

# **TOSHIBA**

TOSHIBA REMOTE RECEIPT PRINTER

## **TRST-A10 SERIES**

### **Product Description**

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**TOSHIBA TEC CORPORATION**

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**CAUTION!**

1. *This manual may not be copied in whole or in part without prior written permission of TOSHIBA TEC.*
2. *The contents of this manual may be changed without notification.*
3. *Please refer to your local Authorised Service representative with regard to any queries you may have in this manual.*

# 1. OUTLINE

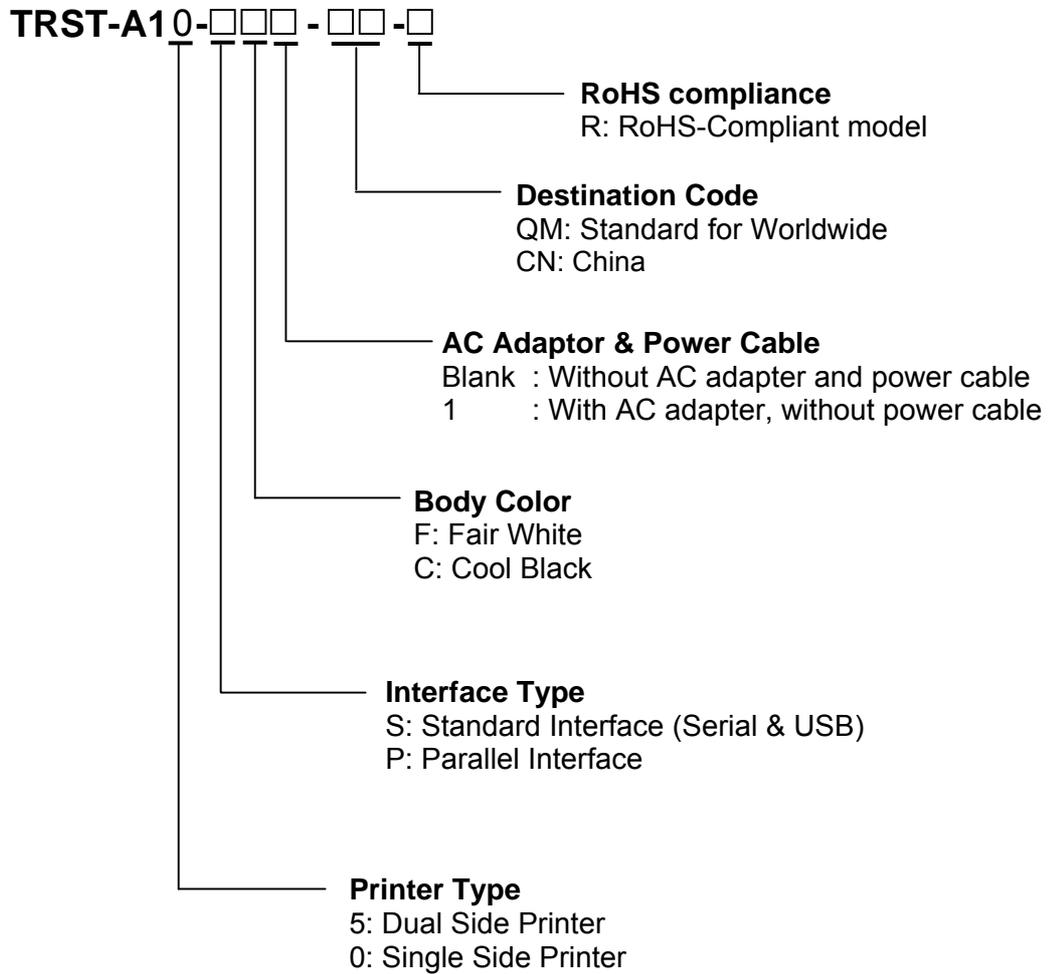
## 1.1 FEATURES OF THE PRINTER

- 1) This printer is a single station printer for 80 mm width receipt and is equipped with the RS-232C serial interface, USB interface or parallel interface (option), conforming to the ESC/POS commands.
- 2) Paper drop-in mechanism realizes easy paper loading and head cleaning. When setting or replacing the paper roll, only load it into the printer and close the cover.
- 3) This printer performs in thermal direct method at high speed (max. 225 mm/s) with less noise.
- 4) Since the paper outlet is provided at front side of the printer, the receipt can be taken out easily and flexible installation is possible.
- 5) The cover closed tightly prevents any foreign material and liquid from getting into the printer.
- 6) This printer performs barcode printing with special commands.
- 7) Print layout can be variously arranged.
- 8) User-defined characters and logos can be stored into the flash memory.
- 9) An automatic cutter is provided as standard. (Partial cut)
- 10) The body color is selectable from Fair White (FW) and Cool Black (CB) as standard to color coordinate with the POS terminal to be connected.
- 11) The AC adapter can be used in every country.

