

Developer's Guide

USB/Serial interface board

UB-U09

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CONTENTS

Meaning of Symbols	v
Purpose of this Document	v
Meaning of Terms	v
Related Documents	v
Product Servicing	vi
Revision Information	vi

Chapter 1 **System Preparation**

Available Operating System	1-1
Specifications	1-1
Interface Cable	1-2
Compatible Printers	1-3
Dimensions	1-3
Temperature/Humidity Conditions	1-4

Chapter 2 **Installation**

Installation Precautions	2-1
Package Contents	2-2
Part Name and Descriptions	2-2
USB/serial switching	2-2
Jumper Locations	2-3
Jumper Settings	2-3
Jumper JP2 Settings	2-3
Circuit Board Installation	2-4
Interface Cable Connection	2-5
Serial Interface Cable	2-5
USB Interface Cable	2-6

Chapter 3 **Software**

Required Software to use the USB Interface Function of the UB-U90	3-1
Installation Procedure	3-1
Confirming the BIOS settings	3-1
Installing OPOS	3-1
Installing Advanced Printer Driver	3-2

Chapter 4 **Function Description**

DTR/DSR Control	4-1
XON/XOFF Control	4-2
Printer Reset	4-3

Meaning of Symbols

The following symbols are used in this document. Read the following carefully before handling the product.

WARNING:

You must follow warnings carefully to avoid the following:

- *Bodily injury*
- *Damage to your equipment*
- *Loss of data*

Note:

This symbol indicates items that are important for maintaining the product and useful information for handling the product.

Purpose of this Document

This document is intended to provide all information necessary for system planning, design, installation and application of the UB-U09 for designers and developers of POS systems.

Meaning of Terms

- ❑ In this document, "Serial communication" means the RS232 compliant serial communication.
- ❑ The DIP switch function is assigned to the Memory switch in some models. So the "DIP switch" should be read as Memory switch in corresponding models.

Related Documents

Other documents related to the UB-U09 are the following:

Table 0-1. Related Documents

Document	Contents
UB-U09 Specifications	Detailed specifications of the UB-U09
UB-U09 Operating Manual	Intended for POS terminal operators, this manual provides information on handling the UB-U09 safely and correctly.

Product Servicing

This product cannot be serviced at the component level. If damage occurs, the UB-U09 should be replaced as a unit.

Revision Information

Revision	Page	Altered Items and Contents
Rev. A		
Rev. B	2-2, 2-4	Descriptions of hex mounting screws eliminated.

Chapter 1

System Preparation

Available Operating System

- ❑ Microsoft Windows 98[®] Second Edition and above.
(Available OS is limited only when using the USB interface. There is no limitation when using the serial interface.)

Specifications

The UB-U90, which has been developed for EPSON[®] TM Printers, has serial and USB interface functions. You can switch between the functions by using the USB/Serial switching located on the front of the UB-U09.

- ❑ When using the USB interface, the fastest communication speed is 12Mbps. (bps: bit per second)
- ❑ When using USB interface, the device driver is necessary. For more details, see Chapter 3 "Software"

Interface Type:	USB Specification Rev.1.1
Communication Speed:	Full Speed mode (12Mbit/s)
Transfer Method:	Bulk Transfer method*
Electrical:	USB self electrical function
USB BUS Consumption:	0mA (provided from TM printer)
USB Packet Size:	
USB Bulk OUT (TM)	8bytes
USB Bulk IN (TM)	64bytes

(*) This interface board uses the bulk transfer method, which is driven by the host computer. Therefore, the printer cannot process data sending interrupts as different from RS232 transfer. The printer's status buffer is larger than 100 bytes. Status data above the buffer capacity will be cancelled. To prevent the cancellation, the host computer needs to read the status data periodically.

The maximum transmission speed is 115.2k bps when using a serial interface.

Supported standard	EIA/TIA RS-232 standard compliant
Data transfer method	Bit Serial
Synchronization	(Asynchronous)
Handshaking*	DTR/DSR or XON/XOFF control
Signal level	Mark: -3 to -15 V = Logic 1, OFF Space: +3 to 15 V = Logic 0, ON
Communications speed* (Baud rate)	115200 bps maximum
Data bit length*	7 or 8 bits
Parity*	None, Odd or Even
Stop bits	One or more bits

(*) Handshaking, communications speed, data bit length and parity are set by DIP switches on the TM Printer.

