DOT MATRIX PRINTER

DP8340 SERIES

[SERIAL INTERFACE]

USERS MANUAL

star

Federal Communications Commission
Radio Frequency Interference
Statement

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

For compliance with the Federal Noise Interference Standard, this equipment requires a shielded cable.

This statement will be applied only for the printers marketed in U.S.A.

Statement of
The Canadian Department of Communications
Radio Interference Regulations

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectiques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

The above statement applies only to printers marketed in Canada.

CE
Manufacturer's Declaration of Conformity

EC Council Directive 89/336/EEC of 3 May 1989

This product, has been designed and manufactured in accordance with the International Standards EN 50081-1/01.92 and EN 50082-1/01.92, following the provisions of the Electro Magnetic Compatibility Directive of the European Communities as of May 1989.

EC Council Directive 73/23/EEC and 93/68/EEC of 22 July 1993

This product, has been designed and manufactured in accordance with the International Standards EN 60950, following the provisions of the Low Voltage Directive of the European Communities as of July 1993.

The above statement applies only to printers marketed in EU.

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- All efforts have been made to ensure the accuracy of the contents of this manual at the time of printing. However, should any errors be found, STAR would greatly appreciate being informed of them.
- The above notwithstanding, STAR can assume no responsibility for any errors in this manual.

TABLE OF CONTENTS

1.OUTLINE

The DP8340 series of serial dot matrix printers is for use in ECR, POS, electronic instruments, banking machines and computer peripheral equipment.

The DP8340 series include the following features;

1) 2 color printing (Red and Black)
2) High-speed bidirectional printing (2 line/sec, 40 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, and red and black printing are provided, which makes the printer very versatile.
6) Simultaneous Data Communication and Printing
7) Error Checking Protocol
8) Peripheral Driver
9) Reverse Channel providing status and full control

Model Name Notation

DP8340 F 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) |

→ Paper Feed

| F | : | Friction Type |
| S | : | Sprocket Type |

2. UNPACKING AND INSTALLATION

2-1.　Unpacking

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

(A) Printer
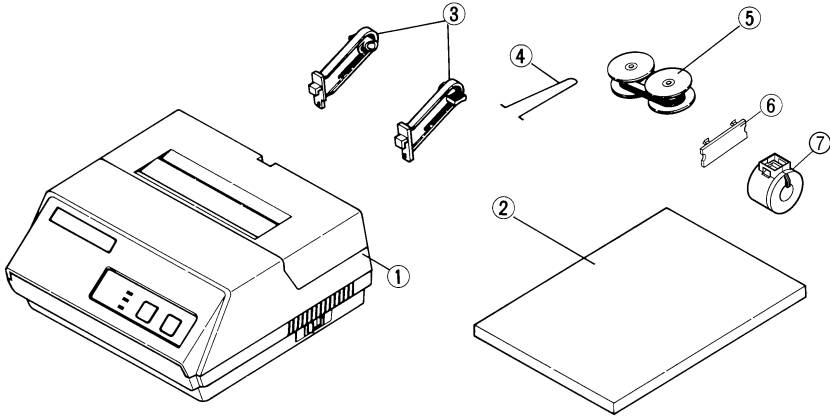
① Printer
② User's Manual
③ Paper Holders
④ Re-Roll Prevention Guard

⑤ Ink Ribbon
⑥ DIP Switch Cover
⑦ Ferrite Core (EU only)

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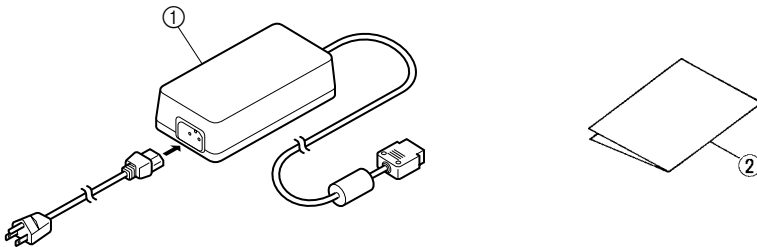
① Power Supply Unit
② User's Manual

Figure 2-1. Unpacking

2-2. Installation of Paper Holders and Re-Roll Prevention Guard (Only Model DP8340F)

Install the Paper Holders in the outermost 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

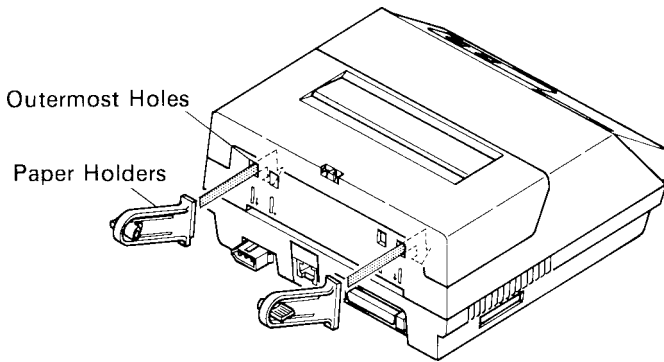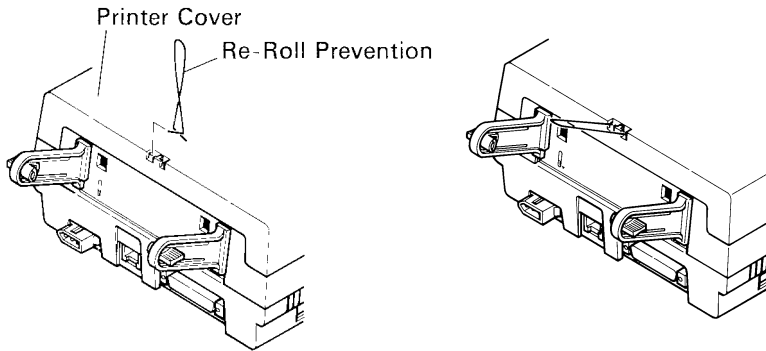## 2-3.   Handling Notes

(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

DC Power Connector (Output)
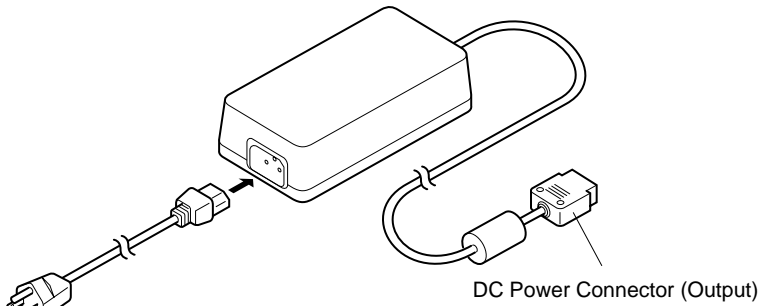
Shape of AC Power plug will
vary according to destinations.

Figure 3-1. Power Supply Unit
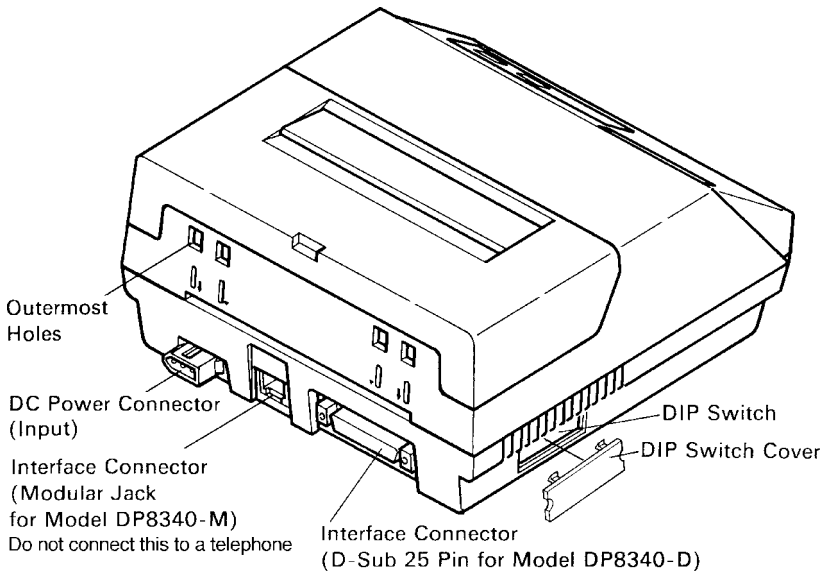
3-2. Printer
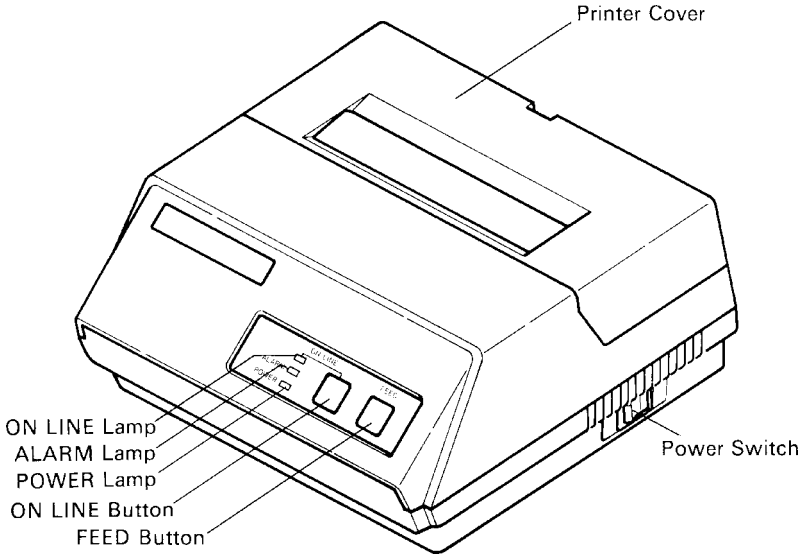
Figure 3-2. Printer: Front View

