



HARMONIZED SYSTEM
COMMITTEE
-
25th Session
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NC0211E1

O. Eng.

Brussels, 14 February 2000 .

CLASSIFICATION OF MULTIFUNCTIONAL DIGITAL COPIERS

(Item VIII.14 on Agenda)

Reference documents :

42.406 (RSC/18)	NR0037E1 (RSC/19)
42.498 (RSC/18)	NC0059E1 (HSC/23)
42.500, Annex B/19 (RSC/18 – Report)	NC0090E2, Annex IJ/26 (HSC/23 – Report)
42.750, Annex E (HSC/22 – Report)	NC0160E2, Annex H/14 (HSC/24 – Report)
NR0023E1 (RSC/19)	

I. BACKGROUND

1. At its 24th Session, the Committee continued its discussion on the classification of multifunctional digital copiers.
2. The Director suggested that in order to make progress with regard to this issue, the Secretariat should study the classification of multifunctional digital copiers on the basis of a number of machines that could be selected from those that had been demonstrated to delegates during the meeting. Several delegates agreed that this would be an appropriate course of action. The US Delegate indicated that perhaps the Secretariat could choose the models in consultation with the industry, thereby ensuring that the basic types of machines (e.g., a desk top model which incorporates a fixed scanning device, a flatbed scanning device connected to a printer unit and a network connectable machine) would be represented in the study.
3. The Committee decided that the Secretariat, in consultation with the industry and Contracting Parties, would select a representative sample of machines for study by the Committee. Technical information with regard to these machines would then be made available to administrations as quickly as possible, in order for administrations to study the matter and to submit their comments to the Secretariat. The Secretariat, for its part, would also prepare its comments to be included in a document for the Committee's next session.

File No. 2802

II. SECRETARIAT COMMENTS

4. One delegate stressed the importance of giving Contracting Parties the opportunity of providing input into the selection of the machines to be included in this study. As a result, the Secretariat has contacted a number of Contracting Parties requesting their input. This input was not finalized until mid-January and, as a result, the Secretariat's original objective of having a list of products to be classified and their descriptions out to Contracting Parties by the end of 1999 was not realized. The Secretariat had hoped that by meeting this goal, Contracting Parties would have had time to study the products and provide written responses on their classification, thereby facilitating the discussion and decision-making process at HSC/25.

Suggested Products and Summary Descriptions

5. The Secretariat has included a number of annexes that provide information on the products that are being put forward for inclusion in the study. Annex I provides a listing of the products in matrix format, including the functions they perform, their output, connectability to ADP machines and the type of scanner used. Annex II contains a visual picture of the products. Annex III, submitted by the industry, provides a comparison of light lens optical system technology and digital multifunction device optical system technology.
6. During consultations with Contracting Parties, it was determined that four categories of products should be represented in the study. These categories are as follows :
1. The large network products (floor type models) typified by the Xerox Document Centre 230ST and 340ST, the Hewlett-Packard Mopier 320 and the OCE ' 3133.
 2. The small desktop machine of which the Brother MFC-1970MC is an example. This is an InkJet-based unit using a stationary scan bar.
 3. The desktop machine which uses a fixed-position scanning device (stationary scan bar) over which the paper is fed. The Brother 8600 laser-based unit represents this category.
 4. The desktop machine which uses a flatbed scanning device, as represented by the Hewlett-Packard OfficeJet 1175c inkjet unit.
7. The Secretariat would first point out that, in its opinion, the type of scanner (i.e., flatbed or stationary scan bar) is not determinative for the classification of these products. In this regard, what is important for classification purposes is the actual scanning method and the Secretariat would refer to Annex III in this document for a discussion on this point. However, it was felt it was important to show that multifunctional machines can use various output technologies but these would not affect the classification of such units. For clarity, in utilizing a flat bed scanner for multifunction digital copiers, the paper is put on the platen and the mechanism goes back and forth once in order to "scan" the document. Once scanned, the information is sent to a file and from that point the multifunction digital copier is then able print multiple "originals" or the operator can make changes as required and then "print" the document. When using a stationary scan bar, it is the paper that is moving by the scanner. The rest is the same.
8. In examining the models chosen, one point stands out clearly; that is, whether the models are floor-type or desktop, the key feature of these multifunction machines is their ability to connect, directly or indirectly, with the central processing unit of an ADP machine,

and to send and receive data in a form (code or signals) which can be recognized and used by the system. They are configured and designed to perform the functions of printing output in hard copy form, scanning of data into digital bit-streams, facsimile transceiving and, when scanning and printing units are used in tandem, "digital copying".

