USB to printer port chip CH340

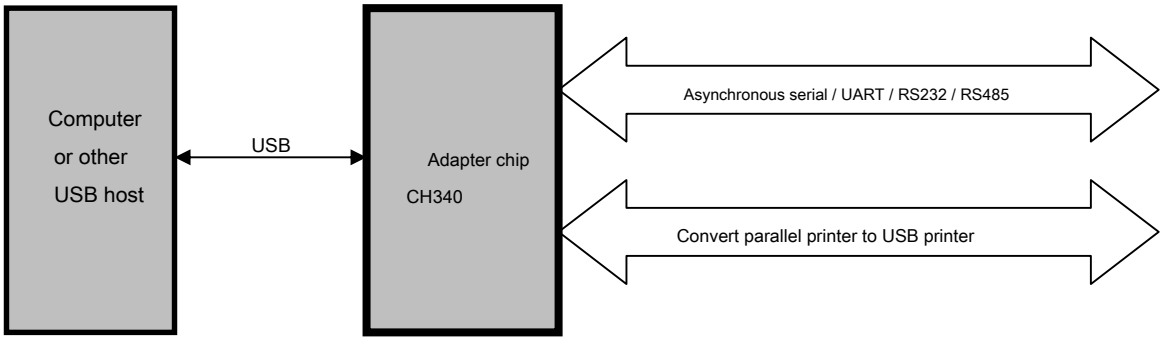
Manual

Version: 2B

http://wch.cn

1 Overview

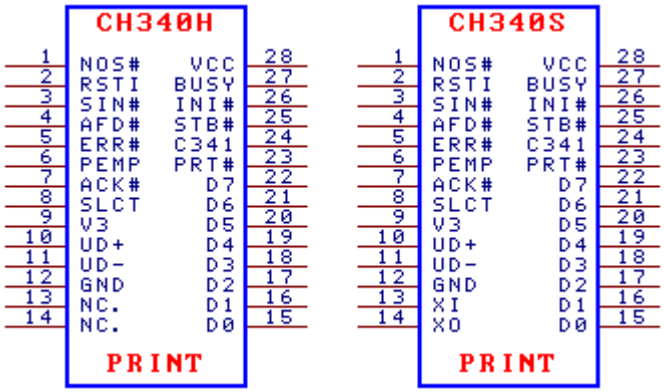
CH340 is a USB bus adapter chip, USB to serial port or a USB port transfer printing. In the printer port mode, CH340 provides a compatible USB specification and the Windows operating system standard USB printer port, parallel port for upgrading common printer directly to the USB bus. For a description of USB to serial refer to the manual (a) CH340DS1.



2. Features

- Full-speed USB device interface, compatible with USB V2.0.
- Standard USB printer port, for upgrade parallel printer, USB compatible with the relevant specifications.
- Compatible with Windows operating systems under Windows 2000 and above systems No driver is fully compatible application.
- It supports IEEE-1284 bi-directional communications standard, supports unidirectional and bidirectional transfer printer.
- Because it is through the conversion of USB printer port, so only compatible with application layer, not totally.
- Software compatible with CH341, CH341 use the driver directly.
- Supports 5V and 3.3V supply voltage even 3V supply voltage.
- CH340H built-in clock, no external crystal.
- SOP-28 using lead-free package, compatible with RoHS, pin-compatible CH341.

3, the package



Package	Width of plastic		Lead pitch		Package Description	Ordering
SOP-28	7.62mm	300mil	1.27mm	50mil	Standard 28-pin SMD	CH340H
SOP-28	7.62mm	300mil	1.27mm	50mil	Standard 28-pin SMD	CH340S

Model difference: CH340H built-in clock, no external crystal.

