

Läs detta innan ni ansluter skrivaren.

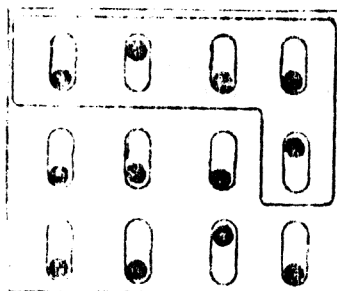
För att skydda Din skrivare under transporten har tillverkaren monterat transportförsäkringar. Dessa skall tas bort före användning.

Gör så här: Lossa de båda skruvarna på skrivarens undersida märkta " SHIPPING BOLOTS ".  
Tag bort tapen som håller skrivhuvudet i vänster kant samt avlägsna den vita cellplastkuben.

Innan skrivaren kan användas måste vissa parametrar ställas in. Detta sker med hjälp av 12 små omkopplare bekvämt placerade på skrivarens översida. I manualen beskrivs detaljerat hur detta skall ske men för att underlätta för Dig visar Vi här en typisk inställning som gäller i de fall.

Inställd funktion.

Normal skrift  
Sidlängd 12 tum  
Radavstånd 1/6 tum  
Hoppar ej över perforeringen  
Svenska tecken



Om Du har en serieskrivare CPA-80S tillkommer även inställning av serieinterfacet. Vi hänvisar till manualen för fullständig information. För att underlätta igångkörning har vi sammanställt ett exempel.

Vald funktion

Baude rate	2400
Stopp bitar	1
Paritet	Jämn
Paritet Ja/Nej	Nej
Ordlängd	8 bitar
Buffert	Ingen
Självtest	Från

Inställning av DIP-Switch ( På serieinterface-kortets undersida )

Sw	1	2	3	4	5	6	7	8	9	10	11	12
	ON	ON	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	---

**PARALLELL SKRIVARE:**

När Du skall ansluta en parallell skrivare till Jet 80 skall Du först se till att Jet 80 är inställd för parallell kommunikation. Detta görs antingen med DEVICE eller med IOSETUP. (LST:=CEN) Det andra Du kontrollerar är att kabeln sitter fast ordentligt i både skrivare och dator.

De omställningar Du kan göra på skrivaren är koncentrerade till framsidan. Vridomkopplaren reglerar papperslängden och enligt svensk standard bör den stå i läge 8. (72 rader per sida)

På insidan av skrivarkåpan sitter ytterligare en omkopplare. För att komma åt denna lossar Du kåpan med två skruvar i framkanten av skrivaren under det genomskinliga locket. Därefter drar Du av pappersmatningsratten till höger på skrivaren. Kåpan går nu att lyfta bort och Du ser omkopplaren till höger om manöverpanelen.

Rekommenderad inställning som följer :

TILL (ON)	FRÅN (OFF)	INSTÄLLD FUNKTION
8.	X	Parallellt gränssnitt
7.	X	DEL-koden ignoreras
6.	X	CR = CR
5.	X	8 bitar
4.	X	Svensk Teckenuppsättning
3.	X	! !
2.	X	! !
1.	X	! _____ !

Det finns även två överkopplingspluggar på styrkortet, dessa är benämnda SP1 och SP2 (på vissa kort kan SP2 istället heta SP3) och är placerade enligt manualen.

Vanligtvis behöver Du inte röra dessa då de skall vara rätt inställda från fabriken. Det kan dock hända att Du behöver ställa om dem på någon enstaka skrivare.

SP1 skall stå på A-sidan och SP2 (SP3) skall stå på B-sidan.

ML 82/83

**SERIELL SKRIVARE**  
**(110 - 1200 BITS/SEKUND)**

Ställ först in datorn för seriell kommunikation med DEVICE eller IOSETUP.

**LST:=LPT**

Därefter ställer Du in de olika parametrarna antingen med IOSETUP eller med PRIMO.

Baudrate: 1200  
Databitar: 8  
Handskakning: YES  
Stopbit: 1  
Paritet: None

Se därefter till att rätt kabel används, det skall vara **JK 817**.

Den enda förändringen Du behöver göra med omkopplaren som sitter på skrivarens framsida är kontakt nummer 8, som skall ställas om till seriellt gränssnitt (läge ON).

I den bakre delen av skrivaren sitter skrivarens styrkort. På detta sitter en omkopplare som skall ställas på följande sätt:

till	till	från	till	till	från
1	2	3	4	5	6

Skrivaren är nu inställd för:

1. SSD-polaritet (BUSY-signal) (nolla-klar, etta-upptagen)
2. Överföringshastighet:
3. 1200 bits/sekund (Baud)
4. Överföringshastighet
5. Används ej
6. Utan paritet

Det finns även två överkopplingspluggar på styrkortet, dessa är benämnda SP1 och SP2 (på vissa kort kan SP2 istället heta SP3) och är lokaliserade enligt manualen.

Vanligtvis behöver Du inte röra dessa då de skall vara rätt inställda från fabriken. Det kan dock hända att Du behöver ställa om dem på någon enstaka skrivare.

SP1 skall stå på A-sidan och SP2 (SP3) skall stå på B-sidan.

SERIELL SKRIVARE

X-ON / X-OFF PROTOKOLL:

Ställ först in datorn till seriell kommunikation med DEVICE:

LST:=LPTAX

Därefter ställer man in de olika parametrarna antingen med IOSETUP eller med PRIMO.

Baudrate: 1200  
Databitar: 8  
Handskakning: NO  
Stopbit: 1  
Paritet: None

Se därefter till att rätt kabel används, vi rekommenderar JK 813. Omkopplare A (den högra) skall stå som föregående, omkopplare B (följaktligen den vänstra) skall stå som följer:

O P E N

off	on	off	off	on	on	off	off
1	2	3	4	5	6	7	8

HANDSKAKNING:

Ställ först in datorn med IOSETUP eller DEVICE och PRIMO till:  
LST:=LPT

Baudrate: 1200  
Databitar: 8  
Handskakning: YES  
Stopbit: 1  
Paritet: NONE

Använd fortfarande samma kabel (JK 813). Omkopplare A skall fortfarande stå som förut, och omkopplare B enligt:

O P E N

off	off	off	off	on	on	on	off
1	2	3	4	5	6	7	8

Inuti skrivaren på interface-kortet finns det tre strömbrytare SW1, SW2 och SW3. Normalt skall man inte behöva ställa om dem. Undtaget som bekräftar regeln är när man använder handskakning då SW 1 skall stå i L-läge, för Ready/Busy signalering.

DWX-305

**PARALLELL SKRIVARE:**

När man skall anpassa en parallell skrivare till Jet 80 skall man först se till att Jet 80 är inställd för parallell kommunikation. Detta görs antingen med DEVICE eller med IOSETUP. (LST:=CEN)  
Det andra man kontrollerar är att kabeln sitter fast ordentligt i både skrivare och dator.

De omställningar man kan göra på skrivaren är koncentrerade till den **högra** omkopplaren (A) på baksidan av skrivaren. Omkopplaren sitter innanför det lilla vita locket i det högra hörnet om man ser skrivaren bakifrån.

Rekommenderad inställning som följer :

O P E N

off	on	off	on	on	on	on	off
1	2	3	4	5	6	7	8

**Inställd funktion:**

**Omkopplare  
nr**

**Alternativ funktion**

Serial print mode = på  
CR=CR  
Radmatning = 1/6"  
Papperslängd = 12"  
Teckenbredd = 10 tkn/tum  
  
Anslagstryck = medium

1  
2  
3  
4  
5  
6  
7  
8

Line print  
CR=CR+LF  
1/3"  
11"  
off+on=12tkn/tum  
on+off=15tkn/tum  
av=on+on, mjuk=off+on  
hård=off+off



**KABELTABELL 1917**

Typ nr		Längd	Benämning/Användning		
JK 817		2,5 m	Seriekabel Jet 80 - MK 82/83		
Kontakt don		Kabel	Kontakt don		Anm.
Cannon			Cannon		
DB 25P			DB 25P		
Funktion	Stift nr	Färg	Stift nr	Funktion	Anm.
	2	→	3		
	3	←	2		
	7	○—○	7		
	5	←	11		
	11	→	5		
	8	]			
	20				
			8		
			20		

**STYCKLISTA**

Pos	Benämning	Typ nr	Antal	Fabrikat	Leverantör
1	Kontakt don	DB 25P	2		
2	Kåpa	DB 5/212 -1	2		
3	Kabel	5-led. 0,15-0,25 mm <sup>2</sup>	2,5 m		

KABELTABELL 1914

Typ nr		Längd	Benämning/Användning		
JK 814		2,5 m	Seriekabel Jet 80 - ML 92/93/84		
Kontaktdon		Kabel	Kontaktdon		Anm.
Cannon DB 25P			Cannon DB 25P		
Funktion	Stift nr	Färg	Stift nr	Funktion	Anm.
	2	→	3		
	3	←	2		
	7	○—○	7		
	5	—┬—	6		
			8		
			20		
	6	—┬—	5		
	8	—┬—			
	20	—┬—			

STYCKLISTA

Pos	Benämning	Typ nr	Antal	Fabrikat	Leverantör
1	Kontaktdon	DB 25P	2		
2	Kåpa	DB 51212-1	2		
3	Kabel	5-led. 0,15 0,25 mm <sup>2</sup>	2,5m		







**KABELTABELL 1912**

Typ nr		Längd	Benämning/Användning		
JK 812		2,5 m	MODEM-kabel		
Kontakt don		Kabel	Kontakt don		Anm.
Cannon DB 25 P			Cannon DB 25 P		
Funktion	Stift nr	Färg	Stift nr	Funktion	Anm.
	1	↔	1		Samtliga stift förbinds mellan de båda kontaktterna. Stift till stift.
	25	↔	25		

**STYCKLISTA**

Pos	Benämning	Typ nr	Antal	Fabrikat	Leverantör
1	Kontakt don	DB 25 P	2		
2	Käpa				
3	Kabel	25-led. Flatkabel	2,5 m		

**KABELTABELL 1910**

Typ nr		Längd	Benämning/Användning		
JK 810		2,5m	Seriekomm. kabel JET 80-JET 80		
Kontakt den		Kabel	Kontakt den		Anm.
Cannon DB 25 P			Cannon DB 25 P		
Funktion	Stift nr	Färg	Stift nr	Funktion	Anm.
TXD	2	→	3	RXD	
RXD	3	←	2	TXD	
CTS	5				} Byglas
DCD	8				
DTR	20				
			5	CTS	} Byglas
			8	DCD	
			20	DTR	
GND	7	○—○	7	GND	

**STYCKLISTA**

Pos	Benämning	Typ nr	Antal	Fabrikat	Leverantör
1	Kontakt den	DB 25 P	2		
2	Köpa	DB 57212-1	2		
3	Kabel	3-led 0,15-0,25mm <sup>2</sup>	2,5m		





Parallell

KABELTABELL 1906

Typ nr		Längd	Benämning/Användning		
JK 806		2,5 m	Centronic parallell CP-80/Columbia MPC		
Kontakt don CP-80 Amphenol 57-30360		Kabel	Kontakt don Columbia MPC Cannish DC-37P		Anm.
Funktion	Stift nr	Färg	Stift nr	Funktion	Anm.
	1		1	$\overline{\text{STROBE}}$	
	2		2	DATA 0	
	3		3	1	
	4		4	2	
	5		5	3	
	6		6	4	
	7		7	5	
	8		8	6	
	9		9	DATA 7	
	10		10	$\overline{\text{ACK}}$	
	11		11	BUSY	
	19		19	GND	
	21		21	GND	
	23		23	GND	
	25		25	GND	
	27		27	GND	
	32		32	$\overline{\text{ERROR}}$	
					Övriga stift ej anslutna

STYCKLISTA

Pos	Benämning	Typ nr	Antal	Fabrikat	Leverantör
1	Kontakt don	57-30360	1	Amphenol	
2	Kontakt don	DC-37P	1	Cannish	
3	Käpa	DC 51214-1	1	Cannish	
4	Kabel	25-led, 0,15-0,25mm <sup>2</sup>	2,5m		







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G E N E R A L

Informations for Repair and Maintenance of CPA-80 PERIPHERAL PRINTER

Before starting repair and/or check of CPA-80 referring this information, the operation manual of CPA-80 should be thoroughly read. This manual includes the all technical informations that are necessary to be referred to for performance of service at the distributor's service organization but the subjects that are covered by the operation manual.

A. MODULES AND COMPONENTS

Refer to followings for index of the part (module)'s name and its location.

