Abstract Title: Combined mouse and wireless modem

A computer peripheral device consists of a mouse 40 and a wireless modem 41. A hub 42 in the device allows the mouse and the modem to connect to a computer using a single connection 43. The connection may be a cable which may include the antenna for the modem. The connection may use the USB standard. The device may include an indicator which may give the status of the wireless connection. The device may include a power control which may be a switch and may switch between a power saving mode and an operating mode. The device may have its own batteries and it may receive power from the computer. It may switch between battery and external power based on the status of the batteries and the external power supply. The wireless modem may filter incoming connections based on the number of the incoming call.
Figure 2

USB Connector 21

Device Controller 15

Battery 14

Internal devices 22
Figure 4
The following terms are registered trademarks and should be read as such wherever they occur in this document:

"Wi-Fi", "GSM", "UMTS" and "Vodafone Mobile Connect Card"
COMPUTER PERIPHERAL DEVICE

This invention relates to a computer peripheral device. More particularly, the present invention relates to a peripheral device for use with a portable computing device.

Background

Portable computer users are becoming accustomed to having information at their fingertips, and in particular, ready access to the internet, such as via wireless internet access hubs like the so-called “Wi-Fi hotspots”.

A new portable modem has been developed for portable computers and is being offered by wireless network providers to computer users. The portable modem allows a user to access the Internet wherever they would normally gain access to the mobile phone network.

One currently available portable modem establishes 3G HSDPA downloads of the order of 1.8Mbps. The modem can also make use of GSM/GPRS and UMTS connections when out of range of an HSDPA-enabled network. The modem has a slot for a SIM card, and connects to a portable computer via a USB port. The portable modem operates like land-line connected modems, with the exception that broadband network access is obtained wirelessly via the mobile telecommunications network.

Wireless modems are becoming a key component of a portable computer user’s paraphernalia, as they provide users with enhanced communications capabilities. However, a converse factor is that computer users are also becoming weighted down with a multitude of such add-on devices and their associated power supplies and cables.

When a portable computer user has multiple computer peripheral devices to carry around, the chances of the user forgetting or losing any or all of these peripherals increase.

A further problem is that some portable computing devices only have one USB socket. Therefore, for these users, to use the modem in conjunction
with another peripheral that connects to the computing device via a USB connection, a USB hub is required. This, in turn, is yet another required ancillary device.

Summary of the Invention

According to a first aspect, the present invention provides a computer peripheral device configured for attachment to a computing device, the peripheral device including: modem means configured to provide a connection to a cellular network; mouse means configured to provide the computing device with a navigational function; and a connection hub located within the computer peripheral device to which the modem means and the mouse means are connected, wherein the connection hub enables the mouse means and the modem means to communicate with the computing device via a single connection point.

According to a second aspect, the present invention provides a computer peripheral device configured for attachment to a computing device, the peripheral device including: modem means configured to provide the computing device with a connection to a cellular network; mouse means configured to provide the computing device with a navigational functionality; and a cable means configured to connect the peripheral device to the computing device, the cable means including at least one antenna in communicable relation with the modem means.

According to a third aspect, the present invention provides a computer peripheral device configured for attachment to a computing device with an auxiliary display, the peripheral device including: modem means configured to provide the computing device with a connection to a cellular network; mouse means configured to provide the computing device with a navigational functionality; and a controller means configured to communicate with the computing device, so as to provide an indicator relating to the cellular connection on the auxiliary display.
According to a fourth aspect, the present invention provides a computer peripheral device configured for attachment to a computing device, the peripheral device including: modem means configured to provide a connection to a cellular network; mouse means configured to provide the computing device with a navigational function; and security means associated with the modem means, the security means configured to receive incoming circuit switched data, extract an MSISDN from the incoming data and determine whether or not to effect a connection with the entity initiating the incoming data.

Further preferred features for these aspects of the invention are described in claims 2 to 23.

In this way, better management of computer peripheral components can be achieved. Further, these aspects of the invention provide a computer user with enhanced ease of use, convenience, and user efficiency.

