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**EPSON**

Unified Interface Board for USB and Serial

**UB-U19**

Specification

STANDARD	
Rev. No.	C
Notes	

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**REVISION SHEET**

Sheet 1 of 2

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	Imaizumi	--	Yamaji	I	B				
B	Change	Hirano	Watanabe	Yamaji	II	C				
C	Change	Aruga	--	Yamaji	III	B				
					IV	B				
					1	C				
					2	B				
					3	B				
					4	B				
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					6	B				
					7	B				
					8	B				
					9	B				
					10	B				
					11	B				
					12	B				
					13	B				
TITLE  UB-U19 Specification (STANDARD)			Front Part					Contents	Appendix	Total
			Cover	Rev. Sheet	Scope	General Features	Table of Contents			
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**REVISION SHEET**

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REV.	SHEET	CHANGED CONTENTS
A	All	Newly enacted.
B	All	All pages are revised.
	1	Figure1.1 UB-U19 Interface Board Structure (changed) 1.2 Printers that Can Use the UB-U19 <ul style="list-style-type: none"><li>• TM-H6000II with Image Scanner → TM-H6000II with Image Scanner (Gray Scale Model)</li><li>• TM-H6000II with Image Scanner (Photo-ID Model) (added)</li></ul>
	8	Figure3.1 External Dimensions of UB-U19 (changed)
	9	Figure3.2 External View of USB Interface Board (changed)
	10	5. EMI Standard Apply 3) Oceania: EMI AS/NZS3548 Class A → AS/NZS3548/CISPR Class A
C	II	Cautions Added 8. (Notes on use of the product).
	1	1.2 Printers that Can Use the UB-U19 Changed “The UB-U19 can be installed in the TM printers listed below: <ul style="list-style-type: none"><li>• TM-H6000II with Image Scanner (Gray Scale Model)</li><li>• TM-H6000II with Image Scanner (Photo-ID Model)” to “The UB-U19 can be used for the TM series printers from which an interface board can be removed. Since some TM printers cannot use the UB-U19, see the TM-UIB Combination Specification for the latest restrictions on TM printers – UB-U19 combination.”</li></ul>
TITLE		
<b>UB-U19</b> Specification (STANDARD)		

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- 1) Do not drop conductive material such as a paper clip onto the circuit board.  
Short circuiting pins on the board may cause heat damage due to excess current or may melt the bonding wire.
- 2) Be sure to connect the devices with the specified cables.  
Improper connection may cause fire or shock.
- 3) Never disassemble or modify this product.  
Tampering with this product may result in injury, fire, or electric shock.
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Product may break or cause injury if it falls.
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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-U19 interface board.

### 2. Features

The UB-U19 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 38.4 Kbps, if the TM series printer can also communicate at this speed.

[bps: bits per second]

The serial interface of the UB-U19 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-U19 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-U19 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-U19 Interface Board Structure

### 1.2 Printers that Can Use the UB-U19

The UB-U19 can be used for the TM series printers from which an interface board can be removed. Since some TM printers cannot use the UB-U19, see the TM-UIB Combination Specification for the latest restrictions on TM printers – UB-U19 combination.

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## 2. ELECTRICAL SPECIFICATIONS

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### 2.1 USB Communications Specifications

USB Communication Specifications are set with the settings on the TM series printer

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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<br>SPACE = +3 to +15 V: Logic "0" or ON   |
| 5) Data Format        | Data length: 7 bit or 8 bit<br>Stop bit: 1 bit or more<br>Baud rate: Max.38,400 bps<br>[bps: bits per second]<br>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. See 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. See 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>When DTR/DSR control is selected, the printer transmits data after confirming this signal (except when transmitting data by <b>DLE EOT</b> or ASB).</p> <p>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. See 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>Same as DTR signal (pin 4)</p> <p>AND 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 .</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 #9 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-U19 and the host computer are recommended as shown in Figure 2.1.

HOST		UB-U19	
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 (RESERVED)
[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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**2.2.3 Notes on resetting the printer using the interface**

## 1) Outline

A TM series printer that is equipped with a UB-U19 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. (See 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-U19.