9. The common features of all digital multifunction machines are that (1) they contain a print engine designed to make marks on paper or other media, and (2) they are connectable to central processing units of ADP machines. Most such machines are of the "laser" type. They use an indirect process electrostatic print engine, in which digital data signals are used to fire a laser, whose emissions impinge on an organic photoreceptor, creating an electrostatic charge. The charged photoreceptor is then brought into contact with toner chemicals bearing an opposite electrical charge. This creates a latent positive image on the surface of the photoreceptor. This image is then transferred to a "hard copy" medium, such as paper or mylar sheets, and is bonded permanently to that medium by heat and pressure, creating printed versions of digital documents. Some digital multifunction machines use "ink jet" technology, in which the digital data is used to activate many small ink jets in a print head, spraying letters or images on paper or other media, or "thermal" printing technology, in which heat and pressure are used to transfer an image from an ink-coated plastic film to other media.

III. CONCLUSION

10. Taking into the account the Secretariat's comments, the Committee is invited to consider the following questions :
1. Are the models put forward in paragraph 6 appropriate for inclusion in the study ?
 2. Do Contracting Parties have any technical questions on the operation of these multifunction digital copiers that require further study ?
 3. Do Contracting Parties require a further demonstration of these machines at the 26th Session ?
11. The Secretariat would suggest that the Committee have a preliminary discussion on the classification of these products at its March Session, with a view to facilitating the taking of a decision at its 26th Session in the fall. During the intersession, the Secretariat would invite Contracting Parties to prepare written classification positions to be sent to the Secretariat for inclusion in a comprehensive working document.

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Multifunction Device Overview

Product	Print Resolution	Paper Output	Marking Technology	ADP Connectable	FAX Modem Type	Scan to ADP
HP 320 Mopier P C S F	600 x 600 DPI 1200 DPI Interpolated	32 PPM	LASER	YES	N/A	YES Flatbed
OCE' 3133 P C S F	600 x 600 DPI	33 PPM	LASER	YES	On-Board	YES Flatbed
Xerox Document Centre 340 ST P C S F	600 x 600 DPI	40 PPM	LASER	YES	On-Board	YES Flatbed
Xerox Document Centre 230 ST P C S F	600 x 600 DPI	30 PPM	LASER	YES	On-Board	YES Flatbed
Brother MFC 8600 P C S F	600 x 600 DPI	12 PPM	LASER	YES	On-Board	YES Stationary Scan bar
HP OfficeJet 1175c (all-in-one) P C S F	600 x 600 DPI	Print 9PPM Black 5PPM Color Copy 9PPM Black 5 min/page Color	INK JET	YES	On-Board	YES Flatbed
Brother MFC 1970 MC P C S F	200 x 400 DPI	2 PPM	INK JET	YES	On-Board	YES Stationary Scan bar

P - Printer Capability

C - Copier Capability

S - Scan Capability

F - Fax Capability

Hewlett Packard 320 Mopier



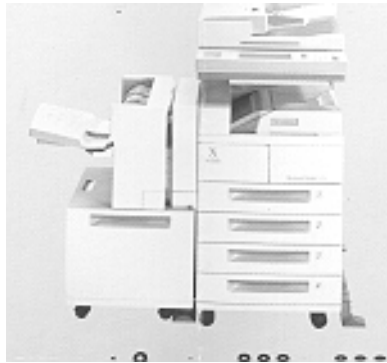
OCÉ 3133



Xerox Document Centre 340 ST



Xerox Document Centre 230



Brother MFC 8600



Hewlett Packard OfficeJet 1175c (all-in-one)



Brother MFC 1970 MC



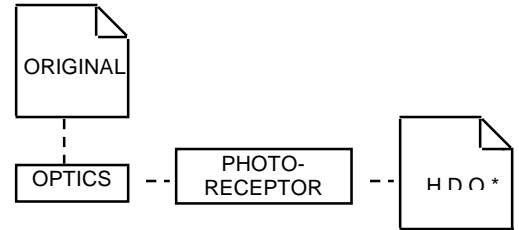
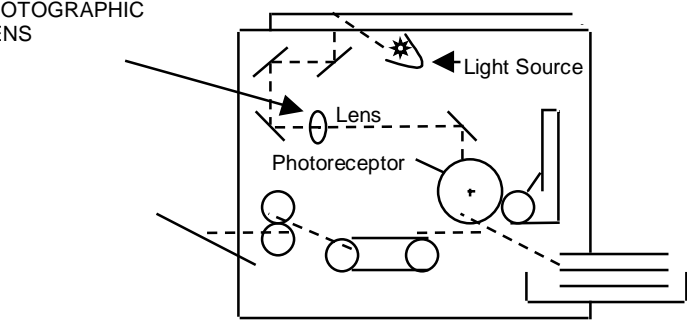
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Light Lens vs Digital Optical System

