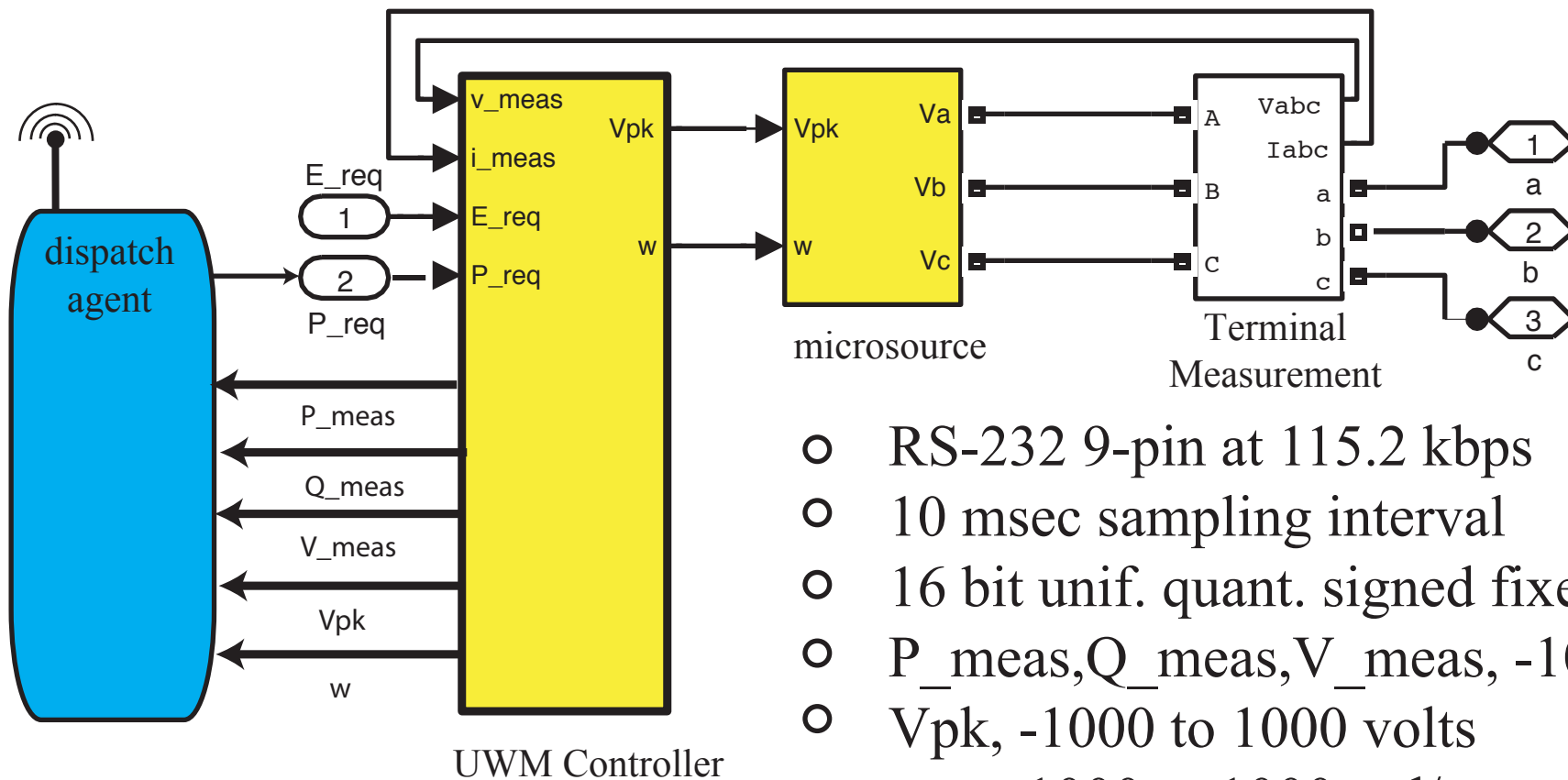


# Notre Dame Tasks

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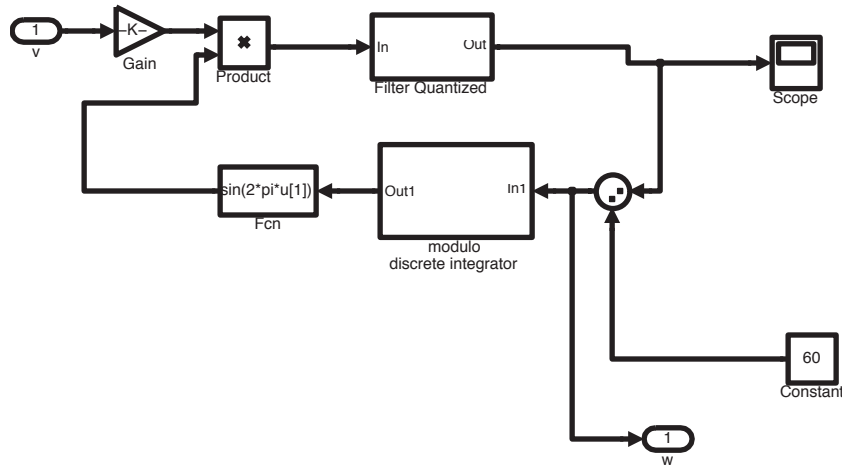
- Activity since last Telecon (Feb 7, 2011)
  - Interface Specification between UWM/Dispatch Agent
  - Frequency estimation simPower component
  - E-board load-shedding simPower component
  - Smart-Switch simPower component
  - Single-phase Odysian testbed simulations
- Remaining activities
  - Finalize e-board load shedding logic
  - Integration of dispatch agent into simulations
