CITIZEN

User's Manual

MINI DOT MATRIX PRINTER

MODEL iDP-3530

Japan CBM Corporation
Information Systems Div.

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

CAUTION: Use shielded cable for this equipment.

For Uses in Canada
This digital apparatus does not exceed the class A limits for radio noise emissions from digital, apparatus, as set out in the radio interface regulations of the Canadian department of communications.

CONTENTS

1. Introduction

The iDP 3530 is a dot impact printer which can be utilized for a wide range of applications including, data communications terminals, P.O.S. terminals and kitchen printers. High speed performance is made possible by a bi-directional printing system. Since this printer is compact, lightweight and equipped with an abundance of functions, it can be easily employed for a variety of different tasks.

Before using your printer, please read this manual carefully to be certain you have an adequate understanding of its operation.

1-1 Features

1) Desktop compact dot impact printer.
2) High speed printing (Bidirectional printing system).
3) Black & Red 2 color printing and all black or purple printing.
4) Paper near-end detection function.
5) Low power consumption.

1-2 Accessories

1) Paper roll   1 Pc.
2) Ribbon cassette   1 Pc.
3) Rear cover   1 Pc. (Friction model only)
4) Paper Stacker   1 Pc. (Pin tracter model only)
5) User's manual   1 Pc.

2. Basic Specifications

2-1 Type classifications
Printer types are classified according to the system shown below.

iDP3530	F	23	P	J	120
	P	28	R	F	220
		40			

iDP3535   F   40   R   F   120

Model

Paper feed system   Power source
F: Friction   120: AC 120V
P: Pin tracter   220: AC 220V

Column capacity   Character set
23: 23 columns   J: Japanese
28: 28 columns   F: International
40: 40 columns

Interface
P: Parallel
R: Serial RS-232C
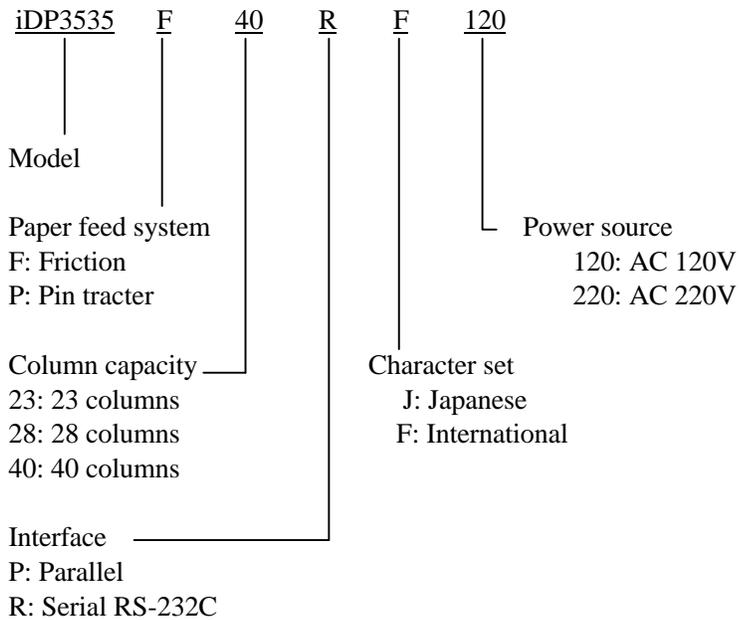
2-2 Features

	Item	iDP3530F	iDP3530P
1	Print Method	Bidirectional serial dot impact method.	
2	Character composition	7 x 7 dots (Incl. Half dot).	
3	Character number per line	23 columns: 230dot / line. 28 columns: 280dot / line. 40 columns: 360dot / line.	
4	Print speed	23 columns: approx. 4.0 line / sec. 28 columns: approx. 3.5 line / sec. 40 columns: approx. 3.0 line / sec.	
5	Character size	23 columns: 1.8(W) x 2.4(H) mm 28 columns: 1.5(W) x 2.4(H) mm 40 columns: 1.36(W) x 2.4(H) mm	
6	Line pitch	4.23 mm (1/6 inch)	
7	Paper size	76±0.5(W) x 80(Dia.)mm *1 3(W) x 3(Dia.)inch.	76-89 (W) mm 3.0-3.5 (W) inch.
8	Interface	P: Parallel interface (8 bit). R: Serial interface (RS-232C).	
9	Paper end detector	When paper is near the end, print operation is interrupted.	
10	Ribbon cassette	Two color (Black / Red) print. IR-61R / B *2	
11	Paper winder	Available as option (Ref. to 3-2 (8)).	
12	Power voltage	120V ± 10% 60Hz (For United States).*3 230V ± 10% 50 / 60Hz (For Europe).	
13	Power Consump.	Approx. 30W.	
14	Operation temp. & humidity	0ºC to 40ºC / 32ºF to 104ºF. 10% to 85% RH.	
15	Storage temp.	-20ºC to 60ºC	
16	Net weight	Approx. 2.8Kg (6.2ib)	
17	External dimentions	160 (W) x 184 (D) x 173 (H) (without Knob and Rear cover)	

Notes: *1 Paper weight of 45 kg refers to 1,000 sheets of 788 x 1,091 mm.
          *2 Single color cassette ribbon is available as option.
          Black print : IR-61B
          Purple Print : IR-61P
          *3 Power voltage setting is performed at the factory.

