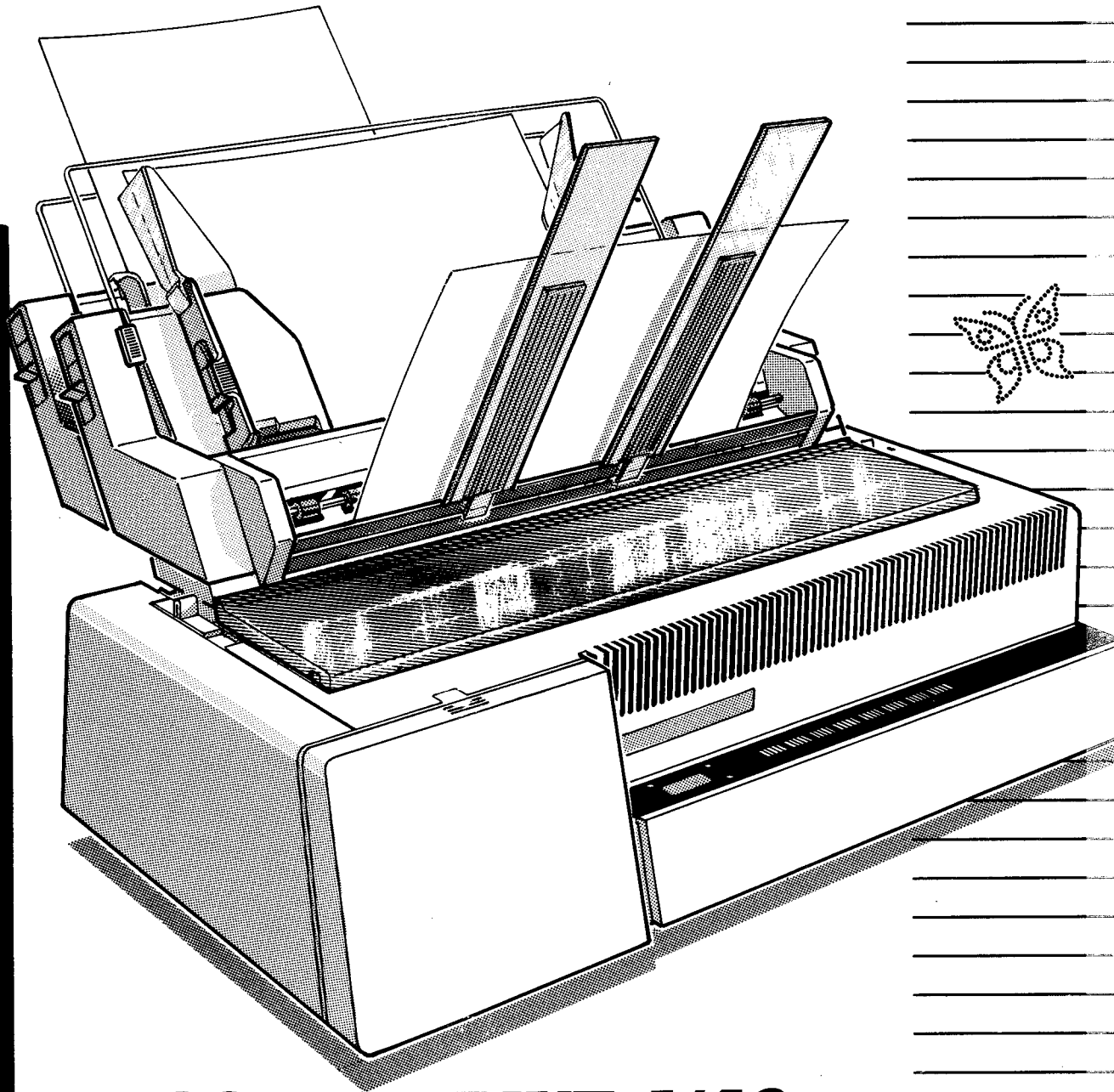
COMPUPRINT

MAINTENANCE MANUAL



COMPUPRINT 4/40
COMPUPRINT 4/41

Worldwide
Information
Systems

Bull

4/40-4/41
MAINTENANCE MANUAL

ORDER NUMBER

A78144299-001

September 1989

FCC NOTICE
(USA only)

WARNING:

This equipment generates, uses and can radiate radio frequency energy and, if not installed and use in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

LIMITATION OF LIABILITY

Except as otherwise provided, in no event shall H.B.I. be liable for direct special, indirect, or consequential damages in connection with or arising out of the furnishing, performance or use of the printer or parts related thereto. Any printer handling should be compliant with following Norms:

FCC (RFI-USA)
UL (Safety-USA)
CSA (RFI+Safety-Canada)
VDE (RFI+Safety-Europe)

The Maintenance Manual focuses over the bare printer excluding malfunctions of the ASF (Automatic Sheet Feeder), which is an optional item to the 4/40-4/41, and defects on front cover, rear cover or inked ribbon cartridge.

Also defects originated by incorrect paper insertion, wrong menu setting or mistaken control commands are not covered by this document to avoid duplications of information available on the User Manual (A78145309-101-english version-, also available in other local languages) forwarded to each end user within printer package.

When the malfunction eludes all the solutions proposed in the User Manual or deducible from it, a severe failure within the printer hardware, firmware or mechanisms should be suspected. Then follow the troubleshooting sequence advised in this manual together with defective part removal replacement.

TRADEMARK ACKNOWLEDGEMENTS

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The contents of this manual are subject to change without notice. All efforts have been made to ensure the accuracy of the contents of this manual.

However, BULL HN can not assume responsibility for any errors in this manual or their consequences.

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CHAPTER 1.1

OVERVIEW

The 4/40-4/41 products are multifunction printers intended to support EDP and/or Office environment applications requiring high level print quality and graphic capabilities, either in black or in colours, in order to print spread sheets, diagrams, business or technical graphics and machine readable labels and/or texts.

Several paper handling modes are possible, such as:

- Fanfold paper (multiple copies or thick) in nearly bottom-feed
- Easy alternation between Fanfold and Cut-sheet paper
- Manual semi-automatic and/or full automatic Cut-Sheet handling

The model 4/40 is a 100 columns printer, while the model 4/41 is a 136 columns one; both exibit versatility towards the application environments, including a high degree of flexibility in personalization by User-installable-plugs, in order to gain:

- Link & Device Protocols independence
- Ease of use/operability and adaptation via permanent menu
- User-interchangeable-Fonts and Functionalities expansions
- Quiet operation oriented to Office requirements
- Paper handling capabilities

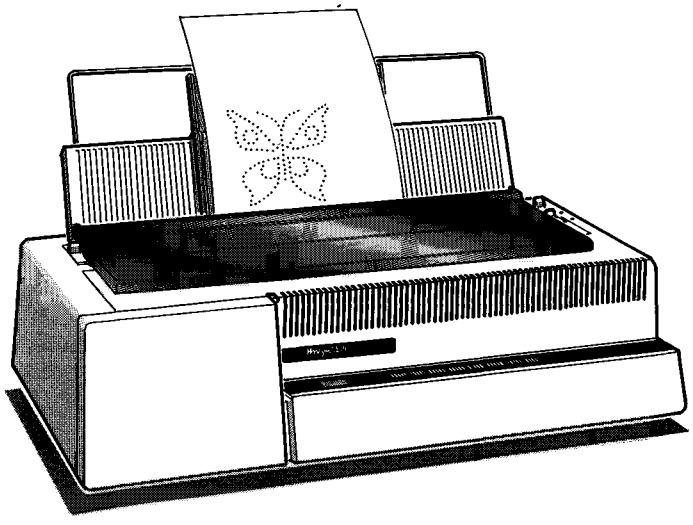


Figure 1-1. External appearance

PRODUCT STRUCTURE

The printers can be described as the complex of the following parts:

- Mechanism, which provides:

  - The movement in front of a rubber platen roller of a carriage carrying a print head, a ribbon cartridge and related motorized selector of ribbon color band. This movement is obtained via a step-motor (providing 1/120" movement per step) and a minipitch belt. The motion of ribbon is driven by mechanical coupling to the carriage movement.

  - The movement of a rubber drum for paper translation, obtained via a step-motor (providing 1/144" movement per step) and paper-pressing-rollers, which applies to the single sheet plain paper transport.

  - A tractor assembly, push-type standard, in nearly Bottom feed configuration.

  - Mechanical connections for an optional Automatic Sheet Feeder, upgradable to two selectable trays (dual Cut-sheets or single Cut-sheets plus Envelopes).

  - Printhead having 9 needles spaced 1/72"

- Electronic components, which provide:

  - Main board which controls the movements and the print head. It also provides two outside connectors which allow the connections to the Interface Board and to the optional Font Cartridge.

  - Interface Board (user-interchangeable) on the side of the cabinet, with an external cover, providing all signals adapting for connection to Host, according to Parallel and/or Serial rules, plus an easy-pluggable-ROM containing all Firmware which controls Printer functionalities. One interface board will be available for each connection type.

  - An optional interchangeable Cartridge containing printing descriptions for Character Fonts (one or more for each cartridge, Draft and Fast or Correspondence Quality mode). The cartridge can be plugged on the lower left side of the front of the cover.

- Operator panel, placed horizontally on the front of the cover, providing:

  - Eight Push-buttons, three Lights and an Alpha-Numeric display (four characters LED) can easily interact with parameters setting for menu operation.

- Cabinet, which allows Safety-proof lifting of frontal upper part for ribbon substitution and paper path check.

- Ribbon cartridge.

- Universal Power supply.

CHAPTER 1.2

PRINTER ASSEMBLY

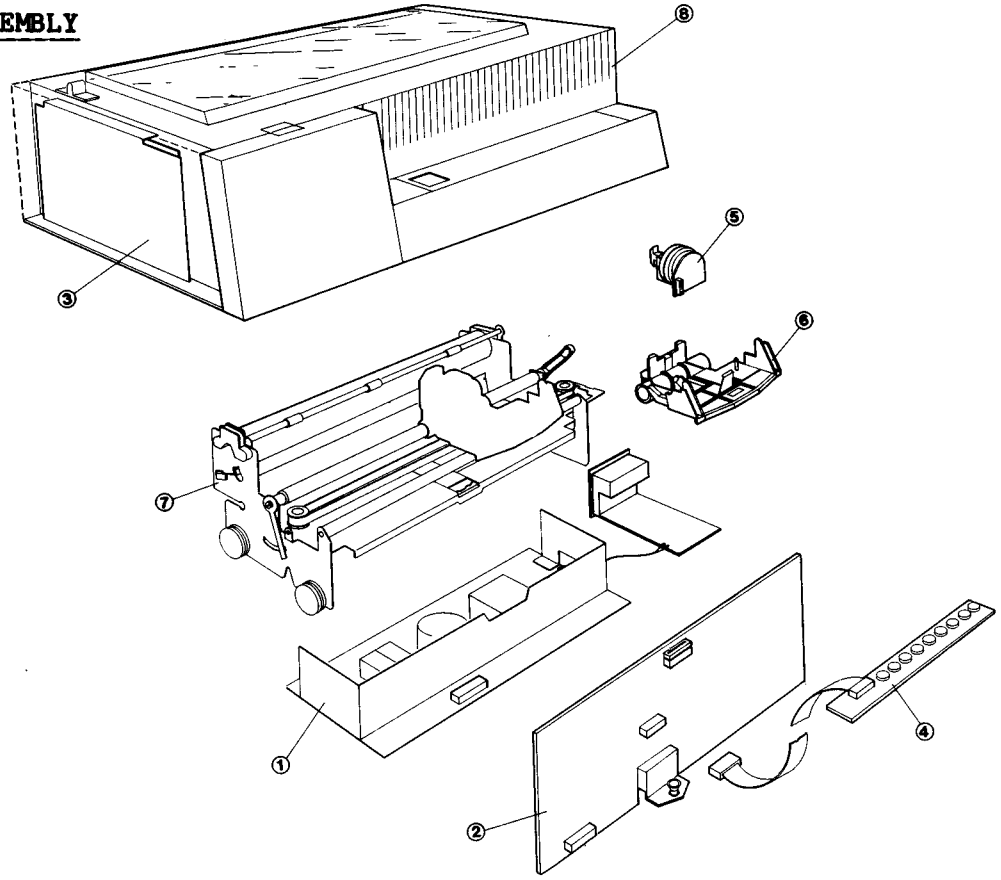


Fig. 1-2. Block Diagram of 4/40-4/41 General Construction

The printer is composed of following basic assemblies:

1 POWER SUPPLY AND NOISE FILTER BOARD
2 MAIN PROCESSING BOARD
3 PARALLEL OR SERIAL I/F BOARD
4 OPERATOR PANEL BOARD
5 PRINT HEAD
6 CARRIAGE AND COLOR GROUP
7 MECHANISM GROUP
8 CASE

JUMPERS & F/W SET UP
PARALLEL INTERFACE BOARD

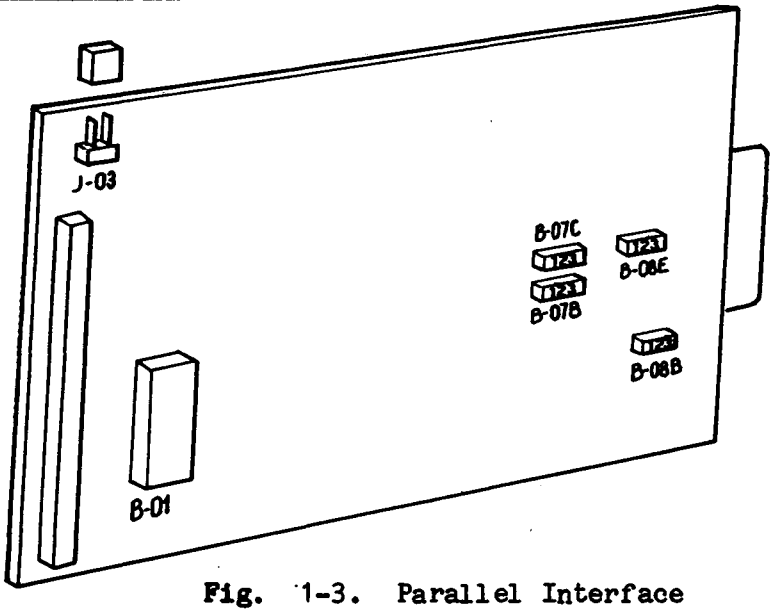


Fig. 1-3. Parallel Interface

JUMPERS POSITION ON PWA

JUMPER NAME	JUMPER POSIT. ON PWA	PIN IDENTIF. ON PWA	DESCRIPTION
W01	-	1-2	SELECTIN ON
-	B07B	2-3	SELECTIN OFF (DEFAULT POSITION)
W02	-	1-2	AUTOFD OFF
-	B07C	2-3	AUTOFD ON (DEFAULT POSITION)
W03	-		
-	J03	1-2	EXECUTION OF 1ST MFG TEST
W04	-	1-2	+5V PRESENT ON J02-18
-	B08B	2-3	+5V ABSENT (DEFAULT POSITION)
W05	-	1-2	PIN 17 DI J02 CONNECTED FRAME GROUND (DEFAULT POSITION)
	B08E	2-3	PIN 17 NOT CONNECTED

FIRMWARE REVISION

REV	EP.ID	POS	CODE	DESCRIPTION
2	W0233	B01	78145599-001	BASIC F/W + T&D AND CH. GENERATOR
3	W0234	B01	78146208-001	as above
4	W0235	B01	78148133-001	as above

SERIAL INTERFACE BOARD

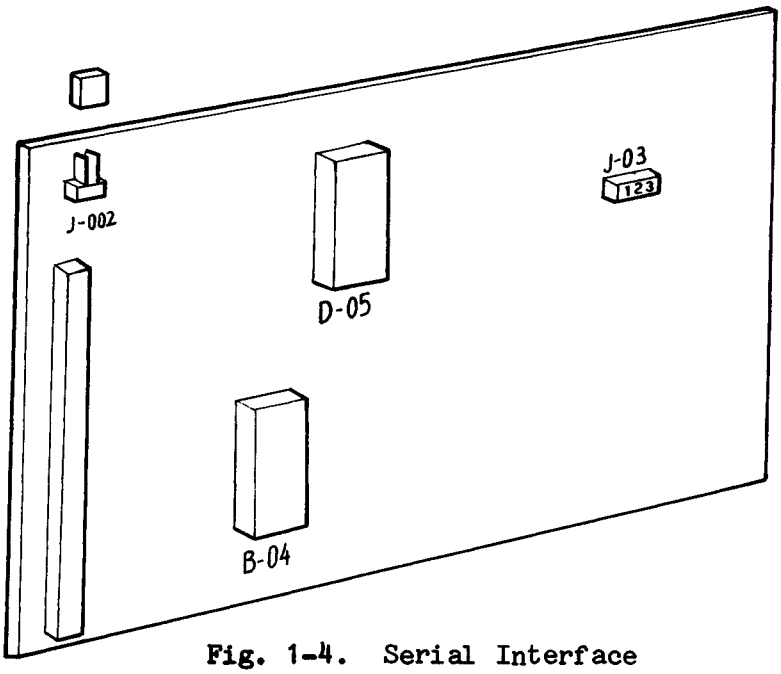


Fig. 1-4. Serial Interface

JUMPER POSITION ON PWA

JUMPER NAME	JUMPER POSIT. ON PWA	PIN IDENTIF. ON PWA	DESCRIPTION
-	J01	-	IT DOES NOT EXIST
-	J02	-	EXECUTES 1ST DIAGNOSTIC TEST - MFG
W03	-	1-2	PIN1 DI P002 CONNECTED TO FRAME GROUND
-	J03	2-3	PIN1 NOT CONNECTED (DEFAULT POSIT.)

F/W REVISION

REV	EP ID	POS	CODE	DESCRIPTION
1	W0208	B04	78145600-001	BASIC F/W + T&D AND CH. GENERATOR
	Y0108	D05	78145601-001	I/F FIRMWARE
2	W0209	B04	78146209-001	as above
	Y0109	D05	78146210-001	
3	W0210	B04	78148134-001	as above
	Y0110	D05	78148135-001	

MAIN PROCESSING BOARD

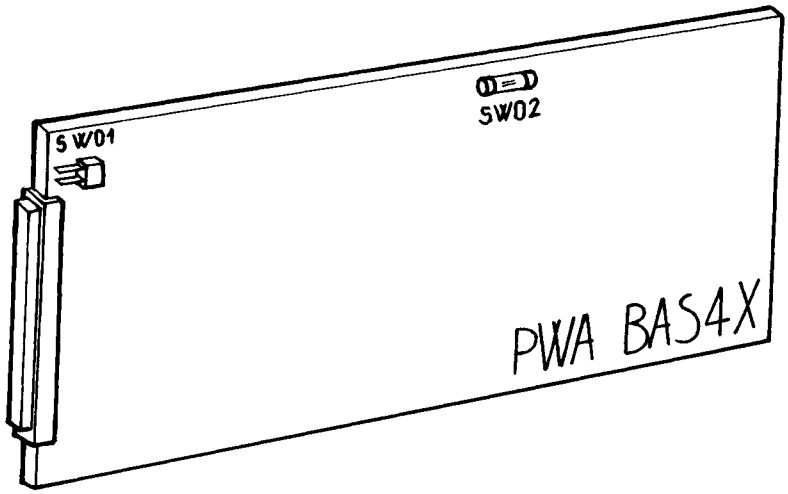


Fig. 1-5. Main Board

JUMPER POSITION ON PWA

JUMPER NAME	JUMPER POSIT. ON PWA	PIN IDENTIF. ON PWA	DESCRIPTION
W01	-	-	EXECUTES THE 1ST
-	J01	-	DIAGNOSTIC TEST - MFG
W02	-	1-2	WATCH DOG ENABLE (DEFAULT)
-	J02	2-3	WATCH DOG NOT ENABLE (for MFG test only)

SECTION II MAIN BOARD CONNECTORS

CHAPTER 1.1 MAIN BOARD LAYOUT

CHAPTER 1.1

MAIN BOARD

Figure 2-1 shows the block diagram of the BAS4X PWA, with respect to the connections with the various electro/mechanical parts of the printer. Thereafter follows the detailed description (pin out) of each connector.

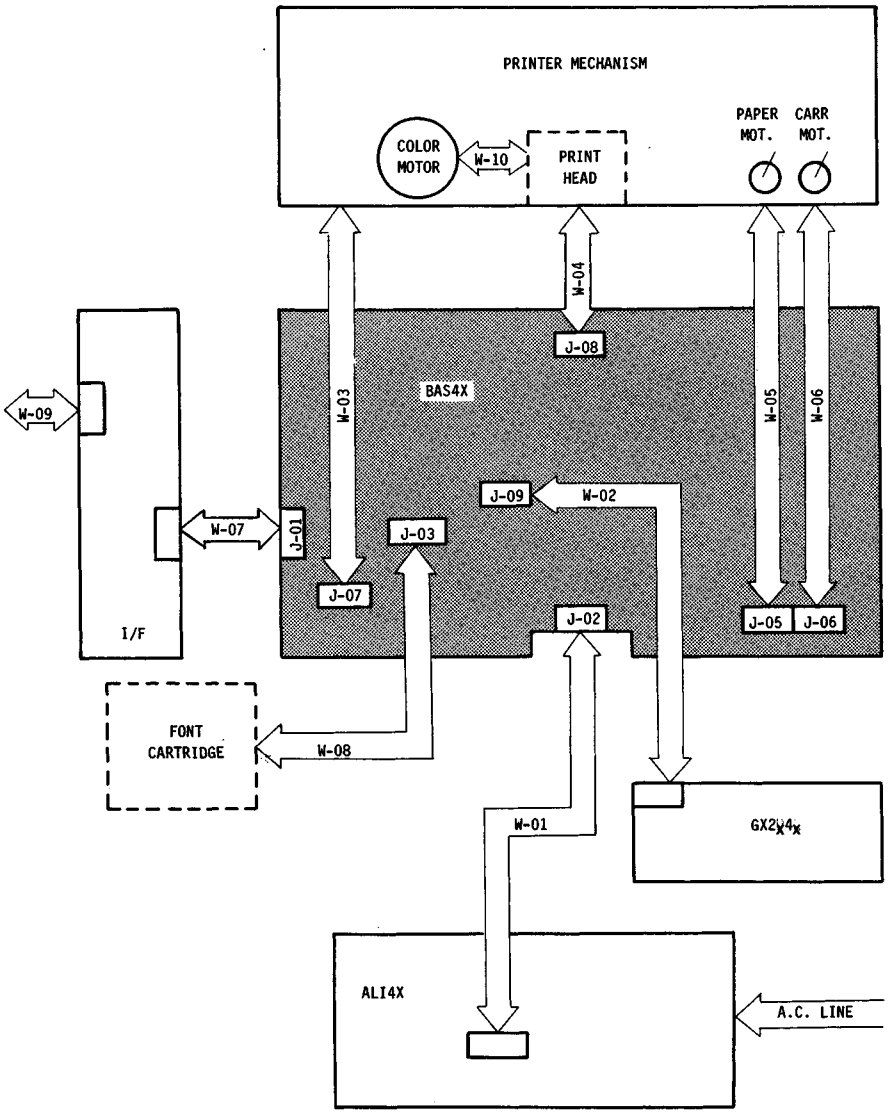


Fig. 2-1. Block diagram of BAS4X PWA

CONNECTORS

CONNECTION	TYPE	NUMBER OF WAYS	FUNCTION
W-01	DIRECT	32	D.C. voltage distribution and reset signal
W-02	CABLED	16	Operator Panel Connection
W-03	CABLED	14 (16)	Sensors Connection; Home position single sheet fanfold open bail, (cover open if present).
W-04	CABLED	18	Connection for: printhead, (color motor), printhead thermal sensor.
W-05	CABLED	4	Paper Motor Connection
W-06	CABLED	4	Carriage Motor Connection
W-07	DIRECT	64	I/F Board Connection
W-08	DIRECT	15	O.C.G. Cartridge Connection
W-09	CABLED	XXX	U/S Host Connection
W-10	CABLED	4	Color Motor Connection

BASXPWA Connectors Description

Designation: J-01
Type : BURNDY RPI64B20R1G02Z0(or equivalent)
Function : BASIC Connection - I/F

PIN No	SIGNAL	DESCRIPTION
1a-3a-11a 24a-26a-28a	GND	Signal ground
2a	READ-2	Receive signal READ/mP rigenerated
4a	EIF1-0	Enable data I/F
5a	EIF-0	Reset start signal INIT-0
6a	AL02+0	Address bus 2
7a	AL03+0	Address bus 3
8a	AL04+0	Address bus 4
9a	AL05+0	Address bus 5
10a	EPOT+1	I/F Driver enable parallel (I/F)
12a	DA03+0	Data bus 3
13a	DA05+0	Data bus 5
14a	DA06-0	Data bus 6
15a	DA02+0	Data bus 2
16a	DA00+0	Data bus 0
17a	AH12+0	Address bus 12
18a	AH10+0	Address bus 10
19a	AH09+0	Address bus 9
20a	AH15+0	Address bus 15
21a	AH13+0	Address bus 13
22a	P31+0	I/O mP pin 3
23a	P13+0	I/O mP pin 1
25a	P30+0	I/O mp pin 3
27a	PSEN-1	Program memory read strobe signal
29a	E3ZWP-0	Enable I/F RAM signal
30a	TEST+0	Only for MFG Test.
31a	P11+0	I/O mP pin 1
32a	P15+0	I/O mP pin 1

Continues J-01

PIN No	SIGNAL	DESCRIPTION
6b-13b-20b 23b	VP05	+5Volt D.C
2b-4b-10b 11b-16b-17b 24b-25b-27b 29b	GND	Signal ground
1b	39V	+39 Volt D.C
3b	WRITE-2	Signal WRITE/mP regenerated
5b	AL01+0	Address bus 1
7b	AL00+0	Address bus 0
8b	AL07+0	Address bus 7
9b	AL06+0	Address bus 6
12b	DA04+0	Data bus 4
14b	DA07+0	Data bus 7
15b	DA01+0	Data bus 1
18b	AH11+0	Address bus 11
19b	AH08+0	Address bus 8
21b	AH14+0	Address bus 14
22b	P12+0	I/O mP port 1
26b	P35+0	I/O mP port 3
28b	RSTCAS+0	Reset I/F board signal
30b	P10+0	I/O mP port 1
31b	P14+0	I/O mP port 1
32b	P16+0	I/O mP port 1

Designation: J-02
Type : BURNDY PI32B20P00F00Z0(or equivalent)
Function : PWA ALI4X Connection

PIN No	SIGNAL	DESCRIPTION
1a-2a-3a-8a 9a-10a-11a 12a-15a-16a	GND	Signal ground
13a-14a	+5V	+5 Volt D.C.
4a-5a-6a-7a	+39V	+39 Volt D.C.
1b-2b-3b 8b-9b-10b 11b-12b	GND	Signal ground
13b-14b	+5V	+5 Volt D.C.
4b-5b-6b-7b	+39V	+39 Volt D.C.
15b	VCLAMP+0	Voltage dedicated to the needles firing circuit
16b	RESET-0	Master reset signal

Designation: J-03
Type : AMP 281718-3(or equivalent)
Function : FONTS Cartridge Connection

PIN No	SIGNAL	DESCRIPTION
1	READ-2	READ mP regenerated signal
2	VP05	+5 Volt D.C.
3	AL00+0	Address bus 0
4	DA07+0	Data bus 7
5	AL01+0	Address bus 1
6	DA06+0	Data bus 6
7	AL02+0	Address bus 2
8	DA05+0	Data bus 5
9	AL03-0	Address bus 3
10	DA04+0	Data bus 4
11	AL04+0	Address bus 4
12	DA03+0	Data bus 3
13	AL05+0	Address bus 9
14	DA02+0	Data bus 2
15	AL06+0	Address bus 6
16	DA01+0	Data bus 1
17	AL07+0	Address bus 7
18	DA00+0	Data bus 0
19	AH09+1	Address bus 9
20	LPCART-0	LED for FONT selection
21	AH10+0	Address bus 10
22	AH11+0	Address bus 11
23	AH12+0	Address bus 12
24	ECART-1	Enable external font cartridge
25	AH13+0	Address bus 13
26	VPP+0	LED for FONT selection return
27	GND	Signal ground
28	AH08+0	Address bus 8
29	FRAME	Frame ground
30	PGN-0	Power Supply plus EPROM programming (usually + 5V)

Designation: J-05
Type : AMP 280372-1(or equivalent)
Function : Paper Motor Connection

PIN No	SIGNAL	DESCRIPTION
1	MOPA 1	Winding A
2	MOPA 2	
3	MOPA 3	Winding B
4	MOPA 4	
5		Not connected
6		Not connected

Designation: J-06
Type : AMP 280371-1(or equivalent)
Function : Carriage Motor Connection

PIN No	SIGNAL	DESCRIPTION
1	MOCA 1	Winding A
2	MOCA 2	
3	MOCA 3	Winding B
4	MOCA 4	

Designation: J-07
Type : AMP 280385-1
Function : Sensor Connection

PIN No	SIGNAL	DESCRIPTION
1	COVER+0	Opt sensor termination of occurred
2	GND	cover opening
3	SHETO-1	Terminations of photodiodes
4	INSE+0	concerning single sheet or fanfold
5	PROL	Sensors
6	PROL	
7	VP05	Termination of sensor for fanfold
8	ENDFF	presence control
9	VP05	Terminations of sensor for single
10	SHETI-1	sheet presence control
11	HOMD+0	Terminations of sensor for control
12	GND	of carriage proper positioning at
13	HOMTR+0	print line beginning
14	HOMCA-0	
15	OPENB+0	Terminations of sensor for occurred
16	GND	bail situation (S.S. loading)

1 Description: J-08
Type : BWRNDY SLEM 18-R1 (or equivalent)
Function : Print head Connection (and color motor)

PIN No	SIGNAL	DESCRIPTION
1	GND	Signal ground for thermal sensor
2	AG05	Fire 5 driver
3	SEN5	Termination of Thermal sensor
4	AG07	Fire 7 driver
5	+39V	D.C. +39 Volt
6	+39V	Paper Supply common to all fires
7	+39V	
8	AG09	Fire 9 driver
9	AG08	Fire 8 driver
10	AG06	Fire 6 driver
11	AG04	Fire 4 driver
12	AG02	Fire 2 driver
13	AG01	Fire 1 driver
14	AG03	Fire 3 driver
15	MCOL1	Winding A color motor
16	MCOL2	
17	MCOL3	Winding B color motor
18	MCOL4	

Description: J-09
Type : ANSLEY 609-1627 (or equivalent)
Function : Connection to Operator Panel

PIN No	SIGNAL	DESCRIPTION
1	POPE04-0	Keys handling signal and Led's to O.P.
2	POPE02-0	as above
3	POPE05-0	as above
4	POPE06-0	as above
5	POPE13+0	O.P. keys signal
6	POPE03-0	Keys handling signal and Led's to O.P.
7	POPE12+0	O.P. keys signal
8	POPE14+0	as above
9	POPE01-0	Keys handling signal and Led's to O.P.
10	GND	Signal ground
11	GND	as above
12	GND	as above
13	GND	as above
14	POPE11+0	O.P. keys signal
15	VP05	+ 5 Volt D.C.
16	VP05	as above

INTRODUCTION

Resident T&D program has been developed to meet with different diagnostic requirements. First of all, it has been conceived to be of help to the Technical Service Staff, who operates on-the-field and needs a diagnostic tool, pratical and complete. Secondarely, T&D must meet with factory requirements related to the printer setup in the various steps of production flow.

