

Release Notes Linux OS Release 1.4.3 (we-wayland-qt5) for EGScore

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1.4.3

12/15/2023

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- 1. Overview 5**
 - 1.1 Safety instructions 5
- 2. Platform 7**
 - 2.1 Supported Hardware 7
- 3. Components 8**
 - 3.1 Versions 8
 - 3.2 License 8
 - 3.3 Directories and files 8
 - 3.3.1 Installation images 8
 - 3.3.2 Boot logo pictures 9
 - 3.3.3 Toolchain 10
 - 3.3.4 Documentation 11
 - 3.3.5 Licenses 11
 - 3.3.6 Sources 11
 - 3.3.7 Yocto System 11
- 4. Installation instructions 13**
 - 4.1 Prerequisites 13
 - 4.2 Update from versions older than 1.3.0 13
 - 4.3 Preparing a USB Flash drive 13
 - 4.4 Installation process 14
- 5. EGScore Linux OS release history 16**
 - 5.1 COMIC change history 16
 - 5.1.1 Changes for EGScore COMIC Firmware 1.0 16
 - 5.1.2 Changes for EGScore COMIC Firmware 2.0 16
 - 5.1.3 Changes for EGScore COMIC Firmware 2.1 16
 - 5.1.4 Changes for EGScore COMIC Firmware 2.2 17
 - 5.1.5 Changes for EGScore COMIC Firmware 2.3 17
 - 5.1.6 Changes for EGScore COMIC Firmware 2.4 17
 - 5.1.7 Changes for EGScore COMIC Firmware 2.5 17
 - 5.1.8 Changes for EGScore COMIC Firmware 2.6 17
 - 5.2 PMIC change history 17
 - 5.2.1 Changes for EGScore PMIC Firmware 1.0 17
 - 5.2.2 Changes for EGScore PMIC Firmware 1.1 18
 - 5.2.3 Changes for EGScore PMIC Firmware 1.2 18
 - 5.2.4 Changes for EGScore PMIC Firmware 1.3 18
 - 5.2.5 Changes for EGScore PMIC Firmware 1.4 18
 - 5.2.6 Changes for EGScore PMIC Firmware 1.5 18
 - 5.2.7 Changes for EGScore PMIC Firmware 1.6 18

5.2.8	Changes for EGScore PMIC Firmware 1.7	18
5.2.9	Changes for EGScore PMIC Firmware 1.8	19
5.3	Linux OS change history	19
5.3.1	Changes for EGScore Linux OS Release 1.0.0	19
5.3.2	Changes for EGScore Linux OS Release 1.1.0	19
5.3.3	Changes for EGScore Linux OS Release 1.1.1	20
5.3.4	Changes for EGScore Linux OS Release 1.2.0	20
5.3.5	Changes for EGScore Linux OS Release 1.2.1	21
5.3.6	Changes for EGScore Linux OS Release 1.2.2	21
5.3.7	Changes for EGScore Linux OS Release 1.3.0	23
5.3.8	Changes for EGScore Linux OS Release 1.3.1	24
5.3.9	Changes for EGScore Linux OS Release 1.4.0	24
5.3.10	Changes for EGScore Linux OS Release 1.4.1	25
5.3.11	Changes for EGScore Linux OS Release 1.4.2	25
5.3.12	Changes for EGScore Linux OS Release 1.4.3	26
6.	Known issues	27

1 Overview

This release contains the Linux OS 1.4.3 (we-wayland-qt5) for Topcon Electronics EGScore units. It is intended for all EGScore variants of series hardware revision. Details about the prerequisites to use this Linux OS release as well as the installation instructions are described in the following.

Purpose

This Linux OS release is a feature release for the EGScore hardware. The release also adds support for a new hardware variant of EGScore hardware and contains bugfixes for older release versions.

Please refer to chapter "[EGScore Linux OS release history](#)"^[16] for a detailed list of changes.

Please refer to chapter "[Known issues](#)"^[27] for a list of known issues.



Warning

This release is intended to be used on preseries units and series units only. Support for older prototypes has been dropped. Do not use this release on older prototype B or C units.

Audience

This Linux OS release is provided to all customers and Topcon Electronics development departments using EGScore units for development purposes.

This document is intended to all developers integrating software on an EGScore unit. It explains the steps to update EGScore units to this new release and provides a list of known issues.

Scope

This Linux OS release contains a new operating system including a small bootloader update, an updated service image, a new Linux kernel and root file system for the supported EGScore units.

Applications like PClient or CODESYS are not part of this release. Updates to these packages are provided separately by Topcon Electronics.

Please refer to chapter "[Supported Hardware](#)"^[7] for a list of supported EGScore units.

References

This document is just a short description for the new features and changes of the corresponding Linux OS release. For details about the driver and API implementations as well as C/C++ programming samples and the FAQ please refer to the "EGScore C/C++ Developer Guide" provided along with this Linux OS release.

1.1 Safety instructions



Notice

Please read the complete document and these safety instructions carefully before applying any update to any EGScore unit.



Warning

Please follow the instructions provided in this document carefully to update the Linux OS release on an EGScore unit. Wrong usage can lead to a none-operational state of the EGScore unit which can only be repaired by Topcon Electronics.

**Warning**

Only use software packages and files which are provided by Topcon Electronics and are contained in this release to update the Linux OS on any EGScore unit. The usage of wrong software packages can lead to a none-operational state of the EGScore unit which can only be repaired by Topcon Electronics.

**Warning**

The update process contains an MD5 checksum verification to check the integrity of each software package. Only use the provided MD5 checksum files along with the software packages. The usage of wrong MD5 checksum files can lead to a none-operational state of the EGScore unit which can only be repaired by Topcon Electronics.

**Warning**

Before applying any update to an EGScore unit please make sure that a possibly installed application package (e.g. PCClient or CODESYS) is compatible with this Linux OS release. An update of the application package may be required to support this Linux OS release.