**NOTE:** Every size is written in millimeter (mm) in this manual. To obtain the size in inch, divide by 25.4.

## 1.2 DESCRIPTION OF MODEL NUMBER

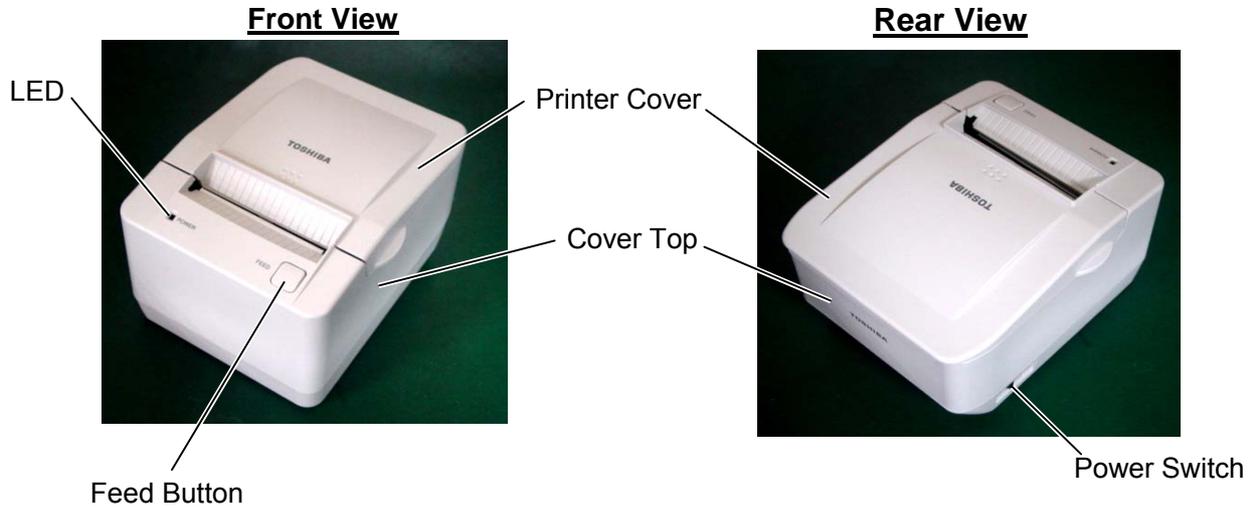
### Model name description



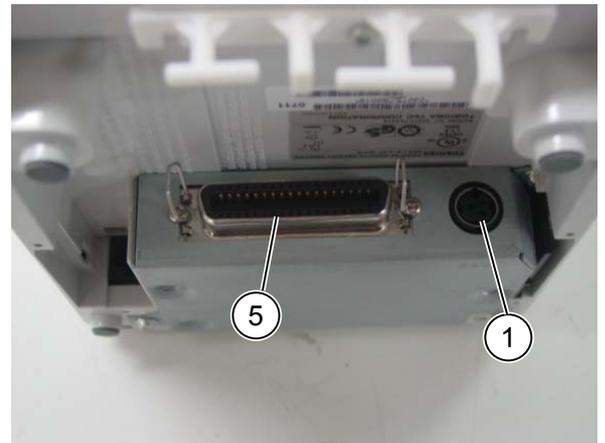
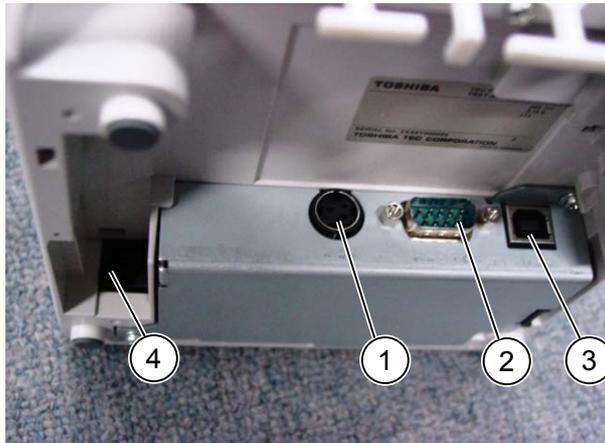
**NOTE:** Some combinations of the above specifications are not developed as products. For details, please refer to your nearest authorized TOSHIBA TEC representative.

## 1.3 OVERVIEW AND DIMENSIONS

### 1.3.1 Front View/Rear View



### 1.3.2 Connectors



#### 1 [DC24V] (Socket connector)

The built-in AC adapter supplies +24V power to the printer through this connector. Do not connect anything other than the Toshiba TEC Specified AC adapter.

#### 2 [Serial interface connector]

An interface cable which connects the printer to a POS terminal or Personal Computer is connected to this connector. A RS-232C interface cable (Serial I/F model)

### 3 [USB interface connector]

An interface cable which connects the printer to a POS terminal or Personal Computer is connected to this connector, a USB I/F (V2.0 Full Speed) is needed for this connector.

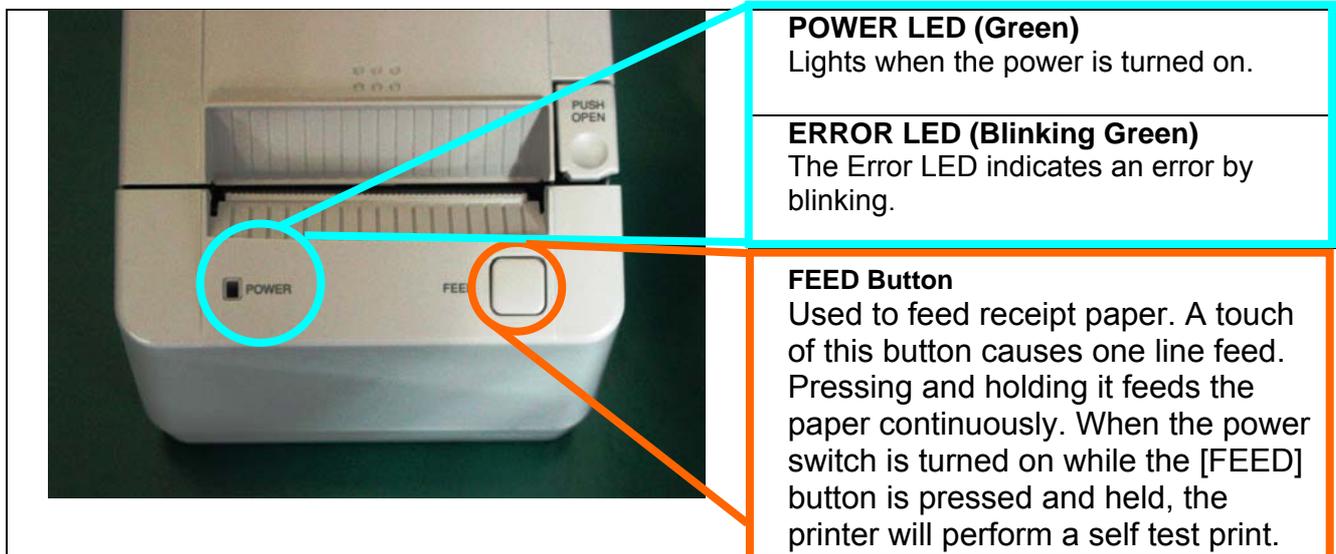
### 4 [Drawer interface Connector] [CDKO] (6 pin modular connector)

A drawer cable which connects the printer to a drawer is connected to this connector. To this connector, a Toshiba drawer can be connected. Do not connect anything other than the connectable drawer.

### 5 [Parallel interface connector]

An interface cable which connects the printer to a POS terminal or Personal Computer is connected to this connector. A Parallel interface cable (Parallel I/F model) is needed for this connector.

#### 1.3.3 LED and Feed Button



## Error Status Table

### Green LED Blinking (Slow)

Problem	What to Do	Where to Go
Receipt paper is low*	There are about 4 ½ meters, ± 3 meters, (15 feet, ± 10 feet) of paper left. Change the paper soon to avoid running out of paper part way through a transaction.	

### Green LED Blinking (Fast)

Problem	What to Do	Where to Go
Receipt paper is out	Change the paper now. Do not run a transaction without paper as the data may be lost.	
Receipt cover is open	Close the cover. The printer will not operate with the cover open.	
Knife failure	Open the receipt cover and check the knife. Clear any jammed paper you can see. Tear off any excess paper against the tear-off blade.	

**NOTE:** *If other LED status except for the above occurs, turn the power off, and then on. If this does not restore the LEDs, contact your nearest TOSHIBA TEC representative for assistance.*

### 1.3.4 Datascope Mode

Datascope Mode allows the user to test the printer's communications. When in Datascope Mode the printer receives all communications, but instead of executing the commands it prints them out on receipt paper as hexadecimal numbers in the order received. For example, the ASCII character "A" is printed as the hexadecimal number 41 and so on.

To run the Datascope Mode:

After you have enabled the Data scope Mode through the Configuration Menu, exit the Configuration Menu.

1. Run a transaction from the host computer.

All commands and data sent from the host computer will be printed as hexadecimal numbers as shown in the illustration.

30 31 32 33 34 35 36 37 38 39 40 41	:	0 1 2 3 4 5 6 7 8 9 @ A
41 42 43 44 45 46 47 48 49 50 51 52	:	A B C D E F G H I J K L

To exit the Datascope Mode:

1. Enter the Configuration Menu again
2. Disable the Data scope Mode
3. Exit the Configuration Menu

The printer is in Normal Mode and can communicate with the host computer.

