

# WDM CAN Driver for Windows 7\*\*/8\*\*/10/11

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**Release notes** for the WDM based CAN driver supporting Windows 7/8/10/11 (32-/64-Bit) and Windows Server 2008/2012 (32-/64-Bit). The driver releases are organized as packages. A package contains the driver itself, driver related libraries and files for the driver configuration. The package release version is coupled with the version of the device driver. A detailed list which hardware is supported by a WDM driver and a table which files get installed with a driver package can be found at the end of this document.

**\*\* Microsoft ended the support to allow in-house cross-signing of device driver code. For this reason it is no longer possible for esd to release new or updated device drivers for Windows 7, Windows 8 and Windows 8.1 based systems starting with driver package V2.8.0 !**

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## Revision History

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Summarized below are the the improvements, changes and fixes between different package releases in reverse chronological order. If a change affects a complete driver family the family name according to the table above is used to refer to the hardware. Changes which are considered to be very important are **highlighted**.

### Driver Package 2.8.3

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*Release date: 2024-08-08*

- **USB3:** Added missing support for ESI indication in received CAN FD messages (Requires FW >= V1.2.3) and own transmitted CAN FD messages (Requires FW >= V1.2.4).
- **USB3:** Added support for global DAR mode (requires FW >= 1.2.4).
- **USB3:** Fixed invalid busload indication for CAN FD communication (requires FW >= 1.2.7).
- **USB3:** Fixed invalid values of baudrate change event data if only the nominal bitrate for CAN CC communication is set with *canSetBaudrateX()* (requires FW >= 1.2.8).
- **USB3:** Fixed possible internal race condition that a configuration request with *canIdAdd()* to receive CAN 2.0B (EFF) IDs is turned into a request to receive CAN 2.0A (SFF) ID 0.
- **USB3:** Fixed driver invalidates bitrate details if only the nominal bitrate for CAN CC communication is set in argument of *canSetBaudrateX()*.
- **All drivers/devices:** Fixed IOCTL\_CAN\_GET\_INFO does not return correct NTCAN library version.
- **All drivers/devices:** Robustness and performance improvements.

### Driver Package 2.8.2

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*Release date: 2023-12-06*

- **USB2:** Fixed possible internal race condition that a configuration request with *canIdAdd()* to receive CAN 2.0B (EFF) IDs is turned into a request to receive CAN 2.0A (SFF) ID 0.
- **All drivers/devices:** The yet unsupported 'msg\_lost' field of CAN messages received in *Rx Object Mode* now contains a revolving counter which gets increased each time the object is updated.
- **All drivers/devices:** Robustness and performance improvements.

## Driver Package 2.8.1

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*Release date: 2022-01-24*

- **USB3:** Fixed communication with hardware failed on return from a low power state.
- **USB3:** Fixed configuration of a classical CAN bit rate fails with *canSetBaudrateX()* if the configuration mode is bitrate table index or direct CAN controller register configuration.

## Driver Package 2.8.0

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*Release date: 2021-09-09*

- **Support for new devices:** CAN-USB/3-FD (x86/x64).
- **All drivers/devices:** Support for CAN-FD enabled devices:
  - Full internal support for CMSG\_X messages with 64 bytes of payload.
  - Support for IOCTL\_CAN\_GET\_FD\_TDC and IOCTL\_CAN\_SET\_FD\_TDC.
- **All drivers/devices:** Internal data processing revised and optimized.
- **All drivers/devices:** Bitrate calculation algorithm completely rewritten according to CiA 601-3.
- **All drivers/devices:** Support for *canSetBaudrateX()* / *canGetBaudrateX()*.
- **All drivers/devices:** Return transceiver type and number of open handles with IOCTL\_CAN\_GET\_INFO.

## Driver Package 2.7.1

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*Release date: 2020-12-18*

- **USB2:** Fixed rare occurrence of frame duplications observed on Windows 10 for high CAN bus loads.
- **C360:** Release digitally signed with a SHA2 (EV) code signing certificate in accordance with the updated signing policy for Windows 10 device driver.
- **C360:** Support for 8 byte bit rate change event.
- **C360:** Support for returning the device's serial number.
- **C360:** Support for *canSendT()/canWriteT()* API to transmit CAN frames (without Timestamped Tx support).
- **C360:** Fixed situation where a CAN message might get an 'old' timestamp.
- **C360:** Fixed possible system freeze closing last open handle for a CAN port if the Smart Disconnect mode is enabled.