**Notice**

If a possibly installed application package is a self-developed C/C++ application, additional changes may be required to support this Linux OS release.

**Warning**

Before applying any update to an EGScore unit please make sure that the EGScore hardware variant is supported by this Linux OS release.

**Warning**

Support for older EGScore prototype A samples has been dropped due to immense hardware changes. Do not install this Linux OS release on these units.

**Notice**

If unsure on any of these points or in case that something does go wrong please contact Topcon Electronics for further information and support.

**Warning**

Please avoid hard reset (battery off) of EGScore during running application. This may lead to system functionality distortions.

2 Platform

In general this Linux OS release is provided for the Topcon Electronics platform EGScore. But there are limitations regarding the support of several EGScore hardware variants due to immense hardware differences. All supported EGScore hardware variants as well as all older EGScore Linux OS releases supported for the update process are listed below.



Warning

All EGScore hardware variants not named here have to be treated as **not supported!**

2.1 Supported Hardware

This Linux OS release supports the following EGScore hardware variants:

• OPUS B3 Eco Basic		Series
• OPUS B3 Eco Touch		Series
• OPUS B3 Eco Full	Industrial ethernet	Prototype C
• OPUS B3 Eco Full	Automotive ethernet	Prototype C
• OPUS B4 Eco Touch	Industrial ethernet	Prototype C
• OPUS B4 Eco Full	Automotive ethernet	Prototype C
• OPUS B4 Eco Full	Industrial ethernet	Prototype C
• OPUS B6 Eco Touch	Industrial ethernet	Prototype B
• OPUS B6 Eco Touch	Automotive ethernet	Prototype C
• OPUS B6 Eco Full	Industrial ethernet	Prototype B
• OPUS B6 Eco Full	Automotive ethernet	Prototype B



Notice

This platform supports WiFi USB adaptors based on the **RTL8192CU** chip. Many WiFi USB manufacturers apply this chip in their products, so please search for available products with this model built in.

3 Components

This Linux OS release contains a new operating system for the Topcon Electronics EGScore platform. The provided components of the release together with their version and license information are described below.

3.1 Versions

Release name and version

- EGScore Linux OS release 1.4.3 (Wayland/Qt5)

Component versions

- Bootloader: U-Boot 2016.05-egscore-1.4.3
- Linux kernel: Linux egscore 5.4.263
- Qt: 5.12.12

3.2 License

All software components of this Linux OS release are provided under the terms of the GNU General Public License version 2 (GPLv2) unless otherwise mentioned. Source code of this release which is published under the terms of the GNU General Public License or other Open Source licenses is included in this release. You may obtain a copy of the GNU General Public License version 2 or later at <http://www.gnu.org/copyleft/gpl.html>.

Some software components of the provided root file system and the service RAMDISK are published under different licenses as the GNU General Public License. Please refer to the license folder provided along with this Linux OS release for a complete and detailed list of provided software packages and their corresponding licenses.

3.3 Directories and files

This Linux OS release contains the following directories and files.

3.3.1 Installation images

These images are intended to be installed directly to the EGScore target. They are located in the folder `images` within the Linux OS release folder.

Software installation image files	
File name	Description
boot-recovery_egscore_1.4.3.bin	Bootloader image for Serviceboot. Provided by TELE in Linux BSP release.
boot-recovery_egscore_1.4.3.bin.md5	MD5 checksum file for Serviceboot image.
boot_egscore_1.4.3.bin	Bootloader image for run-time OS. Provided by TELE in Linux BSP release.
boot_egscore_1.4.3.bin.md5	MD5 checksum file for Bootloader image.
service_egscore_1.4.3.bin	Service OS

service_egscore_1.4.3.bin.md5	Boot logo for service OS
rootfs_egscore_1.4.3.tar.gz	Root file system of run-time OS. Provided by TELE in Linux BSP release.
rootfs_egscore_1.4.3.tar.gz.md5	MD5 checksum file for root file system.
dev-tree_egscore_1.4.3.tar.gz	Collected device tree file. It includes device trees for all device variants.
dev-tree_egscore_1.4.3.tar.gz.md5	MD5 checksum file for collected device tree.
copro_egscore.tar.gz	PMIC+COMIC firmware provided by TELE in Linux BSP release. For 32bit and 8bit controllers.
copro_egscore.tar.gz.md5	MD5 checksum file for COMIC firmware.

3.3.2 Boot logo pictures

This Linux OS release provides a set of default boot logo pictures. There are two types of pictures, a boot logo which is shown at start of normal operating mode and a recovery logo which is shown while loading the update RAMDISK during a software update. All provided default boot logo pictures are located in the folder `logo` within the Linux OS release folder. This folder is split in sub-folders containing the device specific logos.

