BERTL
HIGHLY RECOMMENDED

★ ★ ★ ★

Xerox WorkCentre 4150

45 ppm Monochrome

Print ▪ Copy ▪ Scan ▪ Fax ▪ Internet Fax

100% INDEPENDENT ANALYSIS

Click on an entry to go to the page listed.

OFFICE

Click on an entry to go to the page listed.

OFFICE

When you look at the entire range of Xerox digital imaging systems the WorkCentre 4150 appears to be a very small cog in a very large engine. However, nothing could be further from the truth.

From Anne Mulcahy (Chairman and CEO of Xerox Corp.) down a lot of hopes lie in the success of the 4150. The reason can be spelled out in three letters, SMB (small medium businesses). Xerox has always been strong in the large accounts in corporate, commercial and public sectors. However, with its predominantly direct sales force hunting down the big fleet deals, the soft-underbelly of Xerox has always been a poor showing in the 'main street.' Public perception of Xerox is still that you pay premium dollars for Xerox technology, a factor that puts off the small business owner far more than the giant fleet purchaser, who knows that price is subjective when you are talking in 10's or 100's of units.

Another factor that is making Xerox penetration into SMB even more difficult is the growth in low cost letter- legal-size MFPs from the large printer manufacturers. With a price point that has traditionally been many times lower than a Xerox ledger / A3 capable MFP, Xerox has been unable to compete.

The WorkCentre 4150 is designed to remedy these two issues and help Xerox get more of the lucrative SMB spend (which in the US is rated at $17 Billion alone). The Xerox WorkCentre 4150 looks and feels like a Xerox, with the same style Xerox touchscreen interface, access to the same Xerox software applications like CentreWare Web Services, SMARTsend, SMARTdocument Travel, and Xerox document workflow expertise. The difference is the price and the media support. Xerox has listened to the market and produced a letter- legal-size MFP to compete against, as Xerox calls them H and L companies. They have also come to battle with a very aggressive price point allowing users to experience Xerox document handling for the first time at the same price as they would buy a device from H or L.

The Xerox WorkCentre 4150 has also been designed along the printer manufacturer philosophy of let the user maintain it themselves. Every main part of the WorkCentre 4150 can be switched out by end users with no need for service engineer visits. This design also lends the device to reseller / VAR distribution which is exactly where Xerox hopes most of the sales will come. With this vast new channel to sell Xerox MFPs, Xerox hopes that the SMB market will see Xerox technology and be so impressed that it looks to standardize on the Xerox brand for all MFP needs and the trickle effect starts. It should now be apparent why this small device is so important to Xerox. In BERTL's assessment the needs of SMB were placed firmly at the center of the equation and Xerox strengths were allowed to shine.

Device Features Summary	
Monochrome Engine Speed	45 ppm
Color Engine Speed	N/A
First Copy Out Mono	5 sec.
First Copy Out Color	N/A
Warm Up Time	About 40 sec.
Maximum Monthly Volume	200,000
Copy	Standard
Print	Standard
PSTN Fax	Optional
Internet/Network Fax	Optional
TWAIN Scan	Optional
Network Scan	Optional

The Xerox WorkCentre 4150 with three optional paper trays, staple finisher, network scanning, and Fax Kit installed.

Paper Handling: Paper Input

For more information on this topic go to www.bertl.com

WHAT WE LIKED:

- Up to three optional 500-sheet universal paper cassettes can be added to the device to maximize commercial and business development.

- The paper adjustment guides are located near the front of the device, allowing for easy adjustability when changing paper sizes and loading paper supplies. They are attached to the unit so they cannot be misplaced.

- The ability to load paper supplies while the device is running saves on time and human intervention.

WHAT WE WOULD LIKE TO SEE:

- A paper level indicator on the front of the paper drawers would indicate when the paper supply is low.

- A larger standard 550-sheet capacity drawer would accommodate a full ream of recycled paper, which can be slightly thicker than virgin paper.

- We liked the ability to support heavy media through all main trays rather than just through the bypass, which is the case with other rival units.

- Paper tray handles that can be grasped from both the top and bottom, as currently handles can be only be grasped from the bottom, allows users with disabilities to access the bottom drawers easily.

Paper Handling: Input Features Summary	
Standard Paper Capacity	Standard:1 x 500-sheet universal cassette, 100-sheet bypass Optional: 3 x 500-sheet universal cassettes
Maximum Paper Capacity	2,100 sheets
Bypass Tray Capacity	100 sheets
Maximum Paper Size (bypass)	8.5" x 14"
Maximum Paper Size (main trays)	8.5" x 14"
Max Paper Weight (bypass)	53 lb. Bond/200gsm
Max Paper Weight (main trays)	32 lb. Bond/120gsm
Standard Legal Capacity	600 sheets
Maximum Legal Capacity	2,100 sheets
Standard Ledger Capacity	N/A
Maximum Ledger Capacity	N/A
Standard Paper Sources	2
Maximum Paper Sources	5
Post Process Insertion (PPI)	N/A
PPI Capacity	N/A

The standard main paper tray supports up to 8.5" x 14" paper size and up to 32 lb. Bond/120gsm paper weight.

For more information on this topic go to www.bertl.com

WHAT WE LIKED:

• There was a very minor drop in productivity when creating double-sided or stapled finishing jobs.

• Frequently used functions, such as: stapling, collating, enlargement, simplex/duplex, etc. are found on the front home screen for easy accessibility.

• High stacking capacity of the finisher unit allows for longer uninterrupted print runs.

• Tight stacking of the collated sets makes offline finishing tasks such as perfect binding or professional punch less time-consuming.

• Staple supplies can be easily replenished by the end user.

• The optionally purchased stapling device and hanging side finisher takes up less valuable floor space.

WHAT WE WOULD LIKE TO SEE:

• The ability to create job memory buttons, such as stapled sets of mixed originals for frequently used features on the main home screen, would greatly reduce the users time at the device.

• Support for heavy media weights through the bypass, duplex and main paper tray would provide more in-house presentation materials to be produced.

Paper Handling: Output/Finishing Features Summary	
Maximum Output Capacity	500 sheets
Duplex Capability	Standard
Maximum Paper Weight Through Duplex Unit	28 lb. Bond/2105 gsm
Maximum Stapling Capacity	50 sheets
Maximum Booklet/Saddle-stitch Capacity	N/A
Hole Punch Options	No
Physical Mail Bin Option	No
Folding Options	No

Real World Testing: Advertised speeds are always quoted using the simplest route, in and out of a device. In the real world, users choose finishing options, incorporate multiple media supplies, print in duplex, and add other elements that can impact bottom-line speed.

BERTL evaluates these factors looking at how the same job outputs at different speeds when different factors are applied. In the table, bottom right, the finishing impact is measured by running a 12 page job 10 times through a device and adding a different finishing attribute each time. In the table, bottom left, the impact of incorporating multiple media sources into a single document is measured. In this instance, a 50-page document is printed first using a single media source/ It is then timed using the bypass tray for front and back covers, plus pages 10,20,30, and 40 from a separate media tray.

Copy and print jobs exit to the output tray in neat offset stacks. The 500-sheet output capacity provides users with longer uninterrupted print runs.
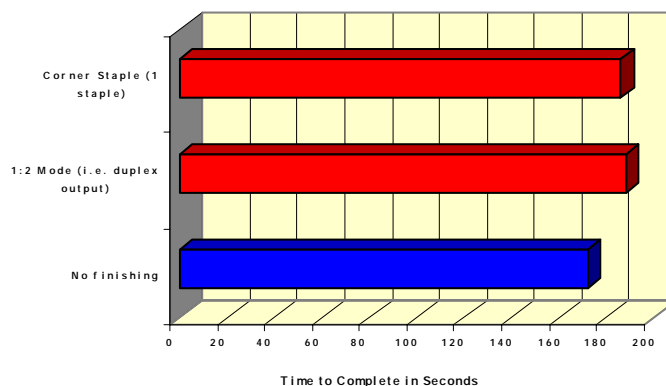
Document Finishing - Affect on Productivity

Corner Staple (1 staple)

1:2 Mode (i.e. duplex output)

No finishing

0 20 40 60 80 100 120 140 160 180 200

Time to Complete in Seconds

BERTL HIGHLY RECOMMENDED ★★★★

Routine Maintenance

For more information on this topic go to www.bertl.com

WHAT WE LIKED:

• Consumables such as the toner cartridge, drum cartridge, and staple cartridge can all be user replaced in a matter of minutes.

• The fuser unit can also be user replaced with a screwdriver and a little technical knowledge, even though Xerox did not recommend that the fuser unit be end-user replaceable.

• All consumables are located in or near the front of the device, providing easy access for disabled users, and are simple to replace. Instructions provided on the control panel were also very helpful.

• Paper jam areas were easy to access with no hidden jam points.

• The fuser area and duplex unit are on the opposite side of the finisher, allowing paper jams to be removed without having to move the finisher unit aside.

• The instructions for the large touch screen and animated paper jam walking users through the jam removal process, were intuitive and user friendly.

• When multiple jams (forced by BERTL analysts) occur, the sensors reset and users are aware of the remaining jam locations. Sensors from other rival units do not reset until every jam has been removed, causing users to continue looking for non-existent jams.

• When a paper jam occurs the device sends an audible beep tone (when turned on), alerting nearby users that maintenance on the device is required. This feature is a time saver for users who might otherwise travel to the device to find that the copies they needed hadn't been printed due to maintenance requirements.

WHAT WE WOULD LIKE TO SEE:

• The ability to send email notifications to more than one person informing them of maintenance requirements could detain the device maintenance notice if the person is out of the office, causing the device to be out of service for a period of time.

Maintenance Features Summary

Toner Yield	Black: 10,000 pages w/device 20,000 pages w/standard
Imaging Unit Life	Up to 55,000 images
Fuser Life	Info Not Available
Developer Life	Info Not Available
Toner Refill During Printing	No
End-user replaceable Imaging Unit	Yes
End-user replaceable fuser unit	No

Above: BERTL analyst performs routine maintenance on the Xerox WorkCentre 4150.
Below: Detailed step-by-step illustrations provide helpful information on jam removal.

Users can replace most consumables in a matter of minutes. In this case, the BERTL analyst is replacing the fuser unit by turning a couple of screws.

For more information on this topic go to www.bertl.com

WHAT WE LIKED:

- The design of the device management interface from the desktop to the walk up panel is very user friendly. This allows for quick and efficient maintenance and management.

- The cloning feature provides the administrator with the ability to clone the device's feature rich settings and profiles so they can be used to configure other devices in the work environment, providing a cohesive standard. They can also be used on new and replacement machine installs, which can be carried out efficiently.

- The ability to copy scan templates is a valuable time saver.

- A user-friendly device management tool allows users to cancel pending jobs on the queue. The job queue currently provides the author, document name and print status on the job queue.

- Direct PDF print, delayed print, and secure print job submission from the desktop can be performed through the device management tool, in addition to submission through print drivers.

