EPSON

Serial Interface Card

C82305*
C8230*

English
Deutsch
Français
ESpañol
Italiano

4000152
C01-00

Serial Interface
C82305 * /C82306 *

English

Schnittstellenkarte
C82305 * /C82306 *

Deutsch

Interface série
C82305 * /C82306*

Français

Interface en serie
C82305 * /C82306*

Español

Interfaccia seriale
C82305* /C82306*

Italiano

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INTRODUCTION

The Serial Interface Card 032305 * /C82306 * is an interface that allows asynchronous serial data communication between a host computer and an EPSON printer.

This interface card offers the following features:

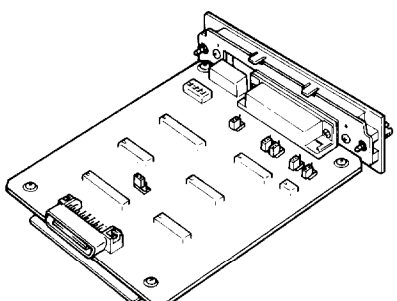
- Data transmission that can be set at either RS-232D or 20 mA Current Loop levels (RS-232D has been revised from the former RS-232C. Set the signal levels for RS-232D the same as for RS-232C.)
- Handshaking protocol using X-on/X-off or DTR flag control
- Selectable data word structure that allows you to choose parity (Odd, Even, or None) and word bit settings (either 7 or 8 bit)
- Selection of baud rate settings from 75 to 19,200 BPS (Data transmission speed is limited to 1,200 BPS when the signal level is set to 20 mA Current Loop)
- DIP switch 1 settings that you can change even after installation

About this guide

This guide is designed to give you detailed information on how to install your C82305 * /C82306 * serial interface card in a variety of EPSON printers. Installation procedures vary slightly depending upon the printer model that you have.

Also included are instructions on how to adjust the settings of the C82305 * /C82306 * interface card, as well as a general description of serial data communication.

The C82305 * /C82306 * option package contains the following items:



C82305*
C82306* serial I/F card (1)

Optional connector lock nuts (2)

Note
When attaching the interface cable to the interface, you may find that the screws of your interface cable do not fit into the connector lock nuts. If this happens you will need to replace the connector lock nuts with the optional ones provided in this package.

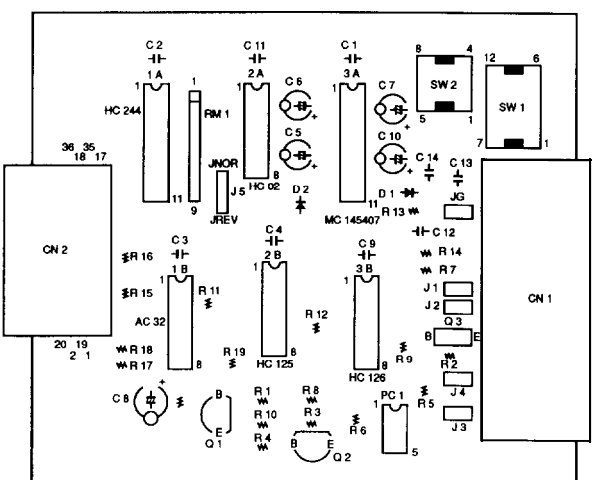
SETTING THE CONDITIONS

The C82305 * /C82306 * interface card has two sets of DIP (Dual In-line Package) switches, and seven jumpers. These switches and jumpers are used for selecting various interface operations.

Card layout

The figure below shows the layout of the C82305 * /C82306 * card, and the locations of the DIP switches and jumpers.

Figure 1. Card layout



DIP switch and jumper settings

Before you install the C82305 * /C82306 * interface, you may need to adjust the DIP switch 2 and jumper settings. You can change the DIP switch 1 settings after you install the interface. When making DIP switch setting changes, it is best to use a pointed device, such as a ball-point pen or small screwdriver.

Caution
All changes of DIP switch and jumper settings should be made with the printer power turned off. New settings become valid only when the printer is turned on.

DIP switches

The settings on DIP switches allow you to change interface functions. The two sets of DIP switches on the C82305 * /C82306* are labelled SW1 and SW2. Each set contains a number of individual toggle-type switches that can be set either on or off. The individual switches are referred to by set (SW1 or SW2) and number. Therefore, the switch in set SW1 marked by the small number 3 is called DIP switchl-3.