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.
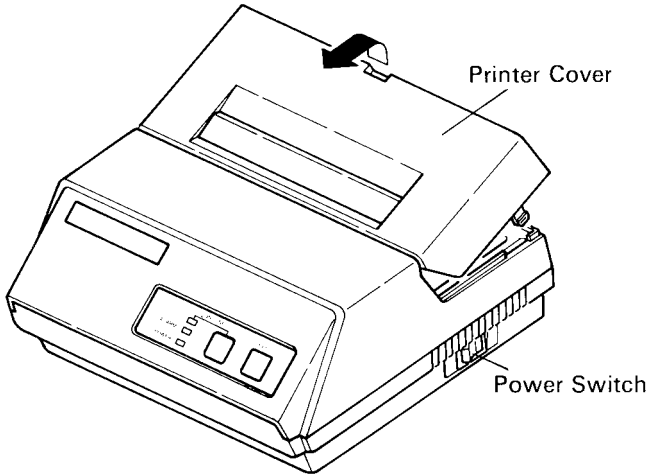
Figure 4-1. Printer Cover Removal

(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

– 8 –
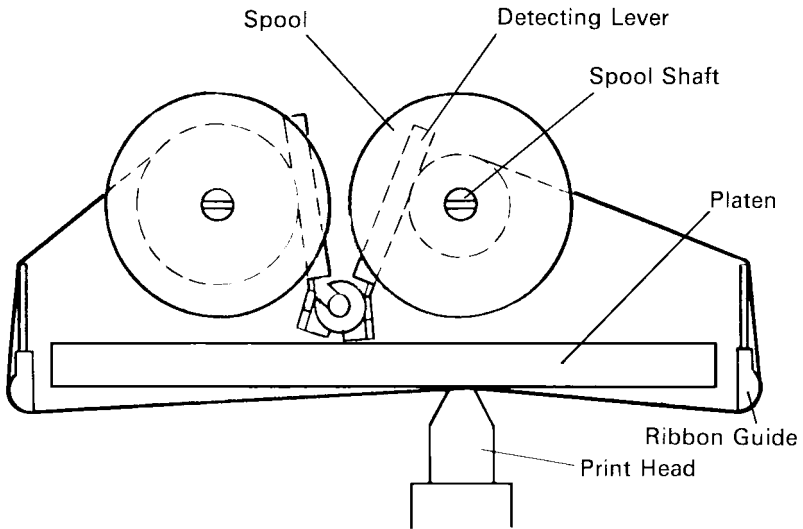
Figure 4-2. Installation of Ink Ribbon
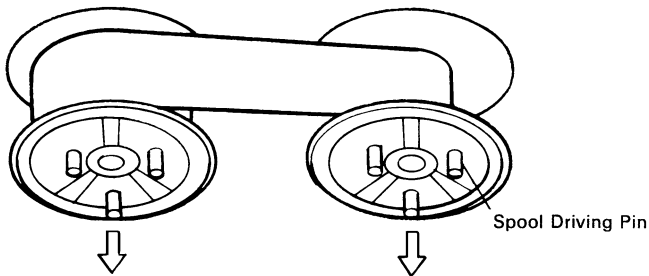
Figure 4-3. Ribbon Spools

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. Model DP8340F

(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.
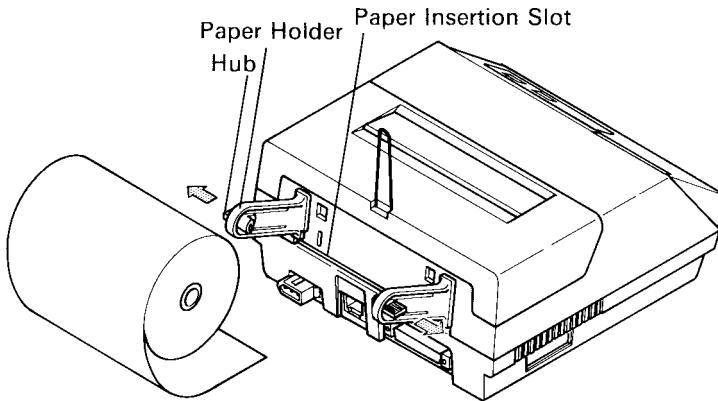
Figure 4-4. Paper Insertion (1) [Model DP8340F]
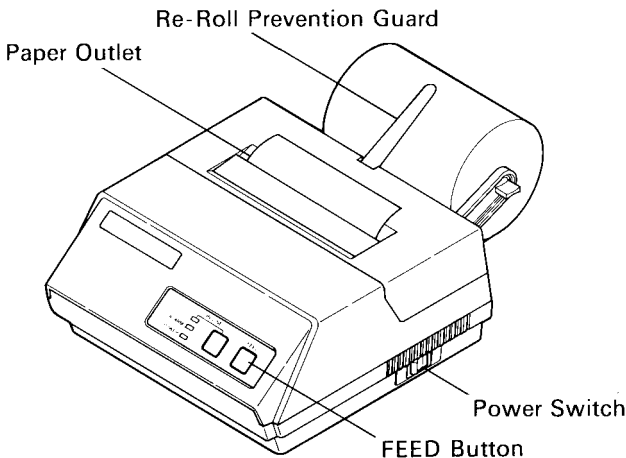
Figure 4-5. Paper Insertion (2) [Model DP8340F]

4-3-2. Model DP8340S

1. Make a straight cut along the top of the paper, about 1/4 inch away from the sprocket holes, (as shown in the figure). If there is perforation, cut the paper on the perforation.
2. Insert the paper squarely into the paper insertion slot until the ALARM lamp goes out. Then, hold down the FEED switch to advance the paper 8 lines, and release the switch when 8-line feeding is completed.
   If the paper is not fed straight during 8-line feeding, straighten the paper by pulling it back slowly as you hold the paper release lever down. If a sprocket hole is torn or enlarged, recut the paper and reinsert it as before.
3. After confirming that the paper has been fed in straight, feed the paper continuously by holding the feed switch down.
4. Release the feed switch when the paper emerges through the paper outlet.
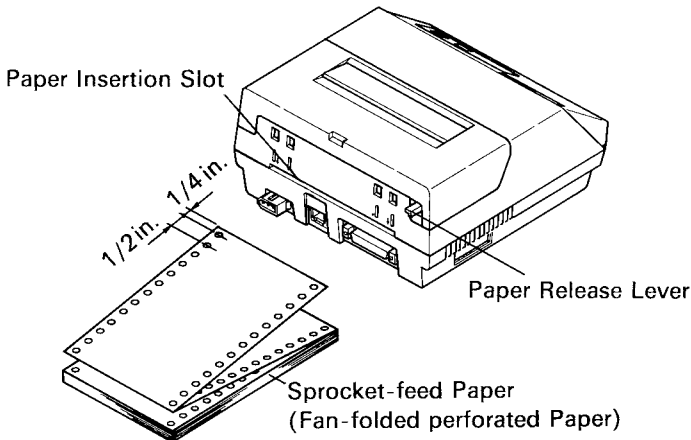
Figure 4-6. Paper Insertion (1) [Model DP8340S]
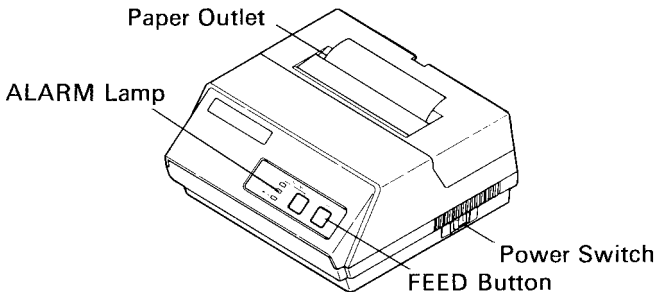
Figure 4-7. Paper Insertion (2) [Model DP8340S]

4-4. 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.

