



# Getting Started with 2D in Retail

## Infrastructure Questions, Key Considerations, & Resources for Retailers

Industry has set a date to transition to accepting 2D barcodes at point-of-sale (POS) — referred to as Sunrise 2027. 2D barcodes allow for a single, standardized way to meet both supply chain needs and evolving consumer requirements. GS1 US® has created this step-by-step guide to help retailers prepare their organizations and scanning systems to accept 2D barcodes at point-of-sale to help streamline operations.

### Getting Started: High-Level Infrastructure Questions for Point of Sale

1. **Software Compatibility:** Can the POS software process multiple barcodes on a single item, including GS1 Data Matrix and QR Codes with GS1 Digital Link URI syntax?
2. **Barcode Recognition:** Does the scanner recognize and decode all compliant retail 2D barcodes, including normal and reversed reflectance?
3. **Processing Efficiency:** What is the processing speed for high-speed bioptic scanners and handheld devices? Are results transmitted within 300 milliseconds for high-speed scanners and 500 milliseconds for handheld devices?
4. **Configuration Flexibility:** Can the scanner be configured to prioritize and transmit desired data (Global Trade Item Number (GTIN®), or GTIN + additional data) from one or all GS1 compliant barcodes?
5. **Operational Modes:** Does the scanner support the three different operational modes to handle various barcode scenarios, such as prioritizing the first GTIN or transmitting all barcodes on a product?
6. **Futureproofing:** How does the POS system ensure scalability and adaptability to future barcode standards and retail requirements?

### Getting Started: Key Considerations

1. **Scanner Software Updates:**
  - Ensure the software can process multiple barcodes on a single item.
  - Identify and decode GS1 Data Matrix, Data Matrix, and QR Codes with GS1 Digital Link URI syntax.
  - Convert GS1 Digital Link URI to a GS1 element string syntax and parse individual data elements.
2. **Barcode Recognition:**
  - Can the scanner recognize and decode all compliant retail 2D barcodes (e.g., GS1 Data Matrix, QR Codes)?

- Does it handle both normal and reversed reflectance (black on white and white on black)?

### 3. **Processing Speed:**

- How quickly can the scanner process and transmit data from 2D barcodes?
- Are the results transmitted within 300 milliseconds for high-speed scanners and 500 milliseconds for handheld devices?

### 4. **Configuration Modes:**

- **Mode 1:** Prioritize the first GTIN from either a linear or 2D barcode and signal completion.
- **Mode 2:** Prioritize GS1-compliant 2D barcodes and transmit GTIN plus additional data.
- **Mode 3:** Identify, decode, and transmit all barcodes on a product, generating an 8-digit label identification to group the data.

### 5. **Retailer Configuration:**

- Can the scanner be configured to transmit desired data (GTIN or GTIN + additional data) from one or all GS1-compliant barcodes?
- Can the scanner be configured to exclude data from barcodes that are not of interest, such as non-GS1 QR codes?

## **Questions to Ask**

- Does the scanner support all necessary barcode types and configurations?
- How does the scanner handle multiple barcodes on a single item?
- What is the processing speed for different types of scanners?
- Can the scanner be configured to meet specific retail needs?

## Roadmap to 2D: Crawl, Walk, Run Guide for Retailers

Below is an incremental roadmap that retailers can follow to prepare and begin their journey to 2D. GS1 US experts are here to help you along the way to understand your organization's needs, use cases, and requirements.

<b>Crawl</b> <b>Establish 2D With GTIN</b>	<b>Walk</b> <b>Expand and Explore GTIN+</b>	<b>Run</b> <b>Deepen Use and Achieve Scale</b>
<b>Use cases:</b> Consumer engagement, digital disclosures, sustainability information, promotions, increased loyalty/trust	<b>Use cases:</b> Enhanced consumer engagement, automation, recalls, inventory/freshness management, sustainability/ESG, business insights	<b>Use cases:</b> Expanded visibility, further improved packaging, wider interoperability, returns fraud, loss prevention
<b>Retailers — Achieve MVP for Sunrise 2027</b>	<b>Retailers — Leverage Additional Data</b>	<b>Retailers — Broadly Leverage 2D and Data</b>
<ul style="list-style-type: none"> <li>• Install optical scanners</li> <li>• Upgrade firmware and software to read all 2D formats and prevent double scanning</li> <li>• Enable systems to extract the Global Trade Item Number® (GTIN®) and process without error (one beep!)</li> <li>• Update own brand/private label products with GS1 2D barcode</li> </ul>	<ul style="list-style-type: none"> <li>• Based on use case, process, and use data beyond the GTIN (e.g., expiration date)</li> <li>• Explore dynamic printing on in-store labeled products. (e.g., expiration date on deli meat)</li> <li>• Remove 1D UPC from own brand/private label products</li> <li>• Non-POS scanners are optical and GS1 2D capable as needed</li> </ul>	<ul style="list-style-type: none"> <li>• Deepen and expand use of barcode data to optimize processes (e.g., stopping a recalled product from going through POS)</li> <li>• Leverage 2D with GTIN+ for variable measure attributes on fresh products</li> <li>• Evaluate use of other technologies to enhance 2D and GS1 data value (e.g., RFID, machine vision, artificial intelligence, digital shelf tags)</li> </ul>

### Resources

- [GS1 Global Office Compliance for 2D Barcodes at Point of Sale \(POS\)](#)
- [GS1 Global Office POS Scanner Criteria Presentation](#)

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