3. External Appearance and Parts Descriptions
3-1 External appearance and parts names
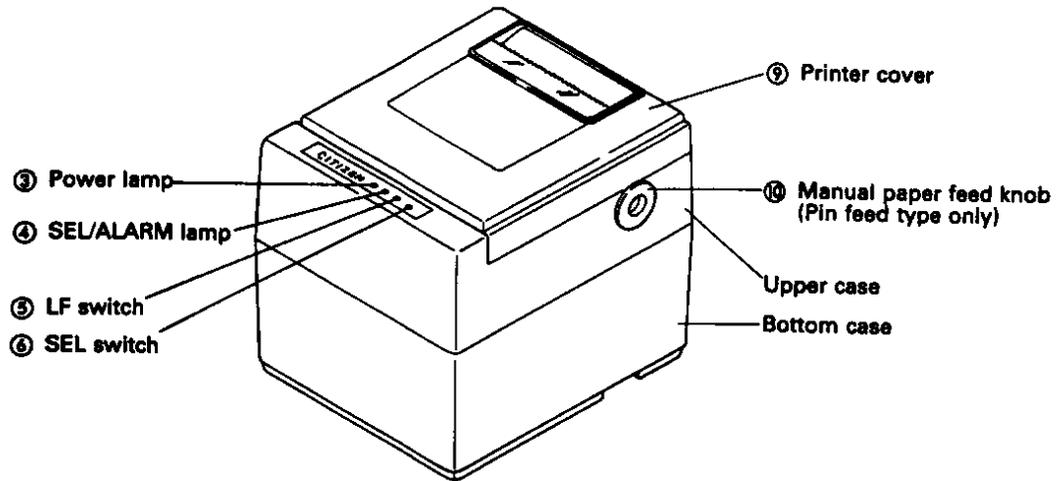
Fig. 1
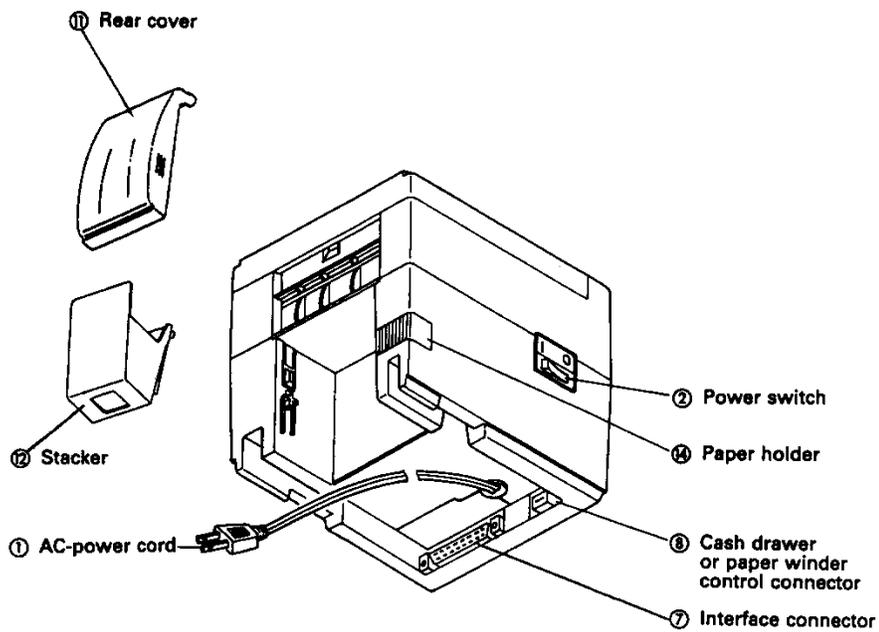
Fig. 2

3-2 Parts Descriptions

(1) Power Cord   Insert the plug end into an electric outlet.

(2) Power Switch   Power is supplied to the printer by turning this switch on.

(3) Power Lamp   This lights up when the power switch is "ON" and goes out when turning "OFF".

(4) SEL / ALARM Lamp   This lights up when the printers is in SELECT state (ON-LINE) and goes out when in DESELECT state (OFF-LINE). The printer can print out the data only when this lamp is on. This lamp may blink on the following occasions.

                                 1) When the paper roll in coming to near-end, the SEL / ALARM lamp keeps blinking at interval of 1.0 second.
                                     In this status, if you want to print out the data in the input-buffer, press the SEL switch two times. First press is cleared an alarm condition (ALARM RESET) and then one line print will be done by second press.
                                     2) When the printer is in alarm state, this lamp keeps blinking at interval of 1/4 second. Remove the cause for alarm and press the SEL switch. (or re-switch the power on).

(5) LF Switch   Paper feeding is performed when this switch is pressed (in DESELECT status only). This is used when inserting the paper and for spacing up etc.

(6) SEL Switch   When this switch is pressed, the printer enters SELECT (ON-LINE) status. When pressed again, the printer enters DESELECT (OFF-LINE) status. This switch is also used when clearing an alarm condition.

(7) I / F Connector   Connects through a cable to a computer etc. Please be certain that power to both the printer and the computer are turned off when connection is made.