**Table 2.2 Settings for Signal Input to TM Series Printers**

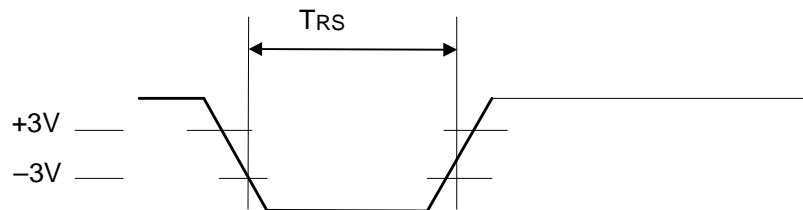
Signal line	Jumper (J2) setting	Reset Condition	Remark
Pin 6 (DSR)	Short 1 and 2	MARK level input (same when terminals open)	In the default setting pin 1 and 2 are shorted.
	Short 2 and 3	SPACE level input	
Pin 9 (INIT)	---	SPACE level input	

**Table 2.3 Electrical Characteristics of Reset Signals**

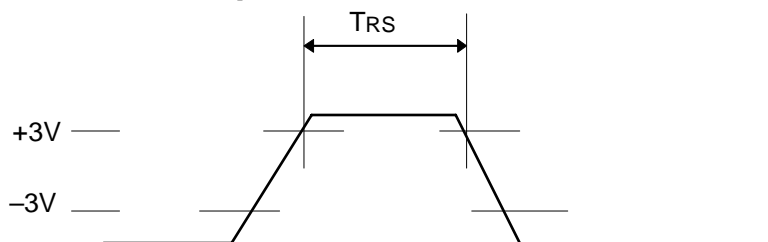
DC characteristics			
Characteristic	Code	Rated Values	
		Pin 6 (DSR)	Pin 9 (INIT)
Input HIGH voltage	V <sub>IH</sub>	+3 to +15 V	+3 to +15 V
Input LOW voltage	V <sub>IL</sub>	−15 to −3 V	−15 to −3 V
Input impedance	R <sub>IN</sub>	3 kΩ (minimum)	
AC characteristics			
Characteristic	Code	Rated Values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

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

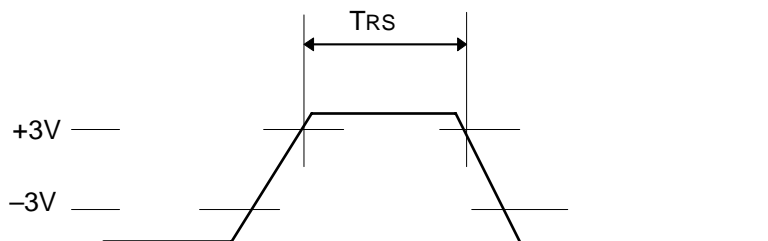


[Pin 2 and 3 of JP2 are shorted]



**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.

### 2.3 DIP Switch Settings

A DIP switch is provided on the plate face of the UB-U19.

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: 1. If the DIP switch 2 is changed, turn the power of the TM series printer off.  
2. If the serial interface is selected, the host computer recognizes the USB port as “unknown device”, since the USB interface is not activated.

### 2.4 Jumper Setting

A jumper is provided on the UB-U19.

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-U19 may not operate correctly.

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## 3. MECHANICAL SPECIFICATIONS

### 3.1 External Dimensions

- 1) PCB dimension: 40 mm × 70 mm {1.57" × 2.76"}
- 1) Plate dimension: 27 mm × 88 mm {1.06" × 3.46"}

