Kodak i780 Scanner vs. **Canon** DR-X10C Scanner

Kodak i780 Scanner

Canon DR-X10C Scanner

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Kodak

Count *on* Kodak for consistent and true performance.
Count *out* Canon.

All testing conducted in quality assurance labs at Kodak's Document Imaging headquarters facility, 2600 Manitou Road, Rochester, NY from November 18th, 2008–December 11th, 2008.

Speed and throughput

Kodak i780 Scanner vs. **Canon** DR-X10C Scanner

The test results report the actual throughput of each scanner using real-world scanner configurations.

Test 1 through 6 Settings	Kodak i780 ISIS Results	DR-X10C VRS Results	DR-X10C ISIS Results	i780 % performance increase over DR-X10C VRS	i780 % performance increase over DR-X10C ISIS
1) 200 dpi, Bitonal, Duplex*	124.8 ppm	84.6 ppm	51.7 ppm	47%	141%
2) 300 dpi, Bitonal, Duplex*	126 ppm	39.8 ppm	52.4 ppm	217%	140%
3) 300 dpi, Bitonal, Simplex*	124.9 ppm	89.9 ppm	97.2 ppm	38%	28%
4) 200 dpi, Color, Duplex**	121.4 ppm	58 ppm	42.1 ppm	109%	188%
5) 300 dpi, Color, Duplex**	125.2 ppm	28.7 ppm	38.2 ppm	336%	227%
6) 300 dpi, Color, Simplex**	125.5 ppm	66.8 ppm	75.3 ppm	88%	67%

ppm = Pages per minute
All documents were fed in landscape format
* Additional settings for test 1-3: Auto orientation, Auto thresholding, Multifeed detection and Multipage TIFF output
** Additional settings for tests 4-6: Auto orientation, Multifeed detection and Multipage TIFF output

Testing observations and conclusions

- The use of landscape format and the need for basic imaging features are part of daily jobs.
- Enabling even basic features seriously impacts productivity of the **Canon** DR-X10C Scanner.
- The **Canon** DR-X10C Scanner's speed with the additional VRS capability and cost drops by as much as 34% (128 ppm claim to 84.6 ppm actual) in a scenario where the following image processing features are enabled: 200 dpi, bitonal, duplex, auto thresholding, auto orientation, multifeed detection, multipage TIFF format (Test 1).
  - When scanning at 300 dpi with all the other features the same, **Canon** DR-X10C Scanner productivity drops to 39.8 ppm (Test 2).
- The use of basic image processing features severely impacts the productivity of the **Canon** Scanner.
- The **Kodak** i780 Scanner outperforms the **Canon** DR-X10C Scanner with more imaging features enabled, and at higher (300 dpi) resolution.
- Canon markets productivity but in real-world scenarios they run much slower. And despite a customer's additional investment in VRS, *turning on features* continues to have a detrimental effect on throughput speed (see charts 2 and 3 in appendices).

Kodak i780 Scanner

Canon DR-X10C Scanner

Competitive knockouts

Key takeaways:

*The **Kodak** i780 Scanner delivers speed, throughput and productivity as rated, even with multiple imaging features enabled, while the **Canon** DR-X10C Scanner suffers severely compromised throughput that is far below claimed speeds and volumes, with only the most basic imaging features enabled.*

- Canon's marketing materials promote optimal speed and throughput levels but do not take into account real-world scenarios, so claimed speeds are not reflective of actual performance.
- In the world of production scanning, it is the actual features-enabled ppm results that truly count.

Methodology

[1] For detailed information about testing methodology and laboratory test results, click here

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Kodak

Count *on* Kodak for consistent and true performance.
Count *out* Canon.

All testing conducted in quality assurance labs at Kodak's Document Imaging headquarters facility, 2600 Manitou Road, Rochester, NY from November 18th, 2008 – December 11th, 2008.

Appendices

Appendix 1—Testing methodology and results for speed and throughput

Kodak's Quality Assurance Team conducted a series of comprehensive, competitive benchmark tests comparing the **Kodak** i780 Scanner with ISIS to the **Canon** DR-X10C Scanner with VRS.

Throughput tests

The intent of these tests was to determine the throughput of each scanner using typical scanner configurations. All scanners were configured with similar settings and all tests were conducted with **EMC** QuickScan Pro v6.5.1 and run on the same PC host. **EMC** QuickScan Pro was chosen because of its popularity as a third party application. The **EMC** QuickScan Pro demonstration version was used so it would be easier for interested parties to validate results. (See Reference A for configuration details.) The operator prepared documents prior to testing and fed them into each scanner as quickly as possible. Five new sets of documents were used for each scanner during testing. Each test was run for one hour with the total number of pages recorded.

Chart 1—Throughput testing

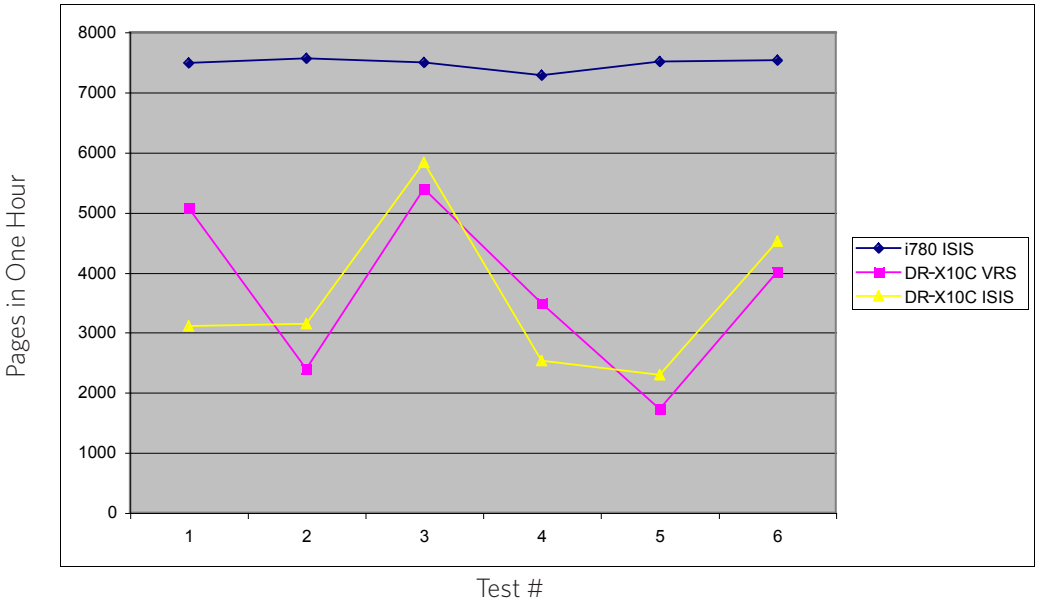
Test Number	# Pgs in 1 hr	Average ppm
i780 ISIS Test #1	7487	124.8
i780 ISIS Test #2	7557	126.0
i780 ISIS Test #3	7491	124.9
i780 ISIS Test #4	7283	121.4
i780 ISIS Test #5	7510	125.2
i780 ISIS Test #6	7528	125.5
DR-X10C VRS Test #1	5075	84.6
DR-X10C VRS Test #2	2390	39.8
DR-X10C VRS Test #3	5391	89.9
DR-X10C VRS Test #4	3477	58.0
DR-X10C VRS Test #5	1719	28.7
DR-X10C VRS Test #6	4009	66.8
DR-X10C ISIS Test #1	3102	51.7
DR-X10C ISIS Test #2	3142	52.4
DR-X10C ISIS Test #3	5829	97.2
DR-X10C ISIS Test #4	2527	42.1
DR-X10C ISIS Test #5	2293	38.2
DR-X10C ISIS Test #6	4516	75.3

Chart 2—Data and differences on number of pages scanned in one hour

	i780	DR-X10C VRS	DR-X10C ISIS	i780 Increase Over DR-X10C VRS Performance	i780 Increase Over DR-X10C ISIS Performance
Test #1	7487	5075	3102	2412 (47%)	4385 (141%)
Test #2	7557	2390	3142	5167 (217%)	4415 (140%)
Test #3	7491	5391	5829	2100 (38%)	1662 (28%)
Test #4	7283	3477	2527	3806 (109%)	4756 (188%)
Test #5	7510	1719	2293	5791 (336%)	5217 (227%)
Test #6	7528	4009	4516	3519 (88%)	3012 (67%)

See Reference A for configuration details.

Chart 3—Graphic representation of data and differences on number of pages scanned in one hour



For more information about testing methodology and laboratory test results, click here

Return to *Speed and throughput*

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Reference A—Testing configuration details*

	Test Job 1	Test Job 2	Test Job 3	Test Job 4	Test Job 5	Test Job 6
EMC QuickScan Settings	200 dpi, bitonal, duplex, AO, auto thresholding, multifeed detection, multipage TIFF output	300 dpi, bitonal, duplex, AO, auto thresholding, multifeed detection, multipage TIFF output	300 dpi, bitonal, simplex, AO, auto thresholding, multifeed detection, multipage TIFF output	200 dpi, color, duplex, AO, multifeed detection, multipage TIFF output	300 dpi, color, duplex, AO, multifeed detection, multipage TIFF output	300 dpi, color, simplex, AO, multifeed detection, multipage TIFF output
QuickScan scan profile name	i780 Test job 01	i780 Test job 02	i780 Test job 03	i780 Test job 04	i780 Test job 05	i780 Test job 06
Scan—show continue dialog after scan	Checked	Checked	Checked	Checked	Checked	Checked
Scan—scan mode	Duplex	Duplex	Simplex	Duplex	Duplex	Simplex
Scan—scan type	Black and white	Black and white	Black and white	24-Bit color	24-Bit color	24-Bit color
Scan—dpi	200	300	300	200	300	300
Scan—page size	Scanner max	Scanner max	Scanner max	Scanner max	Scanner max	Scanner max
Image format and naming—enter file name at...	Checked	Checked	Checked	Checked	Checked	Checked
Image format and naming—file type	TIFF	TIFF	TIFF	JPEG (*.jpg)	JPEG (*.jpg)	JPEG (*.jpg)
Image format and naming—color format	Binary	Binary	Binary	24-Bit color	24-Bit color	24-Bit color
Image format and naming—compression	Group 4	Group 4	Group 4	Sequential JPEG	Sequential JPEG	Sequential JPEG
Image format and naming— append standard extension ...	Checked	Checked	Checked	Checked	Checked	Checked

For more information about testing methodology and laboratory test results, click here

Return to *Speed and throughput*

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	Test Job 1	Test Job 2	Test Job 3	Test Job 4	Test Job 5	Test Job 6
i780 ISIS driver, main, cropping	Aggressive	Aggressive	Aggressive	Aggressive	Aggressive	Aggressive
i780 ISIS driver, main, thresholding	iThresholding	iThresholding	iThresholding	iThresholding	iThresholding	iThresholding
i780 ISIS driver, main, contrast	0	0	0	0	0	0
i780 ISIS driver, layout, image orientation (both front and back image #1)	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic
i780 ISIS driver, layout, page orientation (both front and back image #1)	Top edge first	Top edge first	Top edge first	Top edge first	Top edge first	Top edge first
i780 ISIS driver, scanner, document feeder	250—Automatically start transport	250—Automatically start transport	250—Automatically start transport	250—Automatically start transport	250—Automatically start transport	250—Automatically start transport
i780 ISIS driver, scanner, ultrasonic detection	Medium—3 sensors—end job	Medium—3 sensors—end job	Medium—3 sensors—end job	Medium—3 sensors—end job	Medium—3 sensors—end job	Medium—3 sensors—end job
i780 ISIS driver, dropout, blank image detection	Black and White (back only)—2KB	Black and White (back only)—2KB	Black and White (back only)—2KB	Color (back only)—125KB	Color (back only)—125KB	Color (back only)—125KB
i780 ISIS driver, image processing, JPEG quality	N/A	N/A	N/A	Good	Good	Good
i780 ISIS driver, image processing, color correction	N/A	N/A	N/A	Text with pictures	Text with pictures	Text with pictures

* Note: The **Canon** DR-X10C Scanner configurations were modeled as closely as possible to the **Kodak** i780 Scanner set-ups.

