Lab Test Report

A Comprehensive BLI Laboratory Evaluation | MARCH 2014

EUROPEAN EDITION

Toshiba e-STUDIO2050c*

20 PPM Colour
Copy • Print • Scan • Fax

Reliability	Very Good
Multitasking	Very Good
Administrative Utilities	Good
Feedback to Workstations	Good
Ease of Network Setup	Good
Print Drivers	Very Good
Scan Functions	Very Good
Colour Print/Copy Quality	Very Good/Good
Black Print/Copy Quality	Very Good/Good
Colour Print/Copy Productivity	Good
Black Print/Copy Productivity	Good
Ease of Use	Very Good
Feature Set	Good
Security Features	Excellent
Accessibility Features	Not Rated
Environmental Features	Not Rated
Toner Yield	Excellent

BLI RECOMMENDATION

Positioned as a low-volume, introductory colour A3 MFP, the 20-ppm Toshiba e-STUDIO2050c performed very well in BLI's evaluation. Not only is the device based on an engine that proved to be highly reliable during its 70,000-impression test with the booklet finisher, but also throughout an additional 35,000-impression test with the internal finisher. The device offers basic functionality that includes the most recent e-BRIDGE controller, an easy-to-use 229-mm control panel, and Toshiba's Universal Print Driver (which contains both PCL and PostScript). While its standard paper capacity is lower than average and some features typically standard in this segment, such as an RADF and a 160-GB hard drive (which is required for full functionality), are optional, users can upgrade the system. The e-STUDIO2050c also has robust scan functionality, above average print quality, and print drivers that are easy to install and use. BLI highly recommends the Toshiba e-STUDIO2050c for an average optimum monthly volume up to 10,000 impressions.

Test duration: Two months, including a 105,000-impression durability test.

Maximum monthly duty cycle[1]: 56,000 impressions.

Average optimum monthly volume for models in this speed range: 10,000 impressions[2].

* Reliability, scan, image quality and toner yield results are based on the performance of the Toshiba e-STUDIO2550c, which uses the same engine.

[1] The maximum volume, as specified by the vendor, that the unit is capable of producing in a month; however, it's not recommended that the unit be run at this volume on a regular basis.

[2] Based on a survey conducted by BLI. When comparing models, note that this optimum volume was instituted in May 2012. Optimum monthly volumes for models tested prior to May 2012 may be higher or lower.

Strengths

- Highly reliable
- Bright colour in print and copy modes; very good overall black output in print mode
- Very high tested toner yields; cyan and yellow yields exceeded the rated yields
- Print drivers are easy to install and use; Universal Print Driver includes both PCL and PostScript drivers; the help button on each tab relates to the selection or tab the user is currently in, saving users time searching for answers
- Scan to USB supports blank-page removal, encryption preview, and all typical scan settings
- Logically organized control panel; users can select paper source and exit tray directly from the device graphic
- Users can store one-touch templates to quickly access frequently used settings for copy, scan and fax jobs; users can store jobs and emails to public or private mailboxes at the same time originals are scanned, copied or printed
- Optional e-BRIDGE Open Architecture enables seamless integration with third-party solutions

Weaknesses

- Setup procedures for network configuration via the web utility are more difficult than with the majority of competing devices
- Hard drive is optional
- Below average paper weight support and standard paper capacity
- Searchable PDF not supported

TEST RESULTS AND OBSERVATIONS

+, – and ○ represent positive, negative and neutral attributes, respectively.

RELIABILITY — VERY GOOD

○ The Toshiba e-STUDIO2050c is based on the same engine as the Toshiba e-STUDIO2550c. The e-STUDIO 2550c was initially tested with the booklet finisher. After experiencing several issues with jamming in the finisher, Toshiba determined it was an installation error and subsequently published a technical bulletin with troubleshooting steps to ensure the finisher is installed and running properly.

+ After the issue was resolved, BLI restarted the reliability test, and over the course of 70,000 impressions, the device experienced just two misfeeds and one minor service call to replace a prematurely expired yellow drum.

+ BLI ran an additional 35,000 impressions on the device configured with the internal finisher, as it is the finisher more end users are likely to purchase. The device experienced just one misfeed and required no service calls.

MULTITASKING

VERY GOOD

+ The number of copy jobs that can be reserved while a copy or print job is in progress is limited only by memory capacity.

+ When the machine is out of paper, users can still copy to memory, download print jobs and scan to a destination.

○ When the machine is jammed, users cannot reserve copy jobs or scan jobs to a destination, but print jobs are still downloaded.

+ Users don't have to press a key to reserve a copy job.

+ The e-STUDIO2050c accepts print jobs to memory while a copy or print job is in progress, and the number of print jobs that can be downloaded is limited only by memory capacity.

+ The unit took 14 seconds to download the 15 print files used in testing, which is faster than the majority of models tested to date. All jobs appeared in queue, and there was no delay between jobs.

○ Unlike with some other devices tested, while documents are being scanned through the document feeder, users cannot start to program ahead.

+ Once the document feeder is free, users can scan to email while a copy, print or scan job is in progress, with no slowdown or stoppage during processing.

○ To pause a job in progress to perform an immediate copy job, users select the Interrupt key to access all the features required for a typical copy job, including the RADF, quantity, duplexing and finishing. During testing, the unit automatically returned to non-interrupted copy or print mode in less than 30 seconds, and it restarted the interrupted job without user intervention.

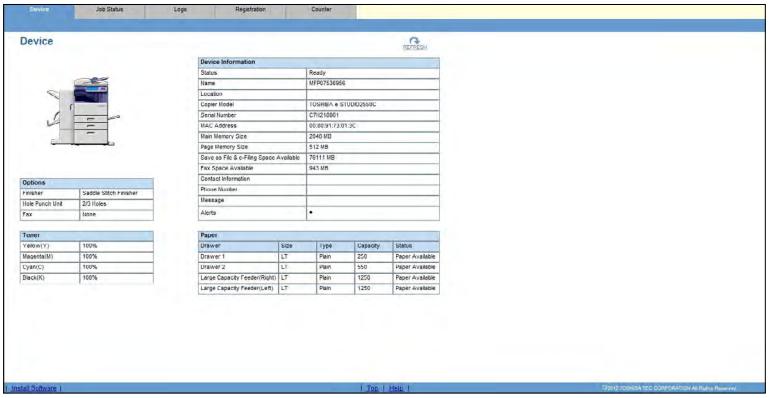
○ Jobs are processed on a first-in, first-out basis by default; no mode can be established as having priority. Instead, the interrupt function is used for the immediate output of a walkup job.

+ Via the device's job skip capability, jobs for which resources are not available are automatically held, allowing jobs for which resources are available to be run. Once the resources of the held job are replaced, the job will continue running where it left off.

ADMINISTRATIVE UTILITIES

GOOD

○ TopAccess, the web utility, allows administrators to configure device settings and update the address book and public template groups. Additionally, administrators can display counter logs, as well as logs for print, scan and fax jobs and error messages; register and modify templates; and download client software.



TopAccess Web Utility (U.S. model pictured)

— BLI technicians found the menu structure of the web utility difficult to navigate. For example, LDAP is labelled “directory services” and is buried under several sub-menus.