# Driver Package 2.7.0

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Release date: 2020-01-20

- **All drivers/devices:** All kernel mode driver are now attestation signed by Microsoft.
- **All drivers/devices:** All device driver binaries are digitally signed with a SHA2 (EV) code signing certificate in accordance with the updated signing policy for Windows 10 device driver. As a consequence Windows XP and Windows Vista which got no update for SHA2 kernel mode code driver signing are no longer supported from this device driver release on.
- **All drivers/devices:** Support for CMSG\_X (only for Classical CAN messages).
- **All drivers/devices:** Updated build environment to Windows 10 WDK.
- **All drivers/devices:** All internal memory is allocated from the NX Non-Paged Pool areas to increase system security and prevent problems with tools as the *Microsoft Device Guard Readiness Tool*.
- **All drivers/devices:** Robustness and performance improvements.

# Driver Package 2.6.10

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Release date: 2018-11-22 (Not publicly released)

- **USB2:** Fixed issue that configuring a bit rate fails after booting Windows 8 and later versions via the 'Fast Startup' if the bit rate which should be configured is identical to the bit rate before the 'Shutdown'.
- **USB2:** Added support for device idle detection.
- **USB2:** Removed unsupported indication of WakeUp capability to OS.
- **CAN-CBX-AIR2:** Added support to process the bit rate indication at bootup.

# Driver Package 2.6.9

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Release date: 2016-05-26

- **Support for new devices:** CPCI-CAN/402 added to the C402 driver family (x86/x64).
- **C331:** Configuring the bit rate 800 KBit/s via the esd bit rate table index now returns with an error as this results in 5 KBit/s for all released FW versions. Configuring 800 KBit/s can still be archived by setting the bit rate numerically or as BTR values.
- **C400:** Updated ESDACC core to V00.63.
- **C400:** Fixed a regression introduced with driver package 2.6.7 that a bitrate was configured correctly if defined as BTR value with enabled pre-scaler but was indicated twice as high with the bitrate details IOCTL.
- **C400/C402:** Internal CAN message dispatcher made more interruptible to prevent overruns in case of very high busload situations.

- **C400/C402:** Fixed a regression introduced with driver package 2.6.5 which caused a BSOD if the driver failed to create a named device object. The latter could happen if the assigned base net did not overlap with a logical net number of another CAN device but the 2nd, 3rd, ... logical net number did.
- **USB2:** Fix possible BSOD during shutdown if the initial internal version request is not replied by the device.
- **USB2:** Detect custom specific device and disable FW BTR address translation if necessary.
- **CAN-CBX-AIR2 and CAN-AIR/2:** Hardware specific configuration tool installed implicitly with the device driver and can be opened via the Settings tab of the CAN devices property sheet.

## Driver Package 2.6.8

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*Release date: 2016-01-29*

- **Support for new devices:** CAN-PCI/402 and CPClserial-CAN/402 added to the C402 driver family (x86/x64).
- **All drivers/devices:** Drivers install on Windows 10 (x86/x64).
- **All drivers/devices:** Extended the indication of error situations in the event log during startup.
- **All drivers/devices:** Internal performance improvements.
- **C400:** Updated ESDACC core to V00.61.
- **C400/C402:** Fixed issues where timestamps are not be applied correctly to CAN messages and events in error situations.
- **C400/C402:** Fixed a regression introduced in driver package 2.6.6 that the CAN driver aborted a failed Tx I/O request if the CAN controller is in error passive state.
- **C400/C402:** Fixed 64-bit version of NTCAN library could not be used on Windows XP x64 because of a missing symbol.
- **C400/C402/C405:** Extended the indication of error situations in the event log during startup.
- **USB2:** Fixed possible BSOD during PnP manager driver stop request if aborting internal IRPs partially failed which may lead to an IRP completion after driver unload.
- **Configuration:** Improved UI of device manager settings dialog and the adaption to a configured UI theme.
- **Configuration:** Added tool tips for configuration/settings options.
- **Configuration:** Added support for a driver/system settings expert dialog to configure the thread priority of the CAN message handler, decrease the system tick period and enable driver trace messages.
- **Configuration:** Added support to start the event viewer with a driver specific filtered view by double-click on a fail reason code. transmit CAN frames (without Timestamped Tx support).