  - Completion of single-phase simulation model

# UWM/Dispatch Agent Interface

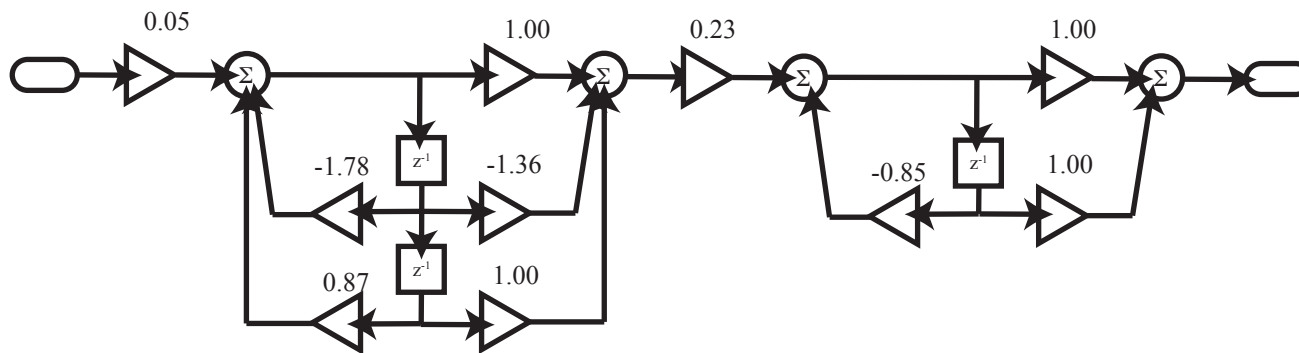


- RS-232 9-pin at 115.2 kbps
- 10 msec sampling interval
- 16 bit unif. quant. signed fixed-point
- $P_{meas}, Q_{meas}, V_{meas}$ , -10 to 10 pu
- $V_{pk}$ , -1000 to 1000 volts
- $w$  : -1000 to 1000 rad/second

# Frequency Estimation Component



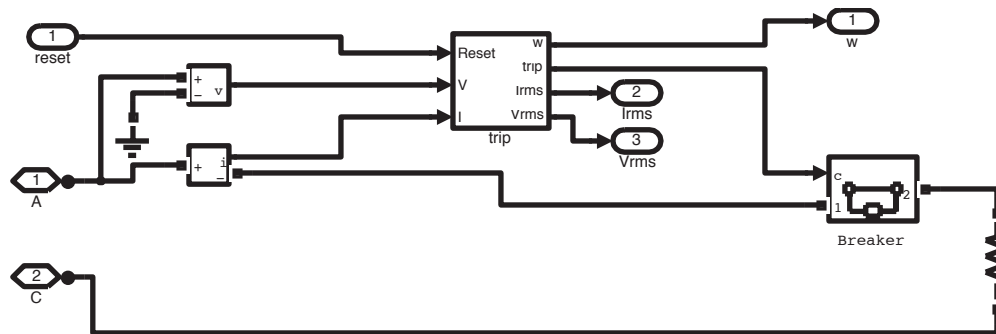
Phase-locked loop (60 Hz)  
IIR elliptical LPF  
Direct form II (2 sections)  
passband 5 Hz,  
stopband 20 Hz  
Sampling Freq 100 Hz  
- 16 bit fixed point quantization