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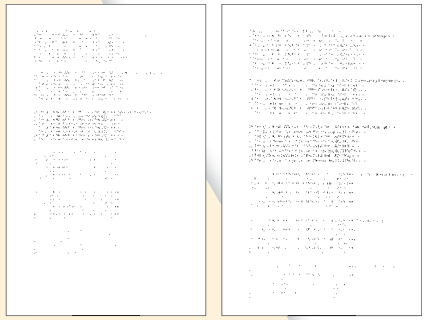
Image and data integrity

Kodak i780 Scanner vs. **Canon** DR-X10C Scanner



Reduced-size versions of the documents scanned during testing

Test: Light Document Challenge	OCR Read Rate for Canon DR-X10C Scanner[2]	OCR Read Rate for Kodak i780 Scanner[2]
Batch of documents with light text density (8-point type) scanned at 200 dpi (LO82) with default settings for both scanners	0%	94%
Batch of documents with light text density (8-point type) scanned at 200 dpi (LO82); brightness and contrast settings optimized for Canon; default settings maintained for Kodak	67%	94%
Batch of documents with light text density (10-point type) scanned at 200 dpi (L102) with default settings for both scanners	0%	95%
Batch of documents with light text density (10-point type) scanned at 200 dpi (L102) with optimized settings for Canon; default settings for Kodak	82%	95%

Testing observations and conclusions

- Lower-quality characters pose a serious challenge for the **Canon** Scanner, requiring time consuming trial-and-error brightness/contrast adjustments that reduce productivity.
- The **Kodak** i780 Scanner exceeds the performance of the **Canon** Scanner with default settings—even with brightness/contrast optimally adjusted for the **Canon** Scanner, the **Kodak** Scanner outperforms it at default settings.
- The **Kodak** Scanner, with default settings, maximizes the integrity of every document scanned, both for viewing and downstream data extraction in real-world scenarios.
- Perfect Page image processing automatically delivers consistently high OCR read rates, exceptional image quality, and a greatly reduced need for rescans.

Competitive knockouts

Key takeaways:

*The **Kodak** i780 Scanner provides outstanding image and data integrity and OCR read rates, even for real-world imaging challenges, while the **Canon** DR-X10C Scanner does not perform nearly as well.*

- Even challenging documents become productive images with the **Kodak** i780 Scanner while the **Canon** DR-X10C Scanner requires a great deal of time to optimize brightness/contrast adjustments and effort to rescan documents.
- Kodak helps ensure that scanned images comprise the best image quality possible—a critical factor in document management workflow—while the **Canon** Scanner can only make a claim to pleasant aesthetics. Kodak delivers real-world scanner performance.
- Even with optimized settings, **Canon** DR-X10C Scanner delivers substandard OCR performance for a production scanner.
- Without adjustments and optimized settings, the **Canon** DR-X10C Scanner performance drops even further.

Kodak i780 Scanner

Canon DR-X10C Scanner

Methodology

[2] For detailed information about testing methodology and laboratory test results, click here

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Count *on* Kodak for consistent and true performance.
Count *out* Canon.

All testing conducted in quality assurance labs at Kodak's Document Imaging headquarters facility, 2600 Manitou Road, Rochester, NY from November 18th, 2008 – December 11th, 2008.

Appendices

Appendix 2—Testing methodology and results for image and data integrity (OCR read rates)

Kodak's Quality Assurance Team conducted a series of comprehensive, competitive benchmark tests comparing the **Kodak** i780 Scanner with VRS to the **Canon** DR-X10C Scanner ISIS.

Image and data integrity—complete testing results

Canon DR-X10C Scanner—optimized brightness and contrast settings		**Canon DR-X10C Scanner—Default configuration settings**		**Kodak i780 Scanner—Default configuration settings**	
Font and dpi variations*	Percent from font and dpi variations	Font and dpi variations	Percent from font and dpi variations	Font and dpi variations	Percent from font and dpi variations
L102	81.7918	L102	0.0000	L102	95.2331
L082	67.1692	L082	0.0000	L082	93.9025
L083	98.9587	L083	0.0000	L083	88.3379
Average Score =	82.6399	Average Score =	0.0000	Average Score =	92.4912

*Font and dpi variations: L = Light; 08 or 10 = Font Size; 2 or 3 = 200 or 300 dpi

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Sensor durability

Kodak i780 Scanner vs. **Canon** DR-X10C Scanner

Kodak's CCD (Charge Coupled Device) sensor provides enhanced durability over Canon's CIS (Contact Image Sensor) technology, which requires any document being scanned to be in direct physical contact with the sensor glass. As a result, sensor damage is a possibility. CCD sensors do not require contact and produce high-quality images without close proximity, eliminating the possibility of sensor glass damage due to contact. The **Kodak** i780 Scanner is designed to maximize uptime, reduce service calls and optimize productivity for your operation.

Fact Check	**Canon** DR-X10C Scanner	**Kodak** i780 Scanner
Vendor's marketing claim	Contact Image Sensor (CIS): "Robust design, outstanding imaging quality."	Charge Coupled Device (CCD): "Superior durability and image quality."
Sensor technology compare/contrast	CIS array requires that documents come into direct contact with sensor glass during imaging; this is necessary for the sensor to capture a quality image.	CCD sensors obtain a quality image without contact between document and sensor glass.
Sensor placement in transport path	Real-world scanning jobs, where documents introduce dust, dirt and staples to the transport path, increase likelihood of damage to **Canon's** Contact Image Sensor during the scanning process. In the **Canon** Scanner design, the sensor is encased in glass that is directly exposed to documents during scanning.	The elegance of **Kodak's** CCD sensor design means it is not placed in the paper path and does not come into contact with documents as they are scanned and pass through the transport. Instead, via a series of mirrors that lie above the CCD sensor but beneath the glass barrier viewable in the paper path, images and data are rapidly captured as documents pass, while the CCD is protected by the glass barrier or imaging guide. Additionally, foam guards seal the imaging guide and surround the mirrors, further preventing contamination.
Impact of sensor technology on productivity, incidence of service calls	Direct contact between sensor glass and document originals increases likelihood of sensor glass damage. With the **Canon** DR-X10C Scanner, a service call is needed in order to replace damaged sensor glass. Uptime and productivity are jeopardized by Canon's technological choices.	No contact is required between a document to be scanned and CCD sensor glass during scanning process, minimizing any chance of risk to sensor glass surface from staples, dust or dirt on documents. CCD sensor is located far below paper path and is additionally protected by a glass barrier known as an "imaging guide" in **Kodak** i780 Scanner specifications. Replacement of glass imaging guide, if ever required, can be completed by end user. Kodak's intelligent design elements enable maximum uptime and productivity for customers.

Kodak i780 Scanner

Canon DR-X10C Scanner

Kodak

Count *on* Kodak for consistent and true performance.
Count *out* Canon.

All testing conducted in quality assurance labs at Kodak's Document Imaging headquarters facility, 2600 Manitou Road, Rochester, NY from November 18th, 2008 – December 11th, 2008.

Conclusions

- The **Canon** Scanner, because of its Contact Image Sensor, requires documents to come into physical contact with the sensor glass, creating a range of potential problems when working with real-world documents. Some of these problems require a service call.
- The **Kodak** Scanner, thanks to its CCD (Charged Coupled Device) sensor's intelligent design and architecture, does not require documents to come into physical contact with the sensor glass, eliminating the possibility of sensor glass damage due to contact with documents that contain staples, dirt or dust.
- Glass imaging guides and strategically placed mirrors that are part of the CCD design, effectively protect the CCD from the paper path and contaminants introduced from documents scanned. Replacement of the glass imaging guides, if ever required, can be completed by the end user, optimizing uptime and productivity.

Competitive knockouts

Key takeaways:

*The **Kodak** i780 Scanner is not at risk of sensor damage due to physical contact with documents during scanning, eliminating the possibility of sensor glass damage due to contact. The **Kodak** i780 Scanner, using CCD technology, is designed to maximize uptime, reduce service calls and optimize productivity for your operation. The technology of the **Canon** DR-X10C Scanner may be vulnerable to damage, and since sensor glass replacement on the **Canon** Scanner requires a service call, there is a potential negative impact to uptime and productivity.*

- In a real-world environment, busy scanning operations understand that scanners that can't elegantly manage the occasional stapled document without interrupting their operation and seriously impacting their productivity, cannot provide the real "robustness" needed in actual work environments.
- The **Kodak** i780 Scanner handles occasional staples and common dust without maintenance of special parts, in order to maximize uptime in busy production environments.
- The **Kodak** i780 Scanner's sensor and scanner design easily tackles common real-world work environment hazards in a busy production scanning environment.
- The **Canon** DR-X10C Scanner utilizes sensor technology that may be vulnerable to damage, and therefore puts customer productivity at risk.
- The **Kodak** i780 Scanner's sensor design, including CCD technology, sensor placement far below the paper path, protective foam barriers that protect the sensor from staples and other contaminants introduced on scanned documents, and customer-replaceable imaging guides, all combine to optimize image quality and productivity in real-world customer operations.
- Kodak's sensor technology is superior in durability to that used by Canon. For robust imaging capabilities, turn to the brand you trust—Kodak—for technology you can count on.

