![FlexiPanel logo]

TEAclipper/Stamp™

Firmware delivery for BASIC Stamps

Summary

TEAclipper/Stamp is a portable, target-powered firmware programmer for BASIC Stamps. About the same weight and size as a nickel (US 5¢ coin), it can be readily transported and plugged in to the PCB or prototyping board containing the BASIC Stamp requiring programming.

TEAclipper/Stamp makes it easy to sell code written for BASIC Stamps and also to deliver updates to products already delivered to customers.

Features
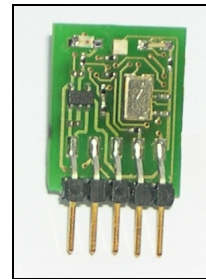
TEAclipper/Stamp features:

- Support for BS2, BS2e, BS2sx, BS2p24, BS2p40, BS2pe, BS2px.

- Limited-download feature that counts the number of devices programmed. When the limit is reached the TEAclipper refuses to program any more, allowing firmware to be sold on a per-copy basis

- Encrypted delivery secures against copying.

- Unique serial numbers and license codes can be written to each Stamp programmed.

- No other components required. Can connect to the BASIC Stamp via, for example:
    - 5 plate-though PCB holes (for light duty use)
    - 0.1" header (for heavy duty use)
    - Prototyping board

- Powered in-situ by target circuit

- TEAclipper USB adapter required for charging TEAclippers with firmware.

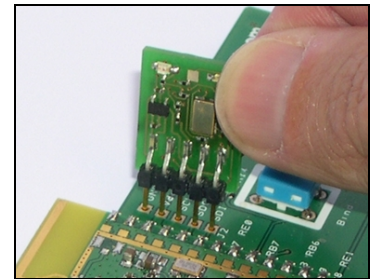- Weight 2g, size 24 x 15 mm including pins.

How It Works

The *HexWax Explorer* application is used to load TEAclippers with firmware, either stored locally or downloaded from *www.hexwax.com* via the TEAclipper USB adapter.
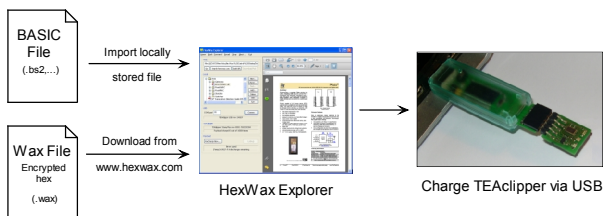
Manufactured to RoHS, WEEE & ISO9001:2001 standards

TEAclipper/Stamp

Programming a target PCB

BASIC Stamps are then programmed by temporarily inserting the TEAclipper into the target device's circuit. The connection can be a PCB header or simply leaning against plate-through holes on a PCB. For prototyping, TEAclippers can be inserted into breadboards.

Applications

- Firmware sales through physical dispatch of TEAclippers to customers

- Delivery of in-the-field firmware updates for already-deployed products. Costs nothing to implement at product design-time.

- Firmware sales through web marketing by *www.hexwax.com*, FlexiPanel's firmware publishing service.

TEAclipper system

TEAclipper/Stamp is part of FlexiPanel's TEAclipper system, which provides:

- TEAclippers for Microchip PICs and Parallax BASIC Stamps available now.

- Planned rollout for most major microcontroller brands.

- *www.hexwax.com* firmware publishing service.

Ordering Information

Part No	Description
TEACL-STAMP	TEAclipper/Stamp programming clip
TEACL-STAMP-30	Biscuit of 30 TEAclipper/Stamps
TEACL-USB	TEAclipper USB payloader
TEACL-STMP-DB	TEAclipper debugging adapter

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Operational Description

To load a TEAclipper with a firmware data payload, start the *HexWax Explorer* application and insert the TEAclipper into the TEAclipper USB adapter. The LEDs should be face upwards, although you will not damage the TEAclipper if you insert it incorrectly. Once inserted, follow the instructions provided with *HexWax Explorer*, which may be downloaded from *www.hexwax.com*.

HexWax Explorer may also be used to determine the payload currently resident on the TEAclipper.

To discharge the payload data into a BASIC Stamp, connection must be made as detailed in the Pinout Table. A PCB header or series of plate-though holes is usually provided on a target PCB for programming. Some payloads are limited discharge and can only program a limited number of Stamps.

The TEAclipper has a limited life due to the low-cost nature of the flash memory used. It can be reloaded with firmware a maximum of 100 times. In addition, if the limited-download or serialization features are used, the total maximum number of downloads is 1600.

Red & Green LED Indicator Guide	
Red & Grn on continuously	Initializing
Red & Grn flash every 2s	Connected to HexWax Explorer
Alternate Red & Green, possibly with one 2s pause	Programming Stamp
Occulting Green	Programming complete
2 Red flashes	Stamp not found
4 Red flashes	Erase limit reached
5 Red flashes	Limited discharge payload exhausted
6 Red flashes	No payload to discharge
7 Red flashes	Programming checksum error
8 Red flashes	Stamp EEPROM error

Evaluation and Development Guide

To experiment with TEAclippers, try downloading the Eval1 and Eval2 firmware files from *www.hexwax.com*. They don't do much – flash LEDs once and twice respectively on P0 and P1 – but they are enough for you to become familiar with how TEAclippers are used.

