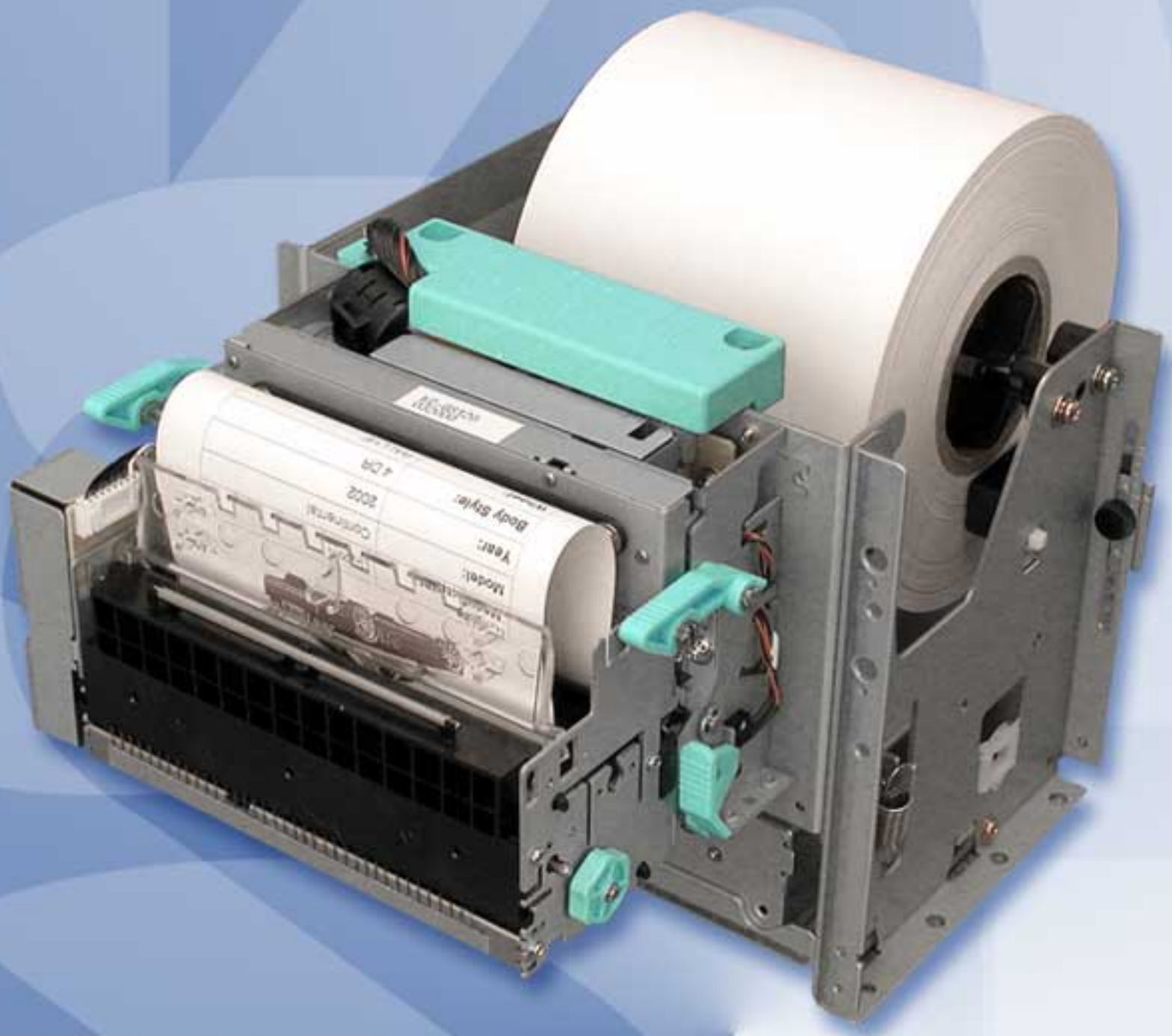
TUP900 Integration Guide



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Integration Guide

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Introduction

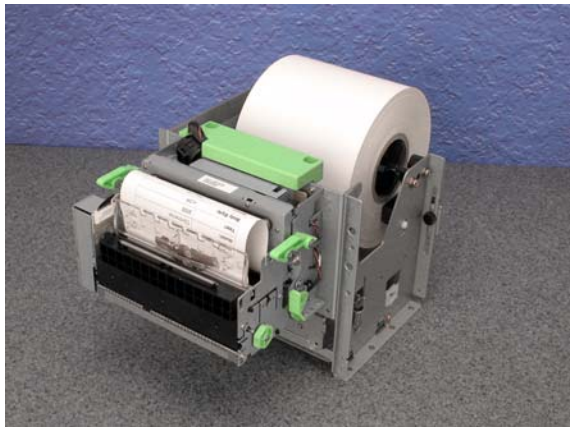
As a world leader in the receipt printing industry, Star Micronics has introduced a number of high quality kiosk printing solutions. Drawing upon our past kiosk printer experience, we've taken the best features, combined them with the latest technology, and developed an exciting new line of kiosk printing solutions.

About the TUP900

The TUP900 kiosk printing solution from Star Micronics brings the ultimate in flexibility and performance to kiosk printing. Its modular design eases integration with many different kiosk configurations.

The looping presenter of the TUP900 ensures jam-free operation by eliminating user access to the document while it is printing. The presenter also allows for the capture of documents which are not removed by the user.

Paper handling capabilities up to 6" diameter paper rolls (up to 10" with optional paper roll holder unit) with widths from 80 to 112 mm give the TUP900 ultimate paper flexibility. The large roll paper holder combined with the looping presenter ensure many hours of unattended operation.

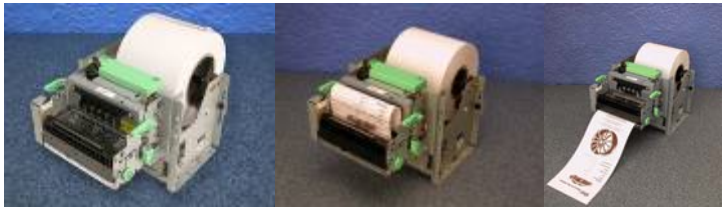


About the TMP900 and its Components

The heart of the TUP992 is the TMP900 mechanism. This 203 dpi direct thermal print mechanism produces brilliant graphics with speed, 2-color capability and unsurpassed reliability. Using simple and robust design, the TMP900 mechanism is sure to provide many years of reliable service.

The guillotine-style auto cutter of the TUP900 ensures crisp cuts with paper thicknesses ranging from 0.065 mm to 0.15 mm. The TUP900 cutter is capable of both full and partial cuts (selectable by command or device driver option).