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. $0 \leq n \leq 120$; Default Value n = 0

Page Length

This section is automatically fed

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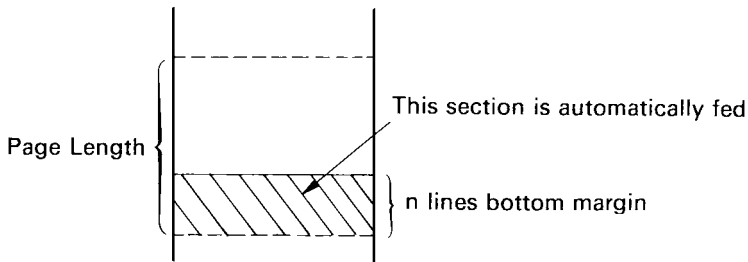
CODE	ESC O
	$(1B)_H$ $(4F)_H$

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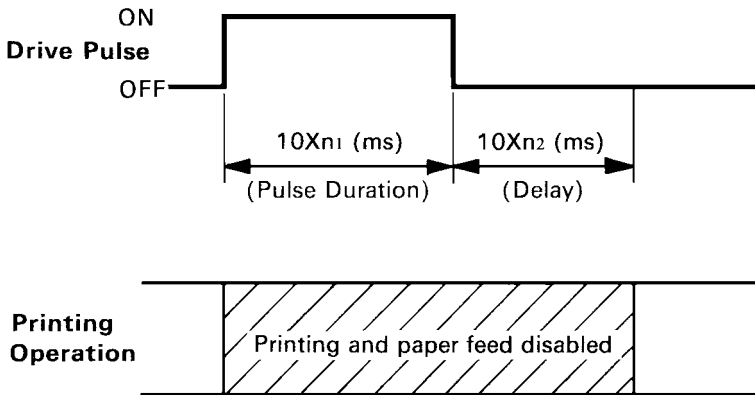
Executed by BEL code and FS code after printing.

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.

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

6. GENERAL SPECIFICATIONS

Printing method	Serial impact dot matrix printing, 9 wires	
Number of print columns	40 columns, 12 CPI	
Print speed	Approx. 2 lines/sec	
Print direction	Bi-directional	
Line spacing	1/6 inch	
Paper feed method	Friction Feed or Sprocket-feed	
Paper feed speed	Approx. 12 lines/sec	
Character set	ASCII	96 characters
	International and symbol	64 characters
	Block graphics*	64 characters
Font configuration	Ordinary characters	5×9 dots
	Block graphics*	6×6 dots

* Graphic Feed Not Available

Character size	2.42 (H) $\times 1.71$(W) mm
Dot spacing	0.35 (H) $\times 0.35$ (W) mm
Print area	84.3 mm
Print Buffer	Approx. 1.5 KB
Serial Interface	
Model DP8340-M	Only RS-232C
Model DP8340-D	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 $\pm$ 5% 2.0 A

Paper specification

Paper type	Ordinary and carbonless copy paper
Size Paper width	114.3 mm (4.5 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

Ink ribbon specification
Color	Black and red
Ribbon material	Nylon (#40 denier)
Ribbon size	13mm × 6m
Spool	13mm (width), 35mm in diameter (two spool)
Recommended ribbon	SF-03BR (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)	
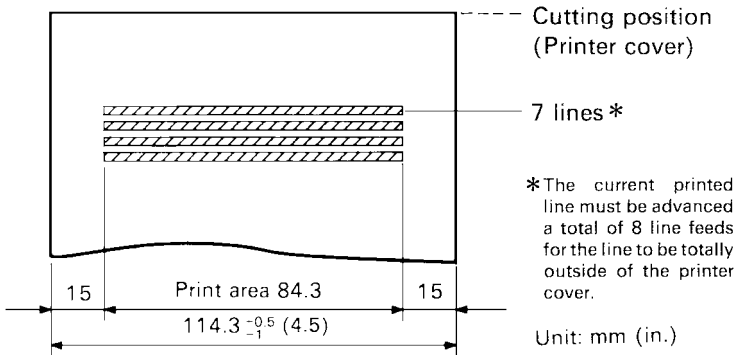
Figure 6-1. Roll Paper and Print Area [Model DP8340F]
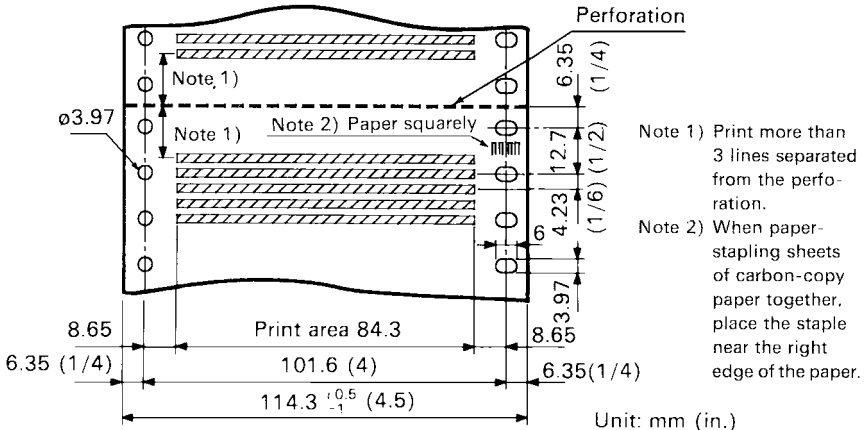
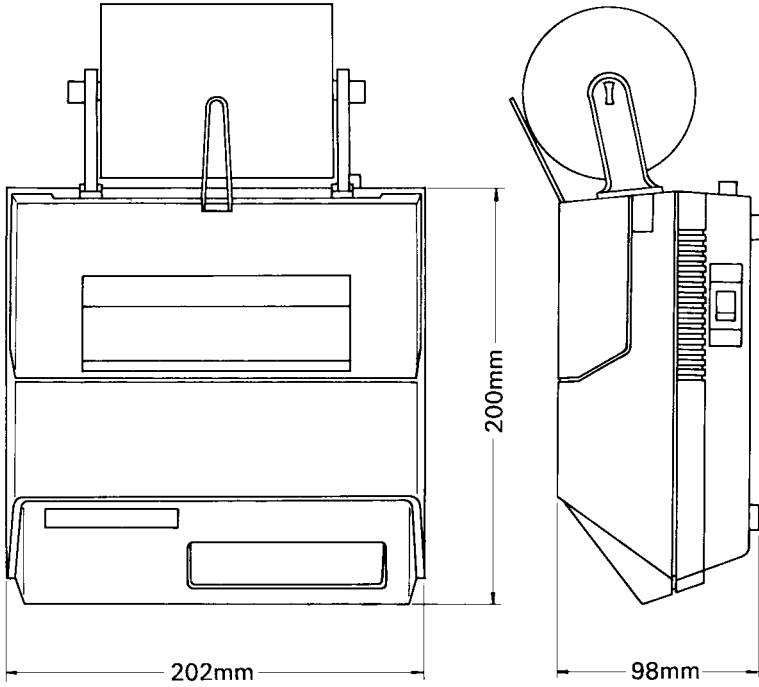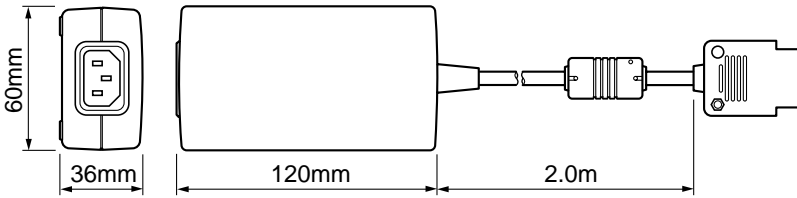**Figure 6-2. Sprocket-feed Paper and Print Area [Model DP8340S]**

**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 DP8340-M (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)

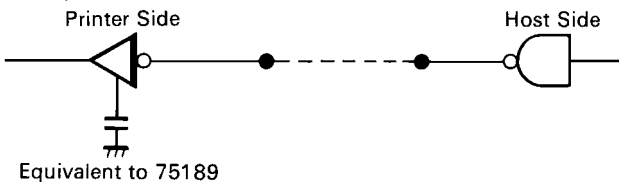① Start bit
② Data bits
③ Parity bit
④ Stop bit
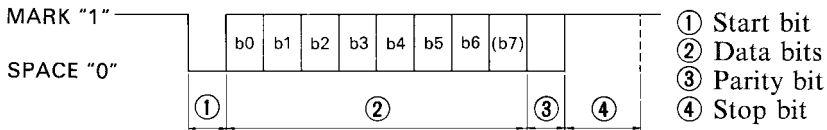
(5) Handshaking
     1 DTR Mode (1 block)
     2 X-ON/Y-OFF Mode
     3 STX-ETX Mode