In addition, the *DoNothing* firmware file can be used to verify the programming process without interfering with the circuit in which the PIC is embedded.

A TEAclipper Evaluation Board is available. It includes a zero-insertion-force test socket, which may be useful for programming a large quantity of BASIC Stamps

The TEAclipper/Stamp Debugging adapter is available which translates the TEAclipper programming connections to a D9 socket. This is designed for development and debugging of applications using the Parallax BASIC Stamp Editor.

Pinout Table

Pin	Name	Description
1	Vdd	Power input 5V DC
2	Sout	Input from BASIC Stamp *Sout* pin
3	Sin	Output to BASIC Stamp *Sin* pin
4	ATN	Output to BASIC Stamp *ATN* pin
5	Vss	Power Ground reference

Mechanical Specifications
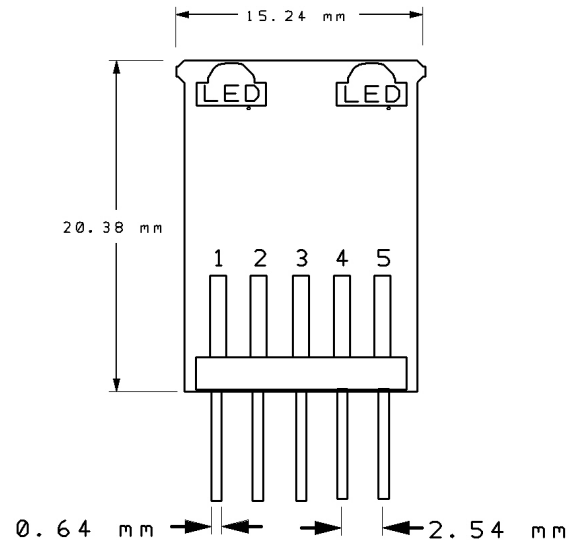
Electrical Specifications

Voltage on *Vdd*	4.5V – 6V DC
Current consumption	20mA max
Maximum erase cycles	100
Operating Temperature	–40°C to 85°C

Target Board Design Guide

When designing a PCB to facilitate frequent in-circuit programming of BASIC Stamps, a five pin 0.1" header socket should be provided. For compact PCBs, it may be necessary to devise an adapter cable.

If it is anticipated that the board will only need to be programmed once or twice in its lifetime, five plate-through holes of 1mm in diameter will be sufficient. Given that there is no cost in doing this, it's worth integrating a TEAclipper socket in every Stamp PCB you design, just in case you might want to use it to update the firmware at a later date.

If any of the ATN, Sout or Sin pins serve another purpose in the circuit, these connections must be isolated so that they do not interfere with, not are affected by, the programming process.

File Formats

Stamp firmware should be supplied in BASIC source code form. It will be compiled using the *tokenizer.dll* library, which should reside in the same directory as *HexWax Explorer.exe*.

Due to limitations of the currently available *tokenizer.dll* library, the following limitations apply to programming BS2px devices:

- All BASIC files must include somewhere the following exact text:

      '{$STAMP BS2px

  with one space between the P and the B.

- The ConfigPin and Compare commands cannot be used.

Embedded Data

In addition to the normal data in BASIC files, special comments may be included which will set the default values of the *Charge TEAclipper/Stamp* dialog settings in HexWax Explorer. The comments are single lines which must be composed as follows:

1. A comment character, **'** (apostrophe).

2. One of the following keywords

SERIALIZATION	MEMLOC
MEMBYTES	NEXTVAL
LIMIT	NAME
VERSION	URL
AFTERPROG	

3. An **=** (equals) character

4. The required text exactly as it appears in the *Charge TEAclipper/Stamp* dialog

5. A new line character.

In addition, an OVERRIDE setting may be specified. Normally, the settings may be modified by the user and any changes will be stored in the registry and used as defaults in the future. OVERRIDE=NONE prevents the settings from being changed. OVERRIDE=NOSTORE permits the settings to be changed but the changes are not stored in the registry.

The parsing of comments is not very forgiving. It is case sensitive and no spaces are permitted. Examples:

      'OVERRIDE=NOSTORE

      'LIMIT=100

      'NAME=One Flash

      'VERSION=0x0001

      'URL=www.hexwax.com

For further examples, use the *Embed Settings* button in HexWax Explorer to create and embed dialog settings into a BASIC file.

Copyright Notice

TEAclippers can be used to buy and sell firmware in limited-use quantities. Any attempt to reverse engineer or interfere with the programming process in order to obtain unlicensed copies is an illegal infringement of copyright law.