STM-STUDIO-STM32 and STM-STUDIO-STM8 release 3.6.0

Introduction

This release note is updated periodically to keep the reader abreast of the evolution, problems and limitations.

Check the ST microcontroller support website at www.st.com to ensure that this is the latest version of this release note.

Customer support

For more information or help concerning STM-STUDIO-STM32 and STM-STUDIO-STM8 contact the nearest sales office. For a complete list of ST offices and distributors, refer to www.st.com.

Software updates

The software updates and all the latest documentation can be downloaded from the ST microcontroller support site at www.st.com.

1 Read me first

This section provides important information about STM-STUDIO-STM32 and STM-STUDIO-STM8 release 3.6.0.

This software applies to STM8 and STM32 microcontrollers, the latter being based on Arm®.

Note: Arm is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.

1.1 Host PC system requirements

PC and compatibles running with:

- Windows® 7 or Windows® 8 32-bit operating systems
- Windows® 7 or Windows® 8 or Windows® 10 64-bit operating systems

A Java™ Runtime Environment version 1.7 or newer must be installed. On 64-bit operating systems, the Java™ 32-bit version has to be preferred as long as only ST-LINK targets are supported on the 64-bit version of Java™ (RLink Swim, Stice Swim and ST-TSLink are managed only in 32-bit mode).

Administrator privileges are required to install STM-STUDIO-STM32 and STM-STUDIO-STM8, and to connect with ST-LINK.

1.2 Supported hardware

This version allows communication with:

- STM32 microcontrollers in JTAG or SWD through ST-LINK, ST-LINK/V2, ST-LINK/V2-1 or STLINK-V3.
- STM8 microcontrollers in SWIM through ST-LINK, ST-LINK/V2, ST-LINK/V2-1, STLINK-V3, Raisonance RLink and STice-SWIM (to use with Raisonance RLink, RLink drivers must have been previously installed). Raisonance RLink and STice-SWIM are managed only on 32-bit versions of Java™.
- ST-TSLink for STM8T microcontrollers (only on 32-bit versions of Java™).

The current version of the software does not support the selection of an ST-Link instance when several ST-Links are connected to the host. In this case, STM-STUDIO-STM32 and STM-STUDIO-STM8 connect to the ST-Link appearing first in the list returned by the system, in exclusive mode.

1.3 Used software

SoftTrace and synchrAcq examples have been built with:

- IAR™ EWARM-8.20
- Keil® MDK-ARM 5.24
- IAR™ EWSTM8-2.20.2
- Cosmic STM8 v4.3.6
- Raisonance Ride7 STM8 v2.60

SoftTrace project examples are provided for STM32F10x, STM32F30x, STM32F40x and STM8L15x microcontrollers, but can be easily ported to any other STM8 or STM32 microcontroller.

SynchrAcq project example is provided for the STM8S105 microcontroller, but can be easily ported to any other microcontroller.

STM-STUDIO-STM32 and STM-STUDIO-STM8 install and might use ST-LinkUpgrade.exe v2.4.12 to update the ST-LINK firmware to the most recent version.

2 What is new in STM-STUDIO-STM32 and STM-STUDIO-STM8 release 3.6.0?

New feature

- Added support for STLINK-V3 probe
- Enhanced elf file parsing to better manage the output from GCC compiler/linker and C++ basics

