

CLAIMS

1. A device comprising:
 - a bootloader;
 - a memory configured to store firmware data for controlling the device;
 - a processor configured to operate in a device operation mode or in a bootloader mode;
 - an interface;
 - a validity checker configured to check whether the firmware data stored in the memory is valid; and
 - a mode changer configured to change from the device operation mode to the bootloader mode if it is determined that the firmware data stored in the memory is not valid;
 - wherein the device operation mode is a mode in which the processor controls the bootloader to load the firmware data stored in the memory; and
 - wherein the bootloader mode is a mode in which the processor controls the bootloader to send an identifier of the device using the interface, to receive firmware data using the interface and to store the firmware data in the memory.
2. The device of claim 1,
 - wherein the device comprises at least one of an input device or an output device.
3. The device of claim 2,
 - wherein the firmware data comprises data for controlling the at least one of the input device or the output device.
4. The device of claim 1,
 - wherein the bootloader mode is a mode in which the processor does not control the bootloader to load the firmware data stored in the memory.

5. The device of claim 1,
wherein the interface comprises at least one of a universal serial bus interface, a Firewire interface, a PS/2 interface, a Thunderbolt interface, a local area network interface, a Bluetooth interface, an infrared interface, a wireless local area network interface or a mobile radio communication interface.
6. The device of claim 1,
wherein the bootloader uses data stored in a secured portion of the memory.
7. The device of claim 1, further comprising:
a receiver configured to receive an instruction to change from the device operation mode to the bootloader mode.
8. The device of claim 7,
wherein the receiver is configured to receive the instruction using the interface.
9. The device of claim 1, further comprising:
a receiver configured to receive an instruction to change from the bootloader mode to the device operation mode.
10. The device of claim 9,
wherein the receiver is configured to receive the instruction using the interface.
11. The device of claim 1,
wherein the device is further configured to determine in which mode to operate at the time of booting the device.
12. An updater comprising:

a receiver configured to receive from a device in a bootloader mode an identifier of the device; and

a sender configured to send to the device firmware data based on the received identifier.

a validity checker configured to check whether the firmware data stored in a memory of the device valid; and

a mode changer configured to change from a device operation mode to the bootloader mode if it is determined that the firmware data stored in the memory is not valid;

wherein the device operation mode is a mode in which the processor controls the bootloader to load the firmware data stored in the memory; and

wherein the bootloader mode is a mode in which the processor controls the bootloader to send an identifier of the device using the interface, to receive firmware data using the interface and to store the firmware data in the memory.

13. The updater of claim 12,

wherein the sender is further configured to send to a device not in the bootloader mode an instruction for changing to the bootloader mode.

14. The updater of claim 12,

wherein the sender is further configured to send to the device in the bootloader mode an instruction for changing to the device operation mode.

15. A method for controlling a device, the method comprising:

controlling a bootloader;

controlling a memory to store firmware data for controlling the device;

controlling a processor to operate in a device operation mode or in a bootloader mode;

controlling an interface;

controlling a validity checker to check whether the firmware data stored in the memory is valid; and

controlling a mode changer to change from the device operation mode to the bootloader mode if it is determined that the firmware data stored in the memory is not valid;

wherein the device operation mode is a mode in which the processor controls the bootloader to load the firmware data stored in the memory; and

wherein the bootloader mode is a mode in which the processor controls the bootloader to send an identifier of the device using the interface, to receive firmware data using the interface and to store the firmware data in the memory.

16. The method of claim 15,
wherein the device comprises at least one of an input device or an output device.
17. The method of claim 16,
wherein the firmware data comprises data for controlling the at least one of the input device or the output device.
18. The method of claim 15,
wherein the bootloader mode is a mode in which the processor does not control the bootloader to load the firmware data stored in the memory.
19. The method of claim 15,
wherein the interface comprises at least one of a universal serial bus interface, a Firewire interface, a PS/2 interface, a Thunderbolt interface, a local area network interface, a Bluetooth interface, an infrared interface, a wireless local area network interface or a mobile radio communication interface.
20. The method of claim 15,
wherein the bootloader uses data stored in a secured portion of the memory.

21. The method of claim 15, further comprising:
controlling a receiver to receive an instruction to change from the device operation mode to the bootloader mode.
22. The method of claim 21,
wherein the receiver receives the instruction using the interface.
23. The method of claim 15, further comprising:
controlling a receiver to receive an instruction to change from the bootloader mode to the device operation mode.
24. The method of claim 23,
wherein the receiver receives the instruction using the interface.
25. The method of claim 15,
wherein the device determines in which mode to operate at the time of booting the device.
26. A method for controlling an updater, the method comprising:
controlling a receiver to receive from a device in a bootloader mode an identifier of the device; and
controlling a sender to send to the device firmware data based on the received identifier.
controlling a validity checker of the device to check whether the firmware data stored in the memory is valid; and
controlling a mode changer of the device to change from the device operation mode to the bootloader mode if it is determined that the firmware data stored in the memory is not valid.

wherein the device operation mode is a mode in which the processor controls the bootloader to load the firmware data stored in the memory; and

wherein the bootloader mode is a mode in which the processor controls the bootloader to send an identifier of the device using the interface, to receive firmware data using the interface and to store the firmware data in the memory.

27. The method of claim 26,

wherein the sender sends to a device not in the bootloader mode an instruction for changing to the bootloader mode.

28. The method of claim 26,

wherein the sender sends to the device in the bootloader mode an instruction for changing to the device operation mode.