Lastly, T&D can be used by the user who, as a consequence, can easily check-out the reliability of the printer in his possession. Obviously, the concept itself of Self-Diagnosis excludes beforehand the possibility of discovering faults by directly involving the microprocessor, as well as the H/W necessary to the same microprocessor to accede to the T&D program on EPROM.

LAUNCH OF T&D

T&D program consists of a determined number of tests, each of which is dedicated to the check-out either of a functionality or of a physical device; the complete list of tests executed is described on the table 3-1.

Each test is executed one at a time in the sequence as described on the table.

The approach adopted is as follows: check-out is first kept on the system core, which is a Microprocessor supplied with RAM's and ROM's. Then, the I/O ports-connected-devices are tested, as well as the standard interface with the Host and any possible options, too. Finally, a Sample Form is printed out.

Four launching modes of T&D programs are provided. They have the purpose to meet with user requirements (USER LAUNCH), field engineers people requirements (CHECK LAUNCH) and with factory requirements (MFG-TEST and RUN-IN tests).

The table shows the conditions necessary to the launch of various types of T&D; the column named MFG is referred to a jumper existing on the Mother Board. The I/F-named column is referred to the Printer's connector through which it dialogues with the Host.

The "Loop-back" title means that it is necessary to plug in a special connector, which has some short-circuited contacts.

When some Options are installed on the printer, they are automatically diagnosed.

Pay attention to the "Printer Setup": if the Optional Character-Generator is neither recognized, nor installed, the "free" word is displayed after the OCG symbol.

On the contrary, if the Generator has been recognized, a 5-digits identifier is displayed.

Table 3-1. LIST OF TESTS

TEST	TEST	DESCRIPTION
'0'	TECPU	CPU 8031 test
'1'	TROMO	rom 0000 (512 kbit) test;31-degree polynomial CRC
'2'	TERAM1	ram 1 (from 8 kbytes) test
'3'	TERAM2	ram 2 (from 8 to 32 kbytes) test
'4'	TIMER	timer test 8253
'5'	TEROM	eprom test 9306
'6'	TEPIO	parallel or serial I/O test
'7'		serial interface rom test; 16- degree polynomial CRC
'8'		serial interface ram 8031 test
'9'		serial interface timers 8051 test
'A'		serial interface ram test
'B'		serial interface loop-back test
'C'	TIOVA	operator panel test
'D'	VECOV	interlock identification and ASF
'E'	VELEL	paper loader test
'F'	TECG1	opt chrt generator test (128 kbit); 16-degree polynomial CRC
'G'	IDLEN	model identification (M40 and M41)
'H'	PRINT	print test
'I'	PRINL	print test from host
'J'	PSCOL	print test + color from host
'K'	TWDOG	watch-dog test
'L'	TENDI	diagnosis end

Table 3-2. LAUNCHING MODES

Type	MFG	COVER	I/O	LAUNCHING MODES
MFG-TEST:	on	open	plug	automatic at power on
RUN-IN TEST:	on	close	free	automatic at power on
CHECK TEST:	off (1)	close	plug	press UP&DOWN push-buttons, at power on
USER TEST:	off (1)	close	free	press DOWN push-buttons, at power on.
1) DEFAULT VALUE				

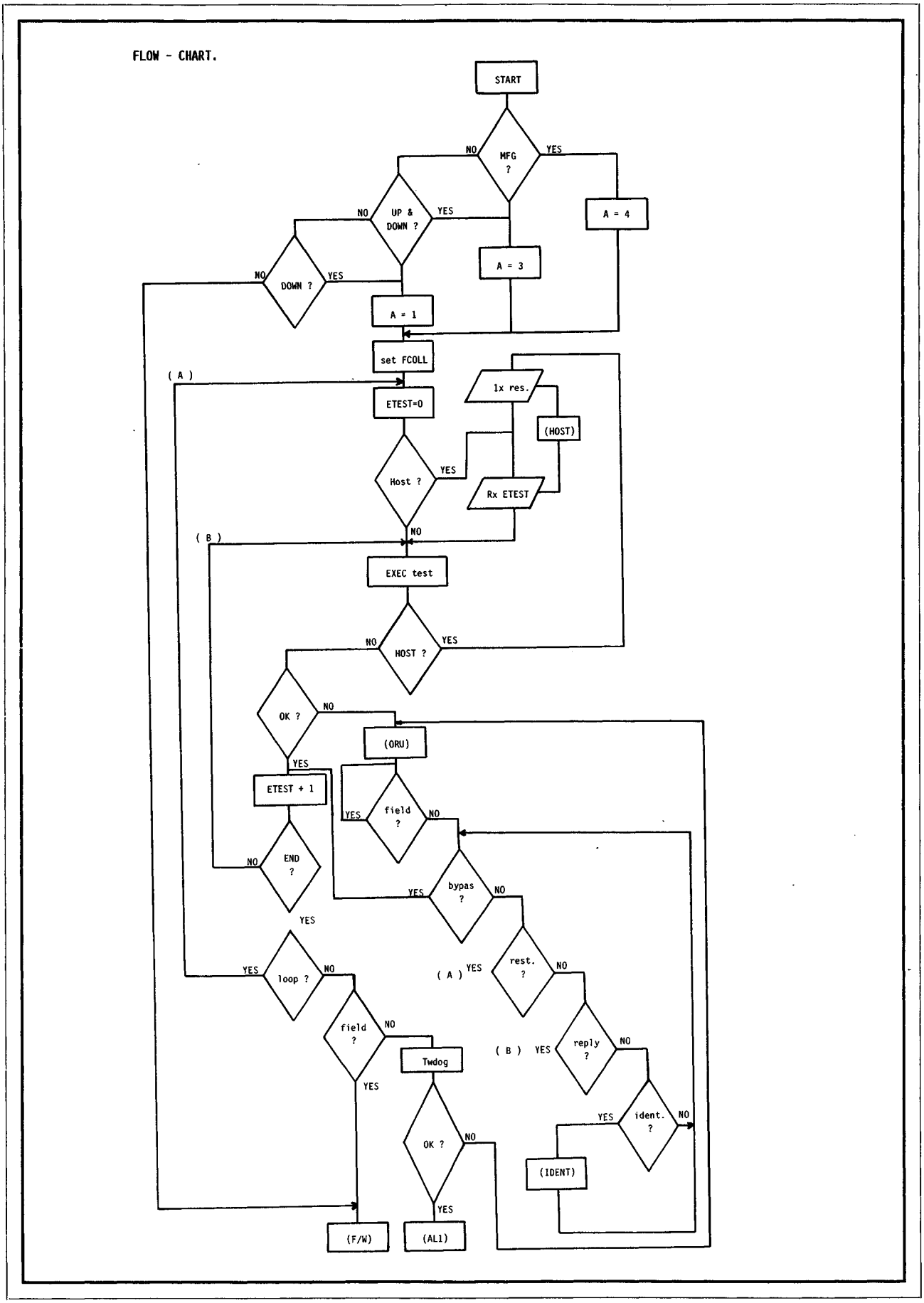


Fig. 3-1 Flow Chart of T&D

MFG-TEST LAUNCH (1st MFG TEST: see also TROUBLE-SHOOTING Section)

Of two provided launches for Factory use, this is the one launched when the printer has been assembled for the first time.

The upper cover of printer must be opened during test phase. It is necessary to plug the Loop-Back connectors into the various printer I/F's.

The form resulting from print test must comply with the attached Standard Module. Keeping pressed the 'FONT' push-button at the end of print test, the Printhead Alignment is entered (see Printhead Alignment description).

During the execution of T&D, the readout displays the number of the outstanding test. Forms must be 13-2' in width (132 columns at 10 CPI); if narrower, the print is executed on the platen. Forms must be from 12" to 27" in length (from 72 to 162 lines at 6 LPI):

- 50 lines before printing
- 12 lines of special form
- 12 lines between last line and paper sensor.

If the paper is already inserted into the printer, the print starts automatically; otherwise manual loading is expected. The case of configurations with display different from the provided ones, should be considered beyond T&D control (Major Error).

The SIO (=Serial I/O) has resident T&D which dialogues with the Mother Board T&D thru the standard connector. At the end of tests, it is necessary to power off the printer to exit from the T&D program. In fact, last test is the simulation for loss of printer F/W control, which causes the Watch-Dog reset. This watch-dog check device consists of a counter which is periodically refreshed thru F/W; should this not occur for whatever reason, the counter reaches the overflow and starts up some protections of the electromechanical area (motors, printhead, power off).

RUN-IN LAUNCH

It is the second launch of the two ones provided for the Factory and can be used for the printer Burn-In (components reliability continuous test). In fact, once it has been launched, this program continues indefinitely passing from the last to the first one. The printer upper cover must be closed during the test phase. The Loop-Back connector must be plugged into be printer I/F's; otherwise, the T&D will indicate error.

The NVM (=Not Volatile Memory) is diagnosed with read and write pattern only during the first test pass; in all subsequent passes check is made of the contents accuracy by means of the CRC only. This is done, in order to limit the number of write operations on said component.

The print test consists of 30 consecutive printouts of the form as per attached Standard Module-(except machine setup line which is printed on the 1st form only)-. All this, in order to stress paper and carriage, and printhead motors. Keeping pressed the 'FONT' push-button, at the end of print test, the Printhead Alignment is entered (see Printhead Alignment description).

During the T&D execution, the readout displays the number of outstanding tests. Forms must be 13.2" in width (132 columns at 10 CPI); if narrower, the print is executed on the platen. Forms must be from 12" to 27" in length (from 72 to 162 lines at 6 LPI).

- 10 lines before printing
- 50 lines of special form
- 12 lines between the last line and the paper sensor.

If the paper is already inserted into the printer, the print starts automatically; otherwise, manual loading is expected. The case of configurations with displays different from the expected ones, is to be considered beyond the T&D control (Major Error).

The SIO (=Serial I/O) has resident T&D, which dialogues with the Mother Board T&D thru the standard connector. Since no end of tests exists, it is necessary to power off the printer to exit from the program.

CHECK LAUNCH

It is the type of launch provided for Field Engineering. All tests listed in Table are executed. Thus, it is necessary to insert all Loop-Back connectors into the various printer I/F's.

The form resulting from the print test must comply with the attached Standard Module.

Keeping pressed the 'FONT' push-buttons, at the end of print test after paper ejection, the Printhead Alignment is entered. (see Printhead Alignment description).

During the T&D execution, the readout displays the number of the outstanding test. Forms must be 13-2 in width (132 columns at 10 CPI); if narrower, the printout is executed on the platen. Forms must be from 12" to 27" in length (from 72 to 162 lines at 6 LPI). The form consists of:

- 3 lines before printing;
- 50 lines of special form
- 12 lines between last line and paper sensor switch

If the paper is already inserted into the printer, the print starts automatically; otherwise manual loading is executed. The case of configurations with displays different from the expected ones, should be considered beyond T&D control (Major Error).

The SIO (=Serial I/O) has resident T&D which dialogues with the Mother Board T&D thru the standard connector.

At the end of tests, it is necessary to power off the printer to exit from the T&D program. In fact, last test is the simulation for loss of F/W printer control, which causes the Watch-Dog reset.

This watch-dog check device consists of a counter which is periodically refreshed via F/W; should this not occur for whatever reason, the counter itself reaches the overflow and starts up some protections to the related electromechanical part (motors, printhead, power supply).

USER LAUNCH

To avoid the disconnections of the printer from the Host, the I/F's (Parallel, Serial and ASF) tests are not executed.

The EPROM's contained in the cartridges of Optional Character-Generator are controlled as follows: if the Generator is recognized, a FONT-identifying-number is issued after the "CG1" symbol. On the contrary, if neither Generation recognition, nor cartridge insertion were realized, the "free" word is displayed.

The H-test (Watch-Dog) checks the max time of non-intervention only. The form resulting from the print test must comply with the attached Standard Module.

At the end of T&D it is possible to relaunch test from the beginning by pressing the 'PROG' push-button during the blinking of the 'END?', word (5 sec.); if not executed, T&D is then ended and the printer goes automatically on-line.

A possible error during the T&D User-Launch execution cannot be by-passed at all (see "Error Recognition"). Keeping pressed the 'FONT' push-buttons, at the end of print test, Printhead Alignment is entered (See Printhead Alignment description).

During the execution of T&D, the readout displays the number of outstanding test. Forms must be 13.2" width (132 columns at 10 CPI); if narrower, the printout is executed on the platen.

The form consists of:

- 1 heading line
- 1 printer setup line

This one contains information related to the Identifying Codes of EPROM's installed and, furthermore, it indicates the existing options (Char. Generator's, ASF, SIO, Color).

If the paper is already inserted into the printer, printing starts automatically, otherwise manual loading is expected. The case of configurations with displays different from the provided ones, should be considered beyond T&D control (Major Error). The SIO (=Serial I/O) has resident T&D which dialogues with the Mother Board T&D thru the standard connector.

EXECUTION OF T&D WITHOUT ERRORS:

When the T&D is launched, the 4 segments-readout displays:

T&Dx with x = number of running test (see table 3-1).

The end of the T&D program is indicated in this way:

MFG-TEST : "END!" configuration on the readout.

RUN-IN TEST : automatic recycle on all tests.

CHECK TEST : "END" configuration on the readout.

USER TEST : possibility of entering, or exiting from the loop, by pressing the "PROG" push-button at diagnosis end, (when the "END? configuration blinks)

Table : lists all possible T&D displays.

Table.3-3. DIAGNOSTIC DISPLAY

NORMAL EXECUTION

```
                                        T & D x
                                              !
      ETEST (test under execution)------------!
```

ERROR CONDITION

```
                                        O R U y
                                              !
      NUORU (spare part)----------------------!
```

IDENTIFIER MODE

```
                                        K x Y z
                                        ! ! ! !
      ETEST (test under execution)--------! ! !
      NUORU (spare part)--------------------! !
      IDENT (error identification)------------!
```

INTERPRETATION OF STANDARD MODULE

The Standard Module is useful to highlight critical conditions in the printer operation; the form is composed of following points:

1. Heading

2. Configuration:

   - EPx = Identification Code (F/W version)
   - OCGx = Optional Character Generator
   - ASF = Automatic Sheet Feeder
   - SIO = Serial I/F

3. Print Needles Stress

4. Alignment Pattern

5. Print Sample:

   - normal
   - compressed
   - near-Letter quality

6. Print under Carriage START/STOP.

7. Color Print Test (via Host only)

8. Underline Test

The standard Form is printed as complete mode in the following launches:

- Check Test Launch
- MFG-Test Launch
- Run-in Launch

On the contrary, upon User Launch, items 1. and 2. only are printed.

PRINTHEAD ALIGNMENT

The Printhead Alignment consists in rating a time delay, which has been inserted between two bidirectional passes, of the carriage. This procedure is necessary anytime a part affecting the carriage movement (carriage motor, drive belt,.....) is repaired/replaced.

When the 'FONT' push-button is kept pressed up to paper form ejection (in all types of T&D launches), access is made to the Printhead Alignment and the current value of the rating parameter is displayed. The rating parameter has a value ranging from -5/+5 and it is possible to vary it by use of the Operator Panel push-buttons which operate as follows:

UP ↑ : Pressing this push-button, the alignment value is incremented (max + 5).

DOWN ↓ : pressing this push-button the alignment value is decremented (min - 5).

FONT : pressing this push-button, the print of 6 'H'-lines is executed.

PROG : pressing this push-button, a Form Feed is executed and T&D restarts with the test subsequent to Form Printout:
Watch-Dog Test.

1ST PRINTABLE LINE ADJUSTMENT

It allows to adjust the position of the first printed line on fanfold.

- Access to the procedure. It is allowed during the final phase printing of the standard module by keeping pressed the PROG push-button (MFG-TEST and RUN-IN launches), up to paper form ejection.
- The printer ejects the paper and requests for a new loading; <LOAD> is displayed on readout.
- Upon executed loading, Eight "E"'s are printed.
- <C=X> is displayed on readout, where x represents the correction value. This value is variable, through the range - 5+5, by means of UP and DOWN arrows.
- Pressing FONT, the test is repeated from the moment of module ejection.
- Pressing PROG, the procedure stops and the values are stored.

PRINTER PERSONALIZATION

During T&DG (TEST Program), the readout will blink M41 (in case of 4/41 printer), or M40 (in case of 4/40 printer).

To personalize the printer model, press UP or DOWN arrow during blink.

RECOGNITION OF ERROR IN T&D

When an error is detected in one of T&D tests, the execution of program is cut off with contemporaneous buzzer signal and the readout displays the spare part to be replaced (see Table.3-4).

O R U Y = Optimal Replacement Unit Y

The list of spare parts is described on Table 3-4. Furthermore, there is a second display (called identifier mode - see Table 3-5) identifying in the most possible way, the component, or the part to which the default is concerned. This indication is displayed by pressing the 'PROG' push-button. An identifying code will be displayed as follows:

K X Y Z = K - Fixed letter
X - number of running test
Y - ORU's number
Z - identifying number

The complete list of error identifier is described in the Table 3-5.

When T&D program is cut off upon detection of a controllable error, the operator has the following possibilities:

PUSH-BUTTON	ACTION
FONT	T&D restarts from first test
UP	T&D executes same test again
DOWN	T&D continues with next test
PROG	Second indication is displayed (if provided)

REMARK: The actions by means of push-buttons are not enabled in case of User Launch.

Table.3-4. LIST OF SPARE PARTS

ORU	PWA	DESCRIPTION
'0'	PWX	generic error
'1'	BAS	BAS pwa
'2'	DAU	I/F pwa
'3'	FW1	F/W pwa, chip U03, (eprom 0000)
'4'	FW2	F/W pwa, chip U04, (eprom 8000)
'5'	OPA	OPA pwa, operator panel
'6'	CG1	CG1 pwa, chrt generator 1
'7'	SWL	loader switch
-	-	- - - - - - - -

Table.3-5. ERROR IDENTIFICATION

DISPLAY	DESCRIPTION
K000	Dialogue initialization error with serial interface
K010	CPU 8031 error
K130	Eprom 27512 not recognized
K131	Eprom 27512 wrong CRC
K210	System RAM error, from 6000 to 8000
K320	RAM error at 8000 (8K or 32K)
K410	Timers operation error
K411	Timer 0 operation error
K412	Timer 1 operation error
K413	Timer 2 operation error
K414	Timer 2 interrupt error
K510	EEPROM memory error

Parallel Interface:

K620	Loop-Back error: strobe <-> busy
K621	Select-in grounded
K622	Loop-back error: ack <-> data 1,4 and 7
K623	Loop-back error: pE <-> data 2,5, 8 and autofeedtxt
K624	Loop-back error: error <-> data 3 and 6
K625	Jumper position autofeedxt error

Serial Interface:

K620	Connection SIO error <-> basic pwa
K621	Missing receive on status from SIO
K720	Wrong CRC 2764 eprom error
K721	Missing answer on status from SIO
K820	Internal RAM error, serial I/F
K821	Missing answer on status from SIO
K920	Timers 8031 error, serial I/F
K921	Missing answer on status from SIO
KA20	External RAM error, serial I/F
KA21	Missing answer on status from SIO
KB21	Missing answer on status from SIO
KB22	DTR/DSR loop back error
KB23	RTS/CTS loop back error
KB24	SRTS/DCD loop back error
KB25	TX/RX loop back error (RS232)
KB26	TD/RD loop back error (RS422)
KC50	Push-button 8 error (on-line)
KC51	Push-button 7 error (ff)
KC52	Push-button 6 error (lf)
KC53	Push-button 5 error (cq)
KC54	Push-button 4 error (font)
KC55	Push-button 3 error (up)
KC56	Push-button 2 error (down)
KC57	Push-button 1 error (prog)
KE70	Paper loading lever on action
KF60	CG1 eprom, not recognized
KF61	CG1 eprom, wrong CRC
KG00	Carriage does not go to "Home"
KG01	NVM error on write M40 or M41
KH01	Paper fault
KH02	Carriage Synchronism error
KH03	Print initialization error
KI00	Paper fault upon print from line
KI03	Carriage initialization error upon print from line
KK10	Watch-dog releases before minimum time
KK11	Watch-dog does not release by maximum time

LOOP-BACK CONNECTIONS

To checkout the functionalities of various I/F's existing on the printer, use is made of proper connectors which have some short-circuited contacts.

Here below Loop-Back plugs layouts are given for connection purposes.

T&D allows a maximum time of signals preparation for "500 msec. (This high value is necessary, since the connector can be simulated via Host).

CENTRONIX I/F

```
STROBE 01 ----- 11  BUSY
  ACKN 10 ----- 02  DATA 1
            |-- 05  DATA 4
            |-- 08  DATA 7
  PAPE 12 ----- 03  DATA 2
            |-- 06  DATA 5
            |-- 09  DATA 8
            |-- 14  AUTFXY
 SLTOU 13 ----- 31  PRIME
 FAULT 32 ----- 04  DATA 3
            |-- 07  DATA 6
```

SERIAL I/O 232:

```
  TX  02-----03  RX
 RTS  04-----05  CTS
 DTR  20-----06  DSR
 DSC  11-----08  DCD
```

SERIAL I/O 422:

loopback plug type 1

```
TD(a) (13)  <-----------------> (16) PD(a)
TD(b) (14)  <-----------------> (17) PD(b)
DTR   (20)  <-----------------> (6)  DSR
RTS   (4)   <-----------------> (5)  CTS
                        |------> (8)  DCD
```

loopback plug type 2

```
TD(a) (13)  <-----------------> (16) PD(a)
TD(b) (14)  <-----------------> (17) PD(b)
DTR   (20)  <-----------------> (6)  DSR
RTS   (4)   <-----------------> (5)  CTS
DSC   (11)  <-----------------> (8)  DCD
```

loopback plug type 3

```
TD(a) (13)  <-----------------> (16) PD(a)
TD(b) (14)  <-----------------> (19) PD(b)
DTR   (20)  <-----------------> (6)  DSR
RTS   (4)   <-----------------> (5)  CTS
DSC   (17)  <-----------------> (8)  DCD
```

CONNECTION WITH DEDICATED HOST

Provision is given for the possibility of connecting a host (FUNTEST) dedicated to the Printer by means of CENTRONIX I/F.

T&D recognizes the presence of Host before executing the first test. If the host is present, T&D keeps waiting for the execution command of a test. Once the execution has finished, T&D sends to host the result. At this point, the host can request the execution of another test, or even of the same (a preset sequence of test is no longer subsisting).

Host/Printer Communication Protocol

EXEC TEST: <STX><ETEST><ETX>

Printer/Host communication protocol

TEST OK : <STX><ETEST><EPROM ID.><ETX>
ROMS TEST (not EEPROM)
<STX><ETEST><ETX> - all other tests

TEST KO : <STX><ETEST><NUORU><IDENT><ADDR><ETX> - roms test (not EEPROM)
<STX><ETEST><NUORU><IDENT><ADDR><ACTUAL><EXPECTED><ETX> - ram test
<STX><ETEST><NUORU><IDENT><ETX> - all other tests

RELATIONSHIPS BETWEEN BASIC F/W AND T&D

The T&D program, for a proper operation, needs to accede to a certain number of routines existing in the basic F/W. These routines are called by means of routines declared as EXTRN in the T&D file and are listed in the below table.

F/W ROUTINES NAME	DESCRIPTION
INIZHW	Initializes Printer Hardware
INDIAG	Sets T&D execution conditions
RDNVM	Reads EEPROM's content
WRNVM	Writes EEPROM's content
SMESSG	Prints a string of character

STANDARD MODULE (1ST MFG.TEST)

1 m 40/41 printer: **assembly test** v1.0

2 **Configuration:** epr=W15/1 sio=Y0106 ocg= free asf= no

3

4 HHHHH

5 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@ABCDE
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@ABCD
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@ABCDE

HHHHHHHHHH
HHHHHHHHHH
HHHHHHHHHH
HHHHHHHHHH
6 HHHHHHHHHH
HHHHHHHHHH
HHHHHHHHHH
HHHHHHHHHH
HHHHHHHHHH
HHHHHHHHHH

7

8

CABINET REMOVAL

- Remove the plug-in cover ① and interface PWA, by pulling the locking push-button.
- Remove the paper support and the upper cover ② .
- Remove knobs of paper and printhead compound levers ③ .
- Raise covers ④ .
- Slacken locking screws for COVER ⑤ and Operator Panel ⑥ .
- Remove cartridges, if installed.
- Raise the rear paper bail cover and extract the cabinet by pulling it upwards.