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Count *on* Kodak for consistent and true performance.
Count *out* Canon.

Misfeed management

Kodak i780 Scanner

Canon DR-X10C Scanner

Kodak i780 Scanner vs. **Canon** DR-X10C Scanner

Side-by-side testing shows that with a challenge set of 50 documents, fed five times as consecutive batches, **Canon's** misfeed detection/retry mechanism and required operator intervention—at both the Operator Control Panel and the Host—result in throughput deficits. Overall productivity of the **Canon** Scanner with this challenge document set is exceeded by the **Kodak** i780 Scanner's performance with the same set of challenge documents.[3] The lack of flexible options for the operator to effectively manage misfeeds, based on both attributes and workflow priorities, contributes to both a "clunky" workflow for the operator to manage, and hampered throughput (when **Canon's** misfeed detection/"retry feeding" mechanism is enabled).

Canon Marketing Claims	**Canon** DR-X10C Scanner Performance[3]	**Kodak** i780 Scanner Performance[3]
"'Double-Feed Re-try mechanism' allows the **Canon** DR-X10C Scanner to re-feed any document that appears to its sensors as a double feed" "User-adjustable ultrasonic double-feed detection sensors" "Rapid Recovery System for superior, reliable and flexible document handling"	When "retry feeding" is enabled, the **Canon** Scanner experiences throughput deficits as the operator is forced to interact with both the operator control panel on the scanner and the host, to observe and compare the image held in the output tray and displayed for action on the host. Common documents can be mistakenly detected by the **Canon** Scanner as double-feeds, based on the technology utilized, including common applications such as checks or EKG printouts taped to letter-size paper within a batch. Any document overlap detected by sensors (documents with lead edges offset by less than 3.5 inches) trips the **Canon** DR-X10C Scanner's retry mechanism, resulting in documents being backed out of transport and auto-fed again (retried). Operators can choose a setting of one, two, or three "retries." If the set number of retries fail (the document continues to be seen as a misfeed), a message appears on the OCP: "ignore" or "retry." Message must be cleared by the operator before the job will continue. The misfed document will be held in the output tray, but resolving the image to be saved or deleted and rescanned at the host, must be done after inspection of the output tray, the paper path, and the image at the host. An action to delete or save each image noted as a misfeed also must be taken by the operator before the job continues. These multiple operator steps, coupled with the slowdown caused by the misfeed retries, result in reduced productivity for the operator and diminished throughput for the operation.	3-D ultrasonic sensors reliably detect true double feeds and are aligned with the transport to help ensure documents are imaged and saved to the host. Operators resolve each incidence at the host by inspecting the last scanned image and/or rescanning the misfed original. Options exist in the **Kodak** i780 Scanner's misfeed detection feature settings, enabling the operator to optimize productivity, operator control, or throughput. Operators can manage misfeed detection workflow in three ways: **Option 1:** Optimized operator control: "beep and stop"—alerts operator with an audible beep, stops job and application, leaving detected document in output tray at top of stack for retrieval while saving the image to host. Operator inspects output tray and image at host. Clicks at host to resume application and pushes button at scanner to restart job. **Option 2:** Optimized operator productivity: "beep and pause"—alerts operator with an audible beep at the scanner and does NOT require host interaction to continue the job. The triggering document is always imaged and saved, so operator has option to review scanned image to determine if intervention is really needed, or to continue job. **Option 3:** Optimized throughput: "beep and continue"—alerts operator that a misfeed is detected but scanning continues. Image is saved and passed to host for later operator inspection to determine if misfeed was detected in error (such as when mixed batches turn up a previously undetected envelope). In side-by-side testing with a challenge document set, as well as with intentionally induced double feeds into a document set, the **Kodak** i780 Scanner's throughput performance and productivity exceeded that of the **Canon** Scanner by as much as 50%.[3] These results demonstrate that the elegant and flexible misfeed management capabilities in the **Kodak** i780 Scanner design and architecture, outperform those from Canon.

Kodak

Count *on* Kodak for consistent and true performance.
Count *out* Canon.

All testing conducted in quality assurance labs at Kodak's Document Imaging headquarters facility, 2600 Manitou Road, Rochester, NY from November 18th, 2008 – December 11th, 2008.

Testing observations and conclusions

- The **Canon** DR-X10C Scanner does not offer flexible options for the operator to manage misfeeds in the most time-efficient manner.
- The **Kodak** i780 Scanner's throughput performance and productivity exceeds that of the **Canon** DR-X10C Scanner by as much as 50% with a challenge set of documents.
- The **Kodak** i780 Scanner provides far more elegant and flexible misfeed detection and control, allowing the operator a choice to prioritize throughput, control or productivity, based on batch attributes, job and document characteristics, and workflow needs.

Competitive knockouts

Key takeaways:

*The **Kodak** i780 Scanner delivers far greater flexibility, customization and practical real-world choices in terms of misfeed handling and management for optimum productivity. The **Canon** DR-X10C Scanner's options for handling misfeeds may at first seem creative and appear impressive in a simple demo, but side-by-side testing shows that with a real-world set of documents, productivity is significantly compromised by Canon's "retry feeding" feature. This feature takes time to stop the transport, reverse the document back on the input stack, and repick the document from the stack. The retry feeding feature may actually lead to the loss of data in misclassified true multifeeds, due to over-reliance on this feature by operators.*

- Canon offers users limited options for enhanced productivity while managing misfed documents.
- In the real world of production scanning, a choice is often made to flag a misfeed and continue scanning to maximize throughput and efficiency (as possible with the **Kodak** i780 Scanner). The **Canon** model does not offer this possibility.
- Canon makes no accommodation for real-world documents that are common in certain industries, such as EKGs or checks taped to a letter-sized document. These real-world documents are falsely detected as misfeeds by the **Canon** Scanner, slowing down operations; while the **Kodak** i780 Scanner will effectively image and pass these critical documents through as needed, efficiently and with integrity, providing you with the imaging performance you've come to expect from a trusted vendor like Kodak.

Methodology

[3] For detailed information about testing methodology and laboratory test results, click here

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Count *on* Kodak for consistent and true performance.
Count *out* Canon.

Appendices

Appendix 3—Part A—Misfeed management—Testing methodology and results

Kodak's Quality Assurance Team conducted a series of comprehensive, competitive benchmark tests comparing the **Kodak** i780 Scanner/ISIS to the **Canon** DR-X10C Scanner ISIS/ **Canon** DR-X10C Scanner with VRS.

Misfeed management—test results

Multifeed productivity test

This test is intended to simulate a job set with pages that create real multifeeds where two pages feed at the same time through the scanner and cannot be separated with retry feeding.

The job stream consisted of 100 pages with induced multifeeds placed every 10 pages in the document stack starting at page 5. The document stack was used for all multifeed tests described.

Scanner features and settings profile used for multifeed productivity test:

300 dpi bitonal, duplex, auto orientation ON, auto thresholding ON, multifeed detection ON, all zones ON, set to disable scanner on multifeed detect. Multipage TIFF output selected. Canon "retry" count set to one attempt.

General test steps:

- Operator scanned five prepared 100-page multifeed stacks.
- The stacks were loaded separately, one following another.
- Each multifeed page was rescanned as quickly as possible by removing the sticky note and placing the document back in the feeder.
- When the images of the multifeed document were sent to the host they were removed (deleted) from the batch before the rescan.

Multifeed Productivity Test	**Kodak** i780 Scanner ISIS	**Canon** DR-X10C Scanner VRS
Time to scan batch of five sets of 100 pages with 10 induced multifeeds in each set	19 min 11 sec	23 min 15.75 sec
Demonstrated performance in ppm	26.1	21.5

Challenging document productivity test

This test was intended to simulate a very challenging document including a wide range of sizes, thicknesses and finishes.

General test steps:

- Operator scanned five prepared challenge stacks.
- The stacks were loaded separately, one following another.
- Each real multifeed was rescanned.
- Images of real multifeeds were not included in the batch.

Scanner features and settings profile for challenge document productivity test:

200 dpi bitonal, duplex, auto orientation ON, auto thresholding ON, multifeed detection ON, multifeed retry ON, all zones ON, set to disable scanner on multifeed. Multipage TIFF output. Canon "retry" count set to one attempt.

Challenge Document Productivity Test Results		Duration		
Product Tested	# of Pages	Total time	Average ppm	# Multifeeds
Kodak i780 Scanner ISIS	250	5:18:03	47.2	25
Canon DR-X10C Scanner ISIS	250	11:36:63	21.5	25

For more information about testing methodology and laboratory test results, click here

Return to *Misfeed management*

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Appendix 3—Part B—Misfeed management—Job stream configurations

This appendix defines the job streams used in the multifeed productivity test and the challenge document productivity test.

Multifeed productivity test

This is a set of 100 pages of 20# 8.5in x 11in copier paper. Sticky notes (3in x 3in) were placed on the documents as defined below.

Page #	Sticky note
5	False multifeed
15	True multifeed
25	True multifeed (recovered)
35	False multifeed
45	True multifeed
55	False multifeed
65	False multifeed
75	True multifeed (recovered)
85	True multifeed
95	False multifeed

Challenge document productivity test

This document set was intended to be a collection of extremely difficult to scan documents.