Figure 1. External View

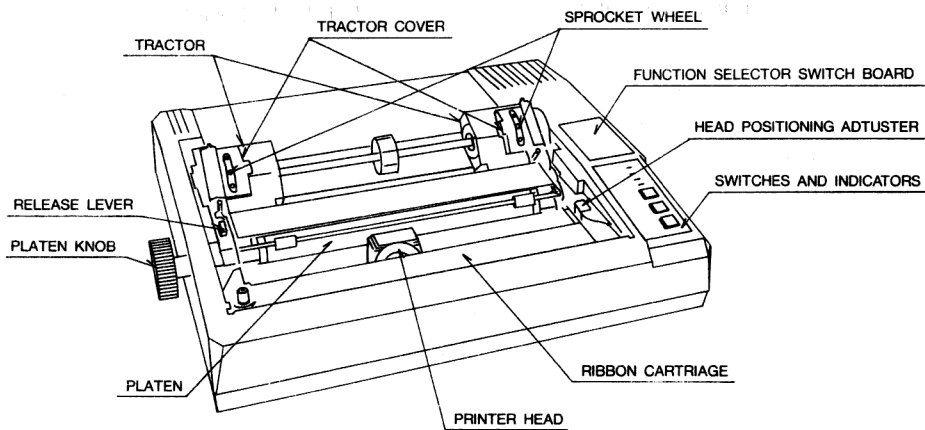


Figure 2. External View on Back Side

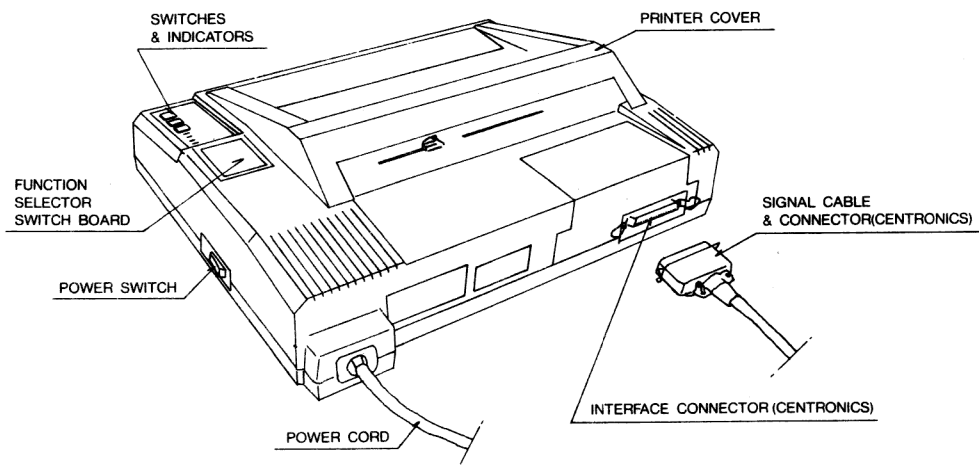
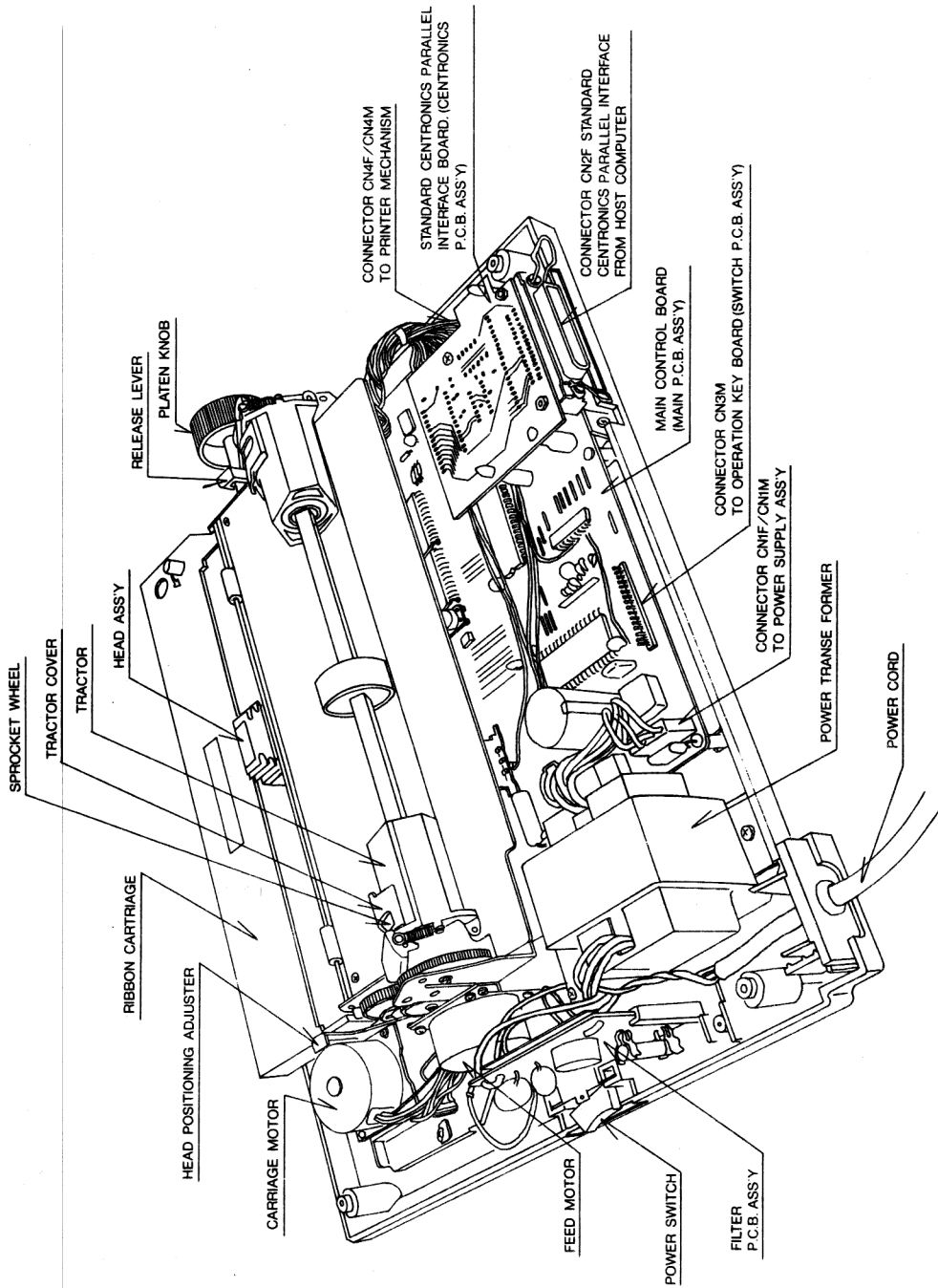


Figure 3. Internal Structure  
 - for how to open the case, refer to Section B, Operation  
 - Manual -



B. BASIC STRUCTURE OF CPA-80

1. Power Supply

Primary -- AC 50/60 Hz 100 V, 115 V, 220 V or 240 V

Transformer for each AC voltage is selected at the factory.

Note: There are four types of transformer. All those voltage selection is the subject of factory-set in accordance with the customer's order.

Secondary - DC 5 Volt for TTL Logics.

DC 23 Volt for Printer Mechanism.

2. CPU and Control Circuit Block

Main Control Board with CPU, Printer Drive Board and Operation Key Board.

3. Printer Mechanism

Printer Head, Head Carriage Mechanism, Paper Feed with Tractor Mechanism and Ribbon Drive Mechanism are in unit.

The Printer head is replaceable but disassembling of the other parts of unit at the field is not recommended for repair. In case of the printer mechanism is defect, should replace the whole printer mechanism unit and send the bad one to the factory through the channel of it is delivered.

Figure 4. General Blocks of Structure

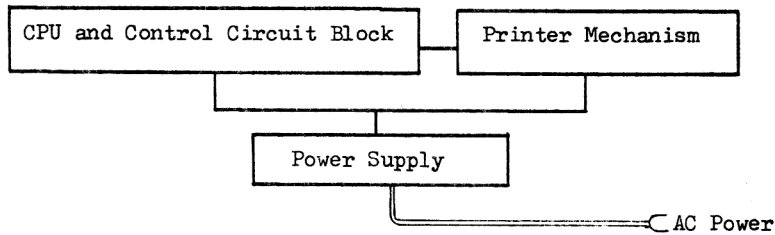
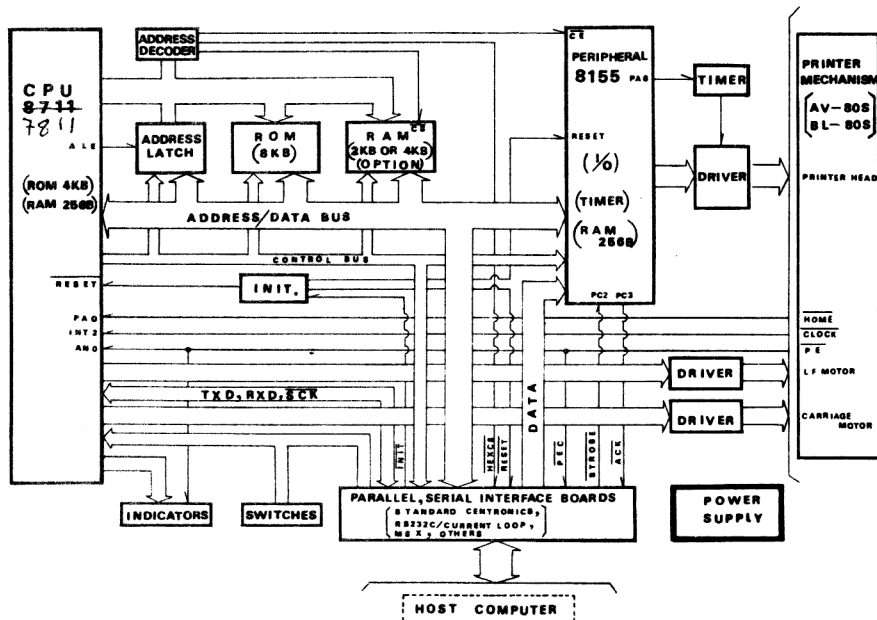


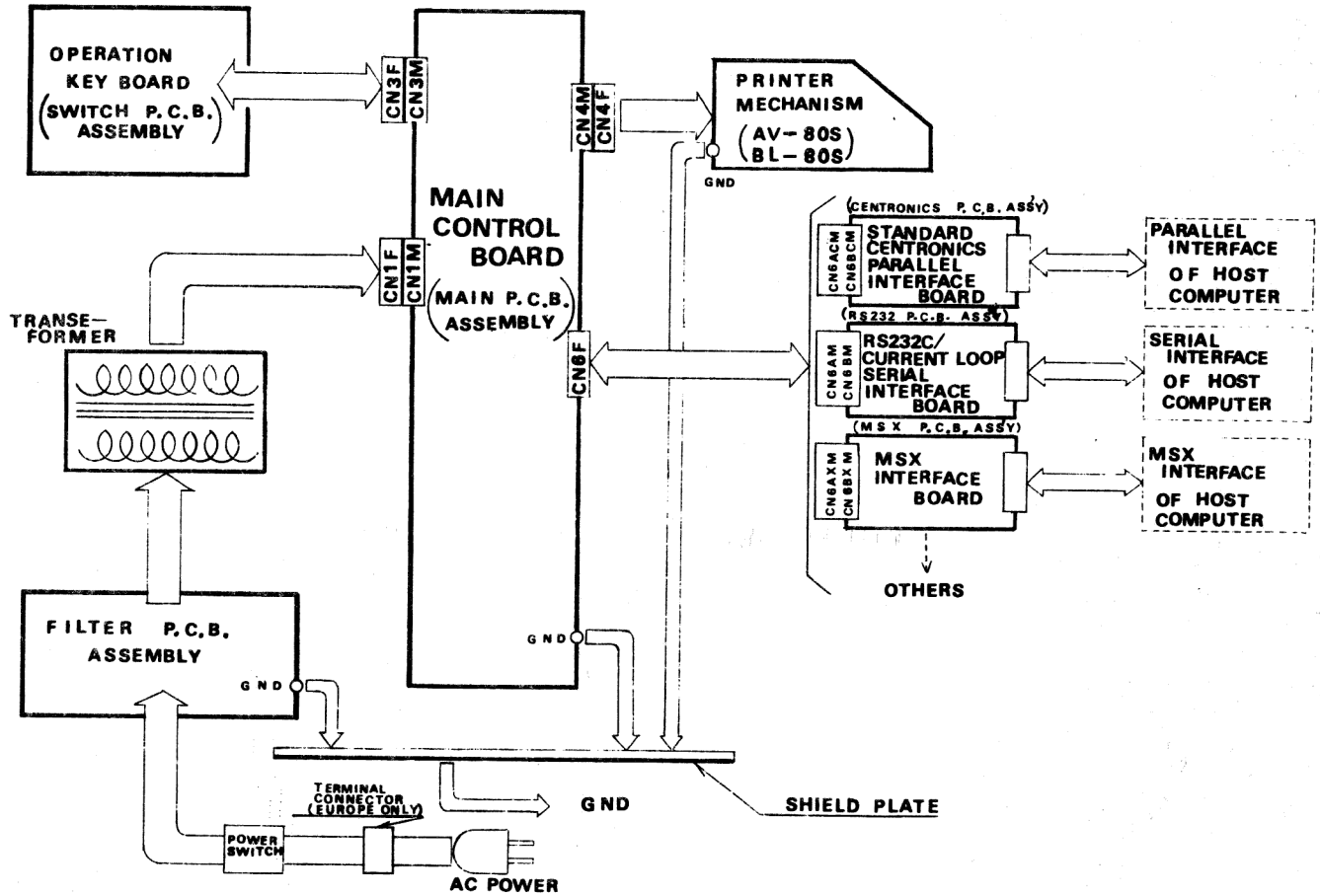
Figure 5. CPU and Control Circuit Block Diagram



#### 4. Connection of Circuits, between Modules

Figure 6. Connector Location, on Blocks

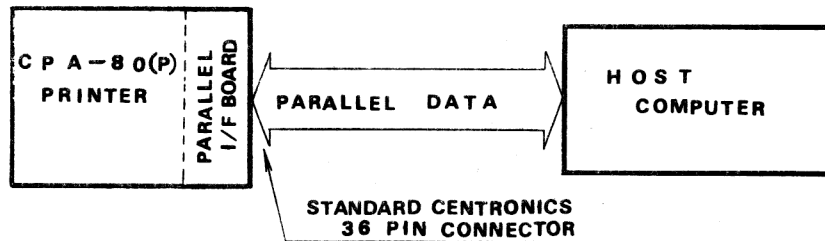
Should refer to the electric circuits diagram and P.C.B. layouts.



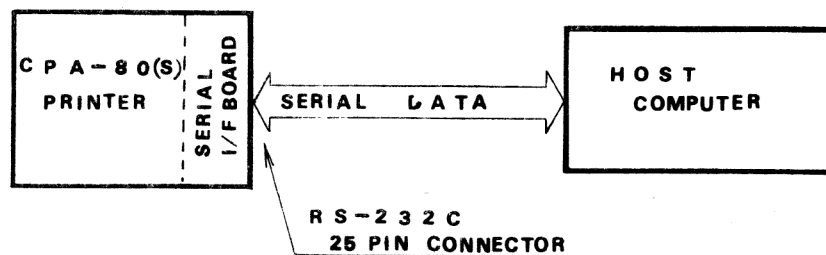
#### 5. Interface Outline

Figure 7. Block Dia. Interface Block Diagrams

##### PARALLEL MODE



##### SERIAL MODE



6. Functional Structure in Block Diagrams

Figure 8. Basic Data Flow between the Hardwares

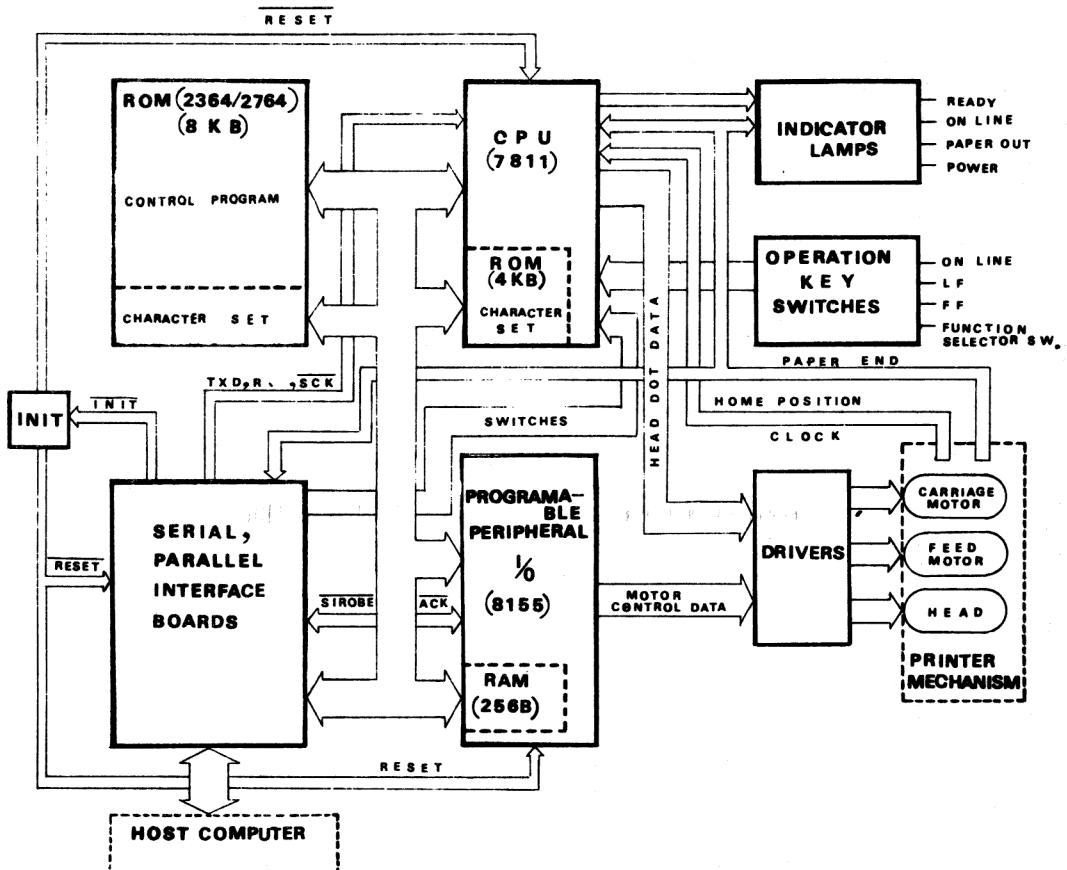
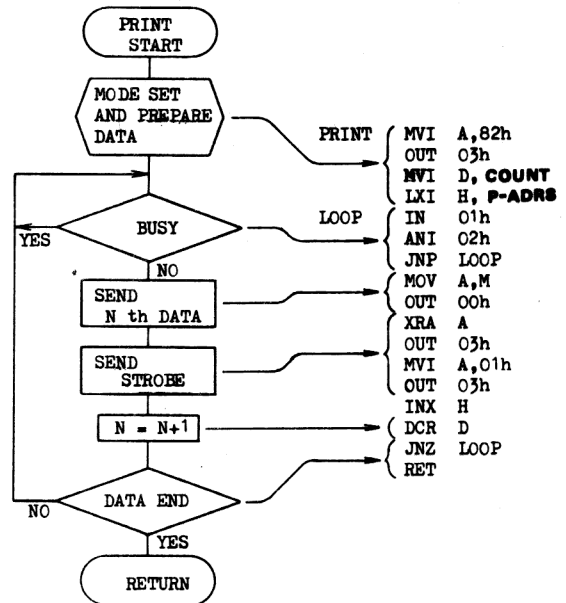
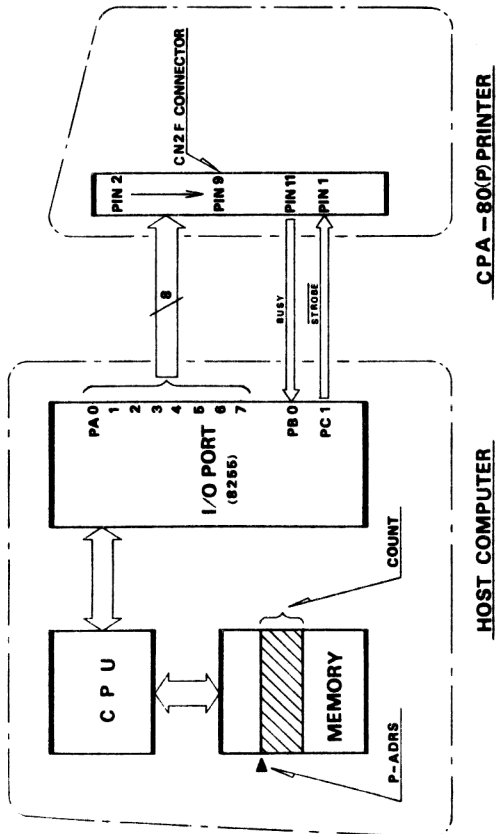


Figure 9. Basic Data Flow with the Host



Software example, command to drive CPA-80

C. ELECTRIC CIRCUITS INFORMATIONS

Refer to Figure 6. for the connections between modules.

