

**Confidential**

**EPSON**

9-pin Serial Interface Board

**UB-S09**

Specification

STANDARD	
Rev. No.	B
Notes	

Copied Date	, ,
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**SEIKO EPSON CORPORATION**

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# REVISION SHEET

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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	--	Yamaji	I	A				
B	Change				II	A				
					III	B				
					1	B				
					2	A				
					3	A				
					4	A				
					5	A				
					6	A				
					7	A				
					8	B				
					9	A				
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# REVISION SHEET

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	1	1.2 Printers which can be installed with UB-S09 (added)
	8	2.1.5 Jumpers NOTES: • If JP1 is set to ... (added)
TITLE <div style="text-align: center;"> <b>UB-S09</b>              Specification              (STANDARD)           </div>		

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## General Description

### 1. Application

This specification applies to the UB-S09 9-pin serial interface board.

### 2. Features

- 1) Has a DM-D connector so that the user can connect to a customer display and the printer which is not equipped with the DM-D connector with a Y-connection.
- 2) Can communicate with the host PC at a maximum of 115.2K bps (bps: bits per second), if the TM series printer and the DM-D series display can also communicate at this speed.

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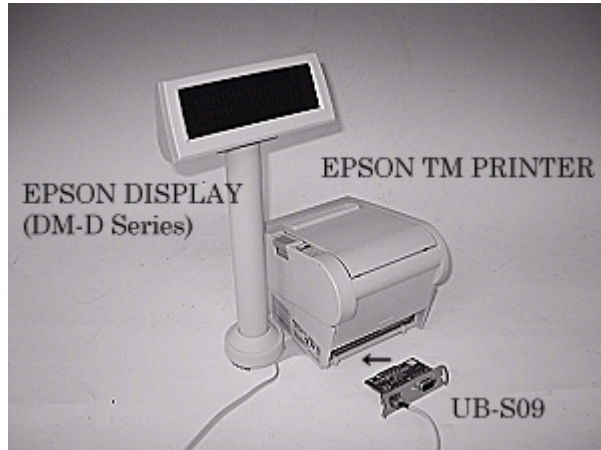
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## **1. GENERAL SPECIFICATIONS**

### **1.1 Configuration**

The UB-S09 is an interface board equipped with a DM-D interface connector and is installed into an EPSON TM series printer. With the TM series printer and DM-D series connected, the UB-S09 can communicate with the serial interface of the host computer at a maximum speed of 115.2K bps (bps: bits per second), if the TM series printer and the DM-D series display can also communicate at this speed.



**Figure 1.1.1 Structure**

### **1.2 Printers in which the UB-S09 can be installed**

All TM series printers that support the UIB, except for RP-U420.

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## 2. ELECTRICAL SPECIFICATIONS

### 2.1 Interface Specifications

#### 2.1.1 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.115200 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

#### 2.1.2 Serial Interface Connector

- 1) Connector: DSUB-9 pin (male) connector  
Interface connector terminal assignments and signal functions are described in Table 2.1.1.

**Table 2.1.1 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	<div>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. When the printer is in the following state, the printer becomes BUSY (or MARK).</div> <table><tr><th colspan="2">Printer offline (BUSY or MARK) condition when DTR/DSR control is selected</th><th colspan="2">DIP SW status for BUSY</th></tr><tr><th colspan="2"></th><th>ON</th><th>OFF</th></tr><tr><td rowspan="7">Offline</td><td>1. During the period from when the power is turned on (including resetting using the interface) to when the printer is ready to receive data.</td><td>BUSY</td><td>BUSY</td></tr><tr><td>2. During the self-test.</td><td>BUSY</td><td>BUSY</td></tr><tr><td>3. When the cover is open.</td><td>—</td><td>BUSY</td></tr><tr><td>4. During paper feeding using the paper FEED switch.</td><td>—</td><td>BUSY</td></tr><tr><td>5. When the printer stops printing due to a paper-end (only when the paper roll is not present).</td><td>—</td><td>BUSY</td></tr><tr><td>6. When an error has occurred.</td><td>—</td><td>BUSY</td></tr><tr><td>7. When the receive buffer becomes full.</td><td>BUSY</td><td>BUSY</td></tr></table>	Printer offline (BUSY or MARK) condition when DTR/DSR control is selected		DIP SW status for BUSY				ON	OFF	Offline	1. During the period from when the power is turned on (including resetting using the interface) to when the printer is ready to receive data.	BUSY	BUSY	2. During the self-test.	BUSY	BUSY	3. When the cover is open.	—	BUSY	4. During paper feeding using the paper FEED switch.	—	BUSY	5. When the printer stops printing due to a paper-end (only when the paper roll is not present).	—	BUSY	6. When an error has occurred.	—	BUSY	7. When the receive buffer becomes full.	BUSY	BUSY
Printer offline (BUSY or MARK) condition when DTR/DSR control is selected		DIP SW status for BUSY																															
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	4. During paper feeding using the paper FEED switch.	—	BUSY																														
	5. When the printer stops printing due to a paper-end (only when the paper roll is not present).	—	BUSY																														
	6. When an error has occurred.	—	BUSY																														
	7. When the receive buffer becomes full.	BUSY	BUSY																														
5	SG	—	Signal ground																														

