DOT MATRIX PRINTER

DP8340R SERIES

[SERIAL INTERFACE]

USERS MANUAL

star

Trademark acknowledgments

DP8340R: Star Micronics Co. Ltd.

Notice

TABLE OF CONTENTS

1. OUTLINE

The DP8340R series of serial dot matrix printers is for use in ECR, POS, electronic instruments, banking machines and computer peripheral equipment. The DP8340R series include the following features;

1) 2 color printing (Red and Black)
2) High-speed bidirectional printing (2 line/sec, 29 or 44 columns per line)
3) 9-pin print head
4) The interface conforms to RS-232C in M type, and to RS-232C/20mA Current Loop in D type.
5) Commands for expanded characters, inverted characters, emphasized characters, red and black printing, and 10CPI or 15CPI characters etc. are provided, which makes the printer very versatile.
6) Simultaneous Data Communication and Printing
7) Error Checking Protocol
8) Peripheral Driver
9) One line validation printing (Option)

Model Name Notation

DP8340 R M – 1 2 0 A

Voltage

None	:	None Power Supply Unit
100	:	AC 100V
120	:	AC 120V
220	:	AC 220V
230	:	AC 230V
240	:	AC 240V

Interface

D : D-Sub 25 Pin Connector
(RS-232C/20mA Current Loop)
M : Modular Jack Connector
(Only RS-232C)

Printer Type

R : R Type Printer
(3.25 Inch Paper)

2. UNPACKING AND INSTALLATION

2-1. Unpacking

After opening the box, check if all necessary accessories are included.

(A) Printer
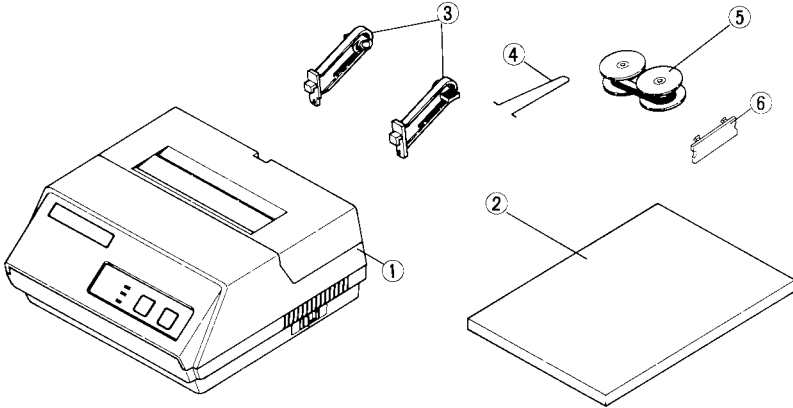
① Printer　　　　　　　　④ Re-Roll Prevention Guard
② User's Manual　　　　　⑤ Ink Ribbon
③ Paper Holders　　　　　⑥ DIP Switch Cover

(B) Power Supply Unit
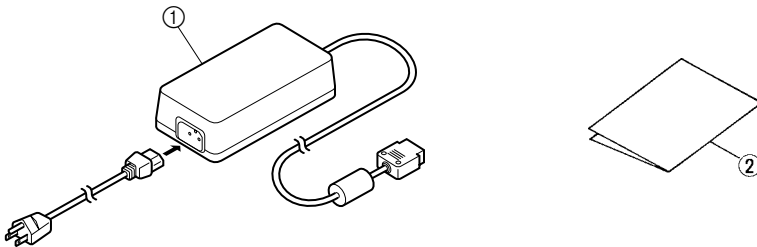
① Power Supply Unit
② User's Manual

Figure 2-1. Unpacking

2-2.　Installation of Paper Holders and Re-Roll Prevention Guard

Install the Paper Holders in the intermost holes in the rear of the printer.
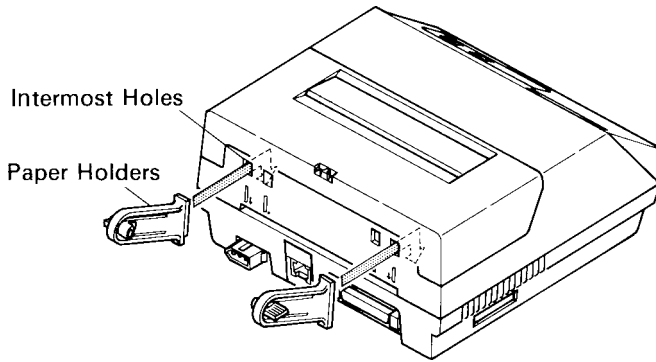
Figure 2-2. Installation of Paper Holders

Install the Re-Roll Prevention Wire in the holes of the printer cover. Twisting the Wire as shown in the figure below, will make the installation easier.
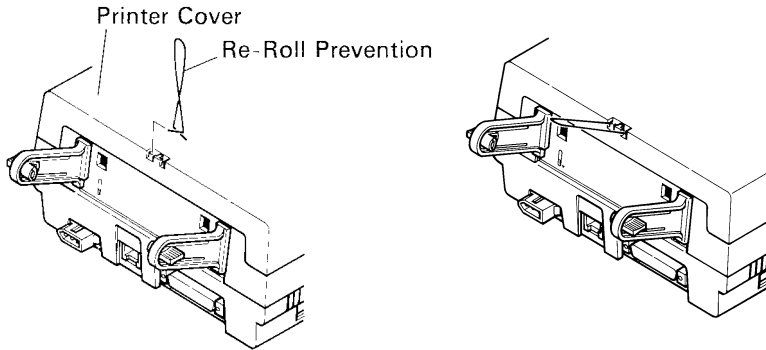
Figure 2-3. Installation of Re-Roll Prevention

2-3. Handling Notes

(1) Install the printer near an easily accessible socket-outlet.
(2) Place the unit on a flat and stable surface for operation.
(3) Do not connect the AC Power Plug to the same outlet used for other noise generating devices (large motors, etc.).
(4) Be careful not to drop paper clips, pins and other foreign objects into the unit.
(5) Wipe off dirt with a soft cloth soaked in alcohol or benzine. Do not use Lacquer thinner, Trichlorethelene or Ketone solvents because they may damage plastic parts.
(6) Use a soft brush, etc. for cleaning the printer mechanism and PCB.
(7) Keep hands out of printer while power is on.
(8) Do not attempt to print when there is no ink ribbon or paper in the unit. The print head life could be severly reduced.
(9) If the paper is fastened tightly to the roll, the paper may not detach from the roll when the end is reached.
If this happens, the no paper detection function and paper feed will not operate.
(10) Always keep the printer cover attached when printing to prevent paper jams, noise, and other problems.
(11) Always turn the power off before opening the printer cover. (e.g. When renewing a ink ribbon)

3. PART IDENTIFICATION AND NOMENCLATURE

3-1.　Power Supply Unit

Shape of AC Power plug will
vary according to destinations.

DC Power Connector (Output)
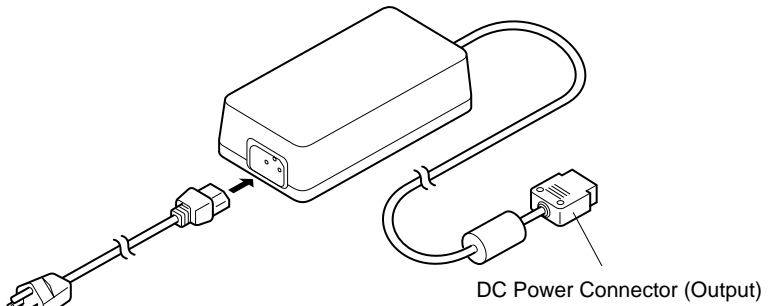
Figure 3-1. Power Supply Unit

3-2. Printer

Printer Cover

ON LINE Lamp
ALARM Lamp
POWER Lamp
ON LINE Button
FEED Button

Power Switch
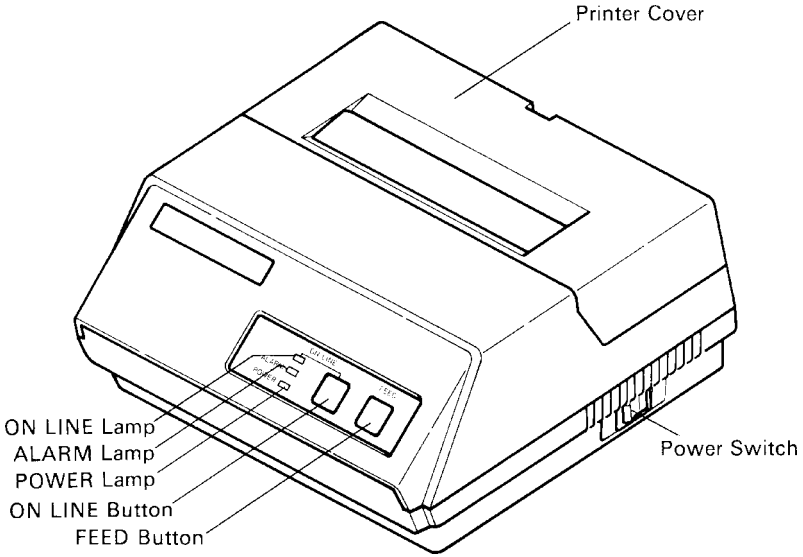
Figure 3-2. Printer: Front View

Intermost
Holes

DC Power Connector
(Input)

Interface Connector
(Modular Jack
for Model DP8340RM)
Do not connect this to a telephone

Interface Connector
(D-Sub 25 Pin for Model DP8340RD)

DIP Switch
DIP Switch Cover
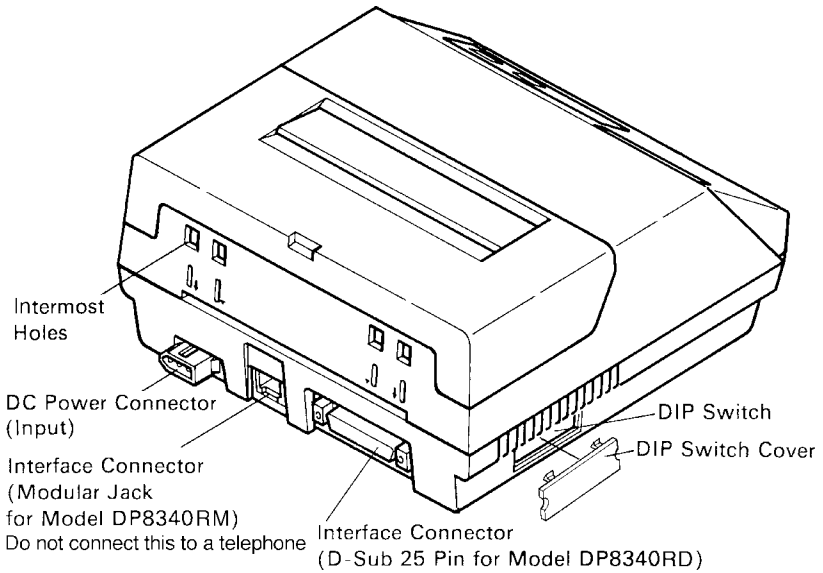
Figure 3-3. Printer: Rear View

3-3.　Part Functional Description

(1)	AC Power Plug	Connect to an outlet of the specified voltage.
(2)	DC Power Outlet	Supplies DC 12V power to the printer.
(3)	Printer Cover	Protects the printer against dust and reduces noise.
(4)	POWER Lamp	Lights up (green LED) when power is on.
(5)	ON LINE Lamp	Lights up (green LED) when the unit is in the online mode.
(6)	ALARM Lamp	Lights up (red LED) when printer operation is not normal, or the printer is out of paper. It is necessary to install paper into the printer and press the ON LINE Button to recover from paper empty status. Turn off the printer power in order to recover from abnormal operation.
(7)	ON LINE Button	Toggles between the on-line and off-line modes. The printer will go on-line after turning power on.
(8)	FEED Button	Momentary operation of this button provides one line feed. Pressing this button continuously will cause continuous paper feed. If power is turned on while pressing this button, self printing*1 will be performed.
(9)	Interface Connector	Connects the printer to host computers. Check that both computer and printer are off before connecting.
(10)	DIP Switches	Allows for setting of various functions according to user requirements.
*1	Self Printing	This printer has another convenient function, the Automatic Test Printing. With the ink ribbon and paper properly installed in the printer, turn the power ON while holding down the Feed switch. Test printing will start and stop again automatically.

