

Retail-hardened store solutions from Toshiba Global Commerce Solutions

Are your point of sale systems designed to withstand hazards in your retail environment?

**TOGETHER
COMMERCE**

TM

Highlights

- Delivers retail-hardened systems and peripherals based on decades of retail experience
- Incorporates the principles of retail hardening during design, testing and manufacturing
- Addresses extremely high operability standards that often exceed accepted industry requirements

Are your point-of-sale systems designed to withstand hazards in your retail environment?

Reliability is one of the most important performance factors for any point of sale (POS) and self service device, for one very simple reason: if the system goes down, even for a few minutes, the store cannot complete the transaction. When that happens, the customer is frustrated and customer loyalty falls, followed shortly by a decline in revenue.

As retail businesses grow and expand, system reliability becomes even more important. Minor problems—so-called quick-fix failures that take only a few moments to resolve—can scale rapidly in frequency and severity as stores add checkout lanes or businesses acquire more stores. In other words, a headache for a retailer supporting ten POS systems becomes a more serious disruption for one with 50 systems— and practically an unmanageable problem for one with 10,000 or more.

Retail-hardened solutions can help retailers maintain high uptime in extreme environments so transactions can be completed and technical support costs can be minimized.

Compared with a typical office environment, a retail store has far more environmental hazards—including temperature extremes, dirt, dust, grease, static electricity, shock, vibration, spills, magnetic fields and radio frequency interference. POS systems usually operate for long hours—sometimes 18 and even 24 hours a day, seven days a week. They are used by many different employees and too often handled roughly. This combination of environment, usage and extended hours means that retail systems not specifically designed for the hazards of retail environments are far more susceptible to early failures.

POS systems must meet a higher standard of retail hardening. Designed to provide a stable and robust platform for many years, genuinely retail-hardened solutions can help retailers maintain high uptime, so transactions can be completed and technical support costs can be minimized.

Designing a robust system

Toshiba Global Commerce Solutions designs POS solutions specifically for the unique demands of the retail world. Retail-hardened systems are not generic office PCs repackaged or customized for retail; they are true POS systems engineered to deliver high uptime and long-term reliability under harsh conditions. Compared with the expected three- to five-year lifecycle of a typical PC with a cash drawer, POS systems from Toshiba Global Commerce Solutions are known to be actively in retail service for seven or more years.

Heavy-duty chassis design

The basic chassis for POS systems from Toshiba Global Commerce Solutions is composed of high-quality materials, including impact-resistant plastics and heavy grades of sheet metal. The plastic of the exterior components of the system, including the monitor and peripherals, is flame resistant. It is also resistant to ultraviolet light, which helps prevent the yellowing or cracking that can occur when systems are exposed to direct sunlight. The sheet metal has a special coating designed to maximize surface electrical conductivity and improve electrostatic discharge performance.

Toshiba Global Commerce Solutions invests heavily in quality assurance programs with key POS suppliers so that components are designed to deliver long-term reliability in retail. Although all customer environments are unique, the target service life is seven years in a typical retail environment.

Component selection

All POS parts are not created equal. Toshiba Global Commerce Solutions works with a core group of long-term suppliers and invests heavily in quality assurance programs to support first-rate component design and manufacturing. Designers select components that are designed to deliver longer life spans under

retail conditions. For example, POS systems typically include gold-plated connectors, which reduce the likelihood of corrosion. Commercial PC manufacturers use tin-plated connectors that are not as robust.

Moreover, guidelines require designers to choose components that have high design margin and reliability ratings. If proper retail-ready and long-life parts are not available for a system, the team designs them. Circuits and building blocks such as power supplies are designed with conservatively-rated components to enhance long-term reliability. Fans utilize more expensive ball bearing construction and have electronic fan speed control to maximize reliability and quiet operation.

Long service life

A technology purchase decision and rollout cycle in retail can last more than two years. Many manufacturers typically produce products for only six months before moving onto the next model. This is often driven by the component suppliers eliminating production of the parts. As a leader in the industry, Toshiba Global Commerce Solutions has a “preferred customer” status with our key technology suppliers. We work with them to identify the key components we need to have in order to manufacture products over a long period. These choices are made at the beginning of a program to help ensure a long service life for our customers. Retail systems are designed with a product life of at least two years (but often more), and service parts are available for a minimum of seven years after a system reaches the end of its product life.

