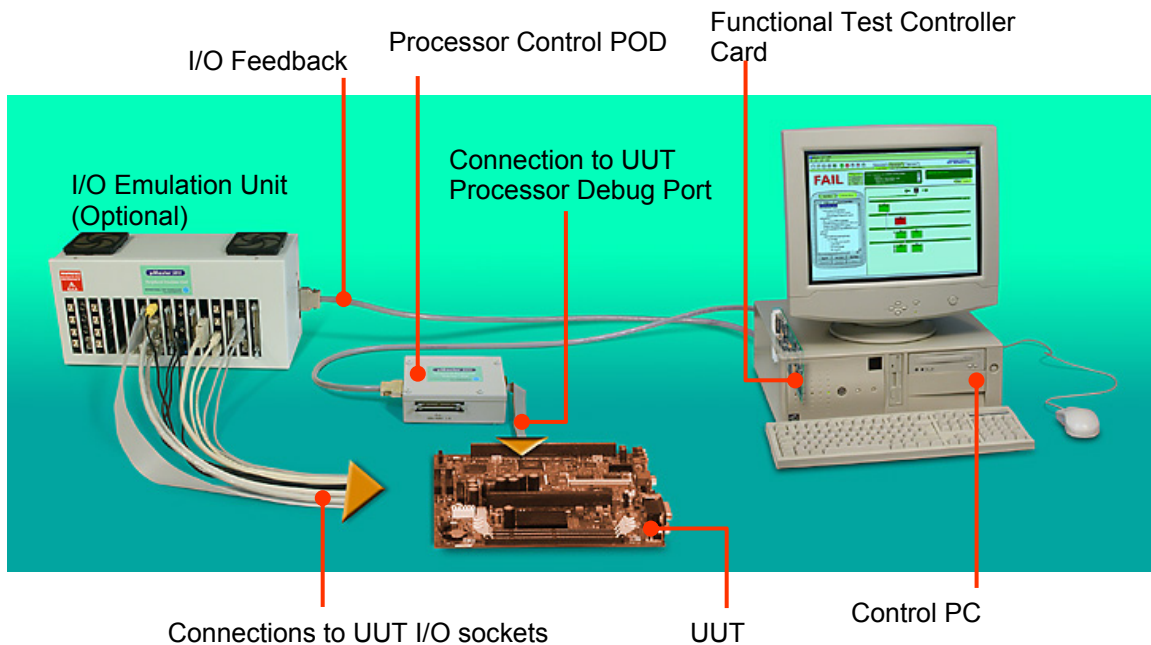


## TESTING AND DIAGNOSING SINGLE BOARD COMPUTERS

Processor-Controlled Test (PCT) processor board test solutions from ASSET InterTech can be used to test all types of CPU-based boards. This application brief shows how the solution can be configured to test a CompactPCI or VME single-board computer based on an Intel Pentium or Motorola/IBM PowerPC microprocessor.

The tester is driven by an external PC, and consists of a CPU emulator, which takes control of the UUT's processor. Once in control, test programs and diagnostics can be directed and sequenced under the control of the host PC. Additionally an I/O emulator is available, which provides the facilities to stimulate and/or measure activity on the boards I/O connector. Using this top-down and bottom-up approach full testing can take place in seconds, rather than minutes.

Figure 1 shows the components of the solution.



*Figure 1. Test Solution Components*

Figure 2 shows how the tester's hardware components are configured for a notebook application, and the table shows the test sequence and program, which is run by the tester. Results returned are pass/fail, or pass/fail with full diagnostics to bus and component level.

