The PS/2 Keyboard and Mouse Interface

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The IBM PC Keyboard

The PS/2 Keyboard and Mouse Interface – p.
The IBM PC Keyboard

Original keyboard connector: DIN-5
The PS/2 Mini-DIN 6 Connector

Female Socket

6 5 = Clk

VCC = 4

3 = GND

2 1 = Data

Female Socket

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Like RS-232, but with a clock. Odd parity, one start, one stop. Keyboard-to-host shown: keyboard initiates everything.
Codes (Keyboard to Host)

00/FF Error or buffer overflow
F0 Key-up
FA Acknowledge
EE Echo response
FE Resend
E0 Extended code coming
Communicating to the Keyboard

Host brings Clock low, then Data low to indicate transfer to keyboard, then releases Clock (rises).

Keyboard starts generating clock signals. Host supplies serial data, changing after each falling edge. After stop bit, host releases Data. Keyboard pulls Data low for one more clock signal to indicate it received the byte.
Commands (Host to Keyboard)

ED  LED control
   | Caps lock | Num lock | Scroll lock

EE  Echo
Keyboard will respond with EE

F0  Set scan code set
Keyboard will respond with FA and wait for another byte 01–03. 00 leaves scan code unchanged.

F3  Set key repeat rate
Keyboard responds with FA and waits for second byte, indicating repeat rate.
Commands (Host to Keyboard)

- **F4** Enable keyboard  
  Responds with FA, clears buffer, enables scanning.

- **F5** Disable keyboard  
  Responds with FA, disables keyboard.

- **FE** Resend  
  Retransmit the last byte.

- **FF** Reset Keyboard
PS/2 Mouse Protocol

Three bytes sent every time mouse moves or button clicked:

<table>
<thead>
<tr>
<th>MSB</th>
<th>LSB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>X</td>
</tr>
<tr>
<td>Overflow</td>
<td>Sign</td>
</tr>
<tr>
<td>X movement</td>
<td></td>
</tr>
<tr>
<td>Y movement</td>
<td></td>
</tr>
</tbody>
</table>

Movement values are since last transmission: 9-bit two’s-complement (signed) numbers.

Many more variants, modes, and other junk.