Doc #	Qty	Description	Orientation
1–5	5	Duplex printed copier paper (Pendleton)	Portrait
6	1	Bank-sized check	Landscape
7	1	Business card	Portrait
8	1	Shipment air way bill	Landscape
9	1	Personal check	Landscape
10	1	W3 form (letter size)	Portrait
11	1	Dark gray iThresholding document (Perfect Page set)	Portrait
12	1	W2 form (letter size)	Portrait
13	1	Empty business-sized envelope	Landscape
14	1	Onionskin iThresholding document (Perfect Page set)	Portrait
15	1	Kodak's blue reseller questionnaire (Perfect Page set)	Portrait
16	1	Value-added tax return (Perfect Page set)	Portrait
17	1	5" x 7" Glossy color photo	Landscape
18	1	8.5" x 17" Glossy chart	Portrait

Challenge document productivity test, continued

Doc #	Qty	Description	Orientation
19	1	8.125" x 17" Photo	Portrait
20, 21	2	Personal checks (Perfect Page set)	Landscape
22	1	Toggle patch 8.5" x 11" with 2 corners cut off	Landscape
23	1	USPS Express Mail multipart mailing label (Label 11-B)	Landscape
24, 25	2	Steno pad, torn from spiral but not cleaned	Portrait
26	1	USPS PS Form 3811, 3½" x 11" card stock	Landscape
27, 28	2	USPS Certified Mail receipt, PS Form 3800, 3 3/16" x 5 ½"	Landscape
29	1	USPS envelope EP14H w/large window, 5" x 10"	Landscape
30–33	3	Duplex printed copier paper (Pendleton)	Portrait
34	1	Gloss personal identification card, 3¾" x 6 ¾"	Landscape
35	1	Textured invitation card 3 7/8" x 8 1/8"	Landscape
36	1	Duplex printed copier paper, wrinkled and torn corner (Pendleton)	Portrait
37	1	Scissor-cut black card stock, edges not straight (approx 3¾" x 4½")	Landscape
38	1	Tri-folded **Kodak** i1200/i1300 Scanner Quick Tips	Portrait
39	1	Order form photocopy, 11" x 17"	Portrait
40	1	Extended warranty application (Perfect Page set)	Portrait
41–47	6	Duplex printed copier paper (Pendleton)	Portrait
48	1	Red Domestic/International USPS mailing envelope, 11 ½" x 15 1/8"	Portrait
49	1	Blue Extremely Urgent USPS mailing envelope, 11 ½" x 15 1/8"	Portrait
50	1	**NexPress** Press sample document, glossy, 8 1/8" x 10 1/8"	Portrait

For more information about testing methodology and laboratory test results, click here

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Appendix 3—Part C—Misfeed management—Workstation configurations

Workstation Components	Version
OptiPlex 755 Minitower:	**Intel Core** 2 Duo Processor E6850 (3.0GHz, 4M, VT, 1333MHz FSB)
Operating system(s):	**Genuine Windows** XP Professional, SP2, x32, with Media, English
Memory:	2GB DDR2 Non-ECC SDRAM, 667MHz, (2 DIMM)
Boot Hard Drives:	250GB SATA 3.0Gb/s and 8MB **DataBurst Cache**
Video Card:	Integrated Video, **Intel** GMA3100

Scanner Related Components	Version
PC Scanning Software	**EMC** QuickScan Pro 6.5.1 demo (build 8372)
Created with QuickDriver Version 1.0.10710.10002	PixTools 32-Bit Runtime Libraries Version 7.0 build 2124
Canon DR-X10C Scanner ISIS Driver	**Canon** DR-X10C version 1.1.10807.03001
Canon DR-X10C Scanner Firmware Version	2.10
Canon DR-X10C Scanner Driver Version	4.20.148
Interface Used (ISIS configuration)	USB interface was used
Canon DR-X10C Kofax Card	CGA Firmware Version 3.10.011
Interface Used (**Canon** VRS configuration)	USB interface was used
Interface Used (Kodak)	IEEE 1394—FireWire 400
Kodak i780 Scanner ISIS Drivers	eki700 Version 2.0.10809.29001
Kodak i780 Scanner Firmware Version	2.00.21

For more information about testing methodology and laboratory test results, click here

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Appendix 3—Part D—Misfeed management—Scanner features and settings profile

Kodak i780 Scanner configuration **EMC Captiva QuickScan Pro** v6.5.1 demo settings

Kodak i780 Scanner ISIS	Multifeed Productivity Test	Challenge Document Productivity Test
	200 dpi, bitonal, duplex, AO, auto thresholding, multifeed detection, multipage TIFF output	300 dpi, bitonal, duplex, AO, auto thresholding, multifeed detection, multipage TIFF output
QuickScan scan profile name	i780 Test job 01	i780 Test job 02
General—save images to this folder	C:\Program Files\EMC Captiva\QuickScan\ My Images\i780\Job01	C:\Program Files\EMC Captiva\QuickScan\ My Images\i780\Job02
Scan—show continue dialog after scan	Checked	Checked
Scan—scan mode	Duplex	Duplex
Scan—scan type	Black and white	Black and white
Scan—dpi	200	300
Scan—page size	Scanner max	Scanner max
Image format and naming—enter file name at …	Checked	Checked
Image format and naming—file type	TIFF	TIFF
Image format and naming—color format	Binary	Binary
Image format and naming—compression	Group 4	Group 4
Image format and naming—append standard extension …	Checked	Checked
i780 ISIS driver, main, cropping	Aggressive	Aggressive
i780 ISIS driver, main, thresholding	iThresholding	iThresholding
i780 ISIS driver, main, contrast	0	0
i780 ISIS driver, layout, image orientation (both front and back image #1)	Automatic	Automatic
i780 ISIS driver, layout, page orientation (both front and back image #1)	Top edge first	Top edge first
i780 ISIS driver, scanner, document feeder	250—Automatically start transport	250—Automatically start transport
i780 ISIS driver, scanner, ultrasonic detection	Medium—3 sensors—end job	Medium—3 sensors—end job
i780 ISIS driver, dropout, blank image detection	Black and white (back only)—2KB	Black and white (back only)—2KB
i780 ISIS driver, image processing, JPEG quality	N/A	N/A
i780 ISIS driver, image processing, color correction	N/A	N/A

For more information about testing methodology and laboratory test results, click here
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Appendix 3—Part D— Misfeed management—Scanner features and settings profile, continued

Canon DR-X10C Scanner, VRS configuration **EMC Captiva QuickScan Pro** v6.5.1 demo settings

Canon DR-X10C with VRS Option	Multifeed Productivity Test	Challenge Document Productivity Test
	200 dpi, bitonal, duplex, AO, auto thresholding, multifeed detection, multipage TIFF output	300 dpi, bitonal, duplex, AO, auto thresholding, multifeed detection, multipage TIFF output
QuickScan scan profile name	DR-X10C VRS test job 01	DR-X10C VRS test job 02
General—save images to this folder	C:\Program Files\EMC Captiva\QuickScan\My Images\ x10c-VRS\Job01	C:\Program Files\EMC Captiva\QuickScan\My Images\ x10c-VRS\Job02
Scan—show continue dialog after scan	Checked	Checked
Scan—scan mode	Duplex	Duplex
Scan—scan type	Black and white	Black and white
Scan—dpi	200	300
Scan—page size	Scanner max	Scanner max
Image format and naming—enter file name at ...	Checked	Checked
Image format and naming—file type	TIFF	TIFF
Image format and naming—color format	Binary	Binary
Image format and naming—compression	Group 4	Group 4
Image format and naming— append standard extension ...	Checked	Checked
PixKofax, main tab, paper source	Feeder	Feeder
PixKofax, main tab, dpi	200	300
PixKofax, main tab, mode	Black and white	Black and white
PixKofax, main tab, page size	Scanner's maximum	Scanner's maximum
PixKofax, main tab, orientation	Portrait	Portrait
PixKofax, main tab, simplex/duplex	Duplex	Duplex
PixKofax, more, detect page size	Checked	Checked
PixKofax, main tab, (scanner preset) {preset names are retained so you can use different names as needed}	Test01	Test02
PixKofax, advanced (VRS adjustments), clarity, auto brightness	Checked	Checked
PixKofax, advanced (VRS adjustments), clarity, brightness	N/A	N/A

For more information about testing methodology and laboratory test results, click here
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Appendix 3—Part D— Misfeed management—Scanner features and settings profile, continued

Canon DR-X10C Scanner, VRS configuration, continued

Canon DR-X10C with VRS Option	Multifeed Productivity Test	Challenge Document Productivity Test
PixKofax, advanced (VRS adjustments), clarity, contrast	50	50
PixKofax, advanced (VRS adjustments), clarity, advanced clarity	Enabled @ level 2	Enabled @ level 2
PixKofax, advanced (VRS adjustments), clarity, gamma	17	17
PixKofax, advanced (VRS adjustments), noise, line filter	Normal	Normal
PixKofax, advanced (VRS adjustments), noise, speckle removal	Small	Small
PixKofax, advanced (VRS adjustments), noise, fill holes	Not checked	Not checked
PixKofax, advanced (VRS adjustments), skew, deskew	Deskew, auto crop, auto orientation	Deskew, auto crop, auto orientation
PixKofax, advanced (VRS adjustments), color, enable detection	N/A	N/A
PixKofax, advanced (VRS adjustments), background, enable smoothing	N/A	N/A
PixKofax, advanced (VRS adjustments), blank page	Enabled detection, delete, context @ 50, ignore holes	Enabled detection, delete, context @ 50, ignore holes
PixKofax, advanced (VRS adjustments), (profile name) {profile names are not retained in PixKofax so only use one}	Test	Test
PixKofax, VRS Admin, warnings, brightness out of range	35—Ignore error	35—Ignore error
PixKofax, VRS Admin, warnings, contrast out of range	40—Ignore error	40—Ignore error
PixKofax, VRS Admin, warnings, color confidence out of range	50—Ignore error	50—Ignore error
PixKofax, VRS Admin, errors, paper jam	Auto resolve	Auto resolve
PixKofax, VRS Admin, errors, multifeed	Auto resolve	Auto resolve
PixKofax, VRS Admin, errors, out of paper	Auto resolve	Auto resolve
PixKofax, VRS Admin, errors, cover open	Auto resolve	Auto resolve
PixKofax, VRS Admin, errors, auto crop failure boundary note detected	Ignore error	Ignore error
PixKofax, VRS Admin, errors, auto deskew failure	Ignore error	Ignore error
PixKofax, VRS Admin, errors, staple detection	Auto resolve	Auto resolve
PixKofax, VRS Admin, errors, excessive skew	Auto resolve	Auto resolve
PixKofax, VRS Admin, accelerated scanning	Best	Best
PixKofax, advanced (VRS adjustments), **Canon** ISIS, endorser	No endorser	No endorser
PixKofax, advanced (VRS adjustments), **Canon** ISIS, color—front/rear color dropout	None	None

For more information about testing methodology and laboratory test results, click here ➡ Return to *Misfeed management* ➡ Table of Contents ➡

