

Certificate of Volatility

Manufacturer: Xerox

Equipment Name: Xerox Nuvera™ Digital Copier/Printer and Production Systems.

Model: Nuvera (all feeder and finisher configurations and all delivery speeds)

Configuration: This item is networked to print servers and workstations with operating systems such as Linux/Unix, Macintosh OS 10, Windows 95/98/ME/XP, Windows 2000 server, or Windows 2003 server

General Description: These Copier/Printer and Production Systems are connected to a network.

Purpose: Production Speed Copy, Print, Local Scanning, and Network Scanning functions.

Volatile Memory:

1. Volatile memory: What is the amount? What period of time does the unit need to be powered off to completely erase this memory?

Document Scanner Volatile Memory:

CMOS RAM: 1024 bytes for microcontroller use (Scanner operation only, No user image data stored.)

DocuSP-based Copy and Print Controller Board Volatile Memory:

Video Display Volatile memory DRAM: 8 MB (No user image data stored.)

SDRAM: up to 2GB (for Solaris OS functions, unprocessed print job image data is passed through this memory to Video Processing board and not stored here)

Image Processing Board Volatile Memory:

EPC RAM: 1024MB default, expandable to 2048MB. (Copy and Print job user image data stored in Xerox proprietary format. Data changes dynamically during page image processing plus a power cycle clears all. (No long term retention during job and clears at power off)

CMOS RAM built into ASIC integrated circuits on the board which also clears on power off. Not battery backed-up.

System Modules Volatile Memory:

There is volatile memory in the microcontrollers used to operate the system, but these are used solely for low-level I/O control and contain no image or job data.

Some examples of this distributed control are:

- ◆ Power distribution, Photoreceptor and main drive motors control
- ◆ Raster Output Scanner (ROS)
- ◆ Paper Registration
- ◆ Feeders
- ◆ Finishers

Typical bleed down time at power off for all volatile memory is less than 10 seconds.

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Non-Volatile Memory:

Type: What type(s) of non-volatile memory are included, EPROM, EEPROM, Flash memory, NVRAM, and battery backed, etc. (fill in)

Document Scanner Non-Volatile Memory:

Flash ROM: 64KB internal to micro-controllers (internal operating code memory, no image data).

EEPROM: 16KB (Control Data and settings only, no image data stored)

DocuSP-based Copy and Print Controller Non-Volatile Memory:

Flash ROM: 8 MB (OS boot executable code. No user image data stored.)

NVRAM: 32 KB / 128 KB (Xerographic set points. No user image data stored.)

System Hard Disk Drive: currently 160 GB (OS, PDL Interpreters, fonts, MIB Objects, Network Protocols, Document Scheduler, and User image data stored before printing.

The Scan to File feature will place images in a directory on the system hard drive, which can then be backed up (or copied elsewhere) and removed. Data Overwrite option will remove these images permanently.

During normal operation with heavy RAM memory usage, Job Images may be stored temporarily in the Solaris swap partition on the drive. They are stored in a proprietary format and placed in random areas in the swap space. Reverse engineering of the swap partition area would be required to retrieve the encrypted image, which would then need to be de-crypted for viewing.

A Removable Hard Disk option is available and is strongly recommended for applications where sensitive information exists.

Image Processing Board Non Volatile Memory:

EEPROM: 16KB Stores Configuration and settings data (No user image data stored.)

FLASH ROM: 64MB Input and Output control code. (No user image data stored.)

Image Hard Disk Drive: 80 GB (User image data is stored in a Xerox proprietary format. diagnostic images are also stored here). User data can be erased if optional Image Data Overwrite option is installed and enabled. Using a four-pass algorithm which conforms to U.S. Department of Defense Directive 5200.28-M (DOD Directive 8500.1 supersedes 5200.28M), images will be removed that were being held before printing or that were saved as part of a scanning operation. For even greater security, Xerox provides a Removable Hard Disk option for secure storage off the system.