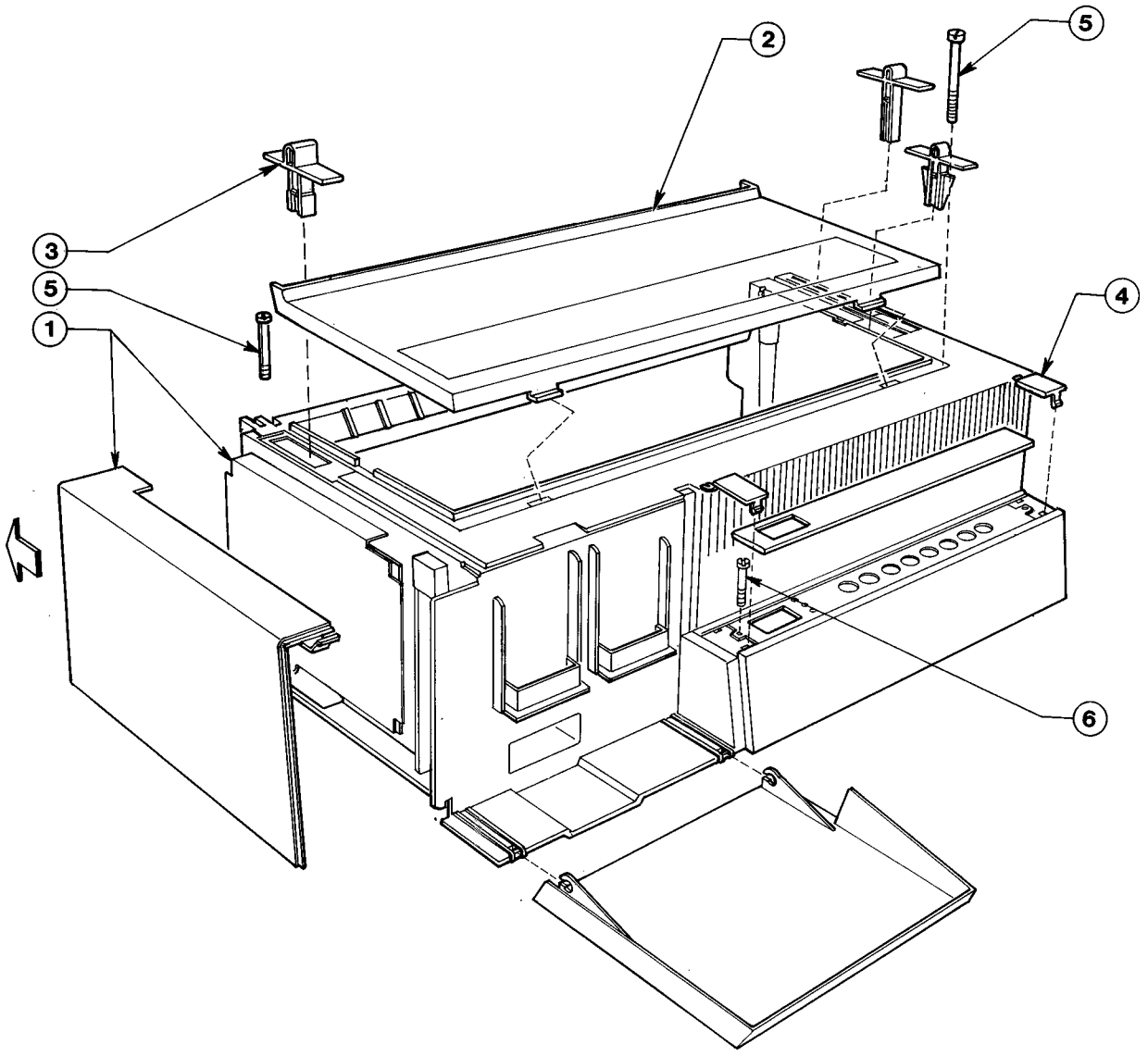


Fig. 4.1 Cabinet Removal.

BAS4X PWA REMOVAL

- By means of a screw-driver, raise the cable of the printhead (1) connector by acting on the proper dent.
- Smoothly slip off the P08 printhead cable.
- Disconnect Oper. Panel cable P09 (2) .
  And sensors cable P09.
- Remove PWA by pulling the locking push-button (3) .
- Slip off the motors connectors P05; P06 (4) .
- The Oper. Panel (5) will result free and standing on the basement.

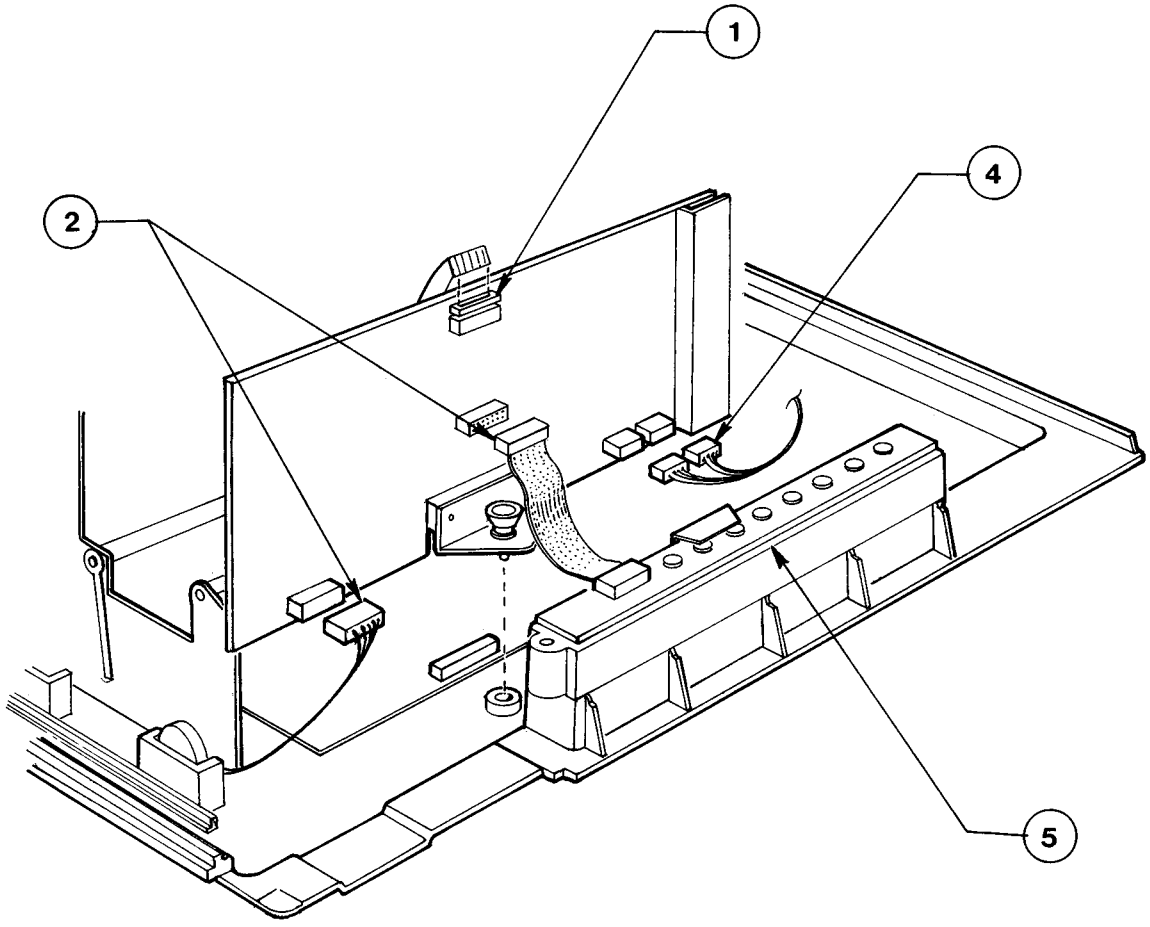


Fig. 4-2. BAS4X PWA Removal

MECHANISM REMOVAL

- Slip off ground cable (1)
- Remove mains filter cover (2)
- Remove screws (3)
- Raise the mechanism (4)

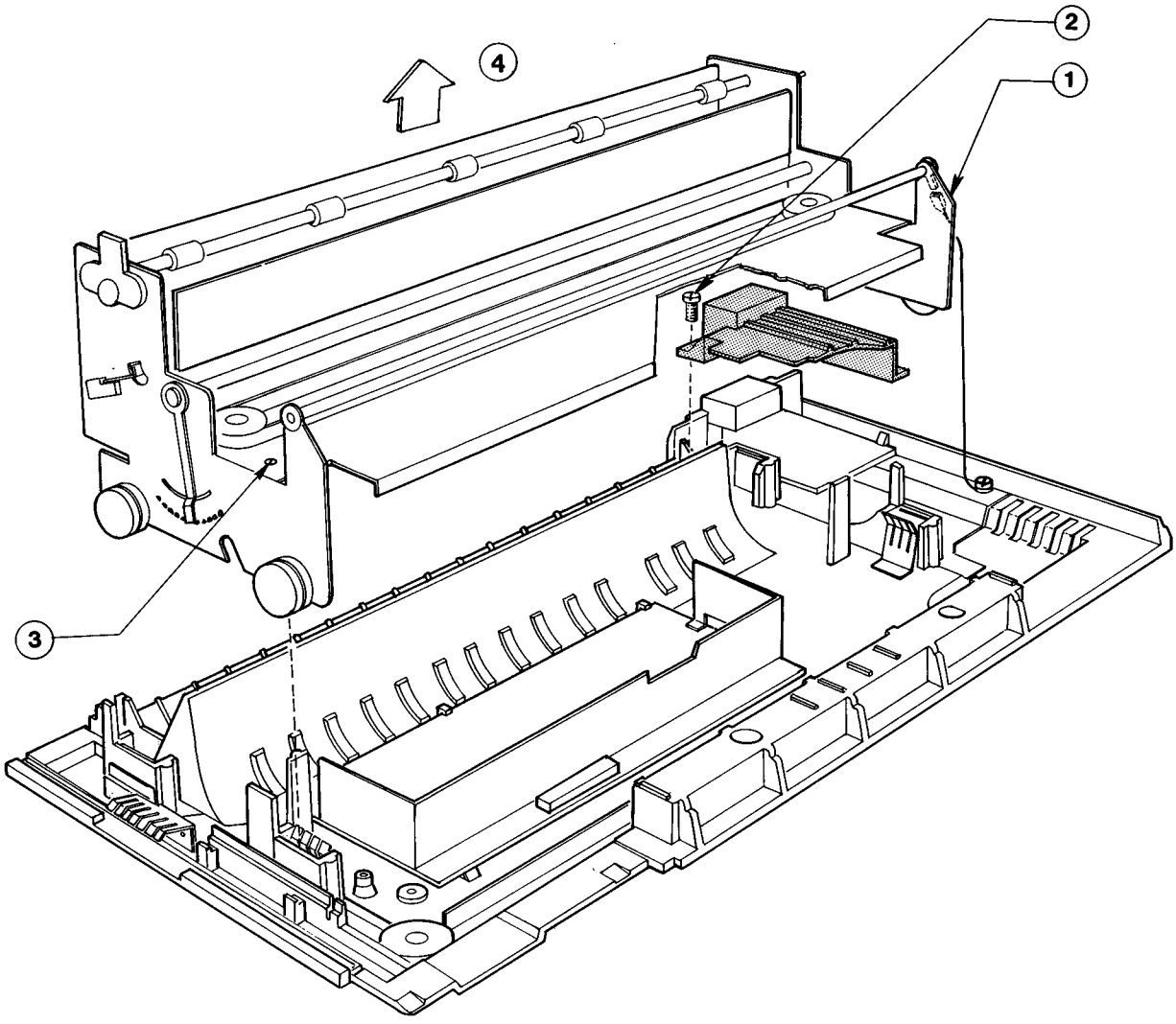


Fig. 4-3. Mechanism Removal

ALI4X POWER SUPPLY REMOVAL

- Remove the securing screws (1) of PWA
- Remove the fastening screw (2) of mains filter
- Remove the power supply PWA and pertinent filter as shown on illustration (3) .

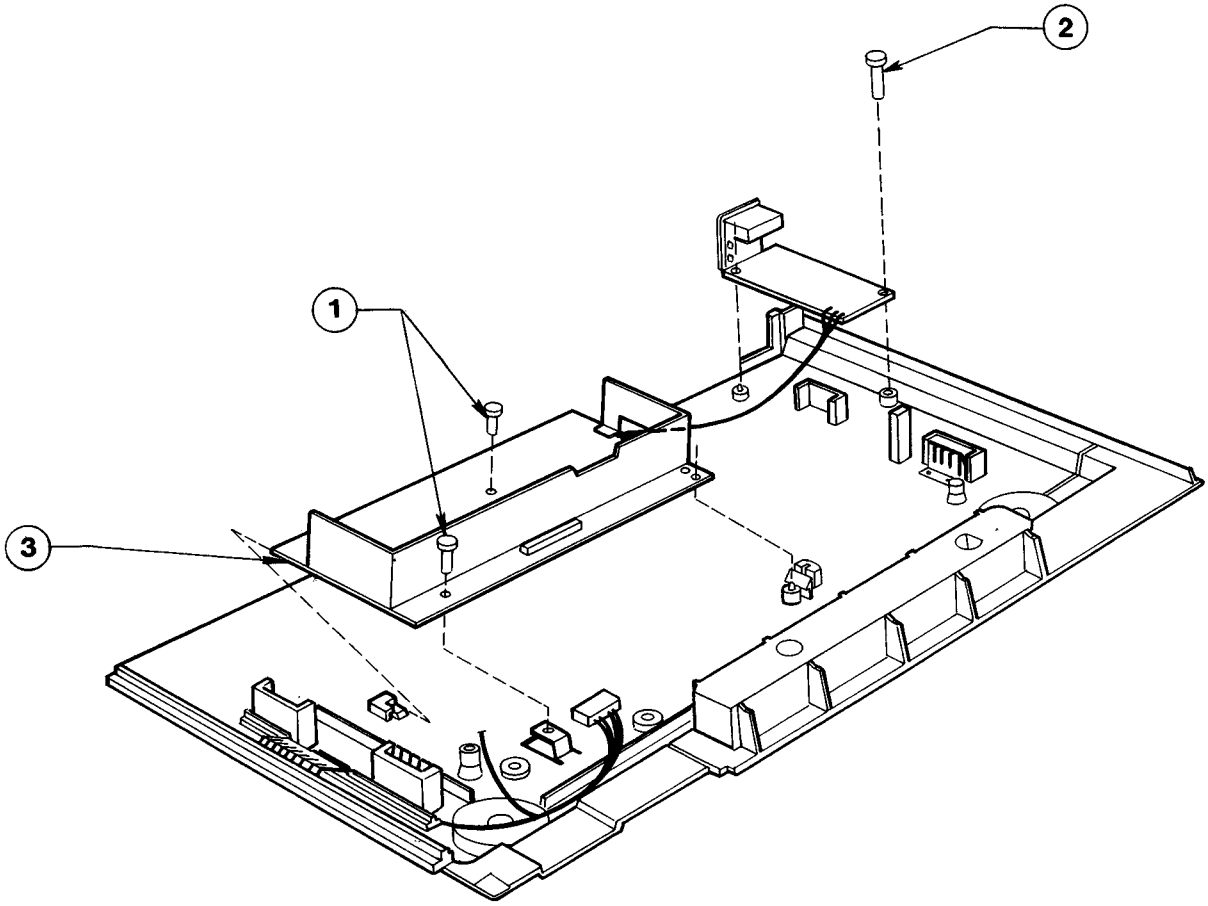


Fig. 4-4. ALI4X Power Supply Removal

CARRIAGE GROUP REMOVAL

LEFT SIDE

- Unscrew front and rear drive bars (1) .
- Remove the inner copy lever (2) .
- Remove the "Front bar lock WASHER" (3) .
- Unscrew the idle gear of carriage belt (4) .

RIGHT SIDE

- Unscrew front and rear drive bars (5) .
- Remove the "Front bar lock washer" (6) .
- Remove the tension spring of ribbon take-up spring (7) .
- Remove the carriage belt (8) .
- Remove the cable clamp plate of printhead (9) .
- Raise the carriage group + bars.

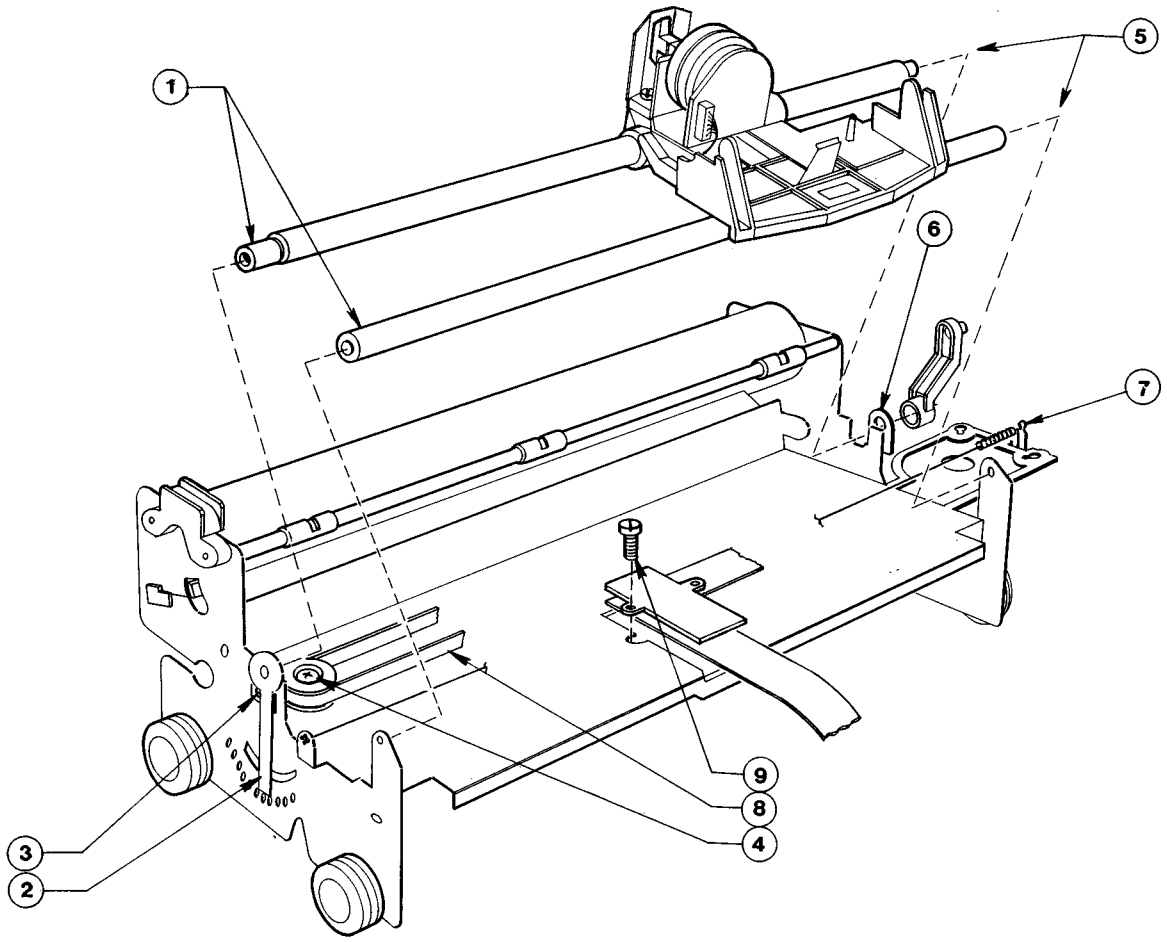


Fig. 4-5. Carriage Group Removal

MOTORS REMOVAL

PAPER MOTOR:

- Unscrew the fastening screws ① and extract the motor as shown on illustration.

CARRIAGE MOTOR:

- Unloosen the idle gear pulley ② .
- Remove the belt ③ .
- Unscrew the fastening screws ④ and extract the motor as shown on illustration.

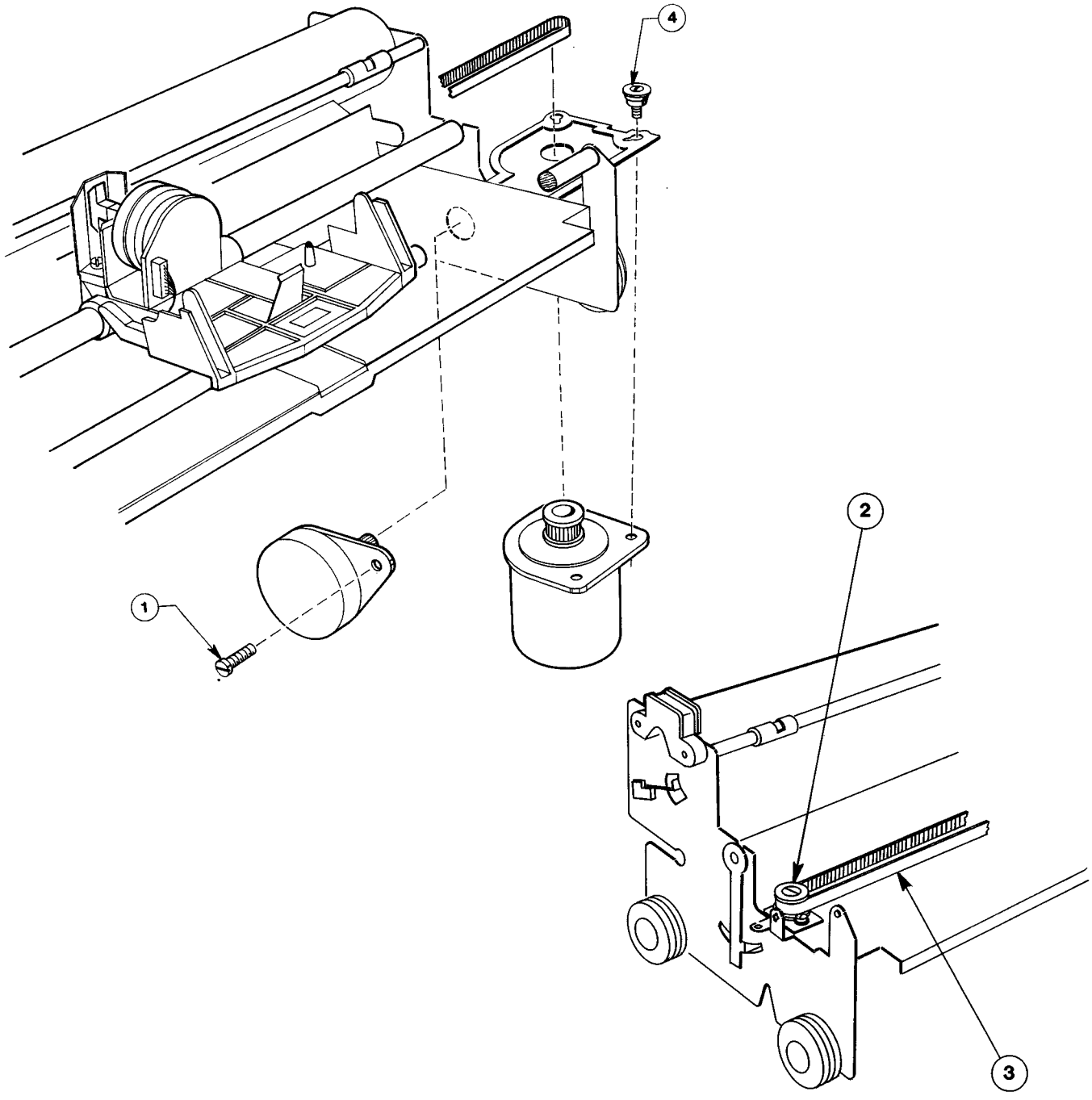


Fig. 4-6. Carriage And Paper Motor Removal

COLOR MOTOR REMOVAL

- Remove the printhead cable.
- Disconnect the color motor connector ① .
- Remove the pulley ② .
- Unscrew the color motor ③ and smoothly extract it.

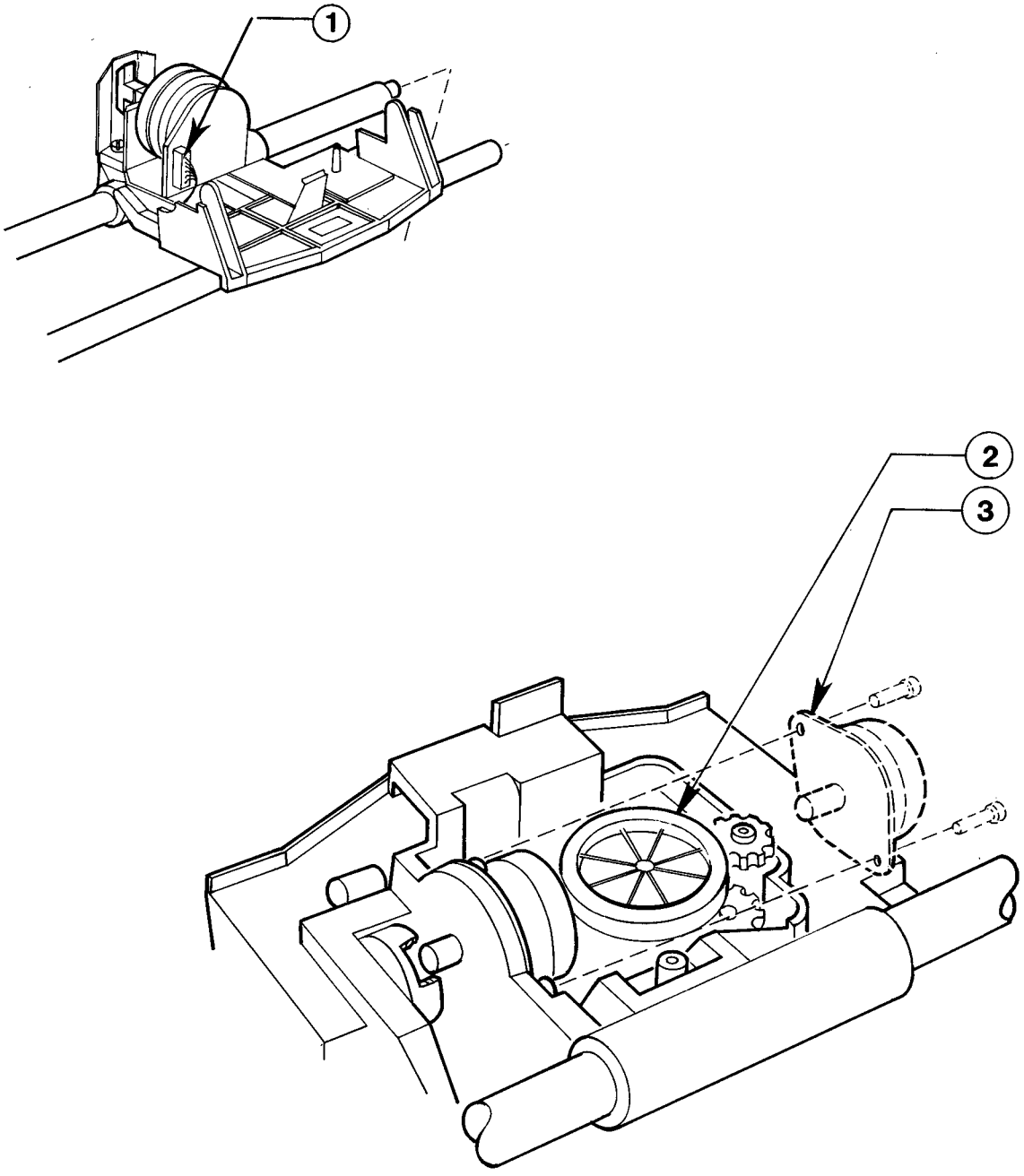


Fig. 4-7. Color Motor Removal

4/40 - 4/41 ADJUSTMENT

CARRIAGE BELT ADJUSTMENT - Slacken the securing screws for (1) belt pulley plate.

- Apply, by means of a (2) dynamometer, a tension of Kg. 3.8 + 0.3.
- Secure the (1) idle pulley plate.