Boot logo pictures	
File	Description
logo_egscore_b3-tele-landscape.bmp	Topcon default B3 landscape boot logo with size 800x480 px
logo_egscore_b3-tele-landscape.bmp.md5	MD5 checksum file for Topcon default B3 landscape boot logo
recovery_egscore_b3-tele-landscape.bmp	Topcon default B3 recovery landscape boot logo with size 800x480 px
recovery_egscore_b3-tele-landscape.bmp.md5	MD5 checksum file for Topcon default B3 recovery landscape boot logo
logo_egscore_b3-tele-portrait_90.bmp	Topcon default B3 portrait 90 degrees rotated boot logo with size 800x480 px
logo_egscore_b3-tele-portrait_90.bmp.md5	MD5 checksum file for Topcon default B3 portrait 90 degrees rotated boot logo
recovery_egscore_b3-tele-portrait_90.bmp	Topcon default B3 recovery portrait 90 degrees rotated boot logo with size 800x480 px
recovery_egscore_b3-tele-portrait_90.bmp.md5	MD5 checksum file for Topcon default B3 recovery portrait 90 degrees rotated boot logo
logo_egscore_b3-tele-portrait_270.bmp	Topcon default B3 portrait 270 degrees rotated boot logo with size 800x480 px
logo_egscore_b3-tele-portrait_270.bmp.md5	MD5 checksum file for Topcon default B3 portrait 270 degrees rotated boot logo
recovery_egscore_b3-tele-portrait_270.bmp	Topcon default B3 recovery portrait 270 degrees rotated boot logo with size 800x480 px
recovery_egscore_b3-tele-portrait_270.bmp.md5	MD5 checksum file for Topcon default B3 recovery portrait 270 degrees rotated boot logo
logo_egscore_b4-tele-landscape.bmp	Topcon default B4 landscape boot logo with size 800x480 px
logo_egscore_b4-tele-landscape.bmp.md5	MD5 checksum file for Topcon default B landscape boot logo
recovery_egscore_b4-tele-landscape.bmp	Topcon default B4 recovery landscape boot logo with size 800x480 px
recovery_egscore_b4-tele-landscape.bmp.md5	MD5 checksum file for Topcon default B4 recovery landscape boot logo

logo_egscore_b4-tele-portrait_90.bmp	Topcon default B4 portrait 90 degrees rotated boot logo with size 800x480 px
logo_egscore_b4-tele-portrait_90.bmp.md5	MD5 checksum file for Topcon default B4 portrait 90 degrees rotated boot logo
recovery_egscore_b4-tele-portrait_90.bmp	Topcon default B4 recovery portrait 90 degrees rotated boot logo with size 800x480 px
recovery_egscore_b4-tele-portrait_90.bmp.md5	MD5 checksum file for Topcon default B4 recovery portrait 90 degrees rotated boot logo
logo_egscore_b4-tele-portrait_270.bmp	Topcon default B4 portrait 270 degrees rotated boot logo with size 800x480 px
logo_egscore_b4-tele-portrait_270.bmp.md5	MD5 checksum file for Topcon default B4 portrait 270 degrees rotated boot logo
recovery_egscore_b4-tele-portrait_270.bmp	Topcon default B4 recovery portrait 270 degrees rotated boot logo with size 800x480 px
recovery_egscore_b4-tele-portrait_270.bmp.md5	MD5 checksum file for Topcon default B4 recovery portrait 270 degrees rotated boot logo
logo_egscore_b6-tele-landscape.bmp	Topcon default B6 landscape boot logo with size 1280x800 px
logo_egscore_b6-tele-landscape.bmp.md5	MD5 checksum file for Topcon default B6 landscape boot logo
recovery_egscore_b6-tele-landscape.bmp	Topcon default B6 recovery landscape boot logo with size 1280x800 px
recovery_egscore_b6-tele-landscape.bmp.md5	MD5 checksum file for Topcon default B6 recovery landscape boot logo
logo_egscore_b6-tele-portrait_90.bmp	Topcon default B6 portrait 90 degrees rotated boot logo with size 1280x800 px
logo_egscore_b6-tele-portrait_90.bmp.md5	MD5 checksum file for Topcon default B6 portrait 90 degrees rotated boot logo
recovery_egscore_b6-tele-portrait_90.bmp	Topcon default B6 recovery portrait 90 degrees rotated boot logo with size 1280x800 px
recovery_egscore_b6-tele-portrait_90.bmp.md5	MD5 checksum file for Topcon default B6 recovery portrait 90 degrees rotated boot logo
logo_egscore_b6-tele-portrait_270.bmp	Topcon default B6 portrait 270 degrees rotated boot logo with size 1280x800 px
logo_egscore_b6-tele-portrait_270.bmp.md5	MD5 checksum file for Topcon default B6 portrait 270 degrees rotated boot logo
recovery_egscore_b6-tele-portrait_270.bmp	Topcon default B6 recovery portrait 270 degrees rotated boot logo with size 1280x800 px
recovery_egscore_b6-tele-portrait_270.bmp.md5	MD5 checksum file for Topcon default B6 recovery portrait 270 degrees rotated boot logo

3.3.3 Toolchain

The Toolchain, which includes all host tools and the sysroot directory required to develop and build one's own applications for the EGScore platform, is located in the folder `toolchain` within the Linux OS release folder.

Toolchain	
File	Description
<code>sdk_glibc-x86_64_we-wayland-qt5_we-image-production-egscore-1.4.3-toolchain.sh</code>	Script to install the EGScore platform Toolchain (we-wayland-qt5) on a Linux host PC.
<code>sdk_glibc-x86_64_we-wayland-qt5_we-image-production-egscore-1.4.3-toolchain.host.manifest</code>	List of all packages included in the Toolchain/SDK package for the host machine.
<code>sdk_glibc-x86_64_we-wayland-qt5_we-image-production-egscore-1.4.3-toolchain.target.manifest</code>	List of all packages included in the Toolchain/SDK package for the target machine.

3.3.4 Documentation

All documentation is located in the main folder of the Linux OS release.

Documentation	
File	Description
EGScore_Release_Notes_Linux_1.4.3-we-wayland-qt5.pdf	This document
EGScore_C_C++_Developerguide_1.4.3.pdf	C/C++ Developer Guide for EGScore platform

3.3.5 Licenses

A list of all target packages, including version and license information as well as a collection of all license files for each target and built package is located in the folder `licenses` within the Linux OS release folder.

Licenses	
File	Description
license_egscore_1.4.3-egscore.manifest	List of all target packages including version and license information (we-wayland-qt5 specific)
licenses_egscore_1.4.3-egscore.tar.xz	A collection of all license files for each target package and build packages used to build the target root file system (we-wayland-qt5 specific)
package_egscore_1.4.3-egscore.manifest	List of all target packages included in the root file system (we-wayland-qt5 specific)

3.3.6 Sources

The source code of all software packages and the Yocto recipes used to build the Linux operating system are located in the folder `sources` within the Linux OS release folder. All source code is published under their corresponding license specified in the license manifest.