Designing a holistic system

Unlike some other POS manufacturers, the Toshiba Global Commerce Solutions team designs the logic unit, display, keyboard, printer and other peripherals to fit and work together as a single unit. The result is a stylish, cohesive package of retail components that complement each other both in appearance and in function. With the unified design, cables can be hidden within the unit to provide a cleaner appearance, and peripherals and features can be seamlessly integrated. Moreover, a retailer can choose POS configurations for a specific store design or layout.

For example, a retailer can choose to place only the display and keyboard on the checkout counter to maintain a streamlined, modern appearance.

The one-stop design approach offers more than just pleasing aesthetics: it helps reduce the time it takes to diagnose a system problem. In any situation where there are multiple parties responsible for the design of a system, a business typically must call several vendors to identify the problem and then determine which party is responsible for resolving it. Toshiba Global Commerce Solutions provides a single resource for identifying and resolving any concern—including user-friendly diagnostics and central site monitoring and management built into the POS systems.

Toshiba Light-Path Management, a distinctive POS feature, aids in local diagnostics and helps service technicians bring the right parts to the store for a service call. Toshiba systems management tools, including Toshiba Remote Management Agent, help retailers monitor the health and software status of POS systems—in one store, a chain of stores or the entire enterprise. The tools can also monitor input and output (I/O) store devices from both TGCS and third-party vendors. Systems can be managed locally or from one central site.

Building systems for the retail environment

Toshiba Global Commerce Solutions designs POS systems for long-term reliability in retail environments. Keyboards, for example, are made using a complex laser engraving process to label the keys, rather than printing letters and numbers on a POS keyboard that can rub off with constant wear. Power supplies are designed to survive severe dips and spikes of power caused by brownouts or utility switching—even a nearby lightning strike. They can withstand up to a 20 percent momentary drop in power without being reset and without secondary uninterruptible power supply equipment. The retail-optimized power supplies also promote energy-efficient operation and reduce the need for separate peripheral power bricks and associated cabling.

Point-of-sale systems from Toshiba Global Commerce Solutions feature numbered ports and latching connectors to facilitate easy installation and integration into the store without special tools or expertise. These latching connectors also help prevent cables from being accidentally unplugged, which can render a system inoperable.

Designed for maximum flexibility

Designing for retail requires systems to be configurable and upgradable. This provides a choice of installation configurations as well as investment protection. Toshiba Global Commerce Solutions offers POS systems with processor sockets, feature card slots, upgradable I/O configurations and other features that allow for easy enhancements. Retailers can evolve their store technology as their needs change, instead of ripping and replacing systems, so they can make the most of their investments.

Systems are offered in a variety of formats with different functionalities that meet unique retail requirements. For example, 12-inch-wide systems are available for space-constrained areas, integrated units for clean and simple presentation, and distributed units that can be hidden under a counter.

Manufacturing innovations

To produce retail-hardened systems and peripherals, Toshiba Global Commerce Solutions employs a number of special practices:

Burn-in and power cycling

Retail testing is much more rigorous than common PC testing of 30 minutes at room temperature. POS systems from Toshiba are subjected to an extended burn-in and power cycling test. They are powered up and down numerous times and are run for as long as 12 hours at elevated temperatures. Extended burn-in and power cycling help eliminate out-of-box and early-life failures.

Round-robin testing

In every batch of systems, a number of units are taken off the production line to run more extensive testing. The systems are loaded with an operating system, POS software and drivers, and

then each is tested to check if the product is meeting its specifications. A burn-in test is run for several weeks during which systems are operated in elevated temperatures. This round-robin testing helps identify issues that result from nearly imperceptible changes in component quality, which could affect long-term reliability.