3 Known problems/limitations

3.1 Known problems/limitations for data acquisition

- In normal acquisition mode (direct access to variables from PC), data acquisition is limited to 6 frames of 255 bytes. The STM-STUDIO-STM32 and STM-STUDIO-STM8 automatically compute the frame size and start address according to the variable size and address.
- In normal acquisition mode (direct access to variables from PC), there is no intrusion in the application execution, but time elapses between the first and the last variable acquisition. As a result, the STM-STUDIO-STM32 and STM-STUDIO-STM8 may give an inconsistent image of the group of variables. The snapshot acquisition mode fixes this limitation, but requires application instrumentation (additional code, RAM buffer, impact on execution timings).
- Bit-field variables are not managed.
- In SWIM mode, if the option “Init comm on each start” is selected, the application restarts (with SWIM disabled on target) on the “Stop recording session” event. If the option “Init comm on each start” is disabled, the application keeps running with SWIM active after the “Stop recording session” event.
- The target resources required by the snapshot acquisition and trigger may be excessive for the smaller microcontrollers. Depending on the compilation environment, the snapshot acquisition requires approximately 800 bytes for program and 200 bytes for data (trace buffer not included), and the trigger requires up to 1.5 Kbytes for program and 50 bytes for data.
- In snapshot mode, the timestamp is now computed according to the timebase, and synchronized with the host time. As a result, the first snapshot record is not necessarily corresponding to t = 0 ms (vertical axis).
- If the timebase specified in the application does not correspond to the real time, a phase offset progressively appears between direct records and snapshot records.
- In snapshot mode with trigger activated, if options "stop when buffer full" and "ignore trigger when buffer not empty" are selected, the buffer is considered full when containing (N - 1) records, where N is the buffer size in number of records.
- Trigger conditions are evaluated by software, at a frequency rate depending on acquisition parameters. For instance, in direct mode the time between two consecutive records cannot be smaller than several milliseconds. As a consequence, to work properly, trigger must be set on a variable that is changing more slowly than the acquisition rate.
- The sampling rate for direct acquisition is limited by the system timer accuracy and the global system performance. Typically, values below 20 ms are not realistic; for a maximum acquisition accuracy in this mode, select the "Maximum (sequential loop)" item.

3.2 Known problems/limitations for graphical interface

- When replaying from a file, the current user configuration settings must fit with those used during the file acquisition.
- The “append mode for log to file” function should be disabled when:
  - "replay from file" will be used later, or
  - there are expressions or statistical variables in the configuration.
- It is not possible to compute statistics on an expression (conversely it is possible to use a statistical variable in an expression).
- It is not possible to use any expression variable in another expression, excepted constant expressions.
- A “zoom out” in a curve varviewer containing a variable that had an “Infinite” value in its history (for instance, the result of a divide by 0 done in an expression variable), freezes the graphical interface.
- When running an acquisition session with the “under-sample data for graphical display” option, the graphical display after stopping is affected by the log file post-processing, if any (option selected + expressions or statistical variables present): all points get displayed.
- When defining a trigger condition through an application symbol, the trigger is not automatically affected by potential changes in the symbol (name, address, type), as long as the “acquisition settings” dialog is not

opened. After executable file changes, it is recommended to open the “acquisition settings” dialog to have the trigger updated.

- Changes in application variables (name, address, type) are not taken into account by the “write variables” table.
- Bit-fields and multi-dimensional tables are not automatically imported from executable. However, they might be defined manually.
- When the “apply trigger to all variables” option is selected, a big difference in acquisition rates between the snapshot mode and the direct mode may result in a surprising display. For instance, no record in direct mode, in case the snapshot mode has triggered then stopped quickly; or all records in snapshot mode aggregated into a single point because of unadjusted horizontal scale. These behaviors are a consequence of asynchronous acquisition modes, and may be limited by zooming, modifying the acquisition rates, or disabling the trigger synchronization when rates are too different.

4 Troubleshooting

- When starting an acquisition session, no record is displayed
  - Check the trigger condition (address, type, threshold) and also ensure that it is set on a variable stable enough for the tool to detect the transition (variable not moving too fast as compared with the acquisition rate).
  - In case of a curve varviewer, check that no data is outside the vertical axis range; select the table mode in order to see if the values are really acquired.
  - Ensure that the target application is running; start an acquisition session in direct mode without trigger.
  - In case of a snapshot acquisition mode, ensure that the "DumpTrace" function is really called by the application. Especially, when using the "softTrace" example on STM8 target, ensure that the preprocessor switch "STM8L_FAMILY" or "STM8S_FAMILY" is correctly defined in stm8/common/mcuregs.h.
- Dropping a display variable into the write variables table is impossible
  - The display variable is neither an application variable nor a linear expression based on a single application variable.
- Selecting the "Auto restart trigger" option is impossible
  - Check that the pre-trigger is set to 0.

