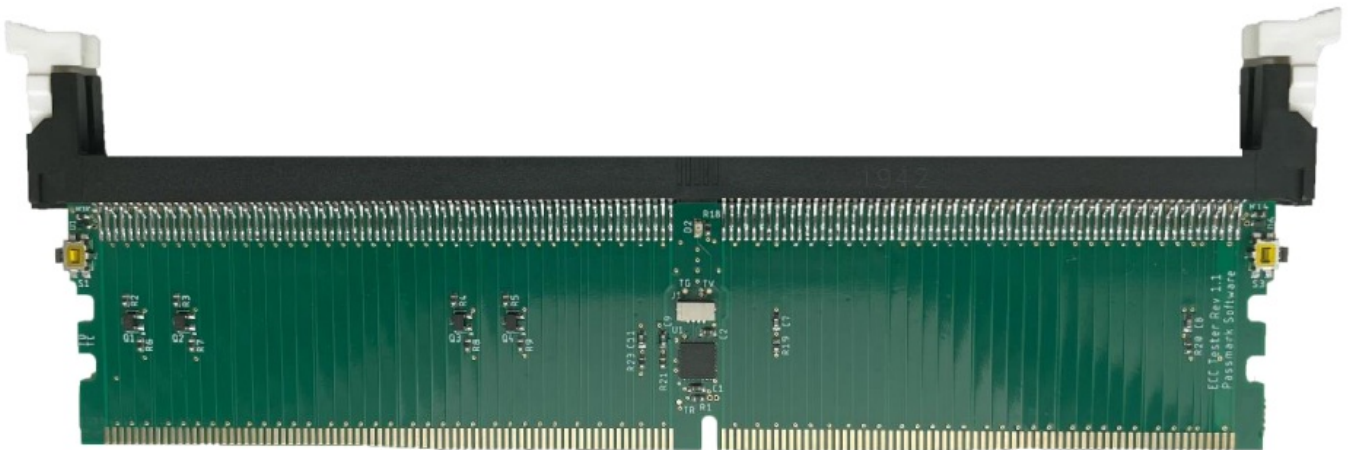


## PASSMARK SOFTWARE PM141 ECC Tester User Guide

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**PASSMARK<sup>®</sup>**  
**SOFTWARE**

**ECC Tester  
Users Guide  
Model PM141 Rev 1**



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## Introduction

The ECC Tester can be used to verify a computer equipped with ECC RAM responds correctly when a memory transfer is corrupted, as well as monitor the voltages on a RAM stick. With the ECC Tester, you can:

- Generate errors in both the error correction and data lines.
- Customize errors to be either correctable (single bit) or non-correctable (double bit), as well as create periodically occurring errors or one time errors.
- Read the voltage of the VDD, VPP, VREFCA, VTT lines in real-time. This can also be tested with a non-ECC RAM.

## Device Operation

This section covers the functions of the ECC Tester and how to use it to diagnose issues related to ECC RAM.

### Injecting Memory Errors

Memory errors are injected using either the provided Windows software (command line interface or ECCTest application), or by pressing one of the four buttons located along the edges of the ECC Tester are pressed. Figure 1 shows where these buttons can be found, each of the buttons are also labelled underneath as either S1, S2, S3, or S4. The type of error injected by each button when it is pressed is configured through the provided Windows software, see section Monitoring Software (ECCTest) for more information on how to use the software to perform error injection.

