

Certificate of Volatility

Manufacturer: **Xerox**

Equipment Name: **WorkCentre**

Model: **118**

Configuration: This item is networked to print servers with operating system VxWorks

General description: This printer is connected to a network.

Purpose: Multi-Functional Device, Print, Copy, Fax, and Scan to e-mail

1. *Type of memory:*

Marking Engine

- DRAM: 96MB (32MB on-board + 64MB optional). The executable software is loaded and run in this memory. It is also used for temporary storage of images, including sent and received fax images and scan-to-email images, if optionally equipped. This non-volatile memory is battery supported but will lose information if removed from the unit.
- Flash ROM: 16MB. This flash memory contains the code necessary to boot, the executable code (operating system, document scheduler, etc.) and the resident fonts. A power-on self test is performed and the bootstrap OS is loaded. This area never contains any user image or document data. All code except for the boot loader is stored in compressed format and is expanded in the DRAM to be executed. When the fax kit is installed, this memory is not used.
- SEEP ROM: 256Byte. This memory contains the system's setting information and error log data. The information is encrypted.

Fax Card

- Memory Card: 64MB Compact Flash. This device overrides the Marking Engine flash memory when present. This device contains the code necessary to boot, all executable code (operating system, document scheduler, etc.) and all resident fonts. A power-on self test is performed to ensure data integrity. This device never contains any user image or document data. All operating system and application executable control code resides here. All code except for the boot loader is stored in compressed format and is expanded in the DRAM to be executed.
- SRAM: 256KB. This memory contains the system's setting information, mailbox information, speed dial information, Fax program memory, user management information, and transmission logs are stored in it. The data gets encrypted to be written. This memory is backed up with the battery.
- Boot ROM: 1MB. This memory contains the code necessary to boot. This non-volatile memory has no image data stored in it.

Print Controller

- DRAM: 192MB (64MB on-board + 128MB optional). The executable software is loaded and run in this memory. It is also used for temporary storage of data files and images. This information is not backed up and is lost when the power to the printer is removed.

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- Flash ROM: 24MB (8MB on board + 16MB optional). This Flash memory contains the code necessary to boot, all executable code (operating system, PostScript interpreter, network protocols, document scheduler, etc.), and the resident fonts. A power-on self test is performed and the bootstrap OS is loaded. The area never contains any user image or document data. All operating system and application executable control code resides here. All code except for the one of boot loader is in a compressed form and is developed to DRAM to be executed. No user image data is stored in this memory.
- NVRAM: 128KB. This non-volatile memory has no image data stored in it. The system setting information, job memory, user management information, and various kinds of logs are stored in it. The data gets encrypted to be written.
- SEEP ROM: 4Kbit. This memory contains the system's setting information.
- FONT ROM: 4MB. This memory contains fonts used for printing.

There are other non-volatile memory devices in the multi-functional device, but these are used solely for low-level I/O control. Some examples of this distributed control are:

- Photoreceptor
- Duplex
- Optional tray
- Finisher

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

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

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

Not accessible.

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

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?*

ROM memory device content is required and essential for operation and normal function of the device. Loss would render the device inoperable. ROM memory never contains user data. This memory is never overwritten or erased during normal operation. SDRAM memory (System Memory, Page Memory) processes user data. Content of this memory is lost at power off.

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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?*

Marking Engine non-volatile memory is used for storing Multifunction Device application settings and is accessible by application level code. There is no user access to the memory devices, except as provided programmatically to control device behaviors

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

Yes, memory removal or erasure will void the warranty

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. Usually 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.

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, but not necessarily intentional corruption.)