## Driver Package 2.6.7

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*Release date: 2015-08-24*

- **All drivers/devices:** Support for extended device/driver information which can be retrieved with `NTCAN_IOCTL_GET_INFO`.
- **C331:** Fixed possible malfunction after return from hibernate state.
- **C400:** Updated ESDACC core to V00.54.
- **C400:** Implicit CAN clock divider in BTR pre-scaler removed. This change is handled internally backward compatible for exiting applications.
- **C400:** Fixed issues handling bus error situations.
- **C400:** Fixed issue with high speed scheduling configurations.
- **PMC-CAN/400:** Added support for 1 PPS signal.
- **C405:** Includes new firmware which supports HW revisions with 405GPr and 405GP.
- **C405:** Removed support for implicit bootloader update introduced with driver package 2.5.0 (Driver V3.7.3). If you still have a CAN-PCI/405 hardware with a bootloader which requires an update you have to install and start once a driver before this release.
- **USB2:** Fixed possible BSOD if Windows changes in a power saving mode and CAN handle are still open.
- **Configuration:** The Settings tab of the CAN devices property sheet in the device manager is extended to indicate the driver type (WDM/WDF), an optional 2nd firmware version and number of CAN ports.
- **Configuration:** If the Settings tab of the CAN devices property sheet is clicked a required firmware update is indicated with a modal dialog and a heading in larger font size.
- **Configuration:** If the Settings tab of the CAN devices errors during startup are indicated in the heading in addition to generate an event log entry.
- **Configuration:** Removed configuration of the interrupt affinity.
- **C200, C331, USB2:** Support for `canSendT()/canWriteT()` API to transmit CAN frames (without Timestamped Tx support).

## Driver Package 2.6.6

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*Release date: 2014-09-01*

- **C200, C331, USB2:** Support for `canSendT()/canWriteT()` API to transmit CAN frames (without Timestamped Tx support).
- **C200, C331, USB2:** Fixed possible system freeze closing last open handle for a CAN port if the Smart Disconnect mode is enabled.
- **C200, C331:** Interrupt affinity configuration via CAN control panel ignored as this caused problems in many hardware configurations since Windows XP SP3 if not set to 'Any'.
- **C400:** Updated ESDACC core to V00.48.
- **C400, C402, C405:** Fixed calling `canWrite()` while previous Tx jobs with `canSend()` on the same handle are pending returned with error instead of queuing the new Tx jobs and block until all Tx jobs are completed.
- **C400, C402:** Improved speed and flexibility of autobaud detection.
- **C400, C402:** Fixed very rare cases of problems handling bus error situations.

- **C402:** Fixed MSI not working on some systems (depending on assigned memory address).
- **USB2:** Added support for a loopback mode.
- **USB2:** Improved robustness in case of a surprise removal.
- **USB2:** Fixed upper 32-bit of 64-bit bus statistic timestamp always set to 0.
- **Installation:** Priority of the device's interrupt defaults to IrqPriorityHigh to reduce latency.

## Driver Package 2.6.5

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*Release date: 2013-08-13*

- **C400:** Updated ESDACC core to V00.35.
- **C400:** Fixed possibility that the CAN ports are assigned arbitrary logical net numbers after a reboot until the base net number is configured once via the Settings tab of the CAN devices property sheet in the device manager.
- **C402:** Change from PIO to busmaster DMA which drastically reduces system CPU load (Requires FW 0.0.28 or later).
- **C402:** Automatic physical layer Add-on detection on driver startup.
- **C405:** Fixed driver is indicating SW timestamps instead of HW timestamps in device manager.

## Driver Package 2.6.4

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*Release date: 2013-06-28*

- **Support for new devices:** New CAN driver family C402 for CAN-PCIe/402 (x86/x64).
- **All:** Minor changes to improve driver performance.
- **C331:** Fixed sporadic malfunction caused by the C compiler with Intel® Sandy-Bridge based Xeon CPUs on Windows x64.
- **C400:** Updated ESDACC core to V00.34.
- **C400:** Support for high precision timed transmission (feature Timestamped Tx).
- **C400:** Support to configure timestamp sample point to Start of Frame (SOF) or default End of Frame (EOF).
- **C400:** Fixed possible BSOD if the first of more than one CAN device in the same system is disabled in device manager.
- **C400:** Automatic physical layer Add-on detection on driver startup.
- **C405:** Support for standard timed transmission (feature Timestamped Tx).
- **C405:** Optimized firmware performance by reducing number of handled interrupts.
- **C405:** Fixed configuring busload interval freezes firmware.
- **C405:** Fixed rare occurrence of non monotonic timestamps for interaction frames in case of very high CAN busload.
- **C405:** Fixed aborted frames not counted for bus statistic.
- **C405:** Fixed returning invalid values in controller state diagnostic data.

- **C405:** Fixed Listen Only mode can not be cleared after being set.
- **USB2:** Fixed 32-Bit libraries are not installed properly on Windows x64.
- **CAN-USB/Micro:** Fixed indication of wrong CAN controller frequency.
- **Configuration:** The Settings tab of the CAN devices property sheet in the device manager is extended to indicate the device capability Timestamped Tx and PXI Support.
- **Configuration:** The Settings tab of the CAN devices property sheet in the device manager is extended to choose between SOF or EOF as timestamp sample point (Only supported by C400 family).

