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EPSON

Unified Interface Board for USB and Serial

UB-U09

Specification

STANDARD	
Rev. No.	A
Notes	

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REVISION SHEET

Sheet 1 of 1

The table below indicates which pages in this specification have been revised.
Before reading this specification, be sure you have the correct version of each page.

Revisions		Design Section			Sheet Rev. No.						
Rev.	Document	WRT	CHK	APL	Sheet	Rev.	Sheet	Rev.	Sheet	Rev.	
A	Enactment	Aruga	--	Nobutani	I	A					
					II	A					
					III	A					
					IV	A					
					1	A					
					2	A					
					3	A					
					4	A					
					5	A					
					6	A					
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				Cover	Rev. Sheet	Scope	General Features	Table of Contents			
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- 1) Do not drop conductive material such as a paper clip onto the circuit board.
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- 2) Be sure to connect the devices with the specified cables.
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- 4) Be sure to set this equipment on a firm, stable, horizontal base.
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- 5) Do not use in locations subject to high humidity or dust levels.
Excessive humidity and dust may cause equipment damage, fire, or shock.
- 6) Do not place heavy objects on top of this product. Never stand or lean on this product.
Equipment may fall or collapse, causing breakage and possible injury.
- 7) To ensure safety, please unplug this product prior to leaving it unused for an extended period.

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General Description

1. Application

This specification applies to the UB-U09 interface board.

2. Features

The UB-U09 is an universal interface board which can communicate with USB or Serial interface by itself.

- USB interface

High speed communication with 12 Mbps

Plug & Play, Hot Insertion & Removal is supported

- Serial interface

Can communicate with the host computer at a maximum of 115.2 Kbps, if the TM series printer can also communicate at this speed.

[bps: bits per second]

The serial interface of the UB-U09 is compatible with RS-232.

Since some TM printers use a memory switch instead of a DIP switch for the interface, you may need to use a memory switch instead of a DIP switch described in this specification.

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1. OVERVIEW

1.1 Structure

The UB-U09 interface board is installed in an EPSON TM series printer and provides a USB interface function and a serial interface function by itself.

The DIP switch on the face of the UB-U09 is used to choose either USB or serial interface. Note that the USB and the serial interface cannot be used simultaneously.

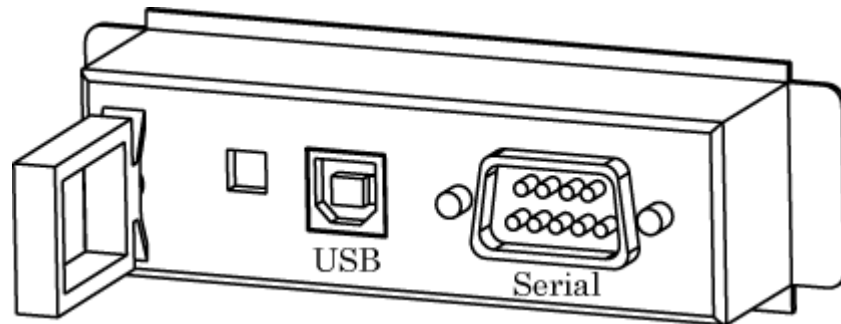


Figure 1.1 UB-U09 Interface Board Structure

1.2 TM Printer which can be Equipped with the UB-U09

This is for TM printers designed for the replaceable universal interface board.

* For usage with OPOS or printer driver, check whether the UB-U09 can work.

The following product does not support the UB-U09.

- RP-U420

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2. ELECTRICAL SPECIFICATIONS

2.1 USB Communications Specifications

2.1.1 USB function specifications

USB Specification:	USB Specification 1.1
Speed:	USB full speed mode (12 MHz)
Type:	USB bulk transfers
Power:	USB self-powered function device
Bus current:	0 mA (All power is supplied from the TM series printer.)
USB packet size:	USB bulk OUT (TM) 8 bytes
	USB bulk IN (TM) 64 bytes

2.1.2 Receiving status information from the printer through the USB interface

It is possible to send information on the status of the TM series Printer to the host computer by using the USB Bulk transfer mode when using the USB interface board.