Interface Cable

Prepare a serial or USB interface cable according to customer requirements. Note that while the standard serial interface of the TM printers uses a 25-pin D-sub connector, the UB-U09 uses a 9-pin D-sub connector.

Table 1-1 shows the recommended wiring for the interface cable.

Table 1-1 Recommended wiring

Host side	UB-U09 side (Female 9-pin D-sub)
---	Pin 1 not connected
TXD	Pin 2 RXD
RXD	Pin 3 TXD
DSR	Pin 4 DTR
SG	Pin 5 SG
DTR	Pin 6 DSR (*1)(*2)
CTS	Pin 7 RTS
Reset	Pin 9 INIT(*2)
Frame GND	Frame GND

(*1) If pin 6 (DSR) is left unconnected, TM printer DIP switch must be set to "disable reset via pin 6." This setting, in combination with the setting of jumper JP2 on the UB-U09, causes the printer to be continually reset. Table 1-2 shows the relationship between jumper JP2 on the UB-U09 and "disable reset via pin 6" setting on the TM printer.

(*2) To reset the TM printer through the interface, the reset signal can be applied to pin 6 or pin 9.

Table 1-2 Relationship between jumper JP2 and TM printer pin 6 reset signals

TM printer DIP switch setting	Jumper JP2 on UB-U09	
	1-2 Shorted	2-3 Shorted
Enable reset via pin 6	When pin 6 (DSR) is open, the printer is reset.	The printer is not reset even though pin 6 (DSR) is open.
Disable reset via pin 6	The printer is not reset even though pin 6 (DSR) is open.	The printer is not reset even though pin 6 (DSR) is open.

Compatible Printers

UB-U09 is available for all TM printers that have a removable interface board. (Confirm the available printers for OPOS/printer driver.)

The following printer is not available.

- RP-U420

Dimensions

The external dimensions of the UB-U09 are shown below.

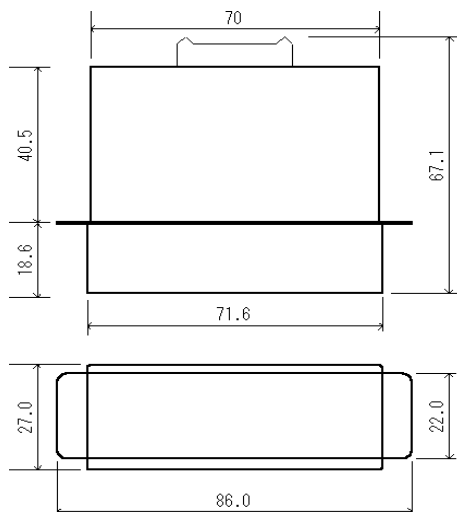


Figure 1-1 UB-U09 External dimensions

Temperature/Humidity Conditions

Refer to the TM printer and customer display specifications for operating temperature and humidity specifications.

Chapter 2

Installation

Installation Precautions

WARNING

- ❑ Before installing, disconnect the power unit from the TM printer (as well as turning the power switch off).
Even when the power switch is off, voltage is present at some points on the circuit board. Changing components while the power unit is connected can cause damage to the UB-U09 and the printer.
- ❑ A grounded wrist strap should be worn during installation to avoid damage from static electricity.
- ❑ To avoid damage from static electricity when the unit is removed, place it on an static-safe surface such as conductive foam.
- ❑ Protect the unit from vibration and shock that could damage to the unit.
- ❑ Be careful to avoid dropping conductive objects such as paper clips on the circuit board, as they could short circuit connections and cause damage from excessive current.
- ❑ This product should only be connected with the devices specified in this document. Connecting other devices could cause damage, fire, or explosion.
- ❑ Do not attempt to wire this product other than as described in this document. Improper wiring could cause damage, fire, or explosion.
- ❑ Do not attempt to disassemble or modify this product, as injury or electric shock could result.
- ❑ Do not operate this product in a very humid or dusty environment, as it could present a fire or electric shock hazard.
- ❑ Components on the circuit board within this product can become hot. Before handling the product, allow about ten minutes with the power off for it to cool.
- ❑ To avoid electric shock, do not install this product or connect cables to it during a thunderstorm.