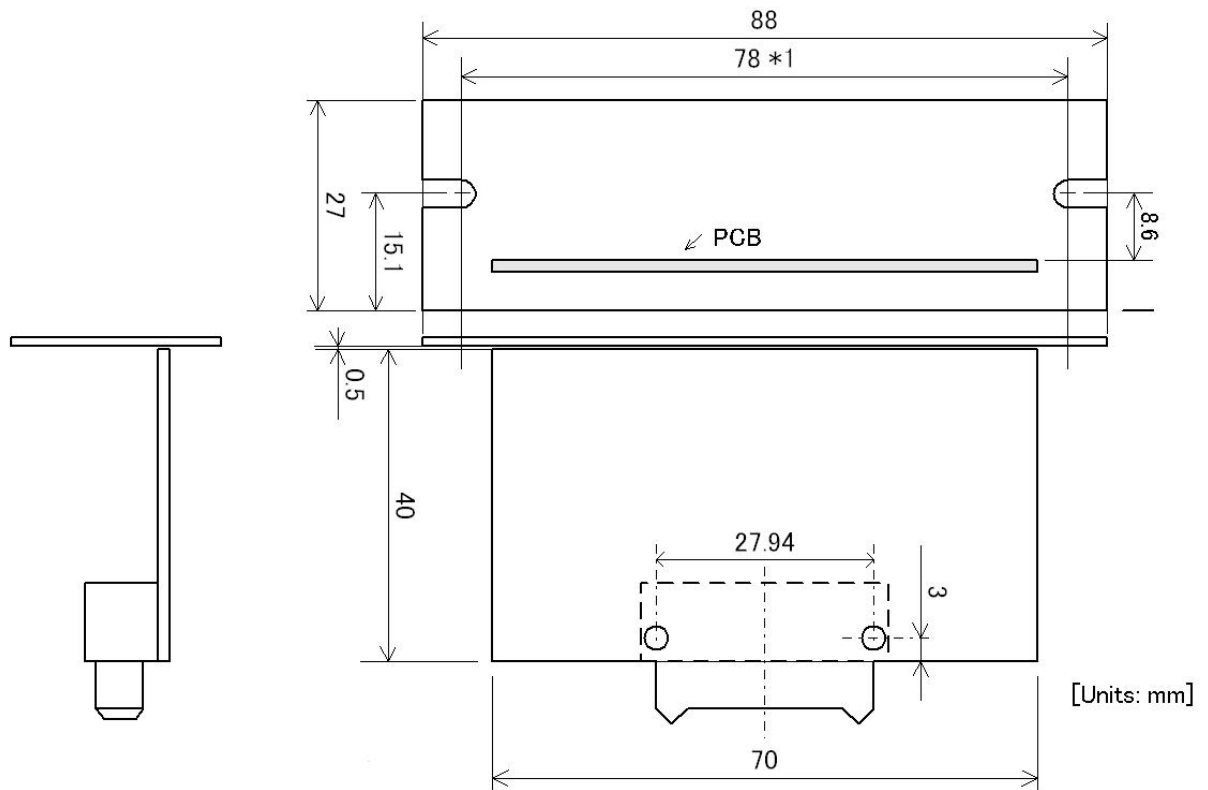


Figure 3.1 External Dimensions of UB-U19

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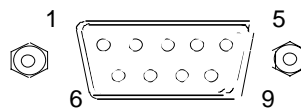


**Figure 3.2 External View of USB Interface Board**

### 3.2 Connectors

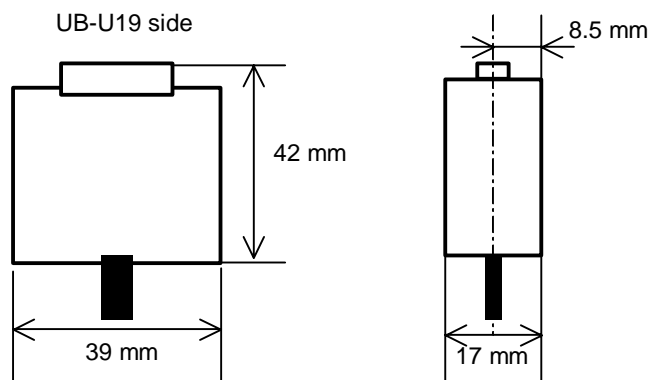
UB-U19 has two types of connectors

- 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. (See Figure 3.2.)

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#### 4. ENVIRONMENTAL CONDITIONS

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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

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1) Europe:	CE Marking Directive 89/336/EEC EN55022 Class A 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) Oceania	EMI AS/NZS 3548/CISPR22 Class A

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## 6. HOW TO SETUP THE TM SERIES PRINTER

### 6.1 When the serial interface is selected

TM printer select as serial interface. TM printer DIP Switches setting must be set as shown in Table 6.1 to Table 6.4.

**Table 6.1 DIP Switch 1 on TM Series Printer**

SW 1	Function	ON	OFF
1	Data reception error	Ignored	Prints '?'
2	Receive buffer capacity	45 bytes	4KB
3	Handshaking	XON/XOFF	DTR/DSR
4	Word length	7 bits	8 bits
5	Parity check	Yes	No
6	Selection of parity	Even	Odd
7	Selection of transmission speed	See Table 6.2.	
8			

**Table 6.2 Transmission speed on TM Series Printer**


Transmission speed (bps)	SW1-7	SW1-8
4800	On	On
9600	Off	On
19200	On	Off
38400	Off	Off

Bps: bits per second

**Table 6.3 DIP Switch 2 on TM Series Printer**

SW 2	Function	ON	OFF
1	Handshaking (BUSY condition)	Receive buffer full	Offline or Receive buffer full
2	Customer display (DM-D) connection	Connected	Not connected
3	Select print density	See Table 6.4.	
4			
5	Internal Use	Fixed to Off	
6	Internal Use	Fixed to Off	
7	I/F pin 6 reset signal	Enabled	Disabled
8	I/F pin 9 reset signal	Enabled	Disabled

**Table 6.4 DIP Switch 2-3 and 2-4 on TM Series Printer**

Level	Function	SW 2-3	SW 2-4
1	Print density (Light)	On	On
2		Off	Off
3		On	Off
4	Print density (Dark)	Off	On

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- NOTES: 1. Changes in DIP switch setting (excluding switches 2-7 and 2-8 interface reset signals) are recognized only when the printer power is turned on or when the printer is reset. If the DIP switch setting is Changed after the printer power is turned on, the change dose not take effect until the printer is turned on again or is reset.
2. If you turn on DIP switch 2-7 or 2-8 while the printer power is turned on, the printer may be reset, depending on the signal state. DIP switches should not be changed while the printer power is on.
3. If the print density is set to level 3 or 4, printing speed is usually reduced.