4. INSTALLATION OF INK RIBBON AND PAPER

4-1.　Installation of Ink Ribbon

(1)　Turn power off, lift the Printer Cover up and remove it.

Note:　Be careful not to touch the print head immediately after printing, because it can get very hot.
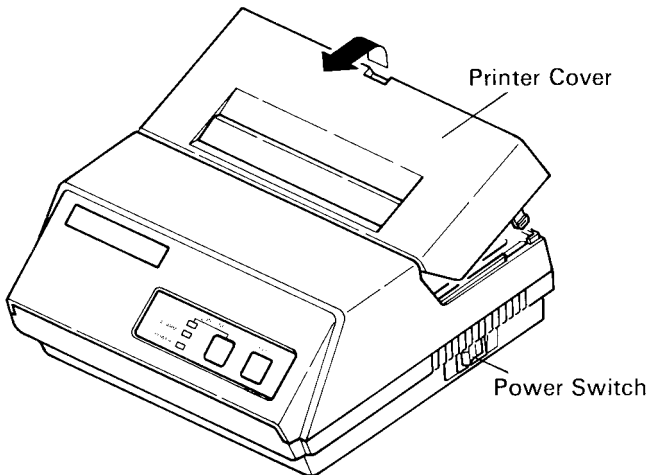
Figure 4-1. Printer Cover Removal

(2)　Unwind ribbon so that the spools are separated as shown in Figure 4-3. Hold the ribbon taut as shown with the drive pins facing down and slide the ribbon between the print head and the platen. While keeping the ribbon taut, wrap one side around the black ribbon guide on the end of the platen and drop one spool on the spool shaft. As you move the spool downwards, move the detecting lever aside to allow the spool to drop into place. Make sure the spool drive pins engage with the spool drive holes. As the spool drops into place there will be a click.

(3)　While continuing to hold the ribbon taut, install the remaining ribbon spool in a similar fashion.

(4)　Turn the spool that rotates freely to take up the ribbon slack.

Ribbon Life

Description	Ribbon life	
	Black	Red
SF-03BR (Fuji Kagakushi Kogyo Co., Ltd.)	Approx. 0.8 million characters	Approx. 0.4 million characters

Ribbon Life

| Description | Ribbon life |
	Black
SF-03B (Fuji Kagakushi Kogyo Co., Ltd.)	Approx. 0.8 million characters
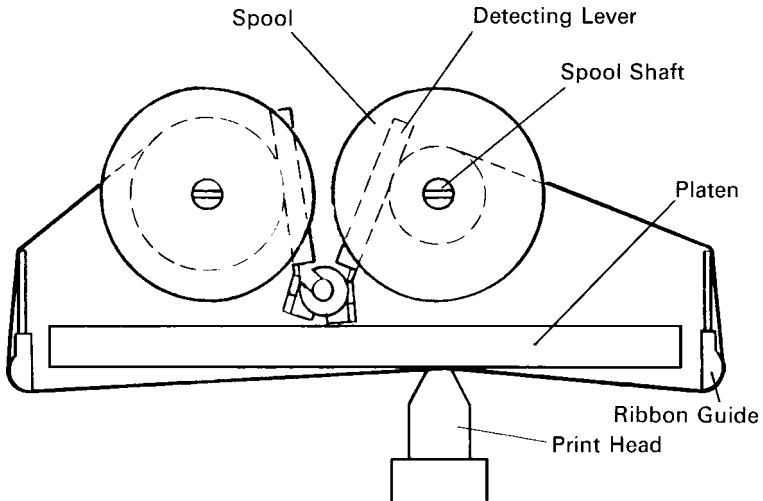
Figure 4-2. Installation of Ink Ribbon
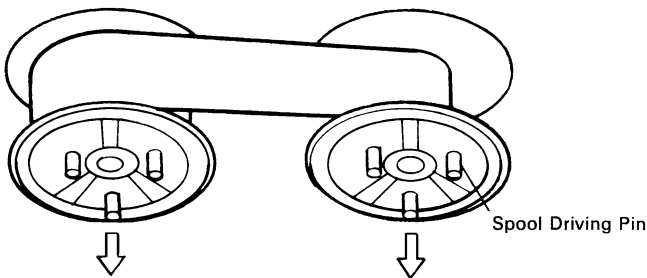
Figure 4-3. Ribbon Spools

4-2. Removal of Ink Ribbon

Hold the spool and lift gently, rotating it until the ribbon sags. Push the ribbon detecting lever out, lift the spool until it comes off the shaft. Remove the second spool in a similar manner.

(Do not apply excessive force when lifting spools.)

4-3. Paper Insertion

4-3-1. For Roll Paper

(1) Cut the Roll Paper end straight and square. Hold the roll so that the paper comes from the bottom.
(2) Attach the Roll Paper to the Holders Paper by slipping one side of the roll onto the Hub and pulling the other Hub out to allow the roll to slip in place.
(3) Insert the paper evenly into the Paper Insertion Slot.
(4) Turn the Power Switch "ON", and press the FEED Button. The paper will be fed into the unit.
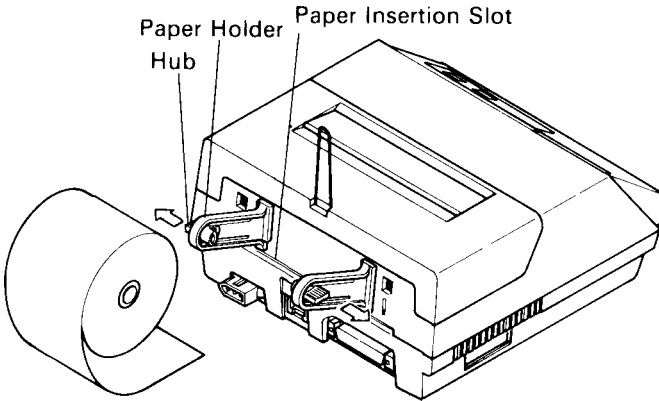
Figure 4-4. Paper Insertion (1)
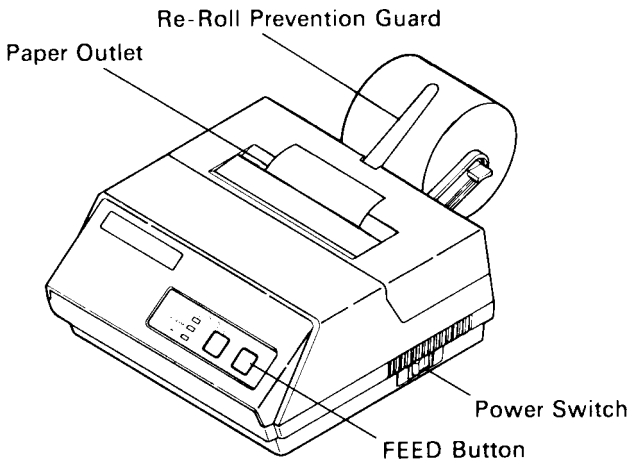
Figure 4-5. Paper Insertion (2)

4-3-2. Roll Paper Installation (When using the optional Printer Cover 8340R)

When installing roll paper with the optional "Ptinter Cover 8340R", please use the following procedure.

(1)   Turn power off, lift the Printer Cover up and remove it.

Note: Be careful not to touch the print head immediately after printing because it can get very hot.

(2)   Insert paper into the printer, and feed the paper so it extends 3 inches or more above the top surface of the printer.

(3)   Insert the paper into the slot in the "Printer Cover 8340R".

(4)   Install the "Printer Cover 8340R" on the printer.
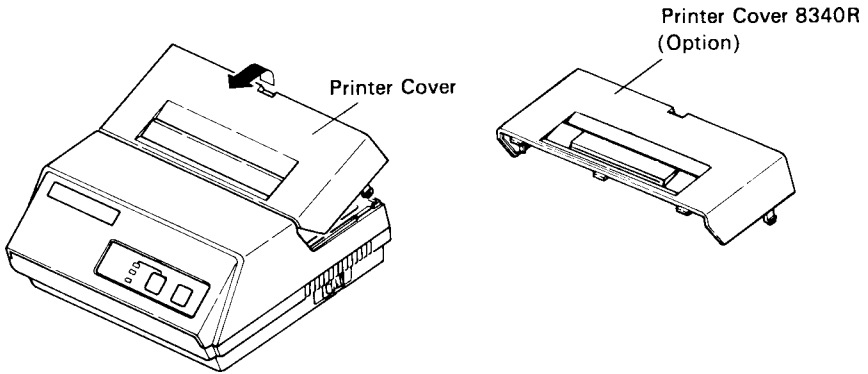
Figure 4-6. Replace the Printer Cover
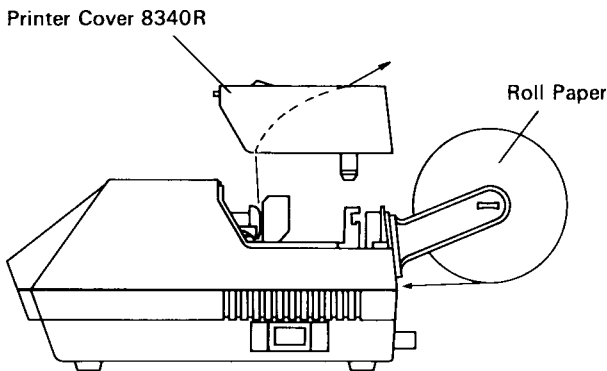
Figure 4-7. Printer Cover 8340R

4-3-3. Validation Option Installation

The validation printing requires the optional printer cover 8340R. Refer to item 4-3-2 for the installation.

(1) Turn power ON.
(2) Enter the printer the validation mode.
     (Refer to the control code "GS" in Chapter 5.)
(3) Insert the material to be validated against the right side of the slot in the Printer Cover 8340R.
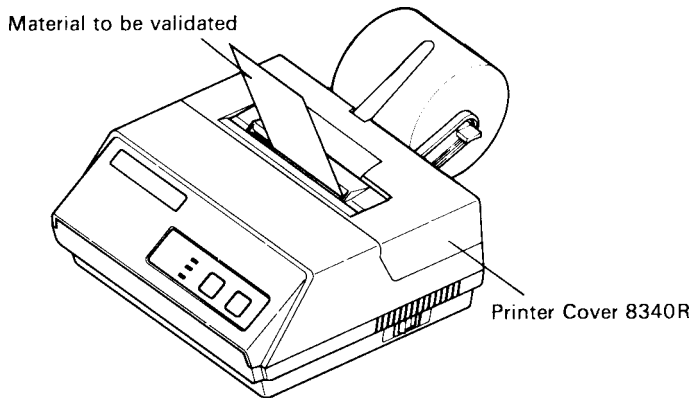
Figure 4-8. Insertion of Material to be validated

4-4. Roll Paper Removal

Cut the paper close to the slot and use the feed button until paper has passed completely through the printer.

