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# Firmware Test Suite (fwts)

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# Agenda

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- Firmware Test Suite (fwts)
  - Introduction to fwts
  - Installation and Source Code
  - Release Schedule
- Firmware Test Suite Live (fwts-live)
  - Introduction to fwts-live
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- Contributing to fwts
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  - Email Questions and Suggestions to Mailing List
  - Commit Patches

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# Firmware Test Suite (fwts)



## What is fwts?

FWTS is a Linux tool that automates firmware checking. It aims to detect bugs and to get firmware fixed.

- ✓ Automatically detect errors
- ✓ Sanity check core functionality
- ✓ Ensure interactions between Linux and firmware
- ✓ Catch kernel warnings
- ✓ Suggest possible workarounds
- ✓ Gather firmware data for debug



## What does fwts test?

fwts comprises large set of fifty tests that are designed to exercise and test different aspects of a machine's firmware – including ACPI, UEFI, hardware configuration, power-saving and so on.

- ✓ ACPI
- ✓ CPU Configuration
- ✓ Legacy/UEFI BIOS Interface
- ✓ PCIe/PCI Configuration
- ✓ Power Management
- ✓ System Configuration
- ✓ Others



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## Key features

### Command line

- Designed to be used by other test tools

- ..or to be run stand alone

- ..and to gather data for a developer

### Batch tests – run without supervision

### Interactive tests – e.g. hotkey, lid, AC power.

### Extensive logging

- Per test PASS/FAIL results

- Explain reasons for failures (ADVICE lines)

- Classify failures (CRITICAL, HIGH, LOW..)

### Summarise results

- Output log format can be configured

### Soak testing (suspend/resume, hibernate/resume)

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## fwts examples

### Show tests

```
fwts --show-tests / fwts -show-tests-full
```

### Run all batch tests

```
sudo fwts
```

### Scan ACPI Methods

```
sudo fwts method
```

### Dump UEFI variables

```
sudo fwts uefidump
```

### Execute UEFI tests (runtime services)

```
sudo fwts uefirtmisc uefirttime uefirtvariable
```

### Scan CPU configuration

```
sudo fwts msr mtrr nx virt
```

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### Scan kernel log

```
sudo fwts klog
```

# Installation



## Ubuntu

- Current version for a distro: `sudo apt-get install fwts`
- Development (stable) release:
  - `sudo add-apt-repository ppa:firmware-testing-team/ppa-fwts-stable`
- Development (unstable) release:
  - `sudo add-apt-repository ppa:firmware-testing-team/ppa-fwts-devel`

```
sudo apt-get update  
sudo apt-get install fwts
```

## Source code

- Source code: `git clone git://kernel.ubuntu.com/hwe/fwts.git`
- Configure:
  - `sudo apt-get build-dep fwts`
  - `autoreconf -ivf`
  - `./configure --prefix=/usr`
- Compile: `make` (or “`make -j 4`” to use 4-cores to compile)
- Install: `sudo make install`



# Release Schedule

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- fwts is released monthly
  - New versioning: Year.Month.Minior\_version: 13.06,13.07 and 13.08
- Release notes are available online
  - 13.06 @ <https://wiki.ubuntu.com/FirmwareTestSuite/ReleaseNotes/13.06.00>
  - 13.07 @ <https://wiki.ubuntu.com/FirmwareTestSuite/ReleaseNotes/13.07.00>
  - 13.08 @ <https://wiki.ubuntu.com/FirmwareTestSuite/ReleaseNotes/13.08.00>
  - 1x.0y @ <https://wiki.ubuntu.com/FirmwareTestSuite/ReleaseNotes/1x.0y.00>

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# Firmware Test Suite (fwts) Live

# Firmware Test Suite Live (fwts-live)



## What is fwts-live?

fwts-live is a bootable USB image that will boot and run the firmware test suite without the need to install Linux/Ubuntu. Results of the tests are saved on the USB drive to be analysed later.