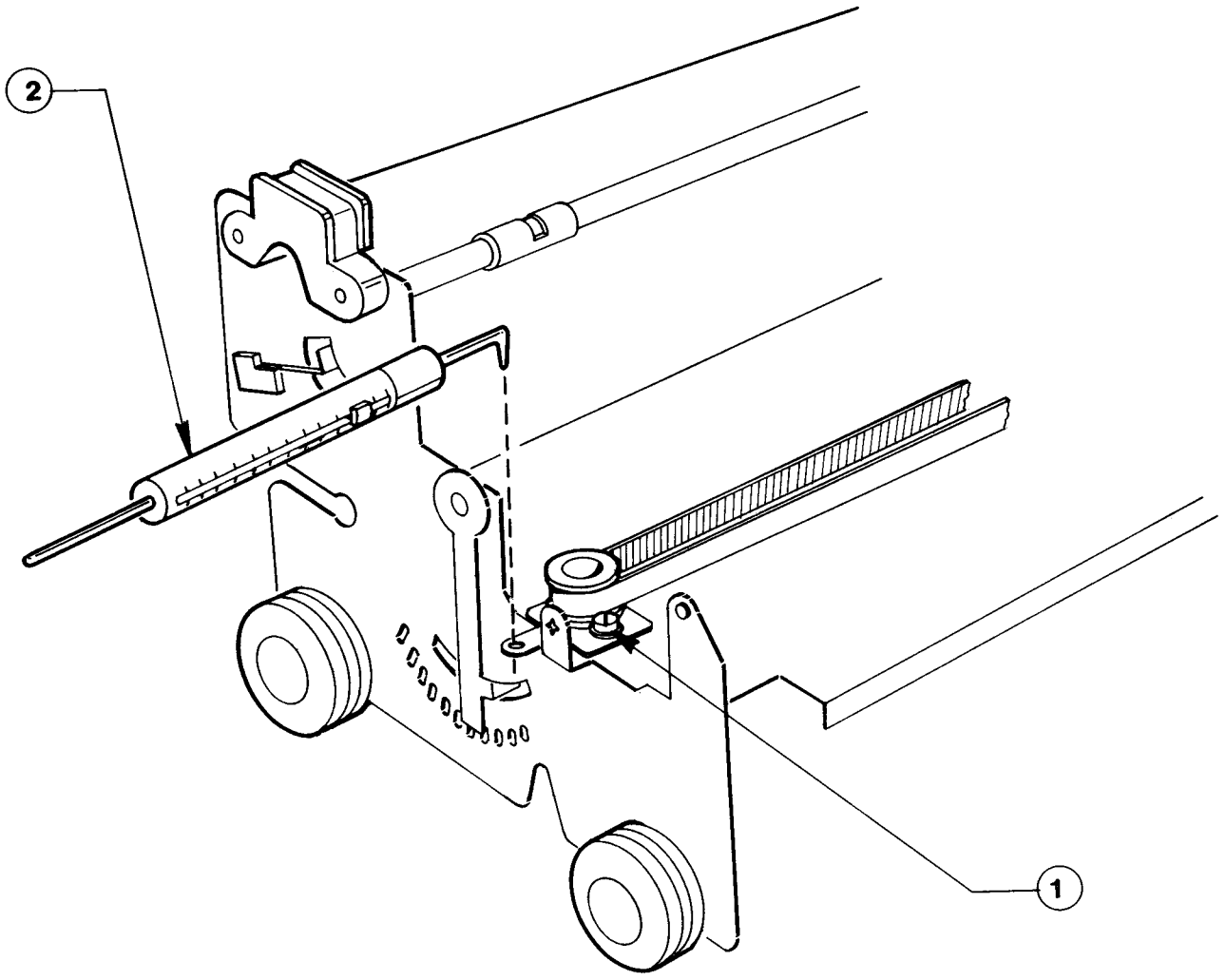


Fig. 4-8. Carriage Belt Adjustment

PAPER BELT TENSION ADJUSTMENT

- Unloosen the screw ① of the idle gear for belt tension
- Apply to point ② by means of a dynamometer, a tension of 1.10 lb.(Kg 0.5)
- Tighten the screw ① .

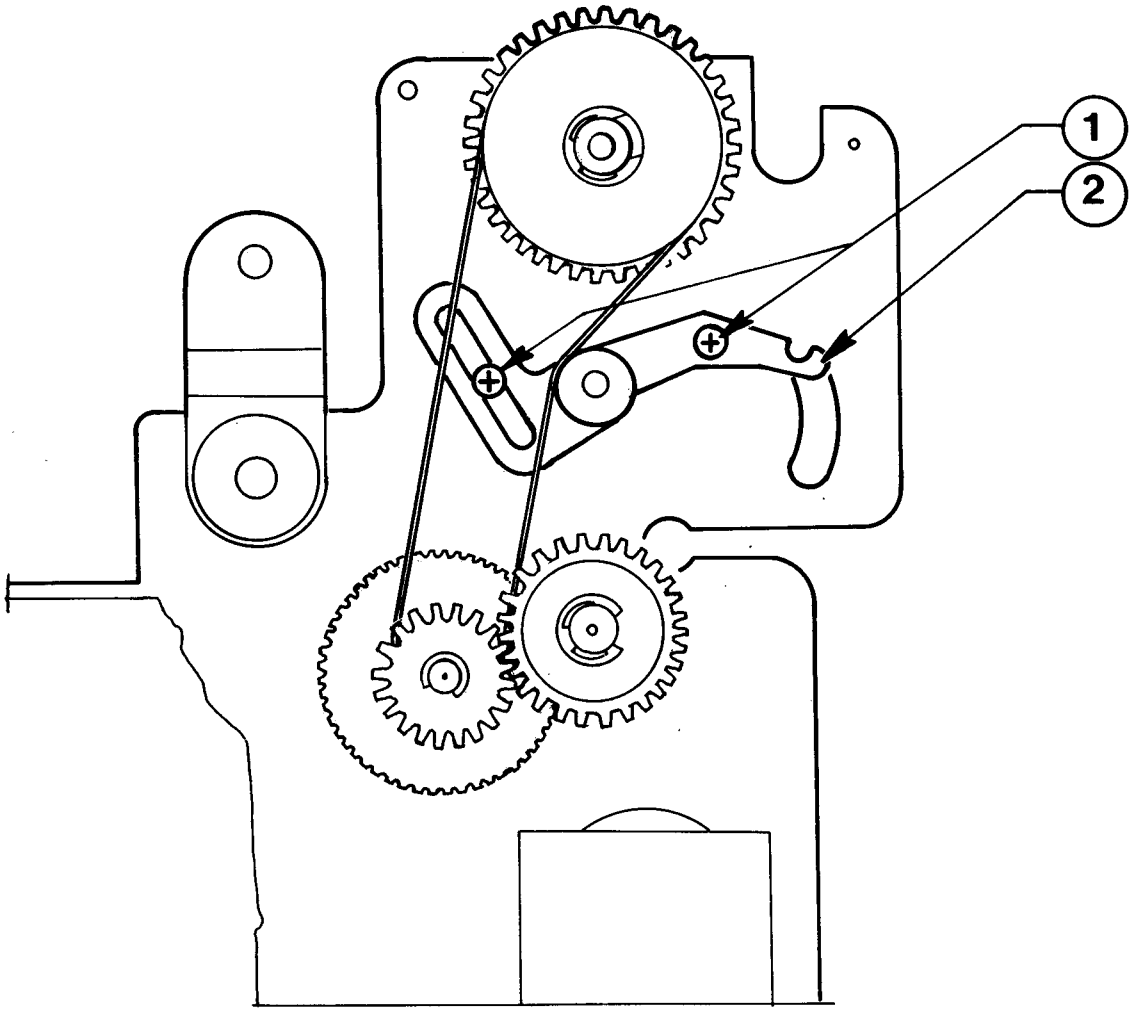


Fig. 4-9. Paper Belt Tension Adjustment

PRINTHEAD/ROLLER DISTANCE ADJUSTMENT

- Remove the screen ① for ribbon protection.

- Position the carriage to the printer centerline.
- Slacken the securing screws ② for the front bar positioning lever ⑤ ..
- By means of ③ copy lever, adjust the ④ distance between the printhead and the roller on a value of 0.35 mm.
- Bring the bar positioning lever ⑤ on the 1st rightside tack corresponding to the position of first copy.
- Tighten the securing screws ② .
- Re-check by means of feeler gauge the 0.35 mm gap of printhead/roller.
- Remount the ① screen for ribbon protection.

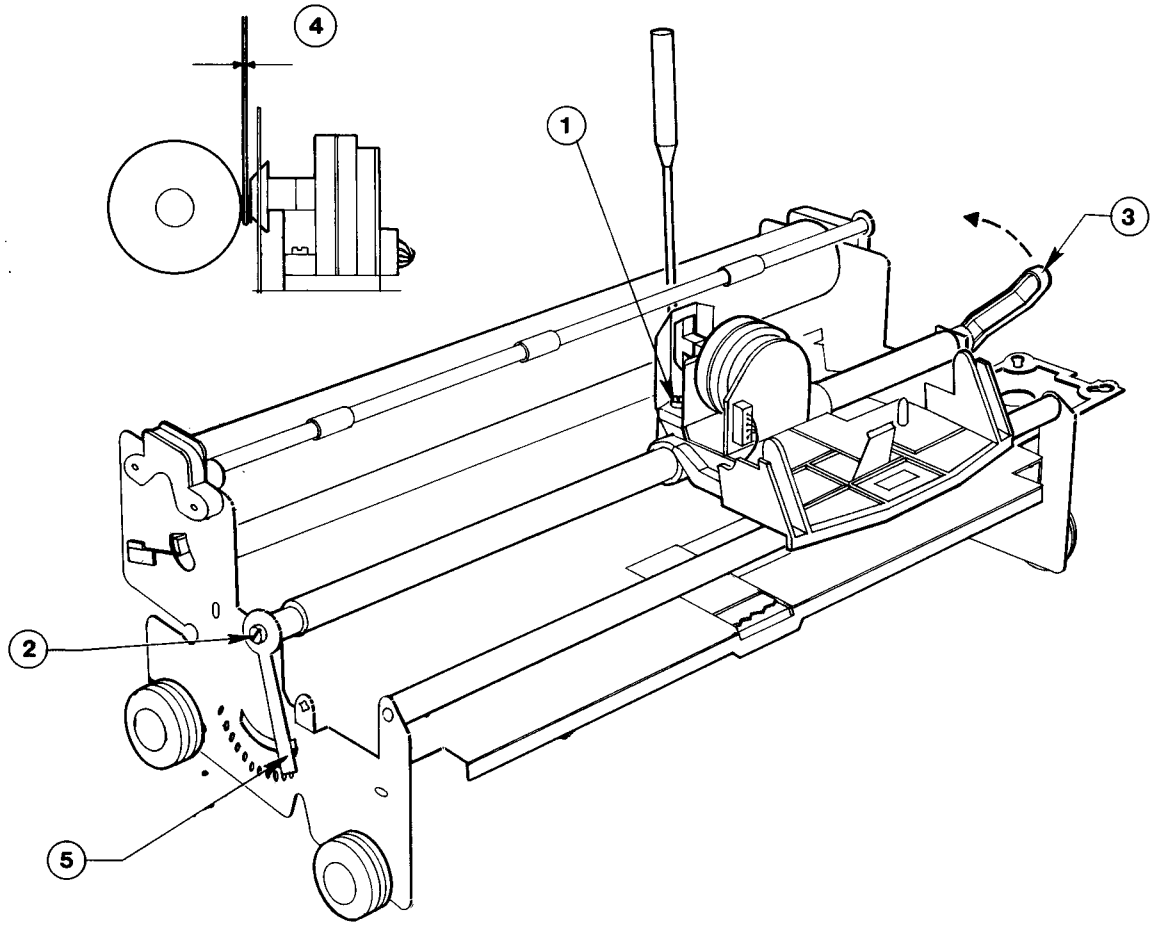


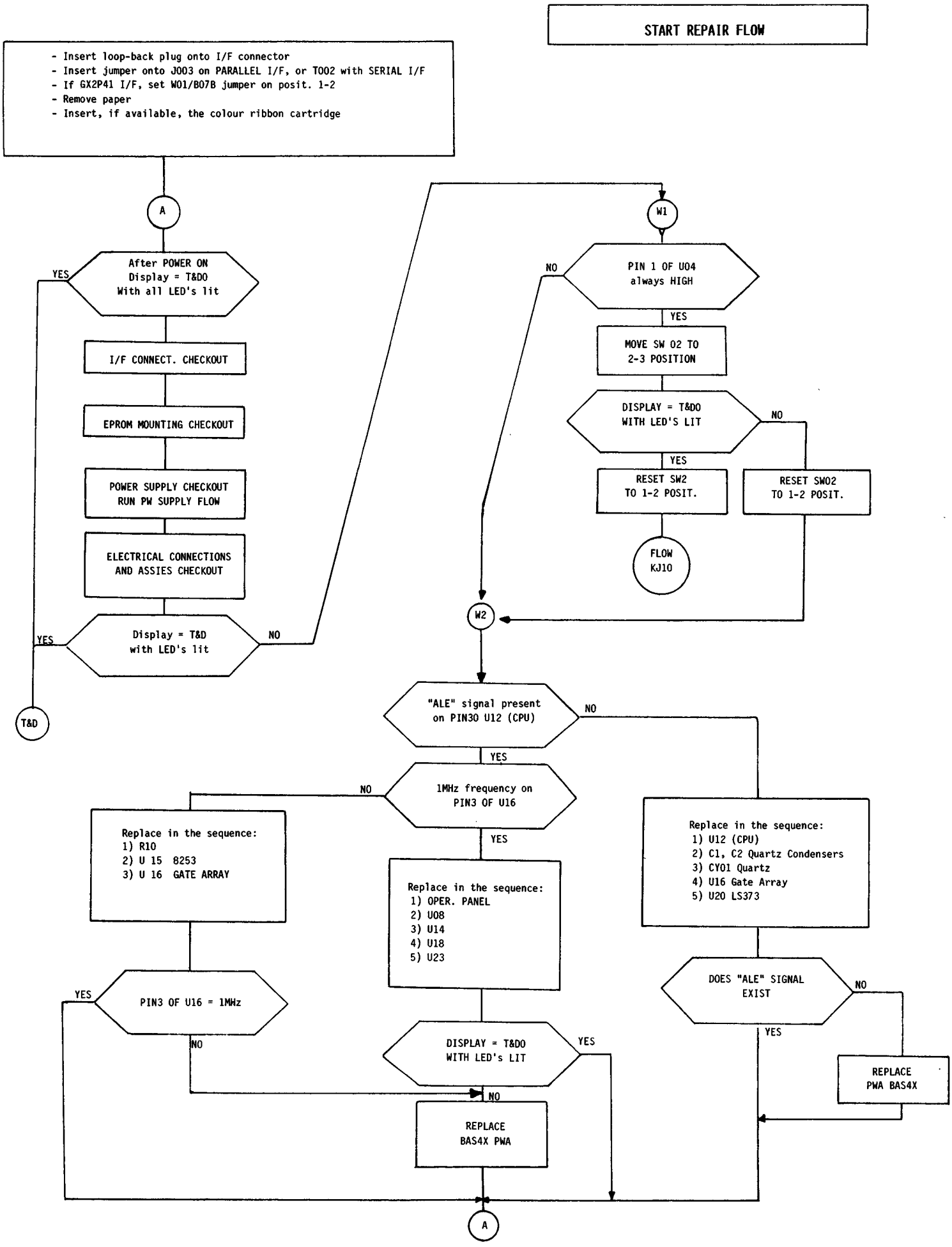
Fig. 4-10. Printhead/Roller Distance Adjustment

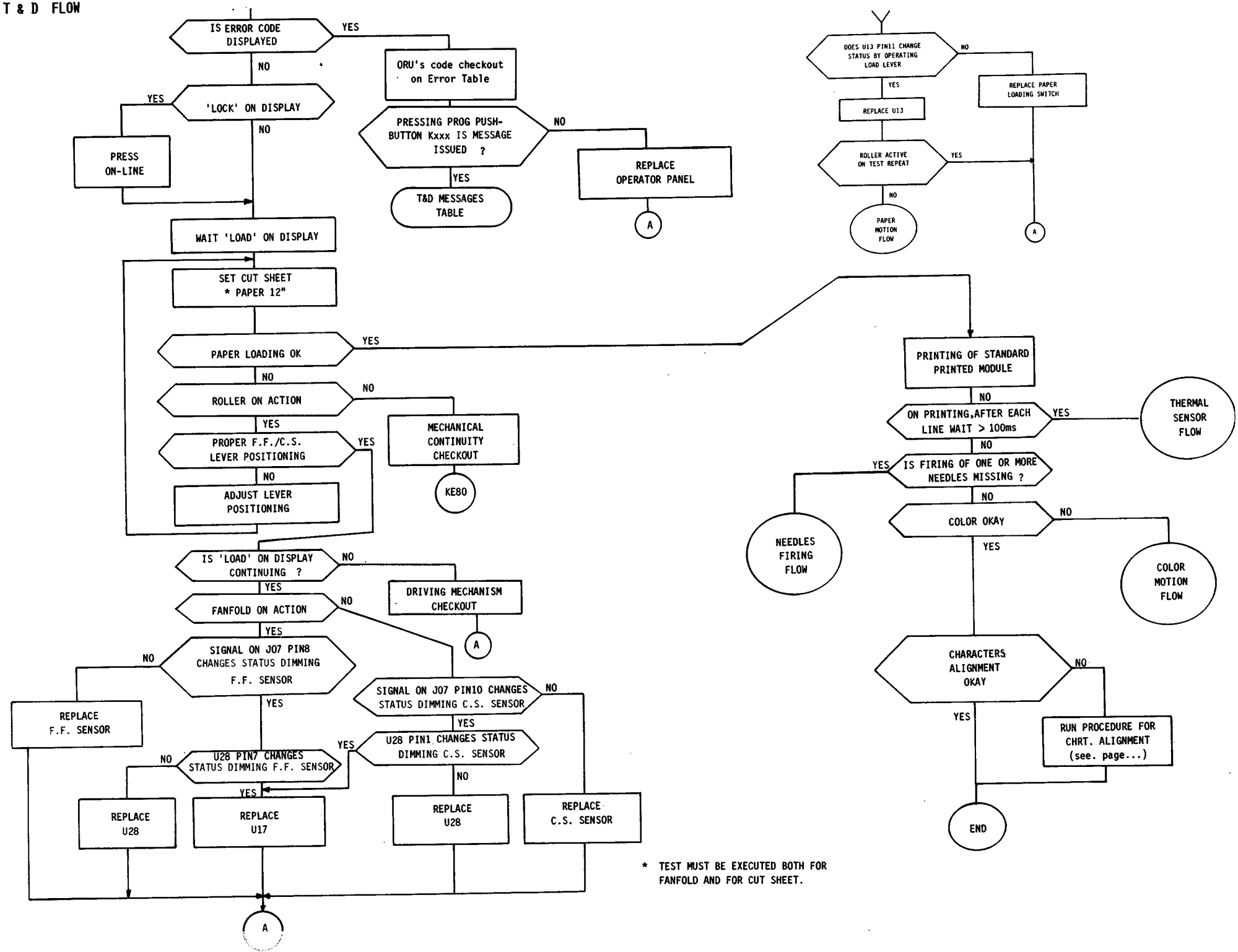
NOTE:

This procedure is oriented to the 1st MFG test. The intervention philosophy is to place the printer in a condition to execute the 1st test diagnosis with relative error message outputs and the display and printing of the STANDARD MODULE.

* Each "diagnostic" STATEMENT entails the test repeat upon final checkout with negative result.

* Each FLOW implies that mechanical parts are properly operating (linkages, belts tension, etc.).


START REPAIR FLOW
- Insert loop-back plug onto I/F connector
- Insert jumper onto J003 on PARALLEL I/F, or T002 with SERIAL I/F
- If GX2P41 I/F, set W01/B07B jumper on posit. 1-2
- Remove paper
- Insert, if available, the colour ribbon cartridge
A
After POWER ON
Display = T&DO
With all LED's lit
YES
I/F CONNECT. CHECKOUT
EPROM MOUNTING CHECKOUT
POWER SUPPLY CHECKOUT
RUN PW SUPPLY FLOW
ELECTRICAL CONNECTIONS
AND ASSIES CHECKOUT
Display = T&D
with LED's lit
YES
NO
T&D
W1
PIN 1 OF U04
always HIGH
NO
YES
MOVE SW 02 TO
2-3 POSITION
DISPLAY = T&DO
WITH LED'S LIT
NO
YES
RESET SW2
TO 1-2 POSIT.
RESET SW02
TO 1-2 POSIT.
FLOW
KJ10
W2
"ALE" signal present
on PIN30 U12 (CPU)
NO
YES
1MHz frequency on
PIN3 OF U16
NO
YES
Replace in the sequence:
1) R10
2) U 15 8253
3) U 16 GATE ARRAY
Replace in the sequence:
1) OPER. PANEL
2) U08
3) U14
4) U18
5) U23
Replace in the sequence:
1) U12 (CPU)
2) C1, C2 Quartz Condensers
3) CY01 Quartz
4) U16 Gate Array
5) U20 LS373
PIN3 OF U16 = 1MHz
YES
NO
DISPLAY = T&DO
WITH LED's LIT
YES
NO
DOES "ALE" SIGNAL
EXIST
NO
YES
REPLACE
PWA BAS4X
REPLACE
BAS4X PWA
A

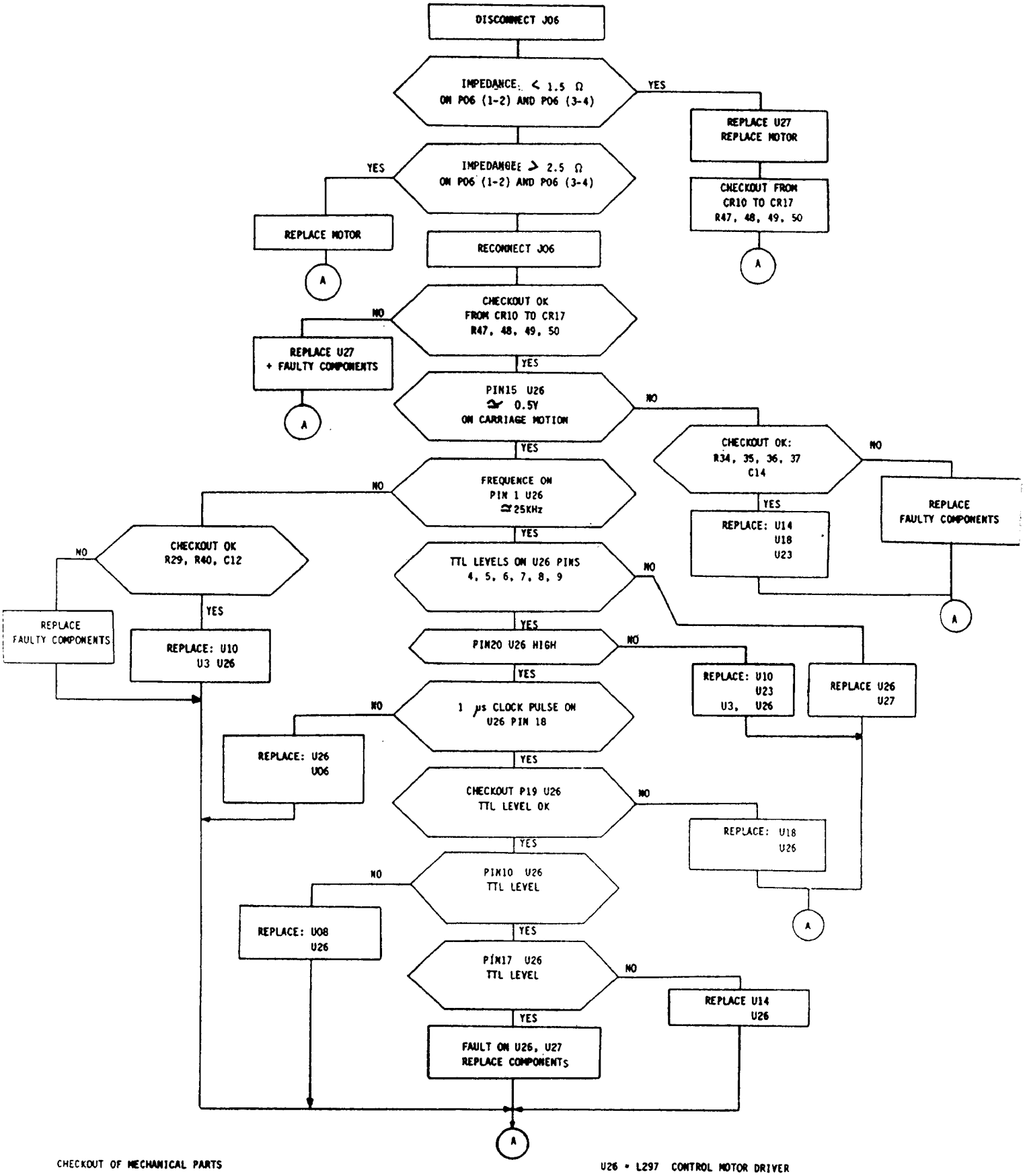


* TEST MUST BE EXECUTED BOTH FOR FANFOLD AND FOR CUT SHEET.

T&D MESSAGES TABLE

K000	SEE FLOW K62X SERIAL INTERFACE (K620)
K010	REPLACE CPU U12 ON BAS4X PWA
K130, K131	REPLACE EPROM BASIC F/W B04 ON SERIAL I/F GX2S4P PWA
K130, K131	REPLACE EPROM BASIC F/W B01 ON PARALLEL I/F GX2P41/P PWA
K210	REPLACE RAM U21 ON BAS4X PWA
K320	(RAM) B06F ON SERIAL I/F, OR (RAM) B03 ON PARALLEL I/F
K410, K411, K412, K413, K414	REPLACE TIMER B253 U15 ON BAS4X PWA
K510	REPLACE EEPROM 9306 U19 ON BAS4X PWA
K620 ÷ K624	SEE SPECIAL FLOW K62X
K625	AUTOFEEDXT JUMPER ERROR POSITION:
K720	REPLACE EPROM D05 ON SERIAL I/F (F/W OF GX2S4P SERIAL E/F MICROPROCESSOR)
K712	SEE FLOW K62X
K820	REPLACE CPU8031 D06 ON GX2S4P PWA
K821	SEE FLOW K62X
K920	REPLACE CPU8031 D06 ON GX2S4P PWA
K921	SEE FLOW K62X
KA20	REPLACE RAM D04E ON GX2S4P PWA
KA21	SEE FLOW K62X
KB21	SEE FLOW K62X
KB22	DTR/DSR LOOP BACK ERROR } SEE KB20 FLOW
KB23	RTS/CTS " " " }
KB24	SRTS/DCD " " " }
KB25	TX/RX " " " }
KC50 ÷ KC57	REPLACE OPER. PANEL, OR U13 ON BAS4X PWA
KD00	SEE FLOW KD00 (INTERLOCK)
KE80	SEE FLOW KE80
KF60	REPLACE OPTIONAL CHARACT. GENER.
KG00	SEE FLOW KG00 (CARRIAGE CANNOT FIND HOME POSITION)
KG01	REPLACE EEPROM 9306 U19 ON BAS4X PWA
KH70	SEE FLOW KD00
KH01	JAM OR PAPER FORM OUT OF STANDARD SPECS
KH02	SEE CARRIAGE MOTION FLOW
KJ10, KJ11	SEE FLOW KJ10 (WATCH-DOG) / KJ11

