Test Strategy

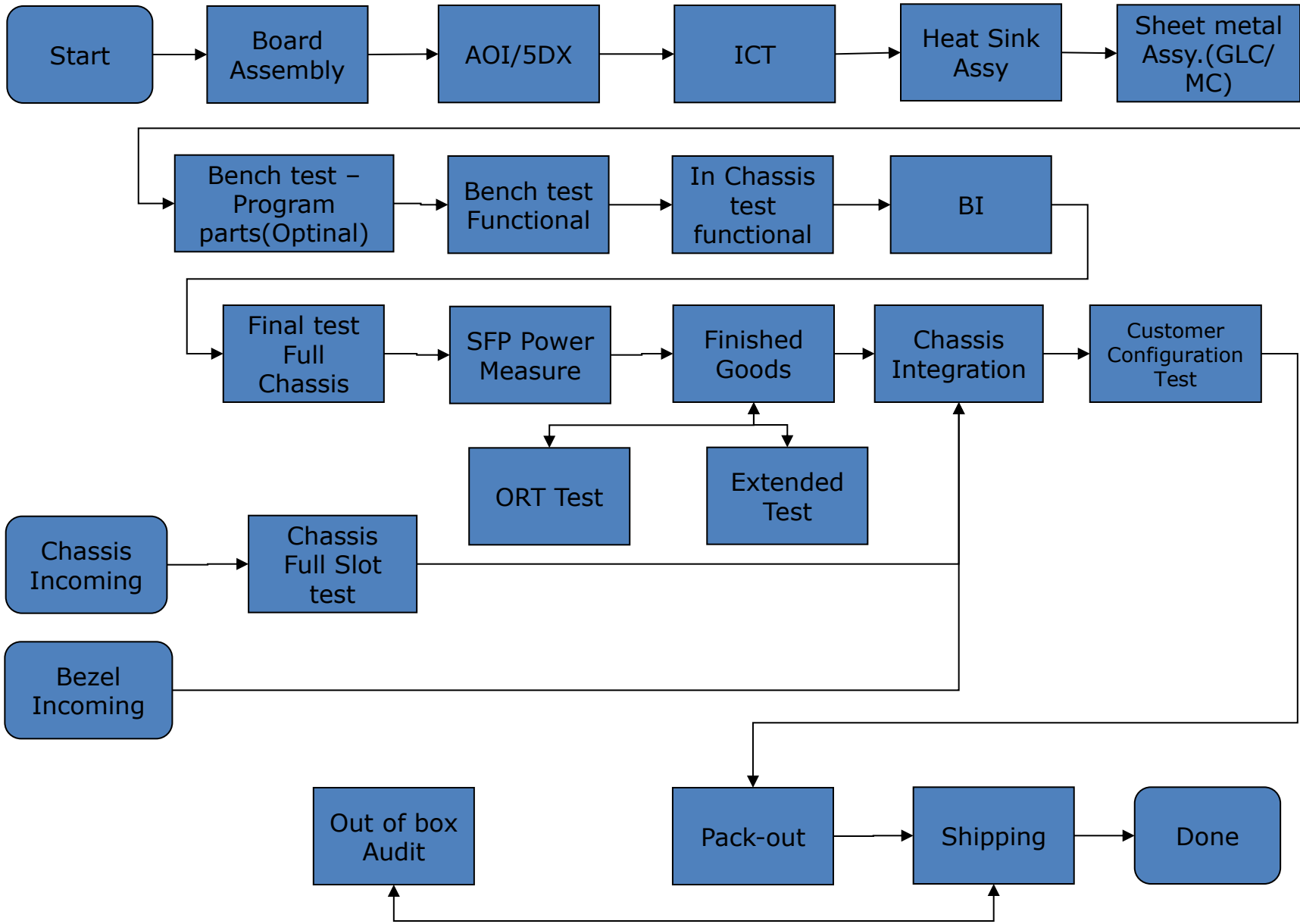
Manufacturing Test Process

- Chassis Vendor ships Chassis fully tested
- CM builds tested product that is shipped directly to a customer.
- CM configures to a customer requirement before shipment to customer.
- Leverage the best of each test strategy. 5DX, ICT,JTAG, Functional, BI test.
- Process quality samples are used to verify test process and create an internal audit of test process.

