A gaming system including handheld devices and console devices has variable functionality and processing performance as determined by the number of components in the system. Gaming components can be combined wirelessly, by wired connections (e.g., via a docking station), or a combination thereof. The processing capabilities and functionality of each gaming component in a combination are augmented by the processing capabilities and functionality of other gaming components in the combination. To take advantage of another gaming components processing capabilities and memory capacity, each gaming component is capable of utilizing another gaming component to process gaming applications. Further, each gaming component is capable of rendering audio and/or video information provided by another gaming component. Also, a gaming component is capable of utilizing another gaming component as an adjunct processor.
MULTI-COMPONENT GAMING SYSTEM

TECHNICAL FIELD

[0001] The technical field generally relates to game systems and more specifically relates to game systems comprising multiple components.

BACKGROUND

[0002] Gaming systems are available in the form of console gaming devices (e.g., XBOX®) or handheld gaming devices. Handheld gaming devices include various devices such as dedicated handheld gaming devices, personal digital assistants (PDAs), cell phones, mobile phones, and smart phones, for example. One of the attractive features of mobile devices is small size. But, the functionality and processing performance of handheld gaming devices is limited by size. Console gaming devices can provide more functionality and improved processing performance as compared to handheld gaming devices. But console gaming devices do not provide the mobility provided by handheld gaming devices. Further, the functionality and processing performance of console gaming devices also is limited by size.

SUMMARY

[0003] A gaming system having variable functionality and processing performance as determined, in part, by the number of components in the system provides a synergistically enhanced gaming experience. A gaming component can include a console gaming device, a handheld gaming device, or a combination thereof. The gaming system includes at least one gaming component. Gaming components can be combined wirelessly, by wired connections (e.g., via a docking station), or a combination thereof. The processing capabilities and functionality of each gaming component in the combination is augmented by the processing capabilities and functionality of other gaming components in the combination. In an exemplary embodiment, a console gaming device is coupled to several handheld gaming devices. Each handheld gaming device is capable of utilizing the console gaming device to process gaming applications, thus taking advantage of the console gaming device’s greater processing speed. Further, each handheld gaming device is capable of rendering audio and/or video information provided by the console that is beyond the capability of the handheld gaming device operating as a stand alone component. Also, a gaming component is capable of utilizing another gaming component as an adjunct processor.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] The following and other objects, aspects and advantages will be better understood from the following detailed description with reference to the drawings, in which:

[0005] FIG. 1 is a block diagram of an exemplary multi-component gaming system;

[0006] FIG. 2 is a block diagram of another exemplary multi-component gaming system;

[0007] FIG. 3 is a diagram an exemplary multi-component gaming system comprising a network; and

[0008] FIG. 4 is a flow diagram of an exemplary process for providing a gaming experience via a multi-component gaming system.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

[0009] FIG. 1 is a block diagram of an exemplary multi-component gaming system 12 comprising a handheld gaming device 14 and a console gaming device 16. The handheld gaming device 14 can include any appropriate handheld gaming device such as a dedicated handheld gaming device, a personal digital assistant (PDA), a cell phone, a mobile phone, a smart phone, or a combination thereof, for example. The handheld gaming device 14 comprises various general purpose input/output ports 18. The input/output ports 18 are capable of providing coupling to any appropriate peripheral such as a game controller, a display monitor, an audio speaker, a processor, another gaming component, or a combination thereof, for example. The handheld gaming device 14 also comprises a display portion 22 for rendering video information. In an exemplary embodiment, the handheld gaming device 14 is capable of rendering audio information (e.g., sound effects, music) and/or mechanical information, such as vibrations.

[0010] The console gaming device 16 can include any appropriate console gaming device such as a dedicated console gaming device, a laptop computer, a personal computer, a server processor, or a combination thereof, for example. The console gaming device 16 comprises various general purpose input/output ports 20. The input/output ports 20 are capable of providing coupling to any appropriate peripheral such as a game controller, a display monitor, an audio speaker, a processor, another gaming component, or a combination thereof, for example. The console gaming device 16 also comprises a display portion 24 for rendering video information. In an exemplary embodiment, the console gaming device 16 is capable of rendering audio information (e.g., sound effects, music) and/or mechanical information, such as vibrations.

[0011] Each of the handheld gaming device 14 and the console gaming device 16 is capable of stand alone operation. That is the handheld gaming device 14 can provide gaming functionality without being coupled to other components. And, the console gaming device 16 can provide gaming functionality without being coupled to other components. In an exemplary embodiment, combining the handheld gaming console 14 and the console gaming device 16 provides enhanced functionality not available from either the handheld gaming device 14 or the console gaming device 16 operating in stand alone mode. The handheld gaming device 14 and the console gaming device 16 are coupled via interface 26. The interface 26 can comprise any appropriate interface. Example appropriate interfaces include a wireless interface, a hard wired interface, a docking station, an optical interface, a radio frequency interface, or a combination thereof. In an exemplary, at least a portion of the input/output ports 18 and 20 are used in conjunction with the interface 26.