1. Power Supply (Power Supply Assembly)

Figure 10. Circuit diagram, 220/240 Volt type

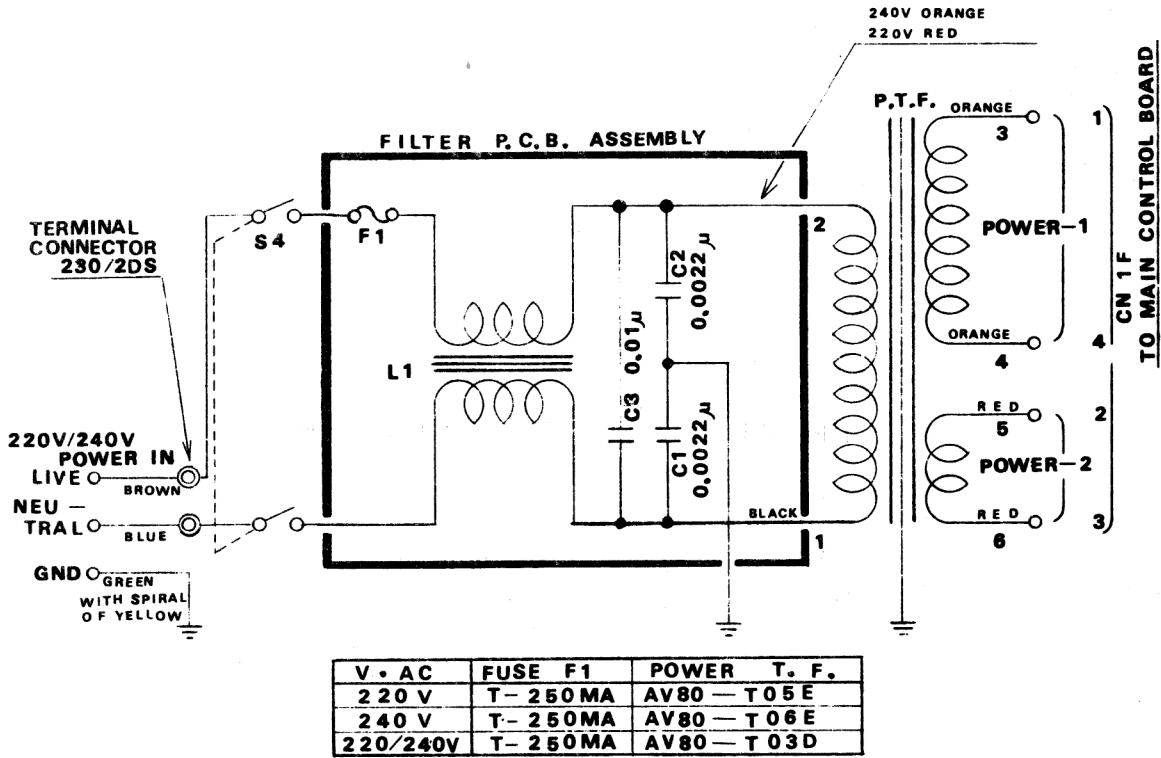


Figure 11. Circuit diagram, 100/115 Volt type

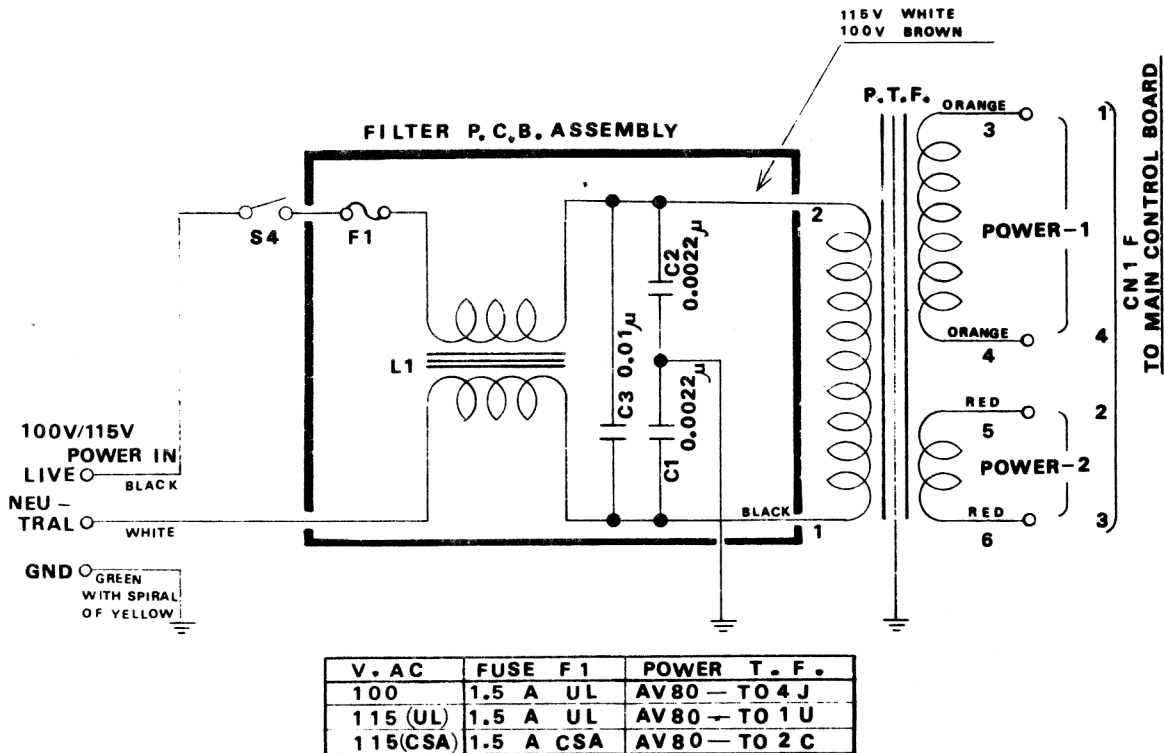
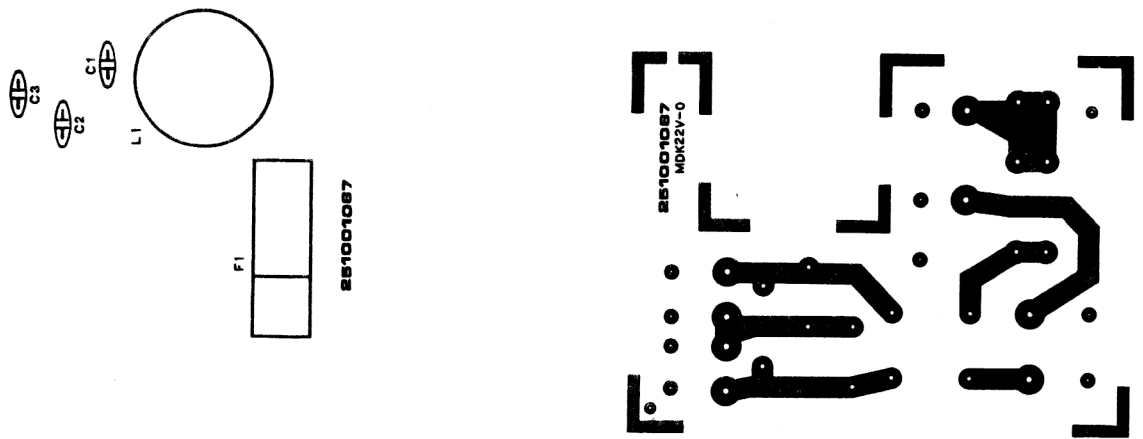
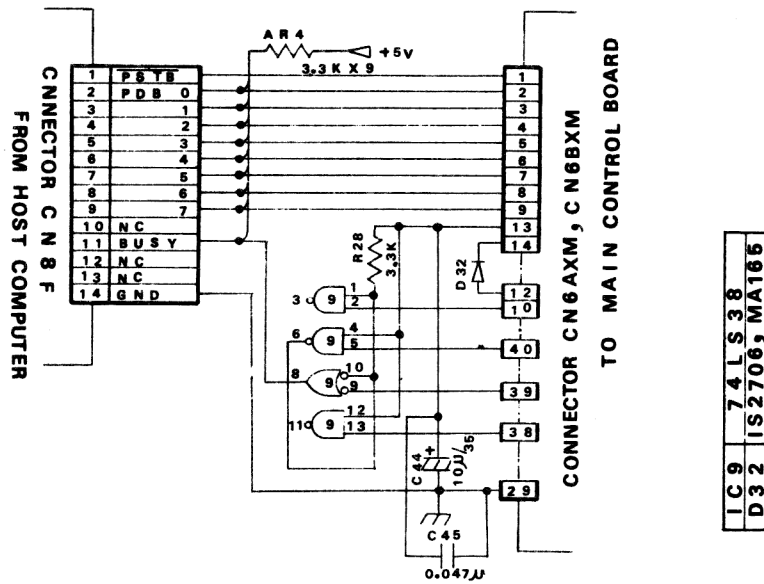


Figure 12. Parts Layout and Pattern Schematic



2. MSX Interface Board (MSX P.C.B. Assembly)

Figure 13. Circuit diagram





3. Operation Key Board (Switch P.C.B. Assembly)

Figure 14. Circuit diagram

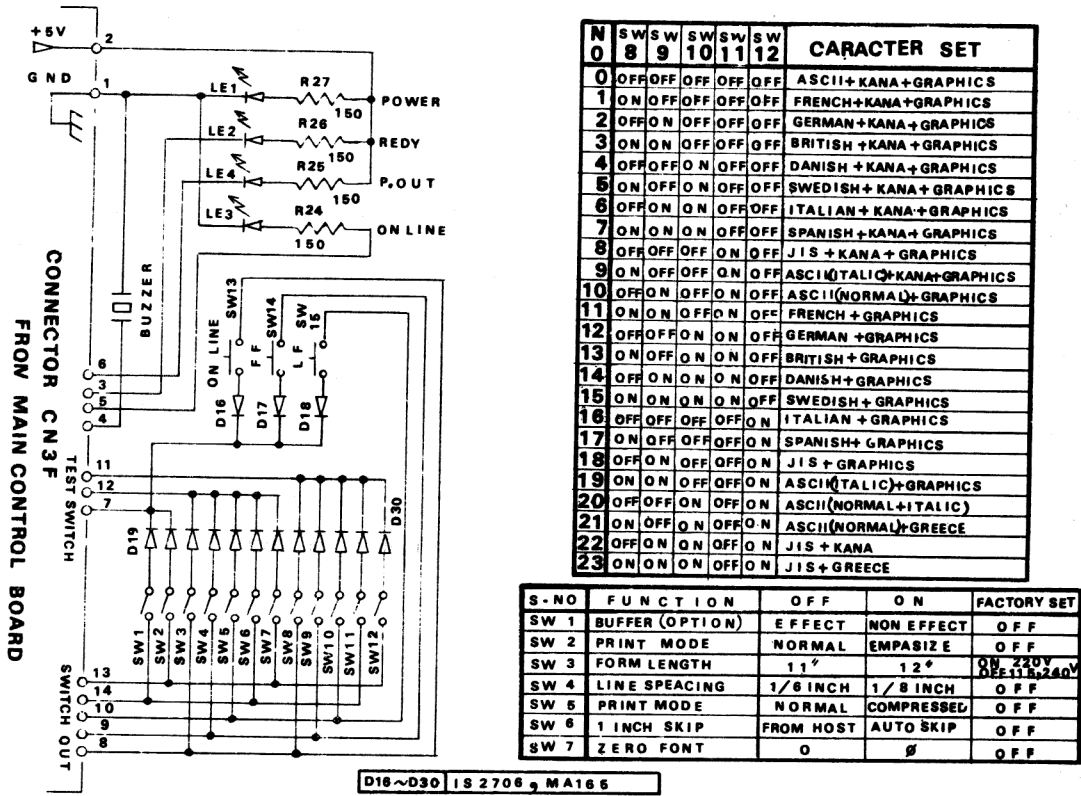
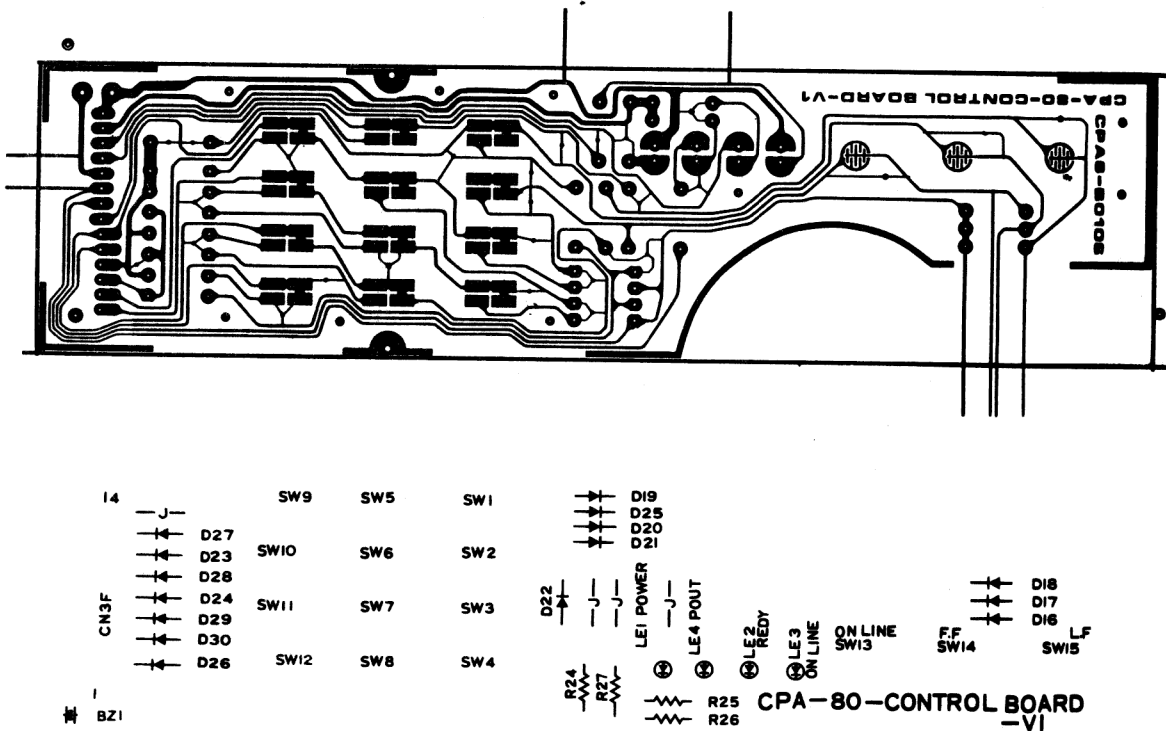
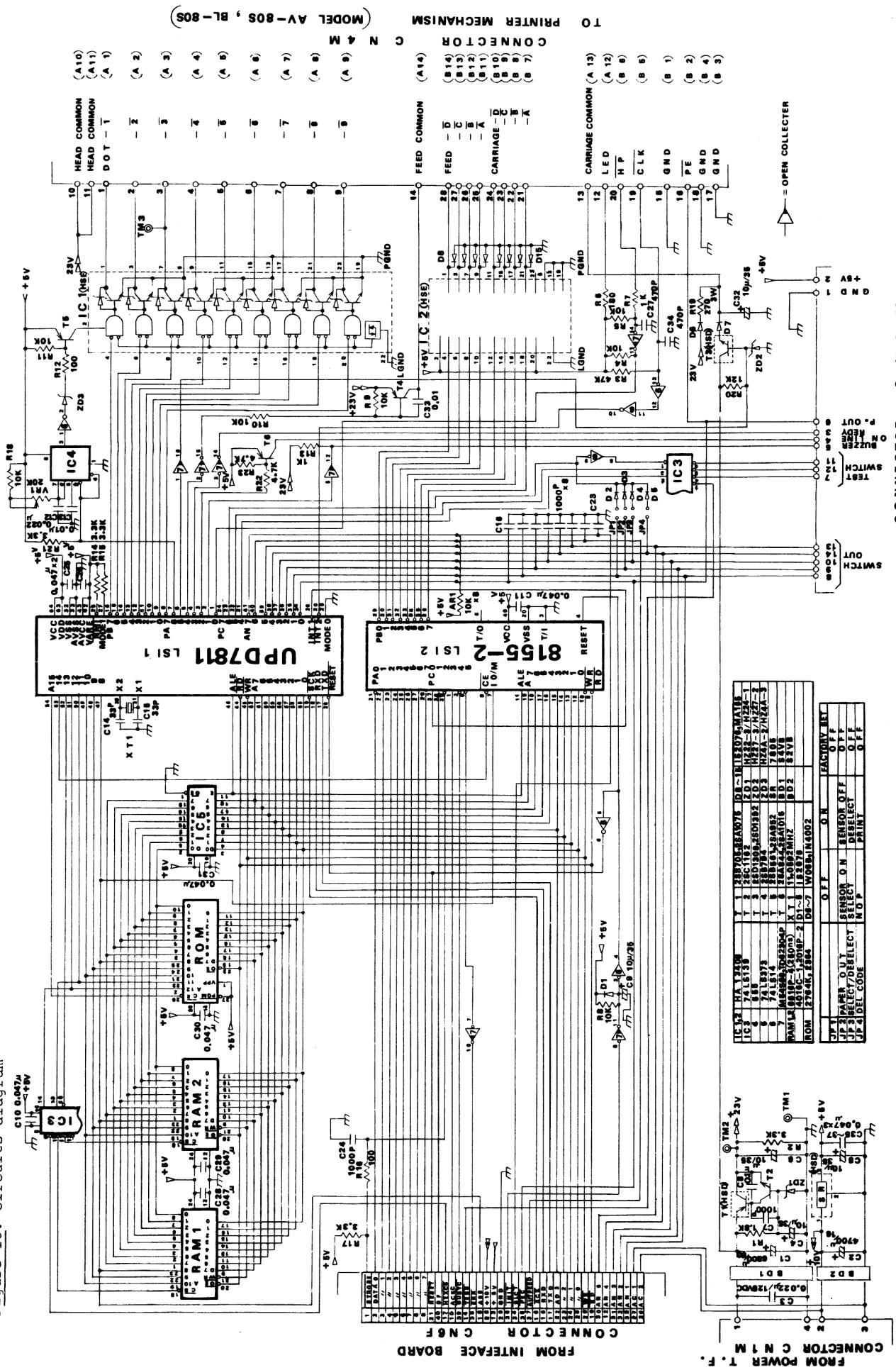


