D-2
8	D-1	2	D-1
12	SG	16	SG
17	STROBE	1	STROBE
23	ACK	10	ACK
24	BUSY	11	BUSY

NOTE

13	SG
20	FAULT
21	SELECT
22	PE

OHIO SCIENTIFIC — RS232 — 8150

	OS		MX
1	FG	1	FG
2	TXD	3	RXD
7	SG	7	SG
5	CTS	20	DTR

NOTE - 8 bits, Parity disabled, 1200 Baud, Standard Busy

OSBORNE 1 — PARALLEL

	OSBORNE		MX
1	D-0	2	D-1
2	D-4	6	D-5
3	D-1	3	D-2
4	D-5	7	D-6
5	D-2	4	D-3
6	D-6	8	D-7
7	D-3	5	D-4
8	D-7	9	D-8
11	STROBE	1	STROBE
15	BUSY	11	BUSY
16	SG	16	SG

Needs conversion ROM for IEEE to Centronics Parallel.

INTERFACE CABLES

CALIF COMP PROD. — RS232 — 8150,8145,8151

	CCS		MX
1	FG	1	FG
3	TXD	3	RXD
7	SG	7	SG
4	RTS		
20	DTR	20	DTR

CROMEMCO — PARALLEL

	CROMEMCO		MX
10	D-6	8	D-7
11	D-4	6	D-5
12	D-2	4	D-3
13	D0	16	SG
14	SG	10	ACK
15	SCK	11	BUSY
17	BUSY	1	STROBE
22	D-7	7	D-6
24	D-3	5	D-4
25	D-1	3	D-3
		9	D-8
		16	SG

CROMEMCO — RS232 — 8150,8151,8145

	TUART		MX
1	FG	1	FG
3	TXD	3	RXD
7	SG	7	SG
4	RTS	20	DTR

NOTE - does not support DTR - use 300 Baud.

CYBER 300 — 8150

Set for 7 bit, 300 Baud, Parity On, Normal Busy

DATAPOINT — RS232 — 8150,8151,8145

	DATAPOINT		MX
1	FG	1	FG
2	TXD	3	RXD
7	SG	7	SG
5	CTS	20	DTR
8	DCD		

NOTE - Inv. Busy, 7 bits, parity disabled.

INTERFACE CABLES

EXIDY SORCERER — PARALLEL

EXIDY		MX	
4	D-7	1	STROBE
16	D-0	2	D-1
17	D-1	3	D-2
18	D-2	4	D-3
19	D-3	5	D-4
7	D-4	6	D-5
6	D-5	7	D-6
5	D-6	8	D-7
		9	D-8
19	SG	16	SG
25	BUSY	11	BUSY

7 bit data word

EXIDY Sorcerer P/N DP 4003 is a Centronics Parellel Cable.

HARRIS 300 — 8150

Set for 8 bit, 300 Baud, Parity Off, Normal Busy

HEATH — RS232 — 8141,8150,8145,8151

HEATH		MX	
1	FG	1	FG
3	TXD	3	RXD
7	SG	7	SG
4	RTS	20	DTR

Heath Kit helpline
Hardware (616) 982-3309
Software (616) 982-3860

NOTE - Inverted busy, 8 bits, Parity Disabled, Device Driver LPH 14, 4800 Preset

INTERACT — RS232 — 8141,8150

INTERACT		MX	
1	FG	1	FG
3	TXD	3	RXD
7	SG	7	SG
5	CTS	20	DTR

INTERTEC (SUPERBRAIN) — 8150,8145,8151

AUX PORT — RS232

INTERTEC		MX	
1	FG	1	FG
3	TXD	3	RXD
7	SG	7	SG
20	DTR	20	DTR

NOTE - Intertec Xmits 8 bits but set printer for 7 bits
Configure Superbrain: 8 bit, Parity Disabled, DSR Enabled
needs software driver reconfigure routine.

INTERFACE CABLES

ITHICA — PARALLEL

ITHICA		MX	
23	STROBE	1	STROBE
14	D-0	2	D-1
15	D-1	3	D-2
16	D-2	4	D-3
17	D-3	5	D-4
18	D-4	6	D-5
19	D-5	7	D-6
20	D-6	8	D-7
21	D-7	9	D-8
25	XRCVD	10	ACK
26	SG	16	SG

NOTE - #25 (xrcvd) is jumper changeable.