### 1.4 SYSTEM CONFIGURATION

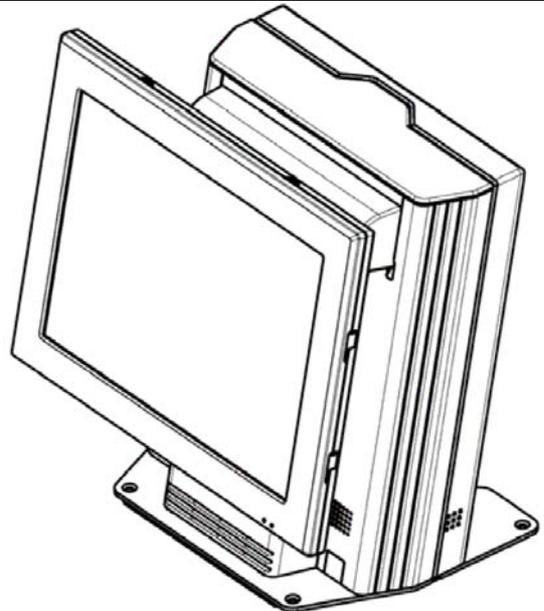


DC 24V



AC Adapter

Serial or Parallel  
Interface



POS Terminal  
(ST-A10 series, etc.)

Drawer Interface  
(Drawer Kick Specification)



TOSHIBA TEC DRAWER  
(DRWST-51A-8MVG-QM-R, etc.)

## 1.5 BASIC SPECIFICATIONS

Item	Description						
Printing method	Line thermal dot printing method						
Printing width	<table border="1"> <thead> <tr> <th>(Font Size 1)</th> <th>(Font Size 2)</th> </tr> </thead> <tbody> <tr> <td>80 mm (576 dots)</td> <td>80 mm (560 dots)</td> </tr> <tr> <td>58 mm (432 dots)</td> <td>58 mm (424 dots)</td> </tr> </tbody> </table>	(Font Size 1)	(Font Size 2)	80 mm (576 dots)	80 mm (560 dots)	58 mm (432 dots)	58 mm (424 dots)
(Font Size 1)	(Font Size 2)						
80 mm (576 dots)	80 mm (560 dots)						
58 mm (432 dots)	58 mm (424 dots)						
Resolution	203.2 dpi x 203.2dpi						
Printing speed Max.	9 ips max (225 mm/sec) for 75W, 55W mode						
2 color printing	Max 50 mm/sec						
Printing columns	<p><b>(Font Size 1)</b></p> <p><b>80 mm Paper</b></p> <p>48 Column (at 16.9 cpi Standard Character)</p> <p>64 Column (at 22.6 cpi Compress Character)</p> <p>24 Column (Double bytes Font)</p> <p><b>58 mm Paper</b></p> <p>36 Column (at 16.9 cpi Standard Character)</p> <p>48 Column (at 22.6 cpi Compress Character)</p> <p>16 Column (Double bytes Font)</p> <p><b>(Font Size 2)</b></p> <p><b>80 mm Paper</b></p> <p>42 Column (at 15.6 cpi Standard Character)</p> <p>56 Column (at 20.3 cpi Compress Character)</p> <p><b>58 mm Paper</b></p> <p>32 Column (at 15.6 cpi Standard Character)</p> <p>42 Column (at 20.3 cpi Compress Character)</p>						
Character size	Font A: 1.5 x 3.00 mm Font B: 1.125 x 3.00 mm						
Character types	Code pages PC437, PC850, PC852, PC857, PC858, PC860, PC863, PC865, PC866 PC949(STD Model only), PC54936(China model only) and PC1252						
Logo registration and print	User defined characters and logos are downloadable in the flash memory.						
Line spacing	7.52 (default) and variable lines per inch.						
Printable bar codes	UPC-A, UPC-E, JAN13 (EAN), JAN8 (EAN), Code 39, Code 128, Interleaf 2 of 5, Codabar, PDF417, Code 93						
Cut method	Partial Cut						
Paper	Thermal paper roll: 80 mm x dia. 83 mm (Max) Thermal paper roll: 58 mm x dia. 83 mm (Max)						
Interface	RS232C I/F or USB I/F (V2.0 Full Speed). Parallel as Option.						
Input buffer	4K bytes/128 bytes						
Printer supply input voltage	Rated output: DC 24V, 3.15A (75W)						
Power consumption	3.15A (75W Power Supply), 2.29A (55W Power Supply)						
AC adapter specification	Rated input: AC 100 – 240V, 50/60Hz, 2.0A max Rated output: DC 24V, 3.15A (75W)						
Body color	Fair White (FW) or Cool Black (CB)						
Operating temperature	5°C to 50°C						
Operating humidity	10% to 90% RH (no condensation)						
Storage temperature	-20°C to 60°C						
Storage humidity	10% to 90% RH (no condensation)						
Weight	1.7 Kg						
Dimension	145.5 mm (W) x 185.5 mm (D) x 141.0 mm (H)						

## 1.6 ELECTRONIC SPECIFICATIONS

### 1.6.1 CPU ..... UP0703111A

### 1.6.2 Serial Interface (RS232)

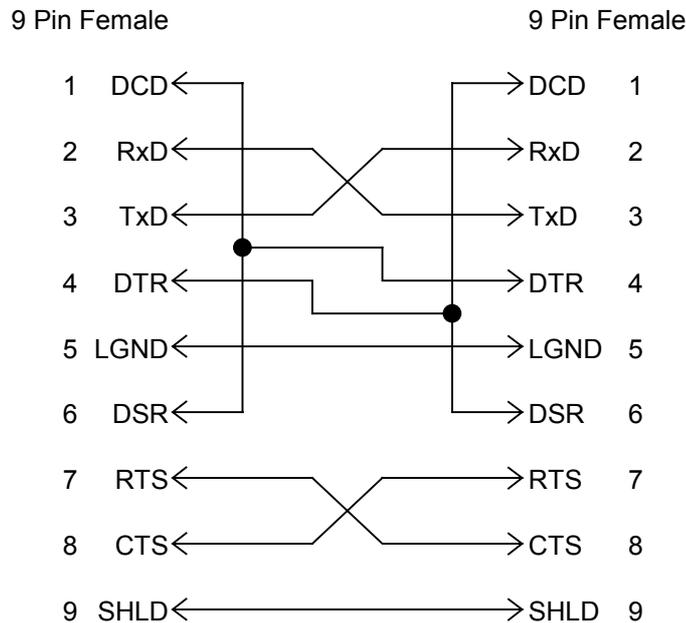
#### 1. Specification

- (1) Synchronization method: Asynchronous
- (2) Baud rate: 9600, 19200, 38400, 57600, 115200 BPS (selectable)
- (3) Transmission parameter:  
 Start bit: 1 bit  
 Word length: 7 bit or 8 bit (selectable)  
 Parity: None, even, odd (selectable)  
 Stop bit: 1, 2 bits selectable
- (4) Signal level:  
 Transmitter:  
 MARK = "1" (-5V~-15V)  
 SPACE = "0" (+5V~+15V)  
 Receiver:  
 MARK = "1" (-3V~-25V)  
 SPACE = "0" (+3V~+25V)
- (5) Receive data (RD signal):  
 MARK = 1  
 SPACE = 0
- (6) Receive control (DTR signal):  
 MARK: Data transmission is impossible.  
 SPACE: Data transmission is possible.
- (7) Send control (TD signal):  
 DC1 code (17H) X-ON: Data can be received.  
 DC3 code (19H) X-OFF: Data cannot be received.