- We liked the ability to import an address book file with a .csv file extension to update the corporate personnel directory.

WHAT WE WOULD LIKE TO SEE:

- Setting up the first scan template initially required multiple steps.

- Currently email notification on device maintenance requirements are limited to being sent to one designated person. It would be more beneficial if more than one person is notified, in the event that person is out of the office or on vacation.

- The opening screen offers little information with users having to make additional selections to view toner and paper supplies. We would like to see the opening screen provide all key consumable information.
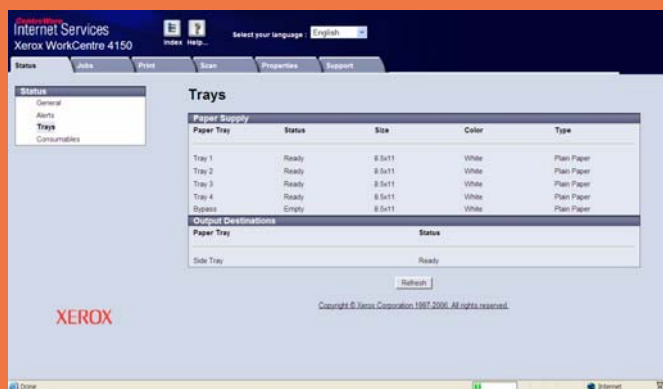
Above: Status Monitoring
Below: Joe Queue Monitoring

The Job Submission utility allows users to submit direct PDF print jobs from the Web Server, which can be sent with customizable print settings. Secure Print and Delayed Print jobs can also be submitted from the Job Submission screen. For Secure Print the user would need to enter the Secure Print ID, which is the password needed at the control panel, browse to select the secure print document and submit the job.
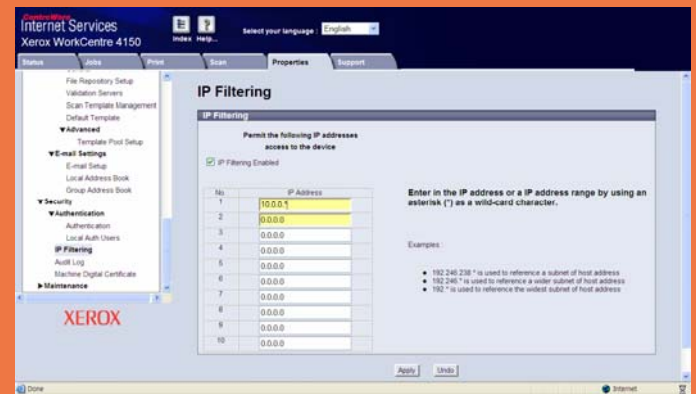

Up to ten IP Filtering addresses are permitted.
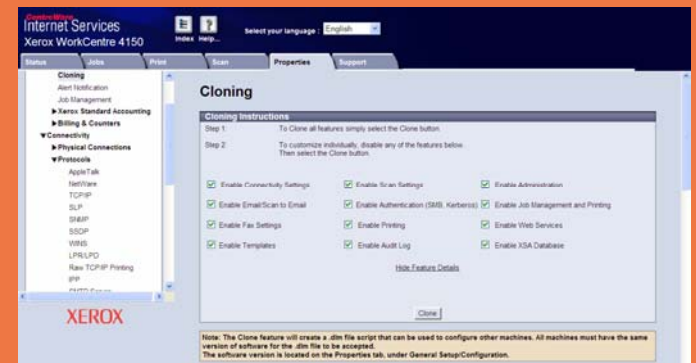
The clone feature allows the administrator to duplicate the device's settings by creating a .dlm file script to be used to configure other MFPs in the office or when new device or replacements are placed in service.
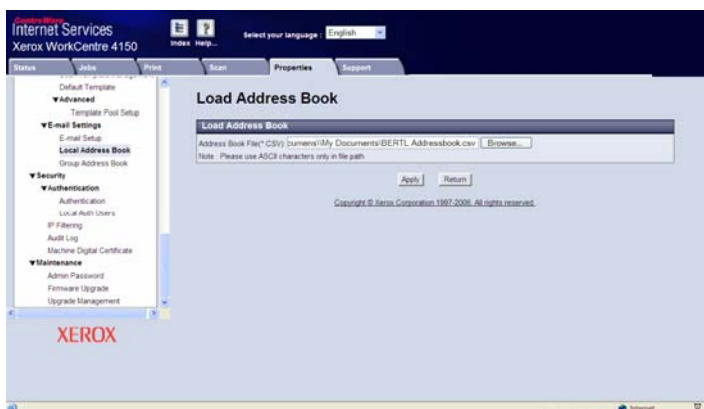
Address Book files with a *.csv extension can be directly downloaded to the corporate directory. The information on the address book files can be edited and uploaded back to the *.csv file. This link provides for direct replacement of the file.
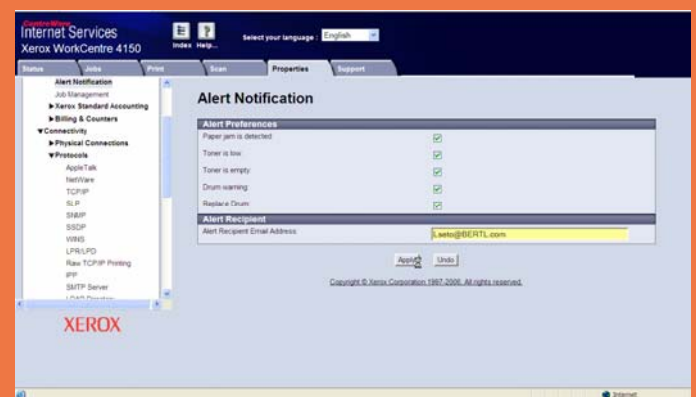
A key person can be notified by email for specific responses to device maintenance.

Security

i For more information on this topic go to www.bertl.com

WHAT WE LIKED:

- The user friendly private/secure print feature, supplied as a standard, provides storage and print outs from the printer's hard drive to allow for secure printing of individual documents to be handled easily.

- The optional "On Demand" or "Immediate Image Overwrite" kit offers higher level security that government and other security conscious environments demand.

- Network Authentication provided as a standard feature is effective in setting up a secure network communication.

- IP filtering, port blocking and domain filtering make hacking into the system harder.

- The cloning feature on the web browser creates a .dlm file script that can be used to configure other devices. This feature allows users to clone all features on the Xerox WorkCentre 4150 to be used on multiple devices, providing the same feature set across the board.

WHAT WE WOULD LIKE TO SEE:

- MAC filtering would deliver even greater security protection since a MAC address, once created for the hardware, remains static and cannot be changed or edited.

- Biometrics for either user authentication and/or secure print/fax queue release would provide added security.

- The ability to provide PDF encryption or encrypted print feature in the scanning function would offer a secure communication solutions for businesses and other corporate entities.

- Anyone can view the entire list of documents on the jobs queue, which includes secure and delayed print documents. BERTL would prefer to see a user ID and password entry set up to prevent prying eyes from viewing an entire list of secure documents that contain confidential and sensitive information.

Security Features Summary	
Hard Drive Overwrite	Optional
Removable Hard Drive	No
Private Print	Standard
Encrypted Print	No
Secure Fax	Standard in fax option
Encrypted PDF Send	No
Network Authentication	Yes
LDAP Authentication	Yes
Kerberos Authentication	Yes
SNMP v3.0	Yes
IPv6	No
SSL	Yes
IP Filtering	Yes
MAC Filtering	No

A user password entry provides security for sensitive and confidential information. This first line of defense prevents unauthorized personnel from viewing or accessing the contents of these documents. User passwords can easily be set up for the secure print option.

The administrator can easily set up the secure print settings on the web browser, such as the password to be a specific length.
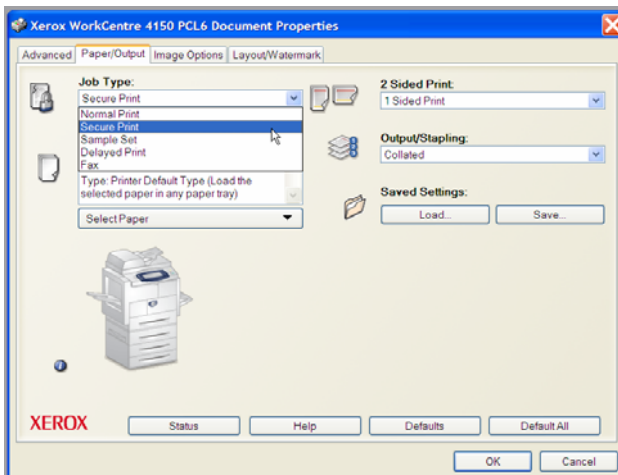
Secure Print

The Xerox WorkCentre 4150 has a secure print feature that allows users to select documents stored on the device's hard drive and to release it for printing using the correct password entry.

The user must first register the documents on the printer driver properties menu, selecting Secure Print and entering a password. This password will be used later at the control panel to release the secure document for printing.

At the device, the user can press the Job Status button on the control panel to access secure print documents. A list of all documents on the jobs queue is displayed, which means anyone without authorization can view the document list, the author's name and its current secure print status.

The users can select a secure document, select the release tab, then enter the correct password to print the document. All secure documents are deleted after printing. Documents can also be deleted without printing and by clicking on the job details tab, additional document details are provided.

Secure Print can be submitted from the Web browser with the appropriate password. User can do this by going into the Job submission under the Print tab, select the secure print button and enter the password twice.


The secure print feature is selected on the printer driver, where the user will set up a password to release the secure document. At the control panel the same password is entered to access the secure print job.
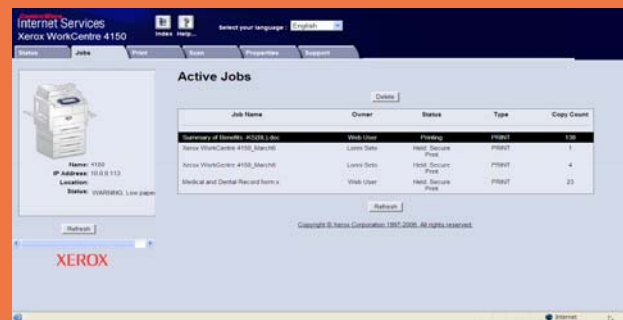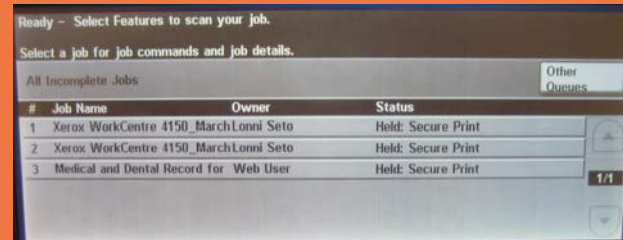
Above: At the control panel the user selects the Job Status button to access secure print jobs in queue. Secure print jobs can also be viewed from the web server under the Jobs tab.