4 pin

Pin Number	Pin Name	Types of	Pin Description
28	VCC	power supply	The positive power supply input, requires an external power supply decoupling capacitor 0.1uF
12	GND	power supply	Common ground terminal directly connected to ground USB bus
9	V3	power supply	When connected to VCC power supply voltage input 3.3V external power supply voltage of 5V when the capacity of an external decoupling capacitor 0.1uF
13	XI	Entry	CH340S: crystal oscillator input terminal, and connect with crystal capacitor
	NC.	No connection	CH340H: No connection, must be left open
14	XO	Export	CH340S: output of the crystal oscillator requires an external crystal and a capacitor
	NC.	No connection	CH340H: No connection, must be left open
10	UD +	USB Signal	Directly to the USB bus data lines D +
11	UD-	USB Signal	D- data lines directly connected to the USB bus
1	NOS #	Entry	Suspend the USB device is prohibited, low effective pull-up resistor
2	RSTI	Entry	External reset input, active high, pull-down resistor
22 to 15	D7 ~ D0	Tristate output	8-bit parallel data output, connected DATA7 ~ DATA0
25	STB #	Export	Data strobe output, active low, then STROBE
4	AFD #	Export	Wrap output, active low, then AUTO-FEED
26	INI #	Export	Printer initialization, active low, then INIT
3	SIN #	Export	Select the printer, active low, then SELECT-IN
5	ERR #	Printer error input, active low, internal pull-up, then ERROR or FAULT	
8	SLCT	Input line printer, high active, with pull-up, then SELECT or SLCT	
6	PEMP	Enter the printer is out of paper, high active, with pull-up, then PEMPTY or PERROR	
7	ACK #	The printer receives the response data input, rising edge, pull built, followed by an ACK	
27	BUSY	Entry	The printer is busy, highly effective, built-in pull, then BUSY
twenty three	PRT #	Entry	Working mode setting input, the pull-up resistor, a low level port print mode, a high level to the serial mode
	SDA	input Output	It can be accessed by an external EEPROM (24C01 / 02/04/08/16) of the SDA pin
twenty four	C341	Retention	And PRT # shorted but also for the printer port mode, only for compatibility CH341
	SCL	Export	It can be accessed by an external EEPROM (24C01 / 02/04/08/16) of the SCL pin

5, Function

CH340-chip pull-up resistor USB, UD + and UD- pin should be connected directly to the USB bus. CH340-chip power on reset circuit. RSTI is an asynchronous reset signal input from the outside; RSTI when the pin is high, CH340 chip is reset; RSTI restored when low, CH340 will continue delay reset about 20mS, then into the state of work normally . In order to reliably reset during powerup and reduce external interference, cross-connected between VCC RSTI with a capacity of about 0.1uF capacitor.

CH340S proper chip requires external work to provide a 12MHz clock signal XI pin. In general, the clock signal generated by a built-in inverter CH340 through the crystal oscillation frequency stabilization. The peripheral circuit and a 12MHz crystal connected between pins XI and XO, XO and XI respectively and pin capacitance connected to ground.

CH340H chips have built-in clock generator, and no external crystal oscillator capacitance.

Another function may be provided CH340A customized version of the chip, built-in EEPROM configuration data area, by a dedicated computer software tools for the die set information for each product serial number.

CH340S chip and then if CH340H external EEPROM, the information may be provided by a product serial number and other tools dedicated computer software, configuration data area shown in the following table.

Byte address referred to		Description of the configuration data area	Defaults
00H	SIG	For CH340A: internal configuration information is valid flag must be 5BH. For CH340H / S: external configuration chip is valid, it must be 53H. Other values are invalid configuration	00H
01H	MODE	LPT mode, it must be 84H. Serial mode, it must be 23H. Other configuration data invalid value, the default mode is the printer port	84H
02H	CFG	The specific configuration of the chip, Bit 5 is used to configure serial number string: 0 = active; 1 = invalid.	FEH
03H	WP	Internal configuration information write protection flag is 57H is read-only, or rewritable	00H
05H ~ 04H	VID	Vendor ID, vendor identification code, high byte, an arbitrary value. 0000H or 0FFFFH the VID and PID using the factory default values	1A86H
07H ~ 06H	PID	Product ID, product ID, high byte, an arbitrary value	7584H 7523H
0AH	PWR	Max Power, in units of 2mA maximum supply current	31H
17H ~ 10H	SN	Serial Number, serial number ASCII string of 8. The first byte is not ASCII characters (21H ~ 7FH) disables the serial number	12345678
3FH ~ 1AH	PROD	For CH340A: Product String, product descriptions Unicode strings. The first byte is the total number of bytes (not more than 26H), second byte is 03H, followed by Unicode strings, do not meet the above characteristics using the factory default description	The first byte of the default 00H product manual
Other Address		(Retaining unit)	00H or FFH

CH340 chip supports 5V supply voltage or 3.3V supply voltage. When a 5V supply, the VCC pin external 5V power supply, and capacity V3 pin must CH340 chip is external power supply decoupling capacitor is 0.1uF. When a working voltage of 3.3V, the chip CH340 V3 pin should be connected to VCC and input 3.3V power supply, the operating voltage and the other circuit connected to the chip CH340 not exceed 3.3V.