#### 2. Connector description

No.	Signal	I/O	Description
1	DCD (NC)		Data Carrier Detect (Not connected )
2	RX	Input	Receive data
3	TX	Output	Sending Data
4	DTR	Input	Data Terminal Ready
5	SG		Send to Ground
6	DSR	Input	Data set ready
7	RTS	Output	Printer BUSY signal
8	CTS	Input	Clear to send
9	RI (NC)		Ring Indicator (Not connected )

## RS232 9 Pin to 9 Pin Cable



Applicable connector: D-sub connector  
 Printer side: 1002-09MS4G-L (CHUFON or equivalent)  
 Cable side: DB9 RS232 F/F serial cable

**NOTE:** The RS-232C signal is according to EIA RS-232C.

### 3. I/O signal

#### (1) RX

This is a serial receive data signal. When a framing error, overrun error, or parity error occurs, the data is printed as “?”.

#### (2) DTR, RTS

When these signals are in ready status, data and command can be written. If the data is written in BUSY status, an overrun error occurs, causing the previous data to be ignored. Data can also be written into input buffer during printing. When the power is turned on, when the printer is in on-line mode during test print, or when the printer is reset, these signals are in BUSY status.

#### (3) TX

This is used for sending data from printer.

In Xon/Xoff control, when the printer enters BUSY status, the printer outputs DC3(13H) signal. When the printer enters READY status, the printer outputs DC1(11H) signal to the host.

## (4) DSR

When the DTR/DSR control is selected, the printer confirms this signal is SPACE and then sends the status data. When it is not selected, the data is sent without DSR.

## (5) SG

Signal ground.

## (6) CTS

Clear to send. This is asserted by host terminal to acknowledge RTS and allow printer to transmit.

**Pin 2 - Transmitted Data (TxD)** This signal is active when data is transmitted from the DTE (computer) device to the DCE (printer) device. When no data is transmitted, the signal is held in the mark condition (logic '1', negative voltage).

**NOTE:** Pin 2 on the DCE device is commonly labeled "Received Data", although by the EIA232 standard it should still be called Transmitted Data because the data is thought to be destined for a remote DTE device.

**Pin 3 - Received Data (RxD)** This signal is active when the DTE device receives data from the DCE device. When no data is transmitted, the signal is held in the mark condition (logic '1', negative voltage).

**NOTE:** Pin 3 on the DCE device is commonly labeled "Transmitted Data", although by the EIA232 standard it should still be called Received Data because the data is thought to arrive from a remote DTE device.

**Pin 4 - Request to Send (RTS)** This signal is asserted (logic '0', positive voltage) to prepare the DCE device for accepting transmitted data from the DTE device. Such preparation might include enabling the receive circuits, or setting up the channel direction in half-duplex applications. When the DCE is ready, it acknowledges by asserting Clear to Send.

**NOTE:** Pin 4 on the DCE device is commonly labeled "Clear to Send", although by the EIA232 standard it should still be called Request to Send because the request is thought to be destined for a remote DTE device.

**Pin 5 - Clear to Send (CTS)** This signal is asserted (logic '0', positive voltage) by the DCE device to inform the DTE device that transmission may begin. RTS and CTS are commonly used as handshaking signals to moderate the flow of data into the DCE device.

**NOTE:** Pin 5 on the DCE device is commonly labeled "Request to Send", although by the EIA232 standard it should still be called Clear to Send because the signal is thought to originate from a remote DTE device.

**4. Error detection**

If a parity error, framing error, and overrun error is detected, the data is stored into the buffer as “?”

- (1) Framing error: This error occurs when no stop bit is found in the frame. The data is stored into the buffer as “?”.
- (2) Parity error: When an error is detected at the parity check, the data is stored into the buffer as “?”.
- (3) Overrun error: When this error is detected, the data is stored into the buffer as “?”.

**5. Receive control**

In case DTR/DSR control is selected, the printer receives data from the host when a BUSY signal is low level, however, the printer cannot receive it when the BUSY signal is high level.

In case DTR/DSR control is not selected, the printer receives data from the host after sending XON signal, however, it cannot send data after sending XOFF

**6. Buffering**

DTR signal and TD signal are provided as a control signal for data transmission to input buffer.

- (1) DTR signal
- (2) TD signal

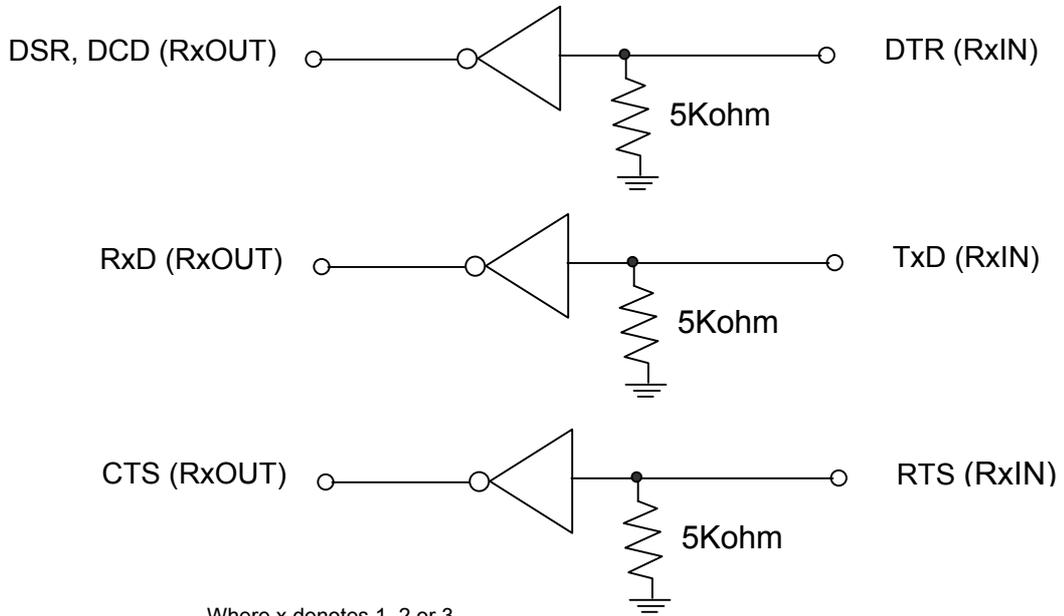
**7. Electric specification**

For RS232, SP3243E or equivalent

Input signal (Rx<sub>D</sub>, DSR, CTS)

[ Printer side ]

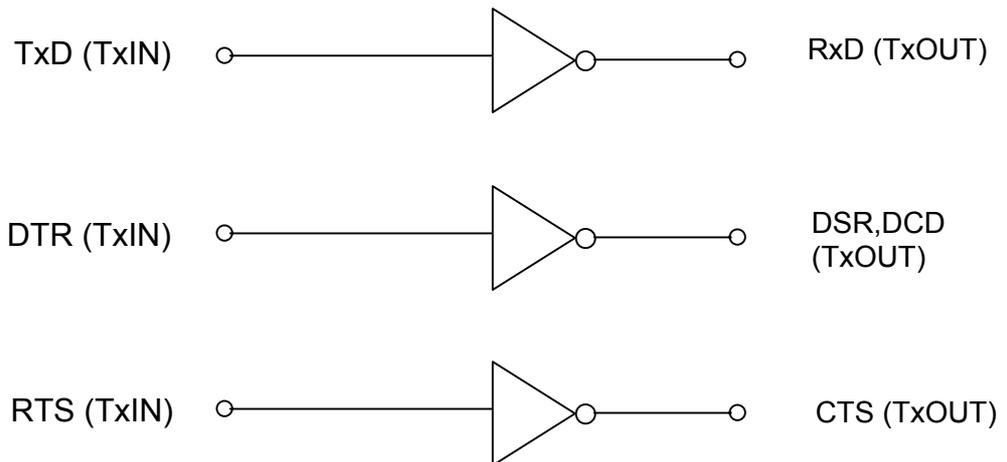
[ Host side ]



Output signal (DTR, Tx<sub>D</sub>, RTS)

[ Printer side ]

[ Host side ]



### 1.6.3 USB Interface

#### 1. Specification

Version 2.0 full speed.