CARRIAGE MOTION FLOW



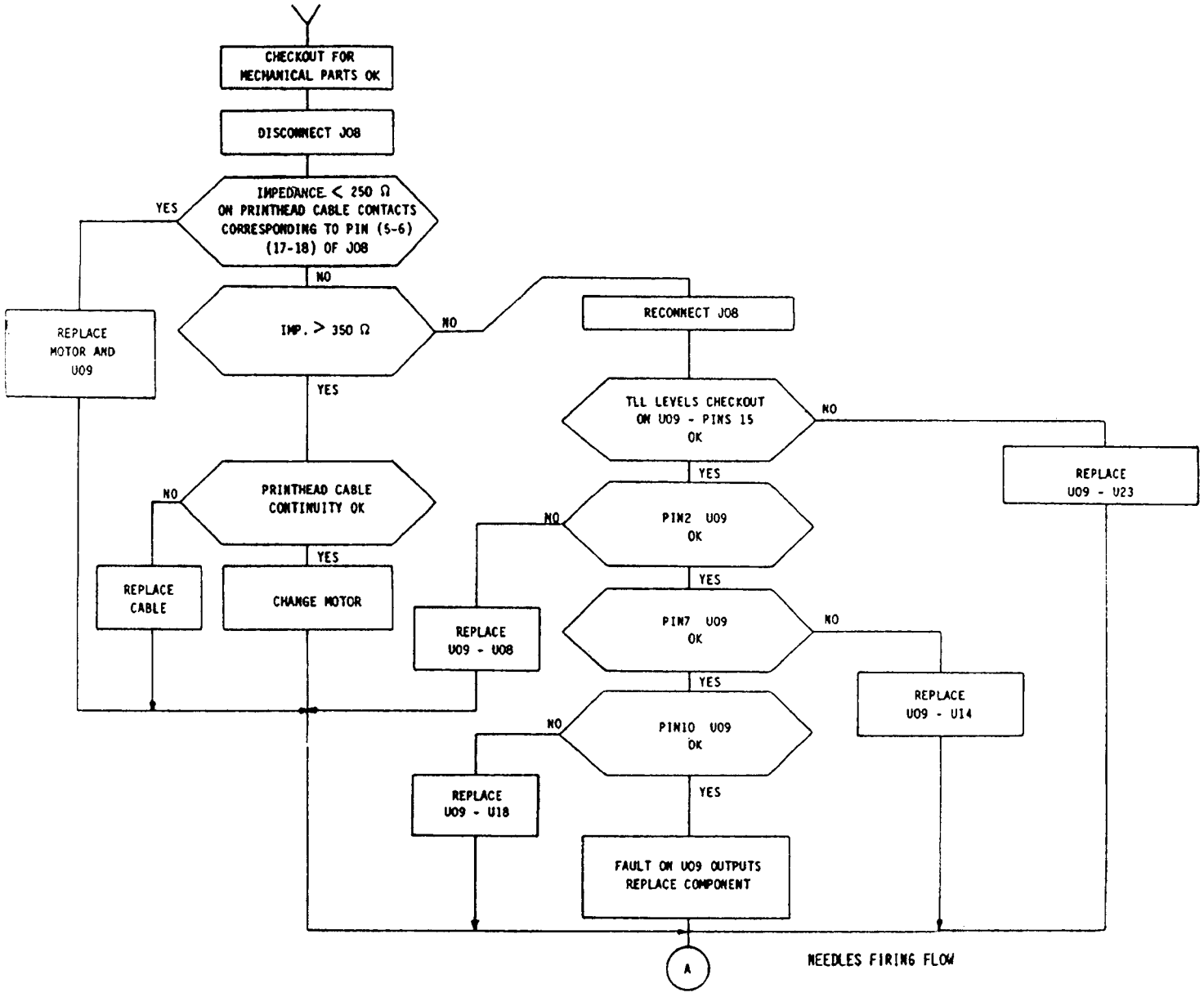
CHECKOUT OF MECHANICAL PARTS

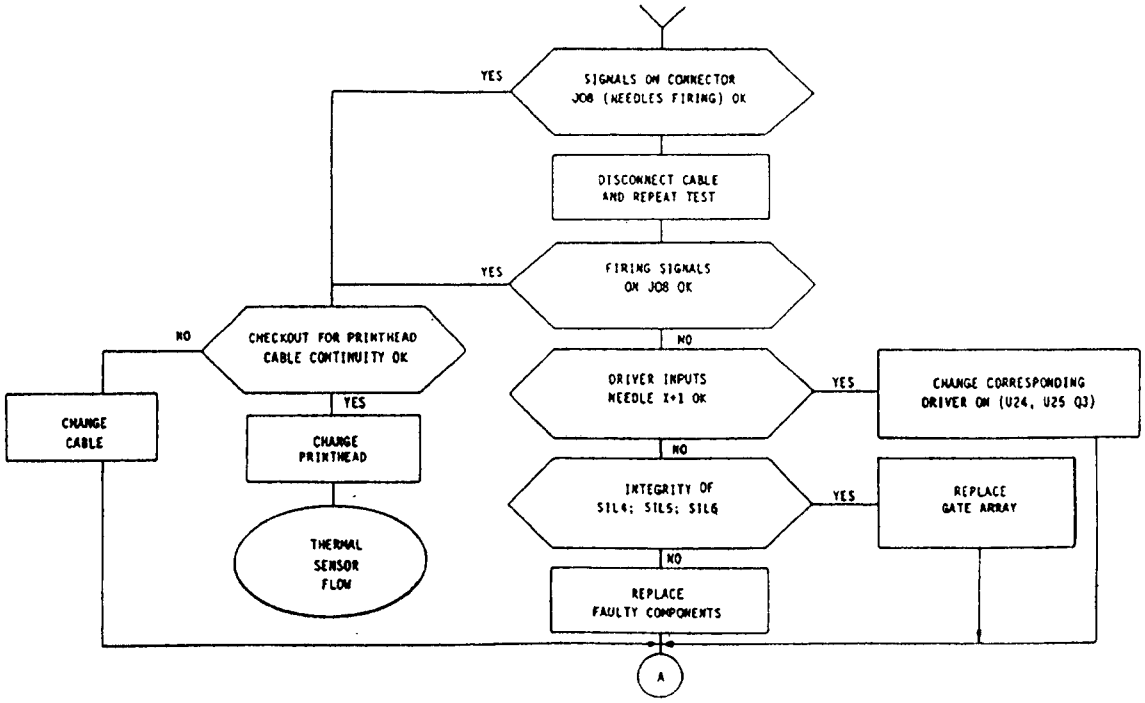
Checkouts at TTL levels are executed on U26, since the causes of levels alternation are:

Power Circuit Fault U27
Sense Resistor Fault R47, 48, 49, 50
U26 Fault

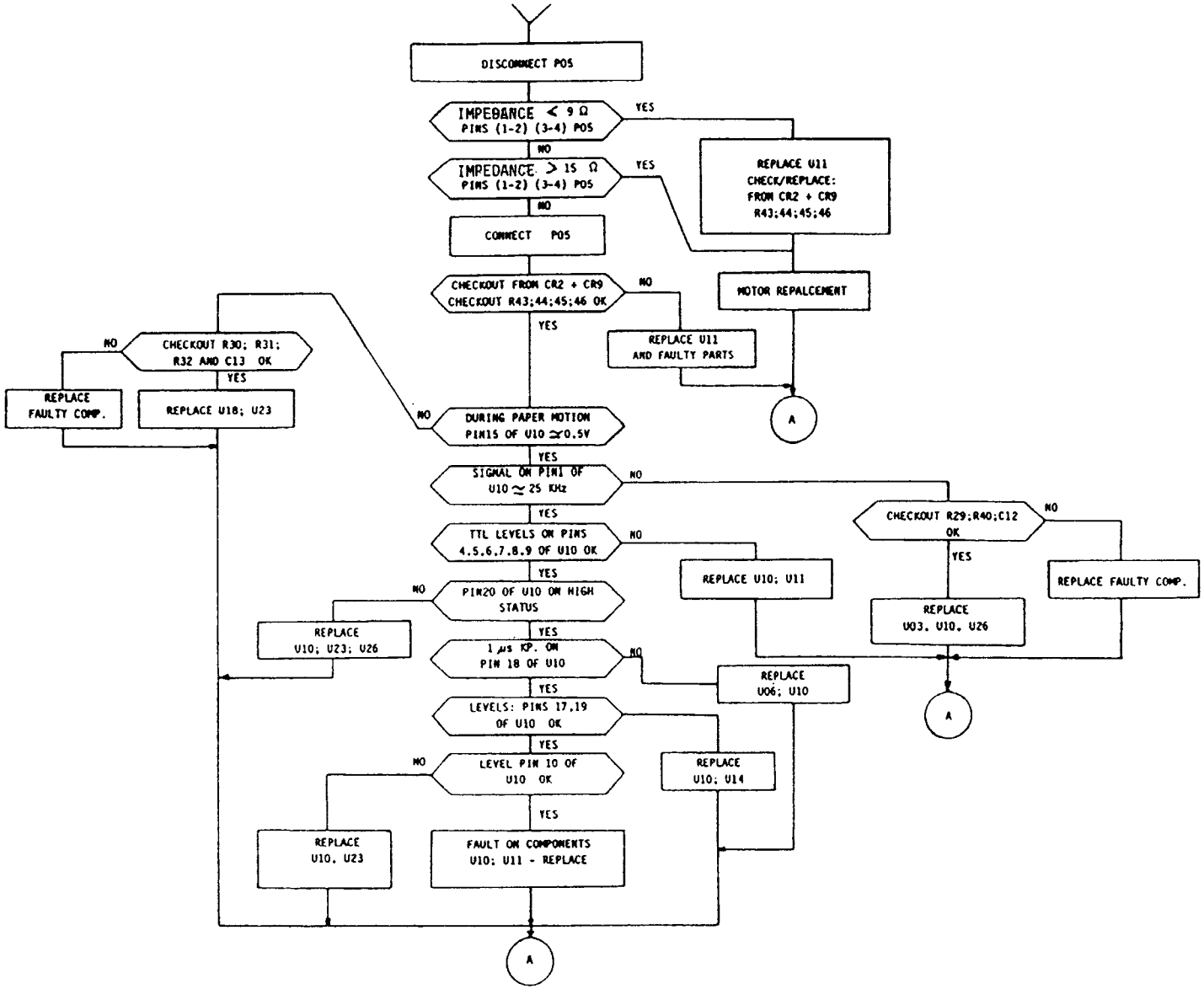
U26 = L297 CONTROL MOTOR DRIVER
U27 = L298 MOTOR DRIVER

COLOR MOTOR FLOW





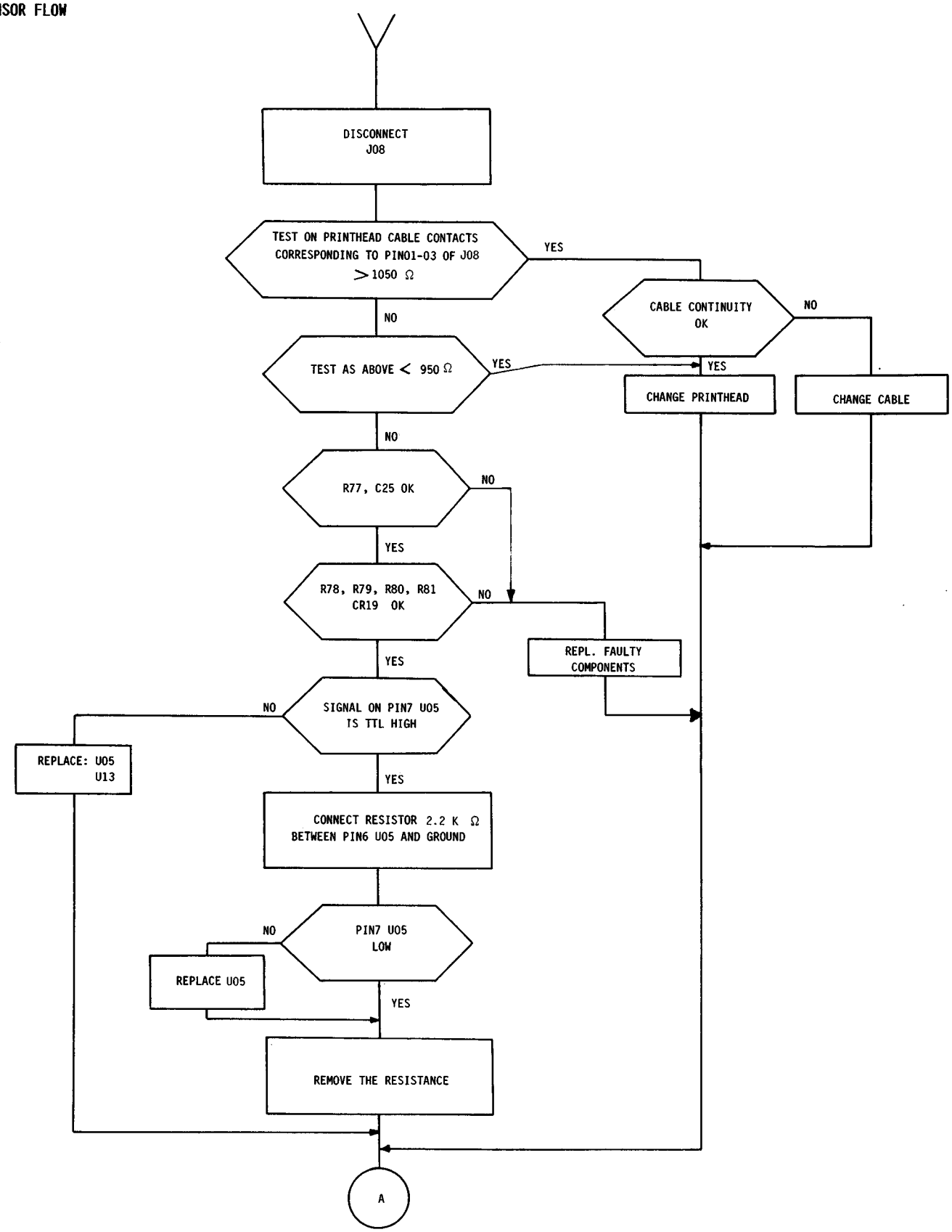
PAPER MOTION FLOW



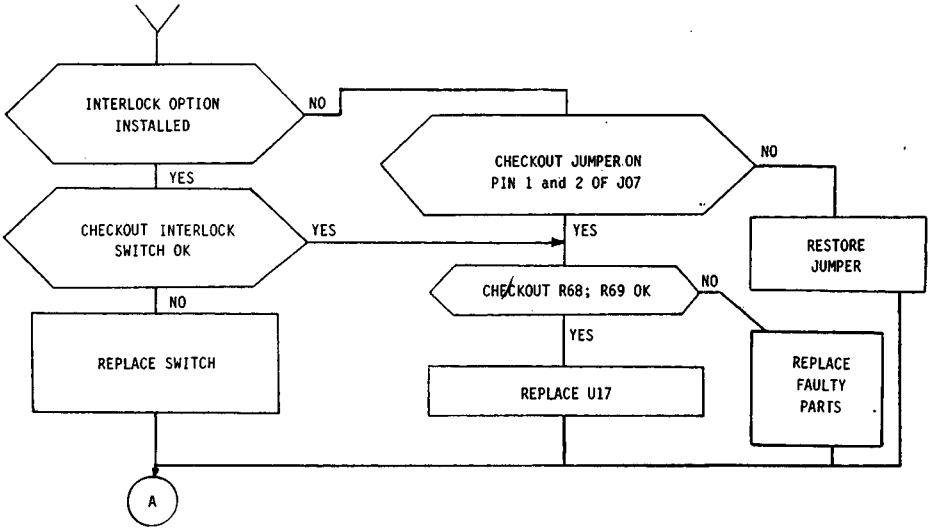
U10 - L297 CONTROL MOTOR DRIVER

U11 - L298N MOTOR DRIVER

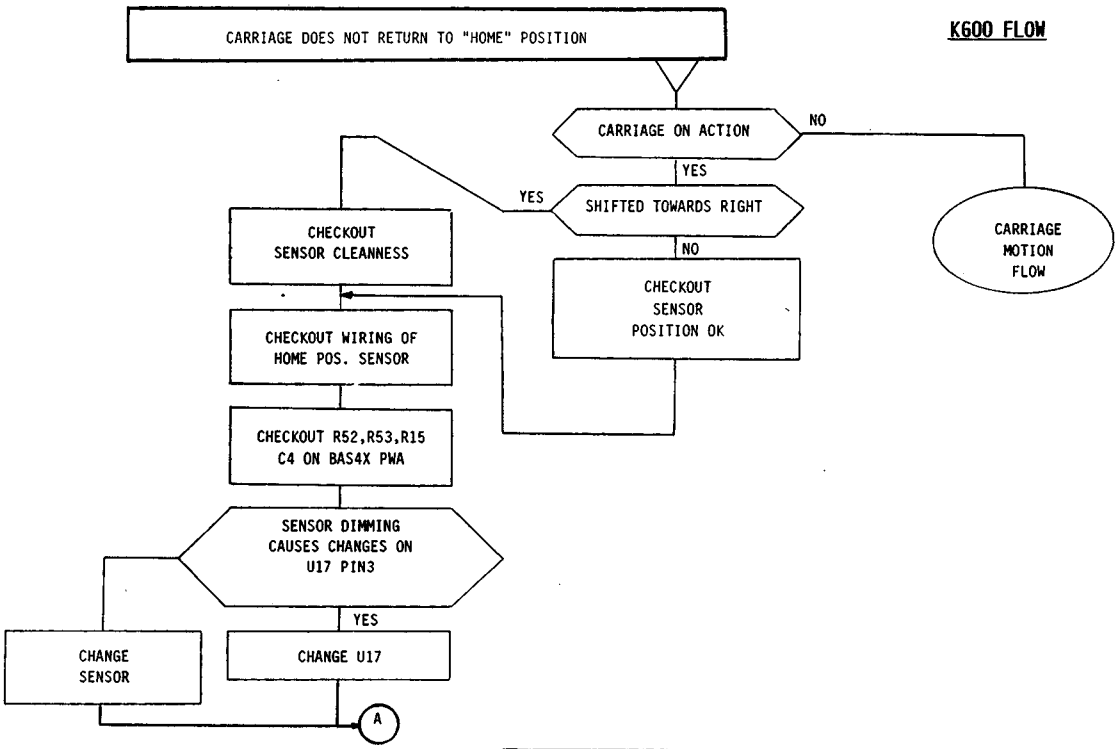
THERMAL SENSOR FLOW



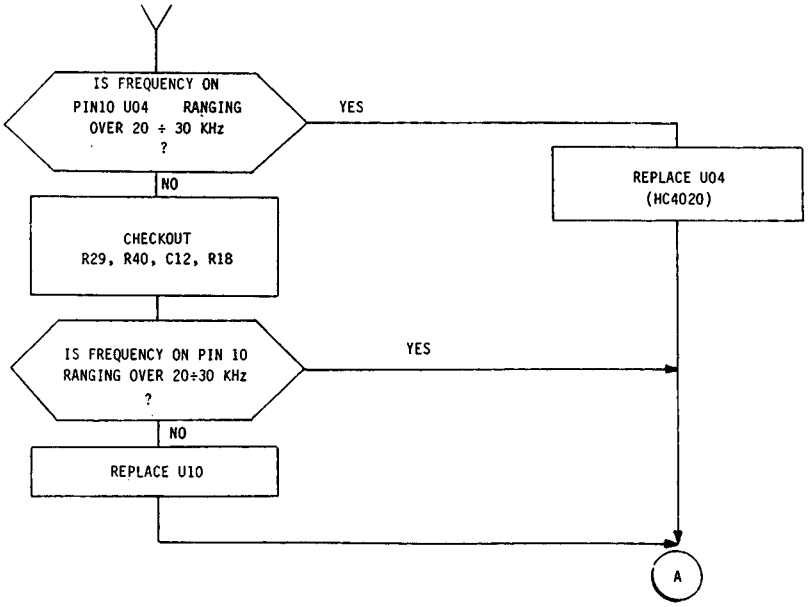
KDOO INTERLOCK FLOW

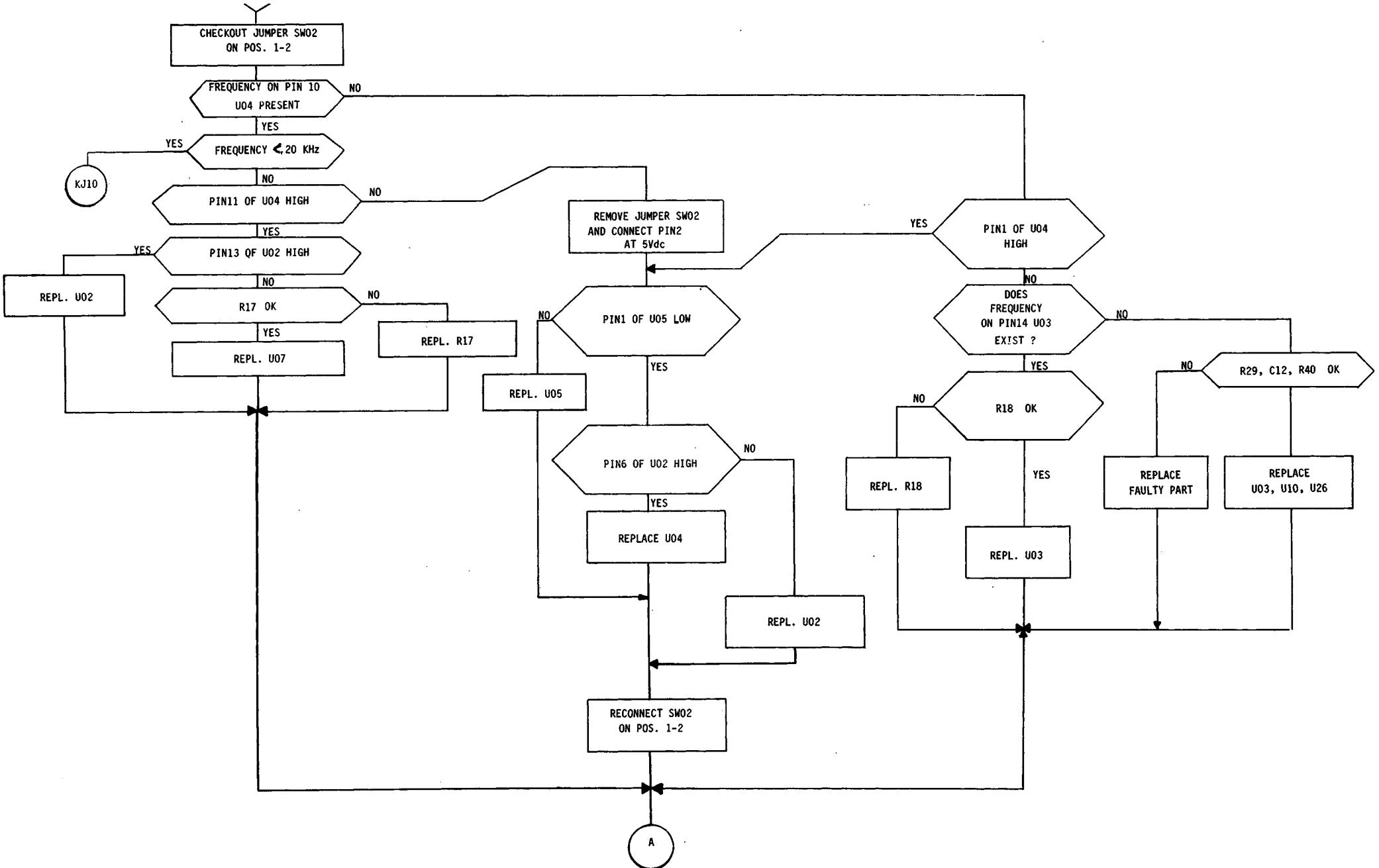


K600 FLOW

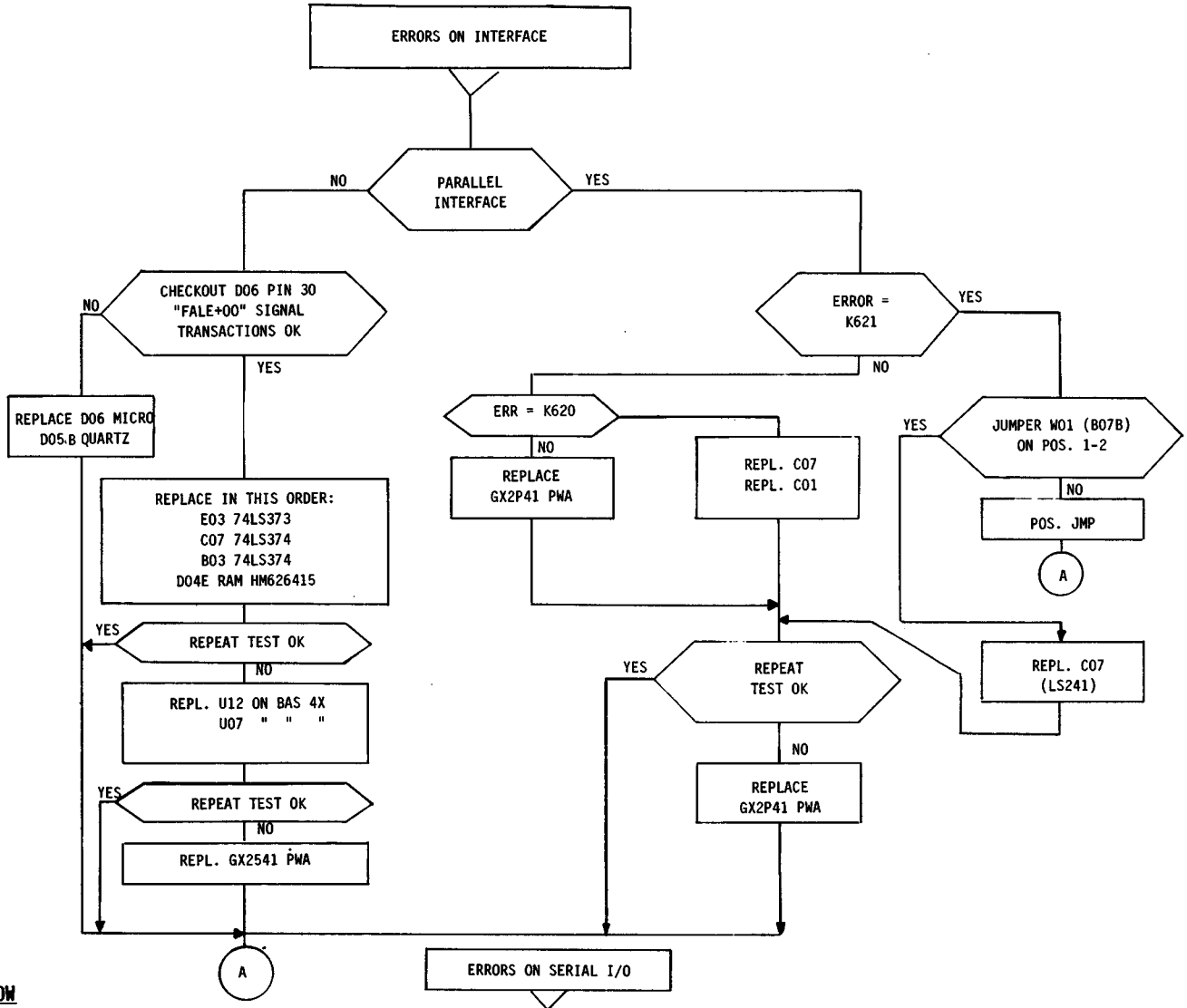


KJ10 FLOW

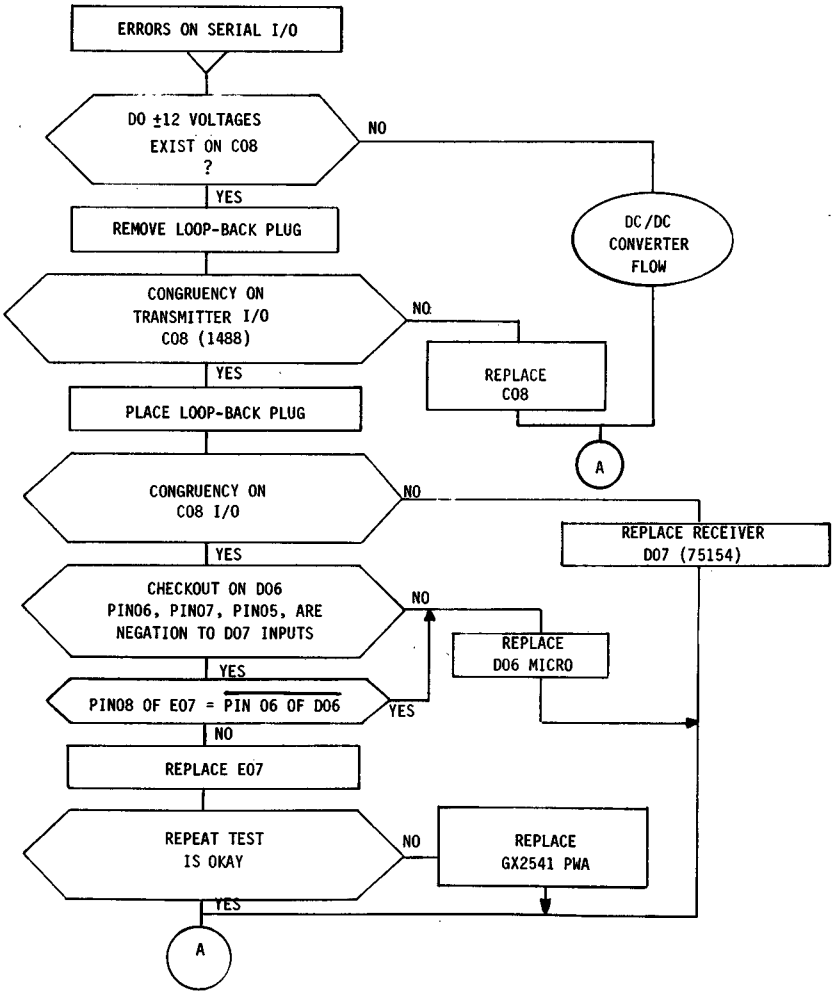



CHECKOUT JUMPER SW02 ON POS. 1-2
FREQUENCY ON PIN 10 U04 PRESENT
NO
YES
FREQUENCY < 20 KHz
YES
KJ10
NO
PIN11 OF U04 HIGH
NO
YES
PIN13 OF U02 HIGH
YES
REPL. U02
NO
R17 OK
NO
YES
REPL. U07
REPL. R17
REMOVE JUMPER SW02 AND CONNECT PIN2 AT 5Vdc
NO
PIN1 OF U05 LOW
YES
REPL. U05
PIN6 OF U02 HIGH
NO
YES
REPLACE U04
REPL. U02
RECONNECT SW02 ON POS. 1-2
YES
PIN1 OF U04 HIGH
NO
DOES FREQUENCY ON PIN14 U03 EXIST ?
NO
YES
R18 OK
NO
YES
REPL. R18
REPL. U03
NO
R29, C12, R40 OK
REPLACE FAULTY PART
REPLACE U03, U10, U26
A

