Title
A method of activating output peripherals

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Abstract

A METHOD OF ACTIVATING OUTPUT PERIPHERALS

A method of activating an output peripheral, such as a printer device (50), is disclosed. The output peripheral is connected to an information appliance, such as the game console (10), from which commands are received. The commands may include a print command, a line feed or form feed command, a stand-by command or maintenance commands such as flush ink cartridges or clear dust from rollers command. If a push button (51) is pressed, the printer device (50) transmits the state of the push button (51), hence whether it has been pressed or not, to the information appliance. It is determined by the information appliance whether additional user input is required. The additional user input may include whether a print command, a line feed or form feed command, a stand-by command or maintenance commands such as flush ink cartridges or clear dust from rollers command is required. After all additional user inputs are gathered, the printer device (50) is controlled to perform the instructed printer task.
The Claims defining the invention are as follows:

1. A method of initiating a task from an output peripheral connected to an information appliance, said method comprising the steps of:
   - determining whether a switch on said output peripheral has been activated; and
   - initiating an application on said information appliance when said switch has been activated, said application thereby controlling said output peripheral to perform said task.

2. A method as claimed in claim 1 comprising the further steps of:
   - determining, by said application, an appropriate task; and
   - designating said appropriate task as said task.

3. A method as claimed in claim 2, where said application determines that more than one appropriate tasks exist, said method comprising the further steps of:
   - displaying information associated with said more than one appropriate tasks on a display screen of said information appliance; and
   - receiving a selection corresponding to said task to be performed by said output peripheral.

4. A method as claimed in any one of claims 1 to 3, wherein said output peripheral is a printer.

5. A method as claimed in claim 4, wherein said task includes one of a printing task, a maintenance task or a power mode task.
Fig. 3

Monitor status of output peripheral

Is the button on the peripheral pressed?

Additional user input required?

Gather additional input

Operate printer
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Invention Title: A Method of Activating Output Peripherals

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The following statement is a full description of this invention, including the best method of performing it known to me/us:-
A METHOD OF ACTIVATING OUTPUT PERIPHERALS

Technical Field of the Invention
The present invention relates generally to output peripherals and, in particular, to the activation of an output peripheral connected to an information appliance where the information appliance does not have a facility for activation of the output peripheral.

Background Art
Information appliances are microprocessor-based appliances that are capable of running application software. Such appliances include computers, set top boxes and game consoles.

Often, especially in the case of set top boxes or game consoles, the application software running thereon does not provide a facility for printing. Furthermore, all user controls of such information appliances have predefined functions, with no controls available to initiate a printer task.

Printers typically have controls in the form of buttons, each with a specific function(s). Such functions typically include placing the printer on or off line, form feed and line feed.

Existing printers often have a very limited user interface, typically a number of light emitting diodes for providing status information, or alternatively, a liquid crystal display which provides adequate information to a user, but at a high cost.

A video printer with a monitor exists for printing an image captured from a video signal received from a signal source. The video signal is monitored on a second monitor. Once a desired frame is displayed on the second monitor, a frame store to a video printer memory is initiated by a memory-in key on a key apparatus of the video printer. The frame is stored as an image in the memory.
The stored frame may be displayed on the video printer monitor and changed by pressing a selection of keys on the key apparatus. The image may then be printed by the video printer.

According to this prior art printer, all image manipulation and printing are performed by the printer. This requires for the printer to have a processor with vast capabilities. It also requires for the key apparatus to have a large number of keys corresponding to the image manipulation and printing capabilities. These capabilities of the printer and the key apparatus layout are inflexible.

**Disclosure of the Invention**

It is an object of the present invention to substantially overcome, or at least ameliorate, one or more disadvantages of existing arrangements.

According to a first aspect of the invention, there is provided a method of initiating a task from an output peripheral connected to an information appliance, said method comprising the steps of:

- determining whether a switch on said output peripheral has been activated; and
- initiating an application on said information appliance when said switch has been activated, said application thereby controlling said output peripheral to perform said task.

According to a second aspect of the invention, there is provided an output peripheral connected to an information appliance, said output peripheral comprising:
- a task switch for initiating a task on said output peripheral; and
- means for initiating an application on said information appliance upon activation of said task switch, wherein said application then controls said output peripheral to perform said task.

According to a third aspect of the invention, there is provided a system comprising:
an information appliance for executing an application; and
an output peripheral connected to said information appliance, said output peripheral
comprising:
   a task switch for initiating a task on said output peripheral; and
means for initiating said application upon activation of said task switch, wherein
said application then controls said output peripheral to perform said task.