#### 2. Connector description

Pin	Signal	Description
1	VCC	+3.3Vdc
2	D-	Data – (Differential pinout)
3	D+	Data +(Differential pinout)
4	SG	Signal Ground

#### 3. I/O signal

USB is a serial bus. It uses 4 shielded wires: two for power (+3.3V & GND) and two for differential data signals (labelled as D+ and D- in pinout). NRZI (Non Return to Zero Invert) encoding scheme used to send data with a sync field to synchronise the host and receiver clocks. In USB data cable Data+ and Data- signals are transmitted on a twisted pair. No termination needed. Half-duplex differential signaling helps to combat the effects of electromagnetic noise on longer lines. Contrary to popular belief, D+ and D- operate together; they are not separate simplex connections.

#### 4. Error detection

The core bit error rate of the USB medium is expected to be close to that of a backplane and any glitches will very likely be transient in nature. To provide protection against such transients, each packet includes error protection fields. When data integrity is required, such as with lossless data devices, an error recovery procedure may be invoked in hardware or software. The protocol includes separate CRCs for control and data fields of each packet. A failed CRC is considered to indicate a corrupted packet. The CRC gives 100% coverage on single- and double-bit errors.

#### 5. Receive control

ML60851E supports three types of transfers: Control, Bulk and Interrupt Transfers as defined by USB Specifications.

- Control Transfer is required for transfer of configuration, commands, and status information between the host and devices.
- Bulk Transfer enables transfer of large amounts of data when the bus bandwidth is adequate.

- Interrupt Transfers are used when moderate amounts of data have to transfer within a specific amount of time.
- The ML60851E requests interrupts to the local MCU, etc., by asserting the -INTR pin.
- Transfer of handshake packet in a direction opposite to that of the data packet.

When packet transfer is completed normally, an ACK packet is returned and the operation proceeds to the next packet transfer.

The ML60851E requests the local MCU to transmit or receive a packet of data by asserting the INTR pin. The interrupt cause will be "packet ready". The transmit packet ready interrupt is one that requests that the packet of data to be transmitted be written in the transmit FIFO, and the receive packet ready

interrupt is one that requests the local MCU to read out the data that has been received and stored in the receive FIFO. The above procedures of transferring one packet of data are explained below for transmission and reception separately.

#### 1) During transmission

The local MCU writes one packet of data that has to be transmitted in the transmit FIFO of the corresponding EP in the ML60851E, and sets the transmit packet ready bit of the corresponding EP status register of the ML60851E. When the host transmits the IN token packet to the ML60851E specifying the communication method, etc., the ML60851E transmits to the host the data packet stored in the above transmit FIFO. When the host receives one data packet normally, it returns the ACK packet to the ML60851E. Consequently, the ML60851E resets the transmit packet ready status, thereby completing the transfer of one data packet over the USB bus. When the transmit packet ready status is reset, the ML60851E gives a request to the local MCU in terms of a transmit packet ready interrupt thereby prompting the local MCU to write the next packet of data to be transmitted.

#### 2) During reception

The host sends to the ML60851E an OUT token followed by a data packet. The ML60851E stores the received data packet in the receive FIFO of the corresponding EP. When it is confirmed that all the data packets have been accumulated and that there is no error, the ML60851E returns an ACK packet to the host. At the same time, the receive packet ready bit of the corresponding EP status register will also be set and a request is sent to the local MCU in terms of an interrupt. Upon receiving this interrupt, the local MCU reads out the received data from the ML60851E and resets the receive packet ready bit.

### 6. Buffering

When a read request is sent to USB, the USB host controller will continue to read 64 byte packets until one of the following conditions is met:

1. It has read the requested size (default is 4 Kbytes).
2. It has received a packet shorter than 64 bytes from the chip
3. It has been cancelled

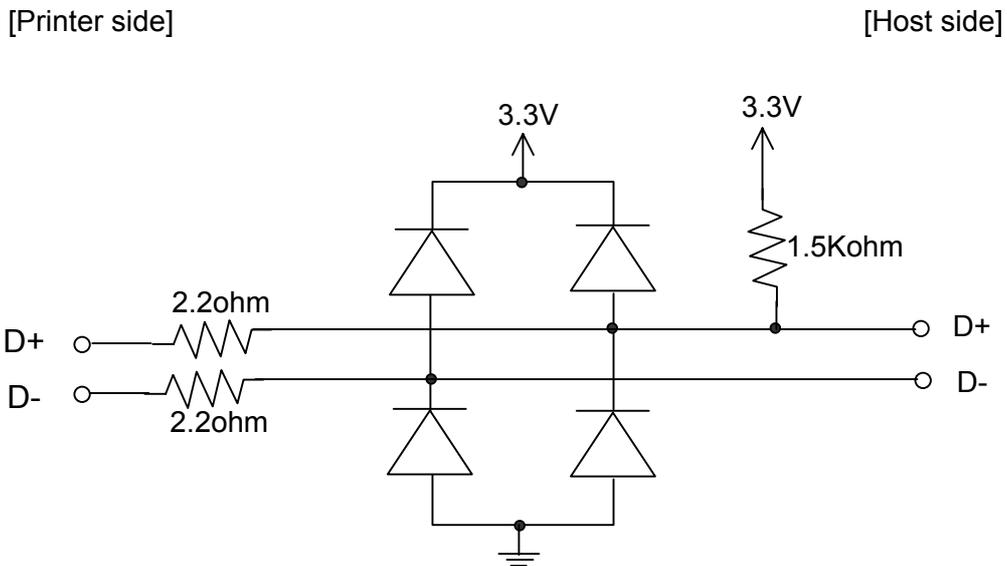
While the host controller is waiting for one of the above conditions to occur, NO data is received by our driver and hence the user's application. The data, if there is any, is only finally transferred after one of the above conditions has occurred.

Normally condition 3 will not occur so we will look at cases 1 and 2. If 64 byte packets are continually sent back to the host, then it will continue to read the data to match the block size requested before it sends the block back to the driver.

If a small amount of data is sent, or the data is sent slowly, then the latency timer will take over and send a short packet back to the host which will terminate the read request.

**7. Electric specification**

For USB, ML60851 or equivalent



#### 1.6.4 Parallel Interface

- (i) Compatibility Mode (Host to Printer: Conforming to Centronics interface)
  - (1) Data input method: 8-bit parallel
  - (2) Synchronization method: nStrobe signal externally supplied
  - (3) Hand shake: nAck signal and Busy signal
  - (4) Signal level: All signals are TTL compatible.
  
- (ii) Reverse Mode: (Printer to Host)

Status data is transmitted from the printer to the host in Nibble mode.  
Description: Data transmission from the asynchronized printer that is controlled by the host is considered. In Nibble mode, each of 4-bit data is transmitted to the host with the existing control line.