## Driver Package 2.6.3

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*Release date: 2012-04-18*

- **Support for new devices:** CAN-USB/Micro added to USB2 driver family (x86/x64).
- **All drivers/devices:** Drivers install on Windows 8 (x86/x64).
- **All drivers/devices:** Fixed Local Echo capability not indicated in feature flags.
- **C200:** Improved CAN controller initialization robustness.
- **USB2:** Fixed BSOD for Autobaud in combination with Listen Only mode.
- **Configuration:** The Settings tab of the CAN devices property sheet in the device manager is extended to indicate the device capability Local Echo and Error Injection.

## Driver Package 2.6.2

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*Release date: 2012-03-12*

- **C200:** Fixed possible BSOD on Windows 64-Bit versions if Listen Only mode is enabled.
- **USB2:** Fixed spurious occurrence of invalid timestamps.
- **CAN-CBX-AIR2:** Fixed indication of wrong CAN controller frequency.
- **C405:** Fixed possible wrong order of received frames in case of interaction.
- **C405:** Fixed CAN bus error handling might stall Tx engine in rare cases.
- **C400:** Updated ESDACC core to V00.30.
- **C400:** Support for error injection.

## Driver Package 2.6.1

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*Release date: 2011-07-07*

- **Support for new devices:** New CAN driver family C400 for CAN-PCI/400, CAN-PCIe/400, CPCI-CAN/400 and PMC-CAN/400 (x86/x64) with ESDACC core V00.25.
- **Support for new devices:** CAN-CBX-AIR/2 added to USB2 driver family.
- **C405:** Initial release of Windows 64-Bit driver.

- **All drivers/devices:** Support for calculating and returning configured bitrate details.
- **All drivers/devices:** Support to mark CAN messages received via interaction.
- **C200:** Support for extended CAN bus diagnostic functionality and events.
- **C200:** Support for busload event.
- **C200:** Fixed last index of ESD bitrate table ignored in autobaud.
- **C200:** CAN bus error events are created on IRQ level so they get the correct timestamp in relation to CAN bus messages.
- **USB2:** Support for extended CAN bus diagnostic functionality and events (Requires FW >= 1.1.0).
- **C331:** Support for 8 byte bit rate change event.
- **C405:** Added missing main event long message available for other devices.
- **All drivers/devices:** Improved WMI support.
- **All drivers/devices:** The very first event log message after driver installation no longer uses "Unknown" for the device name.
- **All drivers/devices:** Several changes to improve driver robustness and performance.
- **Installation:** The 32-bit driver packages are distributed with the same code signing policy as the 64-bit versions.
- **Installation:** Copy CAN class related property sheet page provider with driver update.
- **Installation:** Configure WMI security for Windows Vista and later.
- **Configuration:** The Settings tab of the CAN devices property sheet in the device manager is extended to show CAN controller type and clock instead of bus type.
- **Configuration:** The Settings tab of the CAN devices property sheet in the device manager disables HW/FW/Driver version if device is disabled instead of using the last requested values.

## Driver Package 2.5.4

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*Release date: 2009-10-12*

- **All drivers/devices:** All drivers ready for Windows 7 (32-bit and 64-bit version).
- **USB2:** Error recovery for stalled pipes as a result of USB communication errors.
- **USB2:** Fixed BSOD for surprise removal on SMP machines.
- **Installation:** All PCI driver gets installed with CPU affinity set to 'Any'.
- **C405:** Improved autobaud detection performance which can now be combined with Listen Only mode (Driver Rev. 3.9.0).
- **C405:** Fixed aborting pending read/write requests via canIoctl() always fails (Driver Rev. 3.9.0).
- **C405:** Fixed several issues concerning the auto RTR support (Driver Rev. 3.9.0).
- **C405:** Fixed driver never returns from canClose() under certain conditions (Driver Rev. 3.9.0).
- **C405:** Fixed inopportune timeout in canSend() which might result in lost messages for low bitrates (Driver Rev. 3.9.0).
- **C405:** Fixed loading/unloading driver could freeze system (Driver Rev. 3.9.1).



## Driver Package 2.5.3

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*Release date: 2008-11-10*

- **All drivers/devices:** Fixed bug that a firmware update might fail if not performed on the logical base net.
- **USB2:** Support for more than one physical CAN port.
- **C331:** Fixed further situation where a CAN message might get an 'old' timestamp.