Pre-shipment integration

As a service offering for clients, parts of the POS solution can be assembled and tested—including peripherals, hard file, memory, adapter card and software—and shipped as an intact unit. Once it arrives, the retailer can simply plug the system in and start using it. This service provides a final quality check that not only helps reduce out-of-box failures but also speeds the installation process.

Testing to higher standards

POS systems and peripherals from Toshiba Global Commerce Solutions are tested rigorously to meet a wide range of industry, international and company standards for quality. Systems are assembled and tested in typical retail configurations—not just as an isolated system unit, keyboard or printer. Performance testing simulates worst-case scenarios. Systems must pass a battery of tests to be designated as retail hardened.

Although some POS vendors claim that they manufacture retail-hardened systems, only products that have passed an extensive series of test can truly stake such a claim. Below are examples of some of the tests.

Thermal envelope testing

Retail systems from Toshiba Global Commerce Solutions operate on cruise ships, at gas stations, in amusement parks, at mountaintop resorts and in the mist of scenic waterfalls. They sit in drive-through windows, are rolled out into parking lots for sidewalk sales and are shipped in a variety of conditions, from a tractor trailer passing through the desert to the subzero temperature of an aircraft cargo container. Because these products need to withstand prolonged exposure to a wide range of

temperatures and humidity levels, they are tested in environmental chambers to help ensure that they can address these requirements in operating and shipping environments.

Operational tests simulate temperature and humidity conditions—from 5°C (41°F) to 40°C (105°F)—that occur in store environments. The systems are even operated beyond the condition end points to promote added protection. During these tests, the internal temperature of key components is monitored to help ensure that they do not exceed our test limits, which are conservative compared with the manufacturer's maximum ratings.

During thermal testing, the humidity is varied between 10 to 90 percent and often includes rapid increases and decreases in temperature. POS devices that pass these tests can be moved from inside to outside a store and continue to operate in a normal manner.

Test systems are also exposed to air temperatures from -40°C (-40°F) to 60°C (140°F) to help ensure that components are not damaged and that connectors don't crack or become loose during the most extreme shipping conditions.

Unique tests for lint contamination.

Dirt and lint particles can reside in stores, restaurants and other places where people gather and over time can lodge in the cracks and crevices of checkout systems. Hardware from Toshiba Global Commerce Solutions is designed, manufactured and tested to minimize the effect of dirt and lint contamination in critical components, which could result in overheating and costly downtime.

Spill and drip testing

Spilled beverages and other liquid hazards can wreak havoc on a POS system that is not properly defended. This is especially critical in food service environments, where POS systems are regularly exposed to sticky beverages and other liquids.

Two liquid tests are performed, both of which exceed prevailing requirements in the PC industry. One involves slowly dripping a variety of liquids on the system over a period of time. The other involves dumping an extra large cup of liquid—a frequent occurrence at the POS in sports arenas, pubs and bars. During the test, the system must continue to operate after such exposure to accidental spills.

POS systems from Toshiba Global Commerce Solutions have containment areas that direct the liquid away from sensitive electronics and toward drains, so it can exit the unit. Displays, printers and keyboards also have design features—such as seals and gutters—that divert liquid away.

Electromagnetic compatibility testing

Electromagnetic compatibility is a broad term that defines a product's ability not to affect, and not be affected by, other devices that transmit or receive electromagnetic signals. This testing is divided into two types of tests:

- Interference testing determines if the POS terminal interferes with other devices such as radios, televisions and the like. This type of interference is strictly limited by the U.S. Federal Communications Commission and other regulatory bodies.
- Susceptibility testing helps ensure that the POS terminal is not affected by other devices that might interfere with operating proper operation. This type of test is not typically regulated by regulatory agencies. Examples of these kinds of tests are immunity testing to strong radio fields, magnetic fields and static electricity. Toshiba Global Commerce Solutions uses specific tests for these types of interference. The test criteria are significantly higher than industry norms.

Radio frequency field testing

All POS products from Toshiba Global Commerce Solutions are tested to check for resistance to the effects of nearby radio transmitters. Although cell phones seldom present a problem because of their low power, more powerful radio frequency fields occasionally encounter POS systems through transmitters such as walkie-talkies.