Package Contents

The following items should be included in the UB-U09 package. You can get a locking wire strain relief separately by using the part numbers in the brackets.

- ❑ UB-U09
- ❑ User's Manual
- ❑ Locking wire strain relief <1061268>

Part Name and Descriptions

Install the locking wire strain relief in the position shown below. Hook the USB cables through the locking wire strain relief and keep them in place.

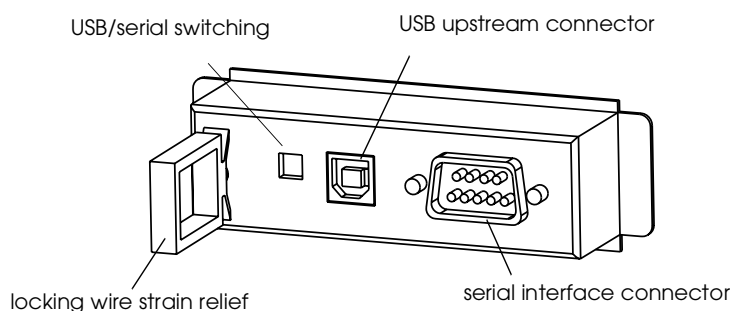


Figure 2-1

USB/serial switching

The settings of the USB/serial switching are shown in the table below.

Table 2-1 USB/Serial switching

Switch number	Function	ON	OFF	Factory default
1	Reserved	Fixed to OFF		OFF
2	Selects interface	Serial	USB	ON



Note:

When the USB/Serial Switching button is turned off and the USB interface is selected as well, the DM-D connector of the TM series printer is not available. When the serial interface is selected, DM-D connector of the TM series printer is available as usual.

Jumper Locations

The jumper location is shown below.

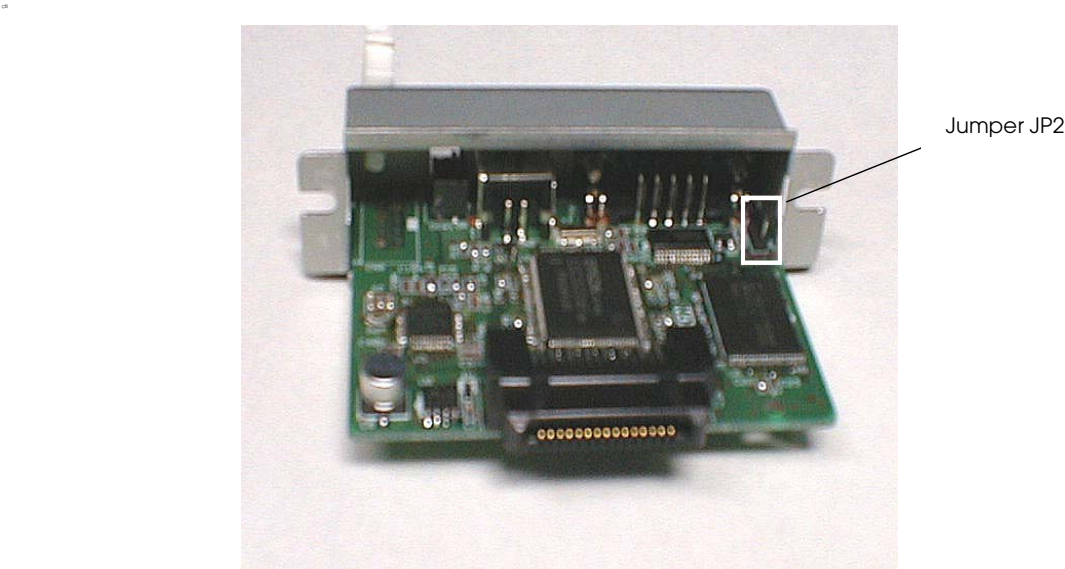


Figure 2-2

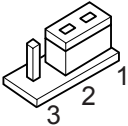
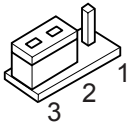
Jumper Settings

The UB-U09 has a jumper: JP2. JP2 selects the function* of pin 6 (DSR) of the serial connector.

(*) Refer to Printer Reset in Chapter 4 for a description of the functions of pin 6 (DSR) of the serial connector.