○ Users can program destinations into the address book from the web utility.

+ LDAP search is supported from the web utility, so users can remotely add and edit destinations from the LDAP servers, which is a valuable time saver and prevents errors in destinations that would otherwise be manually entered.

+ Users can clone device settings from one device to another via the web utility. Settings available include accounting, print, authentication, fax, job management, network scanning connectivity and security.

○ While TopAccess indicates the amount of toner remaining in 1-percent increments, paper remaining in each drawer is indicated only as available or empty.

○ Gauges for the drums are not provided in the web utility, nor are gauges for the waste toner container, fuser or staple cartridge.

+ Email alerts can be sent to the administrator when consumables are depleted and errors occur, as well as when scan jobs are completed and faxes are received. Up to three key operators can receive email alerts via the web utility.

○ Auto emails cannot be set up for when print or copy jobs are completed.

+ TopAccess also offers status information on currently running as well as pending print, copy, scan and fax jobs. Job priority can be changed and pending jobs can be deleted. Details on the job list include document name, date, time, type, status, paper, pages, sets and user name.

○ Job log information is not consistent from log to log. For example, while the print log uses codes to indicate incomplete jobs, the scan log has more specific details pertaining to why a job was not completed.

+ Administrators can export job history as a CSV or XML file, a capability not available on some competitive machines.

+ Electronic meter counters available from TopAccess include information on prints, scans and copies for both small and large paper. Additional counters provide usage specific to different departments.

— TopAccess does not support the direct printing of files.

+ Copy, print, scan and Internet fax jobs can be stored on the unit with the e-Filing feature, as well as viewed and merged within TopAccess. Furthermore, users can pull the merged jobs back to their desktops as single- or multi-page PDFs or single-page TIFFs. The optional e-Filing system provides public and private storage for documents. All users have read and write access to the public box where users can store documents they wish to share with other users. Confidential information can be stored in one of the 200 private user boxes. Private boxes can be secured with a password.

The Web Utility's e-Filing Feature (U.S. model pictured)

○ Users can create up to 100 folders in both the public and user boxes, but they cannot create subfolders within folders.

+ Documents can be stored directly in either type of box, and also in folders within the boxes. Up to 400 documents can be stored in each box and folder, while each document can contain up to 1,000 pages. Documents can be retrieved from the control panel or via the user's PC.

+ Though it wasn't included on the CD, nor was it available as a download on the company's website, e-BRIDGE Fleet Management System (eFMS) is available from Toshiba dealers, direct sales and resellers. The software allows administrators and service providers to remotely configure, manage and monitor all networked Toshiba devices; information about third-party devices is limited, which is common. Devices can be grouped by location, department and cost centre, among others.

+ eFMS can automatically generate usage reports and email them directly to a designated person. They can be exported to Excel or as a PDF with graphs, and organized by month, year, location or cost centre.

+ eFMS can be configured to send pop-up messages and email alerts to key operators

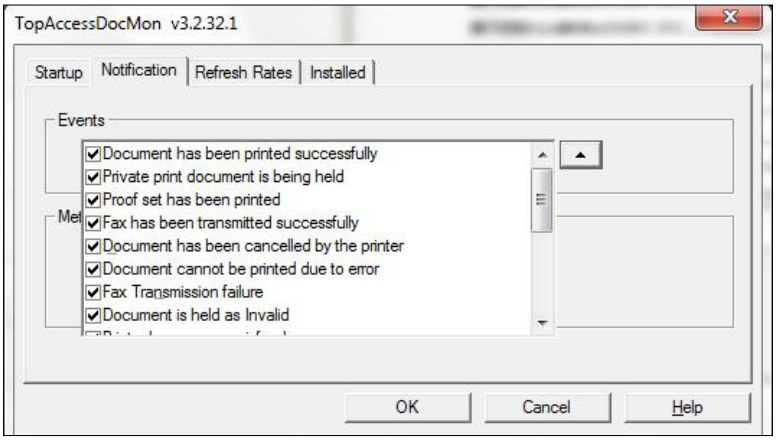
when a paper jam or other warning conditions arise. In the case of more severe technical difficulties, an email can be sent directly to the dealer or other service provider.

+ The e-STUDIO2050c offers 1,000 department and 10,000 user codes with the optional hard drive installed; it offers 50 department and 100 user codes without it.

FEEDBACK TO WORKSTATIONS

GOOD

+ DocMon, which is available as a free download on Toshiba's website, enables pop-ups and audible alerts for print job completion and deletion; when faxes are transmitted or cancelled; when the device misfeeds or an error occurs; if the device is out of paper or toner; if toner is low or the waste container is full or near full; and if the printer is offline. All pop-up messages appear in one window, but the window doesn't automatically dissolve like with some competitive devices. Additionally, device status is provided on the taskbar. Users can configure their own settings for how and when they're notified.



DocMon, Toshiba's Feedback Utility (U.S. model pictured)

○ Additionally, users can go to TopAccess via a link in the drivers. The web utility provides device information and status; the paper size in each drawer and whether paper is loaded or not; the amount of toner remaining in 1 percent increments; and the status of print, scan and fax jobs.

— The drivers do not provide consumables status other than indicating the paper size in the drawers.

EASE OF NETWORK SETUP

GOOD

○ The Universal Print Driver, scan utility, fax driver and user manuals are all included on one CD, and can also be downloaded via Toshiba's website.

\+ Toshiba's Universal Print Driver simplifies setup for administrators, as it requires them to install only one driver that includes both PCL and PostScript. Eight clicks are required to install the Universal Print Driver.

\+ Setup for printing is highly automated. Users can select to install everything at once, or select the drivers to install separately. The software auto-detects that the unit has been installed on the network and automatically creates the port for network printing.

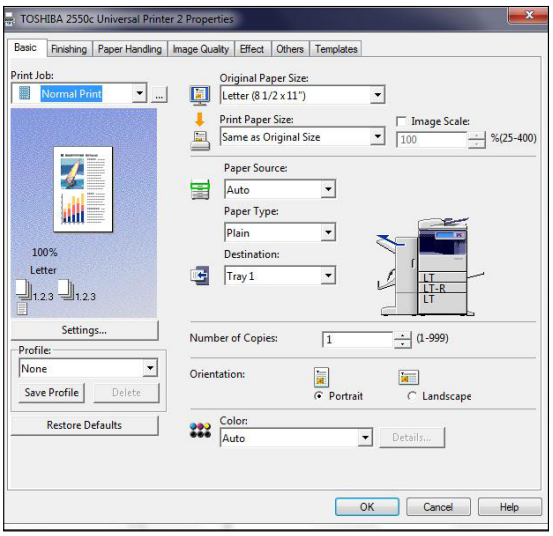
— Setup procedures for network configuration via the web utility, including for LDAP, scanning and the address book, are more difficult than with the majority of competing devices. The setup process is lengthy, as operators must navigate through multiple screens and multiple tabs within the web utility.

PRINT DRIVERS

VERY GOOD

○ The device is equipped with a 1.2-GHz processor and the Universal Print Driver includes standard Microsoft-certified PCL 5e/6 and PostScript 3 drivers, which are compatible with various Windows and Mac operating systems. The unit also supports XPS printing.