Brief Description of the Drawings

Figure 1 illustrates a schematic diagram of a computer peripheral device according to a first embodiment of the invention, when connected to a computing device;

Figure 2 illustrates a schematic diagram of a computer peripheral device according to a second embodiment of the invention;

Figure 3 illustrates a schematic diagram of a computer peripheral device according to a third embodiment of the invention;

Figure 4 illustrates a schematic diagram relating to the functionality of the computer peripheral device;

Figure 5 illustrates a timing diagram for connecting multiple USB functionalities within the device, to a computing device according to an embodiment of the invention;

Figure 6 illustrates an example network configuration in relation to a third party computer seeking to establish a connection with the computer peripheral device according to a further embodiment of the invention;
Figure 7 illustrates an example network configuration in relation to the computer peripheral device having an established high speed VPN connection with a third party, according to the further embodiment of the invention also shown in Figure 6; and

Figure 8 illustrates the emulation functionality according to the further embodiment of the invention also shown in Figures 6 and 7.

**Detailed Description of Embodiments of the Invention**

According to a first embodiment of the invention, a computer peripheral device 10 is illustrated in Figure 1, connected to computing device such as a laptop or portable computer 11.

The peripheral device 10 includes a controller 15, which is in communication with a motion detector (not shown), such as an infrared or laser detector. The detector detects two dimensional motion relative to an adjacent surface. The controller 15 forwards data relating to this motion to the computing device 11, such that that the motion of the peripheral device 10 translates to the motion of a visual pointer on a screen of the computing device 11, allowing the peripheral device to be used to navigate the pointer about the screen.

Physically, the peripheral device consists of a small case, held under one of the user's hands. The peripheral device 10 typically, but not essentially, has "wheels" or ball-bearings (not shown) or other glidable means, which allow the user to freely and evenly move the device about a surface.

The peripheral device 10 also includes a cellular modem 12, which is in communication with the computing device 11 via a buffer memory 13. In use, the computing device 11 typically sends data to the cellular modem 12 at a rate faster than the modem can transmit, and hence the buffer memory is used to store data until it is required. In this regard, the device controller 15 will instruct the buffer memory to forward data to the modem 12 at an appropriate rate, typically being the maximum data rate that the modem is capable of. The cellular modem 12 is configured to receive as well as transmit data.
A further use of the buffer memory is in relation to storing data, such as email messages, that the user wishes to transmit from the cellular modem, where the data is stored independently of the computing device 11. Advantageously, in view of the buffer memory being associated with battery 14 and controller 15, once the user has loaded the data from the computing device into the buffer memory, the user may switch the computing device off, pending the data transmission to be completed. Where the modem 12 has a radio connection, it will commence transmitting the data immediately, however, as this transmission process, and the storage of the data is independent of the computer operation, the user need not maintain the computing device powered up for the data transmission to be completed. This is in complete contrast to current cellular modems, where the user needs to wait for the computing device to send the data to external servers before shutting the computing device down. It is to be appreciated that the data being transmitted may relate to actual email communications, or to other synchronisation data, for instance, data to synchronise the user’s calendar and email on a portable computing device with a remote server.

A particular advantage of this aspect of the invention is that the user is able to shut their computing device down sooner after the end of a working session, thereby increasing their mobility.

As indicated above, the peripheral device also includes battery 14, which is connected to both the buffer memory 13 and the cellular modem 12. As just described, the battery is able to supply the peripheral device with power when the computing device is shut down.

When the computing device is switched on, however, the peripheral device 10 typically uses the power provided by the computing device’s battery or mains connection. However, continuous, unconstrained use of the cellular modem 12 can significantly shorten the battery life of the computing device when it is not connected to a mains supply. To address this problem, the peripheral device is provided with two different power management modes.
The first power management mode is an automatic mode. In this mode, the device controller 15 monitors the connectivity required by the computing device. That is, the controller 15 monitors when the computing device has a radio connection. When the modem functions are not required by the computing device, the device controller 15 will enter the device into a power-saving mode.

The second power management mode is a manual mode. In this regard, one or more buttons (not shown) are typically provided on the housing of the peripheral device in order to manually control entering and exiting the power-saving mode.

This second power management mode may be an alternative to the first mode, or they may be used in conjunction.

