# Unbreakable Enterprise Kernel

## Release Notes for Unbreakable Enterprise Kernel Release 5 Update 4

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Unbreakable Enterprise Kernel Release Notes for Unbreakable Enterprise Kernel Release 5 Update 4,

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# Contents

# Preface

> **Important:**
>
> The software described in this documentation is either in Extended Support or Sustaining Support. See Oracle Open Source Support Policies for more information.
>
> We recommend that you upgrade the software described by this documentation as soon as possible.

Unbreakable Enterprise Kernel: Release Notes for Unbreakable Enterprise Kernel Release 5 Update 4 (4.14.35-2025.400) provides a summary of the new features, changes, and known issues in the Unbreakable Enterprise Kernel Release 5 Update 4.

## 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. |

## Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at https://www.oracle.com/corporate/accessibility/.

## Access to Oracle Support for Accessibility

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# Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees, customers, and partners, we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.

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 7.5 and later on the `x86_64` and 64-bit Arm (aarch64) architectures. The release is based on the mainline Linux kernel version 4.14.35. This release also updates drivers and includes bug and security fixes.

UEK R5U4 uses the 4.14.35-2025.400 version and build of the UEK R5 kernel, which includes security and bug fixes, as well as driver updates.

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.

## Notable Features and Changes

The following are the major new features of Unbreakable Enterprise Kernel Release 5 Update 4 (UEK R5U4), relative to UEK R5U4.

### 64-bit Arm (aarch64) Architecture

With Unbreakable Enterprise Kernel Release 5 Update 4, 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 that are beyond the scope of current development work for Arm are described in more detail in Unusable or Unavailable Features for Arm.

### Core Kernel Functionality

UEK R5U4 provides equivalent core kernel functionality to UEK R5U3, making use of the same upstream mainline kernel release and upstream LTS bug fixes, with additional patches to enhance existing functionality and provide some minor bug fixes and security improvements. Key changes are specific to functionality that is required for Oracle Database and other Oracle software.

## Process Virtual Address Space Reservation

Kernel patching is applied to enable a feature that allows reservation of process virtual address ranges. This feature is specifically developed to improve Oracle Database stability when ASLR (Address Space Layout Randomization) is enabled. Kernel and user space interfaces are available to reserve memory ranges and allocate memory map from these ranges when a user space task requires. This feature is available for ELF64 binary objects only and its support and use case is currently limited to Oracle Database.

## DTrace

The following notable DTrace features and fixes are implemented in UEK R5U4:

- **Fix for tail recursion in dtrace_dynvar()**

  A fix was applied for an issue where lengthy tail recursion in `dtrace_dynvar()` could lead to an out-of-stack crash when the kernel stack is overrun with many recursion calls.

## File Systems

The following notable file system changes are implemented in UEK R5U4:

- **Btrfs**

  General upstream bug fixes are back-ported into this kernel update release.

- **CIFS**

  Upstream bug fixes are included, along with a fix to a specific bug that could prevent CIFS mounts when using Distributed File Systems (DFS).

- **Ext4**

  Multiple upstream bug fixes are back-ported into this kernel update release.

- **NFS**

  NFS is updated with several upstream fixes, along with improvements and optimizations for page cache and RPC call handling . Bug fixes that resolve a number of issues that could result in NFSv4 clients losing lease expiry state or obtaining incorrect lease expiry information were also back-ported from the upstream kernel.

- **OCFS2**

  Issues with the NFS kernel server when hosted on OCFS2 are resolved. In particular, patches are applied to prevent inode removal while nfsd is accessing the inode.

- **XFS**

  XFS is updated to include upstream patches, including security fixes and general bug fixes. Notably, a fix is applied for a file system freeze that could cause a system to hang. . Also, as part of this update, a bug was fixed to fix and improve ratelimiting code that could result in a race condition when inode flushing.

## Networking

UEK R5U4 supports 1/10/25/50/100 Gb Ethernet ports. 200 Gb Ethernet ports are not enabled in UEK R5U4 as the changes required to support this affect the kernel ABI. Oracle maintains

kernel ABI compatibility through the duration of the UEK R5 lifecycle. If you require the use of 200 Gb Ethernet ports use UEK R6.

The following additional enhancements and feature changes are in place for networking functionality in this update release:

- **Enhanced TCP Stack for diagnostics**

  Enhancements are added to the TCP stack to facilitate better diagnostics through extended Berkeley Packet Filter (eBPF) tracepoints along with several optimizations that allow more rapid diagnostics and testing, but also to reduce performance overhead related to tracing.

## Security

The following notable security features are implemented in Unbreakable Enterprise Kernel Release 5 Update 4:

- **Spectre-v1 mitigation extensions**

  Patches available in the upstream Linux 5.6 kernel are included to extend Spectre-v1 mitigation by preventing index computations from causing speculative loads into the L1 cache.

# 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 R5U4 along with version information is provided in the appendix at Driver Modules in Unbreakable Enterprise Kernel Release 5 Update 4 (x86_64).

## Notable Driver Features and Updates

The following driver updates are included in UEK R5U4 since the release of UEK R5U3:

- **Broadcom BCM573xx network driver**

  The Broadcom BCM573xx network driver, `bnxt_en`, is updated to version 1.10.1. This update includes a large number of vendor supplied patches, including a bug fix to improve stats handling.

- **Intel Ethernet Switch Host Interface driver**

  The Intel Ethernet Switch Host Interface driver, `fm10k` is updated to version 0.27.1-k. This update takes advantage of many upstream patches and fixes and enables the driver to work with newer hardware.

- **Intel Ethernet Connection XL710 network driver**

  The Intel Ethernet Connection XL710 network driver, `i40e`, is updated to version 2.8.20-k for the latest upstream and vendor supplied patches.

- **Broadcom MegaRAID SAS driver**

  The Broadcom MegaRAID SAS driver, `megaraid_sas`, is updated to version 07.714.04.00-rc1. This update includes vendor supplied patches that bring the driver version in line with the upstream kernel release.

- **LSI MPT Fusion SAS 3.0 Device driver**

  The LSI MPT Fusion SAS 3.0 Device driver, `mpt3sas`, is updated to version 34.100.00.00 to include vendor supplied patches that bring the driver version in line with the upstream kernel release.

- **QLogic Fibre Channel HBA driver**

  The QLogic Fibre Channel HBA driver, `qla2xxx` is updated to version 10.01.00.25-k and includes a large number of vendor supplied patches to bring the driver version in line with the upstream kernel release.

- **Microsemi Smart Family Controller driver**

  The Microsemi Smart Family Controller driver, `smartpqi`, is released as version 1.2.10-025 which is at the same version as in the previous kernel update, but this module includes a minor bug fix to avoid a potential buffer overflow issue.

- **Intel Volume Management Device driver**

  The Intel VMD (Volume Management Device) driver, `vmd`, version 0.6 is added to this kernel release and enables serviceability of NVMe devices, taking advantage of hardware logic provided by the Intel Xeon processor. The driver aggregates NVMe PCIe SSDs and behaves similarly to an HBA for SATA and SAS.

- **VMware Virtual Machine Communication Interface driver**

  The VMware Virtual Machine Communication Interface driver, `vmw_vmci`, is updated to version 1.1.6.0-k to include upstream fixes that bring the driver version in line with the upstream kernel release.

# Compatibility

Oracle Linux maintains full user-space compatibility with Red Hat Enterprise Linux (RHEL), which is independent of the kernel version that s running underneath the operating system. Existing applications in userspace 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 that have hardware and software 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.

# 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.

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.

## 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-2000-1134**

  Multiple shell programs on various Unix systems, including (1) tcsh, (2) csh, (3) sh, and (4) bash, follow symlinks when processing << redirects (aka here-documents or in-here documents), which allows local users to overwrite files of other users via a symlink attack.

- **CVE-2007-3852**

  The init script (sysstat.in) in sysstat 5.1.2 up to 7.1.6 creates /tmp/sysstat.run insecurely, which allows local users to execute arbitrary code.

  See https://linux.oracle.com/cve/CVE-2007-3852.html for more information.

