

## Stamp Loader (v3.5)

The StampLoader.exe program is a Windows application that can be used by BASIC Stamp developers to create and distribute object code updates to their customers. The Stamp Loader can take BASIC Stamp object code and download it to a BASIC Stamp connected to a Windows-based PC. It provides a simple interface that can be personalized to contain the developer's company information and to display useful information to the end customer.

The StampLoader.exe is built into the BASIC Stamp Editor and can be extracted as a separate executable via the editor's File->Generate Object Code->Object Code and Stamp Loader option. It is also the core executable that is created through the editor's File->Generate Object Code->Single Executable option—this makes a convenient, single file that a customer can run to update their BASIC Stamp based product.

## StampLoader.exe Command-Line Options

```
SL.exe {/Com#} {/NoInfo} {object_file} {> output_file}
SL.exe {/Com#} /NoPrompts {/Updates} {object_file} > output_file
SL.exe /GetInfo {object_file} > output_file
SL.exe /Pipe master_file
SL.exe /Help
```

/Com#	– Specify com port (serial port) to download to. # is a valid com port number. NOTE: must be one word, ie: Com2 indicates com port 2.
/NoInfo	– No Information screen display. StampLoader.exe immediately downloads after loading object file.
/NoPrompts	– No screen prompts at all (not even error messages). This option requires redirection to an output_file. Object_file option can be left off only if object code is integrated into SL.exe.
/Updates	– Provides program slot number (if applicable) and download-percentage-complete status updates during download.
/GetInfo	– Information section of object file is returned and no download occurs. This option requires redirection to an output_file. Object_file option can be left off only if object code is integrated into SL.exe.
/Pipe master_file	– Start up master_file (must be .exe) and establish bi-directional communication pipes for master-program-controlled execution. SL.exe remains open until master_file breaks pipe. This command option is not available once double-piped communication is established.
/Help	– Display command-line help. This command option is not available if double-piped communication is established.

Note: If redirection to an output file is used with syntax #1, GUI prompts still appear and their text is copied to output\_file where applicable.

## Additional Command-Line Details

The StampLoader.exe program can be run through any normal method. It has special features available by passing it command-line options (switches) shown above. While this program can be run from a command-prompt on a Window system, it will not work on a DOS-only system.

The StampLoader.exe supports redirection of its input and output via the standard pipe mechanisms. If its output is redirected via the command-line (ex: StampLoader.exe myfile.obj > Test1.txt) the designated output file, Test1.txt in this case, will be created and various information about the processing of its object file will be stored there. This information directly reflects the information available on the GUI prompts, interactions with the user and downloading status. This feature can be combined with the /NoInfo and /NoPrompts switches for various levels of GUI interaction with the user.

## About the /PIPE Switch:

The /PIPE switch is a special option that causes the StampLoader to create two pipes (for bi-directional communication), start another program (that will act as a Master) and establish a connection between itself and the master\_file. This option allows a developer to create software (the master\_file) that controls the StampLoader's actions. The master\_file program simply needs to write to its Standard Output and read from its Standard Input to communicate with the StampLoader.

When the StampLoader is started with this option, after it creates the pipes and starts the master\_file program, it then sits quietly in the background waiting for commands from the master\_file program. The available commands are exactly the same as the normal command-line switches (with the exception that the /PIPE and /HELP switches are no longer available).

### Example #1:

If your master program is called Master.exe and you'd like it to make the StampLoader program download the object file called C:\Temp\MyObject.obj, do the following:

1. Issue the command-line: StampLoader.exe /PIPE Master.exe
  - a. The StampLoader.exe will start, create two pipes, start the Master.exe program, connect the two pipes to the Master.exe program's STDIN and STDOUT and then sit quietly in the background waiting for its first command from the Master.exe program's STDOUT.
2. Have your master program write the following to its STDOUT: C:\Temp\MyObject.obj
3. Have your master program read its STDIN and process the response messages that arrive from the StampLoader.

### Example #2:

If you'd like the StampLoader program to download the same object file, but this time without prompting the user at all:

1. Issue the command-line: StampLoader.exe /PIPE Master.exe
  - a. The StampLoader.exe will start, create two pipes, start the Master.exe program, connect the two pipes to the Master.exe program's STDIN and STDOUT and then sit quietly in the background waiting for its first command from the Master.exe program's STDOUT.
2. Have your master program write the following to its STDOUT: /NoPrompts C:\Temp\MyObject.obj
3. Have your master program read its STDIN and process the response messages that arrive from the StampLoader.

**Note #1:** When used with the /PIPE switch, the StampLoader.exe program will remain running (in the background) even after successfully downloading (or performing any other command) and will await your next command, as if it was just started. There are two exceptions to this: 1) A Fatal Error occurs; such as those caused by issuing invalid command-line switches, or 2) the Master.exe program breaks its STDOUT pipe (by closing the STDOUT handle or simply terminating itself). See the Stamp Loader Messages for more information.

**Note #2:** The StampLoader.exe program responds via the master program's STDIN using predefined messages. The messages and their formats are shown in the Stamp Loader Messages section, below.

**Note #3:** To allow a user to simply run your master program (rather than forcing them to enter the command-line mentioned above), simply do the following in your master program immediately after starting up:

1. Create a PStartupInfo structure and fill it with a call to GetStartupInfo.
2. If the hStdInput field of the PStartupInfo structure = 0 then you know the user, not the Stamp Editor, started this program...
  - a. Use the ShellExecute API call (or similar function) to start the Stamp Loader program with the following command-line: StampLoader.exe /PIPE /LoaderMaster.exe (make sure to get the paths correct)
  - b. Terminate yourself (your instance with the invalid handles)
3. Otherwise, continue as normal (retrieve the valid Standard Input and Standard Output handles to communicate with the Stamp Loader program).

