Oracle® Linux

Release Notes for Unbreakable Enterprise Kernel Release 5 Update 1

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Abstract

This document contains information on the Unbreakable Enterprise Kernel Release 5 Update 1. This document may be updated after it is released. To check for updates to this document, and to view other Oracle documentation, refer to the Documentation section on the Oracle Technology Network (OTN) Web site:

https://www.oracle.com/technology/documentation/

This document is intended for users and administrators of Oracle Linux. It describes potential issues and the corresponding workarounds you may encounter while using the Unbreakable Enterprise Kernel Release 5 Update 1 with Oracle Linux 7. Oracle recommends that you read this document before installing or upgrading the Unbreakable Enterprise Kernel Release 5 Update 1.

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Preface

The *Oracle Linux Unbreakable Enterprise Kernel Release Notes* provides a summary of the new features, changes, and known issues in the Unbreakable Enterprise Kernel Release 5 Update 1.

Audience

This document is written for system administrators who want to use the Unbreakable Enterprise Kernel with Oracle Linux. It is assumed that readers have a general understanding of the Linux operating system.

Related Documents

The latest version of this document and other documentation for this product are available at:

https://www.oracle.com/technetwork/server-storage/linux/documentation/index.html.

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Chapter 1 New Features and Changes

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The Unbreakable Enterprise Kernel Release 5 (UEK R5) is a heavily tested and optimized operating system kernel for Oracle Linux 7 Update 5 and later on the x86-64 and 64-bit Arm (aarch64) architectures. It is based on the mainline Linux kernel version 4.14.35. This release also updates drivers and includes bug and security fixes.

Oracle actively monitors upstream check-ins and applies critical bug and security fixes to UEK R5.

UEK R5 uses the same versioning model as the mainline Linux kernel version. It is possible that some applications might not understand the 4.14 versioning scheme. However, regular Linux applications are usually neither aware of nor affected by Linux kernel version numbers.

1.1 Notable Features and Changes

The following sections describe the major new features of Unbreakable Enterprise Kernel Release 5 Update 1 (UEK R5U1) relative to the initial release of UEK R5.

1.1.1 64-bit Arm (aarch64) architecture

With Unbreakable Enterprise Kernel Release 5 Update 1, Oracle continues to deliver kernel modifications to enable support for 64-bit Arm (aarch64) architecture. These changes are built and tested against existing Arm hardware and provide support for Oracle Linux for Arm. Features described in this document are available for Arm insofar as the hardware is capable of supporting the feature that is described. Limitations and items beyond the scope of current development work for Arm are described in more detail in Section 3.1, "Unusable or Unavailable Features for Arm".

Where specific changes have been made for Arm architecture, these are usually noted through this document. Particular effort has gone into updating and improving DTrace features to include support for the 64-bit Arm (aarch64) architecture, see Section 1.1.3, "DTrace" for more information.

1.1.2 Core Kernel Functionality

The following notable core kernel features are implemented in UEK R5U1:

- **Cgroup v2 CPU controller backported to support kABI.** The `cgroup` v2 CPU controller has been backported in this release. This change was made to pre-populate structures that could potentially impact the Kernel Application Binary Interface (kABI). The update includes changes to the code that handles cgroup resource usage statistics and improves performance when handling frequent reads where there are many cgroups that are not active.

- **Improved scheduler scalability for fast path.** This release includes scheduler scalability improvements for fast path. In addition, a new scheduler feature, `SIS_CORE`, is introduced to improve performance for certain workloads, such as Oracle database OLTP (online transaction processing). To provide additional performance improvement for OLTP, you can optionally disable this feature by setting `NO_SIS_CORE` in `/sys/kernel/debug/sched_features`. However, note that disabling the `SIS_CORE` feature is recommended for OLTP workloads *only*.

1.1.3 DTrace

The following notable DTrace features and fixes are implemented in UEK R5U1:

- **[aarch64] END and ENDPROC markers added.** DTrace has been enhanced for use on aarch64 platforms by adding or moving `END`[`ENDPROC`] markers in relevant assembly files. This change increases the likelihood that DTrace can map kernel instructions to a symbol.

- **[aarch64] DTrace support for SDT probes added.** DTrace has been enhanced to include support for the use of SDT probes on aarch64 platforms.

- **[aarch64] DTrace support for FBT entry probes added.** DTrace has been enhanced to include support for the use of FBT entry probes on aarch64 platforms.

- **[aarch64] DTrace support for FBT return probes added.** DTrace has been enhanced to include support for the use of FBT return probes on aarch64 platforms.

- **[aarch64] ustack() implementation.** DTrace has been enhanced to include the implementation of `ustack()` on aarch64 platforms.

- **SDT macros updated to accurately support 18 arguments.** The DTrace implementation for defining SDT probes in the kernel source code has been improved to accurately accept up to, and including, 18 arguments. Although all 18 arguments were supported previously, any arguments beyond 8 were truncated. This enhancement applies to both the x86_64 and aarch64 platforms.

- **New -x noresolve option added.** DTrace has been enhanced to include the `-x noresolve` runtime option, which is used to prevent automatic resolution of user-space symbols and to assist with symbol resolution for very large, statically linked binaries, where symbols take a long time to resolve. The option can also be used to reduce overhead when DTrace resolves addresses to symbol names for large applications that contain many symbols. The `-x noresolve` option was previously introduced in the Oracle Solaris 11.3 release.

- **New -x ctfpath option added.** DTrace has been enhanced to include a new `-x ctfpath` option, which enables the use of user-provided Compressed Type Format (CTF) archive data. The `ctfpath` option allows you to explicitly specify which CTF archives to use for the running kernel, thus enabling the archive to be shared and shipped to non-standard locations.

1.1.4 File Systems

The following sections detail the most notable features that have been implemented for file systems in UEK R5U1:

1.1.4.1 Btrfs

The following Btrfs bug fixes and features have been implemented in this update:

- A fix for an issue where an incremental send operation can result in a missed truncate operation if an inode has an increased size in the send snapshot and a prealloc extent is greater in size.

- Patches have been applied to resolve an issue that caused a read failure if there was data corruption on two disks in the same horizontal stripe in a RAID6 configuration using Btrfs.

- A patch was applied to resolve an issue where the data raid profile was lost if a device was removed from the raid configuration using Btrfs.

- A patch was applied to resolve an issue that caused the file system to report a lost parent directory where it was hard linked to a synced target followed by a power outage.

- A patch was applied to resolve an issue that prevented mounting the file system with an EEXIST error when two hard links have been renamed followed by a power outage.

- A patch was applied to resolve an issue that caused the file system to report an ENOSPC error when a file is repeatedly created and deleted while keeping all file descriptors open. The issue was the result of code that kept space reserved for orphan inode items until evicted.

- A patch was applied to resolve an issue that caused an ENOENT send error if the file has all hard links deleted while there is an open file descriptor and the subvolume or snapshot is set to RO mode. This issue resulted from a send operation where the inodes have a link count of zero, which is not possible due to orphan cleanup during snapshot creation.

- A patch was applied to resolve an issue that caused incorrect logging where no-holes mode is enabled and a file is synced after punching a hole in it. This resulted in an inconsistent file system in the event of a power outage.

- Several security related fixes have been applied to resolve recognized vulnerabilities such as CVE-2018-14611 and CVE-2018-14610.

1.1.4.2 ext4

The following ext4 bug fixes and features have been implemented in this update:

- Code updated to introduce support for direct access (DAX) page operations on Non-Volatile Dual Inline Memory Modules (NVDIMMs) using the ext4 file system.

- A bug was fixed to resolve an issue that could cause a corrupted file system if a direct write extended beyond the `i_disksize` but is less than the `i_size`.

1.1.4.3 OCFS2

A patch was applied to the OCFS2 distributed lock manager code in this update, to resolve a locking issue that could cause list corruptions and result in kernel panic.

1.1.4.4 NFS

Several patches and updates have been applied for bug fixes in NFS. Notably, a fix was applied for an issue that caused failure to mount NFSv4 volumes during boot unless the `vers=4.0` option was specified as a mount parameter in `/etc/fstab`. The issue related to deadlock in the NFS client initialization while processing the client list during NFSv4 server trunking detection and was fixed using an upstream patch.

1.1.4.5 XFS

The following XFS features have been implemented:

- Code updated to introduce support for direct access (DAX) page operations on Non-Volatile Dual Inline Memory Modules (NVDIMMs) using XFS.

- A patch was applied to fix the failure to convert an xattr using the short format to the long format during an `ATTR_REPLACE` operation. This bug could cause a file system error and shut down.

1.1.5 Memory Management

The following notable memory management features are implemented in UEK R5U1:

- **Updates to hugetlbfs to resolve several race condition issues.**   Several updates were applied to the `hugetlbfs` code to resolve race issues. These include a fix for an issue that resulted when a `hugetlbfs` file was truncated while another task was still performing a page fault process. This issue could cause a reserve map entry to be created before the cached page is deleted, resulting in the reserved page leaking indefinitely. The code was updated to prevent faults to a file while it is being truncated.

1.1.6 RDMA

Remote Direct Memory Access (RDMA) is a feature that allows direct memory access between two systems that are connected by a network. RDMA facilitates high-throughput and low-latency networking in clusters.

Unbreakable Enterprise Kernel Release 5 Update 1 includes RDMA features that are provided in the upstream kernel, with the addition of Ksplice and DTrace functionality and Oracle's own RDMA features, which includes support for RDS and Shared-PD.

Oracle provides support for RDMA on InfiniBand on the following Oracle-branded HCAs:

- Sun InfiniBand Dual Port 4x QDR Host Channel Adapters M2

- Oracle Dual Port QDR InfiniBand Adapter M3

Notable changes to RDMA implementation in UEK R5U1 include:

- **`resilient_rdmaip` module fixes and improvements.**   The Active-Active bonding code used by the `resilient_rdmaip` module, was updated to handle an issue that could cause a system panic if IPv6 addressing was disabled on the interface. Other improvements to logging and also to the module description information were also applied. A fix was also applied to include a check to prevent failover across ports within the failover group zero, which contains ports not intended for failover.

1.1.7 Security

The following notable security features are implemented in Unbreakable Enterprise Kernel Release 5 Update 1:

- **Secure boot update.**   UEFI Secure Boot certificates used to sign the kernel and `grub2` bootloader and which are verified using `shim`, have been updated to avoid expiration. This update can affect continued UEFI Secure boot functionality if the boot components involved are not all using the same valid Extended Validation (EV) certificate. For more information, see the *Oracle Linux 7 UEFI Secure Boot Update Notice* at https://docs.oracle.com/cd/E93554_01/F12070/html/index.html.

1.1.8 Storage

The following notable storage features are implemented in Unbreakable Enterprise Kernel Release 5 Update 1:

- **`libnvdimm` subsystem updated for PMEM and DAX.**   The `libnvdimm` kernel subsystem, which is responsible for the detection, configuration, and management of Non-Volatile Dual Inline Memory Modules (NVDIMMs) is updated in UEK R5U1 to take advantage a large number of upstream patches, bug fixes and backports. Notably, these include fixes to `/proc/smaps` to reflect the actual

PMEM page size and some work to improve Address Range Scrub (ARS). Also included as a notable improvement, is a fix that includes a new hand-shake mechanism that causes the fs thread to wait until DMA completion before waking up to update the fs metadata.

- **NVMe updates.**   General modifications to NVMe code are included in this update. Build configuration options were synchronized to ensure equivalence and compatibility in aarch64 environments. A patch was also applied to resolve an issue with NVMe hotplug/unplug functionality when used with a KVM guest.

1.1.9 Virtualization

The following notable virtualization features are implemented in Unbreakable Enterprise Kernel Release 5 Update 1:

- **Backported bug fixes and features for KVM, Xen and Hyper-V.**   Many bug fixes and virtualization features in the upstream 4.17, 4.18 and 4.19 kernels are backported into UEK R5U1. These patches offer better stability and resolve bugs and performance issues in KVM, Xen and Hyper-V. Fixes also include specific updates to better accommodate and support KVM on 64-bit Arm platforms.

- **Added the net_failover driver module.**   The addition of the `net_failover` driver module in this update release helps to enable `virtio_net` to act as a standby for a passthru device. This is important in cloud environments where implementing an accelerated data path to `virtio-net` enabled virtual machines should be possible with minimal guest user space modification. In particular, the net_failover module provides an automated failover mechanism for paravirtual drivers to manage network devices in a generic failover infrastructure.

- **KVM Guest startup issue fixed for system where Transparent Huge Pages (THP) are enabled.** An issue that caused a large-memory KVM guest to hang on startup or restart when using Transparent Huge Pages (THP), has been resolved in this update. The issue resulted from a memory mapping heuristic that broke when a local node ran out of memory.

  To prevent this issue from occurring, where a kernel does not have a fix applied, run the following command on the host system before you attempt to start the guest:

  ```
  # echo defer > /sys/kernel/mm/transparent_hugepage/defrag
  ```

  A fix for this issue is included in this update release and systems using this kernel version, or later, do not require the workaround.

1.2 Driver Updates

The Unbreakable Enterprise Kernel Release 5 supports a large number of hardware and devices. In close cooperation with hardware and storage vendors, Oracle has updated several device drivers from the versions in mainline Linux 4.14.35.

A complete list of the driver modules included in UEK R5U1 along with version information is provided in the appendix at Appendix A, *Driver Modules in Unbreakable Enterprise Kernel Release 5 Update 1 (x86_64)*.

1.2.1 Notable Driver Features

The following new features are noted in the drivers shipped with UEK R5U1 as opposed to the original release of UEK R5:

- **Broadcom/Emulex BCM573xx NIC driver updated to version 1.9.2.**   The Broadcom/Emulex BCM573xx NIC driver, `bnxt_en`, has been updated to version 1.9.2 in this kernel update release. This

update includes many upstream patches and bug fixes. Notable changes to the driver include: added Phy retry logic needed to enable hotplug functionality; DCBNL DSCP application protocol support; hwmon sysfs support; improvements to firmware notification about state changes; support for ethtool get dump; and a new VF resource allocation strategy mode.

- **Microsemi Smart Family Controller driver updated to version 1.1.4-130.** The Microsemi Smart Family Controller driver, `smartpqi`, has been updated to version 1.1.4-130 in this kernel update release. This update includes many upstream patches and bug fixes. Notable changes include a fix for a critical ARM issue when reading PQI index registers and improvements to the handling of sync requests.

- **Broadcom/Emulex LightPulse Fibre Channel SCSI driver updated to 12.0.0.7.** The Broadcom/ Emulex LightPulse Fibre Channel SCSI driver, `lpfc` has been updated to version 12.0.0.7. Many upstream patches were applied for bug fixes and enhancements. Notable changes include the removal of the `lpfc_enable_pdbe` module parameter; reduced locking when updating statistics; and added support to retrieve firmware logs. This release also includes improvements to the framework to enable NVMe on Fibre Channel. Note that FC-NVMe in `lpfc` is available as a technical preview.

- **QLogic Fibre Channel HBA driver updated to 10.00.00.07-k1.** The QLogic Fibre Channel HBA driver, `qla2xxx` has been updated to version 10.00.00.07-k1. Changes include many bug fixes for stability and performance. Notably, a fix was applied to enable local buffer boundary checking to resolve an issue that sometimes caused I/O to fail with a DMA error when the Data Integrity Feature (DIF) was enabled. A fix was also applied to resolve a null pointer dereference crash caused by an unexpected interrupt for a device that had not been set up by the driver. Improvements were also made to the code to provide better compatibility for builds on Arm platforms. This release also includes a number of vendor supplied and upstream patches to enable NVMe on Fibre Channel. Note that FC-NVMe in `qla2xxx` is available as a technical preview.

- **Intel PRO/1000 network driver updated.** The Intel PRO/1000 network driver, `e1000e`, is updated to fix interrupt handling for virtual devices that can fail to function properly inside VMWare virtual machines. The fix resolved a link check race condition following an ICR read.

- **Intel 10 Gigabit PCI Express network driver updated.** The Intel 10 Gigabit PCI Express network driver, `ixgbe`, and the virtual function driver, `ixgbevf` are patched to add IPsec offload support.

- **Avago MegaRAID SAS driver updated.** The Avago MegaRAID SAS driver, `megaraid_sas`, driver was patched to resolve an issue where the driver did not use CPU affinity correctly when hotplugging or unplugging CPUs. The issue could cause a system hang.

1.3 Compatibility

Oracle Linux maintains full user space compatibility with Red Hat Enterprise Linux, which is independent of the kernel version running underneath the operating system. Existing applications in user space will continue to run unmodified on the Unbreakable Enterprise Kernel Release 5 and no re-certifications are needed for RHEL certified applications.

To minimize impact on interoperability during releases, the Oracle Linux team works closely with third-party vendors whose hardware and software have dependencies on kernel modules. The kernel ABI for UEK R5 will remain unchanged in all subsequent updates to the initial release. In this release, there are changes to the kernel ABI relative to UEK R4 that require recompilation of third-party kernel modules on the system. Before installing UEK R5, verify its support status with your application vendor.

1.4 Certification of UEK R5 for Oracle products

Note that certification of different Oracle products on UEK R5 may not be immediately available at the time of a UEK R5 release. You should always check to ensure that the product you are using is certified for

use on UEK R5 before upgrading or installing the kernel. Check certification at https://support.oracle.com/epmos/faces/CertifyHome.

Oracle Automatic Storage Management Cluster File System (Oracle ACFS) certification for different kernel versions is described in Document ID 1369107.1 available at https://support.oracle.com/oip/faces/secure/km/DocumentDisplay.jspx?id=1369107.1.

Oracle Automatic Storage Management Filter Driver (Oracle ASMFD) certification for different kernel versions is described in Document ID 2034681.1 available at https://support.oracle.com/oip/faces/secure/km/DocumentDisplay.jspx?id=2034681.1.

Chapter 2 Security Fixes for CVEs

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This chapter lists security vulnerabilities and exposures (CVEs) that are specifically addressed in this release. Note that CVEs are continually handled in patch updates that are made available as errata builds for the current release. For this reason, it is absolutely critical that you keep your system up to date with the latest package updates for this kernel release.

You can keep up to date with the latest CVE information at https://linux.oracle.com/cve.

2.1 List of CVEs fixed in this release

The following list describes the CVEs that are fixed in this release. The content provided here is automatically generated and includes the CVE identifier and a summary of the issue. The associated internal Oracle bug identifiers are also included to reference work that was carried out to address each issue.

- **CVE-2018-1000200.** The Linux Kernel versions 4.14, 4.15, and 4.16 has a null pointer dereference which can result in an out of memory (OOM) killing of large mlocked processes. The issue arises from an oom killed process's final thread calling exit_mmap(), which calls munlock_vma_pages_all() for mlocked vmas.This can happen synchronously with the oom reaper's unmap_page_range() since the vma's VM_LOCKED bit is cleared before munlocking (to determine if any other vmas share the memory and are mlocked).

- **CVE-2018-10322.** The xfs_dinode_verify function in fs/xfs/libxfs/xfs_inode_buf.c in the Linux kernel through 4.16.3 allows local users to cause a denial of service (xfs_ilock_attr_map_shared invalid pointer dereference) via a crafted xfs image. (Bug: 28943577)

  See https://linux.oracle.com/cve/CVE-2018-10322.html for more information.

- **CVE-2018-10323.** The xfs_bmap_extents_to_btree function in fs/xfs/libxfs/xfs_bmap.c in the Linux kernel through 4.16.3 allows local users to cause a denial of service (xfs_bmapi_write NULL pointer dereference) via a crafted xfs image. (Bug: 27989510)

  See https://linux.oracle.com/cve/CVE-2018-10323.html for more information.

- **CVE-2018-10840.** Linux kernel is vulnerable to a heap-based buffer overflow in the fs/ext4/xattr.c:ext4_xattr_set_entry() function. An attacker could exploit this by operating on a mounted crafted ext4 image.

- **CVE-2018-10853.** A flaw was found in the way Linux kernel KVM hypervisor before 4.18 emulated instructions such as sgdt/sidt/fxsave/fxrstor. It did not check current privilege(CPL) level while emulating unprivileged instructions. An unprivileged guest user/process could use this flaw to potentially escalate privileges inside guest.

- **CVE-2018-10876.** A flaw was found in Linux kernel in the ext4 filesystem code. A use-after-free is possible in ext4_ext_remove_space() function when mounting and operating a crafted ext4 image.

- **CVE-2018-10877.** Linux kernel ext4 filesystem is vulnerable to an out-of-bound access in the ext4_ext_drop_refs() function when operating on a crafted ext4 filesystem image.

- **CVE-2018-10879.** A flaw was found in the Linux kernel's ext4 filesystem. A local user can cause a use-after-free in ext4_xattr_set_entry function and a denial of service or unspecified other impact may occur by renaming a file in a crafted ext4 filesystem image.

  See https://linux.oracle.com/cve/CVE-2018-10879.html for more information.

- **CVE-2018-10880.** Linux kernel is vulnerable to a stack-out-of-bounds write in the ext4 filesystem code when mounting and writing to a crafted ext4 image in ext4_update_inline_data(). An attacker could use this to cause a system crash and a denial of service.

- **CVE-2018-10881.** A flaw was found in the Linux kernel's ext4 filesystem. A local user can cause an out-of-bound access in ext4_get_group_info function, a denial of service, and a system crash by mounting and operating on a crafted ext4 filesystem image.

  See https://linux.oracle.com/cve/CVE-2018-10881.html for more information.

- **CVE-2018-10882.** A flaw was found in the Linux kernel's ext4 filesystem. A local user can cause an out-of-bound write in in fs/jbd2/transaction.c code, a denial of service, and a system crash by unmounting a crafted ext4 filesystem image.

- **CVE-2018-10883.** A flaw was found in the Linux kernel's ext4 filesystem. A local user can cause an out-of-bounds write in jbd2_journal_dirty_metadata(), a denial of service, and a system crash by mounting and operating on a crafted ext4 filesystem image.

  See https://linux.oracle.com/cve/CVE-2018-10883.html for more information.

- **CVE-2018-1092.** The ext4_iget function in fs/ext4/inode.c in the Linux kernel through 4.15.15 mishandles the case of a root directory with a zero i_links_count, which allows attackers to cause a denial of service (ext4_process_freed_data NULL pointer dereference and OOPS) via a crafted ext4 image.

  See https://linux.oracle.com/cve/CVE-2018-1092.html for more information.

- **CVE-2018-1093.** The ext4_valid_block_bitmap function in fs/ext4/balloc.c in the Linux kernel through 4.15.15 allows attackers to cause a denial of service (out-of-bounds read and system crash) via a crafted ext4 image because balloc.c and ialloc.c do not validate bitmap block numbers.

  See https://linux.oracle.com/cve/CVE-2018-1093.html for more information.