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)

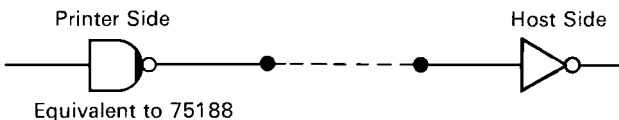Output (DTR, $\overline{\text{FAULT}}$, TXD, RTS)

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

M TYPE ONLY

(*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)

Paper type		SW2-3
DP8340F		ON
DP8340S	Single	OFF
	2 copy	ON

7-3-2. DIP-SW2

Switch	ON	OFF	Factory setting
2-1	International character set: (1) ON, ON ... U.S.A. (2) OFF, ON...FRANCE		ON
2-2	(3) ON, OFF...ITALY (4) OFF, OFF...GERMANY		ON
2-3	Paper type — see above (*2)		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.
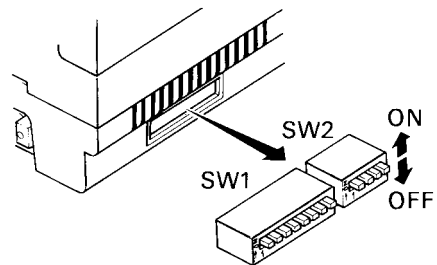

Figure 7-2. Setting of DIP Switch

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. (Machine Error.) 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.
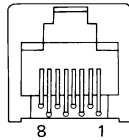
Figure 7-3. Modular Jack Connector

7-5.   Interface Connections

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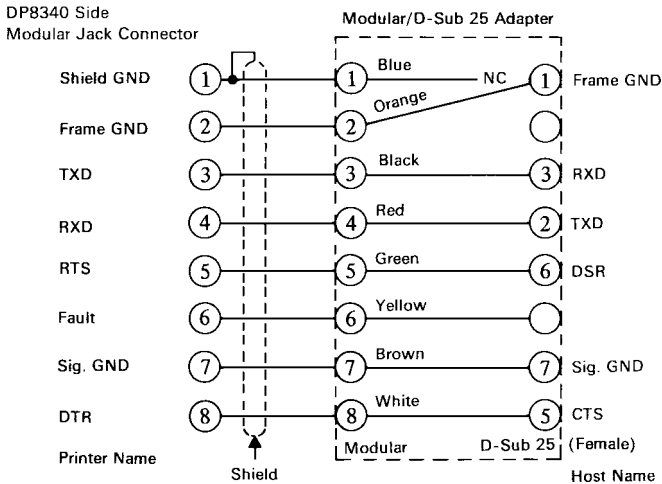
Figure 7-4. Interface Connections using Modular/D-Sub 25 Adapter to IBM PC (Use with straight through cable wiring)

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.
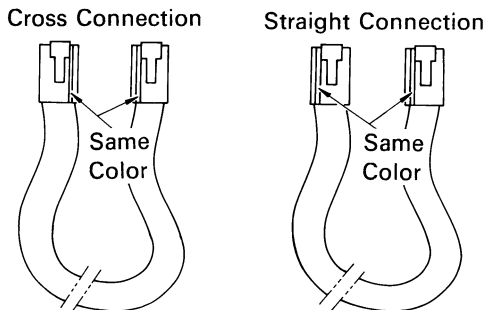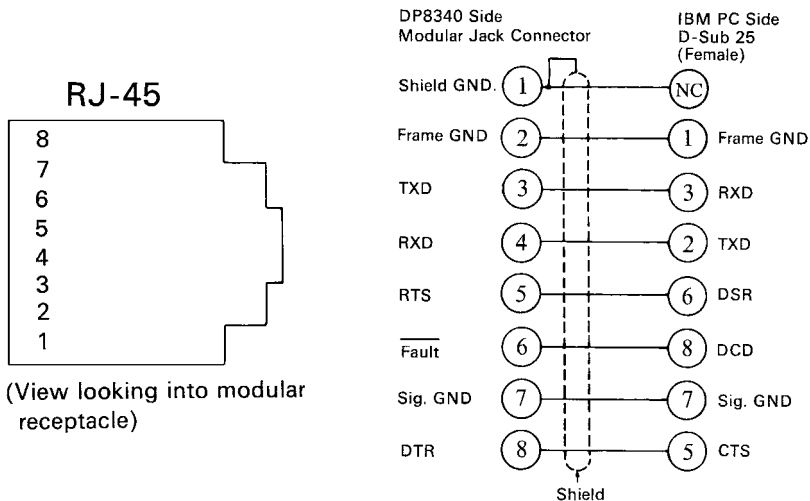
Figure 7-5.

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)

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
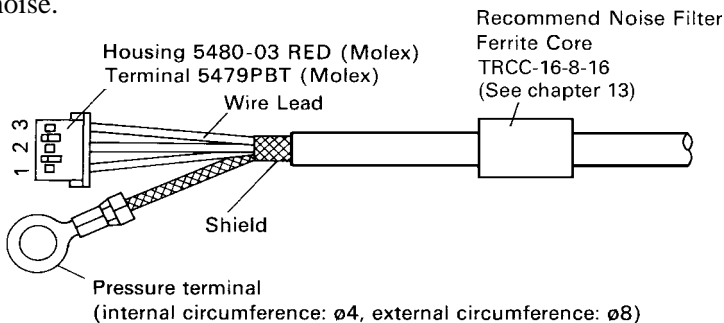noise.

Recommend Noise Filter
Ferrite Core
TRCC-16-8-16
(See chapter 13)

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

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
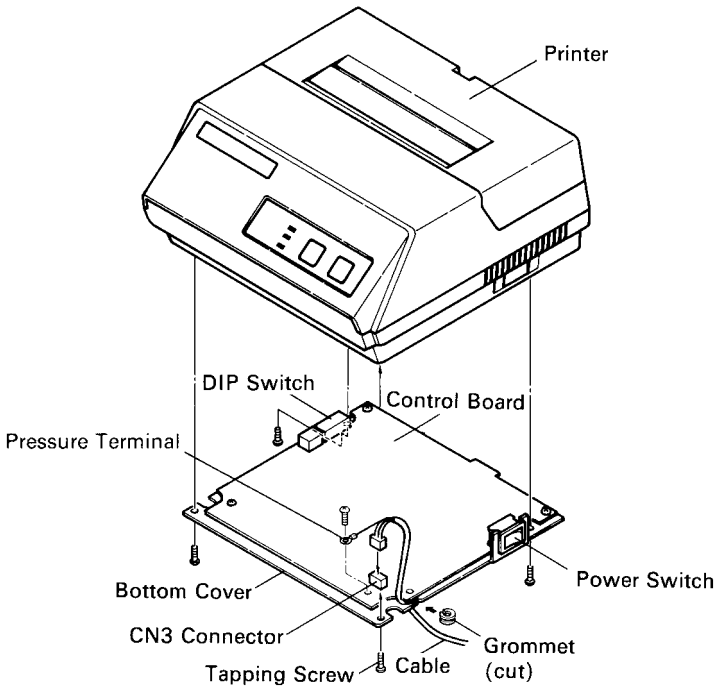in bottom cover. (Grommet may have to be cut)

Figure 7-8. Cable Connection

7-6-2. Peripheral Drive Circuit

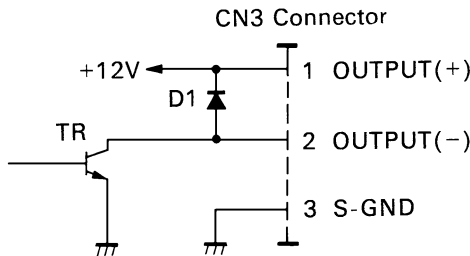|	Absolute Ratings (Ta = 25˚C)			Drive Output	12V, MAX. 1A
D1	Voltage Breakdown	100V			
	Peak Forward Current	1A			