It is not possible to send status data to the host from the printer automatically because USB bulk transfer is controlled by the host.

Status information buffer size of the printer is more than 100 bytes.

Any status information in excess of the buffer size is lost. In order to avoid losing any of status data that is to be sent, the host needs to read the status regularly.

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2.2 Serial Communications

2.2.1 Serial interface specifications

- | | |
|-----------------------|---|
| 1) Data transmission: | Bit serial |
| 2) Synchronization: | Asynchronous |
| 3) Handshaking: | DTR/DSR or XON/XOFF control |
| 4) Signal levels: | MARK = -3 to -15 V: Logic "1" or OFF
SPACE = +3 to +15 V: Logic "0" or ON |
| 5) Data Format | Data length: 7 bit or 8 bit
Stop bit: 1 bit or more
Baud rate: Max.115,200 bps
[bps: bits per second]
Parity: Odd, Even, None |

* Flow control and data format are set with the DIP switch on the TM series printer

2.2.2 Serial interface connector

- 1) Connector: DSUB-9 pin (male) connector
Interface connector terminal assignments and signal functions are described in Table 2.1.

Table 2.1 Interface Connector Pin Assignments

Pin No.	Signal name	Signal direction	Function
SHELL	FG	—	Frame ground
1	NC	—	Not connected
2	RXD	Input	Receive data
3	TXD	Output	Transmit data
4	DTR	Output	1) When DTR/DSR control is selected, this signal indicates whether the printer is busy or ready. SPACE indicates that the printer is ready to receive data, and MARK indicates that the printer is busy. Changing the DIP switch enables the BUSY condition. Refer to each specification of the TM printers for the BUSY (or MARK) conditions. 2) When XON/XOFF control is selected, this signal indicates whether the printer is properly connected and is ready to receive data from the host computer. SPACE indicates that the printer is properly connected and is ready to receive data. Refer to each specification of the TM printers for the BUSY (or MARK) conditions.
5	SG	—	Signal ground

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Pin No.	Signal name	Signal direction	Function
6	DSR	Input	<p>This signal indicates whether the host computer can receive data. SPACE indicates that the host computer can receive data, and MARK indicates that the host computer cannot receive data.</p> <p>① When DTR/DSR control is selected, the printer transmits data after confirming this signal (except when transmitting data by DLE EOT or ASB).</p> <p>② When XON/XOFF control is selected, the printer does not check the condition of this signal.</p> <p>This signal can be used as a reset signal for the printer. In this case, the DIP switch of the TM printer (setting for #6 pin reset signal) must be set to On. The printer is reset when the signal remains MARK or SPACE for 1 ms or more. Refer to section 2.2.3 for signal logic.</p>
7	RTS	Output	<p>Either of the following settings can be selected by the DIP switch setting of the TM printer:</p> <p>① Same as DTR signal (pin 4)</p> <p>② ANDed signal with the DTR signal of the customer display and the DTR signal of the printer (if both are SPACE, the output signal becomes SPACE).</p> <p>Note that some of TM printers may not be set with ②.</p>
8	RESERVE	—	Reserved
9	INIT	Input	<p>This signal can be used as a reset signal for the printer. In this case, the DIP switch of the TM series printer (setting for #25 pin reset signal) must be set to On.</p> <p>The printer is reset when the signal remains SPACE for 1 ms or more.</p>


2) Recommended cable

The signal connections for the cable between the UB-U09 and the host computer are recommended as shown in Figure 2.1.

HOST		UB-U09	
Signal Name		Pin No.	Signal Name
FG	.....	SHELL	FG
TXD	.....	2	RXD
RXD	.....	3	TXD
DSR	.....	4	DTR
SG	.....	5	SG
DTR	.....	6	DSR
CTS	.....	7	RTS
RTS	.....	8	CTS(REERVED)
[Reset signal	.....	9	INIT] (*1)

NOTE: *1) When the reset signal of the host computer is used.

Figure 2.1 Cable Signal Connections

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2.1.3 Notes on resetting the printer using the interface

1) Outline

A TM series printer that is equipped with a UB-U09 can be reset through the interface by the DIP switch setting on the printer.