# E-board simPower Component

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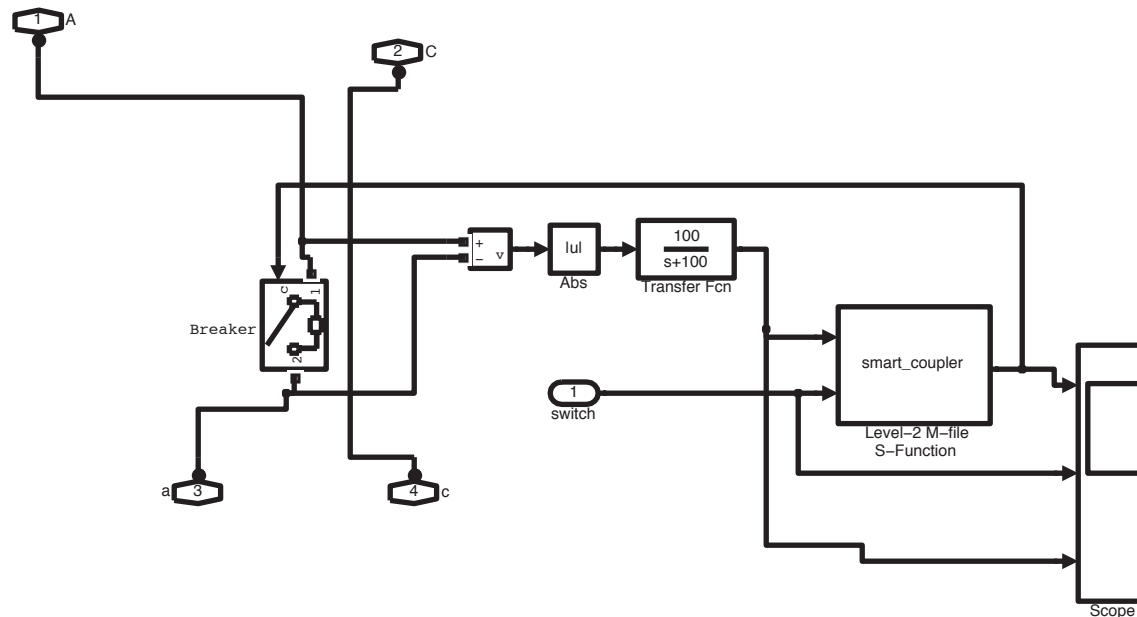
- E-board consists of a resistive load (60-120 W) with load shedding logic implemented as an S-function
- Non-critical loads are shed if following conditions are met
  - load connected
  - frequency drops below 59.8 Hz (59.5 critical loads)
  - RMS current exceeds 100 A or RMS voltage drops below 100 V
- Non-critical loads are reconnected under following conditions
  - load disconnected
  - line frequency is greater than 60.1 Hz for more than 1.0 seconds