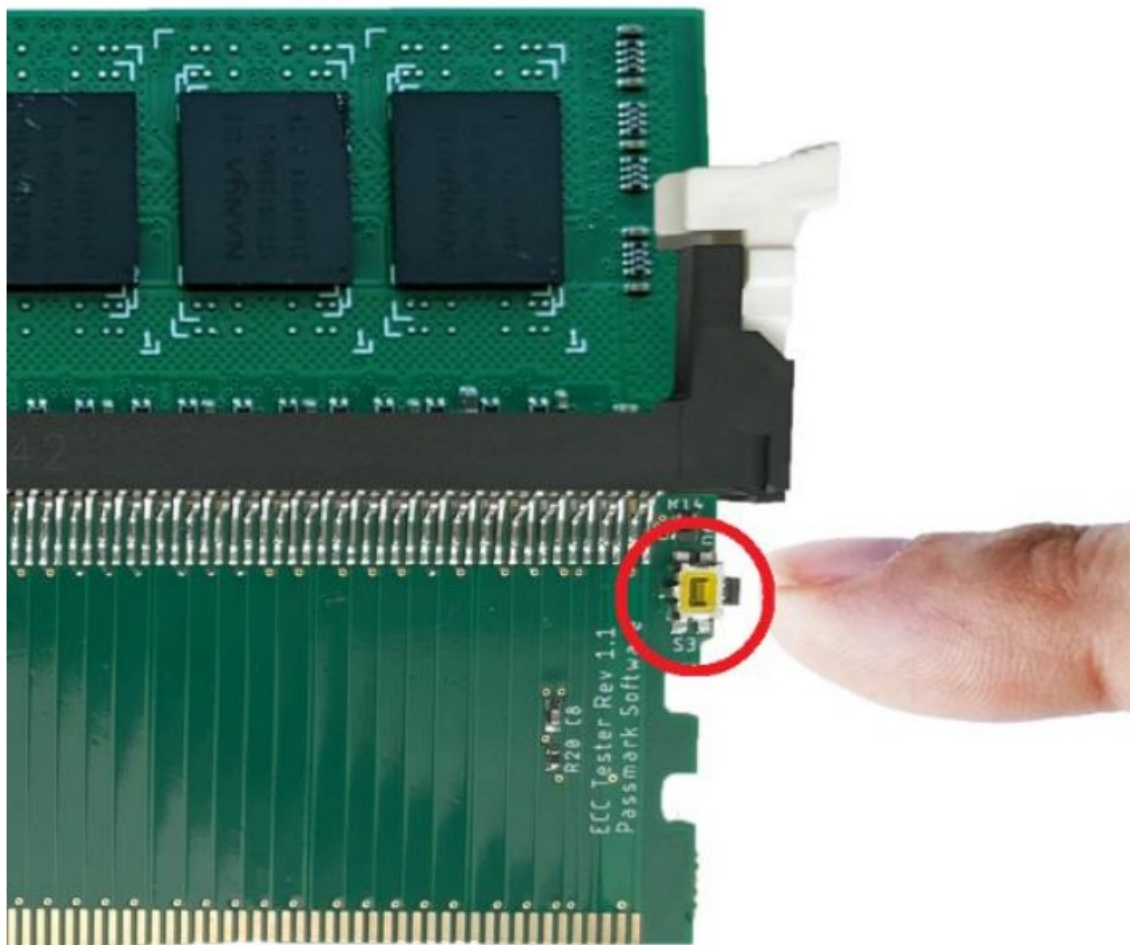
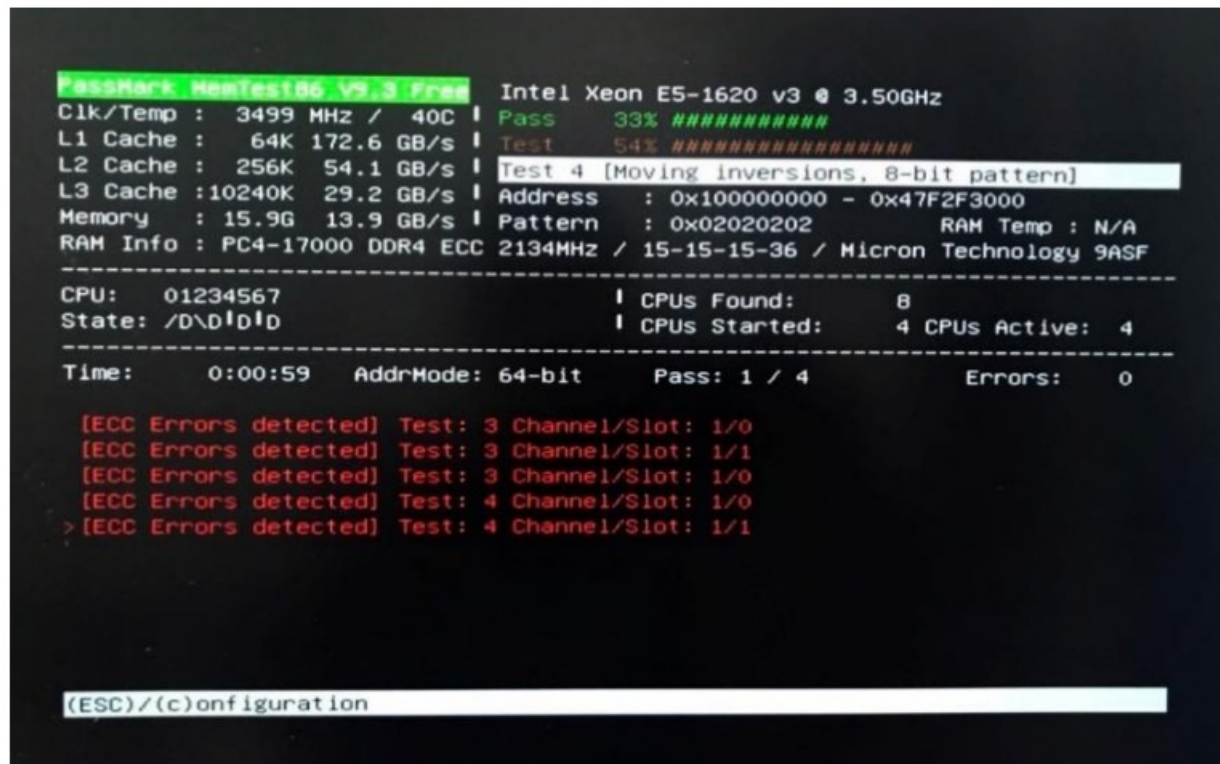