## Driver Package 2.5.2

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*Release date: 2008-08-25*

- **Support for new devices:** CAN-AIR/2 added to USB2 driver family.
- **All drivers/devices:** Performance improvements in multi core environments.
- **All drivers/devices:** Support for Smart Suspend mode to prevent a change of system power state if the CAN device is in use.
- **C405:** Minimized jitter in scheduling (Driver Rev. 3.8.0).
- **C405:** Added support for counters in scheduled CAN frames (Driver Rev. 3.8.0).
- **C405:** Fixed driver might hang in close for handles in scheduling mode (Driver Rev. 3.8.0).
- **C405:** Fixed serial number shows up as N/A on PCI405B4 variants (Driver Rev. 3.8.1).
- **C405:** Fixed firmware signals readiness to early, so that host driver load could fail with Error 10 in device manager. (Driver Rev. 3.8.1).
- **C405:** Fixed system crash with BSOD, if DMA Buffer crosses a 16 MB aligned address (Driver Rev. 3.8.1).
- **C200, C331, C360:** Added support to configure the CPU affinity of the interrupt handler to either a single CPU (default) or to run on an arbitrary free CPU. Please refer to the installation manual for the impact of these options.
- **C200:** Added support for bit rate change event with 8 data bytes.
- **C200:** Fixed timestamp not applied to bit rate change event.
- **C200:** Fixed minimal chance that a received CAN message is discarded during recovery from a CAN controller error state.
- **C331:** Fixed situation where a CAN message might get an 'old' timestamp.
- **USB2:** Support for auto-baudrate detection and baudrate change events with 8 bytes (Requires FW >= 1.0.04).
- **USB2:** Fixed problems returning from a system suspend to disk or RAM (Requires FW >= 1.0.04).
- **Configuration:** The layout of the Settings tab of the CAN devices property sheet in the device manager is changed.
- **Configuration:** The Settings tab of the CAN devices property sheet in the device manager is extended to indicate the new device capability Scheduling.
- **Configuration:** The Settings tab of the CAN devices property sheet in the device manager is extended to configure the CPU affinity of the interrupt handler for CAN hardware which supports software generated timestamps.

- **Configuration:** The Settings tab of the CAN devices property sheet in the device manager is extended to enable/disable the Smart Suspend feature.
- **Configuration:** The Settings tab of the CAN devices property sheet in the device manager now implements context sensitive help for the various settings.
- **Configuration:** Fixed that the 64-bit NTCAN library wasn't present in the list box of libraries which gets installed with the device driver on the Settings tab of the CAN devices property sheet.

## Driver Package 2.5.1

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*Release date: 2007-07-11*

- **Support for new devices:** PMC-CAN/266 added to C200 driver family.
- **All drivers/devices:** Support for setting bitrates numerically.
- **All drivers/devices:** Improved error information in event log in case of driver initialization problems.
- **All drivers/devices:** Support for baudrate change event with 4 data bytes.
- **CAN-PCI104/200:** Fixed bug driver start failed with invalid hardware revision if EEPROM is programmed with default factory data.
- **USB2:** Fixed bug IDs are disabled on device if first application disables an ID.
- **USB1:** Resetting device is repeated if first reset failed during driver startup.
- **C405:** Fixed cleanup problem of TX scheduling.
- **C405:** Fixed initial start is marked as failed in device manager because arbitrary node number is assigned.
- **Installation:** Every driver gets an own INF file for 32- and 64-bit installations as otherwise Windows Vista doesn't install the driver if any of the driver files which are listed in the common INF file are missing.
- **Configuration:** PMC indicated as separate bus type.

## Driver Package 2.5.0

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*Release date: 2007-05-02*

- **Support for new devices:** CAN-PCle/200 and CAN-PCI104/200 added to C200 driver family.
- **Support for new devices:** New CAN driver family USB2 for CAN-USB/2.
- **All drivers:** Support for Windows Vista (32-bit and 64-bit version).
- **All drivers:** All drivers, libraries and executables of the driver package are digitally signed by esd electronic system design gmbh using Microsoft Authenticode technology so the end user can verify at any time the publisher and the code integrity of these files. In addition the complete 64-bit driver package complies with the kernel-mode code signing requirements of the x64-based versions of Windows Vista.
- **All drivers/devices:** Support for capturing timestamp of incoming CAN message. If timestamping isn't supported by the CAN hardware the CAN message is timestamped by the interrupt handler in software.