According to a fourth aspect of the invention, there is provided a computer program
product for initiating a task from a output peripheral connected to an information
appliance, said computer program product comprising:
   code for determining whether a switch on said output peripheral has been activated;
   code for determining an appropriate task as said task; and
   code for controlling said output peripheral to perform said task.

**Brief Description of the Drawings**

A number of embodiments of the present invention will now be described with
reference to the drawings, in which:

Fig. 1 is a schematic block diagram of an information appliance system including an
information appliance and a printer device;

Fig. 2 is a schematic block diagram of the printer device show in Fig. 1;

Fig. 3 is a flow diagram of a control process for initiating a task from the printer
connected to the information appliance; and

Fig. 4 is a flow diagram of a print process.

**Detailed Description including Best Mode**

Fig. 1 shows a schematic block diagram of an information appliance system 1. The
system 1 comprises an information appliance, such as game console 10, having at least
one processor 14, a memory unit 18, for example formed from semiconductor random
access memory (RAM) and read only memory (ROM), input/output (I/O) interfaces
including a video interface 22, and I/O interfaces 16 for controlling at least a printer
device 50 and a control unit 12, also forming part of the system 1. A CD-ROM drive 20
is typically provided as a non-volatile source of data. A magnetic tape drive (not
illustrated) or a computer readable card such as a PCMCIA card may also be used. The
components 14 to 22 of the console 10 typically communicate via an interconnected bus
in a manner that is known to those in the relevant art.

Typically, an application program is resident on an CD-ROM (not illustrated),
which is received into the CD-ROM drive 20, and read and controlled in its execution by
the processor 14. Intermediate storage of the program may be accomplished using the
semiconductor memory 18.

The video interface 22 drives and controls operation of a display 4 connected to the
game console 10. The display 4 may be a cathode ray tube display such as a conventional
television or computer display screen, or a Liquid crystal display (LCD). In the
implementation where the display is a LCD, the display may form part of the console 10.

The game console 10 also has input/output ports 40 and 41, typically in the form of
a universal serial bus (USB) port, for coupling to the printer device 50 and the control unit
12. Preferably, the USB protocol is used to interface the game console 10 and printer
device 50, as the USB Printer Class provides separate communication channels for read
and write operations. The provision of two channels removes the need to time-multiplex
a single channel between reading and writing, which is the case for Nibble mode
IEEE1284 parallel communications.

Fig. 2 shows a schematic block diagram of the printer device 50 in more detail. The
printer device 50 comprises at least one micro-controller 52, RAM 53, ROM 54, at least
one I/O interface 56, an indicator light 57, for example formed by a Light Emitting Diode
(LED), a printing engine 58 and a push button 51. The printing engine 58 may be that in
a conventional inkjet printer, facsimile machine, plotter or copier, and prints pixels at
fixed physical locations on an output medium such as paper. Components 51 to 58 of the
printer device 50 communicate via one or more busses 59 internal to the printer device
50.

The micro-controller 52 controls the operation of the printer device 50. It does this
by executing a control program stored in the ROM 54. Commands from the information
appliance, such as the game console 10 shown in Fig. 1, are received through the I/O
interface 56. The commands may include a print command, a line feed or form feed
command, a stand-by command or maintenance commands such as flush ink cartridges or
clear dust from rollers command. These commands are buffered in the RAM 53, and sent
to the printing engine 58 as needed.

The I/O interface 56 is also used by the micro-controller 52 to transmit printer status
information to the information appliance. The indicator light 57 is used by the micro-
controller 52 to indicate general printer status to the user. The printer status may be
indicated as follows:

<table>
<thead>
<tr>
<th>Indicator Light state</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Printer is off or in stand-by mode</td>
</tr>
<tr>
<td>On</td>
<td>Printer is on, normal condition</td>
</tr>
<tr>
<td>Flashing</td>
<td>Printer is on and requires user intervention</td>
</tr>
</tbody>
</table>

The push button 51 is preferably a standard momentary action push button switch.

Its status is monitored by the micro-controller 52 at all times, including when the printer
device 50 is in a stand-by mode. This is achieved by the use of a wakeup interrupt connected to the push button 51, in a manner that is known to those in the relevant art.

When the printer device 50 is in the stand-by mode, a press of the push button will cause the printer device 50 to switch from the stand-by mode to an active mode.