- **CVE-2008-0525**

  PatchLink Update client for Unix, as used by Novell ZENworks Patch Management Update Agent for Linux/Unix/Mac (LUM) 6.2094 through 6.4102 and other products, allows local users to (1) truncate arbitrary files via a symlink attack on the /tmp/patchlink.tmp file used by the logtrimmer script, and (2) execute arbitrary code via a symlink attack on the /tmp/plshutdown file used by the rebootTask script.

- **CVE-2009-0416**

  The SSL certificate setup program (genSslCert.sh) in Standards Based Linux Instrumentation for Manageability (SBLIM) sblim-sfcb 1.3.2 allows local users to overwrite arbitrary files via a symlink attack on the (1) /var/tmp/key.pem, (2) /var/tmp/cert.pem, and (3) /var/tmp/ssl.cnf temporary files.

- **CVE-2011-1079**

The bnep_sock_ioctl function in net/bluetooth/bnep/sock.c in the Linux kernel before 2.6.39 does not ensure that a certain device field ends with a '\0' character, which allows local users to obtain potentially sensitive information from kernel stack memory, or cause a denial of service (BUG and system crash), via a BNEPCONNADD command.

See https://linux.oracle.com/cve/CVE-2011-1079.html for more information.

- **CVE-2011-4834**

  The GetInstalledPackages function in the configuration tool in HP Application Lifestyle Management (ALM) 11 on AIX, HP-UX, and Solaris allows local users to gain privileges via (1) a Trojan horse /tmp/tmp.txt FIFO or (2) a symlink attack on /tmp/tmp.txt.

- **CVE-2013-1798**

  The ioapic_read_indirect function in virt/kvm/ioapic.c in the Linux kernel through 3.8.4 does not properly handle a certain combination of invalid IOAPIC_REG_SELECT and IOAPIC_REG_WINDOW operations, which allows guest OS users to obtain sensitive information from host OS memory or cause a denial of service (host OS OOPS) via a crafted application.

  See https://linux.oracle.com/cve/CVE-2013-1798.html for more information.

- **CVE-2015-1838**

  modules/serverdensity_device.py in SaltStack before 2014.7.4 does not properly handle files in /tmp.

- **CVE-2015-7442**

  consoleinst.sh in IBM Installation Manager before 1.7.4.4 and 1.8.x before 1.8.4 and Packaging Utility before 1.7.4.4 and 1.8.x before 1.8.4 allows local users to gain privileges via a Trojan horse program that is located in /tmp with a name based on a predicted PID value.

- **CVE-2016-7489**

  Teradata Virtual Machine Community Edition v15.10's perl script /opt/teradata/gsctools/bin/t2a.pl creates files in /tmp in an insecure manner, this may lead to elevated code execution.

- **CVE-2018-1000026**

  Linux kernel version at least v4.8 onwards, probably well before contains a Insufficient input validation vulnerability in bnx2x network card driver that can result in DoS: Network card firmware assertion takes card off-line. This attack appear to be exploitable via An attacker on a must pass a very large, specially crafted packet to the bnx2x card. This can be done from an untrusted guest VM. Improper validation in the bnx2x network card driver of the Linux kernel version 4.15 can allow for denial of service (DoS) attacks via a packet with a gso_size larger than ~9700 bytes. Untrusted guest VMs can exploit this vulnerability in the host machine, causing a crash in the network card. (Bug: 27539200 )

  See https://linux.oracle.com/cve/CVE-2018-1000026.html for more information.

- **CVE-2018-1128**

  It was found that cephx authentication protocol did not verify ceph clients correctly and was vulnerable to replay attack. Any attacker having access to ceph cluster network who is able to sniff packets on network can use this vulnerability to authenticate with ceph service and perform actions allowed by ceph service. Ceph branches master, mimic, luminous and jewel are believed to be vulnerable.It was found that cephx authentication protocol did not verify ceph clients correctly and was vulnerable to replay attack. Any attacker having access to the ceph cluster network who is also able to sniff packets on the network can use this vulnerability to authenticate with ceph service and perform actions allowed by ceph service.

- **CVE-2018-1129**

  . A flaw was found in the way signature calculation was handled by cephx authentication protocol. An attacker having access to ceph cluster network who is able to alter the message payload was able to bypass signature checks done by cephx protocol. Ceph branches master, mimic, luminous and jewel are believed to be vulnerable. A flaw was found in the way signature calculation was handled by cephx authentication protocol. An attacker having access to ceph cluster network, who is able to alter the message payload, was able to bypass signature checks done by cephx protocol.

- **CVE-2018-16882**

  A use-after-free issue was found in the way the Linux kernel's KVM hypervisor processed posted interrupts when nested(=1) virtualization is enabled. In nested_get_vmcs12_pages(), in case of an error while processing posted interrupt address, it unmaps the 'pi_desc_page' without resetting 'pi_desc' descriptor address, which is later used in pi_test_and_clear_on(). A guest user/process could use this flaw to crash the host kernel resulting in DoS or potentially gain privileged access to a system. Kernel versions before 4.14.91 and before 4.19.13 are vulnerable.A use-after-free issue was found in the way the Linux kernel's KVM hypervisor processed posted interrupts when nested(=1) virtualization is enabled. In nested_get_vmcs12_pages(), in case of an error while processing posted interrupt address, it unmaps the 'pi_desc_page' without resetting 'pi_desc' descriptor address, which is later used in pi_test_and_clear_on(). A guest user/process could use this flaw to crash the host kernel resulting in DoS or potentially gain privileged access to a system. (Bug: 29172417 )

  See https://linux.oracle.com/cve/CVE-2018-16882.html for more information.

- **CVE-2019-13648**

  In the Linux kernel through 5.2.1 on the powerpc platform, when hardware transactional memory is disabled, a local user can cause a denial of service (TM Bad Thing exception and system crash) via a sigreturn() system call that sends a crafted signal frame. This affects arch/powerpc/kernel/signal_32.c and arch/powerpc/kernel/signal_64.c. A flaw was found in the PowerPc platform, where the kernel will panic if the transactional memory is disabled. An attacker could use this flaw to panic the system by constructing a signal context through the transactional memory MSR bits set.

  See https://linux.oracle.com/cve/CVE-2019-13648.html for more information.

- **CVE-2019-14814**

  There is heap-based buffer overflow in Linux kernel, all versions up to, excluding 5.3, in the marvell wifi chip driver in Linux kernel, that allows local users to cause a denial of service(system crash) or possibly execute arbitrary code. A flaw was found in the Linux kernel’s implementation of the Marvell wifi driver, which can allow a local user who has CAP_NET_ADMIN or administrative privileges to possibly cause a Denial Of Service (DOS) by corrupting memory and possible code execution.

  See https://linux.oracle.com/cve/CVE-2019-14814.html for more information.

- **CVE-2019-14815**

  A vulnerability was found in Linux Kernel, where a Heap Overflow was found in mwifiex_set_wmm_params() function of Marvell Wifi Driver.A vulnerability found in the Linux kernel's WMM implementation for Marvell WiFi-based hardware (mwifiex) could lead to a denial of service or allow arbitrary code execution. For this flaw to be executed, the attacker must be both local and privileged. There is no mitigation to this flaw. A patch has been provided to remediate this flaw.

  See https://linux.oracle.com/cve/CVE-2019-14815.html for more information.

- **CVE-2019-14816**

There is heap-based buffer overflow in kernel, all versions up to, excluding 5.3, in the marvell wifi chip driver in Linux kernel, that allows local users to cause a denial of service(system crash) or possibly execute arbitrary code.A vulnerability was found in the Linux kernel's Marvell WiFi chip driver. Where, while parsing vendor-specific informational attributes, an attacker on the same WiFi physical network segment could cause a system crash, resulting in a denial of service, or potentially execute arbitrary code. This flaw affects the network interface at the most basic level meaning the attacker only needs to affiliate with the same network device as the vulnerable system to create an attack path.

See https://linux.oracle.com/cve/CVE-2019-14816.html for more information.

- **CVE-2019-14896**

  A heap-based buffer overflow vulnerability was found in the Linux kernel, version kernel-2.6.32, in Marvell WiFi chip driver. A remote attacker could cause a denial of service (system crash) or, possibly execute arbitrary code, when the lbs_ibss_join_existing function is called after a STA connects to an AP.A heap-based buffer overflow vulnerability was found in the Linux kernel's Marvell WiFi chip driver. A remote attacker could cause a denial of service (system crash) or, possibly execute arbitrary code, when the lbs_ibss_join_existing function is called after a STA connects to an AP.

