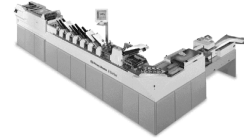


XReader™ Vision System

XReader™ is a digital vision system for high-speed reading of DataGlyph, OCR, DataMatrix, barcodes, postmarks, and other marks and patterns on high-speed printers and inserters.

Large printing and mailing companies are going through a phase of rapidly adopting automation, as customers demand 'package and content integrity.' This involves checking the following:

- The correct print stock is being used.
- The print stock is correctly inserted into the printer.
- Printed materials are properly collated with other materials to be sent to the customer. (These may include items such credit cards, checks, remittance coupons, and return mailers.)
- Materials are properly inserted into the correct mailing envelopes.



Most of these inspections are now performed manually by humans. Any errors put the printing/mailing companies at risk. These risks include:

- Losing a large account because of poor quality.
- Giving unauthorized people access to confidential financial accounts and data of others.
- Losing paper stock and time.
- Creating scheduling conflicts by having to redo a print run.
- Violating SEC regulations by failing to provide prospectus and other materials in a timely manner.

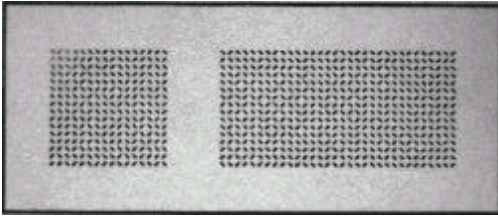


Product description

XReader is a flexible and customizable software-based vision system capable of reading unobtrusive marks at high speed with very high accuracy. XReader can be configured to read barcode and optical marks to support legacy applications, though it was developed initially for even more demanding, high-speed OCR, DataMatrix, and DataGlyph applications.

1. **Speed-** XReader is currently reading at the fastest projected speeds for the fastest inserter on the print factory floor. Read speeds are 30,000 sheets per hour read at up to 200 inches per second. **FSI Automation has been granted a patent on its high-speed DataGlyph reading technology.**
2. **Accuracy-** XReader is capable of reading robust 2D symbologies under harsh environmental conditions with the lowest error rate reported among all of the competitive products. (Installed systems have error rates of 1 false negatives per million reads and 0 false positives out of 3 million reads.)
3. **Flexibility-** Because XReader is primarily a software-based vision system, it can be easily configured to read multiple symbologies at a single inspection station using the same hardware.
4. **Custom Capabilities-** Because of their limited architecture, most scanners only report an ASCII string, requiring data manipulation to be implemented in the printer or inserter firmware. The ease of customizing the XReader allows masking, translation, comparison, or other data-manipulation functions to be performed on the XReader system application before the data is sent to the printer/inserter.

Xerox DataGlyph and its Use with FSI's XReader



What Is A DataGlyph?

- A DataGlyph is a pattern of diagonal forward and backward slashes representing zeros and ones. The picture above shows two DataGlyphs side by side. In a typical mailroom application, information about a document's page sequence and set number are embedded into the DataGlyph as part of a sequence verification operation.

Some of the Advantages of Using Xerox's DataGlyph Symbology

- DataGlyph size and appearance can be tailored to the document thereby providing a more pleasing effect than other symbologies like barcodes, which must often be trimmed off a document after verification because of customer complaints about their appearance.
- DataGlyphs can accommodate any type of binary data (for example, text, audio, image) and in much larger quantities than standard symbologies allow.
- DataGlyphs provide embedded error-checking for environments where a high level of image noise is present. This ensures high levels of reliability under conditions where symbols may be damaged in the printing process.

How FSI's XReader Vision System Handles DataGlyph Symbology

- When the leading edge of a sheet of paper passes in front of the photoelectric paper sensor, a signal is generated to the system. This signal starts a timer which is set to delay for the amount of time required for the DataGlyph to reach the imaging point, which is directly below the camera.
- When the glyph is at the imaging point, the camera acquires an image. Because of the high-speed shuttering of the camera, the image shows no motion blur although the paper is moving. The image is transmitted in digital form to the camera interface board located in the processing unit.
- Once the image is in the CPU, the XReader analysis application is notified of its presence. This application searches the image to determine the number, position, and size **of all data glyphs in the image**. When the boundaries of the glyphs are determined, image processing and pattern recognition techniques are used to interpret the pattern of 1's and 0's (right and left slashes) it contains.
- These strings of bits are passed to the Xerox Intran Dataglyph decode software routines, which will either return the decoded ASCII data or a "failed to decode" message. At this point, the printer or inserter system can be notified by the XReader-based application of the information contained in the message, and it then performs the appropriate response. XReader's patented algorithms can locate and decode DataGlyphs at speeds that will meet the requirements of the most demanding printing and inserting applications.

**For more information please contact: Jim Orrell or Mike Oster at FSI Automation.
Telephone: 425.673.7929 ext.129 or ext.105.**