Below: The user selects a document the releases it for printing.
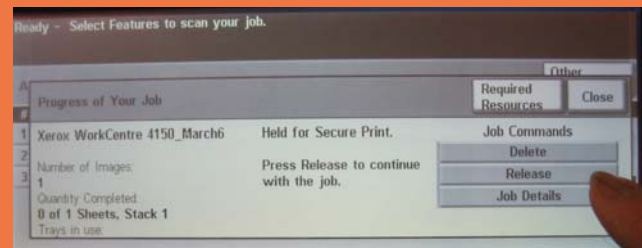
Above: The user enters the password to release the document for printing.

Below: The next screen displays updates to the print queue status. Another secure print can be released by selecting the document and entering the password. Each document is deleted after printing.

Accessibility

For more information on this topic go to www.bertl.com

WHAT WE LIKED:

• The paper path for jam removal, the replacement of consumables, and the paper adjustment guides are all located near the front of the device. This allows users with disabilities to have easy access to these tasks.

• The movable paper adjustment guides can be performed with one hand providing easy access when changing paper sizes and loading paper supplies.

• The large touch screen provides easy viewing of messages on the information line and for data entry on the QWERTY keypad. The contrast dial on the control panel also provides adjustability for users, minimizes glare from overhead lighting, and improves readability.

• The document feeder can be held open at a low grip angle, allowing for easy repeat platen scanning tasks.

WHAT WE WOULD LIKE TO SEE:

• To provide easier access to the control panel and the touch screen functions, it would be beneficial for disabled users if the control panel was tiltable.

• Paper drawers that can be grasped from the top and bottom, as currently the drawers are only accessible from the bottom, would readily accommodate wheelchair users.

• The numeric keypad is fitted with convex buttons instead of concave buttons, which would better accommodate users with limited dexterity.

• Providing the touch screen in color would allow visually challenged users to view the panel better.

• The touch screen icons were smaller than some other competing units, which could make navigating through the screens difficult for some users.

Above: The document feeder can be held open at a low angle aiding platen copying for wheelchair users.

Left: Paper drawers currently have handles that can be grasped from the bottom only. Handles that can also be grasped from the top would make changing the paper size and paper refilling much easier for wheelchair users.

Providing an adjustable tilting control panel would provide users who are physically challenged with easy access to view and use functions on the control panel.

BERTL
HIGHLY RECOMMENDED
★★★★

Copy

For more information on this topic go to www.bertl.com

WHAT WE LIKED:

- We liked the good second and third generation copy reproduction even with white text on solid backgrounds (a problem on some units) which resulted in a very impressive 97 percent score in BERTL's Triple Play Test. This will be well received by law firms and government agencies who both routinely generate second / third generation copies and need high quality reproduction for later OCR workflow demands.

- The ID card copy feature is especially helpful to medical and insurance offices who often need to retrieve pertinent information on both sides of the card.

- Most users will not need to navigate away from the opening screen, reducing job creation times.

- All queued jobs can be viewed from the copier; users can prioritize, print, pause and delete jobs that are no longer needed; and they are quick and easy to do.

- The copy image quality was established at a good level across a wide range of document types. Grayscales reproduced at a good level on text and text/photo mode. Photographs reproduced well on text/photo and photo mode, as were maps and other fine line diagrams making IQ selection less critical than on some rival units.

WHAT WE WOULD LIKE TO SEE:

- Customizing the home page with frequently used companywide or user-specific copy functions would be more user-friendly.

- There was a significant slowdown when scanning in mixed media size mode, which is also a weakness in many competing products. If the Xerox WorkCentre 4150 could handle mixed-size documents similar to same-size documents, this would allow documents such as mortgage contract proposals, legal files and engineering projects to be handled more efficiently.

- A single pass duplex document feeder would raise productivity levels when handling double-sided originals.

- An overview display showing all current settings would be beneficial for more complex jobs.

- No batch job build capabilities provided prevents users from switching between different copy resolutions and settings to build a composite job set.

Copy Features Summary	
Maximum Copy Speed	45 ppm black
First Copy Out Time	5 sec. black
Document Feeder Type	Automatic duplex document feeder
Document Feeder Capacity	50 pages
Job Build	Standard
Scan Ahead Copy	Standard
No. of Copy Job Programs	Unlimited
Customizable One-touch Buttons on Main Screen	No
Min/Max Zoom Ratio	25-400 @1%
Cover Insertion	Standard
Sheet Insertion	No
Page Stamp Options	Yes
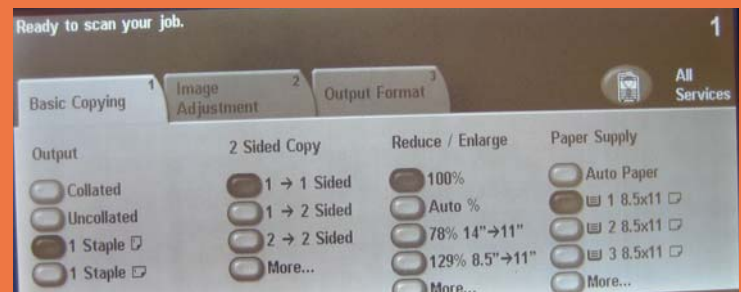
Above: The most frequently used copy functions are located on the main copy screen. Additional features can be navigated through the screens a couple of layers below.
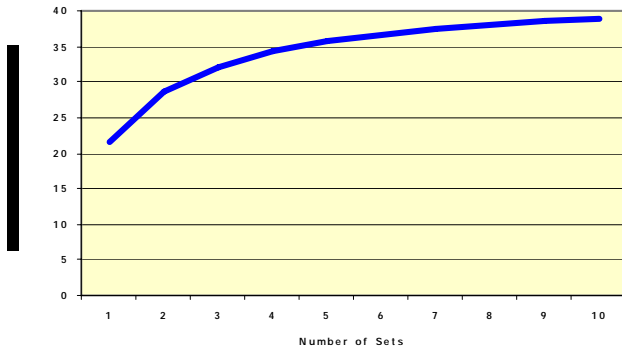
Below: A real-time snapshot of the copy job printing shows the actual page number printing and keeps track of the number of sets currently printing.
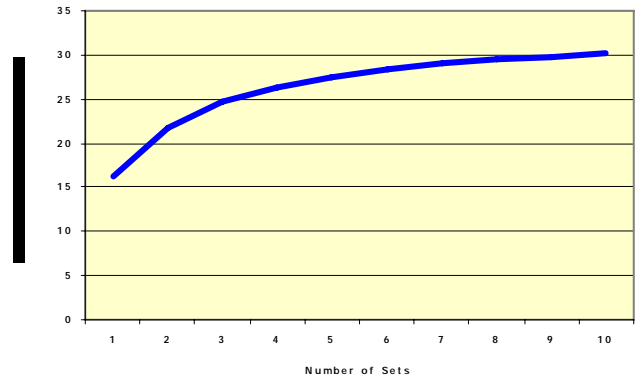
BERTL
HIGHLY RECOMMENDED
★★★★

To assess copy productivity, BERTL ran a series of 5-page copy jobs to investigate the impact of the first set out on overall engine speed and also to investigate whether specific job attributes impact engine throughput capability. Each job was set up by feeding paper from the shortest paper route to the shortest available output destination. A separate test found in the finishing section looks into the productivity impact of adding finishing/output destinations.
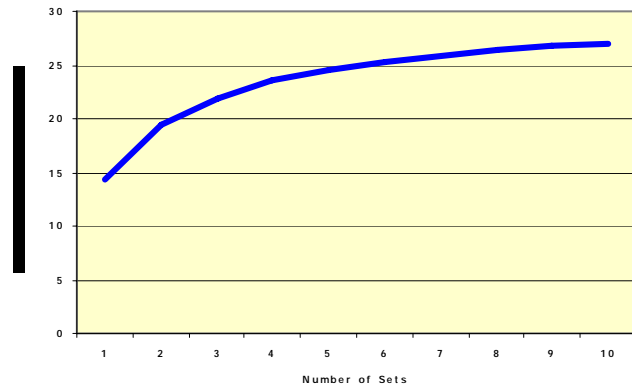
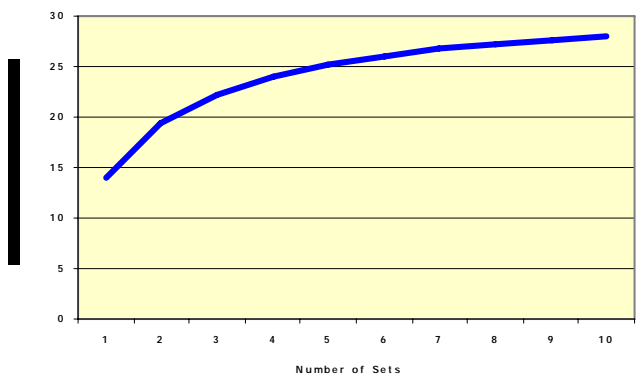Impact of First Set Out in 1:1 Mode BW

Number of Sets

Impact of First Set Out in 2:1 Mode BW

Number of Sets

Impact of First Set Out in 1:2 Mode BW

Number of Sets

Impact of First Set Out in 2:2 Mode BW

Number of Sets

BERTL
HIGHLY RECOMMENDED
★★★★

Copy Productivity

Real World Testing: Of course, judging productivity based solely on green button to output tray excludes the user, who is the most important element in the equation.

BERTL takes the user into account and looks at how the document feeder productivity on different workflow tasks impacts the amount of time a user has to wait at the device before they can walk away with originals in hand.

BERTL also evaluates how much time is spent building jobs, using the touch screen interface before the green button can be selected.
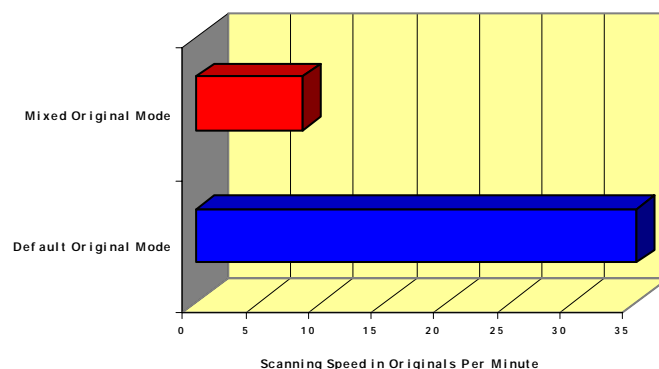
Touch Screen Selections Required for Commonly-used Copy Functions	
Corner Staple	1 step
Hole Punch	N/A
Enlarge to 129%	1 step
2:2	1 step
Photo Mode	3 steps
Mixed Original	3 steps
Cover Mode (printed front cover on bypass supply)	5 steps

Monochrome Originals Scanned Into Memory Per Minute in Simplex and Duplex Modes
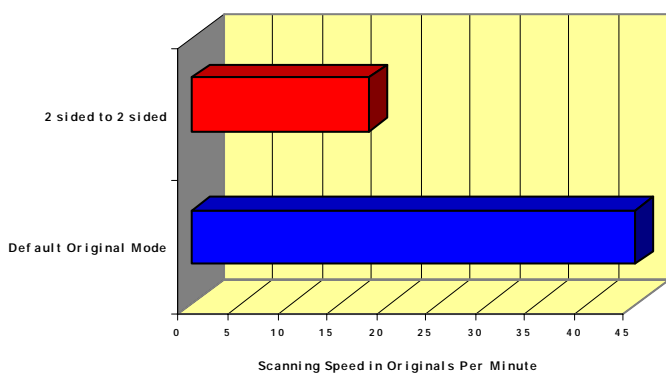
Mixed Original Processing Productivity

Real World Testing: In a perfect world, all original documents are the same size, the same type, and require the same imaging settings. BERTL looks beyond the perfect world to see how devices help those working with difficult workflow situations.