(iii) Connector Description

Pin	Source	Compatibility mode	Nibble Mode
1	Host	Nstrobe	HostCLK
2	Host/Ptr	Data0(LSB)	Data0(LSB)
3	Host/Ptr	Data1	Data1
4	Host/Ptr	Data2	Data2
5	Host/Ptr	Data3	Data3
6	Host/Ptr	Data4	Data4
7	Host/Ptr	Data5	Data5
8	Host/Ptr	Data6	Data6
9	Host/Ptr	Data7	Data7
10	Printer	Nack	PtrClk
11	Printer	Busy	PtrBusy/Data3.7
12	Printer	Perror	AckDataReq/Data2.6
13	Printer	Select	Xflag/Data1.5
14	Host	nAutoFd	HostBusy
15		NC	NC
16		GND	GND
17		FG	FG
18	Printer	Logic-H	Logic-H
19		GND	GND
20		GND	GND
21		GND	GND
22		GND	GND
23		GND	GND
24		GND	GND
25		GND	GND
26		GND	GND
27		GND	GND
28		GND	GND
29		GND	GND
30		GND	GND
31	Host	nInit	NInit
32	Printer	nFault	nDataAvail/Data0.4
33	GND	GWDND	GWDNC
34	Printer	NC	NC
35	Printer	NC	NC
36		nSelectIn	1284-Active

NC: None connect

ND: Not defined

Applicable connector: Printer side: 57RE-40360 (AMPHENOL type or equivalent)  
 Cable side: 57-30360 (AMPHENOL type or equivalent)

**NOTE:** The initial letter “n” of the signal indicates a “L” active signal. Bi-directional data transmission is possible with all the above signals. Be sure to use the twisted pair lines for each signal, and connect the return side to the signal ground level.

## (iv) Input/Output signal

## (1) Input signal to the printer

- DATA: 8-bit parallel signal (positive logic)
- STB: Strobe signal to capture 8-bit data (negative logic)
- RESET: A signal to reset the printer (negative logic)
- SELECT IN: A signal which goes high when the printer is transmitted to IEEE1284 mode

## (2) Output signal from the printer

- ACK: 8-bit data request signal and pulse signal that is output as the last BUSY signal (negative logic)
- BUSY: This signal indicates that the printer is in BUSY status. Input the new data when the level is low. (positive logic)
- FAULT: This signal goes low when the printer is in alarm status. At this time, all control circuit in the printer is stopped. (negative logic)
- PE: This signal indicates that the paper roll runs out or is near to end. (positive logic)
- Select: When the switch is opened, this signal goes high. When the switch is short, this signal goes low.

## (3) Power supply

- +5V DC: 5V
- GND: Common ground on the circuit

## (v) Electronic Characteristics

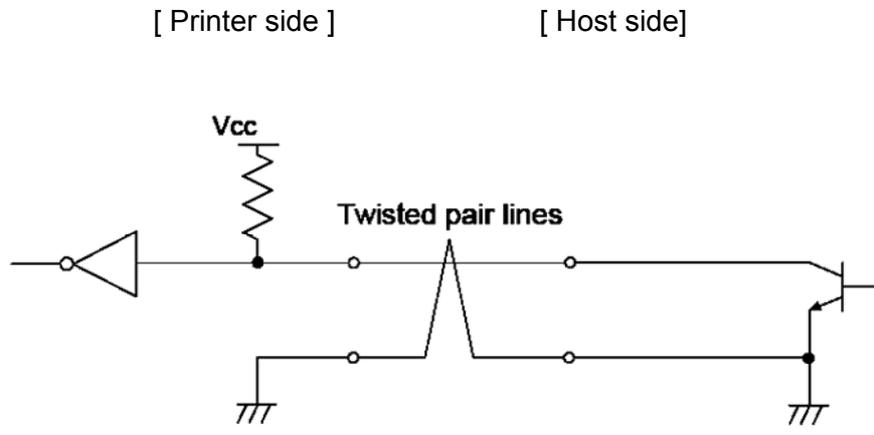
## (1) Input signal level (STBTTL, DATA1Ω8)

- All input signal is C-MOS level.
- High level: Min. 3.8V
- Low level: Max. 1.1V

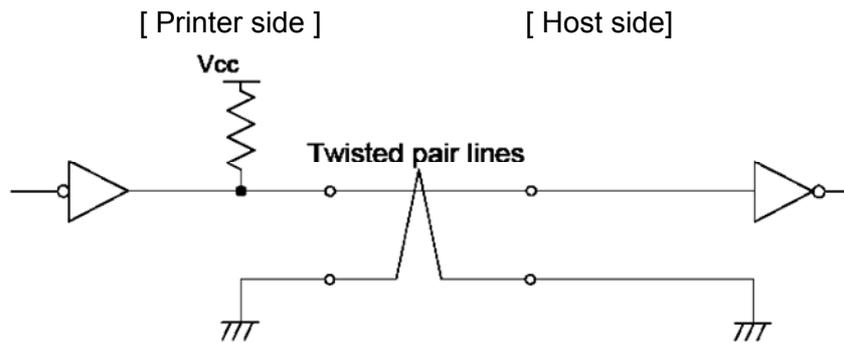
## (2) Output signal level

- All output signal is C-MOS level.
- High level: Min. 2.4V
- Low level: Max. 0.4V

- (3) Condition of input/output  
The input signal DATA1Ω8 are pulled up by 10KΩ, and other input signals are by 10KΩ, respectively.



The output signal DATA1Ω8 are pulled up by 10KΩ, and other output signals are by 2.2KΩ, respectively.



- (vi) Receive control  
When the BUSY signal is low level, the data output from the host can be received, however, when the signal is high level, the data cannot be received.

- (vii) Buffering  
4K-byte data can be buffered, therefore, the host side is released soon.

## 1.7 DRAWER INTERFACE

### 1.7.1 Drawer Kick Drive Signal

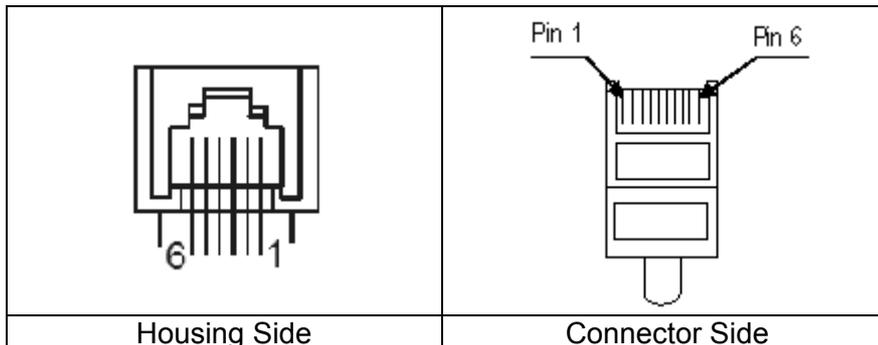
This signal outputs a pulse specified by ESCp. The SW (+) status can be checked by the connector pin #34 for the parallel interface, and by DLE, EOT, GSa, GSr commands for the serial/parallel interface.

