The move to 2D and Digital Link

Considerations and new ways of working

Kyle Parker

MITAS CORPORATION

GS1

The move to 2D

- Compared to traditional 1D barcodes, 2D barcodes can offer a lot more information in a smaller footprint. High information density and also error correction.
- The move to the 2D code means one can include serialisation (SGTIN) of products and this is very powerful to assist with rewards, incentives, fakes, counterfeits, Track & Trace, Roundtripping, etc.
- The need **for improved traceability, efficiency**, and **data management** drives this transformation.
- The 2D code could now contain what is normally just the GTIN, to include Manufacturing date, UB/SB/BB, Batch ID, Serial numbers, etc.

Challenges faced when moving to 2D - Retailer

- **Equipment Upgrades:** Existing 1D Linear barcode scanners will need to be upgraded to image based camera systems.
- **Higher Print Quality**: In-store 1D printers require checking to ensure they can print 2D Datamatrix codes and to a high quality for POS scanning.
- **Store stock rotation:** Stock may need to be controlled to a better level - now to SN rather than quantity only and maybe batch level.
- **Data Management:** 2D Stock is now not only managed in GTIN and quantity in stock (maybe some also managed by batch) but now by serial numbers – requiring better data management systems to handle the increased data volume.
- **Initial Costs:** The transition involves upfront costs for equipment, training, and potential downtime during the switch. Challenge on informal sectors.

Challenges faced when moving to 2D - Manufacturers

- **Packaging Stock planning:** Packaging cannot be pre-printed with just GTIN as before. Marking 2D codes means marking closer to and more so ON the line.
- **Packaging changes:** Primary packaging now needs to provide space for the 2D code and print it on the line. Considerations for TIJ vs. Laser—Add or remove methodology.
- **Equipment Upgrades**
- ***Marking:*** Equipment needs to be able to print high-quality 2D codes, so it is mainly moving away from CIJ to TIJ and Laser.
- ***Vision-based QC:*** *Ensure downstream readability, vision-based verifiers after marking to check* print quality.

Challenges faced when moving to 2D - Manufacturers

- ***Production Monitoring*** (Optional): With serialisation, it's great to know exactly what serial numbers are in which boxes, on what pallet, into which container. All QC data of every item recorded. Aggregation.
- ***Production Line Adjustments*****:** Any current 1D scanners need to be upgraded for 2D reading.
- **Training and Adaptation:** Staff training to handle new equipment and processes, can be time-consuming and costly.
- **Initial Costs:** The transition involves upfront costs for equipment and potential downtime during the switch.

Pros and Cons of existing marking technologies – CIJ

(Continuous InkJet)

Pros

- High Speed - Ideal for Fast Moving Consumer Goods Industry.
- Versatility - Can print on a wide range of substrates.
- Image height up to 19 mm
- Ink throw distances up to 50 mm
- Print speeds up to 470 meters/minute.

Cons

- Lower print quality
- Higher maintenance and consumable costs
- Print durability
- Environmental impact
- Limited data capacity
- Codes can be falsified
- Large physical footprint
- Down-time
- Scalability
- Ink & Solvent Spillage

TIJ - Thermal Inkjets

- Print speeds up to 200m/m @1200dpi
- Print heights up to 50mm
- High print quality
- 79 pieces/second with a 12.7mm QR code
- Barcode ink designed to print crisp barcodes
- Highest rub resistance of 50+
- 1-2 second dry time
- 90-hour de-cap time
- Print on a variety of substrates
- Low maintenance, Easy to use &
- Cost Effective

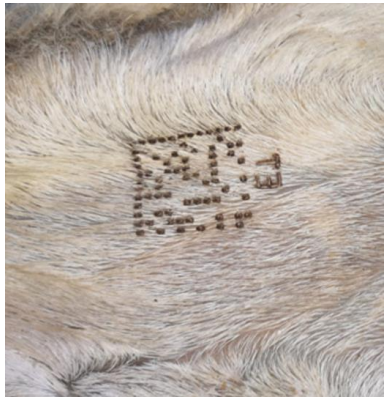
Laser Coding

- Laser coding ensures the identification & traceability of products
- Minimal maintenance and consumables
- Can mark on various materials & directly on the product
- Environmentally friendly
- Permanent, high-quality coding
- High speed – 1000m/min, continuously mark 100 x unique QR codes per second
- Generates codes at 400 microns per point

BiDiLase

DTP Marking

- Food Grade ink or Laser
- Laser is a permanent marking process and does not affect the food's properties.
- Removes micrometric layer from the skin, achieving high-quality visibility and legibility.
- Eliminates labelling, glue, ink or plastic packaging.
- Mark expiry dates, batch numbers, text, logos or images.
- Environmentally friendly.