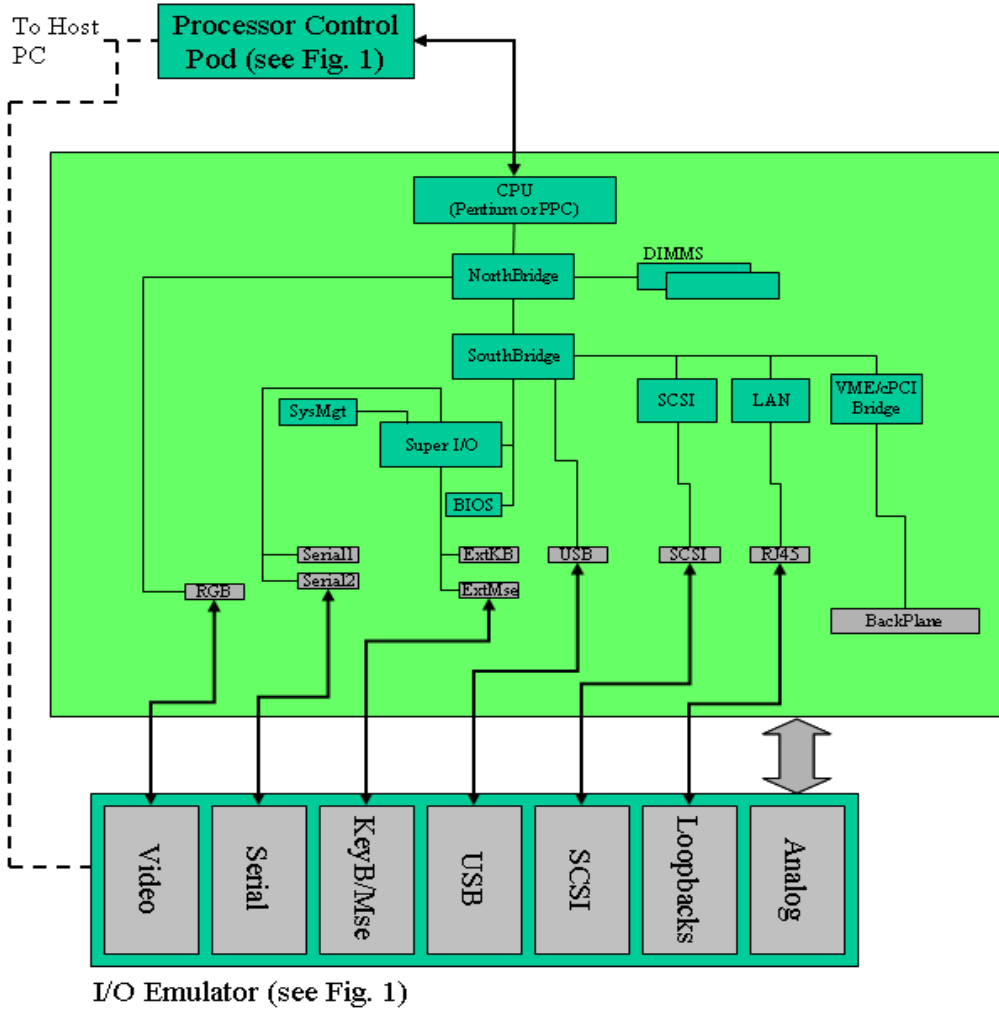


Figure 2. SBC Test

### TEST SEQUENCE AND COVERAGE

Test Name	Test Sequence	What it Tests
Power	Power on UUT Check key voltages using analog test card.	Soft on/off circuitry OK? Key voltages within range?
CPU	CPU ID Check CPU BIST Check Take control of CPU	JTAG OK? CPU OK? CPU infrastructure OK?
General Bus	Boot ROM Bus Test	Verifies all buses from CPU to boot ROM (i.e. host, hub, PCI, LPC, etc.)
NorthBridge	Register Test Configure for normal operation	Verifies communications from CPU to NorthBridge. Verifies NorthBridge registers.
SDRAM	Configure memory Memory test for opens, stucks and shorts to all buses	Verifies all buses and DIMM connectors from NorthBridge to DIMMs.
SouthBridge	Register Test Configure for normal operation Legacy functions (timer, DMAC, IntC, CMOS RAM/RTC)	Verifies communications and buses from NorthBridge to SouthBridge Verifies SouthBridge registers. Verifies PC legacy functions.
USB	Register Test Configure for normal operation Data transfers to ASSET's USB card.	Verifies SouthBridge USB registers. Verifies USB device presence. Verifies USB channel(s) communication.
SCSI	Register Test Configure for normal operation Loopback test to ASSET's SCSI loopback card	Verifies SCSI controller PCI bus and registers. Verifies operation of SCSI bus lines.
LAN	Register Test Configure for normal operation Transmit and receive packets at 10M and/or 100M Optionally program MACID	Verifies LAN controller PCI bus and registers. PHY operation Verifies connections from PHY to LAN connector. Verifies packet transfers to/from LAN.
Super I/O	ID Check Register Test Configure for normal operation	Verifies communications from CPU to SIO. Verifies SIO registers.
System Management Controller (SysMgt)	EEPROM ID Temperature Sensor Check	Access to configuration eeprom. Operation of temperature sensor.
Serial	Register Test Loopback test of tx/rx and control lines.	Verifies serial controller registers. Verifies tx/rx and control lines from controller to serial port connector(s).
Ext Keyboard	Register and self test to keyboard controller. Generate keypress(es) using ASSET keyboard/mouse card and verify keycode at keyboard controller.	Verifies keyboard controller access from CPU. Verifies keyboard port.
Ext Mouse	Register test. Generate mouse click(s) using ASSET keyboard/mouse card and verify returned codes at controller.	Verifies mouse controller access from CPU. Verifies mouse port.

**TEST SEQUENCE AND COVERAGE (CONTINUED)**

Test Name	Test Sequence	What it Tests
BIOS ROM	ID Check CRC Check	Verifies access to boot ROM from CPU. Verifies boot ROM contents.
Video	Run BIOS Initialize selected video mode(s) and verify using ASSET RGB check card or operator.	Verifies BIOS boot. Verifies access from CPU to video controller. Verifies RGB and/or LCD ports.
PCI to VME/cPCI Bridge	Register test to bridge Configure bridge for normal operation. Bi-directional transfers to remote card.	CPU can communicate with bridge. Bridge registers. Operation of bridge. Operation of backplane.

**CONTACTS FOR ADDITIONAL INFORMATION**

For contact details of our worldwide reps. please see our website:

<http://www.asset-intertech.com/contact.html>