(8) Cash Drawer or Paper Winder Connector

To be used to control the P.O.S. cash drawer or paper winder by DIP SWITCH setting (Ref.7-1).
When this connector is used for each drawer solenoid voltage 24V, register over 36Ω, for paper winder, use CBM model AW-3.

Connector Pin Assignment		
Pin No	Signal Name	Function
1	Vp	DC24V, 0.8A or less
2	VL	Solenoid
3	FG	GND
4	FG	GND
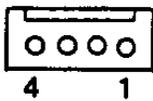
Connector : Printer side
: 5045-04A (MOLEX)

(9) Printer Cover   Open when replacing the cassette ribbon and Paper.

(10) Manual Paper Feed Knob

Use to adjust the paper position (available only on pin tractor paper feeding model).

(11) Rear Cover   Cover for roll paper.

(12) Stacker   Basket for fan-fold paper.

4. Preparation

4-1 Attaching / Removing the Printer Cover

Attaching and removing the printer cover as shown in Fig. 3.
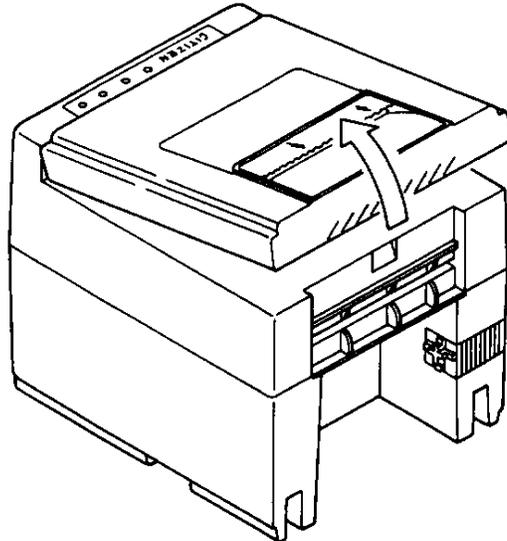
Fig.3

4-2 The Ribbon Cassette Installation

To insert the ribbon, disconnect the power source beforehand. If printing has been continued for many hours, be careful not touch printer head as it might be hot.

1) Remove the printer cover
2) While inserting the ribbon into the space between the print head and the ribbon guide, press the cassette into the holder unit until it clicks into place. (Ref. To Fig. 4&5)
3) Turn the cassette ribbon knob in the direction of the arrow to take up slack in the ribbon.
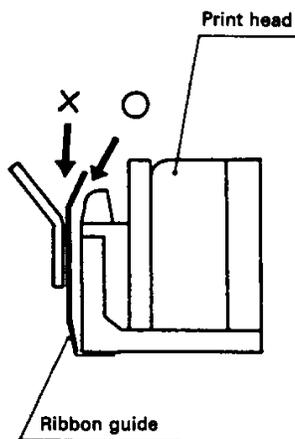
Fig. 4
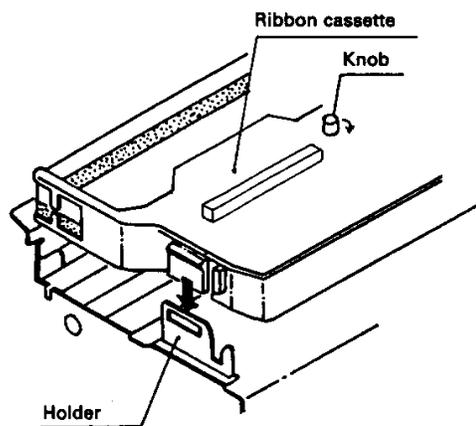
Fig. 5

4-3 Loading and Changing the Paper

Using Paper Roll
1) Cut the paper in right angle to its longitudinal center line as shown in Fig. 7.
2) Insert the paper into insertion inlet on the rear side of printer.
3) Turn on the power switch and feed the paper by pushing the LF switch.
4) When the printing paper comes out of the clearance (paper cutter part) on the printer cover, fix the paper by means of paper holder, then set in on the main unit.