The PR921 presenter of the TUP900 loops the document while printing is in process. When printing has finished, the document is cut and then delivered out of the presenter. Once presented, the document can be captured or pulled back into the kiosk after a pre-determined length of time or by command. A document presenter protects the printer from jams and damage resulting from eager customers attempting to remove the document before printing has finished. The PR921 also employs document capture (retraction of abandoned documents) which helps to avoid documents being left in the paper chute or falling to the floor around the kiosk.



Print… Loop… Cut… Present

Applications

The TUP/TMP900 printer can be implemented in an array of different kiosk applications ranging from ATM/Banking to gift registries to voting systems. Below are just a few examples of where the TUP/TMP900 printer can be implemented. The possibilities are endless.

Standard Features

The TUP900 comes equipped with these standard features:

Remote Monitoring: A maintenance counter is built in allowing for remote polling of the printer's status. The maintenance counter adds the additional functionality of reporting the number of documents printed, presented, and captured. This counter can even report the amount of paper that has been fed through the printer and how many times the print head has been energized.

Quick Release Mechanism: By lifting gently on the mechanism's handle and pulling forward the mechanism can be rotated on its hinge to allow for unobstructed access to the paper loading area.

Paper Roll Holder: The TUP900 is designed to accommodate paper rolls of up to 6" diameter in its standard configuration. The included 1, 2, and 3-inch paper roll core adapters provide the ultimate in paper handling versatility.

Flip Open Presenter: The presenter of the TUP900 is designed with a quick release mechanism. Release the two restraining clips, open the latch and the presenter swings away from the mechanism for fast and easy access to those areas of the printer that require routine maintenance.