DIP switch 1 (interface operations)

The table below contains information on switch functions, and the factory setting of each.

Table 1. DIP switch 1

Switch number	Function	ON	OFF	Factory setting
1-1	I/F card enable/disable (Note)	Enable	Disable	ON
1-2	Word length	8 bit	7 bit	ON
1-3	Parity check 1	See Table 4.		OFF
1-4	Parity check 2			OFF
1-5	Baud rate 1	See Table 5.		ON
1-6	Baud rate 2			OFF

Note

Some printers have a selecting switch (or function) that allows you to select between the optional and original interfaces. If you install the interface card in this type of printer, you should set DIP switch 1-1 on the interface card to ON and also change the setting in the printer to select the optional interface.

DIP switch 2 (interface operations)

The table below contains information on switch functions, and the factory setting of each.

Table 2.

Switch number	Function	ON	OFF	Factory setting
2-1	Baud rate 3	See Table 5.		ON
2-2	Baud rate 4			ON
2-3	Handshake	DTR	X-on/X-off	ON
2-4	RS-232D/Current Loop	RS-232D	Current Loop	ON

Data word structure

The data word structure is also operator selectable through DIP switch settings (See Table 1). The word structure for serial data is:

1 start bit +7 or 8 data bits (selectable) + 1 parity bit (selectable) +1 or more stop bits.

The table below shows the possible word structure combinations.

Table 3. Word structure

Start Bit	Data Bit	Parity Bit	Stop Bit
1	7	No parity	1 or more
1	7	Odd parity	1 or more
1	7	Even parity	1 or more
1	8	No parity	1 or more
1	8	Odd parity	1 or more
1	8	Even parity	1 or more

You can select the parity check method by DIP switch settings. (See Table 4.)

Table 4. Parity check

DIP switch 1-3	DIP switch 1-4	Parity check
OFF	OFF	No parity bit
OFF	ON	Ignore parity
ON	OFF	Odd parity check
ON	ON	Even parity check

Note
Since the selection of parity check depends on your type of printer, refer to your printer's manual for details.

Baud rate selection

In serial data communication, data is transmitted in the form of bits. These data bits go out one at a time along a single path, and in a specified order. The BPS (Bits Per Second) rate, or speed at which these bits are transmitted, can be selected using a combination of DIP switch settings.

Note

In the current loop mode, accurate data transfer cannot be guaranteed at a baud rate setting exceeding 1,200 BPS.

Table 5. Baud rate selection

Baud rate (BPS)	DIP Switch			
	SW 2-1	SW 2-2	SW 1-5	SW 1-6
19,200	ON	ON	ON	ON
9,600	ON	ON	ON	OFF
4,800	ON	ON	OFF	ON
2,400	ON	ON	OFF	OFF
1,800	ON	OFF	ON	ON
1,200	ON	OFF	ON	OFF
600	ON	OFF	OFF	ON
300	ON	OFF	OFF	OFF
200	OFF	ON	ON	ON
150	OFF	ON	ON	OFF
134.5	OFF	ON	OFF	ON
110	OFF	ON	OFF	OFF
75	OFF	OFF	ON	ON

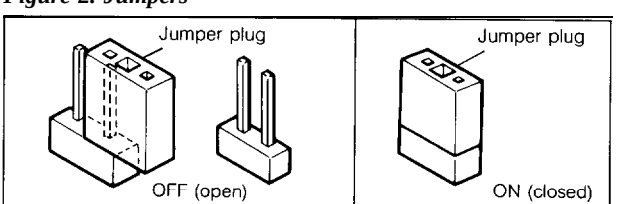
Note

- The printer will assume a setting of 1,200 BPS for switch combinations other than those shown above.
- Since the maximum transmission speed (baud rate) depends on your type of printer, refer to your printer's manual for details.

Jumpers

The jumper is a small terminal used for connecting or disconnecting a circuit. The jumper is on when the jumper plug covers both wires of the terminal. Jumper settings can be changed by either attaching or removing the rectangular jumper plug. If the jumper is to be turned off, connect it to just one of the two terminal pins as shown in the figure below. By doing this, you can avoid losing the unused jumper plug.