Figure 1. Button to inject errors (in red circle)

If your ECC RAM is functioning correctly, then the computer will identify and report memory corruptions that have been created from the ECC Tester. The location of where this memory error is reported varies based on your operating system, below it will be explained how to find this information using either MemTest86 or Windows 10. If after injecting an error these reports do not appear or the computer crashes, then the ECC RAM is not working correctly.

### Verifying with MemTest86

While running the tests in MemTest86, any errors related to ECC memory will be detected and displayed in red writing as shown in Figure 2. To inject an error into MemTest86 while it is running, press a button on the ECC Tester that has been configured to generate an error. If you see an ECC related error message appear in MemTest86, then your ECC RAM is functioning correctly.



```
PassMark MemTest86 v9.3.1 Free Intel Xeon E5-1620 v3 @ 3.50GHz
Clk/Temp : 3499 MHz / 40C | Pass 33% #####
L1 Cache : 64K 172.6 GB/s | Test 54% #####
L2 Cache : 256K 54.1 GB/s | Test 4 [Moving inversions, 8-bit pattern]
L3 Cache : 10240K 29.2 GB/s | Address : 0x100000000 - 0x47F2F3000
Memory : 15.9G 13.9 GB/s | Pattern : 0x02020202 RAM Temp : N/A
RAM Info : PC4-17000 DDR4 ECC 2134MHz / 15-15-15-36 / Micron Technology 9ASF
-----
CPU: 01234567 | CPUs Found: 8
State: /D\D\D\D | CPUs Started: 4 CPUs Active: 4
-----
Time: 0:00:59 AddrMode: 64-bit Pass: 1 / 4 Errors: 0

[ECC Errors detected] Test: 3 Channel/Slot: 1/0
[ECC Errors detected] Test: 3 Channel/Slot: 1/1
[ECC Errors detected] Test: 3 Channel/Slot: 1/0
[ECC Errors detected] Test: 4 Channel/Slot: 1/0
> [ECC Errors detected] Test: 4 Channel/Slot: 1/1

(ESC)/(c)onfiguration
```

Figure 2. ECC memory error in MemTest86

### Verifying with Windows 10

Some operating systems provide information when a memory error is detected and corrected. For Windows 10, this information can be obtained from the Event Viewer program; this program can be found by typing “Event Viewer” into the Windows search bar. In Event Viewer, open the “Windows Logs” dropdown and click on “System” to view the reported memory errors. An example of what will appear when the ECC RAM is working correctly after an error is injected by the ECC Tester is shown in Figure 3.