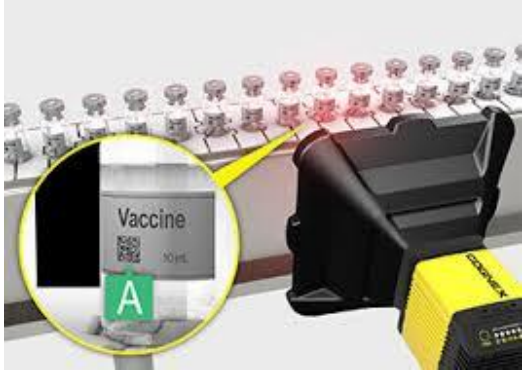


Thermal Transfer Overprinter

- TTO popular for printing 2D barcodes on labels due to their durability and high-quality output for clear scannable marks.
- This method uses heat to transfer ink from a ribbon onto the product.
- Tough barcoding that can resist abrasion and chemicals.
- Capable of high-speed printing, which is beneficial for large-scale labeling operations.

Barcode Verification

- With more variable data, 2-D codes are more challenging to verify and exhibit higher failure rates.
- It is important to remember that one cannot verify with software alone.
- To successfully verify a 2-D code, a barcode verifier must accommodate a specific field of view, minimum x-dimension, lighting angle, format, and software requirements.
- Barcode verifiers guide the marking process to create codes that meet minimum quality standards.
- Auto-generate code quality data and reports.

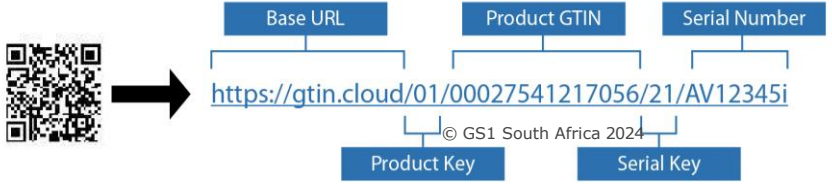


Machine Vision Systems

- Increase throughput without sacrificing product quality, safety, and package integrity.
- Catch labelling defects before goods reach the market.
- Ensure labels are placed correctly and don’t exhibit folds, rips, or misprints.
- Accurate high-speed and multi-code barcode reading
- Detect the presence or absence of date and lot codes and verify that its chain of numbers and letters is correct.
- AI-powered OCR technology deciphers deformed, skewed, and poorly etched characters using OCR and optical character verification (OCV).

Digital Link

- Offer customers an easier way to access enhanced content and experiences, such as detailed ingredient or allergen information, hints and tips for product use, and recommendations
- Avoid the complexity – and overhead – of multiple labels or codes on a single product or package
- Flag recalled, expired, or counterfeit products in the warehouse or where needed.
- Manage returns more effectively (for retailers)
- Enhance product data sharing with trading partners
- Creating consumer product experiences on the Internet accessed from a product's Digital Link (digital twin, traceability information, product safety, product authentication, and more)
- Printing and labeling for 2D Digital Link embedded data carriers

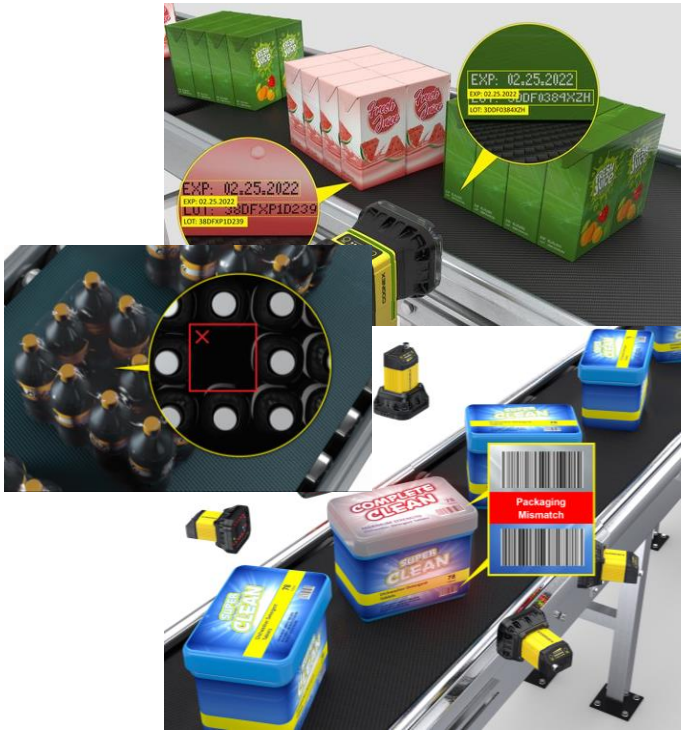


Digital Link

Link

Production Monitoring Software

- Software ties it all together.
- Inspect products for batch numbers & expiry dates through optical character recognition, barcodes & 2D codes, labels, colours, orientation, location, missing items etc.
- Inspects and rejects or stops production line.
- The real-time communication of production volumes, statistics, cross-packing issues, packaging inspection reasons, and unique identifiers to the MES/ERP platform ensures that we are always up to date with our operations.
- End-of-line palletised and aggregated data ready for shipping. SSCC.



Thank you

Kyle Parker

kyle@mitasglobal.com