

TESTING AND DIAGNOSING PC BOARDS

Processor-Controlled Test (PCT) processor board test solutions 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 PC motherboards (desktops, notebooks, and servers).

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.

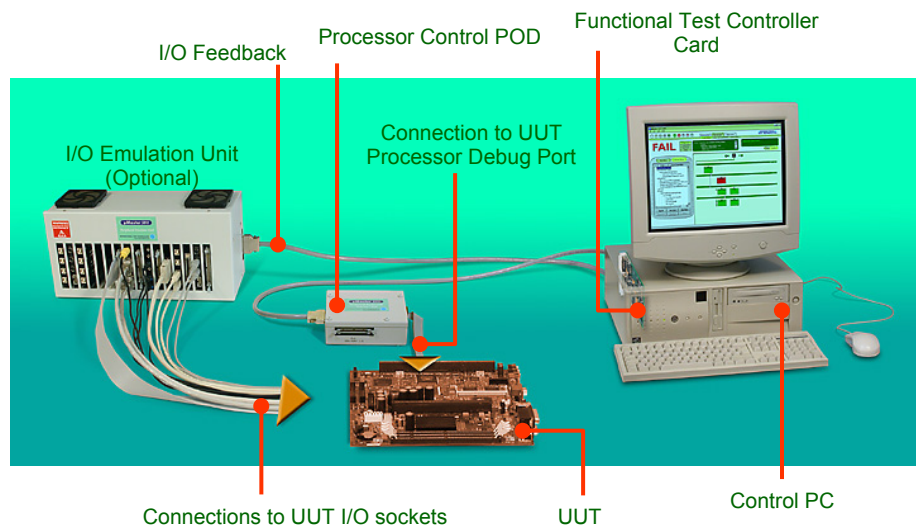


Figure 1. Test Solution Components

Figure 2 shows how the tester's hardware components are configured for a notebook application and the table overleaf 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.