Figure 2. Jumpers



Jumper settings

Table 6. shows information about the interface conditions that can be selected using jumpers. In all cases, ON denotes the connection of the jumper (covering both terminals), while OFF denotes the disconnection of the jumper.

Table 6. Jumper settings

Jumper		Function	Factory Setting
J1		ON: Pulls up 'TTY-TXD' to +5V via 200 ohms resistance. (See Note)	OFF
J2		ON: Connects 'TTY-TXD Return' to Signal Ground. (See Note)	OFF
J3		ON: Pulls up 'TTY-RXD' to +5V via 200 ohms resistance. (See Note)	OFF
J4		ON: Connects 'TTY-RXD Return' to Signal Ground. (See Note)	OFF
J5	JNOR	Flag polarity selection for Current loop. (See Table 7.)	ON
	JREV		OFF
JG		ON: Connects Protective Ground to Signal Ground	OFF

Note
If the host computer is not equipped with a power supply for the Current Loop interface, these jumpers must be connected to perform communication via the Current Loop interface.

Table* 7. Flag *polarity selection

Jumper		Function	Factory setting
J5	JNOR	ON: MARK (do not accept data) = Current ON ON: MARK (do not accept data)= Negative EIA level	ON
	JREV	ON: MARK (do not accept data) = Current OFF ON: MARK (do not accept data)= Positive EIA level	OFF

Note
Either the JNOR or JREV jumper must be connected.

DATA ENTRY

This section gives a brief description of serial data communication conditions and handshaking protocols supported by the C82305 * /C82306 * interface card.

Serial data communications

The CL32305 * /C82306 * interface allows you to select either RS-232D or 20 mA Current Loop signal levels; but never both at the same time.

This interface card also provides for either DTR (Data Terminal Ready) or X-on/X-off handshaking protocol.

About data entry

Transmitted data from a host computer is stored in your printer's internal buffer. (This interface card has no buffer memory.) When this buffer becomes full, any additional transmitted data cannot be accepted and would be discarded. To prevent such data loss, special handshaking protocols are provided to regulate the flow of data transmission. The two protocols available on the C82305 * /C82306 * interface card are DTR and X-on/X-off.

Note
When a parity error (if parity check is enabled), framing error, or overrun error is detected in the data received, data is ignored or an asterisk (*) is printed instead. (Since the handling of communication errors depend on your type of printer, refer to your printer's specifications for details.)

Handshaking protocol

DTR and X-on/X-off handshaking protocols can be performed under either RS-232D or 20mA Current Loop transmission.

X-on/X-off Protocol

X-on/X-off protocol is a system in which the printer transmits a code to the computer to indicate that it cannot accept more data, and a second code when it is once again ready.

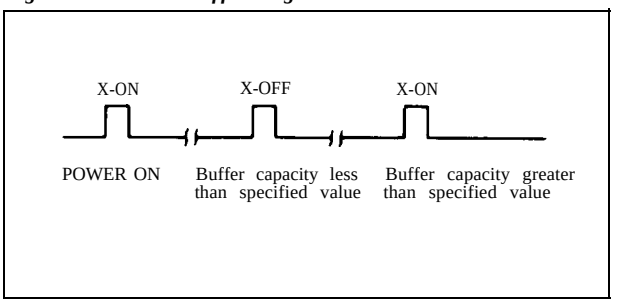
The C82305* /C82306* interface card sends an X-on < 11 > H code when it is ready to receive data, and an X-off < 13 > H when it is busy. The X-on/X-off signals may be transmitted from the TXD terminal at RS-232D signal levels, or through the TTY-TXD terminal at 20 mA Current Loop levels.

After the X-on flag has been set, data can be accepted up to the maximum capacity of the buffer.

- Transmit timing of X-off signal
  The X-off signal is transmitted when the vacant area in the buffer drops below the specified value (typically 256 bytes; refer to your printer manual).
- ***Data transfer after X-off signal***
  Data can be sent to the printer even after the X-off signal is transmitted as long as sufficient room for data remains in the buffer. However, if the transmitted data exceeds the vacant area in the buffer, it will be discarded.

- ***Transmit timing of X-on signal***
  The X-on signal is transmitted when the power is first turned on, or when the vacant area in the buffer is greater than the specified value (typically 512 bytes; refer to your printer manual).