2) Reset signal

It is possible to reset the TM series printer from the host computer, using interface pin 6 or 9 (DSUB-9 connector) by changing the DIP switch setting. (Refer to the specification of each TM series printer for the DIP switch setting. The description of pin 25 in the specification for each TM series printer is that of pin 9.) To reset the printer, the requirements as listed in Table 2.2 and 2.3 must be satisfied.

NOTE: When pin 6 (DSR) is used to reset the printer, the signal logic can be changed by the jumper setting on the UB-U09.

Table 2.2 Settings for Signal Input to TM Series Printers

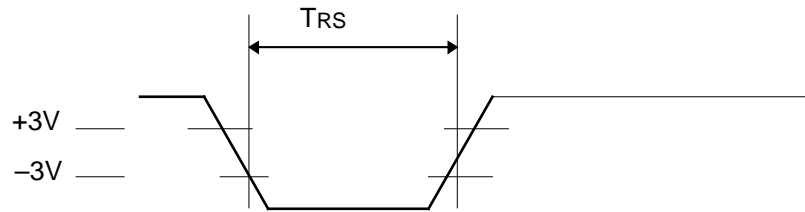
Signal line	Jumper (J2) setting	Reset Condition	Remark
Pin 6 (DSR)	Short 1 and 2	MARK level input (same when terminals open)	In the default setting pin 1 and 2 are shorted.
	Short 2 and 3	SPACE level input	
Pin 9 (INIT)	---	SPACE level input	

Table 2.3 Electrical Characteristics of Reset Signals

DC characteristics			
Characteristic	Code	Rated Values	
		Pin 6 (DSR)	Pin 9 (INIT)
Input HIGH voltage	V _{IH}	+3 to +15 V	+3 to +15 V
Input LOW voltage	V _{IL}	−15 to −3 V	−15 to −3 V
Input impedance	R _{IN}	3 kΩ (minimum)	
AC characteristics			
Characteristic	Code	Rated Values	
Minimum reset pulse width	TR _S	1 ms (minimum)	

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- When using pin 6 (DSR)
[Pin 1 and 2 of JP2 are shorted]



[Pin 2 and 3 of JP2 are shorted]

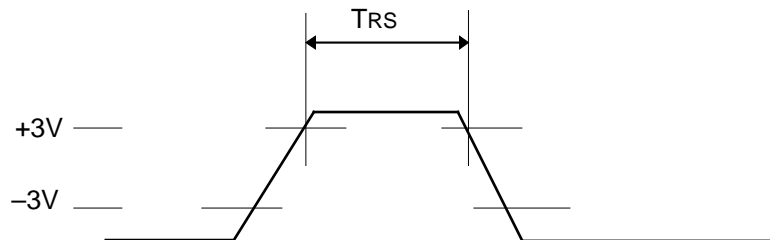


Figure 2.2 Minimum Reset Pulse Width (Pin 6: DSR)

- When using pin 9 (INIT)

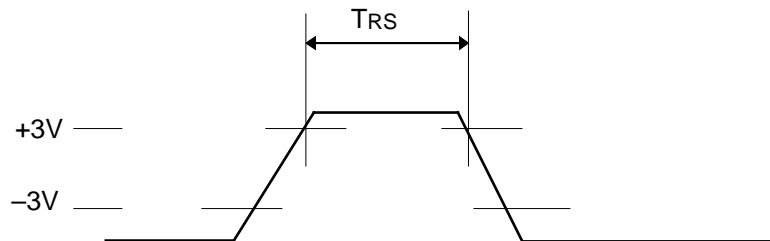


Figure 2.2.3 Minimum Reset Pulse Width (Pin 9: INIT)

- NOTES:
- When a signal is input that does not satisfy the requirements shown in Table 2.2, 2.3 and in Figure 2.2, 2.3, printer operation is not guaranteed.
 - When pin 6 (DSR) is open, the TM series printer is operating in the conditions shown in Table 2.4.

