

ACPI video extensions

This driver implement the ACPI Extensions For Display Adapters for integrated graphics devices on motherboard, as specified in ACPI 2.0 Specification, Appendix B, allowing to perform some basic control like defining the video POST device, retrieving EDID information or to setup a video output, etc. Note that this is an ref. implementation only. It may or may not work for your integrated video device.

The ACPI video driver does 3 things regarding backlight control.

Export a sysfs interface for user space to control backlight level

If the ACPI table has a video device, and `acpi_backlight=vendor` kernel command line is not present, the driver will register a backlight device and set the required backlight operation structure for it for the sysfs interface control. For every registered class device, there will be a directory named `acpi_videoX` under `/sys/class/backlight`.

The backlight sysfs interface has a standard definition here: [Documentation/ABI/stable/sysfs-class-backlight](#).

And what ACPI video driver does is:

`actual_brightness`:

on read, control method `_BQC` will be evaluated to get the brightness level the firmware thinks it is at;

`bl_power`:

not implemented, will set the current brightness instead;

`brightness`:

on write, control method `_BCM` will run to set the requested brightness level;

`max_brightness`:

Derived from the `_BCL` package(see below);

`type`:

firmware

Note that ACPI video backlight driver will always use index for brightness, `actual_brightness` and `max_brightness`. So if we have the following `_BCL` package:

```
Method (_BCL, 0, NotSerialized)
{
    Return (Package (0x0C)
    {
        0x64,
        0x32,
        0x0A,
        0x14,
        0x1E,
        0x28,
        0x32,
        0x3C,
        0x46,
        0x50,
        0x5A,
        0x64
    })
}
```

The first two levels are for when laptop are on AC or on battery and are not used by Linux currently. The remaining 10 levels are supported levels that we can choose from. The applicable index values are from 0 (that corresponds to the 0x0A brightness value) to 9 (that corresponds to the 0x64 brightness value) inclusive. Each of those index values is regarded as a "brightness level" indicator. Thus from the user space perspective the range of available brightness levels is from 0 to 9 (`max_brightness`) inclusive.

Notify user space about hotkey event

There are generally two cases for hotkey event reporting:

- i. For some laptops, when user presses the hotkey, a scancode will be generated and sent to user space through the input device created by the keyboard driver as a key type input event, with proper remap, the following key code will appear to user space:

```
EV_KEY, KEY_BRIGHTNESSUP
EV_KEY, KEY_BRIGHTNESSDOWN
etc.
```

For this case, ACPI video driver does not need to do anything(actually, it doesn't even know this happened).

- ii. For some laptops, the press of the hotkey will not generate the scancode, instead, firmware will notify the video device ACPI node about the event. The event value is defined in the ACPI spec. ACPI video driver will generate an key type input

event according to the notify value it received and send the event to user space through the input device it created:

event	keycode
0x86	KEY_BRIGHTNESSUP
0x87	KEY_BRIGHTNESSDOWN
etc.	

so this would lead to the same effect as case i) now.

Once user space tool receives this event, it can modify the backlight level through the sysfs interface.

Change backlight level in the kernel

This works for machines covered by case ii) in Section 2. Once the driver received a notification, it will set the backlight level accordingly. This does not affect the sending of event to user space, they are always sent to user space regardless of whether or not the video module controls the backlight level directly. This behaviour can be controlled through the `brightness_switch_enabled` module parameter as documented in `admin-guide/kernel-parameters.rst`. It is recommended to disable this behaviour once a GUI environment starts up and wants to have full control of the backlight level.