Figure 3. X-on/X-off thing



DTR protocol

Under this system, when the printer is turned on the DTR enters the SPACE state, meaning that data entry is enabled. When the rate of data reception is greater than that of printing, the buffer gradually fills up. Once the vacant area in the buffer drops below the specified value (typically 256 bytes; refer to your printer manual), the DTR sets the status flag to prohibit further data entry. This flag is output through the DTR pin (No. 20) at RS-232D signal levels, and through the TTY-TXD pin (No. 17) at Current Loop Levels.

With the status flag set, and data reception prohibited, the vacant area of the buffer gradually increases as the printer continues to print. When the vacant area in the buffer reaches the specified value (typically 512 bytes; refer to your printer manual), the flag is reset and data entry is again enabled.

Note
Reverse Channel pin (No. 11) and DTR pin (No. 20) are internally connected on the interface board and must have identical signal levels.

Printer status error

The flag will be set immediately regardless of the remaining buffer capacity if the printer detects an error.

SPECIFICATIONS

1. Synchronization: Asynchronous

2. Baud Rate: 75, 110, 134.5, 150, 200, 300, 600, 1,200, 1,800, 2,400, 4,800, 9,600, or 19,200 BPS (selectable)

3. Word length:
   Start bit: 1 bit
   Data bit: 7 or 8 bits (selectable)
   Parity bit: Odd, even, none, or ignore (selectable)
   Stop bit: 1 bit or more

4. Input signal polarity:
   1) With RS-232D:
      MARK = logic "1' (- 3 to -25V)
      SPACE = logic "0" (+3 to +25V)

   2) Current loop:
      MARK = logic "1" (Current ON)
      SPACE = logic "0" (Current OFF)

Note
The above voltage, between pin No. 17 and No. 24, must not exceed 25V.

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5. Handshaking

Table 8. Handshaking

	US-232D	Control Loop
Using DTR protocol	The two signal conditions at pm No. 11 and pin No. 20 are as follows; MARK-data entry is disabled SPACE-data entry is enabled	The impedance between pin No. 17 and pin No. 24 is as follows; LOW(MARK)-data entry is disabled High(SPACE)-data entry is enabled
Using X-ON/X-OFF protocol	Data transmitted from pin No. 2 is controller as follows; X-ON<11>H-data entry is enabled X-0FF<13>H-data entry is disabled	Data transmitted by the change of the impedance between pin No. 17 and pin No. 24 is controlled as follows; X-ON<11>H-data entry is enabled X-OFF<13>H-data entry is disabled

The DTR signal is always set to SPACE while X-on/ X-off handshaking is selected.
X-on/X-off characters will not be transmitted from TXD while DTR handshaking is selected (TXD signal is always set to MARK).

Note
Operation is not guaranteed when using the current loop mode at rates over 1,200 BPS.

HARDWARE DESCRIPTION

1. I/F board connector: EIA standard 25-pin D-SUB female connector.

2. For signal description and pin assignment, refer to the table below:

signal is at he positive

Table 9. Signal Description and Pin Assignment

Pin No.	Signal name	Direction	Description
1	protective Ground	—	Chasis ground
2	Transmitted Data (TXD)	Text	Transmitted serial data
3	Received Data (RXD)	Ill	Received serial data
4	Request to Send (RTS)	o u t	This signal is always at the positive EIA level.
7	Signal Ground	In	Return path for data and control signals.
1 1	Reverse Channel (=2nd RTS)	Out	This EIA Level when the printer is ready to accept data entry and at the negative EIA level when the printer is not ready to accept data entry Operator can invert the polarity of the signal with jumper 15.
20	Data Terminalk t Ready (DIR)	Out	

Pin No.	Signal Name	Direction*	Description
17	TTY-TXD	out	High impedance ('SPACE') between pin No. 17 and No 24 or an X-on signal sent across pin No. 17 and No. 24 indicates that the printer is ready to accept data. Low impedance ('MARK') or an X-off signal being sent indicates that the printer is busy. Operator can invert the polarity of this signal with jumper J5.
24	TTFTXD Return	—	
25	TTY_RXD	In	Input data of serial Current Loop.
23	Text Return	—	

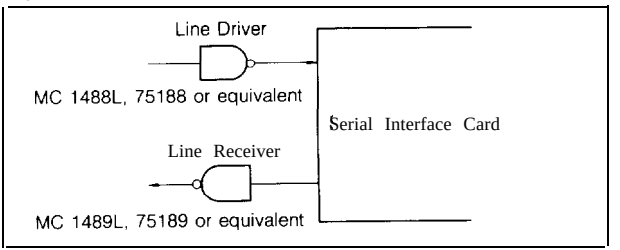
Note

- The column heading "Direction" refers to the direction of signal flow as viewed from the printer.
- All signals except TTY-TXD and TTY-RXD comply with the EIA RS-232D standard.