With the printer device 50 is the active mode, and if the push button 51 is pressed while no information appliance is connected to the I/O interface 56, then the microcontroller 52 controls the printing engine 58 to print a test page. This test page includes a message to the user that the printer device 50 is not connected to an information appliance.

In the case where the printer device 50 is connected to an information appliance, the printer device 50 transmits the state of the push button 51, hence whether it has been pressed or not, to the information appliance. In the preferred implementation, the information appliance regularly polls the printer device 50 for push button 51 status. The polling method is slightly wasteful of processor time and communication port bandwidth, but has the advantage of being compatible with current printer port protocols such as the IEEE1284 bi-directional parallel port and the USB Printer Class.

Fig. 3 shows a flow diagram of a control process 100 for initiating a task on the printer device 50. In the preferred implementation, the application program on CD-ROM includes a game and the control process 100. The control process is typically executed in a background mode of the processor 14 of the game controller 10. The process 100 starts in step 110 by monitoring the status of the printer device 50. The information appliance polls the printer device 50 for the push button status by transmitting the following control codes:

```
ESC [ K 0x00 0x08 0x00 0x1E 0x06 0x00 OBP;
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The printer device 50 replies with one of two possible messages:
If the push button 51 has been pressed since the previous poll, then the printer device 50 returns:

```
0x08 0x00 OBP:ON
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Alternatively, hence when the push button 51 has not been pushed since the previous poll, the printer device 50 returns

```
0x08 0x00 OBP:OF
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to the information appliance.

The process 100 proceeds to step 120 where, from the status information obtained in step 110, it is determined whether the push button 51 has been pressed. If the push button 51 has not been pressed, the process 100 returns back to step 110 where the status of the printer device 50 is again monitored.

If step 120 determines that the push button 51 has been pressed, the process 100 continues to step 130 where it is determined by processor 14 whether additional user input is required. If only one printer task appropriate, then step 130 will directly proceed to step 150 where the printer is operated.

The additional user input may include whether a print command, a line feed or form feed command, a stand-by command or maintenance commands such as flush ink cartridges or clear dust from rollers command is required. A print command may be for a print of the view currently displayed on the display 4, for a map of explored terrain, for an instruction manual for the game, or for any form of print that is appropriate to the application. The appropriate selection options are typically presented to the user on the display device 4 and the user would, in response, provide input by manipulation of the control unit 12.

An advantage is that elaborate information, including help screens, may be provided on the display device about each option, aiding selection. Another advantage is that only appropriate selection options are presented to the user, aiding selection. The options are
further dependent on the application program, and not preset by a design of a printer user interface.

Step 140 gathers the additional input and control is again passed to step 130. After all additional user inputs are gathered in steps 130 and 140, the printer device 50 is controlled to perform the instructed printer task in step 150.

Referring to Fig. 4, if step 150 the printer is operated to produce a print, a print process 300, also performed by the application, is started in step 310. The application determines whether the image to be printed needs to be rendered in step 320. For example, where the image to be printed is a text document consisting of outline font characters, the image needs to be rendered. If rendering is required, then this is performed in step 350, with rendering done at printer resolution. If step 320 determines that rendering is not required, then step 330 determines whether the image is at the correct (printer) resolution. If the image is not at the correct resolution, then the application proceeds to step 340 where the resolution is converted by an algorithm such as bicubic interpolation, which is known to those skilled in the art.

Following step 330 when the resolution was determined to be correct, step 350 or step 340, the application converts the document from the colour space used in the information appliance to the colour space of the printer device 50 in step 360. Information appliances typically use the RGB colour space, while printers typically use the CMYK colour space. Conversion between these colour spaces is achieved by methods known to those skilled in the art.

In step 370, the application dithers the image data, if required by the printer device 50. In step 380 the application adds printer control codes, and in step 390 it transmits the complete data to the printer device 50. In step 395 the printing operation is complete.

Referring again to Fig. 3, on completion of the printer task, the process returns to step 110 where the whole process 100 is repeated.
In an alternative implementation, instead of steps 110 and 120 constantly obtaining the printer status and monitoring whether the print button 51 has been pressed, the printer device 50 transmits an interrupt event, to the information appliance, each time the push button 51 is pressed, which causes the processor 14 to initiate step 130.

In a further implementation, the information appliance is a personal computer. The printer device 50 is connected to a printer port of the personal computer. Driver software is installed in the processor of the personal computer. Referring again to Fig. 3, the driver software continuously monitors whether the print button 51 has been pressed by performing steps 110 and 120.

In step 130 the process 100 may notify an active application that printing is required by the user. The active application may respond by printing an open document in its entirety, by printing the current page of the open document, or alternatively by performing step 140 where the user is required to specify what type of printing is required. If the active application is not designed to, or is otherwise incapable of, receiving the notification that printing is required, then the driver software may perform a screen dump in step 150.

In yet another implementation, the information appliance is a set top box connected to a television and operable to print the television screen or even a list of available programs from an electronic program guide.

The advantage of the process 100 for activating the printer device 50 is that prints can be made on a printer device 50 connected to an information appliance, even when an application running on the information appliance does not provide a facility for printing.

The foregoing describes only some implementations of the present invention, and modifications and/or changes can be made thereto without departing from the scope and spirit of the invention, the implementations being illustrative and not restrictive.
Claims:

The Claims defining the invention are as follows:

1. A method of initiating a task from an output peripheral connected to an information appliance, said method comprising the steps of:
   - determining whether a switch on said output peripheral has been activated; and
   - initiating an application on said information appliance when said switch has been activated, said application thereby controlling said output peripheral to perform said task.

2. A method as claimed in claim 1 comprising the further steps of:
   - determining, by said application, an appropriate task; and
   - designating said appropriate task as said task.

3. A method as claimed in claim 2, where said application determines that more than one appropriate tasks exist, said method comprising the further steps of:
   - displaying information associated with said more than one appropriate tasks on a display screen of said information appliance; and
   - receiving a selection corresponding to said task to be performed by said output peripheral.

4. A method as claimed in any one of claims 1 to 3, wherein said output peripheral is a printer.

5. A method as claimed in claim 4, wherein said task includes one of a printing task, a maintenance task or a power mode task.
6. An output peripheral connected to an information appliance, said output peripheral comprising:
   a task switch for initiating a task on said output peripheral; and
   means for initiating an application on said information appliance upon activation of
   said task switch, wherein said application then controls said output peripheral to perform
   said task.

7. An output peripheral as claimed in claim 6, wherein said output peripheral is a
   printer device and said task includes one of a printing task, a maintenance task or a power
   mode task.

8. A system comprising:
   an information appliance for executing an application; and
   an output peripheral connected to said information appliance, said output peripheral
   comprising:
   a task switch for initiating a task on said output peripheral; and
   means for initiating said application upon activation of said task switch, wherein
   said application then controls said output peripheral to perform said task.

9. A system as claimed in claim 8, said information appliance further comprising:
   means for determining an appropriate task; and
   means for designating said appropriate task as said task.

10. A system as claimed in claim 9, said information appliance further comprising:
means for displaying information associated with appropriate tasks on a display screen of said information appliance, when said means for determining an appropriate task determines that more than one appropriate tasks exist; and

means for receiving a selection corresponding to said task to be performed by said output peripheral.

11. A system as claimed in any one of claims 8 to 10, wherein said output peripheral is a printer device and said task includes one of a printing task, a maintenance task or a power mode task.

12. A computer program product for initiating a task from a output peripheral connected to an information appliance, said computer program product comprising:

code for determining whether a switch on said output peripheral has been activated;

code for determining an appropriate task as said task; and

code for controlling said output peripheral to perform said task.

13. A computer program product as claimed in claim 12, said computer program product further comprising:

code for displaying information associated with appropriate tasks on a display screen of said information appliance when more than one appropriate tasks exist; and

code for receiving a selection corresponding to said task to be performed by said output peripheral.

14. A computer program product as claimed in any one of claims 1 to 3, wherein said output peripheral is a printer.
15. A computer program product as claimed in claim 4, wherein said task includes one of a printing task, a maintenance task or a power mode task.

16. A method of initiating a print task from a printer device connected to an information appliance, said method being substantially as described herein with reference to the accompanying drawings.

17. A printer device being substantially as described herein with reference to the accompanying drawings.

18. A system substantially as described herein with reference to the accompanying drawings.

19. A computer program product substantially as described herein with reference to the accompanying drawings.

Dated 12 December, 2000

Canon Kabushiki Kaisha
Patent Attorneys for the Applicant/Nominated Person

SPRUSON & FERGUSON
Fig. 2
Monitor status of output peripheral

120

Is the button on the peripheral pressed?

No

Yes

130

Additional user input required?

Yes

Gather additional input

No

150

Operate printer

Fig. 3
Fig. 4