

# Design Process for Combinational Designs using SSI/MSI Devices

## 1. Design Requirements

- **Signal Requirements**
  - Available Inputs
  - Required Outputs
  - Signal Timing
  - > Overall Block Diagram
  - > Signal List
  - > Timing Requirements
- **Component Requirements**
- **Cost, Size and Power Requirements**
  - > List of Acceptable Device Technologies

## 2. Design Formulation (System Design)

- 2a. Partition complex design into logical blocks (Optional)
  - > Generate new block diagram
- 2b. Derive output functions
  - > Truth table or standard form equation(s)
- 2c. Reduce Functions using K-maps
  - > Minimized SOP and POS Equation(s)
- 2d. Convert Min. Equation(s) to Logic Diagram(s)
  - > Functional Logic Diagram(s)
- 2e. Capture & Test 'Functional Logic Diagram(s)' (Optional)
  - > Verified Simulation Results in Vector or Timing Form

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## **3. Design Implementation (Detailed Design)**

**3a. Convert Logic Diagram to Use Real Parts**

**-> 'Realizable Logic Diagram(s)'**

**3b. Select 'Best' Implementation**

**3c. Generate and Capture Schematic**

**-> Final Circuit Schematic**

## **4. Timing Simulation**

**4a. Design Test Case**

**-> Test Vectors or Fixture**

**4b. Verify Simulation Timing Models**

**-> Final Circuit with Timing Parameters**

**4c. Run Simulation**

**-> Verified Test Vector Output or Timing Output**

## **5. Circuit Construction**

**• Construct Circuit using 74HCxx Parts and DigiDesigner**

## **6. Circuit Testing**

**• Test Circuit using Test Case**

**-> Working Circuit to be checked by the Instructor**