Fig. 7
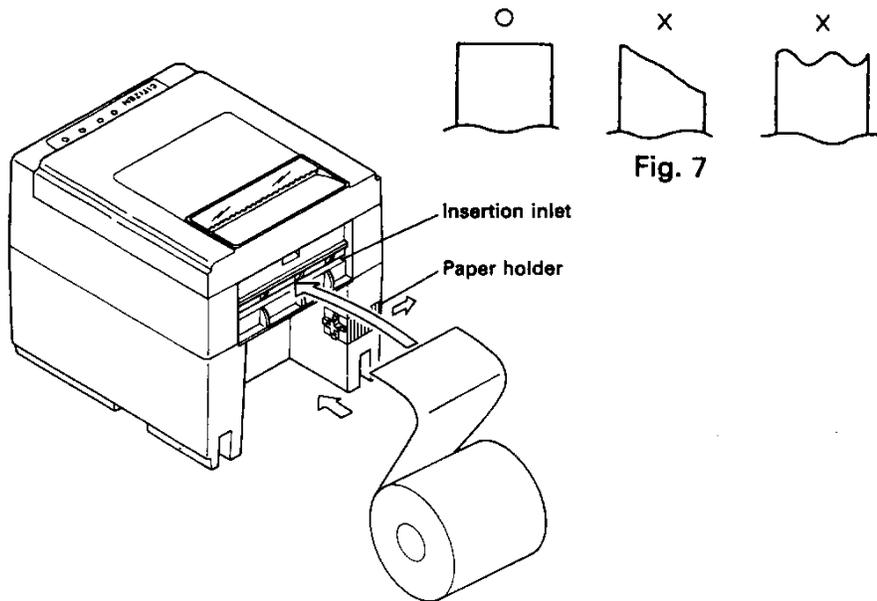
Fig. 6

Using Fan-fold Paper
1) Remove the printer cover.
2) Set the imprint face of the paper down ward and put into the paper entrance.
3) If necessary to adjust the sprocket-wheel's position, free the wheels using the lever on both side.
   Slide them to the appropriate position, and lock them back.
4) Hook some of the paper's perforations on the sprockets and forward the paper into the printer mechanism by pulling and turning the paper-feed knob until the paper's tip reaches the platen.
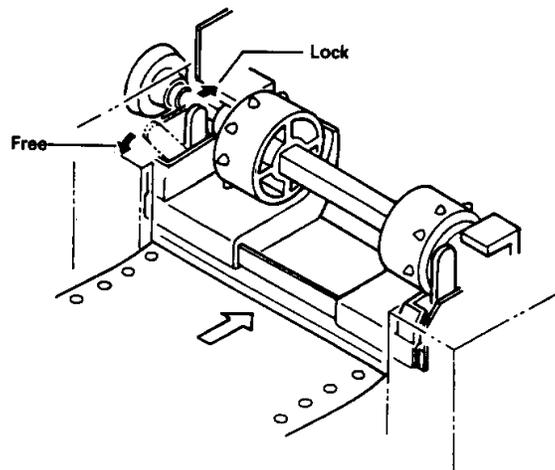
Fig. 8

4-4 Attaching / Removing the Paper Cover and Stacker

1) Attaching and removing the paper cover and the stacker as shown in Fig. 9, 10.
2) Capacity of stacker
The maximum size of fun-fold paper sheaf which can be stored in this stacker is 3 to 3.5 (W) x 6 (H) x 1.6 (D) inches.
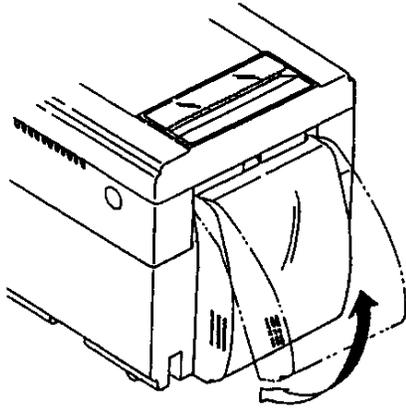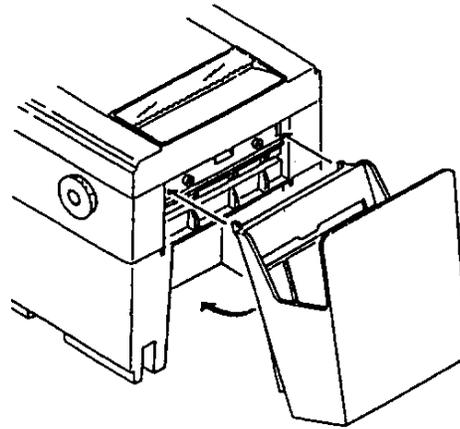
Fig. 9   Fig. 10

4-5 Self Test Printing

Your printer has a built in self print function for purpose of checking print operation without the need for any other external device.

Procedures for Actuating the Print Function
1) Be sure that a paper roll is properly loaded.
2) Confirm that the Ribbon cassette is properly installed and turn the power switch off.
3) Turn the power switch ON while pressing the LF switch, and release the LF switch after the self test operation has begun.

In the above operation, the self print function will stop automatically when completed.
However, the self print function will not operate without paper.

4-6 Alarm and Paper Near-End Detection

This printer has the paper near-end sensor to stop the operation when the paper comes to near-end, sending out both BUSY and FAULT signals. This status is indicated by the SEL / ALARM lamp blinking at-an interval of 1.0 second.
If the printer goes alarm, the printer stops printing out and outputs FAULT signal – OFF-LINE state. This status makes the SEL / ALARM lamp blink at an interval of 1/4 second.

4-7 General Cautions

1) Never operate your printer without inserting paper and ribbon cassette. Any printing without paper and ribbon cassette may cause damage to printer head.
2) Replace ribbon cassette before it is worn out.
3) Be careful not to drop any foreign objects, such as paper clips, pins and the like into your printer.
   It can cause mechanical trouble.
4) Nothing shall be placed on the ventilation slots of the printer.
5) Always place your printer on a stable desk which is set horizontal.
6) No organic solvent (thinner, benzene or the like) shall be used in sweeping clean the surface of the main body case.
7) Make sure that the power of the printer is turned off whenever you do the following.
   (1) Taking out any foreign matter which were dropped into the printer.
   (2) Replacing the ribbon cassette.