Note: Do not try to remove the paper by hand as it could become crooked and get jammed inside the printer.

5. CONTROL CODES

CODE

LF
(0A)H

FUNCTION

Print and line feed instruction

OUTLINE

The LF code causes the data in the line buffer to be printed, followed by a single line feed. When the line buffer is empty, only the feed takes place.

CODE

CR
(0D)H

FUNCTION

Print and line feed instruction

OUTLINE

Same function as of LF code.
However, when the DIP switch 2-4 is ON, the CR code becomes invalid.

CODE

SO
(0E)H

FUNCTION

Expanded character instruction

OUTLINE

This code causes the printer to print expanded characters twice as wide as the regular ones. This remains in effect until a DC4 code is received.

CODE

DC4
(14)H

FUNCTION

Release from expanded characters

OUTLINE

The expanded character instruction is released by the DC4 code, and the succeeding data is printed as regular width characters.

CODE

ESC-1
(1B)H (2D)H (01)H or (1B)H (2D)H (31)H

FUNCTION

Underline mode selection

OUTLINE

All data received after this code is underlined until a ESC-0 is received.

CODE

ESC-0
(1B)H (2D)H (00)H or (1B)H (2D)H (30)H

FUNCTION

Release from underline mode

OUTLINE

The underline mode selection is released by this code.

CODE	SI
	$(0F)_H$

FUNCTION	Inverted print instruction

OUTLINE	This function causes the printing to be inverted. This code must be received at the beginning of a line. If this code is received anywhere other than at the beginning of a line, it is disregarded. Accordingly, normal characters and inverted characters, can not be mixed on the same line.

CODE	DC2
	$(12)_H$

FUNCTION	Release from inverted print instruction

OUTLINE	The inverted print instruction is released by this code. This code must be received at the beginning of a line.

CODE	ESC E
	$(1B)_H (45)_H$

FUNCTION	Emphasized print mode instruction

OUTLINE	Data following this command is printed with emphasized characters. In this mode, characters are printed in a single direction.

CODE	ESC F
	$(1B)_H (46)_H$

FUNCTION	Release from emphasized print instruction

OUTLINE	Emphasized print is released.

CODE	ESC 4
	$(1B)_H (34)_H$

FUNCTION	Red character print instruction

OUTLINE	This command causes subsequent data to be printed with red characters. The instruction is released by the code, ESC 5. Red and black characters may be intermixed. This command is ignored when DIP SW 2-3 is OFF.

CODE	ESC 5
	$(1B)_H (35)_H$

FUNCTION	Release from red character print instruction

OUTLINE	The red character print instruction is released by this code.

CODE	ESC a n (1B)$_H$ (61)$_H$ n

FUNCTION	n-line feed

OUTLINE	After printing the data in the current line, n lines are fed by this code. The value of n ranges from 1 to 120.

CODE	ESC C n (1B)$_H$ (43)$_H$ n

FUNCTION	Sets page length in lines

OUTLINE	This code sets the length of a page to n lines. The value of n ranges from 1 to 120. On initialization, the page length default condition will be 42 lines. The line feed pitch is one-sixth inch.

CODE	ESC Nn (1B)$_H$ (4E)$_H$ n

FUNCTION	Sets bottom margin in lines

OUTLINE	Upon receiving this code, the bottom margin is set to n lines. $0 \leqq n \leqq 120$; Default Value n = 0

Page Length

This section is automatically fed

n lines bottom margin
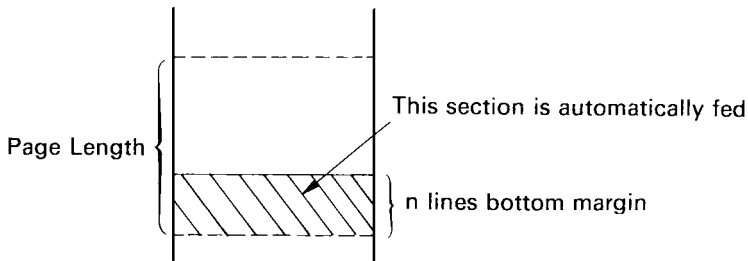
CODE	ESC O (1B)$_H$ (4F)$_H$

FUNCTION	Cancels bottom margin.

OUTLINE	Upon input of this code, bottom margin setting is cleared.

CODE	FF (0C)$_H$

FUNCTION	Form feed

OUTLINE	The FF code prints the data in the current line and transports the paper to the start of the next page.

CODE	ESC @

$(1B)_H$ $(40)_H$

FUNCTION	Printer initialization

OUTLINE	All printing conditions except ESC BEL n1 n2, the line buffer and data buffer are set to the power on default condition.

CODE	ESC BEL n1 n2

$(1B)_H$ $(07)_H$ n1 n2

FUNCTION	Sets peripheral unit drive pulse duration.

OUTLINE	This command sets the pulse duration for peripheral unit drive (Paper Cutter, Take-Up Device, cash drawer, etc.)

Pulse Duration = $10 \times n_1$ (ms)

Delay = $10 \times n_2$ (ms)

$1 \leqq n_1 \leqq 127$; $1 \leqq n_2 \leqq 127$

Default value: $n_1 = n_2 = 20$
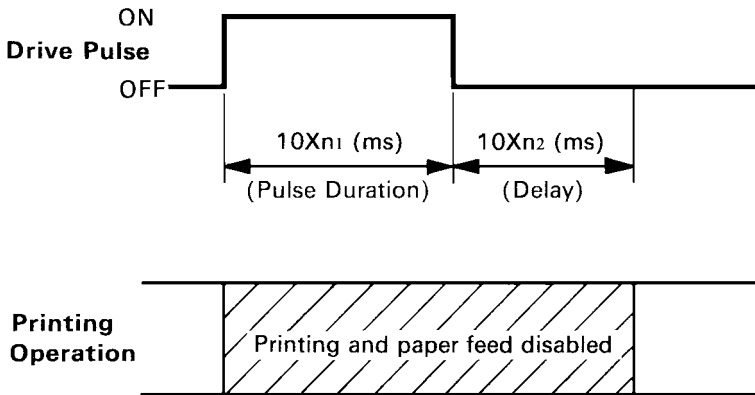
Executed by BEL code and FS code after printing.

CODE	BEL

$(07)_H$

FUNCTION	Trigger peripheral unit drive (Deferred)

OUTLINE	Causes a peripheral drive pulse to be generated. This code is normally stored in the buffer and is performed as it is received from the data queue.

CODE	FS
	$(1C)_H$
FUNCTION	Trigger peripheral unit drive (immediate)
OUTLINE	Causes a peripheral drive pulse to be generated immediately

CODE	ENQ
	$(05)_H$
FUNCTION	Enquiry
OUTLINE	When this code is received, the printer outputs status data. If it is input after text data input in the STX-ETX mode, the printer outputs status data and the check byte.

CODE	STX
	$(02)_H$
FUNCTION	Start of text
OUTLINE	When this code is received, the printer enters the STX-ETX mode. This code is ignored if received when STX-ETX mode is already in effect.

CODE	ETX
	$(03)_H$
FUNCTION	End of text
OUTLINE	When this code is received, the printer leaves the STX-ETX mode. Contents of the data buffer is printed, this code is ignored if received before ENQ.

CODE	CAN
	$(18)_H$
FUNCTION	Clears print buffer
OUTLINE	Upon input of this code the data buffer and line buffer is cleared.

CODE	ESC P
	$(1B)_H$ $(50)_H$
FUNCTION	Select 10 CPI
OUTLINE	This code causes the printer to print at 10 CPI. The number of columns per is 29.

CODE

ESC M
$(1B)_H$ $(4D)_H$

FUNCTION

Select 15 CPI

OUTLINE

This code causes the printer to print at 15 CPI. The number of columns per line is 44. When the power is turned on, the 15 CPI mode is selected.

CODE

GS
$(1D)_H$

FUNCTION

Validation printing instruction

OUTLINE

This code causes the printer to perform validation printing of a maximum of 32 subsequent characters (at 15 CPI, from the thirteenth to the forty-forth column).

After the GS code is received, a maximum of 32 characters should be input, followed by the LF code which indicates the end of the validation printing data.

(At this time, control codes except FS, ENQ, CAN and SUB codes, or any character received beyond the limit of 32 characters are ignored.)

When the printer enters the validation mode, the ribbon is shifted up and the ON-LINE lamp blinks. (This lamp goes on and off at a 0.5-second interval until the end of the validation mode.) After the material to be validated is inserted, and the LF button is pressed, the validate line is printed, followed by a single line feed. When the check is removed and the ON-LINE button is pressed, the printer returns to regular mode and is set to ON-LINE status.

REMARKS

1) The print settings by commands (such as emphasized mode and underline mode) are invalid only during validation printing.

2) When the CAN code is received in the validation mode, the printer returns to regular mode, and the mechanism is initialized.

3) If the FS or SUB codes is received in the validation mode, these codes are executed just after the printer returns to regular mode.

4) In the validation mode, the LF button and the ON-LINE button do not work except the above behavior.

5) If the printer has a Red black ribbon installed, the validate line will be printed in red.

Character Code List

	Character	Code	Function
1	LF	(0A)H	Print and line feed instruction
2	CR	(0D)H	Print and line feed instruction (same as LF)
3	SO	(0E)H	Expanded character instruction
4	DC4	(14)H	Expanded character release
5	ESC-1	(1B)H (2D)H(01)H (1B)H (2D)H (31)H	Underline instruction
6	ESC-0	(1B)H (2D)H(00)H (1B)H (2D)H (30)H	Underline release
7	SI	(0F)H	Inverted print instruction
8	DC2	(12)H	Inverted print release
9	ESC E	(1B)H (45)H	Emphasized print instruction (one-way printing)
10	ESC F	(1B)H (46)H	Emphasized print release
11	ESC 4	(1B)H (34)H	Red character print instruction
12	ESC 5	(1B)H (35)H	Red character print release
13	ESC a n	(1B)H (61)H n	n-line feed instruction
14	ESC C n	(1B)H (43)H n	Sets page length in lines $1 \leqq n \leqq 120$ (default n = 42)
15	ESC N n	(1B)H (4E)H n	Set bottom margin in lines $0 \leqq n \leqq 120$ (default n = 0)
16	ESC O	(1B)H (4F)H	Cancel Bottom margin
17	FF	(0C)H	Form feed
18	ESC @	(1B)H (40)H	Printer initialization instruction
19	ESC BEL n_1 n_2	(1B)H (07)H n_1 n_2	Set peripheral unit drive pulse duration $1 \leqq n_1 \leqq 127, 1 \leqq n_2 \leqq 127$ (default $n_1 = n_2 = 20$)
20	BEL	(07)H	Trigger peripheral unit drive (Deferred)
21	FS	(1C)H	Trigger peripheral unit drive (Immediate)
22	ENQ	(05)H	Enquiry
23	STX	(02)H	Start of text enter STX-ETX mode
24	ETX	(03)H	End of text end STX-ETX mode
25	CAN	(18)H	Clears print buffer
26	ESC P	(1B)H (50)H	Select 10 CPI
27	ESC M	(1B)H (4D)H	Select 15 CPI (Default value)
28	GS	(1D)H	Validation printing instruction

