# US-4866602-A Power supply for a computer peripheral device which positions a cursor on a computer display

(1) BACKGROUND OF THE INVENTION  
(2) 1. Field of the Invention  
(3) This invention relates to a computer graphic input device known as a mouse and, more specifically, to a power supply for such device.  
(4) 2. Description of the Prior Art  
(5) A mouse is a computer input device typically used for positioning a cursor on a computer video display screen. A typical physical embodiment of a mouse includes a small enclosure containing X-Y motion sensors, one or more push buttons operable externally of the enclosure, electrical interface circuitry, and a cable to connect the circuitry to a host computer. In operation, when the mouse is moved on a flat surface by a user, the motion sensors in the mouse detect the movement and direction of the mouse in the X-Y plane. The interface circuitry, typically within the mouse, converts the motion data produced by the sensors into a digital form usable by the host computer. Software in the host computer then utilizes the motion data to perform a particular function, for example, repositioning of the cursor on the display screen. The mouse also usually is provided with one or more switches, often in the form of push buttons, to enable alteration of the program flow in the host computer.  
(6) Mice of the above described type are normally classified by the manner in which motion is detected, the principal motion detection methods being mechanical and optical. Mechanical mice usually employ a technique whereby a spherical ball protrudes slightly below the bottom of the mouse enclosure which is free to roll as the mouse is moved by the operator along a flat surface. Inside the enclosure, the rotating ball is coupled to a pair of orthogonally mounted shaft position encoders by small rubber wheels or the like. Mouse motion is thereby converted into two pairs of quadrature signals, one pair for each axis of motion, thereby providing the required direction and displacement information corresponding to mouse movement. Optical mice utilize a method whereby a light source in the base of the mouse is reflected onto one or more photodetectors by a specially patterned surface over which the mouse is moved. Typically, a single chip computer translates the changes in detected luminance into direction and displacement signals which are utilized by the host computer in the manner described above.  
(7) Mice may be further classified by the manner in which they interface with the host computer. The two common interface methods are parallel and serial. Mice employing a parallel interface usually connect to a specially designed, dedicated controller board installed in the host computer. The circuitry used to convert motion of the mouse into digital data may be located either on the controller board in the host computer, in the mouse itself, or divided between the two. In any event, the controller board provides the interconnection between the host computer and the mouse.  
(8) On the other hand, mice employing a serial interface typically are connected to a general purpose serial I/O port on the host computer of the type often used with other peripheral devices such as modems. One advantage of a serial mouse is that no special mouse controller board is required in the host computer to support operation of the mouse. As a consequence, all circuitry used in translating motion of the mouse into digital form is contained within the mouse itself, or within an additional enclosure external to the host computer.  
(9) The serial mouse typically utilizes a microcomputer, often with several discrete components, to translate the quadrature signals of the shaft encoders or the optical sensors into data packets that are transmitted to the host computer. Additionally, there is circuitry to perform the signal level conversion required by the serial interface standard employed (usually EIA Standard RS-232C). Data is commonly transmitted using an ordinary asynchronous serial protocol. Serial mice require an external power source, such as batteries or an externally located power supply connected to the mouse by a cable. Use of power supplied by batteries is inconvenient because of size and weight considerations, as well as the fact that the supply of power is dependent on battery life. On the other hand, the use of an externally located power supply usually requires an extra enclosure that must be connected to the primary AC power lines, as well as an additional cable to supply the power to the mouse. Both of these methods result in additional cost and complexity.  
(10) SUMMARY OF THE INVENTION  
(11) The invention overcomes the above problems by obtaining power for the mouse directly through signal lines normally used for other purposes but which form a part of the standard RS-232C serial interface. The serial mouse utilizes the RTS (Request To Send), DTR (Data Terminal Ready) and TXD (Transmit Data) signal lines of the host computer's RS-232C serial I/O interface as its power source. These lines, as defined by EIA Standard RS-232C, are normally used for data communication and handshake functions under control of the host computer, and are not intended to provide electrical power to any peripheral device attached thereto. However, in accordance with EIA Standard RS-232C, these signal lines are energized by line drivers capable of sourcing a few milliamperes of current at a minimum of 5 volts into a 3000 ohm load. The serial mouse of this invention is able to obtain all required electrical power through these three signal lines.  
(12) Because the above noted signals are available on the serial I/O ports of substantially all micro and mini computers, the serial mouse of this invention may be directly connected to the host computer interface without hardware modification, an external power source, or internal batteries. A software driver in the host computer is used to properly configure the control lines on the host computer serial interface.