Built-In Test (BIT) Software

Complementing a diverse product line up, Extreme Engineering Solutions, Inc. (X-ES) provides a comprehensive library of Built-In Test (BIT) software. X-ES BIT software provides exceptional test coverage through Power-On BIT (PBIT), Continuous BIT (CBIT) and Initiated BIT (IBIT) routines. X-ES BIT software is available at no additional cost when purchasing a Board Support Package (BSP). BIT is supported on most processor boards for VxWorks and Linux.

Regardless of the X-ES processor board or operating system, the BIT libraries present the user with the same consistent Application Programming Interface (API). For example, all Intel®- and Freescale™-based X-ES processor cards support a common set of BIT tests for common device interfaces such as SDRAM, Ethernet, and non-volatile storage. Example applications in ANSI C source form are included in X-ES BIT.

Whether your goals are Fault Detection and Fault Isolation (FDFI) coverage during deployment, qualification testing, or manufacturing reliability, X-ES has the BIT capabilities your project needs.

BIT Features

- **PBIT (Power-On Tests)**
  - Power-on results available to operating system
  - Fast boot supported
  - Early invasive testing yields high test coverage
  - Field upgradable firmware support
  - Visual and hardware signal failure indicators

- **CBIT (Continuous Tests)**
  - Full source available
  - Non-invasive testing
  - Dedicated OS task
  - Low CPU utilization
  - Runs out-of-the-box
  - Test result logging
  - Health statistics
  - Modular implementation
  - Extensible
  - IPMI integration

- **IBIT (Initiated Tests)**
  - Full source available
  - Comprehensive test set
  - Offline device diagnostic testing
  - IPMI integration

BIT API

The X-ES BIT API provides a standardized interface between the low-level BIT routines, operating system, and application. Applications can query PBIT results, poll CBIT status, or execute IBIT procedures. Whether you have requirements for PBIT, CBIT, or IBIT, X-ES provides the standardized application framework necessary to simplify fault detection software development.
Corporate Overview

Extreme Engineering Solutions, Inc. (X-ES) designs and builds chassis, single-board computers, I/O, power, backplane, and system-level products within the embedded computer industry. X-ES offers cutting-edge performance and flexibility in design plus an unparalleled level of customer support and service. For further information on X-ES products or services, please visit our website: www.xes-inc.com or call (608) 833-1155.

Types of BIT

Power-On BIT
Executed in the boot firmware or in the OS boot process. Examples include PBIT for products supporting UEFI BIOS and U-Boot firmware. The results of PBIT are stored and can be retrieved via API from the operating system.

Continuous BIT
Executed from a task within the operating system. This task periodically runs non-invasive tests such as ECC and device error condition checks.

Initiated BIT
Executed at any time from the user application. Initiated BIT consists of both non-destructive and destructive testing. Destructive tests, such as an internal Ethernet loopback, can be utilized to help diagnose the origin of system failures.

Test Coverage Example

X-ES provides BIT code that covers all the major functional blocks of a design. A BIT device coverage map is available with all X-ES products. Additional FDFI (Fault Detection and Fault Isolation) analysis reports are available upon request.

An example of the standard analysis performed by X-ES is provided in the BIT coverage map and associated block diagram. All major functional elements are incorporated into the appropriate PBIT, CBIT, and IBIT routines.