# Linux port for Xtensa

- Linux git tree: https://github.com/jcmvbkbc/linux-xtensa
- Build/test tools git tree: https://github.com/jcmvbkbc/xtensa-linux-test
- Toolchain build scripts/overlays git tree: https://github.com/jcmvbkbc/xtensa-toolchain-build
- Patch review check list
- Patch/pull request check list
- Rootfs notes

## TODO

- dynamic ftrace
- kgdb/kdb
- kexec
- NX

## In Progress

- kprobes
- Booting linux on ESP32
- Booting linux on ESP32s3

## Features by release

### Linux 5.19

- support coprocessors on SMP.
- support protection faults on noMMU.
- support full tickless operation.
- KCSAN.
- hibernation.

### Linux 5.18

- support compiler plugins (with gcc-12 and newer).
- support for kernel ABI selection.
- removed dependency on compiler's libgcc.

### Linux 5.16

- support for cores without windowed registers.
- call0 ABI kernel.

## Linux 5.13

- GDBIO semihosting.

## Linux 5.9

- syscall audit.
- seccomp filter.

## Linux 5.6

- exception vectors can be attached to the rest of the kernel or placed at specific address.

## Linux 5.5

- eXecute In Place (XIP) kernel.

## Linux 5.4

- support for call0 ABI userspace.

## Linux 5.3

- 'virt' board (sim with PCI, corresponding board model available in QEMU since v4.2).

## Linux 5.2

- support for cores with exclusive access option.
- basic support for cores with MPU.

## Linux 5.1

- generic spinlock/rwlock.

## Linux 5.0

- memtest.
- Jump labels.
- tracehook.
- syscall tracepoints.
- multiple coprocessor fixes.
- SMP fixes.

## Linux 4.16

- KASAN.
- SSP.
- allocation of DMA buffers from high memory.
- support DMA_ATTR_NO_KERNEL_MAPPING.
- kernel is built with -mtext-section-literals and -mno-serialize-volatile.

## Linux 4.9

- New kernel memory layouts: with 256MBytes and 512MBytes of low memory.
- Configurable KSEG physical memory address and kernel load address.
- Custom sysmem boot time memory allocator is replaced with memblock.
- KMEMLEAK.
- reserved-memory DT node.
- Cadence Configurable System Platform (CSP).

## Linux 4.6

- Hardware breakpoints/watchpoints.
- ioremap for memory outside KIO region.
- Big endian: serial, network, i2c work.

## Linux 4.4

- DMA to high memory.

## Linux 4.3

- Hardware perf counters and perf support.

## Linux 4.1

- ALSA playback driver for XTFPGA.

## Linux 3.19

- noMMU.

## Linux 3.17

- Highmem on cores with aliasing cache.
- New (simpler) method of configuring for specific core variant.

## Linux 3.16

- Stability: xtensa linux may be rebuilt natively.

## Linux 3.15

- Highmem.
- KC705 board.

## Linux 3.14

- SMP.
- Futex.
- register spilling overhaul.
- OpenCores ethernet works when connected to gigabit network.
- c67x00 USB host is usable on XTFPGA.
- TAP network works in ISS.

## Linux 3.12

- Kernel preemption.

## Linux 3.11

- Multihit exceptions fixed.
- Static function tracer.

## Linux 3.10

- MMUv3 cores.
- Lockdep/stack tracing.

## Linux 3.9

- TLS (THREADPTR register).
- Oprofile.
- ISS simdisk.

## Linux 3.8

- Device trees.
- uImage generation.
- IRQ subsystem overhaul (IRQ domains, medium-priority interrupts).
- XTFPGA boards.

- s32c1i-based atomic/bit operations and spinlocks.

## Linux 3.7

- Overall architecture port overhaul, mainline is alive again, builds and runs.
- There were dragons prior to that release.

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