- **All drivers/devices:** Support to abort blocked receive/transmit operations without forcing a close handle operation. To distinguish both situations an aborted operation returns with `NTCAN_OPERATION_ABORTED` and a closed handle with `NTCAN_HANDLE_FORCED_CLOSE`.
- **All drivers/devices:** CAN messages received in object mode are marked again invalid, as soon as the data isn't updated any more.
- **All active devices:** Improved speed of firmware update.
- **C200, USB1, USB2:** Support for Listen Only mode where the CAN controller is receiving CAN messages but stays passive on the bus.
- **C200, USB1, USB2:** Support for Smart Disconnect mode where the CAN controller becomes passive on the bus as soon as the last handle is closed.
- **C200:** Support for auto-baudrate detection.
- **CAN-PCI/266:** Fixed device failed returning from low power state.
- **C331:** Reduced occurrence of retries on PCI bus in case of high CAN bus load.
- **C331 and C360:** Reduced driver initialization time.
- **C405:** Major change because of implicit update to new bootloader on PCI405 board which improves latency returning hardware timestamp.
- **All drivers/devices:** The Version tab of the driver's property sheet now lists all CAN devices which are supported by the driver.
- **Installation:** Using separate installer files `canesd32.inf` and `canesd64.inf` for 32-bit and 64-bit Windows versions instead of common `canesd2k.inf`. 64-bit driver package is signed.
- **Installation:** 64-bit version of NTCAN library is installed as `ntcan.dll` instead of `ntcan64.dll` as in previous releases for 64-bit Windows.
- **Installation:** Adapted all device display names in cases they differ from the names printed in catalog.
- **Configuration:** The Settings tab of the CAN devices property sheet in the device manager is extended to indicate the new device capabilities Timestamp, Listen Only and Smart Disconnect as well as the timestamp frequency and type.
- **Configuration:** PCIe and PCI-104 are indicated as separate bus types.
- **Configuration:** The Smart Disconnect feature can be enabled/disabled (default: disabled).
- **Configuration:** The icon is updated and changed to a Vista compatible version.

## Driver Package 2.4.3

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*Release date: 2006-03-02*

- **Support for new devices:** CPCI-CAN/200 added to C200 driver family.
- **C405:** Support for auto-baudrate detection.
- **C405:** Support for numerical setting of bit rate.
- **C405:** Support to purge receive FIFO.

## Driver Package 2.4.2

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*Release date: 2005-09-19*

- **All drivers/devices:** Initial support for Windows XP x64 Edition and Windows Serve03 x64 with 64-bit driver and device manager support and libraries supporting 32-bit and 64-bit applications.
- **C200:** Fixed several issues with CAN messages with DLC is > 8.
- **USB1:** Fixed event log pollution during FW update introduced with previous release.
- **C405:** Support for handle specific 29-bit filter mask.
- **Configuration:** Search in SysWow64 directory on 64-bit Windows for libraries, too.

## Driver Package 2.4.1

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*Release date: 2004-10-15*

- **Support for new devices:** New CAN driver family C405 for CAN-PCI/405.
- **USB1:** Fixed bug with stalled Tx operations with firmware >= 0.C.44. The issue is indicated in the system event log.

## Driver Package 2.4.0

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*Release date: 2003-01-17*

- **C200, C331 and C360:** Initial release as WDM driver with Plug'n'Play, Power Management and WMI support.
- **Support for new devices:** CAN-PCI/266 added to C200 driver family.
- **Support for new devices:** PMC-CAN/331 added to C331 driver family.
- **All drivers/devices:** Updating firmware is only possible if no other handle is open and opening handle while updating firmware isn't possible any more.
- **All drivers/devices:** Handle situations where host PC overruns CAN device FIFO with *canIdAdd()*, *canIdDelete()* and *canClose()*.
- **All drivers/devices:** Support for handle specific 29-bit filter mask.
- **All drivers/devices:** Support to purge receive FIFO.
- **All drivers/devices:** Support to return serial number of CAN device.
- **All drivers/devices:** Support to return number of available receive messages in receive FIFO.
- **C200:** Support for new bit rate table indices for 800 KBit/s, 1,6 MBit/s and 83,3 KBit/s.
- **C331:** Fixed several issues restoring device context after returning from lower power state.
- **USB1:** Support for new bit rate table indices for 800 KBit/s, 1,6 MBit/s and 83,3 KBit/s for firmware revision >= 0.C.49
- **USB1:** Fixed bug with stalled Tx operations with firmware < 0.C.44.
- **Installation:** DeviceNet support library (dnet.dll) no longer installed with driver as all driver related dependencies are removed.

- **Configuration:** Fixed Settings tab of the CAN devices property sheet is also displayed in the class property sheet with junk data.
- **Configuration:** Libraries which aren't present on the system are no longer displayed.
- **Configuration:** Show devices serial if supported.

## Driver Package 2.3.0

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*Release date: 2002-07-03*

- **Support for new devices:** New CAN driver family USB1 for CAN-USB/Mini as WDM driver with Plug'n'Play, Power Management and WMI support.
- **All drivers/devices:** Support for Rx object mode.

## Driver Package 2.2.0

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*Release date: 2001-09-03*

- **C200, C331 and CAN360:** Initial release of these driver families with Windows NT based driver.
- **Installation:** Installed via hardware wizard based on INF file canesd2k.inf.
- **Configuration:** Configured via Settings tab of a CAN devices property sheet in the device manager.