- ☒ The optical system in a traditional “light lens” photocopier is used to capture and reflect an illuminated image in “real time”, and to use that image in the hard document output creation process.
- ☒ The input optics in a digital multifunction device are used only to convert “hard copy” documents into digital data. The digital data is then used to provide instruction to the hard document output engine.
- ☒ In contrast to the photocopying process, the input optical system in a digital multifunction device is not involved in the hard document output creation process.

Light Lens vs. Digital Device

Light Lens Device



(* Hard Document Output / Marks on

Multifunction Digital Device

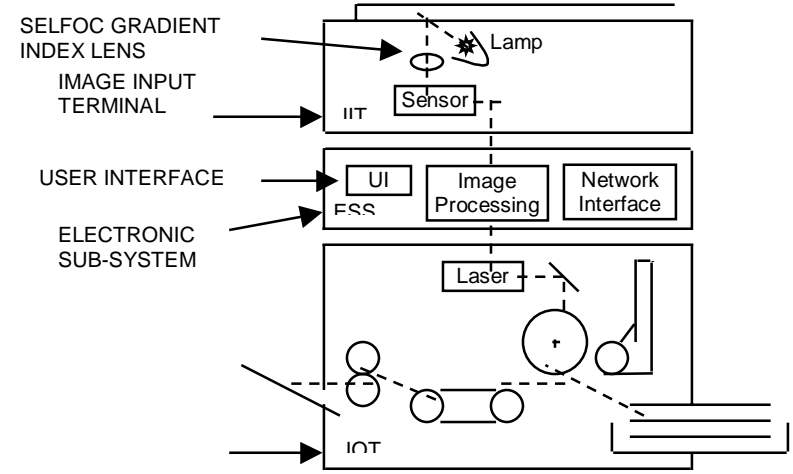
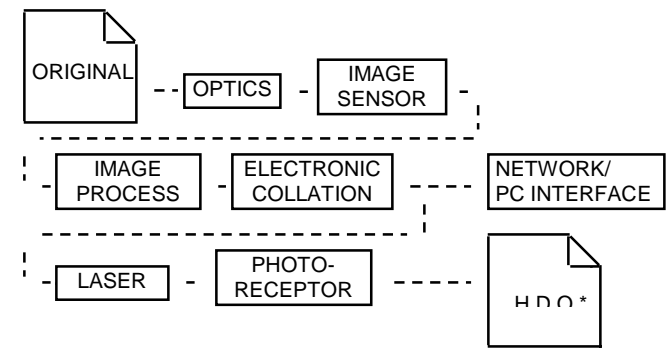


IMAGE OUTPUT TERMINAL



(* Hard Document Output / Marks on

Light Lens vs. Digital Device

Annex III to Doc. NC0211E1
(HSC/25/March 2000)

Light Lens Device

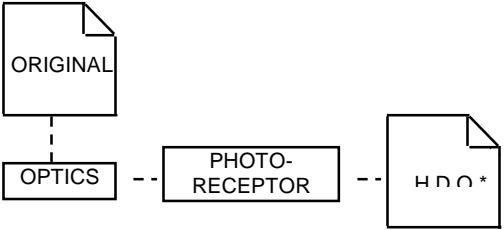
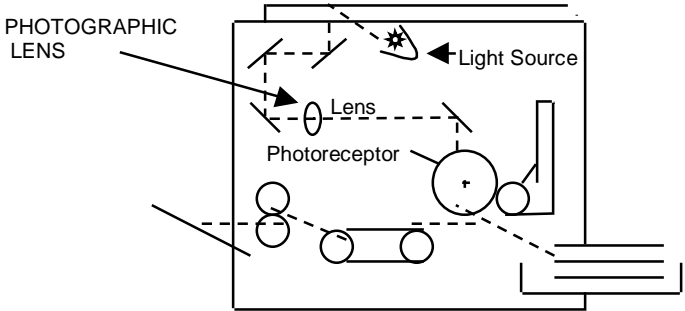
- ☒ Photographic Based
 - Optic path must be continuous, uninterrupted path
 - The input optical system is used to project the reflected image onto a photosensitive surface, and is actually used for Hard Document Output
- ☒ Image is optical
 - Only 1 output for each exposure
 - This light image is routed through a series of lenses, prisms and mirrors, until the image is actually reflected on a photosensitive surface
 - No "post" processing possible
- ☒ Tightly Coupled Input / Output
 - Single Input / Output path
 - Exclusively Hardcopy for both
- ☒ Electromechanical
 - Operation / Adjustments primarily made mechanically