[0012] In an exemplary embodiment, each gaming component of the multi-component gaming system is capable of interaction with other gaming components in the system. Both hardware and software residing on any one gaming component are augmented by the hardware and software of other components. Thus, software residing on the handheld gaming device 14 is flexible and scalable enough to utilize and benefit from software residing on the console gaming
device 16. Similarly, software residing on the console gaming device 16 is flexible and scalable enough to utilize and benefit from software residing on the handheld gaming device 14. Various embodiments are envisioned. For example, the console gaming device 16 can function as an intelligent base station and the handheld gaming device 14 can function as a docked device. Or, the handheld gaming device 14 can function as an intelligent base station and the console gaming device 16 can function as a docked device.

[0013] The exemplary multi-component gaming system 12 depicts a single handheld device 14 coupled to a single console gaming device 16. This configuration is exemplary and the configuration need not be limited thereto. For example, the multi-component gaming system can comprise any number of handheld gaming devices and any number of console gaming devices.

[0014] FIG. 2 is a block diagram of an exemplary multi-component gaming system comprising a single console gaming device 28 and multiple handheld gaming devices. The console gaming device 28 is combined with multiple handheld gaming devices via various interfaces. As exemplarily depicted in FIG. 2, the console gaming device 28 is combined with multiple handheld gaming devices via interfaces 30, 32, and 34. As described above, interfaces used to combine the console gaming device 28 to the handheld gaming devices can comprise any combination of interfaces such as wireless interfaces, hard wired interfaces, docking stations, optical interfaces, radio frequency interfaces, or combinations thereof. Further, the handheld gaming devices are combined via various interfaces (Interfaces between handheld gaming devices are not specifically depicted in FIG. 2), and interfaces used to combine handheld gaming devices also can comprise any combination of interfaces such as wireless interfaces, hard wired interfaces, docking stations, optical interfaces, radio frequency interfaces, or combinations thereof.

[0015] Various configurations of combinations of console gaming devices and/or handheld gaming devices are envisioned. For example, FIG. 3 is a diagram depicting an exemplary multi-component gaming system comprising a network 36. The network 36 can comprise any appropriate network, such as the Internet for example. It is to be understood that it is not possible to depict all configurations of a multi-component gaming system and that FIG. 1, FIG. 2, and FIG. 3, represent example configurations of multi-component gaming systems.

[0016] When a gaming component (i.e., a console gaming device or a handheld gaming device) is combined with another gaming component, the game components can transfer between each other information such as software, game applications, data, metadata, or the like. Each of the gaming components can provide specific functionality. For example, a gaming component can function as a network access point for other gaming components. In the exemplary embodiment depicted in FIG. 3, the console gaming devices 42 and 44, function as network access points for the handheld gaming devices.

[0017] Various embodiments are envisioned in which gaming components perform various functions. For example, a gaming component can be used to perform additional processing that is beyond the capability of another gaming component. Such as a console gaming device processing a game application provided by a handheld gaming device because the game application requires more processing power, memory, or other system resources that are not available on the handheld gaming device. Further, it is possible that the game application is not available on the handheld gaming device. Thus the handheld gaming device can request the console gaming device to function as a remote application server. This effectively increases the processing capabilities, including speed, of the handheld gaming device.

[0018] Memory in one gaming component can serve as backup or additional memory for other gaming components. For example, assuming a console gaming device has spare memory, a handheld gaming device can use the console gaming device’s spare memory to store results of previous games (e.g., levels achieved) played on the handheld gaming device. Thus, when the handheld gaming device is combined with the console gaming device the previous game level can be retrieved, and the gaming experience of the user of the handheld gaming device can start from the previously reached level. In another example, referring to FIG. 3, the handheld gaming device 46 can comprise at least one flash memory compatible port and the console gaming device 44 can comprise at least one Universal Serial Bus (USB) compatible port. When combined, the flash memory compatible port(s) are available to the console gaming device 44 via its USB compatible port(s). Thus, the memory capacity of the console gaming device 44 is augmented by the memory coupled to the flash memory compatible port(s) of the handheld gaming device 46.