Table 2.4 Printer Status (Pin 6 (DSR) is Open)

DIP switch to set the pin 6 reset	Pin 1 and 2 of JP2 shorted	Pin 2 and 3 of JP2 shorted
On	Reset	Operating
Off	Operating	Operating

- The printer is operating when the following conditions are satisfied simultaneously:
 - When the DIP switch for resetting with pin 25 on the TM series printer is enabled.
 - When pin 9 (INIT) is open.
- If either one of pin 6 (DSR) or pin 9 (INIT) enables the reset condition, the printer is reset.

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2.3 DIP Switch Settings

A DIP switch is provided on the plate face of the UB-U09.

The DIP switch function are listed in Table 2.5.

Table 2.5 DIP Switch Function

DIP SW Number	Function	ON	OFF	Default
1	Reserved	Fixed to Off.		OFF
2	Interface Selection	Serial	USB	ON

- NOTES:
- If the DIP switch 2 is changed, turn the power of the TM series printer off.
 - If the serial interface is selected, the host computer recognizes the USB port as “unknown device”, since the USB interface is not activated.
 - If the TM series printer is equipped with the DM-D connector, the DM-D connector is enabled when the serial interface is selected with the DIP switch 2, but disabled when the USB interface is selected.

2.4 Jumper Setting

A jumper is provided on the UB-U09.

The jumper function is listed in Table 2.6.

Table 2.6 Jumper Function

Jumper Address	Function	Pin 1 and 2 shorted	Pin 2 and 3 shorted	All pins open (no shorted pins)	Default setting
JP2	Signal logic change for interface pin 6 (DSR)	Reset with Low of MARK level	Reset with High of SPACE level	Impossible to set	Pin 1 and 2 are shorted.

[bps: bits per second]

NOTE: The setting for JP2 must be pin 1 and 2 short or pin 2 and 3 short. Otherwise, the communication IC may be broken or the UB-U09 may not operate correctly.

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3. MECHANICAL SPECIFICATIONS