# Smart Switch simPower Component

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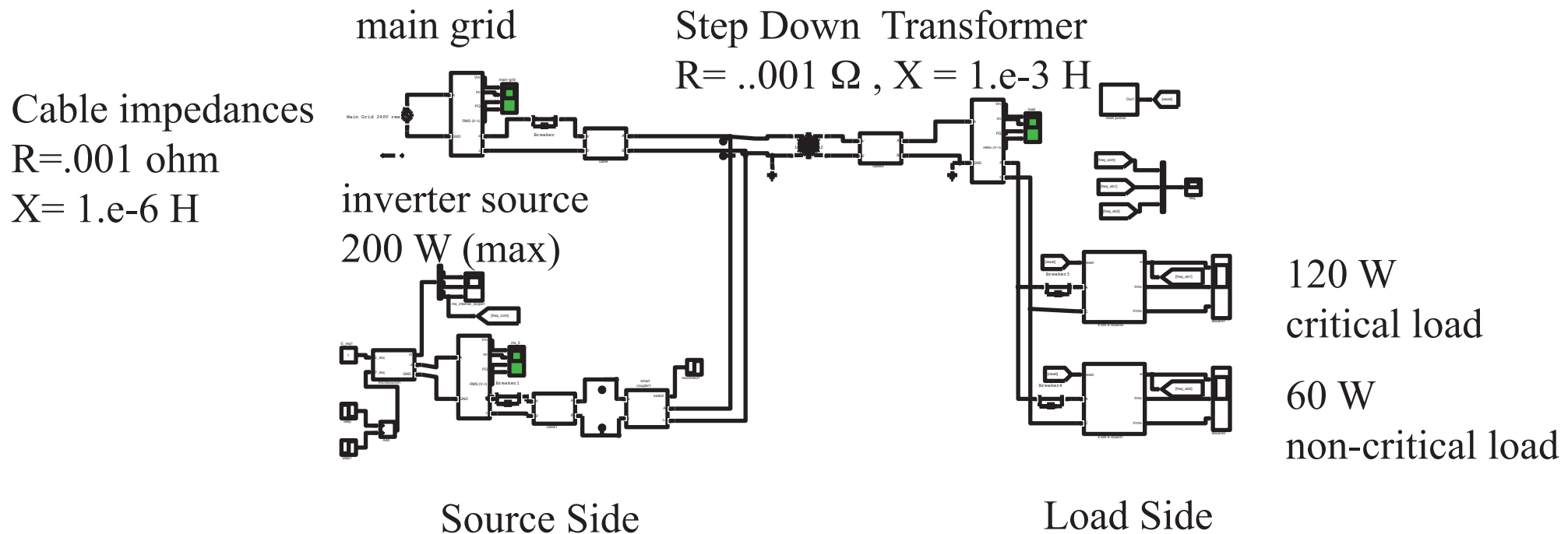
- Smart Switch connects a generator to the microgrid under following conditions
  - external enabling flag = TRUE
  - Filtered RMS voltage across switch is less than 10 V.



# Single-Phase Odysian Testbed (version 1)

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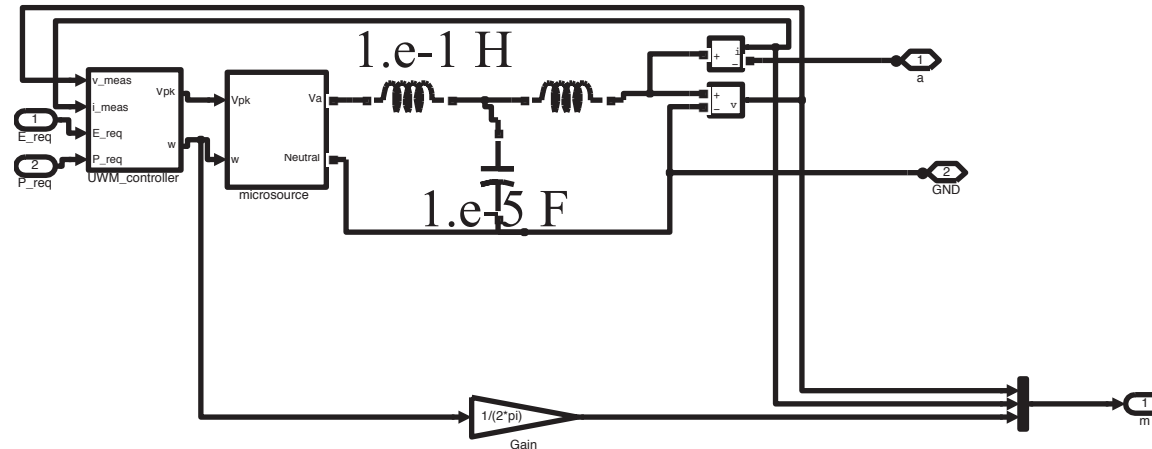
- Single-phase Odysian Testbed uses 240V / 200 W inverters
  - Initial simulation testbed consists of main-grid (240V)
  - a single 200 W inverter (240V)
  - step down transformer
  - Two e-boards at 120 W (critical load) and 60 W (non-critical)



# Single-Phase Microsource Model (version 1)

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- Modifications to original 3-phase UWM model
  - single controlled voltage source
  - LC Low pass filter - no transformer
  - Voltage/current measured LC filter's output



- Large inductors (1.e-1 H) needed to be used in the simulation to prevent simulation breaking down. (Is this an issue related to scale of the sources?)

# Simulation Scenario

Time	Event
0	main grid connected, eboards disconnected microsource disconnected (set to .8 pu)
0.1	loads connect
2	microsource connects
3	microsource setpoint reduced to 0.2 pu
4	microgrid islands
4.3	eboard sheds low priority load
6	microsource setpoint increased to 0.8 pu
7.1	eboard reconnects low priority load

