

AN00148: Using FlashRunner Dynamic Memory to Perform Serial Numbering, Calibration and Device Protection

by Nicola Ciot (nicola.ciot@smh-tech.com)

The FlashRunner dynamic memory is a built-in 512-byte memory area available in some FlashRunner models. This memory is used to store temporary data to be written to/read from the target device memory. When the instrument is powered off, the data contained in this memory is lost. The dynamic memory is typically used to:

- Mark the Unit Under Test (UUT) with a serial number or ID code;
- Program the target device memory with UUT calibration data;
- Protect the target device from unauthorized reading.

1. Dynamic Memory Commands

Typical dynamic memory operations are performed through the following FlashRunner commands:

- **DMSET** (to fill the dynamic memory with the data to be programmed to the target device);
- **TPSETSRC DYNAMIC** (to set the dynamic memory as a source of data of subsequent programming commands);
- **TPCMD PROGRAM** (to program the target device memory);
- **TPCMD VERIFY** (to verify the target device memory).

Please refer to the FlashRunner's programmer's manual for detailed information about these commands.

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2. Application A: Serial Numbering

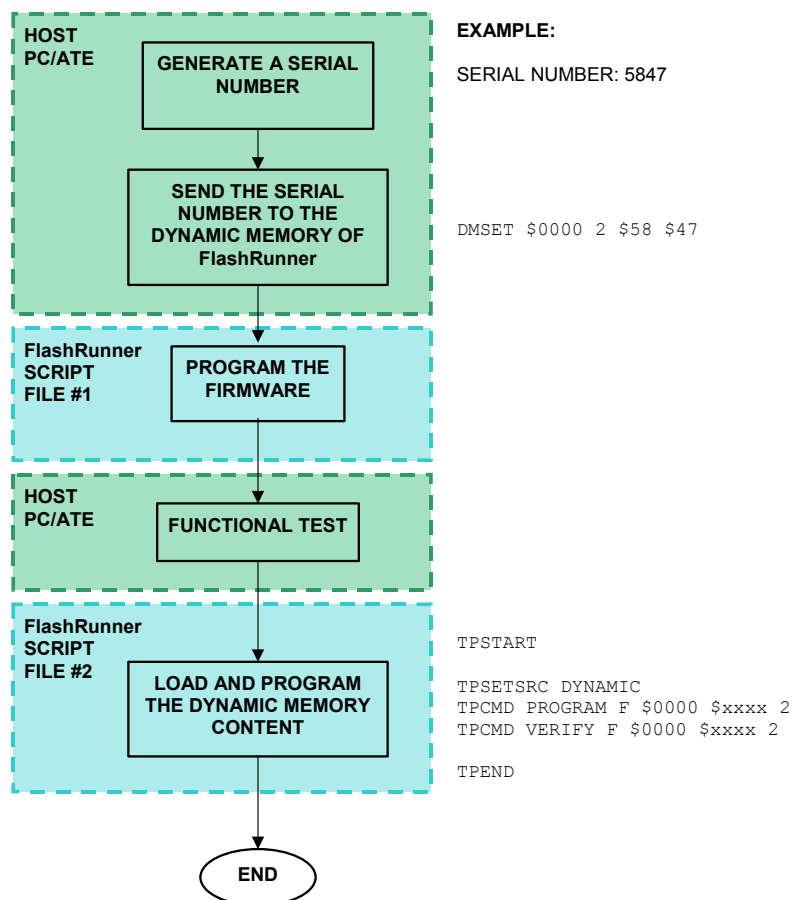
This application is quite common, and consists in marking each UUT with a progressive serial number or code, stored inside the target device memory. An ID code could contain, for example, information about:

- Production batch;
- Programming or production date and hour;
- Product model or version;
- MAC address for products that include an Ethernet peripheral.

This information allows any UUT to be traced during the production flow and, most importantly, after it has been sold.

The flowchart below illustrates how to use FlashRunner for programming a serial number or ID code.

Note: since a serial number or ID code is a UUT-specific value (which changes from one unit to the other), it cannot be included in a script file, but must be sent to FlashRunner by the host PC.