Take the example of a paralegal scanning a case file. The file could well contain both letter- and legal-sized documents, requiring a mixed media capability. The report text pages are best captured using the document feeder in Text or Text/Photo mode. However, the accident scene photographs are best scanned using the platen (to avoid damage) in Photo mode, which captures the halftone detail to a much better degree. There may also be simplex and duplex pages in the same batch. Rather than waste more paralegal time, it would be ideal to be able to switch between single-sided and double sided scanning.

| Batch and Mixed-Media Copy Capabilities	
Batch /job build scanning beyond the capacity of the document feeder	No
Batch/job build scanning incorporating both document feeder and platen scans	No
Change original type (text, text/photo, photo modes between scans)	No
Change between simplex and duplex original scanning in a job build session	No
Mixed-media size scanning capability	No

Image Quality Summary

The copy image quality was established at a good level across a wide range of originals on the Xerox WorkCentre 4150. BERTL analysts were happy with the results of the photo mode with the photo mode handling not only its designated image type well, (i.e. halftone photographs and text / lines) but also did a good job of handling the element that it was not best designed to handle. In photo mode, photos, white fonts on dark background, small fonts, and fine lines reproduced better than other rival units we've seen, without sacrificing text quality. The photo setting would allow users to get high quality output without having to worry about choosing the right settings, which can save time and money.

Real World Testing: Generation Copy Quality

When evaluating MFP image quality, analysts are always working with the best possible scenario by using high quality paper and first generation pristine masters. However, the real world is often very different, with people often working with second or third generation copies. Just consider a law firm. The firm is sent a COPY of the materials (quite possibly copies of originals) by a new client (the master set). They then make multiple copies of the master set (working copies), which get passed around the lawyers and paralegals involved in the case. After redaction and other editing work, the working copies may be scanned to create electronic files that are preferably searchable through Optical Character Recognition (OCR).

To simulate this real world practice BERTL uses a test pattern of its own design, and, using generic Staples copy paper, makes first, second, and third generation copies of the test sheet in text mode. These copies are then scanned (using the same device) at 600 dpi in text mode and fed through ABBYY FineReader 8.0 at BERTL's workflow lab. The results are displayed in the chart below.
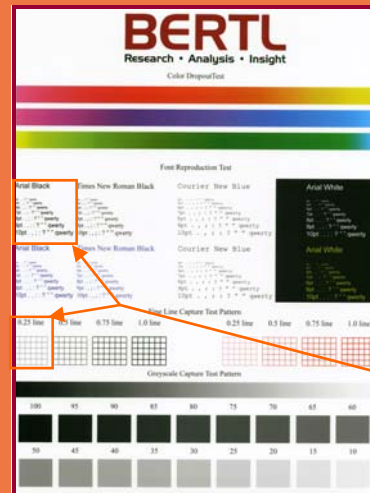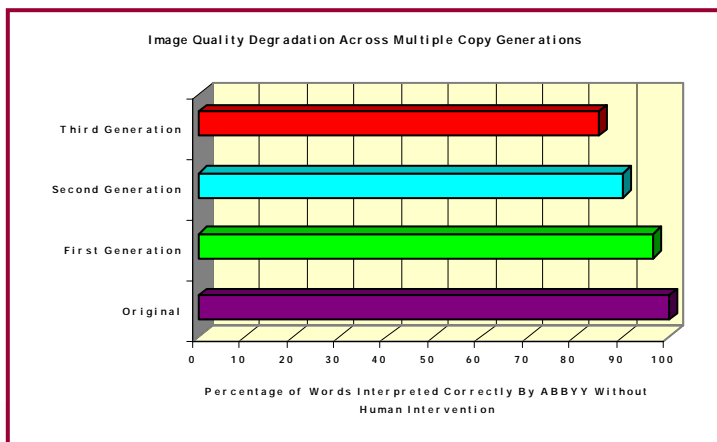
A BERTL Image quality copy reproduction test pattern with multiple fonts in varying sizes, colors and backgrounds from 4 point.

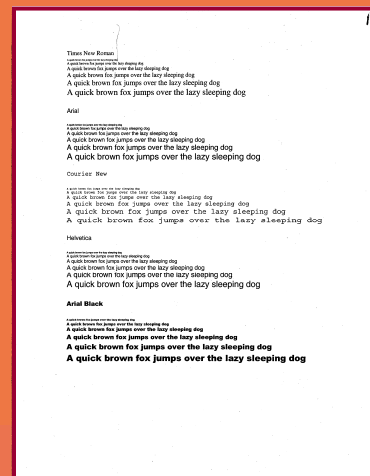Fine line grids in black and blue from 0.25 point upwards.

Greyshades from 0—100 percent in sliding scale and 5 percent block increments.

Portions of the copied test chart are displayed on the following page

A BERTL digital photograph reproduction test pattern. Photographs carefully selected to highlight ability to reproduce flesh tones, light and dark contrasts, textures, fine detail and solid colors.

Original document created in Illustrator with Perceptual Intent, RGB color space, Pro-Photo Profile. The originals were printed on heavyweight satin paper using a Canon imagePROGRAF 9000 driven by an EFI ColorProof XF 3.0 RIP.

Image Quality Degradation Across Multiple Copy Generations

Third Generation	
Second Generation	
First Generation	
Original	

0   10   20   30   40   50   60   70   80   90   100

Percentage of Words Interpreted Correctly By ABBYY Without Human Intervention

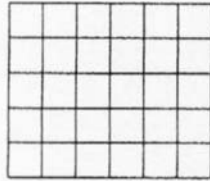BERTL's generation copy original containing five fonts ranging from 4 point to 14 point.

Originals printed on high quality heavyweight paper using 1,200 dpi laser printer. Each original is checked to ensure 100 percent OCR accuracy is achieved when scanned at 600 dpi binary on an in-house scanner.
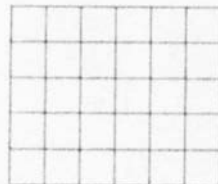
Text Mode:
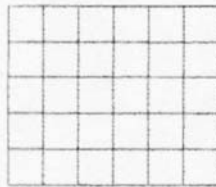
Text/Photo Mode

Photo Mode:

For more information on this topic go to
www.bertl.com

The Xerox WorkCentre 4150 does not have the Print-On-Demand feature.

Print on Demand Features Summary	
Job Storage From the Device	No
Job Storage From the Desktop	No
Finishing Options Included at Time of Storage	No
Document Images (incl. thumbnails) Provided on the Device Touch Screen	No
Document Images (incl. thumbnails) Provided on the Desktop	No
Multiple Jobs Can Be Combined and Printed as One Finished Job	No
Multiple Jobs Can Be Selected and Printed as Separate Jobs	No
Stored Jobs Can Be Edited After Storage	No
Stored Jobs Can Be Combined With Send Features	No

Print

*For more information on this topic go to www.bertl.com*

WHAT WE LIKED:

● Selecting the "Printer" graphic, "i" icon or the "Status" button on the Paper/Output screen displays the paper and toner status information on the printer driver, along with pertinent alert messages at the top of the status screen.

● Jobs sent to the device with media settings not supported at the time are moved to the side, allowing other jobs to continue being processed. Competing units do not have this capability, creating bottlenecks when media selection errors occur.

● There is an ability to print PDFs using the Direct Print feature, secure print or delayed print from the Web Server, in addition to print using the print drivers.

● Xerox handles banner sheets/header sheets very efficiently, treating the job as one data packet rather than two packets as found on competing units. This can mean that government, education and large corporations who use banner sheet printing will find the device more productive.

● The delayed print function allows large jobs to be scheduled during out of office hours to avoid bottlenecks.

● Good functionality is built into the print driver with mixed media selections, poster and imposition functionality, and form overlays.

WHAT WE WOULD LIKE TO SEE:

● Direct USB memory stick print capability would allow walk up users to take advantage of the device in Internet cafes, airports or hotel business lounges.

● File sizes in PCL mode were sizable compared to some other units, especially PDFs, which can put more pressure on the network.

● The ability to have job completion "pop-up" email alerts be set up to inform desktop users that their print jobs are ready for collection saves time and wasted journeys.

● During the course of our testing, BERTL unearthed a problem printing using the PostScript driver with Microsoft Publisher, or printing documents containing linked or embedded EPS graphics that use binary image data. With the help of Xerox's technical team, they ascertained the network port does not support binary data for PostScript jobs. As a result, this causes the printer to produce a PostScript error for jobs that contain binary data. Xerox will be producing a firmware update in the near future to include binary data support.

Print Features Summary	
CPU	400 MHz
RAM and Hard Drive	256 MB/384 MB plus 40 GB HDD
Operating Platforms Supported	Windows 98SE, Me, 2000, Server 2003, XP, NT 4.0, Macintosh OS 8.x-9.x, Xx
Printer Drivers	PCL 5e, PCL 6 Compatibility with PostScript 3
Network Protocols	IPX/SPX. TCP/IP, Ethertalk, NetBEUI LPD, IPP, SMB, SNMP, Netware, Port 9100
Interfaces/Standard	10 BaseT/100 BaseT Ethernet
Interfaces/Options	WIFI via third party
Client Software	SMARTsend, FreeFlow, CentreWare Internet Services, CentreWare Web
Std PCL Fonts Supported	Info Not Available
Std PS Fonts Supported	Info Not Available
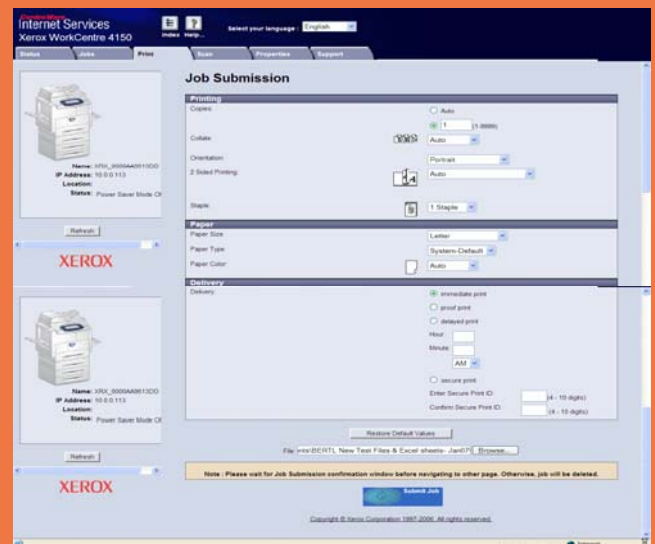
The Direct Print utility allows users to print PDFs directly from the desktop without opening the file and to select printer settings to suit their needs. Proof print, delayed print and secure print can also be executed from this screen.