- **CVE-2018-1094.** The ext4_fill_super function in fs/ext4/super.c in the Linux kernel through 4.15.15 does not always initialize the crc32c checksum driver, which allows attackers to cause a denial of service (ext4_xattr_inode_hash NULL pointer dereference and system crash) via a crafted ext4 image. (Bug: 28929734)

  See https://linux.oracle.com/cve/CVE-2018-1094.html for more information.

- **CVE-2018-10940.** The cdrom_ioctl_media_changed function in drivers/cdrom/cdrom.c in the Linux kernel before 4.16.6 allows local attackers to use a incorrect bounds check in the CDROM driver CDROM_MEDIA_CHANGED ioctl to read out kernel memory. (Bug: 28929734)

  See https://linux.oracle.com/cve/CVE-2018-10940.html for more information.

- **CVE-2018-1095.** The ext4_xattr_check_entries function in fs/ext4/xattr.c in the Linux kernel through 4.15.15 does not properly validate xattr sizes, which causes misinterpretation of a size as an error code, and consequently allows attackers to cause a denial of service (get_acl NULL pointer dereference and system crash) via a crafted ext4 image.

- **CVE-2018-1108.** kernel drivers before version 4.17-rc1 are vulnerable to a weakness in the Linux kernel's implementation of random seed data. Programs, early in the boot sequence, could use the data allocated for the seed before it was sufficiently generated.

- **CVE-2018-1118.** Linux kernel vhost since version 4.8 does not properly initialize memory in messages passed between virtual guests and the host operating system in the vhost/vhost.c:vhost_new_msg() function. This can allow local privileged users to read some kernel memory contents when reading from the /dev/vhost-net device file. (Bug: 28892602)

  See https://linux.oracle.com/cve/CVE-2018-1118.html for more information.

- **CVE-2018-1120.** A flaw was found affecting the Linux kernel before version 4.17. By mmap()ing a FUSE-backed file onto a process's memory containing command line arguments (or environment strings), an attacker can cause utilities from psutils or procps (such as ps, w) or any other program which makes a read() call to the /proc/<pid>/cmdline (or /proc/<pid>/environ) files to block indefinitely (denial of service) or for some controlled time (as a synchronization primitive for other attacks).

  See https://linux.oracle.com/cve/CVE-2018-1120.html for more information.

- **CVE-2018-11412.** In the Linux kernel 4.13 through 4.16.11, ext4_read_inline_data() in fs/ext4/inline.c performs a memcpy with an untrusted length value in certain circumstances involving a crafted filesystem that stores the system.data extended attribute value in a dedicated inode.

- **CVE-2018-12233.** In the ea_get function in fs/jfs/xattr.c in the Linux kernel through 4.17.1, a memory corruption bug in JFS can be triggered by calling setxattr twice with two different extended attribute names on the same file. This vulnerability can be triggered by an unprivileged user with the ability to create files and execute programs. A kmalloc call is incorrect, leading to slab-out-of-bounds in jfs_xattr. (Bug: 28221253)

- **CVE-2018-12896.** An issue was discovered in the Linux kernel through 4.17.3. An Integer Overflow in kernel/time/posix-timers.c in the POSIX timer code is caused by the way the overrun accounting works. Depending on interval and expiry time values, the overrun can be larger than INT_MAX, but the accounting is int based. This basically makes the accounting values, which are visible to user space via timer_getoverrun(2) and siginfo::si_overrun, random. For example, a local user can cause a denial of service (signed integer overflow) via crafted mmap, futex, timer_create, and timer_settime system calls. (Bug: 28603330)

  See https://linux.oracle.com/cve/CVE-2018-12896.html for more information.

- **CVE-2018-14610.** An issue was discovered in the Linux kernel through 4.17.10. There is out-of-bounds access in write_extent_buffer() when mounting and operating a crafted btrfs image, because of a lack of verification that each block group has a corresponding chunk at mount time, within btrfs_read_block_groups in fs/btrfs/extent-tree.c. (Bug: 28693486)

  See https://linux.oracle.com/cve/CVE-2018-14610.html for more information.

- **CVE-2018-14611.** An issue was discovered in the Linux kernel through 4.17.10. There is a use-after-free in try_merge_free_space() when mounting a crafted btrfs image, because of a lack of chunk type flag checks in btrfs_check_chunk_valid in fs/btrfs/volumes.c. (Bug: 28693490)

  See https://linux.oracle.com/cve/CVE-2018-14611.html for more information.

- **CVE-2018-14678.** An issue was discovered in the Linux kernel through 4.17.11, as used in Xen through 4.11.x. The xen_failsafe_callback entry point in arch/x86/entry/entry_64.S does not properly maintain RBX, which allows local users to cause a denial of service (uninitialized memory usage and system crash). Within Xen, 64-bit x86 PV Linux guest OS users can trigger a guest OS crash or possibly gain privileges. (Bug: 28402818)

See https://linux.oracle.com/cve/CVE-2018-14678.html for more information.

- **CVE-2018-15471.** An issue was discovered in xenvif_set_hash_mapping in drivers/net/xen-netback/hash.c in the Linux kernel through 4.18.1, as used in Xen through 4.11.x and other products. The Linux netback driver allows frontends to control mapping of requests to request queues. When processing a request to set or change this mapping, some input validation (e.g., for an integer overflow) was missing or flawed, leading to OOB access in hash handling. A malicious or buggy frontend may cause the (usually privileged) backend to make out of bounds memory accesses, potentially resulting in one or more of privilege escalation, Denial of Service (DoS), or information leaks. (Bug: 28432127)

- **CVE-2018-15572.** The spectre_v2_select_mitigation function in arch/x86/kernel/cpu/bugs.c in the Linux kernel before 4.18.1 does not always fill RSB upon a context switch, which makes it easier for attackers to conduct userspace-userspace spectreRSB attacks. (Bug: 28569500)

  See https://linux.oracle.com/cve/CVE-2018-15572.html for more information.

- **CVE-2018-16658.** An issue was discovered in the Linux kernel before 4.18.6. An information leak in cdrom_ioctl_drive_status in drivers/cdrom/cdrom.c could be used by local attackers to read kernel memory because a cast from unsigned long to int interferes with bounds checking. This is similar to CVE-2018-10940. (Bug: 28639381 28929734)

  See https://linux.oracle.com/cve/CVE-2018-16658.html for more information.

- **CVE-2018-17182.** An issue was discovered in the Linux kernel through 4.18.8. The vmacache_flush_all function in mm/vmacache.c mishandles sequence number overflows. An attacker can trigger a use-after-free (and possibly gain privileges) via certain thread creation, map, unmap, invalidation, and dereference operations. (Bug: 28693570)

  See https://linux.oracle.com/cve/CVE-2018-17182.html for more information.

- **CVE-2018-18021.** arch/arm64/kvm/guest.c in KVM in the Linux kernel before 4.18.12 on the arm64 platform mishandles the KVM_SET_ON_REG ioctl. This is exploitable by attackers who can create virtual machines. An attacker can arbitrarily redirect the hypervisor flow of control (with full register control). An attacker can also cause a denial of service (hypervisor panic) via an illegal exception return. This occurs because of insufficient restrictions on userspace access to the core register file, and because PSTATE.M validation does not prevent unintended execution modes. (Bug: 28762162)

  See https://linux.oracle.com/cve/CVE-2018-18021.html for more information.

- **CVE-2018-18445.** In the Linux kernel 4.14.x, 4.15.x, 4.16.x, 4.17.x, and 4.18.x before 4.18.13, faulty computation of numeric bounds in the BPF verifier permits out-of-bounds memory accesses because adjust_scalar_min_max_vals in kernel/bpf/verifier.c mishandles 32-bit right shifts. (Bug: 28861778)

- **CVE-2018-18710.** An issue was discovered in the Linux kernel through 4.19. An information leak in cdrom_ioctl_select_disc in drivers/cdrom/cdrom.c could be used by local attackers to read kernel memory because a cast from unsigned long to int interferes with bounds checking. This is similar to CVE-2018-10940 and CVE-2018-16658. (Bug: 28929734)

  See https://linux.oracle.com/cve/CVE-2018-18710.html for more information.

- **CVE-2018-3620.** Systems with microprocessors utilizing speculative execution and address translations may allow unauthorized disclosure of information residing in the L1 data cache to an attacker with local user access via a terminal page fault and a side-channel analysis. (Bug: 28220625 28488797)

  See https://linux.oracle.com/cve/CVE-2018-3620.html for more information.

- **CVE-2018-3639.** Systems with microprocessors utilizing speculative execution and speculative execution of memory reads before the addresses of all prior memory writes are known may allow unauthorized disclosure of information to an attacker with local user access via a side-channel analysis, aka Speculative Store Bypass (SSB), Variant 4. (Bug: 28034177 28063980)

  See https://linux.oracle.com/cve/CVE-2018-3639.html for more information.

- **CVE-2018-3646.** Systems with microprocessors utilizing speculative execution and address translations may allow unauthorized disclosure of information residing in the L1 data cache to an attacker with local user access with guest OS privilege via a terminal page fault and a side-channel analysis. (Bug: 28220625 28488797)

  See https://linux.oracle.com/cve/CVE-2018-3646.html for more information.

- **CVE-2018-5390.** Linux kernel versions 4.9+ can be forced to make very expensive calls to tcp_collapse_ofo_queue() and tcp_prune_ofo_queue() for every incoming packet which can lead to a denial of service. (Bug: 28450913)

  See https://linux.oracle.com/cve/CVE-2018-5390.html for more information.

- **CVE-2018-5391.** The Linux kernel, versions 3.9+, is vulnerable to a denial of service attack with low rates of specially modified packets targeting IP fragment re-assembly. An attacker may cause a denial of service condition by sending specially crafted IP fragments. Various vulnerabilities in IP fragmentation have been discovered and fixed over the years. The current vulnerability (CVE-2018-5391) became exploitable in the Linux kernel with the increase of the IP fragment reassembly queue size. (Bug: 28481663 28481670)

  See https://linux.oracle.com/cve/CVE-2018-5391.html for more information.

- **CVE-2018-5703.** The tcp_v6_syn_recv_sock function in net/ipv6/tcp_ipv6.c in the Linux kernel through 4.14.11 allows attackers to cause a denial of service (slab out-of-bounds write) or possibly have unspecified other impact via vectors involving TLS. (Bug: 27500677)

- **CVE-2018-5848.** In the function wmi_set_ie(), the length validation code does not handle unsigned integer overflow properly. As a result, a large value of the 'ie_len' argument can cause a buffer overflow in all Android releases from CAF (Android for MSM, Firefox OS for MSM, QRD Android) using the Linux Kernel. (Bug: 28951264)

  See https://linux.oracle.com/cve/CVE-2018-5848.html for more information.

- **CVE-2018-6412.** In the function sbusfb_ioctl_helper() in drivers/video/fbdev/sbuslib.c in the Linux kernel through 4.15, an integer signedness error allows arbitrary information leakage for the FBIOPUTCMAP_SPARC and FBIOGETCMAP_SPARC commands.

- **CVE-2018-7492.** A NULL pointer dereference was found in the net/rds/rdma.c __rds_rdma_map() function in the Linux kernel before 4.14.7 allowing local attackers to cause a system panic and a denial-of-service, related to RDS_GET_MR and RDS_GET_MR_FOR_DEST. (Bug: 28565415)

  See https://linux.oracle.com/cve/CVE-2018-7492.html for more information.

- **CVE-2018-7755.** An issue was discovered in the fd_locked_ioctl function in drivers/block/floppy.c in the Linux kernel through 4.15.7. The floppy driver will copy a kernel pointer to user memory in response to the FDGETPRM ioctl. An attacker can send the FDGETPRM ioctl and use the obtained kernel pointer to discover the location of kernel code and data and bypass kernel security protections such as KASLR.

- **CVE-2018-9363.** In the hidp_process_report in bluetooth, there is an integer overflow. This could lead to an out of bounds write with no additional execution privileges needed. User interaction is not

needed for exploitation. Product: Android Versions: Android kernel Android ID: A-65853588 References: Upstream kernel.

Chapter 3 Known Issues

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This chapter describes the known issues for the Unbreakable Enterprise Kernel Release 5.

3.1 Unusable or Unavailable Features for Arm

This section calls out specific features that are known to not work, remain untested or which are known to have issues that make the feature unusable.

- **InfiniBand.** InfiniBand hardware is currently not supported for Arm architecture using UEK R5.

- **FibreChannel.** FibreChannel hardware is currently not supported for Arm architecture using UEK R5.

- **RDMA.** RDMA and any sub-features that are described in Section 1.1.6, "RDMA" are not supported for Arm.

- **OCFS2.** The OCFS2 file system and all of the features described in Section 1.1.4.3, "OCFS2" are not supported for Arm.

- **Secure Boot.** The Secure Boot feature that is described in Section 1.1.7, "Security" is currently not supported or available for Arm.

3.2 [aarch64] IOMMU issues

Performance issues, such as increased boot times, soft lockups, and crashes can occur on 64-bit Arm (aarch64) architecture that is running UEK R5 when the input–output memory management unit (IOMMU) feature is active. These issues have been observed on some Arm hardware using Mellanox CX-3 and CX-4 cards. However, note that similar issues could occur with different drivers on different hardware.

UEK R5 is configured to use `swiotlb` by default. To enable the use of the IOMMU feature, use `iommu.passthrough=0` on the kernel command line. (Bug IDs 27687153, 27759954, 27812727, and 27862655)

3.3 [aarch64] Kdump issues

Several issues are noted when using Kdump on 64-bit Arm (aarch64) architecture platforms.

- **Kdump fails when using Mellanox ConnectX devices.** On systems with Mellanox hardware devices that use either the `mlx4_core` or the `mlx5_core` driver modules, Kexec fails to load the crash kernel and hangs while the `mlx4_core` or `mlx5_core` driver is initialized.

  The workaround is to disable loading the driver in the crash kernel by adding either `rd.driver.blacklist=mlx4_core` or `rd.driver.blacklist=mlx5_core` to the `KDUMP_COMMANDLINE_APPEND` option in `/etc/sysconfig/kdump`. Note that this solution is only possible if you have configured to store the vmcore file locally. If Kdump is configured to save the vmcore to a remote host via the device, this workaround fails. (Bug ID 27915989) (Bug ID 27916214)

- **Kdump fails when configured to use remote dump target over an ixgbe device.** On systems where Kdump is configured to use a remote dump target over an `ixgbe` network device, the Kdump Vmcore Save Service is unable to save the vmcore file to the target destination. (Bug ID 27915827)

- **Kdump fails and hangs when configured to use a remote dump target over an igb device.** On systems where Kdump is configured to use a remote dump target over an `igb` network device, NETDEV WATCHDOG returns a timeout error and the network adapter is continually reset, resulting in a system hang when kexec attempts to load the crash kernel. (Bug ID 27916095)

3.4 [aarch64] CPU hotplug functionality not functional in KVM

Although CPU hotplug functionality is available in QEMU, the aarch64 Linux kernel is not yet able to handle the addition of new virtual CPUs to a running virtual machine. When QEMU is used to add a virtual CPU to a running virtual machine in KVM, and error is returned:

```
kvm_init_vcpu failed: Device or resource busy
```

CPU hotplug functionality is currently unavailable for UEK R5 on 64-bit Arm platforms. (Bug ID 28140386)

3.5 [aarch64] KVM guests that include a random number generator device are unable to boot

If a virtual machine is created on a 64-bit Arm host system and the virtual machine is configured to include a random number generator device, the guest does not complete boot and returns errors similar to the following:

```
[2.653535] module virtio_ring: overflow in relocation type 275 val
ffff1f85c31d7178
```

The inclusion of a random number generator device is not a default option and can only be triggered by using the `--rng random` option. Oracle is investigating a fix for this issue. (Bug ID 28954789)

3.6 File System Issues

The following are known issues that are specific to file systems supported with Unbreakable Enterprise Kernel Release 5 Update 1.

3.6.1 ext4: Frequent repeated system shutdowns can cause file system corruption

If a system using `ext4` is repeatedly and frequently shut down, the file system may be corrupted. This issue is considered to be a corner-case due to the difficulty required to replicate. The issue exists in upstream code and proposed patches are currently under review. (Bug ID 27547113)

3.6.2 xfs: xfs_repair allows the corruption of a directory to a symbolic link

An issue exists, where if an `xfs` directory becomes corrupted and appears as a symbolic link, the `xfs_repair` command does not detect the error and allows the corruption to remain. The issue is under investigation.

(Bug ID 28082433)

3.6.3 xfs: xfs_repair fails to repair the corrupted link counts

If an `xfs` file system is repaired by using the `xfs_repair` command, and there are invalid inode counts, the utility may fail to repair the corrupted link counts and return errors while verifying the link counts. The issue is currently under investigation, but appears to be related to the `xfsprogs-4.15-1` package released with UEK R5. The issue may not appear when using the earlier `xfsprogs-4.5.0-18.0.1` version of this package available in the `ol7_latest` yum repository. (Bug ID 28070680)

3.7 RDMA Issues

The following issues are noted for RDMA:

- **ibacm service is disabled by default.** The `ibacm` service is disabled by default immediately after installation. This means that the `ibacm` service does not automatically start after a reboot. This is intended behavior. Requirements to use the `ibacm` service are application-specific. If your application requires this service, you may need to enable the service to start after reboot:

```
# systemctl enable ibacm
```

(Bug ID 28074471)

- **Issues when Network Manager control is enabled or disabled.** Several issues have been observed when the `NM_CONTROLLED=yes` is set for an interface that is used for RDMA. For these reasons, Oracle recommends setting `NM_CONTROLLED=no` in the interface configuration, however when Network Manager control is disabled, the `CONNECTED_MODE=yes` parameter is ignored for InfiniBand interfaces. It is possible to work around this issue by setting the connected mode manually by running the following command:

```
# echo connected > /sys/class/net/ib0/mode
```

where `ib0` is the interface that you wish to change mode for. You may need to run this command after a reboot. (Bug ID 28074921)

- **Error, some other host already uses address** *xxx.xxx.xxx.xxx.* The following error message might be triggered in certain instances:

```
Error, some other host already uses address  xxx.xxx.xxx.xxx
```

The following are the two instances in which this error message might be triggered:

- When active-bonding is enabled, and you run the `ifup ib-interface` command.

- When you run the `systemctl start rdma` command.

You can ignore this message, as in both cases, the InfiniBand interface is brought up successfully. (Bug ID 28097516)

- **Unloading resilient_rdmaip can result in issues accessing InfiniBand interfaces.** Unloading the `resilient_rdmaip` module can cause issues accessing and configuring InfiniBand interfaces. Attempts to use the `ifconfig` command on an InfiniBand interface after the module has been unloaded, results in a 'Device not found' message, and no IP information for these interfaces is available. The interfaces need to be re-initialized with the `ifup` command. The active bonding feature is unaffected by this issue. (Bug ID 28123680)

3.8 Docker Issues

The following are known Docker issues:

- **Running yum install within a container on an overlayfs file system can fail with the following error:**

```
Rpmdb checksum is invalid: dCDPT(pkg checksums): package_name
```

This error can break Dockerfile builds but is expected behavior from the kernel and is a known issue upstream (see https://github.com/docker/docker/issues/10180.)

The workaround is to run `touch /var/lib/rpm/*` before installing the package.

Note that this issue is fixed in any Oracle Linux images available on the Docker Hub or Oracle Container Registry, but the issue could still be encountered when running any container based on a third-party image. (Bug ID 21804564)

- **Docker can fail where it uses the overlay2 storage driver on XFS-formatted storage.** A kernel patch has been applied to prevent overlay mounts on XFS if the `ftype` is not set to 1. This fix resolves an issue where XFS did not properly support the whiteout features of an overlay file system if `d_type` support was not enabled. If the Docker Engine is already using XFS-formatted storage with the `overlay2` storage driver, an upgrade of the kernel can cause Docker to fail if the underlying XFS file system is not created with the `-n ftype=1` option enabled. The root partition on Oracle Linux 7 is automatically formatted with `-n ftype=0` where XFS is selected as the file system. Therefore, if you intend to use the `overlay2` storage driver in this environment, you must format a separate device for this purpose. (Bug ID 25995797)

3.9 LXC Issues

The following are known LXC issues:

- **LXC read-only ip_local_port_range parameter.** With `lxc-1.1` or later and UEK R5, `ip_local_port_range` is a read-writable parameter under `/proc/sys/net/ipv4` in an Oracle Linux container rather than being read-only. (Bug ID 21880467)

3.10 NVMe device names change across reboots

Since UEK R5 adds support for NVMe subsystems and multipathing, enumerated device names generated by the kernel are not stable. This is similar to the way that other block devices are handled by the kernel. If

you use enumerated kernel instance names to handle mounts in your fstab, the mounts may fail or behave unpredictably.

Never use enumerated kernel instance names when referring to block devices. Instead, use the UUID, partition label or file system label to refer to any block device, including an NVMe device. If you are uncertain of the device UUID or labels, use the `blkid` command to view this information.

Prior to multipathing, a subsystem number would typically map onto the controller number. Therefore, you could assume that the subsystem at `/dev/nvme0n1` was affiliated with controller `/dev/nvme0`. This is no longer the case. For multipathing to be enabled a subsystem could have multiple controllers. In this case, `/dev/nvme0n1` could just as easily be affiliated with controllers at `/dev/nvme1` and `/dev/nvme2`. There is no specific correlation between the subsystem device name and the controller device name.

3.11 NVMe device hotplug unplug procedure change

Since UEK R5 adds support for NVMe subsystems and multipathing, enumerated device names generated by the kernel are not stable. This means that the procedure for identifying and unplugging NVMe devices using hotplug functionality is slightly different to the procedure that you may have followed using other kernel releases. This note describes the steps that you should take to identify, power down and unplug the appropriate device.

1. Use the `lsblk` command to identify the disk that you wish to remove according to its WWN or UUID. For example:

   ```
   # lsblk -o +UUID,WWN,MODEL
   ```

   Take note of the enumerated kernel instance name that has been assigned to the device. For example, this may be *nvme0n1*. It is very important to understand that the device name does not necessarily map onto the controller or PCIe bridge that it is attached to. See Section 3.10, "NVMe device names change across reboots" for more information.

2. Search for the device path to obtain the PCI domain identifier for the device:

   ```
   # find /sys/devices -iname nvme0n1
   /sys/devices/pci0000:85/0000:85:01.0/0000:8d:00.0/nvme/nvme1/nvme0n1
   ```

   Note that `0000:8d:00.0` in the returned path for the device is the PCI domain identifier for the device. You need this information to proceed.

3. Obtain the physical slot number for the NVMe drive. Under UEK R5, the slot is bound to the NVMe device directly and not to the PCIe controller. You can find the slot number for the NVMe device by running the `lspci` command and querying the PCI domain identifier for the device in verbose mode:

   ```
   # lspci -s 0000:8d:00.0 -vvv
   8d:00.0 Non-Volatile memory controller: Intel Corporation Express Flash NVMe
   P4500 (prog-if 02 [NVM Express])
           Subsystem: Oracle/SUN Device 4871
           Physical Slot: 104-1
   …
   ```

   Note that the Physical Slot number for the device in this example is `104-1`. Take note of this value to proceed.