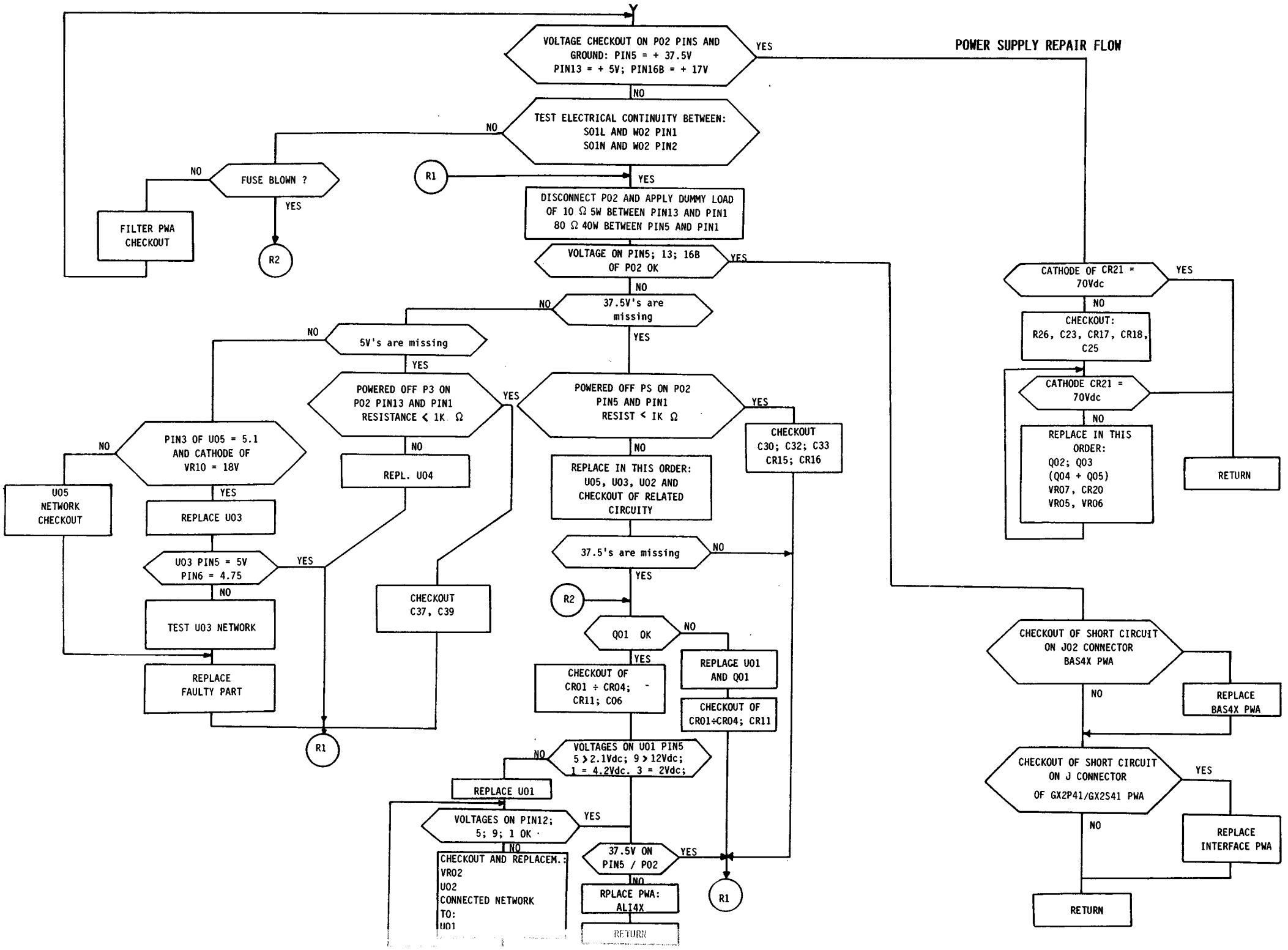
K62X FLOW



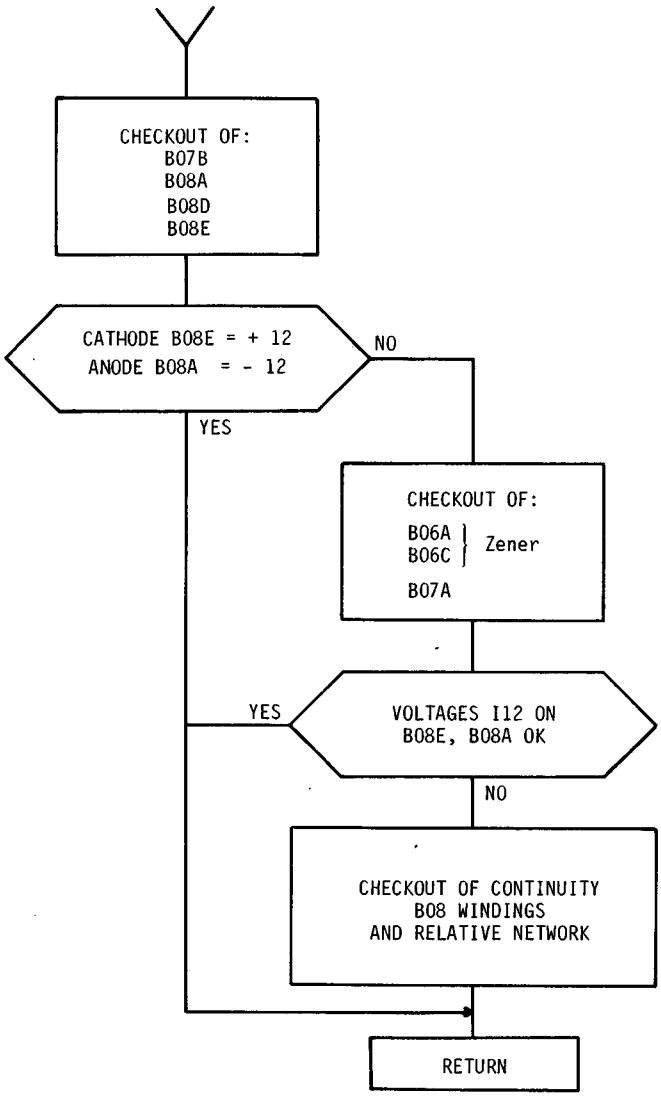
KB20 FLOW



A78144299-001


POWER SUPPLY REPAIR FLOW
VOLTAGE CHECKOUT ON PO2 PINS AND GROUND: PIN5 = + 37.5V PIN13 = + 5V; PIN16B = + 17V
YES
NO
TEST ELECTRICAL CONTINUITY BETWEEN: SO1L AND WO2 PIN1 SO1N AND WO2 PIN2
NO
FUSE BLOWN ?
NO
YES
FILTER PWA CHECKOUT
R2
R1
YES
DISCONNECT PO2 AND APPLY DUMMY LOAD OF 10 Ω 5W BETWEEN PIN13 AND PIN1 80 Ω 40W BETWEEN PIN5 AND PIN1
VOLTAGE ON PIN5; 13; 16B OF PO2 OK
YES
NO
37.5V's are missing
NO
YES
5V's are missing
NO
YES
POWERED OFF P3 ON PO2 PIN13 AND PIN1 RESISTANCE < 1K Ω
YES
NO
REPL. U04
POWERED OFF PS ON PO2 PIN5 AND PIN1 RESIST < IK Ω
YES
NO
CHECKOUT C30; C32; C33 CR15; CR16
REPLACE IN THIS ORDER: U05, UO3, UO2 AND CHECKOUT OF RELATED CIRCUITY
PIN3 OF U05 = 5.1 AND CATHODE OF VR10 = 18V
NO
YES
U05 NETWORK CHECKOUT
REPLACE UO3
UO3 PIN5 = 5V PIN6 = 4.75
YES
NO
TEST UO3 NETWORK
REPLACE FAULTY PART
CHECKOUT C37, C39
R1
37.5's are missing
NO
YES
R2
QO1 OK
NO
YES
CHECKOUT OF CR01 ÷ CR04; CR11; C06
REPLACE UO1 AND QO1
CHECKOUT OF CR01÷CR04; CR11
VOLTAGES ON UO1 PIN5 5 > 2.1Vdc; 9 > 12Vdc; 1 = 4.2Vdc. 3 = 2Vdc;
NO
REPLACE UO1
VOLTAGES ON PIN12; 5; 9; 1 OK
YES
NO
CHECKOUT AND REPLACEM.: VR02 UO2 CONNECTED NETWORK TO: UO1
37.5V ON PIN5 / PO2
YES
NO
RPLACE PWA: ALI4X
RETURN
R1
CATHODE OF CR21 = 70Vdc
YES
NO
CHECKOUT: R26, C23, CR17, CR18, C25
CATHODE CR21 = 70Vdc
NO
REPLACE IN THIS ORDER: QO2; QO3 (QO4 + QO5) VR07, CR20 VR05, VR06
RETURN
CHECKOUT OF SHORT CIRCUIT ON JO2 CONNECTOR BAS4X PWA
NO
REPLACE BAS4X PWA
CHECKOUT OF SHORT CIRCUIT ON J CONNECTOR OF GX2P41/GX2S41 PWA
YES
NO
REPLACE INTERFACE PWA
RETURN

DC/DC CONVERTER FLOW



- SPARE PART LIST

- PART LIST AND EXPLODED VIEWS

APPENDIX A

Table A-1. Spare Part List for 4/40-4/41 Printer

DESCRIPTION	PART NUMBER	PART LIST REFERENCE	
		TABLE No.	INDEX No.
PWA BAS4X	78145607-001	A-12	1
PWA ALI4X	78145587-001	A-13	1
PWA PARALLEL INTERFACE	78142695-003	A-9	1
PWA SERIAL INTERFACE	78142696-002	A-10	1
PWA OPERATOR PANEL	78142727-001	A-12	3
T/F LEVER	78141911-002	A-6	2
COPY LEVER	78141912-002	A-7	3
P. LOAD LEVER	78141913-002	A-7	3
INT. COPY LEVER	78142134-002	A-4	46
INT. T/F LEVER	78142146-001	A-5	42
P. HEAD CABLE (4/41)	78142117-003	A-5	13
P. HEAD CABLE	78142738-002	A-4	13
CABLE ASSY	78143691-001	A-4	53
CABLE ASSY (4/41)	78143691-003	A-5	53
SENSOR CABLE GROUP	78143172-001	A-4	23
SENSOR CABLE GROUP (4/41)	78142724-001	A-5	23
COLOR MOTOR GROUP	78201534-002	A-8	8
PAPER MOTOR GROUP	78142178-002	A-5	9
CARRIAGE MOTOR GROUP	78142179-002	A-5	12
CARRIAGE GROUP	78142219-004	A-5	4
TRACTOR LEFT	78203350-007	A-5	19
TRACTOR RIGHT	78203350-008	A-5	10
PRINT HEAD	78140596-004	A-8	27

Table A-1 (cont.) Spare Part List for 4/40 Printer

DESCRIPTION	PART NUMBER	PART LIST REFERENCE	
		TABLE No.	INDEX No.
FUSE 3 A. 250V.	04670008-009	A-13	2
PRINT HEAD	78140596-008	A-9	27
RIBBON CARTDRIGE COUPLER	78140939-002	A-8	1
TRACTOR/FRICTION LEVER	78141911-002	A-6	2
COPY LEVER	78141912-002	A-6	3
PAPER LOAD LEVER	78141913-001	A-6	8
FONT CARTDRIGE SHUTTER	78141916-001	A-6	7
I/F COVER	78141930-001	A-6	10
PWA BAS4X	78145607-001	A-12	1
PULLEY GEAR	78144456-001	A-4	47
INTERNAL COPY LEVER	78142134-002	A-4	46
INTERNAL F/T LEVER	78142146-001	A-4	42
CABLE ASSY	78143691-001	A-4	53
BAR TRACTOR SPRING	78142164-001	A-4	6
COLOR MOTOR GROUP	78201534-002	A-8	8
PAPER MOTOR GROUP	78142178-001	A-3	9
CARRIAGE MOTOR GROUP	78142179-002	A-4	12
ROLLER ASSY	78142180-001	A-4	26
IDLE PULLEY	78142181-001	-	-
P. HEAD SHIELD	78142199-001	A-4	36
PUSH BUTTON O.P.	78142211-001	A-12	2
CARRIAGE GROUP	78142219-001	A-4	4
PAPER BAIL SPRING	78142421-001	A-4	34
ROLLER SENSOR ASSY	78142433-001	A-4	27
PWA ALI4X - POWER SUPPLY	78145587-001	A-13	1
PWA GX2P41 P. I/F GROUP	78142695-003	A-9	1
PWA GX2S41 S. I/F GROUP	78142696-002	A-10	1
PAPER CHUTE GROUP	78142706-001	A-6	1
TRANSPARENT COVER	78142707-001	A-6	4
CABINET	78142708-001	A-6	5
REAR COVER	78142709-001	A-6	9
O.P. GROUP GX2P4X	78142727-001	A-12	3
SPRING ROLL	78142736-001	A-4	62
P. HEAD CABLE	78142738-002	A-4	13
MYLAR (PRESSER)	78143165-001	A-4	74
SENSORS CABLE GROUP	78143172-001	A-4	23
OPTICAL REFLECTION SENSOR	78200574-001	-	-
TLP802 OPTICAL INTERRUPTER	78200797-001	-	-
P.E. SWITCH / COLOUR SWITCH	78201145-001	-	-
P.S. SWITCH	78201238-001	-	-
TRACTOR LEFT	78203350-007	A-4	19
TRACTOR RIGHT	78203350-008	A-4	10
PAPER BELT	78203377-015	A-4	40
CARRIAGE BELT	78203553-002	A-4	64

Table A-1 (cont.) Spare Part List for 4/41 Printer

DESCRIPTION	PART NUMBER	PART LIST REFERENCE	
		TABLE No.	INDEX No.
FUSE 3 A. 250V.	04670008-009	A-13	2
PRINT HEAD	78140596-002	A-8	27
RIBBON CARTDRIGE COUPLER	78140939-002	A-8	1
TRACTOR/FRICTION LEVER	78141911-002	A-7	2
COPY LEVER	78141912-002	A-7	3
PAPER LOAD LEVER	78141913-002	A-7	8
FONT CARTDRIGE SHUTTER	78141916-001	A-7	7
I/F COVER	78141930-002	A-7	10
REAR COVER	78141931-001	A-7	9
P. HEAD CABLE	78142117-002	A-6	13
PWA BAS4X	78145607-001	A-12	1
PULLEY GEAR	78144456-001	A-5	47
INTERNAL COPY LEVER	78142134-001	A-5	46
INTERNAL F/T LEVER	78142146-001	A-5	42
CABLE ASSY	78143691-003	A-5	53
BAR TRACTOR SPRING	78142164-003	A-5	6
COLOR MOTOR GROUP	78201534-002	A-8	8
PAPER MOTOR GROUP	78142178-001	A-5	9
CARRIAGE MOTOR GROUP	78142179-002	A-5	12
ROLLER ASSY	78142180-001	A-5	29
IDLE PULLEY	78142181-002	-	-
P. HEAD SHIELD	78142199-002	A-5	36
PUSH BUTTON O.P.	78142211-001	A-12	2
CARRIAGE GROUP	78142219-004	A-5	4
ROLLER SENSOR ASSY	78142433-001	A-5	30
PWA AL14X - POWER SUPPLY	78145587-001	A-13	1
PWA GX2P41 P. I/F GROUP	78142695-003	A-9	1
PWA GX2S41 S. I/F GROUP	78142696-002	A-10	1
TRANSPARENT COVER	78142698-001	A-7	4
CABINET	78142699-005	A-7	5
PAPER CHUTE GROUP	78142706-001	A-6	1
REAR COVER	78141931-001	A-7	9
SENSORS CABLE GROUP	78142724-001	A-5	23
O.P. GROUP GX2P4X	78142727-001	A-12	3
SPRING ROLL	78142736-001	A-5	62
MYLAR (PRESSER)	78143164-001	A-5	63
OPTICAL REFLECTION SENSOR	78200574-001	-	-
TLP802 OPTICAL INTERRUPTER	78200797-001	-	-
P.E. SWITCH / COLOUR SWITCH	78201145-001	-	-
P.S. SWITCH	78201238-001	-	-
TRACTOR LEFT	78203350-007	A-5	19
TRACTOR RIGHT	78203350-008	A-5	10
PAPER BELT	78203377-015	A-5	40
CARRIAGE BELT	78203553-002	A-5	64

Table A-2. 4/40 Mechanism General Assembly

INDEX	DESCRIPTION	PART NUMBER
1	Pulley Cover	78143146-001
2	4/40 Mechanism	78143121-002
3	Screw H.S.C. M4x8	78203459-319
4	Filter Shield	78142210-002
5	Gnd Cable	78143634-001
6	Lower Shield Gr.	78142704-003
7	Base Gr.	78142710-002
8	O.P. Support	78142194-001
9	Screw 3.53x16	76951715-061
10	Printer Tilt Bar	78143159-004
11	Rubber Foot	78137804-001
12	Base Assy	78142185-001

Table A-3. 4/41 Mechanism General Assembly

INDEX	DESCRIPTION	PART NUMBER
1	Pulley Cover	78143146-001
2	4/41 Mechanism	78142218-002
3	Screw H.S.C. M4x8	78203459-219
4	Filter Shield	78142210-002
5	Gnd Cable	78143634-001
6	Lower Shield Gr	78142694-002
7	Base Gr	78142702-003
8	O.P. Support	78142194-001
9	Screw 3.53x16	76951715-061
10	Printer Tilt Bar	78143159-004
11	Rubber Foot	78137804-001
12	Base Assy	78141985-002

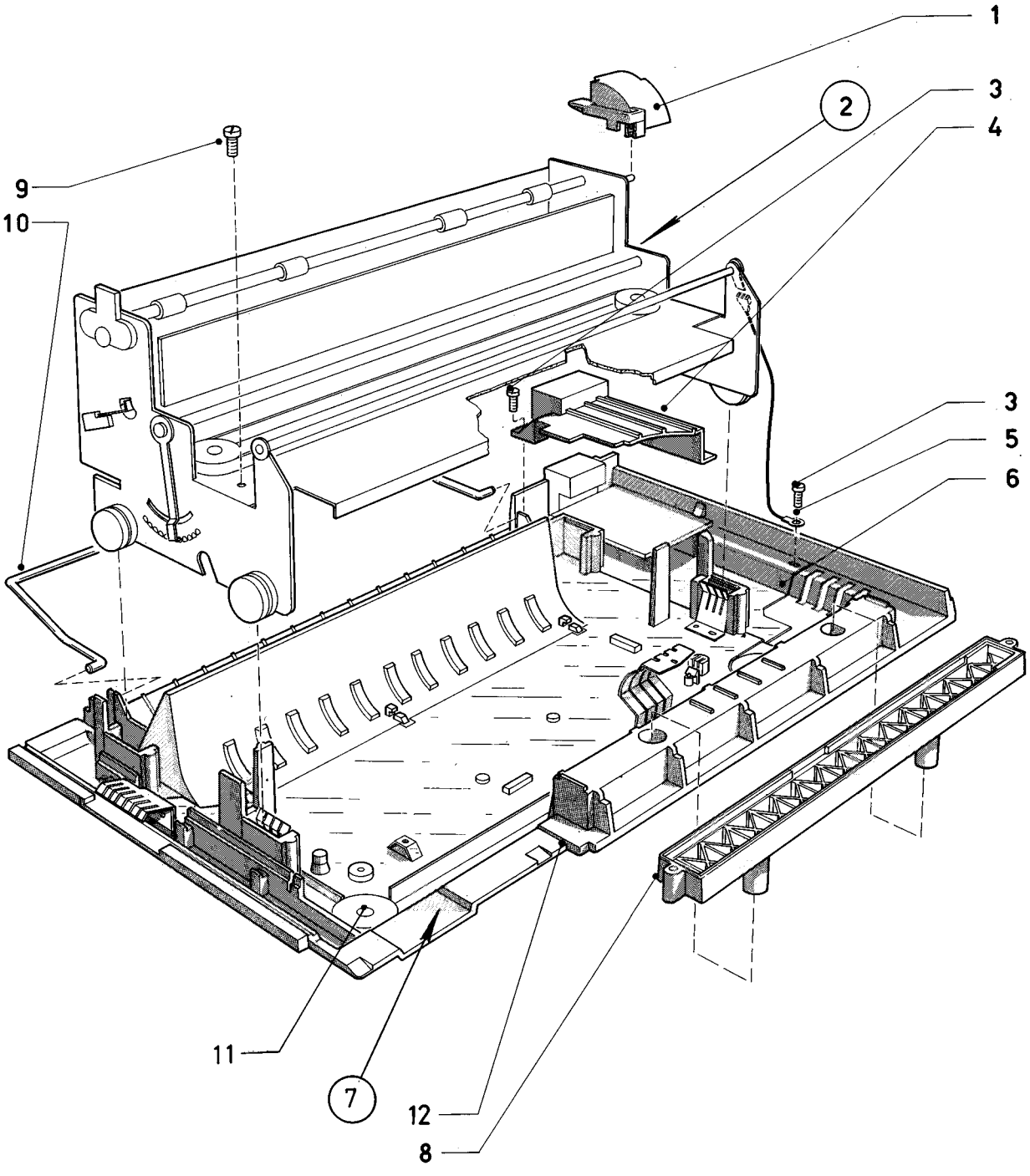


Fig. A-1. 4/40 Mechanism General Assembly

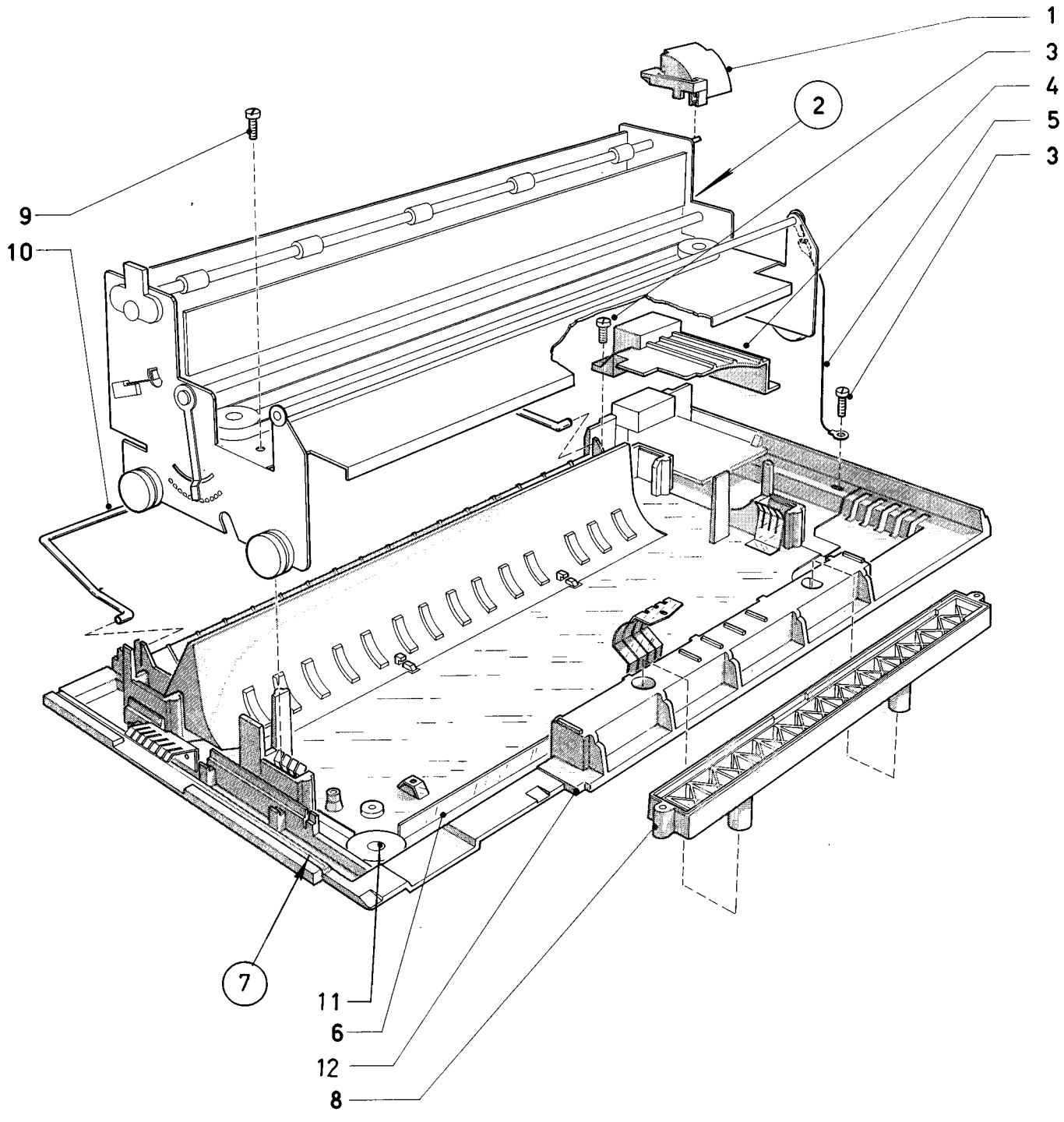


Fig. A-2. 4/41 Mechanism General Assembly

Table A-4. 4/40 Basic Mechanism Assembly

INDEX	DESCRIPTION	PART NUMBER
	4/40 Mechanism Assy	78143121-003
1	Base Frame	78143112-001
2	Right Side Frame Assy	78142171-005
3	Left Side Frame Assy	78142170-004
4	Carriage Assembly	78142219-004
5	Flat Washer	76951126-620
6	Spring	78142164-001
7	Gear	78138010-002
8	Shaft Assy	78143123-001
9	Paper Motor	78142178-003
10	Right Tractor	78203350-008
11	Paper Support	78142773-001
12	Carriage Motor	78142179-002
13	TES40 PWB	78142738-002
14	Nut	78142437-001
15	Plate	78142195-001
16	Shaft	78143119-001
17	Shaft	78143118-001
18	Wire Spring	78138529-001
19	Left Tractor	78203350-007
20	Bushing	78123449-002
21	Benzing Ring	76951706-050
22	Lever	78142131-001
23	Sensor Cable Assy	78143172-001
24	Bracket	78142229-001
25	Vibrodamp	78142150-002
26	Roll Assy	78142180-001
27	Roll Sensor Assy	78142433-001
28	Plate	78142200-001
29	Shaft	78143114-002
30	Platen	78143122-002
31	Bearing	78203247-002
32	Lever	78142136-001
33	Flask for Bearing	78132828-003
34	Spring	78142421-001
35	Plate	78142418-001
36	Mask	78142199-002
37	Spring	78142163-001
38	Roller	78142162-002
39	Screw 2.9x6.5	76951715-046

Table A-4 (cont.). 4/40 Basic Mechanism Assembly

INDEX	DESCRIPTION	PART NUMBER
40	Belt	78203377-015
41	Presure Roller	78142213-002
42	Lever	78142146-001
43	Roller	78142204-002
44	Benzing Ring	76951706-050
45	Screw H.S.C. M4x8	78203459-319
46	Lever	78142134-002
47	Pulley Gear	78144456-001
48	Gear	78142139-002
49	Benzing	76951706-050
50	Screw C.H.S.C.R. M3x4	78203459-208
51	Bush	78143169-001
52	Shaft	78143117-001
53	Cable Assy	78143691-001
54	Screw C.H.C.R. M3x6	78203459-209
55	Benzing Ring	76951706-070
56	Screw C.H.C.R. M3x8	78203459-310
57	Washer	78203286-006
58	Screw C.H.C.R. M4x8	78203459-319
59	Screw H.S.C M6x10	76951108-633
60	Screw T.C.C.I M2x8	78203215-057
61	Washer	76951128-620
62	Spring Roll	78142736-001
63	Plate	78143163-001
64	Carriage Belt	78203553-001
65	Pulley Unit	78143674-002
66	Screw F.H.C.R M3x8	78203460-110
67	Lever	78142133-001
68	Pulley	78142128-001
69	Flask for Bearing	78132828-003
70	Stud	78142201-001
71	Vibrodamp	78142206-001
72	Screw 2.9x9,5	76951715-046
73	Separator	78143665-002
74	Presser (Mylar)	78143165-001
75	Screw C.H.C.R M4x8	78203459-319