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**Table 2.1.1 Interface Connector Pin Assignments (Continued)**

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>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.</p> <p>The printer is reset when the signal remains MARK or SPACE for 1 ms or more. Refer to Section 2.1.6 for signal logic.</p>
7	RTS	Output	<p>When the DM-D is connected, one of the following selections can be set. Refer to Section 2.1.3.</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>
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 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-S09 and the host PC are recommended as shown in Figure 2.1.1.

HOST		UB-S09	
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 PC is used.

**Figure 2.1.1 Cable Signal Connections**

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**2.1.3 Customer Display DM-D Series Connection**

- 1) Connector 8-pin modular connector
- 2) Communication settings Communication settings must be set to match those of the TM series printer.
- 3) Connection settings and operations

- For a TM series printer without a DM-D interface connector

Settings for connection to the DM-D series are made with the jumper on the UB-S09 as shown in Table 2.1.2. Each corresponding operation is also described in Table 2.1.2.

**Table 2.1.2 DM-D Series Connection Settings and Operations**

UB-S09 Connector	Operations
DM-D not connected Pin 2 and 3 of JP1 shorted	1) <b>ESC</b> = default of TM series printer: Printer select 2) Self test print: No DM-D settings print 3) <b>GS I</b> : No DM-D DIP switch status function 4) RTS signal: No DM-D status output
DM-D connected Pin 1 and 2 of JP1 shorted	1) <b>ESC</b> = default of TM series printer: Printer select 2) Self test print: No DM-D settings print 3) <b>GS I</b> : No DM-D DIP switch status function 4) RTS signal: DM-D status output from UB-S09 connector

- DM-D connection is selected from JP1; however if no DM-D is actually connected to the connector of the UB-S09 the RTS signal will always be BUSY.
  - Operations are based on these JP1 settings, even if the DM-D is not actually connected.
- For a TM series printer with a DM-D interface connector  
The DM-D series can be connected either to the connector on the TM series printer or to the connector on the UB-S09. Settings for each type of connection are made according to Table 2.1.3. Each corresponding operation is also described in Table 2.1.3.  
The TM series printer must be set to enable the DM-D connection by the DIP switch on the TM series printer. (For details, refer to the DIP switch item in the specification of each TM series printer.)

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**Table 2.1.3 DM-D Series Connection Settings and Operations**

UB-S09 Connector	TM Printer Connector	Operations
DM-D not connected Pin 2 and 3 of JP1 shorted	DM-D not connected DIP switch off	1) <b>ESC</b> = default of TM series printer: printer select 2) Self test print: Will not be recognized 3) <b>GS I</b> : Sends DIP switch off status 4) RTS signal: No DM-D status output
DM-D connected Pin 1 and 2 of JP1 shorted	DM-D not connected DIP switch off	1) <b>ESC</b> = default of TM series printer: printer select 2) Self test print: Will not be recognized 3) <b>GS I</b> : Sends DIP switch off status 4) RTS signal: DM-D status output from UB-S09 connector
DM-D not connected Pin 2 and 3 of JP1 shorted	DM-D connected DIP switch on	1) <b>ESC</b> = default of TM series printer: DM-D Select. 2) Self test print: Must be connected 3) <b>GS I</b> : Sends DIP switch on status 4) RTS signal: DM-D status output from TM printer connector
DM-D connected Pin 1 and 2 of JP1 shorted	DM-D connected DIP switch on	Prohibited to set

DM-D connection is selected from JP1 or the DIP switch on the TM series printer; however, if no DM-D is actually connected to the connector the RTS signal will always be BUSY.

Operations are based on these JP1 or TM series printer DIP switch settings, even if the DM-D is not actually connected.

When only one DM-D is to be connected, it is recommended that it be connected to the TM series printer. It is prohibited to connect the DM-D to both the TM printer and the UB-S09 board.

#### 4) Power supply

- The power supply to the DM-D series customer display cannot be switched by the power switch for the TM series printers. (except for TM-J8000)
- When power is applied to the power input connector of the TM series printer, power is always supplied to the DM-D series customer display even though the power switch of the TM series printer is turned off. (except for TM-J8000)

NOTES: • Do not connect other cables, such as a telephone line, to the DM-D series connector. Connect only a DM-D cable to the connector.