Evaluating print productivity is not as simple as timing copy jobs. The printing process involves several steps and can be impacted by a variety of factors along the way.

The document must first be spooled by the printer driver into a PCL or PostScript file. The PCL or PostScript file is then sent to the printer where it is raster image processed (RIP) into image data by the device processor. The image data is then sent to the marking engine and output as printed pages.

There are three obvious factors highlighted above (spool time, rip time, and print engine speed), which can all make or break a productivity time. Add into the equation other factors such as concurrency and contention, and one would have a real world not quite so clean cut as some analysts would have people believe.

BERTL provides a selection of print productivity data:

- Raw RIP and print speed data (as displayed below)
- Concurrency and contention workflows (see next page)
- Driver design on spool / rip times (when a Windows print system driver is offered alongside PCL/PS)

Bandwidth Comparison

	Original file size per page	PCL	PS
50-page Text-Based Government Report PDF	3.40 KB	1.71 MB	1.27 MB
22-page Financial Guide Excel Worksheet	5.54 KB	787 KB	718 KB
32-page Text-Based PowerPoint	7.25 KB	6.04 MB	6.06 MB
4 page Passport Form PDF	19.75 KB	4.24 MB	402 KB
38-page Form Word Document	24.00 KB	13.2 MB	13.2 MB
16-page Magazine in PDF	111.25 KB	6.33 MB	2.71 MB
6-page Graphic Intensive DTP PDF	130.33 KB	8.23 MB	1.20 MB
32-page Graphic Intensive PowerPoint	131.24 KB	13.2 MB	13.2 MB
16-page Graphical Publisher Report	936 KB	205 MB	212 MB
2-page High Resolution Menu PDF	2358 KB	24.1 MB	6.67 MB
Digital Photographs PDF	4483 KB	15.6 MB	5.79 MB

Productivity Comparison Between Printer Drivers

■ PCL ■ PostScript

Time to Complete Jobs in Seconds
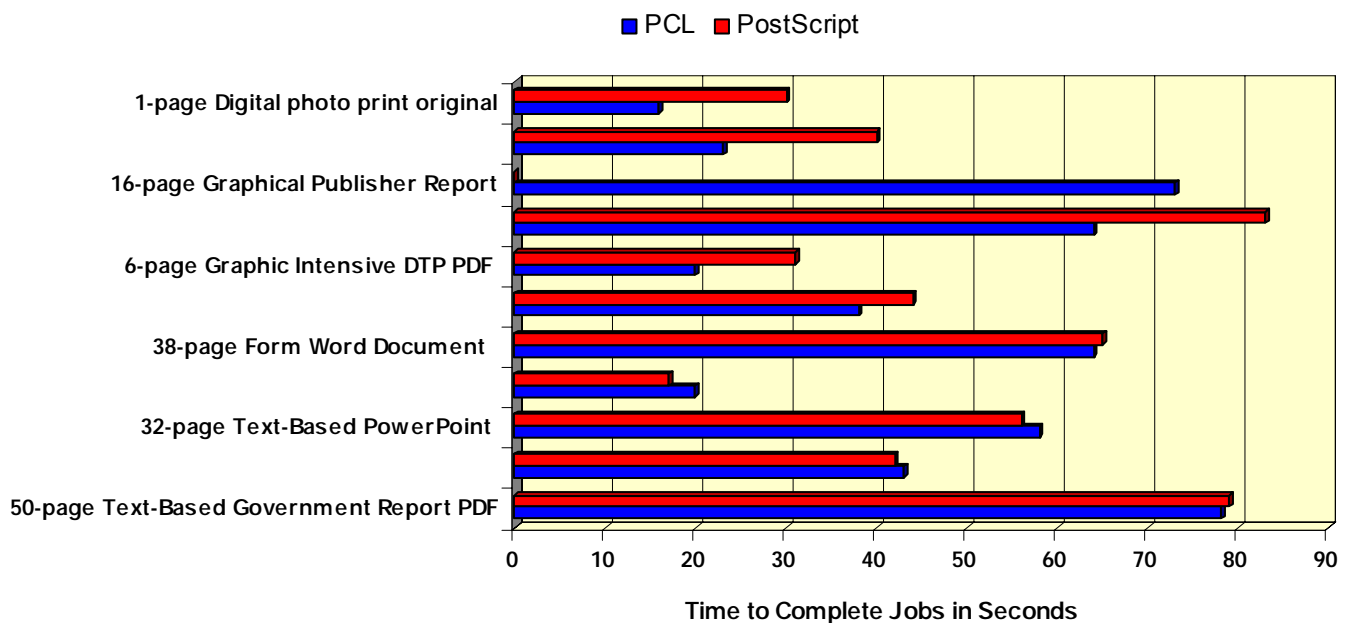
Real World Testing: Batch Printing

Batch Printing: In the real world, people are often faced with multiple files that need to be treated as a single print workflow entity. There are two main scenarios for this:

1) Multiple authors contributing to a single document
2) Collated sets comprised of multiple individual documents.

These two workflow scenarios put MFPs and printers to task, as they demand more than just the ability to spool, RIP, and print a file as fast as possible.

Real World Testing: Concurrency or Contention?

MFPs by their nature are designed to handle multiple tasks, acting as the printer, copier, scanner, even fax. BERTL looks at whether these tasks impact each other.

In BERTL's concurrency test, a large print file is submitted to print. When spooling has completed, the rate pages are exited is measured. The BERTL analyst then carries out tasks to see if the print output rate is affected.

Real World Testing: Network Traffic

Network printing devices may often face a queue of jobs stacked up for processing during busy periods of the day.

During BERTL's network workload tests, analysts queue a series of jobs at a paused print driver. The jobs are arranged in order of their raw application file size per page. The purpose of the test is to illustrate how well a device handles a stream of jobs and how the queues make-up can have a major impact on a device's performance. BERTL is not trying to suggest that a series of jobs is an example of a typical office as this would be misleading.

The series is sent to the printer with the lowest file size per page sent first (minimizing the processing workload at the start of the test and allowing efficient fat engine devices to continue processing jobs while the print engine outputs the first).
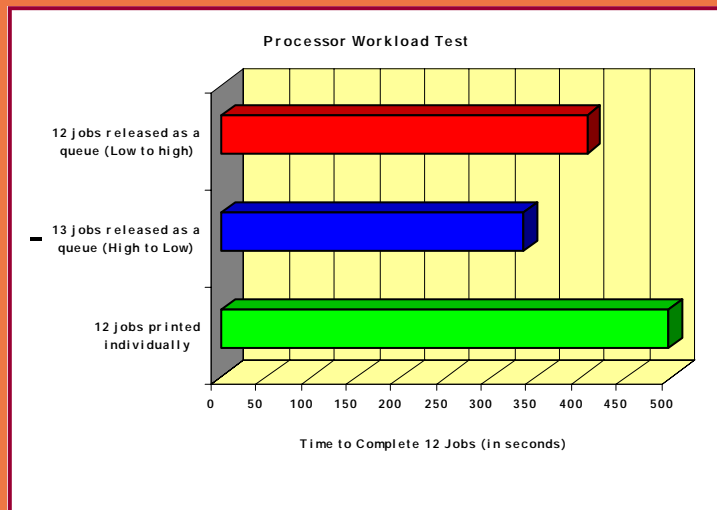
The queue is then reversed and resubmitted with the largest file size per page sent first, placing the greater strain on the processor rather than the engine speed.
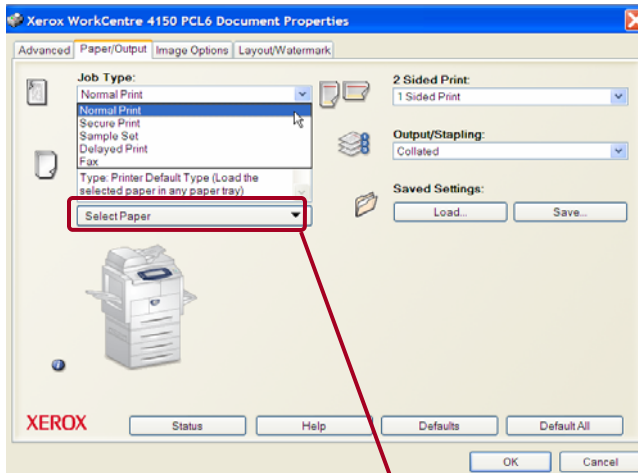
Batch Printing Capabilities

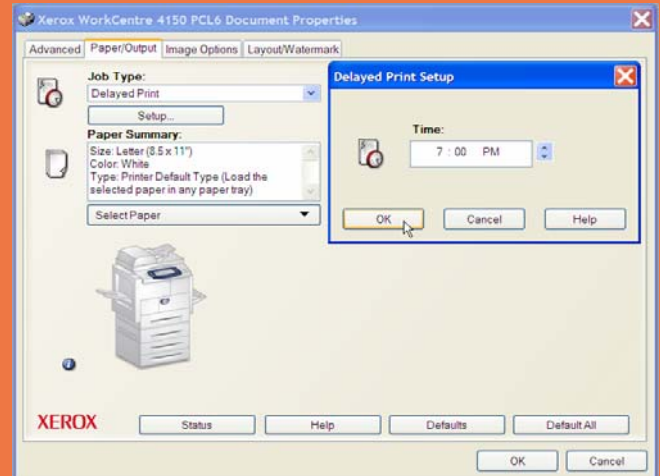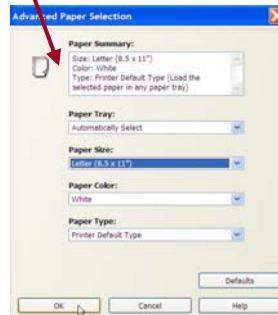|	
Multiple jobs all combined into a single finished document	No
Multiple jobs all combined into a single finished document with page numbering/watermarking added	No
Multiple jobs sent in collated sets	No
Multiple jobs sent in collated sets with finishing/job attribute changes on a job-by-job basis	No

Concurrency Test Results

Print slowdown when scanning in copy job	No
Print slowdown when scanning in scan job	No
Print slowdown when scan data transfer underway	No

Processor Workload Test

Time to Complete 12 Jobs (in seconds)

- 12 jobs released as a queue (Low to high)
- 13 jobs released as a queue (High to Low)
- 12 jobs printed individually

BERTL HIGHLY RECOMMENDED
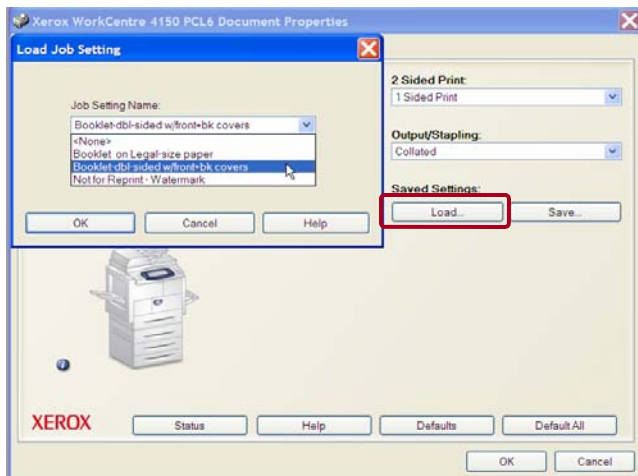★★★★

PCL Print Driver Functionality

The Paper/Output tab on the PCL Driver provides a comprehensive overview of the print capabilities. Majority of the simple walk-up features can be found on this screen. Job delivery options include normal print, secure print, sample set, time-delayed print and Fax.