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## Supported CAN hardware:

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Several driver support more than one esd CAN device. The following table gives an overview on how many and which different CAN devices are supported by a single CAN family device driver.

Driver Family Name	Supported CAN Hardware	Driver Binary (x86/x64)
<b>C200</b>	CAN-PCI/200 CAN-PCI/266 CPCI-CAN/200 CAN-PCIe/200 CAN-PCI104/200 PMC-CAN/266	c200.sys c200a.sys
<b>C331</b>	CAN-PCI/331 CPCI-CAN/331 PMC-CAN/331	c331.sys c331a.sys
<b>C360</b>	CAN-PCI/360 CPCI-CAN/360	c331.sys c331a.sys
<b>C400</b>	CAN-PCI/400 CPCI-CAN/400 CAN-PCIe/400 PMC-CAN/400	c400k.sys c400ak.sys
<b>C402</b>	CAN-PCIe/402 CAN-PCI/402 CAN-PCIe/402-Mini CPCI-CAN/402 CPClserial-CAN/402-2 CAN-PCIe/402-FD CAN-PCI/402-FD PMC-CAN/402-4-FD XMC-CAN/402-4-FD CAN-PCIe/402-Mini-FD CPCI-CAN/402-FD CPClserial-CAN/402-4-FD	c402k.sys c402ak.sys
<b>C405</b>	CAN-PCI/405	pci405.sys pci405a.sys
<b>USB1</b>	CAN-USB/Mini	usb331.sys usb331a.sys
<b>USB2</b>	CAN-USB/2 CAN-USB/Micro CAN-AIR/2 CAN-CBX-AIR/2	usb2292.sys usb2292a.sys
<b>USB3</b>	CAN-USB/3-FD	usb3fd.sys usb3fda.sys

## Package content

The tables below are an overview which version of the binaries is distributed in a released driver package. As driver packages for the different CAN driver families are not released at the same time it is possible that a package with a newer release date contains a newer version of a library. In that case the version is written in the table below as x.y.[a|b] to indicate that one package was released with version x.y.a and another package with x.y.b of the library. A package might also be re-released with the unchanged device driver and just updated libraries.

### Driver Package 2.7.x / 2.8.x

Package/ File	2.7.0	2.7.1	2.8.0	2.8.1	2.8.2	2.8.3	Description
usb3fd.sys	-	-	2.8.0	2.8.1	-	2.8.3	USB3 driver (32-bit)
usb3fda.sys	-	-	2.8.0	2.8.1	-	2.8.3	USB3 driver (64-bit)
usb2292.sys	2.7.0	2.7.1	-	-	2.8.2	2.8.3	USB2 driver (32-bit)
usb2292a.sys	2.7.0	2.7.1	-	-	2.8.2	2.8.3	USB2 driver (64-bit)
c360a.sys	-	2.7.1	-	-	-	-	C360 driver (64-bit)
ntcan.dll	5.0.6	5.0.6	5.0.7	5.0.8	5.1.1	5.1.4	NTCAN library(32-/64-bit)
canui32.dll	1.6.4	1.6.4	1.6.5	1.6.5	1.6.8	1.6.9	Property Sheet (32-bit)
calcan32.dll	2.6.11	2.6.11	2.6.11	2.6.11	2.6.13	2.7.5	CANopen SDO Support (32-Bit)
canui64.dll	1.6.4	1.6.4	1.6.5	1.6.5	1.6.8	1.6.9	Property Sheet (64-bit)
calcan64.dll	2.6.11	2.6.11	2.6.11	2.6.11	2.6.13	2.7.5	CANopen SDO Support (64-Bit)