Multifunction Digital Device

- ☒ Electronic Imaging Based
 - Once digitized, path can be discontinuous
 - The function of the optics system in a digital multifunction device is that of data processing scanning
- ☒ Image is captured digitally
 - The input optics systems contained in digital multifunction devices are not directly engaged in the hard document output creation process
 - Multiple outputs for each exposure
 - Digital Image processing
- ☒ Modular Input / Output
 - Multiple Input / Output paths
 - Hardcopy, Electronic for either
- ☒ Digital
 - Operations / Adjustments primarily made via software
 - Content can be changed

Light Lens Optical System

Light Lens Device



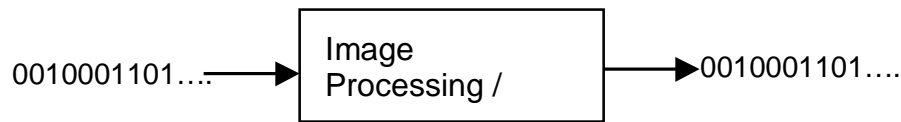
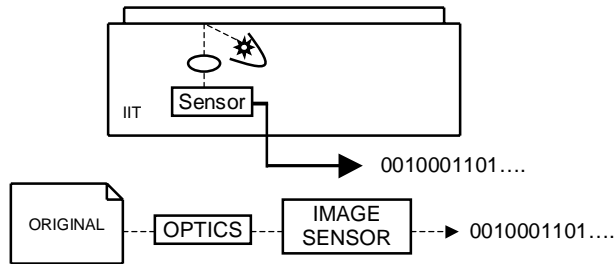
(*) Hard Document Output / Marks on

- ☒ Primary function is to discharge photoreceptor to make Hard Document Output
- ☒ Image is not persistent. When light goes away so does image
- ☒ Direct analog image path from platen to photoreceptor to Hard Document Output
- ☒ Cannot be separated into scanning process and Hard Document Output process
- ☒ Single source for imaging onto photoreceptor
- ☒ Collation requires output sorter and multiple scans
- ☒ No sophisticated image processing, only magnification and reduction
- ☒ Scanning speed must match hard document output speed

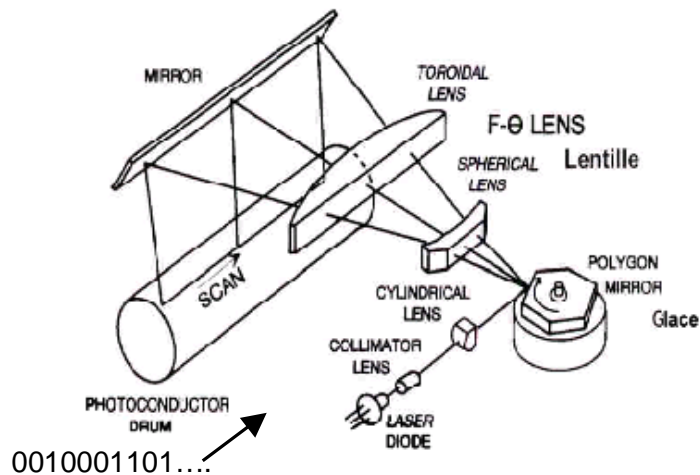
Digital Optical System

Annex III to Doc. NC0211E1
(HSC/25/March 2000)

Digital Optical System - Input



Digital Optical System - Output



- ☒ Primary function is to create digital image (1s and 0s) from light
- ☒ Media conversion: Hard document input into electronic bits (1s and 0s) of information for further processing
- ☒ Image is persistent; once digitized and stored it can go anywhere and be used multiple times for multiple purposes (e.g., hard output, editing,...)
- ☒ Digital image path from Sensor to Image Process to Electronic Collate to Hard Document Output
- ☒ Many configurations possible, eg. Scanner only, Printer only, Network, Copier only, FAX, Copier/Printer,...
- ☒ Sophisticated digital image processing enables potential for manipulation, limitless features and superior image quality
- ☒ Sophisticated self diagnostics
- ☒ Electronic collation for scan once, produce Hard Document Output many and trayless duplex
- ☒ Scanning speed does not have to match