



OpenHW Group

Technical Working Group (TWG) – Meeting July 2 2020

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Terminology

- CLINT (a.k.a. Basic)
 - CLINT-BASE
 - Baseline machine external/timer/software interrupts
 - 16 LSBs of MIP/MIE plus MSTATUS, MTVEC (supporting mode 0 and mode 1), MEPC, MCAUSE as described in the RISC-V privileged spec
 - CLINT-INTENDED-EXT
 - Intended CLINT extension as recommended in the RISC-V privileged spec
 - 16 MSBs of [MIP/MIE](#) are implemented
 - CLINT-CUSTOM-EXT
 - 32 more fixed priority interrupt sources
 - Custom [MIP1/MIE1](#) CSRs
- ~CLIC
 - Core-Local Interrupt Controller as specified in (work-in-progress, non-ratified) specification [v0.9 20200623](#) or later
 - ~CLIC has two parts (one internal to CV32E40P, one external to CV32E40)
 - Interface between ~CLIC parts is not standardized in the Fast Interrupts TG, so verification is required at ~CLIC level

Plan of record

- Discussed in Cores TG early 2019 (documented [here](#))
- CV32E40P
 - CLINT (CLINT-BASE + CLINT-INTENDED-EXT + CLINT-CUSTOM-EXT)
 - No CLIC
- CV32E40
 - CLIC-only
 - No CLINT

Proposal A (“Plan of record”) - Preferred

- Stick to “Plan of record”
- Write CLINT VPLAN and verify CLINT in sprint (EM Micro)
- Develops verification infrastructure such that it can be re-used to verify CLIC at a later date (EM Micro)
- ~CLIC is added as a parameterized build-time option after the sprint
 - Fully compatible to [v0.9 20200623](#) or later (no custom extensions)
 - Okay to convert CLINT to a parameterized build-time option as well

Proposal B (“conditional addition of ~CLIC)


- ~CLIC is added as a parameterized build-time option (EM Micro)
 - Fully compatible to [v0.9 20200623](#) or later (no custom extensions)
- CLINT stays in as primary for the sprint
 - CLINT-BASE + CLINT-INTENDED-EXT + CLINT-CUSTOM-EXT
 - Okay to convert CLINT to a parameterized build-time option as well
- EM Micro also releases the core-external part of ~CLIC (okay if this is an ‘example implementation’)
- EM Micro builds verification infrastructure that they use to verify ~CLIC but enables another verification engineer to use it to verify CLINT (or they do both) – **Needs to be ready by 8/15**
- Conditions of completion must be defined to support the existing sprint



Thank you!

RTL capabilities for CV32E40P

RTL capabilities	PULP	Silabs	Green Waves	Thales	EM Micro	Other
CLINT-BASE						
CLINT-BASE + CLINT-INTENDED-EXT						
CLINT-BASE + CLINT-INTENDED-EXT + CLINT-CUSTOM-EXT						
~CLIC						
~CLIC + CLINT-BASE						
~CLIC + CLINT-BASE + CLINT-INTENDED-EXT						
~CLIC + CLINT-BASE + CLINT-INTENDED-EXT + CLINT-CUSTOM-EXT						

 Sufficient (but maybe overkill) (e.g. provides enough IRQ sources)

 Not sufficient (e.g. not enough IRQ sources, will not meet schedule)