6. GENERAL SPECIFICATIONS

Printing method	Serial impact dot matrix printing, 9 wires	
Number of print columns	29 columns (10CPI), 44 columns (15CPI)	
Print speed	Approx. 2 lines/sec	
Print direction	Bi-directional	
Line spacing	1/6 inch	
Paper feed method	Friction Feed	
Paper feed speed	Approx. 12 lines/sec	
Character set	ASCII	96 characters
	Special	64 characters
	Block graphics*	64 characters
Font configuration	10CPI Ordinary characters	5×9 dots
	Block graphics*	6×6 dots
	15CPI Ordinary characters	7×9 half dots
	Block graphics*	5×6 dots

* Graphic Feed Not Available

Character size	10CPI	2.00 (H) $\times$ 2.42 (V) mm
	15CPI	1.32 (H) $\times$ 2.42 (V) mm
Character spacing	10CPI	2.55 mm (1/10 inch)
	15CPI	1.70 mm (1/15 inch)
Dot spacing	10CPI	H=0.425 mm V=0.353 mm
	15CPI	H=0.340 mm V=0.353 mm
Gross dot	10CPI	174 dots/wire/line
	15CPI	220 dots/wire/line
Print area	10CPI	73.53 mm
	15CPI	74.46 mm
Print Buffer	Approx. 1.5 KB	
Peripheral drive	1 output (1A max. at 12V)	

Serial Interface
   Model DP8340-RM   Only RS-232C
   Model DP8340-RD   RS-232C/20mA Current Loop
External dimensions
   (Printer)   202(W) $\times$ 200(D) $\times$ 98(H) mm
               (without paper holder, DC Power Connector)
   (Power supply unit)   60(W) $\times$ 120(D) $\times$ 36(H) mm (without AC cable)
Weight
   (Printer)   Approx. 1.9 kg
   (Power supply unit)   Approx. 0.4 kg (without AC cable)

Power supply unit
Four supplies available with following ratings

Input	Output
AC 100 – 240 V 47Hz – 63 Hz 0.8 A Max	DC 12.0 V ± 5% 2.0 A

Paper specification
Paper type	Ordinary and carbonless copy paper
Size Paper width	82.55 ± 0.5mm (3.25 inches)
Roll diameter	80 mm outer diameter (Max)
Thickness (single)	0.07 mm (52.3 g/m^2) to 0.09 mm (64g/m^2)
(2 copy)	One copy and one original (max 0.13 mm)
Paper end	Paper should not be attached to the core
One line validation	Check (Refer to Fig. 6-2)

        Paper width 70 to 90 mm
        Thickness 0.1 to 0.15 mm
  * Requires the optional Printer Cover 8340R

Ink ribbon specification
Color	Black and red / Black only
Ribbon material	Nylon (#40 denier)
Ribbon size	13mm × 6m
Spool	13mm (width), 35mm in diameter (two spool)
Recommended ribbon	SF-03BR (Black and red), SF-03B (Black) (manufactured by Fuji Kagakushi Kogyo Co., Ltd.) or approved equivalent.
Operating conditions	Temperature +5˚C — +40˚C Humidity 10% — 80%RH
Storage conditions	Temperature –20˚C — +70˚C Humidity 5% — 95%RH (+40˚C)
Head life	70 million characters
Printer reliability	5.0 million lines MCBF (except head life)

	10 CPI	15 CPI
A	73.53	74.46
B	4.64	4.64
C	4.38	3.45

Cutting position
(Printer cover)

7 lines*

* The current printed line must be advanced a total of 8 line feeds for the line to be totally outside of the printer cover.

Print area A

82.55 ± 0.5 (3.25)

Unit: mm (in.)
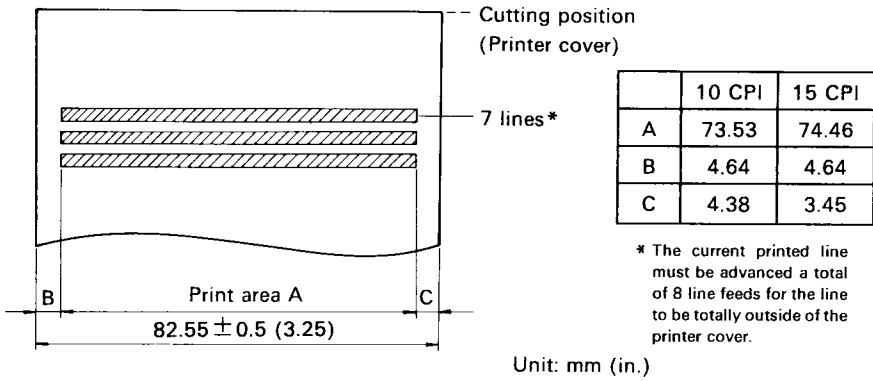
Figure 6-1. Roll Paper and Print Area

Approx. 12.2

(32 columns, 15 CPI)

54.06

70 ～ 90   9.82

Unit: mm (in.)
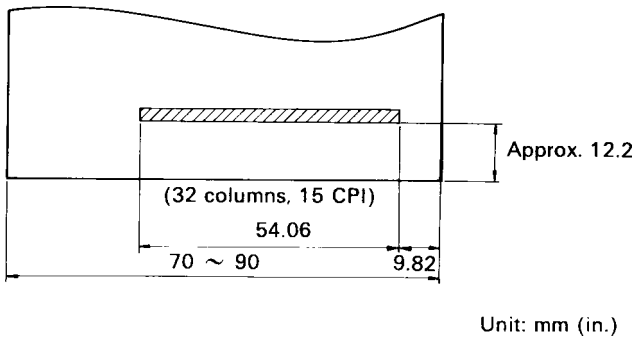
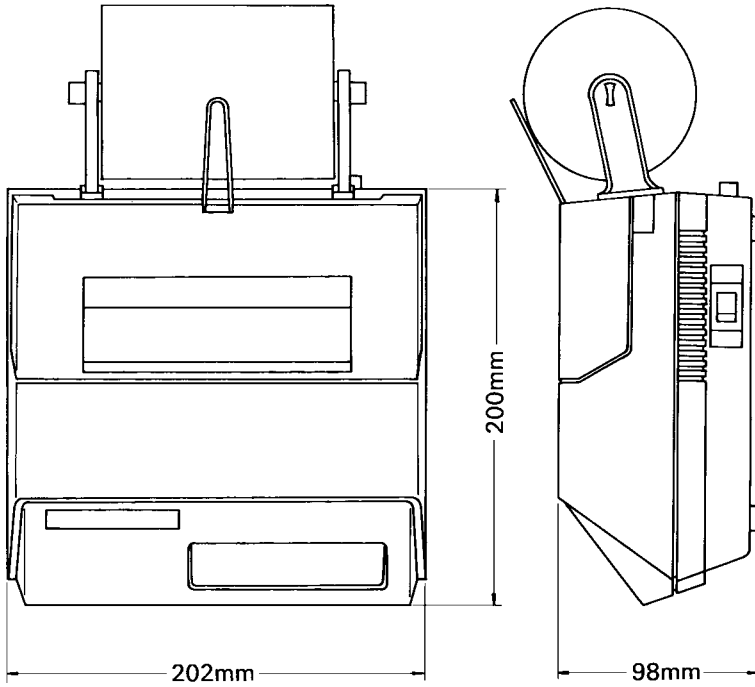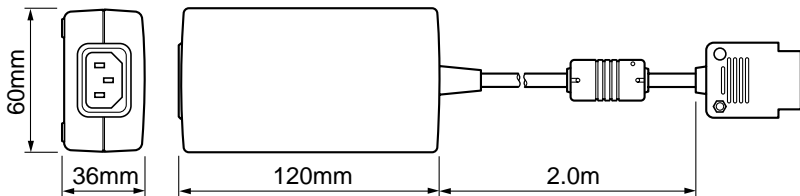**Figure 6-2. Material to be validated and One Line Validation Printing**

Figure 6-3. External Dimensions (Printer)

Shape of AC Power plug will
vary according to destinations.

Figure 6-4. External Dimensions (Power Supply Unit)

7. INTERFACE FOR MODEL DP8340RM (MODULAR JACK CONNECTOR)

7-1. Interface Specifications

(1) Synchronization system Asynchronous

(2) Baud rate   150, 300, 600, 1200, 2400, 4800, 9600,
                          BPS (Selectable)

(3) Word length
     Start bit: 1 bit
     Data bit: 7 or 8 bits (Selectable)
     Parity bit: Odd, Even, or None (Selectable)
     Stop bit: 1 or 2 bit length (Selectable)

(4) Signal polarity
     RS-232C   MARK   : Logic "1" (–3V to –25V)
                          SPACE : Logic "0" (+3V to +25V)

① Start bit
② Data bits
③ Parity bit
④ Stop bit
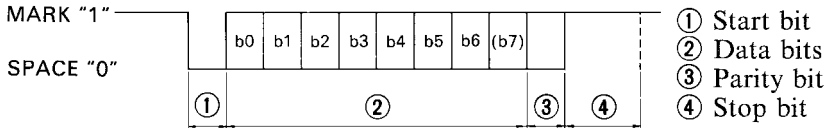
(5) Handshaking
     1 DTR Mode (1 block)
     2 X-ON/Y-OFF Mode
     3 STX-ETX Mode

Note: STX-ETX Mode may use DTR or X-ON/X-OFF, selected by DIP SW 1-
5. See Chapter 9. for details.

7-2. Interface Circuit

Input (RXD, CTS)

Output (DTR, $\overline{\text{FAULT}}$, TXD, RTS)

Figure 7-1. RS-232C Interface

7-3. Setting of the DIP Switches

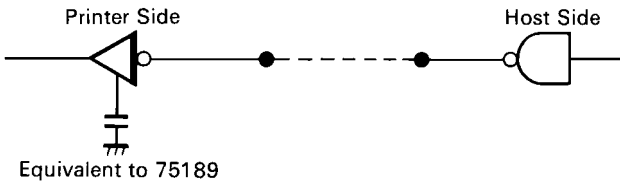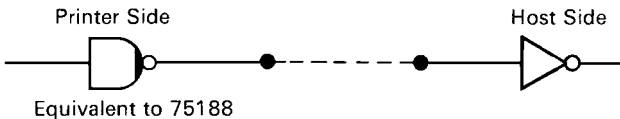### 7-3-1. DIP-SW 1

Switch	ON	OFF	Factory setting
1-1			ON
1-2	Data transfer rate — see below (*1)		ON
1-3			ON
1-4	Stop bit 1	Stop bit 2	ON
1-5	DTR MODE (1 BLOCK)	X-ON/X-OFF MODE	ON
1-6	8 data bits	7 data bits	ON
1-7	No parity	Parity checked	ON
1-8	Odd parity	Even parity	ON

(*1)

Baud rate	SW1-1	SW1-2	SW1-3
150	OFF	OFF	OFF
300	OFF	OFF	ON
600	OFF	ON	OFF
1200	OFF	ON	ON
2400	ON	OFF	OFF
4800	ON	OFF	ON
9600	ON	ON	ON/OFF

(*2) DIP Switch 2-3 should be set to ON when you use a 2-color ribbon for 2-color printing.

It should be set to OFF when a monochrome ribbon is used.

