Monitors, Monitors Everywhere ...

Transaction Level Monitor

class axi_tl_monitor extends uvm_monitor;
// High Level AXI Monitor
// Records Transaction Writes and Reads Only
// Transaction Level Analysis Port
uvm_analysis_port #(axi_tl_tlp) axi_ap;
...

task run_phase(uvm_phase phase)
axi_tl_tlp tlp;
forever @(posedge clk)
// Detect the Write or Read Transaction Level
// Packet from the bus pins
// Send the transaction to the analysis port
// of the Agent
axi_ap.write(tlp);
endtask
endclass

Transaction Level Listener

// Transaction Level Listener
// Implements the write method called from monitor
class axi_item_listener extends uvm_subscriber
// Method captures packet from Monitor analysis port and
// performs user defined task - print it out
function write(uvm_sequence_item_base t);
  uvm_info("AXI", t.convert2string());
endfunction
endclass

Transaction Level Scoreboard

// Transaction Level AXI Scoreboard
// Scoreboards only records Reads and Writes after completion
// and receipt of response
// Simultaneous reads and writes to same address results
// in unknown response
class axi_scoreboard extends uvm_subscriber
// Analysis exports corresponding to each AXI Channel
uvm_analysis_imp_decl
uvm_analysis_imp_decl
...
endfunction

Phase Level Monitor

// Phase level AXI Monitor
// Records each of the AXI channels
class axi_mon extends uvm_monitor;
  uvm_component_utils(axi_mon);
...

task run_phase(uvm_phase phase)
  // Phase level packets for each of the
  // AXI channels
  axi_write_addr_tlpl waddr_ap;
  axi_write_data_tlpl wdata_ap;
  axi_write_resp_tlpl wresp_ap;
  axi_read_addr_tlpl raddr_ap;
  axi_read_data_tlpl rdata_ap;
  ...

task send_tlp(tlp)
  // Send the transaction to the analysis port
  axi_ap.write(tlp);
endtask

Phase Level Scoreboard

// Phase Level AXI Scoreboard
// Triggers a unique write method each time an AXI
// Phase (one for each channel) is detected
// Can handle simultaneous reads and writes to same address
function void write_axi
  uvm_analysis_imp_decl
  uvm_analysis_imp_decl
  ...
endfunction

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