ITHICA — 8150,8145,8151

ITHICA		MX	
1	FG	1	FG
2	TXD	3	RXD
7	SG	7	SG
5	CTS	20	DTR

NOTE - match polarity of Busy.

LEAR SIEGLER — RS232 — 8151

ADM3A/ADM5		MX	
1	FG	1	FG
2	TXD	3	RXD
5	CTS	20	DTR
7	SG	7	SG

NOTE - ADM3A - Inv. Busy/ADM5 Std. Busy

LEAR/SIGLER
TERMINAL ADM32

1) 7 Bit Word
2) 1200 Baud
3) Parity ON (Odd)

1	-	1
3	-	3
5		
7	-	7
20		20

NORTH STAR HORIZON — PARALLEL

NORTH STAR		MX	
1	D-7	1	STROBE
2	D-5	7	D-6
3	SG	9	D-8
4	D-2	4	D-3
5	D-0	2	D-1
7	ACK	10	ACK
9	D-6	8	D-7
10	D-4	6	D-5
11	D-3	5	D-4
12	D-1	3	D-2
13	SG	16	SG

7 Bit Word
Cable/Par by North Star
(must ground Data Bit 8
at Epson)

INTERFACE CABLES

SOL — PARALLEL

	SOL		MX
2	SG	16	SG
16	READY	11	BUSY
17	OUTPUT LOAD	1	STROBE
18	D-7	9	D-8
19	D-6	8	D-7
20	D-5	7	D-6
21	D-4	6	D-5
22	D-3	5	D-4
23	D-2	4	D-3
24	D-1	3	D-2
25	D-0	2	D-1

SONY TYPECORDER — 8150,8145,8151

	SONY		MX
3	TXD	3	RXD
7	SG	7	SG
20	DTR	20	DTR

NOTE - Default not selectable: 300 Baud, 1 start bit, 7 data bits, even parity, 1 stop bit.

SUPER SET — RS232 — 8150,8145,8151

	SS		MX
5	CTS	20	DTR BUSY
3	TXD	3	RXD
7	SG	7	SG
1	FG	1	FG

NOTE - Super Set defaults to 9600 Baud, No Parity. Use
Inverted Busy
Use AUX Port

TEKTRONIX 4052 — RS232 — 8150,8145,8151

	4052		MX
1	FG	1	FG
3	TXD	3	RXD
7	SG	7	SG
20	DTR	20	DTR

NOTE - 7 bit word, even parity
program the LSB (pin #8) to be ignored

TEXAS INSTRUMENT — RS232 — 8141,8145,8151

	TI 99/4		MX
3	TXD	3	RXD
7	SG	7	SG
20	DTR	20	DTR

NOTE - TI default = 7 bits, 300 baud, parity disabled.

INTERFACING THE MX-80 TO COMPUTERS

COMPUTER MODEL	INTERFACE BOARD/CABLE * CATALOG #'S	SPECIAL NOTES *
1. Apple II	8131 and 8230	(1) If using the I/F board made by Apple, data bit must be grounded.
2. Apple III	8150 or 8141	(2) Check pin out configuration
3. TRS-80 Model 1 with expansion interface	8220 or Radio Shack 26-1401	
4. TRS-80 Model 1 without expansion interface	8120 and 8221 or Radio Shack 26-1411	(3) If using the 26-1411, +5v must be provided on pin 18.
5. TRS-80 Model II	Radio Shack 26-4401	
6. TRS-80 Model III	8220 or Radio Shack 26-1401	
7. Osborne 1	8150 or 8141	(4) Check pin out configuration
8. Atari 400	Macrotronics A4P-3	(5) Contact Macrotronics for addition information
Atari 400/800 with 850 interface	Macrotronics A850E	(6) Same as note (5)
* (A) SEE TABLE I (B) EPSON #'S OR AS SPECIFIED		
10. Vector Graphic		(7)
11. Exidy Sorcerer	Custom made cable	(8) Check pin out configuration
12. North Star Horizon	Custom made cable 8150 or 8141 (RS232)	(9) a) Check pin out conifguration PARALLEL b) Check pin out configuration RS-232
13. Intertec Superbrain	8150 or 8141 (RS-232)	(10) Check pin out configuration
14. Perk and Elmer	8150 or 8141 (RS-232)	(11) Check pin out configuration RS-232
15. Commodore VIC 20	N/A	(12) Not compatible
16. South West Tech	Custom made cable	(13) Check pin out configuration
IBC System 40	8150 or 8141 (only)	(14) Check pin out configuration
18. Cromemco	Parallel use custom cable	(15) Check pin out configuration

