

Firmware upgrade for ST-LINK, ST-LINK/V2, ST-LINK/V2-1 and STLINK-V3 boards

About this release note

This release note contains information about the latest firmware versions for ST-LINK, ST-LINK/V2, ST-LINK/V2-1, and STLINK-V3 boards. It can be used to identify the version of the firmware currently running and, if necessary, upgrade firmware through the USB port.

STSW-LINK007 is the part number of the firmware upgrade application for ST-LINK, ST-LINK/V2, ST-LINK/V2-1, and STLINK-V3.

Table 1. ST-LINK board firmware upgrade release summary

Type	Summary
Minor release	ST-LinkUpgrade.exe 2.5.4 and STLinkUpgrade.jar 3.3.4: <ul style="list-style-type: none">Improvements including the support of drag-and-drop programming of .hex files for ST-LINK/V2-1 and STLINK-V3 boards

Customer support

For more information or help concerning ST-LINK, ST-LINK/V2, ST-LINK/V2-1 and STLINK-V3 boards, contact the nearest STMicroelectronics sales office. For the complete list of STMicroelectronics offices and distributors, refer to the www.st.com webpage.

Software updates

Software updates and all the latest documentation can be downloaded from the STMicroelectronics support webpage at www.st.com/en/development-tools/stsw-link007.

1 Host PC system requirements

PC and compatibles running with:

- Windows® 7, 8 and Linux® 32-bit operating systems
- Windows® 7, 8, 10, Linux® and macOS® 64-bit operating systems

The application requires to install the Java Runtime Environment 7u51 (or more recent). On Windows® operating systems, the ST-LINK board requires to install a dedicated USB driver ([STSW-LINK009](#)). In case the STSW-LINK009 driver is not installed by the used toolset, it can be downloaded from the www.st.com web site.

On Linux®, the application relies on `libusb-1.0`, which must be installed separately. For instance, on Ubuntu®, this is done through the command `sudo apt-get install libusb-1.0`.

On Linux®, users must be granted rights for accessing the ST-LINK USB devices. To do that, it might be necessary to install one of the packages (depending on the Linux® version) provided into `AllPlatforms/StlinkRulesFilesForLinux`.

Note: **STLINK-V3 boards can be recognized by Windows® 10 without any driver installation. However, ST-LINK driver installation is required for previous ST-LINK generations, or for STLINK-V3 boards on previous versions of Windows®.**

The ST-LINK boards feature a STM32 32-bit microcontroller based on the Arm® Cortex®-M processor.

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1.1 Licensing

[STSW-LINK007](#) is delivered under the *Image V2* software license agreement ([SLA0047](#)).

2 Change in ST-LinkUpgrade.exe 2.5.4 and STLinkUpgrade.jar 3.3.4

- On [STLINK-V3SET](#) and [STLINK-V3MODS](#), upgrade firmware to the version V3J7M2B4S1.
- On STLINK-V3 boards and [STLINK-V3MINI](#), upgrade firmware to the version V3J7M2.
- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J37M26 (STM32) or V2M26S7 (STM8).
- On ST-LINK/V2 boards, upgrade firmware to the version V2J37S7.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Enhancements and corrections

- On ST-LINK/V2, ST-LINK/V2-1 and STLINK-V3 boards:
 - Enhanced robustness in case of wrong initialization sequence from the host PC (when several access ports are accessed) and JTAG communication WAIT status
 - Updated sequence for target internal register access (check against attempt while the core is running)
- On ST-LINK/V2-1 and STLINK-V3 boards:
 - Added support for drag-and-drop programming of `.hex` files (refer to [Section 3 Known problems and limitations](#) for the conditions of use)
 - Display of STMicroelectronics firmware version string into file `details.txt`
- On STLINK-V3E boards:
 - Possibility added to choose the MCO clock output from ST-LINK to target among 3 values.
The default value ($HSI / 2 = 8$ MHz) can be changed through STLinkUpgrade applications to $HSE / 3 = 8.33$ MHz (for better clock accuracy) or cut off. The operation is reversible. In case of a switch to 8.33 MHz, the target application must be updated accordingly: a factor $\times (24 / 25)$ must be applied in the PLL configuration in order to keep the clock tree unchanged behind (for instance, if $PLL_N = 400$, set $PLL_N = 384$). Moreover the `HSE_VALUE` constant commonly defined into `stm32xxx_hal_conf.h` must be changed to value 8333333.
This possibility does not concern the STLINK-V3 standalone boards ([STLINK-V3SET](#), [STLINK-V3MINI](#) and [STLINK-V3MODS](#)).