Figure 15. Parts Layout and Pattern Schematic



4. Main Control Board (Main P.C.B. Assembly)

Figure 16. Circuits diagram



CONNECTOR C N 3 M TO OPERATION KEY BOARD (SWITCH P.C.B.ASSEMBLY)

MAIN CONTROL BOARD

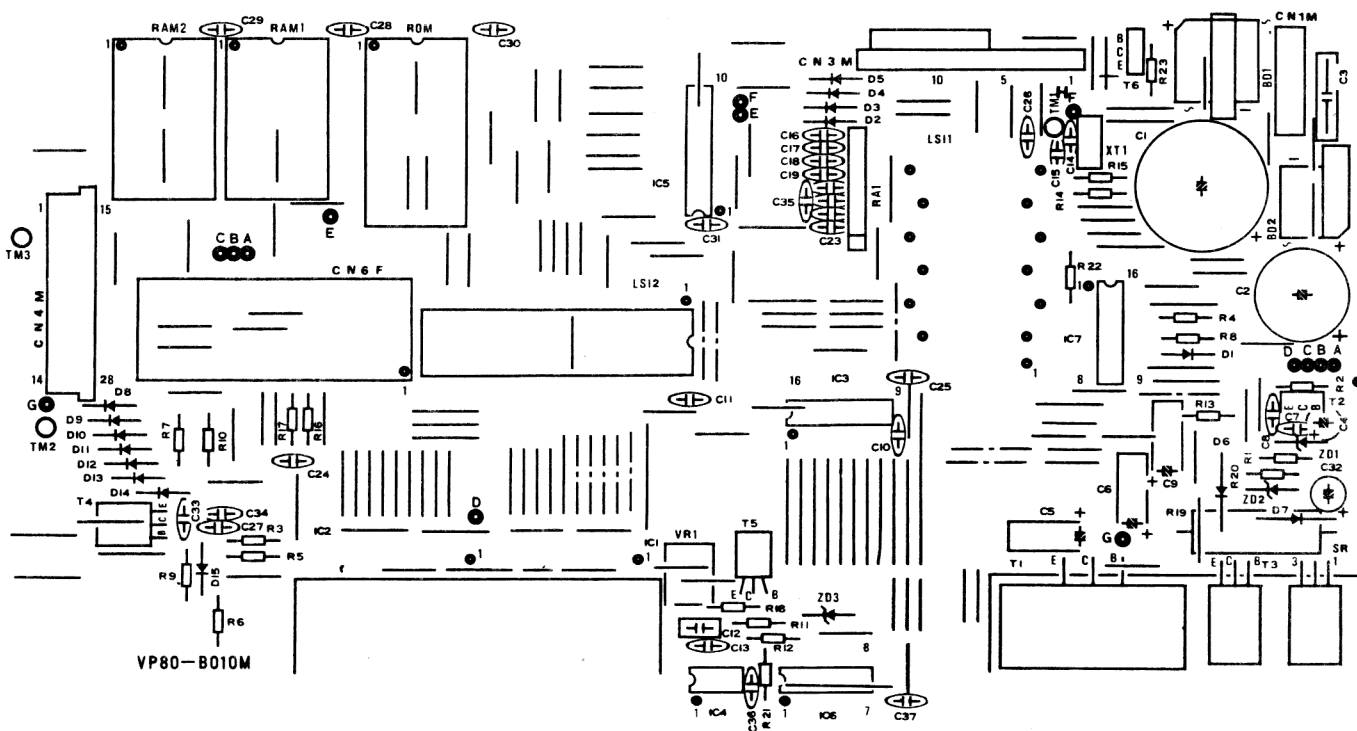
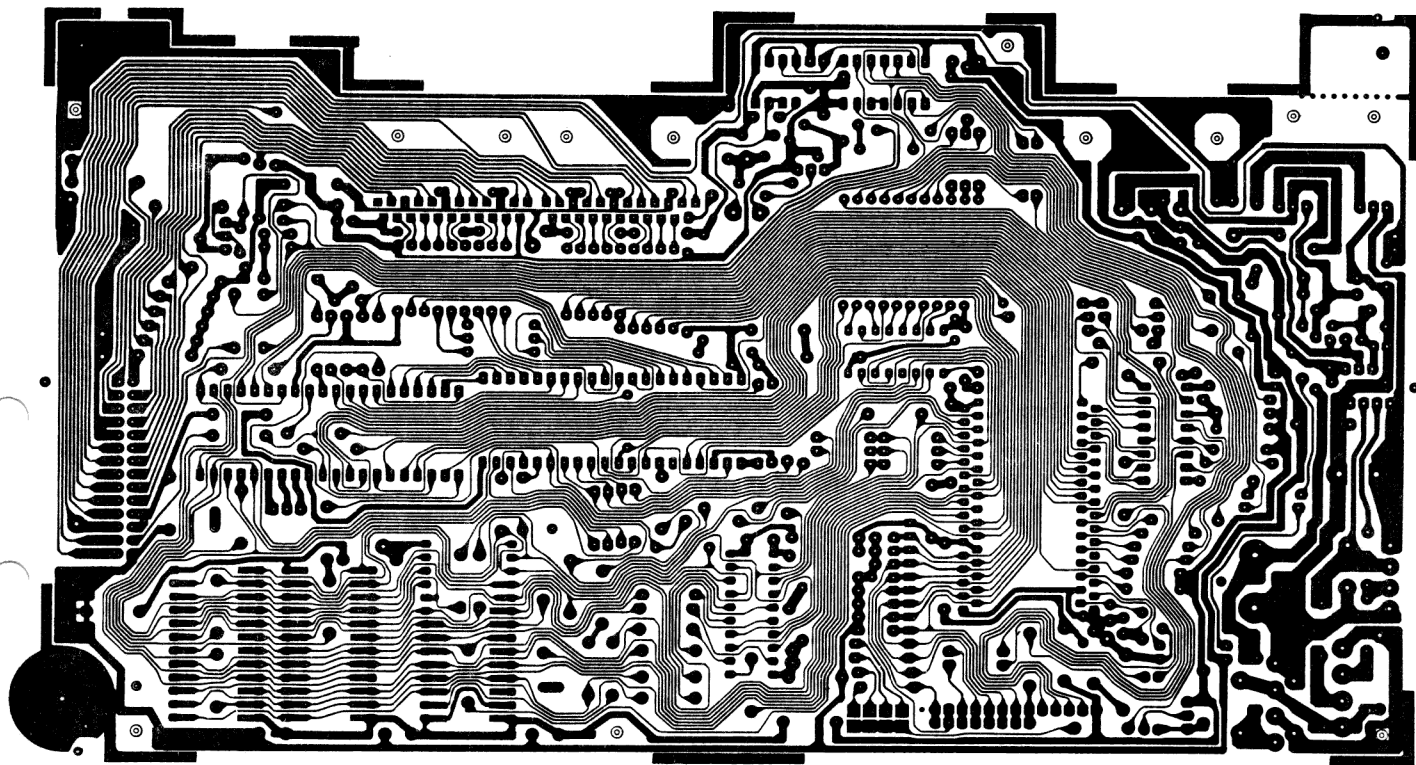
TO PRINTER MECHANISM (MODEL AV-80S, BL-80S)

FROM POWER T.F.

FROM INTERFACE BOARD

= OPEN COLLECTOR

Figure 17. Parts Layout and Pattern Schemat.



5. Standard Centronics Parallel Interface Board  
(Centronics P.C.B. Assembly)

Figure 18. Circuit diagram

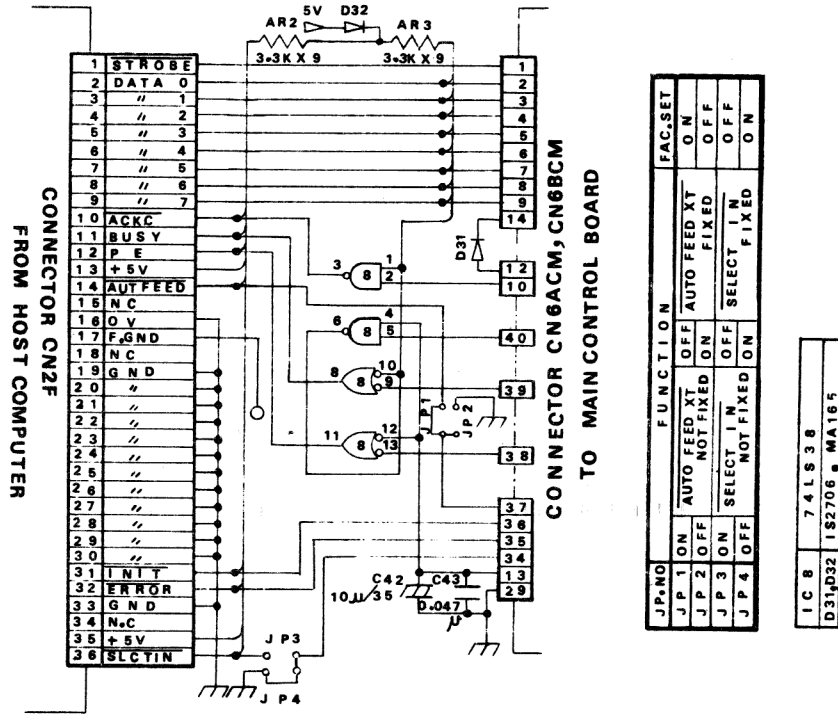
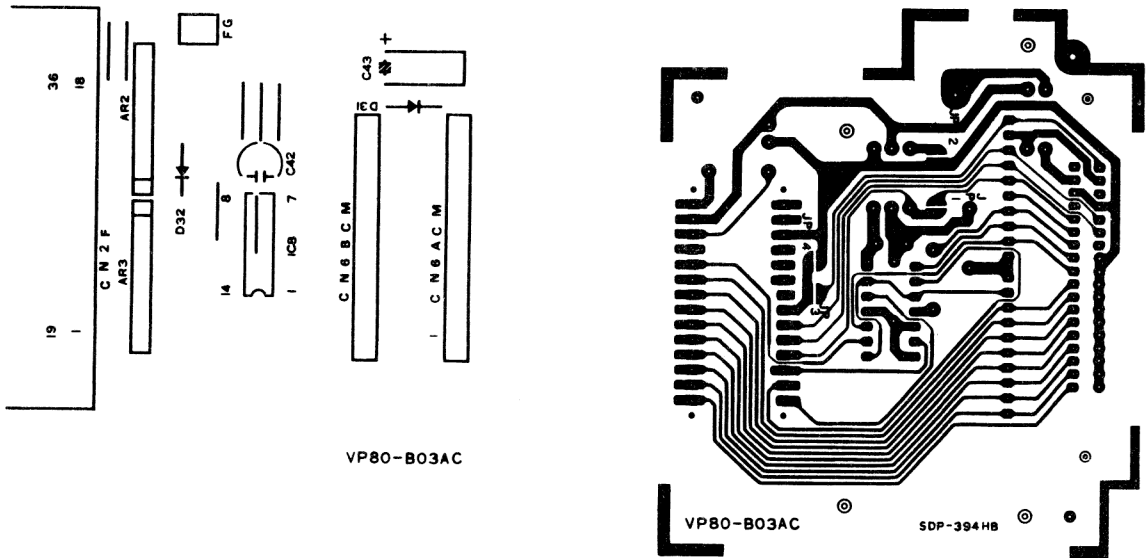
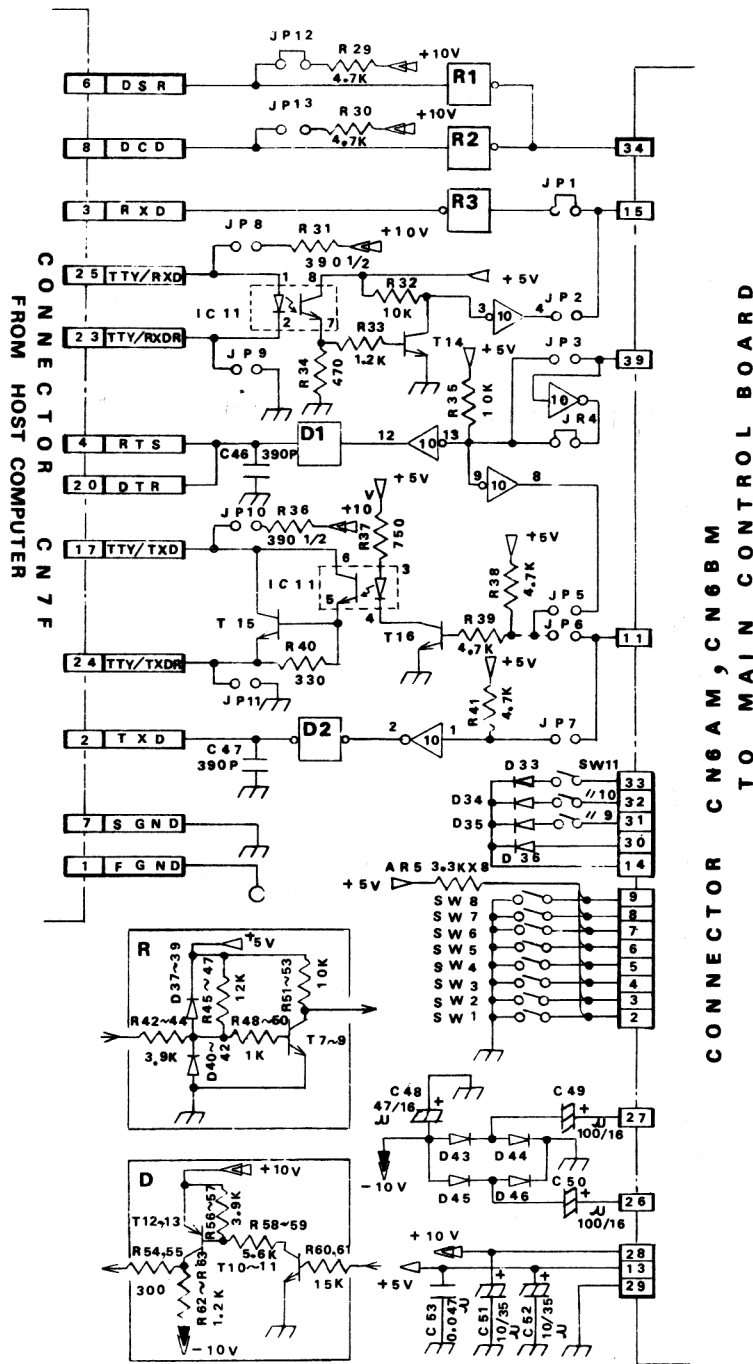