The Select Paper box allows users to select the appropriate paper tray, paper thickness, paper size and orientation for their particular print job.

In our example, we created a "Job Name" for a frequently used manual using the booklet layout feature with different media pulled from the Bypass Tray (for the front and back covers) and from Tray 2 (for transparency insert pages). Blank insert pages can be pulled from Tray 2 and inserted at the pages designated. The ability to edit or delete this "Job Name setting" makes this feature customizable, scalable and a time saver.


When the user selects the "Delayed Print" feature, the user can print large print files or a large amount of documents such as annual reports, statements, brochures, etc. at off-peak hours when the office is least lightly to have a lot of print activity occurring at that time, thereby alleviating any bottleneck print traffic.
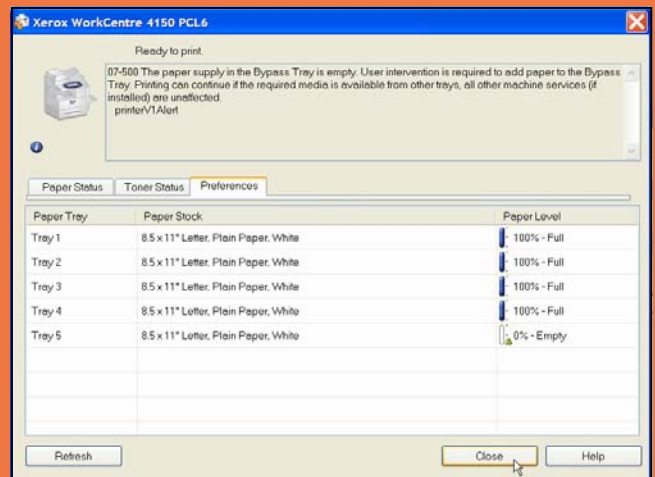

Clicking on the "i" icon, the device graphic, or the "Status" button at the bottom of the Paper/Output screen displays the paper and toner status information. Alert messages at the top of the status screen inform users when the paper supply is running low or when maintenance is required.
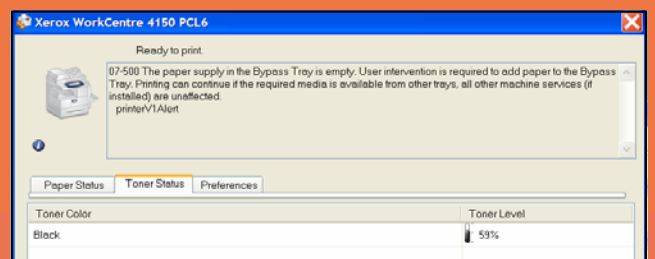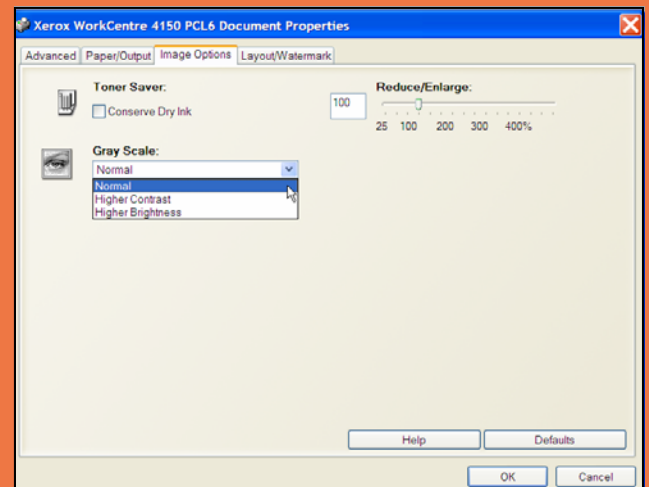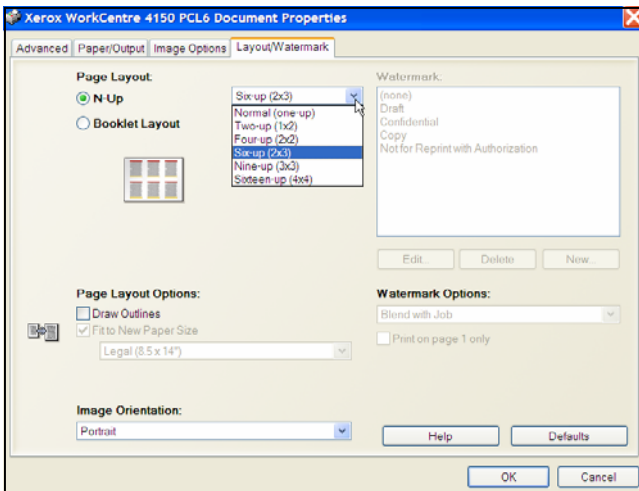
The Layout/Watermark tab provides the user with a few page layout options including the ability to print up to 16 multiple pages onto one page, booklet layout, page layout and target page size option, image orientation, and the watermark creation feature.

Users can select image option settings that include toner conservation when printing document drafts, selecting the gray scale setting, and to reduce and enlarge a document.
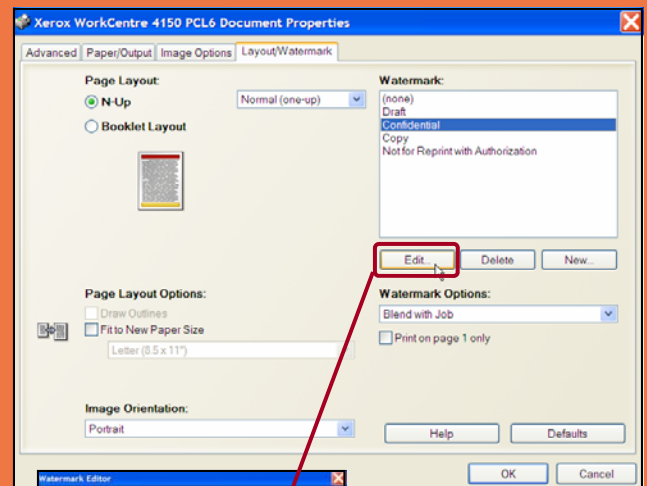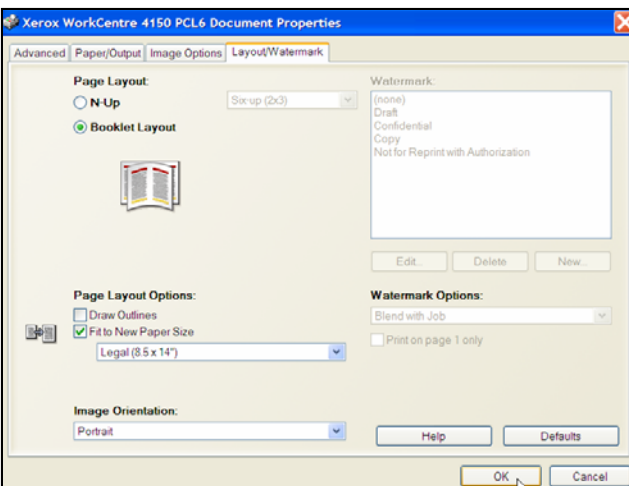
By selecting the Booklet Layout button under the Layout/ Watermark tab, users have access to the booklet creation function. The booklet can be created on letter-size or legal-size paper.
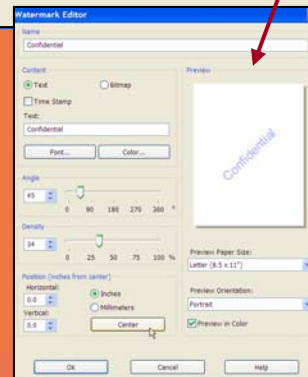
Users can use an existing watermark and edit its size and location to suit their business needs or create a new watermark.

Image Quality

Visual Representation of Print Originals
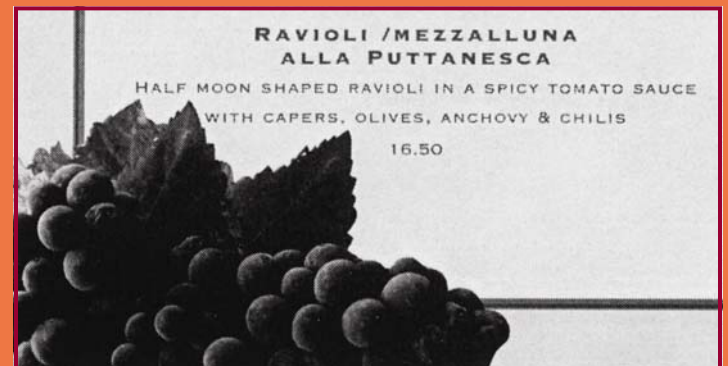
Print Output From the Test Device Scanned at 600 dpi

Above: Black Font Output
Right: Red Fine Line

Scan

For more information on this topic go to www.bertl.com
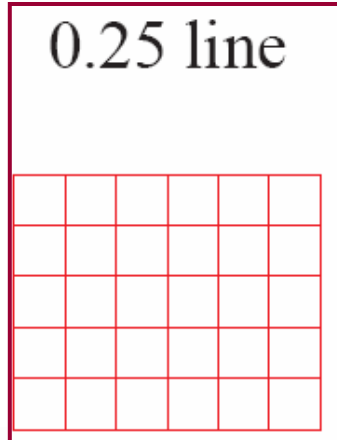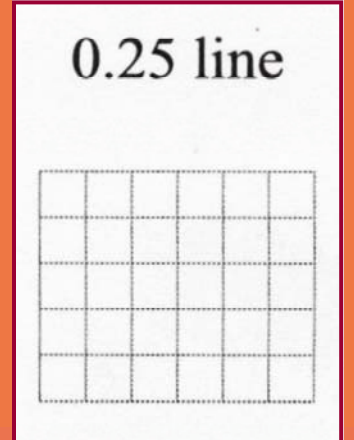
WHAT WE LIKED:

• It is useful to be able to create up to 250 frequently used job templates on the desktop, providing users with an extensive selection of scan protocols and scan settings and not just address book entries with default scan profiles as found on some systems.