3 Known problems and limitations

- On targets running at low CPU frequencies (less than 250 kHz), the SWD clock frequency must also be reduced for correct communication.
- The SWD maximum clock frequency (4 MHz approximately) is not functional on targets powered under 2.8 V. Such targets must use a lower SWD clock frequency (to configure from the toolset using the ST-LINK).
- ST-LINK (V1) boards are not supported on the Linux® and macOS® operating systems. Only ST-LINK/V2, ST-LINK/V2-1, and STLINK-V3 boards can be updated from these operating systems.
- Applications programmed through the mass-storage interface (drag-and-drop to disk) must fulfill both constraints listed below. Applications not respecting one of these constraints are not programmed through the mass-storage interface but can be programmed through other tools, such as STM32CubeProgrammer (STM32CubeProg):
 - A stack pointer value (first entry of the vector table) in the range of the microcontroller RAM range
 - A reset vector value (second entry of vector table) in the range of the microcontroller Flash range
- On STLINK-V3 boards, high SWD and JTAG frequencies are sensitive to the target connection environment; In case of communication issues, firstly try to reduce such frequencies in the settings of the tool being used.
- On [STLINK-V3SET](#) and [STLINK-V3MINI](#), the STM32 target Flash memory programming with drag-and-drop action requires the target to be connected to the STLINK-V3SET or STLINK-V3MINI (SWD/JTAG link) *before* the STLINK-V3SET or STLINK-V3MINI is plugged to the host (USB cable). Moreover this functionality is not available for STM8 targets.
- On [STLINK-V3SET](#) and [STLINK-V3MODS](#), limitations on SPI bridge interface:
 - *STLINK as SPI slave*: mode not supported
 - *SPI half duplex*: mode not supported
 - Limited full-duplex support (cannot simultaneously send and receive, but sequentially)
- On STLINK-V3SET and STLINK-V3MODS, limitations on I²C bridge interface:
 - *STLINK as I²C slave*: mode not supported
 - Digital Noise Filter (DNF): not tested
 - 10-bit addressing: not tested
- On STLINK-V3SET and STLINK-V3MODS, limitations on CAN bridge interface:
 - Only standard and loop-back modes supported
- On STLINK-V3 boards in high-performance mode, the minimum baud rate for Virtual COM port is 2931 baud/s.
- On ST-LINK/V2-1 and STLINK-V3 boards, the support of `.hex` files drag-and-drop programming relies on an artificial increase of the virtual mass storage disk size.

Consequently, this size is made much bigger than the size of the real Flash memory, making it possible to drop a file larger than the target Flash without warning from the mass storage host driver. In that case, the whole Flash memory can be programmed before the error is detected and reported by the ST-LINK.

The `.hex` file format constraints for safe drag-and-drop programming are:
 - max line byte count: 0x20
 - Flash address in ascending order (ordered section)
 - address range: Flash base address 0x08000000 to 0x08000000 + Flash size
 - programing done by 128-byte blocks (0xFF is programmed in case of unaligned block address)
 - Linux®/macOS®/Windows® DOS line termination (LF, CR, CRLF)

4 Release information for previous releases

4.1 Summary of changes in ST-LinkUpgrade.exe 2.5.3 and STLinkUpgrade.jar 3.3.3

- On [STLINK-V3SET](#) and [STLINK-V3MODS](#), upgrade firmware to the version V3J6M2B4S1.
- On STLINK-V3 boards and [STLINK-V3MINI](#), upgrade firmware to the version V3J6M2.
- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J36M26 (STM32) or V2M26S7 (STM8).
- On ST-LINK/V2 boards, upgrade firmware to the version V2J36S7.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Enhancements and corrections

- On [STLINK-V3SET](#):
 - Shortcut (`GETSTART.htm`) added in the mass-storage disk pointing to a dedicated webpage on www.st.com
 - Change in SPI bridge read command for better interaction with STM32 bootloader: send zeroes instead of dummy data when reading
- On STLINK-V3 boards:
 - Maximum size of a single memory-access command done in 8-bit mode increased from 64 bytes to 512 bytes
 - Update for the support of [STLINK-V3MODS](#)
- On ST-LINK/V2-1 and STLINK-V3 boards, added a `GetBoardIdentifiers` command