5 Information for major previous releases

5.1 Summary of changes in release 3.5.1

Corrections

- Fixed a regression appeared in release 3.5: wrong endianess in the default configuration (ST-LINK SWD, big endian). In release 3.6.0 the default configuration is ST-LINK SWD, little endian.

5.2 Summary of changes in release 3.5

Enhancements

- Allow execution from Java™ 64-bit platforms with ST-LINK boards
- Added support for ST-LINK/V2-1 boards (Nucleo boards and recent STM32 discovery and evaluation boards)
- Added support for Windows® 10 64-bit operating system

Corrections

- Desktop shortcut functional on recent versions of Java™ Runtime Environment
- Updated ST-LINK driver installation and ST-LinkUpgrade.exe to most recent versions

Default target changed to ST-LINK SWD

5.3 Summary of changes in release 3.4

Corrections

- Variables extraction possible from elf files made by Arm® GNU EABI compiler/linker.

5.4 Summary of changes in release 3.3

New features

- Management of Java plug-in for user-defined variables. An example is provided with signal/noise ratio (SNR) computing.
- Management of floats (IEEE 754 format, 32 bits) on STM8 and STM32.
- Management of doubles (IEEE 754 format, 64 bits) on STM32 only (not on STM8).
- Possibility to synchronize a trigger event to both acquisition modes (snapshot and direct).

Enhancements

- Automatic stop of the acquisition loop after reaching a trigger end condition (stop when buffer full, stop after N records).

Corrections

- Missing contextual menu in writeTable.
- Take into account the type of expressions. When opening configuration files made out of a previous STM-STUDIO-STM32 and STM-STUDIO-STM8 version, the type of expressions is automatically changed to “double” (which is the way it was processed before, when the type of expressions was ignored).
- Bad computing of the first pre-trig record in snapshot mode (in some cases).
- Clear the expression and statistic variables history when “restart timestamp from 0" trigger option is selected.

5.5 Summary of changes in release 3.2

New features

- User configurable sampling rate for direct acquisition
- Added a third acquisition mode (synchronized with target), using less target resources (RAM and Flash memory), but being more runtime intrusive than the snapshot mode
- Added a third variable selection mode (acquire only variables used by visible viewers)
- Allowed viewers repositioning (drag and drop), resizing, moving into a second frame

Enhancements

- Added vertical scrollbar for easier navigation in curve viewers
- Activated pan mode (control+click) for easier navigation in curve viewers
- Automatic update of snapshot trace header address if found in the executable
- Allowed swapping columns in variable tables and in table varviewer
- Allowed multiple selection in varviewer list of variables
- Allowed to save the path to the executable relatively to the user settings file

Corrections

- Project examples are now deployed into "My Documents\\STMicroelectronics\\ STMStudio" instead of "Program Files\\STMicroelectronics\\STMStudio"
- Enable Y-axis tick labels on curve varviewers when scaling under 1 unit

5.6 Summary of changes in release 3.1.1

Enhancements

- Improved performance when opening and closing a user configuration containing several tens of expression variables

Corrections

- Fixed issues in mode "only used variables in acquisition" that might result, at worst, in not acquiring all variables required for a displayed expression
- Fixed issue in row indexes when working on sorted variable tables; especially when opening the expression editor assistant, or when deleting a variable

5.7 Summary of changes in release 3.1

New features

- Added the possibility to mix the acquisition modes (snapshot and direct) in a same acquisition session. For correct synchronization, a timebase must be defined in the snapshot instrumentation code (dataAcq.c)
- Added the possibility to write to application variables, or to linear expressions of application variables, directly from the table varviewer (additionally to the write variable table, which allows to write to variables that are not in acquisition)
- Allow reuse of constant expressions in other expressions
- Added accelerators for direct import of scaled variables (ax+b) from “Import” dialog instead of variable import + expression editing
- Display Y values on curve graph sliders
- Require Java Runtime Environment version 7 (instead of version 6 previously)

Enhancements

- Allow long acquisition sessions without performance issues or crash. Graphical history reduced to 20,000 points per variable (instead of 30,000 previously) and allocated memory set to 512 MB

