

*CARAVEL, A READY-TO-USE TEST
HARNESS FOR CREATING SYSTEM-
ON-CHIP DESIGNS*

*CARAVEL IS AN OPEN-SOURCE
TEMPLATE SOC FOR EFABLESS OPEN
MULTI-PROJECT WAFER (MPW)
SHUTTLE PROGRAM, BASED ON THE
SKYWATER 130NM POWER DESIGN KIT
(PDK)*

An Efabless (shutdown in 2025) run MPW shuttle program, sponsored by Google which uses the skywater 130nm power design kit (PDK) to produce SoC's that have a readymade harness. Enables smaller tapeout of SoC designs, enabling education, small SoC projects and hobbyists.

The Caravel is an open-source design. It enables the implementation of System on Chip designs with help of a readymade harness, composing of a management structure, housekeeping structure and user area.

The management structure is a module that typically consists of a RISC-V based SoC that has peripherals like timers, UART and GPIO.

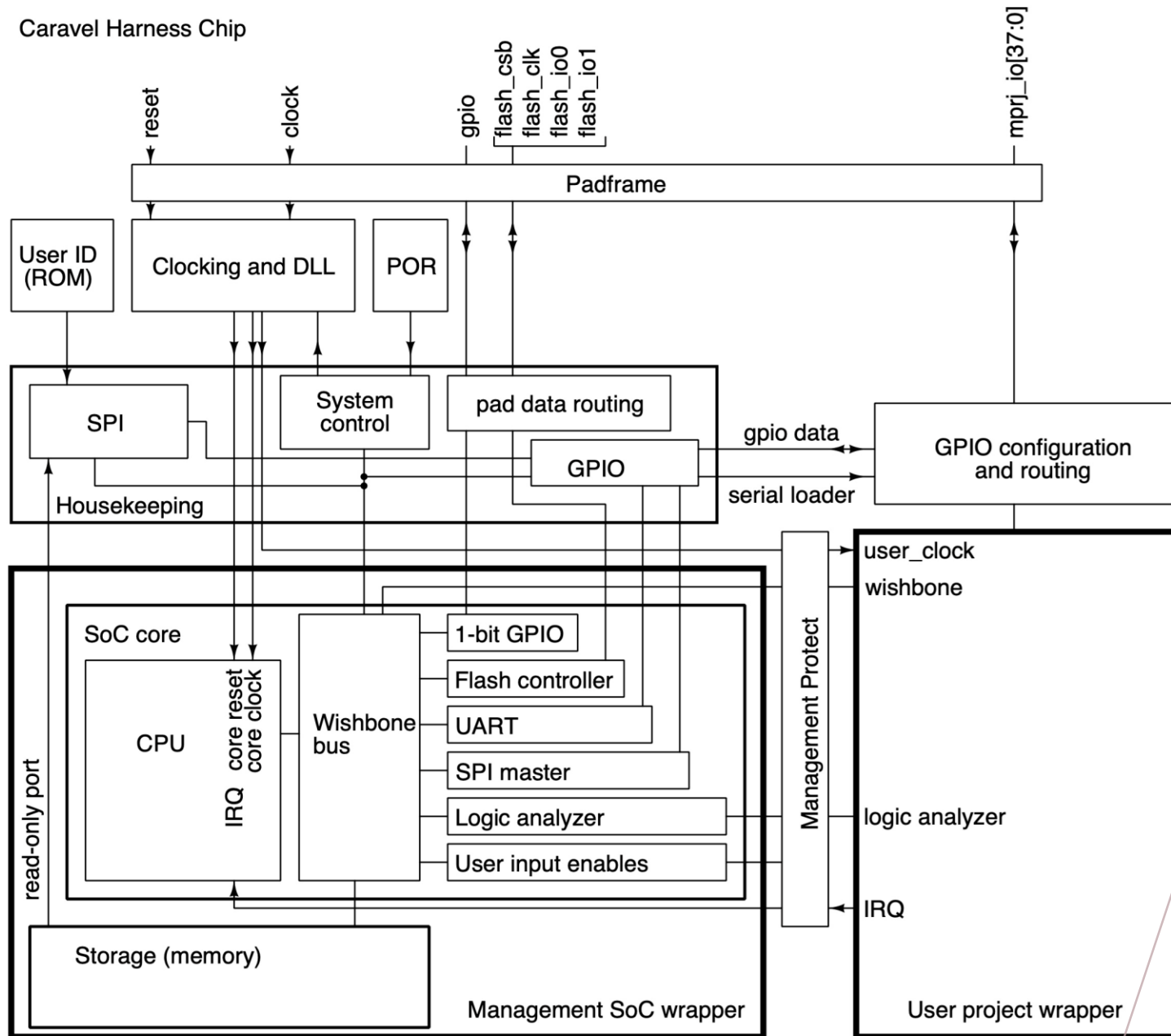
Firmware on the management module can be used to:

- Configure User Project I/O pads
- Observe and control User Project signals (through on-chip logic analyzer probes)
- Control the User Project power supply

The user module has 2.92mm x 3.52mm silicon area with 38 I/O pads and 4 power pads. The user area is connected to 128 logic analyzer probes and the user space is connected to the management area via bus (Wishbone).

The housekeeping module is a dedicated, low-power subsystem for background operations like power on/off, reset management and voltage/temperature monitoring.

Caravel Harness Chip



*CURRENT
ARCHITECTURE*

EFABLESS

- Provided open source affordable chip design, prototyping and manufacturing using the skywater 130nm PDK.
- Was shutdown due to financial reasons in 2025
- Supported TinyTapeout, which provides open source files and tools for IC-design and through Efabless and now ChipFoundry they provide the possibility for tapeout/manufacturing.
- Umbralogic Technologies LLC, doing business as ChipFoundry, has acquired the assets of Efabless Corporation. ChipFoundry continues with MPW Shuttle programs.
- Chipfoundry available SoC platforms: Caravel, Caravan and OpenFrame.

INFO:

<https://www.skywatertechnology.com/google-partners-with-skywater-and-efabless-to-enable-open-source-manufacturing-of-custom-asics/>

<https://youtu.be/jBrBqhVNgDo?si=R8QKECCj4umi5Fi5>

<https://caravel-harness.readthedocs.io/en/latest/index.html>

<https://github.com/efabless/caravel/tree/main?tab=readme-ov-file#additional-material>

<https://chipfoundry.io/knowledge-base/platforms>