G11B

INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER {{producing carriers of sound records for needle playback B29C 39/00} ; recording measured values in a way that does not require playback through a transducer G01D; photosensitive materials or processes for photographic purposes G03C; electrophotography, electrophotography, magnetography G03G; recording or playback apparatus using mechanically marked tape, e.g. punched paper tape, or using unit records, e.g. punched or magnetically marked cards, G06K; transferring data from one type of record carrier to another G06K 1/18; printing of data from record carriers G06K 3/00; arrangements for producing a permanent visual presentation of the output data G06K 15/00; arrangements or circuits for control of indicating devices using static means to present variable information G09G; coding, decoding or code conversion, in general H03M; circuits for coupling output of reproducer to radio receiver H04B 1/20; circuits {or arrangements} specially adapted for {pictorial or} television signal recording H04N 1/21, H04N 5/76, H04N 9/79; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers or circuits therefor H04R)

Definition statement

This place covers:

Recording or playback of information by relative movement between a record track and a transducer, the transducer directly producing, or being directly actuated by, modulation in the track being recorded or played-back, and the extent of modulation corresponding to the signal being recorded or played-back;

Apparatus and machines for recording or playback, and parts thereof, such as heads;

Record carriers for use with such apparatus and machines;

Associated working of other apparatus with such apparatus and machines.

Relationships with other classification places

The specific application specified in G11B is mentioned in the document, the document is classified in G11B. However experience shows that many documents also contain features relevant to H01F. In this case the documents are classified in both places.

When the document is more about magneto-optical elements as such, it goes in G02F 1/09 or lower groups. However if the field of application (G11B) is mentioned in the document or if the expert recognizes that the magneto-optical elements looks like those typically used in the G11B then the document should also be classified in the G11B.

References

Limiting references

This place does not cover:

<p>| Recording measured values in a way that does not require playback through a transducer | G01D 9/00 |
| Details of scanning-probe apparatus | G01Q 10/00 - G01Q 90/00 |</p>
<table>
<thead>
<tr>
<th>Description</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recording or playback apparatus using mechanically marked tape, e.g. punched paper tape, or using unit records, e.g. punched or magnetically marked cards</td>
<td>G06K</td>
</tr>
<tr>
<td>Transferring data from one type of record carrier to another type of record carrier</td>
<td>G06K 1/18</td>
</tr>
<tr>
<td>Guiding cards or sheets</td>
<td>G06K 13/00</td>
</tr>
<tr>
<td>Record carriers for use with machines and with at least a part designed to carry digital markings</td>
<td>G06K 19/00</td>
</tr>
<tr>
<td>Static information storage in which no relative movement takes place between an information storage element and a transducer</td>
<td>G11C</td>
</tr>
<tr>
<td>Circuits for coupling output of reproducer to radio receiver</td>
<td>H04B 1/20</td>
</tr>
<tr>
<td>Loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers or circuits therefor</td>
<td>H04R</td>
</tr>
</tbody>
</table>

**Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associated working of cameras or projectors with sound-recording or - reproducing means</td>
<td>G03B 31/00</td>
</tr>
<tr>
<td>Substation equipment for recording telephonic conversations or messages for absent subscribers</td>
<td>H04M 1/65</td>
</tr>
<tr>
<td>Television signal recording</td>
<td>H04N 5/76, H04N 9/79</td>
</tr>
</tbody>
</table>

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working of plastics; working of substances in a plastic state in general</td>
<td>B29</td>
</tr>
<tr>
<td>Layered products in general</td>
<td>B32B</td>
</tr>
<tr>
<td>Thermography</td>
<td>B41M 5/26</td>
</tr>
<tr>
<td>Containers, packaging elements or packages, specially adapted for particular articles or materials</td>
<td>B65D 85/00</td>
</tr>
<tr>
<td>Storing webs, tapes or filamentary material in general</td>
<td>B65H 75/00</td>
</tr>
<tr>
<td>Coating metallic material; coating material with metallic material; coating by vacuum evaporation, by sputtering, by ion implantation or by chemical vapour deposition, in general</td>
<td>C23C</td>
</tr>
<tr>
<td>Measuring electric or magnetic properties</td>
<td>G01R</td>
</tr>
<tr>
<td>Devices or arrangements for the control of the intensity, colour, phase, polarization or direction of light</td>
<td>G02F</td>
</tr>
<tr>
<td>Magneto-optical materials in general</td>
<td>G02F 1/0036</td>
</tr>
<tr>
<td>Photosensitive materials or processes for photographic purposes</td>
<td>G03C</td>
</tr>
<tr>
<td>Electrography; electrophotography; magnetography</td>
<td>G03G</td>
</tr>
<tr>
<td>Holographic processes or apparatus</td>
<td>G03H</td>
</tr>
<tr>
<td>Electric digital data processing</td>
<td>G06F</td>
</tr>
<tr>
<td>Printing of data from record carriers</td>
<td>G06K 3/00</td>
</tr>
</tbody>
</table>
Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Record carrier</td>
<td>means a body, such as a cylinder, disc, card, tape, or wire, capable of permanently holding information, which can be read-off by a sensing element movable relatively to the record carrier</td>
</tr>
<tr>
<td>Head</td>
<td>includes any means for converting sinusoidal or non-sinusoidal electric wave-forms into variations of the physical condition of at least the adjacent surface of the record carrier, or vice versa</td>
</tr>
<tr>
<td>Near-field interaction</td>
<td>means a very short distance interaction using scanning-probe techniques, e.g. quasi-contact or evanescent contact between head and record carrier</td>
</tr>
</tbody>
</table>

Synonyms and Keywords

In patent documents the terms "transducer", "head" and "pickup" are often used as synonyms.

1.) Medium, media are synonyms of "record carrier".

2) "thin film" and "binderless" both apply to coated films of a (generally) uniformly deposited material, differing from "binder media" which comprises magnetic particles in a (usually organic) binder resin

3) vertical or perpendicular are used interchangeably in the art to refer to magnetization directions normal to the plane of the film

4) horizontal, longitudinal, in-plane are used interchangeably in the art to refer to magnetization directions lying in the plane of the film.

5) substrate, support, base are used interchangeably in the art to refer to the underlying rigid or flexible (in terms of tapes or floppy disks, for example) layer upon which other layers are deposited thereon.

6) seed layer, under layer, intermediate layer, orientation control layer, adhesion layer, crystal growth layer are all generally used terminology to describe (usually non-magnetic) layers deposited under the main magnetic layer(s) to assist in crystal growth and tuning of the magnetic properties of the main magnetic layer(s).

7) soft under layer (SUL) and keeper layer are used interchangeably to describe a soft magnetic layer used under a hard magnetic recording layer to provide a flux path.
G11B 3/00

Recording by mechanical cutting, deforming or pressing, e.g. of grooves or pits; Reproducing by mechanical sensing; Record carriers therefor (G11B 11/00, {G11B 13/00} take precedence; {recording by cutting or deforming using laser beam G11B 7/00, using electron beam G11B 9/10})

Definition statement

This place covers:
Mainly vinyl disks and apparatuses for playing them

References

Limiting references

This place does not cover:

| Recording by cutting or deforming using laser beam | G11B 7/00 |
| Recording by cutting or deforming using electron beam | G11B 9/10 |
| Recording on or reproducing from the same record carrier wherein for these two operations the methods are covered by different main groups of groups G11B 3/00 - G11B 7/00 or by different subgroups of group G11B 9/00 | G11B 11/00 |
| Recording simultaneously or selectively by methods covered by different main groups | G11B 13/00 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Mounting or connecting stylus to transducer with or without damping means | H04R 1/16 |

G11B 5/00

Recording by magnetisation or demagnetisation of a record carrier; Reproducing by magnetic means; Record carriers therefor (G11B 11/00 {and G11B 13/00} take precedence)

Definition statement

This place covers:

• Methods for magnetic recording of information on any type of record carrier (disks, tapes, drums, cards), for reproducing magnetic information and for erasing said information, wherein there is a relative movement between the record carrier and the transducer
• Structure and manufacture of sliders
• Structure and manufacture of transducers, i.e. recording (e.g. inductive) heads and reproducing heads (e.g. magnetoresistive)
• Means for protecting, cleaning, testing and demagnetizing a head
• Means for supporting the head relative to the record carrier (arm assembly) -- Means for moving the head(s) relative to the record carrier or into or out of the recording or reproducing position or for maintaining position relative to the record carrier.
• Magnetic record carriers characterised by the selection of materials from which they are made.
• Magnetic record carriers characterised by their form (e.g. disk, drum, etc.).
• Magnetic record carriers characterised by the selection of the material.
• Processes and apparatuses specially adapted for the manufacturing of magnetic record carriers.
• Rerecording or transcribing data from one magnetic carrier to another.

Relationships with other classification places

Marking record carriers in digital fashion: G06K
Selection of magnetic materials; thin magnetic films: H01F
Measuring electric or magnetic properties: G01R

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Record carriers</th>
<th>G11B 11/00, G11B 13/00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magneto-optical recording method and record carriers therefore, wherein the magnetic information is reproduced by optical means</td>
<td>G11B 11/105</td>
</tr>
<tr>
<td>Driving, starting or stopping carriers of filamentary (wire) or web (tape) form</td>
<td>G11B 15/00</td>
</tr>
<tr>
<td>Guiding record carriers not specifically of filamentary or web form (e.g. disks, cards)</td>
<td>G11B 17/00</td>
</tr>
<tr>
<td>Driving, starting or stopping carriers not specifically of filamentary or web form (e.g. disks, cards)</td>
<td>G11B 19/20</td>
</tr>
<tr>
<td>Magnetic flux sensitive sensors per se, i.e not specific for recording or reproducing</td>
<td>G01R 33/00</td>
</tr>
<tr>
<td>Digital input from or digital output to record carriers, Buffering and Formatting arrangements</td>
<td>G06F 3/06</td>
</tr>
<tr>
<td>Magnetic ID or credit cards</td>
<td>G06K 19/00</td>
</tr>
<tr>
<td>Static magnetic recording methods and memories, i.e. methods wherein there is no relative movement between the record carrier and the transducer</td>
<td>G11C 11/02</td>
</tr>
<tr>
<td>Devices using galvano-magnetic or similar magnetic effects not specific for recording or reproducing; Processes or apparatus peculiar to the manufacture or treatment thereof or of parts thereof</td>
<td>H01L 43/00</td>
</tr>
</tbody>
</table>

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Head arrangements not specific for the method of recording or reproducing | G11B 21/00 |
| Protection against unauthorized use of memory | G06F 12/14 |
| Security arrangements for protecting computers or computer systems against unauthorised activity | G06F 21/00 |
| Methods or arrangements for marking record carriers in a digital fashion | G06K 1/12 |
| Methods or arrangements for the sensing of record carriers | G06K 7/08 |
| Handling of record carriers | G06K 13/02 |
Record carriers characterised by the type of digital marking \hspace{5cm} G06K 19/06

Methods and devices for demagnetising of magnetic bodies (e.g. workpieces, sheet material) \hspace{5cm} H01F 13/00

**Special rules of classification**

- **G11B 5/00** has a number of main areas, which can be seen from the above definition. Although these areas are fairly self-contained, there are some overlapping definitions which may lead to unnecessary dual classification. Obviously, however, it may often be necessary to classify documents across several areas (method, apparatus, carrier) if a document contains matter which is interesting from several points of view.

- The rules of classification below point out specific examples of places where dual classification should be avoided.

- General note: for reasons obvious to those who work in the field, the majority of documents in **G11B 5/00** now relate to magnetic disk drives, specifically hard disks, although a significant minority relate to tape systems, which are still widely used in e.g. large-scale data backup. Magnetic drums represent an older technology which has largely disappeared. Magnetic cards (e.g. ATM cards, 'swipe' cards) are also represented, but there is much overlap with areas of **G06K** (see 'Informative references' above). This is reflected in the structure of much of **G11B 5/00**, which refers explicitly to aspects of disk drives.