### 1.7.2 Electric Characteristics

- 1) Drive voltage: DC24V
- 2) Drive current: Max. 1.5A (within 510ms)
- 3) SW signal: Signal level "L" = 0 ~ 0.5V  
"H" = 3 ~ 5V

### 1.7.3 Connector Description

No.	Signal	Function
1	FG	Case ground
2	DRAWER1	Drawer1 drive signal
3	DRSW	Drawer switch input
4	VDR	Drawer drive power
5	DRAWER2	Drawer2 drive signal
6	GND	Common ground on the circuit

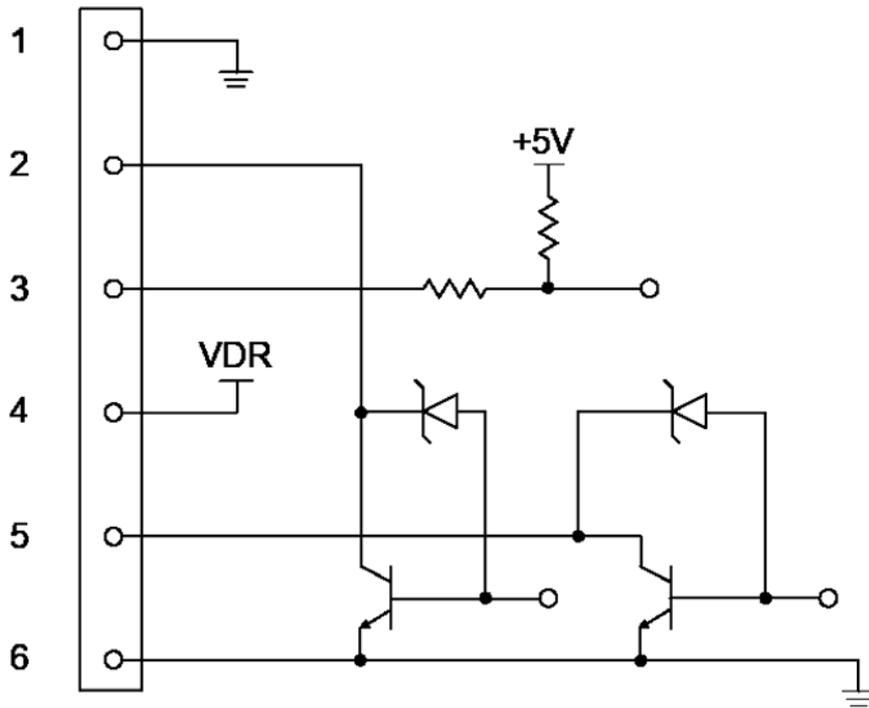


Applicable connector: TM5RJ3-66 (HIROSE) or equivalent  
Adaptable connector: TM3P-66P (HIROSE) or equivalent

### NOTES:

- 1) The printer cannot output this signal while printing.
- 2) The drawer 1 and drawer 2 cannot be driven at the same time.
- 3) A 36ohm-or-more solenoid should be used for the drawer.
- 4) The output current should not exceed 1.5A, which may cause the printer to be broken, burned.
- 5) Connect the solenoid only. A telephone line cannot connect to this drawer connector.
- 6) The drawer of which interface is TOSHIBA TEC standard (4-pin modular type connector) cannot be connected.

1.7.4 Drive Circuit

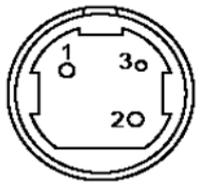


### 1.8 DC POWER CONNECTOR

The DC power connector of the AC adapter is shown below.

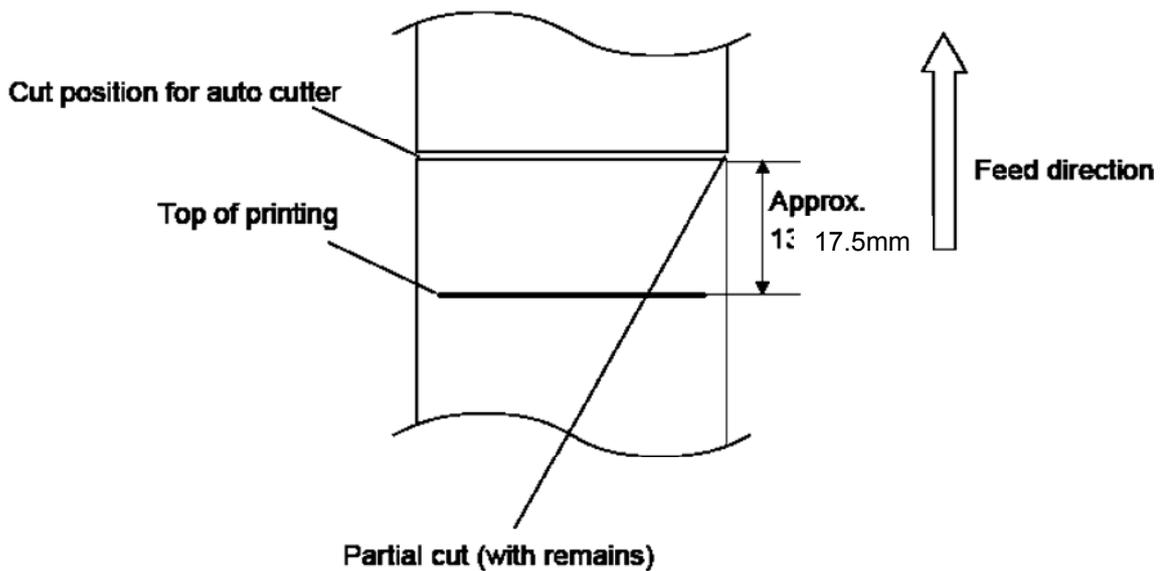
Connector Description

No.	Function
1	+24V
2	GND
3	N.C
SHELL	F.G

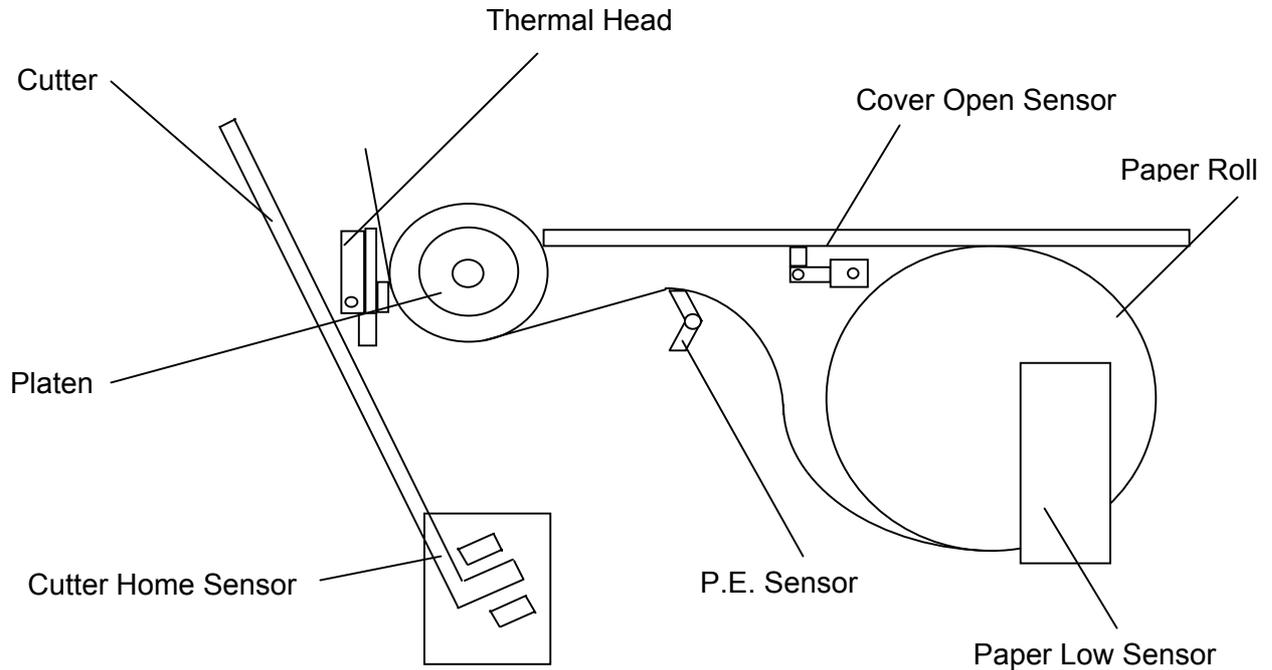


Applicable connector: TCS7960-53-2010 (HOSHIDEN) or equivalent.  
 Adaptable connector: TCP8927-63-1100 (HOSHIDEN) or equivalent.  
 TCP8927-53-1100 (HOSHIDEN) or equivalent.  
 GA1009-38TINI (WIESON) or equivalent.