- Added status bar during log file post-processing for expression and statistical variables. Moreover, thisprocessing is now optional and can be cancelled
- Maximum number of frames in direct mode extended to 6, instead of 3 previously (255 bytes each)
- Use project path as default import path for a configuration when a project is opened
- Automatically start the expression editor when adding a new expression
- Automatically compute the target endianess
- Automatically update variables when closing the “Import” dialog in case of executable file change
- Most Recently Used list of configurations extended from 5 to 10 items
- Changed icons in variable configuration tables

Corrections

- Log file post-processed values were badly computed after having reached the 30,000 points limit in the acquisition session
- Allow writing a double value (non integer) in an expression from the write table
- Enable Y-axis tick labels on curve varviewers when scaling under 1 unit
- Correctly change a varviewer's name when several viewers share the same name
- Enhancements in viewers horizontal scrollbar management
- Import variables in direct acquisition mode
- Set maximum frame size in direct mode to 255 bytes instead of 254 bytes
- Display only one error message in case several variables cannot be inserted within the maximum number of frames in direct mode
- In snapshot mode, always record the trigger event, even if in sub-sampling mode without pre-trigger
- Forbid adding a variable that is not acquired, to a running viewer
- Update the expression column in the table varviewer after a name change of an application variable or a statistical variable used by the expression
- Expressions such as k/var can no longer be used as trigger symbol nor being written into
- Linear expressions referring to the same application variable in multiple ways (such as var+var instead of 2*var) can be used as trigger symbol and can be written into

5.8 Summary of changes in release 3.0

New features

- Triggers in direct acquisition mode
- Possibility to record variables acquired in different modes in a single session, that is:
  - variables acquired in direct mode (not intrusive reading from host) **and**
  - variables acquired in snapshot mode (instrumented application).

Note that it is not possible to display variables acquired in different modes in the same viewer, different viewers must be used instead (due to the asynchronous acquisition process).

- Acquisition mode selection is made via the icon on the left column of the variables table
- Expression edition assistant
- Possibility to write to linear expressions (reversed function computed by the host) through the "write variables" table
- New filter field in the "import variables from executable" window that filters the list of symbols.

Corrections

- Fixed issue with triggers in snapshot mode: was not possible to generate a trigger event on a variable toggling between two consecutive integer values. From now on, the equality with the threshold may generate the trigger event, when the previous value matches the selected edge.
- In snapshot acquisition mode, when using sub-sampled acquisition, the trigger evaluation is no longer sub-sampled (but done on each call to DumpTrace function)

- Fixed possible application crash after target communication error during SWIM entry sequence with ST-LINK (STM8 only)
- Fixed issue when replaying a file containing expressions with parentheses.

5.9 Summary of changes in release 2.2

- Statistical variables (min, max, average, standard deviation)
- Expressions and statistical variables logged to file (if log enabled without raw format option)
- Workspace tree view and ability to organize configurations inside a project
- Pretrigger in snapshot acquisition mode
- Possibility of sub-sampling the acquisition in snapshot mode
- Ability to restart timestamp from 0 when in trigger auto-restart mode
- Resizable variable tables height
- Display in double format in table variable viewer (do not truncate to integer)
- Adjust zooming to the point on the right of the zoom selection in order to avoid bad display in some cases
- Modified log file header in snapshot acquisition mode.

5.10 Summary of changes in release 2.1

- Table variable viewer
- Trigger in snapshot acquisition mode
- Possibility of exhaustive display of all recorded data in snapshot acquisition mode
- Automatic update of variable address and type after .elf modification
- Possibility to record only variables that are displayed in a viewer (instead of all variables from the control list)
- Possibility of hexadecimal display on vertical axis
- Single horizontal slider for all viewers (synchronized scroll)
- Variable name in log file
- Support for STM32 Arm® (Keil®) axf files for symbol import.