\+ Overall, the e-STUDIO2050c's tested print drivers offer very good overall ease of use. The Universal Print Driver requires one installation and includes both PCL and PostScript. The help button, which is located on every tab, is dynamic and relates directly to the selection or tab that the user is currently in, making it easy to understand what each driver function is used for.



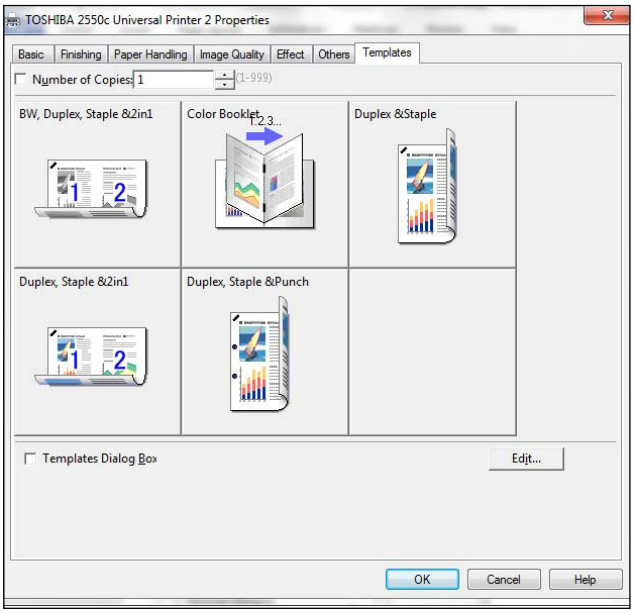
Toshiba's Universal Print Driver (U.S. model pictured)

○ Job settings are displayed in graphical form under the preview window on the left side of the screen. Clicking on the settings button underneath brings up a pop-up window with job and device settings in text form.

+ Users can select the paper source and exit tray by clicking on the preferred drawer on the graphic of the device, or via a pull-down menu to the left of the graphic. The paper size in each drawer is also provided on the graphic of the device, though the amount of paper in each drawer is not indicated. The selected source and destination are indicated on the machine graphic.

○ Although not all of the selections for a typical print job are available on the basic tab—for instance, duplex and finishing options such as staple, hole punch and fold must be selected from the finishing tab—users can select paper source and type, destination, quantity, orientation and reduction/enlargement.

+ Users have the ability to save up to 20 profiles (five of which are defaults) for commonly run job types, accessible on every tab of the driver, helping to reduce the number of clicks needed for such jobs. Profiles can be changed by selecting new settings and saving under the same name. Up to six profiles can be added to the templates tab; users can choose to automatically display the available templates upon opening the driver for quicker access when printing.



Users can program the templates tab to be their default driver screen. (U.S. model pictured)

— The drivers are not defaulted to duplex mode.

+ Advanced features under the Print Job pull-down menu include Scheduled Print, Proof Print, Private Print, Hold Print, Print to Overlay File, and Store to e-FILING, which allows users to store print jobs to electronic mailboxes. Users can also select “Multiple Job Type,” which combines any of the other available print types with Store to e-FILING.

○ The drivers do not support the ability to set up jobs with exceptions.

+ The Paper Handling tab allows users to include front and back covers, as well as to insert pages and print onto tab extensions. The procedures for setting up covers and tabs are simple. Users can select the paper source (all four sources are available) and paper type.

+ Users can also change the order of the tabs to their preference. For example, if a user wanted Image Quality to be first, they could go to the Others tab and select Image Quality from the Default Menu Settings pull-down menu. Then the next time the print driver properties window is opened, Image Quality will be the first tab to appear. In addition, the Others tab contains Toner Save mode and Do not Print Blank Pages, which help to cut down on waste.

○ Secure print jobs are accessed via the Print hard key. BLI would prefer having the ability to access secure print jobs from the job list in the job queue, or via an assigned key to allow access in fewer clicks.

+ Unlike with some competitive machines, details of a secure print job are not shown until a user ID and password is entered at the device. In addition, multiple secure print jobs with the same PIN can be released simultaneously.

O A secure print job can be released while the device is outputting jobs. Users cannot change any settings, such as the number of sets, or simplex and duplex settings, before releasing a secure print job.

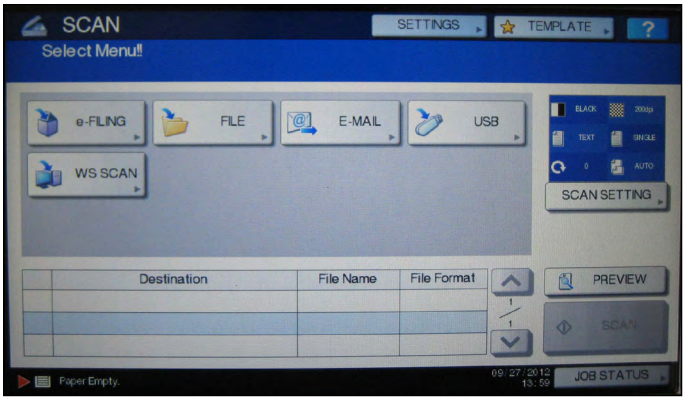
+ Tandem printing, which is standard, allows large print jobs to be distributed between two network printers for faster completion.

SCAN FUNCTIONS

VERY GOOD

+ The e-STUDIO2050c's rated scan speeds are up to 25 ipm in colour and black at 600 dpi. The device's tested scan speeds are faster than average compared with other devices tested in its speed class.

O Maximum resolution is 600 x 600 dpi, and destinations include email, FTP, hard drive, SMB, USB and Internet fax. Users can scan to up to two destination types in a single session. File formats include PDF, encrypted PDF, TIFF, XPS, JPEG and compact PDF.



The e-STUDIO2050c's Scan Menu (U.S. model pictured)

— Searchable PDF is not supported.

+ Frequently used destinations can be programmed as favourites.

+ The QWERTY keypad for scan to email is large and easy to use as the keys are very responsive. It includes a range of symbols, including @ and various others, eliminating the need to press the shift key to select the desired symbols.

+ The control panel displays a thumbnail view of the scan job's programmed settings, such as simplex or duplex.

+ Users can preview scans on the display by pressing the Preview button and the specific scan-to functionality; once the document is processed, pages are displayed one at a time, and users can scroll through them to ensure correct file processing before transmitting them to a destination. Users can zoom, rotate, insert and delete pages, change the original type and size, and perform image quality adjustments.

+ The unit supports up to five LDAP servers. Users can search LDAP by email address, first or last name, corporation or department.

— Addresses located via LDAP can't be automatically stored locally. Destinations have to be manually programmed at the control panel or in TopAccess to be stored in the address book.

+ The procedure for locating email addresses via LDAP is very simple, requiring 12 keystrokes to perform a scan-to-email job when sending to one destination.

+ USB scanning and printing is supported by the port located toward the rear side of the device, but a host USB port can be added toward the front of the device for convenience. Formats supported include TIFF, PDF, encrypted PDF, JPEG and XPS. Users can browse into subfolders, and, when printing, can specify paper source and size, duplex printing and finishing features. When scanning to USB, blank page removal and preview mode are supported, and users can select any of the scan settings for a typical scan job.