  See https://linux.oracle.com/cve/CVE-2019-14896.html for more information.

- **CVE-2019-14897**

  A stack-based buffer overflow was found in the Linux kernel, version kernel-2.6.32, in Marvell WiFi chip driver. An attacker is able to cause a denial of service (system crash) or, possibly execute arbitrary code, when a STA works in IBSS mode (allows connecting stations together without the use of an AP) and connects to another STA.A stack-based buffer overflow was found in the Linux kernel's Marvell WiFi chip driver. An attacker is able to cause a denial of service (system crash) or, possibly execute arbitrary code, when a STA works in IBSS mode (allows connecting stations together without the use of an AP) and connects to another STA.

  See https://linux.oracle.com/cve/CVE-2019-14897.html for more information.

- **CVE-2019-15030**

  In the Linux kernel through 5.2.14 on the powerpc platform, a local user can read vector registers of other users' processes via a Facility Unavailable exception. To exploit the venerability, a local user starts a transaction (via the hardware transactional memory instruction tbegin) and then accesses vector registers. At some point, the vector registers will be corrupted with the values from a different local Linux process because of a missing arch/powerpc/kernel/process.c check. A flaw in the Linux kernel on the PowerPC platform, was found where a local user can read vector registers of other user processes (via a Facility Unavailable exception). An attacker must start a transaction when the FPU operation begins or there is no leakage. Vector registers will become corrupted with values from the different local Linux processes, because of the missing check inside arch/powerpc/kernel/process.c. The highest threat from this vulnerability is confidentiality of data and availability of the system.

  See https://linux.oracle.com/cve/CVE-2019-15030.html for more information.

- **CVE-2019-15098**

  drivers/net/wireless/ath/ath6kl/usb.c in the Linux kernel through 5.2.9 has a NULL pointer dereference via an incomplete address in an endpoint descriptor. A flaw was found in the Linux kernel's implementation of the ath6kl wireless network driver implementation, which could allow an attacker with physical access with custom USB hardware to plug into a rogue USB device that can create a condition where the kernel will panic.

- **CVE-2019-18660**

The Linux kernel before 5.4.1 on powerpc allows Information Exposure because the Spectre-RSB mitigation is not in place for all applicable CPUs, aka CID-39e72bf96f58. This is related to arch/powerpc/kernel/entry_64.S and arch/powerpc/kernel/security.c. A flaw was found in the way the Linux kernel implemented a software flush of the Count Cache (indirect branch cache) and Link (Return Address) Stack on the PowerPC platform. The flushing of these structures helps to prevent SpectreRSB like attacks which may leak information from one user process to another. An unprivileged user could use this flaw to cross the syscall or process boundary and read privileged memory by conducting targeted cache side-channel attacks.

See https://linux.oracle.com/cve/CVE-2019-18660.html for more information.

- **CVE-2019-19037**

  ext4_empty_dir in fs/ext4/namei.c in the Linux kernel through 5.3.12 allows a NULL pointer dereference because ext4_read_dirblock(inode,0,DIRENT_HTREE) can be zero.A NULL pointer dereference flaw was found in the Linux kernel's Ext4 FileSystem in the way it uses a crafted ext4 image. This flaw allows a local user with physical access to crash the system.

  See https://linux.oracle.com/cve/CVE-2019-19037.html for more information.

- **CVE-2019-19054**

  A memory leak in the cx23888_ir_probe() function in drivers/media/pci/cx23885/cx23888-ir.c in the Linux kernel through 5.3.11 allows attackers to cause a denial of service (memory consumption) by triggering kfifo_alloc() failures, aka CID-a7b2df76b42b. A flaw was found in the Linux kernel. The CX23888 Integrated Consumer Infrared Controller probe code handles resource cleanup low memory conditions. A local attacker able to induce low memory conditions could use this flaw to crash the system. The highest threat from this vulnerability is to system availability. (Bug: 31351670 )

  See https://linux.oracle.com/cve/CVE-2019-19054.html for more information.

- **CVE-2019-19073**

  Memory leaks in drivers/net/wireless/ath/ath9k/htc_hst.c in the Linux kernel through 5.3.11 allow attackers to cause a denial of service (memory consumption) by triggering wait_for_completion_timeout() failures. This affects the htc_config_pipe_credits() function, the htc_setup_complete() function, and the htc_connect_service() function, aka CID-853acf7caf10. (Bug: 31351570 )

  See https://linux.oracle.com/cve/CVE-2019-19073.html for more information.

- **CVE-2019-19074**

  A memory leak in the ath9k_wmi_cmd() function in drivers/net/wireless/ath/ath9k/wmi.c in the Linux kernel through 5.3.11 allows attackers to cause a denial of service (memory consumption), aka CID-728c1e2a05e4. (Bug: 31351557 )

  See https://linux.oracle.com/cve/CVE-2019-19074.html for more information.

- **CVE-2019-19768**

  In the Linux kernel 5.4.0-rc2, there is a use-after-free (read) in the __blk_add_trace function in kernel/trace/blktrace.c (which is used to fill out a blk_io_trace structure and place it in a per-cpu sub-buffer).A use-after-free vulnerability was found in the Linux kernel's implementation of blktrace in the __blk_add_trace function. A local attacker with permissions to run block trace instructions against a device can create a situation where the core block_trace object is used after it is freed. The attacker can pre-groom memory to race this use-after-free to create a condition where the memory is corrupted and cause privilege escalation. (Bug: 31123574 )

  See https://linux.oracle.com/cve/CVE-2019-19768.html for more information.

- **CVE-2019-20908**

  An issue was discovered in drivers/firmware/efi/efi.c in the Linux kernel before 5.4. Incorrect access permissions for the efivar_ssdt ACPI variable could be used by attackers to bypass lockdown or secure boot restrictions, aka CID-1957a85b0032. A flaw was found in how the ACPI table loading through the EFI variable (and the related efivar_ssdt boot option) was handled when the Linux kernel was locked down. This flaw allows a (root) privileged local user to circumvent the kernel lockdown restrictions. The highest threat from this vulnerability is to data confidentiality and integrity as well as system availability. (Bug: 31643407 )

  See https://linux.oracle.com/cve/CVE-2019-20908.html for more information.

- **CVE-2019-3846**

  . A flaw that allowed an attacker to corrupt memory and possibly escalate privileges was found in the mwifiex kernel module while connecting to a malicious wireless network.A flaw was found in the Linux kernel's Marvell wifi chip driver. A heap overflow in mwifiex_update_bss_desc_with_ie function in marvell/mwifiex/scan.c allows remote attackers to cause a denial of service(system crash) or execute arbitrary code.

  See https://linux.oracle.com/cve/CVE-2019-3846.html for more information.

- **CVE-2019-3887**

  . A flaw was found in the way KVM hypervisor handled x2APIC Machine Specific Rregister (MSR) access with nested(=1) virtualization enabled. In that, L1 guest could access L0's APIC register values via L2 guest, when 'virtualize x2APIC mode' is enabled. A guest could use this flaw to potentially crash the host kernel resulting in DoS issue. Kernel versions from 4.16 and newer are vulnerable to this issue.A flaw was found in the way KVM hypervisor handled x2APIC Machine Specific Register (MSR) access with nested(=1) virtualization enabled. In that, L1 guest could access L0's APIC register values via L2 guest, when 'virtualize x2APIC mode' is enabled. A guest could use this flaw to potentially crash the host kernel resulting in DoS issue. (Bug: 29617950 )

  See https://linux.oracle.com/cve/CVE-2019-3887.html for more information.

- **CVE-2019-3900**

  An infinite loop issue was found in the vhost_net kernel module in Linux Kernel up to and including v5.1-rc6, while handling incoming packets in handle_rx(). It could occur if one end sends packets faster than the other end can process them. A guest user, maybe remote one, could use this flaw to stall the vhost_net kernel thread, resulting in a DoS scenario.An infinite loop issue was found in the vhost_net kernel module while handling incoming packets in handle_rx(). The infinite loop could occur if one end sends packets faster than the other end can process them. A guest user, maybe a remote one, could use this flaw to stall the vhost_net kernel thread, resulting in a DoS scenario.