COMPUTER MODEL	INTERFACE BOARD/CABLE * CATALOG #'S	SPECIAL NOTES *
19. Ampex	8150 or 8141 (RS-232)	(16) Check pin out configuration
20. Ohio Scientific	8150 or 8141 (RS-232)	(17) Check pin out configuration
21. Sol	8150 (RS-232 only)	(18) Check pin out configuration
22. TRS-80 Color Computer	8141 (RS-232 only)	(19) Check pin out configuration
23. Zenith (Heath H 8)	8141 or 8150 (RS-232)	(20) Check pin out configuration

APPLE II

The APPLE parallel interface board can be used, as can several other parallel interface boards that are compatable with the APPLE. The EPSON MX-Series printers are compatable with CENTRONICS parallel standard. Any Centronics parallel standard interface board may be used, however a modification may have to be made to the cable to match the EPSON printer. Examples of possible problems are described below:

1. The host may have signal ground connected to pin #14 (auto feed xt) of the printer. This may cause multiple line feeds. The printer should have no connection at pin #14.

2. The APPLE II outputs only a 7 bit data word, although its parallel port indicated 8 data bits. Data bit 8, pin #9 of the printer must be grounded.

HOST		MX-SERIES	
1.	N/C	14.	Auto feed xt
2.		9.	D8
		16.	SG

The following is a partial list of parallel interface boards that may be used in the APPLE. Also note APPLE II Serial/Parallel.

APPLE
Centronics parallel interface

SIGMA PACIFIC
APPLE II parallel interface

ORANGE MICRO
Grappler parallel interface

CALIFORNIA COMPUTER SYSTEMS
CCS model 7728 interface

TYMAC
PPC-100 parallel interface

APPLE II (NOT APPLE)

RS232 / Parallel

The following is a partial list of interface boards that can be used inside of the Apple II. Some of these interface boards offer additional features and a few offer serial or parallel applications:

CALIFORNIA COMPUTER SYSTEMS:
CCS Model 2718 (Serial/Parallel Interface)

MOUNTAIN COMPUTER
CPS Multifunction Card (Serial/Parallel Interface)

SSM MICROCOMPUTER PRODUCTS
A10 (Serial and Parallel Apple Interface)

APPLE II (EPSON)

Parallel

Epson America Inc
Apple II Interface kit
P/N 8131 Interface board / P/N 8230 or 8232 cable

8131		MX-Series	
1.	SG	25.	SG
2.	SG	26.	SG
3.	SG	27.	SG
4.	STROBE	1.	STROBE
5.	N/C	28.	SG
6.	D1	2.	D1
7.	D2	3.	D2
8.	D3	4.	D3
9.	D4	5.	D4
10.	D5	6.	D5
11.	D6	7.	D6
12.	D7	8.	D7
13.	D8 (SG)	9.	D8 (SG)
14.	ACK	10.	ACK
15.	SG	29.	SG
16.	SEL IN	36.	SEL IN