Figure 19. Parts Layout and Pattern Schematic



6. RS-232C/Current Loop Serial Interface Board  
 ( RS-232C P.C.B. Assembly)

Figure 20. Circuit diagram



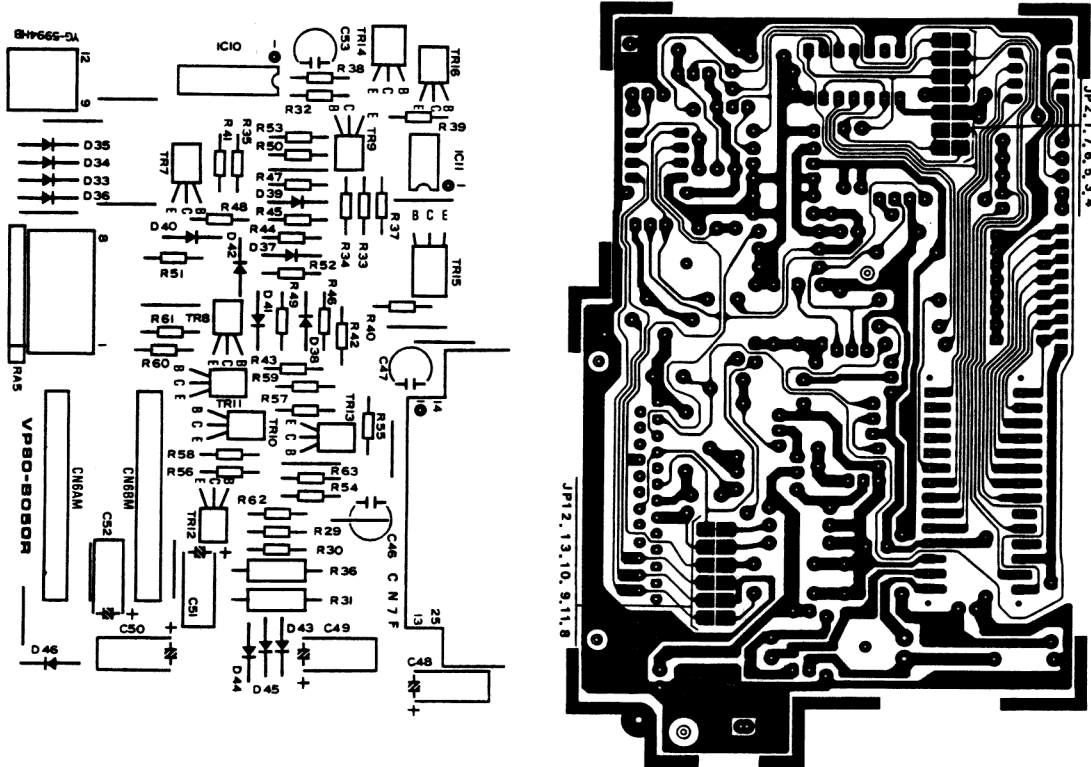
S. NO	FUNCTION	ON	OFF	FACTORY SET
SW 5	STOP BIT 2/1	2	1	ON
SW 6	PARITY EVEN/ODD	EVEN	ODD	ON
SW 7	PARITY YES/NO	YES	NO	ON
SW 8	WORD LENGTH 8/7	8	7	ON
SW 11	LOOP BACK CHECK	ENABLE	DISABLE	OFF

BUFFER FULL RECOVERY POINT				
B. REC.	9 6 B	2 5 6 B	4 9 6 B	1 7 7 6 / 3 7 7 6
SW 9	OFF	OFF	ON	ON
SW 10	OFF	ON	OFF	ON

IC 10	7 4 LS 1 4
IC 11	PS 2 4 0 1 - 2
T 1 2 , 1 3	2 SA 8 4 4 , 2 SA 1 0 1 5
T 7 ~ 9 , 1 4 , 1 6	2 SC 2 3 0 8
T 1 5	2 SC 1 1 6 2 , 2 SD 7 9 3
D 3 3 ~ 4 2	1 S 2 7 0 6 , MA 1 6 5

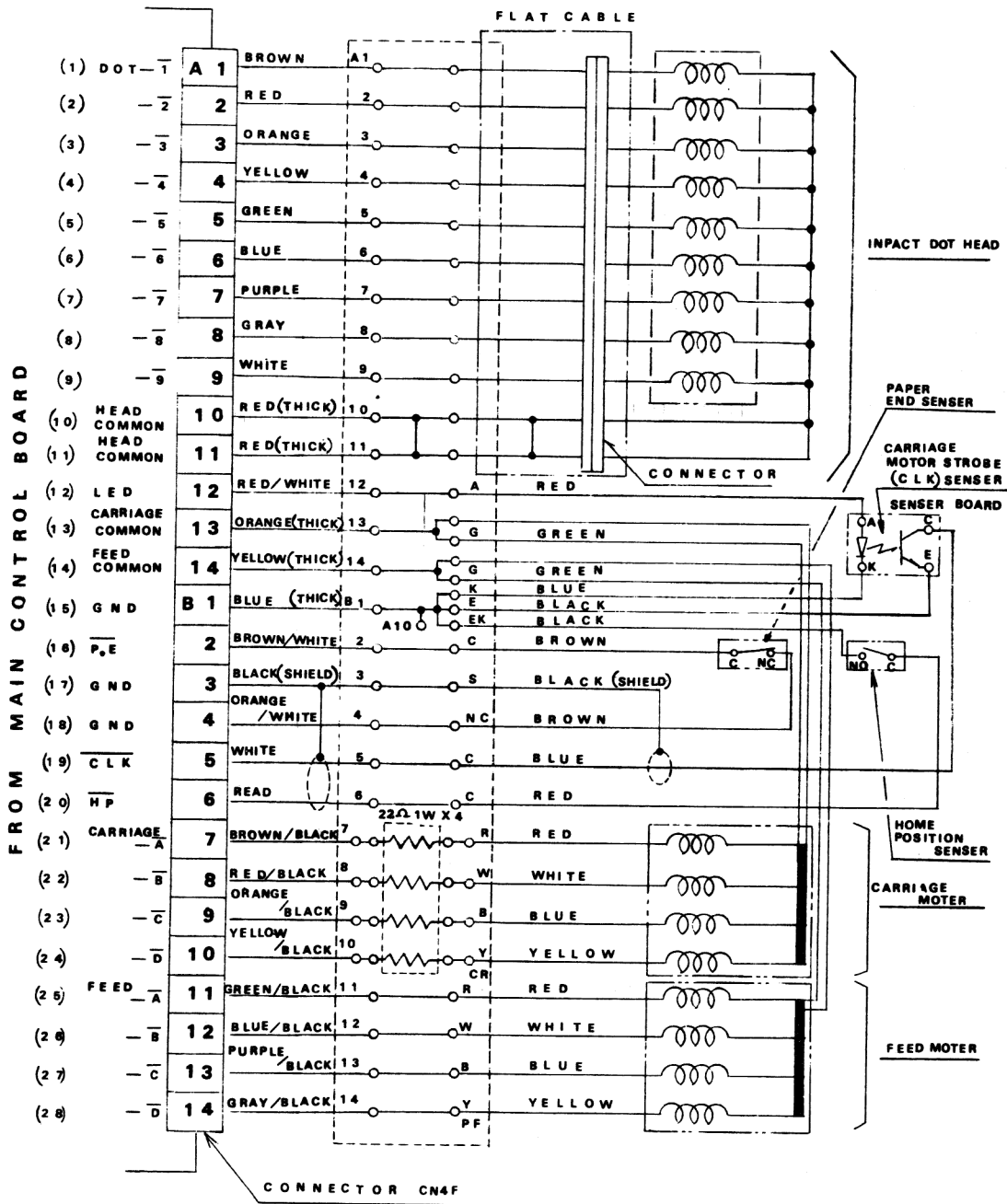
BAUD RATE SELECT				
B.P.S.	SW 1	SW 2	SW 3	SW 4
75	OFF	OFF	ON	ON
110	ON	ON	OFF	ON
134.5	OFF	ON	OFF	ON
150	ON	OFF	OFF	ON
200	OFF	OFF	OFF	ON
300	ON	ON	ON	OFF
600	OFF	ON	ON	OFF
1200	ON	OFF	ON	OFF
1800	OFF	OFF	ON	OFF
2400	ON	ON	OFF	OFF
4800	OFF	ON	OFF	OFF

Figure 21. Parts Layout and Pattern Schematic



7. Electric Circuits for Printer Mechanism  
(Model AV-80S, BL-80S)

Figure 22. Connection diagram on CN4F and Circuit diagram



D. TROUBLE SHOOTING

If the printer fails to operate properly, should solve the problem using this table.

SYMPTOM	REFERENCE
Printer is totally out of work. It does not operate when POWER switch is turned ON.	Refer to CHECK FLOW, TROUBLE-1
Incorrect function on Printer. Motors are working but wrong. Motor works only occasionally. Paper feed and head carriage are OK but no print.	Refer to CHECK FLOW, TROUBLE-2
Incorrect print. Paper feed and head carriage are ok, and does print but wrong font/matrix.	Refer to CHECK FLOW, TROUBLE-3
Feed Motor does not work, Every functions are ok but does not Paper Feed.	Refer to CHECK FLOW, TROUBLE-4

Note: For description of CHECK POINT, REF. Numbers are shown in the flow charts, should refer to the Paragraph 2.  
Check Points for Repair, to know where to be mainly checked for repair service.



1. Check Flows for Trouble Shooting

Figure 23.

# TROUBLE-1

PRINTER IS TOTALLY OUT OF WORK

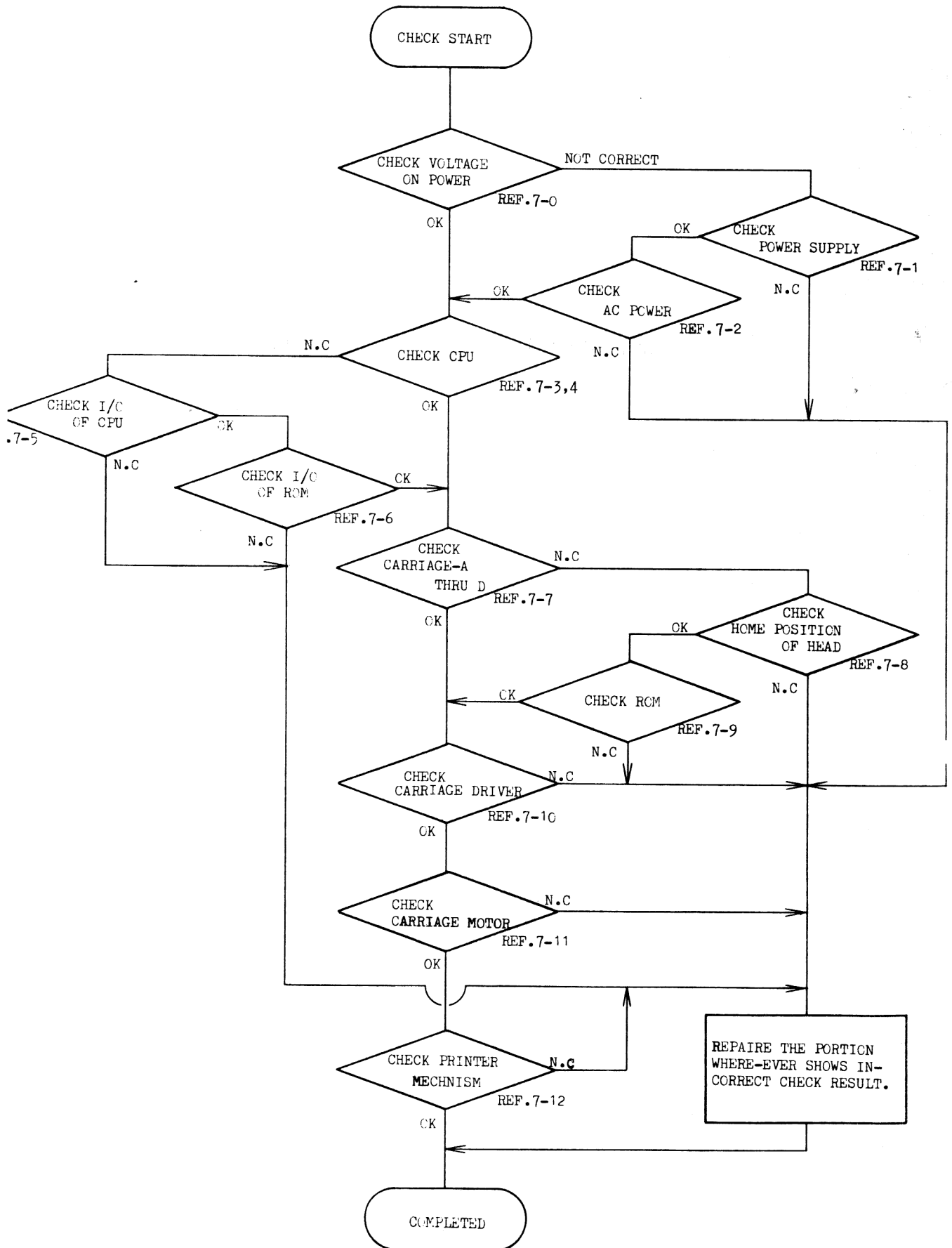


Figure 24.