Canon DR-X10C Scanner, VRS configuration, continued

Canon DR-X10C with VRS Option	Multifeed Productivity Test	Challenge Document Productivity Test
PixKofax, advanced (VRS Adjustments), **Canon** ISIS, color, JPEG compression	Good	Good
PixKofax, advanced (VRS Adjustments), **Canon** ISIS, picking rectangle	Not checked	Not checked
PixKofax, advanced (VRS Adjustments), **Canon** ISIS, rotation (front/rear)	0	0
PixKofax, advanced (VRS Adjustments), **Canon** ISIS, multifeed	Enabled with 3 zones	Enabled with 3 zones
PixKofax, advanced (VRS Adjustments), **Canon** ISIS, other (speed/quality)	High speed scanning enabled	High speed scanning enabled
PixKofax, advanced (VRS Adjustments), **Canon** ISIS, other, moire removal	Checked	Checked
PixKofax, advanced (VRS Adjustments), **Canon** ISIS, other, staple detection	Checked	Checked
PixKofax, advanced (VRS Adjustments), **Canon** ISIS, other, error recovery	Checked	Checked
Canon DR-X10C Operator control panel settings		
Canon DR-X10C OCP—buzzer control (ON2 ON1 OFF)	ON2	ON2
Canon DR-X10C OCP—double feed control (ON/OFF)	ON	ON
Canon DR-X10C OCP—double feed retry (3-2-1-OFF)	1	1
Canon DR-X10C OCP—staple detection (ON/OFF)	ON	ON
Canon DR-X10C OCP—staple control (2/1/0)	0	0
Canon DR-X10C OCP—long document (ON/OFF)	OFF	OFF
Canon DR-X10C OCP—manual feed mode (ON/OFF)	OFF	OFF
Canon DR-X10C OCP—stand by mode (240-60-10)	240	240
Canon DR-X10C OCP—Japanese (ON/OFF)	OFF	OFF
Canon DR-X10C OCP—display contrast	—	—
Canon DR-X10C OCP—SCSI speed (20-10-5)	20	20
Canon DR-X10C OCP—USB short packet (ON/OFF)	ON	ON
Canon DR-X10C OCP—dust detection mode (ON/OFF)	ON2	ON2
Canon DR-X10C OCP—tray position (2-1-0)	1	1
Canon DR-X10C OCP—torque control (5-4-3-2-1)	3	3
Canon DR-X10C OCP—auto USB power off (ON/OFF)	OFF	OFF
Canon DR-X10C OCP—total counter (display only)	N/A	N/A
Canon DR-X10C OCP—roller counter (reset to 0)	N/A	N/A
Canon DR-X10C OCP—imprinter test	N/A	N/A
Canon DR-X10C OCP—cleaning mode	N/A	N/A

For more information about testing methodology and laboratory test results, click here ➡ Return to *Misfeed management* ➡ Table of Contents ➡

Appendix 3—Part D— Misfeed management—Scanner features and settings profile, continued

Canon DR-X10C Scanner, ISIS configuration **EMC Captiva QuickScan Pro** v6.5.1 demo settings

Canon DR-X10C ISIS	Multifeed Productivity Test	Challenge Document Productivity Test
	200 dpi, bitonal, duplex, AO, auto thresholding, multifeed detection, multipage TIFF output	300 dpi, bitonal, duplex, AO, auto thresholding, multifeed detection, multipage TIFF output
QuickScan scan profile name	DR-X10C ISIS test job 01	DR-X10C ISIS test job 02
General—save images to this folder	C:\Program Files\EMC Captiva\QuickScan\ My Images\x10c-ISIS\Job01	C:\Program Files\EMC Captiva\QuickScan\ My Images\x10c-ISIS\Job02
Scan—show continue dialog after scan	Checked	Checked
Scan—scan mode	Duplex	Duplex
Scan—scan type	Black and white	Black and white
Scan—dpi	200	300
Scan—page size	Scanner max	Scanner max
Image format and naming—enter file name at...	Checked	Checked
Image format and naming—file type	TIFF	TIFF
Image format and naming—color format	Binary	Binary
Image format and naming—compression	Group 4	Group 4
Image format and naming—append standard extension ...	Checked	Checked
DR-X10C ISIS Driver, basic, user preference		
DR-X10C ISIS Driver, basic, mode	Black and white	Black and white
DR-X10C ISIS Driver, basic, page size	Auto detection	Auto detection
DR-X10C ISIS Driver, basic, dpi	200	300
DR-X10C ISIS Driver, basic, scanning mode	Duplex	Duplex
DR-X10C ISIS Driver, basic, deskew	Checked	Checked
DR-X10C ISIS Driver, brightness, auto	Checked	Checked
DR-X10C ISIS Driver, brightness, gamma, custom	Not checked	Not checked
DR-X10C ISIS Driver, image processing, text orientation	Checked	Checked
DR-X10C ISIS Driver, other, rapid recovery system	Checked	Checked
DR-X10C ISIS Driver, other, JPEG transfer	N/A	N/A
DR-X10C ISIS Driver, other, staple detection	Checked	Checked
DR-X10C ISIS Driver, other, feeding option	Standard feeding	Standard feeding
DR-X10C ISIS Driver, other, double feed detection	Ultrasonic	Ultrasonic
DR-X10C ISIS Driver, other, double feed detection, setting	3 Sensors	3 Sensors

For more information about testing methodology and laboratory test results, click here ➡ Return to *Misfeed management* ➡ Table of Contents ➡

Canon DR-X10C Scanner, ISIS configuration, continued

Canon DR-X10C ISIS	Multifeed Productivity Test	Challenge Document Productivity Test
Canon DR-X10C Operator control panel settings		
Canon DR-X10C OCP—buzzer control (ON2 ON1 OFF)	ON2	ON2
Canon DR-X10C OCP—double feed control (ON/OFF)	ON	ON
Canon DR-X10C OCP—double feed retry (3-2-1-OFF)	1	1
Canon DR-X10C OCP—staple detection (ON/OFF)	ON	ON
Canon DR-X10C OCP—staple control (2/1/0)	0	0
Canon DR-X10C OCP—long document (ON/OFF)	OFF	OFF
Canon DR-X10C OCP—manual feed mode (ON/OFF)	OFF	OFF
Canon DR-X10C OCP—stand by mode (240-60-10)	240	240
Canon DR-X10C OCP—Japanese (ON/OFF)	OFF	OFF
Canon DR-X10C OCP—display contrast	N/A	N/A
Canon DR-X10C OCP—SCSI speed (20-10-5)	20	20
Canon DR-X10C OCP—USB short packet (ON/OFF)	ON	ON
Canon DR-X10C OCP—dust detection mode (ON/OFF)	ON2	ON2
Canon DR-X10C OCP—tray position (2-1-0)	1	1
Canon DR-X10C OCP—torque control (5-4-3-2-1)	3	3
Canon DR-X10C OCP—auto USB power off (ON/OFF)	OFF	OFF
Canon DR-X10C OCP—total counter (display only)	N/A	N/A
Canon DR-X10C OCP—roller counter (reset to 0)	N/A	N/A
Canon DR-X10C OCP—imprinter test	N/A	N/A
Canon DR-X10C OCP—cleaning mode	N/A	N/A

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Real-world environment
(Mixed Batches/Transport/Reliability/ SurePath/Dust Detection)

Kodak i780 Scanner

Canon DR-X10C Scanner

Kodak i780 Scanner vs. **Canon** DR-X10C Scanner

A variety of real-world scanning scenarios were created and tested with documents scanned by the **Kodak** i780 Scanner and **Canon** DR-X10C Scanner.[4,5]

Real-world situation	**Canon** DR-X10C Scanner performance in real-world scanning scenarios[4,5]	**Kodak** i780 Scanner performance in real-world scenarios[4,5]
Mixed batches—variety of document weights, sizes and thicknesses scanned	Any real diversity of documents (checks, envelopes, etc.) throttled scanner throughput by detecting false misfeeds, unless "misfeed retry" feature was turned off. A wide document range initiates misfeed detect/ rapid recovery mode, requiring ongoing operator intervention and slowing down throughput. With misfeed retry feature on, operator had to respond constantly to scanner control panel error message, as well as resolve physical document output vs. electronic images saved at the host. Operator must determine if documents held in tray are only images not captured.	SurePath paper handling delivered consistent, rated productivity with ultrasonic double feed detection sensors enabled, and always fed the image to the host. (A design created with the operator's ultimate productivity in mind.) Minimal misfeeding and jamming during testing. Messaging at host minimized the "clicks" necessary to clear real misfeeds and quickly restart the job.
Torque	Canon's active torque control is not sensitive enough for a variety of documents, which resulted in bowing and ripping of documents when speed setting was not adjusted properly for document types fed.	Kodak's separation rollers ran fast at initial contact with paper to smoothly peel document off the top, then returned to a stable speed—no manual intervention needed.
Standard-size documents with checks or EKG printouts attached with tape	Documents viewed as misfeeds, slowing scanner throughput and requiring operator intervention and resolution at control panel and host.	Captured images accurately with no productivity loss.
Dust and contaminants	Detected dust and attempted to clear, but streaks still appeared on images. Confused dust with denser objects, causing scanning to stop. Auto dust detection occurred only when scanner was first turned on, at start of job, or coming out of energy saver mode. If dust accumulated during a job, the scanner did not stop, clean and restart the job, automatically. (Operator intervention and initiation of dust detection mid-job resulted in dust being found and cleared in some instances.) Streaks on images caused by dust accumulation were visible long before the system auto initiated and cleared dust from the image path.[5]	**Kodak** i780 Scanner's design focuses on keeping dust away from optics. CCD sensors are encased in glass and additionally protected by a glass barrier—known as an imaging guide—and foam guards to prevent dust from accumulating. No issues with dust forming on the plate. Blower fans pulled in clean air and pushed out contaminants and dust (while cooling lamps).[5]

Kodak

Count *on* Kodak for consistent and true performance.
Count *out* Canon.

All testing conducted in quality assurance labs at Kodak's Document Imaging headquarters facility, 2600 Manitou Road, Rochester, NY from November 18th, 2008 – December 11th, 2008.

Testing observations and conclusions

- Operators of the **Canon** DR-X10C Scanner must be constantly vigilant when preparing documents for scanning, completing more extensive presorting, or risk ongoing misfeeds along with associated downtime and productivity.
- The **Canon** DR-X10C Scanner creates potential confusion because with misfeed retry mechanism engaged, operator must respond to scanner control panel messaging as well as resolve any discrepancy between physical document output and electronic images saved at the host to discover if these were the only images "missed." Occurrences of this scenario during testing diminished productivity significantly.
- No matter how much dust is introduced to the **Canon** DR-X10C Scanner during a job, dust detection software will not be induced to stop/check/clear the dust automatically. Only when the operator intervenes will dust be cleared at this point. Streaking on images was visible during the running of a batch, with auto dust removal not being activated until a new batch was initiated.