4. Use the Physical Slot number for the device to find its bus interface:

   ```
   # find /sys -iname "104-1"
   /sys/bus/pci/slots/104-1
   ```

5. Use the returned bus interface path to power off the NVMe drive:

```
# echo 0 > /sys/bus/pci/slots/104-1/power
```

Depending on your hardware, the blue disk LED may display on the front panel of the system may display to indicate that you can safely remove the disk drive.

3.12 KVM guest crashes when using memory hotplug operation to shrink available memory

A KVM guest may crash if the guest memory is reduced from 96GB or more to 2GB using a memory hotplug operation. the guest crashes. Although this issue is logged for UEK R5, similar issues have been noted for RHCK. (Bug ID 27968656)

3.13 HP DL380 system reboot issue with SD card slot enabled in Legacy mode

A reboot failure can occur on HP DL380 Gen 10 systems where the BIOS is set to Legacy mode and an SD flash device is removed from the on-board SD Reader. A patch is available and being tested but is not included at the time of this release. (Bug ID 28171827)

Chapter 4 Installation and Availability

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You can install Unbreakable Enterprise Kernel Release 5 on Oracle Linux 7 Update 5 or later, running either the Red Hat compatible kernel or a previous version of the Unbreakable Enterprise Kernel. If you are still running an older version of Oracle Linux, first update your system to the latest available update release.

The Unbreakable Enterprise Kernel Release 5 is supported on the x86-64 architecture but not on x86.

4.1 Installation Overview

If you have a subscription to Oracle Unbreakable Linux support, you can obtain the packages for Unbreakable Enterprise Kernel Release 5 by registering your system with the Unbreakable Linux Network (ULN) and subscribing it to additional channels. See Section 4.2, "Subscribing to ULN Channels".

If your system is not registered with ULN, you can obtain most of the packages from Oracle Linux yum server. See Section 4.3, "Enabling Access to Oracle Linux Yum Server Repositories".

Having subscribed your system to the appropriate channels on ULN or Oracle Linux yum server, upgrade your system. See Section 4.4, "Upgrading Your System".

4.2 Subscribing to ULN Channels

The kernel image and user space packages are available on the following ULN channels for Oracle Linux 7:

- `ol7_x86_64_latest` (latest user space packages for Oracle Linux 7)

- `ol7_x86_64_UEKR5` (`kernel-uek*`, `dtrace-utils*`,`ndctl-*`, `btrfs-progs-*` and `xfsprogs-*`)

The following procedure assumes that you have already registered your system with ULN.

To subscribe your system to a channel on ULN:

1. Log in to https://linux.oracle.com with your ULN user name and password.

2. On the Systems tab, click the link named for the system in the list of registered machines.

3. On the System Details page, click **Manage Subscriptions**.

4. On the System Summary page, select each required channel from the list of available channels and click the right arrow to move the channel to the list of subscribed channels.

Subscribe the system to the `ol7_x86_64_latest` and `ol7_x86_64_UEKR5` channels.

5. Click **Save Subscriptions**.

For information about using ULN, see the *Oracle Linux Unbreakable Linux Network User's Guide* available at https://docs.oracle.com/cd/E52668_01/E39381/html/index.html.

4.3 Enabling Access to Oracle Linux Yum Server Repositories

At the Oracle Linux yum server repository at https://yum.oracle.com/, the kernel image and user space packages are available on the following repositories for Oracle Linux 7:

- `ol7_latest` (latest user space packages for Oracle Linux 7 other than the RDMA tool packages)

- `ol7_UEKR5` (`kernel-uek*`, `dtrace-utils*`,`ndctl-*`, `btrfs-progs-*` and `xfsprogs-*`)

To enable access to the Oracle Linux 7 repositories on the Oracle Linux yum server, use `yum-config-manager`. For example, to enable access to the `ol7_latest` and `ol7_UEKR5` repositories, run the following:

```
# yum-config-manager --enable ol7_latest,ol7_UEKR5
```

> **Note**
>
> You can only use `yum-config-manager` to enable or disable repositories where you already have a configuration file for the specified repository. Repository configurations are typically stored in `/etc/yum.repos.d`. You can download the latest copy of a suitable repository file for Oracle Linux 7 from https://yum.oracle.com/public-yum-ol7.repo. For example:
>
> ```
> # wget https://yum.oracle.com/public-yum-ol7.repo -O /etc/yum.repos.d/public-yum-ol7.repo
> ```

Alternatively, edit `/etc/yum.conf` or create a repository file in the `/etc/yum.repos.d` directory, to ensure that the following entries exist:

```
[ol7_latest]
name=Oracle Linux $releasever Latest ($basearch)
baseurl=https://yum.oracle.com/repo/OracleLinux/OL7/latest/$basearch/
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-oracle
gpgcheck=1
enabled=1

[ol7_UEKR5]
name=Oracle Linux $releasever Unbreakable Enterprise Kernel Release 5 ($basearch)
baseurl=https://yum.oracle.com/repo/OracleLinux/OL7/UEKR5/$basearch/
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-oracle
gpgcheck=1
enabled=1
```

To enable a channel, set the value of the `enabled` parameter for the channel to 1.

To disable a channel, set the value of the `enabled` parameter for the channel to 0.

You can find more information about installing the software at https://yum.oracle.com/.

4.4 Upgrading Your System

To upgrade your system to Unbreakable Enterprise Kernel Release 5:

1. After enabling access to the appropriate channels, including `ol7_UEKR5`, in the Oracle Linux yum server repository or `ol7_x86_64_UEKR5` on ULN, run the following command to upgrade the system to UEK R5:

```
# yum update
```

2. After upgrading the system, reboot it, selecting the UEK R5 kernel (version 4.14.35) if this is not the default boot kernel.

If you have questions regarding configuring or using `yum` to install updates, refer to the *Oracle Linux Unbreakable Linux Network User's Guide* available at https://docs.oracle.com/cd/E52668_01/E39381/html/index.html.

The kernel's source code is available through a public git source code repository at https://github.com/oracle/linux-uek.

4.5 Installing Oracle-Supported RDMA Packages

The following procedure describes how to upgrade from the OFED release to the RDMA release. The instructions describe how to remove the `oracle-ofed-release` packages and then install the `oracle-rdma-release` packages.

1. Subscribe your system to the appropriate ULN channels or enable the appropriate yum repositories:

   - If your system is registered with ULN, subscribe the system to the `ol7_x86_64_UEKR5_RDMA`, `ol7_x86_64_UEKR5`, and `ol7_x86_64_latest` channels on ULN.

     By default, the `ol7_x86_64_UEKR5` and `ol7_x86_64_latest` channels are enabled when you register an Oracle Linux 7 system with ULN.

   - If you want to install the packages from the Oracle Linux yum server, check that the yum repository file at `/etc/yum.repos.d/public-yum-ol7.repo` is current or contains and entry for the `ol7_UEKR5_RDMA` repository.

     If there is no `ol7_UEKR5_RDMA` repository in the yum repository file you can download an up-to-date version of this file from https://yum.oracle.com/public-yum-ol7.repo, if required. For example, you can run:

```
# mv /etc/yum.repos.d/public-yum-ol7.repo /etc/yum.repos.d/public-yum-ol7.repo.bck
# wget https://yum.oracle.com/public-yum-ol7.repo -o /etc/yum.repos.d/public-yum-ol7.repo
```

     Enable the `ol7_latest`, `ol7_UEKR5` and `ol7_UEKR5_RDMA` repositories:

```
# yum-config-manager --enable ol7_latest ol7_UEKR5 ol7_UEKR5_RDMA
```

     Alternately, edit the `/etc/yum.repos.d/public-yum-ol7.repo` file to set the `enabled` option to `1` for the required repositories.

     You can optionally disable the `ol7_UEKR4` repository if you do not intend to use this kernel. Note that the RDMA packages installed from the `ol7_UEKR5_RDMA` repository are not compatible with other UEK releases.

2. Remove any existing OFED packages.

```
# yum remove 'ibacm*'
# yum remove 'ib-bonding*'
# yum remove 'ibutils*'
```

```
# yum remove 'infiniband-diags*'
# yum remove 'libibacl*'
# yum remove 'libibcm*'
# yum remove 'libibmad*'
# yum remove 'libibumad*'
# yum remove 'libibverbs*'
# yum remove 'libmlx4*'
# yum remove 'librdmacm*'
# yum remove 'libsdp*'
# yum remove 'mstflint*'
# yum remove 'ofed-docs*'
# yum remove 'ofed-scripts*'
# yum remove 'opensm*'
# yum remove 'perftest*'
# yum remove 'qperf*'
# yum remove 'sdpnetstat*'
# yum remove 'rdma*'
# yum remove 'rds-tools*'
# yum remove 'rdma-core*'
```

3. Clean all yum cached files from all enabled repositories:

```
# yum clean all
```

4. Install the RDMA packages for UEK R5 by running the following command:

```
# yum install oracle-rdma-release
```

Each UEK release requires a different set of RDMA packages. If you change the kernel on your system to a UEK release before UEK R5, remove the existing UEK R5-based RDMA packages before installing the correct packages for the new kernel by running the following command:

```
# yum remove --setopt=clean_requirements_on_remove=1 oracle-rdma-release
```

> **Caution**
>
> Downgrading UEK versions is not advisable, except for testing purposes.

Appendix A Driver Modules in Unbreakable Enterprise Kernel Release 5 Update 1 (x86_64)

Table of Contents

This appendix presents all of the driver modules and their version information as shipped in the current version of UEK R5U1 (x86_64). This appendix is generated automatically. Note that driver versions and available drivers may change in subsequent errata releases, but the driver versions will always be the same or later than presented here.

A.1 `acpi` Drivers in UEK R5U1 (x86_64)

Table A.1 acpi Driver List

Driver	Version	Description
`acpi_extlog`		Extended MCA Error Log Driver
`acpi_ipmi`		ACPI IPMI Opregion driver
`acpi_pad`		ACPI Processor Aggregator Driver
`einj`		APEI Error INJection support
`erst-dbg`		APEI Error Record Serialization Table debug support
`custom_method`		
`ec_sys`		ACPI EC sysfs access driver
`nfit`		
`sbs`		Smart Battery System ACPI interface driver
`sbshc`		ACPI SMBus HC driver
`video`		ACPI Video Driver

A.2 `ata` Drivers in UEK R5U1 (x86_64)

Table A.2 ata Driver List

Driver	Version	Description
`acard-ahci`	1.0	ACard AHCI SATA low-level driver

Driver	Version	Description
ahci	3.0	AHCI SATA low-level driver
ahci_platform		AHCI SATA platform driver
ata_generic	0.2.15	low-level driver for generic ATA
ata_piix	2.13	SCSI low-level driver for Intel PIIX/ICH ATA controllers
libahci		Common AHCI SATA low-level routines
libahci_platform		AHCI SATA platform library
libata	3.00	Library module for ATA devices
pata_acpi	0.2.3	SCSI low-level driver for ATA in ACPI mode
pata_ali	0.7.8	low-level driver for ALi PATA
pata_amd	0.4.1	low-level driver for AMD and Nvidia PATA IDE
pata_artop	0.4.6	SCSI low-level driver for ARTOP PATA
pata_atiixp	0.4.6	low-level driver for ATI IXP200/300/400
pata_atp867x	0.7.5	low level driver for Artop/Acard 867x ATA controller
pata_cmd64x	0.2.18	low-level driver for CMD64x series PATA controllers
pata_hpt366	0.6.11	low-level driver for the Highpoint HPT366/368
pata_hpt37x	0.6.23	low-level driver for the Highpoint HPT37x/30x
pata_hpt3x2n	0.3.15	low-level driver for the Highpoint HPT3xxN
pata_hpt3x3	0.6.1	low-level driver for the Highpoint HPT343/363
pata_it8213	0.0.3	SCSI low-level driver for the ITE 8213
pata_it821x	0.4.2	low-level driver for the IT8211/IT8212 IDE RAID controller
pata_jmicron	0.1.5	SCSI low-level driver for Jmicron PATA ports
pata_marvell	0.1.6	SCSI low-level driver for Marvell ATA in legacy mode
pata_netcell	0.1.7	SCSI low-level driver for Netcell PATA RAID
pata_ninja32	0.1.5	low-level driver for Ninja32 ATA
pata_oldpiix	0.5.5	SCSI low-level driver for early PIIX series controllers
pata_pcmcia	0.3.5	low-level driver for PCMCIA ATA
pata_pdc2027x	1.0	libata driver module for Promise PDC20268 to PDC20277
pata_pdc202xx_old	0.4.3	low-level driver for Promise 2024x and 20262-20267
pata_piccolo	0.0.1	Low level driver for Toshiba Piccolo ATA
pata_rdc	0.01	SCSI low-level driver for RDC PATA controllers
pata_sch	0.2	SCSI low-level driver for Intel SCH PATA controllers
pata_serverworks	0.4.3	low-level driver for Serverworks OSB4/CSB5/CSB6
pata_sil680	0.4.9	low-level driver for SI680 PATA
pata_sis	0.5.2	SCSI low-level driver for SiS ATA
pata_via	0.3.4	low-level driver for VIA PATA
pdc_adma	1.0	Pacific Digital Corporation ADMA low-level driver
sata_inic162x	0.4	low-level driver for Initio 162x SATA
sata_mv	1.28	SCSI low-level driver for Marvell SATA controllers

Driver	Version	Description
sata_nv	3.5	low-level driver for NVIDIA nForce SATA controller
sata_promise	2.12	Promise ATA TX2/TX4/TX4000 low-level driver
sata_qstor	0.09	Pacific Digital Corporation QStor SATA low-level driver
sata_sil	2.4	low-level driver for Silicon Image SATA controller
sata_sil24		Silicon Image 3124/3132 SATA low-level driver
sata_sis	1.0	low-level driver for Silicon Integrated Systems SATA controller
sata_svw	2.3	low-level driver for K2 SATA controller
sata_sx4	0.12	Promise SATA low-level driver
sata_uli	1.3	low-level driver for ULi Electronics SATA controller
sata_via	2.6	SCSI low-level driver for VIA SATA controllers
sata_vsc	2.3	low-level driver for Vitesse VSC7174 SATA controller

A.3 atm Drivers in UEK R5U1 (x86_64)

Table A.3 atm Driver List

Driver	Version	Description
atmtcp		

A.4 auxdisplay Drivers in UEK R5U1 (x86_64)

Table A.4 auxdisplay Driver List

Driver	Version	Description
cfag12864b		cfag12864b LCD driver
cfag12864bfb		cfag12864b LCD framebuffer driver
ks0108		ks0108 LCD Controller driver

A.5 bcma Drivers in UEK R5U1 (x86_64)

Table A.5 bcma Driver List

Driver	Version	Description
bcma		Broadcom's specific AMBA driver

A.6 block Drivers in UEK R5U1 (x86_64)

Table A.6 block Driver List

Driver	Version	Description
aoe	85	AoE block/char driver for 2.6.2 and newer 2.6 kernels
brd		
cryptoloop		loop blockdevice transferfunction adaptor / CryptoAPI

Driver	Version	Description
drbd	8.4.10	drbd - Distributed Replicated Block Device v8.4.10
floppy		
loop		
mtip32xx	1.3.1	Micron RealSSD PCIe Block Driver
nbd		Network Block Device
null_blk		
oracleasm	2.0.8	Kernel driver backing the Generic Linux ASM Library.
pktcdvd		Packet writing layer for CD/DVD drives
rbd		RADOS Block Device (RBD) driver
skd		STEC s1120 PCIe SSD block driver
sx8	1.0	Promise SATA SX8 block driver
umem		Micro Memory(tm) PCI memory board block driver
virtio_blk		Virtio block driver
xen-blkback		
xen-blkfront		Xen virtual block device frontend
zram		Compressed RAM Block Device

A.7 bluetooth Drivers in UEK R5U1 (x86_64)

Table A.7 bluetooth Driver List

Driver	Version	Description
ath3k	1.0	Atheros AR30xx firmware driver
bcm203x	1.2	Broadcom Blutonium firmware driver ver 1.2
bfusb	1.2	BlueFRITZ! USB driver ver 1.2
bluecard_cs		Bluetooth driver for the Anycom BlueCard (LSE039/LSE041)
bpa10x	0.11	Digianswer Bluetooth USB driver ver 0.11
bt3c_cs		Bluetooth driver for the 3Com Bluetooth PCMCIA card
btbcm	0.1	Bluetooth support for Broadcom devices ver 0.1
btintel	0.1	Bluetooth support for Intel devices ver 0.1
btmrvl	1.0	Marvell Bluetooth driver ver 1.0
btmrvl_sdio	1.0	Marvell BT-over-SDIO driver ver 1.0
btrtl	0.1	Bluetooth support for Realtek devices ver 0.1
btsdio	0.1	Generic Bluetooth SDIO driver ver 0.1
btuart_cs		Bluetooth driver for Bluetooth PCMCIA cards with HCI UART interface
btusb	0.8	Generic Bluetooth USB driver ver 0.8
dtl1_cs		Bluetooth driver for Nokia Connectivity Card DTL-1
hci_uart	2.3	Bluetooth HCI UART driver ver 2.3
hci_vhci	1.5	Bluetooth virtual HCI driver ver 1.5

A.8 `cdrom` Drivers in UEK R5U1 (x86_64)

Table A.8 cdrom Driver List

Driver	Version	Description
cdrom		

A.9 `char` Drivers in UEK R5U1 (x86_64)

Table A.9 char Driver List

Driver	Version	Description
hangcheck-timer	0.9.1	Hangcheck-timer detects when the system has gone out to lunch past a certain margin.
amd-rng		H/W RNG driver for AMD chipsets
intel-rng		H/W RNG driver for Intel chipsets
timeriomem-rng		Timer IOMEM H/W RNG driver
tpm-rng		RNG driver for TPM devices
via-rng		H/W RNG driver for VIA CPU with PadLock
virtio-rng		Virtio random number driver
ipmi_devintf		Linux device interface for the IPMI message handler.
ipmi_msghandler	39.2	Incoming and outgoing message routing for an IPMI interface.
ipmi_poweroff		IPMI Poweroff extension to sys_reboot
ipmi_si		Interface to the IPMI driver for the KCS, SMIC, and BT system interfaces.
ipmi_ssif		IPMI driver for management controllers on a SMBus
ipmi_watchdog		watchdog timer based upon the IPMI interface.
lp		
cm4000_cs		
cm4040_cs		
ppdev		
tlclk		
tpm_atmel	2.0	TPM Driver
tpm_infineon	1.9.2	Driver for Infineon TPM SLD 9630 TT 1.1 / SLB 9635 TT 1.2
tpm_nsc	2.0	TPM Driver
uv_mmtimer		SGI UV Memory Mapped RTC Timer
virtio_console		Virtio console driver

A.10 `cpufreq` Drivers in UEK R5U1 (x86_64)

Table A.10 cpufreq Driver List

Driver	Version	Description
acpi-cpufreq		ACPI Processor P-States Driver

Driver	Version	Description
amd_freq_sensitivity		AMD frequency sensitivity feedback powersave bias for the ondemand governor.
p4-clockmod		cpufreq driver for Pentium(TM) 4/Xeon(TM)
pcc-cpufreq	1.10.00	Processor Clocking Control interface driver
powernow-k8		AMD Athlon 64 and Opteron processor frequency driver.
speedstep-lib		Library for Intel SpeedStep 1 or 2 cpufreq drivers.