Integrated Control Panel: The TUP900 is provided with an integrated control panel, which avoids the need to create a custom mount and harness for control switches.

Industry Standard Power Connector: The TUP900's power supply input is a female Hoshiden (TCS7960-532010) connector. This connector is common to the PS60L power supply from Star, which is the recommend power supply for the TUP900.

Three-Sensor Presenter: The presenter of the TUP900 is equipped with three separate optical sensors for close monitoring of the document as it passes through the path of the presenter. These sensors allow the presenter to loop a document while it is printing, present the document, and finally capture or eject the document as printing finishes. In addition, the three sensors allow the TUP900's presenter to keep a running tally of the number of documents presented and/or captured.

Near End Sensor: The included near end paper sensor is fully adjustable to allow for reliable use with the different sizes of paper rolls supported by the TUP900. This same sensor includes an extra length of cable for easy use with the optional Large Paper Roll Holder (RHU-T900).

Customizable Options

The TUP900 can be programmed to use one or all of the customizable options listed below to fit your specific application needs. It is with these numerous options that the TUP900 is the most versatile and flexible kiosk printer.

User-Defined Printer ID: Assigning a printer an ID allows for installations of multiple units to track each individual printer by its electronic ID. Using an electronic ID virtually eliminates confusion in identifying one printer from another.

Forms & Tickets Mode: The standard black mark sensor enables the TUP900 to precisely align documents for reliable printing on pre-printed forms and tickets.

Presenter Options: The presenter of the TUP900 is programmable for different modes of presenting documents.

a. **Long Journal Mode:** The presenter's looping function is disabled allowing for unlimited length documents to be printed.
b. **Document Capture:** Once the document is presented, it can be captured after a pre-determined length of time or when the capture command is received. The document can also be ejected at this point. Ejecting a document allows for multiple documents to be printed without user interaction. When a document is presented, but not ejected, that document must be removed by the user or retracted, using the document capture function, before subsequent printing resumes.

Maintenance Counter: The maintenance counter of the TUP900 allows software to poll the printer and receive the status of many different aspects of the printer. Print head usage, the length of paper fed through the printer, the number of cuts performed, and the number of times the printer's memory switch configuration has been rewritten can all be monitored using the maintenance counter.

Top Search – feeds the paper in reverse a few millimeters to reduce the amount of wasted paper at the top of the document.

Printable Width – adjusts the print width for use with different width paper rolls (72 – 104 mm).

Capture Timer – adjusts the amount of time the document is held in the presenter before Document Capture retracts it (0.5 – 127.5 sec).

Near End Sensor Level – adjusts the sensitivity of the paper near end warning.

Black Mark Sense – allows for use of tickets or other pre-printed papers using a black mark to align the print position.

Adjust Print Density – Different papers can produce different printing results. Adjusting the print density allows for optimization of the printed image.

Adjust Print Start Position – allows for minor adjustments to the positioning of the first line of a print job.

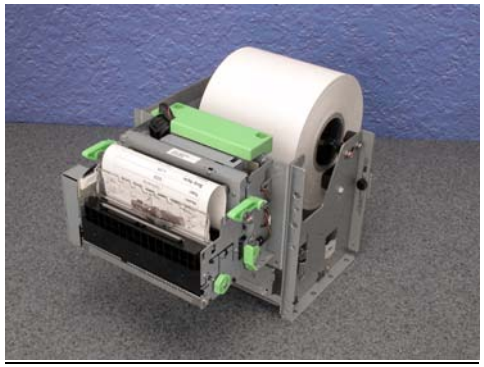
Presenter Mode – selects from several available presenter options:
Loop, Hold (pull off), Capture
Loop, Hold (pull off), Discharge
w/o Loop, Hold (pull off), Capture
w/o Loop, Hold (pull off), Discharge
w/o Loop, discharge (journal mode)

Auto Status Back (ASB) - Automatic status is a group of states that are automatically returned from the printer to the host when the printer's status has changed.