Competitive knockouts

Key takeaways:

*The real world of scanning is not a perfect world. Mixed sizes, shapes, and weights—along with attachments, staples, colors, folds and other common issues—occur daily. To achieve true productivity, variables must be accounted for and handled with ease to ensure robust performance. The **Kodak** i780 Scanner delivers reliable productivity at rated speeds day after day, thanks to a combination of speed, productivity building features, and robust paper handling. In tests, the **Kodak** i780 Scanner seamlessly handled mixed document batches and avoided the types of productivity issues that encumbered the **Canon** DR-X10C Scanner. The **Canon** Scanner arrives with a variety of troublesome design elements that slash productivity, create headaches and hassles, and negatively impact image quality.*

- Divergent document batches befuddle the **Canon** DR-X10C Scanner. Envelopes, checks and varied sizes throttle the scanner's throughput, unless the "misfeed retry" feature is turned off. Batches with a wide range of document types and sizes send the **Canon** Scanner into misfeed detect/rapid recovery mode, which reduced productivity in side-by-side testing.[4]
- Canon claims exclusive paper-feeding technology that easily handles documents of the widest range of sizes, weights and types to deliver high productivity. However, when testing the **Canon** DR-X10C Scanner side-by-side with the **Kodak** i780 Scanner, the **Canon** Scanner's retry feeding mechanism slows down overall throughput as it detects false double feeds when common document types are fed. Kodak's CCD sensors track every page, check for overlaps and misfeeds, and help deliver outstanding image quality at full rated speed. The **Kodak** i780 Scanner is not fooled by adhesive labels or varying paper thicknesses, and requires no operator calibration to optimally handle the widest variety of document types and thicknesses as defined in its specifications.
- Dust can be a significant problem (for cleaning and image quality) with the **Canon** Scanner, as a questionable design for detecting and clearing dust may allow it to negatively impact image quality while setting false expectations for dust-free imaging with customers. Kodak's exceptional sensor and transport technologies and design effectively minimize quality issues due to dust.

Methodology

[4] For detailed information about testing methodology used in real-world environment paper handling and productivity scenarios, click here

[5] For detailed information about testing methodology results related to dust and contaminants, click here

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Count *on* Kodak for consistent and true performance.
Count *out* Canon.

Appendices

Appendix 4—Part A—Real-world environment—Testing methodology and results

Kodak's Quality Assurance Team conducted a series of comprehensive, competitive benchmark tests comparing the **Kodak** i780 Scanner/ISIS to the **Canon** DR-X10C Scanner ISIS/ **Canon** DR-X10C Scanner with VRS.

Misfeed management—test results

Multifeed productivity test

This test is intended to simulate a job set with pages that create real multifeeds where two pages feed at the same time through the scanner and cannot be separated with retry feeding.

The job stream consisted of 100 pages with induced multifeeds placed every 10 pages in the document stack starting at page 5. The document stack was used for all multifeed tests described.

Scanner features and settings profile used for multifeed productivity test:

300 dpi bitonal, duplex, auto orientation ON, auto thresholding ON, multifeed detection ON, all zones ON, set to disable scanner on multifeed detect. Multipage TIFF output selected. Canon "retry" count set to one attempt.

General test steps:

- Operator scanned five prepared 100-page multifeed stacks.
- The stacks were loaded separately, one following another.
- Each multifeed page was rescanned as quickly as possible by removing the sticky note and placing the document back in the feeder.
- When the images of the multifeed document were sent to the host they were removed (deleted) from the batch before the rescan.

Multifeed Productivity Test	**Kodak** i780 Scanner ISIS	**Canon** DR-X10C Scanner VRS
Time to scan batch of five sets of 100 pages with 10 induced multifeeds in each set	19 min 11 sec	23 min 15.75 sec
Demonstrated performance in ppm	26.1	21.5

Challenging document productivity test

This test was intended to simulate a very challenging document including a wide range of sizes, thicknesses and finishes.

General test steps:

- Operator scanned five prepared challenge stacks.
- The stacks were loaded separately, one following another.
- Each real multifeed was rescanned.
- Images of real multifeeds were not included in the batch.

Scanner features and settings profile for challenge document productivity test:

200 dpi bitonal, duplex, auto orientation ON, auto thresholding ON, multifeed detection ON, multifeed retry ON, all zones ON, set to disable scanner on multifeed. Multipage TIFF output. Canon "retry" count set to one attempt.

Challenge Document Productivity Test Results		Duration		
Product Tested	# of Pages	Total time	Average ppm	# Multifeeds
Kodak i780 Scanner ISIS	250	5:18:03	47.2	25
Canon DR-X10C Scanner ISIS	250	11:36:63	21.5	25

For more information about testing methodology and laboratory test results, click here

Return to *Real-world environment*

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Appendix 4—Part B—Real-world environment—Job stream configurations

This appendix defines the job streams used in the multifeed productivity test and the challenge document productivity test.

Multifeed productivity test

This is a set of 100 pages of 20# 8.5in x 11in copier paper. Sticky notes (3in x 3in) were placed on the documents as defined below.

Page #	Sticky note
5	False multifeed
15	True multifeed
25	True multifeed (recovered)
35	False multifeed
45	True multifeed
55	False multifeed
65	False multifeed
75	True multifeed (recovered)
85	True multifeed
95	False multifeed

Challenge document productivity test

This document set was intended to be a collection of extremely dif cult to scan documents.

Doc #	Qty	Description	Orientation
1–5	5	Duplex printed copier paper (Pendleton)	Portrait
6	1	Bank-sized check	Landscape
7	1	Business card	Portrait
8	1	Shipment air way bill	Landscape
9	1	Personal check	Landscape
10	1	W3 form (letter size)	Portrait
11	1	Dark gray iThresholding document (Perfect Page set)	Portrait
12	1	W2 form (letter size)	Portrait
13	1	Empty business-sized envelope	Landscape
14	1	Onionskin iThresholding document (Perfect Page set)	Portrait
15	1	Kodak's blue reseller questionnaire (Perfect Page set)	Portrait
16	1	Value-added tax return (Perfect Page set)	Portrait
17	1	5" x 7" Glossy color photo	Landscape
18	1	8.5" x 17" Glossy chart	Portrait

Challenge document productivity test, continued

Doc #	Qty	Description	Orientation
19	1	8.125" x 17" Photo	Portrait
20, 21	2	Personal checks (Perfect Page set)	Landscape
22	1	Toggle patch 8.5" x 11" with 2 corners cut off	Landscape
23	1	USPS Express Mail multipart mailing label (Label 11-B)	Landscape
24, 25	2	Steno pad, torn from spiral but not cleaned	Portrait
26	1	USPS PS Form 3811, 3½" x 11" card stock	Landscape
27, 28	2	USPS Certified Mail receipt, PS Form 3800, 3 3/16" x 5 ½"	Landscape
29	1	USPS envelope EP14H w/large window, 5" x 10"	Landscape
30–33	3	Duplex printed copier paper (Pendleton)	Portrait
34	1	Gloss personal identification card, 3¾" x 6 ¾"	Landscape
35	1	Textured invitation card 3 7/8" x 8 1/8"	Landscape
36	1	Duplex printed copier paper, wrinkled and torn corner (Pendleton)	Portrait
37	1	Scissor-cut black card stock, edges not straight (approx 3¾" x 4½")	Landscape
38	1	Tri-folded **Kodak** i1200/i1300 Scanner Quick Tips	Portrait
39	1	Order form photocopy, 11" x 17"	Portrait
40	1	Extended warranty application (Perfect Page set)	Portrait
41–47	6	Duplex printed copier paper (Pendleton)	Portrait
48	1	Red Domestic/International USPS mailing envelope, 11 ½" x 15 1/8"	Portrait
49	1	Blue Extremely Urgent USPS mailing envelope, 11 ½" x 15 1/8"	Portrait
50	1	**NexPress** Press sample document, glossy, 8 1/8" x 10 1/8"	Portrait

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Appendix 4—Part C—Real-world environment—Workstation configurations

Workstation Components	Version
OptiPlex 755 Minitower:	**Intel Core** 2 Duo Processor E6850 (3.0GHz, 4M, VT, 1333MHz FSB)
Operating system(s):	**Genuine Windows** XP Professional, SP2, x32, with Media, English
Memory:	2GB DDR2 Non-ECC SDRAM, 667MHz, (2 DIMM)
Boot Hard Drives:	250GB SATA 3.0Gb/s and 8MB **DataBurst Cache**
Video Card:	Integrated Video, **Intel** GMA3100

Scanner Related Components	Version
PC Scanning Software	**EMC** QuickScan Pro 6.5.1 demo (build 8372)
Created with QuickDriver Version 1.0.10710.10002	PixTools 32-Bit Runtime Libraries Version 7.0 build 2124
Canon DR-X10C Scanner ISIS Driver	**Canon** DR-X10C version 1.1.10807.03001
Canon DR-X10C Scanner Firmware Version	2.10
Canon DR-X10C Scanner Driver Version	4.20.148
Interface Used (ISIS configuration)	USB interface was used
Canon DR-X10C Kofax Card	CGA Firmware Version 3.10.011
Interface Used (**Canon** VRS configuration)	USB interface was used
Interface Used (Kodak)	IEEE 1394—FireWire 400
Kodak i780 Scanner ISIS Drivers	eki700 Version 2.0.10809.29001
Kodak i780 Scanner Firmware Version	2.00.21

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Appendix 4—Part D—Real-world environment—Scanner features and settings profile

Kodak i780 Scanner configuration **EMC Captiva QuickScan Pro** v6.5.1 demo settings

Kodak i780 Scanner ISIS	Multifeed Productivity Test	Challenge Document Productivity Test
	200 dpi, bitonal, duplex, AO, auto thresholding, multifeed detection, multipage TIFF output	300 dpi, bitonal, duplex, AO, auto thresholding, multifeed detection, multipage TIFF output
QuickScan scan profile name	i780 Test job 01	i780 Test job 02
General—save images to this folder	C:\Program Files\EMC Captiva\QuickScan\ My Images\i780\Job01	C:\Program Files\EMC Captiva\QuickScan\ My Images\i780\Job02
Scan—show continue dialog after scan	Checked	Checked
Scan—scan mode	Duplex	Duplex
Scan—scan type	Black and white	Black and white
Scan—dpi	200	300
Scan—page size	Scanner max	Scanner max
Image format and naming—enter file name at ...	Checked	Checked
Image format and naming—file type	TIFF	TIFF
Image format and naming—color format	Binary	Binary
Image format and naming—compression	Group 4	Group 4
Image format and naming—append standard extension ...	Checked	Checked
i780 ISIS driver, main, cropping	Aggressive	Aggressive
i780 ISIS driver, main, thresholding	iThresholding	iThresholding
i780 ISIS driver, main, contrast	0	0
i780 ISIS driver, layout, image orientation (both front and back image #1)	Automatic	Automatic
i780 ISIS driver, layout, page orientation (both front and back image #1)	Top edge first	Top edge first
i780 ISIS driver, scanner, document feeder	250—Automatically start transport	250—Automatically start transport
i780 ISIS driver, scanner, ultrasonic detection	Medium—3 sensors—end job	Medium—3 sensors—end job
i780 ISIS driver, dropout, blank image detection	Black and white (back only)—2KB	Black and white (back only)—2KB
i780 ISIS driver, image processing, JPEG quality	N/A	N/A
i780 ISIS driver, image processing, color correction	N/A	N/A