3.1 External Dimensions

86.0 (W) × 27.0 (H) × 67.1 (D) mm {3.39 (W) × 1.06 (H) × 2.64" (D)}

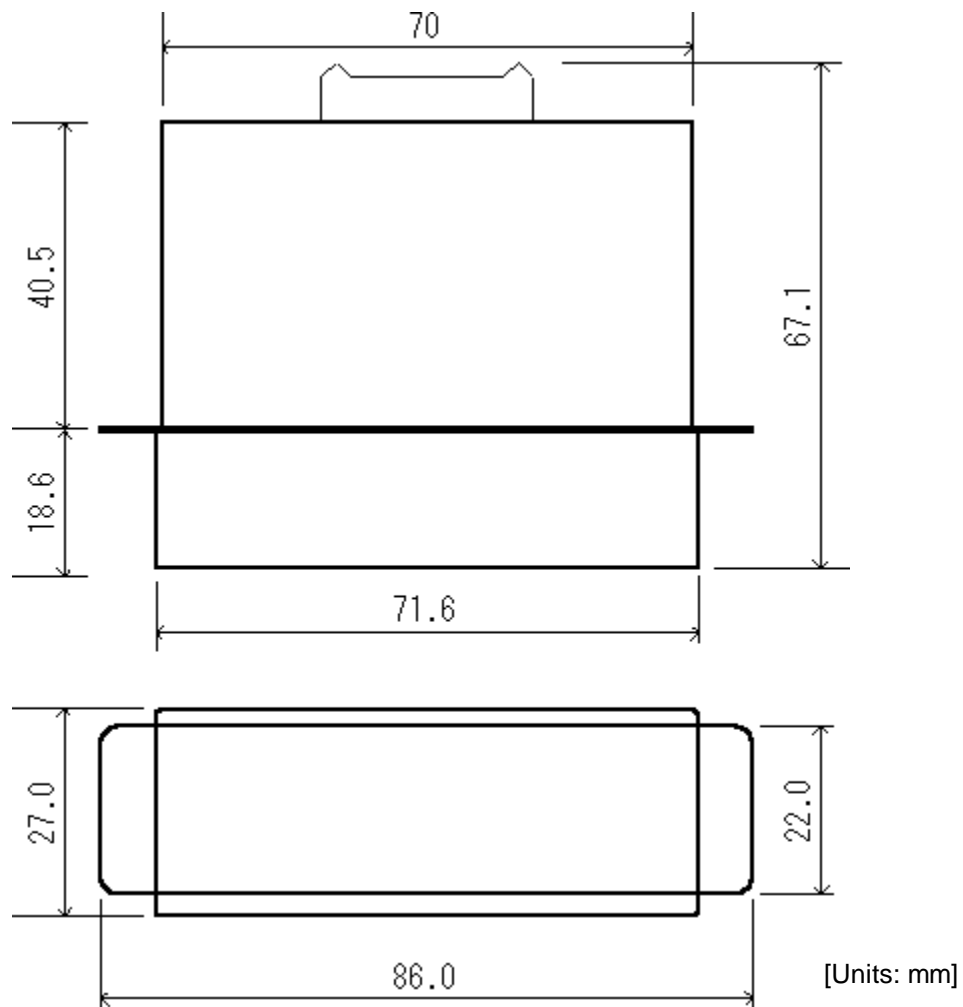


Figure 3.1 External Dimensions of UB-U09

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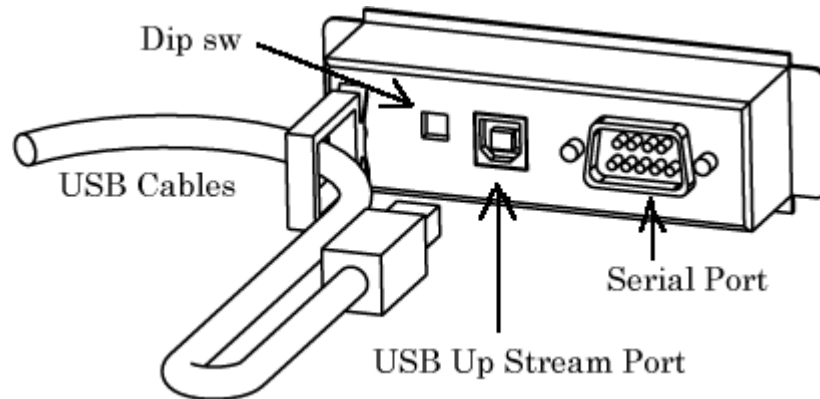


Figure 3.2 External View of USB Interface Board

3.2 Connectors

UB-U09 has two types of connectors

- USB Up Stream port connector (USB Type-B connector)
- Serial interface connector (Dsub-9 pin male)

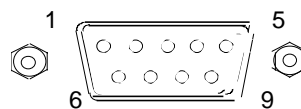


Figure 3.3 Serial Interface Connector

NOTE: Use the serial cable those the shell is less than the size as shown in Figure 3.4.
Otherwise, the cable may not be connected.

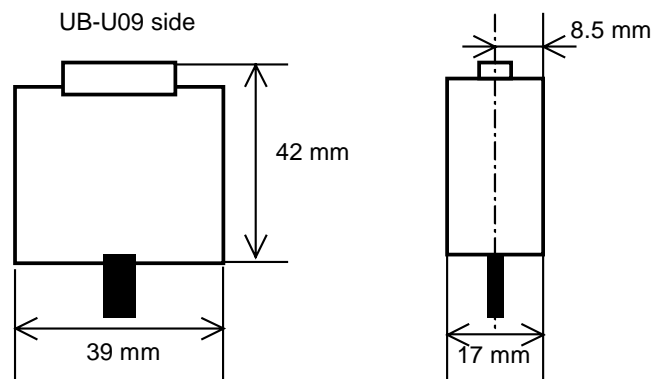


Figure 3.4 External Dimensions of the Serial Cable Shell

3.3 Cable Hook

USB cables can be hung on a hook to prevent them from falling out (refer to Figure 3.2).