7-3-2. DIP-SW2

Switch	ON	OFF	Factory setting
2-1	International character set : U.S.A	FRANCE	ON
2-2	Always ON		ON
2-3(*2)	2-color Ribbon	Monochrome Ribbon	ON
2-4	CR Invalid	CR Valid	ON

Note: DIP switches are only read by the controller at power turn on. DIP switch changes should be made with power off, or after changing switch setting, turn the power off and on again.
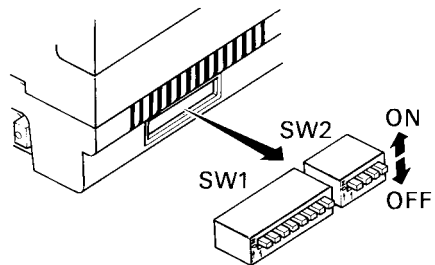

Figure 7-2. Setting of DIP Switch

7-4.   Connectors and Signals

Pin No.	Signal Name	Direction	Function
1	GND	—	Shield Ground
2	GND	—	Frame Ground
3	TXD	OUT	This pin carries data from the printer. (Return channel)
4	RXD	IN	This pin carries data to the printer.
5	RTS	OUT	This is SPACE when the printer power is ON.
6	$\overline{\text{FAULT}}$	OUT	This is MARK when the printer is abnormal. (Refer to Error Condition Alarm Mode *1.) Or there is a paper error.
7	GND	—	Signal ground.
8	DTR	OUT	This printer turns this pin SPACE when it is ready to receive data.
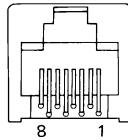
Figure 7-3. Modular Jack Connector

*1   Error Condition Alarm Mode

If an error condition is detected during operation, the printer will stop printing and cause the $\overline{\text{FAULT}}$ signal to go MARK. All solenoides & motors will be de-energized. It is necessary to turn the printer power off and on again in order to recover from the alarm mode.

This printer can detect the following error coditions:

    a. Motor Lock

    b. Defective timing detector

    c. Micro-proccessor out of program sequence

7-5. Interface Connections

For interface connections, refer to the instructions for interface of the host computer. The following gives basic examples.
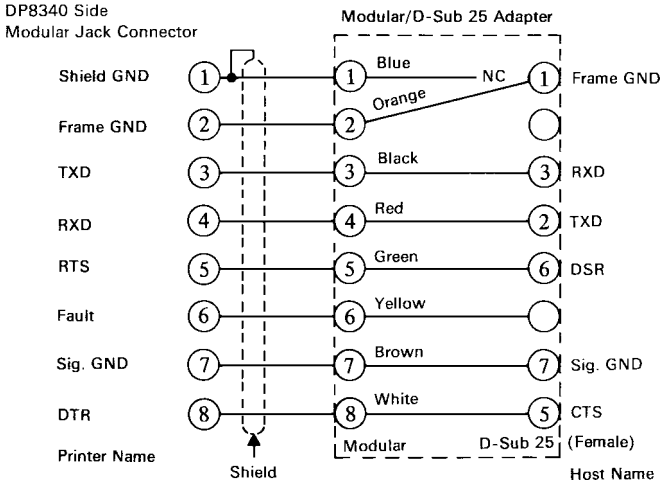
Figure 7-4. Interface Connections using Modular/D-Sub 25 Adapter to IBM PC (Use with straight through cable wiring)

Before selecting interface cable wiring, it is necessary to know the wiring of the modular interconnect cable. Figure 7-5. below shows the way to determine if the cable is straight connected, or cross connected. Cross connected wiring is not suitable for shielded cable.
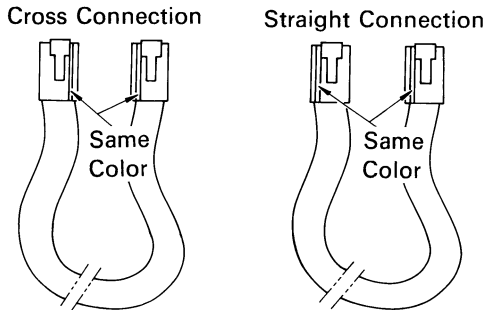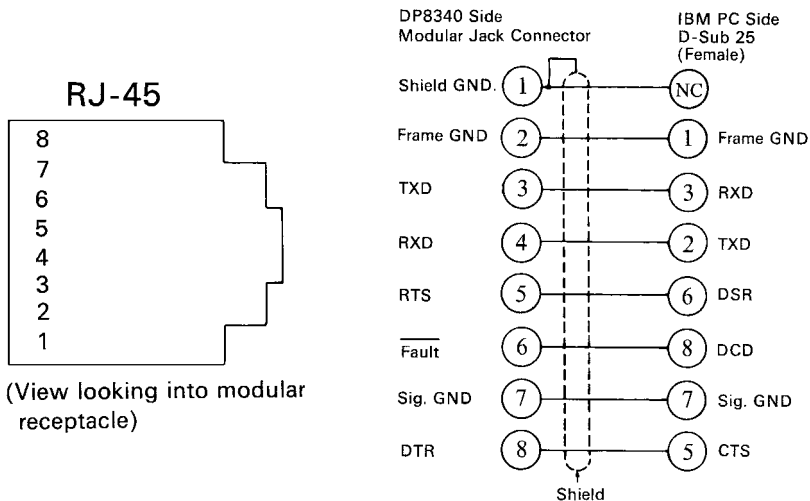

Figure 7-5.

RJ-45

```
8
7
6
5
4
3
2
1
```

(View looking into modular receptacle)

DP8340 Side
Modular Jack Connector

IBM PC Side
D-Sub 25
(Female)

	DP8340		IBM PC	
Shield GND.	1		NC	
Frame GND	2		1	Frame GND
TXD	3		3	RXD
RXD	4		2	TXD
RTS	5		6	DSR
Fault	6		8	DCD
Sig. GND	7		7	Sig. GND
DTR	8		5	CTS

Shield

**Figure 7-6. Wiring of cable for direct connection between DP8340
and IBM PC serial part**

7-6.　Peripheral Unit Drive Circuit

The Control Board of this unit is equipped with a circuit for driving a peripheral unit (Paper Cutter, Take-Up Device, Cash Drawer, etc.)

The Control Board Connector (CN3) is used to connect the Peripheral Unit to the Drive Circuit. When using this circuit connect the peripheral unit cable to the CN3 Connector (cable is not included). Use a cable with the following specifications:

Note: Do not run cable near devices generating large amounts of electrical noise.

Housing 5480-03 RED (Molex)
Terminal 5479PBT (Molex)
Wire Lead

Recommend Noise Filter
Ferrite Core
TRCC-16-8-16

Shield

Pressure terminal
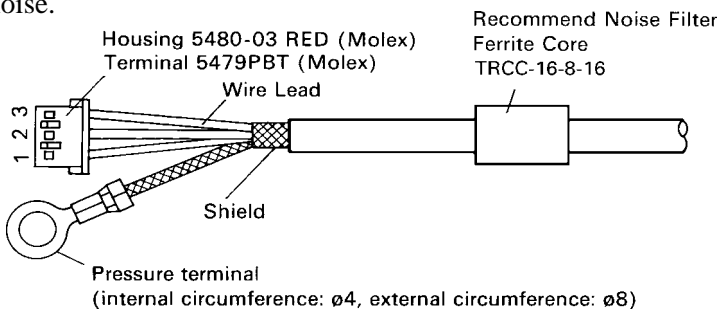(internal circumference: ø4, external circumference: ø8)

Figure 7-7. Cable Specifications

7-6-1.　Cable Connection

Remove the printer Bottom Cover and connect the cable to the CN3 Connector. Pass the cable around the control board as shown and through grommetted hole in bottom cover. (Grommet may have to be cut)

M TYPE ONLY
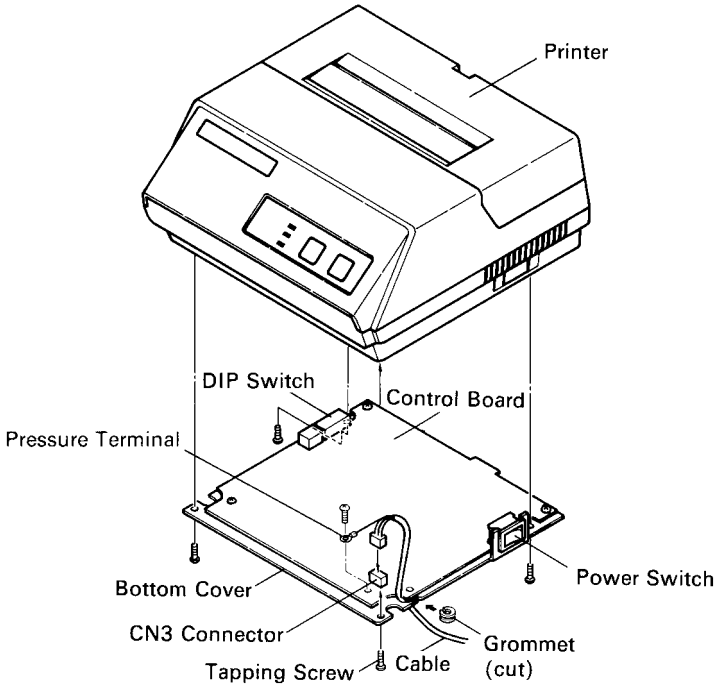
Figure 7-8. Cable Connection

7-6-2. Peripheral Drive Circuit

	Absolute Ratings (Ta = 25˚C)	
D1	Voltage Breakdown	100V
	Peak Forward Current	1A

Drive Output	12V, MAX. 1A

Figure 7-9. Drive Circuit

Caution: Do not use external power supply with peripheral drive circuit.

7-6-3. Control Codes

Codes for Drive Circuit control are ESC BEL n1 n2, BEL and FS. Refer to the Control Codes in Chapter 5.

8. INTERFACE FOR MODEL DP8340RD (D-SUB 25 PIN CONNECTOR)

8-1. Interface Specifications

(1) Synchronization system Asynchronous
(2) Baud rate 150, 300, 600, 1200, 2400, 4800, 9600
       BPS (Selectable)
(3) World length
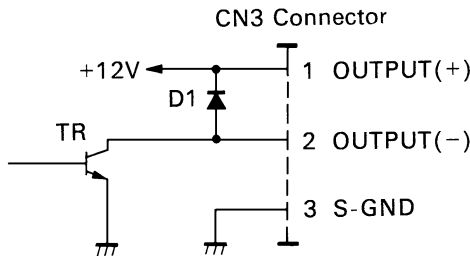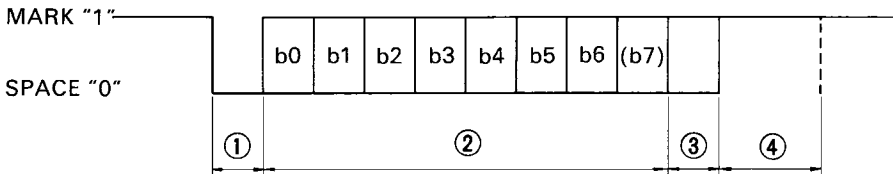   Start bit: 1 bit
       Data bit: 7 or 8 bits (Selectable)
       Parity bit: Odd, Even, or None (Selectable)
       Stop bit: 1 or 2 bit length (Selectable)
(4) Signal polarity
       RS-232C MARK : Logic "1" (–3V to –25V)
              SPACE : Logic "0" (+3V to +25V)
       Current Loop MARK : Logic "1" (Current ON)
              SPACE : Logic "0" (Current OFF)

① Start bit
② Data bits
③ Parity bit
④ Stop bit

(5) Handshaking
       1 DTR Mode (1 block)
       2 X-ON/Y-OFF Mode
       3 STX-ETX Mode

Note: STX-ETX Mode may use DTR or X-ON/Y-OFF, selected by DIP SW 1-5. See Chapter 9. for details.