  See https://linux.oracle.com/cve/CVE-2019-3900.html for more information.

- **CVE-2020-0543**

  Incomplete cleanup from specific special register read operations in some Intel(R) Processors may allow an authenticated user to potentially enable information disclosure via local access.A new domain bypass transient execution attack known as Special Register Buffer Data Sampling (SRBDS) has been found. This flaw allows data values from special internal registers to be leaked by an attacker able to execute code on any core of the CPU. An unprivileged, local attacker can use this flaw to infer values returned by affected instructions known to be commonly used during cryptographic operations that rely on uniqueness, secrecy, or both. (Bug: 31352780 )

  See https://linux.oracle.com/cve/CVE-2020-0543.html for more information.

- **CVE-2020-10757**

. A flaw was found in the Linux Kernel in versions after 4.5-rc1 in the way mremap handled DAX Huge Pages. This flaw allows a local attacker with access to a DAX enabled storage to escalate their privileges on the system. A flaw was found in the way mremap handled DAX Huge Pages. This flaw allows a local attacker with access to a DAX enabled storage to escalate their privileges on the system. (Bug: 31452397 )

See https://linux.oracle.com/cve/CVE-2020-10757.html for more information.

- **CVE-2020-10768**

  . A flaw was found in the prctl() function, where it can be used to enable indirect branch speculation after it has been disabled. This call incorrectly reports it as being 'force disabled' when it is not and opens the system to Spectre v2 attacks. The highest threat from this vulnerability is to confidentiality. (Bug: 31557901 )

  See https://linux.oracle.com/cve/CVE-2020-10768.html for more information.

- **CVE-2020-10942**

  In the Linux kernel before 5.5.8, get_raw_socket in drivers/vhost/net.c lacks validation of an sk_family field, which might allow attackers to trigger kernel stack corruption via crafted system calls.A stack buffer overflow issue was found in the get_raw_socket() routine of the Host kernel accelerator for virtio net (vhost-net) driver. It could occur while doing an ictol(VHOST_NET_SET_BACKEND) call, and retrieving socket name in a kernel stack variable via get_raw_socket(). A user able to perform ioctl(2) calls on the '/dev/vhost-net' device may use this flaw to crash the kernel resulting in DoS issue. (Bug: 31085990 )

  See https://linux.oracle.com/cve/CVE-2020-10942.html for more information.

- **CVE-2020-11494**

  An issue was discovered in slc_bump in drivers/net/can/slcan.c in the Linux kernel through 5.6.2. It allows attackers to read uninitialized can_frame data, potentially containing sensitive information from kernel stack memory, if the configuration lacks CONFIG_INIT_STACK_ALL, aka CID-b9258a2cece4. A flaw was discovered in slc_bump in drivers/net/can/slcan.c in CAN Communication Protocol. It allows a local attacker with special user privilege (or root) to read sensitive kernel stack information (considering CONFIG_INIT_STACK_ALL is not enabled) when a partially initialized data structure is exposed over the network layer. (Bug: 31136751 )

  See https://linux.oracle.com/cve/CVE-2020-11494.html for more information.

- **CVE-2020-11608**

  An issue was discovered in the Linux kernel before 5.6.1. drivers/media/usb/gspca/ov519.c allows NULL pointer dereferences in ov511_mode_init_regs and ov518_mode_init_regs when there are zero endpoints, aka CID-998912346c0d. A flaw was found in the way the ov519 driver in the Linux kernel handled certain types of USB descriptors. This flaw allows an attacker with the ability to induce the error conditions to crash the system. (Bug: 31213756 )

  See https://linux.oracle.com/cve/CVE-2020-11608.html for more information.

- **CVE-2020-11609**

  An issue was discovered in the stv06xx subsystem in the Linux kernel before 5.6.1. drivers/media/usb/gspca/stv06xx/stv06xx.c and drivers/media/usb/gspca/stv06xx/stv06xx_pb0100.c mishandle invalid descriptors, as demonstrated by a NULL pointer dereference, aka CID-485b06aadb93. A flaw was found in the way the stv06xx driver in the Linux kernel handled certain types of USB descriptors. This flaw allows an attacker with the ability to induce the error conditions to crash the system. (Bug: 31200577 )

  See https://linux.oracle.com/cve/CVE-2020-11609.html for more information.

- **CVE-2020-11668**

In the Linux kernel before 5.6.1, drivers/media/usb/gspca/xirlink_cit.c (aka the Xirlink camera USB driver) mishandles invalid descriptors, aka CID-a246b4d54770.A NULL pointer dereference flaw was found in the Xirlink camera USB driver 'xirlink-cit' in the Linux kernel. The driver mishandles invalid descriptors leading to a denial-of-service (DoS). This could allow a local attacker with user privilege to crash the system or leak kernel internal information. (Bug: 31213765 )

See https://linux.oracle.com/cve/CVE-2020-11668.html for more information.

- **CVE-2020-11669**

  An issue was discovered in the Linux kernel before 5.2 on the powerpc platform. arch/powerpc/kernel/idle_book3s.S does not have save/restore functionality for PNV_POWERSAVE_AMR, PNV_POWERSAVE_UAMOR, and PNV_POWERSAVE_AMOR, aka CID-53a712bae5dd. A flaw was found in the way Linux kernel running on the Power9 processor saves and restores its registers while going in and coming out of an idle state. The issue occurs when a guest kernel has Kernel Userspace Address Protection (KUAP) feature enabled. The idle_book3s function does not save and restore the Authority Mask Register (AMR), Authority Mask Override Register (AMOR) and User Authority Mask Override Register (UAMOR). A guest user may use this flaw to render the host system unusable resulting in DoS issue.

- **CVE-2020-12114**

  A pivot_root race condition in fs/namespace.c in the Linux kernel 4.4.x before 4.4.221, 4.9.x before 4.9.221, 4.14.x before 4.14.178, 4.19.x before 4.19.119, and 5.x before 5.3 allows local users to cause a denial of service (panic) by corrupting a mountpoint reference counter. A flaw was found in the Linux kernel's implementation of the pivot_root syscall. This flaw allows a local privileged user (root outside or root inside a privileged container) to exploit a race condition to manipulate the reference count of the root filesystem. To be able to abuse this flaw, the process or user calling pivot_root must have advanced permissions. The highest threat from this vulnerability is to system availability.

- **CVE-2020-12655**

  An issue was discovered in xfs_agf_verify in fs/xfs/libxfs/xfs_alloc.c in the Linux kernel through 5.6.10. Attackers may trigger a sync of excessive duration via an XFS v5 image with crafted metadata, aka CID-d0c7feaf8767. A flaw was discovered in the XFS source in the Linux kernel. This flaw allows an attacker with the ability to mount an XFS filesystem, to trigger a denial of service while attempting to sync a file located on an XFS v5 image with crafted metadata. (Bug: 31350921 )

  See https://linux.oracle.com/cve/CVE-2020-12655.html for more information.

- **CVE-2020-12768**

  ** DISPUTED ** An issue was discovered in the Linux kernel before 5.6. svm_cpu_uninit in arch/x86/kvm/svm.c has a memory leak, aka CID-d80b64ff297e. NOTE: third parties dispute this issue because it's a one-time leak at the boot, the size is negligible, and it can't be triggered at will.A flaw was found in the Linux kernel. A memory leak in svm_cpu_init() is possible leading to a system crash. The highest threat from this vulnerability is to system availability. (Bug: 31350456 )

  See https://linux.oracle.com/cve/CVE-2020-12768.html for more information.

