RH-20160119-4073

1. **Deliverables**
   1. **Waveform Processing Custom Device.** The specifications and requirements for this custom device are included in Appendix A.
   2. **Custom device testing/verification on customer’s system.**
2. **Proposed Schedule with Milestones**

|  |  |
| --- | --- |
| February 2 | Finalize architecture and plan breakdown of effort. |
| February 5 | Review custom device code : system definition configuration, inline + asynchronous framework |
| February 10 | SDF configuration & framework should be complete and tested. Running average functionality should be planned or implemented. |
| February 12 | The custom device should be complete enough for testing at NI. |
| February 17 | Deploy custom device to end-user at DENSO. |

1. **Tasks & Responsibilities**

|  |  |  |
| --- | --- | --- |
| **Task** | **Est. Hours** |  |
| Gather & verify requirements (SE) | 2 | Complete |
| Develop custom device design (SE) | 4 | Complete |
| Implement custom device engine (SE) | 32 | In progress |
| Implement custom device configuration (AES) | 8 | In progress |
| Test custom device | 8 |  |
| Deploy custom device | 8 |  |
| **Total** | 62 |  |

**Appendix A**

**Waveform Processing Custom Device**

**Design Overview**

* **Inline component:** reads CD configuration and enable channels. Launches Asynchronous module and creates communication FIFOs. Passes enable information and configuration to Asynchronous module. Receives processed results and returns them to VeriStand host.
* **Asynchronous module:** reads waveform data and applies desired processing, e.g. averaging, other filtering/processing/measurement stability. Returns result to Inline process.
* Both the Inline and Asynchronous modules will likely rely on the Inline Async

**Configuration**

* Within the VeriStand System Definition:
  + User selects Waveform Task to be processed
    - The configuration code should then add an output channel for every channel contained in the task
  + User selects processing steps, e.g. averaging
    - The configuration code should add necessary input channels for the processing step run-time parameters (e.g. running average period) as well as a custom device input channel to enable the processing step.
  + The configuration code should compile settings which will be used by the Inline and Asynchronous modules

**Operation**

* The latest averaged/processed data (and any associated flags) is then returned to the Inline module and made available to the VeriStand host

**Channels**

**Input**

* + **Custom Device core:** none
  + **Running average:** running average period, running average enable channel

**Output**

* + **Custom Device core: N** processed channel values (e.g. averaged current)
  + **Running average:** none

**Proposed Order of Operations (when used within DENSO ELM Parametric Tester)**

1. **VeriStand:** configure continuous Waveform Task of desired sample rate that includes all AI channels
2. **VeriStand:** configure Waveform Processing Custom Device.
3. **TestStand**: send trigger to DUT (e.g. CAN message to turn on PWM channel)
4. (optional) **TestStand:** Wait for desired settle time
5. (optional) **TestStand:** Wait for MeasurementStable? flag to return true
6. **TestStand:** Read processed measurement from Custom Device output channel

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