CH340 supports USB devices automatically suspend in order to save power consumption, NOS # pin is low disables USB devices to hang. CH340 Centronic printer standard chip pin signal interface may refer to the printer port mode. CH340 provides a standard USB printer port, compatible with USB specification and IEEE-1284 specification and the Windows operating system in the computer end of the Windows 2000 operating system and above No driver (the reality is that Windows already comes with driver), all drivers and support for printing applications are fully compatible, you do not need to make any changes.

CH340 support unidirectional transmission and bidirectional transmission, can be used to convert a variety of standard IEEE-1284 compliant parallel printer to USB printer.

6, parameters

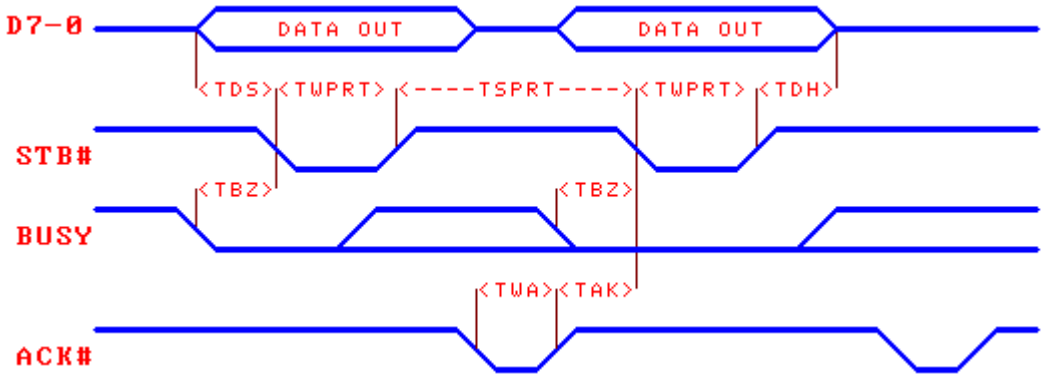
6.1. Absolute maximum (equal to or exceed absolute maximum value will likely cause the chip does not work properly or even damage)

name	Parameter Description		Minimum	Maximum	Unit
TA	Ambient temperature at work	CH340S	- 40	85	℃
		CH340H	--20	70	℃
TS	The ambient temperature during storage		- 55	125	℃
VCC	Supply voltage (VCC power supply connected, GND Ground)		- 0.5	6.0	V
VIO	Voltage on the input or output pins		- 0.5	VCC + 0.5	V

6.2 Electrical parameters (test conditions: TA = 25 ℃, VCC = 5V, does not include USB bus connector pin)

name	Parameter Description			Min	Typ	Max	Units
VCC	voltage	V3 pin VCC pin is not connected		4.0	5	5.3	V
		V3 connect the VCC pin	CH340S	2.8	3.3	3.6	
			CH340H	3.0	3.3	3.6	
ICC	Working at 5V total supply current				7	20	mA
ISLP	The total supply current USB suspend		VCC = 5V		0.1	0.2 mA	
			VCC = 3.3V		0.09	0.15	mA
VIL	Low level input voltage			- 0.5		0.7	V
VIH	High-level input voltage			2.0		VCC + 0.5	V
VOL	Low-level output voltage (current suction 4mA)					0.5	V
VOH	(100uA output current only during a chip reset) High-level output voltage (output current 3mA) VCC-0.5						V
IUP	Input current on-chip pull-up resistor input terminal			5	150	300	uA
IDN	Input current pull-down resistor at the input of			--50	- 150	- 300	uA
VR	The power-on reset voltage threshold			2.4	2.6	2.8	V

