

ST10 Flasher Documentation

Version: V2.0
 Visual Basic 5.0 application for Win95/98/NT.

Remark

This program is made for laboratory environments and usage by engineers knowing the device they are working with.

The target of this flasher is simple: A engineer develops code for one of STMicroelectronics nice embedded flash microcontrollers (like the ST10F168 and others) and wants to program it (fast and easy) from his desktop PC into the chip. If that is what you are looking for, then this program is for you.

This software was not created for use in production environments.

For production programming the user is responsible to generate their own tested and qualified programming facility.

Install

1. Close all running programs on your PC.
2. If it exists, remove a previous version of the tool in the control panel ("add/remove program").
3. Install ST10Utility with setup.exe.

Important note

Setup errors may occur if an application is using msvcp60.dll, kernel32.dll or msvcrt.dll.

In that case, choose "ignore": there will be any bad effect on the application.

Program functions:

- Device auto-detection
- K-line auto-detection and management
- FCpu (CPU frequency) auto-detection
- Single chip operation using the bootstrap loader mode
- Operates on PC standard COM port 1..4
- Reload command handler (= monitor)
- Read status
- Erase flash memory by banks / by blocks
- Load a hex file
- Program HEX files
- Compare embedded flash memory content versus file on disk
- Find highest possible baud rate
- Dump Flash Memory to a HEX file or to screen
- Set or clear ST10 port
- Blank check
- Test COM
- Initialize COM port
- Close COM port

Short documentation:

There is no other document than this one available since the program is seen as self-explaining.

Usage

1. Before first use, check that the file "startup.ini" (in the selected application directory) corresponds to the application parameters, especially for the parameters COMPORT, BAUDRATE.

Default delivery settings are :
[COMPORT] = COM1 ;
[BAUDRATE] = 9600,N,8,1 ;

2. Reset your application before starting ST10Utility.exe to enter the Bootstrap Loader Mode.

If the microcontroller is NOT in bootstrap loader mode, then the message

"BSL receive acknowledge failed appears. Reset your application and reload the monitor" will appear.

In this case, then :

- Issue a hardware reset to latch port 0 pin 4 ~~a~~ low level during startup.
- Make sure you have selected the correct serial communication port and that no other program occupies it (close it if so).
- Click the button "RELOAD" starts the bootstrap loader based command handler download again, which then should be successful complete by printing the "Monitor OK" in the message window.

3. Select COM port for communication by menu item "CONNECT". The command button "initialize port" evaluates if the selected COM port and baud rate are OK (green LED) or not (red LED).

4. A message indicate the monitor status (OK/BAD), this information is also visible on the Monitor status LED.

If the ST10 cannot be contacted in bootstrap loader mode, the message *"Reset your board to bootstrap loader mode and press RELOAD"* appears.

5. Click "Get Status" to get the flash tool status. If an error occurred, it returns the last error message.

6. When loading the monitor, the tool performs an autodevice detection. The device is then displayed in the interface indicating that you are connected to e.g. ST10F168.

If the monitor loading was not successful, the following message will appear in the flash type window : *"ChipAutoDetection"*.

The flasher can also detect if the communication is a Kline port or not. If it's the case, it is displayed in window Com port status.

GETTING possible baudrates

Press "Get maximum baud rate" in menu "CONNECT" to get the highest possible baud rate for the communication channel in use. Then the flasher will propose you to set the speed at the maximum baud rate or at the previous baud rate.

The following table indicates the possible baud rates for each CPU frequency.

Some baud rates cannot be set for some CPU frequencies because of the RS232 deviation between the baud rate register baded in the Flash and the target baud rate.

The baud rate is considered OK when deviation < 2 %.

In practice, note that these values may change with the user environment (length of the serial line, quality of cable and connectors, noise, PC buffer size, number of active tasks, ...). In these cases the max. transmission speed cannot be obtained!

Fcpu (MHz)	Possible baud rates (kbauds)
7.5	57.6 / 38.4 / 19.2 / 14.4 / 9.6
8	19.2 / 14.4 / 9.6
10	38.4 / 19.2 / 14.4 / 9.6
12.5	56 / 38.4 / 19.2 / 14.4 / 9.6
15	115.2 / 57.6 / 38.4 / 19.2 / 14.4 / 9.6
16	56 / 38.4 / 19.2 / 14.4 / 9.6
20	57.6 / 56 / 38.4 / 19.2 / 14.4 / 9.6
24	57.6 / 56 / 38.4 / 19.2 / 14.4 / 9.6
25	57.6 / 56 / 38.4 / 19.2 / 14.4 / 9.6
30	115.2 / 57.6 / 56 / 38.4 / 19.2 / 14.4 / 9.6

Note: Refer to the device datasheet, check and respect the minimum baudrate allowing flash operations to operate within the specifications!
Violating the specification may result in limited flash reliability!