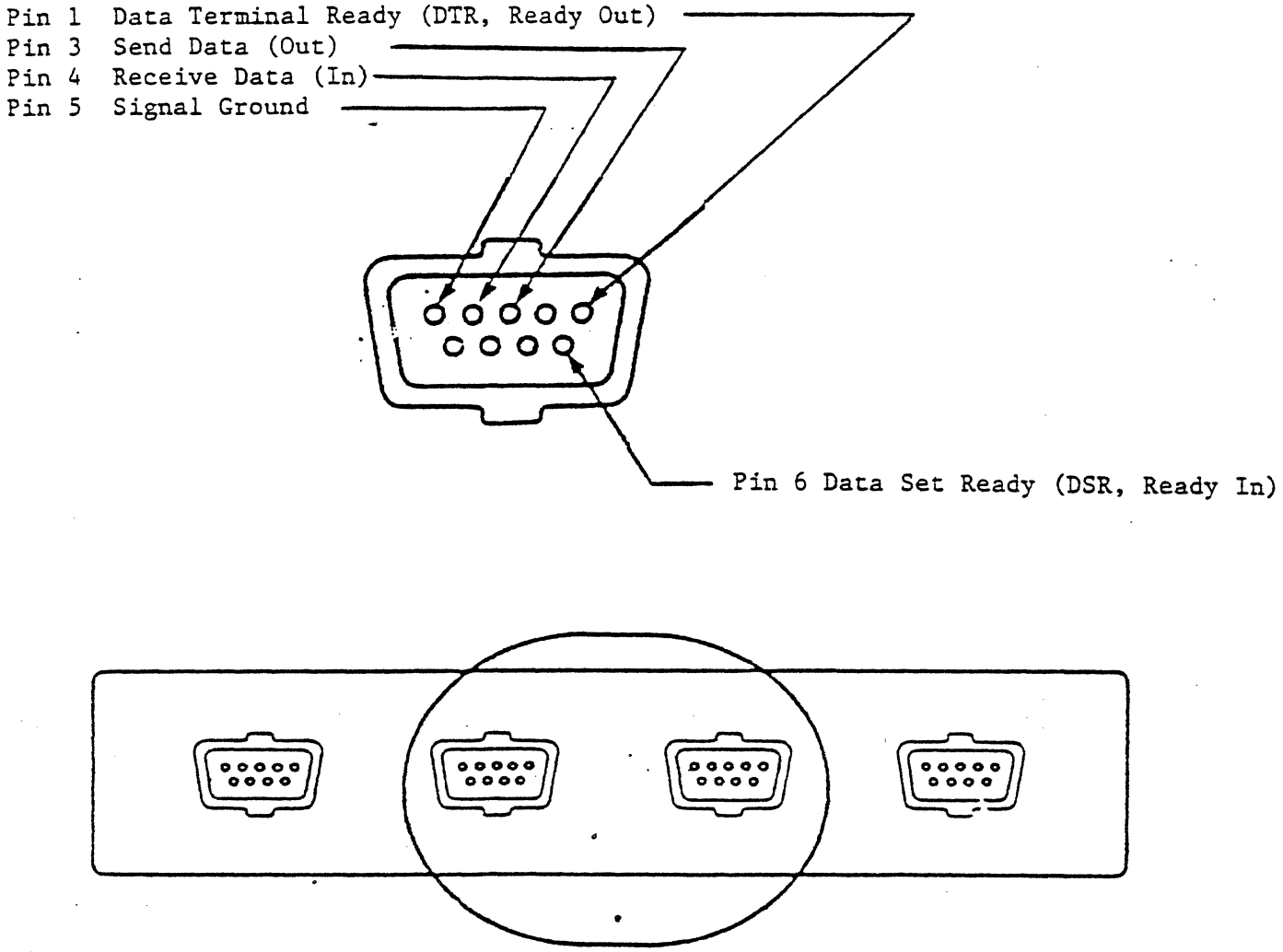


Figure 2. Pin functions of Serial Port Nos. 2 and 3 in 850™ Interface Module (9-pin female connector)