[0019] Further, any device coupled to a gaming component via its input/output ports is available to other gaming components in combination. Examples of coupled devices include monitors, speakers, audio processing equipment, video processing equipment, or a combination thereof. For example, one of the input/output ports of the console gaming device 42 can be coupled to a large screen display and another of the console gaming device’s 42 input/output ports can be coupled to a home theater audio system. Accordingly, the video and audio of a game being played on the handheld gaming device 40 can be rendered on the large screen display and the home theater system, respectively, via the console gaming device 42. In a less elaborate example, the display of the console gaming device 42 can be used render video output from the handheld gaming device 40.

[0020] Functions performed by one gaming component can be augmented by other gaming components. For example, as depicted in FIG. 3, the functionality of handheld gaming device 40 can be augmented by handheld gaming device 38. The handheld gaming device 38 can comprise specific sound effects that are not available from the handheld gaming device 40. When the handheld gaming devices 38 and 40 are combined, the handheld gaming device 40 can download the additional sound effects from the handheld gaming device 38 to augment a gaming application. For example, the handheld gaming device 40 can comprise sound effects for displayed objects, but not include Doppler sound effects for objects in motion. And the handheld gaming device 38 can comprise a library of Doppler sound effects for objects in motion. When combined, the handheld gaming device 40 can download the handheld gaming device’s 38 Doppler sound effect library to enhance the handheld gaming device’s 40 sound effects.
A gaming component can utilize another gaming component in combination as an adjunct processor. For example, the console gaming device 44 can be executing a game application that is capable of providing several pictures within a picture as part of the gaming experience. The console gaming device 44 operating in stand alone mode can be limited by its CPU processing capacity. But, in combination, the console gaming device 44 can utilize one or more other gaming components to conduct the processing for rendering the picture-in-picture displays. Thus, for example, the console gaming device 44 can offload the processing for two pictures to the handheld gaming devices 38 and 46, wherein utilizing the handheld gaming devices 38 and 46 as adjunct processors. The handheld gaming devices 38 and 46 can provide the processed video information to the console gaming devices 44 for inclusion as pictures in a picture rendered on the console gaming device 44.

Gaming components can provide updates and/or modifications to other gaming components in combination. For example, the handheld gaming device 40 can comprise an earlier version of a particular game application than the handheld gaming device 38. When combined, the handheld gaming device 38 can update the game application residing on the handheld gaming device 40. In another example, when the handheld gaming device 40 is coupled to and registers with the system depicted in FIG. 36, the distributor of a particular game application can provide updates for that particular game application to the handheld gaming device 40.

A gaming component can be controlled by another gaming component in combination. For example, the console gaming device 42 can be controlled by the handheld gaming device 38. Thus, the console gaming device 42 will process game applications and the results will be rendered on the handheld gaming device 38. This provides the handheld gaming device 38 with more processing capability, more memory, and more processing resources than the handheld gaming device 38 has when operating in stand alone mode.

Non-gaming applications on a gaming component can be controlled by another gaming component in combination. For example, the handheld gaming device 40 can be used to control music playback on the console gaming device 42.

In an exemplary embodiment, at least two of the gaming components in combination operate in a master/slave relationship. Thus, one gaming component is responsible for control, distribution, and timing. For example, the console gaming device 44 can be designated as the master gaming component. In this role, the console gaming device 44 controls (either directly or indirectly via other gaming components) the flow of information between gaming components. The master console gaming device 44 also is responsible for ensuring processing workloads are appropriately distributed. The master console gaming device 44 also is responsible for ensuring that synchronization and timing issues are addressed.

FIG. 4 is a flow diagram of an exemplary process for providing a gaming experience via a multi-component gaming system. At step 48, gaming features are provided via the multi-component gaming systems. Providing gaming features includes rendering video gaming information, rendering audio gaming information, render residual (other than audio and video) gaming information, or a combination thereof. Gaming features can be provided to a single user or to multiple users. Memory of a gaming component is augmented by memory of another gaming component at step 50. As described above, the memory capacity of a gaming component is effectively increased in accordance with the memory capacity of another gaming component, or components, combined therewith. The processing capability, such as processing speed for example, of a gaming component is augmented by the processing capacity of another gaming component at step 52. As described above, the processing capacity of a gaming component is effectively increased in accordance with the processing capacity of another gaming component, or components, combined therewith. At least one other gaming component in the combination is used as an adjunct processor at step 54. A gaming component can be used as an adjunct processor to provide any appropriate resource, such as video processing, audio processing, additional memory, increased processing speed, additional features, or a combination thereof for example. As described above, video and/or audio information of one gaming component in the combination is rendered by another gaming component at step 56. The processing load is distributed across combined gaming components at step 60. Gaming components update other gaming components in the combination at step 60. An update can include an update to a game application, update to a game component system configuration (e.g., bios, graphics parameters, audio parameters), downloading of data/parameters (e.g., audio effects), or a combination thereof for example.