Configurations

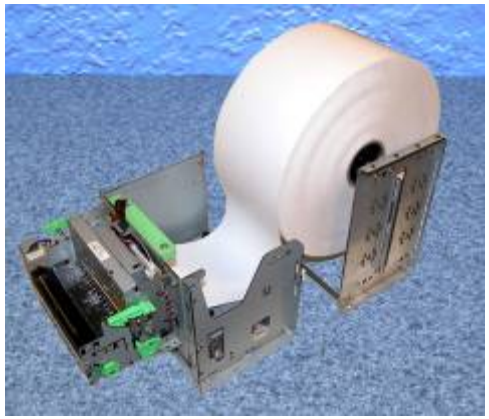
The TUP900 can be configured in many different ways. Each of these configurations offers unique features that can be invaluable to many applications.

Mounting of the TUP900 is simple using the multiple mounting holes built-in to the base of the unit.



The standard configuration for the TUP992 has the control box mounted underneath the unit. This configuration minimizes the overall width of the unit and places the control panel facing towards the paper outlet at the front of the unit.

Here, the control box has been moved to the side of the unit. While this configuration does increase the overall width of the unit, it also puts the control panel facing upwards. This configuration can work well in applications with only rear or side access to the printer.



Adding the RHU-T900 large paper roll holder unit allows for use of a larger paper roll up to 10 inches in diameter. While this configuration does offer the largest paper roll it also requires a rather deep installation.

Mounting the RHU-T900 underneath the TUP992 allows for up to an 8-inch diameter paper roll while still maintaining a relatively low horizontal depth of the enclosure.

Mounting

TUP900

Mounting the Printer Unit

Use the four holes (a, b, c, and d) shown below to secure the printer unit.

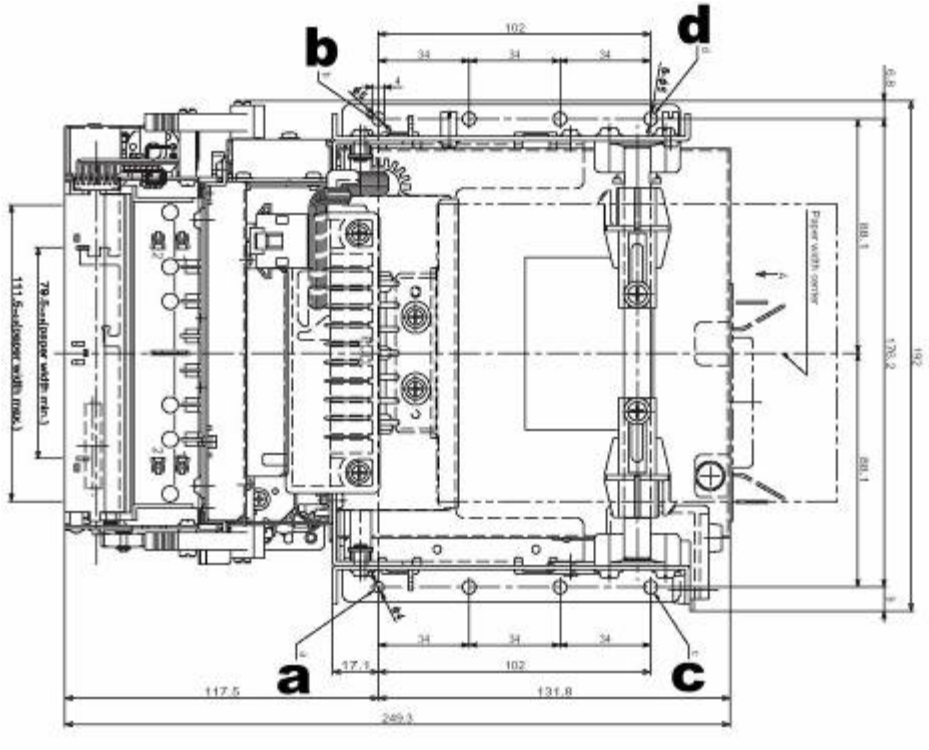


Fig. 8.1A

RHU-T900

Vertical Layout

When using the RHU-T900 the vertical layout, it is necessary to mount the printer to the RHU-T900. Use the printer unit holes (a, b, c and d) and the RHU-T900 unit holes (a, b, c and d) to join the units together. When doing so, align a with a, b with b, and so on. Once the two units are joined, use the holes (A, B, C and D) shown below to secure the entire unit.

Horizontal Layout

Use the four holes (A, B, C and D) shown in figure below to secure the RHU-T900.