RECOMMENDED CIRCUIT CONNECTIONS

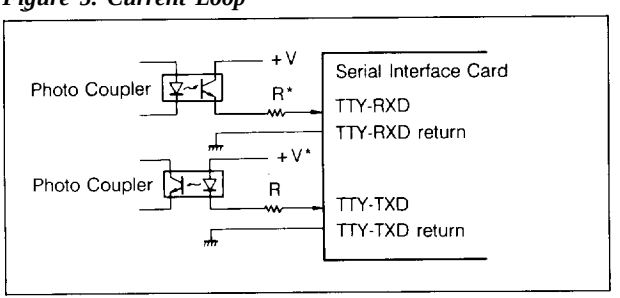
Recommended line driver and line receiver for RS-232D signal level settings. (As viewed from the host computer.)

Figure 4. RS-232D



Recommended line interface circuit for 20mA Current Loop signal level settings. (As viewed from the host computer.)

Figure 5. Current Loop



Note
The value of "R" should be selected so that the loop current is set between 10 and 20 mA. The "+v" should be 3V to 24V.

INSTALLATION

The C82305* /C82306* interface card is designed to be installed inside the printer. Installation or removal of the interface board is easy, and requires only a screwdriver.

The following section gives you detailed information on how to install your interface card in a variety of EPSON printers.

Caution

- Turn off the power to the printer and the computer before installing the serial interface. Make sure that all power and interface cables are removed.
- Avoid touching the printer's circuit board contacts, as many of these components are sensitive to static electric charges that may build up on your body.

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1. First, you may need to adjust the DIP switches and jumper settings.

   If the screws don't fit your interface cable, you will need to replace the connector lock nuts with the optional ones provided in this package.

Note

The original CS2305* lock nuts are imperial standard (inch), and the C82306* lock nuts are metric.

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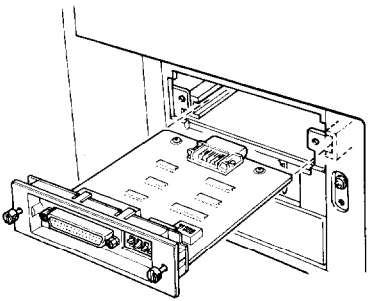
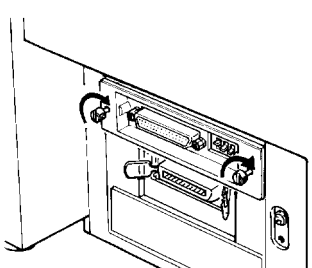
2. Fit both sides of this interface card into the guides inside the compartment.



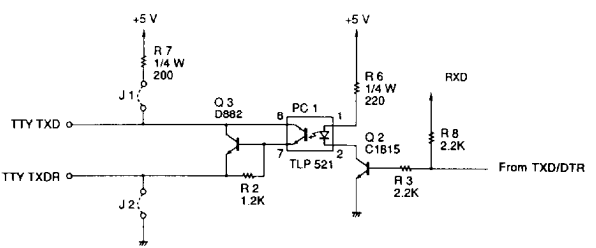
3. Insert this interface card until the interface pins mate with the connector inside your printer.
4. Secure the interface with the two screws.



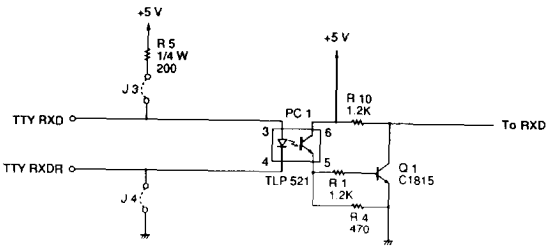
Current-Loop Transmitter/Receiver Circuit Diagrams

Set the Jumper Jl, J2, J3, and J4 referring to the following diagrams.

Transmitter Circuit Diagram



Receiver Circuit Diagram



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