• Diverse range of additional workflow solutions are available, including Xerox SMARTsend (see separate BERTL report), SMARTdocumentTravel (see separate BERTL report), Omtool and other third party solutions.

• The ability to add One touch ".com" or custom e-mail address suffixes such as @Bertl.com or @hotmail.com is a useful addition to the QWERTY keyboard design, allowing users to be more efficient at entering adhoc email addresses. Administrators have up to six smart key addresses that can be set up via CentreWare Internet Services giving users easy entry of frequently used email addresses.

WHAT WE WOULD LIKE TO SEE:

• Scanning directly to USB flash drives would extend the feature set in remote locations.

• The ability to preview scanned pages prior to sending is a useful feature offered by some competitors. This can avoid costly mistakes.

• Data capture accuracy at the 4 point font did not fair as well in BERTL's OCR workflow test as compared to other rival units. The test revealed less than 60 percent successful OCR conversion of 4 point text and text/photo at the 200 dpi and 300 dpi mode.

• The Xerox WorkCentre 4150 does not have the job build and batch scan feature in scan mode as offered by other competing units and other Xerox SMB units.

• An auto-set file name "DOC" is populated into the file name window prior to sending, so users wishing to enter their own custom file name will need to delete the default name first.

• The ability to provide comprehensive security measures including PDF encryption and encrypted print will make communications more secure.

Scan Features Summary	
Maximum Scan Speed (Mono)	45 opm
Maximum Scan Speed (Color)	Info not available
Document Feeder Capacity	50 sheets
Connectivity Options	10/100 BaseT Ethernet, WIFI via third party
Scan to e-mail	Yes
Scan to SMB	Yes
Scan to FTP	Yes
Scan to HDD	Yes
Scan to URL	No
Scan to Internet Fax	Yes
TWAIN Scanning	Yes
Scan to External Memory Source (USB/SD card)	No
Network Authentication	Yes
LDAP Authentication	Yes
File Formats Supported	PDF, JPEG, TIFF, MTIFF
Encrypted PDF Format	No
Resolution Options	200 dpi, 300 dpi, 400 dpi, 600 dpi
Ad hoc Subject Line Entry	Yes
Ad hoc Message Line Entry	Yes
Ad hoc File Name Entry	Yes
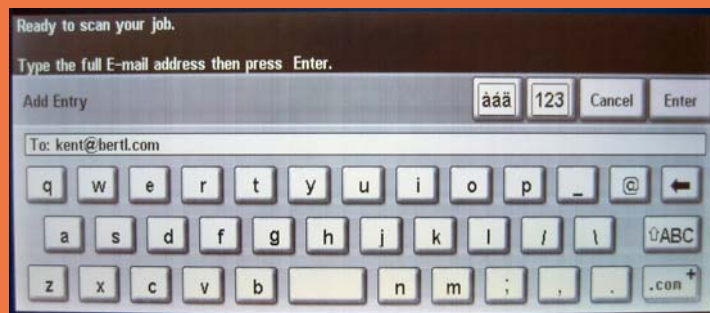
The Xerox WorkCentre 4150 QWERTY keyboard for email address entry

BERTL HIGHLY RECOMMENDED ★★★★

Real World Testing: Scanning in its simplest workflow is to convert a hard copy printed image into an electronic image. This may be all that is needed when sending a scan to email or making an archive copy of an order using scan to desktop. However, the vast majority of scanning workflow involves converting hard copy into an intelligent image that can be further processed by OCR engines, forms processing applications, or other automated information management processes. In all of these workflows, the conversion of text (captured as an image by the scanner) into editable, searchable text is a critical first step. To investigate this important workflow issue, BERTL ran a series of standard test patterns with multiple font types, sizes, and colors, capturing the data at various resolutions using both text and text/photo settings.

After scanning each page of its test originals, BERTL analysts ran the scanned files through OCR software—ABBYY FineReader 8.0 in default configuration. The accuracy of the scanning process at the various resolutions and settings is reflected in the number of words that the OCR application converts correctly without human intervention.

Above is a portion of BERTL's OCR test chart scanned at 200 dpi (top), 300 dpi (middle), and 600 dpi (bottom) in text format and saved as a PDF file. The image has been zoomed to 400 percent in Adobe Acrobat and screen-captured for display. The top line is 6 point, and the bottom line 8. point.

Effect of Scan Resolution on OCR Accuracy Evaluation

Legend: ■ 200 dpi Text ■ 200 dpi Text/Photo ■ 300 dpi Text ■ 300 dpi Text/Photo

Percentage of words processed correctly with no human intervention
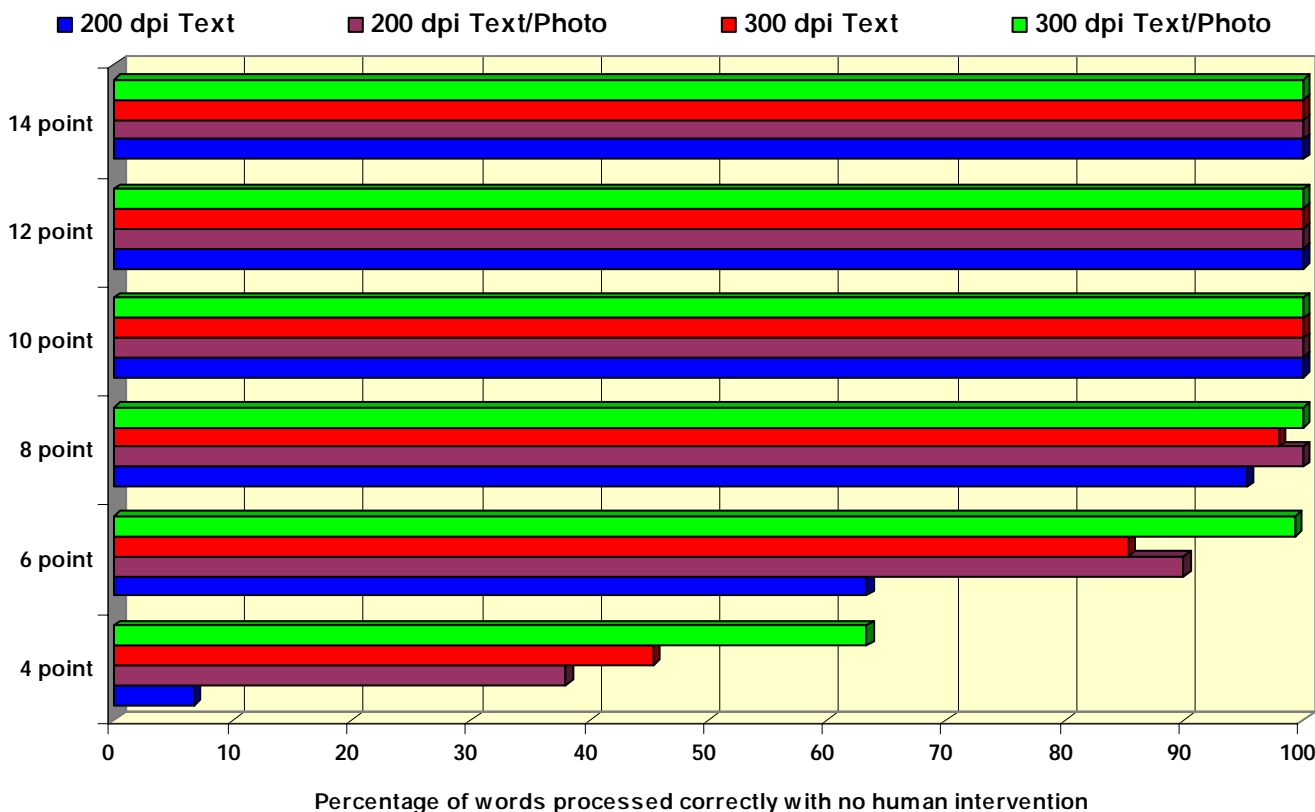
Scan Productivity

Real World Testing: Measuring scan productivity with a stopwatch is only capturing a small part of the overall workflow picture. However, removing accuracy, network bandwidth considerations and other human intervention elements, such as jam rates, BERTL measures the time that a user spends at a device to carry out the initial scanning phase of getting the originals processed and into the device memory. To do this, BERTL uses 25 copies of a government agency form that is printed initially in full color. The originals are then scanned at different resolutions, creating PDF files and (if offered by the manufacturer) compressed and searchable PDFs. The time taken to get the originals through the document feeder is recorded.

The time to get the files back to the desktop, FTP location, or email address is not an exact science. It relies on other network factors that are out of the user's control. The lower the bandwidth the faster the data transfer, whatever the bandwidths, so BERTL provides the file size created by each scan process.

Scan Bandwidth Comparison

200 dpi black	.97 MB
300 dpi black	1.68 MB
600 dpi black	5.13 MB

Impact of Scanning Options on Original Scanning Speed
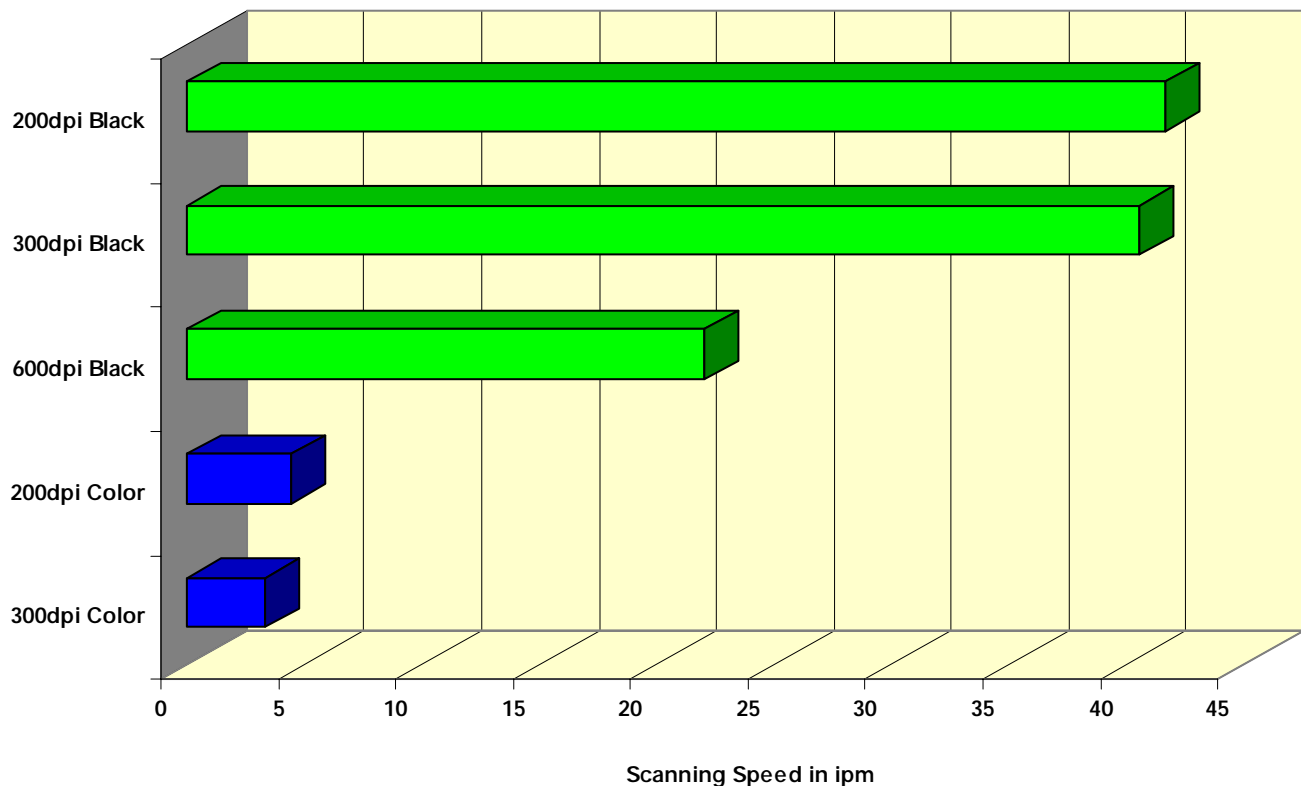
Scanning Speed in ipm

Real World Testing: In a perfect world, all original documents are the same size, the same type, and require the same imaging settings.

