



LABCHECK

Panasonic WORKiO DP-2500 Copier-Printer-Fax -Scanner

Also Sold As:
None Notified

END USER PERSPECTIVE: This Lab Report, of the above named device, is designed to provide a Concise, Easy to Read, Independent Analysis of product performance based upon tests we have performed from the End-User's Perspective. We do not quote retail prices nor full product specifications within any of our Lab Reports as this information can be easily obtained via our DataCheck On-Line service at WWW.DIGITAL-TIMES.NET.

This Lab Report provides User-Relevant test analysis and constitutes a Summary of the Product, its Position within its Target Sector and its Performance during Benchmarked Testing.

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USA & UK TESTING: Products are often tested in both USA and the United Kingdom. During testing we check that a product is substantially the same in both locations and list any differences that are observed.

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OVERALL SUMMARY

LAB STAR GRADING RANGES FROM 0 - 5 STARS

- 0 = POOR
- 1 = BASIC PERFORMANCE
- 2 = FUNCTIONAL but has limitations
- 3 = RECOMMENDED
- 4 = HIGHLY RECOMMENDED
- 5 = EXCEPTIONAL

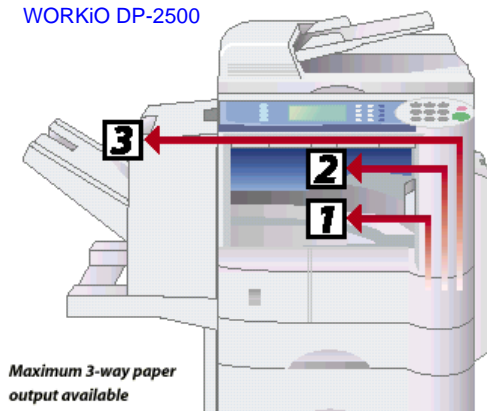
Copying 5

Printing 4

Scanning 3

Fax 4

WORKiO DP-2500



Pros Print speeds match dedicated network printers on standard documents. Average copy speeds exceeded other 25-27cpm digital copiers. Duplex copy speeds outperformed alternative copiers. LCD touch screen display is large and easy to use. Sends documents direct to email addresses from copy glass or document feeder - user just keys in the address via Querty keypad in LCD touch screen. 2 Line - 33.6Kbps JBIG fax.

Cons Image quality was acceptable but blazed no trails. Graphical documents produced large print files and printed slowly / reduced network print speeds. Scanning system is simplistic and needs parallel port and local client PC (this is different to scan to email function in pros). No physical mailbins. Can't print first sheet onto letterheads/separate paper source. No next job copy memories or job build.

This test report covers the Panasonic WORKiO DP-2500 with print, fax and scan capabilities. Our test was conducted using a 100BaseT network connection on a 700MHz / 160Mb RAM client PC and Panasonic PCLXL driver (version date 11/20/2000)

The Panasonic WORKiO DP-2500 is a clean sheet design which has a lot going for it. While it follows similar design concepts to several of its competitors, Panasonic has had to time to study earlier 3rd party products and improve some aspects. Like most copier based products, the WORKiO DP-2500 is primarily designed to be used as a copier with the added benefit of network (or parallel port) printing, fax and scanning. You buy the basic copier and then if you wish to add the other functions they are chargeable upgrades. This may change during the life of this report because Panasonic indicated that they are considering bundling this, and other systems, to provide a fully functional copier-printer as the standard basic system.

A 5 star grade requires something unique or highly functional in the product; in the WORKiO DP-2500's case it was overall ease of use, novel design and operating efficiency. Copy speeds were high, when compared to competing 25-27ppm units, and the WORKiO DP-2500 did not achieve the speed by lowering image dpi (it has a 600x600dpi copy scanner).

