ACPI Debug Output

The ACPI CA, the Linux ACPI core, and some ACPI drivers can generate debug output. This document describes how to use this facility.

Compile-time configuration

ACPI debug output is globally enabled by CONFIG_ACPI_DEBUG. If this config option is turned off, the debug messages are not even built into the kernel.

Boot- and run-time configuration

When CONFIG_ACPI_DEBUG=y, you can select the component and level of messages you're interested in. At boot-time, use the acpi.debug_layer and acpi.debug_level kernel command line options. After boot, you can use the debug_layer and debug_level files in /sys/module/acpi/parameters/ to control the debug messages.

debug_layer (component)

The "debug_layer" is a mask that selects components of interest, e.g., a specific driver or part of the ACPI interpreter. To build the debug_layer bitmask, look for the "#define _COMPONENT" in an ACPI source file.

You can set the debug_layer mask at boot-time using the acpi.debug_layer command line argument, and you can change it after boot by writing values to /sys/module/acpi/parameters/debug_layer.

The possible components are defined in include/acpi/acoutput.h and include/acpi/acpi_drivers.h. Reading /sys/module/acpi/parameters/debug_layer shows the supported mask values, currently these:

ACPI_UTILITIES	0x00000001
ACPI_HARDWARE	0x00000002
ACPI_EVENTS	0x00000004
ACPI_TABLES	0x00000008
ACPI_NAMESPACE	0x00000010
ACPI_PARSER	0x00000020
ACPI_DISPATCHER	0x00000040
ACPI_EXECUTER	0x00000080
ACPI_RESOURCES	0x00000100
ACPI_CA_DEBUGGER	0x00000200
ACPI_OS_SERVICES	0x00000400
ACPI_CA_DISASSEMBLER	0x00000800
ACPI_COMPILER	0x00001000
ACPI_TOOLS	0x00002000
ACPI_BUS_COMPONENT	0x00010000
ACPI_AC_COMPONENT	0x00020000
ACPI_BATTERY_COMPONENT	0x00040000
ACPI_BUTTON_COMPONENT	0x00080000
ACPI_SBS_COMPONENT	0x00100000

ACPI_FAN_COMPONENT	0x00200000
ACPI_PCI_COMPONENT	0x00400000
ACPI_POWER_COMPONENT	0x00800000
ACPI_CONTAINER_COMPONENT	0x01000000
ACPI_SYSTEM_COMPONENT	0x02000000
ACPI_THERMAL_COMPONENT	0x04000000
ACPI_MEMORY_DEVICE_COMPONENT	0x08000000
ACPI_VIDEO_COMPONENT	0x10000000
ACPI_PROCESSOR_COMPONENT	0x20000000

debug_level

The "debug_level" is a mask that selects different types of messages, e.g., those related to initialization, method execution, informational messages, etc. To build debug_level, look at the level specified in an ACPI_DEBUG_PRINT() statement.

The ACPI interpreter uses several different levels, but the Linux ACPI core and ACPI drivers generally only use ACPI_LV_INFO.

You can set the debug_level mask at boot-time using the acpi.debug_level command line argument, and you can change it after boot by writing values to /sys/module/acpi/parameters/debug_level.

The possible levels are defined in include/acpi/acoutput.h. Reading /sys/module/acpi/parameters/debug_level shows the supported mask values, currently these:

ACPI_LV_INIT	0x00000001
ACPI_LV_DEBUG_OBJECT	0x00000002
ACPI_LV_INFO	0x00000004
ACPI_LV_INIT_NAMES	0x00000020
ACPI_LV_PARSE	0x00000040
ACPI_LV_LOAD	0x00000080
ACPI_LV_DISPATCH	0x00000100
ACPI_LV_EXEC	0x00000200
ACPI_LV_NAMES	0x00000400
ACPI_LV_OPREGION	0x00000800
ACPI_LV_BFIELD	0x00001000
ACPI_LV_TABLES	0x00002000
ACPI_LV_VALUES	0x00004000
ACPI_LV_OBJECTS	0x00008000
ACPI_LV_RESOURCES	0x00010000
ACPI_LV_USER_REQUESTS	0x00020000
ACPI_LV_PACKAGE	0x00040000
ACPI_LV_ALLOCATIONS	0x00100000
ACPI_LV_FUNCTIONS	0x00200000
ACPI_LV_OPTIMIZATIONS	0x00400000
ACPI_LV_MUTEX	0x01000000
ACPI_LV_THREADS	0x02000000
ACPI_LV_IO	0x04000000
ACPI_LV_INTERRUPTS	0x08000000
ACPI_LV_AML_DISASSEMBLE	0x10000000
ACPI_LV_VERBOSE_INFO	0x20000000
ACPI_LV_FULL_TABLES	0x40000000

```
    ACPI_LV_EVENTS                  0x80000000
```

Examples

For example, drivers/acpi/bus.c contains this:

```
    #define _COMPONENT              ACPI_BUS_COMPONENT
    ...
    ACPI_DEBUG_PRINT((ACPI_DB_INFO, "Device insertion detected\n"));
```

To turn on this message, set the ACPI_BUS_COMPONENT bit in acpi.debug_layer and the ACPI_LV_INFO bit in acpi.debug_level. (The ACPI_DEBUG_PRINT statement uses ACPI_DB_INFO, which is macro based on the ACPI_LV_INFO definition.)

Enable all AML "Debug" output (stores to the Debug object while interpreting AML) during boot:

```
    acpi.debug_layer=0xffffffff acpi.debug_level=0x2
```

Enable PCI and PCI interrupt routing debug messages:

```
    acpi.debug_layer=0x400000 acpi.debug_level=0x4
```

Enable all ACPI hardware-related messages:

```
    acpi.debug_layer=0x2 acpi.debug_level=0xffffffff
```

Enable all ACPI_DB_INFO messages after boot:

```
    # echo 0x4 > /sys/module/acpi/parameters/debug_level
```

Show all valid component values:

```
    # cat /sys/module/acpi/parameters/debug_layer
```