— When users plug the USB device into the port, the menu does not automatically open,

unlike with some other devices tested, requiring users to press the Scan key and then select USB. Job build is not available.

+ Toshiba's optional Re-Rite allows users to convert paper documents into a wide range of editable file formats and then distribute those files to a shared network folder, an email address or both.

+ High, medium and low compression settings are offered for greyscale and colour documents.

+ Colour scan file size using high compression is smaller than average compared with copier-based MFPs tested to date.

○ While no compression is offered in black mode, file size is competitive.

IMAGE QUALITY

COLOUR PRINT/COPY QUALITY — VERY GOOD/GOOD

+ Business graphic output was rated very good in print mode and good in copy mode, exhibiting bright, saturated colour. Sharpness of fine details and background reproduction were above average in print mode, and average in copy mode. Pastel shades earned average marks for both print and copy output.

○ Photographic images were rated good in both print and copy modes. While flesh tones were natural in copy mode, they were slightly yellowish on printed output. Both smoothness and colour halftone range were above average in print mode, and average for copied output.

+ The unit's colour gamut exhibited moderate fluctuation throughout testing, which was observed especially in the green and yellow regions of the spectrum at 70,000 impressions, as well as in the magenta region of the spectrum at all test points.

BLACK PRINT/COPY QUALITY — VERY GOOD/GOOD

+ In print mode, the e-STUDIO2050c offers very good overall image quality. Text was very good, earning above average marks for darkness, formation of characters and smoothness of curves, serifs and lines, and average marks for sharpness. There was no evidence of toner overspray, even with magnification. Halftone range was also found to be very good overall, with smooth fill and greyscale visible over a wide range—from 20 percent (10 percent is the minimum level) to 100 percent—with distinct separation between all levels. Line art was good, exhibiting above average production of closely spaced fine lines and above average consistency of line thickness. Similar to text output, there was no evidence of toner overspray with or without magnification. There was, however,

more than average stair-stepping of diagonal lines. Solids were also good, with average scores for darkness and for consistency of coverage.

- In copy mode, the e-STUDIO2050c's image quality was good overall. Halftone output was found to be excellent, with smooth fill and greyscale visible from 15%, which is the minimum coverage level of the original, to 100%, and distinct separation between all levels. Text, line art and solids each earned good marks. In copied text output, darkness, sharpness, character formation and smoothness of serifs each earned average marks. For line art, consistency of line thickness and production of closely spaced fine lines earned average marks. Stair-stepping of diagonal lines was average. There was no evidence of toner overspray in text or line art. Solids earned average marks for both darkness and consistency of coverage.

PRODUCTIVITY

COLOUR PRINT/COPY PRODUCTIVITY

GOOD

- When using the PCL driver to print BLI's job stream test, which simulates the type of usage seen by devices at busy times during the day, the device's tested speed is competitive, but efficiency (the percentage of its rated speed) is above average, as the device ran closer to its rated speed than the majority of devices in the competitive group.
- Tested speeds are competitive when printing multiple sets, but efficiency is among the best in the group.
- When copying sets, tested speeds are competitive with the group, but efficiency is above average.
- First-copy times are competitive with the group from both the platen and document feeder.

BLACK PRINT/COPY PRODUCTIVITY

GOOD

- While tested speed is competitive when running the job stream test from the PCL driver, the e-STUDIO2050c's efficiency was the highest of the group.
- Tested productivity when printing sets is competitive with the group.
- First-copy times are competitive with the group from both the platen and document feeder.

NOTE: Productivity tests were performed in the field on a unit configured without a finisher.

EASE OF USE

VERY GOOD

+ The e-STUDIO2050c's colour touchscreen control panel is logically organized and features large, highly responsive keys labelled with common industry terms. The display was bright at default settings, and can be adjusted via the User Functions hard key. A question mark icon provides dynamic help related to the menu or sub-menu a user is currently in.

+ The control panel tilts up and down freely.

○ Three tabs are available (Basic, Edit and Image), and all the most commonly used copy features are accessible, if not programmable, from the Basic tab, including duplex, finishing, exposure, paper drawers and reduction/enlargement. When the reduction/enlargement, finishing, duplex and text/photo options are selected, users are taken to sub-menus to complete their selections.

The e-STUDIO2050c's Control Panel and Copy Screen (U.S. model pictured)

+ Paper source and exit tray can be selected directly from the graphic of the device on the Basic tab. Users can choose the exit tray, tray 1, any of the three drawers, as well as APS for auto paper selection. The paper drawer graphics indicate the paper levels remaining in each drawer. Proof Copy is also selectable from the Basic tab, as is Exposure, with adjustments for darkening or lightening the image over five increments each, as well as an auto exposure setting. All the job settings currently selected can be seen from the Basic tab as both text and icons.

+ Touch keys for Storage and Template are located at the top of every control panel screen for easy access. With Storage, scanned data can be stored in the e-FILING box of the machine at the same time originals are scanned and copied. Users can also opt to store scanned data in the shared folder of the machine or a computer on the network (see Scan section for more on e-FILING). With Template, up to 12,060 templates (60 without the optional hard drive) can be stored to enable one-touch access to frequently used settings for copy, scan and fax jobs.

○ The Settings touch key serves as a convenient location for users to view all selected settings for the current job being programmed. Shortcuts to each of the menus in which a setting is currently selected are also provided, so that users can conveniently change

the current settings, if desired, saving time that would otherwise be needed to navigate to these selections via the Basic, Edit and Image tabs.

+ Ease of use is also boosted because of the control panel's Menu hard key. When an authenticated user selects the Menu hard key, his or her 60 default templates will be displayed, as will counter information specific to that user. The 60 templates are among the 12,060 templates that can be created from the control panel. In addition, the Menu hard key will show any restrictions an authenticated user has. If any embedded applications supporting the company's Open Platform are installed, they will be accessible from here.

+ The Job Status key opens up the device's highly detailed job queue. Copy and print are combined in one queue, while separate queues are available for scan and fax. Users can delete and pause jobs stored in the queue. In the combined print/copy queue, the user name and date/time of each job is indicated, as are the number of sets for each job. The number of originals in print and copy jobs is also indicated.

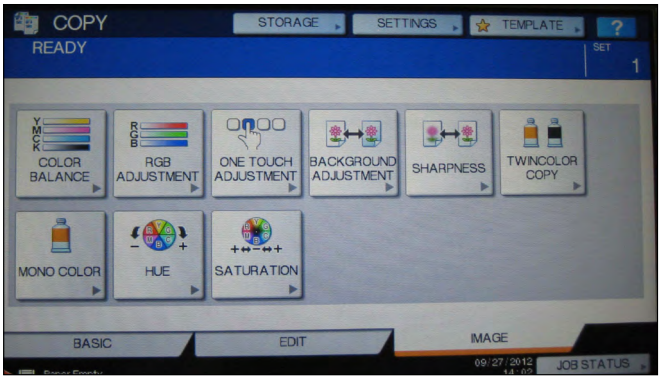
○ Via the Job Status touch key, complete and incomplete jobs are indicated, though incomplete jobs are indicated by a code number rather than a message. The scan queue indicates To/File Name, Date/Time, Pages and Status. The fax queue indicates File Number, To, Date/Time, Pages, Sets and Status.

