

**ds30 Studio free edition  
manual**



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## **2. Introduction**

### ***2.1. ds30 Loader***

ds30 Loader is a boot loader supporting PIC12, PIC16, PIC18, PIC24, dsPIC families of MCUs from Microchip.

### ***2.2. ds30 Studio free edition***

ds30 Studio free edition is a PC application with functionality related to ds30 Loader boot loader firmwares. It consists of a graphical application and a console/terminal application. The graphical application works only on Windows. The console application also works in Linux and macOS.

### ***2.3. Prerequisites and Requirements***

.NET framework 3.5 (Windows) or Mono (Linux and macOS).

### ***2.4. Trademarks***

All rights to copyrights, registered trademarks, and trademarks reside with their respective owners.

## **3. Getting started**

### **3.1. Requirements**

ds30 Studio requires a .NET framework to run. For Windows there are two different frameworks available; .NET framework from Microsoft and Mono from Xamarin. For Linux and macOS, only Mono is available. Mono is constantly being developed and bug fixed. It is recommended to use the latest version. Download links are available in appendix A.

Running ds30 Loader Studio on Linux and macOS is not supported. It may or it may not work.

### **3.2. Installation**

The ds30 Studio does not need to be installed.

### **3.3. Starting**

#### **3.3.1. Windows**

- Double click ds30Studio.exe from Explorer
- or use run on the start menu, browse to ds30Studio.exe
- or start from command prompt