Jumper JP2 Settings

Table 2-2 Serial Connector Pin 6 (DSR) Function Settings

JP2	1-2 shorted	2-3 shorted
Settings	Select reset up on Mark input 	Select reset up on Space input 

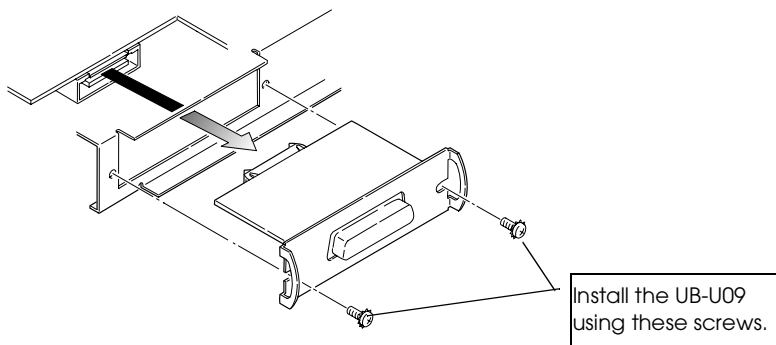
As shipped from the factory, pins 1 and 2 of JP2 are shorted.

⚠ WARNING

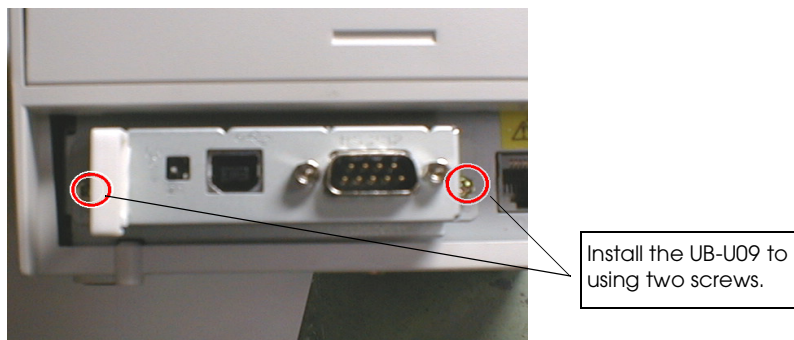
Do not set JP2 open (without jumper). Shorting pins other than 1 and 2 or 2 and 3 of JP2 could cause incorrect operation or damage to the UB-U09 communications IC.

Circuit Board Installation

1. If an interface circuit board is already installed in the TM printer, remove it. Re-use the screws when installing the UB-U09.



2. Install the UB-U09 in the TM printer, and tighten the screws.



Interface Cable Connection

Serial Interface Cable

1. Confirm that the printer and host computer are turned off.
2. Connect the cable to the serial interface connector on the UB-U09.

**Note:**

Connect cables that have a smaller shell than the size indicated in the Figure 2-3. If the shell size is bigger, it may not be connected.

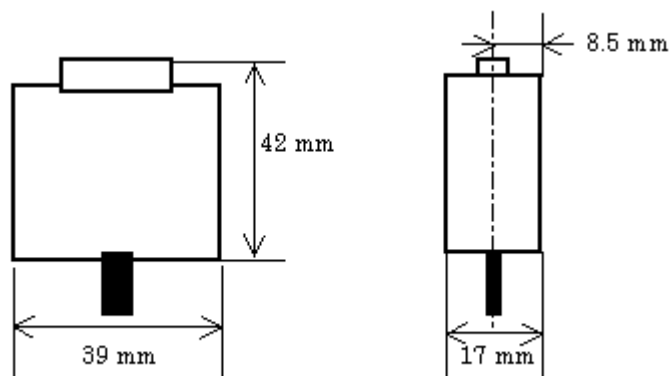
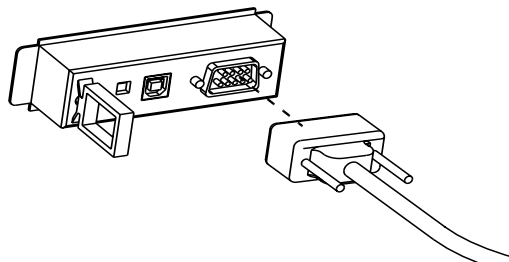


Figure 2-3

3. Tighten the screws on both sides of the plug.

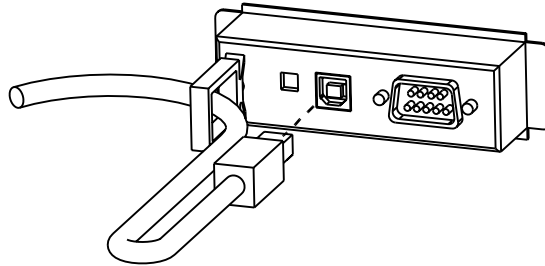
**Note:**

If the interface cable includes a separate ground line, the ground line should be connected to the printer at either of the two UB-U09 mounting screws.

