Infiniti HCL Labs

HCL Labs has been functioning since long to provide quality hardware to the Indian market. Our specialised technology skill spans hardware, operating systems, drivers and middlewares for distributed computing and management. We carry out special environmental testing so that our products operate smoothly under the varied weather, power and transportation conditions in India.
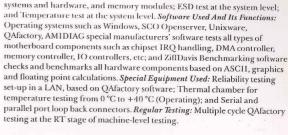
Over time, we have developed close interaction with other test labs all over the world such as Intel, Microsoft, NSTL, SCO, Novell, Seagate, Quantum, to name a few. We work as a Beta testing site of Intel server products. Our products are certified from Microsoft, Novell and SCO; this helps us to remain a technology leader as well as provide quick solutions to our customers in this highly dynamic, open-ended and high-tech world.

HCL Labs put HCL machines through rigorous tests and extreme conditions to ensure that only the best product reaches the customer. A guarantee of excellence.

Special Equipment Used
...tools that test for perfection

❶ **QAfactory** based on LAN multiple cycle reliability test set-up with online monitoring of machine status and final error log mechanism. The set-up puts all machines through multiple cycle reliability testing with the minimum human intervention. One Monitoring Station, developed inhouse, provides the online status of all connected machines. In case of any error, an error log is generated.

❷ **Thermal Chamber:** Temperature Range: –40 to +70 °C. Required for thermal stress testing while running a diagnostics software.

❸ **ESD Simulator** that can generate a max 10 kV air discharge. Required to verify the ESD susceptibility levels of all products.

❹ **Dielectric Tester (Hi-Pot Tester):** Used to assess the adequacy of dielectric material between primary circuits (220V AC input) and accessible metal parts (ground area on chassis). It short-circuits the input power lines and applies a voltage between the **machine** and the ground.

❺ **Ground Resistance Tester:** To test the resistance between the input earth point and any metallic part of the chassis (it should be <100 million-Ohm).

❻ **AC Leakage Current Tester:** Checks for the leakage current between 220V AC line input and ground of the chassis (it should be <3.5 mA).

❼ **Serial and Parallel Port Loop Back Connectors.**

Software Used
...programmed to excel

❶ **QAfactory:** Conducts extensive testing and provides an error log. Tests the motherboard components, provides accurate information about bad sectors on hard drives. Also checks the serial and parallel ports using special loop back connectors.

❷ **ZiffDavis Benchmarking Software:** Checks and benchmarks all hardware components based on ASCII, graphics and floating point calculations.

Component Level Testing
...each part a marvel of technology

For the following important machine components: motherboards; SMPS; cabinets; hard drives; floppy drives; monitors; and keyboards.

Motherboard

Type Tests: BIOS validation; Compatibility with all important operating systems and hardware, and memory modules; ESD test at the system level; and Temperature test at the system level. *Software Used And Its Functions:* Operating systems such as Windows, SCO Openserver, Unixware, QAfactory, AMIDIAG special manufacturers' software tests all types of motherboard components such as chipset IRQ handling, DMA controller, memory controller, IO controllers, etc; and ZiffDavis Benchmarking software checks and benchmarks all hardware components based on ASCII, graphics and floating point calculations. *Special Equipment Used:* Reliability testing set-up in a LAN, based on QAfactory software; Thermal chamber for temperature testing from 0 °C to +40 °C (Operating); and Serial and parallel port loop back connectors. *Regular Testing:* Multiple cycle QAfactory testing at the RT stage of machine-level testing.

SMPS

Type Tests: Voltage and current rating checks; Ripple voltage check on all lines, for instance a max 50 mV ripple on a 'PG' signal line; 'PG' signal line check; On Delay 100-500 ms and Off Delay >1 ms check; and Dielectric Testing (Hi-Pot Testing). *Special Equipment Used:* Storage Oscilloscope 60 MHz; Home-made PG signal monitoring jig (on delay tester); and Dielectric tester. *Regular Testing:* MIL Std 105D with 0.65 per cent AQL; Cross load regulation testing of lines; PG On Delay/Off Delay; and Short-circuit protection; AC high/low voltage testing.

Cabinet

Type Tests: ESD Test at the system level, max 10 kV in air; Drop testing at the system level in packed condition from a height of 5 feet, on all six surfaces; Temperature testing at the system level working for eight hours at 40 °C; and Bump test, vibration, humidity cycling, as required, outside the plant. *Special Equipment:* ESD simulator generates max 15 kV air discharge.

Hard Drives

Type Tests: Reliability testing for 24 hours. *Software Used And Its Functionality:* QAfactory, for bad sector testing, read/write testing, etc. *Regular Testing:* 100 per cent QAfactory testing for bad sectors and read/write testing. *Acceptance Criteria:* Zero bad sector and no read/write error. *Facility Required:* LAN-based QAfactory test set-up.

Floppy Drives

Type Tests: Reliability testing using inhouse software, Mfyrel. Alignment checks such as zero track, read/write, radial and Azimuth alignment and index adjustment. *Software Used And Its Functionality:* Mfyrel (inhouse software). For read/write on selected tracks, head seek, etc. *Special Equipment Used:* Analog FDD exerciser, alignment diskette (analog diskette). *Regular Testing:* Sample test 1 drive per lot; alignment checks and Mfyrel 1 cycle. QAfactory multiple cycle reliability testing.

Monitors

Type Tests: Pattern testing; Functionality testing; Environmental tests such as Temperature testing, Drop test (for local monitors only); ESD, ground leakage current, Hi-Pot test, AC Hi-Low test; Workmanship: Solder quality, PCB cleaning, etc; and Reliability: 24-hour power on at room temperature. *Software Used And Its Functionality:* DMU pattern generator (display mate video utility). Special software to check all preset resolutions; and QAfactory VGA test to check all resolutions, on-screen pattern movement. *Special Equipment Used:* Thermal chamber; Hi-Pot tester; ESD tester that can generate up to 15 K; Variac for AC Hi-Low; and Earth leakage current tester. *Regular Testing:* Physical testing, functional CL mode, QAfactory. 14" sample testing for MIL 105D; 17" onwards there is 100 per cent testing.

Keyboards

Type Tests: ASCII code checking of every key pressed. *Software Used And Its Functionality:* QaPlus: displays the ASCII code on a key press. *Regular Testing:* Sample 1 per lot, same as above.