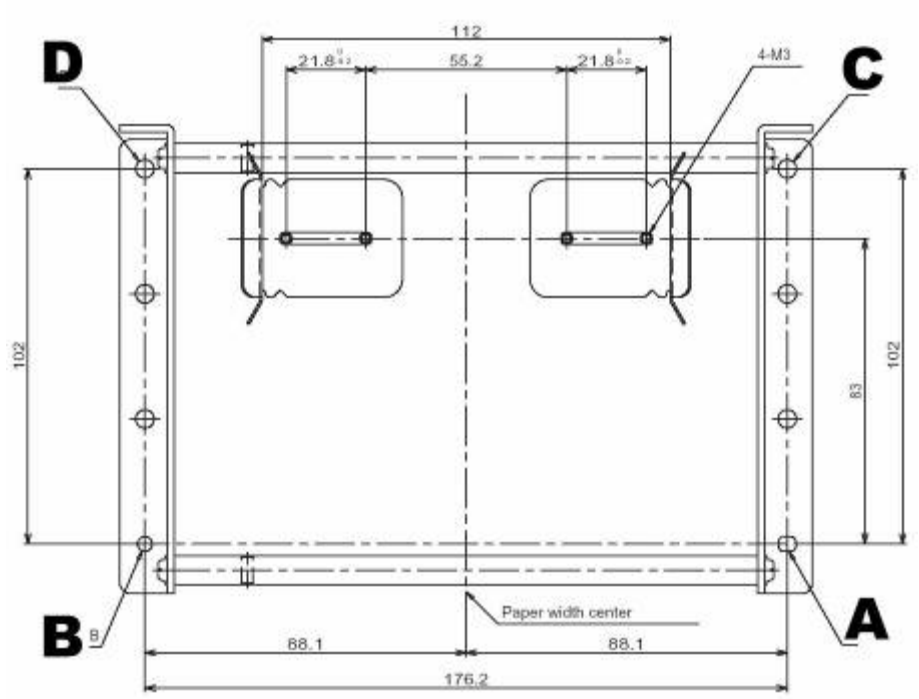


Fig. 8.1B

TMP900

Mounting from the Printer Front

Use the U-shaped grooves (a, b, c and d) and the hole (e) shown in figure 8.2A to fasten the printer mechanism. Also, A and B are for positioning the printer mechanism.

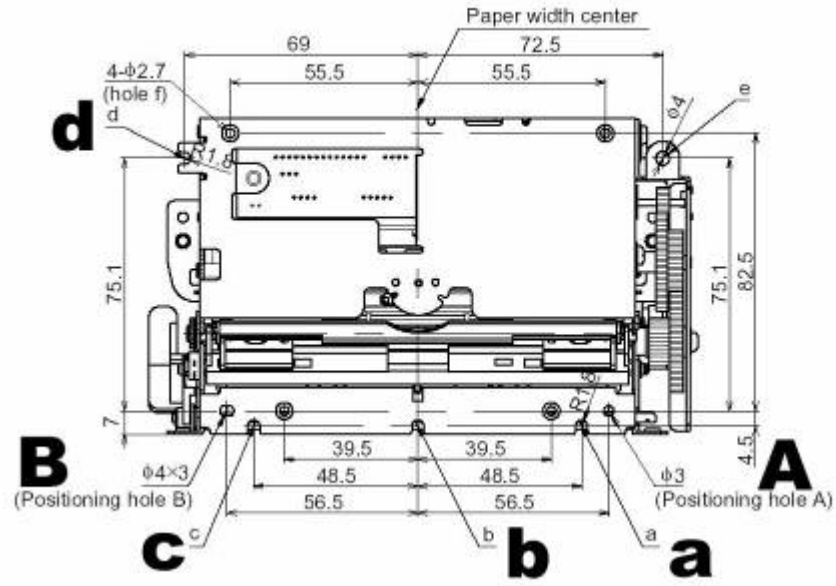


Fig. 8.2A

Mounting from the Printer Rear

Use the four holes (f) shown in fig 8.2B to fasten the printer mechanism. Also, A and B are for positioning the printer mechanism. Use self-tapping screws to fasten the printer mechanism. Control the tightening torque to avoid damaging the threads of the screws when tightening.