8-2. Interface Circuit

8-2-1. RS-232C

Input (RXD, CTS)
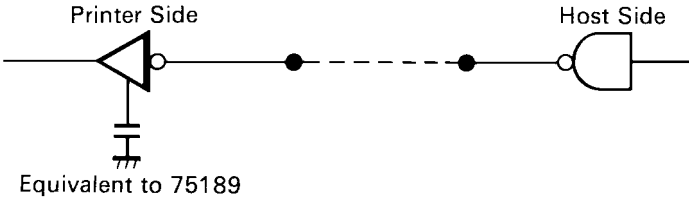
Output (DTR, $\overline{\text{FAULT}}$, TXD, RCH, RTS)

Figure 8-1. RS232-C Interface

8-2-2. Current Loop

Input (TTY-RXD, TTY-RXDR)

Output (TTY-TXD, TTY-TXDR)

Note: Resistance should be set so that Current Loop is restricted to the range of 10 ~ 20 mA.

Figure 8-2. Current Loop Interface

8-3. Setting of the DIP Switches

8-3-1. DIP-SW 1

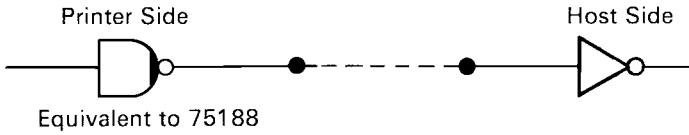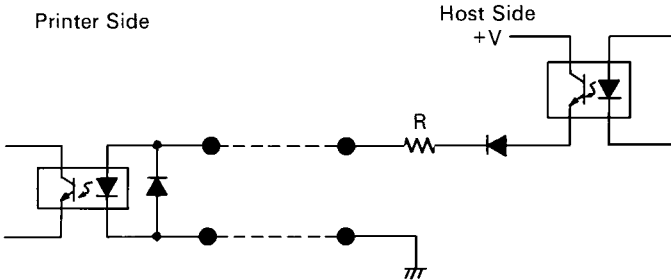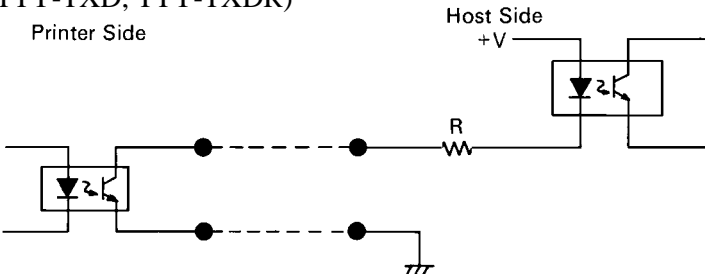| Switch	ON	OFF	Factory setting
1-1			ON
1-2	Data transfer rate — see below (*1)		ON
1-3			ON
1-4	Stop bit 1	Stop bit 2	ON
1-5	DTR MODE (1 BLOCK)	X-ON/X-OFF MODE	ON
1-6	8 data bits	7 data bits	ON
1-7	No parity	Parity checked	ON
1-8	Odd parity	Even parity	ON

(*1)

Baud rate	SW1-1	SW1-2	SW1-3
150	OFF	OFF	OFF
300	OFF	OFF	ON
600	OFF	ON	OFF
1200	OFF	ON	ON
2400	ON	OFF	OFF
4800	ON	OFF	ON
9600	ON	ON	ON/OFF

(*2) DIP Switch 2-3 should be set to ON when you use a 2-color ribbon for 2-color printing.

It should be set to OFF when a monochrome ribbon is used.

8-3-2. DIP-SW 2

Switch	ON	OFF	Factory setting
2-1	International character set : U.S.A	FRANCE	ON
2-2	Always ON		ON
2-3(*2)	2-color Ribbon	Monochrome Ribbon	ON
2-4	CR Invalid	CR Valid	ON

Note: DIP switches are only read by the controller at power turn on. DIP switch changes should be made with power off, or after changing switch setting, turn the power off and on again.

Figure 8-3. Setting of DIP Switch

8-4.　Jumper Setting

The serial interface is set to the RS-232C mode upon shipment from the factory.
When using in the 20mA current loop mode, it is necessary to set the jumpers.
The jumpers built into the Control Board allow for setting of functions shown in
the table. However, the Bottom Cover must be removed to perform this setting.
For setting the Jumper, disconnect the power source beforehand.

D TYPE ONLY

8-4-1.　Removal of the Bottom Cover
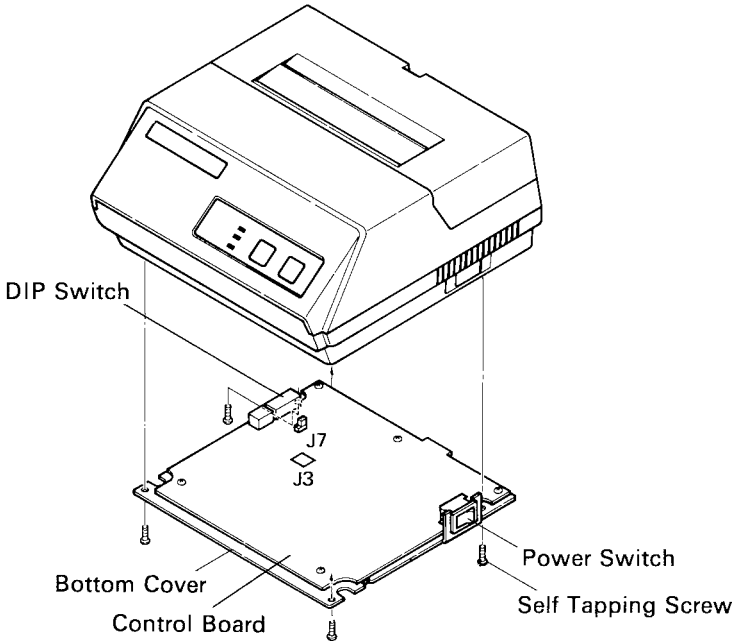
Figure 8-4. Removal of the Bottom Cover

8-4-2.　Setting of Jumper

Jumper No.	Setting		Function	Factory Setting
J3	OPEN		RS-232C	○
	SHORT	Cut　Solder	Current Loop	
J7	A-C	A C B	Selection of Current Loop Output (between TTY-TXD and TTY-TXDR)　Signal Polarity (inversion possible) Consult STAR MICRONICS for details.	○
	B-C	A C B		

– 33 –

8-5.   Connectors and Signals

Pin No.	Signal Name	Direction	Function
1	GND	—	Frame Ground
2	TXD	OUT	This pin carries data from the printer. (Return channel)
3	RXD	IN	This pin carries data to the printer.
4	RTS	OUT	This is SPACE when the printer power is ON.
5	CTS	IN	This pin is SPACE when the computer is ready to send data.The printer does not check this pin.
6	DSR	IN	This pin is SPACE when the computer is ready to send data.The printer does not check this pin.
7	GND	—	Signal ground.
8	N/C		Unused.
9	TTY TXDR	—	This pin is the return path for data transmitted from the printer on the 20mA current loop.
10	TTY TXD	OUT	This pin carries data from the printer on the 20mA current loop.
11	RCH	OUT	This pin is SPACE when the printer is ready to receive data. This line carries the same signal as pin 20.
12	N/C		Unused.
13	GND	—	Signal ground.
14	$\overline{\text{FAULT}}$	OUT	This is MARK when the printer is abnormal. (Refer to Error Condition Alarm Mode *1.) Or there is a paper error.
15 ~ 16	N/C		Unused.
17	TTY TXDR	—	This pin is the return path for data transmitted from the printer on the 20mA current loop.
18	TTY RXDR	—	This pin is the return path for data transmitted to the printer on the 20mA current loop.
19	TTY RXD	IN	This pin carries data to the printer on the 20mA current loop.
20	DTR	OUT	This printer turns this pin SPACE when it is ready to receive data.
21 ~ 22	N/C		Unused.
23	TTY RXDR	—	This pin is the return path for data transmitted to the printer on the 20mA current loop.
24	TTY TXD	OUT	This pin carries data from the printer on the 20mA current loop.
25	TTY RXD	IN	This pin carries data to the printer on the 20mA current loop.
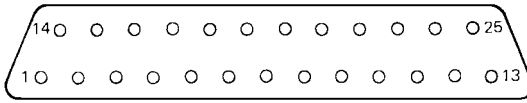
Figure 8-5. D-Sub 25 Pin Connector

*1 Error Condition Alarm Mode

If an error condition is detected during operation, the printer will stop printing and cause the $\overline{\text{FAULT}}$ signal to go MARK. All solenoides & motors will be de-energized. It is necessary to turn the printer power off and on again in order to recover from the alarm mode.

D
TYPE
ONLY

This printer can detect the following error coditions:

    a. Motor Lock
    b. Defective timing detector
    c. Micro-proccessor out of program sequence

8-6. Interface Connections

For interface connections, refer to the instructions for interface of the host computer. The following gives one basic example of connections.
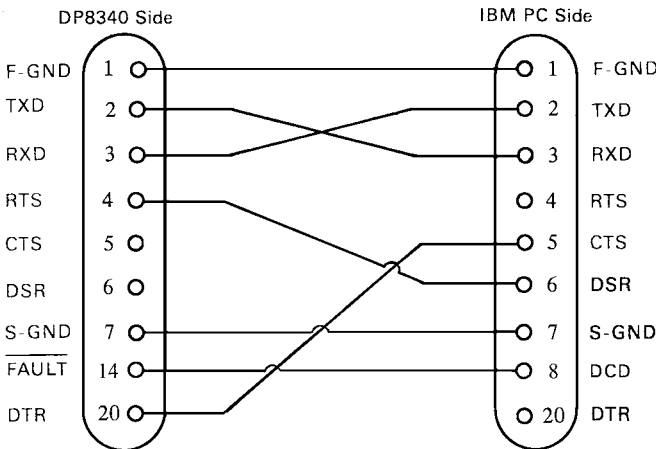
Figure 8-6. Interface Connections
with D-Sub 25 Pin Connector to IBM PC

8-7. Peripheral Unit Drive Circuit

The Control Board of this unit is equipped with a circuit for driving a peripheral unit (Paper Cutter, Take-Up Device, Cash Drawer, etc.)
The Control Board Connector (CN3) is used to connect the Peripheral Unit to the Drive Circuit. When using this circuit connect the peripheral unit cable to the CN3 Connector (cable is not included). Use a cable with the following specifications:

Note: Do not run cable near devices generating large amounts of electrical noise.
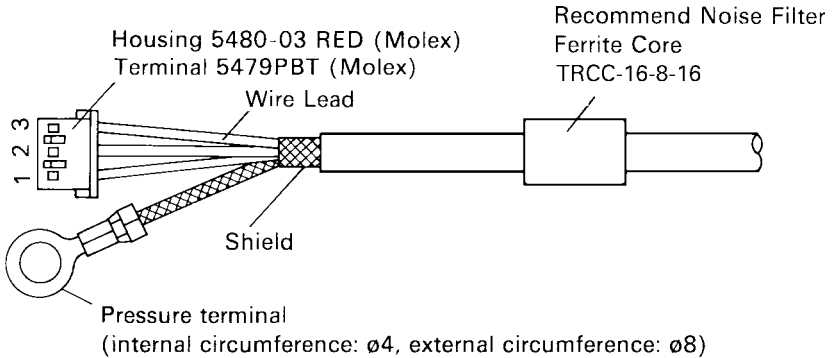
Figure 8-7. Cable Specifications