4.2 Summary of changes in ST-LinkUpgrade.exe 2.5.2 and STLinkUpgrade.jar 3.3.2

- On [STLINK-V3SET](#), upgrade firmware to the version V3J5M2B3S1.
- On STLINK-V3 boards, upgrade firmware to the version V3J5M2.
- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J35M26 (STM32) or V2M26S7 (STM8).
- On ST-LINK/V2 boards, upgrade firmware to the version V2J35S7.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Enhancements and corrections

- On ST-LINK/V2, ST-LINK/V2-1 and STLINK-V3 boards, enhanced robustness in case of wrong initialization sequence from host PC and SWD communication WAIT status.
- On ST-LINK/V2-1 boards and [STLINK-V3SET](#), enhanced Virtual COM port and mass storage USB interfaces behaviour after PC reboot.
- On STLINK-V3 boards, fixed regression appeared in V3J4M2: used space of mass storage virtual disk wrongly computed if target Flash size is over 1.5 Mbyte.
- On ST-LINK/V2-1 boards for STM8, fixed issue with STM8 drag-and-drop programming potentially not working on boards with SWIM pin reconfigured.
- On ST-LINK/V2-1 boards, Virtual COM port internal buffer increased from 512 bytes to 204 bytes for upstream (target to ST-LINK).

4.3 Summary of changes in ST-LinkUpgrade.exe 2.5.1 and STLinkUpgrade.jar 3.3.1

- On [STLINK-V3SET](#), upgrade firmware to the version V3J4M2B3S1.
- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J34M25 (STM32) or V2M25S7 (STM8).
- On ST-LINK/V2 boards, upgrade firmware to the version V2J34S7.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

New feature

- Manage the Flash drag-and-drop programming on STM32L552 and STM32L562 microcontrollers when Arm® TrustZone® for Armv8-M is enabled.

Enhancements and corrections

- On [STLINK-V3SET](#), the baud rate for the Virtual COM port can exceed 12 MHz.
- On [STLINK-V3SET](#), improved SWV (Serial Wire Viewer) and Virtual COM port performance (reduced the probability of data loss).
- On [STLINK-V3SET](#), reduced the ST-LINK consumption when in idle state.

4.4 Summary of changes in ST-LinkUpgrade.exe 2.5.0 and STLinkUpgrade.jar 3.3.0

- On [STLINK-V3SET](#), upgrade firmware to the version V3J3M2B3S1.
- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J33M25 (STM32) or V2M25S7 (STM8).
- On ST-LINK/V2 boards, upgrade firmware to the version V2J33S7.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

New features

- Added the possibility to hide the mass-storage interface on ST-LINK/V2-1 and [STLINK-V3](#) boards (requires to update the ST-LINK USB driver: [STSW-LINK009](#) on Windows®, `49-stlinkvxxx.rules` files on Linux®). Moreover, it might be also necessary to update the host application so that it identifies correctly this new ST-LINK version, especially on Linux® and macOS®.
- On [STLINK-V3SET](#), allows the replacement of the mass-storage interface by a second Virtual COM port (VCP2), using the Bridge UART signals of the MB1440B.CN9 connector. This VCP2 implements hardware-flow control (CTS/RTS) if the signals are physically connected to the target. The hardware-flow control can be disabled by removing the physical connection of signals to the target. It cannot be disabled by software (the hardware-flow control configuration parameter available in some hyperterminal applications has no effect on Virtual COM port).

Corrections

- Fixed some instabilities during mass-storage disk refresh after drag-and-drop programming on ST-LINK/V2-1 and [STLINK-V3](#) boards.
- Immediately report error (if any) after a memory-access command done in 8-bit mode to an STM32 target.
- Fixed an issue with some targets (STM32L4x2, STM32G0x1): an application programmed by drag and drop to a fully erased target does not start immediately (power-down sequence required to make it run).
- Virtual COM port reception is no more started with default parameters at ST-LINK startup, but waits for host command.
- On [STLINK-V3SET](#), fixed a possible loss of data in the Virtual COM port downstream (host to target).
- The [STLINK-V3SET](#) can enumerate on Windows 10® without any specific USB driver installation; however, the USB driver installation is still required for older ST-LINK versions, or for [STLINK-V3SET](#) on older versions of Windows®.