Sources	
File	Description
sources_egscore_1.4.3-egscore-allarch-poky-linux.tar.xz	Source code of all packages, including original source archives, patches and invoked Yocto build recipes (we-wayland-qt5 specific). Split in architecture specific parts due to file sizes. Files can be extracted to the same place.
sources_egscore_1.4.3-egscore-arm-poky-linux-gnueabi.tar.xz	
sources_egscore_1.4.3-egscore-x86_64-linux.tar.xz	

3.3.7 Yocto System

The `yocto` folder contains the Yocto system, which was used to build the release. These files can be used to rebuild the images from source code. Please refer to the chapter in the Developerguide for instructions.

Sources	
File	Description
yocto-meta-layers_egscore_1.4.3.tar.xz	This tarball contains all Yocto meta layers used to build the Linux operating system.
mirrortarballs_egscore_1.4.3.tar.xz	This tarball contains tarballs of VCS repositories, which are only accessible Topcon Electronics internal. These are needed to rebuild the release from source with no access to the Topcon Electronics network.

4 Installation instructions

4.1 Prerequisites

Before installing software on an EGScore target, please make sure that it meets the hardware and software requirements. They are specified in chapter "[Platform](#)".

In addition you need a clean USB Flash drive, an external power supply for powering the EGScore target and an EGScore connector cable with the connectors for power supply, Serv_EN pin and USB port.

This document only describes an update by using a USB Flash drive. For the usage of the internal file system for updating, please consult the developer guide.

4.2 Update from versions older than 1.3.0

Due to some new features corresponding to the update mechanism you either need to update the OS release to version 1.3.0 and then update to release 1.4.3 or you have to copy the corresponding firmware files from the update folder to your USB flash drive, too.



Warning

After an update to a 1.4.x release a downgrade to a 1.x.y release, is no longer possible. If you try to install a lower release version, the installer will prevent the downgrade and abort the installation process.

4.3 Preparing a USB Flash drive

To prepare a USB Flash drive for software installation, please follow these instructions:

- Connect the USB Flash drive to your PC and copy the following files provided by this release to it. Each file has to be stored in the root directory without any sub-directories:

- o we-wayland-qt5/images/boot_egscore_1.4.3.bin
- o we-wayland-qt5/images/boot_egscore_1.4.3.bin.md5
- o we-wayland-qt5/images/boot-recovery_egscore_1.4.3.bin
- o we-wayland-qt5/images/boot-recovery_egscore_1.4.3.bin.md5
- o we-wayland-qt5/images/copro_egscore_1.4.3.sud
- o we-wayland-qt5/images/copro_egscore_1.4.3.sud.md5
- o we-wayland-qt5/images/dev-tree_egscore_1.4.3.tar.gz
- o we-wayland-qt5/images/dev-tree_egscore_1.4.3.tar.gz.md5
- o we-wayland-qt5/images/rootfs_egscore_1.4.3-we-wayland-qt5.tar.gz
- o we-wayland-qt5/images/rootfs_egscore_1.4.3-we-wayland-qt5.tar.gz.md5
- o we-wayland-qt5/images/service_egscore_1.4.3.bin
- o we-wayland-qt5/images/service_egscore_1.4.3.bin.md5

- Optionally copy the installation packages, which contain the user application and data to the same USB Flash drive. You can also update or install these packages without the installation of the operating system, if it is already installed on the EGScore target. Replace `<version>` with a custom version string. The file `logo_egscore_<variant>.bmp` is the boot logo shown at regular start up, the file `recovery_egscore_<variant>.bmp` is the boot logo shown at start of the update RAMDISK, the file `user_egscore_<version>.tar.gz` contains the content which is extracted to directory `/opt` on the target. Additional user Tarball archives can be provided optionally,

which are extracted to /opt in their numeric order. The files have to be named `user<1-9>_egscore_<version>.tar.gz` where <1-9> has to be replaced with a number between 1 and 9. The old content on /opt will only be deleted, if the `user_egscore` package is installed. This method can be used to split the user application into several packages for installation.

```
o logo_egscore_*.bmp
o logo_egscore_*.bmp.md5
o recovery_egscore_*.bmp
o recovery_egscore_*.bmp.md5
o user_egscore_<version>.tar.gz
o user_egscore_<version>.tar.gz.md5
o user<1-9>_egscore_<version>.tar.gz
o user<1-9>_egscore_<version>.tar.gz.md5
```

- Disconnect and remove the USB Flash drive safely from your PC.

4.4 Installation process

To install the operating software on a supported EGScore target, please follow these instructions:

- Connect the prepared USB Flash drive to the USB port of the EGScore target
- Make sure the EGScore target is correctly connected.
- Connect the Serv_EN pin of the main connector to supply voltage to enter the maintenance mode.
- Power on the EGScore target.
- The update process will start automatically after entering the maintenance mode. During the update process the display is showing informational messages about the update progress.



Notice

A full installation requires an update of the comic firmware, the devicetree and the service image to be able to program the comic option bytes. The final firmware installation is performed after a reboot. So the service image needs to be run twice. The target will show that the update is completed before the required reboot. Do not disconnect to Serv_EN pin until this reboot has completed. During the 2nd installation process after reboot a popup image will be displayed if the option bytes are updated. Now you can disconnect Serv_EN pin. This step is required to ensure the correct power management behavior.

- After successfully installing the files from USB Flash drive, the machine automatically performs a reboot and starts the new comic firmware and the new maintenance mode.
- The update process will start automatically after entering the maintenance mode. During the update process the display is showing informational messages about the update progress.
- Disconnect the Serv_EN pin from power supply after the display shows a message that the option bytes are updated.
- After successfully installing the files from USB Flash drive, the machine automatically performs a reboot and normal start up and the new Linux OS release is ready to use.