- The following combinations with DM-D and AC adapter are prohibited to use.  
DM-D102, DM-D203  
AC adaptor PA-65xx, PD-65xx

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**2.1.4 Notes on Resetting the Printer Using the Interface**

## 1) Outline

A TM series printer that is equipped with a UB-S09 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 PC, 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 2.1.4 and 2.1.5 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-S09.

**Table 2.1.4 Settings for Signal Input to TM Series Printers**

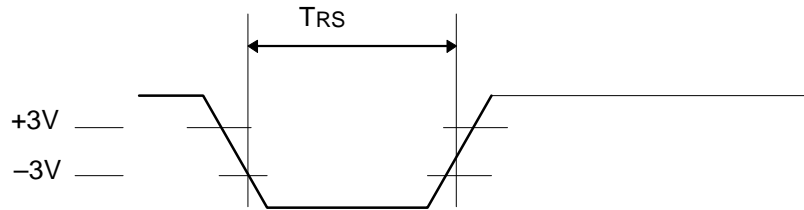
Signal line	Jumper (J2) setting	Reset Condition	Remark
Pin 6 (DSR)	Short 1 and 2	MARK level input (same when terminals open)	In the default setting pin 1 and 2 are shorted.
	Short 2 and 3	SPACE level input	
Pin 9 (INIT)	---	SPACE level input	

**Table 2.1.5 Electrical Characteristics of Reset Signals**

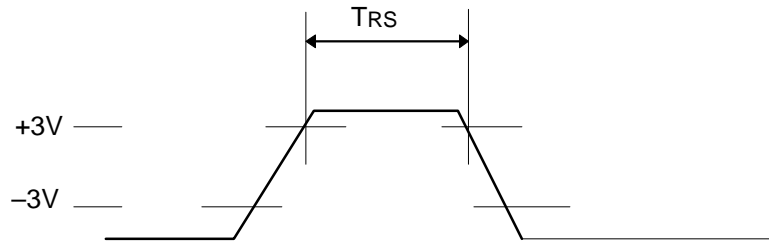
DC characteristics			
Characteristic	Code	Rated Values	
		Pin 6 (DSR)	Pin 9 (INIT)
Input HIGH voltage	V <sub>IH</sub>	+3 to +15 V	+3 to +15 V
Input LOW voltage	V <sub>IL</sub>	-15 to -3 V	-15 to -3 V
Input impedance	R <sub>IN</sub>	3 kΩ (minimum)	
AC characteristics			
Characteristic	Code	Rated Values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

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

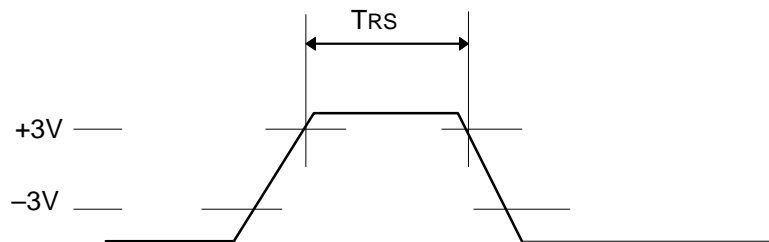


[Pin 2 and 3 of JP2 are shorted]



**Figure 2.1.2 Minimum Reset Pulse Width (Pin 6)**

- When using pin 9 (INIT)



**Figure 2.1.3 Minimum Reset Pulse Width (Pin 9)**

- NOTES:
- When a signal is input that does not satisfy the requirements shown in Table 2.1.4, 2.1.5 and in Figure 2.1.2, 2.1.3, printer operation is not guaranteed.
  - When pin 6 (DSR) is open, the TM series printer is operating in the conditions shown in Table 2.1.6.

**Table 2.1.6 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 interface 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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### 2.1.5 Jumpers

Two jumpers are provided on the UB-S09.

Each jumper function is listed in Table 2.1.7.

**Table 2.1.7 Jumper Function**

Jumper Address	Function	Pin 1 and 2 shorted	Pin 2 and 3 shorted	All pins open (no shorted pins)	Default setting
JP1	DM-D connection settings	DM-D connected	DM-D not connected	Impossible to set	Pin 1 and 2 are shorted
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

- NOTES:
- The setting for JP1 must be pin 1 and 2 short or pin 2 and 3 short. Otherwise, the UB-S09 may not operate correctly.
  - 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-S09 may not operate correctly.
  - If JP1 is set to DM-D not connected, the communication with the DM-D cannot be performed correctly.