5. Serial Interface

5-1 Specifications

1) Synchronism : Asynchronous
2) Baud rate : 1200, 2400, 4800, 9600 BPS (Selected by user)
3) Composition of one word : Start bit : 1 bit
                                      Data bit : 7 or 8 bit (selected by user)
                                      Parity bit : Odd, even or parity (selected by user)
                                      Stop bit : 1 bit or more.
4) Signal polarity : RS-232C : Mark = Logic "1"
                                                   (-3V to -12V)
                                    : Space = Logic "0"
                                                   (+3V to +12V)
4) Receiving Control (DTR signal)
                                     : RS-232C : Mark = Data transfer not possible
                                     : Space = Data transfer possible

5-2 Connector Pin Assignment

Pin No.	Signal Name	Direction Host / Printer	Function	RS-232C
1	FG		Safety Ground	
3	RD	→	Received Data	○
7	SG		Signal Ground	
14	FAULT	←	Printer ALARM Signal	○
20	DTR	←	Printer BUSY Signal	○

14 / o o o o o o o o o o o o \ 25
1 / o o o o o o o o o o o o o \ 13

Notes: 1. The signal for RS-232C use are based on EIA RS-232C level.
                2. Please always maintain the "Mark state", when received data is not being transferred.
                3. Compatible connector (D-Sub connector)
                              Printer side: Equivalent to AMPHENOL 17-13250
                              Cable side: Equivalent to AMPHENOL 17-23250

5-3 Input / output Signals

RS-232C Circuit
Input (RD)

[Printer side]   [Host side]
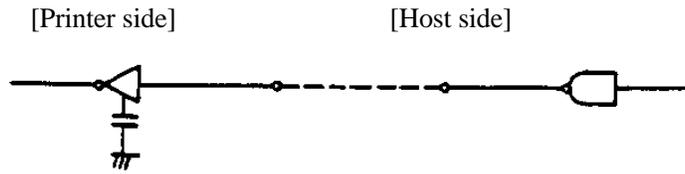
uPD4711 or equivalent

Output (DTR,FAULT)

[Printer side]   [Host side]
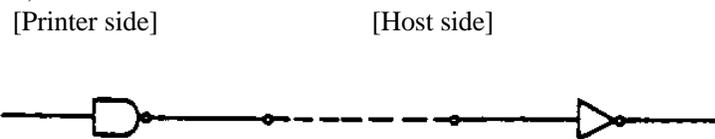
uPD4711 or equivalent

DTR   : (-8V) BUSY
        : (+8V) READY

FAULT   : (-8V) Normal
        : (+8V) Abnormal

5-4 Data Composition

Mark
Space
t b₀, b₁, b₂, ...
① ② ③
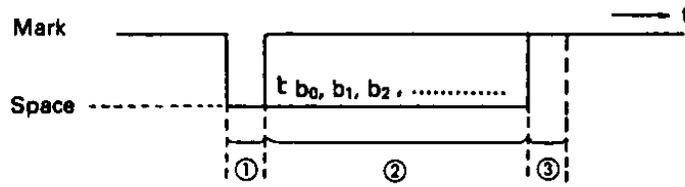
[1] Start bit
[2] Data bits (and parity bit)
[3] Stop bit (1 bit more)

1) Start bit

1/2 bit past the line dropping from MARK to SPACE, a status reading is taken again. If the reading is SPACE, a start bit is recognized.

2) Data bits and Parity bit

Data bit and Parity bit are checked out every bit form the half point of start bit. Signal level of these points (Mark = 1, Space = 0) are read as input data. The sequence of these bit is Bit 0, Bit 1 ~ Parity bit from Start bit.

3) Stop bit

The stop bit consists of one or more bits at "mark" level. When "space" level is detected for a stop bit, a framing error occurs.

5-5 Error Detection

The printer detects Parity, Framing and Overrun Error. When any error is detected, the data is printed out as (7FH).

Framing Error;

Framing error occurs when SPACE signal is checked out at STOP BIT and the printer print out (7FH).

Parity Error;

Parity check is carried out only when user designates it on the printer pre-setting.

Input Control and Buffering; (over-run-error)
The printer is designed to output DTR signals for each word. If the host computer neglects DTR signal and transmits the data, it may cause the "OVER-RUN ERROR". In order to avoid such case, set up the host computer to observe DTR signals from the printer by following the connector pin assignments described in 5-2.

6. Parallel Interface

6-1 Specifications

1) Data Input System   : 8 bit parallel (Data 1-8)

2) Control Signal   : ACK, BUSY, STB, FAULT

3) Compatible Connector   : Printer side. To equivalent AMPHENOL 57-40360

                                        : Cable side. To equivalent AMPHENOL 57-30360

6-2 Connector Pin Assignment

Pin No.	Signal Name	Pin No.	Signal Name
1	STB	19	Twisted Pair GND
2	Data 1	20	″
3	Data 2	21	″
4	Data 3	22	″
5	Data 4	23	″
6	Data 5	24	″
7	Data 6	25	″
8	Data 7	26	″
9	Data 8	27	″
10	ACK	28	″
11	BUSY	29	″
12	GND	30	
13	+5V Level	31	
14	GND	32	FAULT
15	GND	33	
16	GND	34	
17	Frame GND	35	
18		36	
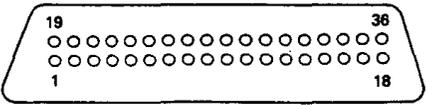
6-3 Description of Input / Output Signals