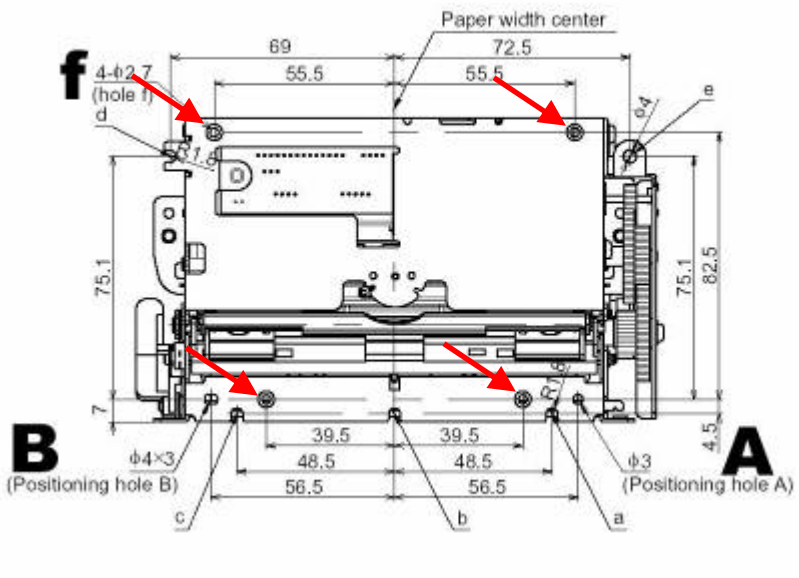


Fig. 8.2B

Optional Accessories

Large Paper Roll Holder: Quickly and easily expand the paper roll size that the TUP900 can support with the optional large paper roll holder. Holding up to a 10-inch diameter roll of paper, the TUP/TMP900 can greatly reduce the number of service calls for paper replacement.

PS60L-24A: The PS60L is a purpose-built power supply with the requirements of the TUP900 printer in mind. This power supply provides a pre-packaged ready-to-run solution for providing power for the TUP900. The PS60L is a universal power supply allowing input voltages from 100V AC to 240V AC at 47-63 Hz. This power supply allows ease of integration to every application with an available standard power outlet.

Interfaces: The TUP/TMP900 is available in each of the following interfaces.

a. **USB:** Based on the USB 1.1 standard, Star's USB interface for the TUP/TMP900 ensures connectivity and fast data transfer with today's more compact devices that sometimes lack traditional serial or parallel interfaces.

b. **Parallel:** Star's parallel interface uses a 36-pin Centronics connector to conform to the IEE1284 bi-directional parallel standard. Parallel connection allows for fast and reliable transfer of data.

c. **Serial:** The RS232C serial communication standard is tried and true. While it does not provide the fastest of data transmission, the maximum allowable cable length of the RS232C specification is second to that of Ethernet.

Large Paper Roll Holder
RHU-T900

Serial, Parallel and USB Interfaces

PS60L-24A Power Supply

Product Name	Description	Part Number
RHU-T900	Large Paper Roll Holder – TUP900	39590020
PS60L-24A	Universal Power Supply	30781440
IFBD-HC04	Parallel Interface Card	39607410
IFBD-HD04	Serial Interface Card	39607400
IFBD-HN04	Serial Interface Card (9-Pin)	39607420
IFBD-HU04	USB Interface Card	39607430

Available Drivers


Microsoft Windows™


Mac OS X™


Linux™

JavaPOS™

OPOS

Available Software and Documentation

Listed are available manuals and utilities for the TUP/TMP900 printer.

Specification and Operation Manual – Lists detailed technical specifications of the TUP900 and provides tips for maintenance and location of the printer.

Programmer's Manual – Provides a listing of the applicable commands for programming the TUP900. Also provides some sample command.

Technical Manual – Complete parts break-down and electrical diagrams required by service organizations and engineers.

Configuration Utility – GUI utility for changing the software configuration of the TUP900.

Logo Store Utility – Stores bitmap graphics in the printer's flash ROM memory for faster printing of logos, coupons and other graphics.