# TROUBLE-2 INCORRECT FUNCTION ON PRINTER MECHANISM

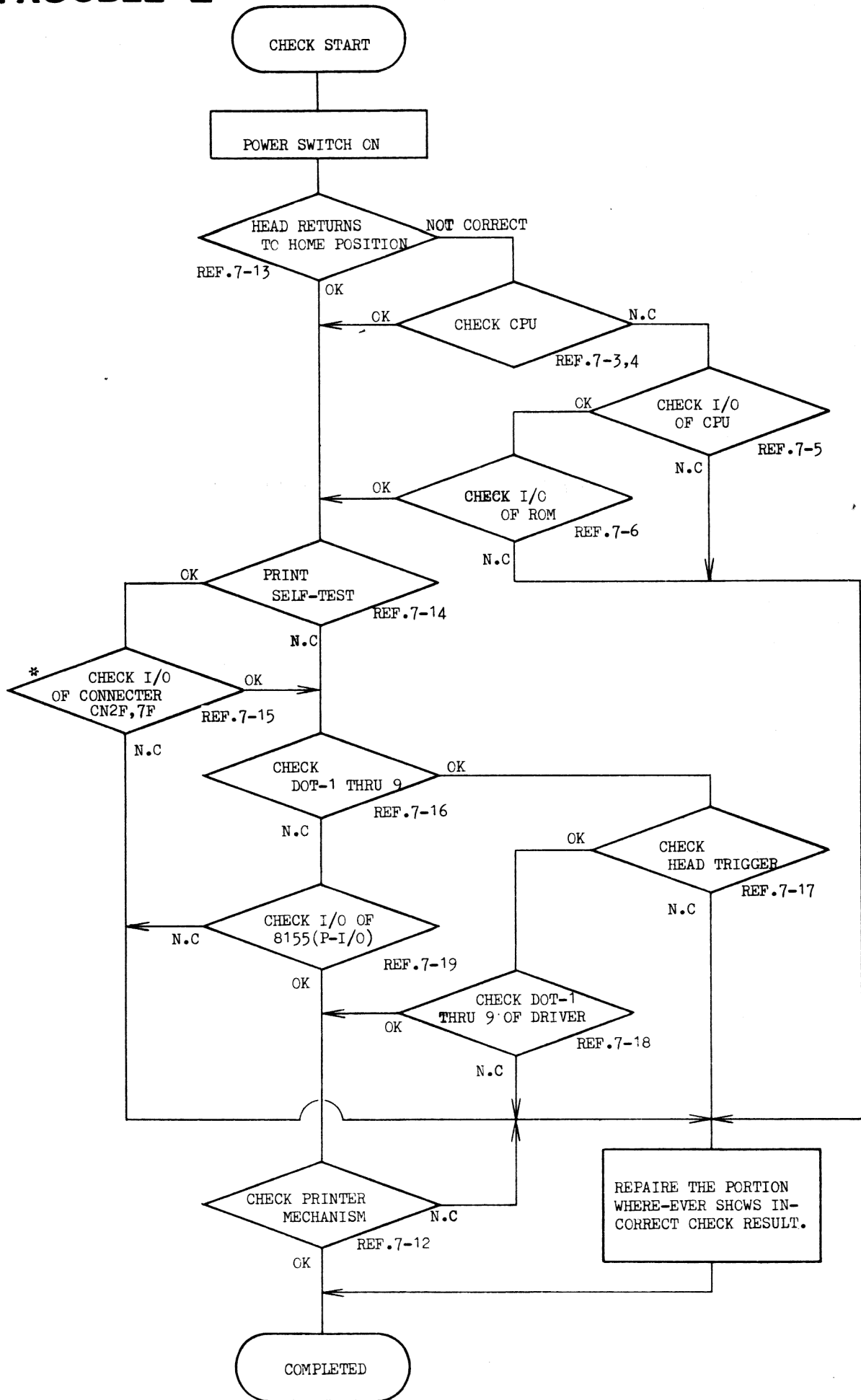
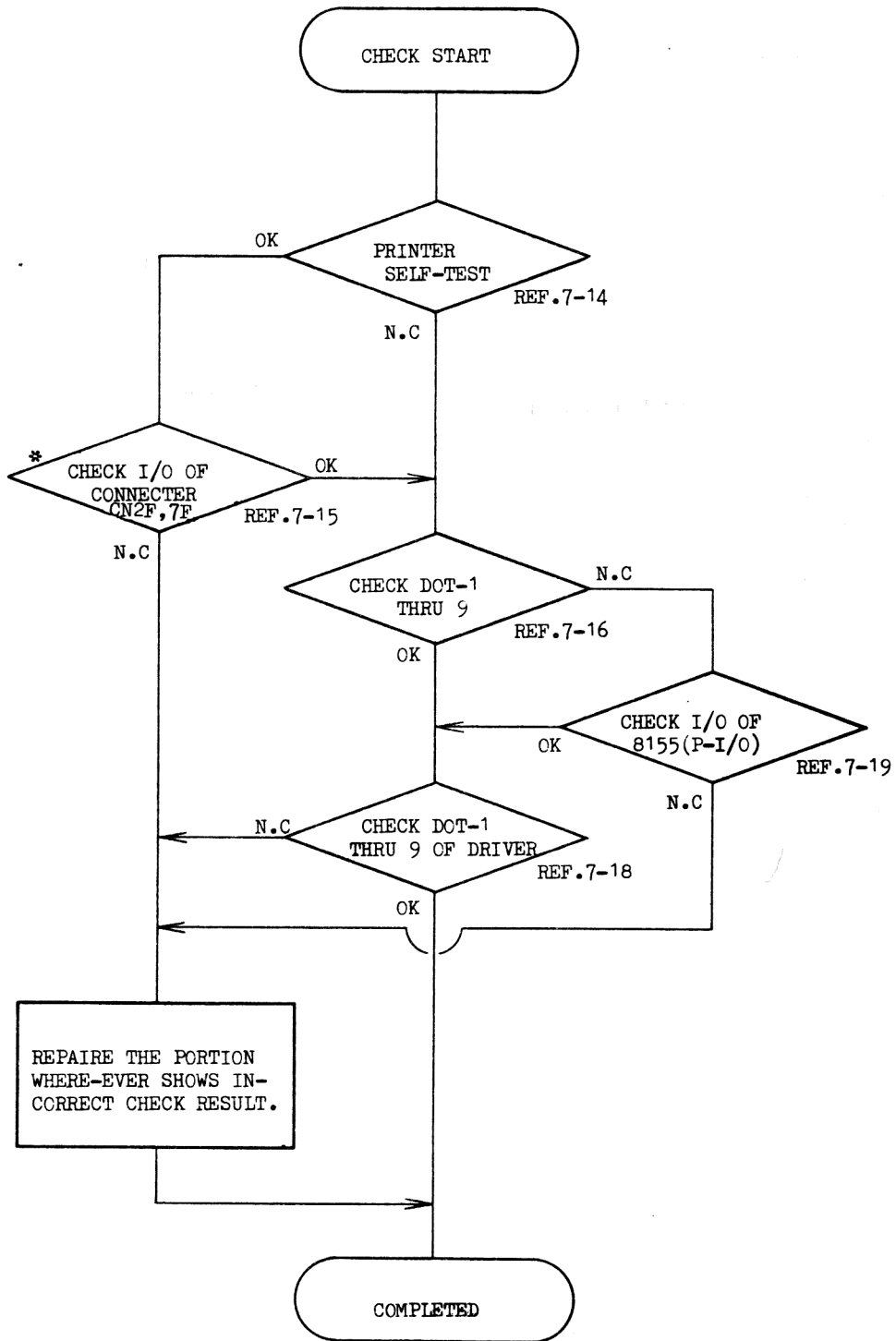


Figure 25.

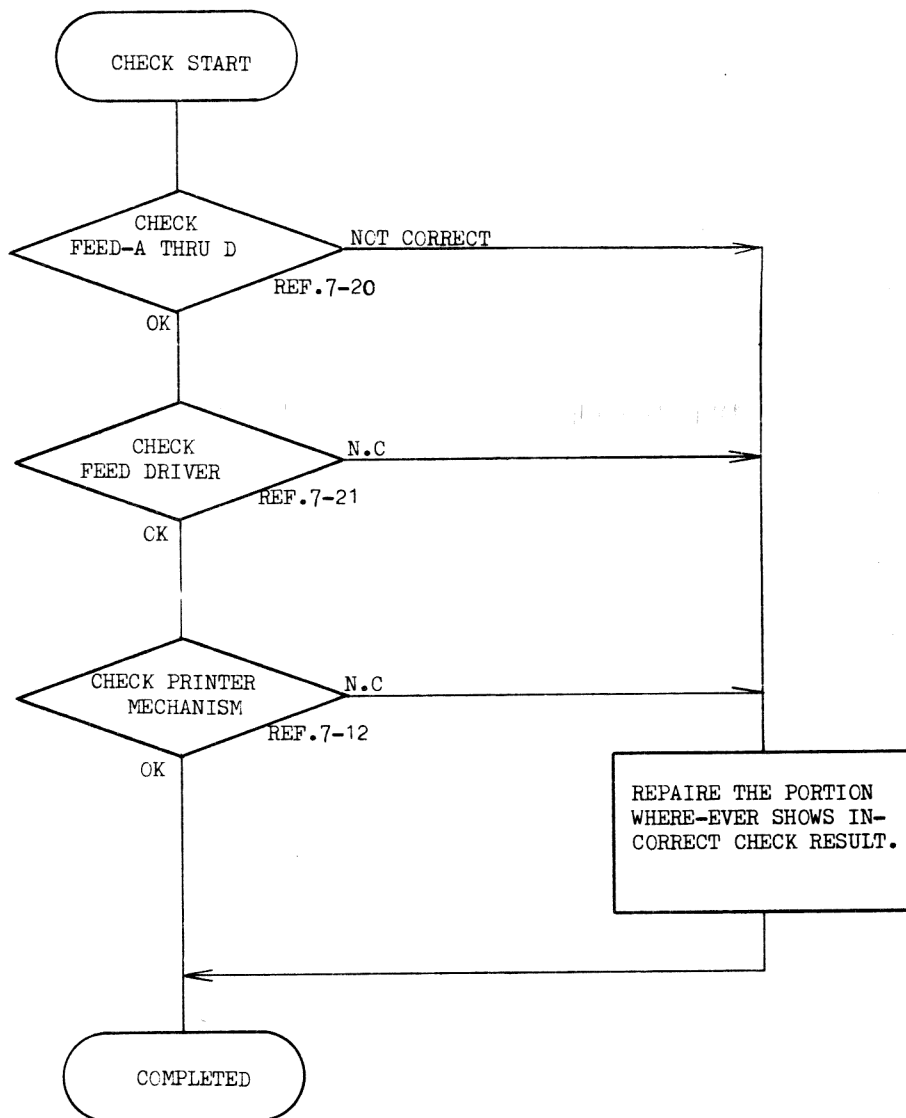
# TROUBLE-3 PRINTS BUT INCORRECT CHARACTER



\* CN2F: Female connector on "STANDARD CENTRONICS" Parallel interface board  
CN7F: Female connector on "RS-232C/CURRENT LOOP" Serial interface board

Figure 26.

# TROUBLE-4 FEED MOTOR IS NOT WORKING



## 2. Check Points for Repair

The followings are reflected to the markings on the check flow charts on Paragraph 1.

In this description, there are the explanations as refer to FIG. a,b,c,... that meant the tested wave form on scope can be compared with the same index in Paragraph 3. Typical Wave Form of Signals. When the checking operation is disturbed by the printer mechanism, which should be removed from the bottom case. GND test point (TM1) is located toward CPU (7811).

REF.7-0 Check of Voltage on Power Supply. Check while the printer is stop.

- Anode side of zenner diode ZD-1 should show the voltage of DC 23v +/- 2v. (on the Main Control Board).
- The PIN 20 of IC5 (74LS373) that is located toward to C-13 should show the voltage of DC 5v +/- 5%. (on the driver board).

REF.7-1 Check of Power Supply Circuits and Devices, while the printer is stop.

- The "3" leg of regulator SR, located toward to C-7 should show the voltage of DC 5v +/- 5%. (on the Main Control Board).
- The "1" leg of regulator SR should show the voltage of about DC 10v.
- The "C" leg of T-1 (on the Main Control Board) should show the voltage of DC 23v +/- 2.0v.

REF.7-2 Check of AC Voltage, while the printer is stop. Without Host.

- In-put of diode BD-1 should show the sine wave with voltage range of approx. AC 76vpp.
- AC In-put of diode BD-2 should show the sine wave with voltage range of approx. AC 25vpp.

REF.7-3 Check for pulses at power-on reset time.

- Relation between "DC 5v" on Pin 40 and "RESET" on Pin 4 of programable parallel I/O (8155) should show the pulse wave, refer to FIGURE W, at turning power switch on.
- Relation between "DC 5v" on Pin 63, 64 and "RESET" on Pin 28 of CPU (7811) should show the pulse wave, refer to FIGURE X, at turning power switch on.

REF.7-4 Check for "if soft-ware running?"

- Signal ALE, on Pin 46 of CPU (7811) should show the pulse wave, refer to FIG.a.
- Signal  $\overline{CE}$ , Pin 8 of Peripheral I/O (8155) should show; High level while the printer is stop. Pulse wave refer to FIG.b-Similar while the printer is running.

REF.7-5 Check around main CPU (7811).

- Signal  $\overline{RD}$ , on Pin 44 of main CPU (7811) should show the pulse wave, refer to FIG.c while the printer is stop.

- Signal CLK, on Pin 31 of main CPU (7811) should show the wave, refer to FIG.d.
- Signal ALE, on Pin 46 of main CPU (7811) should show the pulse wave, refer to FIG.a.
- Signal  $\overline{WR}$ , on Pin 45 of main CPU (7811) should show the pulse wave, refer to FIG.e-Similar while the printer is running. It stays at High Level while the printer is stop.
- Signals on Data and Address Bus, Pin 55 thru 62 of main CPU (7811) should show the pulse wave, refer to FIG.f-Similar.
- Signals on ADDRESS BUS, Pin 47 thru 54 of CPU (7811) should show the pulse wave, refer to FIG.g-similar.
- Other pins on CPU (7811) should be as follows, under condition 1.

PIN NO.	LEVEL	PIN NO.	LEVEL	PIN NO.	LEVEL	PIN NO.	LEVEL
1	L	12	H	23	H	38	H
2	H	13	H	24	H	39	H
3	H	14	H	25	H	40	H
4	H	15	H	26	L	41	L
5	H	16	H	27	PLS	42,43	H(+5V)
6	L	17	F(C) H(R)	28	H	52	H(C)PLS(R)
7	H	18	F(C) L(R)	29,32,33	L(GND)	53	H(C)PLS(R)
8	H	19	F(C)PLS(R)	34	L	53,64	H(+5V)
9	H	20	H	35	H		
10	H	21	L	36	H		
11	H	22	L	37	H		

F: FLOATING (C): CENTRONICS (R): RS 232C PLS: PULSE

FIG.7-6 Check around ROM (2764/2364).

Check the Pin of CPU, IC3 or IC5 instead of the Pin of ROM.

- Signals on Address Bus, Pin 2 thru 10, 21 & 23-25 of ROM (2764/2364) should show the pulse wave, refer to FIG.g-similar. while printer is running.
- Signals on Data Bus, Pin 11 thru 13 and 15 thru 19 of ROM (2764/2364) should show the pulse wave, refer to FIG.f-similar. while printer is running.
- Other pins on ROM (2764/2364) should be as follows, under condition 1.

PIN NO.	LEVEL	PIN NO.	LEVEL	PIN NO.	LEVEL	PIN NO.	LEVEL
1	H(+5V)	14	L(GND)	23	PULSE	27	H(+5V)
2	PULSE	20	PULSE	26	-(Nc)	28	H(+5V)

CONDITION 1 While Printer is stop, after power on reset and home positioning of Head and sound of Buzzer.without Host, and paper.

All Slide Switches on Function Selector Switch Board, all switches on RS-232C Serial Interface Board and JP1-4 on Main Control Board are off. JP1 and 4 except 2, 3 on Centronics Parallel Interface Board are on.

REF.7-7 Check signals to the Carriage Motor.

- On Power-on Time, if Head is located at home position, Pin 33 thru 36 of Parallel I/O (8155) should show just few pulses of, refer to FIG.h -just few pulses then stop. While the head is moving, this pulse remains.

REF.7-8 Check Signal for the head is at Home Position.

-Level on Pin 1 of CPU (7811) should be;

Head is on home position ----- level low.

Head is not on home position -- level High.