Test coverage

- 100% manufacturing defects coverage.
- System memories tested to a high confidence level.
- Board components are assumed known good modules. Test will exercise components to high degree, but not all functions are tested
- Test are designed to catch defects as early in the process as possible

Contract Manufacturer Production



Test Strategy

Process Controls

- All programmables are under direct control of COMPANY
- Test process verifies correct programmed revisions.
- Test process collects Pass/Fail data at each process step
- CMTest Process controls movement through test process, Test can not be completed until prior test process is completed

Yield Targets

- Above 90% yield at 5DX and ICT
- Above 90% at Bench test
- Above 95% at Chassis Functional and BI
- Above 99% at Final functional test, Customer configuration

Test Strategy

Test time targets

- 5DX – under 15 minutes
- ICT – under 7 minutes(Includes Potentia,Xilinx Programming)
- Board Flash Programming – To be pre programmed at the chip level.
- Board Serial programming on bench – under 5 minutes
- Bench functional – Under 15 minutes
- Functional test in chassis – Under 25 minutes
- Burn-in – Starting at 12 hours, @ 40 Deg C static temperature
- Configuration test – Under 25 minutes
- Extended testing – Starting at 72 hours
- Out of box audit – Under 3 Hours

Test Strategy

- Manufacturing test Executive
  - Simplified menu driven interfaces for manufacturing test operators
  - Simplified scripting environment to speed Test Engineering scripting activities
  - Modular for code reuse
  - Data logging embedded in scripting environment
  - Scripting over Serial and Telnet, including Terminal Servers
  - Supports multiple script code bases
  - Remote access to test process for execution and monitoring
  - Test process flow control
  - Assembly Version control
- Linux Based using Perl with Perl::TK and Perl::Expect modules
- Test stations support multiple sessions each to its own serial port or telnet port
- Data collection in flat files at each CM site
- Extensions:
  - Data can be pushed/pulled to central databases at COMPANY and COMPANY CMs
  - Offline Analysis of test data via 3rd party software packages(SigmaQuest)
  - Graphical Test interfaces for Operators
  - Operator Access Controls

Current Test Times

AOI
- 4 minutes GLC, 3 Minutes IMC
- 6 Minutes XGLC

5DX
- 12 minutes GLC, 8 Minutes IMC
- 19 Minutes XGLC

ICT
- 5 minutes GLC, 3 Minutes IMC
- 3 Minutes XGLC

Bench Flash programming, if needed
- Total test time: GLC 10min, Operator Time: 1Min
- Total test time: IMC 5min, Operator Time: 1Min
- Total test time: XGLC 20min, Operator Time: 1Min

Bench Serial number programming
- Total test time: GLC/IMC 2min, Operator Time: 1Min

Bench Test(Includes Serial number programming Step)
- Total test time: GLC 17min, Operator Time: 2Min
- Total test time: IMC 21min, Operator Time: 2Min
- Total test time: XGLC 45min, Operator Time: 5Min

Pre-Burn-in test
- **1-2 IMC, 3-4 GLC** Total test time: 55min, Operator Time: 2Min
- **2 IMC, 3 XGLC** Total test time: 90min, Operator Time: 5Min

Current Test Times(Cont)

Burn-in test

- **1-2 IMC, 3-4 GLC** Total test time: 12 Hours, Operator Time: 5Min
- **2 IMC, 3 XGLC** Total test time: 12 Hours, Operator Time: 5Min

Post-Burn-in test

- **1-2 IMC, 3-4 GLC** Total test time: 50min, Operator Time: 5Min
- **2 IMC, 3 XGLC** Total test time: 90min, Operator Time: 5Min

Configuration test

- **1-2 IMC, 1-4 GLC** Total test time: 50min, Operator Time: 5Min
- **1-2 IMC, 3-4 XGLC** Total test time: 90min, Operator Time: 5Min