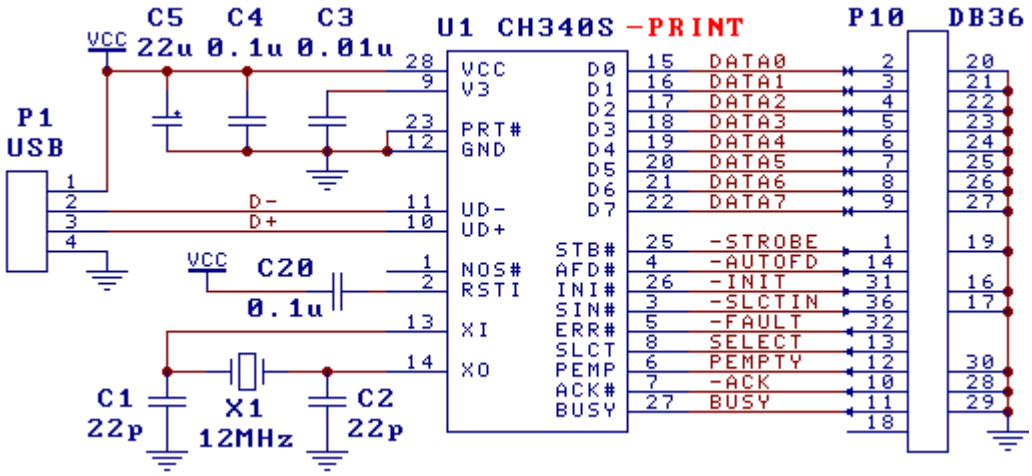
6.3 Timing parameter (test conditions: TA = 25 ℃, VCC = 5V, with reference to the drawings)



name	Parameter Description	Min	Typ	Max	Units
FCLK	XI frequency of the input clock signal pin	11.98	12.00	12.02	MHz
TPR	A power supply reset time	20	35	50	mS
TRI	The effective width of the external reset signal input	100			nS
TRD	The external reset input reset delay	20	35	40	mS
TWPRT	Low effective width of the data strobe STB #	450	1000	10000	nS
TSPRT	Data strobe STB # high-level space width	950			nS
TDS	STB # effective data before setup time	450		10000	nS
TDH	STB # after the effective data retention time	450		10000	nS
TBZ	Busy state BUSY effective low-to-STB #	250			nS
TWA	Reception response ACK # is active low width	100			nS
TAK	Receiving a response to the rising edge of STB # ACK # valid	400			nS

7, Application

7.1. USB transfer printer port (below)



PRT # figure above ground pin (or pins PRT # C341 pin connection) is configured to print the CH340 mode port, for converting parallel printer to USB printer. FIG P10 ports corresponds to a signal line of signal lines or IEEE-1284 standard specification Centronic printer interface, DB36 port P10 can be connected directly parallel printer.

P1 is a USB port, USB 5V power bus comprising a pair of lines and a pair of data signal lines, generally, red + 5V power supply line, a ground line is black, D + signal line is green, D- signal line is white. USB bus provides the maximum power supply current can reach 500mA, under normal circumstances, CH340 chip and a low-power USB 5V power products can be used directly by USB bus. If the USB products provided by other common power supply, you should use the standing CH340 power, if the need to **use USB bus power, the resistance value can be from about 1 Ω A resistor connected to the USB bus 5V 5V power supply line and the common power USB products, and** both directly connected to the ground line.

C3 capacity is 0.1μF, 3.3V for the internal power supply node CH340 decoupling, C4 capacity of 0.1μF, an external power supply decoupling. Optional auxiliary capacitor C20 for power-on reset CH340 achieved.

For CH340S chip, the crystal X1, capacitor C1 and C2 to the clock oscillation circuit. X1 is a quartz crystal frequency of 12MHz, C1, and C2 are 22pF capacity or high frequency monolithic ceramic capacitors. If the selection of low-cost ceramic crystal X1, then the capacitance C1 and C2 of the crystal must manufacturer's recommended value, under normal circumstances is 47pF. From crystal oscillator of difficulty, half the capacity C1 is recommended.

For CH340H chip, no crystal X1 and the capacitors C1 and C2.

In practice, if the longer the connection between the printer and CH340, taking into account the impedance matching requirements of the proposed reference IEEE-1284 specification, the signal line for the printer port P10 plus the resistance is about to pull the 2KΩ ~ 5KΩ resistor, and the series resistance is about 20Ω ~ 40Ω resistor and then parallel printer connected to the respective signal lines between CH340 and P10.

When designing the PCB, note: decoupling capacitors C3 and C4 connected to the pin as close to CH340; enable signals D + and D- lines are parallel and supply ground or copper on both sides, from the outside to reduce the signal to interference; XO and XI minimize the length of the pin associated signal line, in order to reduce high frequency interference, may surround the ground or copper in relative equipment.