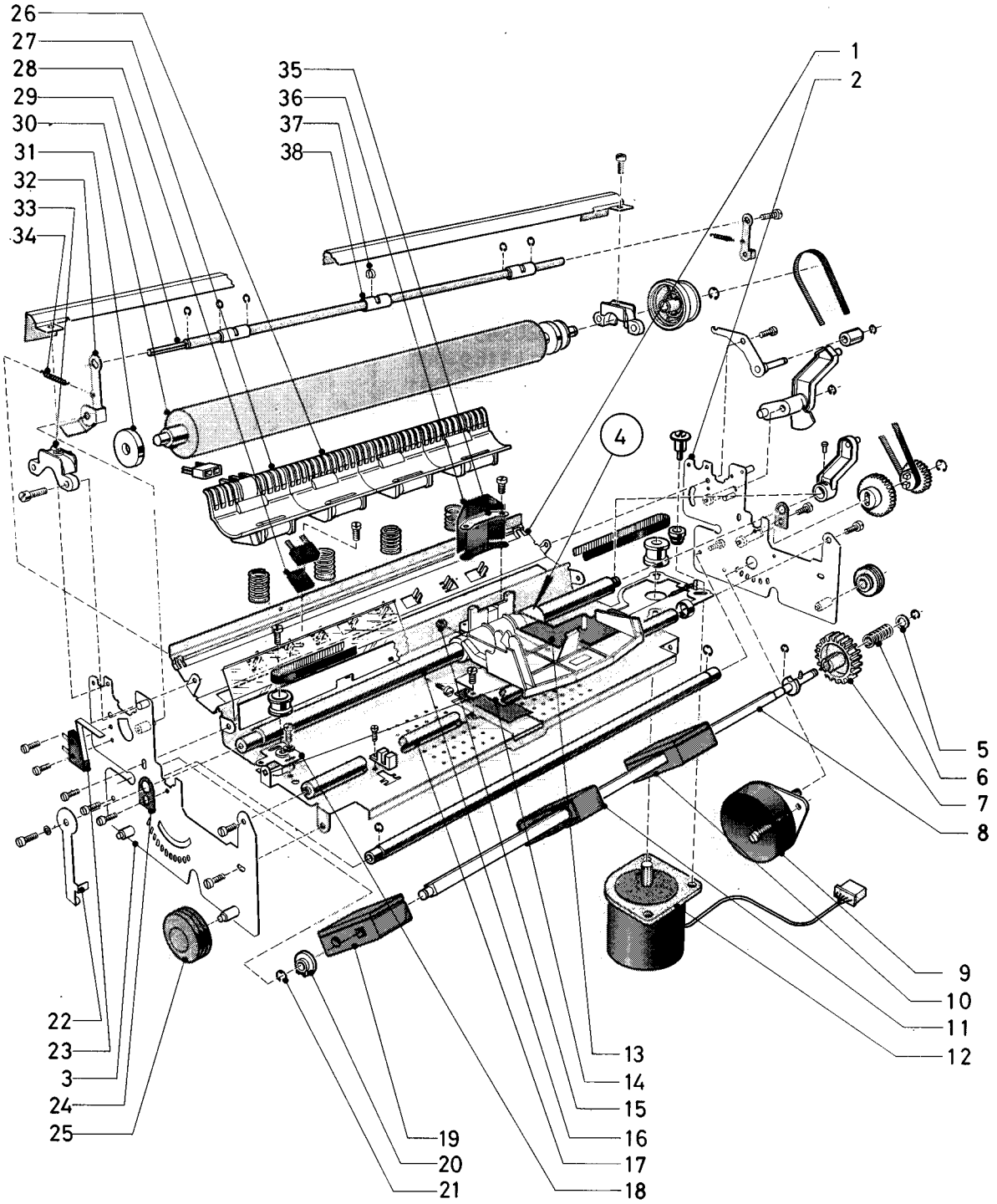


Fig. A-3. 4-40 Mechanism General Assembly

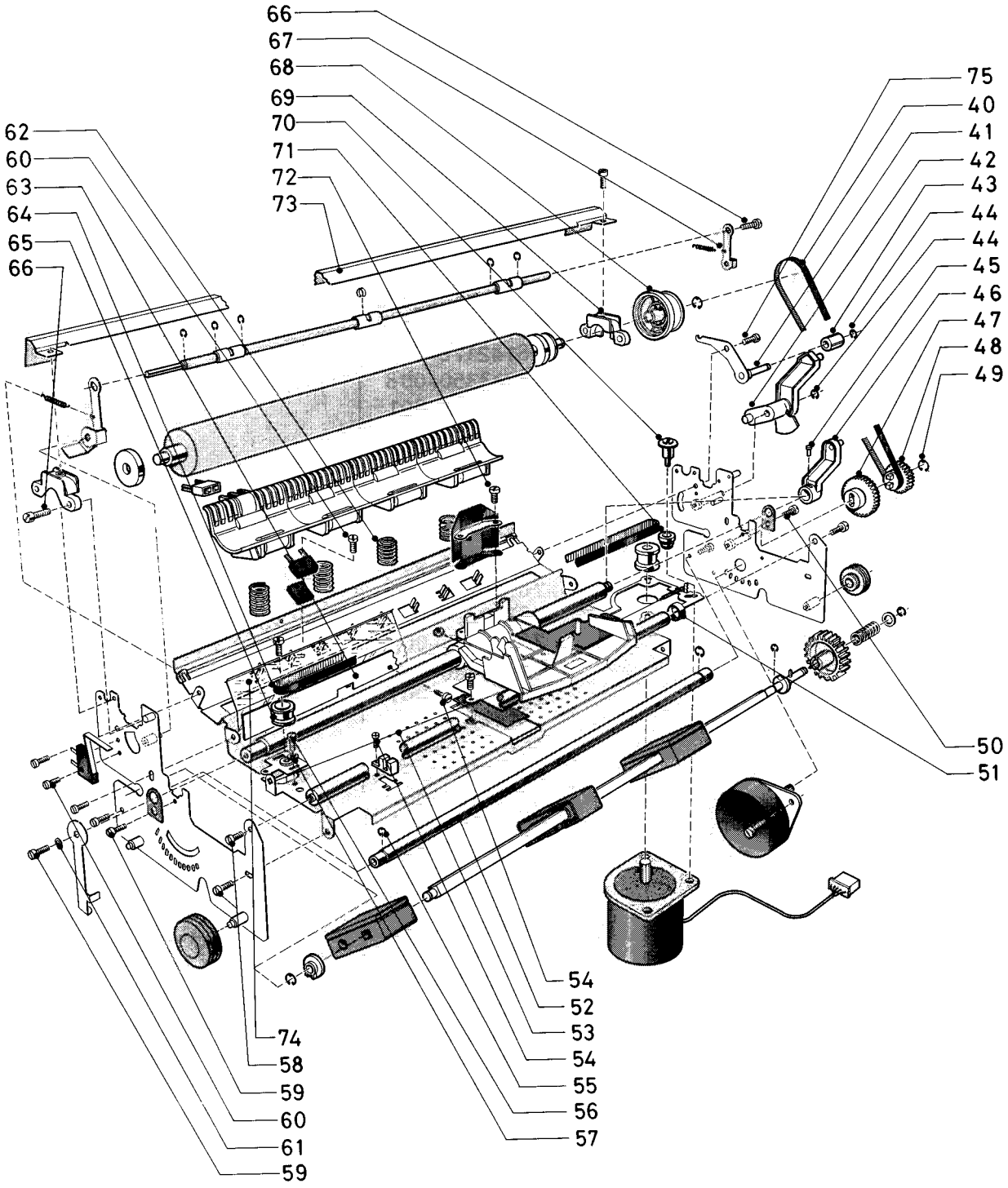


Fig. A-3 (cont.). 4-40 Mechanism General Assembly

Table A-5. 4/41 Basic Mechanism Assembly

INDEX	DESCRIPTION	PART NUMBER
	4/41 Mechanism Assy	78142218-003
1	Base Frame	78142186-004
2	Right Side Frame Assy	78142171-005
3	Left Side Frame Assy	78142170-004
4	Carriage Assembly	78142219-004
5	Flat Washer	76951126-620
6	Spring	78142164-001
7	Gear	78138010-002
8	Shaft Assy	78142435-001
9	Paper Motor	78142178-002
10	Right Tractor	78203350-008
11	Paper Support	78142773-001
12	Carriage Motor	78142179-002
13	TES41 PWB	78142117-003
14	Nut	78142437-001
15	Plate	78142195-001
16	Shaft	78142124-001
17	Shaft	78142127-001
18	Wire Spring	78138529-001
19	Left Tractor	78203350-007
20	Bushing	78123449-002
21	Benzing Ring	76951706-050
22	Lever	78142131-001
23	Sensor Cable Assy	78142724-001
24	Bracket	78142229-001
25	Vibrodamp	78142150-002
26	Plate	78142200-001
27	Fastener Loop	03510004-002
28	Roller	78142162-002
29	Roll Assy	78142180-001
30	Roll Sensor Assy	78142433-001
31	Shaft	78142173-002
32	Platen	78142436-002
33	Lever	78142136-001
34	Bearing	78203247-002
35	Flask for Bearing	78132828-003
36	Mask	78142199-002
37	Spring	78142163-001
38	Screw M2.9x6.5	76951715-046

Table A-5 (cont.). 4/41 Basic Mechanism Assembly

INDEX	DESCRIPTION	PART NUMBER
39	Screw C.H.C.R. M4x8	78203459-319
40	Belt Paper	78203377-015
41	Presure Roller	78142213-002
42	Lever	78142146-001
43	Roller	78142204-002
44	Benzing Ring	76951706-032
45	Screw H.S.C M4x8	78203459-219
46	Lever	78142134-001
47	Pulley Gear	78144456-001
48	Gear	78142139-002
49	Benzing Ring	76951706-023
50	Screw C.H.S.C.R. M3x4	78203459-208
51	Bush	78143169-001
52	Shaft	78142120-001
53	Cable Assy	78203577-003
54	Screw C.H.C.R. M3x6	78203459-209
55	Screw C.H.C.R. M3x8	78203459-310
56	Benzing Ring	76951706-070
57	Washer	78203286-006
58	Screw C.H.C.R. M4x8	78203459-319
59	Screw H.S.C. M6x10	76951108-633
60	Screw T.C.C.I M2x8	78203215-057
61	Washer	76951128-620
62	Spring Roll	78142736-001
63	Presser (Mylar)	78143164-001
64	Carriage Belt	78203553-002
65	Pulley Unit	78143674-002
66	Spring	78142421-001
67	Screw F.H.C.R M3x8	78203460-110
68	Lever	78142133-001
69	Pulley	78142128-001
70	Flask for Bearing	78132828-003
71	Stud	78142201-001
72	Vibrodamp	78142206-001
73	Screw M 2.9x9.5	76951715-046
74	Plate	78142418-001
75	Plate	78143162-001
76	Separator	78143652-002
77	Opt. Reflect. Sensor	78200574-001
78	TLP802 Opt. Swt.	78200797-001
79	Switch	78201445-002

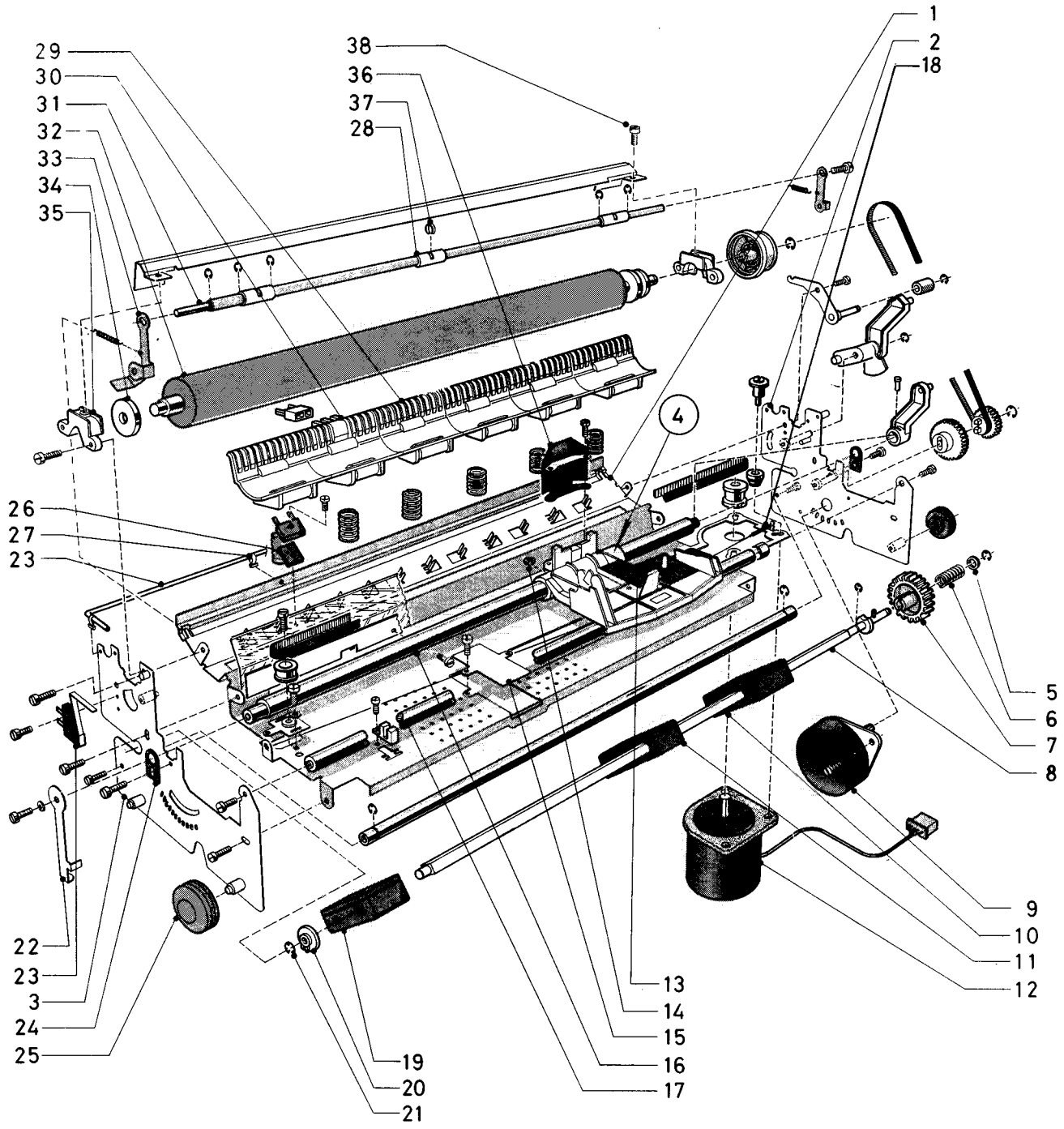


Fig. A-4. 4/41 Basic Assembly Mechanism

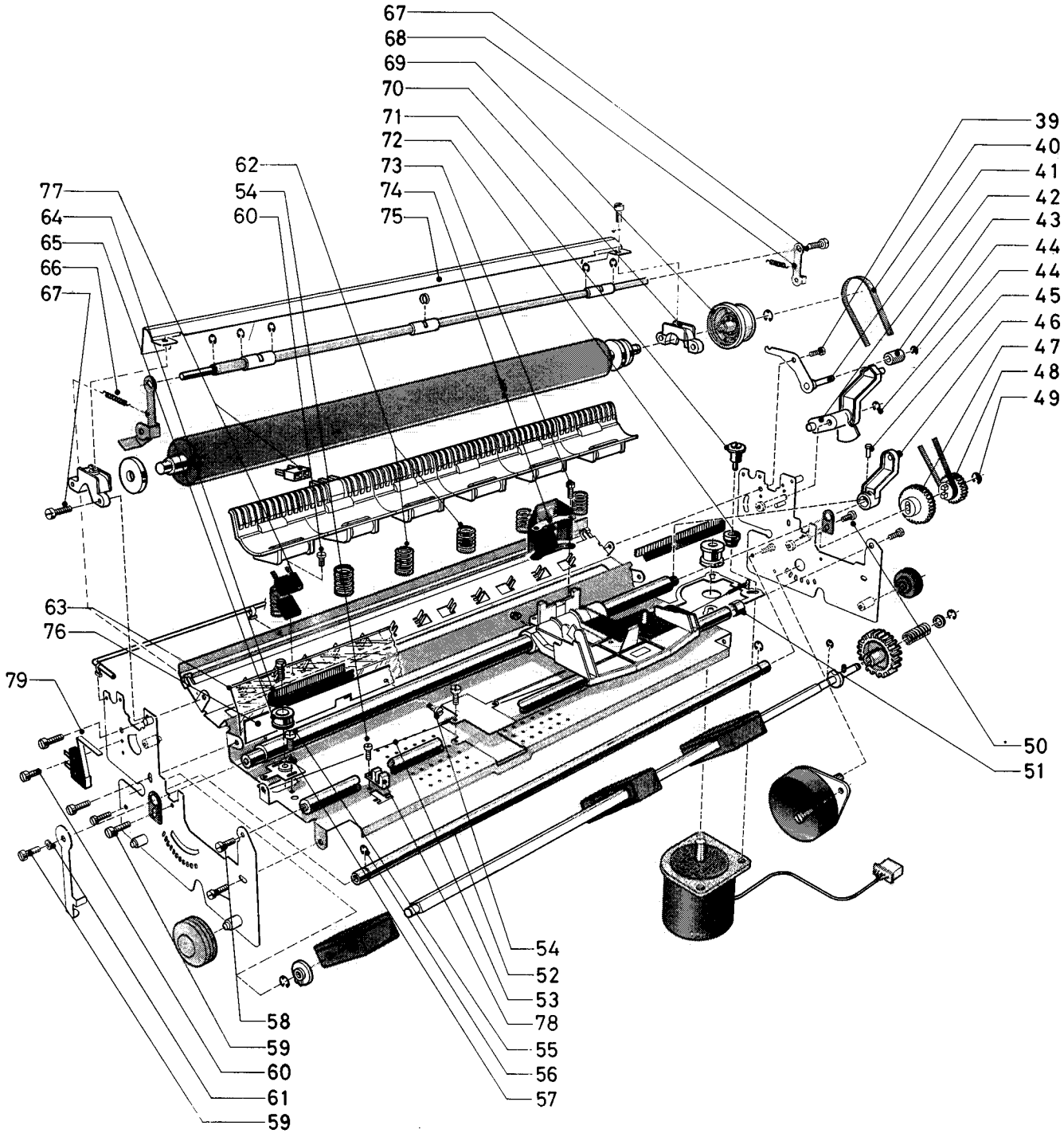


Fig. A-4 (cont.). 4/41 Basic Assembly Mechanism

Table A-6. 4/40 Covers Assembly and Operator Panel

INDEX	DESCRIPTION	PART NUMBER
1	Paper Chute Group	78142706-001
2	Drive Selection Switch	78141911-002
3	Paper Thickness Switch	78141912-002
4	Transparent Cover	78142707-001
5	Cabinet	78142708-001
6	Operator Panel	78142212-003
7	Cartridge Area Cover	78141916-001
8	Paper Bail Switch	78141913-001
9	Rear Cover	78142709-001
10	I/F Board Cover	78141930-002
11	Panel Cap	78141910-001
12	Font Cartridge	See. Table A - 14
13	Slider	78143161-001
14	Screw M4x8 HSC	78203459-219
15	Screw M4X95	78203215-296
16	Paper Chute	78142184-001
17	Left Paper Guide	78141914-001
18	Right Paper Guide	78141915-001
19	Flat Spring	78136029-001
20	Paper Support Bar	78144288-002
21	Paper Guide	78144289-001

Note: Items 5- 7- 9- 10- 13 are contained in Cover Assembly (P.N. 78142766-002)

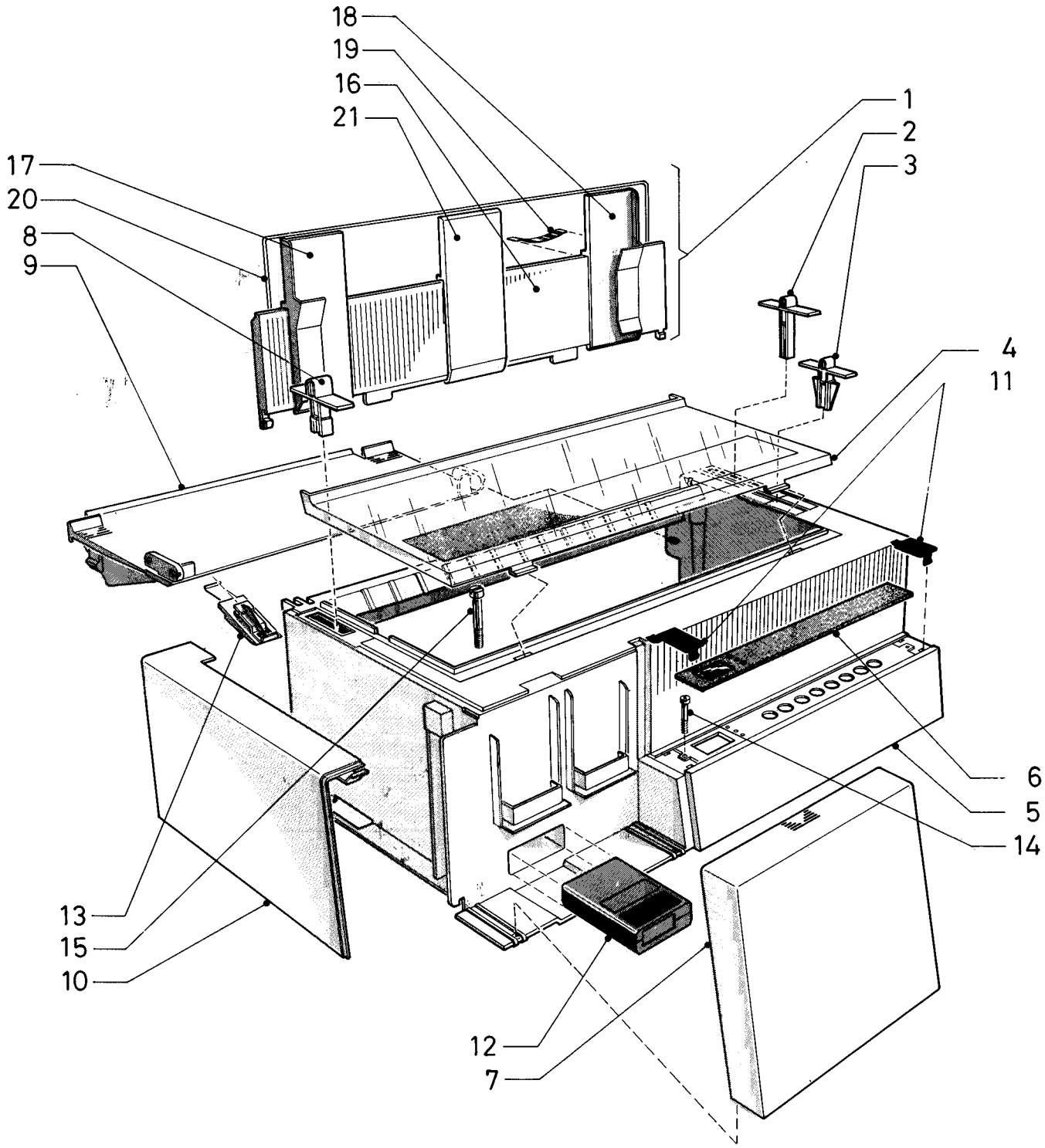


Fig. A-5. 4/40 Covers Assembly and Operator Panel

Table A-7. 4/41 Covers Assembly and Operator Panel

INDEX	DESCRIPTION	PART NUMBER
1	Paper Chute Group	78142700-001
2	Drive Selection Switch	78141911-002
3	Paper Thickness Switch	78141912-002
4	Transparent Cover	78142698-001
5	Cabinet	78142699-002
6	Operator Panel	78142212-003
7	Cartridge Area Cover	78141916-001
8	Paper Bail Switch	78141913-002
9	Rear Cover	78141931-001
10	I/F Board Cover	78141930-002
11	Panel Cap	78141910-001
12	Right Panel Cap	78142209-001
13	Slider Assy	78143161-001
14	Screw M4x8 H.S.C	78203459-219
15	Screw M4X95	78203215-296
16	Paper Chute	78141934-001
17	Left Guide	78141914-001
18	Right Guide	78141915-001
19	Flat Spring	78136029-001
20	Paper Support Bar	78144288-002
21	Paper Guide	78144289-001
22	Font Cartridge	See. TableA -14

Note: Items 5- 7- 9- 10- 13 are contained in Cover Assembly (P.N. 78142697-003)

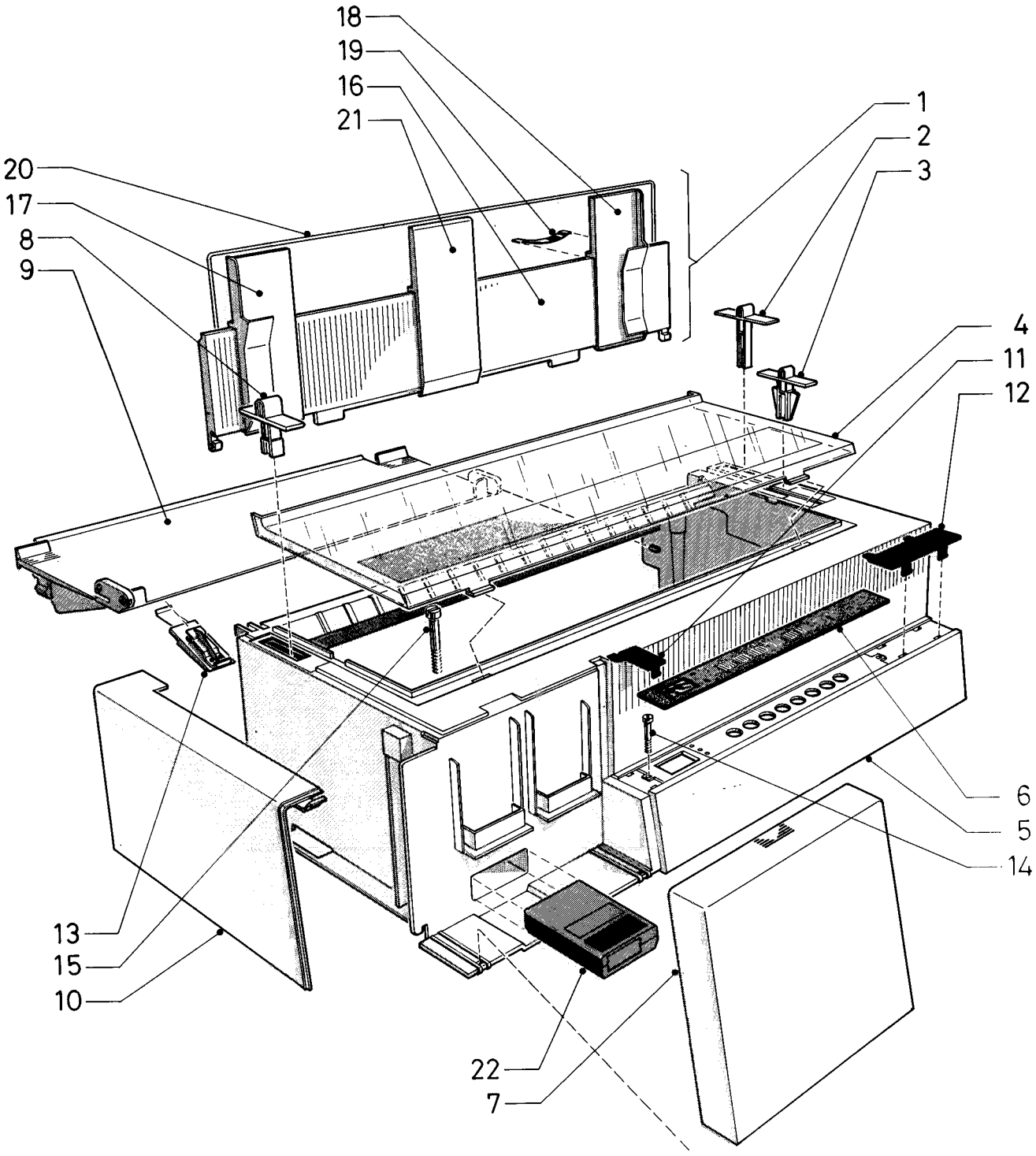


Fig. A-6. 4/41 Covers Assembly and Operator Panel

Table A-8. Carriage Assembly and Print Head

INDEX	DESCRIPTION	PART NUMBER
	Carriage Assy	78142219-002
1	Bracket	78140939-002
2	Benzing Ring	76951706-040
3	Screw F.H.C.R M3x6	78203460-109
4	Spring	78142135-001
5	Roller 2x9.8	78203471-011
6	Flange	78142153-002
7	Carriage Assy	78142183-002
8	Colour Motor	78201534-002
9	Screw 2.9x6.5	76951715-045
10	Oilfelt	78142152-001
11	Pivot	78142157-001
12	Pivot	78142156-001
13	Drive	78142182-001
14	Gear	78144291-001
15	Ring	76951704-004
16	Ribbon Reverse Assy	78146205-001
20	Washer	78203376-008
21	Lever	78142132-002
22	Cam	78142174-001
23	Belt Clamp	78144888-001
24	Pulley	78144292-002
25	Screw D.R.C.H M3x18	78203386-031
26	Flat Washer 3.2	76951126-490
27	Stored 9 Head	78140596-004
28	Screw R.C.F.H.T 2.9x9.5	78203230-035
29	Screw 2.9x9.5	76951715-046
30	Plate 17	78144452-002