Because of this situation, the following general rules apply:

Documents relating to the 'minority' carriers, e.g. tapes, webs, wires, cards, drums, are always classified in one of the subgroups concerning methods and apparatuses for a specific carrier form (G11B 5/004, G11B 5/008).

However, the 'record carrier' subgroups (G11B 5/76 and the subgroups which depend upon it) are only used if there is something interesting about the carrier itself (other than the materials of which it is made, for which see G11B 5/62 et seq.) e.g. a disk has a series of timing slots or holes in it, or a drum is made removable by separating into two halves longitudinally, etc.

If an aspect (e.g. head, method of recording, servo tracking, etc.) is of more general application, or if there is a place more specific to it elsewhere in the scheme (e.g. G11B 5/584 is specifically for track following on tapes), it is also classified there.

**G11B 5/00** partially overlaps with H01F, G01R, H01L. The following general rules apply:

In **H01F 10/00** are classified "Magnetic thin films" in general, i.e. thin films whose application is not specific or not limited for magnetic recording or reproducing. Examples are Magnetic Spin Tunnel Junctions (STJ) or Spin Valve structures (SV) which are classified in H01F 10/3254 and H01F 10/3268 respectively and not in **G11B 5/39** if the invention does only relate to the magnetic films and their magnetic coupling, without a specific adaptation of the junction or Spin valve to MR reproducing heads, i.e. if the use of the STJ or SV as reproducing head is not mentioned or mentioned among other possibilities and the invention has no specific information related e.g. to the shaping, shielding and biasing necessary for a STJ to be adapted as reproducing head. If, on the contrary, the invention only refers specifically to an adaptation of the STJ or SV thin film structure as reading head, than only the code **G11B 5/39** (or subcodes) is given. When the invention has both aspects, i.e. the thin film structure in general and the specific application as reproducing head, then both codes are given.

The same rule applies to **G01R**, in particular **G01R 33/09**, where are classified magnetoresistive devices in general (i.e. MR devices whose application is not specific or not limited or specially adapted for magnetic recording or reproducing) and to **H01L**, in particular **H01L 43/00**, where are classified devices using galvano-magnetic or similar magnetic effects in general, i.e. not specially adapted for magnetic recording or reproducing.
Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perpendicular Magnetic Recording</td>
<td>In perpendicular magnetic recording the magnetization directions representing the data bits are perpendicular to or out-of-the-plane of the recording layer</td>
</tr>
<tr>
<td>Longitudinal Magnetic Recording</td>
<td>In longitudinal magnetic recording the magnetization directions representing the data bits are parallel to or in the plane of the recording layer</td>
</tr>
<tr>
<td>MAMR</td>
<td>Microwave Assisted Magnetic Recording</td>
</tr>
<tr>
<td>TAMR or TMR</td>
<td>Thermally Assisted Magnetic Recording</td>
</tr>
<tr>
<td>NF or NFL</td>
<td>Near Field Light</td>
</tr>
<tr>
<td>ATE</td>
<td>Adjacent Track Erasure</td>
</tr>
</tbody>
</table>

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMR</td>
<td>Perpendicular Magnetic Recording</td>
</tr>
<tr>
<td>MAMR</td>
<td>Microwave Assisted Magnetic Recording</td>
</tr>
<tr>
<td>TAMR or TMR</td>
<td>Thermally Assisted Magnetic Recording</td>
</tr>
</tbody>
</table>

The terms "thin film" and "binderless" both apply to coated films of a (generally) uniformly deposited material, differing from "binder media" which comprises magnetic particles in a (usually organic) binder resin.

Vertical or perpendicular are used interchangeably in the art to refer to magnetization directions normal to the plane of the film.

Horizontal, longitudinal, in-plane are used interchangeably in the art to refer to magnetization directions lying in the plane of the film.

Substrate, support, base are used interchangeably in the art to refer to the underlying rigid or flexible (in terms of tapes or floppy disks, for example) layer upon which other layers are deposited thereon.

Seed layer, under layer, intermediate layer, orientation control layer, adhesion layer, crystal growth layer are all generally used terminology to describe (usually non-magnetic) layers deposited under the main magnetic layer(s) to assist in crystal growth and tuning of the magnetic properties of the main magnetic layer(s).

Soft under layer (SUL) and keeper layer are used interchangeably to describe a soft magnetic layer used under a hard magnetic recording layer to provide a flux path.
G11B 5/004

Recording on, or reproducing or erasing from, magnetic drums (G11B 19/00 takes precedence)

References

Limiting references

This place does not cover:

| Driving, starting, stopping record carriers not specifically of filamentary or web form, or of supports therefor; Control thereof; Control of operating function | G11B 19/00 |

Special rules of classification

This group refers to an obsolete technology.

G11B 5/008

Recording on, or reproducing or erasing from, magnetic tapes, {sheets, e.g. cards,} or wires (G11B 15/00 G11B 19/00 take precedence; {bulk transferring of information magnetisation for re-recording G11B 5/865; marking record carriers in digital fashion G06K})

Definition statement

This place covers:

• Methods for recording, reproducing or erasing from magnetic cards in G11B 5/00808
• Methods for recording, reproducing or erasing from magnetic tapes in longitudinal and/or transverse tracks in G11B 5/00813, heads therefore, including stationary (G11B 5/00821 and G11B 5/00852) or cyclically driven heads (G11B 5/00839 and G11B 5/0086)

References

Limiting references

This place does not cover:

| Disposition or mounting of heads relative to moving tape | G11B 5/4893 |
| Fixed mounting of heads | G11B 5/49 |
| Mounting with simultaneous movement of head and tape | G11B 5/52 |
| Track change selection or acquisition by movement of the head across tape tracks | G11B 5/5504 |
| Provisions for track following on tapes | G11B 5/588 |
| Driving, starting, stopping, guiding recording tapes | G11B 15/00 |
| Guiding cards or sheets | G06K 13/00 |
| Record carriers for use with machines and with at least a part designed to carry digital markings | G06K 19/00 |

Special rules of classification

• Bulk transferring of information magnetisation for re-recording G11B 5/865;
• Methods or arrangements for marking record carriers in digital fashion G06K 1/12;
• Structures and methods of manufacture of recording or reproducing heads for magnetic tapes or wires are also classified in G11B 5/127 and subgroups

G11B 5/012

Recording on, or reproducing or erasing from, magnetic disks (G11B 17/00, G11B 19/00 take precedence)

Definition statement

This place covers:
Recording, reproducing and erasing methods and corresponding apparatuses specific for magnetic recording disks (e.g. definition of tracks, control of skew angle between head and tracks, subdivision in sectors etc.)

References

Limiting references

This place does not cover:

| Guiding magnetic or nonmagnetic discs | G11B 17/00 |
| Guiding record carriers not specifically of filamentary or web form, or of supports therefor | G11B 17/00 |
| Driving, starting, stopping record carriers not specifically of filamentary or web form, or of supports therefor; Control thereof; Control of operating function | G11B 19/00 |
| Control of disk drives operating functions | G11B 19/02 |
| Turntables, hubs and motors for disk drives and control thereof | G11B 19/20 |

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

| HDD | Hard Disk Drive |
| HGA | Head Gimbal Assembly |

G11B 5/02

Recording, reproducing, or erasing methods; Read, write or erase circuits therefor (timing or synchronising arrangements G11B 27/10)

Definition statement

This place covers:
• Recording methods (e.g. thermally assisted magnetic recording)
• Reproducing methods
• Erasing methods
• Circuitry for driving the load of a write head of a hard disk drive, e.g. H-bridge configurations to inverse the current direction in the head in order to write data on the recording medium and circuits for boosting said inversion.
References

Limiting references
This place does not cover:

- Improvement or modification of read or write signals (magnetic read/write channels, equalizers, Viterbi detectors etc.)

Informative references
Attention is drawn to the following places, which may be of interest for search:

- Timing or synchronising arrangements

Special rules of classification
Timing or synchronising arrangements are classified in G11B 27/10

Signal processing for digital recording or reproducing is generally classified in G11B 20/10 unless specific for the recording method, in which case the class G11B 5/09 is given.

Glossary of terms
In this place, the following terms or expressions are used with the meaning indicated:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shingled writing</td>
<td>Tracks are written in a sequential manner from an inner diameter (ID) to an outer diameter (OD), from OD to ID, or from OD and ID towards a middle diameter (MD) in a radial region of a disk in a hard disk drive (HDD). In other words, a first track is partially overwritten on one side when a second track adjacent to the first track is written, and subsequently a third track is written that partially overwrites the second track, and so forth</td>
</tr>
</tbody>
</table>

G11B 5/10
Structure or manufacture of housings or shields for heads

Definition statement
This place covers:
- Structure or manufacture of head housing, e.g. sliders
- Structure or manufacture of shields for shielding the head against electric or magnetic fields

References

Informative references
Attention is drawn to the following places, which may be of interest for search:

- Grounding of static charges, shielding from Electro-Magnetic Interference (EMI)

Special rules of classification
- Fluid dynamic spacing of the slider from the record carrier and specific structures of the slider Air Bearing Surface therefore are classified in G11B 5/60
- Shields specific for thin film magnetic inductive heads are classified in G11B 5/3146
• Shields specific for Magnetoresistive reproducing heads are classified in G11B 5/3912

Glossary of terms
In this place, the following terms or expressions are used with the meaning indicated:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS</td>
<td>Air Bearing Surface</td>
</tr>
</tbody>
</table>

G11B 5/127
Structure or manufacture of heads, e.g. inductive

References

Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Description</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnetic thin films in general (i.e. thin film whose application is not specific or not limited for magnetic recording or reproducing, e.g. MR)</td>
<td>H01F 10/00</td>
</tr>
</tbody>
</table>

Informative references
Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Description</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical recording using near field effect</td>
<td>G11B 7/1387</td>
</tr>
<tr>
<td>Lapping machines</td>
<td>B24B 37/00</td>
</tr>
<tr>
<td>Thin film devices manufacturing methods per se, metallic coating e.g. by evaporation, sputtering</td>
<td>C23C 14/00</td>
</tr>
<tr>
<td>MR elements</td>
<td>G11C 11/16, H01F 10/3254, H01F 10/3272, H01L 43/08, G01R 33/093</td>
</tr>
</tbody>
</table>

Special rules of classification

• Thin film heads comprising extra layers for thermally assisted recording, e.g. optical wave guides, optical near field generators are classified in G11B 5/314.
• Manufacturing of thin film heads (inductive or not, i.e. also magnetoresistive) is classified in G11B 5/3163 if it is related to manufacturing aspects which are specific for thin film (e.g. thin film deposition). It is noted that almost all modern heads are thin film heads.
• G11B 5/3967 (composite structural arrangements of transducers, e.g. inductive write head and magnetoresistive read head): since almost all recent heads have this composite structure, documents are classified in this subclass only if the invention relates to this composite structure, e.g. to the positioning or shielding of one head with respect to the other.

Glossary of terms
In this place, the following terms or expressions are used with the meaning indicated:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS</td>
<td>Air Bearing Surface</td>
</tr>
<tr>
<td>AFM</td>
<td>Anti-FerroMagnetic</td>
</tr>
<tr>
<td>TMR</td>
<td>Tunnelling Magneto-Resistance</td>
</tr>
<tr>
<td>GMR</td>
<td>Giant Magneto-Resistance</td>
</tr>
</tbody>
</table>
EMR | Extraordinary Magneto-Resistance, i.e. Magneto-resistance in thin film head using narrow-gap semiconductors with metallic impurity in place of ferromagnetic layers.
---|---
AMR | Anisotropic Magneto-Resistance
CPP-GMR | Current Perpendicular-to-the-Plane- GMR
CIP-GMR | Current In-Plane-GMR
STO | Spin Torque Oscillator (spin-torque oscillator used in perpendicular write heads to apply a high-frequency auxiliary field to the recording layer to assist writing)

**G11B 5/40**

Protective measures on heads, e.g. against excessive temperature (G11B 5/31 takes precedence; protection against wear G11B 5/255 {protective structure of the head: see under structures, e.g. G11B 5/3106})

**Definition statement**

This place covers:

Measures and methods (e.g. control of the operating functions) to protect the head against damages, e.g. against excessive temperature, head-record carrier collisions (means for their prediction, detection and avoidance), wear.