- **CVE-2020-12771**

  An issue was discovered in the Linux kernel through 5.6.11. btree_gc_coalesce in drivers/md/bcache/btree.c has a deadlock if a coalescing operation fails. (Bug: 31350644 )

- **CVE-2020-12888**

  The VFIO PCI driver in the Linux kernel through 5.6.13 mishandles attempts to access disabled memory space. A flaw was found in the Linux kernel, where it allows userspace

processes, for example, a guest VM, to directly access h/w devices via its VFIO driver modules. The VFIO modules allow users to enable or disable access to the devices' MMIO memory address spaces. If a user attempts to access the read/write devices' MMIO address space when it is disabled, some h/w devices issue an interrupt to the CPU to indicate a fatal error condition, crashing the system. This flaw allows a guest user or process to crash the host system resulting in a denial of service. (Bug: 31439669 31663630 )

See https://linux.oracle.com/cve/CVE-2020-12888.html for more information.

- **CVE-2020-8647**

  There is a use-after-free vulnerability in the Linux kernel through 5.5.2 in the vc_do_resize function in drivers/tty/vt/vt.c. A flaw was found in the Linux kernel's virtual console resize functionality. An attacker with local access to virtual consoles can use the virtual console resizing code to gather kernel internal data structures.

  See https://linux.oracle.com/cve/CVE-2020-8647.html for more information.

- **CVE-2020-8648**

  There is a use-after-free vulnerability in the Linux kernel through 5.5.2 in the n_tty_receive_buf_common function in drivers/tty/n_tty.c.A use-after-free flaw was found in the Linux kernel console driver when using the copy-paste buffer. This flaw allows a local user to crash the system.

  See https://linux.oracle.com/cve/CVE-2020-8648.html for more information.

- **CVE-2020-8649**

  There is a use-after-free vulnerability in the Linux kernel through 5.5.2 in the vgacon_invert_region function in drivers/video/console/vgacon.c. A flaw was found in the Linux kernel's implementation of the invert video code on VGA consoles when a local attacker attempts to resize the console. An out-of-bounds read can occur, leaking information to the console.

  See https://linux.oracle.com/cve/CVE-2020-8649.html for more information.

- **CVE-2020-9383**

  An issue was discovered in the Linux kernel through 5.5.6. set_fdc in drivers/block/floppy.c leads to a wait_til_ready out-of-bounds read because the FDC index is not checked for errors before assigning it, aka CID-2e90ca68b0d2.An out-of-bounds (OOB) memory access flaw was found in the floppy driver module in the Linux kernel. A bounds check failure allows a local attacker to gain access to out-of-bounds memory leading to a system crash or a leak of internal kernel information. The highest threat from this vulnerability is to system availability. (Bug: 31067511 )

  See https://linux.oracle.com/cve/CVE-2020-9383.html for more information.

# 3
# Known Issues

> **Important:**
>
> The software described in this documentation is either in Extended Support or Sustaining Support. See Oracle Open Source Support Policies for more information.
>
> We recommend that you upgrade the software described by this documentation as soon as possible.

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

## Unusable or Unavailable Features for Arm

This section calls out specific features that are known to not work, remain untested, or 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 are not supported for Arm.

- **OCFS2**

  The OCFS2 file system is not supported for Arm.

- **Secure Boot**

  The Secure Boot feature is currently not supported or available for Arm.

## [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, 27812727, and 27862655)

# [aarch64] Kdump issues

Note the following issues when using Kdump on the 64-bit Arm (aarch64) architecture.

- **Kdump fails when using Mellanox ConnectX devices with a remote target**

  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 if a remote dump target is used.

  The workaround is to either store the vmcore file locally or 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`. (Bug IDs 27915989 and 27916214)

- **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)

- **Kdump might fail on some AMD hardware**

  Kdump might fail on some AMD hardware that is running UEK R5U4 kernel. Impacted hardware includes the AMD EPYC CPU (codename Naples and Rome) servers.

  To work around this issue, modify the `/etc/sysconfig/kdump` configuration file, remove the "iommu=off" command-line option from `KDUMP_COMMANDLINE_APPEND`, then restart the `kdump` service for the changes to take effect.

  (Bug ID 31127379)

# [aarch64] CPU hot plug functionality not functional in KVM

Although CPU hot plug 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, the following error is returned:

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

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

# [aarch64] Networking fails for Mellanox ConnectX-3 Pro Ethernet controller

Mellanox networking may fail on Arm platform systems using the Mellanox ConnectX-3 Pro Ethernet controller with certain firmware versions. The issue typically results in the following dmesg output:

```
...
[   21.605491] mlx4_core 0001:01:00.0: Failed to initialize event queue
table, aborting
[   22.660967] mlx4_core: probe of 0001:01:00.0 failed with error -12
[   22.704966] mlx4_en: Mellanox ConnectX HCA Ethernet driver v4.0-0
```

```
[   22.711355] mlx4_en 0000:01:00.0: Activating port:1
[   22.742948] mlx4_en: 0000:01:00.0: Port 1: Using 32 TX rings
[   22.748600] mlx4_en: 0000:01:00.0: Port 1: Using 8 RX rings
[   22.754437] mlx4_en: 0000:01:00.0: Port 1: Initializing port
[   22.760602] mlx4_en 0000:01:00.0: registered PHC clock
[   22.766283] mlx4_en 0000:01:00.0: Activating port:2
[   22.766956] mlx4_core 0000:01:00.0 enp1s0: renamed from eth0
[   22.778621] mlx4_en: 0000:01:00.0: Port 2: Failed to allocate NIC
resources
[   22.785776] mlx4_en 0000:01:00.0: removed PHC
[   25.488635] mlx4_en: enp1s0: Steering Mode 1
...
```

This issue can be resolved by using the maxcpus=8 kernel parameter at boot, to limit the number of CPUs that are available during the boot process. Once the system has fully booted, Systemd enables all available CPUs and there is no performance impact.

To set this parameter so that it is used for all kernels when the system boots, edit the GRUB configuration. You can do this by editing the `GRUB_CMDLINE_LINUX` line in `/etc/sysconfig/grub` in a text editor, for example:

```
GRUB_CMDLINE_LINUX="crashkernel=auto resume=/dev/mapper/linux1-swap rd.lvm.lv=linux1/
root \
  rd.lvm.lv=linux1/swap rhgb quiet maxcpus=8"
```

To update your grub configuration with the changes so that they are used on the next boot if you are using legacy BIOS, run:

```
# grub2-mkconfig -o /boot/grub2/grub.cfg
```

Alternately, if you are booting using UEFI, run:

```
# grub2-mkconfig -o /boot/efi/EFI/redhat/grub.cfg
```

This issue is only present in later firmware versions for this hardware. The issue is not replicated on cards with the `HVE102M-0.2` firmware, but appears when the firmware is upgraded to `HVE104N-1.12`. The issue can also be avoided by downgrading the card firmware. (Bug ID 30877943)

# File System Issues

The following are known issues that are specific to file systems supported with Unbreakable Enterprise Kernel Release 5 Update 4.

## 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)

## 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 that is released with UEK R5. The issue might not appear when

using the earlier `xfsprogs-4.5.0-18.0.1` package version, which available in the `ol7_latest` yum repository. (Bug ID 28070680)

# 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, which means the `ibacm` service does not automatically start after a reboot. This behavior is expected. Note that requirements for using 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)