## Driver Package 2.6.x

Package/ File	2.6.1	2.6.2	2.6.3	2.6.4	2.6.5	2.6.6	2.6.7	2.6.8	2.6.9
c200.sys	2.6.1	2.6.2	2.6.3	-	-	2.6.6	-	-	2.6.9
c331.sys	2.6.1	2.6.2	-	2.6.4	-	2.6.6	2.6.7	-	2.6.9
c400.sys	3.9.63	3.9.70	-	3.9.72	3.9.77	3.9.81	3.10.0	3.10.2	3.10.3
c402.sys	-	-	-	3.9.2	3.9.3	3.9.x	-	3.10.2	3.10.3
pci405.sys	-	3.9.3	3.9.3	3.9.4	3.9.5	-	3.10.0	3.10.1	-
usb331.sys	-	-	-	2.6.4	-	-	-	-	-
usb2292.sys	2.6.1	2.6.2	2.6.3	2.6.4	-	2.6.6	2.6.7	-	2.6.9
c200a.sys	2.6.1	2.6.2	2.6.3	-	-	2.6.6	-	-	2.6.9
c331a.sys	2.6.1	2.6.2	-	2.6.4	-	2.6.6	2.6.7	-	2.6.9
c400a.sys	3.9.63	3.9.70	-	3.9.72	3.9.77	3.9.81	3.10.0	3.10.2	3.10.3
c402a.sys	-	-	-	3.9.2	3.9.3	3.9.5	-	3.10.2	3.10.3
pci405a.sys	3.9.2	3.9.3	-	3.9.4	3.9.5	-	3.10.0	3.10.1	-
usb2292a.sys	-	-	-	2.6.4	-	2.6.6	2.6.7	-	-
ntcan.dll	4.4.1	4.6.0	4.6.0	4.7.[0/1]	4.8.1	4.8.x	4.8.7	4.8.[7/8]	4.8.8
canui32.dll	1.4.2	1.4.2	1.4.3	1.4.3	1.4.4	1.4.4	1.5.x	1.6.0	1.6.0
calcan32.dll	2.5.5	2.5.7	2.5.7	2.6.x	2.6.2	2.6.2	2.6.3	2.6.3	2.6.3
canui64.dll	1.4.2	1.4.2	1.4.3	1.4.3	1.4.4	1.4.4	1.5.x	1.6.0	1.6.0
calcan64.dll	2.5.5	2.5.7	2.5.7	2.6.x	2.6.2	2.6.2	2.6.3	2.6.3	2.6.3



## Driver Package 2.5.x

Package/ File	2.5.0	2.5.1	2.5.2	2.5.3	2.5.4
c200.sys	2.5.0	2.5.1	2.5.2	-	-
c331.sys	2.5.0	2.5.1	2.5.2	-	2.5.4
c360.sys	2.5.0	2.5.1	2.5.2	-	-
pci405.sys	3.7.4	3.7.5	3.8.[0/1]	-	3.9.[0/1]
usb331.sys	2.5.0	2.5.1	-	-	-
usb2292.sys	2.5.0	2.5.1	-	2.5.3	2.5.4
c200a.sys	2.5.0	2.5.1	2.5.2	-	-
c331a.sys	2.5.0	2.5.1	2.5.2	-	2.5.4
c360a.sys	2.5.0	2.5.1	2.5.2	-	-
pci405.sys	-	-	-	-	-
usb331a.sys	2.5.0	2.5.1	-	-	-
usb2292a.sys	2.5.0	2.5.1	-	-	2.5.4
ntcan.dll	4.1.1	4.1.1	4.2.4	4.2.4	4.2.7
canui32.dll	1.2.1	1.2.3	1.3.0	1.3.0	1.4.0
calcan32.dll	2.3.2	2.3.2	2.4.4	2.4.4	2.5.3
canui64.dll	1.2.1	1.2.3	1.3.0	-	1.4.0
calcan64.dll	2.3.2	2.3.2	2.4.4	-	2.5.3

## Driver Package 2.2.x to 2.4.x

Package/ File	2.2.0	2.3.0	2.4.0	2.4.1	2.4.2	2.4.3
c200.sys	2.2.0	2.3.0	2.4.0	2.4.0	2.4.2	2.4.3
c331.sys	2.2.0	2.3.0	2.4.0	2.4.0	2.4.2	2.4.2
c360.sys	2.2.0	2.3.0	2.4.0	2.4.0	2.4.2	2.4.2
pci405.sys	-	-	-	3.6.2	3.6.3	3.6.4
usb331.sys	-	-	2.4.0	2.4.1	2.4.2	2.4.2
usb2292.sys	-	-	4.0.3	-	-	-
c200a.sys	-	-	-	-	2.4.2	2.4.3
c331a.sys	-	-	-	-	2.4.2	2.4.2
c360a.sys	-	-	-	-	2.4.2	2.4.2
pci405a.sys	-	-	-	3.6.2	-	-
usb331a.sys	-	-	-	2.4.1	2.4.2	2.4.2
ntcan.dll	2.0.1	2.3.1	3.1.0	3.1.0	3.1.1	3.1.1
canui32.dll	1.0.0	1.0.1	1.0.2	1.0.2	1.0.3	1.0.3
calcan32.dll	1.6.2	1.6.3	2.0.4	2.0.4	2.2.2	2.2.2
canui64.dll	-	-	-	-	1.0.3	1.0.3
calcan64.dll	-	-	-	-	2.2.2	2.2.2

## Known Issues

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All 3.x driver and the CAN-USB/Mini driver **do not** support any system sleep mode. Since Windows Vista a driver can no longer prevent the change to a low power mode by itself so the system administrator has to make sure that the system is configured in a way which prevent such a power state. For the same reason it is necessary to disable the *Hybrid Shutdown* which was introduced with Windows 8.