**References**

**Limiting references**

This place does not cover:

Fluid-dynamic spacing of heads from record carriers per se G11B 5/60

**Special rules of classification**

Structural means (e.g. extra layer included in the recording or reproducing head or special layer compositions thereof) to reduce physical detrimental influence (e.g. contamination, humidity) are classified in G11B 5/3103. Structural means to reduce the influence of wear are classified in G11B 5/3103 if they refer to thin film heads and in G11B 5/255 in all other cases.

Structural means (e.g. extra layer included in the recording or reproducing head or special layer compositions thereof) for reducing the influence of temperature changes (e.g. heat dissipation layers or structures avoiding deformation of the head or the pole tip protrusion due to temperature expansion of the pole are classified in G11B 5/3133

**G11B 5/41**

Cleaning of heads {of record carriers G11B 23/50})

**References**

**Limiting references**

This place does not cover:

Cleaning of record carriers G11B 23/50
**G11B 5/455**

Arrangements for functional testing of heads {(testing of the manufacturing process G11B 5/127); Measuring arrangements for heads (measuring electric or magnetic properties G01R; {measuring properties for shaping or assembling elements G11B 5/127})}

**Definition statement**

*This place covers:*

Functional testing of the heads when the manufacturing is completed and arrangements therefore, e.g. spin stands or test beds.

**Relationships with other classification places**

Measuring electric or magnetic properties: G01R

**References**

*Limiting references*

*This place does not cover:*

| Testing of disk drives                        | G11B 19/048 |
| Monitoring, i.e. supervising the progress of recording or reproducing (monitoring defects of the apparatus and of the recording medium) | G11B 27/36 |

**Special rules of classification**

- Testing of the manufacturing process is classified in G11B 5/127
- Testing of the manufacturing process of thin film heads or indicating thereto, e.g. before the manufacturing is completed, is classified in G11B 5/3163

**G11B 5/465**

Arrangements for demagnetisation of heads (demagnetisation in general H01F 13/00)

**References**

*Limiting references*

*This place does not cover:*

| Demagnetisation of record carriers, e.g. bulk erasing | G11B 5/0245 |
| Demagnetisation in general                            | H01F 13/00  |
G11B 5/73

Base layers {, i.e. all non-magnetic layers lying under a lowermost magnetic recording layer, e.g. including any non-magnetic layer in between a first magnetic recording layer and either an underlying substrate or a soft magnetic underlayer}

Definition statement

This place covers:
Magnetic media in which each medium includes one or more non-magnetic layers under a lowermost magnetic recording layer.

Base layers are substrates or non-magnetic layers designated either by position (e.g. precoat layer, prelayer, base layer, underlayer, intermediate layer, lower layer, sublayer, ground layer, etc.) or function (e.g. nucleation layer, seed layer, barrier layer, corrosion prevention layer, diffusion prevention layer, texture layer, etc.).

Relationships with other classification places

Other aspects of magnetic recording media are classified as follows:
- **G11B 5/64** concerns thin film-type media directed to the selection of magnetic material for the recording layer(s).
- **G11B 5/68** concerns binder-type media directed to the selection of magnetic particles, binder composition, or binder additives to the recording layer(s).
- **G11B 5/72** concerns protective layers used on magnetic recording media.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Magnetic media characterised by the patterning of the magnetic layer (bit patterned, discrete track, etc.) | G11B 5/743 - G11B 5/746 |
| Magneto-optic or opto-magnetic media substrates | G11B 7/253 - G11B 7/2539 |
| Magneto-optic or opto-magnetic underlayers | G11B 7/256 - G11B 7/2595 |
| Energy assisted record carriers | G11B 11/10582 - G11B 11/10593 |
| Thin film-type magnetic layers characterized by material or structural arrangement, characterized by the coupling or physical contact with other layers | H01F 10/06 |
| Thin film-type magnetic layers characterized by material or structural arrangement, characterized by the substrate or intermediate layers | H01F 10/26 - H01F 10/30 |
| General utility Synthetic Antiferromagnetic exchange coupled magnetic layers | H01F 10/324 - H01F 10/3259 |

Special rules of classification

Layers formed by chemically modifying a surface layer (e.g. an oxidized surface layer formed from a previously deposited layer) are considered a separate layer and should be placed in the appropriate subgroup. Note that a surface layer formed as part of a recording medium substrate is still considered
part of the substrate for classification purposes (i.e. placement would be in the coated or composite substrate areas).

Classification in this area is primarily of the claimed invention with each embodiment of claimed subject matter being Inventive unless the subject matter recited is nominal and well known in the art. Relevant disclosure in the specification should be classified primarily as Additional information unless deemed particularly relevant to the invention as a whole, in which case it may be given an Inventive symbol.

Base layers in which the invention is directed to the initial substrate or support upon which all other layers are deposited are classified in G11B 5/739 - G11B 5/73937.

Base layers in which the recording or magnetizable layer is a continuous-type layer free of polymeric binder (i.e. "thin film media") are classified in G11B 5/736 - G11B 5/7379 if on the same side of the substrate as the magnetic layer or G11B 5/7353 if a backcoat layer.

Base layers in which the recording or magnetizable layer is a mixture of magnetic particles and a polymeric binder (i.e. "binder media") are classified in G11B 5/733 - G11B 5/7334 if on the same side of the substrate as the magnetic layer or G11B 5/735, G11B 5/7356, or G11B 5/7358 if a backcoat layer.

The following figures illustrate where appropriate base layers should be classified, depending on whether the media in question includes a soft under layer (SUL) (also termed a 'Keeper layer').

### Media with SUL or Keeper Layer

<table>
<thead>
<tr>
<th>Lubricant Layer</th>
<th>Protective Layer</th>
<th>Magnetic Recording Layer(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Magnetic Seed/Intermediate/Interlayers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soft Magnetic Underlayer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Magnetic Orientation Control/Adhesion Layers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substrate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backcoat</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Binder with particles → G11B 5/733
- Thin film-type layers → G11B 5/7368 – G11B 5/7379

- Binder with particles → G11B 5/733
- Thin film-type layers → G11B 5/736 – G11B 5/7367

- All media → G11B 5/739 – G11B 5/73937
- Thin Film media → G11B 5/7353
- Binder media → G11B 5/753 and/or
  - G11B 5/7356 – G11B 5/7358

### Non-Keepered (or without SUL) Media

<table>
<thead>
<tr>
<th>Lubricant Layer</th>
<th>Protective Layer</th>
<th>Magnetic Recording Layer(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Magnetic Seed/Adhesion/Underlayers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substrate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backcoat</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Binder with particles → G11B 5/733
- Thin film-type layers → G11B 5/7368 – G11B 5/7379

- All media → G11B 5/739 – G11B 5/73937
- Thin Film media → G11B 5/7353
- Binder media → G11B 5/753 and/or
  - G11B 5/7356 – G11B 5/7358
The following flow-chart provides guidance on the precedent notes within this portion of the scheme.

An invention is to 'plural inventive non-magnetic layers' for the purpose of placement in appropriate subgroups of G11B 5/736 - G11B 5/7379 if the independent claim is directed to multiple non-magnetic layers, even if these layers are recited in name only or if dependent claims recite multiple non-magnetic layers in other than name only. The sole exception would be if a dependent claim further limits the structural location of one of the inventive non-magnetic layers relative to an included soft magnetic layer (such that only a single non-magnetic layer is now above or below an included soft magnetic layer - see example 2, below).
Examples:

(1) What is claimed is:
1. A magnetic recording medium comprising:
a substrate;
a seed layer;
an under layer; and
a perpendicular recording layer having a granular structure,
wherein (M_is a (1−R_s)(6−33)), M_s, and α satisfy the following relations:

\[ M_s \alpha^2 \left( 1 - R_s \right)^{6-33} = 0.1 \left( \mu_0 mm/mm \right)^{1.7} \]

2. The magnetic recording medium according to claim 1, wherein the seed layer has an amorphous state and includes a metal having a melting point of 2000°C or less.

(2) Claim 1: A magnetic recording medium comprising a magnetic layer having ...

Claim 2: The invention of claim 1, further comprising a base substrate and a laminated film thereon.

...

Claim 5: The invention of claim 2, wherein the laminated film has an amorphous TiC rich seed layer, a Ru foundation layer, and a recording layer formed in this order.

...

Claim 15: The invention of claim 5, further comprising a soft magnetic layer provided between the seed layer and the foundation layer.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binder-type media</td>
<td>A recording medium where the recording layer includes (a usually polymeric) binder mixed with magnetisable particles.</td>
</tr>
<tr>
<td>Thin film-type media</td>
<td>A recording medium where the recording layer is substantially free of any polymeric material.</td>
</tr>
<tr>
<td>Non-magnetic</td>
<td>A material that has a zero magnetic moment.</td>
</tr>
<tr>
<td>Magnetic</td>
<td>A material that has a non-zero magnetic moment, including paramagnetic, ferromagnetic, and ferrimagnetic materials.</td>
</tr>
<tr>
<td>SUL</td>
<td>Soft Under Layer - a soft magnetic layer usually located between a substrate and a recording layer to direct the flux from the magnetic head through the media recording layer and back to a return head.</td>
</tr>
<tr>
<td>Soft Magnetic</td>
<td>A material exhibiting a (relatively) low coercivitity, typically under 100 Oe.</td>
</tr>
<tr>
<td>Hard Magnetic</td>
<td>A material exhibiting a (relatively) high coercivitity capable of storing data, typically over 1000 Oe.</td>
</tr>
</tbody>
</table>
Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- Base layer, precoat, prelayer, under layer, inter layer, intermediate layer, onset layer, lower layer, sublayer, ground layer, barrier layer, corrosion prevention layer, diffusion barrier layer, or texture layer.

In patent documents, the word/expression in the first column is often used instead of the word/expression in the second column, which is used in the classification scheme of this place:

| Any base layer used in a binder-type medium | Characterized by the addition of non-magnetic particles (i.e. G11B 5/733) |

G11B 5/733

caracterised by the addition of non-magnetic particles { (base layers having a non-magnetic layer under a soft magnetic layer G11B 5/736; magnetic recording media substrates G11B 5/739) }

Definition statement

This place covers:

Magnetic recording media having one or more base layers formed from a binder with included non-magnetic particles or filler.

References

Limiting references

This place does not cover:

| Base layers having a non-magnetic layer under a soft magnetic layer | G11B 5/736 |
| Magnetic recording media substrates | G11B 5/739 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Layers above a recording layer (relative to a substrate), even if including non-magnetic particles (i.e. protective layers) | G11B 5/72 |
| Base layers on the opposite side of the substrate from the magnetic recording layer, even if including non-magnetic particles (i.e. backcoat layers) | G11B 5/735 |
| Base layers having a non-polymeric layer under the lowermost magnetic recording layer, but without binder material and without non-magnetic particles (i.e. thin film-type layers) | G11B 5/7368 |

Special rules of classification

A base layer deposited solely as part of a substrate that has no disclosed utility in establishing the magnetic properties of the recording layer would not be classified here, even if containing non-magnetic particles. Such a layer would be classified in G11B 5/739 according to the scheme title of G11B 5/733 and would include layers typically denoted as smoothing layers, coating layers, etc. that are taught as part of the substrate, per se.
Underlayers used in binder-type media cases are typically referred to as lower layers, primer layers, undercoats, etc. and would be classified here if including non-magnetic particles. If without non-magnetic particles they are classified in G11B 5/73.