4.5 Summary of changes in ST-LinkUpgrade.exe 2.4.12 and STLinkUpgrade.jar 3.2.12

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J32M22 (STM32) or V2M22S7 (STM8).
- On ST-LINK/V2 boards, upgrade firmware to the version V2J32S7.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Correction

- Fixed mass storage interface issue with [NUCLEO-8L152R8](#) and [NUCLEO-8S208RB](#) on Windows 10® (operating system files corrupting the STM8 Flash). Currently, a binary file dropped into the mass storage virtual disk is programmed into the STM8 Flash only if it starts with code 0x82 and if the following 3 bytes (reset vector value) point to an address in Flash.

4.6 Summary of changes in ST-LinkUpgrade.exe 2.4.11 and STLinkUpgrade.jar 3.2.11

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J31M21 (STM32) or V2M21S7 (STM8).
- On ST-LINK/V2 boards, upgrade firmware to the version V2J31S7.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Correction (for STM32 debug with ST-LINK/V2-1 and ST-LINK/V2)

- Fixed wrong management of STM32 target hardware reset pin by firmware V2J30M21 in SWD mode.

4.7 Summary of changes in ST-LinkUpgrade.exe 2.4.10 and STLinkUpgrade.jar 3.2.10

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J30M21 (STM32) or V2M21S7 (STM8).
- On ST-LINK/V2 boards, upgrade firmware to the version V2J30S7.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Corrections (for ST-LINK/V2-1 only)

- Bugfix against mass storage disk refresh loop after drag and drop on Windows 10®.
- Bugfix against SWV issues (Serial Wire trace through SWO pin).

4.8 Summary of changes in ST-LinkUpgrade.exe 2.4.9 and STLinkUpgrade.jar 3.2.9

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J30M20.
- On ST-LINK/V2 boards, upgrade firmware to the version V2J30S7.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Corrections (for ST-LINK/V2-1 only)

- Bugfix against random refresh of mass storage disk after drag and drop on Linux®.
- Bugfix of wrong link in `mbed.htm` file (mass storage interface) for [NUCLEO-L4A6ZG](#).
- Implemented change request: display `fail.txt` if the dropped application has wrong vector values (stack pointer and reset).
- Manage drag-and-drop Flash programming whatever the value of the single/dual bank Option Byte on the microcontroller providing it.
- Increased USB FIFO size for Virtual COM port (direction host to ST-LINK) from 8 bytes to 16 bytes.

4.9 Summary of changes in ST-LinkUpgrade.exe 2.4.8 and STLinkUpgrade.jar 3.2.8

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J30M19.
- On ST-LINK/V2 boards, upgrade firmware to the version V2J30S7.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Corrections (for ST-LINK/V2-1 only)

- Allow application to run even if the readout protection is set on the target microcontroller and the MCO signal from ST-LINK is connected to the target microcontroller (case of the [NUCLEO-L073RZ](#) for instance).
- Allow application to run immediately when powered externally to the ST-LINK (Evaluation boards), or when power configuration is set in *charger* position (case for some Discovery boards). In previous releases, a 2-second timeout was awaited in such situations.

4.10 Summary of changes in ST-LinkUpgrade.exe 2.4.5 and STLinkUpgrade.jar 3.2.5

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J29M18.
- On ST-LINK/V2 boards, upgrade firmware to the version V2J29S7.

- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Corrections (for ST-LINK/V2 and ST-LINK/V2-1)

- Correction against sporadic failure during the initialization of the debug session on STM32L0xx microcontrollers.

Corrections (for ST-LINK/V2-1 only)

- Correction against drag-and-drop programming issue on STM32L432 of an application with initial stack pointer located into RAM2 segment @0x2000 C000.
- Correction against the presence of multiple `fail.txt` files on mass storage disk, after failing drag-and-drop programming on Evaluation boards.

4.11 Summary of changes in ST-LinkUpgrade.exe 2.4.2 and STLinkUpgrade.jar 3.2.2

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J28M18.
- On ST-LINK/V2 boards, upgrade firmware to the version V2J28S7.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Corrections (for ST-LINK/V2-1)

- Add up to 20 Kbytes in virtual mass storage for disk size compared to the target Flash size, to have enough space after the host wrote some system files (for instance in a Windows 10® environment).
- Application on [NUCLEO-L452RE](#) did not run automatically after application programming through drag-and-drop.
- The file `fail.txt` was missing on the virtual mass storage disk when the target STM32 was readout protected.

