

Parallel Printer Interface

The parallel printer interface is probably the simplest type of parallel peripheral interface.

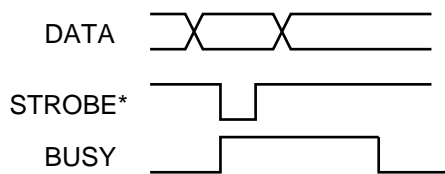
The object of this lecture is learn enough about the handshaking signals on a “Centronics” parallel printer interface to be able to write programs to transfer data over it.

1 “Centronics” Parallel Printer Port 2 Software Details

This simple unidirectional interface is used to drive printers. There are 8 data lines and two important data transfer control lines, STROBE* and BUSY. BUSY is an output from the printer that is high when the printer cannot accept data. STROBE* is an output from the PC which is strobed (brought low and then high again) to transfer the data on the data lines to the printer. This interface uses TTL signal levels.

To write a character to the printer the computer waits until busy is low, puts the character on data lines and brings STROBE* low and then high again. The minimum width of the strobe is half a microsecond and the data setup and hold times should also be at least half a microsecond.

In addition, there is an ACK* strobe from the printer which goes low temporarily to acknowledge that the byte has been transferred. This strobe is often used to drive an interrupt but it's high/low state cannot be relied up to indicate the status of the printer.



There are additional handshaking lines to control various printer features (e.g. auto line feed) and to indicate various printer status conditions (e.g. out of paper).

The original IBM PCs parallel port was an output-only Centronics-compatible interface but in recent designs the port can also be configured as an input. The maximum speed usually depends on the software use but is typically 50 to 100 kB/s.

The PC printer interface is through a data register at offset 0 from the base I/O address, a status register at offset 1 and a control register at offset 2.

Since the PC can have several printer interfaces installed, the actual base address of the main printer interface will depend on the configured hardware. When MS-DOS boots up it stores the (I/O) address of the first interface (“LPT1”) in the word at memory location 0408H.

Setting the bits 7 to 0 in the data register drive the data pins (9 to 2 respectively) on the interface connector.

The bits in the status register are connected to the printer's status outputs and have the following meanings:

bit	name	pin	meaning
7	BUSY*	11	printer busy
6	ACK*	10	transfer complete
5	PAPER*	12	paper available
4	ONLINE	13	on-line
3	ERROR*	15	error detected

The bits in the control register drive individual pins on the printer interface and have the following functions:

bit	symbol	pin	meaning
4	IRQ	-	enable IRQ
3	SEL	17	printer select
2	INIT*	16	initialize printer
1	AUTOLF	14	enable automatic line feed
0	STROBE*	1	data strobe