Magnetic field testing

Quality teams use testing hardware from several of the anti-theft industry providers to protect POS products from anti-theft demagnetizing units. During these tests, product performance is evaluated in relationship to the devices that demagnetize anti-theft tags. These devices emit strong magnetic fields that can disable the system's magnetic stripe reader, distort the display image or corrupt the hard file. These tests provide retailers peace of mind in that the anti-theft device will not affect system performance or reliability when placed at a reasonable distance away from the POS unit.

Electrostatic discharge testing

Electrostatic discharge (ESD) is the transfer of static electricity from one person or object to another. ESD occurs in all types of environments, but it can be found most often in low-humidity environments and in areas with carpeting. For example, a clothing store in winter typically creates a harsh ESD environment. An ESD discharge to an unprotected terminal will typically cause the terminal to hang or reboot. If the discharge is severe enough, it can cause damage.

Some countries require ESD testing to 8,000 volts. By contrast, all POS products from Toshiba Global Commerce Solutions are tested up to 15,000 volts to help facilitate proper operation in the most stressful situations. The higher testing requirement (15,000 volts versus 8,000 volts) was based on feedback from clients over many years—an example of how the closed-loop process translates field experience into better products. During ESD tests, hardware systems—including peripherals—are placed on a grounded metal table and repeatedly exposed to high levels of

ESD. Testers apply different voltages and probes to different test points selected to provide worst-case conditions. In the test, the terminal is started with exerciser software, and thousands of discharges are applied to the various points to test for ESD impact. Multiple units are subjected to this test, and, as a result, systems have a low risk of being affected by ESD, even when exposed to elevated ESD voltages.

Lightning strike testing

Every time a thunderstorm rolls in POS systems can't be unplugged. Toshiba Global Commerce Solutions tests all POS systems to help ensure they can withstand power line surges at amplitudes up to 2,000 volts, which is equivalent to a lightning strike to a nearby object outside the store. No system can survive a direct strike to its store's incoming power line, but when systems are designed to stop the energy from a nearby strike at the power supply, it means the energy is not transferred to the other electronics in the system, including peripherals.

Vibration testing

Toshiba Global Commerce Solutions conducts a variety of vibration tests to simulate the abuse systems receive during shipment and once installed in a normal retail store. A set of tests simulate the kind of vibrations experienced on an airplane flying through turbulence or a tractor trailer driving on a bumpy road—both common occurrences during shipping.

Motor-driven tables shake test systems violently along all three axes to identify any potential weaknesses in the design or in the packaging materials. Other shaker tables simulate a less violent vibration but for a longer period. Systems are powered up and run during both of these tests and must continue to operate flawlessly for the duration of the vibration tests for them to pass.

Another test simulates the constant opening and closing of a cash drawer and the shock of breaking coin rolls against its edge. The test involves weighing down the cash drawer with coins and repeatedly opening and shutting the drawer with a pneumatic arm millions of times.

Drop and fragility testing

A variety of tests are conducted to simulate the abuse system units receive in a normal retail store, as well as during shipping and delivery. POS systems from Toshiba Global Commerce Solutions are designed to be robust enough to withstand rough handling.

Test systems, while in their shipping packages, are dropped multiple times from heights of 30 to 36 inches. Each device is dropped on all six sides, three edges and a corner to make sure it will not crack or shatter. The system must power up and operate without incident after each drop to pass the test. Depending on the product, some out-of-packaging drop tests are also performed.

Chemical resistance testing

Retailers use a wide range of cleaners in their stores, many of which are used around POS displays. Experience has proven that long-term exposure to cleaners can damage internal POS electronics and plastics. Chemical resistance testing checks if cleaners, solvents and other harsh substances often found in retail settings can penetrate the specially designed seals on displays. Consumer-grade monitors, for example, do not have front seals to prevent cleaners from penetrating the unit. Testing helps determine which materials and designs are most resilient.