1. Input / Output Signals

Input Signals (To Printer)
DATA 1 : 8 bit signal (Positive logic)
DATA 2 : 8 bit signal (Positive logic)
DATA 3 : 8 bit signal (Positive logic)
DATA 4 : 8 bit signal (Positive logic)
DATA 5 : 8 bit signal (Positive logic)
DATA 6 : 8 bit signal (Positive logic)
DATA 7 : 8 bit signal (Positive logic)
DATA 8 : 8 bit signal (Positive logic)

STB : A strobe signal for reading in 8 bit data. (Negative logic)

Output Signals (From Printer)

ACK : This is pulse signal for requesting 8 bit data, issued at the end of a BUSY signal. (Negative logic)

BUSY : This signal indicated that your printer is in a BUSY state. New data should be input when this signal is "LOW". (Positive logic)

FAULT : When your printer is in an alarm state, this signal is "LOW". At this time, all control circuit of your printer are interrupted. (Negative logic)

6-4 Electrical Characteristics

1   Input Signal Level
All input signals are TTL level.
"HIGH" Level   = 2.0V Min.
"LOW" Level   = 0.8V Max.

2   Output Signal Level
"HIGH" Level   = 2.4V Min.
"LOW" Level   = 0.4V Max.

3   Input / Output Conditions
All of the input signals are pulled up by 3.3K ohms.

[Printer Side]   [Host Side]
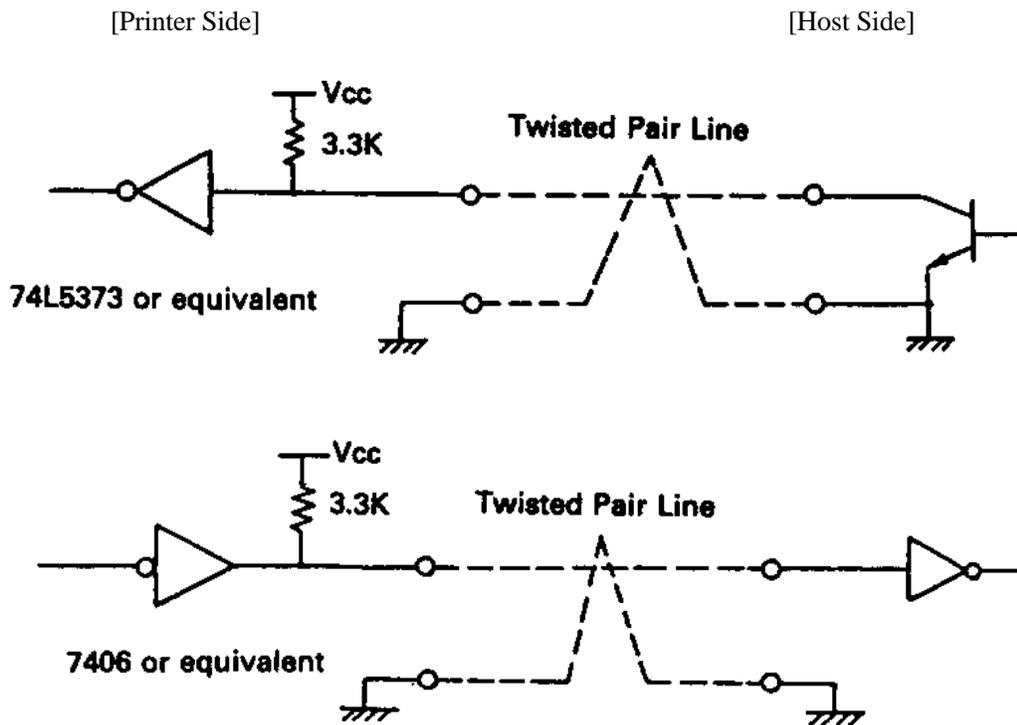
6-5 Timing Chart

Data Input and Print Timing
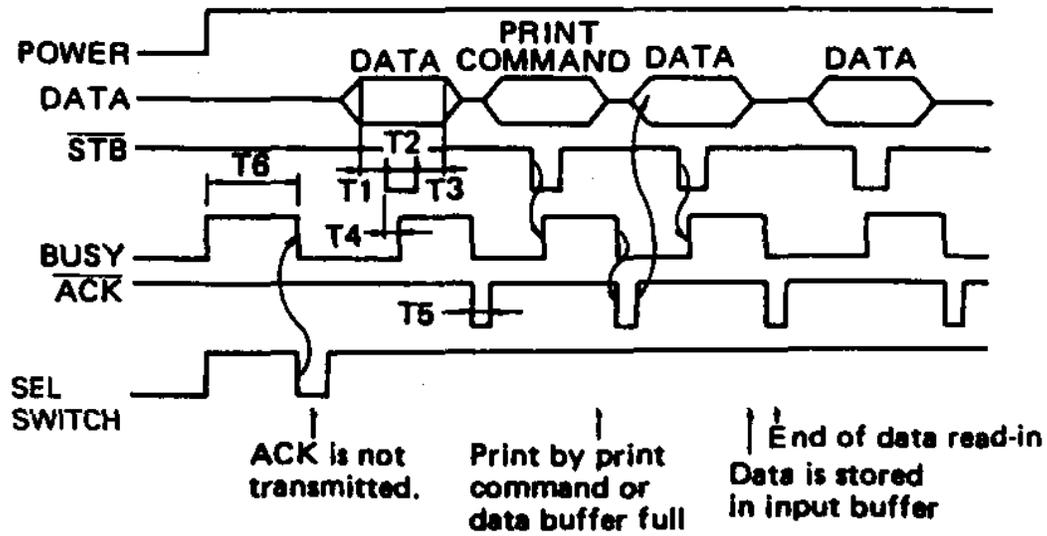
T1 ……… 0.5µs Min.   T2 ……… 0.5µs Min.   T3 ……… 0.5µs Min.
T4 ……… 270ns Max.   T5 ……… 5.5µs Typ.
T6 ……… 500ms Min. (When power switch is turned on)