5.11 Summary of changes in release 2

- Added support for Write on-the-fly variables
- Added new data acquisition mode (snapshot mode): intrusive mode, where the application fills in a trace-dedicated embedded buffer that is read from the PC, instead of accessing the variables directly
- Added Var viewers can be hidden independently from each other
- Added sorting of variable tables
- Added resizable control panel
- Added sliders with two vertical bars for cursors
- Added confirmation message displays before overwriting user configuration file
- No exception on expression variables after deleting a variable used in an expression
- STM32 variables type 'int' or derived imported from elf file as 16 bits instead of 32 bits
- In bargraph mode, positive values are displayed above the bar.

5.12 Summary of changes in release 1.3

- Added support for IAR™ elf file parsing (STM8 and STM32)
- Added support for ST-TSLink (for STM8T142 microcontroller)
- Added option for elf variables table expansion
- Acquisition settings dialog enhancements:
  - manage STM8 low power modes
  - manage communication errors
  - added cancel/close buttons
  - bugfix dirty flag after modification of the refresh rate

5.13 Summary of changes in release 1.2

First official version. Contains the following features:

- Read on-the-fly (non intrusive) variable from RAM while the application is running
- Parse DWARF debugging information in the ELF application executable file (Cosmic STM8 and Raisonance STM8)
- Two types of viewer:
  - Variable viewers: Real-time waveforms
  - TouchPoint viewer: Association of two variables, one on X axis, one on Y axis
- Possibility to log data into file, and replay later (exhaustive record display, not real-time)
- Configuration settings management (save, load, Most Recently Used list).

Revision history

Table 1. **Document revision history**

Date	Revision	Changes
22-Nov-2010	1a	Initial release.
07-Apr-2011	2	Updated Chapter 2 for STM-STUDIO 1.3. Removed two limitations in Section 3.2: Known problems/limitations for elf file parsing on page 5.
21-Apr-2011	3	Updated Chapter 2 and Chapter 3 for STM-STUDIO 2.
01-July-2011	4	Updated Chapter 2 and Chapter 3 for STM-STUDIO 2.1.
15-Dec-2011	5	Changed STM Studio to STM-STUDIO. Updated Chapter 2 and Chapter 5 for STM-STUDIO 2.2.
29-May-2012	6	Updated all chapters for STM-STUDIO 3.0.
31-Oct-2012	7	Updated the title and most chapters for STM-STUDIO 3.1. Added Chapter 4: Troubleshooting.
10-Dec-2012	8	Updated the title, Chapter 2, Chapter 3.1: Known problems/limitations for data acquisition, Chapter 4: Troubleshooting and Chapter 5.2: Summary of changes in release 3.1 for STM-STUDIO 3.1.1.
16-Apr-2013	9	Updated the title, updated Chapter 2: What's new in STM-STUDIO release 3.2?, added Section 1.3: Used software and updated Section 3.1: Known problems/limitations for data acquisition for STM-STUDIO 3.2.
12-Sep-2013	10	Updated the title for STM-STUDIO 3.3. Updated Section 2 What is new in STM-STUDIO-STM32 and STM-STUDIO-STM8 release 3.6.0? and moved its previous contents to Section 5.5 Summary of changes in release 3.2. Edited the 3rd bullet of Section 3.1 Known problems/limitations for data acquisition. Removed the 5th bullet of Section 3.2 Known problems/limitations for graphical interface and added the last two bullets.
12-Dec-2014	11	Updated: • the title for STM-STUDIO 3.4. • Updated Section 2: What is new in STM-STUDIO-STM32 and STM-STUDIO-STM8 release 3.5.1? and moved its previous contents to Section 5.4 Summary of changes in release 3.3
17-Feb-2016	12	Added version 3.5 that supports Windows 10.
13-Apr-2016	13	Added version 3.5.1 to fix a regression.
23-Oct-2018	14	Modified for release 3.6.0. Updated Section 1.1 Host PC system requirements, Section 1.2 Supported hardware and Section 1.3 Used software. Moved content of former Section 2 to Section 5.1 Summary of changes in release 3.5.1. Added Section 2 What is new in STM-STUDIO-STM32 and STM-STUDIO-STM8 release 3.6.0?. Minor text edits across the whole document.

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