A further feature of the peripheral device is illustrated in relation to Figure 2, where the peripheral device is connected to a computing device via a USB connector 21. In this regard, some computing devices do not meet the USB specification for the power they should make available from a USB connector. Therefore, according to this embodiment of the invention, controller 15 of the peripheral device is configured to sense when the USB power supply voltage from the computing device drops below the required USB specification level. When a drop occurs, the controller 15 instructs its internal battery 14 to provide power to its internal USB devices 22, such as the cellular modem 12, in order to restore the voltage level to that required.

The controller may also implement this functionality in the situation of the peripheral device sharing a USB connection with one or more other USB devices, such as via an external USB hub that is not externally powered. In this situation, the power available through the single socket on the computing device must be shared between the hub and each of the connected USB devices. As this may result in insufficient power being provided to the peripheral device 10, the controller 15 may be configured to reduce the power required by the peripheral device through the USB connector 21, by using its
internal battery 14, thereby allowing the peripheral device 10 to better share the external hub with the other USB devices.

Alternatively, or in addition, a further function that the controller may perform is in relation to recharging the internal battery 14 of the peripheral device. In this regard, whenever the controller 15 senses that the power available from the computing device’s USB connector 21 exceeds that required by all devices attached to the USB connector, then the controller 15 is configured to use the surplus power to recharge the battery 14.

The user, however, may disable this functionality. This may be desirable when the computing device does not have a mains connection, and is operating off its own batteries. In these circumstances, the user may not want the peripheral device to be a drain on the computing device’s own battery.

With reference to Figure 4, it is to be appreciated that both of the mouse functionality 40 and the modem functionality 41 are provided through a single USB hub 42, thereby allowing each functionality to be provided simultaneously.

However, as some operating systems malfunction when several USB devices are connected simultaneously, the device of the present invention is preferably configured so that the device controller 15 consecutively enables the connections of the mouse functionality 40 and the modem functionality 41, with a delay between each of the connections. This is illustrated in Figure 5.

More specifically, when power is first applied to the device, by the insertion of the USB connector 43 into a computing device, all of the device’s internal USB functionalities are disabled. The device controller will then firstly set about enabling the USB hub 42. After time delay t1, the device controller 15 will then set about enabling USB device 1, which could be the mouse USB device, or the modem USB device. Then after time delay t2, the device controller 15 will enable the remaining USB device 2. The delays t1...tn are chosen so that the operating system of the computing device can acknowledge the appearance of each device in turn and fully configure itself before the next device is activated. Without these delays, when the computing
device's operating system was configuring itself for USB device 1, the appearance of USB device 2 would fatally disturbs the configuration process.

To enable each device, the controller first connects power from the USB cable to the device. It will then pause to allow the device to initialise. The controller then proceeds to measure the USB supply voltage, in order to determine if there is sufficient power available to operate the new device. If the voltage is not within the USB specification, the power is disconnected from the device and the enabling sequence terminates. If however the supply voltage is within a predetermined specification, the device's USB signal lines are connected. The controller will then again pause to allow the operating system to configure itself.

Another feature of the device 10 is shown in relation to Figure 3, whereby the antenna or antennae 30 is incorporated into the cable 31 connecting the device 10 to a computing device. By integrating the antenna(e) into the cable, the size of the peripheral device 10 may be minimised the size without unduly affecting the operation of the antenna(e). In this regard, current trends dictate that computer peripherals, such as data cards and modems are as small as possible. Antennae that are shoehorned into small spaces become progressively more ineffective, as the size of the antenna is reduced. Furthermore, where multiple diversity antennae are used, the spacing between the antennae is critical. These problems are addressed in the device 10 of the present embodiment of the invention by removing the antenna(e) 30 from the main body of the device 10, and integrating it into the cable 31. By doing this, the antennae can also be made larger, thereby improving any radio connection signal strength. Further, where multiple antennae are utilised, it becomes possible to choose spacings between each antenna, which better meet the requirements of diversity operation.

An additional benefit that results from moving the antenna out of the main body of the device 10, is that the screening effect from a user's hand operating the device is reduced. In this regard, when the device 10 is being used as a mouse, it is standard for a user to place their hand entirely over the
device when navigating with the mouse functionality. Were the antennae incorporated into the body of the device 10, the user's hand would screen and/or detune the antenna for the cellular modem that also may be operating within the device at the same time.