7. Function Selection by Dip Switch
7-1 Dip-Switch (DS-1) Setting

No.	Function	ON	OFF	Factory Setting
1	to chose SEL / DSEL state (when powered on)	SELECT	DESELECT	OFF
2	to chose CR code functions	CR + LF	CR only	OFF
3	to chose Character Table	(Japanese)	International	OFF
4	to chose Character	- see the table below -		OFF
5	Table by the Country			OFF
6	to chose output signal for external device	Paper Winder	Cash Drawer	OFF
7	- not used -			OFF
8	- not used -			OFF

No.	U.S.A.	FRANCE	GERMANY	ENGLAND
4	OFF	ON	OFF	ON
5	OFF	OFF	ON	ON

7-2 Dip-Switch (DS-2) Setting
(only for Serial Interface)

No.	Functions	ON	OFF	Factory Setting
1	to chose Word's Length	7 bit	8 bit	OFF
2	Parity Checking	No	Yes	ON
3	Parity Checking	Even	Odd	OFF
4	Baudrate	- see the table below -		OFF
5	Setting			ON
6	- not used -			OFF
7	- not used -			OFF
8	- not used -			OFF

Baudrate Selection

No.	1200	2400	4800	9600
4	OFF	ON	OFF	ON
5	OFF	OFF	ON	ON

7-3 Dip-Switch Location

Power off and remove the printer cover before setting the Dip-Switches.
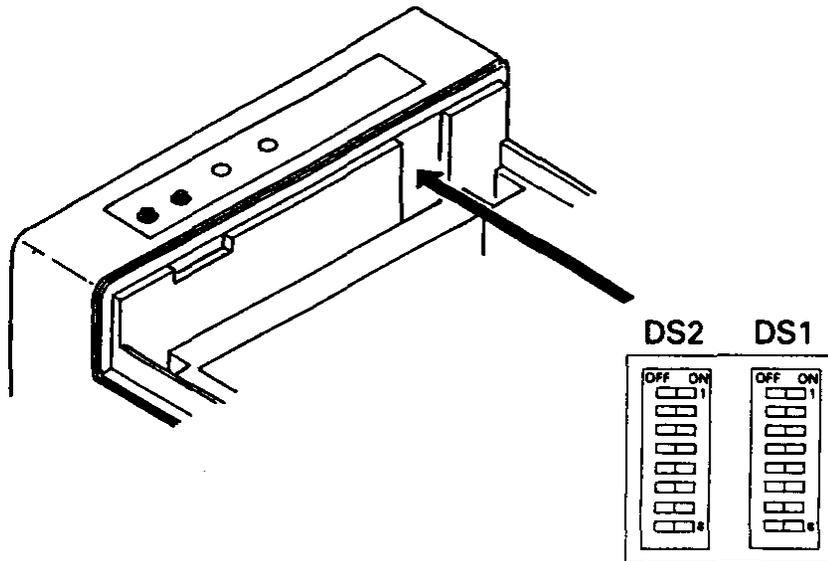
8. Print Control Functions
8-1 SI & SO Code

Symbol	Code (Hex.)	8 bit data	7 bit data
SI	0F	Standard character designation (Same as US)	Designation of SI side character
SO	0E	Double-width character designation (Same as RS)	Designation of SO side character

8-2 Function Code

Symbol	Code (Hex.)	Function
LF	0A	Feeds a new line after printing.
CR	0D	Feeds a new line after printing. You can select CR function in accordance with your computer's output. For details, refer to 7. Function select by Dip-switches.
RS	1E	Enhanced character designation. The designation is released with US code or line feed.
US	1F	Standard character designation.
FF	0C	Carries out from feed performance after printing.
DC 1	11	Makes the printer SELECT (ON LINE) state. Only this code can be accepted irrespective of DESELECT (OFF LINE) state.
DC 2	12	Red printing is specified / released. Designation / release (alternative) of red one line printing is possible with this code.
DC 3	13	Makes the printer DESELECT (OFF LINE) state.
CAN	18	Clears the print data in the buffer. All the previous input data is cleared with this code.
ESC + "C"	1B, 43	Page length designation and paging action. Ref.to 8-3 (4).
ESC + "0"	1B, 4F	Paging is off.
BEL	7	Cash drawer control.