## 6.2 When the USB interface is selected

TM printer select as "USB Interface(UB-U05)". TM printer DIP Switches setting must be set as shown in Table 6.5 and Table 6.7.


**Table 6.5 DIP Switch 1 on TM Series Printer**

SW 1	Function	ON	OFF
1	Auto line feed	Always enabled	Always disabled
2	Receive buffer capacity	45 bytes	4KB
3-8	Reserved	Fixed to Off	

**Table 6.6 DIP Switch 2 on TM Series Printer**

SW 2	Function	ON	OFF
1	Handshaking (BUSY condition)	Receive buffer full	Offline or Receive buffer full
2	Customer display (DM-D) connection	Connected	Not connected
3	Select print density	See Table 6.7.	
4			
5	Internal Use	Fixed to Off	
6	Internal Use	Fixed to Off	
7	Reserved (for serial interface)	Fixed to Off	
8	Reserved	Fixed to Off	

**Table 6.7 DIP Switch 2-3 and 2-4 on TM Series Printer**

Level	Function	SW 2-3	SW 2-4
1	Print density (Light)	On	On
2		Off	Off
3		On	Off
4	Print density (Dark)	Off	On

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## 7. DRIVERS

UB-U19 can be used with the driver that is in the host computer.

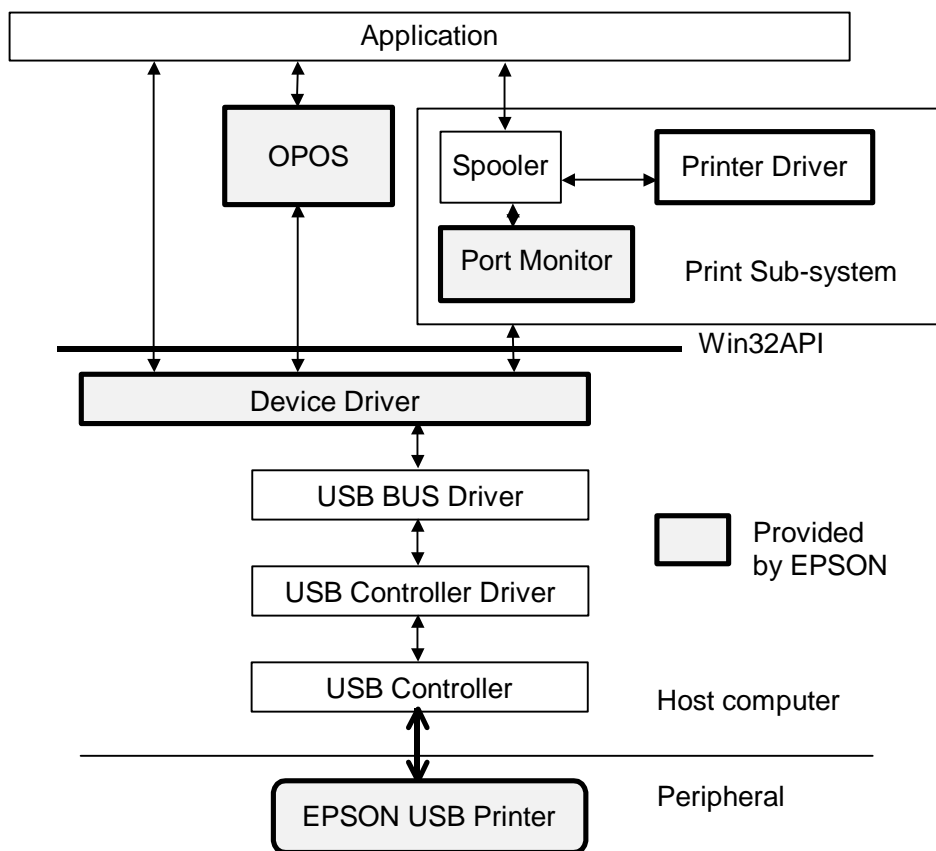
### 7.1 Operation Environment

See 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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