Extended test(1-2 IMC, 3-4 (X)GLC), up to 5% Sample test

- Total test time: 72 Hours, Operator Time: 10Min

ORT(1-2 IMC, 3-4 (X)GLC), up to 5% sample test

- Total test time: 1 Week, Operator Time: 10Min

Current First Pass Yields

5DX, 80%

ICT, 95%

Bench test, 95%

Pre-BI Test, 98%

Burn-in, 98%

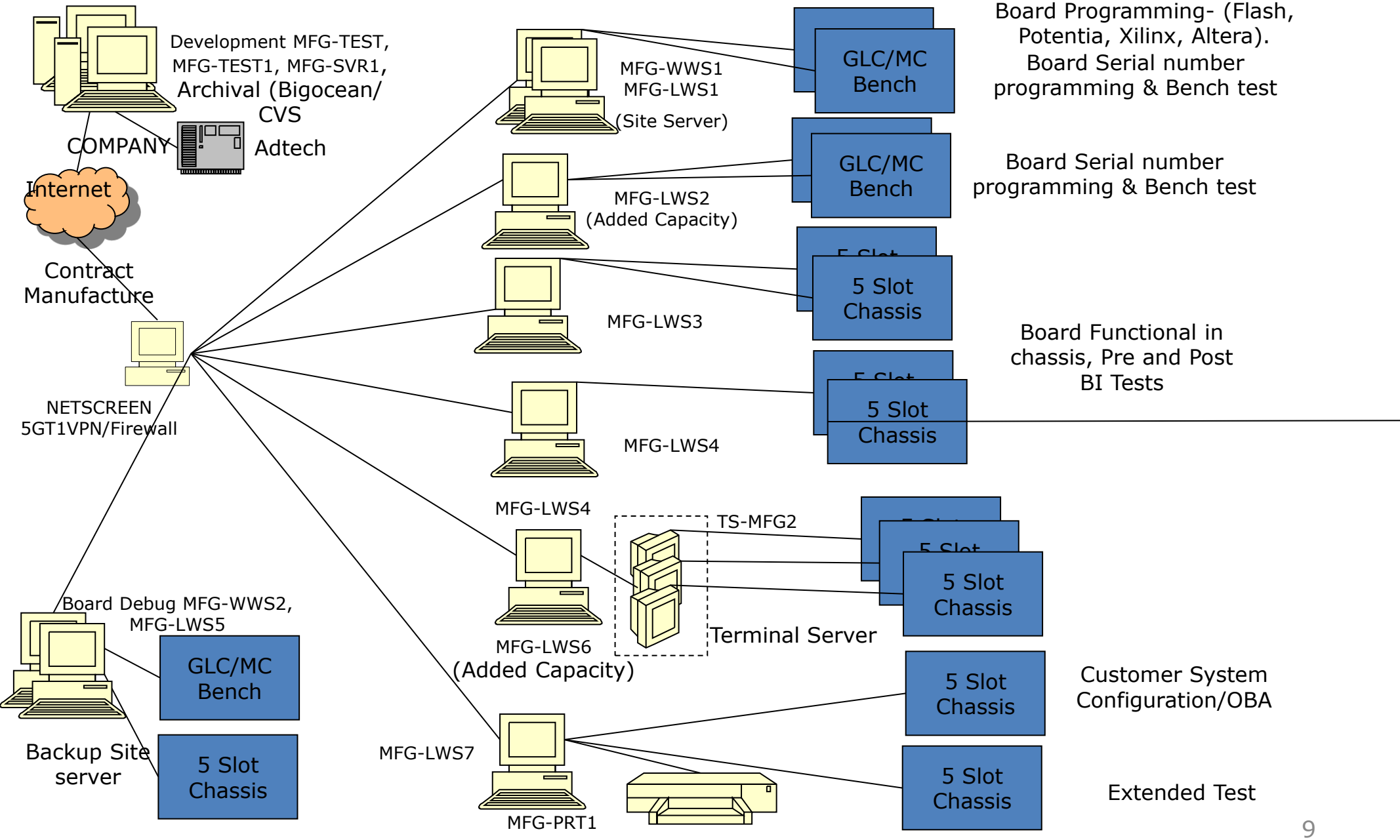
Post BI Test, 100%

Configuration test, 100%