Further, the cable 31 may be retractable, so that when not in use, the cable can be stored inside the peripheral device. This feature has the advantage of further minimising the additional paraphernalia that a computer user needs to remember to carry around, thereby reducing the chances of the user forgetting or losing the cable.

According to an additional embodiment of the invention, the device includes indicators, such as indicator lights to show the status of the IP connection. These indicators may indicate only that a cellular network has been found and that a radio connection has been established. Alternatively, or in addition, a status indicator may be provided which indicates the signal strength of the radio connection. The inclusion of this signal strength indicator further enhances the information available to a user and accordingly improves their experience when using the peripheral device.

According to a still further embodiment of the invention, where the peripheral device is used in conjunction with a computing device with an auxiliary display, such as a laptop with an auxiliary display on the outside of its lid, the device controller 15 of the peripheral device is configurable so that it can show the status of the radio connection on the auxiliary display. In this regard, the peripheral device can show the status of the radio connection and/or the signal strength of the radio connection.

A further application of this embodiment of the invention is in relation to providing on the auxiliary display the progress of data being sent via the cellular modem 12. This feature may be implemented once the computing device has been shut down, and the modem is transmitting data previously stored in the buffer memory of the peripheral device 10, as well when the computing device is still on.
In a further embodiment of the invention, the peripheral device 10 includes a confidential data store. This data store may be a component of the buffer memory 13 or separate. In this regard, cellular data such as phone number lists, network passwords, security keys, tokens and cellular data transmission functions such as Short Message Service (SMS) and Multimedia Message Service (MMS). These data transmission functions by their nature contain data that is confidential to the user. Where this data is stored on personal computers, it is notoriously difficult to keep the information secure, as the user generally has the ability to access all areas of the computer memory, and therefore may be able to find where the operating system has kept the data, including any temporary copies made.

In the present embodiment of the invention, by storing the confidential data on the peripheral device 10, the data may be kept secure, and also accessible by the cellular modem, in order to extract the necessary functionality to interact with the cellular network.

With reference to Figures 6, 7 and 8, in a still further embodiment of the invention, the peripheral device 65 is able to effect a secure remote user connection 60, which, for instance, may provide a remotely located IT support (ITS) person 61 with access to the computing device 62. To implement this embodiment of the invention, the peripheral device is Circuit Switched Data (CSD) compatible, such as with 2G GSM Circuit Switched Data (CSD) or 3G CSD. A remotely located person 61 is then able to make a CSD call to the peripheral device 65 from a computing device with includes an appropriate connection card, such as a Vodafone Mobile Connect Card (VMCC) 63. This call would be carried out within a 2G/3G network 64, such as the GSM cellular network, where the usual GSM security applies. In this regard, the GSM number space for addressing communications endpoints ensures unique identity, and also country-level geographic marking is implicit within the number space.

The peripheral device 65 contains, or has access to, a list of acceptable incoming MSISDNs, and will only accept a CSD call from one of these
numbers. This prevents any unauthorised person attempting to "dial into" the peripheral device 65, and its associated computing device 62. In this way, the remotely located person 61 is able to gain authorised access to the user's computing device 62 and for instance to diagnose any computing problems that the user may have.

To make the connection between the two computing devices secure, security keys may be exchanged in order to establish a secure Virtual Private Network (VPN) using a cellular data connection to a mobile network operator 71 and thence to the Internet 72, as shown in Figures 7 and 8. This would enable higher speed data channels to be accessed, which are more suited to remote support requirements. Alternatively the two computing devices may used CSD as described above to exchange security keys and then both may use wired connections to the Internet 72 for the VPN.

In this embodiment of the invention, the peripheral device 65 is also provided with the necessary functionality to emulate a computing device keyboard and graphics display in addition to its usual mouse function. These functions are made available via the VPN to the remotely located person, so that they can operate the laptop remotely.

Figure 8 shows the main components that provide the emulation functionality. The peripheral device 65 includes a keyboard/mouse emulator 81 and a graphics emulator 82. The keyboard/mouse emulator provides the remote ITS computing device 61 with a replica of the keyboard/mouse of the user's computing device 62. Similarly the graphics emulator provides the remote ITS computing device 61 with a replica of the graphics interface/display of the user's computing device 62.