REF.7-9 Check content of ROM (2764/2364) is correct.

-Replace the rom and see the trouble be solved.

-If no rom for replacement, follow to next step of Flow Chart.

REF.7-10 Check on Carriage Driver Circuits.

-Connect plus lead of scope to Cathode side of D-7 then check following points touching by minus lead of scope.

Cathode sides of D-12, D-13, D-14 & D-15 should show the step motor drive pulses while the head is moving, refer to FIG.i.

"CAUTION": For this check, the Scope should be floating from GND.

REF.7-11 Check for Dot Strobe.

-While the head is moving by hand or by power, Pin 20 of CPU (7811) should show the pulse, refer to FIG.j.

-While the head is moving by hand or by power, Pin 13 of IC6 (74LS14) should show the pulse, refer to FIG.k.

"CAUTION": Moving the head by hand should not be done for long time, just few seconds only.

REF.7-12 Check for Printer Mechanism.

-If trouble is on head, replace it and test.

-If trouble is not on head, try to replace whole printer mechanism then check. Before replace, should see throughly the mechanism to see for any mechanical damage.

NOTE: Repair of printer mechanism is not recommendable.

Special service manual for mechanism repair will be provided.

REF.7-13 The head should return to home position on power on time, even so the head is originally located at home position it should be moved to right and returned to home position automatically on Power On.

REF.7-14 Test print should be done when the main power switch is turned on. while the LF or FF switch is also pressed down.

REF.7-15 Check pin status on signal connector CN-2F or 7F

a. In case of "Standard Centronics" parallel interface board (connector: CN2F)

-- Check at "on Line" mode, without connection with Host, with paper.

-BUSY Signal, on Pin 11 of CN-2F should be Low, - no printing.

-ACKNLG Signal, on Pin 10 of CN-2F should be High,- no printing.

-PE Signal, on Pin 12 of CN-2F should be Low, - no printing.

-SLCT Signal, on Pin 13 of CN-2F should be High, - no printing.

-ERROR Signal, on Pin 32 of CN-2F should be High, - no printing.

-- For reference, at On-line mode connected with the Host,

BUSY (Pin 11), ACKNLG (Pin 10) and STROBE (Pin 1) should show the pulse waves, refer to FIG.1 & FIG.m while printing.  
 -Other Pins of CN-2F should show statuses as follows under Condition 1.

PIN NO.	LEVEL	PIN NO.	LEVEL	PIN NO.	LEVEL	PIN NO.	LEVEL
1	H	8	H	21	L (GND)	28	L (GND)
2	H	9	H	22	/	29	/
3	H	14	H(OFF JP2*)	23	/	30	/
4	H	16	L (GND)	24	/	31	H
5	H	17	FLOAT (FG)	25	/	33	L (GND)
6	H	19	L (GND)	26	/	35	H
7	H	20	/	27	/	36	H (ON JP4*)

\*Jumpers are located on the parallel interface board.

b. In case of "RS-232 C/CURRENT LOOP" serial interface board (connector: CN7F)

-- Jumper wires JP1, 4 and 12 except others are on.

-- Each signal pins of CN-7F, while no printing, should show statuses as follows under Condition 1.

PIN NO.	SIGNAL	LEVEL	PIN NO.	SIGNAL	LEVEL
1	F.GND	GND	8	DCD	DC + 1V
2	TXD	DC - 12V	17	TTY/TXD	FLOATING
3	RXD	DC + 1V	20	DTR	DC - 12V
4	RTS	DC - 12V	23	TTY/RXDR	FLOATING
6	DSR	DC + 6V	24	TTY/TXDR	/
7	S.GND	GND	25	TTY/RXD	/

-- For reference, at On-line mode connected with the Host, RXD (Pin 3), DTR (Pin 20) and RTS (Pin 4) should show the pulse waves, refer to FIG.u and FIG.v - while printing.

-In interface condition of FLAG CONTROL, 4800 BPS, omissible parity, 1 stop bit, 8 bit data length and buffer full recovery point is 96 BYTE. The condition of DIP switches is SW 2 & 8 on except others.)

REF.7-16 Check Print Signals on CPU (7811).

-While printing, Pin 8 thru 16 should show pulse wave, refer to FIG.n-similar.

REF.7-17 Check Dot Timing Signal on CPU (7811), while printing.

-Pin 7 of CPU (7811) and Pin 2,4 of IC4 (555) should show the pulse wave, refer to FIG.o.

-Fire timing pulse (Pin 2 of IC1) should show the pulse wave, refer to FIG.p. Pulse width is typical 600 $\mu$ s,

REF.7-18 Check Print signals on the driver.

-Connect plus lead of scope to <sup>+23V test post (TM2),</sup> Anode side of Diode ZD6, then check following points by minus lead of scope.

Pin 1, 3, 7(TM3), 9, 11, 15, 17, 21 & 23 of IC1 (HA13408) should show pulse wave, refer to FIG.q-similar.

"CAUTION": For this check, the Scope should be floating from GND.

REF.7-19 Check for status of pins on programable parallel I/O (8155)

-Signal  $\bar{R}D$ , on Pin 9 of 8155 should show pulse wave, refer to



FIG.c-similar.

-Signals on Data and Address Bus-line of 8155 should show pulse wave, refer to FIG.f-similar.

-Signal ALE. on Pin 11 of 8155 should show pulse wave, refer to FIG.a.

-Signal  $\overline{IO/\overline{M}}$ , on Pin 7 of 8155 should show pulse wave, refer to FIG.r.

-Signal  $\overline{WR}$ , on Pin 10 of 8155 should show High level when printer is stop, and on printing should show pulse wave, refer to FIG.e-similar.

-Signal  $\overline{CE}$ , on Pin 8 of 8155 should show High level when printer is stop, and on printing should show pulse wave, refer to FIG.b-similar.

-Other pins should show followings.under Condition 1.

PIN NO.	LEVEL	PIN NO.	LEVEL	PIN NO.	LEVEL	PIN NO.	LEVEL
1	L	21	H	28	H	35	L
2	L	22	H	29	H	36	H
3	L (GND)	23	H	30	L	37	L
4	L	24	H	31	H	38	L
5	L	25	H	32	L	39	H
6	H	26	H	33	L	40	H(+5V)
20	L (GND)	27	H	34	H		

REF.7-20 Check paper feed signals.

-Some 2 pins in Pin 29 thru 32 of parallel I/O (8155) should show High level other 2 pins should show Low level when not feeding paper, and on paper feeding should show pulse, refer to FIG.s-similar.

REF.7-21 Check circuits for Paper Feed Motor, on feeding.

-Connect plus lead of scope to the "C" leg of transistor T4 on main control board then check following points by minus lead of scope, Cathode sides of D-8, D-9, D-10 & D-11 should show pulse wave, refer to FIG.t-similar.

"CAUTION" : For this check, the Scope should be floating from GND.

### 3. Typical Wave Form of Signals

500nSEC/DIV 2VOLT/DIV

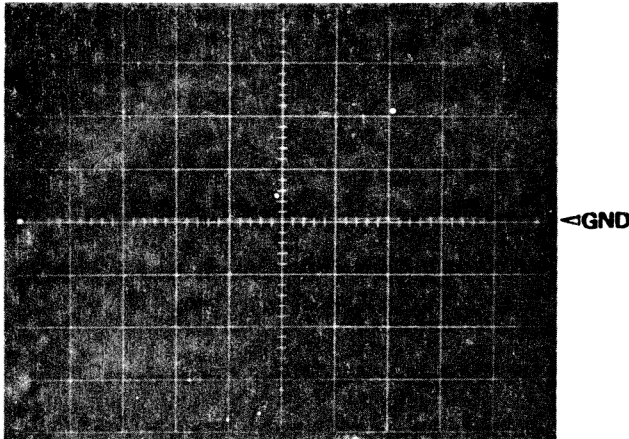


FIG. a ALE SIGNAL

5uSEC/DIV 2VOLT/DIV

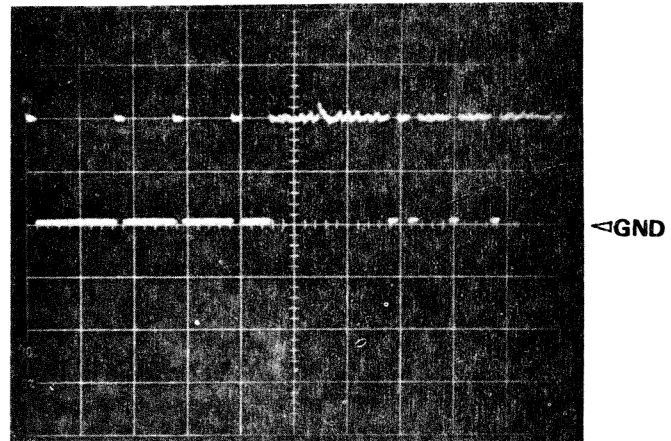


FIG. b  $\overline{CE}$ (8155) SIGNAL (AT POWER ON)

1uSEC/DIV 2VOLT/DIV

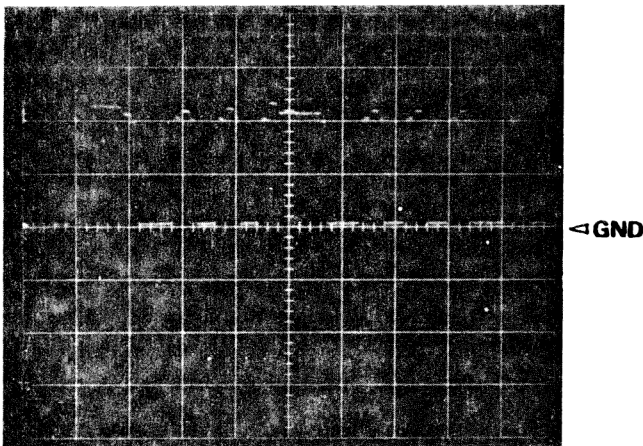


FIG. c  $\overline{RD}$  SIGNAL

50nSEC/DIV 2VOLT/DIV

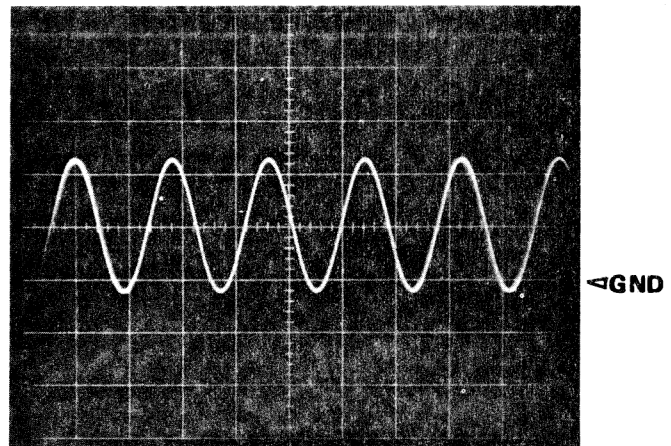


FIG. d CLOCK SIGNAL (11.0592 MHz)

200nSEC/DIV 2VOLT/DIV

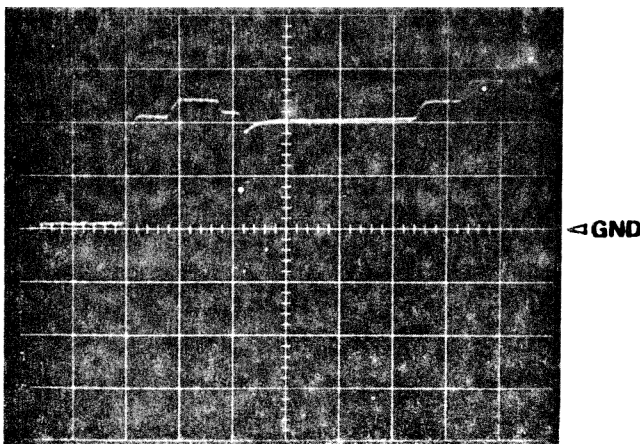


FIG. e  $\overline{WR}$  SIGNAL

1uSEC/DIV 2VOLT/DIV

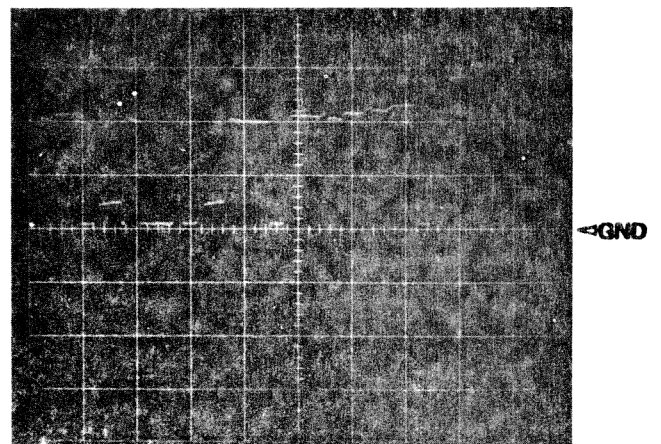
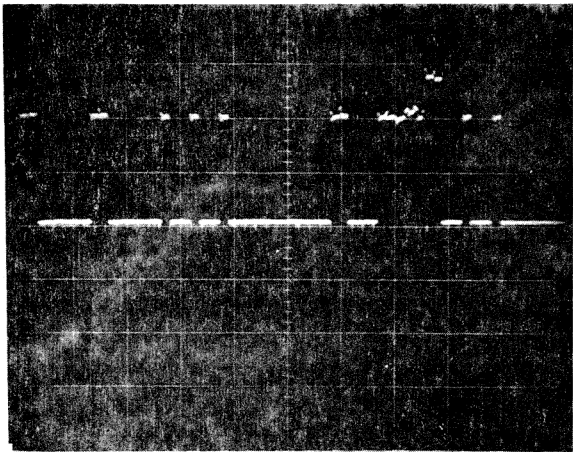


FIG. f DATA and ADDRESS BUS SIGNAL

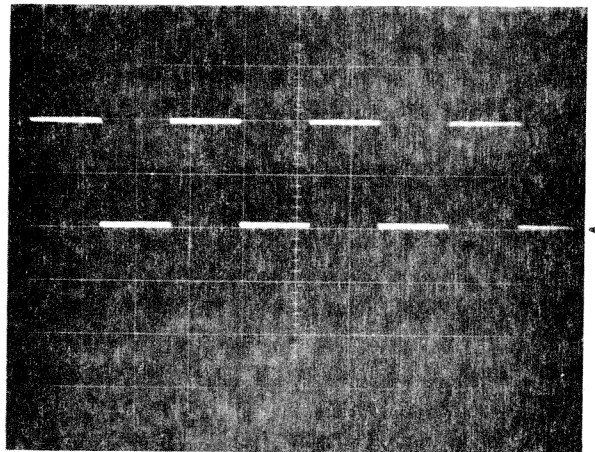
5 $\mu$ SEC/DIV 2VOLT/DIV



GND

FIG. g ADDRESS BUS SIGNAL

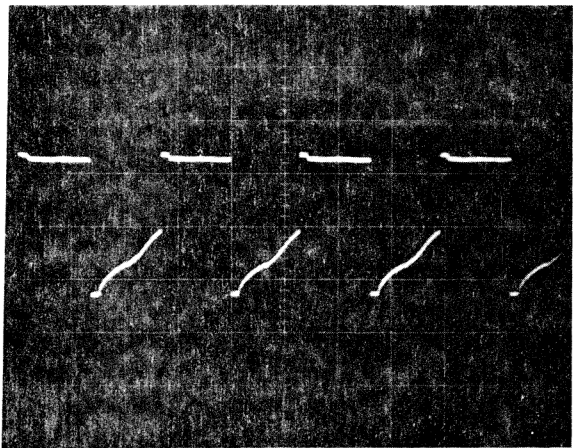
2 mSEC/DIV 2VOLT/DIV



GND

FIG. h CARRIAGE SIGNAL

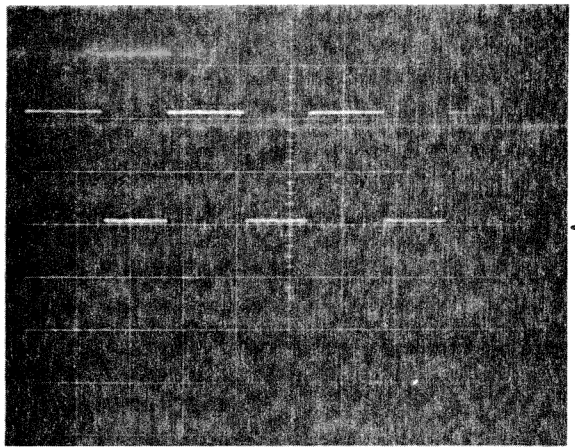
2 mSEC/DIV 20VOLT/DIV



OSC  
GND

FIG. i CARRIAGE MOTOR CURRENT

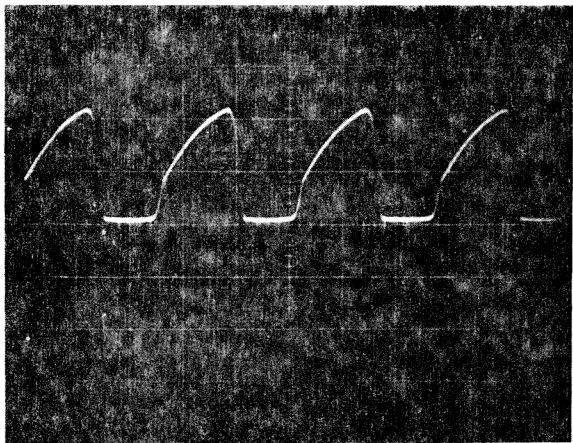
0.5 mSEC/DIV 2VOLT/DIV



GND

FIG. j DOT STROBE (CLK)