System Modules Non Volatile Memory:

There is non volatile memory in the microcontrollers used to operate the system modules, but these are used solely for low-level I/O control and contain no image or job data. Some examples of this distributed control are:

- ◆ Power distribution, Photoreceptor and main drive motor controls
- ◆ Raster Output Scanner (ROS)
- ◆ Paper Registration
- ◆ Feeders
- ◆ Finishers

2. **Accessibility:** Is it accessible by accidental/intentional keystroke, or software malfunction?

No. However, the "system administrator" login (privileged user) service technician (via diagnostic operation) may adjust certain machine operational parameters. User data (image information) is never viewable or accessible.

3. If "YES, it is accessible, describe location and purpose.

Purpose: typical uses for non-volatile memory location are system identification number and system configuration, boot, and initialization parameters, for example (battery-backed NVRAM on SUN Microsystems devices); put in for future design needs, internal depot repair, clock circuit, "nice" to have, or to flag unauthorized software, etc.

If "NO", it is not accessible, ____X____ (Check here).

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4. Required memory: Is device needed for normal operation, i.e. required for this processing period?

All memory listed is required for normal operation.

5. Removal consequences: If device memory chip is erased, what impact will this have on operation and normal function of device?

Example: If the SUN is turned on without this means of checking for the authorized configuration, the system will not boot and therefore the data cannot be processed per the standard Practice Procedure (SPP).

ROM memory device content is required and essential for operation and normal function of the device. Loss would render the device inoperable.

ROM memory, as stated above, never contains user data. This memory is never overwritten or erased during normal operation.

EPC DRAM memory processes user data. Content of this memory is lost at power off.

System Hard Disk Drive: Disk Drive removal will result in the system being unable boot or operate.

6. Method of access: How is it accessed? Is non-volatile memory location theoretically accessible with any system code, not just via the operating system or low level booting firmware?

There is no user access to the memory devices, except as provided programmatically to control Device behavior.

Remember: Modifying internal programming to access is not the same thing as unknowingly accessing from an accidental keyboard stroke.

7. Warranty: Does chip removal or EEPROM erasure void the warranty?

Yes, memory removal or erasure will void the warranty. Disk removal of the internal disk drive will void the warranty unless Removable Disk Option is purchased and installed.

8. Size: How much memory is contained? Number of bytes, etc.
See section 1, "Type of Memory"

9. Spacing: Is the memory fully utilized or does it have available memory space for additional information to be placed?

The non-volatile memory devices are sized to contain the necessary amount of data required for system operation. In some cases there are some unused memory addresses where additional information could be theoretically stored. Without access to the software developers' memory maps, determining the location of this unused memory would require reverse engineering the software.

The System Hard Disk Drive contains spooling partitions designated for customer document data. Space is dynamically allocated to each job handled; at job completion this space is de-allocated to be available for new document images. When the Image Overwrite Security option is enabled, all residual customer data in de-allocated space is overwritten using a single or four pass algorithm (depending on what the user chooses), after which no image data can be salvaged from the drive.

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10. Can this non-volatile memory be addressed to ensure that only authorized information is resident? If yes, how?

At boot-up, the system computes a checksum for each non-volatile memory device.

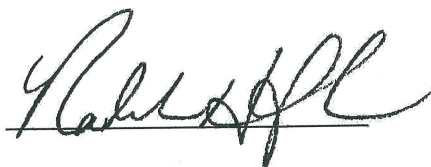
Note: The computed checksum is compared against a value stored in the device itself. This is sufficient to detect hardware failures, or intentional corruption.

General Summary:

There is no substitute for good physical security measures, data security measures, and housekeeping to keep sensitive data secure. Actions such as limiting access to trusted users, not allowing jobs to remain in print queues before power-off, and removing scanned images will help insure data is seen by only those who should.

Xerox Corporation strongly recommends the Removable Disk Option to completely eliminate the chance of sensitive material being left on a Nuvera device.

Evaluation and summary of this equipment was completed by the following:



Signature

Ralph H. Stoos Jr.

Printed Name

Systems Engineer

Title

Software Systems Engineering

Job Function