Trust Toshiba's Retail Experience

As the world's leading provider of integrated in-store solutions and retail insights, Toshiba Global Commerce Solutions delivers end-to-end solutions for checkout, consumer interactions and retail operations that unlock amazing new possibilities for our clients and shoppers everywhere. In partnership with the Together Commerce Alliance, our global business partner program, we help bring innovation and value to every retailing experience so that you can delight your customers every day, everywhere.

Together Commerce

Together Commerce is Toshiba's vision for the new future of retail where retailers adapt their strategies, their stores and their technology to engage with consumers throughout the buying process in a seamless and helpful way. This collaborative approach enables retailers and customers to create mutually rewarding commerce—together.

Focus and commitment

Many retailers choose Toshiba Global Commerce Solutions because products are designed exclusively for the unique demands of the retail environment. As important, Toshiba Global Commerce Solutions is dedicated to helping clients make technology choices based on the retailers' unique needs, whether a client needs 50 POS systems or 50,000 units worldwide.

Global presence and experience

With over six million POS systems shipped and installed, Toshiba Global Commerce Solutions has store systems in practically every segment of the global retail industry. This client base effectively acts as the world's largest retail test laboratory, and we pride ourselves in taking what we learn in each segment and applying it to every client we serve.

© Copyright Toshiba Corporation 2012

Toshiba Global Commerce Solutions, Inc.
3039 E. Cornwallis Road
Research Triangle Park, NC 27709
U.S.A.

Printed in the United States of America
December 2012
All Rights Reserved

Toshiba, the Toshiba logo, SureMark, SurePoint, AnyPlace kiosk and SurePOS are trademarks or registered trademarks of Toshiba in the United States, other countries, or both.

Toshiba Global Commerce Solutions the Toshiba Global Commerce Solutions logo and toshibagcs.com are trademarks of Toshiba Global Commerce Solutions in the United States, other countries or both. If these and other Toshiba Global Commerce Solutions trademarked terms are marked on their first occurrence in this information with a trademark symbol (® or ™), these symbols indicate U.S. registered or common law trademarks owned by Toshiba Global Commerce Solutions at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A current list of Toshiba Global Commerce Solutions trademarks is available on the web at "Copyright and trademark information" at <http://www.toshibagcs.com/legal/copytrade.shtml>

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines in the United States, other countries or both.

Other company, product or service names may be trademarks or service marks of others.

The information included in this publication could include technical inaccuracies or typographical errors. Toshiba may make improvements and/or changes in the product(s) or the program(s) described in this publication at any time without notice. Toshiba assumes no responsibility or liability for any use of the information contained herein and all such information is provided "AS IS" without warranties of any kind, express or implied, including but not limited to the implied warranties of merchantability or fitness for a particular purpose. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Toshiba or third parties. For more details on limited warranty terms and conditions or extended warranty, please contact your Toshiba representative.

References in this publication to Toshiba products or services do not imply that Toshiba intends to make them available in all countries in which Toshiba operates. Copying or downloading the images contained in this document is expressly prohibited without the written consent of Toshiba. Any proposed use of claims in these materials must be reviewed by Toshiba counsel prior to such use.

All statements regarding Toshiba's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

The Toshiba Global Commerce Solutions home page on the Internet can be found at toshibagcs.



Please Recycle

For more information

To learn more about how Toshiba retail hardened point-of-sale technology can help transform your business, contact your local Toshiba sales representative or Toshiba Business Partner or visit: toshibagcs.com

About the authors

Dave Landers

System unit development manager,
Toshiba Global Commerce Solutions

Dave Landers is a senior technical staff member and is responsible for the overall hardware strategy for Toshiba Global Commerce Solutions. Previously with IBM Retail Store Solutions since 1976, Dave is responsible for designing and continuously improving many of the award-winning Toshiba point-of-sale systems.

Don Smith

Hardware test architect, development,
Toshiba Global Commerce Solutions

Don Smith joined the IBM Retail Store Solutions team in 2004 as the manager of its hardware support team. During his nearly 30 years with IBM, he has been a member of, and has led, complex systems integration and flight test teams for several large-scale airborne projects. Through his involvement with IBM, Don brings his knowledge of testing and its importance to consumer usability and safety to the Toshiba Global Commerce Solutions team.