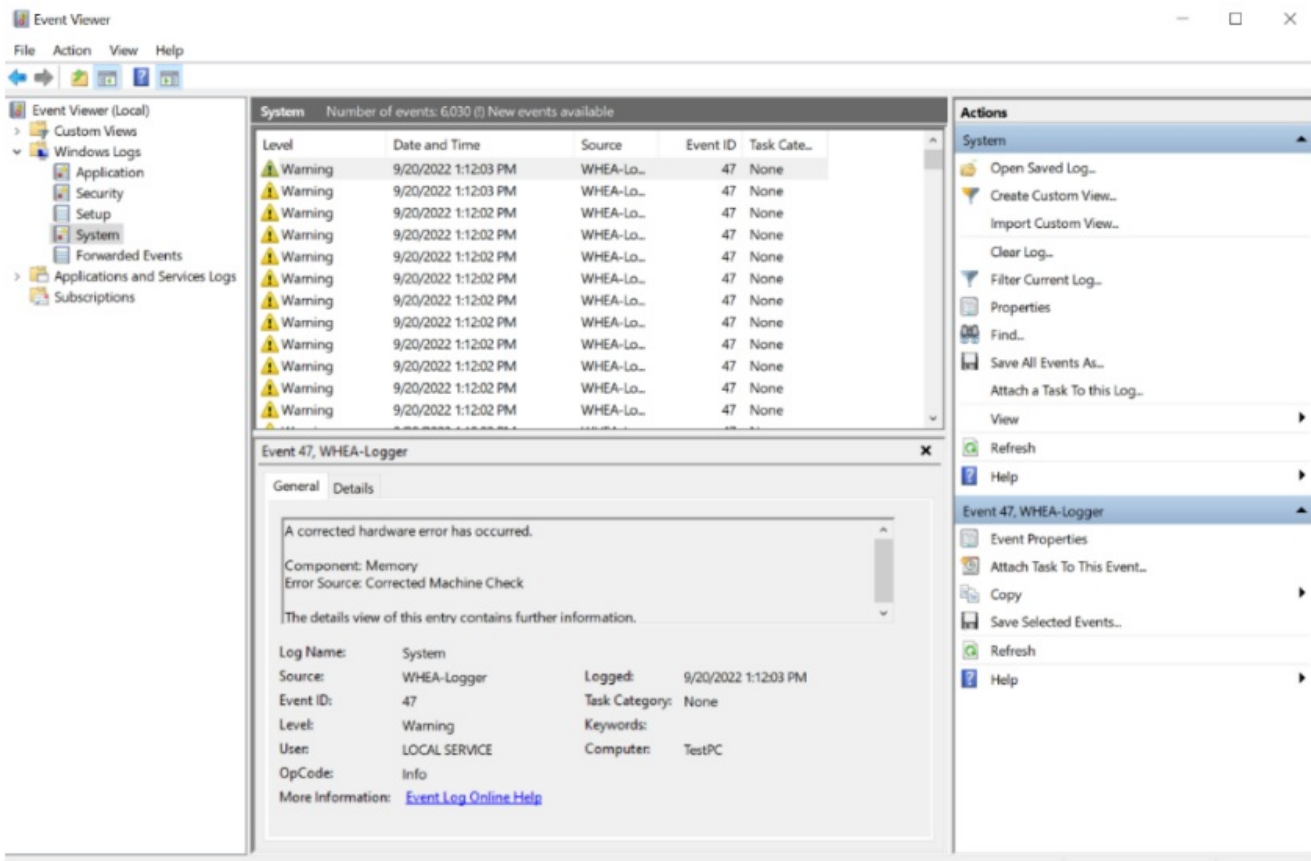


Figure 3. Windows 10 memory error report

### Voltage Monitoring

The voltage of the VDD, VPP, VREFCA, VTT lines can be monitored in real-time through either using the command line interface or ECCTest application. Using the ECCTest application, a log of these voltages can also be generated in the background and written to a file for further processing, the process to do this is described in the Log Window section under Monitoring Software (ECCTest).