8-7-1. Cable Connection

Remove the printer Bottom Cover and connect the cable to the CN3 Connector. Pass the cable around the control board as shown and through grommetted hole in bottom cover. (Grommet may have to be cut)

D TYPE ONLY
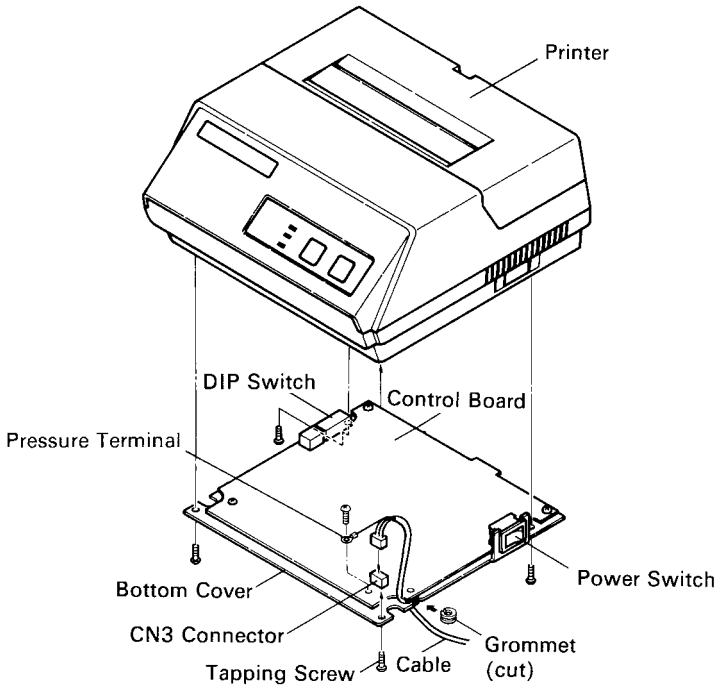
Figure 8-8. Cable Connection

8-7-2. Peripheral Drive Circuit

	Absolute Ratings (Ta = 25˚C)	
D1	Voltage Breakdown	100V
	Peak Forward Current	1A

Drive Output	12V, MAX. 1A
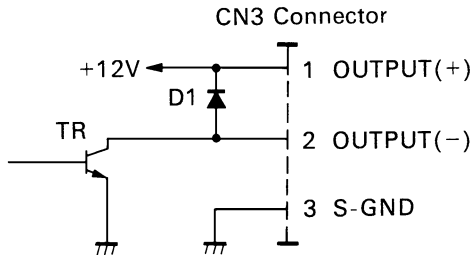
Figure 8-9. Drive Circuit

Caution: Do not use external power supply with peripheral drive circuit.

8-7-3. Control Codes

Codes for Drive Circuit control are ESC BEL n_1 n_2, BEL and FS. Refer to the Control Codes in Chapter 5.

9. DATA STRUCTURE AND CONTROL

9-1. DTR Mode (1 BLOCK)

Controls Data Transfer by using DTR line as BUSY FLAG

(a)
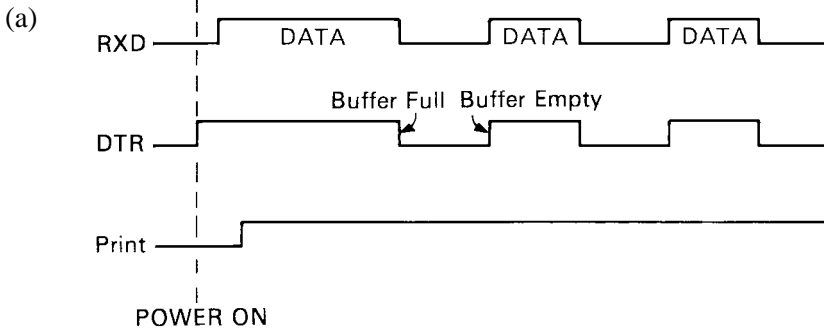
(b) In case of Paper Empty
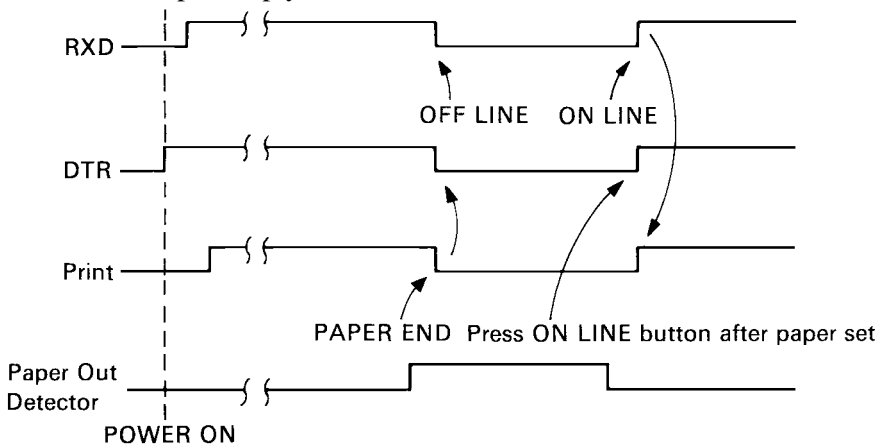
Paper Empty

When the paper out detector indicates end of paper, the printer stops printing after a maximum of two lines of printing or paper feed. The printer goes OFF LINE and sets the DTR to "MARK" status immediately after occurrence of a paper empty. It is necessary to install paper into the printer and press the ON LINE BUTTON to light the ON LINE LAMP in order to recover from paper empty status.

Machine Error

A machine error may be generated by paper jamming or when the printer is unable to print data. When a machine error occurs the printer stops printing. The printer goes OFF LINE and sets the DTR to "MARK" status immediately after the occurrence of Machine Error. It is necessary to turn the printer power off and on again in order to recover from Machine Error.

9-2. X-ON/X-OFF Mode
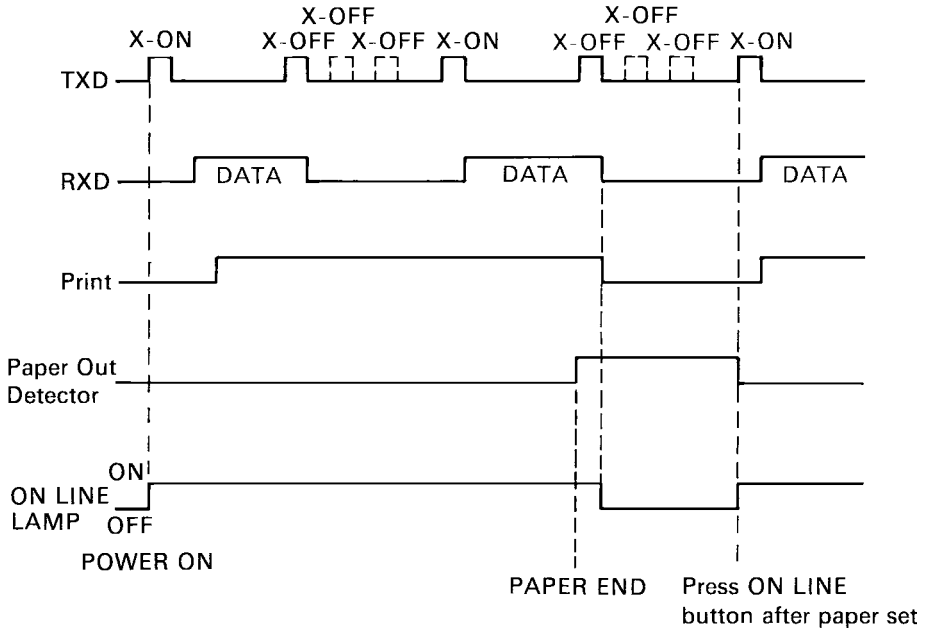
The printer transmits an X-ON (Control Code; DC1, Hexadecimal Value; 11H,) signal after power is turned on, if there is no printer error being generated. When this signal is received by the host computer, the host computer transmits the data to the printer. The X-ON signal is output intermittently every three seconds until the host computer receives and responds to this signal.

The X-OFF (DC3, 13H) signal outputting begins when the amount of empty space in the buffer becomes less than 256 bytes. When the computer receives the X-OFF signal, it will halt data transmission as soon as it can. However even at this time the printer can receive data until the buffer is completely full. An X-ON signal is output when the contents of the buffer goes below 256 bytes. The increase of the empty area in the buffer is caused by printing. If the computer causes a buffer overflow, a flag bit in the status register will be set. (See Status) The X-OFF signal will continue to be output at a 3-second interval until the data buffer becomes near empty (less than 256 bytes).

Paper Empty

When the paper out detector indicates end of paper, the printer stops printing after a maximum of two lines of printing or paper feed. The host computer can receive the printer status by transmitting an ENQ code to the printer. The printer goes OFF LINE and sets the DTR to "MARK" status in 5 seconds after occurrence of a paper empty. It is necessary to install paper into the printer and press the ON LINE BUTTON to light the ON LINE LAMP in order to recover from paper empty status.
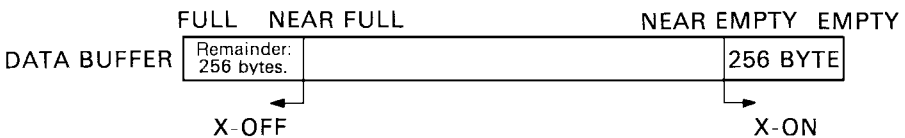
Machine Error

A machine error may be generated by paper jamming or when the printer is unable to print data. When a machine error occurs the printer stops printing. In the X-ON/X-OFF mode, the printer outputs an X-OFF signal immediately. At this time the host computer can receive the printer status after transmitting an ENQ code to printer. The printer goes OFF LINE and sets the DTR to "MARK" status within 5 seconds after the occurrence of Machine Error. It is necessary to turn the printer power off and on again in order to recover from Machine Error.

STATUS
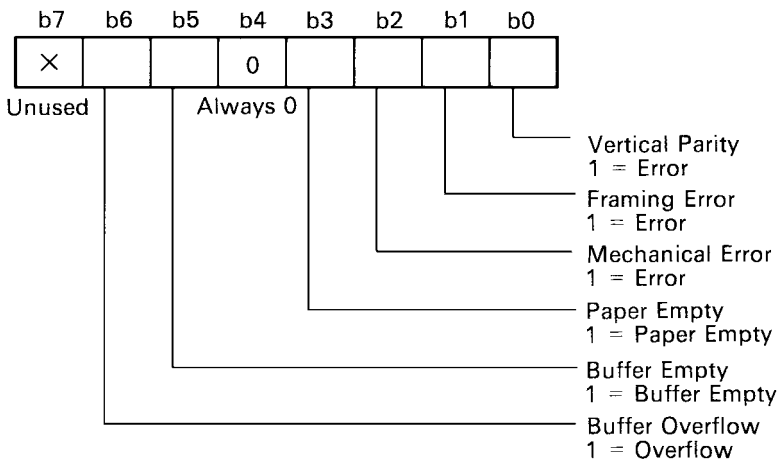
Parity

In DTR mode and X-ON/X-OFF mode parity check is done on vertical parity only.

Framing Error

Framing Error occurs when SPACE signal is detected at STOP Bit time. Framing error and vertical parity error will be indicated by printing "?".

9-3. STX-ETX Mode

The start of the STX-ETX mode should occur with a totally empty print buffer. This can be achieved by sending an ENQ code to the printer and checking the status until the status code indicates an empty buffer. At that point, the STX code is sent by the host computer followed by a data block. While receiving the data block, the printer generates a horizontal parity check character. After the data block is sent, the host computer sends an ENQ which causes the printer to return 2 characters, one would be the normal status character, and the second would be the horizontal parity check character that was generated by the printer while the data block was received.