○ The Counter hard key provides information on copy, fax, print and scan jobs for black and full colour, and can be printed.

+ Via the Edit tab, job build is available using both the feeder and the platen. Users can scan groups of originals with different settings, including quantity, colour mode, reduction/enlargement and simplex or duplex, to be printed as one document. In addition, if the number of originals in a job exceeds the document feeder capacity, pages can be scanned in two or more batches and combined.

○ In job build, stapling is only selectable when programming the first set of originals and is greyed out thereafter. If users do not select it on the first batch, but wish to add stapling later on, they must start the job build process over. Additionally, job build does not support automatic paper selection, and therefore cannot accurately copy mixed-size originals. So, if a user programs an A4 job and another size job, both jobs will print on A4 paper. While this is comparable to competitive machines' job build, BLI technicians feel that these features could be improved. Users must select the "Job Finish" touch key, which is small and easy to overlook, in order for a job build job to begin outputting.

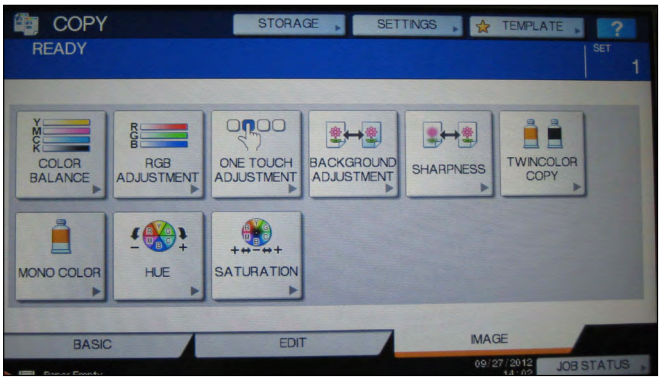
+ The Edit tab is also where users can program additional job settings. Omit Blank Page removes the blank sheets included in the scanned originals before copying. Outside Erase eliminates black around the edges of a copy when the platen is open, a benefit when copying books and other three-dimensional objects. Time Stamp adds the date and time on the copied paper, and users can choose short edge or long edge and position. Page Number allows users to specify the direction and position of the page number.



Users can program image adjustments from the image tab. (U.S. model pictured)

— Procedures for loading paper in the device's standard, 250-sheet paper drawer are more difficult than with some competing models. Users must slide paper under a roller, and lock down the tray to complete the process.

+ Loading paper in the optional paper drawers, however, is very simple. There are no rollers to move or trays to lock. All of the drawers, including the standard tray, include automatic paper sensors to detect changes in paper size.



Although it is more difficult to load paper into the standard paper drawer, loading paper into the optional paper drawers is simple. (U.S. model pictured)

○ The pop-up message to notify users that the paper size in the drawers has been changed is turned off by default and must be enabled via administrator mode.

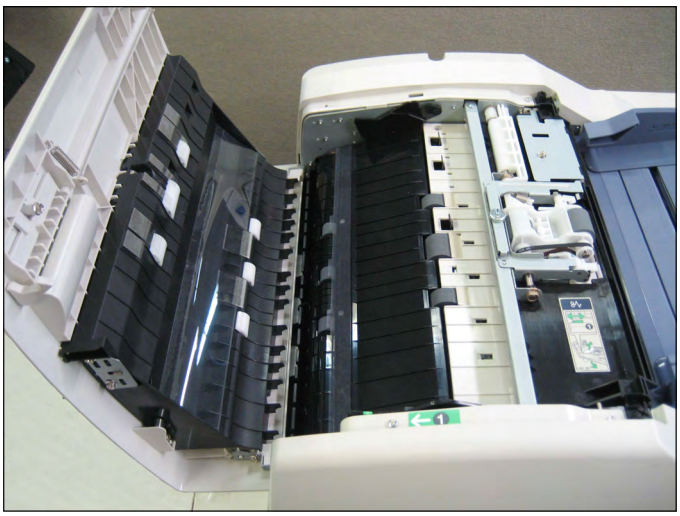
○ The drawers feature sliding length and width guides, which make it easy to adjust them for different sizes.

○ The bypass tray is automatically selected when paper is loaded but users must select the correct size. Auto tray switching has a separate on/off setting for print and copy jobs. Most devices have one setting for both print and copy.

○ In default mode, users must release each job from the print queue at the control panel when printing to the bypass tray. According to Toshiba, this is done to eliminate the possibility for another user to accidently pull specialty media for their normal job.

— A service call is required to make the bypass tray auto feed, which allows jobs using the bypass tray to be released automatically if the paper selected in the driver matches up with the paper loaded in the bypass tray. BLI technicians would prefer that administrators had the ability to change this setting.

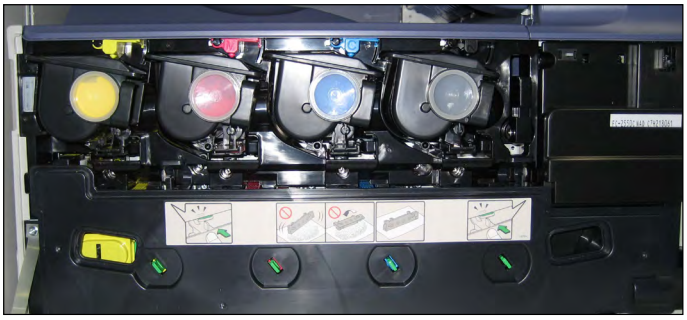
+ Access to misfeed areas, which are well labelled and clearly identified, is above average. The machine offers step-by-step, dynamic instructions for misfeed removal. Like many competing machines, users can clear misfeeds in the finisher area by simply opening a door at the front or top of the device, keeping the footprint at a manageable size.



Misfeeds in the document feeder are easy to access. (U.S. model pictured)

+ The Toner tab accessible via the Job Status key indicates the amount of toner remaining in 1-percent increments.

+ Toner is easily replaced and can be changed when near empty, though not on the fly. Instructions on toner replacement are provided onscreen.



Toner is easily replaced. (U.S. model pictured)

— By default, copy and print jobs can be moved in queue, but the process is more limiting than with most competitive devices. The first 10 jobs in the queue cannot be moved. Subsequent jobs that fall in line after the first 10 can be moved up, but the highest position in the queue they can be moved to is the 11th position, because, as noted, the order of the fist 10 jobs cannot be changed. As jobs are processed on a first-in, first-out basis, the only way for walk-up users to promote their copy jobs is to interrupt the current job. During installation, service can change a setting to specify the position in the queue where jobs can begin to be promoted, so for example, the job in slot two could be moved up to be output next.

○ The device doesn't support copying onto tab extensions, but it does support printing onto tab extensions via the drivers; tabs must be fed through the bypass.

+ Users can open the left side of the LCF and load paper while paper is being drawn from the right.

+ The unit has a job recovery feature for a misfeed in the RADF; once it's cleared and the sheet is reinserted, the job will automatically continue rather than be deleted.

