



## BackBit Chip Tester Pro Documentation

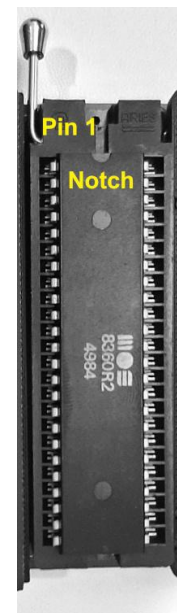
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[For the latest version of this document, visit https://backbit.io](https://backbit.io)

**⚠ WARNING: DO NOT connect the Chip Tester to live electronics as this may cause damage to devices.**

### Summary of Features

- USB powered (***Recommended to use dedicated 2A supply***);
- Tests Dual Inline Package chips up to 48 pins;
- Adapters support additional configurations;
- Burn-in mode and vertical offset option;
- Backlit 16x2 character LCD display with adjustable brightness, contrast and dimming timer;
- LED result indicator;
- Rotary encoder with pushbutton selection;
- Pushbutton to activate tests;
- Ripping of data and logging to SD card;
- Ability to update firmware.



### Included Items

- USB cable;
- Quick reference card.

# Firmware Upgrade

The latest firmware can be downloaded at <http://backbit.io/downloads/Firmware>.

*For Chip Tester Pro:* Update the firmware with SD card. Place CTPRO.UPG in the root folder of a FAT32-formatted SD card. Insert card and power cycle the tester. Upon successful firmware upgrade, the file will be erased. If the file is read-only, remove the card before proceeding.

## Test Modes

After selecting a test, you can twist the rotary knob to choose a test mode.

**Normal Mode:** This is the default test mode. Put the chip in the ZIF socket and press TEST.

**Burn-In Mode:** If you rotate the knob counter-clockwise, you can activate burn-in mode. This allows you to test a chip continuously. You will see a summary of results at the end of each test, i.e. **Passed # Times** or **Failed #/#**. To stop burn-in mode, press the rotary button while you see the summary screen. Be sure to check the tester periodically to make sure the chip is not overheating.

**Offset Mode:** If you rotate the knob clockwise, you can activate offsets. Most users will not need these modes. The offset modes just perform the same test at a vertical offset (the chip further down the socket by that many positions)

***Tip:*** Press the knob for a full second to go back to the first item in the category. This is useful for quickly returning to the main menu.

## Detailed Results

After a test finishes, you will see a PASSED or FAILED result. If the specific test has detailed results, you can twist the knob to see which specific tests passed or failed. If you want more detailed results for a test or a more exhaustive test, please inquire at the **BackBit Forum**..

# Test Categories

## 4000 Series

This corresponds to CD4xxx and MC14xxx chips. Detection tests are available for chips that use only one power pin at the upper-right.

## 74LS TTL Series

This corresponds to 74xx chips, 74Sxx, and 74HCTxx. Detection tests are available for chips that use only one power pin at the upper-right.

## 74HC CMOS Series

These tests are the same as the 74LS TTL tests, except they operate at 3.3V utilizing low voltage CMOS.

## Atari, Intel, MOS/CSG, Motorola

Tests for specific brands of chips.

## Op Amps / Comparators

Op amp tests are limited to chips that have TTL level outputs.

## Other

Tests for brands not listed above.

## RAM

Tests are sorted by pin count. To find a matching test, first line up the pin count, then “S” for static or “D” for dynamic. The size is reported in bytes, whereas your data sheet will refer to bits and words.

Test has 4 passes (random, inverted, alternating and inverted alternating). For chips under 1MB in size, the entire RAM is written before being read back.

4027, 4096, and 4116 tests require a tri-voltage adapter (available to purchase separately).

Cross references are available to match the specific chip you are testing, as many brand variations exist. Here is one such reference: [https://www.ardent-tool.com/memory/Chip\\_Conversion.html](https://www.ardent-tool.com/memory/Chip_Conversion.html)

## ROM

Rips are saved to SD card with details in the CTPRO.LOG file in the root. When a save happens, you'll see the RIP file number on the display. Tests performed after ripping show the checksum (type can be configured in the options menu).

GALs and PALs are read back as EPROMs, not fuse readout.

CornBit tests can modify Flash ROM. No other Flash programming is supported.

***Tests are added based on available parts. Please send an email to [backbitio@gmail.com](mailto:backbitio@gmail.com) or inquire on the BackBit Forum ([forum.backbit.io](https://forum.backbit.io)) if you are able to donate hardware for generating tests.***

# Test Results

A passing test result indicates a very strong likelihood that a chip is good. However, a failing test can result from a number of circumstances. The most reliable tests are loose chip tests, but in-circuit tests can offer helpful clues when a chip is soldered onto a board. Report your results on the BackBit forum for help and feedback.

- A chip that PASSES may not actually be a good chip. The reason is that even with the most exhaustive tests, a real world test case can interpret digital voltages differently:

	LOW signal voltage	HIGH signal voltage
Chip Tester Input	0 - 1.2V	2.3V - 5V
Chip Tester Output	0V	3.3V
TTL Input	0 - 0.8V	2V - 5V
TTL Output	0 - 0.4V	2.4V - 5V
CMOS Input	0 - 1.5V	3.5V - 5V
CMOS Output	0V	5V

If a chip is damaged and outputs a voltage in between the specification for LOW and HIGH, it could behave fine in the chip tester but not in a real world application.

Therefore, it's good to confirm that a passing chip works in a real world case.

- A failure can be the result of a poor connection. Make sure no pins on the chip are bent or tarnished. In the case of an in-circuit test, make sure your wiring rig is intact (test for continuity if necessary).

# Programming the CornBit™ or CornBitXL™

The CornBit™ and CornBitXL™ can only be programmed with the chip tester. To do so, first you will need a binary file with appropriate content.

For the CornBit™, there are 4 slots, each 8KB in size. Do a binary appending of the individual ROMs to make a 32KB file. Make sure the file is exactly 32768 bytes long.

For the CornBitXL™, there are 8 slots, each 16KB in size. Do a binary appending of the individual ROMs to make a 128KB file. Make sure the file is exactly 131072 bytes long.

Now, follow these simple steps with the tester:

- Insert MicroSD card with your binary file;
- Select the CornBit™ or CornBitXL™ test from the ROM tests menu;
- Navigate to the binary file using the rotary knob. Press the button to select a file or enter a subdirectory;
- Perform a “test” like normal. Make sure all DIP switches on the CornBit™ are set to the OFF position;
- If the programming is successful, you will see a green light along with “PROGRAMMED”;
- If the programming is not successful, make sure to remove the attached socket (very carefully with a flat blade screwdriver). Also make sure the chip is completely level.

## Optional Accessories

These accessories go along with your chip tester:

- 4116 DRAM Adapter: Applies -5V and 12V voltage for testing 4116, 4096 and 4027 DRAM chips.
- CartRip™: Allows you to plug in various cartridge types to test the RAM and/or extract ROM contents;
- CornBit™ and CornBitXL™: Multi-ROM replacements which are programmable using the tester;
- ZIP DRAM Adapter: Allows testing of DRAMs with a ZIP package;
- All accessories are available for purchase at <http://store.backbit.io>

## The BackBit Forum™

The Chip Tester is being actively supported, so if you have any trouble or would like to share your results, please join the public forum at <http://forum.backbit.io>