4.12 Summary of changes in ST-LinkUpgrade.exe 2.4.0 and STLinkUpgrade.jar 3.2.0

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J28M16.
- On ST-LINK/V2 boards, upgrade firmware to the version V2J28S6.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Corrections (for ST-LINK/V2-1)

- Fixed file `fail.txt` missing in some cases after target communication failure.
- Fixed issue with mass storage disk on Windows 10® version 1607.
- Reworked the refresh sequence of the mass storage disk after drag-and-drop programming.
- Modified the description size of the USB Virtual COM port.

4.13 Summary of changes in ST-LinkUpgrade.exe 2.3.30 and STLinkUpgrade.jar 3.1.0

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J27M15.
- On ST-LINK/V2 boards, upgrade firmware to the version V2J27S6.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Corrections

- Fixed a regression, which made the V2J26M15 not functional on few host systems.
- Failing boards may be recovered either by upgrading the firmware to V2J27M15 from another host, not presenting the incompatibility with the V2J26M15, or by forcing manually the upgrade mode of the board, when possible. For instance on Nucleo-64 boards, make a little shortcut between RST and SB11 pads behind the board. In this way, firmware may be upgraded afterwards, even on host presenting the incompatibility with the V2J26M15. On other ST-LINK/V2-1 boards, refer to the schematics of the board to find how to reset the [STM32F103CB](#) microcontroller (solder bridge on the STM_RST signal).

4.14 Summary of changes in ST-LinkUpgrade.exe 2.3.28 and STLinkUpgrade.jar 3.0.7

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J26M15.
- On ST-LINK/V2 boards, upgrade firmware to the version V2J26S5.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Enhancement

- Virtual COM port latency reduced from 5 ms to 1 ms (approximately average values) in the target Tx / ST-LINK/V2-1 Rx direction.

Corrections

- On ST-LINK/V2-1 Discovery boards and Nucleo boards, the target application is now able to run even if the target read-out protection is set. It is the case on ST-LINK/V2-1 of the Evaluation boards, but only if the ST-LINK/V2-1 USB cable is not connected to any enumerating host.
- On all ST-LINK/V2-1 boards, the target application is now able to run even if the ST-LINK/V2-1 is either not connected to an USB host, or is powered through a USB charger (or through a not-enumerating USB host).
- Removed risk of loosing the Virtual COM port interface if reprogramming the application (by drag-and-drop) while the Virtual COM port is intensely used. Fixed wrong contents of `mbed.html` file in some cases (wrong shortcut to *ST unknown board* page).

4.15 Summary of changes in ST-LinkUpgrade.exe 2.3.27 and STLinkUpgrade.jar 3.0.6

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J25M14.
- On ST-LINK/V2 boards, upgrade firmware to the version V2J25S4.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Enhancements

- Fixed USB communication failures on Mac OS X 10.11 after ClearFeature (ENDPOINT_STALL).
- Removed risk of lockups when using the Virtual COM port intensely in both directions (Rx/Tx) simultaneously.

Large applications are now fully programmed through drag-and-drop on Evaluation boards (on Evaluation boards, applications with sizes greater than the target Flash memory size minus 4 Kbytes were not totally programmed).

4.16 Summary of changes in ST-LinkUpgrade.exe 2.3.26 and STLinkUpgrade.jar 3.0.5

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J25M13.
- On ST-LINK/V2 boards, upgrade firmware to the version V2J25S4.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Enhancement

- Implementation of retry loops for better behavior in case of noisy SWD communication.

New features

- Added support for NUCLEO-F410RB, NUCLEO-F446RE and NUCLEO-L011K4 boards.
- Added support for 32F746GDISCOVERY and 32F469IDISCOVERY boards.

4.17 Summary of changes in ST-LinkUpgrade.exe 2.3.24 and STLinkUpgrade.jar 3.0.3

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J24M11.

- On ST-LINK/V2 boards, upgrade firmware to the version V2J24S4.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Correction

- Bugfix SWV not working with V2J23Mx firmware on some recent PCs.

New features

- Provided a command for JTAG clock frequency selection.
- Added support for the management of the 32L053DISCOVERY and 32F3348DISCOVERY boards.
- Added support for STM32F746.

4.18 Summary of changes in ST-LinkUpgrade.exe 2.3.21 and STLinkUpgrade.jar 3.0.0

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J23M10.
- On ST-LINK/V2 boards, upgrade firmware to the version V2J23S4.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Corrections

- Bugfix: mass storage interface badly connecting on OS X[®] Yosemite operating system.
- Modification of the Flash programming algorithm for the STM32F4 Series, STM32F7 Series and STM32L4 Series.
- Added check against the validity of the application, when it is programmed through the mass storage interface (validity algorithm based on Reset and Stack Pointer values in the vector table).
- Set default SWCLK to 4 MHz for better performance.