The host computer checks the status character to determine if any vertical parity errors or other errors occurred during block transmission, and checks the horizontal parity character against a character generated in the host computer while the data was transmitted. If there are no errors, ETX causes the buffer to be printed, but if an error is detected, CAN code clears the buffer and the data is transmitted again. Any control codes transmitted to the printer during the STX-ETX mode will be ignored as control codes, but will be included in the check character. This is done to prevent a control code received in error from causing printing of erroneous data.

STATUS

b7	b6	b5	b4	b3	b2	b1	b0
✕			0				

Unused

Always 0

- b0 — Vertical Parity 1 = Error
- b1 — Framing Error 1 = Error
- b2 — Mechanical Error 1 = Error
- b3 — Paper Empty 1 = Paper Empty
- b5 — Buffer Empty 1 = Buffer Empty
- b6 — Buffer Overflow 1 = Overflow

Parity
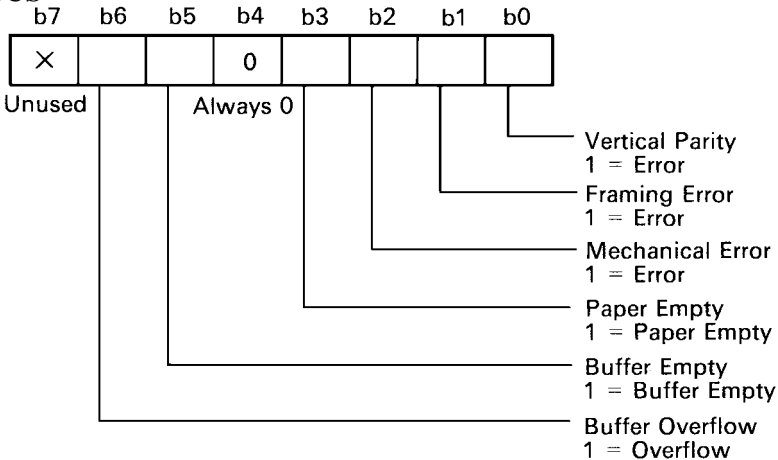Vertical and horizontal parity check is executed in STX-ETX mode.
Framing Error
Framing Error occurs when SPACE signal is detected at STOP Bit time. Framing error or even vertical parity error will be indicated by printing "?".

Start
STX-ETX mode

Transmit (ENQ)

Receive status byte

Is buffer empty? — NO

YES

Send (STX)

Odd parity check? — NO

YES

Set 1 byte location in host =(FF)H (TEST BYTE)

Set 1 byte location in host =(0)H (TEST BYTE)

Get character
XOR (Character)
with (TEST BYTE)
Store to (TEST BYTE)

Transmit character to printer

Last character in Block? — NO

YES

Transmit (ENQ)

Receive status byte from printer

Receive check byte from printer

Does status indicate error — YES

NO

Does CHECK BYTE = TEST BYTE — NO

Horizontal parity check

YES

Send (ETX)

(Print)

Send (CAN)

End of STX-ETX Mode

More STX-ETX Block to send — NO

YES

RET

CHECK BYTE
: Horizontal parity on printer

TEST BYTE
: Horizontal parity on computer

STX-ETX Mode Flow Diagram

10. CHARACTER CODE LIST

Hexa-decimal	0	1	2	3	4	5	6	7
0	0	16	SP 32	0 48	@ 64	P 80	' 96	p 112
1	1	DC1 17	! 33	1 49	A 65	Q 81	a 97	q 113
2	STX 2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114
3	ETX 3	DC3 19	# 35	3 51	C 67	S 83	c 99	s 115
4	4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116
5	ENQ 5	21	% 37	5 53	E 69	U 85	e 101	u 117
6	6	22	& 38	6 54	F 70	V 86	f 102	v 118
7	BEL 7	23	' 39	7 55	G 71	W 87	g 103	w 119
8	8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120
9	9	25	) 41	9 57	I 73	Y 89	i 105	y 121
A	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122
B	11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123
C	FF 12	FS 28	, 44	< 60	L 76	\ 92	l 108	¦ 124
D	CR 13	GS 29	— 45	= 61	M 77	] 93	m 109	} 125
E	SO 14	30	. 46	> 62	N 78	^ 94	n 110	~ 126
F	SI 15	31	/ 47	? 63	O 79	— 95	o 111	▦ 127

(SP: Space)

– 43 –

Hexa-decimal	8	9	A	B	C	D	E	F
0	SP 128	⌐ 144	Ä 160	é 176	ù 192	ā 208	■ 224	⊤ 240
1	▮ 129	Γ 145	Ö 161	è 177	ū 193	â 209	▬ 225	▬ 241
2	▬ 130	▪ 146	Ü 162	ē 178	û 194	° 210	▬ 226	▬ 242
3	▮ 131	▪ 147	β 163	ê 179	ç 195	°C 211	▮ 227	▬ 243
4	▬ 132	▪ 148	§ 164	ï 180	¿ 196	°F 212	+ 228	▮ 244
5	▮ 133	▪ 149	a̲ 165	í 181	Ñ 197	Ω 213	⌐ 229	▮ 245
6	▬ 134	/ 150	o̲ 166	ì 182	ñ 198	μ 214	L 230	▮ 246
7	▮ 135	\ 151	f̲ 167	î 183	Ē 199	Σ 215	⌐ 231	▪ 247
8	▬ 136	◣ 152	₵ 168	î̂ 184	Ɔ 200	σ 216	■ 232	▪ 248
9	▮ 137	◥ 153	½ 169	ö 185	i 201	x̄ 217	▦ 233	◢ 249
A	▬ 138	⌐ 154	ᴺ/ᴛ 170	ó 186	Å 202	Tʟ 218	⊥ 234	◣ 250
B	▮ 139	⊥ 155	ᴛ/ₓ 171	õ 187	ø 203	X 219	← 235	▬ 251
C	⊢ 140	⊤ 156	¥ 172	ō 188	θ 204	∞ 220	↑ 236	‖ 252
D	▬ 141	⊣ 157	¼ 173	ô 189	ä 205	± 221	→ 237	⌐ 253
E	L 142	◆ 158	Ā 174	ü 190	á 206	÷ 222	↓ 238	⌐ 254
F	⌐ 143	✕ 159	ë 175	ú 191	à 207	π 223	⌐ 239	⌐ 255

(SP: Space)

– 44 –

International Character Sets

| Hexadecimal	23	40	5B	5C	5D	60	7B	7C	7D	7E
U.S.A.	#	@	[	\	]	`	{	¦	}	~
France	£	à	°	ç	§	`	é	ù	è	¨

11. WHEN POWER IS SUPPLIED BY THE USER

When printer power is supplied by the user rather than through the accessory power source unit, please be careful of the following points.

Note 1: The power supply must be $+12V^{+10\%}_{-5\%}$ 2A or above. An electrolytic capacitor (C = 4700μF/25V to 6800μF/25V) must be connected across the output of the power supply.

Note 2: A DC power plug is available as an option.

(Parts No. 80925470)
Cable unit 8340

(Parts No. 04991220)
Cord busing SR-5N-4

WHITE
(GND)

BLACK (＋12V)

FRAME GND

GND
+12V
GND

(Parts No. 09106003)
Connector PP812A
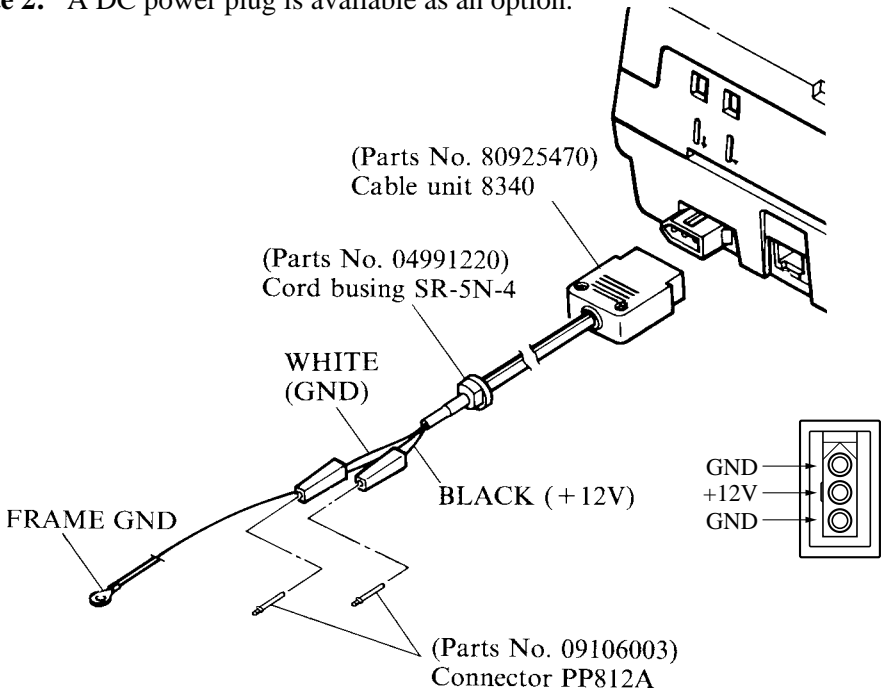
Reference: Design the power supply referring to the power supply circuit shown below.

Fuse Sw | Line Noise Filter | IAC | VAC | C1 | R1 | D1 | C2 | ZD1 | R2 | TR1 (Heat Sink) | C3 | R3 | VDC | GND
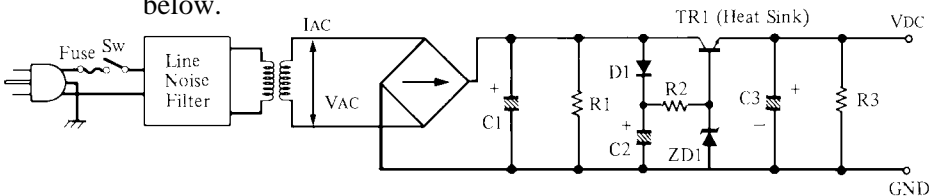
Note: A line noise filter must be used to prevent line transients from passing through power supply. Filter design to be determined by environmental noise requirements.

VAC	14V	C2	100 ~ 200μF/25V
VDC	12V $^{+10\%}_{-5\%}$	ZD1	VZD = 14V (1W)
IAC	2 ~ 3A	C3	4700 ~ 6800μF/25V
C1	6800μF/25V	TR1	2SD633 (TOSHIBA)

Other parameters may be determined by user.

Figure 11-1. Power Supply Reference Circuit

ELECTRONIC PRODUCTS DIVISION
STAR MICRONICS CO., LTD.
536 Nanatsushinnya, Shimizu, Shizuoka
424-0066 Japan
Tel: 0543-47-0112, Fax: 0543-48-5271

Please access the following URL
http://www.star-micronics.co.jp/service/sp_sup_e.htm
for the lastest revision of the manual.

OVERSEAS SUBSIDIARY COMPANIES
STAR MICRONICS AMERICA, INC.
70-D Ethel Road West, Piscataway, NJ 08854 U.S.A
Tel: 732-572-9512, Fax: 732-572-5095

STAR MICRONICS U.K. LTD.
Star House, Peregrine Business Park, Gomm Road,
High Wycombe, Bucks, HP 13 7DL, U.K.
Tel: 01494-471111, Fax: 01494-473333