4. Connect the other end of the cable to the host computer.
5. Change the printer settings to the serial interface settings. For details, see the settings described in the printer documentation.

USB Interface Cable

1. Confirm that the printer and host computer are turned off.
2. Hook USB cable through the locking wire strain relief to keep them in place.



3. Insert the square connector end of the USB cable into the upstream connector of the UB-U09.
4. Insert the opposite end of the USB cable into the downstream connector of the host computer.
5. Change the printer settings to the parallel interface setting. For details, see the settings described in the printer documentation.

Chapter 3

Software

Required Software to use the USB Interface Function of the UB-U90

When using the USB interface function of the UB-U90, you need one of the following drivers. Contact your dealer to find out the compatible printers and how to get the software.

- ☐ OPOS
- ☐ Advanced Printer Driver

Installation Procedure

The installation procedure is as follows. If you plan to use the serial interface only, this procedure is not necessary.

1. Confirm the BIOS settings.
2. Install the driver. (See the instructions to install the driver you plan to use.)

Confirming the BIOS settings

Make sure that the USB is set to Enable in BIOS setting of the PC. If it is set to Disable, USB is not available.

Installing OPOS

1. First, prepare a blank FD. Start the steps below while the TM printer and PC are not connected.
2. Install OPOS following the Installation Wizard. See the OPOS manual packed with the Install Disk for details.
3. The device driver [TMUSB90.SYS] and [TMUSB90.INF] are saved in the folder in which OPOS is installed. Save them to the FD.
4. Connect the printer with UB-U90 attached to PC while the printer is off.
5. Turn on the printer. Installation starts by Plug and Play feature.
6. When the message [*This wizard searches for new drivers for*] appears, click **Next**.
7. [*What do you want Windows to do?*] appears. Then select [*Search for the best driver for your device. (Recommended)*] option and click **Next**.
8. Check the Specify a location check box then click **Browse**.

9. Insert the FD you made at step 3 into the floppy disk drive. Then select [TMUSB90.inf].
10. When the message [Search for driver files for the following hardware device. EPSON USB Controller for TM Printer Series. Windows is now ready to install the best for this device?.] appears as shown in Figure 3-1, click **Next**. Then click **Finish** in the next window.



Figure 3-1

11. While the printer is on, open the device manager. If the [EPSON USB Controller for TM Printer Series] exists on the Universal Serial BUS controllers, the installation is successful.
12. Start the OPOS ADK; then click **Add** for the device. Select the printer that has "U" after its name.
13. Open [Check Health Interactive] and start the test printing. When the test printing is completed properly, the installation is finished.

Installing Advanced Printer Driver

1. First, prepare a blank FD. Start the steps below while the TM printer and PC are not connected.
2. Start the Advanced Printer Driver installer (ADT***J.exe), and follow the instructions on Wizard.
3. The device driver [TMUSB90.SYS] and [TMUSB90.INF] are saved in the folder in which Advanced Printer Driver is installed. Save them to the FD.
4. Connect the printer with UB-U90 attached to PC while the printer is off.
5. Turn on the printer. Installation starts by Plug and Play feature.
6. When you see the message [This wizard searches for new drivers for], click **Next**.
7. [What do you want Windows to do?] appears. Then select [Search for the best driver for your device. (Recommended)] option and click **Next**.

8. Check the Specify a location check box then click **Browse**.
9. Insert the FD you made at step 3 into the floppy disk drive. Then select [TMUSB90.inf].
10. When the message [Search for driver files for the following hardware device. EPSON USB Controller for TM Printer Series. Windows is now ready to install the best for this device?.] appears as the figure 3-2, click **Next**. Then click **Finish** on the next window.

