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| Model Name: Banshee – Hardware Control IO Interface | | |
| Name and affiliation of author or POC:  Reynaldo Salcedo, MIT Lincoln Laboratory | Model Symbol: | Accreditation (TRL?):  SimPowerSystems standard |
| Date of Publication:  3/15/2017 |
| Version Information:  1.0 |
| Model accessibility (open source, license, …):  Open source |
| Model Description and Theory of Operation:  This block is used to interface hardware controller’s signals with the simulated power system model via Opal-RT IO Cards. Signals measured from the simulation (voltage, current, status, others) are appropriately externally scaled to mimic selected equipment size and mapped to the hardware controller via hardwired connections to the Opal-RT IO cards. Similarly, output signals from the hardware controllers are supplied to the simulated model via Opal-RT IO cards and wired to the simulated asset (e.g. diesel generator, circuit breaker); thus, closing the control loop. This block contains control interface for Banshee’s diesel generator, CHP, SEL751 relays and SEL2440.  List of References:   * See SimPowerSystems documentation * See Opal-RT documentation * See IO\_MAPPING * See IO\_MAPPING\_2440 * SEL751\_InterfaceBlocks * WoodwardEasyGen3500\_InterfaceBlocks | | |
| Model Specifications:  Banshee’s hardware controller interface is implemented using standard Simulink and Opal-RT blocks. Signals from the simulation are scaled before being passed into the block. Within this block signals are mapped and supplied to the diesel generator, CHP, three PCC SEL751 relays, and SEL2440. Additionally, the signals received from each of these units is pre-processed and then wired to the simulated models.  This block does not follow EPHCC suggested modeling practice since internal blocks do not have independent libraries. The implementation of the composing blocks is simple to navigate and understand, and comments were included where appropriate.  Assumptions and Limitations   * Libraries need to be disabled before using this model due to Opal-RT requirements * Signal/channel mapping correspond to the MIT-LL architecture. However, pin-outs and hardware interface details are available for simpler integration. | | |
| Interfacing Information (platform, input requirements, possible outputs):   1. Inputs:   CHP Scaled signals: gcb\_voltage, gcb\_current, mcb\_voltage, mcb\_current, speed  Diesel Scaled signals: gcb\_voltage, gcb\_current, mcb\_voltage, mcb\_current, speed  SEL751 Scaled signals: 3X PCC circuit breaker status  SEL751 Scaled signals: Iabc, Vabc\_site, Va\_grid  SEL2440 signals: circuit breaker status   1. Outputs:   CHP signals: Governor bias, AVR bias  Diesel signals: Governor bias, AVR bias  SEL751 signals: Open/close signals  SEL2440 signals: trip commands   1. Electrical connections: 2. Parameters: | | |
| Diagrammatic Representation of Model Internals: | | |
| Model Validation (technique used, evidence):  The mappings of signals for sending-receiving ends were verified for each channel using oscilloscopes. | | |
| Simulation Platform, Solvers:  Matlab 2013a with Simscape. A discrete Tustin solver with 100us time step was used. | | |
| Known Issues:  N/A | | |
| Models which use this block:  Basic element for numerous distribution systems. | | |