A.11 crypto Drivers in UEK R5U1 (x86_64)

Table A.11 crypto Driver List

Driver	Version	Description
ccp-crypto	1.0.0	AMD Cryptographic Coprocessor crypto API support
ccp	1.1.0	AMD Secure Processor driver
padlock-aes		VIA PadLock AES algorithm support
padlock-sha		VIA PadLock SHA1/SHA256 algorithms support.
qat_c62x	0.6.0	Intel(R) QuickAssist Technology
qat_c62xvf	0.6.0	Intel(R) QuickAssist Technology
intel_qat	0.6.0	Intel(R) QuickAssist Technology
qat_dh895xcc	0.6.0	Intel(R) QuickAssist Technology
virtio_crypto		virtio crypto device driver

A.12 dax Drivers in UEK R5U1 (x86_64)

Table A.12 dax Driver List

Driver	Version	Description
dax_pmem		
device_dax		

A.13 dca Drivers in UEK R5U1 (x86_64)

Table A.13 dca Driver List

Driver	Version	Description
dca	1.12.1	

A.14 devfreq Drivers in UEK R5U1 (x86_64)

Table A.14 devfreq Driver List

Driver	Version	Description
governor_simpleondemand		

A.15 `dma` Drivers in UEK R5U1 (x86_64)

Table A.15 dma Driver List

Driver	Version	Description
dw_dmac		Synopsys DesignWare DMA Controller platform driver
dw_dmac_pci		Synopsys DesignWare DMA Controller PCI driver
ioatdma	4.00	

A.16 `edac` Drivers in UEK R5U1 (x86_64)

Table A.16 edac Driver List

Driver	Version	Description
amd64_edac_mod		MC support for AMD64 memory controllers - 3.5.0
e752x_edac		MC support for Intel e752x/3100 memory controllers
edac_mce_amd		AMD MCE decoder
i3000_edac		MC support for Intel 3000 memory hub controllers
i3200_edac		MC support for Intel 3200 memory hub controllers
i5000_edac		MC Driver for Intel I5000 memory controllers - Ver: 2.0.12
i5100_edac		MC Driver for Intel I5100 memory controllers
i5400_edac		MC Driver for Intel I5400 memory controllers - Ver: 1.0.0
i7300_edac		MC Driver for Intel I7300 memory controllers - Ver: 1.0.0
i7core_edac		MC Driver for Intel i7 Core memory controllers - Ver: 1.0.0
i82975x_edac		MC support for Intel 82975 memory hub controllers
ie31200_edac		MC support for Intel Processor E31200 memory hub controllers
pnd2_edac		MC Driver for Intel SoC using Pondicherry memory controller
sb_edac		MC Driver for Intel Sandy Bridge and Ivy Bridge memory controllers - Ver: 1.1.2
skx_edac		MC Driver for Intel Skylake server processors
x38_edac		MC support for Intel X38 memory hub controllers

A.17 `firewire` Drivers in UEK R5U1 (x86_64)

Table A.17 firewire Driver List

Driver	Version	Description
firewire-core		Core IEEE1394 transaction logic
firewire-net		IP over IEEE1394 as per RFC 2734/3146
firewire-ohci		Driver for PCI OHCI IEEE1394 controllers
firewire-sbp2		SCSI over IEEE1394

A.18 `firmware` Drivers in UEK R5U1 (x86_64)

Table A.18 firmware Driver List

Driver	Version	Description
dcdbas	5.6.0-3.2	Dell Systems Management Base Driver (version 5.6.0-3.2)
dell_rbu	3.2	Driver for updating BIOS image on DELL systems
edd	0.16	sysfs interface to BIOS EDD information
iscsi_ibft	0.5.0	sysfs interface to BIOS iBFT information

A.19 `gpu` Drivers in UEK R5U1 (x86_64)

Table A.19 gpu Driver List

Driver	Version	Description
amdkfd	0.7.2	Standalone HSA driver for AMD's GPUs
ast		AST
bochs-drm		
cirrus		qemu Cirrus emulation
drm		DRM shared core routines DRM bridge infrastructure DRM panel infrastructure
drm_kms_helper		DRM KMS helper
gma500_gfx		DRM driver for the Intel GMA500, GMA600, GMA3600, GMA3650
ch7006		Chrontel ch7006 TV encoder driver
sil164		Silicon Image sil164 TMDS transmitter driver
tda998x		NXP Semiconductors TDA998X HDMI Encoder
i915		Intel Graphics
mgag200		MGA G200 SE
nouveau		nVidia Riva/TNT/GeForce/Quadro/Tesla
qxl		RH QXL
radeon		ATI Radeon
ttm		TTM memory manager subsystem (for DRM device)
udl		
vgem		Virtual GEM provider
virtio-gpu		Virtio GPU driver
vmwgfx	2.14.0.0	Standalone drm driver for the VMware SVGA device

A.20 `hid` Drivers in UEK R5U1 (x86_64)

Table A.20 hid Driver List

Driver	Version	Description
hid-alps		ALPS HID driver
hid-appleir		HID Apple IR remote controls

Driver	Version	Description
hid-aureal		
hid-axff		Force feedback support for ACRUX game controllers
hid-cp2112		Silicon Labs HID USB to SMBus master bridge
hid-dr		
hid-elecom		
hid-emsff		
hid-gaff		
hid-gyration		
hid-holtek-kbd		
hid-holtek-mouse		
hid-holtekff		
hid-hyperv		
hid-icade		ION iCade input driver
hid-keytouch		
hid-kye		
hid-lcpower		
hid-led		Simple USB RGB LED driver
hid-logitech-dj		
hid-logitech-hidpp		
hid-multitouch		HID multitouch panels
hid-ortek		
hid-petalynx		
hid-picolcd		Minibox graphics PicoLCD Driver
hid-pl		
hid-primax		
hid-prodikeys		
hid-roccat-arvo		USB Roccat Arvo driver
hid-roccat-common		USB Roccat common driver
hid-roccat-isku		USB Roccat Isku/FX driver
hid-roccat-kone		USB Roccat Kone driver
hid-roccat-koneplus		USB Roccat Kone[+]/XTD driver

Driver	Version	Description
hid-roccat-konepure		USB Roccat KonePure/Optical driver
hid-roccat-kovaplus		USB Roccat Kova[+] driver
hid-roccat-lua		USB Roccat Lua driver
hid-roccat-pyra		USB Roccat Pyra driver
hid-roccat-ryos		USB Roccat Ryos MK/Glow/Pro driver
hid-roccat-savu		USB Roccat Savu driver
hid-roccat		USB Roccat char device
hid-saitek		
hid-samsung		
hid-sjoy		
hid-sony		
hid-speedlink		
hid-steelseries		
hid-sunplus		
hid-tivo		
hid-tmff		
hid-topseed		
hid-twinhan		
hid-uclogic		
hid-waltop		
hid-wiimote		Driver for Nintendo Wii / Wii U peripherals
hid-zpff		
hid-zydacron		
i2c-hid		HID over I2C core driver
uhid		User-space I/O driver support for HID subsystem
wacom	v2.00	USB Wacom tablet driver

A.21 hv Drivers in UEK R5U1 (x86_64)

Table A.21 hv Driver List

Driver	Version	Description
hv_balloon		Hyper-V Balloon
hv_utils		Hyper-V Utilities
hv_vmbus		

A.22 `hwmon` Drivers in UEK R5U1 (x86_64)

Table A.22 hwmon Driver List

Driver	Version	Description
`abituguru`		Abit uGuru Sensor device
`abituguru3`		Abit uGuru3 Sensor device
`acpi_power_meter`		ACPI 4.0 power meter driver
`ad7414`		AD7414 driver
`ad7418`	0.4	AD7416/17/18 driver
`adc128d818`		Driver for ADC128D818
`adm1021`		adm1021 driver
`adm1025`		ADM1025 driver
`adm1026`		ADM1026 driver
`adm1029`		adm1029 driver
`adm1031`		ADM1031/ADM1030 driver
`adm9240`		ADM9240/DS1780/LM81 driver
`ads1015`		ADS1015 driver
`ads7828`		Driver for TI ADS7828 A/D converter and compatibles
`adt7410`		ADT7410/AD7420 driver
`adt7411`		ADT7411 driver
`adt7462`		ADT7462 driver
`adt7470`		ADT7470 driver
`adt7475`		adt7475 driver
`adt7x10`		ADT7410/ADT7420, ADT7310/ADT7320 common code
`amc6821`		Texas Instruments amc6821 hwmon driver
`applesmc`		Apple SMC
`asb100`		ASB100 Bach driver
`asc7621`		Andigilog aSC7621 and aSC7621a driver
`asus_atk0110`		
`atxp1`	0.6.3	System voltages control via Attansic ATXP1
`coretemp`		Intel Core temperature monitor
`dell-smm-hwmon`		Dell laptop SMM BIOS hwmon driver
`dme1737`		DME1737 sensors
`ds1621`		DS1621 driver
`ds620`		DS620 driver
`emc1403`		emc1403 Thermal Driver
`emc2103`		SMSC EMC2103 hwmon driver
`emc6w201`		SMSC EMC6W201 hardware monitoring driver
`f71805f`		F71805F/F71872F hardware monitoring driver

Driver	Version	Description
`f71882fg`		F71882FG Hardware Monitoring Driver
`f75375s`		F75373/F75375/F75387 hardware monitoring driver
`fam15h_power`		AMD Family 15h CPU processor power monitor
`fschmd`		FSC Poseidon, Hermes, Scylla, Heracles, Heimdall, Hades and Syleus driver
`g760a`		GMT G760A driver
`g762`		GMT G762/G763 driver
`gl518sm`		GL518SM driver
`gl520sm`		GL520SM driver
`gpio-fan`		GPIO FAN driver
`hih6130`		Honeywell HIH-6130 humidity and temperature sensor driver
`hwmon-vid`		hwmon-vid driver
`i5500_temp`		Intel 5500/5520/X58 chipset thermal sensor driver
`i5k_amb`		Intel 5000 chipset FB-DIMM AMB temperature sensor
`ibmaem`		IBM AEM power/temp/energy sensor driver
`ibmpex`		IBM PowerExecutive power/temperature sensor driver
`ina209`		INA209 driver
`ina2xx`		ina2xx driver
`it87`		IT8705F/IT871xF/IT872xF hardware monitoring driver
`jc42`		JC42 driver
`k10temp`		AMD Family 10h+ CPU core temperature monitor
`k8temp`		AMD K8 core temperature monitor
`lineage-pem`		Lineage CPL PEM hardware monitoring driver
`lm63`		LM63 driver
`lm73`		LM73 driver
`lm75`		LM75 driver
`lm77`		LM77 driver
`lm78`		LM78/LM79 driver
`lm80`		LM80 driver
`lm83`		LM83 driver
`lm85`		LM85-B, LM85-C driver
`lm87`		LM87 driver
`lm90`		LM90/ADM1032 driver
`lm92`		LM92/MAX6635 driver
`lm93`		LM93 driver
`lm95234`		LM95233/LM95234 sensor driver
`lm95241`		LM95231/LM95241 sensor driver
`lm95245`		LM95235/LM95245 sensor driver

Driver	Version	Description
ltc2945		LTC2945 driver
ltc4151		LTC4151 driver
ltc4215		LTC4215 driver
ltc4222		LTC4222 driver
ltc4245		LTC4245 driver
ltc4260		LTC4260 driver
ltc4261		LTC4261 driver
max16065		MAX16065 driver
max1619		MAX1619 sensor driver
max1668		MAX1668 remote temperature sensor driver
max197		Maxim MAX197 A/D Converter driver
max6639		max6639 driver
max6642		MAX6642 sensor driver
max6650		MAX6650 sensor driver
max6697		MAX6697 temperature sensor driver
mcp3021		Microchip MCP3021/MCP3221 driver
nct6683		NCT6683D driver
nct6775		Driver for NCT6775F and compatible chips
ntc_thermistor		NTC Thermistor Driver
pc87360		PC8736x hardware monitor
pc87427		PC87427 hardware monitoring driver
pcf8591		PCF8591 driver
adm1275		PMBus driver for Analog Devices ADM1275 and compatibles
lm25066		PMBus driver for LM25066 and compatible chips
ltc2978		PMBus driver for LTC2978 and comppatible chips
max16064		PMBus driver for Maxim MAX16064
max34440		PMBus driver for Maxim MAX34440/MAX34441
max8688		PMBus driver for Maxim MAX8688
pmbus		Generic PMBus driver
pmbus_core		PMBus core driver
tps40422		PMBus driver for TI TPS40422
ucd9000		PMBus driver for TI UCD90xxx
ucd9200		PMBus driver for TI UCD922x, UCD924x
zl6100		PMBus driver for ZL6100 and compatibles
powr1220		POWR1220 driver
sch5627		SMSC SCH5627 Hardware Monitoring Driver
sch5636		SMSC SCH5636 Hardware Monitoring Driver
sch56xx-common		SMSC SCH56xx Hardware Monitoring Common Code

Driver	Version	Description
sht15		Sensirion SHT15 temperature and humidity sensor driver
sht21		Sensirion SHT21 humidity and temperature sensor driver
shtc1		Sensirion SHTC1 humidity and temperature sensor driver
sis5595		SiS 5595 Sensor device
smm665		SMM665 driver
smsc47b397		SMSC LPC47B397 driver
smsc47m1		SMSC LPC47M1xx fan sensors driver
smsc47m192		SMSC47M192 driver
thmc50		THMC50 driver
tmp102		Texas Instruments TMP102 temperature sensor driver
tmp103		Texas Instruments TMP103 temperature sensor driver
tmp401		Texas Instruments TMP401 temperature sensor driver
tmp421		Texas Instruments TMP421/422/423/441/442 temperature sensor driver
via-cputemp		VIA CPU temperature monitor
via686a		VIA 686A Sensor device
vt1211		VT1211 sensors
vt8231		VT8231 sensors
w83627ehf		W83627EHF driver
w83627hf		W83627HF driver
w83781d		W83781D driver
w83791d		W83791D driver
w83792d		W83792AD/D driver for linux-2.6
w83793		w83793 driver
w83795		W83795G/ADG hardware monitoring driver
w83l785ts		W83L785TS-S driver
w83l786ng		w83l786ng driver

A.23 `i2c` Drivers in UEK R5U1 (x86_64)

Table A.23 i2c Driver List

Driver	Version	Description
i2c-algo-bit		I2C-Bus bit-banging algorithm
i2c-algo-pca		I2C-Bus PCA9564/PCA9665 algorithm
i2c-amd756-s4882		S4882 SMBus multiplexing
i2c-amd756		AMD756/766/768/8111 and nVidia nForce SMBus driver
i2c-amd8111		AMD8111 SMBus 2.0 driver
i2c-cbus-gpio		CBUS I2C driver

Driver	Version	Description
`i2c-designware-core`		Synopsys DesignWare I2C bus adapter core Synopsys DesignWare I2C bus master adapter
`i2c-designware-pci`		Synopsys DesignWare PCI I2C bus adapter
`i2c-diolan-u2c`		i2c-diolan-u2c driver
`i2c-gpio`		Platform-independent bitbanging I2C driver
`i2c-i801`		I801 SMBus driver
`i2c-isch`		Intel SCH SMBus driver
`i2c-ismt`		Intel SMBus Message Transport (iSMT) driver
`i2c-nforce2-s4985`		S4985 SMBus multiplexing
`i2c-nforce2`		nForce2/3/4/5xx SMBus driver
`i2c-ocores`		OpenCores I2C bus driver
`i2c-parport-light`		I2C bus over parallel port (light)
`i2c-parport`		I2C bus over parallel port
`i2c-pca-platform`		I2C-PCA9564/PCA9665 platform driver
`i2c-piix4`		PIIX4 SMBus driver
`i2c-robotfuzz-osif`		RobotFuzz OSIF driver
`i2c-scmi`		ACPI SMBus CMI driver
`i2c-simtec`		Simtec Generic I2C Bus driver
`i2c-sis5595`		SIS5595 SMBus driver
`i2c-sis630`		SIS630 SMBus driver
`i2c-sis96x`		SiS96x SMBus driver
`i2c-taos-evm`		TAOS evaluation module driver
`i2c-tiny-usb`		i2c-tiny-usb driver v1.0
`i2c-via`		i2c for Via vt82c586b southbridge
`i2c-viapro`		vt82c596 SMBus driver
`i2c-viperboard`		I2C master driver for Nano River Techs Viperboard
`i2c-xiic`		Xilinx I2C bus driver
`i2c-dev`		I2C /dev entries driver
`i2c-mux`		I2C driver for multiplexed I2C busses
`i2c-smbus`		SMBus protocol extensions support
`i2c-stub`		I2C stub driver

A.24 `iio` Drivers in UEK R5U1 (x86_64)

Table A.24 iio Driver List

Driver	Version	Description
industrialio		Industrial I/O core

A.25 `infiniband` Drivers in UEK R5U1 (x86_64)

Table A.25 infiniband Driver List

Driver	Version	Description
ib_cm		InfiniBand CM
ib_core		core kernel InfiniBand API
ib_ucm		InfiniBand userspace Connection Manager access
ib_umad		InfiniBand userspace MAD packet access
ib_uverbs		InfiniBand userspace verbs access
iw_cm		iWARP CM
rdma_cm		Generic RDMA CM Agent
rdma_ucm		RDMA Userspace Connection Manager Access
resilient_rdmaip		Resilient RDMA IP
bnxt_re		Broadcom NetXtreme-C/E RoCE Driver Driver
iw_cxgb3		Chelsio T3 RDMA Driver
iw_cxgb4		Chelsio T4/T5 RDMA Driver
i40iw		Intel(R) Ethernet Connection X722 iWARP RDMA Driver
mlx4_ib		Mellanox ConnectX HCA InfiniBand driver
mlx5_ib		Mellanox Connect-IB HCA IB driver
ib_mthca		Mellanox InfiniBand HCA low-level driver
iw_nes		NetEffect RNIC Low-level iWARP Driver
ocrdma		Emulex OneConnect RoCE Driver 11.0.0.0
qedr		QLogic 40G/100G ROCE Driver
ib_qib		Intel IB driver
usnic_verbs		Cisco VIC (usNIC) Verbs Driver
rdmavt		RDMA Verbs Transport Library
rdma_rxe		Soft RDMA transport
ib_ipoib		IP-over-InfiniBand net driver
ib_iser		iSER (iSCSI Extensions for RDMA) Datamover
ib_isert		iSER-Target for mainline target infrastructure
ib_srp		InfiniBand SCSI RDMA Protocol initiator
ib_srpt		InfiniBand SCSI RDMA Protocol target v2.0.0 (2011-02-14)

A.26 `input` Drivers in UEK R5U1 (x86_64)

Table A.26 input Driver List

Driver	Version	Description
`input-polldev`	0.1	Generic implementation of a polled input device
`gpio_keys`		Keyboard driver for GPIOs
`gpio_keys_polled`		Polled GPIO Buttons driver
`matrix_keypad`		GPIO Driven Matrix Keypad Driver
`mcs_touchkey`		Touchkey driver for MELFAS MCS5000/5080 controller
`qt1070`		Driver for AT42QT1070 QTouch sensor
`qt2160`		Driver for AT42QT2160 Touch Sensor
`tca6416-keypad`		Keypad driver over tca6146 IO expander
`matrix-keymap`		
`apanel`	1.3.1	Fujitsu Application Panel driver
`ati_remote2`	0.3	ATI/Philips USB RF remote driver
`atlas_btns`		Atlas button driver
`cm109`		CM109 phone driver
`keyspan_remote`		Driver for the USB Keyspan remote control.
`pcspkr`		PC Speaker beeper driver
`powermate`		Griffin Technology, Inc PowerMate driver
`uinput`	0.3	User level driver support for input subsystem
`xen-kbdfront`		Xen virtual keyboard/pointer device frontend
`yealink`		Yealink phone driver
`appletouch`		Apple PowerBook and MacBook USB touchpad driver
`bcm5974`		Apple USB BCM5974 multitouch driver
`cyapatp`		Cypress APA I2C Trackpad Driver
`gpio_mouse`		GPIO mouse driver
`sermouse`		Serial mouse driver
`synaptics_i2c`		Synaptics I2C touchpad driver
`synaptics_usb`		Synaptics USB device driver
`vsxxxaa`		Driver for DEC VSXXX-AA and -GA mice and VSXXX-AB tablet
`altera_ps2`		Altera University Program PS2 controller driver
`arc_ps2`		ARC PS/2 Driver
`hyperv-keyboard`		
`ps2mult`		TQC PS/2 Multiplexer driver
`serio_raw`		Raw serio driver
`sparse-keymap`	0.1	Generic support for sparse keymaps
`acecad`		USB Acecad Flair tablet driver
`aiptek`		Aiptek HyperPen USB Tablet Driver (Linux 2.6.x)

Driver	Version	Description
gtco		GTCO digitizer USB driver
hanwang		USB Hanwang tablet driver
kbtab		USB KB Gear JamStudio Tablet driver
ad7879-i2c		AD7879(-1) touchscreen I2C bus driver
ad7879		AD7879(-1) touchscreen Driver
atmel_mxt_ts		Atmel maXTouch Touchscreen driver
bu21013_ts		bu21013 touch screen controller driver
cy8ctmg110_ts		cy8ctmg110 TouchScreen Driver
dynapro		Dynapro serial touchscreen driver
eeti_ts		EETI Touchscreen driver
elo		Elo serial touchscreen driver
fujitsu_ts		Fujitsu serial touchscreen driver
gunze		Gunze AHL-51S touchscreen driver
hampshire		Hampshire serial touchscreen driver
inexio		iNexio serial touchscreen driver
mk712		ICS MicroClock MK712 TouchScreen driver
mtouch		MicroTouch serial touchscreen driver
penmount		PenMount serial touchscreen driver
touchit213		Sahara TouchIT-213 serial touchscreen driver
touchright		Touchright serial touchscreen driver
touchwin		Touchwindow serial touchscreen driver
tsc2007		TSC2007 TouchScreen Driver
usbtouchscreen		USB Touchscreen Driver
wacom_i2c		WACOM EMR I2C Driver
wacom_w8001		Wacom W8001 serial touchscreen driver

A.27 `iommu` Drivers in UEK R5U1 (x86_64)

Table A.27 iommu Driver List

Driver	Version	Description
amd_iommu_v2		

A.28 `isdn` Drivers in UEK R5U1 (x86_64)

Table A.28 isdn Driver List

Driver	Version	Description
capi		CAPI4Linux: Userspace /dev/capi20 interface
capidrv		CAPI4Linux: Interface to ISDN4Linux
kernelcapi		CAPI4Linux: kernel CAPI layer
dss1_divert		ISDN4Linux: Call diversion support

Driver	Version	Description
bas_gigaset		USB Driver for Gigaset 307x
gigaset		Driver for Gigaset 307x
ser_gigaset		Serial Driver for Gigaset 307x using Siemens M101
usb_gigaset		USB Driver for Gigaset 307x using M105
avm_cs		CAPI4Linux: PCMCIA client driver for AVM B1/M1/M2
b1		CAPI4Linux: Common support for active AVM cards
b1dma		CAPI4Linux: DMA support for active AVM cards
b1pci		CAPI4Linux: Driver for AVM B1 PCI card
b1pcmcia		CAPI4Linux: Driver for AVM PCMCIA cards
c4		CAPI4Linux: Driver for AVM C2/C4 cards
t1pci		CAPI4Linux: Driver for AVM T1 PCI card
avmfritz	2.3	
hfcmulti	2.03	
hfcpci		
hfcsusb		
mISDNinfineon	1.0	
mISDNipac	2.0	
mISDNisar	2.1	
netjet	2.0	
speedfax	2.0	
w6692	2.0	
avma1_cs		ISDN4Linux: PCMCIA client driver for AVM A1/Fritz!PCMCIA cards
elsa_cs		ISDN4Linux: PCMCIA client driver for Elsa PCM cards
hfc4s8s_l1		ISDN layer 1 for Cologne Chip HFC-4S/8S chips
hisax		ISDN4Linux: Driver for passive ISDN cards
hisax_fcpcipnp		AVM Fritz!PCI/PnP ISDN driver
hisax_isac		ISAC/ISAC-SX driver
hisax_st5481		ISDN4Linux: driver for ST5481 USB ISDN adapter
sedlbauer_cs		ISDN4Linux: PCMCIA client driver for Sedlbauer cards
teles_cs		ISDN4Linux: PCMCIA client driver for Teles PCMCIA cards
hysdn		ISDN4Linux: Driver for HYSDN cards
isdn		ISDN4Linux: link layer
isdnhdlc		General purpose ISDN HDLC decoder
l1oip		
mISDN_core		
mISDN_dsp		

A.29 `leds` Drivers in UEK R5U1 (x86_64)

Table A.29 leds Driver List

Driver	Version	Description
`leds-blinkm`		BlinkM RGB LED driver
`leds-clevo-mail`		Clevo mail LED driver
`leds-lm3530`		Back Light driver for LM3530
`leds-lp3944`		LP3944 Fun Light Chip
`leds-lp5521`		LP5521 LED engine
`leds-lp5523`		LP5523 LED engine
`leds-lp5562`		Texas Instruments LP5562 LED Driver
`leds-lp55xx-common`		LP55xx Common Driver
`leds-lp8501`		Texas Instruments LP8501 LED driver
`leds-ss4200`		Intel NAS/Home Server ICH7 GPIO Driver
`ledtrig-backlight`		Backlight emulation LED trigger
`ledtrig-camera`		LED Trigger for Camera Flash/Torch Control
`ledtrig-default-on`		Default-ON LED trigger
`ledtrig-heartbeat`		Heartbeat LED trigger
`ledtrig-oneshot`		One-shot LED trigger
`ledtrig-timer`		Timer LED trigger
`ledtrig-transient`		Transient LED trigger

A.30 `md` Drivers in UEK R5U1 (x86_64)