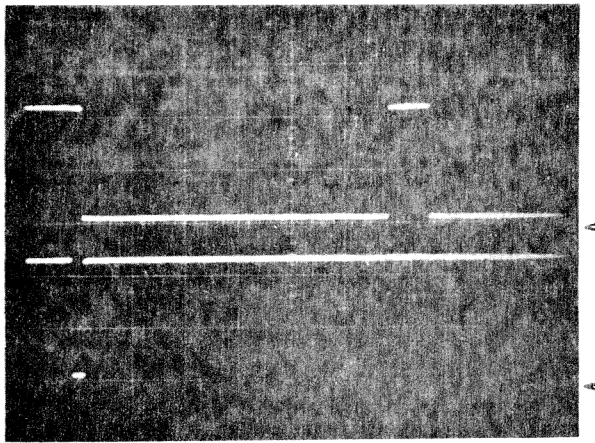
0.5 mSEC/DIV 2VOLT/DIV



READY  
GND

FIG. k DOT STROBE (CLK)

1 mSEC/DIV 2VOLT/DIV



GND

GND

FIG. l RECEIVE DATA TIMING-1  
(Example)

1 mSEC/DIV 2 VOLT/DIV

BUSY

READY

STROBE

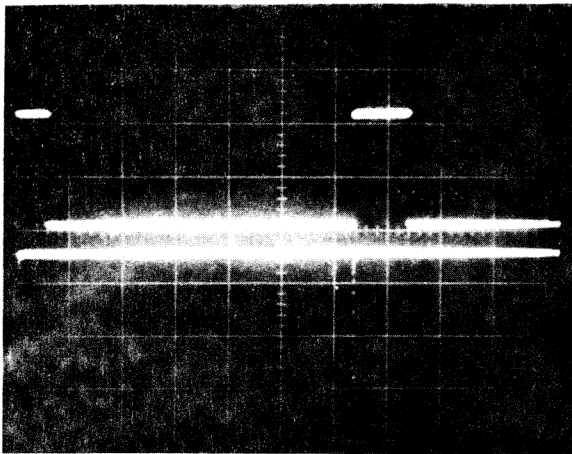


FIG. m RECEIVE DATA TIMING-2  
(Example)

0.5 mSEC/DIV 2 VOLT/DIV

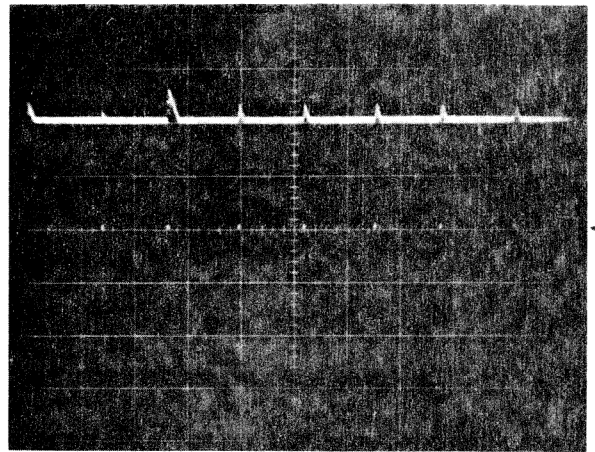


FIG. n DOT SIGNAL

0.2 mSEC/DIV 2 VOLT/DIV

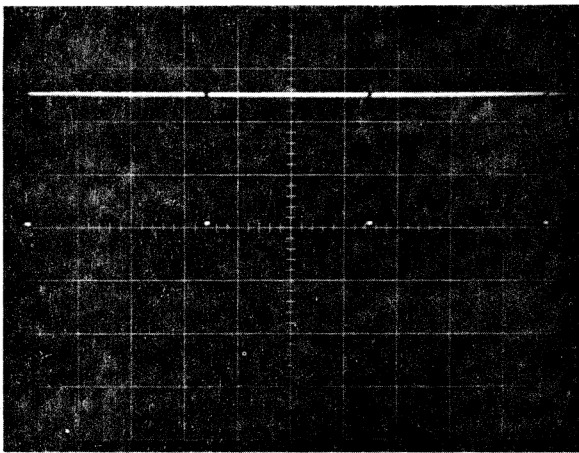


FIG. o HEAD TRIGGER SIGNAL

0.2 mSEC/DIV 2 VOLT/DIV

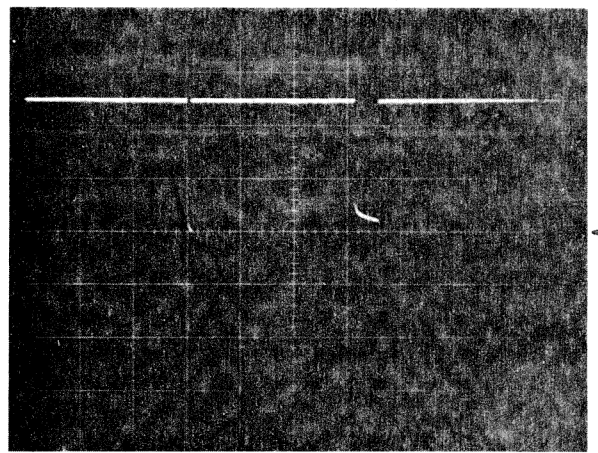


FIG. p FIRE TIMING PULSE

0.2 mSEC/DIV 20 VOLT/DIV

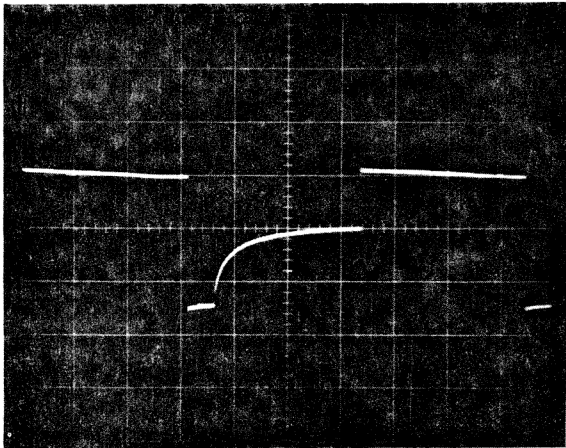


FIG. q HEAD COIL <sup>voltage</sup> CURRENT

2 mSEC/DIV 2 VOLT/DIV

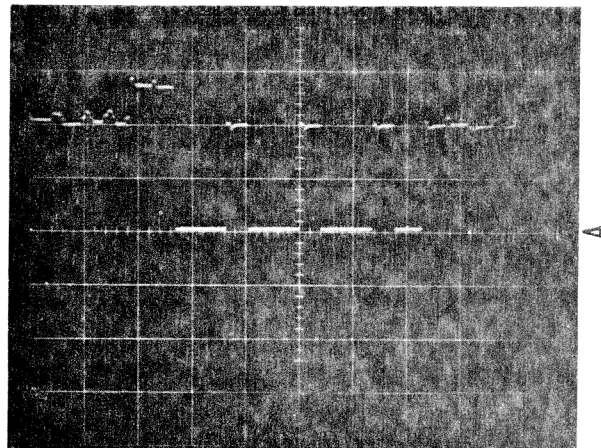


FIG. r IO/M(8155) SIGNAL



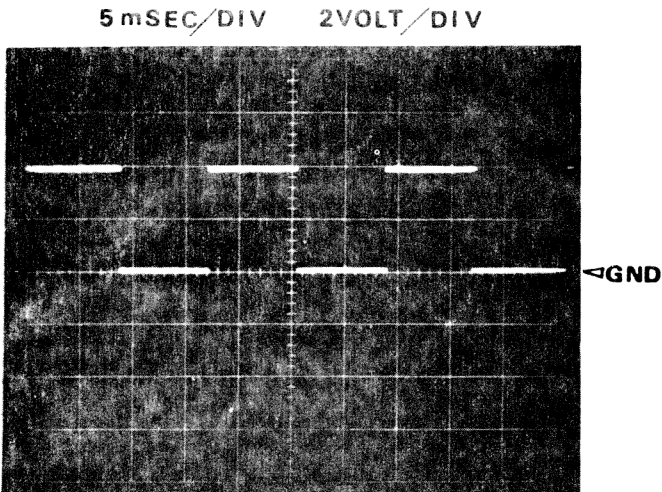


FIG. s PAPER FEED SIGNAL

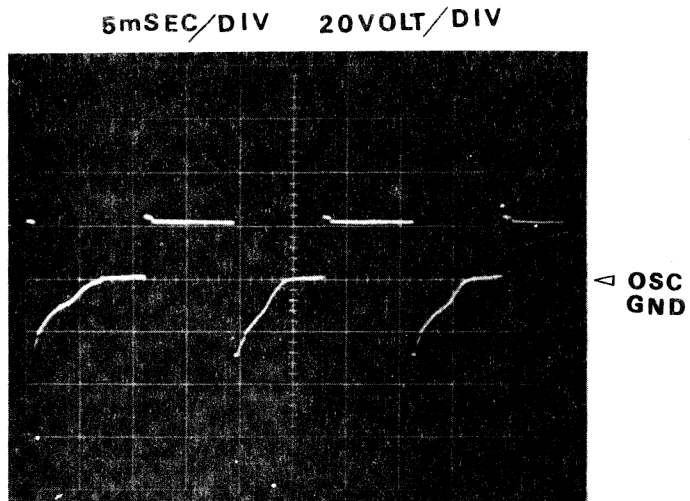


FIG. t FEED MOTOR CURRENT

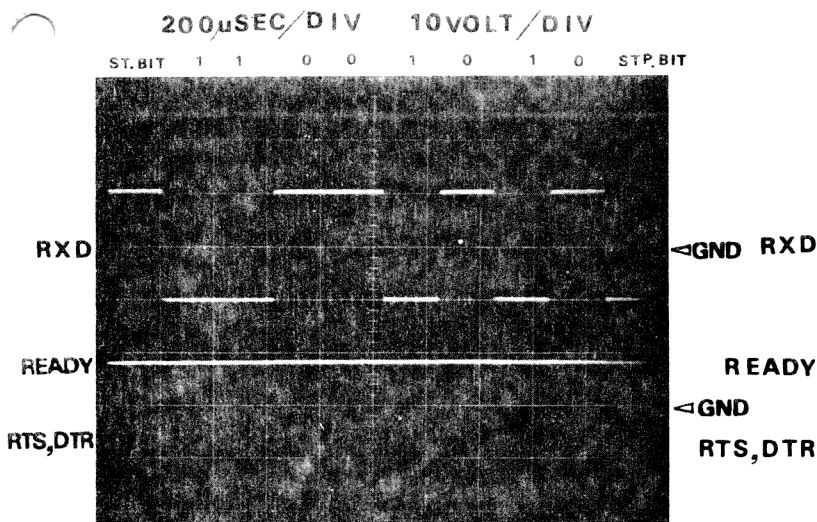


FIG. u RXD and RTS,DTR  
4800BPS(Example 1) CH. "S"

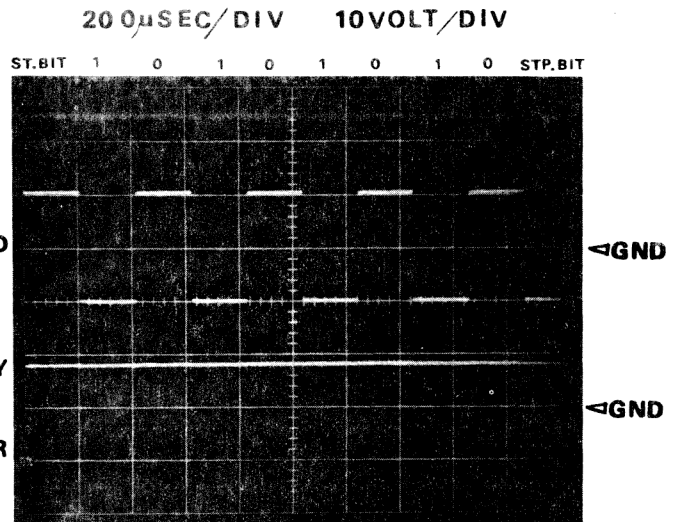


FIG. v RXD and RTS,DTR  
4800BPS(Example 2) CH. "U"

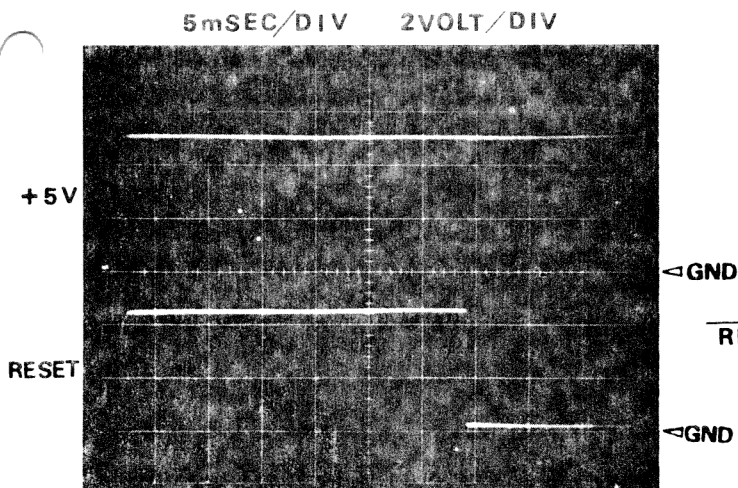


FIG. w +5V and RESET

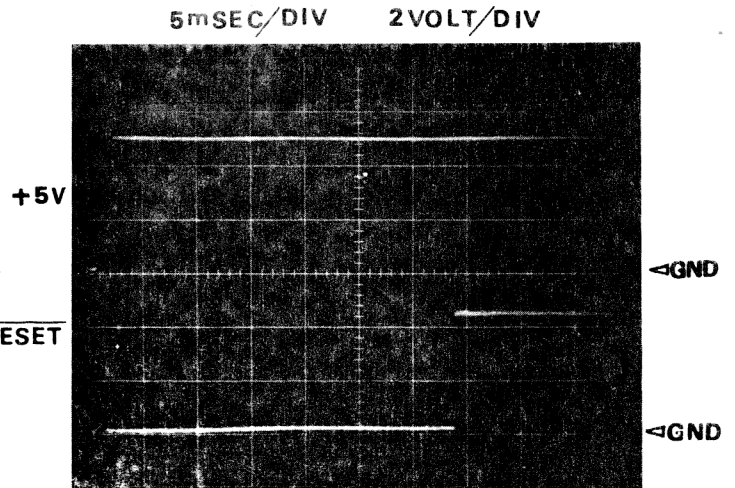


FIG. x +5V and RESET