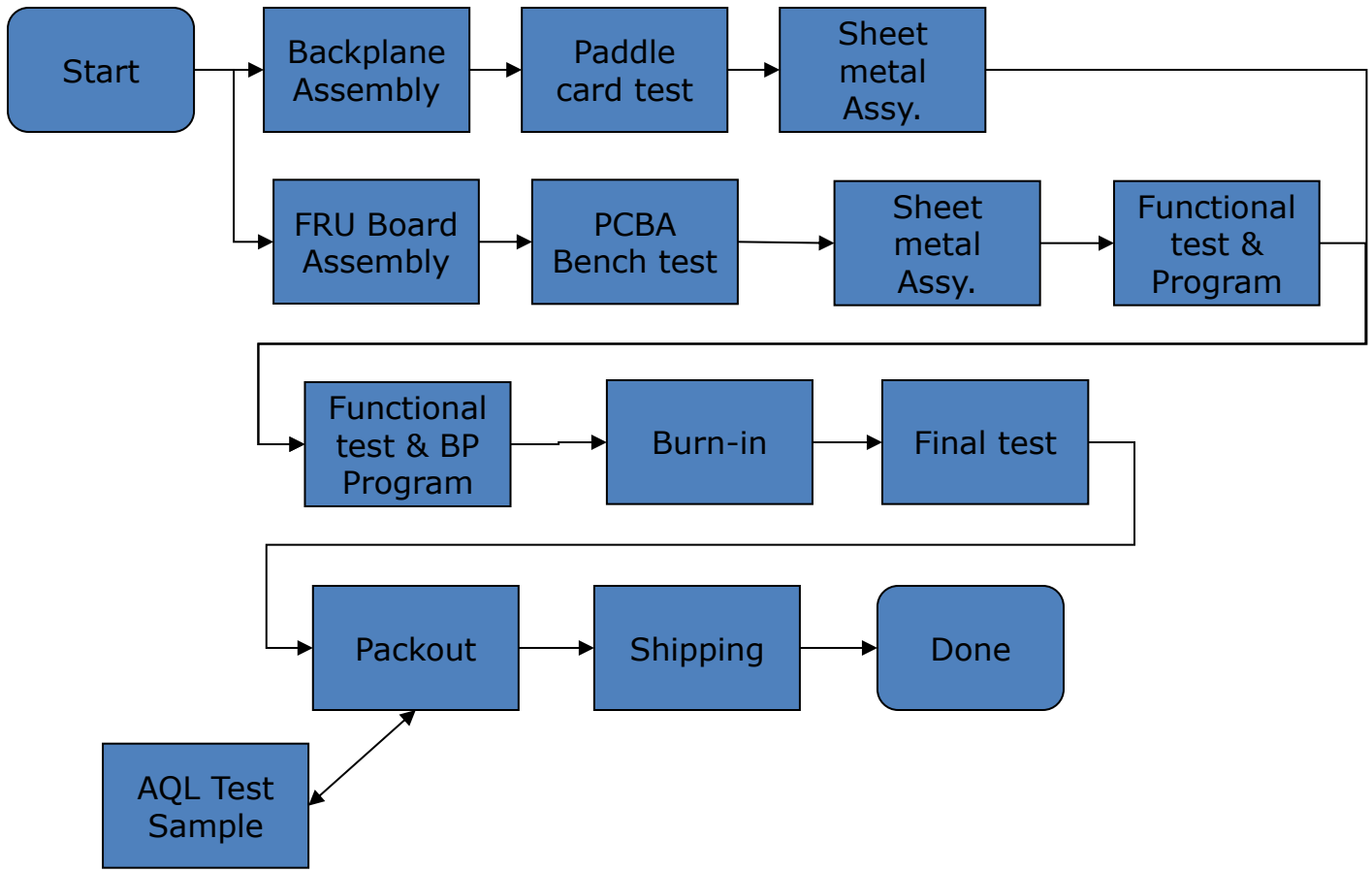
Extended test, 99%

ORT Test, 99%

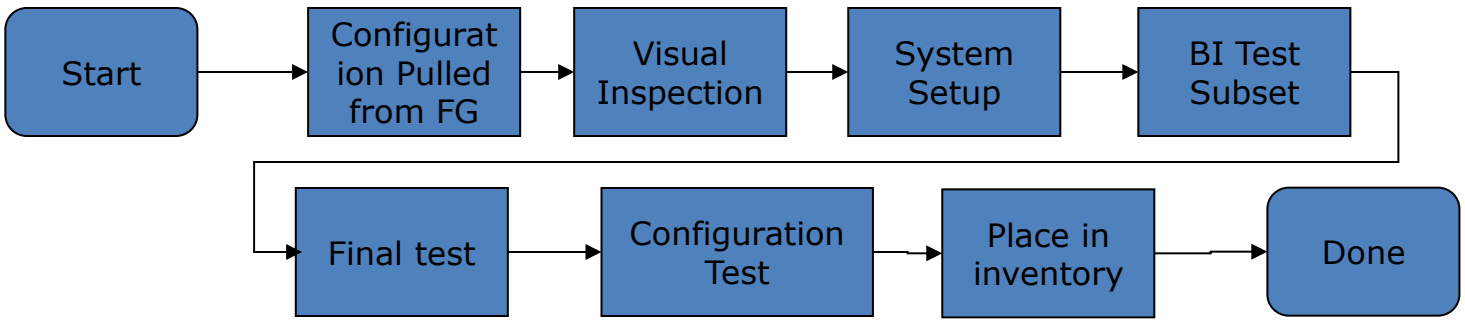
Current Test Layout



Chassis Production



Contract Manufacturer Extended Test



- Test over a 72 Hour period
- Re-verify test process over extended period
- Sample test for Sanity check of Manufacturing process
- Validation for Production and RMA repair