COPY THROUGHPUT TESTS [3rd party names removed - products included for comparison only]

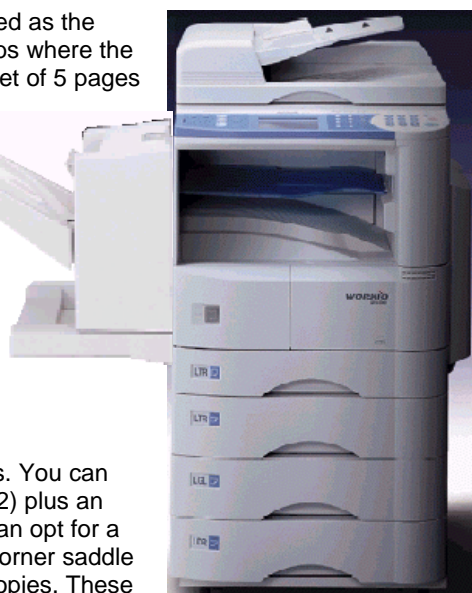
Copy Job / Test	Copier 1	Copier 2	Copier 3	Copier 4	WORKiO DP-2500
Advertised CCP	27	25	25	25	25
One Set 1:1	17.80	13.76	15.38	8.53	16.21
Five Sets 1:1	24.60	22.11	21.74	16.60	21.18
Five Sets 2:2	16.00	15.67	16.81	15.67	18.86
One Set 1:2	12.77	15.30	11.09	8.30	18.02
One Set 2:1	12.74	11.24	15.79	10.13	13.27
One Set 2:2	7.26	11.08	9.38	6.53	12.17
Average CPM	13.98	14.84	15.01	10.96	16.61

As the table shows, on the above basket of jobs, the WORKiO DP-2500 was measured as the overall fastest product of our benchmark copiers. Marked in blue are the individual jobs where the WORKiO DP-2500 outperformed the competitors. Stapling added 20 seconds on a set of 5 pages and 10.25 seconds across 5 sets of the same 5 page document.

We liked the large LCD touch screen control panel built into the control panel; it separates Panasonic from competitors which have small, awkward button controls and no touch screen.



Use Acrobat magnifying glass to enlarge



For a 25ppm unit the WORKiO DP-2500 is well stocked on finishing and output areas. You can have two internal paper catch trays (see locations 1 and 2 on our illustration at page 2) plus an external 250 sheet catch tray (item 3 on our illustration - page 2). Alternatively you can opt for a 1,000 sheet finisher which can staple up to 30 sheets at a time with a single top left corner saddle stitch. Via the finisher you can also shift / jog documents between sets to separate copies. These are not trail blazing but do offer a reasonable number of outlet options while letting you separate fax, print and copy output when the WORKiO DP-2500 is fully configured.

The base unit comes with just one 500 sheet paper tray but you can choose to add 3 additional 500 sheet paper drawers to take the total capacity up to 2,000 sheets plus a 50 sheet (30 if you use Ledger, A3 or Legal). Auto tray switching is standard but can be turned off if not needed. In many offices this capability is essential because they use different paper in each tray.

Worth special consideration is the standard electronic sorting in memory (eSort). This allowed us to sort multi-copy jobs into neat sets without buying any chargeable options. The output ran a bit slower, when using eSort, because each complete document is printed in a different direction (criss cross) which requires the WORKiO DP-2500 to (a) switch paper trays between jobs and (b) feed alternate sets lengthwise - both of which slow the engine speed down.

SKYCOPY: When you lift the lid and place an object (book, document, etc) onto the glass copy platen, the WORKiO DP-2500 automatically detects the size and blocks out the remainder of the copy area. The benefit of this is that copies emerge clean with white surrounds rather than having the black edges normally made when copying with the lid up. An added benefit of the WORKiO DP-2500's 'Skycopy' is the reduction in wear on the photoconductor and other mechanical components. The problem with most alternative copy systems is that the areas outside of the copied object prints as black; this requires the imaging drum to be saturated with toner. The extra toner wears out the drum quickly and can cause problems with the cleaning mechanism which is not designed to scrape off large quantities of toner. If you regularly copy with the lid up on most copiers, you can get premature wear, leakage, reduced reliability and shortened product life. Panasonic's Skycopy therefore prevents these problems.

DUPLEX: Panasonic has built the duplex unit into the bottom of the copy platen. This saves space in the copier and removes the need to take up one of the paper trays with a duplex unit. In practice it worked well and we measured duplex productivity as higher than most alternative copiers with up to 325 pages an hour advantage.