These emulators 81,82 are managed by the device controller 15 which connects them via the cellular modem 12 to a program running on the ITS computing device 61. This program controls the mouse/keyboard/display emulation via a protocol which runs over the VPN established between ITS computing device 61 and the peripheral device 65. This program typically produces a window on the screen of the ITS computing device 61 which
displays the replica graphical interface, being the graphical interface that is, or would have been shown on the display of the user’s computing device 62.

The keyboard and mouse of the ITS computing device 61 can be connected to the emulated mouse and keyboard, in order to provide the keyboard of the ITS computing device 61 with the ability to control those peripherals of the user’s computing device 62. The IT support person can thus operate the remote computing device as if they were sitting in front of it.

In terms of corporate networks, there are several remote management programs that will implement this functionality on computing device 61 when run inside a corporate network. However, such remote management programs generally cannot run over cellular networks because many corporate networks will not allow incoming requests at the modem end of computing device 61, and/or will not allow the type of network traffic required. In addition, these remote management programs require that the remote user’s computing device 62 be running a “client” program which communicates with the ITS program, so if the laptop operating system is defective and no programs will run on the remote computing device 62, then access is impossible.

To address these problems, the peripheral device controller 15 is configured to run the client program. Thence, since the peripheral device 65 also emulates the physical peripherals of computing device 62, the IT Support person can control the remote computing device 62 from an initial power-on startup and can therefore repair or reload the operating system, if necessary.

Similarly, this embodiment of the invention may be used by the user of the peripheral device 65 to dial out and gain computing access to another remote computing device 61. In this alternative, in view of security issues, the peripheral device preferably only has access to remote computers with an acceptable MSISDN.

This embodiment of the invention is not to be considered as limited to use in relation to the peripheral device as claimed. For instance, the embodiment may readily be applied to cellular communication devices, particularly so-called “smart phones”. The embodiment may in general be
applied to any device with a CSD capability that can be securely connected to another similarly equipped device so that one can control the other and/or can communicate securely. Further, this embodiment may be applied to any pair of computing devices to which GSM cellular network connectivity is available. This includes:

- IP network infrastructure such as switches, routers and firewalls;
- intelligent remote sensors; and
- equipment where remote and secure charging/billing control is required, for example Pay-per-View systems and networked games.

Whilst the embodiments of the invention have been described in relation to portable computing devices, the embodiments of the invention may readily be applied to desktop computers.

Further, the embodiments of the invention may be applied to any computing device with an operating system, such as Personal Digital Assistants (PDAs) and the like.

The embodiments of the invention have been described in relation to two different USB functionalities within the peripheral device, however a greater number may be incorporated if required.

Various features have been described in this specification. Except where explicitly indicated, all of these features are to be considered as separate embodiments of the peripheral device. However, each of these embodiments may be readily combined in any order or combination.
CLAIMS

1. A computer peripheral device configured for attachment to a computing device, the peripheral device including:
   modem means configured to provide a connection to a wireless network;
   mouse means configured to provide the computing device with a navigational function; and
   a connection hub located within the computer peripheral device to which the modem means and the mouse means are connected,
   wherein the connection hub enables the mouse means and the modem means to communicate with the computing device via a single connection point.

2. The peripheral device of claim 1 further including a cable means configured to connect the peripheral device to the computing device, the cable means including at least one antenna in communicable relation with the modem means.

3. The peripheral device of claim 1 or 2 wherein the connection point is a USB hub.

4. The peripheral device of any preceding claim, further including a first control means configured to communicate with the computing device, so as to provide an indicator relating to the wireless connection on an auxiliary display of the computing device.

5. The device of claim 4, wherein the indicator provided is an indicator of the status of a data transmission over the wireless connection or an indicator of the strength of the wireless connection.
6. The peripheral device of any preceding claim, further including a second control means for controlling power consumption of the device.

7. The peripheral device of claim 6, wherein the second control means is configured to monitor communications between the peripheral device and the computing device, when connected, and enter a power-saving mode when the modem functionality is not required.

8. The peripheral device of claim 6 wherein the second control means is a button for switching between a power-saving mode and an operating mode.