Notice

When a new root file system is installed on the EGScore target, both boot logos will be deleted during installation of the root file system. A reinstallation of these packages is required in this case.



Notice

When a new user application package is installed on the EGScore target, all content on /opt except /opt/data will be deleted during the installation of the first user application package. Additional user application packages will be installed in addition to the first package.

**Warning**

Do not switch off power supply of the EGScore target or disconnect the USB Flash drive during the whole installation process. This can result in a loss of data or data inconsistency. Also make sure that the power supply of the EGScore is stable throughout the complete installation process to avoid unwanted resets.

5 EGScore Linux OS release history

5.1 COMIC change history

5.1.1 Changes for EGScore COMIC Firmware 1.0

- No changes here

5.1.2 Changes for EGScore COMIC Firmware 2.0

- Rework and optimize power management
- Improve device configuration
- Fix missed wake signal, if system is in middle of suspend
- Add system ready/busy flag for write access detection
 - I2C flag for system notification that data is received but not processed.
 - Flag is cleared if data is received. Flag is set if i2c stack data are processed by main function.
- Add suspend hang detection
 - On IMX6S a problem exists, that the system hangs while suspending.
 - To detect the system an additional parameter was added to COMIC interface to inform the COMIC about system suspend.
 - If the sleep command is set in the state change request register.
 - Immediately after this command is set, the core system starts suspending.
 - If the CPU enters the final suspend state the STBY_REQ pin is asserted. The timeout will be stopped and cleared at this moment.
 - If the STBY_REQ pin is not asserted at the moment the timeout is reached, we expect that the system hung up. Now the COMIC has to reset the whole system to leave the fault state.
 - In WEHMD we added EEPROM Value: EE_SUSPEND_CRASH_COUNT.
- Fix bug that system does not boot by adding small hardware monitoring of wake signals
 - If service adapter and debug interface are removed from board the system does not boot anymore.
 - The problem is that the wake signal is enabled and the code continues immediately. So it is possible that the enable signal is not set yet if the enable signal is processed to send the wake event.
 - To solve this problem the system is forced to wait until the wake signals are set to the expected level.
 - Remove unused variable and obsolete event calls for wake on CAN.
- Add event handling for low power state initiated by wake-sources from wepmd to firmware
 - Handling low-power requests completely in wepmd caused a race-condition which can be reached if wake-sources are toggled fast.
 - To solve this race-condition the last part of wake-source handling (low-power state change handling) was completely moved to firmware.
 - Triggering events to wake or low-power the system was completely moved to update_wake_signals routine.

5.1.3 Changes for EGScore COMIC Firmware 2.1

- LED with a new version as configurable device implemented and can be controlled over WEPMD.
- Fixed issue where changing to On-Mode LED was hard configured on green.

5.1.4 Changes for EGScore COMIC Firmware 2.2

- Improve COMIC ready flag handling:
 - i. If the ready flag is reset while writing the first data bytes, the function to process the data can be called before all data is received if the data is written on block.
 - ii. To solve this problem the Ready flag is reset at the end of a running transmission. This guarantees that every data is processed before the whole data block is received.
- Remove unused state changes to match to WEPMD behavior:
 - i. These state changes do not result in any benefit for boot-/wake-time but perhaps in an unexpected behavior from end-user's view
 - ii. So this change should be removed again for a clear behavior.
- Fix a bug that KL15 is not always debounced if a hard reset was executed by removing KL30.
- Add PMIC_SR_RDY flag handling to memory access part.

5.1.5 Changes for EGScore COMIC Firmware 2.3

- Fix wrong initialization of the Button configuration register

5.1.6 Changes for EGScore COMIC Firmware 2.4

- Fix wrong handling of the event priorities.
- Fix bug that wake signals are not handled correct if API on request command was executed before.

5.1.7 Changes for EGScore COMIC Firmware 2.5

- Added workaround for system freezing on startup and added a EE_ON_CRASH_COUNT to log this event.
- New power management command flag TIM (Bit 7 in the COMIC_PMCR Register) enabled the start and stop of a timeout counter (on_timeout). The timeout is started by the bootloader and in the normal case stopped by the wepmd and/or command in the userscript.

5.1.8 Changes for EGScore COMIC Firmware 2.6

- Remove workaround introduced with COMIC firmware version 2.5. It is no longer required.

5.2 PMIC change history

5.2.1 Changes for EGScore PMIC Firmware 1.0

- This is an initial PMIC version, which has been properly tested, based on requirements.
- Behavior should be expected as with comic.
- Compare to 2.0 comic version, here we have configurable LED.
- In case of any issues emerging please report.

5.2.2 Changes for EGScore PMIC Firmware 1.1

- Fix wrong start value of enumeration for chip register value CMC_MODE.
- Clear CAN transceiver status to complete transceiver disable process.
- Fix configuration bug for wake on CAN.
- Close gap on counting WOC bitrates and compensate it on TJA driver.
- Bugfix wake on CAN configuration restore after reset.
- Fix a bug that KL15 is not always debounced if a hard reset was executed by removing KL30.

5.2.3 Changes for EGScore PMIC Firmware 1.2

- Remove wrong type conversion for I2C transmit buffer register feed.
- Fix wrong handling of the PMIC_SR_RDY flag.
- Modify pin configuration temporarily to support CAN3 and CAN4 on 10" boards.
- Improve PMIC ready flag handling.
- Update powerdown sequence for 10" boards.
- Remove unused state changes to match to WEPMD behavior.
- Reconfigure wake lines to CPU as open drain.
- Fix small bug in MAKEFILE and change fw version to 0.0 for debug builds.
- Fix bug in powerdown sequence for 5" EF / 7".
- Fix bug in silent wake line handling.
- Add PMIC_SR_RDY flag handling to memory access part.
- Improve and standardize powerdown sequence one step.