COPY DUPLEX COMPARISON					
[3 rd party names removed - products included for comparison only]					
Job / Test	Copier 1	Copier 2	Copier 3	Copier 4	WORKiO DP-2500
Five Sets 2:2	16.00	15.67	16.81	15.67	18.86
One Set 1:2	12.77	15.30	11.09	8.30	18.02
One Set 2:1	12.74	11.24	15.79	10.13	13.27
One Set 2:2	7.26	11.08	9.38	6.53	12.17
Average CPM	12.19	13.32	13.26	10.15	15.58
Pages Per Hour	731	799	795	609	934

JOB BUILD AND NEXT JOB MEMORIES: Neither function is supported on the WORKiO DP-2500. The lack of next job memory is relatively common on a 25cpm copier; though at least one competitor has 5 next job memories. Without next job memories you can not scan a second job into the work queue which can be a limitation in a busy office with a lot of printing and copying (ie: you may need to queue copy jobs to slot in with print jobs arriving over the network).

Job build may be more of a limitation because you can not scan copy jobs larger than the document feeder's 50 sheet capacity (30 if you use Ledger/A3 or Legal). However this is common on this level of copier based copier-printer.

FAX OPTION: Panasonic offer the WORKiO DP-2500 with the option of a built in Super G3 fax (up to 33,600bps modem) with G4 (64,000bps) upgrade option. The basic fax function comes with 2Mb of memory and up to an additional 8Mb memory can be purchased. This is probably enough fax memory for most users but is some 24Mb lower than the maximum capacity of alternative copier-fax options available. MH, MR, MMR and JBIG compression are supported. JBIG is a bonus for modern documents which have lots of images. Our tests measured standard text documents as being slower transmission in JBIG than MMR but mixed text and graphics has been faster (this applies to all JBIG faxes tested). Fax scanning takes place via the standard document feeder or copy glass and you can scan/fax Ledger/A3 sized faxes plus get the benefit of the duplex capability in the scanner unit. Fax functionality is impressive and in-line with high end corporate faxes (but the price may put some people off incorporating the fax into the copier and printer). In reality most faxes around the world are 9,600 and 14,400bps therefore above 14,400bps fax options do not speed up fax transmissions, nor cut fax costs, unless you are regularly sending to higher specified 33,600bps fax machines. For busier fax environments you can have two fax lines running on the WORKiO DP-2500, this may be required in limited environments but does increase costs and require a separate dedicated telephone line.

The WORKiO DP-2500's fax option is a solid, corporate level fax but we have reservations about whether the inclusion of a hardware based fax function in any copier-printer is a better option than including network scanning and a LANfax option. IT managers often prefer systems that move the work away from the print/copy engine and process in background on a central shared fax server / resource which can be monitored and controlled. Network scan based systems also allow other scanning functions to be performed on the system thereby opening the network / digital possibilities that can not be undertaken via a traditional fax machine.

SCAN TO EMAIL / TCP/IP ADDRESS: Panasonic has catered for most business requirements by having both a fax option and a scan to email option; though please note that, unlike other manufacturers, Panasonic call this Internet Faxing. Whatever it is called, the WORKiO DP-2500 has one of the best systems tested at this level of the market. Many systems offer scan to email but you can not walk up and enter an email address from the control panel, this means that you have to have a predefined store of names and addresses which you select from a list at the fax/copier. Panasonic has not adopted this limited approach but has installed one of the smoothest fax or email sending capabilities. All you do is press the button marked Internet Fax (not scan to email) and use a touch screen QWERTY keyboard on the LCD panel to type an email address and send the document. You can also display speed dial buttons which show the recipient's details on the button in the LCD touch screen.

SCAN TO PC: The WORKiO DP-2500 offers a scan to PC / document management option called Panasonic Document Management System (PDMS). This is best described as functional because it is a relatively weak option. In essence the system works like a standard parallel port scanner. You can not use the scanning function over the network but are limited to having a single parallel port connection to a PC near the WORKiO DP-2500. Because the copy scanner is mono you can not scan in color (this is common on copier based systems though printer manufacturers have been shipping color and mono scanners with their copier-printers for some time). The 'parallel port only' connection is a limitation; you have to have the receiving PC next to the WORKiO DP-2500. The software and functionality of PDMS was very limited but we could store and view our scanned documents on the attached PC and we could re-print the images later if we wanted to use PDMS as a document store for archive or regularly reprinted documents. We could also send the documents as attachments with emails or perform some limited editing functions on the document. Ultimately we got little more from the PDMS system than we expect to obtain when we buy a low cost (ie: around \$50 / £50) scanner from a computer retail store. In its favor are two main benefits:

- 1) Panasonic give PDMS away free when you purchase the printer option
- 2) You can use the duplexing, Ledger / A3 capable 600dpi copy scanner for scanning.