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Canon DR-X10C Scanner, VRS configuration **EMC Captiva QuickScan Pro** v6.5.1 demo settings

Canon DR-X10C with VRS Option	Multifeed Productivity Test	Challenge Document Productivity Test
	200 dpi, bitonal, duplex, AO, auto thresholding, multifeed detection, multipage TIFF output	300 dpi, bitonal, duplex, AO, auto thresholding, multifeed detection, multipage TIFF output
QuickScan scan profile name	DR-X10C VRS test job 01	DR-X10C VRS test job 02
General—save images to this folder	C:\Program Files\EMC Captiva\QuickScan\My Images\x10c-VRS\Job01	C:\Program Files\EMC Captiva\QuickScan\My Images\x10c-VRS\Job02
Scan—show continue dialog after scan	Checked	Checked
Scan—scan mode	Duplex	Duplex
Scan—scan type	Black and white	Black and white
Scan—dpi	200	300
Scan—page size	Scanner max	Scanner max
Image format and naming—enter file name at …	Checked	Checked
Image format and naming—file type	TIFF	TIFF
Image format and naming—color format	Binary	Binary
Image format and naming—compression	Group 4	Group 4
Image format and naming—append standard extension …	Checked	Checked
PixKofax, main tab, paper source	Feeder	Feeder
PixKofax, main tab, dpi	200	300
PixKofax, main tab, mode	Black and white	Black and white
PixKofax, main tab, page size	Scanner's maximum	Scanner's maximum
PixKofax, main tab, orientation	Portrait	Portrait
PixKofax, main tab, simplex/duplex	Duplex	Duplex
PixKofax, more, detect page size	Checked	Checked
PixKofax, main tab, (scanner preset) {preset names are retained so you can use different names as needed}	Test01	Test02
PixKofax, advanced (VRS adjustments), clarity, auto brightness	Checked	Checked
PixKofax, advanced (VRS adjustments), clarity, brightness	N/A	N/A

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Canon DR-X10C Scanner, VRS configuration, continued

Canon DR-X10C with VRS Option	Multifeed Productivity Test	Challenge Document Productivity Test
PixKofax, advanced (VRS adjustments), clarity, contrast	50	50
PixKofax, advanced (VRS adjustments), clarity, advanced clarity	Enabled @ level 2	Enabled @ level 2
PixKofax, advanced (VRS adjustments), clarity, gamma	17	17
PixKofax, advanced (VRS adjustments), noise, line filter	Normal	Normal
PixKofax, advanced (VRS adjustments), noise, speckle removal	Small	Small
PixKofax, advanced (VRS adjustments), noise, fill holes	Not checked	Not checked
PixKofax, advanced (VRS adjustments), skew, deskew	Deskew, auto crop, auto orientation	Deskew, auto crop, auto orientation
PixKofax, advanced (VRS adjustments), color, enable detection	N/A	N/A
PixKofax, advanced (VRS adjustments), background, enable smoothing	N/A	N/A
PixKofax, advanced (VRS adjustments), blank page	Enabled detection, delete, context @ 50, ignore holes	Enabled detection, delete, context @ 50, ignore holes
PixKofax, advanced (VRS adjustments), (profile name) {profile names are not retained in PixKofax so only use one}	Test	Test
PixKofax, VRS Admin, warnings, brightness out of range	35—Ignore error	35—Ignore error
PixKofax, VRS Admin, warnings, contrast out of range	40—Ignore error	40—Ignore error
PixKofax, VRS Admin, warnings, color confidence out of range	50—Ignore error	50—Ignore error
PixKofax, VRS Admin, errors, paper jam	Auto resolve	Auto resolve
PixKofax, VRS Admin, errors, multifeed	Auto resolve	Auto resolve
PixKofax, VRS Admin, errors, out of paper	Auto resolve	Auto resolve
PixKofax, VRS Admin, errors, cover open	Auto resolve	Auto resolve
PixKofax, VRS Admin, errors, auto crop failure boundary note detected	Ignore error	Ignore error
PixKofax, VRS Admin, errors, auto deskew failure	Ignore error	Ignore error
PixKofax, VRS Admin, errors, staple detection	Auto resolve	Auto resolve
PixKofax, VRS Admin, errors, excessive skew	Auto resolve	Auto resolve
PixKofax, VRS Admin, accelerated scanning	Best	Best
PixKofax, advanced (VRS adjustments), **Canon** ISIS, endorser	No endorser	No endorser
PixKofax, advanced (VRS adjustments), **Canon** ISIS, color—front/rear color dropout	None	None

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Canon DR-X10C Scanner, VRS configuration, continued

Canon DR-X10C with VRS Option	Multifeed Productivity Test	Challenge Document Productivity Test
PixKofax, advanced (VRS Adjustments), **Canon** ISIS, color, JPEG compression	Good	Good
PixKofax, advanced (VRS Adjustments), **Canon** ISIS, picking rectangle	Not checked	Not checked
PixKofax, advanced (VRS Adjustments), **Canon** ISIS, rotation (front/rear)	0	0
PixKofax, advanced (VRS Adjustments), **Canon** ISIS, multifeed	Enabled with 3 zones	Enabled with 3 zones
PixKofax, advanced (VRS Adjustments), **Canon** ISIS, other (speed/quality)	High speed scanning enabled	High speed scanning enabled
PixKofax, advanced (VRS Adjustments), **Canon** ISIS, other, moire removal	Checked	Checked
PixKofax, advanced (VRS Adjustments), **Canon** ISIS, other, staple detection	Checked	Checked
PixKofax, advanced (VRS Adjustments), **Canon** ISIS, other, error recovery	Checked	Checked
Canon DR-X10C Operator control panel settings		
Canon DR-X10C OCP—buzzer control (ON2 ON1 OFF)	ON2	ON2
Canon DR-X10C OCP—double feed control (ON/OFF)	ON	ON
Canon DR-X10C OCP—double feed retry (3-2-1-OFF)	1	1
Canon DR-X10C OCP—staple detection (ON/OFF)	ON	ON
Canon DR-X10C OCP—staple control (2/1/0)	0	0
Canon DR-X10C OCP—long document (ON/OFF)	OFF	OFF
Canon DR-X10C OCP—manual feed mode (ON/OFF)	OFF	OFF
Canon DR-X10C OCP—stand by mode (240-60-10)	240	240
Canon DR-X10C OCP—Japanese (ON/OFF)	OFF	OFF
Canon DR-X10C OCP—display contrast	—	—
Canon DR-X10C OCP—SCSI speed (20-10-5)	20	20
Canon DR-X10C OCP—USB short packet (ON/OFF)	ON	ON
Canon DR-X10C OCP—dust detection mode (ON/OFF)	ON2	ON2
Canon DR-X10C OCP—tray position (2-1-0)	1	1
Canon DR-X10C OCP—torque control (5-4-3-2-1)	3	3
Canon DR-X10C OCP—auto USB power off (ON/OFF)	OFF	OFF
Canon DR-X10C OCP—total counter (display only)	N/A	N/A
Canon DR-X10C OCP—roller counter (reset to 0)	N/A	N/A
Canon DR-X10C OCP—imprinter test	N/A	N/A
Canon DR-X10C OCP—cleaning mode	N/A	N/A

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Appendix 4—Part D—Real-world environment—Scanner features and settings profile, continued

Canon DR-X10C Scanner, ISIS configuration **EMC Captiva QuickScan Pro** v6.5.1 demo settings

Canon DR-X10C ISIS	Multifeed Productivity Test	Challenge Document Productivity Test
	200 dpi, bitonal, duplex, AO, auto thresholding, multifeed detection, multipage TIFF output	300 dpi, bitonal, duplex, AO, auto thresholding, multifeed detection, multipage TIFF output
QuickScan scan profile name	DR-X10C ISIS test job 01	DR-X10C ISIS test job 02
General—save images to this folder	C:\Program Files\EMC Captiva\QuickScan\ My Images\x10c-ISIS\Job01	C:\Program Files\EMC Captiva\QuickScan\ My Images\x10c-ISIS\Job02
Scan—show continue dialog after scan	Checked	Checked
Scan—scan mode	Duplex	Duplex
Scan—scan type	Black and white	Black and white
Scan—dpi	200	300
Scan—page size	Scanner max	Scanner max
Image format and naming—enter file name at...	Checked	Checked
Image format and naming—file type	TIFF	TIFF
Image format and naming—color format	Binary	Binary
Image format and naming—compression	Group 4	Group 4
Image format and naming—append standard extension ...	Checked	Checked
DR-X10C ISIS Driver, basic, user preference		
DR-X10C ISIS Driver, basic, mode	Black and white	Black and white
DR-X10C ISIS Driver, basic, page size	Auto detection	Auto detection
DR-X10C ISIS Driver, basic, dpi	200	300
DR-X10C ISIS Driver, basic, scanning mode	Duplex	Duplex
DR-X10C ISIS Driver, basic, deskew	Checked	Checked
DR-X10C ISIS Driver, brightness, auto	Checked	Checked
DR-X10C ISIS Driver, brightness, gamma, custom	Not checked	Not checked
DR-X10C ISIS Driver, image processing, text orientation	Checked	Checked
DR-X10C ISIS Driver, other, rapid recovery system	Checked	Checked
DR-X10C ISIS Driver, other, JPEG transfer	N/A	N/A
DR-X10C ISIS Driver, other, staple detection	Checked	Checked
DR-X10C ISIS Driver, other, feeding option	Standard feeding	Standard feeding
DR-X10C ISIS Driver, other, double feed detection	Ultrasonic	Ultrasonic
DR-X10C ISIS Driver, other, double feed detection, setting	3 Sensors	3 Sensors

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Canon DR-X10C Scanner, ISIS configuration, continued

Canon DR-X10C ISIS	Multifeed Productivity Test	Challenge Document Productivity Test
Canon DR-X10C Operator control panel settings		
Canon DR-X10C OCP—buzzer control (ON2 ON1 OFF)	ON2	ON2
Canon DR-X10C OCP—double feed control (ON/OFF)	ON	ON
Canon DR-X10C OCP—double feed retry (3-2-1-OFF)	1	1
Canon DR-X10C OCP—staple detection (ON/OFF)	ON	ON
Canon DR-X10C OCP—staple control (2/1/0)	0	0
Canon DR-X10C OCP—long document (ON/OFF)	OFF	OFF
Canon DR-X10C OCP—manual feed mode (ON/OFF)	OFF	OFF
Canon DR-X10C OCP—stand by mode (240-60-10)	240	240
Canon DR-X10C OCP—Japanese (ON/OFF)	OFF	OFF
Canon DR-X10C OCP—display contrast	N/A	N/A
Canon DR-X10C OCP—SCSI speed (20-10-5)	20	20
Canon DR-X10C OCP—USB short packet (ON/OFF)	ON	ON
Canon DR-X10C OCP—dust detection mode (ON/OFF)	ON2	ON2
Canon DR-X10C OCP—tray position (2-1-0)	1	1
Canon DR-X10C OCP—torque control (5-4-3-2-1)	3	3
Canon DR-X10C OCP—auto USB power off (ON/OFF)	OFF	OFF
Canon DR-X10C OCP—total counter (display only)	N/A	N/A
Canon DR-X10C OCP—roller counter (reset to 0)	N/A	N/A
Canon DR-X10C OCP—imprinter test	N/A	N/A
Canon DR-X10C OCP—cleaning mode	N/A	N/A

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Appendix 5—Real-world environment—Testing methodology and results (dust and contaminants)

Kodak's Quality Assurance Team conducted a series of comprehensive, competitive benchmark tests comparing the **Kodak** i780 Scanner with VRS to the **Canon** DR-X10C Scanner ISIS. Testing parameters exceeded normal benchmark tests.