Where the non-magnetic particles included in the base layer are only nominally recited and the inventive subject matter is directed to the base layer binder composition (or structure) or the composition (or structure) of a non-particulate additive (e.g. lubricant, viscosity aid, etc.), classification is in G11B 5/734.

G11B 5/7334

{Base layer characterised by composition or structure}

**Definition statement**

*This place covers:*

Magnetic recording media having one or more base layers formed from a binder with included non-magnetic particles or filler, where the particles are recited in name only and the inventive subject matter is in the binder composition (or structure) or a non-particulate additive composition (or structure).

**Special rules of classification**

If the non-magnetic particles are recited in more than name only and are deemed inventive, classification should be in G11B 5/73. If inventive subject matter is directed to both the particles and the binder (or additive), then classification should be given in both G11B 5/733 and G11B 5/7334.

**Glossary of terms**

*In this place, the following terms or expressions are used with the meaning indicated:*

| Structure  | The chemical structure of an organic compound, i.e. the arrangement of the atoms or molecules of one or more of the underlayers. |

G11B 5/735

**characterised by the back layer {(magnetic recording media substrates G11B 5/739)}**

**Definition statement**

*This place covers:*

Magnetic recording media having one or more base layers formed on the opposite side of a support from where the recording layer is located (i.e. back layers).

Also included are back layers including a binder with non-magnetic particles or filler, where the particles or filler are nominal and recited in name only.

Two-sided recording media having recording layer structures on both sides may be placed in G11B 5/735 and its subgroups if meeting the requirements for placement. In this situation, multi-aspect classification must be done on the appropriate base layer subgroups for the layer structure under the recording layer, as well.
References

Limiting references
This place does not cover:

| Magnetic recording media substrates | G11B 5/739 |

Informative references
Attention is drawn to the following places, which may be of interest for search:

| Layers above a recording layer (relative to a substrate), even if including non-magnetic particles (i.e. protective layers) | G11B 5/72 |
| Base layers on the same side of the substrate as the recording layer structure for single sided media | G11B 5/733 - G11B 5/7334, G11B 5/736 - G11B 5/7379 |

Special rules of classification
If the back layer includes non-magnetic particles or filler and the particles or filler are recited in no more than name only, classification is in G11B 5/735 and not in G11B 5/7356 - G11B 5/7358. If any inventive subject matter is directed to the particles, classification is in G11B 5/7356 or G11B 5/7358.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

| Back layer | A layer on the opposite side of a substrate from the recording layer structure; typically used for controlling the running and electrostatic properties of a tape-form medium. |

Synonyms and Keywords
In patent documents, the following words/expressions are often used as synonyms:
- Back layer, backcoat, back coat

G11B 5/735

{for a thin film medium where the magnetic recording layer structure has no bonding agent}

Definition statement
This place covers:
Magnetic recording media, each having one or more back layers wherein the recording layer is a thin-film type structure, e.g. sputtered layer, CoCrPt alloy layer, Co/Pt multilayers.
G11B 5/7356
{comprising non-magnetic particles in the back layer, e.g. particles of TiO$_2$, ZnO or SiO$_2$}

Definition statement
This place covers:
Magnetic recording media having one or more back layers characterized by inventive non-magnetic particles (e.g. oxides, carbon black, etc.).

Special rules of classification
If the back layer includes non-magnetic particles or filler and the particles or filler are recited in no more than name only, classification is in G11B 5/735.

If the non-magnetic particles or filler are recited as being added to achieve a specified inventive or non-conventional physical property, classification is in G11B 5/7358.

G11B 5/7358
{specially adapted for achieving a specific property, e.g. average roughness [Ra]}

Definition statement
This place covers:
Back layers including non-magnetic particles or filler recited as being added to achieve a specified inventive or non-conventional physical property.

Special rules of classification
If the recited property is nominal or conventional (e.g. carbon black is added to control the electrostatic property of the back layer to known, conventional ranges), classification is in G11B 5/735 and its subgroups.
G11B 5/736

{Non-magnetic layer under a soft magnetic layer, e.g. between a substrate and a soft magnetic underlayer [SUL] or a keeper layer (magnetic recording media substrates G11B 5/739)}

Definition statement

This place covers:

Base layers between a substrate and a soft magnetic underlayer.

References

Limiting references

This place does not cover:

Magnetic recording media substrates G11B 5/739

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Surface layers comprising particles mixed in a binder or resin wherein the layer is set forth as distinct from the substrate and used for establishing the surface properties of a magnetic layer</th>
<th>G11B 5/733 - G11B 5/7334</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substrates only characterised by having a specific form or shape</td>
<td>G11B 5/74 - G11B 5/825</td>
</tr>
<tr>
<td>Magnetic media substrates characterised by the patterning of the magnetic layer (bit patterned, discrete track, etc.)</td>
<td>G11B 5/743 - G11B 5/746</td>
</tr>
<tr>
<td>Magneto-optic or opto-magnetic media substrates</td>
<td>G11B 7/253 - G11B 7/2539</td>
</tr>
</tbody>
</table>

G11B 5/7361

{Two or more non-magnetic layers}

Definition statement

This place covers:

Base layers including two or more inventive layers between a substrate and a soft magnetic underlayer wherein the inventive subject matter lies in the composition or structural arrangement of the layers.
Special rules of classification
For a base layer to be considered 'inventive' it should be recited in the independent claim (even if recited in name only) or have non-nominal, inventive features.

G11B 5/7362
{Physical structure of underlayer, e.g. texture}

Definition statement
This place covers:
Base layers including two or more inventive layers between a substrate and a soft magnetic underlayer wherein the physical macroscopic structure (e.g. texture, patterning, etc.) or microstructure (crystal plane, crystallographic texture, etc.) of at least one layer is also deemed inventive.

Special rules of classification
If the physical structure is recited in name only and is not deemed inventive, classification should be based on other aspects of the recording media base layers.

G11B 5/7363
{Non-magnetic single underlayer comprising nickel}

Definition statement
This place covers:
Base layers including only a single inventive layer between a substrate and a soft magnetic underlayer wherein the layer is recited as including non-trace amounts of nickel.

Special rules of classification
If the composition of the underlayer is not inventive, classification should be based on other aspects of the recording media base layers (e.g. circa 2010, NiP underlayers are well established and mere recitation of an NiP underlayer would not result in placement in this subgroup without additional, inventive features).

G11B 5/7364
{Non-magnetic single underlayer comprising chromium}

Definition statement
This place covers:
Base layers including only a single inventive layer between a substrate and a soft magnetic underlayer wherein the layer is recited as including non-trace amounts of chromium.

Special rules of classification
If the composition of the underlayer is not inventive, classification should be based on other aspects of the recording media base layers (e.g. circa 2010, Cr-alloy underlayers are well established and mere recitation of a Cr-alloy underlayer would not result in placement in this subgroup without additional, inventive features).
G11B 5/7365

{Non-magnetic single underlayer comprising a polymeric structure, e.g. polymeric adhesion layer or plasma-polymerized carbon layer}

Definition statement

This place covers:

Base layers including only a single inventive layer between a substrate and a soft magnetic underlayer wherein the layer is recited as being polymeric or a resin-based underlayer.

This includes polymeric or resin-based non-magnetic underlayers having particles, provided they are located under a soft-magnetic layer.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Polymeric or resin-based underlayers without particles, wherein the layer is under a recording layer, but either above a soft magnetic underlayer or in a medium without a soft magnetic underlayer | G11B 5/73 |
| Polymeric or resin-based underlayers with particles, wherein the layer is under a recording layer, but either above a soft magnetic underlayer or in a medium without a soft magnetic underlayer | G11B 5/733 - G11B 5/7334 |

G11B 5/7366

{for heat-assisted or thermally-assisted magnetic recording [HAMR, TAMR]}

Definition statement

This place covers:

Base layers having specific utility for use in energy assisted (HAMR, TAMR, etc.) magnetic recording.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Optical Recording | G11B 7/00 |
| Magneto-optical Recording | G11B 11/00 |

Special rules of classification

Barring exceptional circumstances, most classification into G11B 5/7366 will be Additional information. If the base layer is critical and inventive to the energy assisted recording medium, an Inventive symbol may be placed in this subgroup.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

| Energy Assisted | A recording process where, in addition to a magnetic field from a magnetic head, the reading and/or writing process is assisted by energy in the form of heat, microwaves, etc. |
Synonyms and Keywords

In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAMR</td>
<td>Energy Assisted Magnetic Recording</td>
</tr>
<tr>
<td>HAMR</td>
<td>Heat Assisted Magnetic Recording</td>
</tr>
<tr>
<td>MAMR</td>
<td>Microwave Assisted Magnetic Recording</td>
</tr>
<tr>
<td>TAMR</td>
<td>Thermally Assisted Magnetic Recording</td>
</tr>
</tbody>
</table>

In patent documents, the following words/expressions are often used as synonyms:
- HAMR, TAMR, Heat Assisted Magnetic Recording, or Thermally Assisted Magnetic Recording

G11B 5/7367

{Physical structure of underlayer, e.g. texture}

Definition statement

This place covers:

Base layers including one inventive layer between a substrate and a soft magnetic underlayer wherein the physical macroscopic structure (e.g. texture, patterning, etc.) or microstructure (crystal plane, crystallographic texture, etc.) of the layer is also deemed inventive.

Special rules of classification

If the physical structure is recited in name only and is not deemed inventive, classification should be based on other aspects of the recording media base layers.
G11B 5/7368
{Non-polymeric layer under the lowermost magnetic recording layer (base layers having a non-magnetic layer under a soft magnetic layer G11B 5/736; magnetic recording media substrates G11B 5/739)}

Definition statement
This place covers:
Non-Polymeric base layers between a soft magnetic underlayer and the recording layer structure or, if no soft magnetic underlayer in the recording medium, any base layers under the recording layer structure.

Media with SUL or Keeper Layer

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lubricant Layer</td>
<td></td>
</tr>
<tr>
<td>Protective Layer</td>
<td></td>
</tr>
<tr>
<td>Magnetic Recording Layer(s)</td>
<td></td>
</tr>
<tr>
<td>Non-Magnetic Seed/Intermediate/Interlayers</td>
<td></td>
</tr>
<tr>
<td>Soft Magnetic Underlayer</td>
<td></td>
</tr>
<tr>
<td>Non-Magnetic Orientation Control/Adhesion Layers</td>
<td></td>
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<tr>
<td>Substrate</td>
<td></td>
</tr>
<tr>
<td>Backcoat</td>
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</tbody>
</table>

Non-Keepered (or without SUL) Media

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Lubricant Layer</td>
<td></td>
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<tr>
<td>Protective Layer</td>
<td></td>
</tr>
<tr>
<td>Magnetic Recording Layer(s)</td>
<td></td>
</tr>
<tr>
<td>Non-Magnetic Seed/Adhesion/Underlayers</td>
<td></td>
</tr>
<tr>
<td>Substrate</td>
<td></td>
</tr>
<tr>
<td>Backcoat</td>
<td></td>
</tr>
</tbody>
</table>

References

Limiting references
This place does not cover:

| Base layers having a non-magnetic layer under a soft magnetic layer | G11B 5/736 |
| Magnetic recording media substrates | G11B 5/739 |
Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polymeric or resin-based underlayers without particles, wherein the layer</td>
<td>G11B 5/73</td>
</tr>
<tr>
<td>is under a recording layer, but either above a soft magnetic underlayer or</td>
<td></td>
</tr>
<tr>
<td>in a medium without a soft magnetic underlayer</td>
<td></td>
</tr>
<tr>
<td>Polymeric or resin-based underlayers with particles, wherein the layer is</td>
<td>G11B 5/733</td>
</tr>
<tr>
<td>under a recording layer, but either above a soft magnetic underlayer or in</td>
<td>- G11B 5/7334</td>
</tr>
<tr>
<td>a medium without a soft magnetic underlayer</td>
<td></td>
</tr>
</tbody>
</table>

G11B 5/7369

{Two or more non-magnetic underlayers, e.g. seed layers or barrier layers}

Definition statement

This place covers:

Base layers including two or more inventive layers in the required structural location within the media wherein the inventive subject matter lies in the composition or structural arrangement of the layers.