If you purchase the optional print capability it comes with a parallel port and PDMS within the price. For this reason we do not feel that the limitations of the PDMS system are significant (ie: you get a free functional, albeit basic, scanning capability when you buy the print option).

MONO PRINTING: We had a fault free test. The WORKiO DP-2500 is marketed towards offices that require a budget priced copier but also has a print and fax requirement. For the intended user, the WORKiO DP-2500 delivered most of what a standard office needs. The system only supports Windows based printing though most other connections are available via third party interfaces (ie: Axis, Ringdale, etc). The WORKiO DP-2500 delivered network printing at an above average speed which was noticeable against a benchmark of dedicated network printers.

Black / Mono Printing versus a dedicated black printer (PPM)		
Job	WORKiO DP-2500	Network Printer
Advertised mono print speed	25 ppm	25 ppm
1 set 35 pages Word (simplex)	21.73 ppm	22.38 ppm
5 sets 6 pages Word Perfect (duplex)	11.04 ppm	11.13 ppm

When used as a network printer the WORKiO DP-2500 proved able to keep up with the leading dedicated network printers on standard simplex and duplex jobs. Our research indicates that this is the main application for most businesses that will buy the WORKiO DP-2500.

When subjected to a stream of network traffic (which included mixed simplex, duplex and more graphical documents) the WORKiO DP-2500 slowed down substantially and was not able to maintain the same level of production as our benchmark network printer. The cause of the slowdown can be seen in the print controller's handling of the graphics documents (see network traffic). The high bandwidth took its toll on print speeds which dropped to 2.15ppm during the above test. Standard text documents were fast and the code generated to produce the print files was small (hence the fast speed). The slowdown was traced to graphical documents and standard Acrobat documents with a single page generating up to 1.28Mb and a 5 page document hitting 8.41Mb. During these documents the WORKiO DP-2500's processor took a long time to RIP and print the job.

Mixed Network Traffic / Printing versus a dedicated black printer (PPM)		
Job	WORKiO DP-2500	Network Printer
Advertised mono print speed	25 ppm	25 ppm
Mixed Network Load	2.15 ppm	8.04 ppm

NETWORK TRAFFIC: The WORKiO DP-2500 generated 19.93Mb of network traffic on our network load test. This compares to just 3.68Mb measured on a leading-brand dedicated network printer (ie: the WORKiO DP-2500 driver produced 5.4 x more code / network traffic than our network printer benchmark). We expect the WORKiO DP-2500 to mainly be used in small offices where network bandwidth may not be noticed or monitored, but it is higher than an IT manager may like.

NETWORK BANDWIDTH COMPARISON [3 rd party names removed - products included for comparison only]						
Job / Test	Network Printer	Copier Printer 1	Copier Printer 2	Copier Printer 3	Copier Printer 4	WORKiO DP-2500
Bandwidth used	3.68 Mb	11.01 Mb	15.51 Mb	14.57 Mb	14.92 Mb	19.93

PRINTER DRIVER: The print driver is reasonably laid out with most of the main options on two tabs (reproduced below). Missing from the driver was the capability to print a first page onto a separate paper source - which is essential if you use printed letter heads or need covers. On a 25ppm network printer we felt that it may be a basic requirement for many people. The WORKiO DP-2500's 'Magnify' option in the print driver let us convert ISO A4 documents to USA sizes but there were no other settings.

MAILBOXES. There is no physical mailbin option, so sharing the WORKiO DP-2500 across a larger department may be awkward. For its target market the lack of mailbins may not hold buyers back because it is likely to be with a small group of users with line of sight to the output areas to see their work emerging. Panasonic's driver includes virtual mailboxes which they call 'Secure Printing'. This is not as convenient as physical mailboxes but does let users to send jobs to the printer and hold them in memory until the user arrives and enters a password. This keeps them separate from other work arriving at the printer. You can also do a work-around because there are 3 output areas which could be used to separate types of work or user documents.

IMAGE QUALITY: For the average business, the image quality from the WORKiO DP-2500 was acceptable but not high. In copy mode the WORKiO DP-2500 had trouble reproducing light greys. Copying photos could have been better and the images lacked detail (mainly due to them being over dark / dense). Copied and printed text was to a good standard but solid fills and shaded areas tended to be slightly banded with white paper show through. Panasonic stressed the fact that we were testing a unit which engineers had been training on so customers may see a better image quality than we did.