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CLAIMS

1. A device comprising:
 - a bootloader;
 - a memory configured to store firmware data for controlling the device;
 - a processor configured to operate in a device operation mode or in a bootloader mode;
 - an interface;
 - a validity checker configured to check whether the firmware data stored in the memory is valid; and
 - a mode changer configured to change from the device operation mode to the bootloader mode if it is determined that the firmware data stored in the memory is not valid;
 - wherein the device operation mode is a mode in which the processor controls the bootloader to load the firmware data stored in the memory; and
 - wherein the bootloader mode is a mode in which the processor controls the bootloader to send an identifier of the device using the interface, to receive firmware data using the interface and to store the firmware data in the memory.
2. The device of claim 1,
 - wherein the device comprises at least one of an input device or an output device.
3. The device of claim 2,
 - wherein the firmware data comprises data for controlling the at least one of the input device or the output device.
4. The device of any one of claims 1 to 3,
 - wherein the bootloader mode is a mode in which the processor does not control the bootloader to load the firmware data stored in the memory.

5. The device of any one of claims 1 to 4,
wherein the interface comprises at least one of a universal serial bus interface, a Firewire interface, a PS/2 interface, a Thunderbolt interface, a local area network interface, a Bluetooth interface, an infrared interface, a wireless local area network interface or a mobile radio communication interface.
6. The device of any one of claims 1 to 5,
wherein the bootloader uses data stored in a secured portion of the memory.
7. The device of any one of claims 1 to 6, further comprising:
a receiver configured to receive an instruction to change from the device operation mode to the bootloader mode.
8. The device of claim 7,
wherein the receiver is configured to receive the instruction using the interface.
9. The device of any one of claims 1 to 8, further comprising:
a receiver configured to receive an instruction to change from the bootloader mode to the device operation mode.
10. The device of claim 9,
wherein the receiver is configured to receive the instruction using the interface.
11. The device of any one of claims 1 to 10,
wherein the device is further configured to determine in which mode to operate at the time of booting the device.
12. An updater comprising:

a receiver configured to receive from a device in a bootloader mode an identifier of the device; and

a sender configured to send to the device firmware data based on the received identifier;

a validity checker configured to check whether the firmware data stored in a memory of the device is valid; and

a mode changer configured to change from a device operation mode to the bootloader mode if it is determined that the firmware data stored in the memory is not valid;

wherein the device operation mode is a mode in which the processor controls the bootloader to load the firmware data stored in the memory; and

wherein the bootloader mode is a mode in which the processor controls the bootloader to send an identifier of the device using the interface, to receive firmware data using the interface and to store the firmware data in the memory.

13. The updater of claim 12,

wherein the sender is further configured to send to a device not in the bootloader mode an instruction for changing to the bootloader mode.

14. The updater of claim 12 or 13,

wherein the sender is further configured to send to the device in the bootloader mode an instruction for changing to the device operation mode.

15. A method for controlling a device, the method comprising:

controlling a bootloader;

controlling a memory to store firmware data for controlling the device;

controlling a processor to operate in a device operation mode or in a bootloader mode;

controlling an interface;

controlling a validity checker to check whether the firmware data stored in the memory is valid; and

controlling a mode changer to change from the device operation mode to the bootloader mode if it is determined that the firmware data stored in the memory is not valid;

wherein the device operation mode is a mode in which the processor controls the bootloader to load the firmware data stored in the memory; and

wherein the bootloader mode is a mode in which the processor controls the bootloader to send an identifier of the device using the interface, to receive firmware data using the interface and to store the firmware data in the memory.

16. The method of claim 15,
wherein the device comprises at least one of an input device or an output device.
17. The method of claim 16,
wherein the firmware data comprises data for controlling the at least one of the input device or the output device.
18. The method of any one of claims 15 to 17,
wherein the bootloader mode is a mode in which the processor does not control the bootloader to load the firmware data stored in the memory.
19. The method of any one of claims 15 to 18,
wherein the interface comprises at least one of a universal serial bus interface, a Firewire interface, a PS/2 interface, a Thunderbolt interface, a local area network interface, a Bluetooth interface, an infrared interface, a wireless local area network interface or a mobile radio communication interface.
20. The method of any one of claims 15 to 19,
wherein the bootloader uses data stored in a secured portion of the memory.

21. The method of any one of claims 15 to 20, further comprising:
controlling a receiver to receive an instruction to change from the device operation mode to the bootloader mode.
22. The method of claim 21,
wherein the receiver receives the instruction using the interface.
23. The method of any one of claims 15 to 22, further comprising:
controlling a receiver to receive an instruction to change from the bootloader mode to the device operation mode.
24. The method of claim 23,
wherein the receiver receives the instruction using the interface.
25. The method of any one of claims 15 to 24,
wherein the device determines in which mode to operate at the time of booting the device.
26. A method for controlling an updater, the method comprising:
controlling a receiver to receive from a device in a bootloader mode an identifier of the device; and
controlling a sender to send to the device firmware data based on the received identifier;
controlling a validity checker of the device to check whether the firmware data stored in the memory is valid; and
controlling a mode changer of the device to change from the device operation mode to the bootloader mode if it is determined that the firmware data stored in the memory is not valid.

wherein the device operation mode is a mode in which the processor controls the bootloader to load the firmware data stored in the memory; and

wherein the bootloader mode is a mode in which the processor controls the bootloader to send an identifier of the device using the interface, to receive firmware data using the interface and to store the firmware data in the memory.

27. The method of claim 26,

wherein the sender sends to a device not in the bootloader mode an instruction for changing to the bootloader mode.

28. The method of claim 26 or 27,

wherein the sender sends to the device in the bootloader mode an instruction for changing to the device operation mode.