△ FEATURE SET — GOOD

○ The e-STUDIO2050c offers standard copying, network printing, network scanning and Internet fax, as well as optional fax (including walk-up, network and PC fax) functionality.

○ The device's standard, non-upgradable 2-GB RAM is competitive.

— The majority of units in the competitive group offer a standard hard drive, whereas the e-STUDIO2050c offers an optional hard drive whose 160-GB capacity is competitive with the group.

+ When the optional hard drive is installed, the device offers 1,000 department/10,000 user codes. In addition, up to 12,060 templates can be stored to enable one-touch access to frequently used settings for copy, scan and fax jobs. Without the hard drive installed, it supports 50 department/100 user codes and 60 templates in up to 5 groups.

○ The optional hard drive unlocks a host of additional features, some of which include e-Filing, schedule print, proof print, private print, scan preview, XPS support and job skip.

— Standard paper capacity of 250 sheets, not including the bypass, is lower than average.

○ The capacity of the 100-sheet bypass tray is competitive.

○ Maximum paper capacity of 2,900 sheets is also competitive.

— The unit's paper drawers accommodate up to 163 gsm, and the bypass tray can handle up to 209 gsm, which are both lower than average.

— An optional 100-sheet RADF (reversing automatic document feeder) is available; more than half of its competitors offer an RADF standard.

+ There are two finishing options including a 600-sheet internal finisher, and a 1,000-sheet saddle-stitch finisher that can saddle-stitch up to 15 sheets to create 60-page booklets. Both finishers can staple up to 50 sheets. Optional hole-punch units are available for each finisher.

○ A 2,000-sheet LCT is available as an option.

○ Users can select multi-copy runs up to 999, which is competitive.

○ Other copy features include ID card copy, booklet mode, book copy, covers, editing, interrupt, job build, stamping, and reduction and enlargement from 25% to 400% in 1% increments.

+ Toshiba's open platform architecture, which is optional for this device, allows optional Toshiba and third-party solutions to be embedded for direct access from the control panel.

○ The 33.6-Kbps fax option offers 12,060 speed dial destinations, batch files, polling, battery backup, confidential transmissions and receptions, and incoming fax routing to shared folders, email or e-Filing. A second fax line, which would allow simultaneous transmissions and/or receptions, is available as an option.

△ SECURITY FEATURES

EXCELLENT

AUTHENTICATION	
Network user authentication at control panel	Yes (up to 16 servers)
Windows	Yes
Novell NetWare NDPS	Yes
LDAP	Yes
Kerberos	Yes
802.1x wireless	Yes
SMTP	Yes
POP before SMTP	Yes
Biometric	No
ID Card	Yes
HID	Yes
Common Access	Yes
Other	Yes
Registered department or user ID codes	Standard
Number	10,000 users 1,000 departments

ACCESS CONTROL	
Restrict colour	Standard
Control panel lock/disablement	Standard
Restrict access to address book	Standard
Restrict USB port	Standard
Restrict direct printing	Standard
Restrict other	Lots of restrictions
HARD DRIVE	
Encryption	Standard
Maximum level	AES 256 Bit
Overwrite	Optional
Method	Compliant with DOD
Maximum number after a job	15
Maximum number at end of lease	15
Lock	NA
Removable	No
Password-protected mailboxes	Standard
Data auto-deletion in mailboxes	Standard
JOB TRACKING	
Job logs	Standard
Digital signature	No
Verify document came from device	Yes
Verify document came from specific user	Yes
JOB PROTECTION	
Encrypted secure print	Yes by PDF direct print
Secure print	Yes
Encrypted scanning	Standard
Maximum level	AES 128 Bit
For scan to USB	Yes
Unauthorised scan/copy protection block (watermark)	Standard/Optional
Compatible with same-brand devices	Yes
Compatible with third-party devices	No
NETWORK SECURITY/PROTOCOLS	
Protocol disablement	Standard
Port disablement	Standard
IP address filtering	Standard
MAC address filtering	Standard
HTTPS	Standard
Self-signed certificate	Yes
Certificate signing request	Yes
IPsec	Optimal

IPv6	Standard
Secure Sockets Layer (SSL)	Standard
S/MIME encryption	No
SNMPv3 support	Standard
Transport Layer Security (TLS)	Standard
Trusted Platform Module (TPM)	No
CERTIFICATIONS	
Common Criteria	Yes
EAL level	3
Capabilities certified	Entire security suite
FIPS 140-2	Pending
Level	INA
IEEE 2600	Yes
OTHER	
Administrator password length	Up to 64 alpha/numeric characters
Password-protected web server	Yes
Additional features	Password Policy etc.
Third-party features	FollowMe, PaperCut

INA: The vendor declined to provide this information
NA: Not applicable

ACCESSIBILITY FEATURES

NOT RATED

Accessibility handle	Opt
Braille label kit	No
Enlarged display mode	No
Remote operator software	No
Tilting control panel	Yes
Voice guidance (audible instructions	No
Voice operation (responds to voice commands)	No

ENVIRONMENTAL FEATURES

NOT RATED

Specified capable of running 30% post-consumer recycled paper	Yes
Specified capable of running 50% post-consumer recycled paper	Yes
Specified capable of running 100% post-consumer recycled paper	Yes
Instant/Quick Fusing	Yes
Duplexing	Yes
Toner-save mode	Yes
Energy-save mode/modes	Yes
RoHS compliant	Yes
Percentage of this product that is made with recycled materials/parts	4.2
Are recycled materials taken from previous devices that have been returned by your customers	No
Are recycled materials taken from post-consumer materials	Yes
Are recycled materials taken from pre-consumer materials	Yes
Are recycled materials taken from bio-based materials	No
Product designed for recycling (easily disassembled, no binding agents)	Yes
Hardware remanufacturing program for this product	No
Toner cartridge recycling program for this product	Yes
Pre-paid label for return of toner cartridges/bottles for this unit	Yes
Toner recycling system	No
Ability to program features such as duplexing and auto shut-off over entire fleet	Yes
What tool can be used to do this?	Top Access, e-BRIDGE Fleet Management
Green packaging materials for the product	Yes
Green packaging materials for its consumables	Yes
Packaging materials used	Fibreboard (made from recycled paper), EPS and plastic bags
Eco-Label Certifications	
ENERGY STAR	Yes
Other	ECMA-370/The Eco Declaration, Germany Blue Angel, Japan Eco Mark, Nordic Swan Label, Taiwan Green Mark, Chinese Environmental Labelling, Chinese Low Carbon and Environmental Labelling, and China Energy Conservation Product Certification
Tested energy consumption levels of the device (watts):	
Ready/Idle	100
Energy-save	36
Sleep mode	1
During Printing	740

How fast can this product be programmed to go into the following modes:	
Ready/Idle	35 seconds
Energy-save	60 seconds
Sleep mode	60 seconds
Can the above settings be programmed by a walkup user	Yes
First-print time after being in sleep mode (seconds)	26
Emissions output from this device for the following substances (mg/h):	
Ozone	<1
Styrene	<0.5
Benzene	0.04
TVOC	<10
Dust	<0.5
Other	NA

INA: The vendor declined to provide this information
NA: Not applicable

TONER YIELD

EXCELLENT

○ Tested black yield fell just short of the rated yield.