NETWORK MANAGEMENT & CLUSTER

PRINTING: We were not provided with / shown any form of network management system which may restrict sales in larger organisations. No cluster or tandem printing is available on the WORKiO DP-2500.

DESIGN / BUILD CONSIDERATIONS: The WORKiO DP-2500 is built along similar, but not identical, lines to a printer. There is a user replaceable toner cartridge which has the look and feel of a standard laser printer cartridge. We liked the fact that this is a slide-in swappable item; this should please people who are used to HP style printer cartridges.

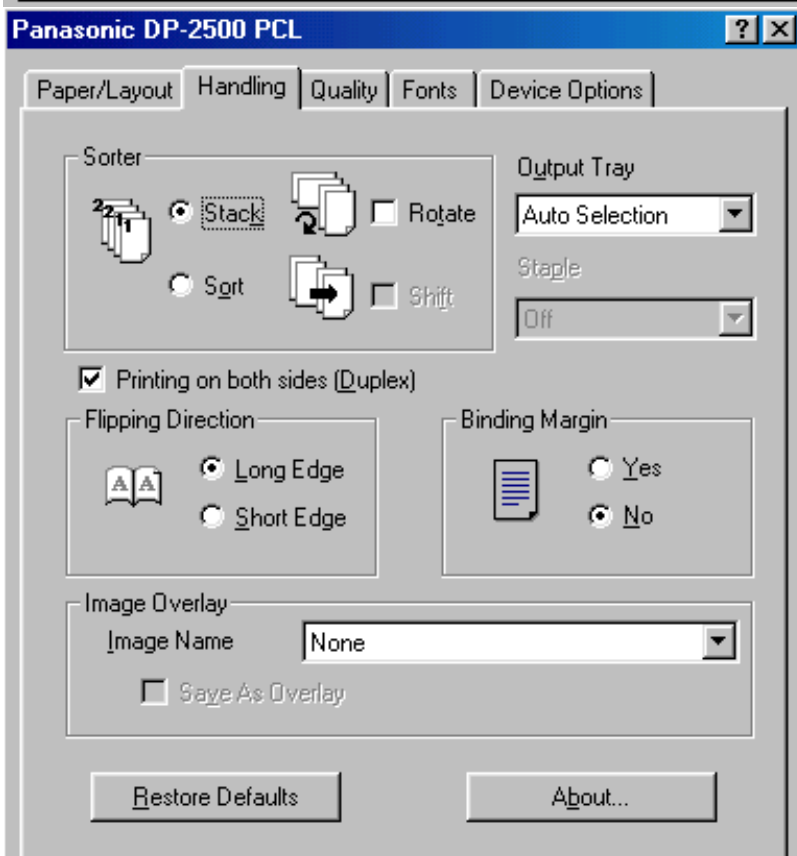
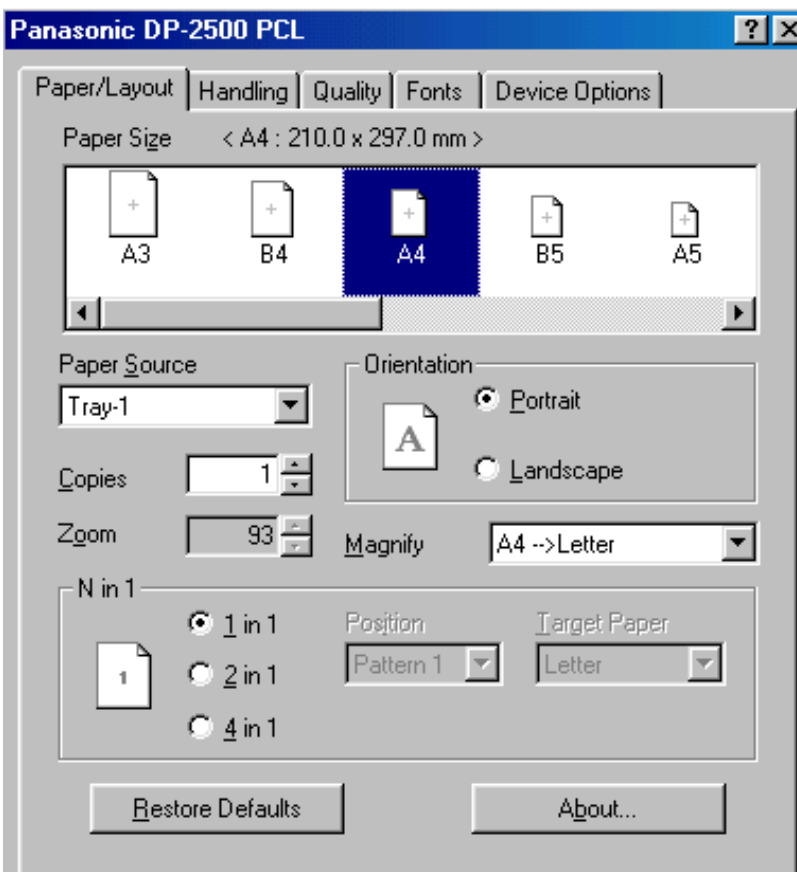
Past that point the similarity with HP style printers ends and the WORKiO DP-2500's copier ancestry can be seen because it needs engineer attendance at shortish intervals.