5.2.4 Changes for EGScore PMIC Firmware 1.3

- Fix wrong initialization of the Button configuration register
- Enable some additional print messages to default output
 - To give the possibility to do some basic debug event messages and some irq messages are enabled in the normal build.
 - This is useful for i.e. device reset in lab.
- Add detected HWID to boot string
- Fix wrong pin assignment comment for HWID pins.
- Update power sequencing for 10" proto B.

5.2.5 Changes for EGScore PMIC Firmware 1.4

- Fix wrong initialization of debug interface pins
- Fix a race condition inside SPI transfer routine which may cause a system crash

5.2.6 Changes for EGScore PMIC Firmware 1.5

- Fix bug that wake signals are not handled correct if API on request command was executed before.
- Improve accuracy of the ADC values.
- Update files to the new implementation of printf.

5.2.7 Changes for EGScore PMIC Firmware 1.6

- Increase reset wait delay:
 - We need this to avoid system restart in case of hard power-down.
 - Tested with B3 Full AE and B4 Full AE.
- Remove float functionality from printf.
- Add WDT reset to avoid update issues with larger FWs.

5.2.8 Changes for EGScore PMIC Firmware 1.7

- Added workaround for system freezing on startup and added a EE_ON_CRASH_COUNT to log this event.
- New power management command flag TIM (Bit 7 in the COMIC_PMCR Register) enabled the start and stop

of a timeout counter (on_timeout). The timeout is started by the bootloader and in the normal case stopped by the wepmd and/or command in the userscript.

5.2.9 Changes for EGScore PMIC Firmware 1.8

- Remove workaround introduced with COMIC firmware version 1.7. It is no longer required.

5.3 Linux OS change history

5.3.1 Changes for EGScore Linux OS Release 1.0.0

Bootloader

- No changes.

Kernel

- Jump to a new Linux Kernel 5.4.3.
- Enable USB over-current protection feature.

Update

- Implement new collective device tree.

Root file system

- No changes.

Rest

- No changes.

5.3.2 Changes for EGScore Linux OS Release 1.1.0

Bootloader

- Fix timeout on usb data transfer on some USB sticks.
- Enable output on RS232 console during service mode.

Kernel

- Add support for BroadR-Reach interface.
- Add support for Ethernet interface.
- Add support for analog video interface.
- Improve eMMC support.
- Fix timeout error during flexcan_suspend.
- Remove system vulnerability, which was giving full comic EEPROM memory access.
- Update kernel to the version 5.4.53.
- Add access to customer EEPROM values.
- Remove memory leak for video applications.
- Add support for 5" Full and 7" devices.
- Solve temperature issue with display.
- Fix camera related regulators.

Root file system

- Update several packages of the OS.

Power management

- Rework and optimize power management.
- Add API configuration parameters to configure the behavior of all wake sources.
- In very rare cases the CPU may hang during system suspend and does not react to any user interaction. Add workaround which executes a reset if this fault state is reached.
- Close a small time gap while entering sleep state in which the power management does not react to wake signals.
- Update COMIC driver to solve wake-up issue.

5.3.3 Changes for EGScore Linux OS Release 1.1.1

Bootloader

- No changes.

Kernel

- No changes.

Root file system

- No changes.

Power management

- No changes.

Release build

- Adjust device trees naming.

5.3.4 Changes for EGScore Linux OS Release 1.2.0

Bootloader

- Remove touch reset differences between 5" and 10".
- sunrize optimisation
 - - fix makefile to fix issue with Sunrize installation.
 - - add setup "fdtfile_var" env depends on EE_PRODUCT_VARIANT for all B-Series devices.
- Include lpj value for imx6 Quad and Dual.
- Print the processor type.
- Update u-boot eeprom init table.
- Bugfix set general the lpj value for the kernel.

Kernel

- Solve problem with display Clock line jitter with 5" display
- Add driver base package for PMIC drivers.
- Update PMIC adc driver.
- Boot-logo smooth transition into Kernel, without disappearing.
- Correct RAM memory size => 512MB.
- Add support for 7" Basic devices.
- Add support for 7" display.
- Improve video performance.
- Light sensor driver optimizes to avoid time delay at the reading stage.
- Bugfix: disable the clock source calculation over the frequency (GPT).
- Add support for Line-Out on 7" devices.

- Comic eeprom: Fix wrong app partition size.
- Fix problem with CMA memory.
- Optimize support for 2 power management chips: comic and pmic.
- Add initial support for 10" devices.

Power management

- No changes.

Release build

- Adjust device trees naming.

5.3.5 Changes for EGScore Linux OS Release 1.2.1

Bootloader

- Bootstrap: add 1G and 2G configurations for 7" Full and 10" support.

Kernel

- Solve problem with touch-enable pin.
 - Add support for 7" Full IE and AE.
 - Add JPEG codec.
 - Fix ADC values.
 - Fix bugs related to pmic driver.
 - Accelerate application boot time, due to random values generator update.

Power management

- Fix bug, that WEPMD_CMD_SET*_WAKE_SOURCE commands return button config instead of wake type.
 - Add support for selective wake on CAN configuration.
 - Add default configuration for selective wake on CAN, wake input and ignition input configuration.
 - API: Add feature to configure selective wake on can and ignition input configuration.
 - API: increase WEPMD_API_VERSION for the new selected wake on can configuration feature.
 - API: Add feature to configure external wake input.
 - Add support for ignition input configuration.
 - Add support for external wake input configuration.
 - Add support for ignition input configuration.
 - Improve error handling.

Release build

- Adjust device trees naming.