– Tested magenta yield fell short of the rated yield

\+ Tested cyan yield exceeded the rated yield by close to 10,000 impressions, and tested yellow yield exceeded its rated yield by more than 3,000 impressions.

\+ All four tested yields were far and away the highest of their respective groups.

SUPPORTING TEST DATA

Test Environment: This product was tested in BLI's 929-square-metre U.S. test lab, in an environment monitored by an Extech RH S20 Digital RH/Temperature Recorder and Honeywell Model 61 Seven-Day Temperature/Relative Humidity Chart Recorder. All products lab tested by BLI are powered by dedicated circuits that are protected by ESP (Electronic Systems Protection, Inc.) surge protectors to prevent transient power and communication disturbances from affecting equipment under test.

Test Equipment: BLI's dedicated test network, consisting of Windows 2003 and Microsoft Exchange servers, Windows 7 and XP workstations, 10BaseT/100BaseTX network switches and CAT5 cabling.

Test Duration: Products are tested for two months, five weeks of which consists of a durability test during which the product is run at its manufacturer-rated maximum monthly duty cycle, with 25 percent of the test volume comprised of copy jobs and 75 percent comprised of print jobs. BLI's daily test usage is designed to replicate real-world use over an eight-hour workday, and as such includes a mix of various-size documents, simplex and duplex modes, and a mix of short, moderate and long run lengths, and on/off cycles, throughout the day. The durability evaluation also includes testing of the document feeder/scanner in simplex and duplex modes for an additional 20 percent of the monthly maximum volume, evenly divided over the course of the test. Imaging media includes virgin multi-use paper. Recycled multi-use paper comprised of 30, 50 and 100 percent post-consumer waste is also tested for up to 10 percent usage of each of the recycled media types.

Tested Configuration: Base model with inner finisher, RADF, 2,000-sheet LCT, 550-sheet paper feed unit, and 160-GB hard drive option for 35,000 impressions; base model with booklet finisher, RADF, 2,000-sheet LCT, 550-sheet paper feed unit, and 160-GB hard drive option for 70,000 impressions

Test Procedures: The test methods and procedures employed by BLI in its lab testing include BLI's proprietary procedures and industry-standard test procedures, including a BLI-developed variation of ASTM's 1318-90 Test Method for Determination of Productivity using Electrostatic Copy Machines. In addition to a number of proprietary test documents, BLI uses an industry-standard KATUN test original for evaluating black image quality and test suites from Quality Logic to evaluate applications compatibility. In addition to a visual observation, colour print quality is tested using the ANSI standard IT8 Colour Test Target, which is read using the Minolta CM503I Spectrophotometer, and samples are analysed using the CIE XY Chromaticity Diagram. In addition, density of black and colour output is measured using an X-Rite 428 Densitometer. Georgia-Pacific Spectrum Multi-Use Paper is used in the tests, 30 percent of which is recycled paper containing 30, 50 and 100 percent post-consumer content. Image quality is tested using Georgia-Pacific Printing Paper. Units are tested for compatibility on Windows 7 with Microsoft Office Suite 2010, as well as Adobe Acrobat Reader 10.0. Tests are conducted using U.S. letter/ledger paper; A4/A3 results may vary slightly.

RELIABILITY

Test Duration	105,000 impressions and 14,000 scans
Service Calls/PMs	1/0
Misfeeds	3
Misfeed Rate	35,000

IMAGE QUALITY

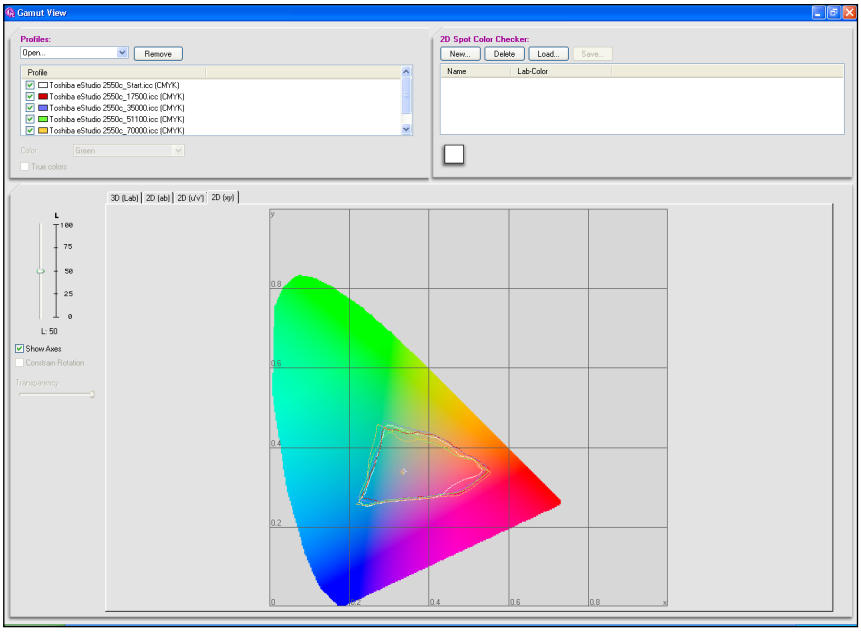
Print Quality

Text	Very Good
Line Art	Good
Halftone Pattern	Good
Halftone Range	Very Good
Solids	Good
Colour Business Graphics	Very Good
Colour Photographic Images	Good
Colour Shift	Very Good

Colour Shift Readings

Test Point	Delta E	BLI Rating
17,500	3.74	Very Good
35,000	3.53	Very Good
51,100	5.26	Good
70,000	3.90	Very Good

Delta E is a colorimetric measurement assessing the distance between colours. The readings above reflect the average shift of the colour gamut from the previous measured point.



The unit's colour gamut exhibited moderate fluctuation throughout testing, which was observed especially in the green and yellow regions of the spectrum at 70,000 impressions, as well as in the magenta region of the spectrum at all test points. (U.S. model pictured)

Colour Density Readings

Colour	Yellow	Magenta	Cyan
Print Density	0.88	0.92	0.74
Competitive Average	0.90	1.18	1.09

Density of a printed image with blocks of all solid colours (based on the average of two readings for each colour).

Print Density Range

Toshiba e-STUDIO2050c	1.33 to 1.36
Density for devices in this class tested to date	1.23 to 1.82

Measurements are based on four readings corresponding to four different solid black locations on output.

The higher the density reading, the darker the image.

Print Density Average

Toshiba e-STUDIO2050c	1.35
Average density for devices in this class tested to date	1.48

The higher the density reading, the darker the image.

Halftone range:

Halftone output was visible from the 10% to 100% dot-fill levels, with distinct transitions between all levels.

Copy Quality

Text	Good
Line Art	Good
Halftone Pattern	Good
Halftone Range	Excellent
Solids	Good
Colour Business Graphics	Good
Colour Photographic Images	Good

Colour Copy Density Readings

Colour	Yellow	Magenta	Cyan
Original Density	1.07	1.43	1.52
Copy Density	0.95	1.16	1.15
Competitive Average	1.84	1.23	1.28

Density of copied image when tested in "Full Colour" copy mode using a KATUN test original containing blocks of all solid colours (based on the average of two readings for each colour).