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 DP8340-D (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)
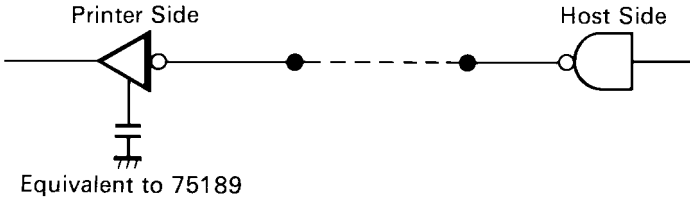Current Loop MARK : Logic "1" (Current ON)
SPACE : Logic "0" (Current OFF)
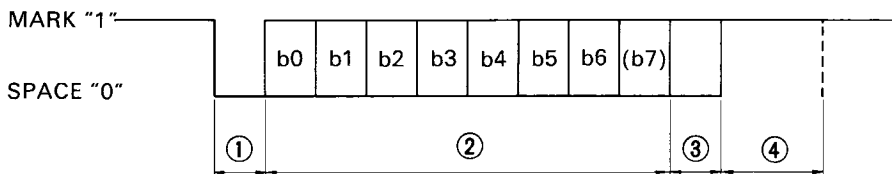
① Start bit
② Data bits
③ Parity bit
④ Stop bit

(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)

Equivalent to 75189

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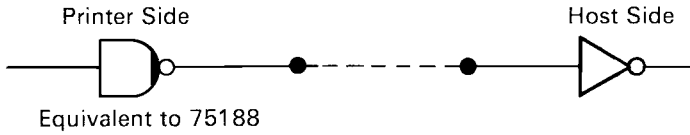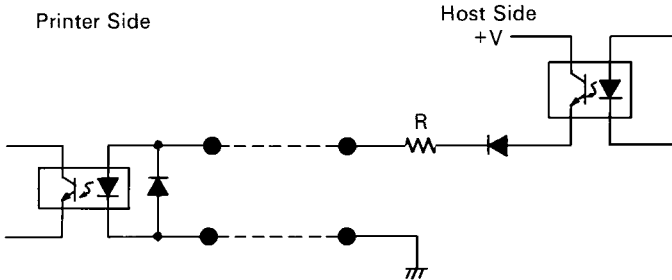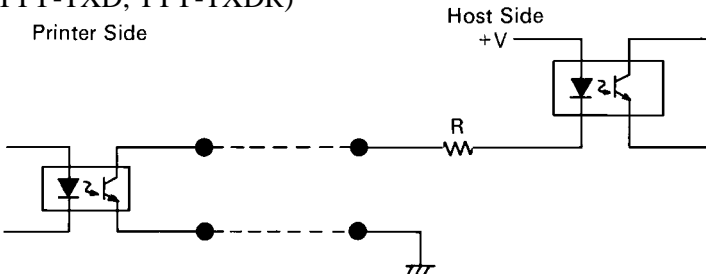

Equivalent to 75188

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

D
TYPE
ONLY

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)

Paper type		SW2-3
DP8340		ON
DP8340S	Single	OFF
	2 copy	ON

8-3-2. DIP-SW 2

Switch	ON	OFF	Factory setting
2-1	International character set: (1) ON, ON ... U.S.A.	(2) OFF, ON...FRANCE	ON
2-2	(3) ON, OFF...ITALY	(4) OFF, OFF...GERMANY	ON
2-3	Paper type — see above (*2)		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.
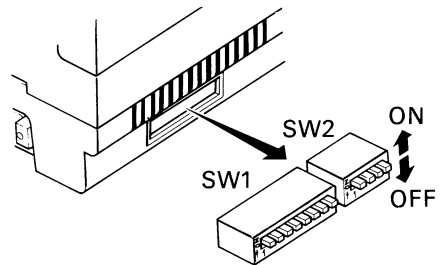

Figure 8-3. Setting of DIP Switch

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

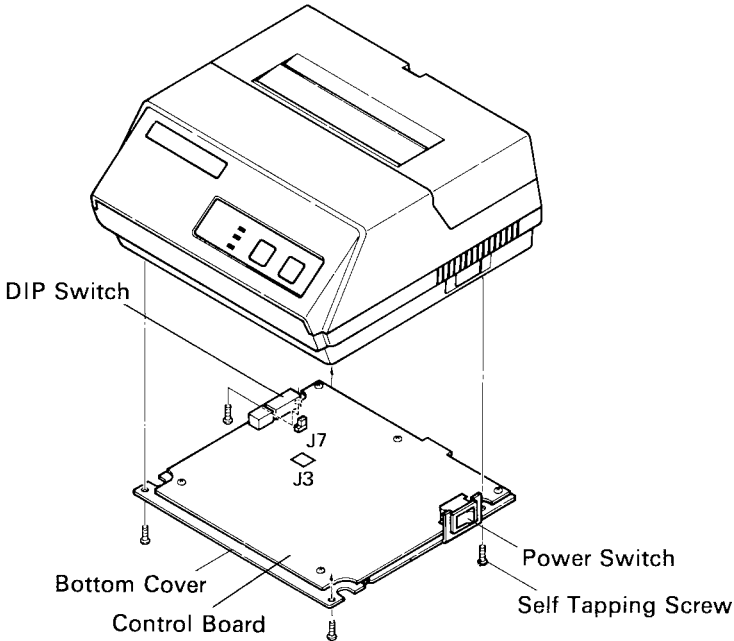### 8-4-1.　Removal of the Bottom Cover

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		

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. (Machine Error.) 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.
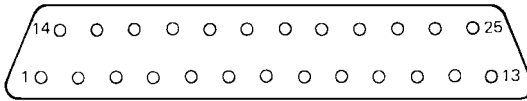
Figure 8-5. D-Sub 25 Pin Connector

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.
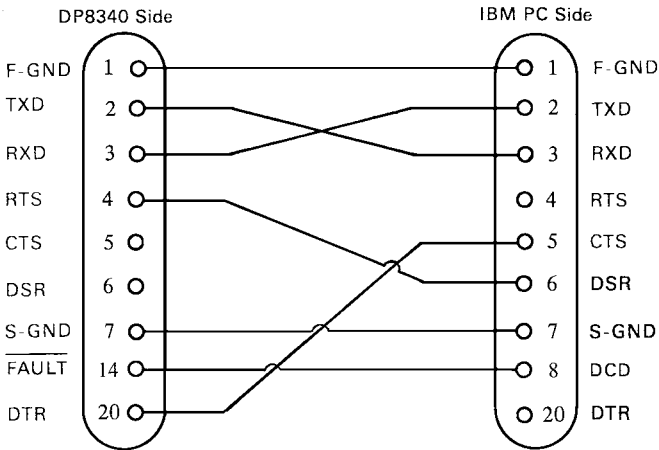
D
TYPE
ONLY

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.
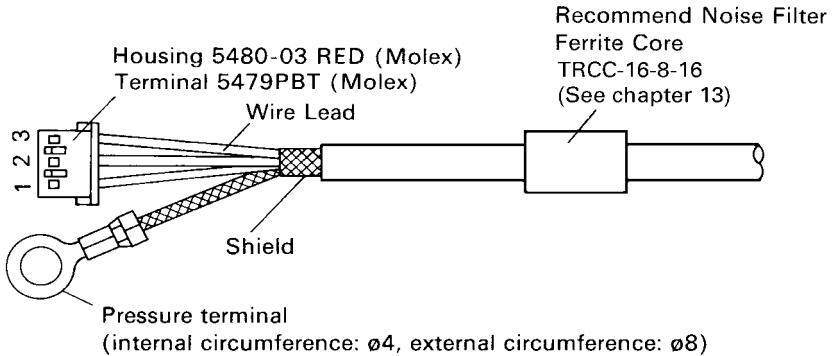

Figure 8-7. Cable Specifications

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)
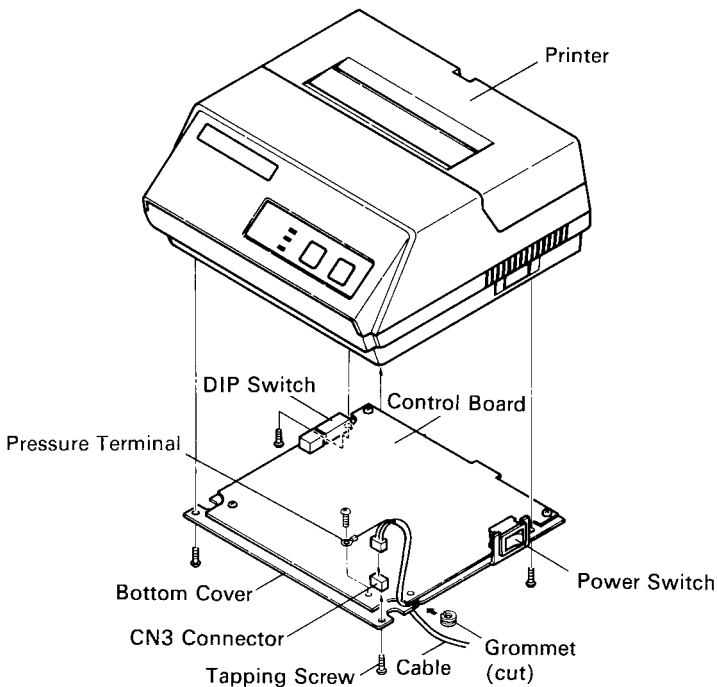
Figure 8-8. Cable Connection