5.3.6 Changes for EGScore Linux OS Release 1.2.2

Bootloader

- Change 2G RAM speed setting to DDR-1600.
- Update MFG configurations to build MFG-image with yocto 2.7 including all relevant bootloader configurations.
- Fix wrong pad configuration for 10" display.
- Add display enable for 5" Eco full to show bootlogo in bootloader.
- Fix wrong hardware type for 7" devices.
- Add display support for 7" display.
- Add support for silent boot.

- Add support for DI-clock as pixel clock.
- Reconfigure IPU clock to 198MHz.
- Fix wrong 5" display pixel clock.
- Fix wrong display sequencing for 10" devices.
- Fix wrong display timings for 10" devices.
- ldb display: Fix wrong behaviour of display initialization on ldb displays.
- Do not enable reset line on 5" devices on silent boot to match display power sequencing requirements, may cause unexpected behaviour.

Kernel

- 10" bugfix reset pin of video1 , change namings of the regulators.
- 10" activate mipi for second video decoder.
- 10" include regulator for CAN2 and CAN3 reset.
- Add netlink IDs for external wake input as well as the IDs for wake on CANx, update button definition.
- COMIC/PMIC: Add mutexes to prevent multiple access to the same source at the same time.
- Improve error handling for additional pincontrols.
- Update to vanilla kernel 5.4.101 & Merge with vanilla-5.4.x.
- 10" include for br ethernet the enable pin and change the phy address from 3 to 6.
- Add pmic interface for state change requests needed for suspend crash workaround.
- 10" change Display power supply, effect was that the display does not have power when the bootloader does not show a bootlogo.
- Fix issue with red lines on 5" displays.
- Re-name 7" full device trees.
- PMIC / COMIC: Fix wrong user eeprom partition size for PMIC and COMIC.
- PMIC: Fix wrong analog class scale value for channel video1_mirror.
- 10" bugfix audio change setting ; bugfix Touch include right GPIO for Touch enable.
- Fix 7" tianma display timings.
- Add boot-pin for silent wake support.
- pwm_backlight: Add boot-pin for silent wake support.
- Regulator-fixed: Add boot-pin for silent wake support.
- Add new dtb entries to support silent boot feature.
- Panel: Add new driver for tianma tm070rvgp12 panel.
- Clk: Do not disable PLL5 on clk init, it is already used by bootloader to generate display pixel clock on several devices.
- Separate 5" and 7" display settings to separate dtsti files.
- Add new tianma display timings for 10" devices.
- 10" dtb: Add configuration to support the display correctly.
- panel-simple: Add support for silent boot.
- 10" dtb: Add configuration for silent boot support.
- Panel-simple: Increase display clock by 1KHz to prevent display flicker and fix bootloader inaccuracy.
- Touch: Add a delay of 100ms after power enable.
- COMIC regulator: Modify suspend routine to only check "wake_on" regulator.
- COMIC: Fix small C99 mismatch.
- 7" / 10" dtb: Change interrupt configuration for touch screen irq.
- Limit maximum speaker volume.

Power management

- API: Modify API header to restore backward compatibility as fast as possible and prepare system for future changes.
- API: New version: 9

Release build

- Adjust device trees naming.

5.3.7 Changes for EGScore Linux OS Release 1.3.0

Bootloader

- Adjust 5", 7" and 10" display drive strength pads.
 - Add correct configuration for pwm_bl, reset and standby pads, based on required options.
 - For 7" display we have to use proprietary reset pads configuration, therefore added 7" display specific reset config.
 - New pwm configuration has influence on 7" display, but this was confirmed with HW department.
 - New reset and pwm settings has influence on 5" basic devices, but this also was confirmed with HW department.
- Improve usb/service issue handling in failure case.
- Add pin initialisation for video decoder chips.
- Fix wrong pin initialization for video decoder chips.
- Add network configuration to support tftp-boot and nfs

Kernel

- Adjust display settings per manufacturer recommendation.
- Change default CAN2 regulator to PMIC configuration.
- Replace hardware revision driver by newer hardware identification driver.
- Reduce pwm_bl drive strength.
- Reduce i2s drive strength to lower EMI.
- Reduce ETH interface drive strength to lower EMI.
- Reduce BRR interface drive strength to lower EMI.
- Reduce RGB interface drive strength to lower EMI.
- Adjust video codec clock and video data out drive strength.
- Added platform callback for 'halt' to execute platform specific operations before halting.
- Change eeprom partitioning.
- Improve video codec pin drive strength implementation.
- adv7180: Modify driver to fulfill power sequence requirements.
- tw9912: Modify driver to fulfill power sequence requirements.
- Update backlight voltage settings.
- Adjust for 5" full / 7" Proto_C KL30(supply_vcc) ADC factor.
- Fine tuning of backlight_voltage ADC factor for 5" full / 7".
- Enable CAN3/4 reset regulator again for Proto B.
- Update 10" eco touch device-tree.
- Rework 7" basic device trees.
- Fix issue with recover LED from suspend mode.

Power management

- No changes.

Release build

- Adjust device trees naming.
- Add new device trees for Proto C.

5.3.8 Changes for EGScore Linux OS Release 1.3.1

Bootloader

- No changes.

Kernel

- Fix small naming mismatch inside the OPUS B6 Eco Touch device-tree board string.

Power management

- No changes.

Release build

- Switch firmware release files to the new tarball detection mechanism inside the service mode.

5.3.9 Changes for EGScore Linux OS Release 1.4.0

Bootloader

- Add check wake-on pin one time during boot and store the value in a variable.

Kernel

- Fix two bugs on CAN controller driver for CAN3 and CAN4 on OPUS B6 devices that causes invalid state changes.
 - If the CAN restarts from bus-off state the driver entered the error-passive state instead of the error-active state.
 - In some special cases (depending on a race-condition of the CAN controller) the driver entered error-waring state or error-passive state while the controller chip entered bus-off state.
- Optimize customer values implementation.
- Boot-mode differentiation in drivers changed from dynamically checking gpio to checking a variable.