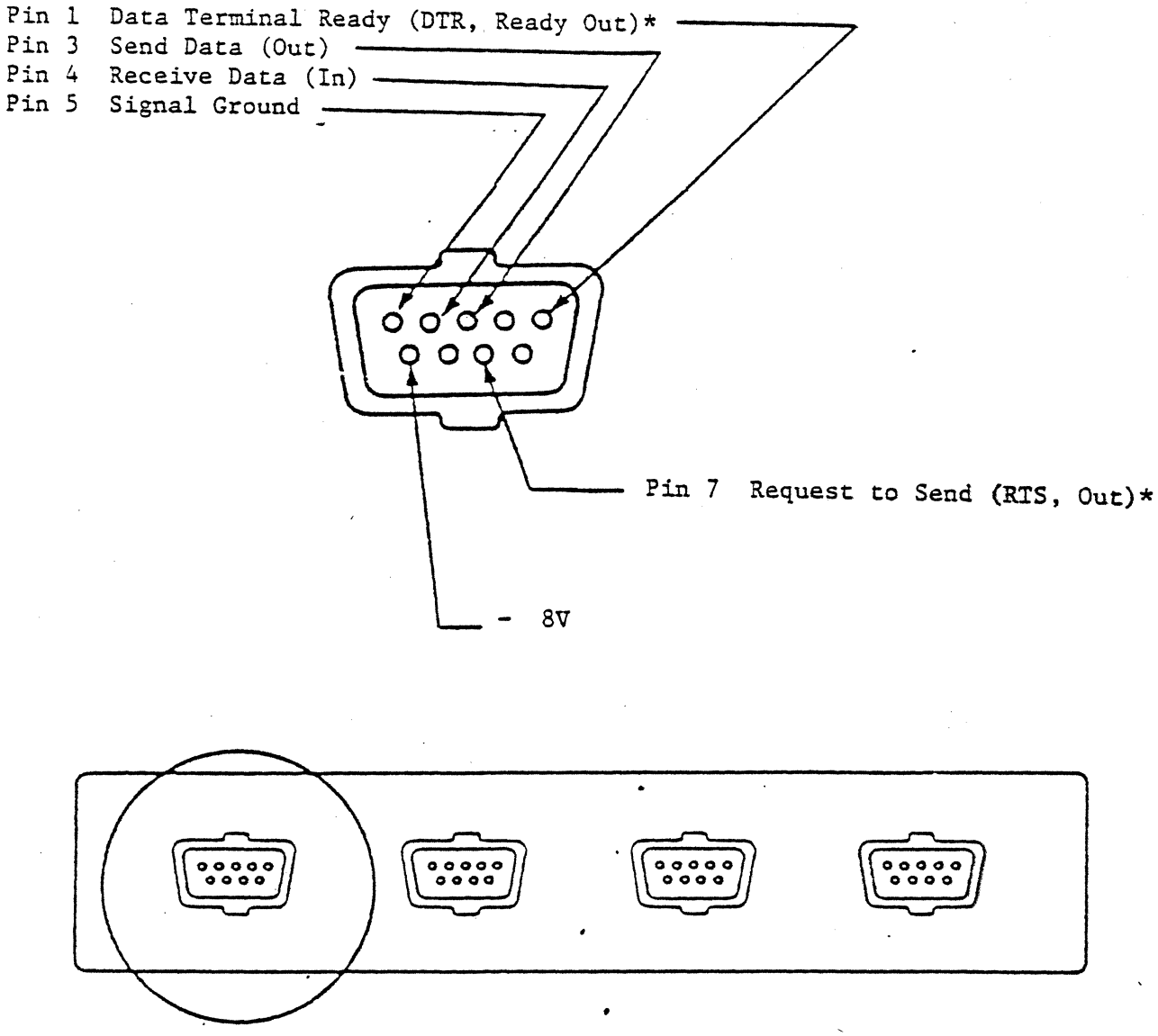
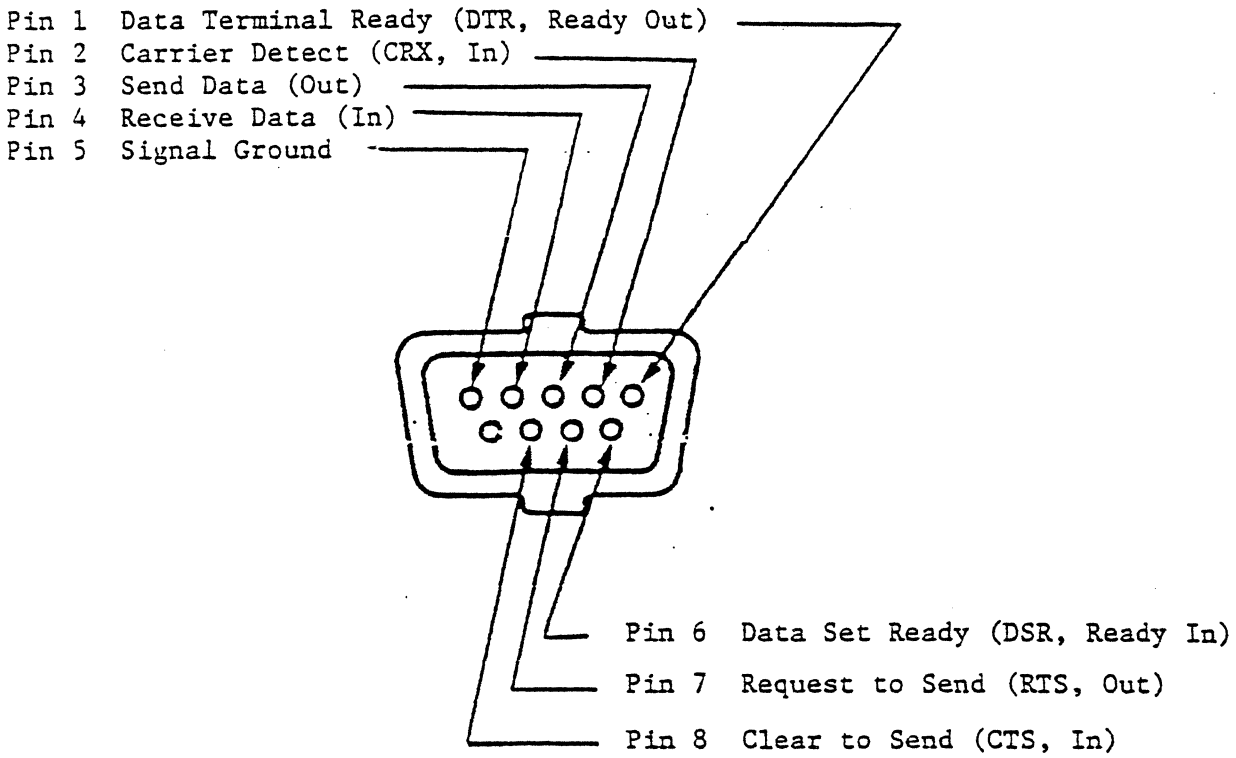