Special rules of classification

For a base layer to be considered 'inventive' it should be recited in the independent claim (even if recited in name only) or have non-nominal, inventive features.

G11B 5/737

{Physical structure of underlayer, e.g. texture}

Definition statement

This place covers:

Base layers including two or more inventive layers in the required structural location within the media wherein the physical macroscopic structure (e.g. texture, patterning, etc.) or microstructure (crystal plane, crystallographic texture, etc.) of at least one layer is also deemed inventive.

Special rules of classification

If the physical structure is recited in name only and is not deemed inventive, classification should be based on other aspects of the recording media base layers.

G11B 5/7371

{Non-magnetic single underlayer comprising nickel}

Definition statement

This place covers:

Base layers including only a single inventive layer in the required structural location within the media wherein the layer is recited as including non-trace amounts of nickel.

Special rules of classification

If the composition of the underlayer is not inventive, classification should be based on other aspects of the recording media base layers (e.g. circa 2010, NiP underlayers are well established and mere recitation of an NiP underlayer would not result in placement in this subgroup without additional, inventive features).
G11B 5/7373
{Non-magnetic single underlayer comprising chromium}

Definition statement
This place covers:
Base layers including only a single inventive layer in the required structural location within the media wherein the layer is recited as including non-trace amounts of chromium.

Special rules of classification
If the composition of the underlayer is not inventive, classification should be based on other aspects of the recording media base layers (e.g. circa 2010, Cr-alloy underlayers are well established and mere recitation of a Cr-alloy underlayer would not result in placement in this subgroup without additional, inventive features).

G11B 5/7375
{for heat-assisted or thermally-assisted magnetic recording [HAMR, TAMR]}

Definition statement
This place covers:
Base layers in the required structural location within the media having specific utility for use in energy assisted (HAMR, TAMR, etc.) magnetic recording.

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Optical Recording</th>
<th>G11B 7/00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magneto-optical Recording</td>
<td>G11B 11/00</td>
</tr>
</tbody>
</table>

Special rules of classification
Barring exceptional circumstances, most classification into G11B 5/7375 will be Additional information. If the base layer is critical and inventive to the energy assisted recording medium, an Inventive symbol may be placed in this subgroup.

Glossary of terms
In this place, the following terms or expressions are used with the meaning indicated:

| Energy Assisted | A recording process where, in addition to a magnetic field from a magnetic head, the reading and/or writing process is assisted by energy in the form of heat, microwaves, etc. |

Synonyms and Keywords
In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>EAMR</th>
<th>Energy Assisted Magnetic Recording</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAMR</td>
<td>Heat Assisted Magnetic Recording</td>
</tr>
<tr>
<td>MAMR</td>
<td>Microwave Assisted Magnetic Recording</td>
</tr>
</tbody>
</table>
In patent documents, the following words/expressions are often used as synonyms:

- HAMR, TAMR, Heat Assisted Magnetic Recording, or Thermally Assisted Magnetic Recording

**G11B 5/7377**

{Physical structure of underlayer, e.g. texture}

**Definition statement**

*This place covers:*

Base layers including two or more inventive layers in the required structural location within the media wherein the physical macroscopic structure (e.g. texture, patterning, etc.) or microstructure (crystal plane, crystallographic texture, etc.) of at least one layer is also deemed inventive.

**Special rules of classification**

If the physical structure is recited in name only and is not deemed inventive, classification should be based on other aspects of the recording media base layers.

**G11B 5/7379**

{Seed layer, e.g. at least one non-magnetic layer is specifically adapted as a seed or seeding layer}

**Definition statement**

*This place covers:*

Base layers in the required structural location within the media having specific utility for use as seed or seeding layers.

**Special rules of classification**

Multi-aspect classification should be used when dealing with seed or seeding layers having inventive subject matter that falls in other subgroups of the G11B 5/73 area.

**Glossary of terms**

In this place, the following terms or expressions are used with the meaning indicated:

| Seed or Seeding Layer | A non-magnetic layer explicitly recited as a 'seed' or 'seeding' layer or that is explicitly disclosed as only used for seeding the crystallographic growth of the immediately following layer in the deposition process. |

**Synonyms and Keywords**

In patent documents, the following words/expressions are often used as synonyms:

- Seed Layer, Seeding Layer, or Nucleation Layer
G11B 5/739

{Magnetic recording media substrates}

Definition statement

This place covers:

Base layers in which a layer or laminate provides physical integrity to a magnetic recording media by acting as substrate or support for a magnetic recording layer.

This subgroup and its subgroups provide for substrates set forth with chemical or structural specificity.

Care must be taken to distinguish between (a) a composite or coated substrate and (b) a subsequently formed non-magnetic base layer when considering binder media type structures. A layer recited as an "underlayer", "undercoat", "lower layer" or "intermediate layer" is a layer distinct from a substrate. For a layer to be considered as a part of a substrate, it must be recited specifically in the disclosure of forming the substrate or as part of a substrate prior to any deposition of a recording layer structure.

Examples:

(1) What is claimed is
   1. A magnetic recording medium comprising a flexible support containing polyethylene naphthalate or polyethylene terephthalate and having a thickness of 10 to 200 μm, an undercoating layer containing at least one of polynaphthalate resins, polynaphthalate resins, and silicon resins, and fluoro resins, and a magnetic layer selected from a cobalt/palladium multilayer film and a cobalt/platinum multilayer film, wherein the undercoating is located between the support and the magnetic layer, wherein a surface of the undercoating layer has projections having a height of 5 to 60 nm, and a density of the projections is 0.1 to 100 μm².

(1) In claim 1 at left, the "undercoating layer" is part of the recording layer structure and is distinct from the substrate.

(2) A multi-layer biaxially oriented film comprising a first layer (A) comprising an aromatic polyester (a) and a second layer (B) comprising a polycrystalline (b) having a melting point of from 250 to 290°C, wherein said polycrystalline is a styrene polymer, and an adhesive interlayer (C) between a layer (A) and a layer (B), wherein said adhesive layer comprises a tie-layer material (e) selected from anhydride-modified ethylene copolymer in which the proportion of anhydride present in the copolymer is no more than 3.0% by weight of the copolymer, and in which the ethylene copolymer comprises one or more additional comonomers other than styrene.

(2) In claim 1 at left, layers (A), (B), and (C) are all part of a composite substrate including at least one polyester layer.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Surface layers that are not part of a substrate, but are provided for the electromagnetic or crystallographic growth properties of a recording medium

G11B 5/73 - G11B 5/7379
Surface layers comprising particles mixed in a binder or resin wherein the layer is set forth as distinct from the substrate and used for establishing the surface properties of a magnetic layer

Substrates only characterised by having a specific form or shape

Magnetic media substrates characterised by the patterning of the magnetic layer (bit patterned, discrete track, etc.)

Methods of making substrates

Magneto-optic or opto-magnetic media substrates

---

**Synonyms and Keywords**

*In patent documents, the following words/expressions are often used as synonyms:*

- Substrate, Support, or Base Layer

**G11B 5/73911**

**{Inorganic substrates}**

**Definition statement**

This place covers:

Base layers including a substrate having at least one formed layer or portion comprising inorganic material.

**References**

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

| Substrates including a non-esterfied polymeric binder layer containing inorganic particles or particulate |
| G11B 5/73925 |

| Substrates including an esterfied polymeric binder layer containing inorganic particles or particulate |
| G11B 5/73935 |

**Special rules of classification**

Resin or binder material including inorganic particles wherein the substrate, in total, would be considered a polymeric or organic substrate are classified in the appropriate subgroup, i.e. G11B 5/73923 - G11B 5/73937.

Substrates which are formed from inorganic compounds and are disclosed primarily in terms of property values are classified in G11B 5/739, i.e. the inorganic materials are nominal and recited in name only.

Multi-aspect classification should be used for composite substrates including mixture of both inorganic and organic layers or formed portions.
G11B 5/73913

{Composites or coated substrates}

Definition statement
This place covers:
Inorganic substrates having two or more contiguous layers or portions of distinct components (e.g. glass containing metallic particles, etc.).

Included in this subgroup are an inorganic structural element and an organic compound; e.g. metallic particles and resin, provided that the substrate as a whole would be considered an inorganic substrate.

Special rules of classification
Substrates having only a single alloy layer, i.e. heterogeneous mixtures of elements that are not separate phases, are not classified in this subgroup, but in other subgroups appropriate to the recited alloy.

Included herein are NiP plated substrates wherein the NiP plating layer is inventive and is clearly taught as part of the substrate. NiP layers deposited with the purpose of corrosion prevention, adhesion, or establishing the microstructure of the recording layer are classified in G11B 5/7363 or G11B 5/7371. The lines between these subgroups and the current subgroup can often be ascertained by looking at the method of depositing the NiP layer and/or whether the NiP layer is deposited on an already commercially formed substrate (as opposed to being deposited to form the substrate).

Glossary of terms
In this place, the following terms or expressions are used with the meaning indicated:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>NiP</td>
<td>Nickel-Phosphorous (a conventional pre-coat deposited on substrates for smoothing and texturing purposes).</td>
</tr>
<tr>
<td>AlMg/NiP</td>
<td>An aluminium-magnesium alloy substrate coated with an NiP coating layer</td>
</tr>
<tr>
<td>Plating layer</td>
<td>A layer deposited by either an electrolytic or electroless plating method; typically an NiP layer.</td>
</tr>
</tbody>
</table>

G11B 5/73915

{Silicon compound based coating}

Definition statement
This place covers:
Base layers including a substrate having at least one contiguous layer of a silicon compound.

G11B 5/73917

{Metallic substrates, i.e. elemental metal or metal alloy substrates}

Definition statement
This place covers:
Base layers including a substrate that is an elemental metal or a metal alloy.
G11B 5/73919
{Aluminium or titanium elemental or alloy substrates}

Definition statement
This place covers:
Base layers including a substrate that is elemental aluminium or titanium or an aluminium or titanium alloy (i.e., an alloy containing 40% or more aluminum and/or titanium).

G11B 5/73921
{Glass or ceramic substrates}

Definition statement
This place covers:
Base layers including a substrate that is composed of glass or ceramic, including amorphous or crystalline glasses.

Included in this subgroup are glass or ceramic substrates including texturing.

G11B 5/73923
{Organic polymer substrates}

Definition statement
This place covers:
Substrates composed of a solid polymer compound or polymeric composition (e.g. polyurethane, melamine resin, polyamide, etc.).

Special rules of classification
Substrates that are formed from organic polymer compounds and that are disclosed primarily in terms of property values are classified in G11B 5/739, i.e. when the polymer materials are nominal and recited in name only.

Multi-aspect classification should be used for substrates including a mix of organic and inorganic material layers, as appropriate for the specific materials recited.

Synonyms and Keywords
In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>Abbr.</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEN</td>
<td>Polyethylene naphthalate (poly(ethylene 2,6-naphthalate)</td>
</tr>
<tr>
<td>PET</td>
<td>Polyethylene terephthalate</td>
</tr>
</tbody>
</table>

G11B 5/73925
{Composite or coated non-esterified substrates}

Definition statement
This place covers:
Substrates that are materials other than an ester and are composed of a plurality of layers (e.g. a laminate or distinct particulate or non-particulate compounds containing in a single layer).
This subgroup includes coatings on an organic substrate directed to the improvement of the properties of the substrate and not affecting the crystalline anisotropy or magnetic orientations of a subsequently deposited layer (e.g. a coating solely for adhesive, texture, etc.).

**Special rules of classification**

The distinction between a lower layer used in a binder-type media and a coating layer for purpose of classification here depends on the recited end use of the layer, as most are composed of similar mixtures of binder material plus non-magnetic particulate filler. If the layer is recited as a "lower layer", "under layer", "first layer", it is usually directed to establishing the deposition of the magnetic layer and are classified in G11B 5/733 - G11B 5/7334. The same applies if the deposition is a "wet-on-wet" process where the magnetic layer is immediately deposited following the non-magnetic layer.