#### **3.3.2. Linux**

Run command: `mono ds30StudioConsole.exe`

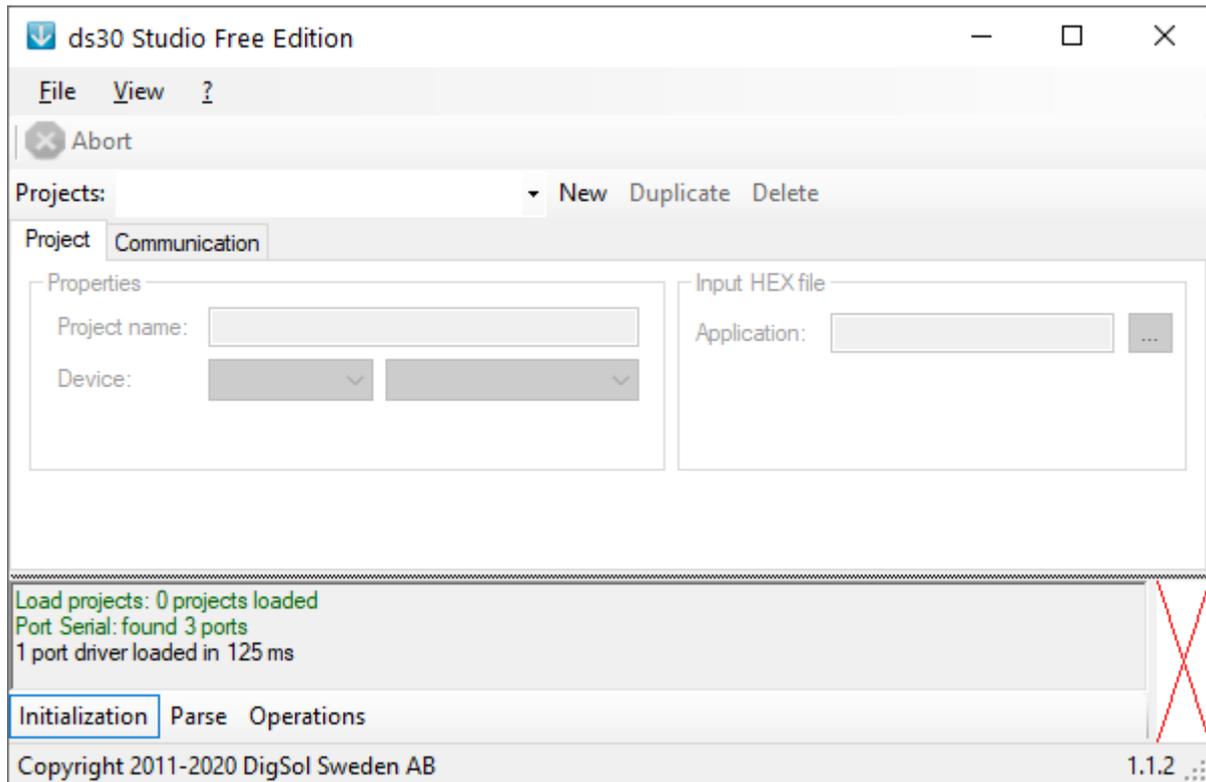
#### **3.3.3. macOS**

Run command: `mono ds30StudioConsole.exe`

### 3.4. First start

When started the first time it will look something like the screenshot below, depending on the operating system version and configuration.

If you are an experienced boot loader user you will probably want to switch to advanced mode on the menu View\Advanced mode. This will enable more settings and features.



## **4. Window elements**

The ds30 Studio consists of six parts; the menu, the operations toolbar, the project toolbar, the tab pages, the output text boxes and the graphical hex file representation.

### **4.1. Menu items**

#### **4.1.1. File\Exit**

Saves all settings and closes the application.

#### **4.1.2. Operations\Debug mode**

When debug mode is enabled, additional information is output during most operations. This option is typically used when for troubleshooting. When toggled, the hex-file is re-parsed.

#### **4.1.3. Operations\Reload hex file**

Reloads the application hex file. The application hex file is also automatically reloaded when ds30 Studio receives focus and the application hex file time stamp has changed.

#### **4.1.4. Operations\Boot loading\Abort**

Aborts the current write, read, or check for boot loader operation.

#### **4.1.5. Operations\Boot loading\Check for boot loader**

Sends the hello command to the boot loader and displays firmware and device information if it is received properly.

#### **4.1.6. Operations\Boot loading\Write**

Initiates a write operation based on the selection in the write destinations under the boot loader tab.

If poll time is set to lower than 100ms, the applications process priority is raised to above normal. The priority is restored after write.

If “Switch to after write” is checked in the terminal tab, the terminal tab is shown after a successful write and the port is opened.

#### **4.1.7. Operations\Boot loading\Read**

Initiates a read operation based on the selection in the write destinations under the boot loader tab. When the read has successfully completed the user is asked for a filename to store the read data in.

#### **4.1.8. Operations\Boot loading\Create console command**

Creates a command string that can be used with ds30 Loader console. The command is output in the operations text box and copied to the clipboard.

#### **4.1.9. Operations\Encryption\Encrypt**

Encrypts the application hex file using the encryption settings in the encryption tab.

#### **4.1.10. Operations\Encryption\Create console command**

Creates a command string that can be used with ds31 Encryptor console. The command is output in the operations text box and copied to the clipboard.

#### **4.1.11. Operations\Merger\Merge**

Merges the application and boot loader hex files into a single hex file using the settings in the merging tab.

#### **4.1.12. Operations\Merger\Create console command**

Creates a command string that can be used with ds32 HEX Merger console. The command is output in the operations text box and copied to the clipboard.

#### **4.1.13. Operations\Rectifier\Rectify**

Merges the application and boot loader hex files into a single hex file using the settings in the merging tab.

#### **4.1.14. Operations\Rectifier\Create console command**

Creates a command string that can be used with ds33 HEX Rectifier console. The command is output in the operations text box and copied to the clipboard.

#### **4.1.15. View\Always on top**

When checked, the window stays on top of other windows even when not active.

#### **4.1.16. View\Settings directory**

Opens the directory where the setting files are stored.

#### **4.1.17. View\Advanced mode**

When enabled all available options are made visible.

#### **4.1.18. Help\About...**

Opens the about window.

### **4.2. Operations toolbar**

The toolbar buttons have the same function as the menu items with the same name.