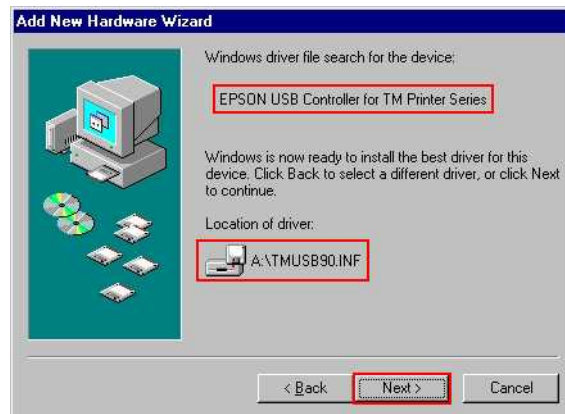


Figure 3-2

11. While the printer is on, open the device manager. If the [EPSON USB Controller for TM Printer Series] exists on the Universal Serial BUS controllers, the installation is successful.
12. Select Setting from the Start menu; then select Printers.
13. Open the Property of the installed printer, and make the printer port setting to TMUSB000. If you connect some printers, set the proper numbers. such as TMUSB001, 002.. .
14. Turn on the printer and start test printing. When the test printing is completed properly, the installation is finished.

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Chapter 4

Function Description

The following functions are available when using the serial interface. Each function is described below.

- ☐ DTR/DSR control
- ☐ XON/XOFF control
- ☐ Printer reset

DTR/DSR Control

The DTR signal indicates the BUSY/READY status of the TM printer; Space status indicates that the TM printer is READY; and Mark status indicates the printer is BUSY. The handshaking mode used by the TM printer to determine the conditions under which the printer becomes BUSY is determined by a DIP switch setting on the printer, as shown below.

Table 4-1 TM printer BUSY conditions

Printer DIP Switch Setting	Printer BUSY Condition
ON	<ul style="list-style-type: none">• During power on or resetting• While self-test is executing• When the receive buffer is full
OFF	<ul style="list-style-type: none">• At power on or reset• During self-test• When the cover is open• When feeding paper with the FEED button• When the printer has stopped due to being out of paper• When an error has occurred• When the receive buffer is full

The DSR signal indicates whether the host can receive data: the Space status indicates that the host is ready to receive, and the Mark status indicates that the host is not able to receive.

XON/XOFF Control

The XON code is defined as character 11h, and the XOFF code is 13h. A DIP switch on the TM printer selects the handshaking conditions under which it sends the XON and XOFF codes.

Table 4-2 TM printer XON/XOFF sending conditions

Printer DIP Switch Setting	XON/XOFF Sending	Sending Condition
ON	Sends XON	<ul style="list-style-type: none">• When first online after power on or reset• When a receive buffer full condition is cancelled
	Sends XOFF	<ul style="list-style-type: none">• When the receive buffer becomes full
OFF	Sends XON	<ul style="list-style-type: none">• When first online after power on or reset• When a receive buffer full condition is cancelled• When switched from offline to online (*)• When recovering from a recoverable error by a command
	Sends XOFF	<ul style="list-style-type: none">• When the receive buffer becomes full• When switched from offline to online (*)

(*) During the receive buffer full state, XON and XOFF are not sent even when the online/offline state is changed.

The term “offline” as used above means any of the following conditions:

- ☐ During power-on or resetting.
- ☐ While executing the self test.
- ☐ While the cover is open.
- ☐ When feeding paper by the paper feed button.
- ☐ When printing has stopped due to out-of-paper condition.
- ☐ When an error has occurred.

The term “online” refers to the state when any of the above conditions has been cancelled.

Printer Reset

The UB-U09 can reset the TM printer through the serial interface by applying a signal to pin 6 or pin 9 of the interface.

The reset signal logic can be selected by jumper JP2 on the UB-U09 for resetting using pin 6 (DSR).

To use pin 9 (INIT), the reset signal logic is fixed at Space level.

Table 4-3 Reset Signal Logic Selection

	Jumper JP2 Setting	Reset Condition
Reset by pin 6 (DSR)	1-2 shorted	Reset upon Mark level (reset occurs when this pin is open circuit)
	2-3 shorted	Reset upon Space level input
Reset by pin 9 (INIT)	–	Reset upon Space level input

To reset the printer, the reset signal must conform to the electrical characteristics specified in the *UB-U09 Specifications*.

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