### Cables

The ECC Tester comes with 1 cable that has a USB A (male) connector at one end, and at the other end a custom connector that attaches to the ECC Tester. When using any software that interacts with the ECC Tester (Windows ECCTest application or the command line interface), this cable must be connected to the ECC Tester and a USB port on the computer to allow communication. Refer to Figure 4 for where the cable is connected to on the ECC Tester.



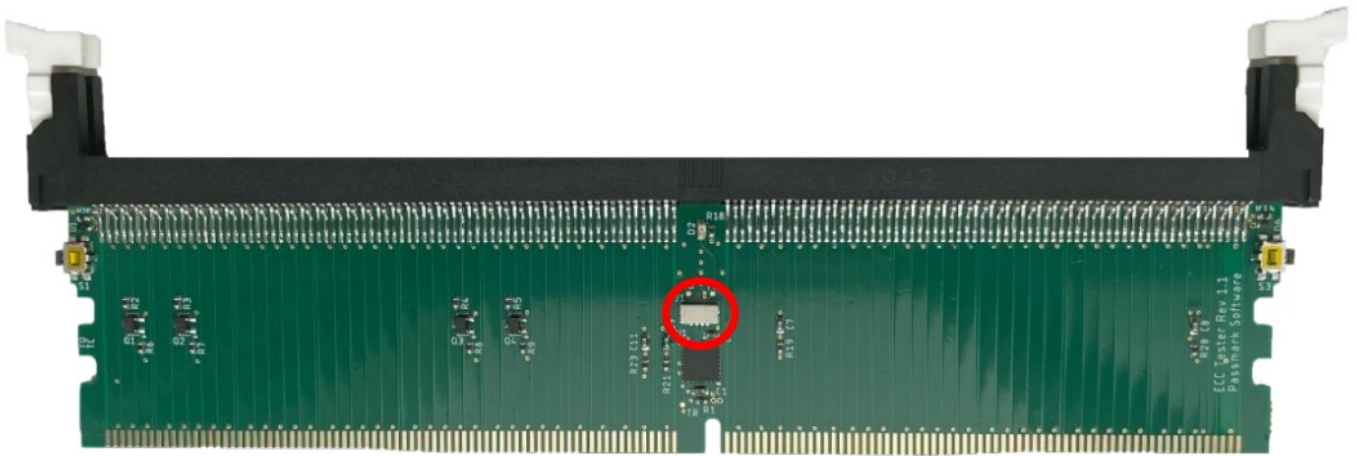


Figure 4. Location of cable connector shown in red circle

## Monitoring Software (ECCTest)

The Windows application ECCTest can be used to configure and interact with the ECC Tester from a computer. An image of the main window is shown in Figure 5 and the features and options of this application are described below.

