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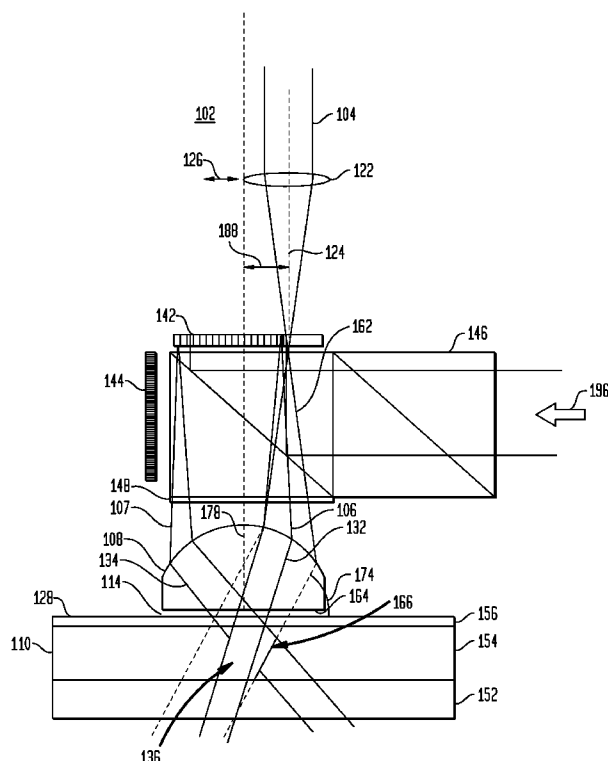
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[Continued on next page]

(54) Title: MONOCULAR HOLOGRAPHIC DATA STORAGE SYSTEM ARCHITECTURE

(57) Abstract: A monocular holographic storage device or system to provide for compact recording and/or reading of data pages in a holographic storage medium. Also provided are methods for carrying out such data storage and/or data recovery using a monocular holographic storage device or system. Further provided are articles comprising holographic storage media for recording or for reading recorded data using such devices or systems.

FIG. 1





TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/76188

## A. CLASSIFICATION OF SUBJECT MATTER

IPC: G03H 1/04( 2006.01)

USPC: 359/35

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 359/35,1,3,8,10,11,27,28,29,30,31,32,33;430/1,2

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
EAST

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2006/0203689 A1 (KANAOKA et al) 14 September 2006 (14.09.2006), See entire document, including Figure 1.	1-23
Y	US 2003/0039001 A1 (KING et al) 27 February 2003 (27.02.2003), See entire document, including Figures 1, 6A.	1-23
X	US 6,418,106 B1 (STOLL) 9 July 2002 (09.07.2002), See entire document, including Figures 2-4.	64-72

☐

Further documents are listed in the continuation of Box C.

☐

See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/76188

## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:  
Please See Continuation Sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of any additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

- Remark on Protest**
- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
  - ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
  - ☐ No protest accompanied the payment of additional search fees.

**BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING**

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, Claim(s) 1-23, drawn to a method and holographic storage device, including an objective lens and an objective lens mover for moving the objective lens to thereby change the angle of the reference beam relative to the holographic storage medium.

Group II, Claim(s) 24-39, drawn to a method and holographic storage device, including a reference beam lens and a reference beam lens mover for moving the reference beam to thereby change the angle of the reference beam relative to the holographic storage medium.

Group III, Claim(s) 40-63, drawn to a method and holographic storage device, including a phase conjugate optical system, wherein the reconstruction beam is directed along a reconstruction beam path that passes through the objective lens, through the holographic storage medium, and is directed by the reflective device back through the holographic storage medium to the phase conjugate optical system.

Group IV, Claim(s) 64-72, drawn to a method and holographic storage recovery device, including a phase conjugate optical system located on the opposite side of the recording material layer, wherein the reconstruction beam is directed along a reconstruction beam path that passes through the objective lens and through the recording material layer toward the phase conjugate optical system.

Group V, Claim(s) 73-89, drawn to an article comprising a holographic recording medium, including a variable beam transmission layer underneath the recording material layer which absorbs light beams when one or more data pages are being recorded in the recording material layer, and which allows light beams to pass through when one or more data pages recorded in the recording material layer are being recovered therefrom; and a reflective layer underneath the variable layer for reflecting light beams passed by the variable layer to thereby create a phase conjugate beam.

The inventions listed as Groups I-V do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

For each of Groups I-V above, each of the listed groups has special technical features not required for the other listed groups. The special technical features exclusive to each group are listed above in the listing of the groups.

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International application No.

PCT/US07/76188