Figure 3. Pin functions of Serial Port No. 4 in 850™ Interface Module (9-pin female connector)

*These pins are not computer-controlled and are always ON (+10v).



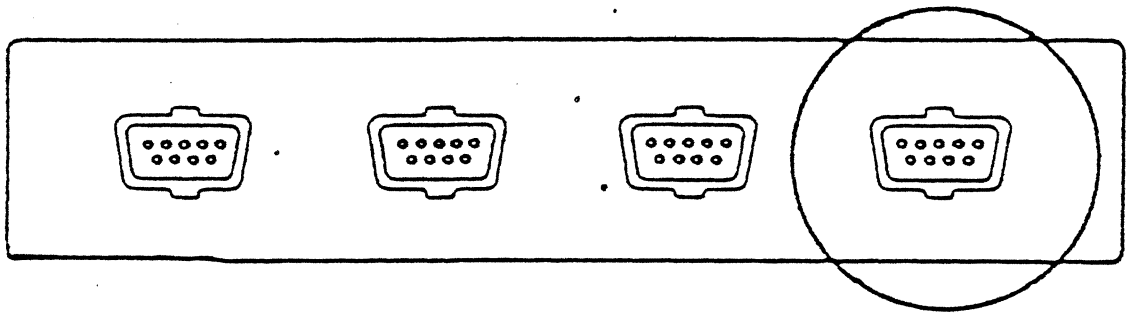


Figure 1. Pin functions of Serial Port No. 1 in 850™ Interface Module (9-pin female connector)

