

Are You Ready for Gen 2?

The EPC global Gen 2/ISO 18000-6C standard is creating a buzz that the RFID industry has never before seen. It's also creating Gen 2-compliant smart label printing/encoding considerations that are often unforeseen, even for experienced RFID labeling specialists. Gen 2 is best known for being available for use worldwide and its unique serialization capabilities. Lesser known are its memory, security, and quality control features, which must be accounted for when planning Gen 2 smart label printing/encoding systems.

This article examines some of the features and options that differentiate Gen 2 products and how they affect smart label printing.

Past Experience Doesn't Guarantee Future Success

Companies that began smart labeling using EPC Class 0, Class 1, or other RFID technologies will need to repeat their testing to determine the best smart label media and placement locations. Gen 2 behaves differently than other protocols, and very likely will not provide the same reading performance when placed in the same location on pallets, cartons, or other packaging. Class 0 smart labels are often more indicative of how Gen 2 will perform than Class 1, but testing and evaluation are needed nonetheless. Media substrates, coatings, and adhesives also affect Gen 2 inlay performance. As with other types of smart labels, organizations may need to use a variety of Gen 2 media to provide quality reading performance for different types of materials that are labeled.

When users change RFID protocols and smart label media, printer/encoder settings often need to change, too. The encoder needs to be programmed for the specific location of the inlay within the smart label media, and the power setting needs to be appropriate to the inlay type and prevailing environmental conditions. Weber's Zebra-based printer/encoders mitigate the problem because of their inlay sensing feature, which helps the encoder calibrate itself for the inlay position. Don't overlook testing and adjusting the printhead settings to provide high-quality and durable text, bar codes, and graphics on the finished label.

Gen 2 shifts support for write verification of encoded data from the reader to the tag. All Gen 2-standard inlays support write verification, but the feature is optional in standard-compliant encoders. Because smart labeling is mission-critical, all tags should be verified, so Zebra printer/encoders support write verification and automatically perform two inlay quality checks.

Memory Matters

One of the most obvious and important new features in Gen 2 is its requirement for a unique 96-bit serial number, instead of the 64-bit identifiers used in earlier-generation EPC technology. The larger serial number required many changes to label formats and database applications for companies that began smart labeling programs based on 64-bit IDs. But Gen 2 isn't limited to 96 bits, and makes up to 512 bits of memory available. The additional, optional memory is available for users to do with as they wish, and may be encoded, enhanced, or ignored by different participants in the supply chain. Memory is available in blocks that support variable security levels, so that data access can be blocked to specified users or unknown devices. For users to take advantage of the data storage available in Gen 2, label formats, printing applications, inlays, and printer encoders must all be able to support the additional memory.

Added Security, Added Considerations

Gen 2 has standard, required base-level security, plus optional security methods and protocols. There may be several different security methods used to protect different portions of memory on the same tag. Available security includes 32-bit password protection (up from 8 bits in Gen 1), lockable fields, and toggling. Once again, the printer/encoder and inlay must be compatible for the security to be available. Zebra printer/encoders support comprehensive Gen 2 security.

TCO Tips

There is already effort underway to develop more security enhancements to the Gen 2 standard, which has led some to predict a “Gen 3” standard will emerge. While this talk is extremely premature, it is fairly certain that additional security protocols will be released, just as we continually see in the wireless LAN industry. Other options and enhancements to the Gen 2 standard will likely emerge as usage grows and best practices are established. Because technical development is ongoing, it is very important for smart label printing/encoders to be installed so they can be conveniently configured, updated, monitored, and managed.

Smart labeling best practices apply to Gen 2, but the protocol has its own additional requirements and considerations. It is clearly not a straight replacement for other types of smart label technology, nor is Gen 2 media plug-and-play compatible with Gen 2-compliant printer/encoders. Gen 2 may grow to become the largest segment of the smart labeling market, creating a tremendous opportunity for labeling specialists who understand its many variables and can tailor them to create unique, reliable systems for their customers.