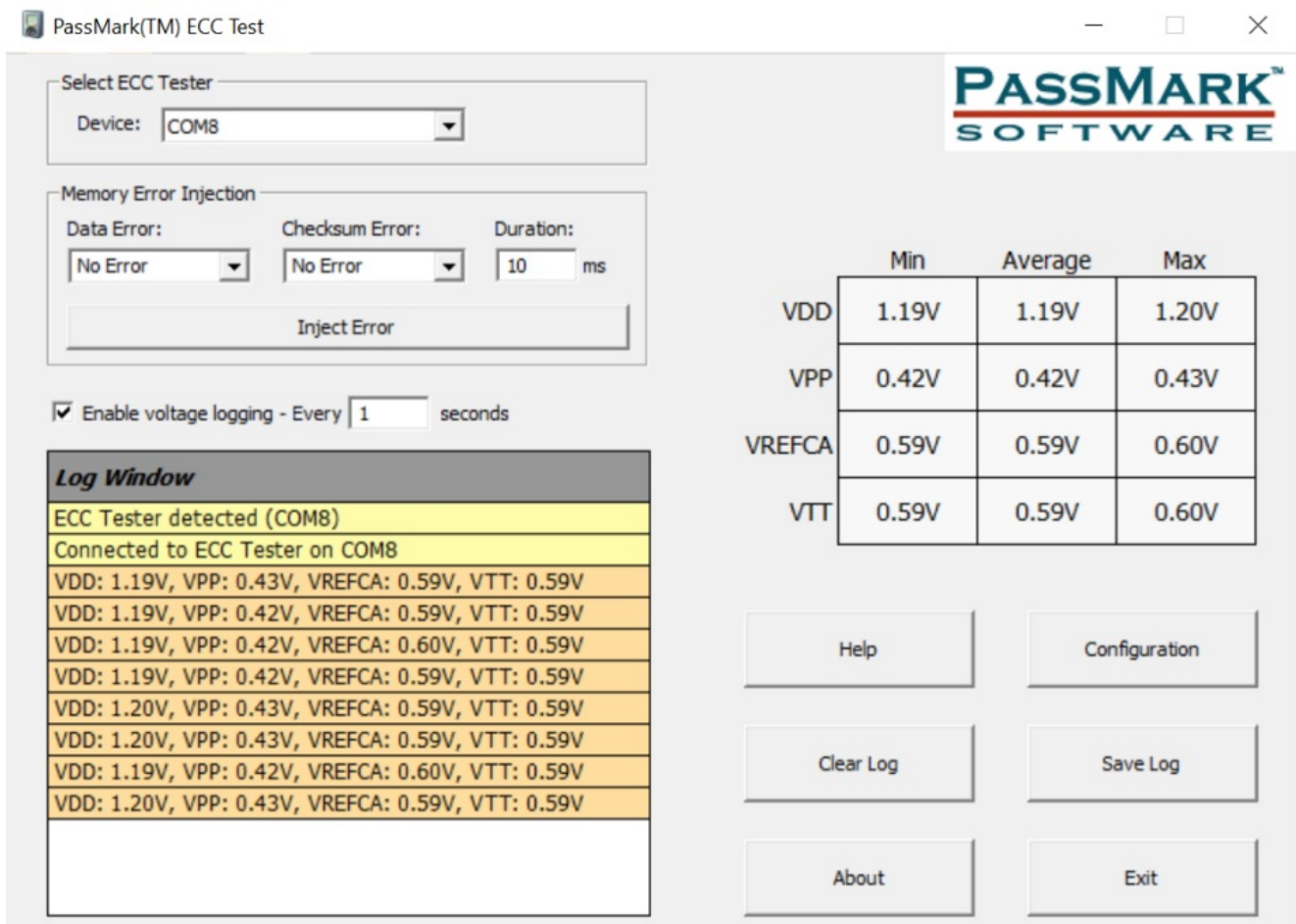


Figure 5. Image of ECCTest main window

### Device

The device dropdown box will list all the COM ports that a ECC Tester has been detected as being connected to. Selecting an option from the list will connect the application to the corresponding ECC Tester. If "None Connected" is displayed in the box, then no ECC Tester is connected to the application.

### Memory Error Injection

This box can be used to send a command to the ECC Tester to corrupt the memory lines without having to press

the buttons. The memory lines to be corrupted is selected through the “Data Error” and “Checksum Error” dropdown boxes, and the amount of time the memory line is corrupted is entered in the duration box. Clicking the “Inject Error” button will send the command to the ECC Tester where the error will be injected.

### Enable voltage logging

Ticking this box will begin writing the measured voltages to the log window. The rate at which messages are logged can be adjusted by changing the value in the text box.

### Log Window

The log window displays information about when ECC testers are detected and connected, as well as contains the voltage log if enabled. This log can be saved to a file by clicking the Save Log button, and the log can be reset by clicking the Clear Log button.

### Voltages

The minimum, maximum and average voltage of some RAM lines are monitored from when an ECC Tester is connected. These results are displayed in the table here.

The table can be reset by reconnecting the ECC Tester, and for obtaining real-time voltage values the voltage logging feature should be used instead.

### Configuration

Opens the window where the error generated by the buttons can be customized, this window is shown in Figure 6. The Duration is the length of time (in milliseconds) the data lines will stay corrupted, Number of pulses is the number of times the error will

be repeated on a single button press, and Interval is the time (in milliseconds) between errors if more than one is generated. To choose which memory lines are corrupted, the Data error and Checksum error dropdown boxes are used. The button this setting is attached to can be identified by looking for the button on the ECC Tester that has the matching label underneath.