TUP/TMP900 Technical Specifications

Specification		
Print Method	Direct Thermal	
Print Resolution	203dpi (8 dots/mm)	
Print Speed	150mm/sec	
Print Width	72-104mm (adjustable)	
Paper Width	80-112mm (adjustable)	
No. of Columns	69 / 92	
Autocutter	Full-Cut, Guillotine Style	
Presenter	Looping Presenter with Document Capture	
Black Mark Sensor	Standard	
Buffer Size	8K Bytes (Max.)	
Reliability	37 Million Lines MCBF	
Print Head	100Km	
Auto Cutter	1 Million Cuts	
Presenter	1 Million Receipts	
Interface	Serial, 9-Pin Serial, Parallel, USB	
Drivers	Windows, Mac OS X, Linux, OPOS, JavaPOS	
Power Required	24vdc	
Paper Specification	Width (mm)	79.5±0.5 – 111.5±0.5
	Thickness (mm)	0.065 – 0.15
	Diameter (mm)	Outer Max. 150 (254 w/ RHU-T9
	Paper roll shaft	One Inch (Standard)
	Parts for 2 inch and 3 inch core are included in package	
Safety Standards	CE Marking, FCC Class A, VCCI Class A (Not included – UL/C-UL/C-tick/TUV)	
Dimension	192 (W) x 289.5 (D) x 207 (H) (With Paper) 192 (W) x 249.3 (D) x 179 (H) (Without Paper) Conditions: Control board is on bottom, paper outer diameter is 150 mm.	

Parts and Accessories List

Open Frame Printer

Model No.	Description	Part No.
TUP992-24	Kiosk Printer w/ Presenter	39469200

Mechanism and Components

Model No.	Description	Part No.
TMP942-24A	Printer Mechanism	39458000
TBD900-24A	Control Board	39206000
PBD09	Power Supply Board	39206500
PR921-24A	Document Presenter	39515000

Interfaces

Model No.	Description	Part No.
IFBD-HC04	Parallel Interface	39607410
IFBD-HD04	Serial Interface	39607400
IFBD-HN04	Serial interface (9-Pin)	39607420
IFBD-HU04	USB Interface	36907430

Optional Accessories

Model No.	Description	Part No.
RHU-T900	Large Paper Roll Holder Unit	39590020
PS60L-24A	Universal Power Supply	30781440
NEU-T900	TMP900 Near End Paper Sensor (TMP900 ONLY)	39590030
DRU-T900	TMP900 Tension Bar (TMP900 ONLY)	39591000
OPA-T900	TMP900 Operation Panel (TMP900 ONLY)	39591500

**Note: The TMP900 offers all the features of the TUP900 without constraints of being a framed unit. This can increase engineering effort and development time, but the TMP900 offers even greater flexibility.

Glossary

Auto Cutter – A mechanical device that automatically cuts the document after it's printed as opposed to a manual tear bar, where the user is required to separate the document from the roll. Auto cutters ensure a clean edge on each document which in turn limits the possibility of paper jams.

Black Mark Sensor – A black mark sensor or top of form sensor allows the printer to precisely align itself either at the top of a document, the top of a label, or to a specific field of a pre-printed ticket or document. The most common use would be with labels, using a black mark sensor to align the printer precisely with each label with great consistency. Black mark sensing relies on a "black mark" on the reverse side of the document that is positioned according to the printer's specifications. The printer will then use an optical sensor to locate this mark and align itself accordingly.

Device Drivers – Drivers allow for communication between programs on a computer and a printer. Several different types of drivers are available. The proper driver for a given application will vary depending on the application on which the application is run. Some popular platforms for device drivers are:

Document Capture – Kiosk printers are charged with the task of presenting printed documents to the user. Unfortunately, not every user will remove his/her receipt from the kiosk. Receipts that are left in the chute can result in paper jams, abandoned documents lying about on the floor, or the inadvertent sharing of sensitive information. Document capture eliminates this concern by retracting untaken documents back into the kiosk housing. Typically, a bin will be located beneath the printer inside the kiosk. Captured documents will then be dropped in this bin by the printer for later removal.

Interface – An interface is the physical connection through which data is sent to and from a printer. The following are the most common forms of communication interfaces.