- ✓ No Installation necessary
- ✓ Easy to use
- ✓ Release with latest Ubuntu

**Release schedule:** fwts-live is planned to be released with fwts (monthly)



# Firmware Test Suite Live (fwts-live)



## Firmware Test Suite

### Select Tests

This will run a suite of firmware tests that will check the BIOS and ACPI tables. It can also find issues that can cause Linux problems.

The default below is to run just all the Batch Tests, but you can select more tests below if required.

Please select below (using cursor up/down and space) and press enter to continue:

- 1 All Batch Tests
- 2 Select Individual Tests
- 3 Abort Testing

< OK >

<Cancel>

< Help >

# Firmware Test Suite Live (fwts-live)



Firmware Test Suite

Running Batch Tests

So far: 7 passed, 0 failed, 0 warnings, 3 aborted, 0 skipped, 1 info only

Test ACPI Wakealarm.

Running test #8: Multiple wakealarm firing tests.



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# Firmware Test Suite Live (fwts-live)



Firmware Test Suite

Testing Complete

The results can be found on the USB stick in the  
the directory: /fwts/11102011/1327/results.log

Do you want to view the results log now?

< Yes >

< No >

# Installation: Bootable USB Disk




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## Download fwts-live

(Temporary) URL: <http://people.canonical.com/~alexhung/fwts-live/>

## Make bootable fwts-live USB

- **Linux:** `[ 2525.654620] sd 6:0:0:0: [sdb] Attached SCSI removable disk`
  - Identify USB device: `dmesg | tail -10 | grep Attached` 
  - Copy image: `sudo dd if=fwts-live-13.08.00.img of=/dev/sdb ; sync`
- **Windows:** Use “Win32 Disk Imager”



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# Contributing to fwts



# File bugs on Launchpad



<https://launchpad.net/fwts>

- File a bug:
  - Click on “Report a bug”
  - Input a summary for the bug
  - Follow on-screen instructions
  - ...
- fwts team receives notification when a bug is filed.
- All discussion can take place on Launchpad.

The screenshot shows the Launchpad interface for the Firmware Test Suite (fwts) bugs page. The browser address bar shows <https://bugs.launchpad.net/fwts/+bugs>. The page title is "Bugs : Firmware Test Suite". The sidebar on the right contains several options: "Report a bug", "Ask a question", "Subscribe to bug mail", "Edit bug mail", "Configure bug tracker", "Bug supervisor: Firmware Test Suite Bug Team", and "CVE reports". The main content area shows a search bar and a list of bugs. The first bug is #1028797, titled "fwts - S3 test gets unexpected wake up failed", with a status of "CONFIRMED" and a severity of "LOW". The second bug is #1035060, titled "medium failures in cpu frequency scaling test", with a status of "NEW" and a severity of "UNDECIDED".

# Email Suggestions and Questions to Mail List

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- Mailing list: [fwts-devel.lists.ubuntu.com](https://fwts-devel.lists.ubuntu.com)
  - Questions
  - Suggestions
  - Feature requests
  - Patches (more next slide)
  - Etc...

# Commit Patches

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- We use a similar approach as Linux kernel – uses of git
  - Generate patches (git format-patch)
  - Send patches (git send-email) to [fwts-devel.lists.ubuntu.com](mailto:fwts-devel.lists.ubuntu.com)
  - Get two acknowledges (ACK) from fwts developers
  - Refine patches if NACK is received
- Maintainer (Kengyu Lin <[kengyu@canonical.com](mailto:kengyu@canonical.com)>) adds patches to git repo



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# Online Resource for fwts

# Information for fwts

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Architecture Supported:

x86 PC – full support

ARM – limited features



## Information for fwts and fwts-live



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### Looking for more information?

fwts:

<https://wiki.ubuntu.com/Kernel/Reference/fwts>

fwts-live:

<https://wiki.ubuntu.com/HardwareEnablementTeam/Documentation/FirmwareTestSuiteLive>





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Thank you