- **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
  ```

  This issue is typically triggered when active-bonding is enabled, and you then run the `ifup` *ib-interface* command.

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

# Docker Issues

The following are known Docker issues:

- **yum install can fail within a container on an overlayfs file system**

  Running the `yum install` command 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 it is expected behavior from the kernel and a known issue upstream. See https://github.com/moby/moby/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 that are available on the Docker Hub or Oracle Container Registry; however, the issue could still be encountered when running any container that is 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)

# IOMMU kernel option enabled by default

Starting with UEK R5U1, IOMMU functionality is enabled by default in the `x86_64` kernel. This change better facilitates single root input-output virtualization (SR-IOV) and other virtualization extensions; but, it is also known to result in boot failure issues on certain hardware that cannot complete discovery when IOMMU is enabled. The status of this feature no longer appears in `/proc/cmd` reporting as `iommu=on` and may need to be explicitly disabled as a kernel `cmdline` option if boot failure occurs. As an alternate workaround, you can disable IOMMU or Intel-Vtd in your system ROM by following your vendor instructions.

These boot failure issues have been observed on equipment with certain Broadcom network devices, such HP Gen8 servers. For more detailed information, see https://support.hpe.com/hpesc/public/docDisplay?docId=emr_na-c04565693.

# 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)

# NVMe device names change across reboots

Because UEK R5 adds support for NVMe subsystems and multipathing, enumerated device names that are generated by the kernel are not stable. This behavior 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` file, 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 to the controller number. Therefore, you could assume that the subsystem at `/dev/nvme0n1` was affiliated with controller `/dev/nvme0`. This correlation 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`. Currently, no specific correlation between the subsystem device name and the controller device name exists.

# NVMe device hotplug unplug procedure change

Because UEK R5 adds support for NVMe subsystems and multipathing, enumerated device names that are generated by the kernel are not stable. The result is that the procedure for identifying and unplugging NVMe devices by using hotplug functionality is slightly different than the procedure that you may have followed when using other kernel releases.

Perform the following steps to identify, power down, and unplug the appropriate device:

1. Identify the disk that you wish to remove, according to its WWN or UUID, by using the `lsblk` command:

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

   Take note of the enumerated kernel instance name that is assigned to the device; for example: *nvme0n1*.

   > **Important:**
   >
   > it is important to understand that the device name does not necessarily map to the controller or PCIe bridge to which it is attached. See NVMe device names change across reboots.

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 will 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, not the PCIe controller.

   You can locate the slot number for the NVMe device by running the `lspci` command and by querying the PCI domain identifier for the device in verbose mode, for example:

   ```
   # 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 the previous example is `104-1`. This value is required 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 located on the front panel of the system may display to indicate that you can safely remove the disk drive.

# Kernel warning when allocating memory for Avago MegaRAID SAS 9460-16i controller

An issue that causes a kernel warning when loading the `megaraid_sas` module for the Avago MegaRAID SAS 9460-16i controller is introduced in this kernel release. The issue results when the kernel attempts to allocate memory for the IO request frame pool.

The issue is resolved by setting the contiguous memory allocation (cma) value to 64M at boot, by editing the `/etc/defaults/grub` file to update the GRUB_CMDLINE_LINUX line to include the option `cma=64M`. For example:

```
GRUB_CMDLINE_LINUX="crashkernel=auto rd.lvm.lv=ol7/root rd.lvm.lv=ol7/swap
rhgb quiet cma=64M"
```

(Bug ID 29635963, 29618702)

# 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 by using a memory hotplug operation. Although this issue is logged for UEK R5, similar issues have been noted for RHCK. This behavior is expected and relates to the how memory ballooning works. Shrinking guest memory in large amounts can result in Out Of Memory (OOM) conditions; processes are killed automatically, if the memory shrinks to below the amount that is currently in use by the guest operating system. (Bug ID 27968656)

# Mellanox ConnectX adapter not detected after boot

On systems using the Mellanox ConnectX adapters, the driver does not load the InfiniBand and RMDA modules at boot time, resulting in a failure to detect the adapter when using RDMA and InfiniBand related tools, such as `ibstat`. Errors typically display as follows:

```
ibpanic: [26013] main: stat of IB device 'mthca0' failed: No such file or directory
```

This issue results because although the `mlx4_core` and `mlx5_core` drivers are included in the initramfs to facilitate PXE boot, the InfiniBand and RDMA modules are not. If you need the driver for PXE boot, you can reload the driver manually after boot to trigger the RDMA hotplug sequence, for example:

```
# modprobe mlx5_core
```

If you do not require the `mlx4_core` or `mlx5_core` driver for PXE boot, you can remove these drivers from the initramfs and they are loaded after boot, as required, and the RDMA hotplug sequence is triggered normally. To remove the drivers from the initramfs, create `/etc/dracut.conf.d/10-mlx_dracut-denylist.conf` to include the line:

```
omit_drivers+=" mlx4_* mlx5_* mlxfw "
```

After you have done this, rebuild the initramfs by running:

```
# dracut -f
```

The changes take effect after reboot.

(Bug ID 31353413)

4

# Installation and Availability

> **Important:**
>
> The software described in this documentation is either in Extended Support or Sustaining Support. See Oracle Open Source Support Policies for more information.
>
> We recommend that you upgrade the software described by this documentation as soon as possible.

You can install Unbreakable Enterprise Kernel Release 5 on Oracle Linux 7.5 or later, if you are running either RHCK or a previous Unbreakable Enterprise Kernel release. If you are currently running an earlier Oracle Linux release, you must 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. The Unbreakable Enterprise Kernel Release 5 is also supported on the 64-bit Arm (aarch64) architecture.

## 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 then subscribing it to additional channels. See Subscribing to ULN Channels.

If your system is not registered with ULN, you can obtain most of the packages from the Oracle Linux yum server. See 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 Upgrading Your System.

## Subscribing to ULN Channels

ULN channel requirements differ depending on the platform architecture that you are using.

For Oracle Linux 7 on the 64-bit Arm (aarch64) platform, no RHCK is available and UEK R5 is used by default. Your system must be subscribed to:

- `ol7_aarch64_latest` (latest user space packages for Oracle Linux 7)

For Oracle Linux 7 on the x86 platform, the kernel image and user space packages are available on the following ULN channels:

- `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 appropriate channels for your platform architecture.
5. Click **Save Subscriptions**.

For information about using ULN, see Oracle Linux: Unbreakable Linux Network User's Guide for Oracle Linux 6 and Oracle Linux 7.

# Enabling Access to Oracle Linux Yum Server Repositories

Packages are also available on the Oracle Linux yum server repository at https://yum.oracle.com/.

Yum repository requirements differ depending on the platform architecture that you are using.

For Oracle Linux 7 on the 64-bit Arm (aarch64) platform, no RHCK is available and UEK R5 is used by default. Your system must have the following repository enabled:

- `ol7_latest` (latest user space packages for Oracle Linux 7)

For Oracle Linux 7 on the x86 platform, the kernel image and user space packages are available on the following repositories:

- `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 command:

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

> **Note:**
>
> You can only use `yum-config-manager` to enable or disable repositories after you already have a configuration file for the specified repository. Repository configurations are typically stored in `/etc/yum.repos.d`. The repository configurations that are required to install UEK on Oracle Linux 7 are included in the `oraclelinux-release-el7` package.

See Oracle Linux 7: Administrator's Guide.

# Upgrading Your System

To upgrade your system to Unbreakable Enterprise Kernel Release 5:

1. After enabling access to the appropriate ULN channels or repositories on the Oracle Linux yum server, run the following command, which upgrades the system to UEK R5:

   ```
   # yum update
   ```

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

If you have questions regarding configuring or using the `yum` command to install updates, refer to Oracle Linux: Unbreakable Linux Network User's Guide for Oracle Linux 6 and Oracle Linux 7.

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

# Installing Oracle-Supported RDMA Packages

The following procedure describes how to upgrade to the latest UEK R5 Oracle-supported RDMA packages from the OFED release. The instructions describe how to remove the `oracle-ofed-release` packages and then install the Oracle-supported RDMA packages.

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

   - If the 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.

   - To install the packages from the Oracle Linux yum server, enable the required repositories and ensure the system is using the modular yum repository configuration. If the system isn't using the modular yum repository configuration, install the `oraclelinux-release-el7` package and run the `/usr/bin/ol_yum_configure.sh` script:

     ```
     sudo yum install oraclelinux-release-el7
     sudo /usr/bin/ol_yum_configure.sh
     ```

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

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

     If you don't intend to use this kernel, you can optionally disable the `ol7_UEKR4` repository.

     > **Note:**
     >
     > The RDMA packages that are installed from the `ol7_UEKR5_RDMA` repository aren't compatible with other UEK releases.

See Oracle Linux 7: Administrator's Guide for more information.