8-3 Input Data Formats

The data input to the printer is made by the codes listed in the Character Code Table.
(1) Standard Character Print Mode Designation.

US (1F)	DATA	CR (0D)

The printer goes automatically to the standard character mode immediately after power-on initialization or line feed. Therefore, US code can be omitted. In addition, an automatic line feed is carried out after inputting the data for one line (Full Buffer Print).
The same function as US code is performed by using SI code (except for serial 7 bit data use).

(2) Double-Width Character Print Mode Designation

RS (1E)	DATA	CR (0D)

All print data following RS code are printed out in double-width size and this code can be released by US code.
It is possible to mix the characters in normal width and double width on one line.
However, because a double-width character requires twice the normal width, take care not to exceed the column capacity of the printer. When the input data become full to fill one line, the Full Buffer Print and one line feed will be automatically carried out.
RS code will be automatically cancelled after each line feed. The same function as RS is performed by SO code (except for serial 7 bit data use).

(3) Red Color Print Mode Designation

DC2 (12)	DATA	CR (0D)

All print data including DC2 are printed in red color and it's not possible to mix the black and red color characters on one line. This command will be automatically cancelled after the line feed. If DC2 commands are used 2 times on the same line by error, the printer will print out all characters in black color.

(4) Paging Designation and Page Length Designation

ESC (1B)	c (43)	n

Input ESC + "C" (1B 43) at the top of the line and next input n, which are integers.
With this code, the length (number of lines) per page can be set, and paging action is started, and the space of three lines are left at the both top and bottom of the page, n should be;
$14 \le n \le 120$

Otherwise, it will be 66. The paging can be released by ESC + "0" (1B,4F).

(5) Form Feed

DATA

With this code, paper feed goes on. If there is data in the buffer when this code is input, the printer does from feed printing. The top of form for the next page is made in accordance with the page length which was specified with ESC + "C" + "n".
Top of position of the page is determined when power is turned on or when page length is specified with ESC + "C" + "n".

(6) Canceling

CAN (18)

All the data in one line prior to CAN are cleared entirely with this code.

(7) Cash drawer control

BELL (07)

Command to drive the drawer port for 0.2 second period.

9. Initial Setting

Following are automatically set after Power-on.
(1) Printer head returns to its start position.
(2) SELECT (ON-LINE) or DESELECT (OFF-LINE) status may be chosen by the Dip Switches for Pre-Setting.
(3) Print buffer is cleared.
(4) Standard character mode is set.
(5) 66 lines per page is set.
(6) The first line set at the present line.
(7) Designation of Red printing is cleared.
(8) For 7 bit data, character code SI is applied.

10. Maintenance

10-1 Maintenance Procedures
It is recommended that users perform periodic cleaning of their printer.

(1) Exterior

The exterior case of the printer can be cleaned with alcohol. Care should be taken to keep water from reaching the electronic parts and the printing mechanism.

(2) Interior

There is no particular requirement, however, when the printer case is opened to change settings etc., dust and other foreign matter may be removed from the printer mechanism and circuit boards with a soft brush.
Special care should be taken to avoid damage to electronic parts and wiring. Furthermore, be sure to disconnect the power plug from the electric outlet before opening the printer case.

11. Character Code Tables
11-1 International Character Codes

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	@	P	`	p	_	=	α	ϱ	↑	1	—	▬
1		DC1	!	1	A	Q	a	q	_	ʇ	β	σ	↓	2		
2		DC2	"	2	B	R	b	r	_	⊥	γ	τ	←	3	¬	¬
3		DC3	#	3	C	S	c	s	▬	⅃	δ	υ	→	4	⌐	▪
4			$	4	D	T	d	t	▬	◢	ε	ø	±	5	⌐	▮
5			%	5	E	U	e	u	▪	◣	ζ	χ	≠	6	⌞	▮
6			&	6	F	V	f	v	■	◥	η	ψ	≥	7	⊥	▲
7	BEL		'	7	G	W	g	w	■	◤	θ	ς	≤	8	⊣	◀
8		CAN	(	8	H	X	h	x	I	♠	ι	Δ	≈	9	⊦	▶
9			)	0	I	Y	i	y	I	♦	ϰ	Γ	•	(	⊤	▼
A	LF		*	:	J	Z	j	z	I	◆	λ	Σ	⦿	)	+	✦
B		ESC	+	;	K	[	k	{	▮	♣	μ	Λ	∞	+	+	⊤
C	FF		,	<	L	\	l	¦	▮	●	ν	Ω	∴	−	⊥	+
D	CR		−	=	M	]	m	}	▮	○	ξ	¢	½	·	⊣	+
E	SO	RS	.	>	N	^	n	~	■	/	ο	◺	¼	∘	⊦	+
F	SI	US	/	?	O	_	o	❋	+	\	π	▬	0	/	⊤	+

11-2 Individual Country Character Codes

	U.S.A.	England	France	Germany
23H	#	£	#	#
40H	@	@	à	§
5BH	[	[	°	Ä
5CH	\	\	Ç	Ö
5DH	]	]	§	Ü
7BH	{	{	é	ä
7CH	¦	¦	ü	ö
7DH	}	}	è	ü
7EH	~	~	¨	ß