9. The peripheral device of any one preceding claim, further including a memory means configured to buffer data for transmission to the modem means at an appropriate rate.

10. The peripheral device of claim 9, further including a battery means configured to provide power to the modem means, so that the modem means can continue operating even once the computing means has been switched off.

11. The peripheral device of any one preceding claim, wherein the modem means is further configured to transmit and/or receive data independently of the status of the computing device.

12. The peripheral device of claim 11 wherein the modem means is further configured to transmit and/or receive data even once the computing device has been switched off.

13. The peripheral device of claim 4 wherein the first control means, when connected to the computing device, is further configured to:

   monitor a power supply voltage received from the computing device;
determine when the received voltage falls below a predetermined voltage level required for the modem means and/or the mouse means; and when the received voltage falls below the required voltage level, use an internal battery to provide a voltage in order to restore the required voltage level to the modem means and/or the mouse means.

14. The peripheral device of claim 4 or 13, wherein the first control means, when connected to the computing device, is further configured to:

compare a power level of an internal battery with a power level received from the computing device; and

when the internal battery power level is less than the received power level, recharge the internal battery using the power available from the computing device.

15. The peripheral device of claim 4, 13 or 14 wherein the first control means is further configured to:

determine that the peripheral device has been connected to the computing device;

register the connection point with the computing device;

register either one of the modem means or the mouse means with the computing device after a first time delay; and then

register the other one of the modem means or the mouse means with the computing device after a second time delay.

16. The peripheral device of claim 15 wherein the first control means is further configured to:

measure the supply voltage received from the peripheral device, once connected; and

only register the modem means and/or the mouse means with the computing device when the supply voltage is not less than a required operating voltage level.
17. The peripheral device of claim 9 wherein the memory means further
comprises a secure data store.

18. The peripheral device of any one preceding claim, further including
security means associated with the modem means, the security means
configured to:

receive incoming circuit switched data;
extract an MSISDN from the incoming data; and
determine whether or not to effect a connection with a remote
computing device initiating the incoming data.

19. The peripheral device of claim 18 wherein the security means is
configured to determine whether or not to effect the connection, by comparing
the MSISDN of the remote computing device with a list of acceptable
MSISDNs.

20. The peripheral device of claim 18 or 19 wherein the security means is
further configured to exchange security keys with the remote computing
device, when it is determined to allow the connection, in order to establish a
Virtual Private Network (VPN) over which to communicate.

21. The peripheral device of any one of claims 18 to 20 wherein the security
means is further configured to emulate one or more functionalities of the first
computing device, in order to allow the remote computing device to remotely
operate the first computing device with which the peripheral device is
associated.

22. The peripheral device of claim 21 wherein the security means is further
configured to emulate the following one or more functionalities:

a mouse functionality;
a graphical display functionality;
a keyboard functionality.

23. The peripheral device of any one of claims 18 to 22 further comprising a
first control means configured to run a client program, the client program
configured to communicate with a corresponding program running on the
remote computing device.

24. A method of operating the computer peripheral device of any one
preceding claim including:

determining that the computer peripheral device has been connected to
the computing device;
 registering the connection point with the computing device;
 registering either one of the modem means or the mouse means with the
computing device after a first time delay; and then
 registering the other one of the modem means or the mouse means with
the computing device after a second time delay.

25. The method of claim 24, wherein it is determined that the computer
peripheral device has been connected to the computing device when power is
applied to the peripheral device.

26. The method of claim 24 or 25 further including controlling power
consumption of the device by monitoring communications between the
peripheral device and the computing device, and enter a power-saving mode
when the functionality of the modem means is not required.

27. The method of any one of claims 24 to 26 further including sending a
communication to the computing device, in order to provide an indicator
relating to the wireless connection on an auxiliary display of the computing
device.
28. The method of claim 27, wherein the communication is configured to provide a visual indicator relating to the status of a data transmission over the wireless connection or of the strength of the wireless connection.

29. The method of any one of claims 24 to 28 further including:
   the modem means receiving an incoming circuit switched data for a third party;
   extract an MSISDN from the incoming data; and
determine whether or not to effect a connection with the third party initiating the incoming data.