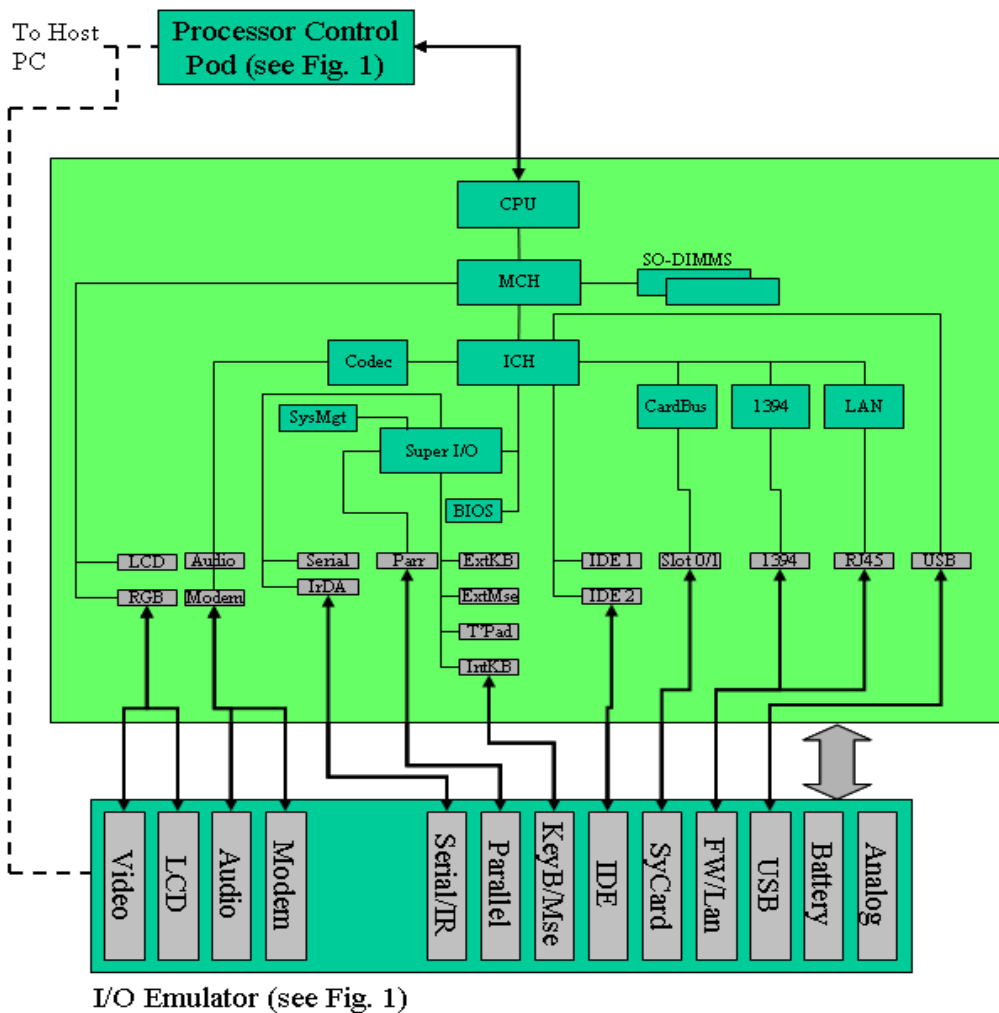


Figure 2. Desktop Test

TEST SEQUENCE AND COVERAGE

Test Name	Test Sequence	What it Tests
Power	Power on UUT Check key voltages using analogue 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)
MCH	Register Test Configure for normal operation	Verifies communications from CPU to MCH. Verifies MCH registers.
SDRAM	Configure memory Memory test for opens, stucks and shorts to all buses	Verifies all buses and DIMM connectors from MCH to DIMMs.
ICH	Register Test Configure for normal operation Legacy functions (timer, DMAC, IntC, CMOS RAM/RTC)	Verifies communications and buses from MCH to ICH. Verifies ICH registers. Verifies PC legacy functions.
Audio/Modem	Register Test Configure for normal operation Audio generation and measurement test using ASSET's audio card. Modem test using ASSET's modem card	Verifies ICH audio registers. Verifies communications to Codec. Verifies all audio channels for generation or measurements. Verifies modem port operation
USB	Register Test Configure for normal operation Data transfers to ASSET's USB card.	Verifies ICH USB registers. Verifies USB device presence. Verifies USB channel(s) communication.
IDE	Register Test Configure for normal operation PIO test to ASSET's IDE Emulator DMA reads and writes to ASSET's IDE emulator.	Verifies ICH IDE registers Verifies IDE bus(es) Verifies IDE read/write DMA transfers.
CardBus	Register Test Configure for normal operation Read/write tests to SyCard tester.	Verifies cardbus controller PCI bus and registers. Verifies operation of CardBus Slot 0 & 1.
1394	Register Test Configure for normal operation Data test using ASSET's FW card. Optionally program GUID	Verifies 1394 controller PCI bus and registers. PHY operation Verifies connections from PHY to 1394 connector.
LAN	Register Test Configure for normal operation Transmit and receive packets at 10M and/or 100M using ASSET's LAN card. 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.

TEST SEQUENCE AND COVERAGE (CONTINUED)

Test Name	Test Sequence	What it Tests
System Management Controller (SysMgt)?Battery	EEPROM ID Smart battery interface test Battery Charge/Discharge using ASSET's battery simulator Temperature Sensor Check	Access to configuration eeprom. Operation of battery interface, and battery charge/discharge 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).
IrDA	Register test Transmit and receive bytes to/from ASSET's IrDA card.	Verifies IrDA controller registers. Verifies transceiver. Verifies tx/rx from controller to/from IrDA card.
Parallel	Register Test Loopback test for all data and control lines.	Verifies parallel controller registers. Verifies tx/rx and control lines from controller to parallel port connector(s).
Ext Keyboard	Register and self test to keyboard controller. Generate keypress(es) using ASSET's 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's keyboard/mouse card and verify returned codes at controller.	Verifies mouse controller access from CPU. Verifies mouse port.
TouchPad	Register test. Generate mouse click(s) using ASSET's keyboard/mouse card and verify returned codes at controller.	Verifies touchpad controller access from CPU. Verifies touchpad port.
Internal Keyboard	Register and self test to keyboard controller. Generate keypress(es) using ASSET's keyboard/mouse card and verify keycode at keyboard controller.	Verifies internal keyboard controller access from CPU. Verifies internal keyboard scan to internal keyboard port.
BIOS ROM	ID Check CRC Check	Verifies access to boot ROM from CPU. Verifies boot ROM contents.
Video/LCD	Run BIOS Initialize selected video mode(s) and verify using ASSET's RGB & LCD check cards or operator.	Verifies BIOS boot. Verifies access from CPU to video controller. Verifies RGB and/or LCD ports.

CONTACTS FOR ADDITIONAL INFORMATION

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

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