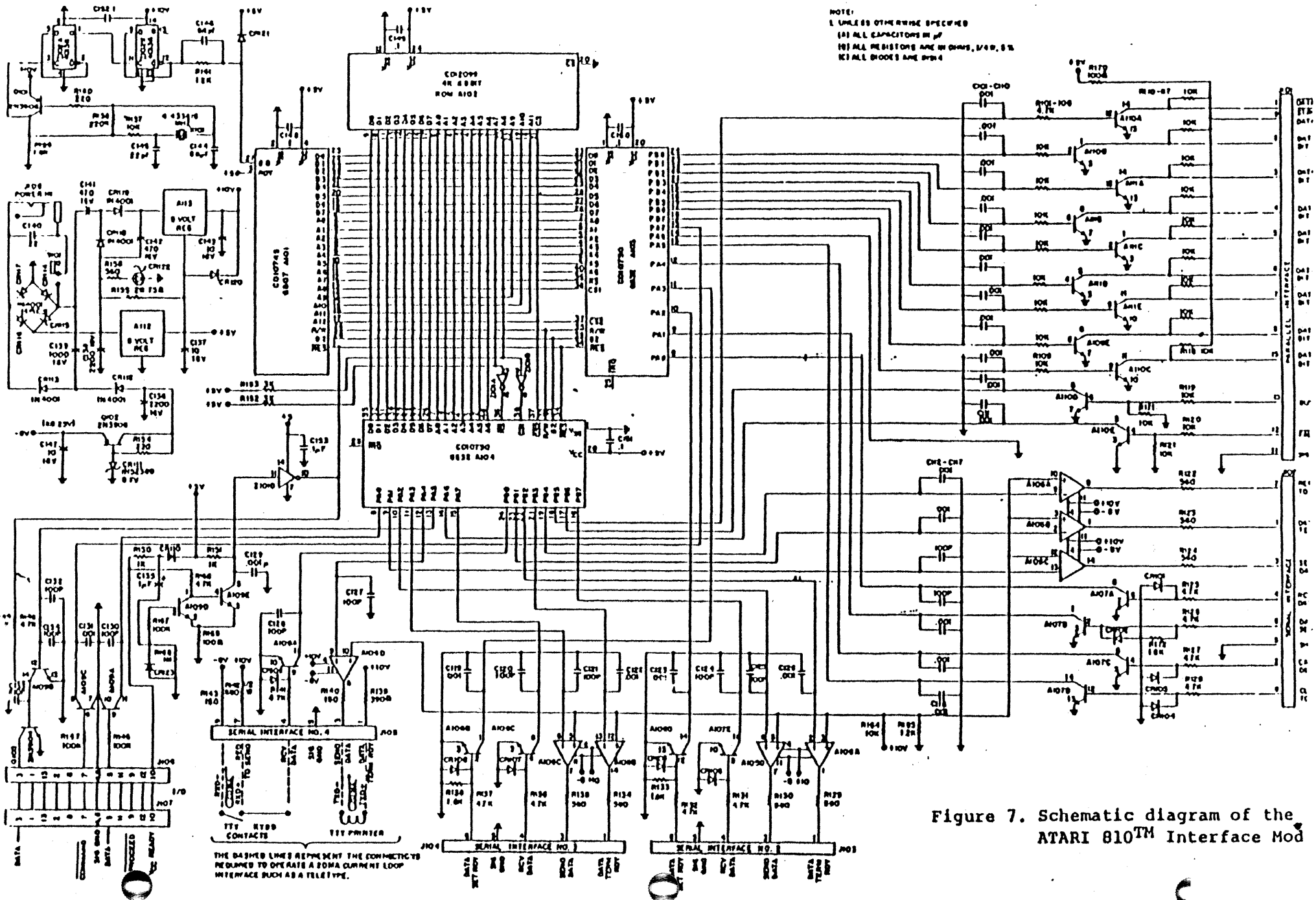


Figure 7. Schematic diagram of the ATARI 810™ Interface Mod

TABLE I

(1) On printer end of cable, cut wire from pin 9. Connect pin 9 to pin 16 (GRD)

(2) Apple III	Epson (Serial)-8141	Epson-8150
1	1 frame ground	1
3 (using modem elim)	3 RXD	3 (pin 2 of Apple)
4	20 DTR	20 (pin 6 of Apple)
7	7 signal ground	7
1200 Baud		1200 Baud

(3) If +5v is pulled from the printer it will void the warranty.

(4) Osborne 1	Epson-8141/8150	
1 frame ground	1	
2 RXD	2	
3 TXD	3	8 bit word
7 signal ground	7 signal ground	300/1200 baud
20 CTS	20 DTR	

(5) Vector Graphics

1 frame ground
3 TXD
7 signal ground

(8) EXIDY SORCERER (Parallel) MX-80

2	Output data accepted	→	10	$\overline{\text{ACK}}$
3	Output data available	→	11	BUSY
4	Output bit 7	→	1	Data Strobe
5	Output bit 6	→	8	Data bit 7
6	Output bit 5	→	7	Data bit 6
7	Output bit 4	→	6	Data bit 5
8	GRD	→	16	Logic ground
16	Output bit 0	→	2	Data bit 1
17	Output bit 1	→	3	Data bit 2
18	Output bit 2	→	4	Data bit 3
19	Output bit 3	→	5	Data bit 4