TEST COM

This function is used to the to test the serial communication.
It only sends a byte "0x0" and checks the response of the ST10.

ERASING and PROGRAMMING the on-chip flash memory

Erase operation

1. Click ERASE button command.
2. A window will be displayed. Mark the flash memory areas (among 4 banks for ST10F168) to erase by checking them.
3. Click OK to start the erase operation.

Note: The marks are automatically reset after erase.

4. Status messages of the erase operation are written to the text window, act accordingly.
5. You can check if a bank (or a block) is blank with the button "*BlankCheck*".

Note : You can select automatic erase option (checked by default) before programming to erase the flash areas concerned by the hex file to program. In this case, prior to a programming operation the ENTIRE flash memory space will be erased automatically.

Note: This slows down the programming time also.

Program operations: Load, Program and Verify

1. Click *SELECT HEXFILE* and select one Hexfile to program into the onchip flash memory.
2. Clicking OK or double clicking the selected hexfile automatically loads the hex file. The name of the current loaded file is displayed. A text box indicates also the last loaded files (history function for convenience).
3. The text window returns the result of the loading operation.
4. Click on the "*Program - Verify*" button triggers programming operation- Now the loaded hex file is transferred to the ST10 and programmed into the embedded flash memory. The programming is verified thanks to the checksum returned by the ST10.

Compare operation

User can then check that the content of the Flash is identical to the hex file loaded by clicking on the "*Compare*" command.

The HEX FILE on your PC IS THE REFERENCE against the flash content. The area indicated by the hex file is automatically checked against the embedded flash memory content.

Important Note : Compare issue

On some environments, the "Compare" command may take a long time. It's not useful to do "compare" at each programming, because the checksum included in the programming step assume that the operation was OK.

DUMPING the flash memory

With this function the user may read out the embedded flash memory content for control and debugging purposes. The content can be stored in a file or displayed on screen.

Dump to file allows to read the content of the flash memory in a HEX file. This dump file is by default created at the application directory (where the flasher software is stored).

Additional the user can choose a dump file name by selecting the browse button. To start choose "Dump To File" in the dump window. Then you can select to read by an address or by a defined Block. Block addresses can be found in the device datasheet.

Dump to file by address

1. Write the Start address in G-style (0x...). Take care to dump physical addresses, otherwise the "out of physical memory" will appear.
2. Write either the Size of bytes to be dumped or the End address.
3. Open the dump file to see the result.

Dump to file by block

1. Select banks (for F168) or blocks (for the enhanced derivatives)
2. Click on "OK" to start dumping.
3. Open the dump file to see the result.

Choose "Dump to screen" in the dump window when you want to display the Flash memory on the screen. In "Dump to screen", the dump size is limited to 4096 bytes. In parallel the dump result is also saved in a file "Tmpdump.txt" at the application path on your computers disk.

Dump to screen by address

1. Write the Start address in G-language style (0x...). Take care to dump physical addresses, otherwise the message "out of physical memory" will appear.
2. Write either the Size of bytes to be dumped ($\leq 4\text{kb}$) or the End address.
3. Select the format : per byte, per word or per long word. The size must be even when the word format is selected and that size/2 must be even when the long word format is selected.
4. The software displays the dump result.

Dump to screen by block

1. Select a bank (for F168) or a block (for enhanced devices)
2. Select the format : per byte, per word or per long word.
3. Select the offset to add to the beginning of block (or bank).

4. Click on "OK" to start "dumping".

5. The application displays the 4kb block (or bank) area from the block start address + offset.

ENABLE ST10 Port

This function allows to set or clear a ST10 port pin. Enabled ports keep the value at startup and after reloading of the monitor..

The user may want to use this command to activate a external charge pump generating Vpp for ST10F168 or other purposes.

To disable a port, click on "disable" on the "Port" menu.

Note under Windows 95/98: Programming speed issue

Under windows 95/98, it is strongly recommended to set the FIFO option in the advanced COM port settings (Start Menu > settings > control panel > System > COM PORT). Otherwise, flasher operations may take a long time.

Known issues

- Install issues (see note in Install section).
- Verify operation may take a long time (> 2 minutes), due to COM issues under some systems.
- Programming bank 0 of the F168 may trigger error at 115200 bauds.

Feedback and Problem reporting

If you have discovered a serious bug and/or want to give some feedback please send a written comment to the source who gave you the program. The STMicroelectronics contact person will send us **your feedback which is always welcome**. For debugging a hex file showing the behavior is always needed!

STMicroelectronics, TPA DMD tools group, November 2000