BERTL looks beyond the perfect world to see how devices help those working with difficult workflow situations.

Take the example of a paralegal scanning a case file. The file could contain both letter- and legal-sized documents, requiring a mixed media capability.

The report text pages are best captured using the document feeder in Text or Text/Photo mode. However, the accident scene photographs are best scanned using the platen (to avoid damage) in Photo mode, which captures the halftone detail to a much better degree.

There may also be simplex and duplex pages in the same batch. Rather than waste more paralegal time, it would be ideal to be able to switch between single-sided and double sided scanning.

Real World Testing: While scanning speeds and duty volumes may be based on perfect standard letter/A4 sized office-grade laser printer paper, there is a much wider range of media substrates that is commonly used and handled in the office world every day.

Manufacturers advertise a range of media sizes and weights that they have tested and feel comfortable with their device handling efficiently.

BERTL looks beyond the manufacturer quoted capabilities and on many occasions finds that the limits can be considerably extended to accommodate those occasions when office staff need to copy non standard office paper.

Note: A device should not be considered a failure if it does not get a 100 percent success rate in any of the original handling tests. These tests are deliberately designed to push the boundaries.

Batch and Mixed-Media Scanning Capabilities

Batch/job build scanning beyond the capacity of the document feeder	No
Batch/job build scanning incorporating both document feeder and platen scans	No
Change scan settings such as original type, original size, etc. from scan-page to scan-page	No
Mixed-media size scanning capability	No

Advertised Document Feeder Specifications

Minimum Original Size	4" x 6"/170mm x 250mm
Maximum Original Size	8.5" x 14"/279mm x 356 mm
Minimum Original Weight	12 lb. Bond/50 gsm
Maximum Original Weight	32 lb. Bond/120 gsm

Original-Handling Results
(50 originals scanned at 200 dpi monochrome) setting

67 lb. Cover Stock Registration Cards	Fed successfully
Yellow Pages (newspaper grade media)	Fed successfully
Magazine with heavy glossy cover and 20 lb. glossy coated inside pages	Fed successfully
Carbonless Purchase Order Forms	Fed successfully
Business Cards	Could not be fed
Coated Inkjet Paper	Fed successfully
4" x 6" Index Cards	Jams occurred repeatedly
20 lb. bond office paper fed with leading edge damage due to staple removal	Fed successfully

The Ultimate Multifunction Test: Manufacturers promote their devices as being multi-tasking, multi-functional solutions. BERTL aggressively tests this claim with its new Triple Play test.

In BERTL's other tests, analysts are careful to ensure that only one factor is entered into the equation at a time to provide the reader with specific result that stem from one user selection/action.

In the triple play test, the device's overall multifunctional capabilities are put under the microscope.

A BERTL test master file has been created as a standard CMYK document, using Adobe Illustrator to ensure the highest quality original with vector graphics, then RIPped at 1,200 dpi into a PDF format using Adobe Acrobat 8.0 Professional set to Press Quality.

This document contains Times New Roman and Arial fonts in 10 pt. text in black, blue and red on a white background, plus 12 pt. white and yellow text on a black background.

The document is first printed using high quality color laser paper on the test device, using the PostScript driver set to its highest image quality to ensure the best print quality.

The printed output is then copied in text mode, using default settings. The output is then copied (to create second generation output), and the second generation output is copied, creating a third generation copy.

The third generation output is then scanned at 300 dpi, using text mode, and converted into a PDF file.

The PDF file is run through ABBYY FineReader 8.0 where the data capture accuracy is assessed, leaving the ABBYY FineReader 8.0 in default settings.

The file contains 100 words across the multiple fonts and color combinations. To achieve a perfect 100 percent BERTL Triple Play score, the device would need to show all 100 words correctly detected by ABBYY FineReader 8.0 without a need for human intervention.

This first one-of-a-kind multifunctional test will show users how an MFP affects a document throughout its entire potential lifecycle in both hard copy and soft copy formats.
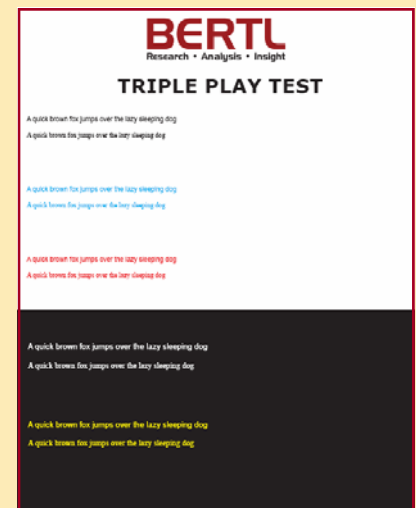
Thumbnail of the BERTL
Triple Play test sheet

BERTL Triple Play Rating

97%

Summing Up

The Xerox WorkCentre 4150 does what Xerox hopes it would do. Give SMB a real taste of what Xerox can do with documents. The look and feel of the unit is very similar to other Xerox MFPs which will be greeted warmly by existing Xerox customers.

BERTL analysts were impressed by how easy it was to install and maintain the device which arrived via courier as a couple of boxes. Network set up proved to be equally easy with copies and prints coming out in under a hour.

We would have liked to have seen the same high level of job build functionality included in the 4150 as found on other Xerox MFPs but on the whole users got a good feel for what Xerox copying was all about. Image quality, while not outshining other printer-based products was more than satisfactory for day to day work.

Printing was handled well with the Xerox printer drivers being liked by BERTL analysts and presenting no major problems during test, apart from one Microsoft Publisher issue where pages containing embedded EPS images with binary image data caused a problem with the PostScript driver. Xerox mismatched media job handling will be an instant hit with those working in multiple media size documents like legal and accounting firms.

BERTL would have liked to have seen the mailbox feature included allowing users to not only store frequently used documents for instant reprint but also jobflow commands for instant sending to one or more destinations.

Network scanning is possibly the most important introduction that Xerox hopes to make to the SMB market, showing them how Xerox technology, plus the integration with its partners can deliver simple to use yet sophisticated workflows. We would have liked to have seen much more job build / batch scanning capabilities included. With WorkCentre 4150 due to support Xerox's new open architecture EIP platform the scanning capabilities of the 4150 will be very impressive in years to come.

Security is well catered to both out of the box and with optional security measures that can be purchased if required.

Last, but by no means least is network administration. With IT playing a pivotal role in MFP purchasing today, it is important to remember that IT does not want technical staff roaming the building fixing issues all day. They want a system that limits downtime and offers a remote diagnostic system for when downtimes occur. Xerox's CentreWare Internet Services and integration into many of the leading fleet management applications will give the device the IT thumbs up.

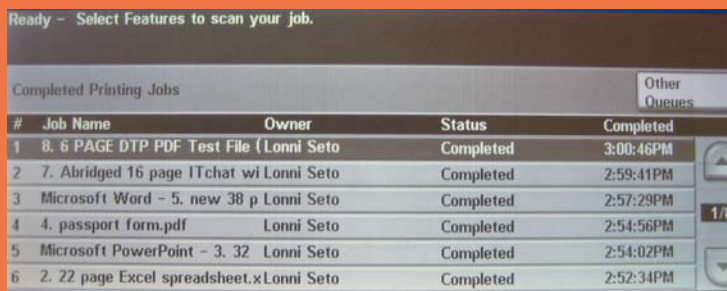Above: The job print screen on the Xerox WorkCentre 4150 displays all current jobs in queue, which also allows jobs to be canceled or promoted. Below: For accounting purposes the admin. can monitor the job history logs for usage, which are further broken down into six different job logs. Clicking on the job name line will provide additional job details.

Top view of the ADF and control panel on the Xerox WorkCentre 4150.

The Xerox WorkCentre 4150 with optional cassettes and stapling finisher.

About BERTL

The success of an organization depends on its ability to manage its information and assets. An effective workflow process requires the complex integration of information, devices, software, and people.

IT managers, office managers, and other knowledge management professionals need to know what digital imaging devices would best serve their specialized workflow processes.

BERTL's services are designed around this real-world framework, delivering business consumers the independent analysis and insight needed to make critical decisions about digital imaging's role in their organization.

Independent Analysis and Insight

BERTL's reports, comparative data, and strategic guides look at digital imaging through the eyes of the business user. The research examines not only the technical features, but also vertical market applications, and business benefits. The impact on worker productivity is a primary concern.

BERTL is 100 percent independent. It receives no funding from manufacturers and all product evaluations and reports are published at BERTL's own expense for its subscribers. Business users worldwide trust BERTL for objective, unbiased analysis of digital imaging systems.

BERTL Services

Reports and Star Ratings
BERTL analysts provide detailed reports on the technical and practical benefits of thousands of color and monochrome workgroup, office, graphic arts, and production devices.

Product Specifications
DataCheck Gen II provides the most current competitive data on printers, copiers, MFPs, fax devices, wide format printers, scanners, and more.

News, Interviews, and Analysis
The ITchat online magazine provides insight into the dynamics and trends of the digital imaging marketplace through interviews, feature articles, and software reviews.

BERTL Awards
BERTL analysts recognize the leading devices and software solutions in the annual BERTL's Best awards. BERTL also honors the performance of manufacturers in the annual Readers' Choice selections.

Contact BERTL

200 Craig Road
Manalapan, NJ 07726 USA
Tel 1.732.761.2311
Fax 1.732.761.2312
Email: info@bertl.com
www.BERTL.com