---

(9) NORTH STAR (Parallel) MX-80

1	Data bit 7	→	1	Data $\overline{\text{Strobe}}$
2	Data bit 5	→	7	Data bit 6
3	GRD, to 13		9	GRD to 16
4	Data bit 2		4	Data bit 3
5	Data bit 0		2	Data bit 1
6	$\overline{\text{PO}}$/$\overline{\text{FLAG}}$		11	$\overline{\text{BUSY}}$
7	$\overline{\text{ACK}}$		10	$\overline{\text{ACK}}$
8	N/C			
9	Data bit 6		8	Data bit 7
10	Data bit 4		6	Data bit 5
11	Data bit 3		5	Data bit 4
12	Data bit 1		3	Data bit 2
13,14,15	GRD	16,19	30	GRD

NORTH STAR (8 bit RS-232)		Epson 8150 or 8141	
1	Frame ground	1	Frame ground
3	RXD	3	RXD
7	Signal ground	7	Signal ground
20	DTR	20	DTR

---

(10) INTERTEC SUPERBRAIN

1	Frame ground	TERMINAL (MAIN PORT)
2	TXD	
3	RXD	
4	RTS	
5	CTS	
6	PCD	
7	Signal ground	
16	T CLK	
17	R CLK	
20	DTR	

Epson Serial 8141

1	Frame ground	PRINTER (AUX PORT)	2	TXD
2	RXD		3	RXD
3	TXD		7	Signal ground
7	Signal ground		20	DTR
20	DTR			

(11) PERK & ELMER

1	Frame ground
2	Aux RXD
3	Aux TXD
5	CTS
7	Logic ground
8	CDC
20	DTR

EPSON 8141 (RS232)

1	Frame ground
3	RXD
20	DTR
7	Logic ground

---

(12) COMMADORE VIC 20

1	Serial SRQ
2	Logic ground
3	ATN. I/O
4	CLK I/O
5	Data I/O

NOT COMPATIBLE

---

(13) SOUTH WEST TECH (Parallel)

C1	Handshake in
C2	Handshake out
Grd.	
DB 0-7	

MX-80

10	$\overline{\text{ACK}}$
1	$\overline{\text{Strobe}}$
16	Grd
DB 1-8	
19-30	Ground

---

(14) IBC SYSTEM 40

3	TXD
5	CTS
7	Signal ground

EPSON 8141 (RS232)

3	RXD
20	DTR
7	Signal ground

---

(15) CROMEMCO (Parallel)

10	Data 6
11	Data 4
12	Data 2
13	Data 0
14	Signal ground
15	ACK
17	Busy
22	Data 7
23	Data 5
24	Data 3
25	Data 1

MX-80

8	Data 7
6	Data 5
4	Data 3
2	Data 1
16	Signal ground
10	ACK
11	$\overline{\text{Busy}}$
1	$\overline{\text{Data Strobe}}$
7	Data 6
5	Data 4
3	Data 2
9	)
)	Data 8 Grp
16	

(16) AMPEX

1	Frame ground
2	TXD
3	RXD
5	CTS
6	DSR
7	Signal ground
20	DTR

EPSON SERIAL

1	Frame ground
3	RXD
20	DTR
7	Signal ground

---

(17) OHIO SCIENTIFIC

2	TXD
5	CTS
7	Signal ground

EPSON SERIAL

3	RXD
20	DTR
7	Signal ground

---

(18) SOL (Parallel)

1	CG
2	Signal ground
3	Input enable ←
4	Data Ready ←
5	ACK ←
6	Data ←
}	
13	
14	Unit select
15	Output Enable
16	RDY
17	Output Load
18	D 7 out
19	D 6
20	D 5
21	D 4
22	D 3
23	D 2
24	D 1
25	D 0

MX-80

17	Chassis ground
16	Ground
11	Busy
1	Data Strobe
9	Data bit 8
8	Data bit 7
7	Data bit 6
6	Data bit 5
5	Data bit 4
4	Data bit 3
3	Data bit 2
2	Data bit 1

(19) TRS-80 COLOR COMPUTER

1	Frame ground
2	RXD
3	Signal ground
4	TXD

EPSON 8141 RS232

1	Frame ground
20	DTR
7	Signal ground
3	RXD

(20) ZENITH (HEATH H89)		EPSON 8141 - 8150	
3	RXD	3	
7	Signal ground	7	
20	DTR	20	
No program patch		No special cable	
3		3	
7		7	
4	CTS	20	DTR

UREV, Program patch - HDOS 2.0 Manual App. D
Compatible w 2PH24,DVD + CP/M BIOS needs special cable
8 bit word
No parity