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4. ENVIRONMENTAL CONDITIONS

1) Temperature	Operating:	0 to 50°C
	Storage:	-10 to 50°C
2) Humidity	Operating	10 to 90% RH (non-condensing)
	Storage	10 to 90% RH (non-condensing)

5. EMI STANDARD APPLY

1) Europe:	CE Marking Directive 89/336/EEC EN55022 class B EN55024 IEC61000-4-2 IEC61000-4-3 IEC61000-4-4 IEC61000-4-5 IEC61000-4-6 IEC61000-4-11
	Note that the printers in which this board is installed do not conform to the following CE Marking: Directive 90/384/EEC EN45501
2) North America	EMI FCC/ICES-003 Class A
3) JAPAN	EMC VCCI Class A, JEIDA52
4) Oceania	EMI AS/NZS 3548 Class B

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6. HOW TO SETUP THE TM SERIES PRINTER

When using this interface board, the interface of the TM printer must be set as shown in Table 6.1. Refer to the specification of each TM printer for these settings for details.

Table 6.1 Setting the TM Series Printer

When the USB interface is selected	Select as "parallel"
When the serial interface is selected	Select as "serial"

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7. DRIVERS

UB-U09 can be used with the driver which is in the host computer.

7.1 Operation Environment

Refer to each driver's manual.

7.2 Driver Structure

EPSON provides the following drivers.

- USB Driver
- Printer Driver and USB Port Monitor
- OPOS Driver for USB

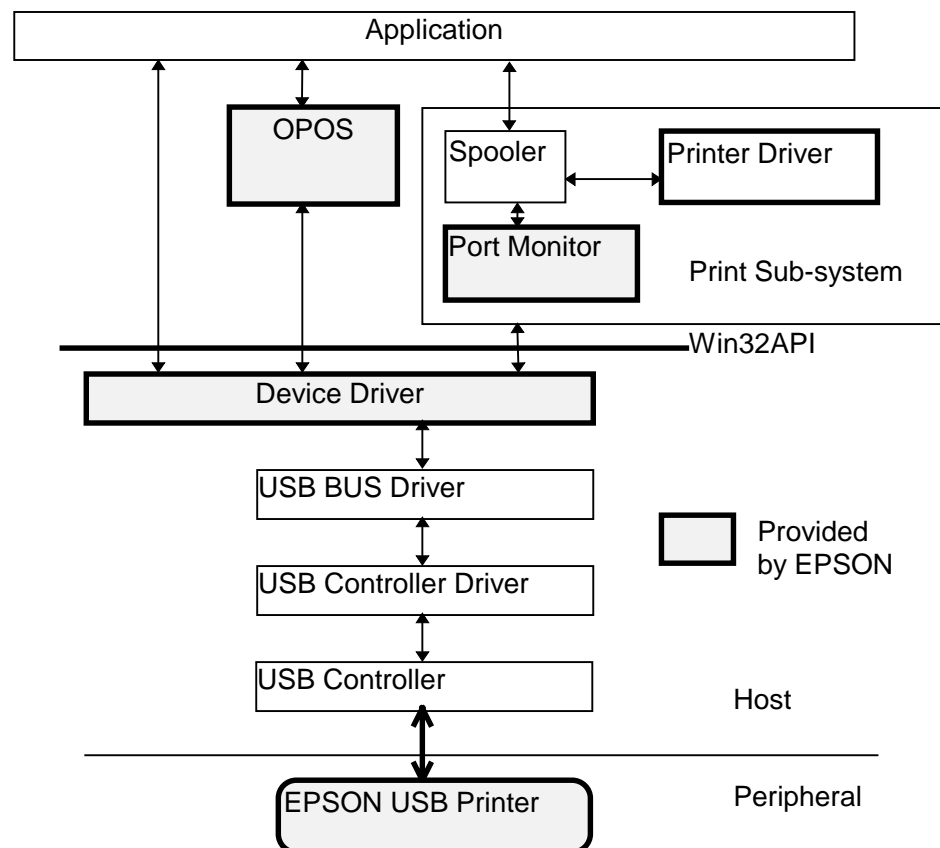


Figure 7.1 Drivers Structure

The USB driver is absolutely necessary. The user can communicate by using OPOS or a Printer Driver in the user's application.

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