Table A.30 md Driver List

Driver	Version	Description
`dm-bio-prison`		device-mapper bio prison
`dm-bufio`		device-mapper buffered I/O library
`dm-cache-smq`		smq cache policy
`dm-cache`		device-mapper cache target
`dm-crypt`		device-mapper target for transparent encryption / decryption
`dm-delay`		device-mapper delay target
`dm-era`		device-mapper era target
`dm-flakey`		device-mapper flakey target
`dm-integrity`		device-mapper target for integrity tags extension

Driver	Version	Description
dm-log-userspace		device-mapper userspace dirty log link
dm-log-writes		device-mapper log writes target
dm-log		device-mapper dirty region log
dm-mirror		device-mapper mirror target
dm-mod		device-mapper driver
dm-multipath		device-mapper multipath target
dm-queue-length		(C) Copyright IBM Corp. 2004,2005 All Rights Reserved. device-mapper path selector to balance the number of in-flight I/Os
dm-raid		device-mapper raid0/1/10/4/5/6 target
dm-region-hash		device-mapper region hash
dm-round-robin		device-mapper round-robin multipath path selector
dm-service-time		device-mapper throughput oriented path selector
dm-snapshot		device-mapper snapshot target
dm-switch		device-mapper dynamic path switching target
dm-thin-pool		device-mapper thin provisioning target
dm-verity		device-mapper target for transparent disk integrity checking
dm-zero		device-mapper dummy target returning zeros
dm-zoned		device-mapper target for zoned block devices
faulty		Fault injection personality for MD
linear		Linear device concatenation personality for MD
md-cluster		Clustering support for MD
dm-persistent-data		Immutable metadata library for dm
raid0		RAID0 (striping) personality for MD
raid1		RAID1 (mirroring) personality for MD
raid10		RAID10 (striped mirror) personality for MD
raid456		RAID4/5/6 (striping with parity) personality for MD

A.31 `media` Drivers in UEK R5U1 (x86_64)

Table A.31 media Driver List

Driver	Version	Description
b2c2-flexcop		B2C2 FlexcopII/II(b)/III digital TV receiver chip
cx2341x		cx23415/6/8 driver
cypress_firmware		Cypress firmware download
saa7146		driver for generic saa7146-based hardware
saa7146_vv		video4linux driver for saa7146-based hardware
smsdvb		SMS DVB subsystem adaptation module

Driver	Version	Description
smsmdtv		Siano MDTV Core module
tveeprom		i2c Hauppauge eeprom decoder driver
dvb-core		DVB Core Driver
a8293		Allegro A8293 SEC driver
af9013		Afatech AF9013 DVB-T demodulator driver
af9033		Afatech AF9033 DVB-T demodulator driver
atbm8830		AltoBeam ATBM8830/8831 GB20600 demodulator driver
au8522_common		Auvitek AU8522 QAM-B/ATSC Demodulator driver
au8522_decoder		
au8522_dig		Auvitek AU8522 QAM-B/ATSC Demodulator driver
bcm3510		Broadcom BCM3510 ATSC (8VSB/16VSB & ITU J83 AnnexB FEC QAM64/256) demodulator driver
cx22700		Conexant CX22700 DVB-T Demodulator driver
cx22702		Conexant CX22702 DVB-T Demodulator driver
cx24110		Conexant CX24110 DVB-S Demodulator driver
cx24113		DVB Frontend module for Conexant CX24113/CX24128hardware
cx24116		DVB Frontend module for Conexant cx24116/cx24118 hardware
cx24117	1.1	DVB Frontend module for Conexant cx24117/cx24132 hardware
cx24120		DVB Frontend module for Conexant CX24120/CX24118 hardware
cx24123		DVB Frontend module for Conexant CX24123/CX24109/CX24113 hardware
cxd2820r		Sony CXD2820R demodulator driver
cxd2841er		Sony CXD2837/38/41/43/54ER DVB-C/C2/T/T2/S/S2 demodulator driver
dib0070		Driver for the DiBcom 0070 base-band RF Tuner
dib0090		Driver for the DiBcom 0090 base-band RF Tuner
dib3000mb		DiBcom 3000M-B DVB-T demodulator
dib3000mc		Driver for the DiBcom 3000MC/P COFDM demodulator
dib7000m		Driver for the DiBcom 7000MA/MB/PA/PB/MC COFDM demodulator
dib7000p		Driver for the DiBcom 7000PC COFDM demodulator
dib8000		Driver for the DiBcom 8000 ISDB-T demodulator
dibx000_common		Common function the DiBcom demodulator family
drx39xyj		Micronas DRX39xxj Frontend
drxd		DRXD driver
drxk		DRX-K driver
ds3000		DVB Frontend module for Montage Technology DS3000 hardware

Driver	Version	Description
dvb-pll		dvb pll library
ec100		E3C EC100 DVB-T demodulator driver
gp8psk-fe	1.1	Frontend Driver for Genpix DVB-S
isl6405		Driver for lnb supply and control ic isl6405
isl6421		Driver for lnb supply and control ic isl6421
isl6423		ISL6423 SEC
itd1000		Integrant ITD1000 driver
ix2505v		DVB IX2505V tuner driver
l64781		LSI L64781 DVB-T Demodulator driver
lg2160	0.3	LG Electronics LG216x ATSC/MH Demodulator Driver
lgdt3305	0.2	LG Electronics LGDT3304/5 ATSC/QAM-B Demodulator Driver
lgdt3306a	0.2	LG Electronics LGDT3306A ATSC/QAM-B Demodulator Driver
lgdt330x		LGDT330X (ATSC 8VSB & ITU-T J.83 AnnexB 64/256 QAM) Demodulator Driver
lgs8gxx		Legend Silicon LGS8913/LGS8GXX DMB-TH demodulator driver
lnbh25		ST LNBH25 driver
lnbp21		Driver for lnb supply and control ic lnbp21, lnbh24
lnbp22		Driver for lnb supply and control ic lnbp22
m88ds3103		Montage Technology M88DS3103 DVB-S/S2 demodulator driver
m88rs2000	1.13	M88RS2000 DVB-S Demodulator driver
mb86a16		
mb86a20s		DVB Frontend module for Fujitsu mb86A20s hardware
mn88472		Panasonic MN88472 DVB-T/T2/C demodulator driver
mn88473		Panasonic MN88473 DVB-T/T2/C demodulator driver
mt312		Zarlink VP310/MT312/ZL10313 DVB-S Demodulator driver
mt352		Zarlink MT352 DVB-T Demodulator driver
mxl5xx		MaxLinear MxL5xx DVB-S/S2 tuner-demodulator driver
nxt200x		NXT200X (ATSC 8VSB & ITU-T J.83 AnnexB 64/256 QAM) Demodulator Driver
nxt6000		NxtWave NXT6000 DVB-T demodulator driver
or51132		OR51132 ATSC [pcHDTV HD-3000] (8VSB & ITU J83 AnnexB FEC QAM64/256) Demodulator Driver
or51211		Oren OR51211 VSB [pcHDTV HD-2000] Demodulator Driver
rtl2830		Realtek RTL2830 DVB-T demodulator driver
rtl2832		Realtek RTL2832 DVB-T demodulator driver
s5h1409		Samsung S5H1409 QAM-B/ATSC Demodulator driver
s5h1411		Samsung S5H1411 QAM-B/ATSC Demodulator driver
s5h1420		Samsung S5H1420/PnpNetwork PN1010 DVB-S Demodulator driver

Driver	Version	Description
s921		DVB Frontend module for Sharp S921 hardware
si2165		Silicon Labs Si2165 DVB-C/-T Demodulator driver
si2168		Silicon Labs Si2168 DVB-T/T2/C demodulator driver
si21xx		SL SI21XX DVB Demodulator driver
sp2		CIMaX SP2/HF CI driver
sp8870		Spase SP8870 DVB-T Demodulator driver
sp887x		Spase sp887x DVB-T demodulator driver
stb0899		STB0899 Multi-Std frontend
stb6000		DVB STB6000 driver
stb6100		STB6100 Silicon tuner
stv0288		ST STV0288 DVB Demodulator driver
stv0297		ST STV0297 DVB-C Demodulator driver
stv0299		ST STV0299 DVB Demodulator driver
stv0367		ST STV0367 DVB-C/T demodulator driver
stv0900		ST STV0900 frontend
stv090x		STV090x Multi-Std Broadcast frontend
stv0910		ST STV0910 multistandard frontend driver
stv6110		ST STV6110 driver
stv6110x		STV6110x Silicon tuner
stv6111		ST STV6111 satellite tuner driver
tc90522		Toshiba TC90522 frontend
tda10021		Philips TDA10021 DVB-C demodulator driver
tda10023		Philips TDA10023 DVB-C demodulator driver
tda10048		NXP TDA10048HN DVB-T Demodulator driver
tda1004x		Philips TDA10045H & TDA10046H DVB-T Demodulator
tda10071		NXP TDA10071 DVB-S/S2 demodulator driver
tda10086		Philips TDA10086 DVB-S Demodulator
tda18271c2dd		TDA18271C2 driver
tda665x		TDA665x driver
tda8083		Philips TDA8083 DVB-S Demodulator
tda8261		TDA8261 8PSK/QPSK Tuner
tda826x		DVB TDA826x driver
ts2020		Montage Technology TS2020 - Silicon tuner driver module
tua6100		DVB tua6100 driver
ves1820		VLSI VES1820 DVB-C Demodulator driver
ves1x93		VLSI VES1x93 DVB-S Demodulator driver
zl10036		DVB ZL10036 driver
zl10039		Zarlink ZL10039 DVB-S tuner driver

Driver	Version	Description
zl10353		Zarlink ZL10353 DVB-T demodulator driver
firedtv		FireDTV DVB Driver
cs3308		i2c device driver for cs3308 8-channel volume control
cs5345		i2c device driver for cs5345 Audio ADC
cs53l32a		i2c device driver for cs53l32a Audio ADC
cx25840		Conexant CX25840 audio/video decoder driver
ir-kbd-i2c		input driver for i2c IR remote controls
m52790		i2c device driver for m52790 A/V switch
msp3400		device driver for msp34xx TV sound processor
mt9m111		Micron/Aptina MT9M111/MT9M112/MT9M131 Camera driver
saa6588		v4l2 driver module for SAA6588 RDS decoder
saa6752hs		device driver for saa6752hs MPEG2 encoder
saa7115		Philips SAA7111/SAA7113/SAA7114/SAA7115/SAA7118 video decoder driver
saa7127		Philips SAA7127/9 video encoder driver
saa717x		Philips SAA717x audio/video decoder driver
imx074		Sony IMX074 Camera driver
mt9m001		Micron MT9M001 Camera driver
mt9t031		Micron MT9T031 Camera driver
mt9t112		SoC Camera driver for mt9t112
mt9v022		Micron MT9V022 Camera driver
ov772x		SoC Camera driver for ov772x
ov9640		SoC Camera driver for OmniVision OV96xx
ov9740		SoC Camera driver for OmniVision OV9740
rj54n1cb0c		Sharp RJ54N1CB0C Camera driver
tw9910		SoC Camera driver for tw9910
tda7432		bttv driver for the tda7432 audio processor chip
tvaudio		device driver for various i2c TV sound decoder / audiomux chips
upd64031a		uPD64031A driver
upd64083		uPD64083 driver
vp27smpx		vp27smpx driver
wm8739		wm8739 driver
wm8775		wm8775 driver
smssdio		Siano SMS1xxx SDIO driver
b2c2-flexcop-pci		flexcop-pci
bt878		
bttv	0.9.19	bttv - v4l/v4l2 driver module for bt848/878 based cards

Driver	Version	Description
dst		DST DVB-S/T/C/ATSC Combo Frontend driver
dst_ca		DST DVB-S/T/C Combo CA driver
dvb-bt8xx		Bt8xx based DVB adapter driver
cx18-alsa	1.5.1	CX23418 ALSA Interface
cx18	1.5.1	CX23418 driver
altera-ci		altera FPGA CI module
cx23885	0.0.4	v4l2 driver module for cx23885 based TV cards Driver for cx23885 based TV cards
cx88-alsa	1.0.0	ALSA driver module for cx2388x based TV cards
cx88-blackbird	1.0.0	driver for cx2388x/cx23416 based mpeg encoder cards
cx88-dvb	1.0.0	driver for cx2388x based DVB cards
cx88-vp3054-i2c		driver for cx2388x VP3054 design
cx8800	1.0.0	v4l2 driver module for cx2388x based TV cards
cx8802	1.0.0	mpeg driver for cx2388x based TV cards
cx88xx		v4l2 driver module for cx2388x based TV cards input driver for cx88 GPIO-based IR remote controls
ddbridge	0.9.31intermediate-integrated	Digital Devices PCIe Bridge
dm1105		SDMC DM1105 DVB driver
ivtv	1.4.3	CX23415/CX23416 driver
ivtvfb		
hopper		HOPPER driver
mantis		MANTIS driver
mantis_core		Mantis PCI DTV bridge driver
ngene		nGene
pluto2		Pluto2 driver
earth-pt1		Earthsoft PT1/PT2 Driver
saa7134-alsa		
saa7134-dvb		
saa7134-empress		
saa7134	0, 2, 17	v4l2 driver module for saa7130/34 based TV cards
saa7164		Driver for NXP SAA7164 based TV cards
budget-av		driver for the SAA7146 based so-called budget PCI DVB w/ analog input and CI-module (e.g. the KNC cards)
budget-ci		driver for the SAA7146 based so-called budget PCI DVB cards w/ CI-module produced by Siemens, Technotrend, Hauppauge
budget-core		

Driver	Version	Description
`budget-patch`		Driver for full TS modified DVB-S SAA7146+AV7110 based so-called Budget Patch cards
`budget`		driver for the SAA7146 based so-called budget PCI DVB cards by Siemens, Technotrend, Hauppauge
`dvb-ttpci`		driver for the SAA7146 based AV110 PCI DVB cards by Siemens, Technotrend, Hauppauge
`ttpci-eeprom`		Decode dvb_net MAC address from EEPROM of PCI DVB cards made by Siemens, Technotrend, Hauppauge
`soc_camera`		Image capture bus driver
`soc_camera_platform`		SoC Camera Platform driver
`soc_mediabus`		soc-camera media bus interface
`tea575x`		Routines for control of TEA5757/5759 Philips AM/FM radio tuner chips
`ati_remote`		ATI/X10 RF USB Remote Control
`ene_ir`		Infrared input driver for KB3926B/C/D/E/F (aka ENE0100/ENE0200/ENE0201/ENE0202) CIR port
`fintek-cir`		Fintek LPC SuperIO Consumer IR Transceiver driver
`gpio-ir-recv`		GPIO IR Receiver driver
`iguanair`		IguanaWorks USB IR Transceiver
`imon`	0.9.4	Driver for SoundGraph iMON MultiMedia IR/Display
`ir-jvc-decoder`		JVC IR protocol decoder
`ir-lirc-codec`		LIRC IR handler bridge
`ir-mce_kbd-decoder`		MCE Keyboard/mouse IR protocol decoder
`ir-nec-decoder`		NEC IR protocol decoder
`ir-rc5-decoder`		RC5(x/sz) IR protocol decoder
`ir-rc6-decoder`		RC6 IR protocol decoder
`ir-sanyo-decoder`		SANYO IR protocol decoder
`ir-sharp-decoder`		Sharp IR protocol decoder
`ir-sony-decoder`		Sony IR protocol decoder
`ir-xmp-decoder`		XMP IR protocol decoder
`ite-cir`		ITE Tech Inc. IT8712F/ITE8512F CIR driver
`rc-adstech-dvb-t-pci`		
`rc-alink-dtu-m`		
`rc-anysee`		
`rc-apac-viewcomp`		

Driver	Version	Description
rc-asus-pc39		
rc-asus-ps3-100		
rc-ati-tv-wonder-hd-600		
rc-ati-x10		
rc-avermedia-a16d		
rc-avermedia-cardbus		
rc-avermedia-dvbt		
rc-avermedia-m135a		
rc-avermedia-m733a-rm-k6		
rc-avermedia-rm-ks		
rc-avermedia		
rc-avertv-303		
rc-azurewave-ad-tu700		
rc-behold-columbus		
rc-behold		
rc-budget-ci-old		
rc-cec		
rc-cinergy-1400		
rc-cinergy		
rc-d680-dmb		
rc-delock-61959		Delock 61959 remote keytable
rc-dib0700-nec		
rc-dib0700-rc5		
rc-digitalnow-tinytwin		
rc-digittrade		
rc-dm1105-nec		
rc-dntv-live-dvb-t		

Driver	Version	Description
rc-dntv-live-dvbt-pro		
rc-dtt200u		
rc-dvbsky		
rc-dvico-mce		
rc-dvico-portable		
rc-em-terratec		
rc-encore-enltv-fm53		
rc-encore-enltv		
rc-encore-enltv2		
rc-evga-indtube		
rc-eztv		
rc-flydvb		
rc-flyvideo		
rc-fusionhdtv-mce		
rc-gadmei-rm008z		
rc-geekbox		
rc-genius-tvgo-a11mce		
rc-gotview7135		
rc-hauppauge		
rc-imon-mce		
rc-imon-pad		
rc-iodata-bctv7e		
rc-it913x-v1		
rc-it913x-v2		
rc-kaiomy		
rc-kworld-315u		
rc-kworld-pc150u		
rc-kworld-plus-tv-analog		

Driver	Version	Description
rc-leadtek-y04g0051		
rc-lme2510		
rc-manli		
rc-medion-x10-digitainer		Medion X10 RF remote keytable (Digitainer variant)
rc-medion-x10-or2x		Medion X10 OR22/OR24 RF remote keytable
rc-medion-x10		
rc-msi-digivox-ii		
rc-msi-digivox-iii		
rc-msi-tvanywhere-plus		
rc-msi-tvanywhere		
rc-nebula		
rc-nec-terratec-cinergy-xs		
rc-norwood		
rc-npgtech		
rc-pctv-sedna		
rc-pinnacle-color		
rc-pinnacle-grey		
rc-pinnacle-pctv-hd		
rc-pixelview-002t		
rc-pixelview-mk12		
rc-pixelview-new		
rc-pixelview		
rc-powercolor-real-angel		
rc-proteus-2309		
rc-purpletv		

Driver	Version	Description
rc-pv951		
rc-rc6-mce		
rc-real-audio-220-32-keys		
rc-reddo		
rc-snapstream-firefly		
rc-streamzap		
rc-su3000		
rc-tbs-nec		
rc-technisat-ts35		
rc-technisat-usb2		
rc-terratec-cinergy-c-pci		
rc-terratec-cinergy-s2-hd		
rc-terratec-cinergy-xs		
rc-terratec-slim-2		
rc-terratec-slim		
rc-tevii-nec		
rc-tivo		
rc-total-media-in-hand-02		
rc-total-media-in-hand		
rc-trekstor		
rc-tt-1500		
rc-twinhan-dtv-cab-ci		
rc-twinhan1027		
rc-videomate-m1f		
rc-videomate-s350		

Driver	Version	Description
rc-videomate-tv-pvr		
rc-winfast-usbii-deluxe		
rc-winfast		
rc-zx-irdec		
lirc_dev		LIRC base driver module
mceusb		Windows Media Center Ed. eHome Infrared Transceiver device driver
nuvoton-cir		Nuvoton W83667HG-A & W83677HG-I CIR driver
rc-core		
rc-loopback		Loopback device for rc-core debugging
redrat3		RedRat3 USB IR Transceiver Driver
streamzap		Streamzap Remote Control driver
ttusbir		TechnoTrend USB IR Receiver
winbond-cir		Winbond SuperI/O Consumer IR Driver
e4000		Elonics E4000 silicon tuner driver
fc0011		Fitipower FC0011 silicon tuner driver
fc0012	0.6	Fitipower FC0012 silicon tuner driver
fc0013	0.2	Fitipower FC0013 silicon tuner driver
fc2580		FCI FC2580 silicon tuner driver
it913x		ITE IT913X silicon tuner driver
m88rs6000t		Montage M88RS6000 internal tuner driver
max2165		Maxim MAX2165 silicon tuner driver
mc44s803		Freescale MC44S803 silicon tuner driver
mt2060		Microtune MT2060 silicon tuner driver
mt2063		MT2063 Silicon tuner
mt20xx		Microtune tuner driver
mt2131		Microtune MT2131 silicon tuner driver
mt2266		Microtune MT2266 silicon tuner driver
mxl5005s		MaxLinear MXL5005S silicon tuner driver
mxl5007t	0.2	MaxLinear MxL5007T Silicon IC tuner driver
qm1d1c0042		Sharp QM1D1C0042 tuner
qt1010	0.1	Quantek QT1010 silicon tuner driver
r820t		Rafael Micro r820t silicon tuner driver
si2157		Silicon Labs Si2141/Si2146/2147/2148/2157/2158 silicon tuner driver
tda18212		NXP TDA18212HN silicon tuner driver
tda18218		NXP TDA18218HN silicon tuner driver

Driver	Version	Description
`tda18271`	0.4	NXP TDA18271HD analog / digital tuner driver
`tda827x`		DVB TDA827x driver
`tda8290`		Philips/NXP TDA8290/TDA8295 analog IF demodulator driver
`tda9887`		
`tea5761`		Philips TEA5761 FM tuner driver
`tea5767`		Philips TEA5767 FM tuner driver
`tua9001`		Infineon TUA9001 silicon tuner driver
`tuner-simple`		Simple 4-control-bytes style tuner driver
`tuner-types`		Simple tuner device type database
`tuner-xc2028`		Xceive xc2028/xc3028 tuner driver
`xc4000`		Xceive xc4000 silicon tuner driver
`xc5000`		Xceive xc5000 silicon tuner driver
`au0828`	0.0.3	Driver for Auvitek AU0828 based products
`b2c2-flexcop-usb`		Technisat/B2C2 FlexCop II/IIb/III Digital TV USB Driver
`cx231xx-alsa`		Cx231xx Audio driver
`cx231xx-dvb`		driver for cx231xx based DVB cards
`cx231xx`	0.0.3	Conexant cx231xx based USB video device driver
`dvb-usb-a800`	1.0	AVerMedia AverTV DVB-T USB 2.0 (A800)
`dvb-usb-af9005-remote`	1.0	Standard remote control decoder for Afatech 9005 DVB-T USB1.1 stick
`dvb-usb-af9005`	1.0	Driver for Afatech 9005 DVB-T USB1.1 stick
`dvb-usb-az6027`	1.0	Driver for AZUREWAVE DVB-S/S2 USB2.0 (AZ6027)
`dvb-usb-cinergyT2`		Terratec Cinergy T2 DVB-T driver
`dvb-usb-cxusb`	1.0-alpha	Driver for Conexant USB2.0 hybrid reference design
`dvb-usb-dib0700`	1.0	Driver for devices based on DiBcom DiB0700 - USB bridge
`dvb-usb-dibusb-common`		
`dvb-usb-dibusb-mb`	1.0	Driver for DiBcom USB DVB-T devices (DiB3000M-B based)
`dvb-usb-dibusb-mc-common`		
`dvb-usb-dibusb-mc`	1.0	Driver for DiBcom USB2.0 DVB-T (DiB3000M-C/P based) devices
`dvb-usb-digitv`	1.0-alpha	Driver for Nebula Electronics uDigiTV DVB-T USB2.0
`dvb-usb-dtt200u`	1.0	Driver for the WideView/Yakumo/Hama/Typhoon/Club3D/Miglia DVB-T USB2.0 devices