As mentioned above, while exemplary embodiments of a multi-component gaming system have been described in connection with various computing devices, the underlying concepts can be applied to any computing device or system capable of multi-component gaming.

The various techniques described herein can be implemented in connection with hardware or software or, where appropriate, with a combination of both. Thus, the methods and apparatus for multi-component gaming, or certain aspects or portions thereof, can take the form of program code (i.e., instructions) embodied in tangible media, such as floppy diskettes, CD-ROMs, hard drives, or any other machine-readable storage medium, wherein, when the program code is loaded into and executed by a machine, such as a computer, the machine becomes an apparatus for practicing memory management. In the case of program code execution on programmable computers, the computing device will generally include a processor, a storage medium readable by the processor (including volatile and non-volatile memory and/or storage elements), at least one input device, and at least one output device. The program(s) can be implemented in assembly or machine language, if desired. In any case, the language can be a compiled or interpreted language, and combined with hardware implementations.

The methods and apparatuses for multi-component gaming also can be practiced via communications embodied in the form of program code that is transmitted over some transmission medium, such as over electrical wiring or cabling, through fiber optics, or via any other form of transmission, wherein, when the program code is received and loaded into and executed by a machine, such as an
While a multi-component gaming system has been described in connection with the exemplary embodiments of the various figures, it is to be understood that other similar embodiments can be used or modifications and additions can be made to the described embodiments for performing the same functions of multi-component gaming without deviating therefrom. Therefore, multi-component gaming as described herein should not be limited to any single embodiment, but rather should be construed in breadth and scope in accordance with the appended claims.

What is claimed:

1. A gaming system comprising at least one gaming component, each gaming component being capable of stand alone operation, each gaming component being capable of operating in combination with other gaming components, wherein gaming performance of each gaming component is augmented in accordance with functionality of other gaming component in combination therewith.

2. A gaming system in accordance with claim 1, wherein at least one gaming component comprises a console gaming device and at least one gaming component comprises a handheld gaming device.

3. A gaming system in accordance with claim 1, said system comprising at least two combined gaming components operational in a master/slave relationship.

4. A gaming system in accordance with claim 1, wherein any one gaming component is capable of operating software of any other gaming component.

5. A gaming system in accordance with claim 1, wherein a processing speed of a gaming component is effectively increased when combined with another gaming component combined therewith.

6. A gaming system in accordance with claim 1, wherein memory capacity of a gaming component is effectively increased when combined with another gaming component.

7. A gaming system in accordance with claim 1, wherein a gaming component renders a display for another game component combined therewith.

8. A gaming system in accordance with claim 1, wherein a gaming component is capable of utilizing at least one other gaming component combined therewith as an adjunct processor.

9. A gaming system in accordance with claim 1, wherein processing of a game application is distributed across at least two combined gaming components.

10. A gaming system in accordance with claim 1, wherein software residing in a gaming component is updatable via at least one other gaming component combined therewith.

11. A method for providing a multi-component gaming experience, said method comprising:

   providing at least one audio gaming feature and video gaming features via at least one gaming component, each gaming component being capable of stand alone operation, each gaming component being capable of operating in combination with other gaming components, wherein gaming performance of each gaming component is augmented in accordance with functionality of other gaming component in combination therewith.

12. A method in accordance with claim 11, further comprising effectively increasing a memory of a gaming component in accordance with memory capacity of another gaming component combined therewith.

13. A method in accordance with claim 11, further comprising effectively increasing a processing speed of a gaming component in accordance with a processing speed of another gaming component combined therewith.

14. A method in accordance with claim 11, further comprising rendering at least one of video information and audio information of a gaming component via another gaming component combined therewith.

15. A method in accordance with claim 11, further comprising a gaming component utilizing another gaming component combined therewith as an adjunct processor.

16. A computer-readable medium having computer-executable instructions for performing the acts of:

   providing gaming features via at least one gaming component, each gaming component being capable of stand alone operation, each gaming component being capable of operating in combination with other gaming components, wherein gaming performance of each gaming component is augmented in accordance with functionality of other gaming component in combination therewith.

17. A computer-readable medium in accordance with claim 16, wherein at least one of a processing speed and a memory capacity of a gaming component is effectively increased when combined with another gaming component.

18. A computer-readable medium in accordance with claim 16, wherein any one gaming component is capable of operating software of any other gaming component.

19. A computer-readable medium in accordance with claim 16, wherein a gaming component is capable of utilizing at least one other gaming component combined therewith an adjunct processor.

20. A computer-readable medium in accordance with claim 16, said computer-readable medium having further computer-executable instructions for rendering by a gaming component at least one of video information and audio information of another gaming component combined therewith.

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