Update

- Prevent downgrades lower then 1.4.0 EGScore release.

Power management

- Changed the source for waking up from sleep mode from the CPU-internal RTC (/dev rtc_pm) to the external RTC (/dev/rtc). The reason for this change was the actual sleep timeout of the internal RTC always falling below the configured value. The external RTC has another limitation in that deviations of actual sleep timeout vs. configured sleep timeout between 0 - 59 seconds can occur. But the configured timeout is guaranteed as a minimum. For further information regarding the behavior of the external RTC see the corresponding section 4.4 in the developer guide.

Release build

- No changes.

5.3.10 Changes for EGScore Linux OS Release 1.4.1

Bootloader

- Optimize reset functionality.

Kernel

- Fix issue with video ADV driver to provide reliable video signal.
- Fix issue with fast video format switch.
- Fix video mirror switch issue.
- Reduce maximum size of logs, due to memory limitations.

Update

- Update Partition eMMC scheme.

Power management

- Fix timer handling.

Release build

- No changes.

5.3.11 Changes for EGScore Linux OS Release 1.4.2

Bootloader

- Add EE_ON_CRASH_COUNT, shows how many times the startup of the Linux system failed.
- Send a new message to the pmic to start a on_timeout counter . (Power management command flag TIM (Bit 7 in the COMIC_PMCR Register) to start and stop the timeout)
The timeout is started by the bootloader and in the normal case stopped by the wepmd and/or command in the userscript.

Kernel

- Update kernel configuration to vanilla 5.4.256.
- Remove real time kernel patch
- Add new connector type configuration for TELE LVDS panels
- Change kernelconfig added 8021Q for VLAN support.

Release build

- wepmd
 - Add ignore files generated by Axivion analysis
 - Change system call RTC_WKALM_RD to RTC_RD_TIME to set the right format for the write command.
 - Fix unused-parameter warnings, fix stringop-overread and stringop-truncation warnings
 - Makefile: enable -Wextra and -Werror compile flags
 - Add platform specific callback for timers
 - Add Timeout and regulator parameter for button configuration
 - Move Pre/PostPlatformStateChange calls to DoEvent
 - include the message to stop the on_timeout counter
- wehmd
 - Bugfix: not working PowerOn EEPROM array check

- ssh: improve handling of the system commands and interfaces
- ssh: Close the file previously opened
- wesud
 - wesud: add a doxy config file and overwork the doxygen comments, include main graph
 - UserCheckDiskPartition: read mount path from user_part if possible
 - main:fix the comparison display active or not will always evaluate as 'true' warning
 - documentation: fix doxygen commands on lineend
- libhalopus
 - change license from GPLv2 to LGPLv2.1
 - add extern "C" to halopus header to improve compatibility with C++
 - halopus.h: add doxygen-able documentation to header
- userscript
 - include the message to stop the on_timeout counter

**Warning**

If you disable Topcon's wepmd (power management daemon) the Topcon userscript in the init process then you have to switch off the "on_timeout" manually. The on_timeout (10s) is started in the bootloader (release 1.4.2) and must be switched off again if the kernel booted successfully, otherwise the system will be reset. The timer can be stopped by writing 0 to `/sys/bus/i2c/devices/0-0075/on_timeout`.

5.3.12 Changes for EGScore Linux OS Release 1.4.3

Bootloader

- Remove obsolete boot timeout workaround and EE_ON_CRASH_COUNT

Kernel

- Update kernel configuration to vanilla 5.4.263
- Disable eMMC HS200 mode. This caused sporadic (~1 / 250) kernel hangs during boot or during system resume
- Rework the seamless bootlogo transition from bootloader to kernel, this caused sporadic (~1 / 1000) kernel hangs during boot
 - Previously the GPU was reconfigured without disabling it to realize a flicker free bootlogo during the whole boot process
 - Now the Backlight and the GPU are disabled during boot, the GPU is reset and initialized and enabled after successful probe
 - This change causes a short visible black screen during system boot. The blank time depends on the used display and is in a range between 50ms and 300ms depending on variant

Release build

- wepmd
 - Remove obsolete boot timeout workaround
- userscript
 - Remove obsolete boot timeout workaround
- Rootfs
 - Add gpsd and gps-utils
- Yocto
 - Add missing mirror tarball for the video-test application

6 Known issues

- When one of the CAN ports `can0` or `can1` is configured to listen-only mode it will receive an error frame on the first transmission. After that no error frames will be received. Reason for this behavior is the CAN port still being in error-active state after being set to listen-only and executing one transmission being necessary for it to be put to error passive state. Since this is the driver workaround for a hardware quirk it should be considered regular behavior.
- By introducing the DRM / KMS / DPMS into the kernel the display compositor (WAYLAND-EGL / EGLFS) has exclusive access to the graphic subsystem. The WEPMD has a very limited access only. As result the functionality to control the display by the system power management is limited, too. As result there are some limitations and known issues in combination of the WEPMD, the legacy framebuffer interface and WAYLAND-EGL / EGLFS.
 - In system power mode *low-power* the display backlight is disabled but the panel still keeps enabled. Depending on environmental lighting conditions the application may be visible in this power mode.
 - If the system boots to power mode *silent-on* and EGLFS is used as display compositor, the display will not be enabled if the system enters power mode *on*. To workaround this issue, please use WAYLAND-EGL.
 - If the system boots to power mode *silent-on* and WAYLAND-EGL is used as display compositor, the display will be enabled automatically if the Weston starts, independently of the current system power mode.
 - If the system boots to power mode *silent-on* and no compositor is running before the system enters on-mode, a short flicker is visible at the state change to power mode *on*.