### **4.3. Projects toolbar**

#### **4.3.1. List**

A list of all projects. Projects are automatically save on exit and read on start-up. Each project is stored as a separate XML file in the settings directory.

#### **4.3.2. New button**

Creates a new empty project with default settings. Projects can also be created by dragging on or more hex files onto ds30 Studio.

#### **4.3.3. Duplicate button**

Creates a copy of the selected project.

#### **4.3.4. Delete button**

Deletes the selected project. Projects can also be deleted manually by deleting the project XML files in the settings directory, this must be done while ds30 Studio is not running or the project files will be recreated when ds30 Studio exits..

### **4.4. Project tab**

#### **4.4.1. Project name**

The project name is set by the user and is not tied to any functionality.

#### **4.4.2. Device**

The chosen device and family are used to parse hex files correctly. When device or family is changed, the hex-file is re parsed. Available devices depends on the license.

#### **4.4.3. Application, input hex file**

This is the file that is to be written.

### **4.5. Communication tab**

#### **4.5.1. Port**

Port used to communicate with the boot loader. If the desired serial port is not available in the drop down list it is possible to manually type in the port name.

#### **4.5.2. ...-button**

When pressed a configuration window is opened for the selected port. Not all ports have a configuration window.

#### **4.5.3. Baud/bit rate**

If the desired rate isn't available, it may be possible to specify a custom rate depending on which port type is selected. See the ds30 Loader main manual for additional information.

#### **4.5.4. Flow Control**

This setting is specific to serial ports. See the ds30 Loader main manual for more information.

#### **4.5.5. Parity**

This setting is specific to serial ports. See the ds30 Loader main manual for more information.

#### **4.5.6. Two stop bits**

This setting is specific to serial ports. See the ds30 Loader main manual for more information.

#### **4.5.7. Echo verification**

See the ds30 Loader main manual.

#### **4.5.8. One way communication**

See the ds30 Loader main manual.

#### **4.5.9. Send auto baud rate sync character**

This setting is specific to serial ports. See the ds30 Loader main manual.

#### **4.5.10. Manual reset**

When checked, the user is responsible to make the boot loader running on the target unit.

#### **4.5.11. Reset by command**

See the ds30 Loader main manual.

#### **4.5.12. Reset time**

See the ds30 Loader main manual.

#### **4.5.13. Reset baud/bit rate**

See the ds30 Loader main manual.

#### **4.5.14. Reset by RTS**

This setting is specific to serial ports. See the ds30 Loader main manual for more information.

#### **4.5.15. Reset by DTR**

This setting is specific to serial ports. See the ds30 Loader main manual for more information.

#### **4.5.16. Manual activation**

This setting is specific to serial ports. When checked, the user is responsible to power and get the target unit out of reset state.

#### **4.5.17. Activation by RTS**

This setting is specific to serial ports. See the ds30 Loader main manual for more information.

#### **4.5.18. Activation by DTR**

This setting is specific to serial ports. See the ds30 Loader main manual for more information.

### **4.6. Boot loader tab**

#### **4.6.1. Flash, write destination**

See the ds30 Loader main manual.

#### **4.6.2. EEPROM, write destination**

This option is disabled if the application hex file does not contain any EEPROM data. See the ds30 Loader main manual for more information.

#### **4.6.3. Configuration bits, write destination**

This option is disabled if the application hex file does not contain any configuration bits. See the ds30 Loader main manual for more information.

#### **4.6.4. Flash, read source**

When checked, the flash memory is read during a read operation.

#### **4.6.5. EEPROM, read source**

When checked, the EEPROM memory is read during a read operation.

#### **4.6.6. Hello timeout**

See the ds30 Loader main manual.

#### **4.6.7. Poll time**

See the ds30 Loader main manual.

#### **4.6.8. Timeout**

See the ds30 Loader main manual.

#### **4.6.9. Delay after port open**

See the ds30 Loader main manual.

#### **4.6.10. Don't relocate application reset vector**

See the ds30 Loader main manual.

