IBM Retail Hardened

Retail hardened is a term that is used to describe I/T products that are designed specifically for the retail environment. It encompasses the continuity of supply, store image and reliability considerations that are critical to the retailer. Retail hardening for IBM is the result of longevity within the retail technology field. IBM has built an experienced staff (80% averaging over 15 years specifically with retail technology) of designers and engineers who understand the retail environment and the requirements it places on technology.

Retail hardened starts with industry standard PC componentry, but uses that componentry on a motherboard designed specifically for retail rather than just using a PC motherboard. This is because PC motherboards have planned production lives of 3 to 4 months. Retailers choose their application, then test it with the hardware platform until they are satisfied the solution is stable and then finally roll out the chain. Typically this takes from 18 months to 2 years. If a standard PC motherboard were used, the retailer would have to either 1) buy enough technology to complete the chain rollout at the start of the rollout or 2) support and maintain at least 4 different hardware platforms across their enterprise. By controlling the chipsets that are used on the motherboard, retail hardened technology provides 18 months to 2 years in production life. This allows the retailer to maintain a single platform throughout the entire chain rollout without having to purchase hardware in advance of the installation.

Retail hardened technology is designed to be a total system, not just pieces cobbled together. There is one diagnostic package for the entire system, rather than a diskette for the cash drawer, another for the logic unit and another for the printer. The input/output devices are all designed in conjunction with the logic unit. They all fit together and make a stylish, cohesive package. The system unit is designed to conceal the peripheral, connectivity and power cables. The cables for the input/output devices are concealed within the chassis or mount. The store image is considered as much as the reliability of the product.

Retail hardened technology is designed for Customer Setup, which means it is easy to assemble and update. Generally, no special tools are required for assembly. The input/output device ports are numbered and match the number on the cable for the corresponding input/output device. The ports and connectors are positive latching for easy assembly and to help prevent accidental disconnection during operation. The logic unit can be easily updated with memory or feature cards without disrupting the entire check stand.

Finally, retail hardened is designed and tested for the stringent, retail environment. And IBM has access to some of the best test labs in the industry; actual retail stores with over 1.7 million POS terminals shipped and installed providing real-time data on performance requirements for retail. IBM retail hardened technology is reliable. It is designed to be dropped, shaken, shocked and rained on.

IBM retail hardened logic units use variable speed fans or a compact, water cooling process ('cool pipe' technology) to increase the longevity of the processor and electrical components. The keyboards are all designed to be dust proof and spill proof. They are also designed to operate while totally submerged. The SureMark™ printer is a thermal printer, which are generally quieter, faster and more reliable than impact printers.

Standard PCs test with Arizona Road Dust for contamination to ensure terminals have good contacts at connectors to help prevent intermittent failures and provide proper ventilation for cooling. Arizona Road Dust is a very fine, gritty dirt that gets in everywhere. Field service data shows that a retail terminal accumulates more than just dirt. Lint, clothing fibers, grease, human skin particles, bug pieces and hair also get drawn into the terminal. IBM has patented a formula equating to the actual 'dirt' composition found in retail terminals.

Electrostatic discharge (ESD) is an issue in arid areas of the country, like the southwest or the northeast in the winter time. People build up charges in their bodies by walking across a carpeted area or swiveling out of a cloth seat and then get a shock, or an electrostatic discharge, when they touch a metal object. Electrostatic discharge can provide sufficient voltage to cause a terminal to hang. Industry standard ESD tests for PCs and other electronic equipment is to discharge up to 8000 volts into the equipment. When a person touches something metal and can actually see a spark and hear a snap, they have discharged approximately 7000 volts. This is enough of a charge to 'hang' PCs. IBM retail hardened terminals are tested up to 15,000 volts. They can withstand both direct shocks to the metal portions of the machine and indirect shocks to the surface it is sitting on. They should not hang, even when hit with these elevated voltages.

Retail terminals exist in a wide variety of environments. They are not always in nice, temperature controlled buildings. To ensure they will thrive in the environments they will be used in, IBM retail hardened terminals must operate for extended periods of time in IBM's test environmental chamber. The environmental chamber is an oven - refrigerator combination that can also vary the level of humidity. IBM retail terminals are totally operational in conditions of 10 - 40 degrees centigrade, with 8 - 80% humidity. And many retail environments have highly corrosive chemicals, from general cleaning solvents to chlorine for pools to brake fluid. There are also general environmental conditions to consider, such as rust from being used outside for sidewalk sales. IBM retail terminals use gold plated device connectors, which do not corrode easily and ensure a more reliable connection of all input/output devices.

In the US, 48% of the retail terminals IBM ships are in an integrated configuration where the logic unit sits on top of the cash drawer. General purpose operating systems, such as Windows, require hard drives. Hard drives are fairly fragile instruments, not designed to take the vibration of the constant opening and closing of a cash drawer or the shock of breaking coin rolls against the edge of the open cash drawer. Without specific design and testing, hard drives average a 1 year life span in the retail environment.

IBM retail terminals are designed and tested to accommodate this very real, retail environment. The hard drives selected have been tested by placing them in logic units that sit on top of cash drawers. The cash drawers are weighted with coins and a pneumatic arm continually opens and slams the cash drawer shut. This testing is done not only for the original hard drive size, but for every hard drive released as a feature for the terminal throughout its life span.

Point of Sale is a mission critical function. Retailers cannot have customers waiting in line while the terminal re-IPLs. Major metropolitan areas, and the state of California, continually have power line disturbances. This happens when the power company switches from one transformer to another to balance the power load. The lights dim, but do not go out. IBM retail hardened power supplies are designed to withstand a dip of up to 20% in power without needing a UPS. This helps to ensure the power supply will continue running during the transformer changes, which generally produce a 15% dip in power.

Similarly, the Point of Sale system cannot be unplugged from the wall just because a major thunderstorm has rolled in. IBM retail hardened terminals are designed and tested to withstand power surges at amplitudes of up to 2500 volts, which simulates lightening strikes to the ground outside the store. Electronic equipment cannot withstand a direct lightening strike to the store power lines, however, IBM retail hardened terminals are designed so that the power supply will blow first, which helps protect the planar. There is less risk that the vital financial data, such as daily and departmental totals, will be lost or have to be manually reentered when the store is struck by lightening, because the motherboard has Nonvolatile memory that can store the financial data. The data can readily be polled by the server once the power supply is replaced.

Radio frequency activity is rampant in retail. There are RF inventory/receiving scanners in the back, Sensormatic security devices out front, RF terminals and kiosks and electronic shelf labels installed in stores. Additionally, there are customers coming in the store with cell phones and pagers.

All electronic equipment must test and report how much RF they emit into the environment. Past experience has shown that RF activity can cause terminals to hang. High powered, construction walkie-talkies and intercom systems can jam terminals. However, IBM is prepared for this environment and bombards the retail hardened terminals with a wide range of radio frequencies to help ensure operation is not impacted.

The reliability, product availability to maintain a consistent platform throughout the enterprise and the appearance of the terminal are all a part of retail hardening. Some of the basics are the same, but each vendor has specific differentiators and different priorities based upon their experiences. IBM's install base and extensive experience in retail provides a definite advantage in determining and providing what it takes to excel in the retail environment: truly retail hardened terminals.