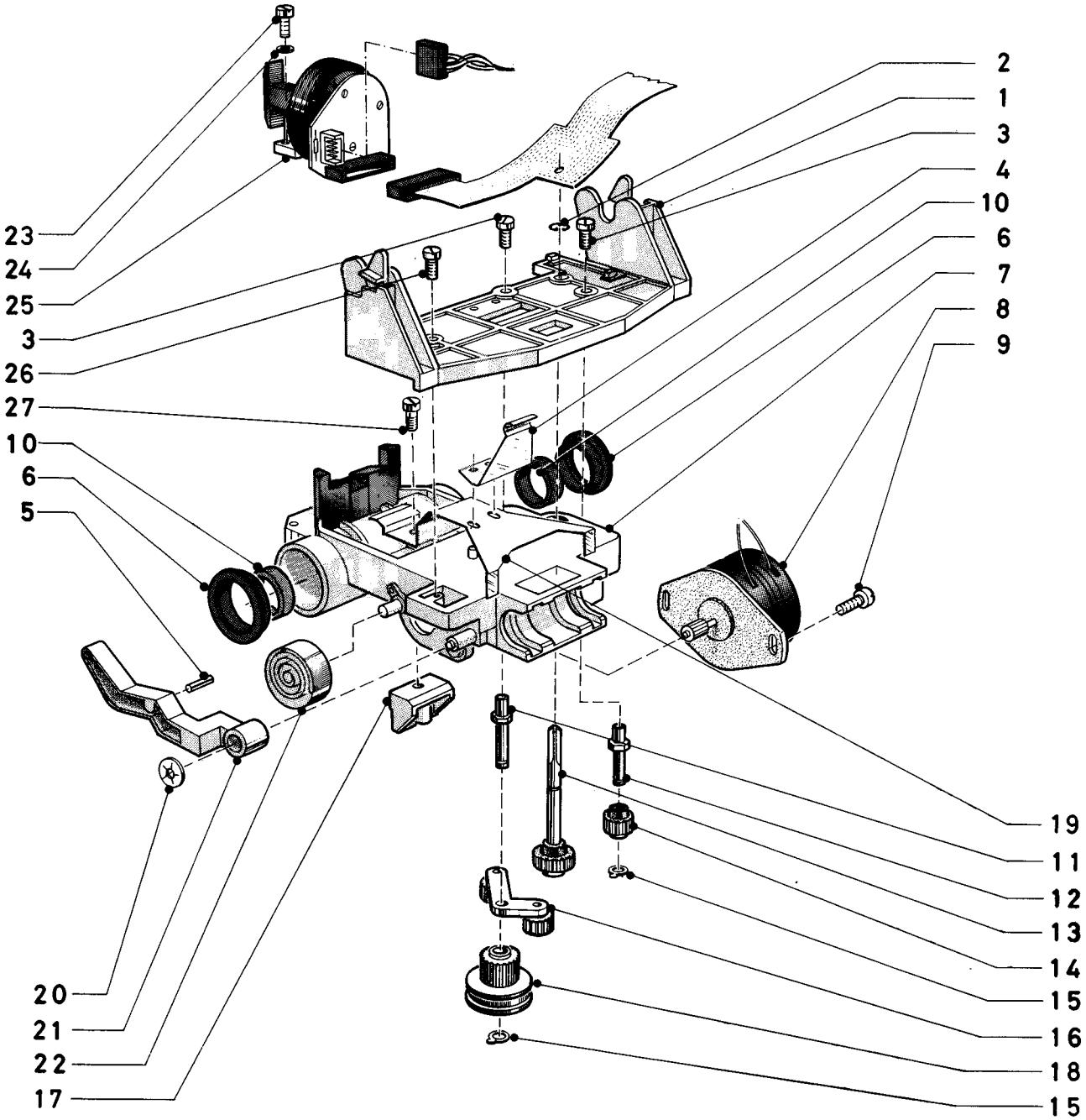


Fig. A-7. Carriage Assembly and Print Head

Table A-9. Parallel Interface

INDEX	DESCRIPTION	PART NUMBER
1	Parallel I/F PWA	78142695-003
2	GX2P41 PWA	78141906-004
2	GX2P4P PWA (fut. availab.)	78145622-001
3	Shield	78142386-001
4	Bushing	78203541-001
5	Push Button	78203541-101
6	Screw C.H.C.R M3x6	78203459-209
7	Washer	76951126-490

Table A-10. Serial Interface

INDEX	DESCRIPTION	PART NUMBER
1	Serial I/F PWA	78142696-002
2	GX2S4P PWA	78146100-001
3	Shield	78142387-001
4	Bushing	78203541-001
5	Push Button	78203541-101
6	Screw C.H.C.R M3x6	78203459-209
7	Washer	76951126-490

Table A-11. Firmware Mounting

INDEX	DESCRIPTION	PART NUMBER
1	EPROM W0235 (Parallel I/F)	A78148133-001
2	EPROM W0210 (Serial I/F)	A78148134-001
3	EPROM Y0110 (Serial I/F)	A78148135-001

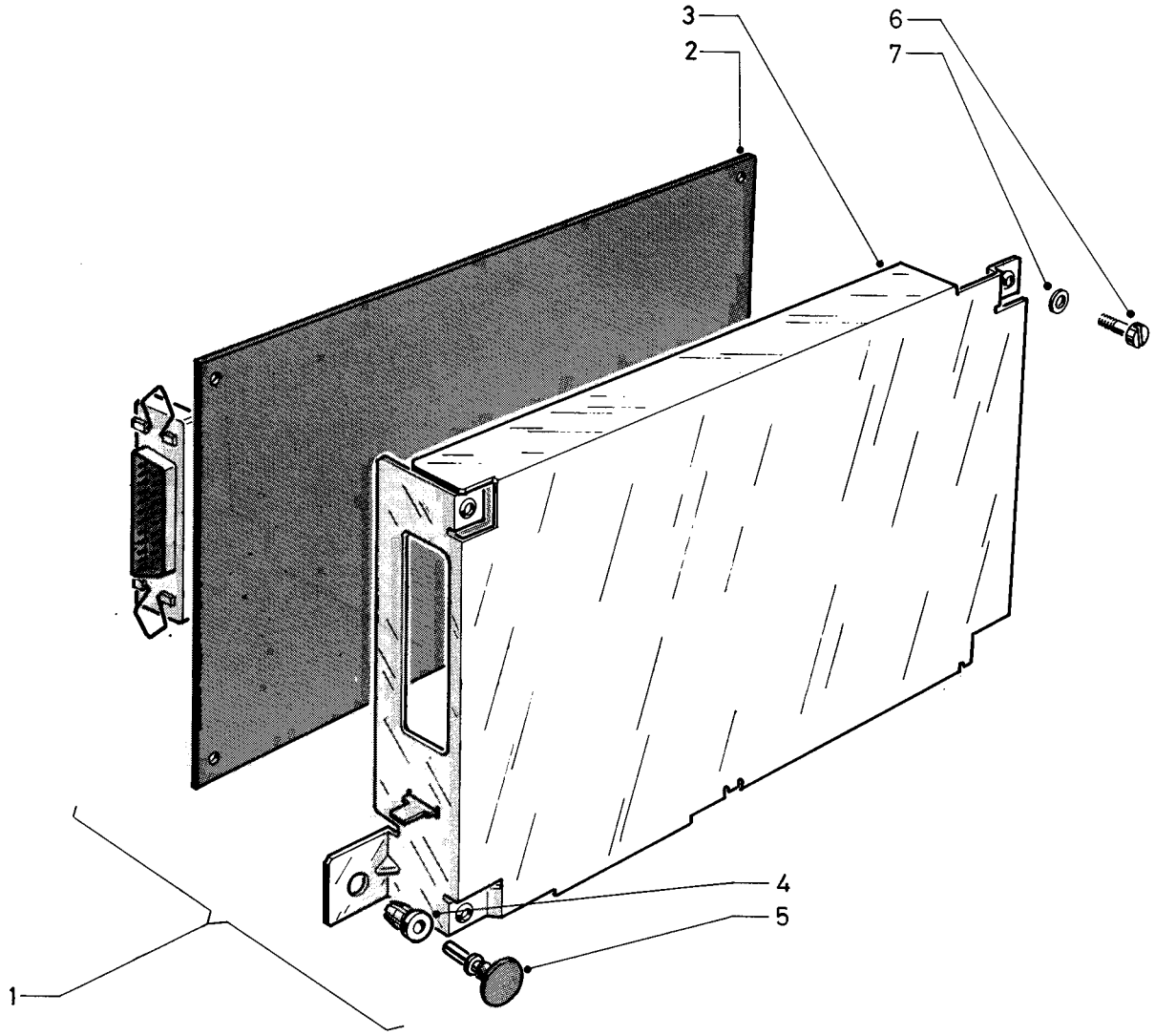


Fig. A-8. Parallel Interface

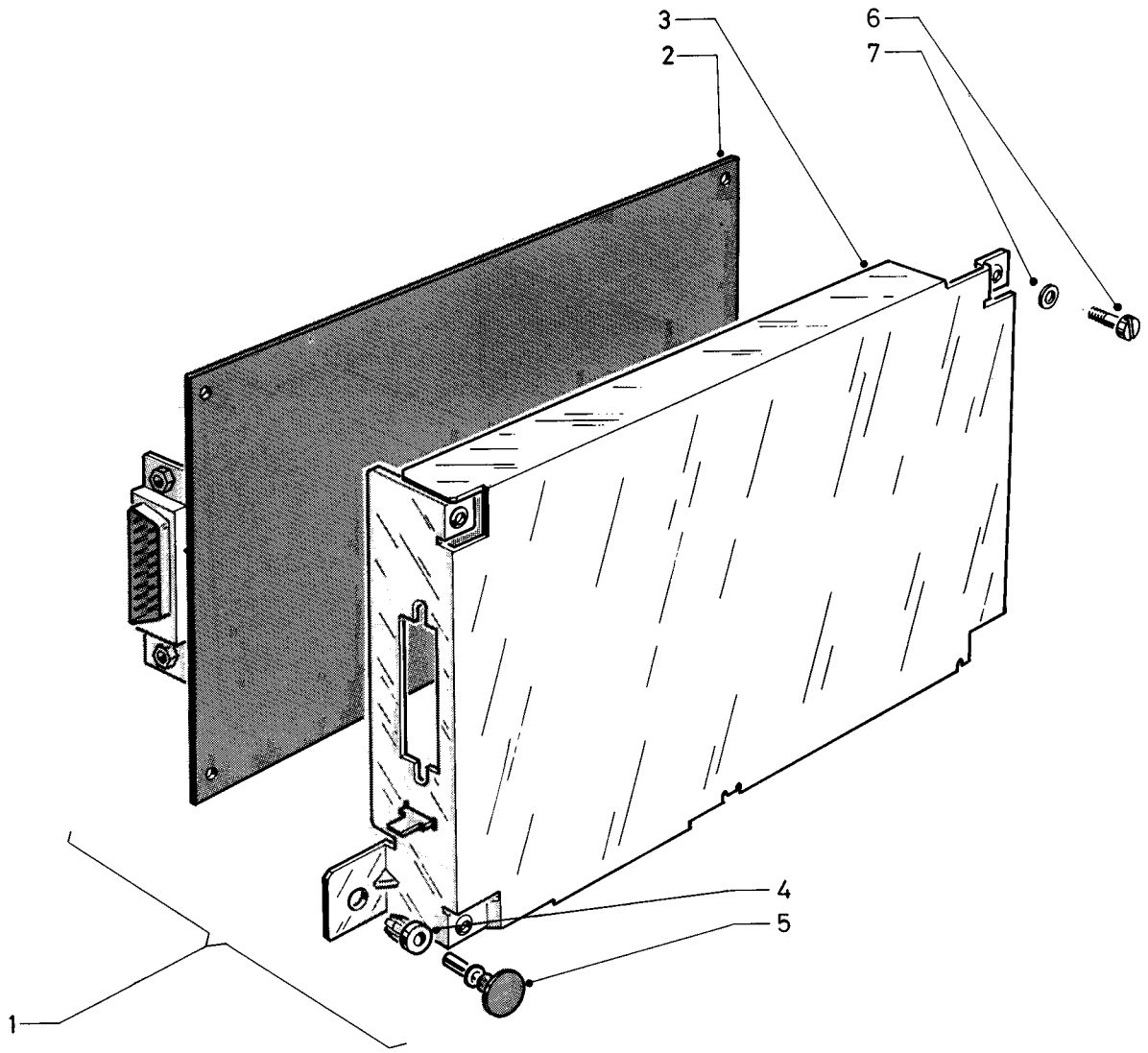


Fig. A-9. Serial Interface

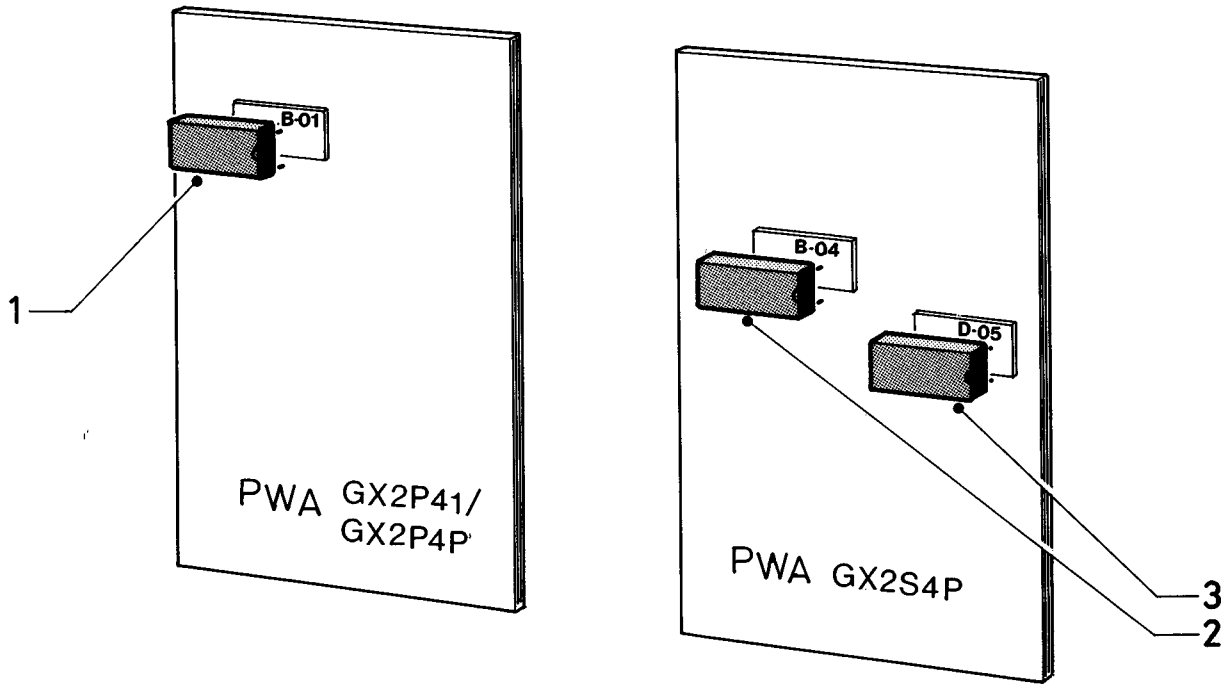


Fig. A-10. Firmware Mounting

Table A-12. Basic Electronic Assembly

INDEX	DESCRIPTION	PART NUMBER
1	BAS4x PWA	78145607-001
2	Push button	78142211-001
3	GX2P4 PWA	78142727-001

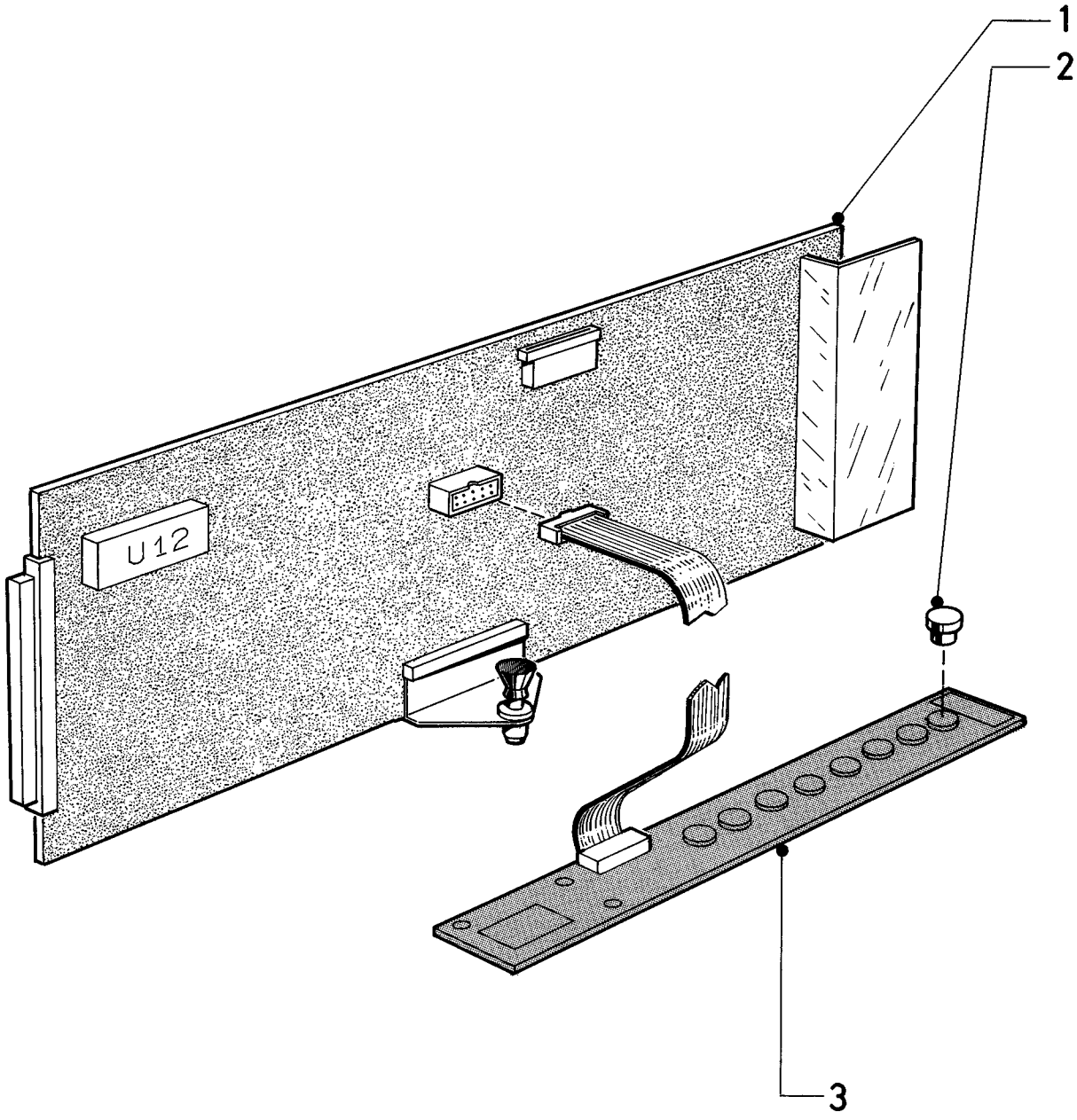


Fig. A-11. Basic Electronic Assembly

Table A-13. Power Supply PWA

INDEX	DESCRIPTION	PART NUMBER
1	ALI4X PWA	78145587-001
2	FUSE	78200343-008
3	SCREW CRPHTCT 3.53x9,5	76951715-059
4	SCREW	78203459-319
5	P.S. Switch	78201238-001
6	Clamp for Cable	78201015-060

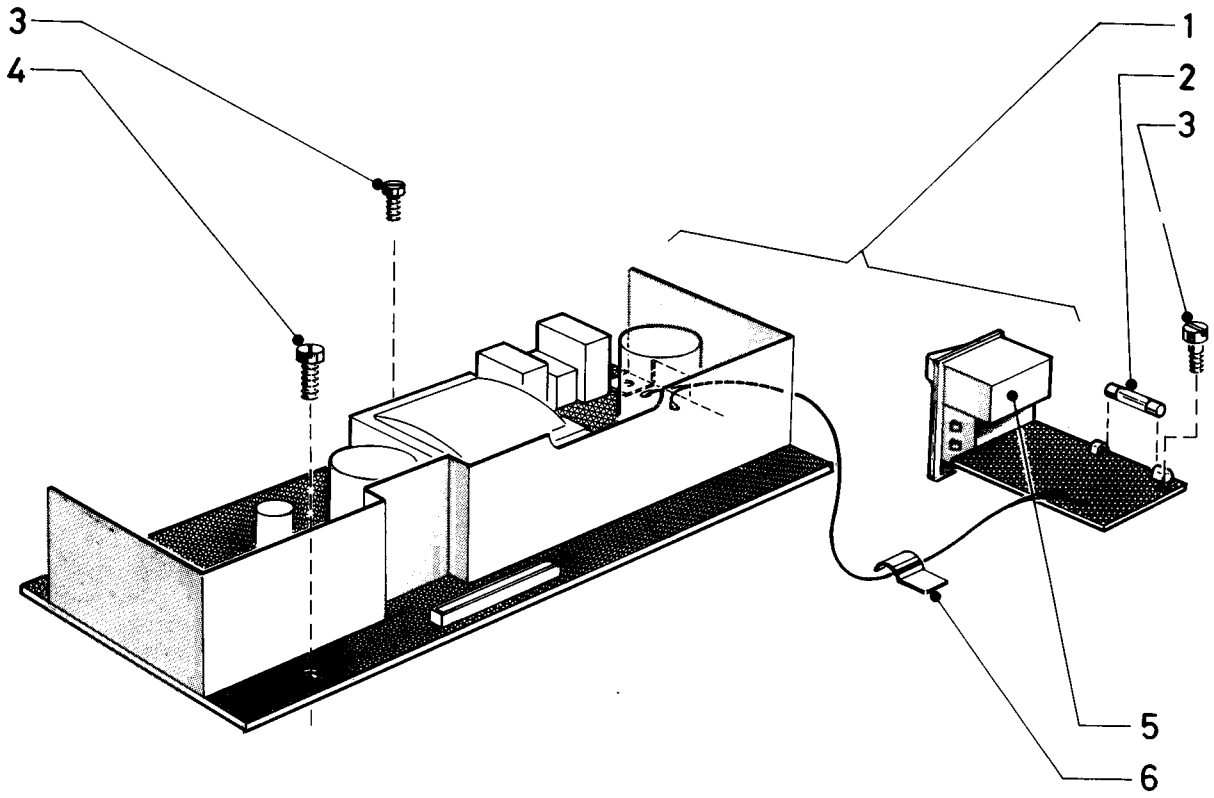


Fig. A-12. Power Supply PWA

Table A-14. Characters Generators

INDEX	DESCRIPTION	PART NUMBER
1	Fast Boston & Square	78138403-003
2	Elite & Tile	78138594-003
3	Round Light & Serif	78138636-003
4	Presentor	78138400-004
5	Superegg Light & Serif	78138404-003
6	OCR-A & OCR-B	78138401-004
7	Pica	78144387-001
8	OCR-B EXT.	78144439-001
9	Elite	78144443-001
10	Tile	78144447-001
11	Square Light	78144388-001

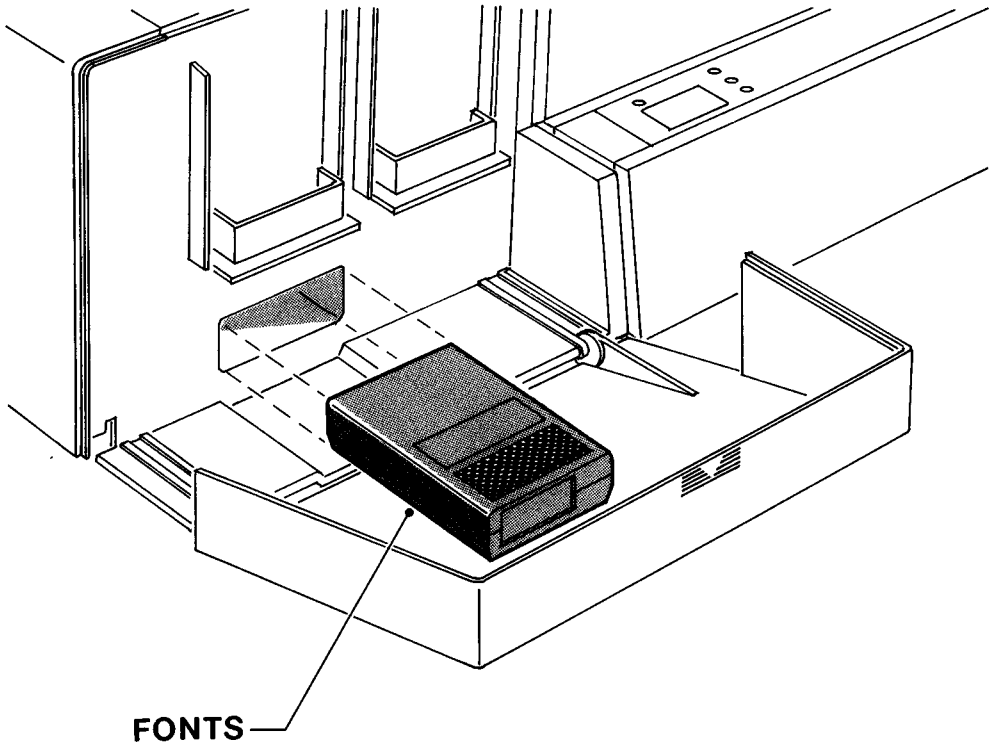


Fig. A-13. Characters Generators

APPENDIX B

DESCRIPTION	CODE	
PWA BAS4X (old version)	C78145607	(2)
L.F.D. PWA BAS4X (old version)	C78144321	(9)
PWA BAS4X (new version)	C78145607	(2)
L.F.D. PWA BAS4X (new version)	C78144321	(3)
PWA - GX2P4X	C78142395	
PWA - GX2S4P	C78146100	
L.F.D. GX2S4P	C78146098	(9)
PWA GX2P41	C78141906	
L.F.D. GX2P41	C78141908	(5)
PWA-GX2P4P (future availability)	C78145622	
L.F.D. GX2P4P (future availability)	C78145625	(5)
FW 4/4X MNT.DRW (old version)	B78143191	
FW 4/4X MNT.DRW (new version)	B78143191	(2)
PWA ALI4X (old version)	C78144461	(2)
L.F.D. PWA ALI4X (old version)	C78144463	(EA)
PWA ALI4X (new version)	C78145587	(2)
L.F.D. PWA ALI4X (new version)	C78144463	(FA)