If the invention is directed to the substrate and the layer is included to tailor the surface properties of the substrate (e.g. a binder and particulate layer deposited on a polyamide base to create a polyamide substrate having specific roughness profile), then classification should be in this subgroup only.

When the non-magnetic layer is unable to be ascertained as to whether it is part of the substrate or used to establish the magnetic layer deposition, multi-aspect classification should be applied in G11B 5/733 and G11B 5/73925.

**G11B 5/73927**

{Polyester substrates, e.g. polyethylene terephthalate}

**Definition statement**

*This place covers:*

Base layers including a substrate in which the polymer substrate includes an ester group thereon such as carboxylic acid ester.

**References**

**Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

| Esterified substrates having two or more layers | G11B 5/73931 |
| Composite esterified substrates formed from a mixture of an ester-based resin and particles | G11B 5/73935 |
G11B 5/73929
{comprising naphthalene ring compounds, e.g. polyethylene naphthalate substrates}

Definition statement

This place covers:
Base layers including a substrate that comprises a polyester substrate including a naphthalene ring structure.

Example of a naphthalene ring structure.

G11B 5/73931
{Two or more layers, at least one layer being polyester}

Definition statement

This place covers:
Substrates that are composed of a plurality of layers, wherein at least one inventive layer is a polyester.

This subgroup includes coatings on a polyester substrate directed to the improvement of the properties of the substrate and not affecting the crystalline anisotropy or magnetic orientations of a subsequently deposited layer (e.g. a coating solely for adhesive, texture, etc.).

Special rules of classification

The distinction between a lower layer used in a binder-type media and a coating layer for purpose of classification here depends on the recited end use of the layer, as most are composed of similar mixtures of binder material plus non-magnetic particulate filler. If the layer is recited as a "lower layer", "under layer", "first layer", it is usually directed to establishing the deposition of the magnetic layer and are classified in G11B 5/733 - G11B 5/7334. The same applies if the deposition is a "wet-on-wet" process where the magnetic layer is immediately deposited following the non-magnetic layer.

If the invention is directed to the substrate and the layer is included to tailor the surface properties of the substrate (e.g. a binder and particulate layer deposited on a polyester base to create a polyester substrate having specific roughness profile), then classification should be in this subgroup only.

When the non-magnetic layer is unable to be ascertained as to whether it is part of the substrate or used to establish the magnetic layer deposition, multi-aspect classification should be applied in G11B 5/733 and G11B 5/73931.
G11B 5/73933
{Surface treated layers, e.g. treated by corona discharge}

Definition statement
This place covers:
Base layers including a polyester substrate that has been coated or surface treated.
Included in this subgroup are polyester substrate leader and trailer tapes.

G11B 5/73935
{characterised by roughness or surface features, e.g. by added particles}

Definition statement
This place covers:
Base layers including a polyester substrate, typically containing particles, which has a defined and inventive roughness profile/property or surface feature, e.g. protrusion density.

G11B 5/73937
{Substrates having an organic polymer comprising a ring structure}

Definition statement
This place covers:
Base layers including a substrate that has a specific organic ring structure, e.g. benzyl groups or 1,4-dihydroxydimethylbenzene.

G11B 5/74
Record carriers characterised by the form, e.g. sheet shaped to wrap around a drum

Definition statement
This place covers:
Record carriers (tapes, cards, disks) specially shaped, e.g., bit patterned media, or discrete-track media

References

Limiting references
This place does not cover:

Manufacturing of record carriers

G11B 5/84

Informative references
Attention is drawn to the following places, which may be of interest for search:

Manufacturing of patterned magnetic recording media

G11B 5/855

Photomechanical, e.g. photolithographic, production of textured or patterned surfaces

G03F 7/00
Special rules of classification

Acquisition of servo patterns and processing thereof G11B 5/596

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patterned Media and Bit</td>
<td>In Patterned Media (PM) and Bit-patterned-media (BPM), the magnetic recording layer on the media is patterned into small magnetic isolated data islands. In Bit-patterned media each island corresponds to a bit and is arranged e.g. in concentric data tracks in the case of disks media, while in patterned media the islands may correspond to discrete tracks or to servo patterns. Patterned-media may be longitudinal magnetic recording disks, wherein the magnetization directions are parallel to or in the plane of the recording layer, or perpendicular magnetic recording disks, wherein the magnetization directions are perpendicular to or out-of-the-plane of the recording layer. To produce magnetic isolation of the patterned data islands, the magnetization of the spaces between the islands is destroyed or substantially reduced to render these spaces essentially nonmagnetic. Alternatively, the media may be fabricated so that that there is no magnetic material in the spaces between the islands.</td>
</tr>
<tr>
<td>Patterned Media</td>
<td>Bit-patterned-media (BPM)</td>
</tr>
</tbody>
</table>

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPM</td>
<td>Bit-Patterned-Media</td>
</tr>
<tr>
<td>PM</td>
<td>Patterned Media</td>
</tr>
<tr>
<td>DTM</td>
<td>Discrete Track Media</td>
</tr>
</tbody>
</table>

G11B 5/86

Re-recording, i.e. transcribing information from one magnetisable record carrier on to one or more similar or dissimilar record carriers {by varying the order of the information **G11B 27/029, G11B 27/036**}

Definition statement

This place covers:

Master disks - i.e. original disks drawn preliminarily with magnetic information corresponding to a preformatted signal to be magnetically transferred (e.g. servo patterns or reference servo patterns for self-servo-writing) - used to duplicate information on lave disks

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Description</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Re-recording by varying the order of the information</td>
<td><strong>G11B 27/029, G11B 27/036</strong></td>
</tr>
<tr>
<td>Transferring data from one type of record carrier to another type of record carrier</td>
<td><strong>G06K 1/18</strong></td>
</tr>
</tbody>
</table>
Special rules of classification

When the medium to which information has to be transferred is in direct contact with the master disk the method or apparatus is classified in **G11B 5/865**.

**G11B 7/00**

Recording or reproducing by optical means, e.g. recording using a thermal beam of optical radiation (by modifying optical properties or the physical structure), reproducing using an optical beam at lower power (by sensing optical properties); Record carriers therefor; (**G11B 11/00**, **G11B 13/00** take precedence)

Definition statement

*This place covers:*

- purely optical aspects of magneto-optical recording (for example a focus error method)
- optical recording of label information on optical recording media such as CDs, where the recording is done using the optical head that records the coded main data

In general terms, this group is subdivided into:

systems (**G11B 7/002**, **G11B 7/003**) e.g. tape, card, disc

methods of recording or reproduction (also erasing, overwriting), including holographic recording of coded data (**G11B 7/004**, **G11B 7/0065**); re-recording of data (transcription) (**G11B 7/28**)

arrangement of information e.g. control area, land and groove structure, including details of discrete physical structures such as "pits" (**G11B 7/007**, **G11B 7/013**)

access e.g. moving the optical pickup (**G11B 7/085**)

servo e.g. moving the objective lens (**G11B 7/09**)

heads e.g. types of heads (**G11B 7/12**, **G11B 7/14**)

- details of head components e.g. lasers, detectors, optical elements in the light path between laser and record carrier or between record carrier and detector (**G11B 7/125**, **G11B 7/135**)

- manufacture of heads (**G11B 7/22**)

record carriers e.g. CD, DVD, BD (**G11B 7/24**)

- structural aspects e.g. multiple data layers

- material aspects e.g. materials used in recording layers, protective layers, substrates (**G11B 7/241**, **G11B 7/258**)

- manufacture e.g. depositing a layer of recording material, pressing pits into substrate material, arrangements of multiple types of machinery in a production line (**G11B 7/26**)

In principle, only aspects of the above subjects that are particularly adapted as a result of using light for recording/reproduction (e.g. track pitch, pit depth adapted to the wavelength of light used) should be classified in **G11B 7/00**.

Relationships with other classification places

- optical recording/writing of uncoded images e.g.
- holographic storage of images (see **G03H 1/10**)
- thermography (**B41M 5/26**)
- laser (electrophotographic)/thermographic printers (**B41J 2/435**)
- facsimile (**H04N 1/00**)
• xerography i.e. photocopiers (G03G)
• optical displays based on liquid crystals (G02F 1/135)
• optical storage of small amounts of coded data e.g. on credit card size carriers or bar codes (see G06K 7/10 for methods or arrangements, or G06K 19/0609 for the media e.g. G06K 19/0628 for bar codes)
• static optical memories G11C
• applications of optical carriers such as CD, DVD, BD e.g.
  • games (A63F 13/00);
  • audio visual presentations of educational apparatus (G09B 5/06);
• addressable supports for biological samples (G01N 35/00069)
• advertising (G09F 23/00)
• greeting cards (G09F 1/00)

References

Limiting references

This place does not cover:

| Optical arrangements for thermally assisted magnetic recording | G11B 5/314 |
| Optical servo for magnetic recording | G11B 5/59677 |
| Aspects for data formats for standards such as CD, DVD, BD unless the technical problem underlying the invention arises because of the optical nature of the recording | G11B 7/00, G11B 20/12 |
| Aspects of editing, addressing, timing etc for standards such as CD, DVD, BD unless the technical problem underlying the invention arises because of the optical nature of the recording | G11B 7/00, G11B 27/00 |
| Near field interactions that do not involve optical radiation | G11B 9/12 |
| Using microscopic probe means | G11B 9/14 |
| If recording and reproducing are covered by different main groups, | G11B 11/14 |
| Microscopic probe means | G11B 11/26 |
| Control of operating function, e.g. general control aspects of preventing overwriting of data | G11B 19/02, G11B 19/04 |
| Starting, stopping record carriers, e.g. spindle control discrimination of media type | G11B 19/20, G11B 19/12 |
| Defect management for optical media such as CD, DVD, BD | G11B 20/1889 |
| Aspects of record carriers not specific to method of recording or reproducing e.g. hub details are generally not specific to whether or not the recording is optical or magneto-optical | G11B 23/0028 |
| Computer systems involving digital I/O from or to direct access storage devices involving optical discs | G06F 3/0601 |

Special rules of classification

The following "horizontal" Indexing Codes are assigned where appropriate:
• G11B 2007/0006 recording, reproducing or erasing systems adapted for scanning different types of carriers e.g. CD & DVD
• G11B 2007/0009 recording, reproducing or erasing systems for carriers having data stored in three dimensions e.g. volume storage
• G11B 2007/0013 recording, reproducing or erasing systems for carriers having data stored in three dimensions and having multiple discrete layers
• **G11B 2007/0016** recording, reproducing or erasing systems for carriers adapted to have label information written on the non-data side by the optical head used for recording (e.g. lightscribe, labelflash)

Further information of subgroups:

**G11B 7/241**: should be used as little as possible e.g. where different materials for various layers are disclosed and the invention does not reside in one particular layer (e.g. EP2224444, US2005129899)

**G11B 7/242**: this group and subgroups are used when the recording material does not fall (exclusively) into one of the higher dot subgroups; e.g. comprising inorganic and organic material (US2003175616, JP58062094)

**G11B 2007/2445**:  

**G11B 7/2467**: R1−N=N−R2

**G11B 7/247**: styril dye

**G11B 7/2472**:  

**G11B 7/2475**:  

**G11B 7/2478**:  

**G11B 7/248**:  

**G11B 7/25**: in the recording layer

Examples:

• e.g. light-shielding layer, reactive compounds, recording blocking particles, subbing layer (US5100766), smoothing layer,
• mask (=shutter) layer (for Super-RENS application; if in direct contact with recording layer, **G11B 7/257** takes precedence) e.g.US5470628, WO2006135180;
• labelling layer; ink receiving layer
• limit-play layer
• third dielectric layer(US5681632), heat sink layer or heat radiating layer (not in direct contact with the recording layer);
• auxiliary layer (US5442619), electrodes, filters;
• parting layer (e.g. WO2005035237A1);
• peelable sheet (e.g. WO2008126524)
• decomposition reaction layer (see EP1645429A1);
• compensating layer (WO2004008446);
• thermochromic layer (WO2004010424)
• flat-plate lens (EP1365394);
• stabilization layer (EP1069556);
• delamination-proof layer (EP0896328);
• shutter layer (DE4214978);
• record-blocking portions (WO2006022360);
• solvent barrier layer (US4423427);
• reflectivity adjustment layer (US646625);
• super-resolution film (US6385162);
• pyrotechnic layer (WO0000453);
• Servo layers (WO0178068);
• subbing layer (US4753861);
• ultraviolet absorption film (EP0259151);

Note in group G11B 7/252, multi-aspect classification is applied, so that if subject matter is characterised by aspects covered by more than one of its subgroups, the subject matter should be classified in each of those subgroups

G11B 7/254: topcoat layers = outermost layer

G11B 7/2542:

Examples:
• in case of printing layer on the top of the protective layer,
• class G11B 7/254 is given to the printing layer,
• G11B 7/252 to the protective layer (cf. e.g. EP0628956, US5510164);
• if cover layer on the protective coat, then G11B 7/254 to cover layer,
• and G11B 7/252 to protective coat; anti-staining layer e.g. see doc. No US2005158558);
• when there is an inorganic material film (G11B 7/252) provided on the surface, which
• in turn has a protective layer provided thereon (G11B 7/2542), see doc. No EP0123223);
• vibration prevention layer (US2003224136);
• lubricant layer as outermost layer (e.g. US2002054974)

G11B 7/2545: e.g. carbon containing coating, DLC coating - (EP0410704)
G11B 7/256: (EP1343159)

G11B 7/257: Only layers provided in direct contact with the recording layer are classified here. Other protecting layers, which are not toplayers (G11B 7/254) are classified under G11B 7/252.

Examples:
• antireflection layer (US5398232);
• A heat-deformable dye binder layer (US4336545);
• Oxidisable (oxidation) layer (JP57163597);
• Hollow spaces above recording layers (e.g. spacers) (US4791044);
• Charge transfer layer (EP0183168);
• Mask (= shutter layer for near-field applications) (EP1071086)

G11B7/257B:

Examples:
• shutter layer (EP0580346)

**G11B 7/2575**

Examples:
• high modulus layer (WO03021588);
• heat insulation layer (FR2435779);

**G11B 7/2578**

Examples:
• flattening layer (US5095478);
• light-to-heat converting film (EP0596339);
• reinforcement layer (US4408213)

**G11B 7/0025**

*with cylinders or cylinder-like carriers {or cylindrical sections or flat carriers loaded onto a cylindrical surface}, e.g. truncated cones*

**Definition statement**

_This place covers:_
Uncommon or outdated technology (in 2011)

**G11B 7/003**

*with webs {, filaments or wires}, e.g. belts, spooled tapes or films of quasi-infinite extent*

**Definition statement**

_This place covers:_
Uncommon or outdated technology (in 2011)

**G11B 7/0031**

{using a rotating head, e.g. helicoidal recording}

**Definition statement**

_This place covers:_
Optical tape data storage systems that feed an optical tape helically around a drum while writing and/or reading digital data on the optical tape see e.g. US5524105

Uncommon or outdated technology (in 2011)

**G11B 7/0032**

{for moving-picture soundtracks, i.e. cinema (cameras or projectors with sound recording or reproducing means **G03B 31/02**)}

**Definition statement**

_This place covers:_
Uncommon or outdated technology (in 2011)
G11B 7/0033
with cards {or other card-like flat carriers, e.g. flat sheets of optical film}

Definition statement

This place covers:

Optical storage of small amounts of data on cards (analogous to magnetic strip on bank cards) is
normally classified in G06K 19/06009 (media) or G06K 7/10 (methods and apparatus)

G11B 7/0037
with discs

Definition statement

This place covers:

This sub-group is a residual sub-group and should only be assigned if there is something about an
optical disc system related to the optical nature of recording and reproduction that is not classifiable
elsewhere in G11B 7/00

this sub-group includes systems in which the label information is written optically on the non-data side
of disc e.g. technologies such as Hewlett Packard LightScribe and Yamaha/FujiFilm LabelFlash

for labelling of optical data carriers that does not write the label data with the optical head used to write
the main data, see G11B 23/40

G11B 7/00375
{arrangements for detection of physical defects, e.g. of recording layer}

Definition statement

This place covers:

This sub-group is a residual sub-group and should only be assigned if (part of) the subject-matter can
not be classified elsewhere, in particular in one of the following:

G11B 7/0948: servo control specially adapted for detection and avoidance or compensatin of
imprefections on the carrier e.g. dust, scratches, dropouts

G11B 20/1889: defect management

G11B 20/1816 testing e.g. of dropouts

G11B 7/268: checking for defects during/after manufacture

G01N 21/9506: Systems specially adapted for investigating the presence of flaws or contamination in
optical discs

G11B 7/0045
Recording (G11B 7/006, G11B 7/0065 take precedence)

Definition statement

This place covers:

Indexing Code G11B 2007/00457 is assigned for two photon recording (including two photon
recording in holographic data storage media
**G11B 7/00451**

{involving ablation of the recording layer}

**Definition statement**

*This place covers:*

For example, recording data as "pits" in a dye recording layer (e.g. CD-R, DVD-R, BD-R) not to be confused with spectral hole burning (see [G11B 7/00453](#)) for materials used in recording layers see [G11B 7/242](#) and subgroups.

**G11B 7/00452**

{involving bubble or bump forming}

**Definition statement**

*This place covers:*

Uncommon or outdated technology (in 2011)

Generally involves thermal expansion of a recording layer to form bumps which alter the amount of reflected light because of the phase difference (interference effect) between light reflected by the protuberance and light reflected by the surface which is not raised.

![Image](#)

Figure from EP 338776

For materials used in recording layers see [G11B 7/242](#) and subgroups.

**G11B 7/00453**

{involving spectral or photochemical hole burning}

**Definition statement**

*This place covers:*

Uncommon or outdated technology (in 2011)

Multiple bits can be stored in the same space using different frequencies atoms or molecules which are in different environments. The absorption line of a material is inhomogeneously broadened (comprised of many homogeneously broadened lines, due to the slightly different energies and therefore frequencies/wavelengths corresponding to the different environments.

Not to be confused with ablative recording (which is a thermal effect, not a spectral one).

For materials used in recording layers see [G11B 7/242](#) and subgroups.
G11B 7/00454
{involving phase-change effects}

Definition statement
This place covers:
For example, recording using chalcogenide materials e.g. GeSbTe.

This classification should only be assigned if:
• the invention is about the phase change recording mechanism (note that this is now rare, since phase change recording is a "mature" technology), or
• if the invention is specifically adapted for recording based on a phase change of the material AND there is no better classification (see below)

Recording pulse sequences are classified in G11B 7/0062 (for overwritable media) or in G11B 7/00456 (for write-once media)

Phase change materials are classified in G11B 7/243 and subgroups.

G11B 7/00455
{involving reflectivity, absorption or colour changes}

Definition statement
This place covers:
For example, photochromic recording in which the colour is changed; documents concerning recording in which the texture of the surface is changed to change the reflectivity are classifiable here.

References
Limiting references
This place does not cover:

| Involving ablation of the recording layer | G11B 7/00451 |
| Involving bubble or bump forming | G11B 7/00452 |
| Involving spectral or photochemical hole burning | G11B 7/00453 |
| Involving phase-change effects | G11B 7/00454 |

G11B 7/00456
{Recording strategies, e.g. pulse sequences (G11B 7/0062 takes precedence)}

References
Limiting references
This place does not cover:

| Overwriting strategies, e.g. recording pulse sequences with erasing level used for phase-change media | G11B 7/0062 |
Special rules of classification

Both G11B 7/00456 and G11B 7/0062 are assigned if the strategy or strategies disclosed is/are applicable to both write-once and rewritable media. Example:

![Figure 1A](image1)

![Figure 1B](image2)

Figure taken from EP1548710

G11B 7/00458

{Verification, i.e. checking data during or after recording}

Definition statement

This place covers:

This class should only be assigned for invention information (mostly older technology) in which the actual data is read during recording and compared with the data that should have been recorded, or verification using a separate read/verify beam.

Running optical power control (ROPC): G11B 7/1263

Walking optical power control : G11B 7/1263

G11B 7/0051

{involving phase depth effects}

Definition statement

This place covers:

Documents are only assigned this class (or code) if the particular problem or solution of the invention disclosed relates to the aspect of phase depth AND if there is no better classification (see below). (Phase depth effects are the most common basis for reproduction of information in G11B 7/00: the reproduction of the usual data pits in a CD, DVD, BD (i.e. pits in the plastic substrate, covered with a reflective layer) relies on this effect.)

Also reproduction of phase change media normally involves a phase depth effect, because the refractive indices of the various layers are adjusted to give a particular optical path length difference. (n.b. "phase" here has two different meaning - the physical state of the material ("phase change material") and the optical or physical difference in path length between two aread resulting in conctructive or destruction optical interference "phase depth")
**G11B 7/0052**

**{involving reflectivity, absorption or colour changes}**

**Definition statement**

*This place covers:*

For example, reproduction of data recorded in a photochromic material.

**G11B 7/0055**

**Erasing (G11B 7/006, G11B 7/0065 take precedence)**

**Definition statement**

*This place covers:*

Mostly uncommon or outdated technology (in 2011) - nearly all modern commercial disc technology is of the write-once type (e.g. recording in dye layer) or of the overwritable type (e.g. recording in a layer of phase change material).

**References**

**Limiting references**

*This place does not cover:*

<table>
<thead>
<tr>
<th>Overwriting</th>
<th>G11B 7/006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recording, reproducing or erasing by using optical interference patterns, e.g. holograms.</td>
<td>G11B 7/0065</td>
</tr>
</tbody>
</table>

**G11B 7/00557**

**{involving phase-change media}**

**Definition statement**

*This place covers:*

Mostly uncommon or outdated technology (in 2011) - most modern phase change materials are overwritable.

**G11B 7/006**

**Overwriting (G11B 7/0065 takes precedence)**

**Definition statement**

*This place covers:*

Rewritable is often synonymous with overwritable (but rewritable may mean merely erasable in old documents).
G11B 7/0062

{Overwriting strategies, e.g. recording pulse sequences with erasing level used for phase-change media}

Definition statement

This place covers:

Both G11B 7/00456 and G11B 7/0062 are assigned if the strategy or strategies disclosed is/are applicable to both write-once and rewritable media.

See Figure of a pulse strategy under G11B 7/00456.

G11B 7/0065

Recording, reproducing or erasing by using optical interference patterns, e.g. holograms

Definition statement

This place covers:

Relationship between groups:

There are subgroups for certain aspects of holographic recording and where one (or more) or those subgroups is relevant they are assigned, and G11B 7/0065 or Indexing Code G11B 7/0065 are not assigned unless

there is "invention" information relevant to the system as a whole, or

if there is no better classification for the invention information.

Warning: These "holographic" subgroups were created in the second half of 2009, and the reclassification from G11B 7/0065 has not been systematically done. For documents published before 2010, G11B 7/0065 and Indexing Code G11B 7/0065 should be searched.