2. Stop and then disable the `rdma.service` service:

```
sudo systemctl stop rdma.service
sudo systemctl disable rdma.service
```

3. Remove any existing OFED packages:

```
sudo yum remove 'ibacm*'
sudo yum remove 'ib-bonding*'
sudo yum remove 'ibutils*'
sudo yum remove 'infiniband-diags*'
sudo yum remove 'libibacl*'
sudo yum remove 'libibcm*'
sudo yum remove 'libibmad*'
sudo yum remove 'libibumad*'
sudo yum remove 'libibverbs*'
sudo yum remove 'libmlx4*'
sudo yum remove 'librdmacm*'
sudo yum remove 'libsdp*'
sudo yum remove 'mstflint*'
sudo yum remove 'ofed-docs*'
sudo yum remove 'ofed-scripts*'
sudo yum remove 'opensm*'
sudo yum remove 'oracle-ofed-release*'
sudo yum remove 'perftest*'
sudo yum remove 'qperf*'
sudo yum remove 'sdpnetstat*'
sudo yum remove 'rdma*'
sudo yum remove 'rds-tools*'
```

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

```
sudo yum clean all
```

5. Install the RDMA packages for UEK R5.

   - Run the following commands:

```
sudo yum install rdma-core
sudo yum install infiniband-diags
sudo yum install libibverbs-utils
sudo yum install librdmacm-utils
sudo yum install mstflint
sudo yum install oracle-rdma-tools
sudo yum install rds-tools
sudo yum install ibutils
sudo yum install libibacl
```

   - (Optional) If you require the `perftest` package, install the package by running:

```
sudo yum install perftest
```

   - (Optional) If you require the `qperf` package, install the package by running:

```
sudo yum install qperf
```

   - (Optional) If you require the `libpcap` package, install the package by running:

```
sudo yum install libpcap
```

Each UEK release requires a different set of RDMA packages. If you change the kernel on the 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.

> **Caution:**
>
> Downgrading UEK versions isn't advisable, except for testing purposes.

# Upgrading Oracle-Supported RDMA Packages for x86_64 platforms

Typical upgrade of Oracle-supported RDMA packages can be achieved using the yum update command.

If you're upgrading a system where the `oracle-rdma-release` or `oracle-rdma-release-guest` package is installed and the package version is lower than version 0.18.1-1 and you intend to upgrade to version 0.18.1-1 or above, you must first manually remove the `rdma-core-devel` package before performing the upgrade. Remove this package using the `rpm -e --nodeps` command to remove the package outside of the standard yum or dnf package manager control and leaving any dependencies intact, for example:

```
sudo /bin/rpm -e --nodeps rdma-core-devel
sudo yum update
```

If you're upgrading an older system where the `oracle-ofed-release` or `oracle-ofed-release-guest` package is installed and you intend to upgrade to `oracle-rdma-release` or `oracle-rdma-release-guest` version 0.18.1-1 or above, you must manually remove development packages that were installed for OFED before performing the upgrade or installation of the `oracle-rdma-release` or `oracle-rdma-release-guest` package:

```
sudo /bin/rpm -e --nodeps libibumad-devel libibverbs-devel librdmacm-devel libibmad-devel
sudo yum install oracle-rdma-release-guest
```

Note that these steps are only required for the transition from versions of the `oracle-rdma-release` and `oracle-rdma-release-guest` packages prior to 0.18.1-1 to version 0.18.1-1 or later; or for the transition from `oracle-ofed-release` to `oracle-rdma-release` version 0.18.1-1 or later. These steps aren't required for upgrades after the packages are at version 0.18.1-1 or later.

If the system you have upgraded has the `oracle-rdma-release` or `oracle-rdma-release-guest` package installed and if the package version is version 0.31.0-1, then you can remove it because that package no longer serves any purpose:

```
sudo yum remove oracle-rdma-release*
```

5

# Driver Modules in Unbreakable Enterprise Kernel Release 5 Update 4 (x86_64)

> **Important:**
>
> The software described in this documentation is either in Extended Support or Sustaining Support. See Oracle Open Source Support Policies for more information.
>
> We recommend that you upgrade the software described by this documentation as soon as possible.

This appendix presents all of the driver modules and their version information as shipped in the current version of UEK R5U4 (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.

## acpi Drivers in UEK R5U4 (x86_64)

| 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 |

## ata Drivers in UEK R5U4 (x86_64)

| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

## atm Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| atmtcp | | |

## auxdisplay Drivers in UEK R5U4 (x86_64)

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

## bcma Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| bcma | | Broadcom's specific AMBA driver |

## block Drivers in UEK R5U4 (x86_64)

| 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 |
| 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 |

# bluetooth Drivers in UEK R5U4 (x86_64)

| 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 |

# cdrom Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| cdrom | | |

# char Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| hangcheck-timer | 0.9.1 | Hangcheck-timer detects when the system has gone out to lunch past a certain margin. |

| Driver | Version | Description |
|---|---|---|
| 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 |

## cpufreq Drivers in UEK R5U4 (x86_64)

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

| Driver | Version | Description |
|---|---|---|
| powernow-k8 | | AMD Athlon 64 and Opteron processor frequency driver. |
| speedstep-lib | | Library for Intel SpeedStep 1 or 2 cpufreq drivers. |

## crypto Drivers in UEK R5U4 (x86_64)

| 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 |

## dax Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| device_dax | | |
| kmem | | |
| dax_pmem | | |
| dax_pmem_compat | | |
| dax_pmem_core | | |

## dca Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| dca | 1.12.1 | |

## devfreq Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| governor_simpleondemand | | |

# dma Drivers in UEK R5U4 (x86_64)

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

# edac Drivers in UEK R5U4 (x86_64)

| 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 |
| i10nm_edac | | MC Driver for Intel 10nm server processors |
| 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 |

# firewire Drivers in UEK R5U4 (x86_64)

| 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 |

# firmware Drivers in UEK R5U4 (x86_64)

| 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 |

# gpu Drivers in UEK R5U4 (x86_64)

| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |

## hid Drivers in UEK R5U4 (x86_64)

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

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 | | |

| Driver | Version | Description |
|---|---|---|
| i2c-hid | | HID over I2C core driver |
| uhid | | User-space I/O driver support for HID subsystem |
| wacom | v2.00 | USB Wacom tablet driver |

## hv Drivers in UEK R5U4 (x86_64)

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

## hwmon Drivers in UEK R5U4 (x86_64)

| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| sht15 | | Sensirion SHT15 temperature and humidity sensor driver |
| sht21 | | Sensirion SHT21 humidity and temperature sensor driver |

| Driver | Version | Description |
|---|---|---|
| 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 |

## i2c Drivers in UEK R5U4 (x86_64)

| 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 |

| Driver | Version | Description |
|---|---|---|
| i2c-amd8111 | | AMD8111 SMBus 2.0 driver |
| i2c-cbus-gpio | | CBUS I2C driver |
| 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 |

# iio Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| industrialio | | Industrial I/O core |

# infiniband Drivers in UEK R5U4 (x86_64)

| 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 |

| Driver | Version | Description |
|---|---|---|
| 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) |

## input Drivers in UEK R5U4 (x86_64)

| 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 |

| Driver | Version | Description |
|---|---|---|
| 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) |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |

## iommu Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| amd_iommu_v2 | | |

## isdn Drivers in UEK R5U4 (x86_64)

| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 | | |

## leds Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| leds-blinkm | | BlinkM RGB LED driver |
| leds-clevo-mail | | Clevo mail LED driver |

| Driver | Version | Description |
|---|---|---|
| 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 |

## md Drivers in UEK R5U4 (x86_64)

| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |

## media Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| b2c2-flexcop | | B2C2 FlexcopII/II(b)/III digital TV receiver chip |
| cx2341x | | cx23415/6/8 driver |
| cypress_firmware | | Cypress firmware download |

| Driver | Version | Description |
|---|---|---|
| saa7146 | | driver for generic saa7146-based hardware |
| saa7146_vv | | video4linux driver for saa7146-based hardware |
| smsdvb | | SMS DVB subsystem adaptation module |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 | | |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 | | |
| 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 | | |

| Driver | Version | Description |
|---|---|---|
| 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 | | |
| 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 | | |

| Driver | Version | Description |
|---|---|---|
| rc-it913x-v1 | | |
| rc-it913x-v2 | | |
| rc-kaiomy | | |
| rc-kworld-315u | | |
| rc-kworld-pc150u | | |
| rc-kworld-plus-tv-analog | | |
| 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 | | |
| rc-pv951 | | |
| rc-rc6-mce | | |
| rc-real-audio-220-32-keys | | |
| rc-reddo | | |

| Driver | Version | Description |
|---|---|---|
| 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 | | |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| dvb-usb-dtv5100 | | AME DTV-5100 USB2.0 DVB-T |

| Driver | Version | Description |
|---|---|---|
| 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 |

| Driver | Version | Description |
|---|---|---|
| mxl111sf-demod | 0.1 | MaxLinear MxL111SF DVB-T demodulator driver |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