#### **4.6.11. Don't point reset vector to boot loader**

See the ds30 Loader main manual.

#### **4.6.12. Don't write empty pages**

See the ds30 Loader main manual.

#### **4.6.13. Put checksum before application vector**

See the ds30 Loader main manual.

#### **4.6.14. Allow overwrite of boot loader**

See the ds30 Loader main manual.

#### **4.6.15. Custom boot loader**

See the ds30 Loader main manual.

#### **4.6.16. Hello character**

See the ds30 Loader main manual.

#### **4.6.17. Placement, size**

See the ds30 Loader main manual.

### **4.7. Terminal tab**

#### **4.7.1. Baud/bit rate**

The baud rate used to communicate.

#### **4.7.2. RTS**

When checked the RTS pin is activated. This option is only enabled for serial ports.

#### **4.7.3. DTR**

When checked the RTS pin is activated. This option is only enabled for serial ports.

#### **4.7.4. DSR**

When checked the RTS pin is activated. This option is only enabled for serial ports.

#### **4.7.5. CTS**

When checked the RTS pin is activated. This option is only enabled for serial ports.

#### **4.7.6. Open**

Opens the port specified on the basic page.

#### **4.7.7. Close**

Closes the port.

#### **4.7.8. Tx text**

The text in the text box is treated as a string.

#### **4.7.9. Tx hex**

The text in the text box is parsed, it can contain 8-bit hex values and/or strings. The format of the data is `hexval1;'string';"string"....`

Example hex only: 0;11;f;ab;3e

Example strings only: 'Hello';"Reset"

Example mixed: "Reset";d

#### **4.7.10. \r \n \0**

When checked return feed, newline, and null character respectively are appended to the string. Only for text transmission.

#### **4.7.11. Send**

Transmits data according to the tx settings.

#### **4.7.12. Rx type selection**

#### **4.7.13. Clear Rx**

Clears the receive text box.

#### **4.7.14. Switch to after write**

When checked, the terminal page is showed and the port is opened after a successful write operation.

#### **4.7.15. Clear rx on open**

When checked, the rx textbox is cleared when the open is opened.

#### **4.7.16. Counters**

Shows number of transmission, number of transmitted bytes and number of received bytes. The reset button clears all the counters. All counters are automatically cleared then the port is opened.

### **4.8. Info tab**

#### **4.8.1. Device**

Shows some basic information about the selected device. The config count is not always accurate.

#### **4.8.2. Application hex file**

Shows some information about the application hex file.

#### **4.8.3. Boot loader**

Shows information about the boot loader from the last successful communication.

### **4.9. Output text boxes**

#### **4.9.1. Initialization**

Information about application startup and initialization is shown here.

#### **4.9.2. Parse**

Information from hex file parsing is shown here.

#### **4.9.3. Operations**

Information from the operations is shown here.

#### **4.9.4. Terminal**

Terminal received text/data is shown here.

### ***4.10. Graphical hex-file representation***

This bar represents the entire device main flash memory. Other memory areas such as EEPROM, configuration bits and user id are not shown. Because the boot loader size is unknown until communication has been established the orange and red pars may be incorrect. Colors:

- Green – user application
- Orange – boot loader
- Red – colliding user application and boot loader

## 5. Boot loading

### 5.1. Console

### 5.2. Usage syntax

The syntax is:

```
ds30StudioConsole options
```

Option values containing spaces need to be enclosed with quotation marks, the quotation marks should surround the entire argument like this “option=value”.

### 5.3. Options summary

When unknown option or illegal option value is detected, the operation is aborted. For more information about each command refer to the ds30 Loader main manual.