> **Parallel** – Parallel communication generally refers to the IEEE 1284 specification. Specifically, parallel communication refers to the simultaneous transmission of data over multiple wires. Parallel communication offers high speed, bi-directional communication between the printer and the host with standardized cabling.
>
> **Serial** – Serial communication typically refers to the RS-232C specification. By definition serial communication relies on the sequential transmission of data over a single wire. Serial communication offers simple cables with extended cable lengths, but is limited in the speed of data transmission.
>
> **USB** – USB or Universal Serial Bus refers to an external device standard specifically intended for peripheral devices. While USB relies on serial communication, the USB standard offers accelerated communication speeds of up to 12 Mbps. USB also allows for the use of up to 127 devices from a single port. Some devices can even derive their power source directly from the USB port eliminating the need for an external power supply for the device.

Maintenance Counters – Maintenance counters allow a printer to report basic information to the user about the printer's status. For example, the number of documents that have been issued, the number of times the auto cutter has cut, and the number of times paper has been fed are few of the many ways the maintenance counter can be used. Maintenance counters allow for the easy monitoring and scheduling of preventative maintenance.

Manuals – There are several different manuals available for most printers. Installation manuals detail the basic specifications and instructions for getting the printer up and running. Specification and operation manuals offer further detail in specifications and add concepts necessary to implement the features of a printer. Programmer's manuals detail control codes or commands used in operation of a printer. Technical manuals provide a detailed break-down of the assembly of the printer part by part and are meant to offer assistance in the maintenance and repair of printers.

Mechanism – When speaking of printers, mechanism refers to the portion of the printer that actually creates the image on the document. A mechanism also generally includes the feeding of paper from the paper roll through the mechanism and delivering a printed document.

Modular – Modular printers are available in two or more independently functional portions. Typically, this includes a "paper roll holder", a "mechanism", and a "presenter". Due to its modular design these components can be configured differently depending on the application. Modular design lends itself well to custom applications while eliminating the need for extraneous engineering and design.

Near End Paper Sensor - By monitoring the amount of paper on a roll, a near end paper sensor is able to alert an operator when the paper roll is about to be depleted. This allows the operator time to arrange for replacement of the depleted roll.

Paper Clutching Mechanism – A paper clutching mechanism avoids excessive wear on the paper feed mechanism of the printer by absorbing the initial force required to get the paper roll moving and allowing a more gradual effort to be exerted by the printer.

Paper Roll Diameter – The diameter of a paper roll specifically refers to the outside diameter of the paper roll. A larger diameter means more paper which in turn means less paper roll changes.

Paper Roll Holder – A paper roll holder supplies the printing mechanism with a continuous supply of paper in a manner that fits that specific printer. As a printing mechanism pulls paper from the roll, more resistance equals more strain on the mechanism. By providing an efficient paper roll holder, the stress and wear on the mechanism is lessened. This equals a longer life for the mechanism and more reliable operation.

Power Supply – Any printer will require a source of power. Power supply specifically refers to the unit that will provide the printer with the amount and intensity of power it requires. Printer power supplies generally have AC (Alternating Current) input and DC (Direct Current) output. The voltage and amperage required by a specific printer will be provided in the Specifications and Operations manual in most cases.

Presenter – A presenter, also known as a "document presenter", will contain the document during printing and only allow the user access to the document after printing has completed. This ensures that the user will not attempt to remove the document prior to completion of printing. By not allowing the user to prematurely remove the document from the printer, paper jams and damage to the printing mechanism will be eliminated. Some presenters offer the added functionality of retracting the document into the enclosure if the user does not remove the document in due time. The amount of time elapsed between presentation and retraction is typically pre-determined by command.

Remote Monitoring – Remote monitoring refers to the ability to retrieve an electronic report of the operational status of a printer via remote communication. This feature is commonly used to monitor maintenance intervals that are based on the amount of use the printer gets. However, remote monitoring can also be used to keep a close eye on paper levels in unattended applications where a "paper out" condition can be quite costly.

Utilities – Configuration of printers generally depends on the use of explicit commands. Utilities use graphical interfaces to automate these command procedures to make use and implementation simpler. Utilities can load graphics to the printer's memory for faster printing or make configuration changes to the printer, for example. Utilities aid in the simple integration of a printer to a specific application.

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