The drum and fuser units are within the body of the copier and requires an engineer to remove and swap them periodically (drum lasts a maximum of 30,000 pages, fuser rollers 120,000/240,000).

There is a relatively short paper path with paper leaving the paper trays, passing the developer system and exiting the print engine rather than travelling across through the chassis like standard copiers and network printers. Overall the unit was easy to load paper into, clear paper jams and so forth.

To remove the toner cartridge we had to first remove a large plastic toner filled waste hopper. This tended to stick to the end of the toner cartridge and was awkward to remove. When changing toner cartridges this must be replaced and the old one disposed of.

RECYCLING: A bonus lies in the recycling capability of the toner cartridge; it is designed to be refilled by the dealer who then sends it back out to customers.



Productivity Tests			
Output Origin	Job		
Single Copy	First Page Out	9.5	Sec
Copying A4/Letter	5 pages	16.21	CPM
Copying A4/Letter	5 sets of 5 pages	21.18	CPM
Copying 1:2	10 single to 5 double	18.02	CPM
Copying 2:1	5 double to 10 single	13.27	CPM
Copying 2:2	5 double to 5 double	12.17	CPM
Copying 2:2 Short documents	5 sets 5 double to 5 sets 5 double	18.86	CPM
Copying 2:2 Long Documents	20 double to 20 double	14.68	CPM
Printing Duplex PCL-XL	5 sets of 6 pages Word Perfect 2000	11.04	PPM
Printing Various Networked Jobs	Mixed Network Workload	2.15	PPM
Printing Simplex:	35 Page Word 97		PPM
Concurrency	Mixed Print and Copies	None Single Memory	

Production Efficiency & Network Usability / Capability	
Copier: Scan Once Print Many	Yes
Copier: Max Jobs Auto Scanned into memory	1
Print: 1 st page from a different tray than rest of page	No
Print: Insert dividers for chapters from the driver	No
Print: Insert front and back cover from the driver	No
Print: Offset separate finished documents	Yes
Print: Send to physical mailbox for later collection	Yes
Print: Send to virtual mailbox & print with a password	No

Remote Control from Client Terminals / Network	
View Toner Levels before printing	No
Estimate max pages printed from toner	No
View paper levels in trays	No
Specify problem (paper jam, door open)	No
Obtain departmental management figures	No
See \ View 3 rd party products	No
Check page throughput \ copy totals	No
Estimate toner usage	No

Bandwidth \ File Sizes & Send Once Print Many		
Print Job	Network Printer	PCL-XL
Network Load Test	3.68 MB	19.93 Mb
1 copy of 35 pages Office 2000 / Word	300 Kb	477 Kb
1 copy of 5 pages Word Perfect	140 Kb	381 Kb
5 copies of 5 pages Word Perfect	140 Kb	381 Mb

Reproduction Quality		
	Copying	Printing
Banding \ Screen Clash	Yes	Yes
Small Text \ Lines	Average	Average
Color Definition (in grey)	Borderline	Acceptable
Photo Fine detail	Dark with little definition	Light
General impression	Light & grainy on images, grey and colors	Acceptable but photos, shadings and images were borderline

Copy Quality measured to ISO standard from a test pattern placed on copy glass	Clarity High 50 Low 140	Lines High 5.0 Low 2.0
	70	4