GSI Timing Starter Kit

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Why another starter kit?

➔ WR does not include a timing system
➔ GSI has multiple form factors
➔ Other departments wanted a prototype
What is the GSI Starter Kit?

• Integrates:
  • White-Rabbit starter kit
  • Etherbone gateware (+BOOTP firmware)
  • Host-bridging (PCIe only so far)
  • Placeholder timestamp unit
  • Placeholder ECA unit (discussed later)

• Platforms: SCU, SPEC, (exploder, pexaria, vme, ...)
Not very glamorous

Mostly just packaging work:

✗ Find/create compatible repositories
✗ Glue together with git submodules
✗ Create a top-level build script

The people who demanded it have not yet used it
=> Still unclear how useful it will be.
Useful item #1: Wishbone host bridge

Wishbone is more than a Genum-style memory map
(error line, cycle line, pipelined, 32-bits, ...)

Etherbone = Wishbone wire format
=> can speak Etherbone on a character device

PCle-WB hardware: full WB (32-bit, err/cyc line, pipelined)
PCle-WB driver: use Etherbone to speak to userspace
Useful item #1: Wishbone host bridge

Uniformity of access
  Programs need only one API
  Tools reusable (esp. eb-ls/read/write/load)

Full 32-bits; 128KB too small: custom devices

Bidirectional bridge (software slaves a reality)

H/W support is Altera-specific.
Driver supports SPEC too.
Useful item #2: ECA Unit

Idea:

Control system issues commands (events)
Controllers translate events to local actions
Configure translation using condition table

Based on the event-condition-action (ECA) model
Useful item #2: ECA Unit

Why?

Separates commands from implementation
Avoid custom HDL for each front-end controller
Can be (re-)parameterized after deployment
Event timestamp + rule offset = action execution time
Uniform programming model for all equipment