## memstick Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| memstick | | Sony MemoryStick core driver |
| mspro_block | | Sony MemoryStickPro block device driver |

| Driver | Version | Description |
|---|---|---|
| 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 |

## message Drivers in UEK R5U4 (x86_64)

| 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 |

## mfd Drivers in UEK R5U4 (x86_64)

| 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 |

| Driver | Version | Description |
|---|---|---|
| viperboard | | Nano River Technologies viperboard mfd core driver |
| vx855 | | Driver for the VIA VX855 chipset |

## misc Drivers in UEK R5U4 (x86_64)

| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 | 1.1.6.0-k | VMware Virtual Machine Communication Interface. |

## mmc Drivers in UEK R5U4 (x86_64)

| 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 |

# mtd Drivers in UEK R5U4 (x86_64)

| 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 | | |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

## net Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| bonding | 3.7.1 | Ethernet Channel Bonding Driver, v3.7.1 |
| c_can | | CAN bus driver for Bosch C_CAN controller |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 | 1.713.36-0 | QLogic BCM57710/57711/57711E/ 57712/57712_MF/57800/57800_MF/ 57810/57810_MF/57840/57840_MF Driver |
| bnxt_en | 1.10.1 | 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 | 2.3.0.53 | 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 | 12.0.0.0 | Emulex OneConnect NIC Driver 12.0.0.0 |
| 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 | 0.27.1-k | Intel(R) Ethernet Switch Host Interface Driver |
| i40e | 2.8.20-k | Intel(R) Ethernet Connection XL710 Network Driver |
| iavf | 3.2.3-k | Intel(R) Ethernet Adaptive Virtual Function Network Driver |
| ice | 0.7.2-k | Intel(R) Ethernet Connection E800 Series Linux Driver |
| igb | 5.4.0-k | Intel(R) Gigabit Ethernet Network Driver |
| igbvf | 2.4.0-k | Intel(R) Gigabit Virtual Function Network Driver |
| igc | 0.0.1-k | Intel(R) 2.5G Ethernet Linux 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 |

| Driver | Version | Description |
|---|---|---|
| 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 | 8.37.0.20 | QLogic FastLinQ 4xxxx Core Module |
| qede | 8.37.0.20 | QLogic FastLinQ 4xxxx Ethernet Driver |
| qla3xxx | v2.03.00-k5 | QLogic ISP3XXX Network Driver v2.03.00-k5 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| sr9700 | | SR9700 one chip USB 1.1 USB to Ethernet device from http://www.corechip-sz.com/ |

| Driver | Version | Description |
|---|---|---|
| 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. |

| Driver | Version | Description |
|---|---|---|
| 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. |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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. |

| Driver | Version | Description |
|---|---|---|
| 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 | | |
| wl3501_cs | | Planet wl3501 wireless driver |
| zd1201 | 0.15 | Driver for ZyDAS ZD1201 based USB Wireless adapters |

| Driver | Version | Description |
|---|---|---|
| zd1211rw | 1.0 | USB driver for devices with the ZD1211 chip. |
| xen-netback | | |
| xen-netfront | | Xen virtual network device frontend |

## ntb Drivers in UEK R5U4 (x86_64)

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

## nvdimm Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| libnvdimm | | |
| nd_blk | | |
| nd_btt | | |
| nd_e820 | | |
| nd_pmem | | |

## nvme Drivers in UEK R5U4 (x86_64)

| 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 | | |

# parport Drivers in UEK R5U4 (x86_64)

| 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 |

# pci Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| pci-hyperv | | Hyper-V PCI |
| vmd | 0.6 | |
| 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 |

# pcmcia Drivers in UEK R5U4 (x86_64)

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

# pinctrl Drivers in UEK R5U4 (x86_64)

| 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 |

# platform Drivers in UEK R5U4 (x86_64)

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

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

## power Drivers in UEK R5U4 (x86_64)

| 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 Gauage IC driver |
| ds2781_battery | | Maxim/Dallas DS2781 Stand-Alone Fuel Gauage IC driver |
| ds2782_battery | | Maxim/Dallas DS2782 Stand-Alone Fuel Gauage 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 |

# pps Drivers in UEK R5U4 (x86_64)

| 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 |

# ptp Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| ptp | | PTP clocks support |
| ptp_kvm | | PTP clock using KVMCLOCK |

# regulator Drivers in UEK R5U4 (x86_64)

| 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 |

# rtc Drivers in UEK R5U4 (x86_64)

| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

## scsi Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| 3w-9xxx | 2.26.02.014 | 3ware 9000 Storage Controller Linux Driver |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| iscsi_tcp | | iSCSI/TCP data-path |
| libfc | | libfc |
| libiscsi | | iSCSI library functions |
| libiscsi_tcp | | iSCSI/TCP data-path |
| libsas | | SAS Transport Layer |
| lpfc | 0:12.0.0.13 | Emulex LightPulse Fibre Channel SCSI driver 12.0.0.13 |
| megaraid_mbox | 2.20.5.1 | LSI Logic MegaRAID Mailbox Driver |
| megaraid_mm | 2.20.2.7 | LSI Logic Management Module |
| megaraid_sas | 07.714.04.00-rc1 | Broadcom MegaRAID SAS Driver |
| mpt3sas | 34.100.00.00 | 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; $Revision$ |
| 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 | 8.37.25.20 | QLogic QEDF 25/40/50/100Gb FCoE Driver |
| qedi | 8.37.0.20 | QLogic FastLinQ 4xxxx iSCSI Module |
| qla2xxx | 10.01.00.25-k | 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| sg | 3.5.36 | SCSI generic (sg) driver |
| smartpqi | 1.2.10-025 | Driver for Microsemi Smart Family Controller version 1.2.10-025 |
| 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 |

## ssb Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| ssb | | Sonics Silicon Backplane driver |

## staging Drivers in UEK R5U4 (x86_64)

| 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 |

## target Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| iscsi_target_mod | 4.1.x | iSCSI-Target Driver for mainline target infrastructure |

| Driver | Version | Description |
|---|---|---|
| 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 |

## thermal Drivers in UEK R5U4 (x86_64)

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

## tty Drivers in UEK R5U4 (x86_64)

| 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 | | |

## uio Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| uio | | |

| Driver | Version | Description |
|---|---|---|
| uio_aec | | |
| uio_cif | | |
| uio_hv_generic | 0.02.1 | 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 |

## usb Drivers in UEK R5U4 (x86_64)

| 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. |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |
| 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 |

## uwb Drivers in UEK R5U4 (x86_64)

| Driver | Version | Description |
|---|---|---|
| hwa-rc | | Host Wireless Adapter Radio Control Driver |
| i1480-dfu-usb | | Intel Wireless UWB Link 1480 firmware uploader for USB |

| Driver | Version | Description |
|---|---|---|
| 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 |

## vfio Drivers in UEK R5U4 (x86_64)

| 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_virqfd | 0.1 | IRQFD support for VFIO bus drivers |

## vhost Drivers in UEK R5U4 (x86_64)

| 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 |

## video Drivers in UEK R5U4 (x86_64)

| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 |

## virtio Drivers in UEK R5U4 (x86_64)

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

## w1 Drivers in UEK R5U4 (x86_64)

| 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 |

| Driver | Version | Description |
|---|---|---|
| wire | | Driver for 1-wire Dallas network protocol. |

## watchdog Drivers in UEK R5U4 (x86_64)

| 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 |

| Driver | Version | Description |
|---|---|---|
| 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 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 |
| wdat_wdt | | ACPI Hardware Watchdog (WDAT) driver |
| wdt_pci | | Driver for the ICS PCI-WDT500/501 watchdog cards |
| xen_wdt | | Xen WatchDog Timer Driver |

## xen Drivers in UEK R5U4 (x86_64)

| 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 |

| Driver | Version | Description |
|---|---|---|
| xen-gntdev | | User-space granted page access driver |
| xen-privcmd | | |
| xen-scsiback | | Xen SCSI backend driver |
| xenfs | | Xen filesystem |