A Delphi program and source code is available (called LoaderMaster) that does this. Locate this program and study its code. There are only a few Windows API calls that are necessary to accomplish this since the StampLoader takes care of all the complicated issues.

# Stamp Loader Messages

When the output of the Stamp Loader is piped (to a file or a master program) it displays all its messages in a specific, predefined format. There are 3 types of messages: 1) Errors, 2) Events and 3) Information. Each type can contain a number of different messages. The format of the piped output messages is:

Message Header (always first 9 characters)			Message Text (unlimited length)
Character 1	Characters 2 - 5	Characters 6 - 9	Characters 10+
Start Of Header	Message Type	Message ID	Message Text
SOH character (ASCII value 1).	ERR:, EVT: or INF: meaning Error, Event or Info, respectively.	nnn- ;where nnn is the 3-digit unique ID of the message.	Text string indicating the nature of the message.

For example, an Error-type message may appear as: `␣ERR:001-Invalid command-line switch: switch_name`

Note: The "␣" is the SOH character (ASCII 1) that appears at the start of every message.

This format works well for both computers and humans. The Message Type (ERR:, EVT: or INF:), Message ID (nnn-) and Message Text is easily readable by humans when seen in a redirected output file. The Start Of Header is always the first character of each new message, and the Message Type and ID can be easily parsed by most programming languages. In addition, each of these fields begins at a specific character location in every message.

## Final and Intermediate Messages

The Message ID is a unique, 3-digit number. A program can quickly determine the nature of the message by its ID. The ID indicates two things: 1) the actual meaning of the message (ie: errors, events, etc) and 2) the scope of the message (ie: final or intermediate). The scope of the message indicates whether or not there are more messages to follow. A "final" message (those with IDs less than 101) is the last message anyone should expect to receive from the Stamp Loader until it is commanded to do another task. An "intermediate" message (those with IDs greater than 100) is NOT the last message anyone should expect to receive from the Stamp Loader. **This is particularly important when using pipes since a call to read the pipe does not return until data is received (ie: if you go to read the pipe and the program on the other side never sends any data, your program will be preempted (locked) indefinitely).**

The Stamp Loader also sends the Final message with an EOT (End of Transmit, ASCII 4) character at the end of the Message Text portion. **Either the Message ID or the EOT character can be used to determine if there are more messages to come.**

## List Of Messages

The following are all the possible messages, their types and IDs.

ERROR MESSAGES	
FATAL ERRORS (failures that cause termination of Stamp Loader program, even when double-piped)	
001	- Invalid command-line switch: 'SWITCH'
002	- Duplicate or Conflicting command-line switch: 'SWITCH'. This switch either: 1) appears more than once, or 2) is not allowed in combination with the switches appearing before it
003	- SWITCH switch not allowed while in Inter-Process Communication Pipe Mode.
004	- Duplicate command-line option: 'SWITCH'. Only one input filename (object_file or master_file) is allowed.
005	- Missing parameter required. REQUIREMENTS.
006	- Cannot create In-Pipe or Out-Pipe.
007	- Cannot create child process.
008-010 - (reserved)	
SERIOUS ERRORS (failures that don't cause termination of Stamp Loader program (when double-piped))	
~~~file related errors~~~	
011	- File not found: 'FILENAME'.
012	- Checksum Error. Data is corrupt in file 'FILENAME'.
013	- Can not process object code. File format is version '#.#'. Expected version '#.#'.
014	- Not proper object code file format.
015-020 - (reserved)	

~~~device related errors~~~	
021	- Can not download to this version of the device. Contact 'COMPANY' for updated software.
022	- Can not download to this version of the device.
023	- No 'DEVICE' found.
024	- EEPROM verify failure.
025	- Hardware communication failure. Check serial cable and power supply.
026	- Duplicate devices found. Select COM port of desired unit.
027	- Object code not embedded. Must specify object code file name.
028-040 - (reserved)	
<b>EVENT MESSAGES</b>	
Events usually indicate an action taken by user, lead up to a required user action, or other significant event.	
FINAL EVENTS (events that mark the last message from Stamp Loader)	
041	- User cancelled open-file dialog.
042	- User cancelled information dialog.
043	- User cancelled device selection.  044 - Download successful!
045-050 - (reserved)	
INTERMEDIATE EVENTS (events that indicate more messages to come from Stamp Loader)	
101	- User selected download from information dialog.
102	- Duplicate devices found.
103	- User selected device on COM#.
104	- Downloading to 'COM#'.
105-110 - (reserved)	
<b>INFO MESSAGES</b>	
Information messages indicate status of ports and downloading progress.	
FINAL INFO (info that marks the last message from Stamp Loader)	
051	- COMPANY=COMPANYNAME PRODUCT=PRODUCTNAME FIRMWARE=FIRMWAREINFO CHECKSUM=CRC COMPILEDATE=DATETIME INTROMESSAGE=INTRODUCTORYMESSAGE
052-100 - (reserved)	
INTERMEDIATE INFO (info that indicate more messages to come from Stamp Loader)	
111	- PORT=COM# DEVICE=DEVICENAME VERSION=VERSIONNUMBER LOOPBACK=YES/NO ECHO=YES/NO
112	- SLOT=PROGRAMSLOTNUMBER PROGRESS=PERCENTAGE%