Driver	Version	Description
`dvb-usb-dtv5100`		AME DTV-5100 USB2.0 DVB-T
`dvb-usb-dw2102`	0.1	Driver for DVBWorld DVB-S 2101, 2102, DVB-S2 2104, DVB-C 3101 USB2.0, TeVii S421, S480, S482, S600, S630, S632, S650, TeVii S660, S662, Prof 1100, 7500 USB2.0, Geniatech SU3000, T220, TechnoTrend S2-4600, Terratec Cinergy S2 devices
`dvb-usb-friio`	0.2	Driver for Friio ISDB-T USB2.0 Receiver
`dvb-usb-gp8psk`	1.1	Driver for Genpix DVB-S
`dvb-usb-m920x`	0.1	DVB Driver for ULI M920x
`dvb-usb-nova-t-usb2`	1.0	Hauppauge WinTV-NOVA-T usb2
`dvb-usb-opera`	0.1	Driver for Opera1 DVB-S device
`dvb-usb-pctv452e`		Pinnacle PCTV HDTV USB DVB / TT connect S2-3600 Driver
`dvb-usb-technisat-usb2`	1.0	Driver for Technisat DVB-S/S2 USB 2.0 device
`dvb-usb-ttusb2`	1.0	Driver for Pinnacle PCTV 400e DVB-S USB2.0
`dvb-usb-umt-010`	1.0	Driver for HanfTek UMT 010 USB2.0 DVB-T device
`dvb-usb-vp702x`	1.0	Driver for Twinhan StarBox DVB-S USB2.0 and clones
`dvb-usb-vp7045`	1.0	Driver for Twinhan MagicBox/Alpha and DNTV tinyUSB2 DVB-T USB2.0
`dvb-usb`	1.0	A library module containing commonly used USB and DVB function USB DVB devices
`dvb-usb-af9015`		Afatech AF9015 driver
`dvb-usb-af9035`		Afatech AF9035 driver
`dvb-usb-anysee`		Driver Anysee E30 DVB-C & DVB-T USB2.0
`dvb-usb-au6610`	0.1	Driver for Alcor Micro AU6610 DVB-T USB2.0
`dvb-usb-az6007`	2.0	Driver for AzureWave 6007 DVB-C/T USB2.0 and clones
`dvb-usb-ce6230`		Intel CE6230 driver
`dvb-usb-dvbsky`		Driver for DVBSky USB
`dvb-usb-ec168`		E3C EC168 driver
`dvb-usb-gl861`	0.1	Driver MSI Mega Sky 580 DVB-T USB2.0 / GL861
`dvb-usb-lmedm04`	2.07	LME2510(C) DVB-S USB2.0
`dvb-usb-mxl111sf`	1.0	Driver for MaxLinear MxL111SF
`dvb-usb-rtl28xxu`		Realtek RTL28xxU DVB USB driver
`dvb_usb_v2`	2.0	DVB USB common
`mxl111sf-demod`	0.1	MaxLinear MxL111SF DVB-T demodulator driver

Driver	Version	Description
mxl111sf-tuner	0.1	MaxLinear MxL111SF CMOS tuner driver
em28xx-alsa	0.2.2	Empia em28xx device driver - audio interface
em28xx-dvb	0.2.2	Empia em28xx device driver - digital TV interface
em28xx-rc	0.2.2	Empia em28xx device driver - input interface
em28xx	0.2.2	Empia em28xx device driver
gspca_gl860		Genesys Logic USB PC Camera Driver
gspca_benq		Benq DC E300 USB Camera Driver
gspca_conex		GSPCA USB Conexant Camera Driver
gspca_cpia1		Vision CPiA
gspca_dtcs033		Scopium DTCS033 astro-cam USB Camera Driver
gspca_etoms		Etoms USB Camera Driver
gspca_finepix		Fujifilm FinePix USB V4L2 driver
gspca_jeilinj		GSPCA/JEILINJ USB Camera Driver
gspca_jl2005bcd		JL2005B/C/D USB Camera Driver
gspca_kinect		GSPCA/Kinect Sensor Device USB Camera Driver
gspca_konica		Konica chipset USB Camera Driver
gspca_main	2.14.0	GSPCA USB Camera Driver
gspca_mars		GSPCA/Mars USB Camera Driver
gspca_mr97310a		GSPCA/Mars-Semi MR97310A USB Camera Driver
gspca_nw80x		NW80x USB Camera Driver
gspca_ov519		OV519 USB Camera Driver
gspca_ov534		GSPCA/OV534 USB Camera Driver
gspca_ov534_9		GSPCA/OV534_9 USB Camera Driver
gspca_pac207		Pixart PAC207
gspca_pac7302		Pixart PAC7302
gspca_pac7311		Pixart PAC7311
gspca_se401		Endpoints se401
gspca_sn9c2028		Sonix SN9C2028 USB Camera Driver
gspca_sn9c20x		GSPCA/SN9C20X USB Camera Driver
gspca_sonixb		GSPCA/SN9C102 USB Camera Driver
gspca_sonixj		GSPCA/SONIX JPEG USB Camera Driver
gspca_spca1528		SPCA1528 USB Camera Driver
gspca_spca500		GSPCA/SPCA500 USB Camera Driver
gspca_spca501		GSPCA/SPCA501 USB Camera Driver
gspca_spca505		GSPCA/SPCA505 USB Camera Driver
gspca_spca506		GSPCA/SPCA506 USB Camera Driver
gspca_spca508		GSPCA/SPCA508 USB Camera Driver
gspca_spca561		GSPCA/SPCA561 USB Camera Driver

Driver	Version	Description
gspca_sq905		GSPCA/SQ905 USB Camera Driver
gspca_sq905c		GSPCA/SQ905C USB Camera Driver
gspca_sq930x		GSPCA/SQ930x USB Camera Driver
gspca_stk014		Syntek DV4000 (STK014) USB Camera Driver
gspca_stk1135		Syntek STK1135 USB Camera Driver
gspca_stv0680		STV0680 USB Camera Driver
gspca_sunplus		GSPCA/SPCA5xx USB Camera Driver
gspca_t613		GSPCA/T613 (JPEG Compliance) USB Camera Driver
gspca_topro		Topro TP6800/6810 gspca webcam driver
gspca_tv8532		TV8532 USB Camera Driver
gspca_vc032x		GSPCA/VC032X USB Camera Driver
gspca_vicam		GSPCA ViCam USB Camera Driver
gspca_xirlink_cit		Xirlink C-IT
gspca_zc3xx		GSPCA ZC03xx/VC3xx USB Camera Driver
gspca_m5602		ALi m5602 webcam driver
gspca_stv06xx		STV06XX USB Camera Driver
hdpvr	0.2.1	Hauppauge HD PVR driver
pvrusb2	0.9.1	Hauppauge WinTV-PVR-USB2 MPEG2 Encoder/Tuner
pwc	10.0.15	Philips & OEM USB webcam driver
s2255drv	1.25.1	Sensoray 2255 Video for Linux driver
smsusb		Driver for the Siano SMS1xxx USB dongle
stk1160		STK1160 driver
stkwebcam		Syntek DC1125 webcam driver
tm6000-alsa		ALSA driver module for tm5600/tm6000/tm6010 based TV cards
tm6000-dvb		DVB driver extension module for tm5600/6000/6010 based TV cards
tm6000		Trident TVMaster TM5600/TM6000/TM6010 USB2 adapter
dvb-ttusb-budget		TTUSB DVB Driver
ttusb_dec		TechnoTrend/Hauppauge DEC USB
ttusbdecfe		TTUSB DEC DVB-T/S Demodulator driver
usbvision	0.9.11	USBVision USB Video Device Driver for Linux
uvcvideo	1.1.1	USB Video Class driver
zr364xx	0.7.4	Zoran 364xx
tuner		device driver for various TV and TV+FM radio tuners
v4l2-common		misc helper functions for v4l2 device drivers
v4l2-dv-timings		V4L2 DV Timings Helper Functions
videobuf-core		helper module to manage video4linux buffers

Driver	Version	Description
`videobuf-dma-sg`		helper module to manage video4linux dma sg buffers
`videobuf-dvb`		
`videobuf-vmalloc`		helper module to manage video4linux vmalloc buffers
`videobuf2-core`		Media buffer core framework
`videobuf2-dma-sg`		dma scatter/gather memory handling routines for videobuf2
`videobuf2-dvb`		
`videobuf2-memops`		common memory handling routines for videobuf2
`videobuf2-v4l2`		Driver helper framework for Video for Linux 2
`videobuf2-vmalloc`		vmalloc memory handling routines for videobuf2
`videodev`		Device registrar for Video4Linux drivers v2

A.32 `memstick` Drivers in UEK R5U1 (x86_64)

Table A.32 memstick Driver List

Driver	Version	Description
`memstick`		Sony MemoryStick core driver
`mspro_block`		Sony MemoryStickPro block device driver
`jmb38x_ms`		JMicron jmb38x MemoryStick driver
`r592`		Ricoh R5C592 Memstick/Memstick PRO card reader driver
`rtsx_pci_ms`		Realtek PCI-E Memstick Card Host Driver
`rtsx_usb_ms`		Realtek USB Memstick Card Host Driver
`tifm_ms`		TI FlashMedia MemoryStick driver

A.33 `message` Drivers in UEK R5U1 (x86_64)

Table A.33 message Driver List

Driver	Version	Description
`mptbase`	3.04.20	Fusion MPT base driver
`mptctl`	3.04.20	Fusion MPT misc device (ioctl) driver
`mptfc`	3.04.20	Fusion MPT FC Host driver
`mptlan`	3.04.20	Fusion MPT LAN driver
`mptsas`	3.04.20	Fusion MPT SAS Host driver
`mptscsih`	3.04.20	Fusion MPT SCSI Host driver
`mptspi`	3.04.20	Fusion MPT SPI Host driver

A.34 `mfd` Drivers in UEK R5U1 (x86_64)

Table A.34 mfd Driver List

Driver	Version	Description
lpc_ich		LPC interface for Intel ICH
lpc_sch		LPC interface for Intel Poulsbo SCH
pcf50633-adc		PCF50633 adc driver
pcf50633-gpio		
pcf50633		I2C chip driver for NXP PCF50633 PMU
rdc321x-southbridge		RDC R-321x MFD southbridge driver
retu-mfd		Retu MFD driver
rtsx_pci		Realtek PCI-E Card Reader Driver
rtsx_usb		Realtek USB Card Reader Driver
si476x-core		API for command exchange for si476x Si4761/64/68 AM/FM MFD core device driver
sm501		SM501 Core Driver
ucb1400_core		Philips UCB1400 driver
viperboard		Nano River Technologies viperboard mfd core driver
vx855		Driver for the VIA VX855 chipset

A.35 `misc` Drivers in UEK R5U1 (x86_64)

Table A.35 misc Driver List

Driver	Version	Description
ad525x_dpot-i2c		digital potentiometer I2C bus driver
ad525x_dpot		Digital potentiometer driver
altera-stapl		altera FPGA kernel module
apds9802als		Avago apds9802als ALS Driver
apds990x		APDS990X combined ALS and proximity sensor
bh1770glc		BH1770GLC / SFH7770 combined ALS and proximity sensor
cb710		ENE CB710 memory card reader driver
at24		Driver for most I2C EEPROMs
eeprom		I2C EEPROM driver
eeprom_93cx6	1.0	EEPROM 93cx6 chip driver
max6875		MAX6875 driver
enclosure		Enclosure Services
hmc6352		hmc6352 Compass Driver
hpilo	1.5.0	hpilo

Driver	Version	Description
ics932s401		ICS932S401 driver
ioc4		PCI driver master module for SGI IOC4 Base-IO Card
isl29003	1.0	ISL29003 ambient light sensor driver
isl29020		Intersil isl29020 ALS Driver
lis3lv02d		ST LIS3LV02Dx three-axis digital accelerometer driver
lis3lv02d_i2c		lis3lv02d I2C interface
mei-me		Intel(R) Management Engine Interface
mei		Intel(R) Management Engine Interface
gru	0.85	SGI GRU Device Driver0.85
xp		Cross Partition (XP) base
xpc		Cross Partition Communication (XPC) support
xpnet		Cross Partition Network adapter (XPNET)
tifm_7xx1	0.8	TI FlashMedia host driver
tifm_core	0.8	TI FlashMedia core driver
tsl2550	1.2	TSL2550 ambient light sensor driver
vmw_balloon	1.5.0.0-k	VMware Memory Control (Balloon) Driver
vmw_vmci	1.1.5.0-k	VMware Virtual Machine Communication Interface.

A.36 mmc Drivers in UEK R5U1 (x86_64)

Table A.36 mmc Driver List

Driver	Version	Description
mmc_block		Multimedia Card (MMC) block device driver
mmc_core		
sdio_uart		
cb710-mmc		ENE CB710 memory card reader driver - MMC/SD part
rtsx_pci_sdmmc		Realtek PCI-E SD/MMC Card Host Driver
rtsx_usb_sdmmc		Realtek USB SD/MMC Card Host Driver
sdhci-acpi		Secure Digital Host Controller Interface ACPI driver
sdhci-pci		Secure Digital Host Controller Interface PCI driver
sdhci-pltfm		SDHCI platform and OF driver helper
sdhci		Secure Digital Host Controller Interface core driver
sdricoh_cs		Ricoh PCMCIA Secure Digital Interface driver
tifm_sd	0.8	TI FlashMedia SD driver
usdhi6rol0		Renesas usdhi6rol0 SD/SDIO host driver
ushc		USB SD Host Controller driver
via-sdmmc		VIA SD/MMC Card Interface driver
vub300		VUB300 USB to SD/MMC/SDIO adapter driver
wbsd		Winbond W83L51xD SD/MMC card interface driver

A.37 `mtd` Drivers in UEK R5U1 (x86_64)

Table A.37 mtd Driver List

Driver	Version	Description
`ar7part`		MTD partitioning for TI AR7
`cfi_cmdset_0001`		MTD chip driver for Intel/Sharp flash chips
`cfi_cmdset_0002`		MTD chip driver for AMD/Fujitsu flash chips
`cfi_cmdset_0020`		
`cfi_probe`		Probe code for CFI-compliant flash chips
`cfi_util`		
`chipreg`		Core routines for registering and invoking MTD chip drivers
`gen_probe`		Helper routines for flash chip probe code
`jedec_probe`		Probe code for JEDEC-compliant flash chips
`map_absent`		Placeholder MTD chip driver for 'absent' chips
`map_ram`		MTD chip driver for RAM chips
`map_rom`		MTD chip driver for ROM chips
`cmdlinepart`		Command line configuration of MTD partitions
`block2mtd`		Emulate an MTD using a block device
`mtdram`		Simulated MTD driver for testing
`pmc551`		Ramix PMC551 PCI Mezzanine Ram Driver. (C) 1999,2000 Nortel Networks.
`ftl`		Support code for Flash Translation Layer, used on PCMCIA devices
`inftl`		Support code for Inverse Flash Translation Layer, used on M-Systems DiskOnChip 2000, Millennium and Millennium Plus
`lpddr_cmds`		MTD driver for LPDDR flash chips
`qinfo_probe`		Driver to probe qinfo flash chips
`ck804xrom`		MTD map driver for BIOS chips on the Nvidia ck804 southbridge
`esb2rom`		MTD map driver for BIOS chips on the ESB2 southbridge
`latch-addr-flash`		MTD map driver for flashes addressed physically with upper address lines being set board specifically
`map_funcs`		
`pci`		Generic PCI map driver
`scb2_flash`		MTD map driver for Intel SCB2 BIOS Flash
`mtd`		Core MTD registration and access routines Generic support for concatenating of MTD devices
`mtd_blkdevs`		Common interface to block layer for MTD 'translation layers'
`mtdblock`		Caching read/erase/writeback block device emulation access to MTD devices
`mtdblock_ro`		Simple read-only block device emulation access to MTD devices
`mtdoops`		MTD Oops/Panic console logger/driver

Driver	Version	Description
`mtdswap`		Block device access to an MTD suitable for using as swap space
`diskonchip`		M-Systems DiskOnChip 2000, Millennium and Millennium Plus device driver
`nand`		Generic NAND flash driver code
`nand_bch`		NAND software BCH ECC support
`nand_ecc`		Generic NAND ECC support
`nandsim`		The NAND flash simulator
`nftl`		Support code for NAND Flash Translation Layer, used on M-Systems DiskOnChip 2000 and Millennium
`redboot`		Parsing code for RedBoot Flash Image System (FIS) tables
`rfd_ftl`		Support code for RFD Flash Translation Layer, used by General Software's Embedded BIOS
`sm_ftl`		Smartmedia/xD mtd translation layer
`ssfdc`		Flash Translation Layer for read-only SSFDC SmartMedia card
`ubi`	1	UBI - Unsorted Block Images

A.38 `net` Drivers in UEK R5U1 (x86_64)

Table A.38 net Driver List

Driver	Version	Description
`bonding`	3.7.1	Ethernet Channel Bonding Driver, v3.7.1
`c_can`		CAN bus driver for Bosch C_CAN controller
`c_can_pci`		PCI CAN bus driver for Bosch C_CAN/D_CAN controller
`c_can_platform`		Platform CAN bus driver for Bosch C_CAN controller
`can-dev`		CAN device driver interface
`cc770`		cc770CAN netdevice driver
`m_can`		CAN bus driver for Bosch M_CAN controller
`sja1000`		sja1000CAN netdevice driver
`slcan`		serial line CAN interface
`softing`		Softing DPRAM CAN driver
`softing_cs`		softing CANcard driver, links PCMCIA card to softing driver
`ems_usb`		CAN driver for EMS Dr. Thomas Wuensche CAN/USB interfaces
`esd_usb2`		CAN driver for esd CAN-USB/2 and CAN-USB/Micro interfaces
`gs_usb`		Socket CAN device driver for Geschwister Schneider Technologie-, Entwicklungs- und Vertriebs UG. USB2.0 to CAN interfaces and bytewerk.org candleLight USB CAN interfaces.
`kvaser_usb`		CAN driver for Kvaser CAN/USB devices
`peak_usb`		CAN driver for PEAK-System USB adapters
`usb_8dev`		CAN driver for 8 devices USB2CAN interfaces
`vcan`		virtual CAN interface

Driver	Version	Description
dummy	1.0	
eql		
3c574_cs		3Com 3c574 series PCMCIA ethernet driver
3c589_cs		3Com 3c589 series PCMCIA ethernet driver
3c59x		3Com 3c59x/3c9xx ethernet driver
typhoon	1.0	3Com Typhoon Family (3C990, 3CR990, and variants)
starfire	2.1	Adaptec Starfire Ethernet driver
acenic		AceNIC/3C985/GA620 Gigabit Ethernet driver
ena	1.5.0K	Elastic Network Adapter (ENA)
amd8111e		AMD8111 based 10/100 Ethernet Controller. Driver Version 3.0.7
nmclan_cs		New Media PCMCIA ethernet driver
pcnet32		Driver for PCnet32 and PCnetPCI based ethercards
alx		Qualcomm Atheros(R) AR816x/AR817x PCI-E Ethernet Network Driver
atl1c	1.0.1.1-NAPI	Qualcomm Atheros 100/1000M Ethernet Network Driver
atl1e	1.0.0.7-NAPI	Atheros 1000M Ethernet Network Driver
atl1	2.1.3	Atheros L1 Gigabit Ethernet Driver
atl2	2.2.3	Atheros Fast Ethernet Network Driver
b44	2.0	Broadcom 44xx/47xx 10/100 PCI ethernet driver
bnx2	2.2.6	QLogic BCM5706/5708/5709/5716 Driver
bnx2x	1.712.30-0	QLogic BCM57710/57711/57711E/57712/57712_MF/57800/57800_MF/57810/57810_MF/578 Driver
bnxt_en	1.9.2	Broadcom BCM573xx network driver
cnic	2.5.22	QLogic cnic Driver
tg3	3.137	Broadcom Tigon3 ethernet driver
bna	3.2.25.1	QLogic BR-series 10G PCIe Ethernet driver
liquidio_vf	1.6.1	Cavium LiquidIO Intelligent Server Adapter Virtual Function Driver
cxgb		Chelsio 10Gb Ethernet Driver
cxgb3	1.1.5-ko	Chelsio T3 Network Driver
cxgb4	2.0.0-ko	Chelsio T4/T5/T6 Network Driver
cxgb4vf	2.0.0-ko	Chelsio T4/T5/T6 Virtual Function (VF) Network Driver
libcxgb	1.0.0-ko	Chelsio common library
enic	2.3.0.42	Cisco VIC Ethernet NIC Driver
de2104x	0.7	Intel/Digital 21040/1 series PCI Ethernet driver
de4x5		
dmfe	1.36.4	Davicom DM910X fast ethernet driver

Driver	Version	Description
tulip	1.1.15	Digital 21*4* Tulip ethernet driver
uli526x		ULi M5261/M5263 fast ethernet driver
winbond-840	1.01-e	Winbond W89c840 Ethernet driver
xircom_cb		Xircom Cardbus ethernet driver
dl2k		D-Link DL2000-based Gigabit Ethernet Adapter
sundance		Sundance Alta Ethernet driver
dnet		Dave DNET Ethernet driver
be2net	11.4.0.0	Emulex OneConnect NIC Driver 11.4.0.0
ethoc		OpenCores Ethernet MAC driver
fmvj18x_cs		fmvj18x and compatible PCMCIA ethernet driver
e100	3.5.24-k2-NAPI	Intel(R) PRO/100 Network Driver
e1000	7.3.21-k8-NAPI	Intel(R) PRO/1000 Network Driver
e1000e	3.2.6-k	Intel(R) PRO/1000 Network Driver
fm10k	0.21.7-k	Intel(R) Ethernet Switch Host Interface Driver
i40e	2.1.14-k	Intel(R) Ethernet Connection XL710 Network Driver
i40evf	3.0.0-k	Intel(R) XL710 X710 Virtual Function Network Driver
igb	5.4.0-k	Intel(R) Gigabit Ethernet Network Driver
igbvf	2.4.0-k	Intel(R) Gigabit Virtual Function Network Driver
ixgb	1.0.135-k2-NAPI	Intel(R) PRO/10GbE Network Driver
ixgbe	5.1.0-k	Intel(R) 10 Gigabit PCI Express Network Driver
ixgbevf	4.1.0-k	Intel(R) 10 Gigabit Virtual Function Network Driver
jme	1.0.8	JMicron JMC2x0 PCI Express Ethernet driver
mvmdio		Marvell MDIO interface driver
skge	1.14	SysKonnect Gigabit Ethernet driver
sky2	1.30	Marvell Yukon 2 Gigabit Ethernet driver
mlx4_core	4.0-0	Mellanox ConnectX HCA low-level driver
mlx4_en	4.0-0	Mellanox ConnectX HCA Ethernet driver
mlx5_core	5.0-0	Mellanox Connect-IB, ConnectX-4 core driver
mlxfw		Mellanox firmware flash lib
myri10ge	1.5.3-1.534	Myricom 10G driver (10GbE)
s2io	2.0.26.28	
vxge		Neterion's X3100 Series 10GbE PCIe I/OVirtualized Server Adapter
forcedeth		Reverse Engineered nForce ethernet driver
netxen_nic	4.0.82	QLogic/NetXen (1/10) GbE Intelligent Ethernet Driver
qed	8.10.11.21	QLogic FastLinQ 4xxxx Core Module
qede	8.10.10.21	QLogic FastLinQ 4xxxx Ethernet Driver
qla3xxx	v2.03.00-k5	QLogic ISP3XXX Network Driver v2.03.00-k5