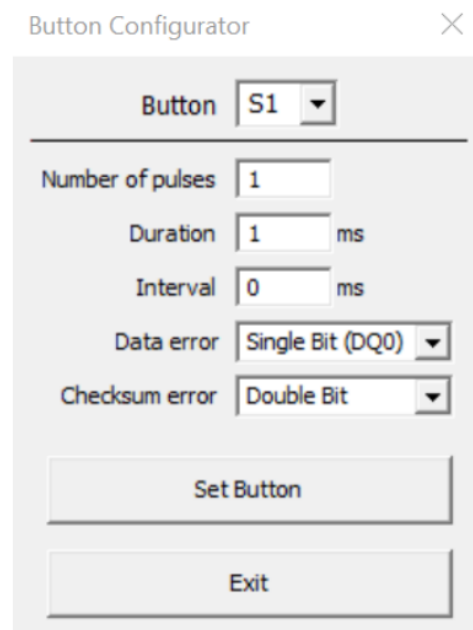


Figure 6. Image of button configuration window. Configuring button with label “S1” on ECC Tester.

## Driver Installation

Starting from Windows 10, the STSW-STM32102 driver is no longer required, and the usage of the native inbox driver (Microsoft driver) is recommended instead. For other operating systems please follow the below procedure. Windows Installation (Win7 & Win8) Step1 – connect the device

With the computer turned on and running, connect the ECC Tester to the USB port on the computer to be used with the provided cable.

Step 2 – Install the device driver

Download the latest driver from the following address and extract the package.  
<https://www.passmark.com/products/ecc-tester/download.php>

The STSW-STM32102 software package contains four installation files based on the various versions of the Microsoft® operating system. Run the setup file according to the version of your operating system. E.g., run ‘CP\_V1.5.0\_Setup\_W7\_x64\_64bits.exe’ if you have a 64-bit version of Windows 7 installed on your computer.

## Technical Specification

Product Code	PM141
Supported SDRAM Class	DDR4 (unbuffered or fully buffered)
CPU	ARM Cortex MO onboard controller
Memory	6KB RAM, 32K Flash onboard memory
User Interface	4x Programmable Buttons
Error Injection	Single bit or double bit error injection on DQ0, DQ2, CBO, CB2 lines
Operational Voltage	USB: 3.5V — 6.0V or from VDDSPD line on DIMM slot : 2.25V — 2.75V
Operational Current	30mA
Voltage Measurement	VDD, VPP, VREFCA and VTT at a sampling rate of 10 ms
Maximum Voltage Ratings	VDD: +4V VPP: +4V VREFCA: +4V VTT: +4V
Measurement Error (V)	±1%
PC Communication	USB 2 Full Speed
Dimensions	147mm x 50mm x 5mm (5.8 x 2.0 x 0.2 inches)
Weight	25g (0.88 oz)
Storage Temperature	-30 °C to + 80 °C
Usage Temperature	0 °C to + 50 °C
Part number	PM 141
RoHS (Lead free)	Yes

The ECC Tester firmware is software upgradeable in the field.


## Software Compatibility

The command line interface and ECCTest application are supported on Windows 7, 8, and 10. Error injection can be performed manually with the buttons on any system. Additional Information For more information, please see the ECC Tester FAQ page.

### Disclaimer

This product is not warranted nor intended to be used for medical, life support, lifesaving, critical control or safety applications, unless pursuant to an express written agreement with PassMark Software. Furthermore, PassMark Software does not authorize this product for use as critical components in life-support systems where a malfunction or failure may reasonably be expected to result in significant injury to the user. The inclusion of this PassMark Software product in life-support systems application implies that the manufacturer assumes all risk of such use and in doing so indemnifies PassMark Software against all charges.

## Documents / Resources

	<p><a href="#">PASSMARK SOFTWARE PM141 ECC Tester</a> [pdf] User Guide PM141 ECC Tester, PM141, ECC Tester, Tester</p>
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## References

- 🔥 [PassMark Software - PC Benchmark and Test Software](#)
- 🔥 [PassMark ECCTest and ECC Tester device driver downloads](#)