New features

- Added support for recent boards (NUCLEO-F070RB, NUCLEO-L073RZ and NUCLEOL476RG).
- Added support for Linux[®] and Mac OS X[®] operating systems (see [Section 1](#) for details).

4.19 Summary of changes in ST-LinkUpgrade.exe 2.3.16

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J23M6.
- On ST-LINK/V2 boards, upgrade firmware to the version V2J23S4.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Corrections

- In the Virtual COM port, suppressed a possible delay in data reception by the host (like a cache-flush issue).
- In the Virtual COM port, suppressed a possible communication failure during data emission by the host, on some USB 3 ports.
- Modified the mass storage interface enumeration after a programming of the target application, reducing the risk to lose the VCP communication during such operation.
- Suppressed one target reset sequence during the power-on sequence.
- Modified SWD communication to reduce the noise generated by SWD signals.

4.20 Summary of changes in ST-LinkUpgrade.exe 2.3.14

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J22M5.
- On ST-LINK/V2 boards, upgrade firmware to the version V2J22S4.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

New functionalities

- Added support for NUCLEO-F411RE.
- Added command for SWCLK frequency selection.

4.21 Summary of changes in ST-LinkUpgrade.exe 2.3.11

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J21M5.
- On ST-LINK/V2 boards, upgrade firmware to the version V2J21S4.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Corrections

- Set NRST pin high, when exiting the firmware update mode.

4.22 Summary of changes in ST-LinkUpgrade.exe 2.3.10

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J20M4.
- On ST-LINK/V2 boards, upgrade firmware to the version V2J20S4.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Corrections

- Suppressed *high-speed device* notification, when plugging to a non-high speed USB port or to a USB 3 port.
- Keep the Virtual COM port session valid (if any opened), when reprogramming the application.
- Fixed potential lockup condition in SWV trace management and Virtual COM port management.

4.23 Summary of changes in ST-LinkUpgrade.exe 2.3.7

- On ST-LINK/V2-1 boards, upgrade firmware to the version V2J19M3.
- On ST-LINK/V2 boards, upgrade firmware to the version V2J19S4.
- On ST-LINK boards, upgrade firmware to the version V1J13S4.

Correction

- Fixed the issue about the application sometimes not running after being programmed (STM32Fxx targets, programmed through a *Save As* action with long filename).

Revision history

Table 2. Document revision history

Date	Version	Changes
13-Feb-2014	1	Initial release.
14-Apr-2014	2	Added content for new version 2.21.4.
2-June-2014	3	Added content for new version 2.21.5.
10-July-2014	4	Added content for new version 2.22.5.
22-Sept-2014	5	Added content for new version 2.23.6.
2-April-2015	6	Added content for new version 2.23.7.
25-May-2015	7	Added content for new version 2.24.11.
9-Nov-2015	8	Added content for new version 2.25.13.
11-Dec-2015	9	Added content for new version 2.25.14.
26-Jan-2016	10	Added content for new version 2.26.15.
7-Mar-2016	11	Added content for new version 2.27.15.
28-Sep-2016	12	Title and content changes to cover the firmware update for ST-LINK, ST-LINK/V2 and ST-LINK/V2-1 boards.
4-Jan-2017	13	Added <i>Section 2: Changes in ST-LinkUpgrade.exe 2.4.2 and STLinkUpgrade.jar 3.2.2.</i>
13-Sep-2017	14	Updated <i>Section 2: Changes in ST-LinkUpgrade.exe 2.4.5 and STLinkUpgrade.jar 3.2.5.</i>
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26-Mar-2018	16	Updated <i>Section 2: Changes in ST-LinkUpgrade.exe 2.4.9 and STLinkUpgrade.jar 3.2.9.</i>
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24-Jan-2019	20	Document scope extended to STLINK-V3: <ul style="list-style-type: none"> • Updated document title and <i>About this release note</i> • Updated <i>Section 1: Host PC system requirements</i> • Updated <i>Section 2: Changes in ST-LinkUpgrade.exe 2.5.0 and STLinkUpgrade.jar 3.3.0</i> • Added STLINK-V3SET entries to <i>Section 3: Known problems and limitations</i>
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