Driver	Version	Description
qlcnic	5.3.66	QLogic 1/10 GbE Converged/Intelligent Ethernet Driver
qlge	1.00.00.35	QLogic 10 Gigabit PCI-E Ethernet Driver
r6040	0.29 04Jul2016	RDC R6040 NAPI PCI FastEthernet driver
8139cp	1.3	RealTek RTL-8139C+ series 10/100 PCI Ethernet driver
8139too	0.9.28	RealTek RTL-8139 Fast Ethernet driver
r8169	2.3LK-NAPI	RealTek RTL-8169 Gigabit Ethernet driver
sfc	4.1	Solarflare network driver
sc92031		Silan SC92031 PCI Fast Ethernet Adapter driver
sis190	1.4	SiS sis190/191 Gigabit Ethernet driver
sis900		SiS 900 PCI Fast Ethernet driver
epic100		SMC 83c170 EPIC series Ethernet driver
smc91c92_cs		SMC 91c92 series PCMCIA ethernet driver
smsc9420	1.01	
dwmac-generic		Generic dwmac driver
stmmac-platform		STMMAC 10/100/1000 Ethernet platform support
stmmac		STMMAC 10/100/1000 Ethernet device driver
cassini		Sun Cassini(+) ethernet driver
niu	1.1	NIU ethernet driver
sungem		Sun GEM Gbit ethernet driver
sunhme	3.10	Sun HappyMealEthernet(HME) 10/100baseT ethernet driver
tehuti		Tehuti Networks(R) Network Driver
tlan		Driver for TI ThunderLAN based ethernet PCI adapters
xirc2ps_cs		Xircom PCMCIA ethernet driver
geneve	0.6	Interface driver for GENEVE encapsulated traffic
hv_netvsc		Microsoft Hyper-V network driver
fakelb		
ifb		
ipvlan		Driver for L3 (IPv6/IPv4) based VLANs
ipvtap		
macsec		MACsec IEEE 802.1AE
macvlan		Driver for MAC address based VLANs
macvtap		
mdio		Generic support for MDIO-compatible transceivers
mii		MII hardware support library
net_failover		Failover driver for Paravirtual drivers
netconsole		Console driver for network interfaces
nlmon		Netlink monitoring device

Driver	Version	Description
ntb_netdev	0.7	ntb_netdev
amd		AMD PHY driver
at803x		Atheros 803x PHY driver
bcm-phy-lib		Broadcom PHY Library
bcm7xxx		Broadcom BCM7xxx internal PHY driver
bcm87xx		
broadcom		Broadcom PHY driver
cicada		Cicadia PHY driver
davicom		Davicom PHY driver
dp83640		National Semiconductor DP83640 PHY driver
et1011c		LSI ET1011C PHY driver
icplus		ICPlus IP175C/IP101A/IP101G/IC1001 PHY drivers
lxt		Intel LXT PHY driver
marvell		Marvell PHY driver
mdio-bitbang		
micrel		Micrel PHY driver
national		NatSemi PHY driver
qsemi		Quality Semiconductor PHY driver
realtek		Realtek PHY driver
smsc		SMSC PHY driver
ste10Xp		STMicroelectronics STe10Xp PHY driver
vitesse		Vitesse PHY driver
bsd_comp		
ppp_async		
ppp_deflate		
ppp_generic		
ppp_mppe	1.0.2	Point-to-Point Protocol Microsoft Point-to-Point Encryption support
ppp_synctty		
pppoe		PPP over Ethernet driver
pppox		PPP over Ethernet driver (generic socket layer)
pptp		Point-to-Point Tunneling Protocol
rionet		Ethernet over RapidIO
slhc		
slip		
sungem_phy		
tap		
team		Ethernet team device driver

Driver	Version	Description
team_mode_activebackup		Active-backup mode for team
team_mode_broadcast		Broadcast mode for team
team_mode_loadbalance		Load-balancing mode for team
team_mode_random		Random mode for team
team_mode_roundrobin		Round-robin mode for team
tun		Universal TUN/TAP device driver
asix	22-Dec-2011	ASIX AX8817X based USB 2.0 Ethernet Devices
ax88179_178a		ASIX AX88179/178A based USB 3.0/2.0 Gigabit Ethernet Devices
catc		CATC EL1210A NetMate USB Ethernet driver
cdc-phonet		USB CDC Phonet host interface
cdc_eem		USB CDC EEM
cdc_ether		USB CDC Ethernet devices
cdc_mbim		USB CDC MBIM host driver
cdc_ncm		USB CDC NCM host driver
cdc_subset		Simple 'CDC Subset' USB networking links
cx82310_eth		Conexant CX82310-based ADSL router USB ethernet driver
dm9601		Davicom DM96xx USB 10/100 ethernet devices
gl620a		GL620-USB-A Host-to-Host Link cables
hso		USB High Speed Option driver
huawei_cdc_ncm		USB CDC NCM host driver with encapsulated protocol support
int51x1		Intellon usb powerline adapter
ipheth		Apple iPhone USB Ethernet driver
kalmia		Samsung Kalmia USB network driver
kaweth		KL5USB101 USB Ethernet driver
lg-vl600		LG-VL600 modem's ethernet link
mcs7830		USB to network adapter MCS7830)
net1080		NetChip 1080 based USB Host-to-Host Links
pegasus		Pegasus/Pegasus II USB Ethernet driver
plusb		Prolific PL-2301/2302/25A1/27A1 USB Host to Host Link Driver
qmi_wwan		Qualcomm MSM Interface (QMI) WWAN driver
r8152	v1.09.9	Realtek RTL8152/RTL8153 Based USB Ethernet Adapters
rndis_host		USB Host side RNDIS driver
rtl8150		rtl8150 based usb-ethernet driver
sierra_net	v.2.0	USB-to-WWAN Driver for Sierra Wireless modems
smsc75xx		SMSC75XX USB 2.0 Gigabit Ethernet Devices
smsc95xx		SMSC95XX USB 2.0 Ethernet Devices

Driver	Version	Description
`sr9700`		SR9700 one chip USB 1.1 USB to Ethernet device from http://www.corechip-sz.com/
`sr9800`	11-Nov-2013	SR9800 USB 2.0 USB2NET Dev : http://www.corechip-sz.com
`usbnet`		USB network driver framework
`zaurus`		Sharp Zaurus PDA, and compatible products
`veth`		Virtual Ethernet Tunnel
`virtio_net`		Virtio network driver
`vmxnet3`	1.4.a.0-k	VMware vmxnet3 virtual NIC driver
`vxlan`	0.1	Driver for VXLAN encapsulated traffic
`dlci`		Frame Relay DLCI layer
`hdlc`		HDLC support module
`hdlc_cisco`		Cisco HDLC protocol support for generic HDLC
`hdlc_fr`		Frame-Relay protocol support for generic HDLC
`hdlc_ppp`		PPP protocol support for generic HDLC
`hdlc_raw`		Raw HDLC protocol support for generic HDLC
`i2400m-usb`		Driver for USB based Intel Wireless WiMAX Connection 2400M (5x50 & 6050)
`i2400m`		Intel 2400M WiMAX networking bus-generic driver
`adm8211`		Driver for IEEE 802.11b wireless cards based on ADMtek ADM8211
`ath`		Shared library for Atheros wireless LAN cards.
`ath9k`		Support for Atheros 802.11n wireless LAN cards.
`ath9k_common`		Shared library for Atheros wireless 802.11n LAN cards.
`ath9k_htc`		Atheros driver 802.11n HTC based wireless devices
`ath9k_hw`		Support for Atheros 802.11n wireless LAN cards.
`carl9170`		Atheros AR9170 802.11n USB wireless
`wil6210`		Driver for 60g WiFi WIL6210 card
`at76c50x-usb`		Atmel at76x USB Wireless LAN Driver
`atmel`		Support for Atmel at76c50x 802.11 wireless ethernet cards.
`atmel_cs`		Support for Atmel at76c50x 802.11 wireless ethernet cards.
`atmel_pci`		Support for Atmel at76c50x 802.11 wireless ethernet cards.
`b43`		Broadcom B43 wireless driver
`b43legacy`		Broadcom B43legacy wireless driver
`brcmfmac`		Broadcom 802.11 wireless LAN fullmac driver.
`brcmsmac`		Broadcom 802.11n wireless LAN driver.
`brcmutil`		Broadcom 802.11n wireless LAN driver utilities.
`airo`		Support for Cisco/Aironet 802.11 wireless ethernet cards. Direct support for ISA/PCI/MPI cards and support for PCMCIA when used with airo_cs.

Driver	Version	Description
airo_cs		Support for Cisco/Aironet 802.11 wireless ethernet cards. This is the module that links the PCMCIA card with the airo module.
ipw2100	git-1.2.2	Intel(R) PRO/Wireless 2100 Network Driver
ipw2200	1.2.2kdmprq	Intel(R) PRO/Wireless 2200/2915 Network Driver
libipw	git-1.1.13	802.11 data/management/control stack
iwl3945	in-tree:ds	Intel(R) PRO/Wireless 3945ABG/BG Network Connection driver for Linux
iwl4965	in-tree:d	Intel(R) Wireless WiFi 4965 driver for Linux
iwlegacy	in-tree:	iwl-legacy: common functions for 3945 and 4965
iwldvm		Intel(R) Wireless WiFi Link AGN driver for Linux
iwlwifi		Intel(R) Wireless WiFi driver for Linux
iwlmvm		The new Intel(R) wireless AGN driver for Linux
hostap		Host AP common routines
hostap_cs		Support for Intersil Prism2-based 802.11 wireless LAN cards (PC Card).
hostap_pci		Support for Intersil Prism2.5-based 802.11 wireless LAN PCI cards.
hostap_plx		Support for Intersil Prism2-based 802.11 wireless LAN cards (PLX).
orinoco		Driver for Lucent Orinoco, Prism II based and similar wireless cards
orinoco_cs		Driver for PCMCIA Lucent Orinoco, Prism II based and similar wireless cards
orinoco_nortel		Driver for wireless LAN cards using the Nortel PCI bridge
orinoco_plx		Driver for wireless LAN cards using the PLX9052 PCI bridge
orinoco_tmd		Driver for wireless LAN cards using the TMD7160 PCI bridge
spectrum_cs		Driver for Symbol Spectrum24 Trilogy cards with firmware downloader
p54common		Softmac Prism54 common code
p54pci		Prism54 PCI wireless driver
p54usb		Prism54 USB wireless driver
mac80211_hwsim		Software simulator of 802.11 radio(s) for mac80211
libertas		Libertas WLAN Driver Library
libertas_cs		Driver for Marvell 83xx compact flash WLAN cards
libertas_sdio		Libertas SDIO WLAN Driver
usb8xxx		8388 USB WLAN Driver
libertas_tf		Libertas WLAN Thinfirm Driver Library
libertas_tf_usb		8388 USB WLAN Thinfirm Driver
mwifiex	1.0	Marvell WiFi-Ex Driver version 1.0
mwifiex_pcie	1.0	Marvell WiFi-Ex PCI-Express Driver version 1.0

Driver	Version	Description
`mwifiex_sdio`	1.0	Marvell WiFi-Ex SDIO Driver version 1.0
`mwifiex_usb`	1.0	Marvell WiFi-Ex USB Driver version1.0
`mwl8k`	0.13	Marvell TOPDOG(R) 802.11 Wireless Network Driver
`rt2400pci`	2.3.0	Ralink RT2400 PCI & PCMCIA Wireless LAN driver.
`rt2500pci`	2.3.0	Ralink RT2500 PCI & PCMCIA Wireless LAN driver.
`rt2500usb`	2.3.0	Ralink RT2500 USB Wireless LAN driver.
`rt2800lib`	2.3.0	Ralink RT2800 library
`rt2800mmio`	2.3.0	rt2800 MMIO library
`rt2800pci`	2.3.0	Ralink RT2800 PCI & PCMCIA Wireless LAN driver.
`rt2800usb`	2.3.0	Ralink RT2800 USB Wireless LAN driver.
`rt2x00lib`	2.3.0	rt2x00 library
`rt2x00mmio`	2.3.0	rt2x00 mmio library
`rt2x00pci`	2.3.0	rt2x00 pci library
`rt2x00usb`	2.3.0	rt2x00 usb library
`rt61pci`	2.3.0	Ralink RT61 PCI & PCMCIA Wireless LAN driver.
`rt73usb`	2.3.0	Ralink RT73 USB Wireless LAN driver.
`rtl818x_pci`		RTL8180 / RTL8185 / RTL8187SE PCI wireless driver
`rtl8187`		RTL8187/RTL8187B USB wireless driver
`btcoexist`		Realtek 802.11n PCI wireless core
`rtl8188ee`		Realtek 8188E 802.11n PCI wireless
`rtl8192c-common`		Realtek 8192C/8188C 802.11n PCI wireless
`rtl8192ce`		Realtek 8192C/8188C 802.11n PCI wireless
`rtl8192cu`		Realtek 8192C/8188C 802.11n USB wireless
`rtl8192de`		Realtek 8192DE 802.11n Dual Mac PCI wireless
`rtl8192ee`		Realtek 8192EE 802.11n PCI wireless
`rtl8192se`		Realtek 8192S/8191S 802.11n PCI wireless
`rtl8723ae`		Realtek 8723E 802.11n PCI wireless
`rtl8723be`		Realtek 8723BE 802.11n PCI wireless
`rtl8723-common`		Realtek RTL8723AE/RTL8723BE 802.11n PCI wireless common routines
`rtl8821ae`		Realtek 8821ae 802.11ac PCI wireless
`rtl_pci`		PCI basic driver for rtlwifi
`rtl_usb`		USB basic driver for rtlwifi
`rtlwifi`		Realtek 802.11n PCI wireless core
`rndis_wlan`		Driver for RNDIS based USB Wireless adapters
`wl1251`		TI wl1251 Wireless LAN Driver Core
`wl1251_sdio`		

Driver	Version	Description
wl3501_cs		Planet wl3501 wireless driver
zd1201	0.15	Driver for ZyDAS ZD1201 based USB Wireless adapters
zd1211rw	1.0	USB driver for devices with the ZD1211 chip.
xen-netback		
xen-netfront		Xen virtual network device frontend

A.39 ntb Drivers in UEK R5U1 (x86_64)

Table A.39 ntb Driver List

Driver	Version	Description
ntb	1.0	PCIe NTB Driver Framework
ntb_transport	4	Software Queue-Pair Transport over NTB

A.40 nvdimm Drivers in UEK R5U1 (x86_64)

Table A.40 nvdimm Driver List

Driver	Version	Description
libnvdimm		
nd_blk		
nd_btt		
nd_e820		
nd_pmem		

A.41 nvme Drivers in UEK R5U1 (x86_64)

Table A.41 nvme Driver List

Driver	Version	Description
nvme-core	1.0	
nvme-fabrics		
nvme-fc		
nvme-rdma		
nvme	1.0	
nvme-fcloop		
nvme-loop		
nvmet-fc		
nvmet-rdma		
nvmet		

A.42 `parport` Drivers in UEK R5U1 (x86_64)

Table A.42 parport Driver List

Driver	Version	Description
parport		
parport_cs		PCMCIA parallel port card driver
parport_pc		PC-style parallel port driver
parport_serial		Driver for common parallel+serial multi-I/O PCI cards

A.43 `pci` Drivers in UEK R5U1 (x86_64)

Table A.43 pci Driver List

Driver	Version	Description
pci-hyperv		Hyper-V PCI
acpiphp_ibm	1.0.1	ACPI Hot Plug PCI Controller Driver IBM extension
shpchp		Standard Hot Plug PCI Controller Driver
aer_inject		PCIe AER software error injector

A.44 `pcmcia` Drivers in UEK R5U1 (x86_64)

Table A.44 pcmcia Driver List

Driver	Version	Description
pd6729		Driver for the Cirrus PD6729 PCI-PCMCIA bridge
yenta_socket		

A.45 `pinctrl` Drivers in UEK R5U1 (x86_64)

Table A.45 pinctrl Driver List

Driver	Version	Description
pinctrl-cannonlake		Intel Cannon Lake PCH pinctrl/GPIO driver
pinctrl-denverton		Intel Denverton SoC pinctrl/GPIO driver
pinctrl-geminilake		Intel Gemini Lake SoC pinctrl/GPIO driver
pinctrl-intel		Intel pinctrl/GPIO core driver
pinctrl-lewisburg		Intel Lewisburg pinctrl/GPIO driver

A.46 `platform` Drivers in UEK R5U1 (x86_64)

Table A.46 platform Driver List

Driver	Version	Description
chromeos_laptop		Chrome OS Laptop driver
chromeos_pstore		Chrome OS pstore module

Driver	Version	Description
acer-wmi		Acer Laptop WMI Extras Driver
acerhdf		Aspire One temperature and fan driver
amilo-rfkill		
apple-gmux		Apple Gmux Driver
asus-laptop		Asus Laptop Support
asus-nb-wmi		Asus Notebooks WMI Hotkey Driver
asus-wmi		Asus Generic WMI Driver
classmate-laptop		
compal-laptop	0.2.7	Compal Laptop Support
dell-laptop		Dell laptop driver
dell-smbios		Common functions for kernel modules using Dell SMBIOS
dell-wmi-aio		WMI hotkeys driver for Dell All-In-One series
dell-wmi		Dell laptop WMI hotkeys driver
eeepc-laptop		Eee PC Hotkey Driver
eeepc-wmi		Eee PC WMI Hotkey Driver
fujitsu-laptop	0.6.0	Fujitsu laptop extras support
fujitsu-tablet	2.5	Fujitsu tablet pc extras driver
hdaps		IBM Hard Drive Active Protection System (HDAPS) driver
hp-wmi		HP laptop WMI hotkeys driver
hp_accel		Glue between LIS3LV02Dx and HP ACPI BIOS and support for disk protection LED.
ibm_rtl		
ideapad-laptop		IdeaPad ACPI Extras
intel-rst		
intel-smartconnect		
intel-vbtn		
intel_ips		Intelligent Power Sharing Driver
intel_oaktrail	0.4ac1	Intel Oaktrail Platform ACPI Extras
msi-laptop	0.5	MSI Laptop Support
msi-wmi		MSI laptop WMI hotkeys driver
mxm-wmi		MXM WMI Driver
panasonic-laptop		ACPI HotKey driver for Panasonic Let's Note laptops
samsung-laptop		Samsung Backlight driver
samsung-q10		Samsung Q10 Driver
sony-laptop		Sony laptop extras driver (SPIC and SNC ACPI device)
thinkpad_acpi	0.25	ThinkPad ACPI Extras

Driver	Version	Description
`topstar-laptop`		Topstar Laptop ACPI Extras driver
`toshiba_acpi`		Toshiba Laptop ACPI Extras Driver
`toshiba_bluetooth`		Toshiba Laptop ACPI Bluetooth Enable Driver
`wmi-bmof`		WMI embedded Binary MOF driver
`wmi`		ACPI-WMI Mapping Driver

A.47 `power` Drivers in UEK R5U1 (x86_64)

Table A.47 power Driver List

Driver	Version	Description
`bq2415x_charger`		bq2415x charger driver
`bq24190_charger`		TI BQ24190 Charger Driver
`bq24735-charger`		bq24735 battery charging driver
`ds2780_battery`		Maxim/Dallas DS2780 Stand-Alone Fuel Gauge IC driver
`ds2781_battery`		Maxim/Dallas DS2781 Stand-Alone Fuel Gauge IC driver
`ds2782_battery`		Maxim/Dallas DS2782 Stand-Alone Fuel Gauge IC driver
`gpio-charger`		Driver for chargers which report their online status through a GPIO
`isp1704_charger`		ISP170x USB Charger driver
`lp8727_charger`		TI/National Semiconductor LP8727 charger driver
`max17040_battery`		MAX17040 Fuel Gauge
`max17042_battery`		MAX17042 Fuel Gauge
`max8903_charger`		MAX8903 Charger Driver
`sbs-battery`		SBS battery monitor driver
`smb347-charger`		SMB347 battery charger driver

A.48 `pps` Drivers in UEK R5U1 (x86_64)

Table A.48 pps Driver List

Driver	Version	Description
`pps-gpio`	1.0.0	Use GPIO pin as PPS source
`pps-ldisc`		PPS TTY device driver
`pps_parport`		parallel port PPS client
`pps_core`		LinuxPPS support (RFC 2783) - ver. 5.3.6

A.49 `ptp` Drivers in UEK R5U1 (x86_64)

Table A.49 ptp Driver List

Driver	Version	Description
`ptp`		PTP clocks support
`ptp_kvm`		PTP clock using KVMCLOCK

A.50 `regulator` Drivers in UEK R5U1 (x86_64)

Table A.50 regulator Driver List

Driver	Version	Description
fixed		Fixed voltage regulator
lp3971		LP3971 PMIC driver
max1586		MAXIM 1586 voltage regulator driver
tps65023-regulator		TPS65023 voltage regulator driver
tps6507x-regulator		TPS6507x voltage regulator driver
userspace-consumer		Userspace consumer for voltage and current regulators

A.51 `rtc` Drivers in UEK R5U1 (x86_64)