Real-world results: testing results (for dust and contaminants)

Tests performed:

1) Performance of Dust Evasion System

Result—This test was halted when we could not get the Dust Detection System to detect dust in the scanner during normal operation.

2) Determine the Dust Particle size needed to trigger the **Canon** DR-X10C Scanner Dust Detection System

Result—This test was halted. We could not get dust to trigger the detection system.

Canon DR-X10C Scanner Streak Detection Software

Testing was performed using Dust Detect Modes ON1 and ON2.

■ **Dust Detect Mode Setting**

```
Dust Detect Mode
  ON2   ON1  [OFF]
```

If dust is detected on the scanner glass when the scanner is turned ON, the sensor position is moved forward or backward to avoid vertical streaks caused by the dust on the scanned image.
ON2: Displays an error message and stops scanning. (scanning disabled)
ON: Normal display alternates with error message. (scanning enabled)
OFF: Dust detection is disabled.

IMPORTANT

When the dust detection error message is displayed (either continuously or alternating with the normal display), clean the scanning glass.

Note: Dust Detection occurs prior to scanning the first image.

Canon DR-X10C Scanner Sleep Mode

The scanner has a configurable sleep mode. The settings are 10, 60, and 240 min. We did not find a way to turn this off.

■ **Stand-by Mode Setting**

```
Stand-by Mode
  240   60   [10]
```

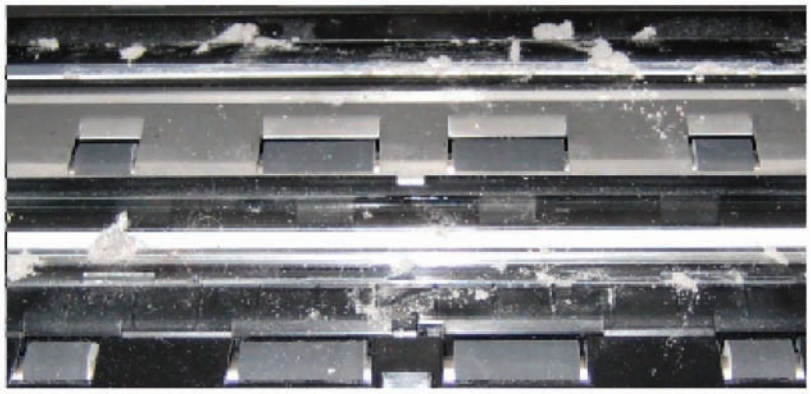
Selects the amount of time (240, 60 or 10 minutes) from when the scanner is last used to when the Stand-by mode is activated.

When the scanner is enabled after waking up from Stand-by Mode, the cleaning system activates.

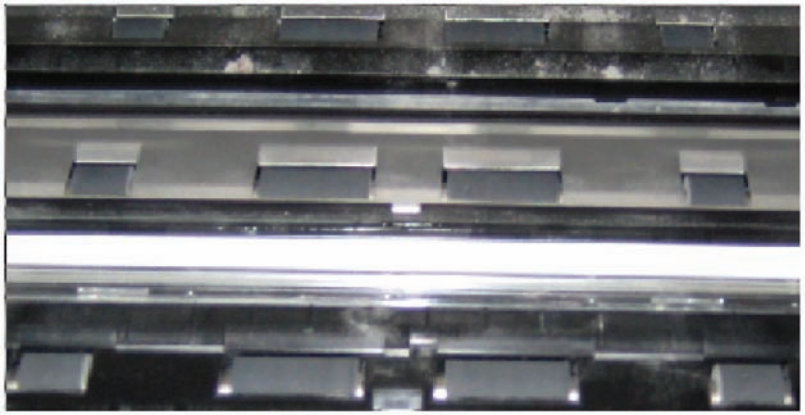
Test 1—Description and detailed results

The intent of this test was to seed the imaging area of the **Canon** DR-X10C Scanner with a large quantity of naturally made paper dust. Dust was collected from **Kodak** Scanners normally used for testing purposes in the QA Lab. Dust was placed on the upper and lower image paths.

This is a photo of the dust that was seeded in the scanner at the beginning of the test. The dust was collected from several scanners in the QA Lab. This was not "manufactured" dust.



This photo was taken after the first sheet was scanned. Notice there is little sign of the piles of dust that had been placed in the scanner.



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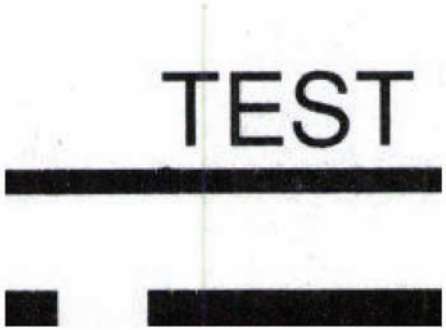
Appendix 5—Real-world environment—Testing methodology and results (dust and contaminants), continued

Performance of Dust Evasion System Test—detailed results, continued

This is a portion of the first image taken. There were streaks both in the image and in the background.



Streak on the document

Streaks seen in the background

The scanner's ability to remove large amounts of dust from the imaging area was observed. However, there was still a noticeable streak in the image after the dust was removed.

Dust particle size to trigger **Canon** DR-X10C Dust Detection System

The intent of this test was to run the scanner until there was a visible streak in the image and disable the scanner. When the scanner was re-enabled the dust detection system was to detect the dust, clean the imaging area and continue scanning. This test would be repeated until the Dust Detection System could no longer correct for the dust on the guides.

To speed up the creation of dust, the Dust Creator Tool was used.

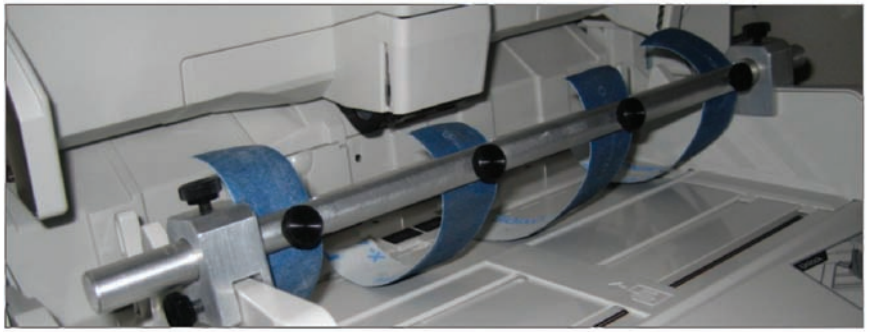


Photo of Dust Creation Tool

During our testing we noticed that there were very visible streaks in the images. When the scanner was disabled and re-enabled, the Dust Detection System did not detect the dust.

The dust streak grew from 1 pixel wide to about 49 pixels wide. Dust was not detected by the Dust Detection System using either the ON1 or ON2 settings.

Conclusion

The Dust Detection System did not detect dust that was clearly visible in the image.

For more information about testing methodology and laboratory test results, click here

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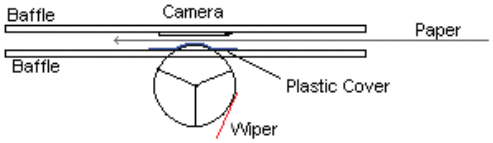
Appendix 5—Real-world environment—Testing methodology and results (dust and contaminants), continued

Test #2—Determine dust particle size to trigger DR-X10C Dust Detection System—detailed results

The intent of this test was to determine under what conditions the Dust Detection System would detect dust.



Using a "Dust Creation Tool" to create dust quickly, we also needed a way to prevent the dust brush from cleaning the imaging area. We taped a piece of plastic document protector over the brush mechanism.

To determine if the Dust Detection System was operating, we placed a sticky note over the image guide. This action triggered a dust detection "event."

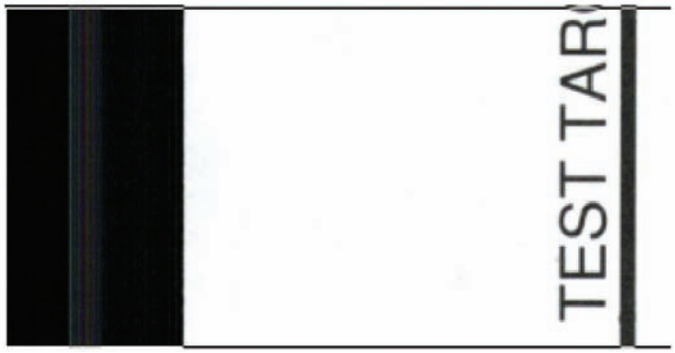
We then cut the sticky notes into smaller and smaller width strips and placed them on the image guides. This also triggered a dust event. We were able to create a sliver at about 1/16th inch wide. This also triggered a dust detection event. We concluded that the Dust Detection System was functioning.

We scanned for several days using the Dust Creation Tool. We were disabling and re-enabling every 10 documents. The Dust Detection System did not detect dust.

We placed a pile of dust just before the image guide and allowed the document to spread dust throughout the scanner. The dust was visible in the image, but the Dust Detection System did not detect a dust error.

We scanned in bitonal image capture mode and got the same results.

As a last test we taped a human hair across the imaging area. This was immediately detected when the scanner was enabled.



Overall testing conclusion

The Dust Detection System did not detect dust but could detect more dense or solid objects. We concluded that if the test was run long enough, the dust would have built up to the point were the Dust Detection System would have triggered an event. However, streaks caused by dust would have been noticeable in images long before then.

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