8-7-2.   Peripheral Drive Circuit

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

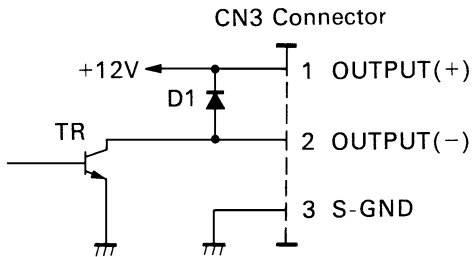| Drive Output	12V, MAX. 1A

Figure 8-9. Drive Circuit

Caution: Do not use external power supply with peripheral drive circuit.
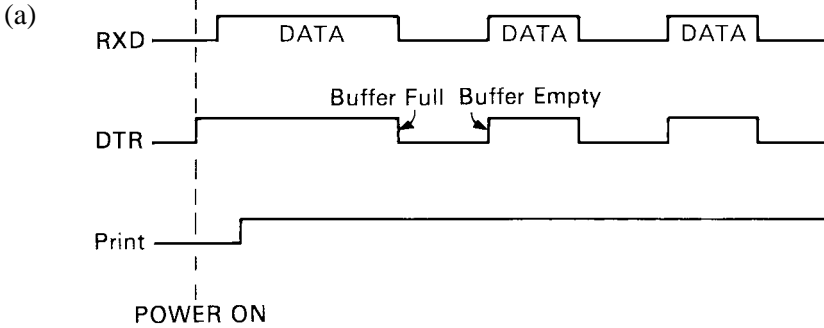
8-7-3.   Control Codes

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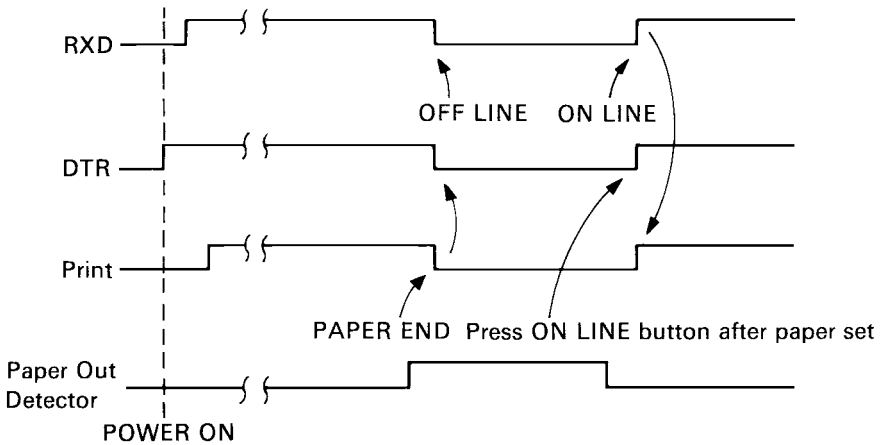
9. DATA STRUCTURE AND CONTROL

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.
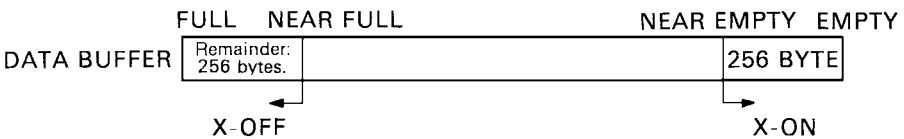
Machine Error

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
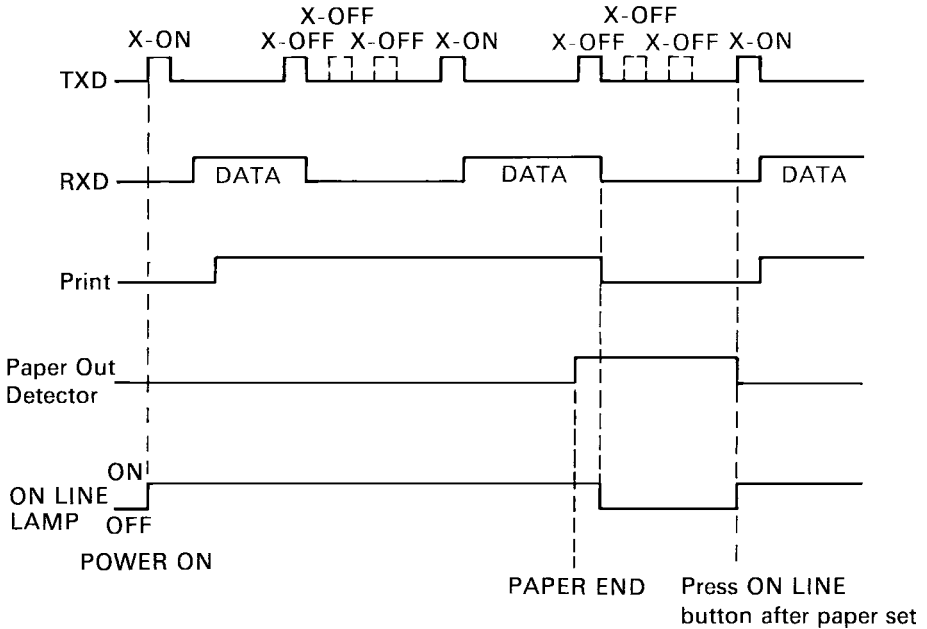
The printer transmits an X-ON (Control Code; DC1, Hexadecimal Value; 11H,) signal after power is turned on, if there is no printer error being generated. When this signal is received by the host computer, the host computer transmits the data to the printer. The X-ON signal is output intermittently every 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
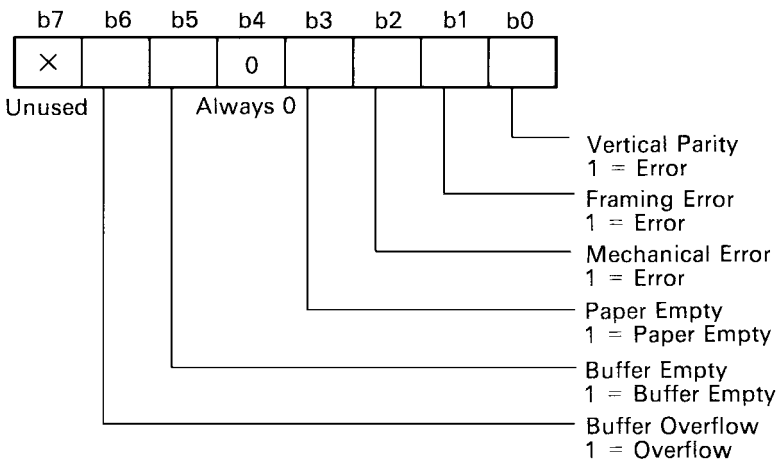
Parity

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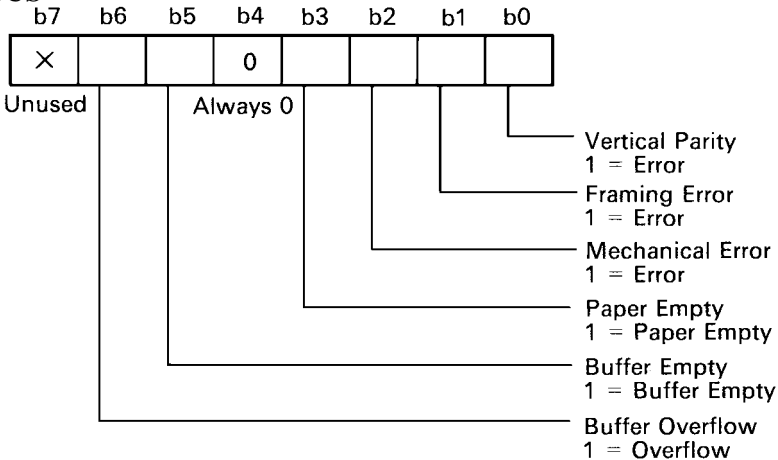
Framing Error