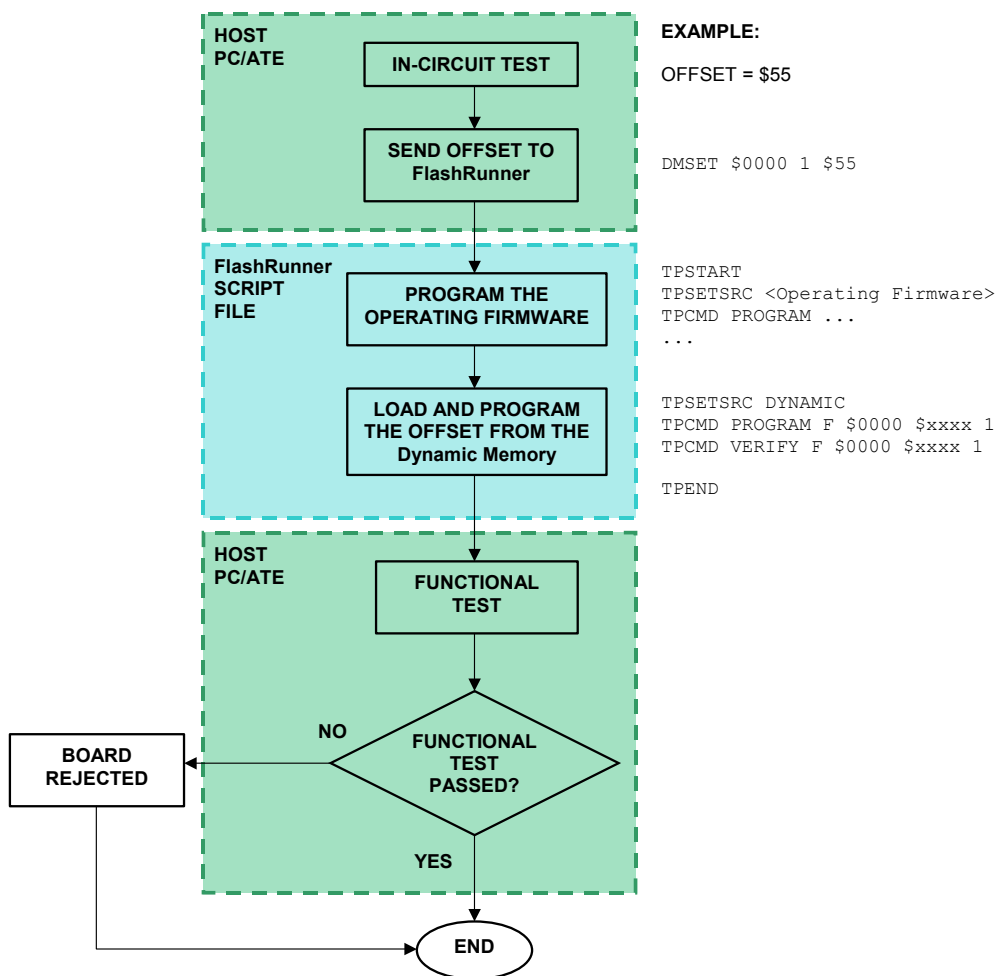


3. Application B: Calibration

The second way to use the dynamic memory is for storing some calibration values after the UUT has been tested. These values can be derived from a parametric test performed on components that require a fine trimming. These values are different from board to board.

As an example, the dynamic memory is useful to program the offset of sensors mounted on the UUT, after they are calibrated by the in-circuit test. Below is an example of a flow chart for the calibration process using FlashRunner.

Note: since a calibration value is a UUT-specific value (which changes from one unit to the other), it cannot be included in a script file, but must be sent to FlashRunner by the host PC.



4. Application C: Device Protection

Some MCUs can be protected against unauthorized reading or accidental re-programming by a byte or a series of bytes (referred to as a password, or “protection bytes”) to be programmed to their the Flash or EEPROM memory. Usually, device protection is performed only after the programming and testing of the firmware has ended successfully.

In this application the dynamic memory will store the protection bytes values and the process flow chart is similar to what outlined in the figure below.