30. The method of claim 29 wherein it is determined whether or not to effect the connection by comparing the MSISDN with a list of acceptable MSISDNs.

31. The method according to any one of claims 24 to 30 further comprising:
   monitoring a power supply voltage received from the computing device;
determining when the received voltage falls below a predetermined voltage level required for the modem means and/or the mouse means; and
   when the received voltage falls below the required voltage level, using an internal battery to provide a voltage in order to restore the required voltage level to the modem means and/or the mouse means.

32. The method according to any one of claims 24 to 31 further comprising:
   comparing a voltage level of an internal battery with a voltage level received from the computing device; and
   when the internal battery voltage level indicates that the battery is not fully charged, recharging the internal battery using the power available from the computing device when that power is not required by other devices attached to the computing device.
33. The method of any one of claims 24 to 32 further comprising:

measuring the supply voltage received by the peripheral device, once connected; and

only registering the modem means and/or the mouse means with the computing device when the supply voltage is not less than a required operating voltage level.

34. A computer peripheral device substantially as herein described with reference to the accompanying drawings.

35. A method of operating a peripheral device, substantially as herein described with reference to the accompanying drawings.

36. A remote management gateway configuration configured for use with a first device in a communications network, the gateway configuration comprising:

a receiver configured to receive incoming circuit switched data from a remote computing device;

control means configured to extract an MSISDN from the incoming data and determine whether or not to effect a connection with the remote computing device initiating the incoming data.

37. The management gateway of claim 36 wherein the control means is further configured to determine whether or not to effect the connection by comparing the MSISDN of the remote computing device with a list of acceptable MSISDNs.

38. The gateway configuration of claim 36 or 37, wherein the control means is further configured to exchange security keys with the remote computing
device, when it is determined to allow the connection, in order to establish a Virtual Private Network (VPN) over which to communicate.

39. The gateway configuration of any one of claims 36 to 38 wherein the control means is further configured to emulate one or more functionalities of the first device, in order to allow the remote computing device to remotely operate the first device.

40. The gateway configuration of claim 39 wherein the control means is further configured to emulate the following one or more functionalities:
   a mouse functionality;
   a graphical display functionality;
   a keyboard functionality.

41. A computer peripheral device substantially as hereinbefore described with reference to and/or substantially as illustrated in the accompanying drawings.

42. A method of operating the computer peripheral device, substantially as hereinbefore described with reference to and/or substantially as illustrated in the accompanying drawings.

43. A remote management gateway substantially as hereinbefore described with reference to and/or substantially as illustrated in the accompanying drawings.
Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

<table>
<thead>
<tr>
<th>Category</th>
<th>Relevant to claims</th>
<th>Identity of document and passage or figure of particular relevance</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>1-35, 41, 42</td>
<td>GB 2417107 A (RAM) Whole document, particularly figures 8-10 and pages 13-16</td>
</tr>
<tr>
<td>X</td>
<td>1-35, 41, 42</td>
<td>DE 10317542 A1 (HAAS) Whole document</td>
</tr>
<tr>
<td>X</td>
<td>1-35, 41, 42</td>
<td>US 5706031 A (BRENDEZEL et al) Whole document</td>
</tr>
<tr>
<td>X</td>
<td>1-35, 41, 42</td>
<td>US 5943625 A (YEOM et al) Whole document</td>
</tr>
</tbody>
</table>

Categories:

- X: Document indicating lack of novelty or inventive step
- Y: Document indicating lack of inventive step if combined with one or more other documents of same category.
- A: Document indicating technological background and/or state of the art.
- P: Document published on or after the declared priority date but before the filing date of this invention.
- E: Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC:

- G4A
- Worldwide search of patent documents classified in the following areas of the IPC
- G06F; H04M

The following online and other databases have been used in the preparation of this search report:

- WPI, EPODOC, Google
### International Classification:

<table>
<thead>
<tr>
<th>Subclass</th>
<th>Subgroup</th>
<th>Valid From</th>
</tr>
</thead>
<tbody>
<tr>
<td>G06F</td>
<td>0003/033</td>
<td>01/01/2006</td>
</tr>
<tr>
<td>H04M</td>
<td>0001/02</td>
<td>01/01/2006</td>
</tr>
</tbody>
</table>