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

- Vertical Parity 1 = Error
- Framing Error 1 = Error
- Mechanical Error 1 = Error
- Paper Empty 1 = Paper Empty
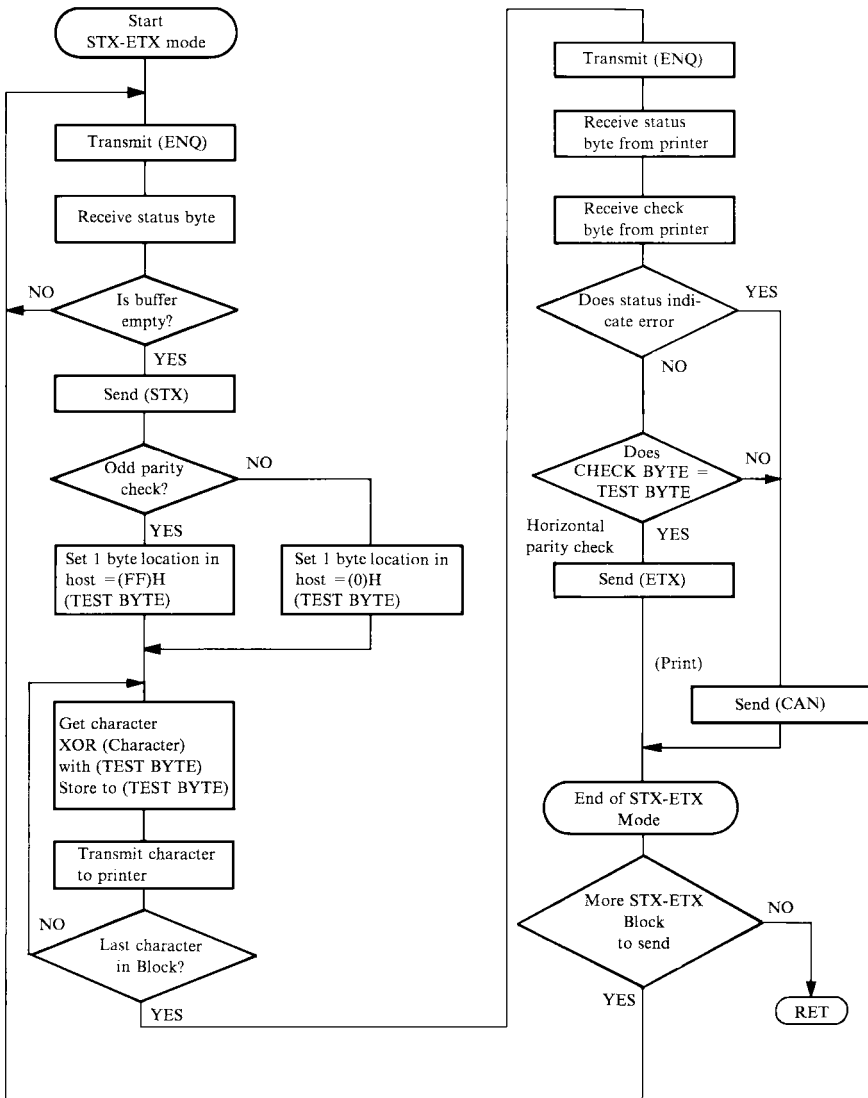- Buffer Empty 1 = Buffer Empty
- Buffer Overflow 1 = Overflow

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

NO — Is buffer empty?

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

NO — Last character in Block?

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	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

– 41 –

(SP: Space)

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	⌐ 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	∟ 230	▮ 246
7	▮ 135	\ 151	f̲ 167	ī 183	Ē 199	Σ 215	⌐ 231	◣ 247
8	─ 136	◢ 152	₵ 168	î 184	Ɔ 200	σ 216	■ 232	◣ 248
9	▮ 137	◢ 153	½ 169	ö 185	i 201	x̄ 217	▓ 233	◢ 249
A	─ 138	⌐ 154	N/T 170	ó 186	Å 202	T_L 218	⊥ 234	◤ 250
B	▮ 139	⊥ 155	T/X 171	õ 187	φ 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	∟ 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)

International Character Sets

Hexadecimal	23	40	5B	5C	5D	60	7B	7C	7D	7E
U.S.A.	#	@	[	\	]	`	{	¦	}	~
France	f̱	à	°	ç	§	`	é	ù	è	¨
Germany	#	§	Ä	Ö	Ü	`	ä	ö	ü	β
Italy	#	§	°	ç	é	ù	à	ò	è	ì

11. FONT LIST
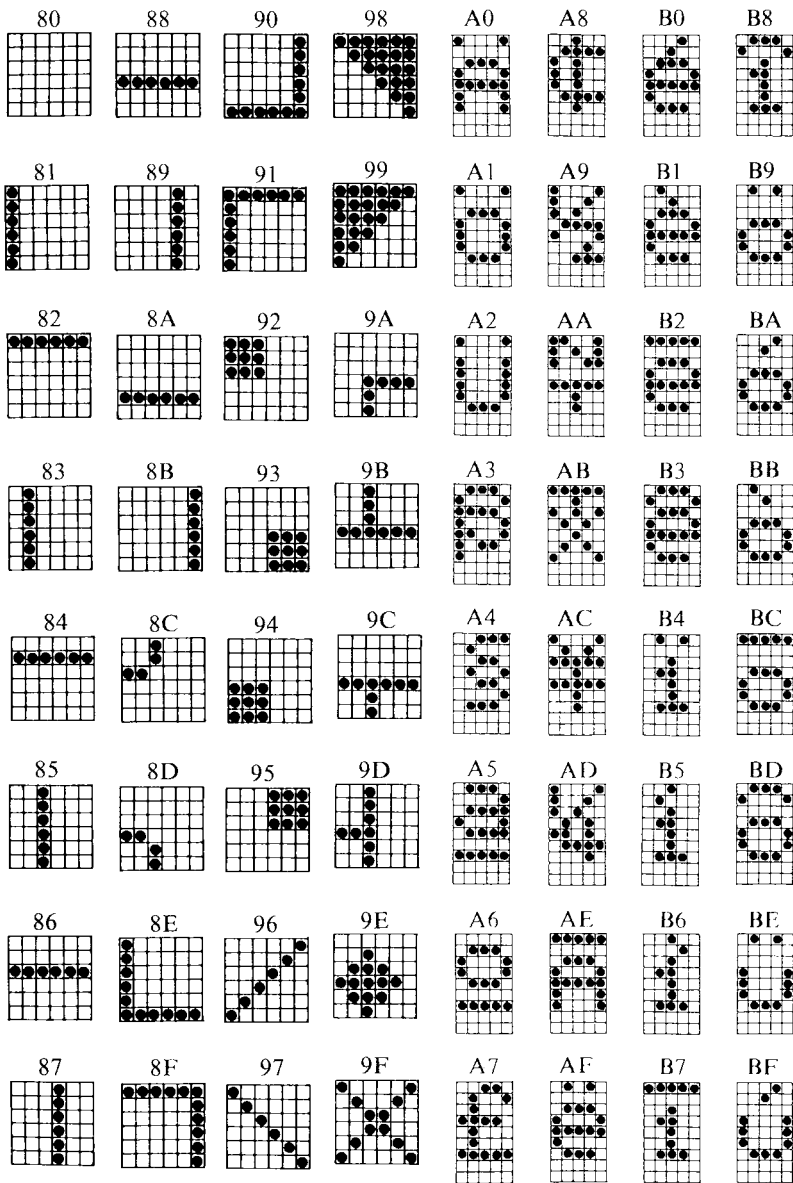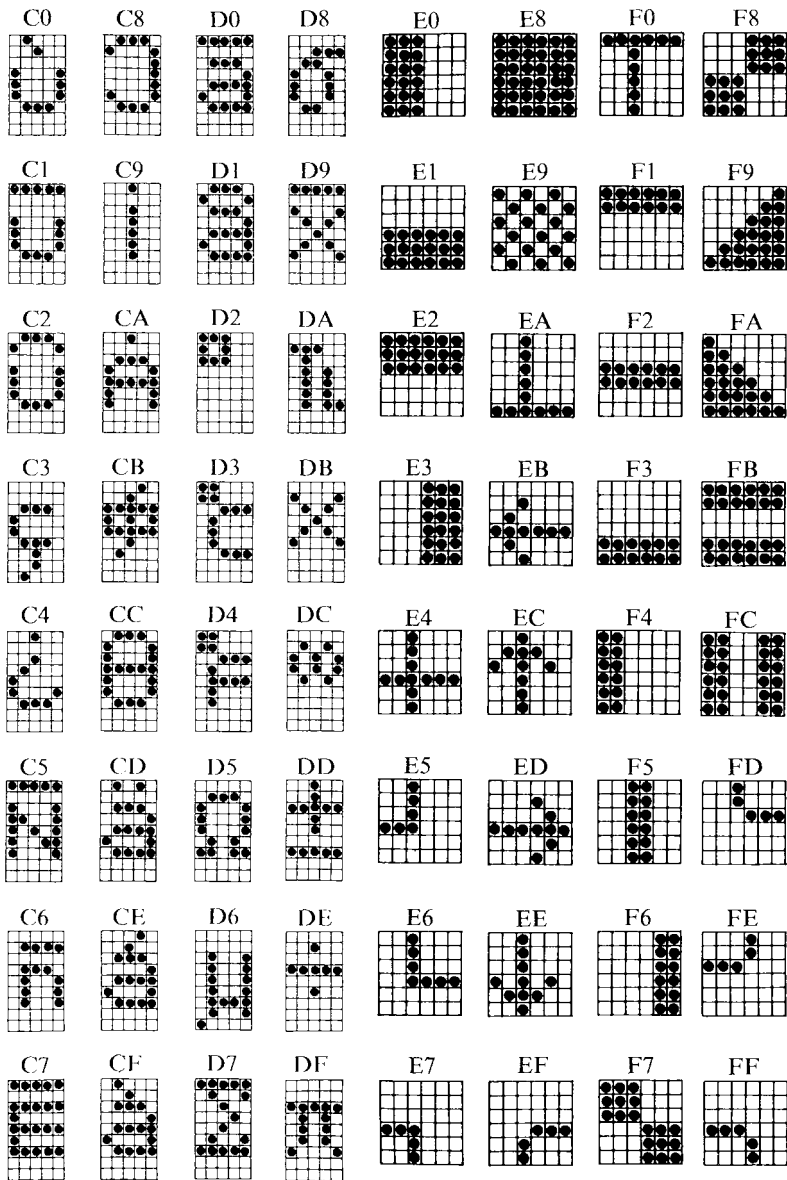
International Characters
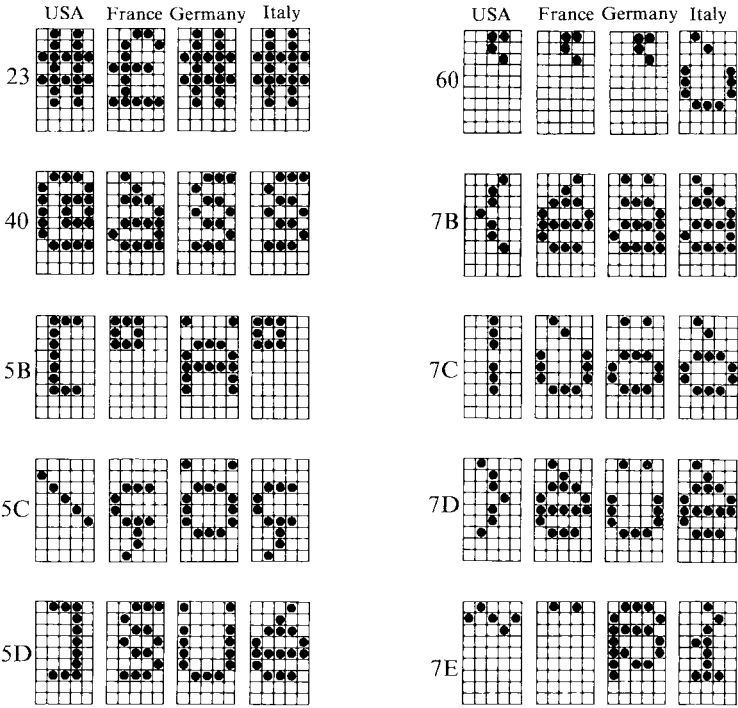
12. WHEN POWER IS SUPPLIED BY THE USER