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### 3. MECHANICAL SPECIFICATIONS

#### 3.1 Overall Dimensions

Approximately 88 mm (W) × Approximately 54.2 mm (D) × Approximately 27 mm (H)  
(maximum values including the plate and the connectors)

#### 3.2 External Appearance

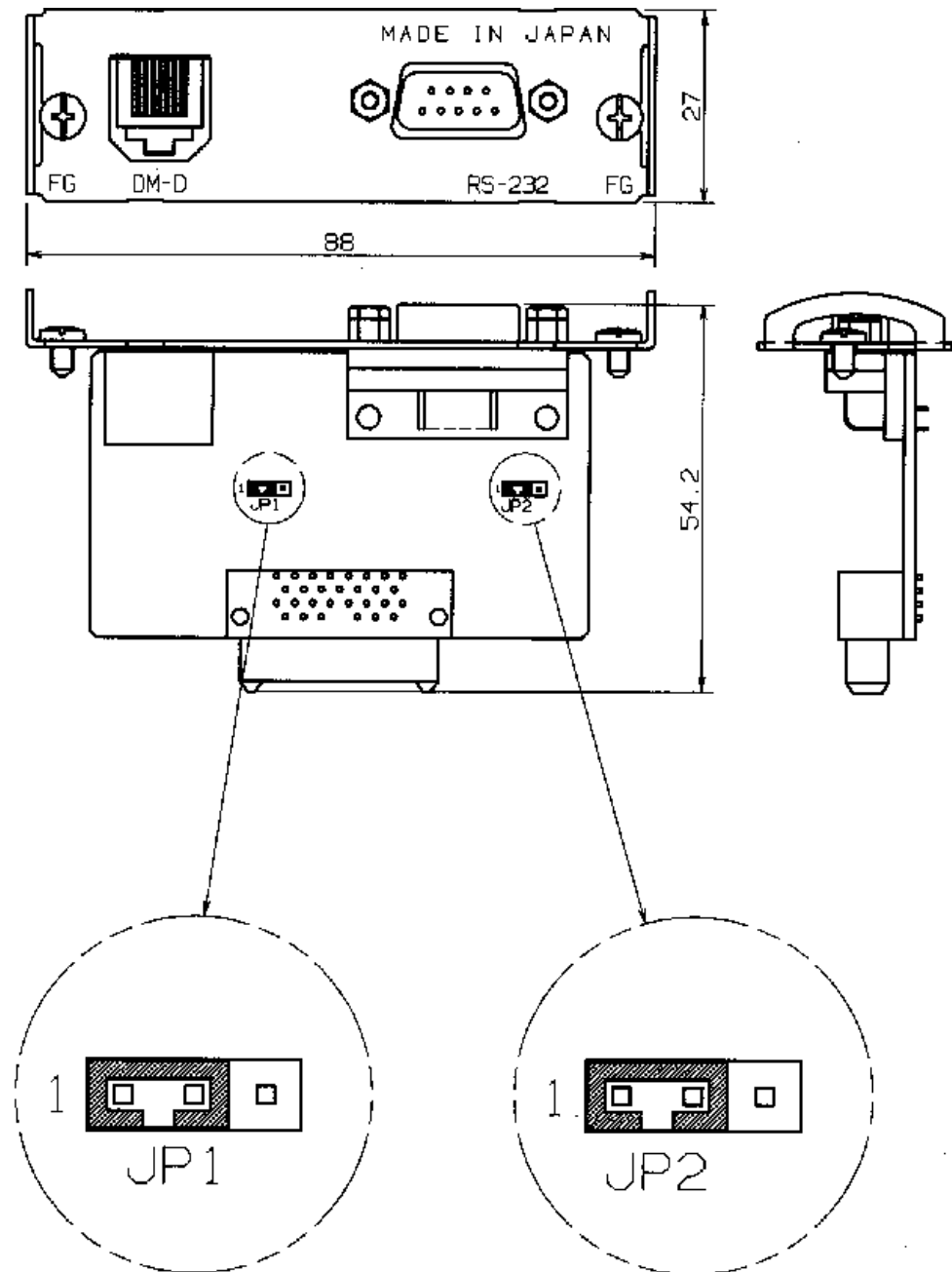
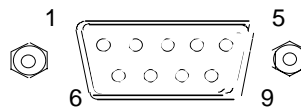


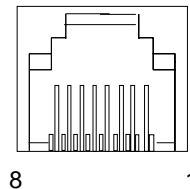
Figure 3.1.1 External Appearance

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## 3.3 Connectors



**Figure 3.3.1 Serial Interface Connector**



**Figure 3.3.2 DM-D Interface Connector**

## 4. EMC APPLIED

EMC is tested using the EPSON TM series printers with the EPSON PS-170 power supply.

- 1) Europe: CE marking (\*1)  
 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
- 2) North America: EMI FCC/ICES-003 Class A
- 3) Japan: EMI VCCI Class A
- 4) Oceania: EMC AS/NZS 3548 Class B

\*1: The TM series printers which is equipped with the UB-S09 cannot be adapted to the following CE marking directive:

Directive: 90/384/EEC  
 EN45501

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