Colour Fidelity Readings

Colour	Yellow	Magenta	Cyan	Red	Green	Blue	Black
Fidelity	2.44	6.34	4.19	9.06	4.01	14.67	4.20
Competitive Average	5.33	6.26	5.98	8.60	9.42	14.34	3.28

Colour fidelity of a copy to its original (using a KATUN test original containing blocks of all solid colours: tested in walk-up mode using the machine default settings in "Full colour" mode and auto exposure settings); average of two readings for each colour. Measurements are taken with a Minolta CM-503i spectrophotometer. The closer the number is to 0, the closer the copy's colour fidelity is to the test original (based on the average of two readings for each colour).

Copy Density Range

Original	1.79 to 1.79
Toshiba e-STUDIO2050c	1.33 to 1.35
Density for devices in this class tested to date	1.15 to 1.80

Measurements are based on two readings corresponding to two different solid black locations on the output. The higher the density, the darker the image.

Copy Density Average

Toshiba e-STUDIO2050c	1.34
Average density for devices in this class tested to date	1.51

The higher the density reading, the darker the image.

Visible Halftone Range

Toshiba e-STUDIO2050c	15% to 100%
Halftone increments on test original	15, 29, 53, 77, 83, 91, 95, 100%

PRODUCTIVITY

PRINT PRODUCTIVITY

Average Print Productivity | Competitive Average

	SPEED IN PPM		PERCENT OF RATED SPEED	
AUTO Colour				
1:1	**17.5**	20.5	**87.7**	79.0
1:2	**16.7**	19.4	**83.6**	75.4
BLACK				
1:1	**17.8**	22.2	**89.1**	85.9
1:2	**17.1**	20.9	**85.5**	81.3

Efficiency is tested using a 10-page full-colour document and a 10-page black document. BLI obtains the overall efficiency for each mode by averaging the efficiency ratings (derived by dividing the tested speed of the device by the rated speed and then multiplying by 100) for each run length (1, 5 and 10 sets). The unit's efficiency was tested using the PCL driver at 600 dpi.

Job Stream | Competitive Average

	SPEED IN PPM		PERCENT OF RATED SPEED	
PCL				
AUTO COLOUR	**17.5**	19.2	**87.7**	74.4
BLACK	**18.1**	21.7	**90.5**	84.3

BLI's job stream includes Word documents, Outlook e-mail messages, Excel spreadsheets, PowerPoint, HTML and Acrobat PDF files, totalling 19 pages. This test simulates the type of traffic a typical device might experience in a real-world, multi-user environment. All of the files are sent to the device as a group, at which time the stopwatch begins; timing ends when the last page of the last file exits the device. Job stream efficiency is determined by the percentage of the rated speed at which the device operates when producing real-world jobs. The closer the rate is to 100%, or if it exceeds 100%, the more efficient the device.

Tests were conducted using U.S. letter-size paper; A4 results may vary slightly.

COPY PRODUCTIVITY

Average Copy Productivity | Competitive Average

	SPEED IN PPM		PERCENT OF RATED SPEED	
AUTO COLOUR				
1:1	**17.6**	20.3	**87.7**	78.4
1:2	**16.7**	18.6	**83.8**	71.9
2:2	**17.2**	19.0	**85.9**	73.2
BLACK				
1:1	**17.8**	22.0	**89.1**	85.5
1:2	**16.9**	19.9	**84.6**	78.4
2:2	**17.4**	20.2	**87.1**	81.2

Efficiency is tested using a 10-page full-colour document and a 10-page black document. BLI obtains the overall efficiency for each mode by averaging the efficiency ratings (derived by dividing the tested speed of the device by the rated speed and then multiplying by 100) for each run length (1, 5 and 10 sets). The unit's efficiency was tested using the PCL driver.

First-Copy Time in Seconds | Competitive Average

AUTO COLOUR		
Platen	**9.66**	11.47
Document Feeder	**10.95**	12.50
BLACK		
Platen	**9.76**	7.74
Document Feeder	**8.45**	9.08

Tests were conducted using U.S. letter-size paper; A4 results may vary slightly.

SCAN FUNCTIONS

Tested Scan Speed in IPM | Competitive Average

AUTO COLOUR		
1:1	**42.8**	22.2
2:2	**23.0**	14.6
BLACK		
1:1	**43.3**	31.9
2:2	**23.0**	18.4

Files are scanned at 300 dpi in PDF format. Competitive averages represent the average scan speed for devices in this speed range tested to date.

Tested Scan File Size in KB | Competitive Average

Full Colour (default compression)	1,290.24	1,097.60
Full Colour (compact PDF)	161	339.93
Black	43.6	307.71
Black (compact PDF)	NA	48.40

Testing is conducted with single-page files scanned at 300 dpi in PDF format.

PRINT DRIVERS

Toshiba e-STUDIO2050c Print Driver Features

Windows XP	PCL 6	PostScript 3
Auto Feature/Device Detection	Yes	Yes
Booklet Printing	Yes	Yes
Collate Sets	Yes	Yes
Consumables Gauge	No	No
Delayed Print	Yes	Yes
Max Paper Sources Per Job	4	4
Blank Page Removal	Yes	Yes
Carbon Copy Mode	No	No
Cover Mode	Yes	Yes
Exception Programming	No	No
N-up Printing	2 to 16	2 to 16
Tab Printing	Yes	Yes
Envelope Selection	Yes	Yes
Point and Click Output Source	Yes	Yes
Point and Click Paper Source	Yes	Yes
Overlay	Yes	Yes
Paper Gauge	No	No
Poster Mode	Yes	Yes
Print Text as Black	Yes	Yes
Default Duplex	No	No
Toner Save Mode	Yes	Yes
Print and Hold	Yes	Yes
Proof Print	Yes	Yes
Quantity Selection	Up to 999	Up to 999
Reduction/Enlargement	25% to 400%	25% to 400%

Windows XP	PCL 6	PostScript 3
Resolution Modes (dpi)	600	600
Save Settings	Yes	Yes
Secure Printing	Yes	Yes
Watermarks/Custom Watermarks	Yes/Yes	Yes/Yes

TONER YIELD

Tested Toner Yield | Competitive Average

	Black		Cyan		Magenta		Yellow	
Tested Impressions	**37,016**	20,111	**43,534**	21,299	**28,741**	18,674	**36,634**	15,968
Rated Yield	**38,400**	18,400	**33,600**	15,350	**33,600**	15,350	**33,600**	15,350

Based on an average of two cartridges per colour using BLI's toner yield test original with 5% page coverage.

Certificate of Reliability

Awarded to

TOSHIBA TEC CORPORATION

for the performance of the

Toshiba e-STUDIO2050c

in BLI's in-house durability test.

Anthony F. Polifrone
Managing Director

March 2014
Date

This is to certify that when subjected to a 105,000-impression Buyers Lab durability test, the Toshiba e-STUDIO2050c proved to be a highly reliable product.

BUYERS LABORATORY LLC

THE LEADING INDEPENDENT OFFICE PRODUCTS TEST LAB AND BUSINESS CONSUMER ADVOCATE

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