Short option name	Long option name	Description
Required		
-f=filename	--file=filename	Hex file name
-d=device	--device=devicename	Device name
-k=portname	--port=portname	Port name
-r=baudrate	--baudrate=baudrate	Baud rate
Misc		
-h	--help	Display help
-l	--debugmode	Enable debug mode
-o	--non-interactive	Start the selected operation without user interaction
-z	--list-ports	List available ports
n/a	--parse-only	Parse hex file then exit
n/a	--find	Find boot loader then exit
n/a	--less-dots	Output less progress indicating dots
Basic		
-p	--writef	Write flash
-e	--writee	Write eeprom
n/a	--readf	Reads and exports PIC flash*

n/a	--reade	Reads and exports PIC eeprom*
n/a	--read-aux --read-boot	Read the aux/boot flash
Serial		
n/a	--flowc= none/hw/sw/both	Serial flow control. Sw = Xon / Xoff
n/a	--parity=none/even odd/mark/space	Parity selection.
n/a	--stop-bits=1/2	Stop bits selection
CAN		
n/a	--pic-id=id	CAN id of device to download to*
n/a	--ds30-id=id	CAN id of the ds30 Loader application*
n/a	--ext	CAN extended frames*
n/a	--dlc=dlc	CAN transmit data length code*
n/a	--canfd	Send CAN FD frames.
n/a	--noniso	Use non iso crc.
n/a	--dbr=xxx	Data bit rate for bit rate switching.
TCP socket		
n/a	--address=address:port	Address and port nr to connect to*
Advanced		
-g	--no-goto-app	Don't relocate application reset vector
-s	--allow-bl-overwrite	Allow overwrite of boot loader
-c	--writec	Write configuration bits
n/a	--write-aux --write-boot	Writes the aux/boot flash
-v	--customplacement=x	Custom boot loader placement, pages from end
-w	--customsize=x	Custom boot loader size, page(s)
-x	--auto-baudrate	Send auto baud rate sync character
-y	--echo-verification	Verify tx echoes
n/a	--add-crc	Writes a checksum of the flash
n/a	--disable-empty-pages	Empty pages will no be written

n/a	--no-goto-bl	Don't point reset vector to boot loader
n/a	--one-way	One way communication
n/a	--hello-char	Custom hello character
<b>Timing</b>		
n/a	--ht=hello timeout	Time to keep sending hello before aborting [ms]
-a=time	--polltime=polltime	Poll time [ms]
-t=time	--timeout=timeout	Time before timeout [ms]
n/a	--port-open-delay=del	Delay after port is opened [ms]
<b>Device reset</b>		
-q=cmd	--reset-command=cmd	Reset device by specified command, this option may need to be enclosed in " under Linux, se Linux example in the next section
-u=baudrate	--reset-baudrate=br	Baud rate for reset command
-m	--reset-dtr	Reset device by dtr
-n	--reset-rts	Reset device by rts
-b=time	--resettime=time	Resett ime [ms]
n/a	--reset-dlc=dlc	CAN DLC for reset frames*
n/a	--reset-ext	Send CAN extended frames*
n/a	--reset-pic-id=id	CAN id of device to reset*
n/a	--reset-addr=addr:port	Address and port for TCP port reset command*
<b>Device activation</b>		
-i	--activate-dtr	Activate device by dtr
-j	--activate-rts	Activate device by rts
<b>Security</b>		
n/a	--pw=password	Password to send to ds30 Secure Loader*. If no password is entered on the command line it is entered interactively with hidden characters.

\* Not available in the free edition

## 5.4. Return value

0 is returned after a successful download, else -1.

## Examples

### **5.4.1. Windows**

```
ds30StudioConsole -f=filename.hex "-q='reset';d" -d=pic18f2550 -k=com1  
-r=115200 --writef
```

### **5.4.2. Linux / macOS**

```
mono ds30StudioConsole.exe -f=filename.hex "-q='reset';d" -d=pic18f2550  
-k=/dev/ttyUSB0 -r=11520 --writef
```

## **6. Appendix A – Links**

ds30 Loader website

<https://ds30loader.com>

ds30 Loader free edition website

<https://picbootloader.com>

Microsoft .NET Framework Version 3.5

<https://www.microsoft.com/sv-se/download/details.aspx?id=21>

Mono

<http://www.mono-project.com>