### 1.9 POSITION OF CUTTER



## 1.10 SENSORS

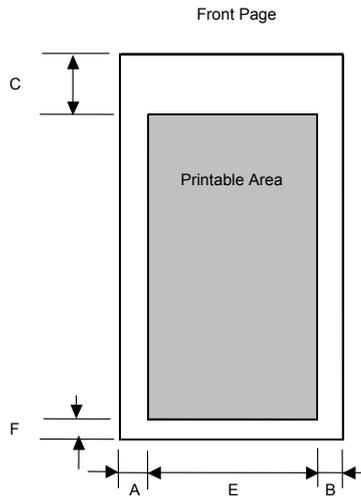


- 1) Cover open sensor  
This sensor performs synchronizing with the printer cover's open/close at the paper roll replacement, and adopts a mechanical switch. The thermal head is also opened/closed together with the printer cover. When the printer cover is opened, the printer stops all performance.
- 2) Paper End Sensor (P.E. Sensor)  
This sensor detects presence or absence of the paper just before the thermal head. If the thermal head is charged without a paper roll, it may be damaged or the head life may be shorten. This sensor prevents them.
- 3) Paper Low Sensor  
This sensor detects that remaining paper is reduced. When remaining paper is reduced and the outer diameter becomes small, the sensor detects it.
- 4) Cutter Home Sensor  
This sensor detects that cutter blade has returned to it's "home" position. If the cover is opened before the cutter is in the home position, damage to the cutter blade will result. This sensor ensures that the cutter blade is always in the home position when not cutting.

## 2. SUPPLY SPECIFICATIONS

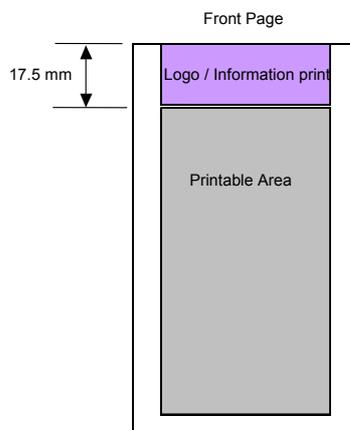
### 2.1 EFFECTIVE PRINTING AREA

#### 80mm paper

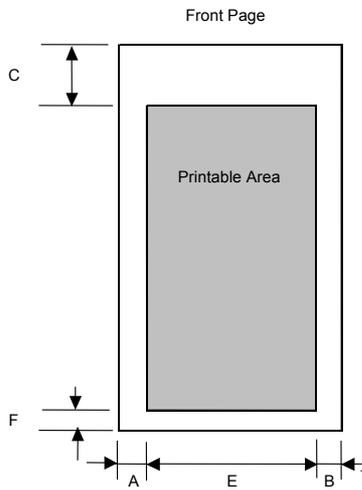


- A = 4 mm +/-1 mm
- B = 4 mm +/-1 mm
- C = 17.5mm +/-1 mm
- E = 72mm
- F = Depend on print data condition  
(recommendation 2mm)

The above shows the printing area for the first transaction.  
Printable area for the second transaction onwards is as follows.

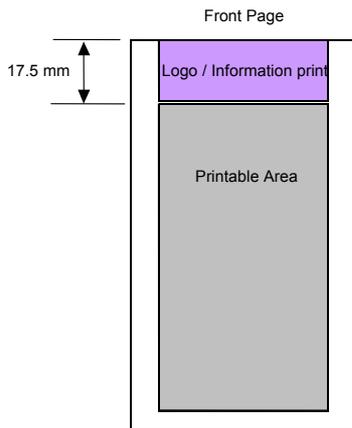


**58mm paper**



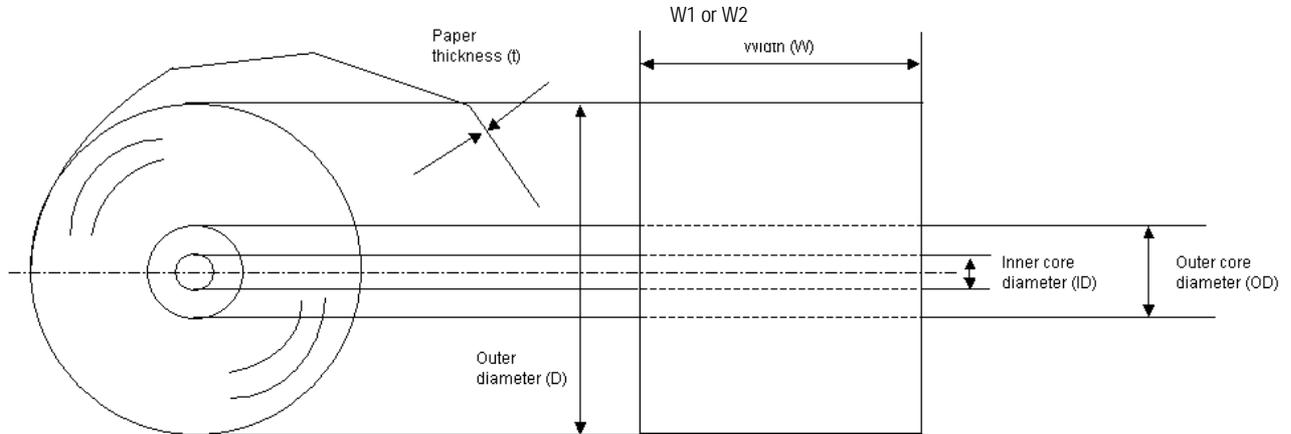
- A = 2 mm +/-1 mm
- B = 2 mm +/-1 mm
- C = 17.5mm +/-1 mm
- E = 54mm
- F = Depend on print data condition (recommendation 2mm)

The above shows the printing area for the first transaction.  
Printable area for the second transaction onwards is as follows.



## 2.2 DESIGN OF PAPER ROLL

Use only paper which meets the following specification.



Paper type	Thermal paper rolled with the print side facing outside
Width (W1)	80 +/- 1.0 mm
Width (W2)	58 +0/ -1.0 mm (With optional 58 mm paper guide)
Outer diameter (D)	76 +/- 2.0 mm
Paper thickness (T)	0.065 +/- 0.005 mm
Weight	53 g/m <sup>2</sup>
Outer core diameter	21.5 mm
Inner core diameter	12.5 +/- 0.5 mm
Recommended thermal paper	Only paper rolled onto a core is acceptable, however, the paper end should not be pasted to the core. TOSHIBA TEC recommends using the following thermal paper for this product. Manufacturer : NIPPON PAPER Type : TF50KS-E

**NOTE:** Use of non-specified paper may cause the following problems.

- Print quality problem
- Paper feed problem
- Cut problem
- Paper jam
- Discoloring, etc.