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
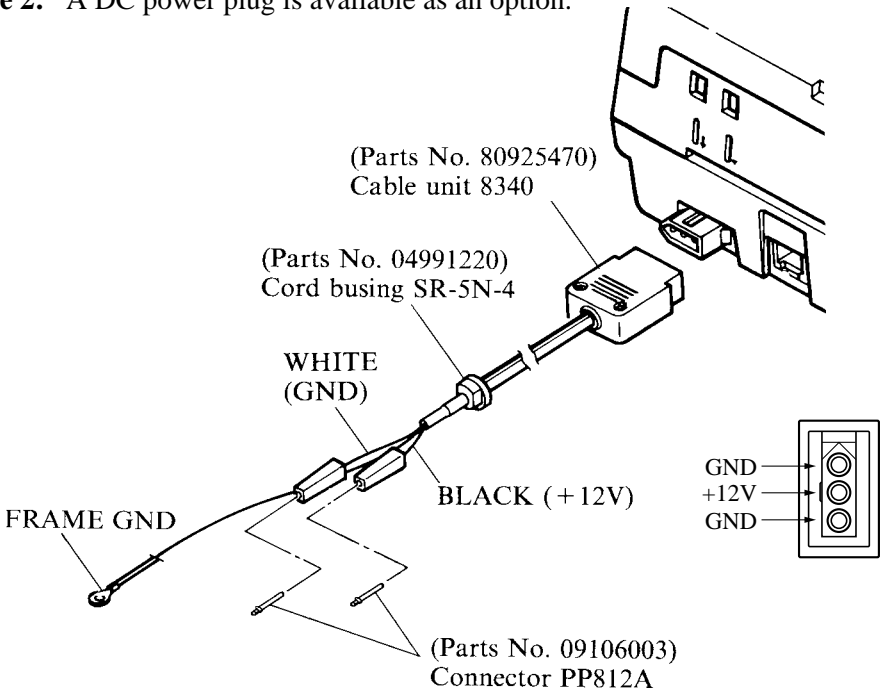
Reference: Design the power supply referring to the power supply circuit shown below.
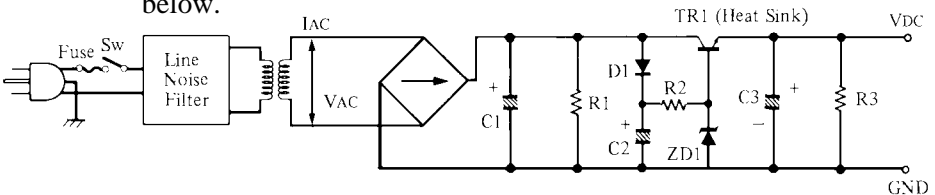
Note: A line noise filter must be used to prevent line transients from passing through power supply. Filter design to be determined by environmental noise requirements.

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.
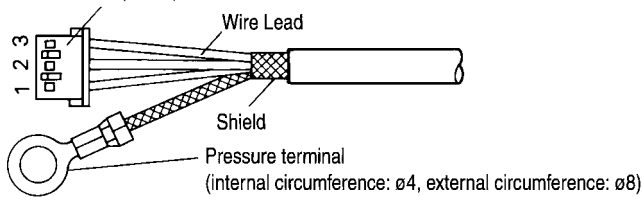
Figure 12-1. Power Supply Reference Circuit

13. FERRITE CORE INSTALLATION (EU ONLY)

If a peripheral unit drive circuit is to be used, attach a ferrite core using the following instructions.

■ A ferrite core noise filter for the peripheral unit cable comes packed with the printer for distribution throughout the European Union. Ferrite cores must be purchased separately in other areas.
- Cable is not included.
- Use a cable with the following specifications.

Product Code	09990713
Model Name	Ferrite Core TRCC-16-8-16

Housing 5480-03 RED (Molex)
Terminal 5479PBT (Molex)
Wire Lead
1 2 3
Shield
Pressure terminal
(internal circumference: ø4, external circumference: ø8)

■ The ferrite core is normally packed so it is open, as shown in Figure 13-2. If you find that the ferrite core is not open, use a pointed object to pry the plastic lock of the ferrite core apart (Figure 13-1.). When you do, take care not to damage the ferrite core or the plastic lock.
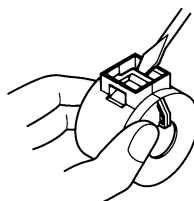
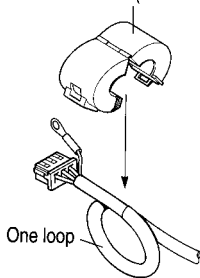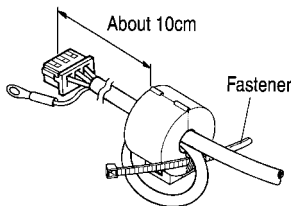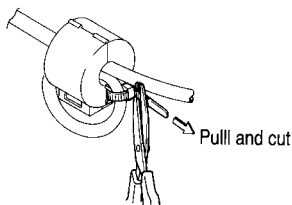**Figure 13-1.**

Ferrite core (20mm diameter)

One loop

About 10cm

Fastener

· Pass fastener through ferrite core

Pulll and cut

· Pass fastener around cable and lock it. Cut off excess with scissors.

Figure 13-2.   **Figure 13-3.**   **Figure 13-4.**

■ Clamp the ferrite core onto the peripheral unit cable, looping the cable as shown in Figure 13-2.
- Take care to avoid damaging the cable when installing the ferrite core.
- The ferrite core should be anchored firmly in place with the fastener that comes with it, as shown in Figures 13-3. and 13-4.
- Do not forget to loop the cable.

■ 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 grommeted hole in bottom cover. (Grommet may have to be cut)

Figure 13-5.