Table A.51 rtc Driver List

Driver	Version	Description
rtc-bq32k		TI BQ32000 I2C RTC driver
rtc-bq4802		TI BQ4802 RTC driver
rtc-ds1286		DS1286 RTC driver
rtc-ds1307		RTC driver for DS1307 and similar chips
rtc-ds1374		Maxim/Dallas DS1374 RTC Driver
rtc-ds1511		Dallas DS1511 RTC driver
rtc-ds1553		Dallas DS1553 RTC driver
rtc-ds1672		Dallas/Maxim DS1672 timekeeper driver
rtc-ds1742		Dallas DS1742 RTC driver
rtc-ds2404		DS2404 RTC
rtc-ds3232		Maxim/Dallas DS3232/DS3234 RTC Driver
rtc-em3027		EM Microelectronic EM3027 RTC driver
rtc-fm3130		RTC driver for FM3130
rtc-isl12022		ISL 12022 RTC driver
rtc-isl1208		Intersil ISL1208 RTC driver
rtc-m41t80		ST Microelectronics M41T80 series RTC I2C Client Driver
rtc-m48t35		M48T35 RTC driver
rtc-m48t59		M48T59/M48T02/M48T08 RTC driver
rtc-m48t86		M48T86 RTC driver
rtc-max6900		Maxim MAX6900 RTC driver
rtc-msm6242		Oki MSM6242 RTC driver
rtc-pcf2127		NXP PCF2127/29 RTC driver
rtc-pcf50633		PCF50633 RTC driver

Driver	Version	Description
`rtc-pcf85063`		PCF85063 RTC driver
`rtc-pcf8523`		NXP PCF8523 RTC driver
`rtc-pcf8563`		Philips PCF8563/Epson RTC8564 RTC driver
`rtc-pcf8583`		PCF8583 I2C RTC driver
`rtc-rp5c01`		Ricoh RP5C01 RTC driver
`rtc-rs5c372`		Ricoh RS5C372 RTC driver
`rtc-rv3029c2`		Micro Crystal RV3029/RV3049 RTC driver
`rtc-rx8025`		RX-8025 SA/NB RTC driver
`rtc-rx8581`		Epson RX-8581 RTC driver
`rtc-s35390a`		S35390A RTC driver
`rtc-stk17ta8`		Simtek STK17TA8 RTC driver
`rtc-v3020`		V3020 RTC
`rtc-x1205`		Xicor/Intersil X1205 RTC driver

A.52 `scsi` Drivers in UEK R5U1 (x86_64)

Table A.52 scsi Driver List

Driver	Version	Description
`3w-9xxx`	2.26.02.014	3ware 9000 Storage Controller Linux Driver
`3w-sas`	3.26.02.000	LSI 3ware SAS/SATA-RAID Linux Driver
`aacraid`	1.2.1[50834]-custom	Dell PERC2, 2/Si, 3/Si, 3/Di, Adaptec Advanced Raid Products, HP NetRAID-4M, IBM ServeRAID & ICP SCSI driver
`aic79xx`	3.0	Adaptec AIC790X U320 SCSI Host Bus Adapter driver
`aic7xxx`	7.0	Adaptec AIC77XX/78XX SCSI Host Bus Adapter driver
`aic94xx`	1.0.3	Adaptec aic94xx SAS/SATA driver
`arcmsr`	v1.30.00.22-20151126	Areca ARC11xx/12xx/16xx/188x SAS/SATA RAID Controller Driver
`be2iscsi`	11.4.0.0	Emulex OneConnectOpen-iSCSI Driver version11.4.0.0 Driver 11.4.0.0
`bfa`	3.2.25.1	QLogic BR-series Fibre Channel HBA Driver fcpim
`bnx2fc`	2.11.8	QLogic FCoE Driver
`bnx2i`	2.7.10.1	QLogic NetXtreme II BCM5706/5708/5709/57710/57711/57712/57800/57810/57840 iSCSI Driver
`ch`		device driver for scsi media changer devices
`csiostor`	1.0.0-ko	Chelsio FCoE driver
`cxgb3i`	2.0.1-ko	Chelsio T3 iSCSI Driver
`cxgb4i`	0.9.5-ko	Chelsio T4-T6 iSCSI Driver
`libcxgbi`	0.9.1-ko	Chelsio iSCSI driver library
`fcoe`		FCoE

Driver	Version	Description
libfcoe		FIP discovery protocol and FCoE transport for FCoE HBAs
fnic	1.6.0.34	Cisco FCoE HBA Driver
hpsa	3.4.20-0	Driver for HP Smart Array Controller version 3.4.20-0
hptiop		HighPoint RocketRAID 3xxx/4xxx Controller Driver
hv_storvsc		Microsoft Hyper-V virtual storage driver
imm		
initio		Initio INI-9X00U/UW SCSI device driver
ips	7.12.05	IBM ServeRAID Adapter Driver 7.12.05
isci	1.2.0	
iscsi_boot_sysfs		sysfs interface and helpers to export iSCSI boot information
iscsi_tcp		iSCSI/TCP data-path
libfc		libfc
libiscsi		iSCSI library functions
libiscsi_tcp		iSCSI/TCP data-path
libsas		SAS Transport Layer
lpfc	0:12.0.0.7	Emulex LightPulse Fibre Channel SCSI driver 12.0.0.7
megaraid_mbox	2.20.5.1	LSI Logic MegaRAID Mailbox Driver
megaraid_mm	2.20.2.7	LSI Logic Management Module
megaraid_sas	07.704.04.00-rc1	Avago MegaRAID SAS Driver
mpt3sas	17.100.00.00	LSI MPT Fusion SAS 3.0 Device Driver
mvsas	0.8.16	Marvell 88SE6440 SAS/SATA controller driver
mvumi		Marvell UMI Driver
libosd		open-osd initiator library libosd.ko
osd		open-osd Upper-Layer-Driver osd.ko
osst		OnStream {DI-|FW-|SC-|USB}{30|50} Tape Driver
aha152x_cs		Adaptec 152x SCSI driver; $Revision: 2.7 $
pm80xx	0.1.38	PMC-Sierra PM8001/8006/8081/8088/8089/8074/8076/8077/8070/8072 SAS/SATA controller driver
pmcraid	1.0.3	PMC Sierra MaxRAID Controller Driver
ppa		
qedf	8.20.5.0	QLogic QEDF 25/40/50/100Gb FCoE Driver
qedi	8.10.4.0	QLogic FastLinQ 4xxxx iSCSI Module
qla2xxx	10.00.00.07-k1	QLogic Fibre Channel HBA Driver
qla4xxx	5.04.00-k6	QLogic iSCSI HBA Driver
raid_class		RAID device class
scsi_debug	1.86	SCSI debug adapter driver
scsi_transport_fc		FC Transport Attributes

Driver	Version	Description
`scsi_transport_iscsi`	2.0-870	iSCSI Transport Interface
`scsi_transport_sas`		SAS Transport Attributes
`scsi_transport_spi`		SPI Transport Attributes
`scsi_transport_srp`		SRP Transport Attributes
`sd_mod`		SCSI disk (sd) driver
`ses`		SCSI Enclosure Services (ses) driver
`sg`	3.5.36	SCSI generic (sg) driver
`smartpqi`	1.1.4-130	Driver for Microsemi Smart Family Controller version 1.1.4-130
`snic`	0.0.1.18	Cisco SCSI NIC Driver
`sr_mod`		SCSI cdrom (sr) driver
`st`		SCSI tape (st) driver
`stex`	6.02.0000.01	Promise Technology SuperTrak EX Controllers
`sym53c8xx`	2.2.3	NCR, Symbios and LSI 8xx and 1010 PCI SCSI adapters
`ufshcd-pci`	0.2	UFS host controller PCI glue driver
`ufshcd`	0.2	Generic UFS host controller driver Core
`virtio_scsi`		Virtio SCSI HBA driver
`vmw_pvscsi`	1.0.7.0-k	VMware PVSCSI driver
`xen-scsifront`		Xen SCSI frontend driver

A.53 `ssb` Drivers in UEK R5U1 (x86_64)

Table A.53 ssb Driver List

Driver	Version	Description
`ssb`		Sonics Silicon Backplane driver

A.54 `staging` Drivers in UEK R5U1 (x86_64)

Table A.54 staging Driver List

Driver	Version	Description
`firewire-serial`		FireWire Serial TTY Driver
`r8192e_pci`	0014.0401.2010	Linux driver for Realtek RTL819x WiFi cards
`rtllib`		
`rtllib_crypt_ccmp`		
`rtllib_crypt_tkip`		
`rtllib_crypt_wep`		
`r8712u`		rtl871x wireless lan driver

A.55 `target` Drivers in UEK R5U1 (x86_64)

Table A.55 target Driver List

Driver	Version	Description
`iscsi_target_mod`	4.1.x	iSCSI-Target Driver for mainline target infrastructure
`tcm_loop`		TCM loopback virtual Linux/SCSI fabric module
`target_core_file`		TCM FILEIO subsystem plugin
`target_core_iblock`		TCM IBLOCK subsystem plugin
`target_core_mod`		Target_Core_Mod/ConfigFS
`target_core_pscsi`		TCM PSCSI subsystem plugin
`target_core_user`		TCM USER subsystem plugin
`tcm_fc`		FC TCM fabric driver 0.4

A.56 `thermal` Drivers in UEK R5U1 (x86_64)

Table A.56 thermal Driver List

Driver	Version	Description
`intel_powerclamp`		Package Level C-state Idle Injection for Intel CPUs

A.57 `tty` Drivers in UEK R5U1 (x86_64)

Table A.57 tty Driver List

Driver	Version	Description
`cyclades`	2.6	
`ipwireless`		ipwireless 1.1
`n_gsm`		
`n_hdlc`		
`nozomi`		Nozomi driver
`serial_cs`		
`altera_jtaguart`		Altera JTAG UART driver
`altera_uart`		Altera UART driver
`arc_uart`		ARC(Synopsys) On-Chip(fpga) serial driver
`jsm`		Driver for the Digi International Neo and Classic PCI based product line
`synclink`		
`synclink_gt`		
`synclinkmp`		

A.58 `uio` Drivers in UEK R5U1 (x86_64)

Table A.58 uio Driver List

Driver	Version	Description
`uio`		

Driver	Version	Description
uio_aec		
uio_cif		
uio_hv_generic	0.02.0	Generic UIO driver for VMBus devices
uio_pci_generic	0.01.0	Generic UIO driver for PCI 2.3 devices
uio_pdrv_genirq		Userspace I/O platform driver with generic IRQ handling
uio_sercos3		UIO driver for the Automata Sercos III PCI card

A.59 usb Drivers in UEK R5U1 (x86_64)

Table A.59 usb Driver List

Driver	Version	Description
cxacru		Conexant AccessRunner ADSL USB modem driver
speedtch		Alcatel SpeedTouch USB driver
ueagle-atm		ADI 930/Eagle USB ADSL Modem driver
usbatm		Generic USB ATM/DSL I/O
xusbatm		Driver for USB ADSL modems initialized in userspace
cdc-acm		USB Abstract Control Model driver for USB modems and ISDN adapters
cdc-wdm		USB Abstract Control Model driver for USB WCM Device Management
usblp		USB Printer Device Class driver
usbtmc		
hwa-hc		Host Wired Adapter USB Host Control Driver
isp1362-hcd		ISP1362 USB Host Controller Driver
sl811-hcd		SL811HS USB Host Controller Driver
u132-hcd		U132 USB Host Controller Driver
whci-hcd		WHCI Wireless USB host controller driver
mdc800		USB Driver for Mustek MDC800 Digital Camera
microtek		Microtek Scanmaker X6 USB scanner driver
adutux		adutux (see www.ontrak.net)
appledisplay		Apple Cinema Display driver
emi26		Emagic EMI 2|6 firmware loader.
emi62		Emagic EMI 6|2m firmware loader.
ezusb		
ftdi-elan		FTDI ELAN driver
idmouse		Siemens ID Mouse FingerTIP Sensor Driver
iowarrior		USB IO-Warrior driver
isight_firmware		
ldusb		LD USB Driver

Driver	Version	Description
legousbtower		LEGO USB Tower Driver
sisusbvga		sisusbvga - Driver for Net2280/SiS315-based USB2VGA dongles
usb3503		USB3503 USB HUB driver
usblcd		USBLCD Driver Version 1.05
usbsevseg		USB 7 Segment Driver
uss720		USB Parport Cable driver for Cables using the Lucent Technologies USS720 Chip
phy-generic		NOP USB Transceiver driver
aircable		AIRcable USB Driver
ark3116		USB ARK3116 serial/IrDA driver
belkin_sa		USB Belkin Serial converter driver
ch341		
cp210x		Silicon Labs CP210x RS232 serial adaptor driver
cyberjack		REINER SCT cyberJack pinpad/e-com USB Chipcard Reader Driver
cypress_m8		Cypress USB to Serial Driver
digi_acceleport		Digi AccelePort USB-2/USB-4 Serial Converter driver
empeg		USB Empeg Mark I/II Driver
f81232		Fintek F81232 USB to serial adaptor driver
ftdi_sio		USB FTDI Serial Converters Driver
garmin_gps		garmin gps driver
io_edgeport		Edgeport USB Serial Driver
io_ti		Edgeport USB Serial Driver
ipaq		USB PocketPC PDA driver
ipw		IPWireless tty driver
ir-usb		USB IR Dongle driver
iuu_phoenix		Infinity USB Unlimited Phoenix driver
keyspan		Keyspan USB to Serial Converter Driver
keyspan_pda		USB Keyspan PDA Converter driver
kl5kusb105		KLSI KL5KUSB105 chipset USB->Serial Converter driver
kobil_sct		KOBIL USB Smart Card Terminal Driver (experimental)
mct_u232		Magic Control Technology USB-RS232 converter driver
metro-usb		Metrologic Instruments Inc. - USB-POS driver
mos7720		Moschip USB Serial Driver
mos7840		Moschip 7840/7820 USB Serial Driver
mxuport		
navman		
omninet		USB ZyXEL omni.net LCD PLUS Driver

Driver	Version	Description
opticon		Opticon USB barcode to serial driver (1D)
option		USB Driver for GSM modems
oti6858		Ours Technology Inc. OTi-6858 USB to serial adapter driver
pl2303		Prolific PL2303 USB to serial adaptor driver
qcaux		
qcserial		Qualcomm USB Serial driver
quatech2		Quatech 2nd gen USB to Serial Driver
safe_serial		USB Safe Encapsulated Serial
sierra		USB Driver for Sierra Wireless USB modems
spcp8x5		SPCP8x5 USB to serial adaptor driver
ssu100		Quatech SSU-100 USB to Serial Driver
symbolserial		
ti_usb_3410_5052		TI USB 3410/5052 Serial Driver
usb-serial-simple		
usb_debug		
usb_wwan		USB Driver for GSM modems
visor		USB HandSpring Visor / Palm OS driver
whiteheat		USB ConnectTech WhiteHEAT driver
wishbone-serial		USB Wishbone-Serial adapter
xsens_mt		USB-serial driver for Xsens motion trackers
uas		
ums-alauda		Driver for Alauda-based card readers
ums-cypress		SAT support for Cypress USB/ATA bridges with ATACB
ums-datafab		Driver for Datafab USB Compact Flash reader
ums-eneub6250		Driver for ENE UB6250 reader
ums-freecom		Driver for Freecom USB/IDE adaptor
ums-isd200		Driver for In-System Design, Inc. ISD200 ASIC
ums-jumpshot		Driver for Lexar "Jumpshot" Compact Flash reader
ums-karma		Driver for Rio Karma
ums-onetouch		Maxtor USB OneTouch hard drive button driver
ums-realtek		Driver for Realtek USB Card Reader
ums-sddr09		Driver for SanDisk SDDR-09 SmartMedia reader
ums-sddr55		Driver for SanDisk SDDR-55 SmartMedia reader
ums-usbat		Driver for SCM Microsystems (a.k.a. Shuttle) USB-ATAPI cable
usb-storage		USB Mass Storage driver for Linux
typec		USB Type-C Connector Class

Driver	Version	Description
typec_ucsi		USB Type-C Connector System Software Interface driver
usbip-core		USB/IP Core
wusb-cbaf		Wireless USB Cable Based Association
wusb-wa		Wireless USB Wire Adapter core
wusbcore		Wireless USB core

A.60 uwb Drivers in UEK R5U1 (x86_64)

Table A.60 uwb Driver List

Driver	Version	Description
hwa-rc		Host Wireless Adapter Radio Control Driver
i1480-dfu-usb		Intel Wireless UWB Link 1480 firmware uploader for USB
i1480-est		i1480's Vendor Specific Event Size Tables
umc		UWB Multi-interface Controller capability bus
uwb		Ultra Wide Band core
whc-rc		Wireless Host Controller Radio Control Driver
whci		WHCI UWB Multi-interface Controller enumerator

A.61 vfio Drivers in UEK R5U1 (x86_64)

Table A.61 vfio Driver List

Driver	Version	Description
mdev	0.1	Mediated device Core Driver
vfio_mdev	0.1	VFIO based driver for Mediated device
vfio-pci	0.2	VFIO PCI - User Level meta-driver
vfio	0.3	VFIO - User Level meta-driver
vfio_iommu_type1	0.2	Type1 IOMMU driver for VFIO
vfio_virqfd	0.1	IRQFD support for VFIO bus drivers

A.62 vhost Drivers in UEK R5U1 (x86_64)

Table A.62 vhost Driver List

Driver	Version	Description
vhost	0.0.1	Host kernel accelerator for virtio
vhost_net	0.0.1	Host kernel accelerator for virtio net
vhost_scsi		VHOST_SCSI series fabric driver
vhost_vsock		vhost transport for vsock

A.63 `video` Drivers in UEK R5U1 (x86_64)

Table A.63 video Driver List

Driver	Version	Description
apple_bl		Apple Backlight Driver
lcd		LCD Lowlevel Control Abstraction
platform_lcd		
aty128fb		FBDev driver for ATI Rage128 / Pro cards
atyfb		FBDev driver for ATI Mach64 cards
radeonfb		framebuffer driver for ATI Radeon chipset
cirrusfb		Accelerated FBDev driver for Cirrus Logic chips
fb_ddc		DDC/EDID reading support
fb_sys_fops		Generic file read (fb in system RAM)
syscopyarea		Generic copyarea (sys-to-sys)
sysfillrect		Generic fill rectangle (sys-to-sys)
sysimgblt		1-bit/8-bit to 1-32 bit color expansion (sys-to-sys)
hyperv_fb		Microsoft Hyper-V Synthetic Video Frame Buffer Driver
macmodes		
nvidiafb		Framebuffer driver for nVidia graphics chipset
rivafb		Framebuffer driver for nVidia Riva 128, TNT, TNT2, and the GeForce series
savagefb		FBDev driver for S3 Savage PCI/AGP Chips
sm501fb		SM501 Framebuffer driver
vfb		
vga16fb		Legacy VGA framebuffer device driver
viafb		
xen-fbfront		Xen virtual framebuffer device frontend
vgastate		VGA State Save/Restore

A.64 `virtio` Drivers in UEK R5U1 (x86_64)

Table A.64 virtio Driver List

Driver	Version	Description
virtio		
virtio_balloon		Virtio balloon driver
virtio_input		Virtio input device driver
virtio_pci	1	virtio-pci
virtio_ring		

A.65 `w1` Drivers in UEK R5U1 (x86_64)

Table A.65 w1 Driver List

Driver	Version	Description
`w1_ds2780`		1-wire Driver for Maxim/Dallas DS2780 Stand-Alone Fuel Gauge IC
`w1_ds2781`		1-wire Driver for Maxim/Dallas DS2781 Stand-Alone Fuel Gauge IC
`wire`		Driver for 1-wire Dallas network protocol.

A.66 `watchdog` Drivers in UEK R5U1 (x86_64)

Table A.66 watchdog Driver List

Driver	Version	Description
`acquirewdt`		Acquire Inc. Single Board Computer Watchdog Timer driver
`advantechwdt`		Advantech Single Board Computer WDT driver
`alim1535_wdt`		ALi M1535 PMU Watchdog Timer driver
`alim7101_wdt`		ALi M7101 PMU Computer Watchdog Timer driver
`cpu5wdt`		sma cpu5 watchdog driver
`eurotechwdt`		Driver for Eurotech CPU-1220/1410 on board watchdog
`f71808e_wdt`		F71808E Watchdog Driver
`hpwdt`	1.4.0	hp watchdog driver
`i6300esb`		Watchdog driver for Intel 6300ESB chipsets
`iTCO_vendor_support`	1.04	Intel TCO Vendor Specific WatchDog Timer Driver Support
`iTCO_wdt`	1.11	Intel TCO WatchDog Timer Driver
`ib700wdt`		IB700 SBC watchdog driver
`ibmasr`		IBM Automatic Server Restart driver
`ie6xx_wdt`		Intel Atom E6xx Watchdog Device Driver
`it8712f_wdt`		IT8712F Watchdog Driver
`it87_wdt`		Hardware Watchdog Device Driver for IT87xx EC-LPC I/O
`machzwd`		MachZ ZF-Logic Watchdog driver
`mena21_wdt`		MEN A21 Watchdog
`nv_tco`		TCO timer driver for NV chipsets
`of_xilinx_wdt`		Xilinx Watchdog driver
`pc87413_wdt`		PC87413 WDT driver
`pcwd_pci`		Berkshire PCI-PC Watchdog driver
`pcwd_usb`		Berkshire USB-PC Watchdog driver
`sbc60xxwdt`		60xx Single Board Computer Watchdog Timer driver
`sbc_epx_c3`		Hardware Watchdog Device for Winsystems EPX-C3 SBC. Note that there is no way to probe for this device -- so only use it if

Driver	Version	Description
		you are *sure* you are running on this specific SBC system from Winsystems! It writes to IO ports 0x1ee and 0x1ef!
sbc_fitpc2_wdt		SBC-FITPC2 Watchdog
sc1200wdt		Driver for National Semiconductor PC87307/PC97307 watchdog component
sch311x_wdt		SMSC SCH311x WatchDog Timer Driver
smsc37b787_wdt		Driver for SMsC 37B787 watchdog component (Version 1.1)
softdog		Software Watchdog Device Driver
sp5100_tco		TCO timer driver for SP5100/SB800 chipset
via_wdt		Driver for watchdog timer on VIA chipset
w83627hf_wdt		w83627hf/thf WDT driver
w83877f_wdt		Driver for watchdog timer in w83877f chip
w83977f_wdt		Driver for watchdog timer in W83977F I/O chip
wafer5823wdt		ICP Wafer 5823 Single Board Computer WDT driver
wdt_pci		Driver for the ICS PCI-WDT500/501 watchdog cards
xen_wdt		Xen WatchDog Timer Driver

A.67 xen Drivers in UEK R5U1 (x86_64)

Table A.67 xen Driver List

Driver	Version	Description
ovmapi		
tmem		Shim to Xen transcendent memory
xen-acpi-processor		Xen ACPI Processor P-states (and Cx) driver which uploads PM data to Xen hypervisor
xen-evtchn		
xen-gntalloc		User-space grant reference allocator driver
xen-gntdev		User-space granted page access driver
xen-privcmd		
xen-scsiback		Xen SCSI backend driver
xenfs		Xen filesystem