If there is no subgroup specific to holography for the invention subject-matter (e.g. there are no specific subgroups under G11B 7/242 for specific materials for holography), then the relevant general class is assigned and the Indexing Code G11B 7/0065. For example:

G11B 7/08564 for galvanomirrors e.g. used in angular multiplexing G11B 7/128 for SLM, acousto-optical, electro-optical, magneto optical modulators G11B 7/128 and G11B 7/1369 if modulator is liquid crystal device

G11B 7/1392 for a diffuser (e.g. in speckle holography)

G11B 7/1365 for polarization rotators G11B 7/1372, or subgroup, for lenses G11B 7/1356 for double prism beam splitter G11B 7/1395 for other beam splitters

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Catalogue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>G11B 7/0045</td>
<td>Where the recording mechanism of the holographic storage is of interest e.g. G11B 2007/00457 is assigned for two-photon recording of holograms</td>
</tr>
<tr>
<td>G11B 2007/00653</td>
<td>Collinear holography: Where the object and reference beams are substantially parallel or coaxial before being focused (synonym: &quot;coaxial&quot;, &quot;common path&quot;, co-propagating)</td>
</tr>
</tbody>
</table>
Counter propagating holography: Where the object and reference beams are directed to opposite sides of the medium (synonym: "standing wave" or "stationary wave")

<table>
<thead>
<tr>
<th>Counter propagating holography: Where the object and reference beams are directed to opposite sides of the medium (synonym: &quot;standing wave&quot; or &quot;stationary wave&quot;)</th>
<th>G11B 2007/00656</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holographic storage of images</td>
<td>G03H</td>
</tr>
</tbody>
</table>

**Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

<table>
<thead>
<tr>
<th>Arrangement of holographic information, including multiplexing of information</th>
<th>G11B 7/00772</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrangement of auxiliary information for holographic storage</td>
<td>G11B 7/00781</td>
</tr>
<tr>
<td>Concerning access of holographic information</td>
<td>G11B 7/083</td>
</tr>
<tr>
<td>Concerning structural aspect of media for holographic storages</td>
<td>G11B 2007/240025</td>
</tr>
</tbody>
</table>

**G11B 7/007**

Arrangement of the information on the record carrier, e.g. form of tracks (e.g. wobbled, or cross-section, e.g. v-shaped; Sequential information structures, e.g. sectoring or header formats within a track)

**Definition statement**

This place covers:

Aspects for data formats for standards such as CD, DVD, BD are not classified in G11B 7/007 unless the technical problem underlying the invention arises because of the optical nature of the recording. In such cases the documents may be classifiable both in G11B 7/007 and in G11B 20/00.

Standards for various aspects of the formats of optical discs are available from the Internet site of ECMA (www.ecma.org).

(e.g. CD-ROM, DVD-ROM, DVD-RAM, DVD-R, DVD-RW, CD-RW Ultra-speed)

White Papers for the Blu-ray Disc Format are available from the Internet site of the Blu-ray Disc Association (www.blu-raydisc.com)

e.g. the Physical Format Specifications for BD-RE and for BD-ROM

There are also ECMA standards for holographic discs (HVD-ROM, HVD)
Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

| Burst cutting area | Auxiliary data recorded towards the inner periphery of the disc, as a type of bar code (stripes). Because it is recorded as stripes, it can be read before the tracking servo is on. The data is phase-encoded (i.e. "0" is represented by 2 channel bits set to "1 0", and "1" by "0 1"), and the sequence of data bits is return-to-zero modulated. |

![Diagram of Burst Cutting Area](image)

for more information see ECMA-267 standard for 120mm Read Only DVDs, Appendix H

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

| BCA | burst cutting area |
In patent documents, the following words/expressions are often used with the meaning indicated:

<table>
<thead>
<tr>
<th>&quot;read in (area)&quot;</th>
<th>&quot;lead in (area)&quot;, based on Japanese applications.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;read out (area)&quot;</td>
<td>&quot;lead out (area)&quot;.</td>
</tr>
</tbody>
</table>

G11B 7/00772
{on record carriers storing information in the form of optical interference patterns, e.g. holograms}

Definition statement

This place covers:
When the invention information concerns multiplexing, the document should be classified in G11B 7/00772 (since it has to do with the arrangement of the information) and assigned the relevant EC for the means (elements) by which the multiplexing is done. For example:

angular (azimuth) multiplexing:

G11B 7/08564 for deformable or movable mirrors and G11B 7/1362 when the movable mirror cooperates with stationary mirror(s):
• for angular (azimuth) multiplexing or peristrophic multiplexing, when the medium is moved relative to the (reference) light beam G11B 7/083
• for wavelength multiplexing, G11B 7/127 if tuneable lasers are involved, G11B 7/1275 if multiple lasers with different wavelengths are used
• phase multiplexing:
  • G11B 7/1365 for stationary REFRACTIVE plates that change the phase;
  • G11B 7/1369 for MOVABLE refractive plates; G11B 7/128 for other phase modulators
• for shift modulation (overlapping holograms) and spatial modulation G11B 7/083
• speckle modulation G11B 7/1392

Special rules of classification

This subgroup was created in the second half of 2009, and the reclassification from G11B 7/0065 has not been systematically done. For documents published before 2010, G11B 7/0065 and Indexing Code G11B 7/0065 should be searched.

G11B 7/00781
{Auxiliary information, e.g. index marks, address marks, pre-pits, gray codes}

Definition statement

This place covers:
For example, separate layers containing servo information for holographic discs, or marks around the edge for aligning page type holographic media.

Servo information for volume storage media that are not holographic: classify G11B 7/0938 (or Indexing Code G11B 7/0938 if the document discloses these details, but it is not particularly relevant to the invention information) in addition to the Indexing Code G11B 7/00.00S4 to indicate the volumetric aspect of the storage medium itself.

Warning: This subgroup was created in the second half of 2009, and the reclassification from G11B 7/0065 has not been systematically done. For documents published before 2010, G11B 7/0065 and Indexing Code G11B 7/0065 should be searched.
G11B 7/013

for discrete information, i.e. where each information unit is stored in a distinct discrete location {, e.g. digital information formats within a data block or sector}

**Definition statement**

*This place covers:*

Only aspects of format that are adapted to solve a problem related to the optical recording. (In general, the data formats for optical recording media are not very closely related to the optical aspect and are classified in G11B 20/12)

G11B 7/081

{for time base error correction by moving the light beam}

**Definition statement**

*This place covers:*

Uncommon or outdated technology (in 2011)

G11B 7/083

{relative to record carriers storing information in the form of optical interference patterns, e.g. holograms}

**Definition statement**

*This place covers:*

Apparatus/methods aspects of access e.g. multiplexing are classified here, and if appropriate in the relevant optical element group.

If the optical elements used are not especially adapted for the type of access, but e.g. just used or controlled in a special way then the document should be classified in G11B 7/083 and coded in the appropriate optical element group (e.g. galvanomirror G11B 7/08564 or G11B 7/00:0085B3).

If it is the arrangement of the information aspect of the multiplexing that is "invention information" it is classified in G11B 7/00772

Warning: This subgroup was created in the second half of 2009, and the reclassification from G11B 7/0065 has not been systematically done. For documents published before 2010, G11B 7/0065 and G11B 7/0065 should be searched.

G11B 7/08505

{Methods for track change, selection or preliminary positioning by moving the head}

**References**

*Limiting references*

*This place does not cover:*

| Arrangements for moving the whole head | G11B 7/0857 |
G11B 7/08511
{with focus pull-in only}

Definition statement
This place covers:
Changing layers in media with multiple data layers e.g. dual layer DVD.

References
Limiting references
This place does not cover:
Focus search for distinguishing between types of discs

G11B 7/08564
{using galvanomirrors}

Definition statement
This place covers:
For example, multiplexing in holographic storage of data.

G11B 7/0904
{Dithered tracking systems}

Definition statement
This place covers:
Uncommon or outdated technology in 2011.
Methods in which the beam is driven back and forth to generated the tracking error signal.
G11B 7/0906

{Differential phase difference systems}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group:

Synonyms and Keywords

In patent documents the following expressions:

"phase difference tracking error method"
"differential phase detection" (DPD)
"phase variation method"
"time difference detection method"
"heterodyne"
"phase contrast method"
"phase comparison method"

are often used instead of "differential phase difference method".
G11B 7/0908
{for focusing only (G11B 7/0925, G11B 7/094, G11B 7/0941, G11B 7/0943, G11B 7/0945, G11B 7/0946, G11B 7/0948 take precedence)}

References

Limiting references
This place does not cover:

| Electromechanical actuators for lens positioning (G11B 7/0857 takes precedence) | G11B 7/0925 |
| Methods and circuits for servo offset compensation | G11B 7/094 |
| Methods and circuits for servo gain or phase compensation during operation (for initialising servos G11B 7/0945) | G11B 7/0941 |
| Methods and circuits for performing mathematical operations on individual detector segment outputs | G11B 7/0943 |
| Methods for initialising servos, start-up sequences | G11B 7/0945 |
| Specially adapted for operation during external perturbations not related to the carrier or servo beam, e.g. vibration | G11B 7/0946 |
| Specially adapted for detection and avoidance or compensation of imperfections on the carrier, e.g. dust, scratches, dropouts (G11B 7/095 takes precedence) | G11B 7/0948 |

G11B 7/0909
{by astigmatic methods}

Definition statement
This place covers:

Illustrative example of subject matter classified in this group:

Figure from EP1220210
G11B 7/0912
{by push-pull method}

References
Limiting references
This place does not cover:

| Push-pull tracking | G11B 7/0901 |

Synonyms and Keywords
In patent documents, the following words/expressions are often used with the meaning indicated:

| "spot size focus error method" | "push-pull method" |

G11B 7/0916
{Foucault or knife-edge methods}

Definition statement
This place covers:

Illustrative example of subject matter classified in this group:

![Illustrative example](image)

Figure taken from JP60010424

G11B 7/0917
{Focus-error methods other than those covered by G11B 7/0909 - G11B 7/0916}

Definition statement
This place covers:
Uncommon or outdated technology (in 2011).

Further classification information:
The following Indexing Codes are assigned:

G11B 2007/0919 critical angle methods
**G11B 2007/0919** dither methods

**S11B/09B8F** far-field methods

**G11B 2007/0924** skewed beams method

**G11B 7/0932**

**{Details of sprung supports}**

**Definition statement**

*This place covers:*

Sprung supports - e.g. lens holder support by wires or flat springs

also contains other support systems such as liquid, magnetic, combinations.
**G11B 7/0933**

**Details of stationary parts**

**Definition statement**

_This place covers:_

Stationary parts: e.g. the magnets on the sled, e.g. the yokes and magnets of a "normal" four-wire-sprung actuator.
G11B 7/0935
{Details of the moving parts}

Definition statement
This place covers:
Moving parts: lens holder and coils (or, occasionally, magnets) attached to it. Example:

G11B 7/0945
{Methods for initialising servos, start-up sequences}

References
Limiting references
This place does not cover:

| Distinguishing between types of discs by using an initial focus search or scan | G11B 19/12 |

G11B 7/0953
{to compensate for eccentricity of the disc or disc tracks}

Definition statement
This place covers:
Acting on the tracking actuator.
Synonyms and Keywords

In patent documents, the following words/expressions are often used with the meaning indicated:

"radial runout"  "eccentricity".

G11B 7/0956

{to compensate for tilt, skew, warp or inclination of the disc, i.e. maintain the optical axis at right angles to the disc}

Definition statement

This place covers:
Acting on focusing or tilt actuator

Synonyms and Keywords

In patent documents, the following words/expressions are often used with the meaning indicated:

"axial runout"  "tilt", "skew" or "inclination of the disc"

G11B 7/12

Heads, e.g. forming of the optical beam spot or modulation of the optical beam (disposition or mounting of head elements within housing or with provision for moving of light source, optical beam or detector, irrelevant to the transducing method G11B 7/08 ; modulating lasers H01S 3/10; controlling the intensity, colour, phase, polarisation or direction of light beams arriving from an independent light source, e.g. switching gating or modulating G02F 1/00)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Controlling the intensity, colour, phase, polarization or direction of light beams arriving from an independent light source, e.g. switching gating or modulating | G02F 1/00 |
| Modulating lasers | H01S 3/10 |

G11B 7/121

Protecting the head, e.g. against dust or impact with the record carrier

Definition statement

This place covers:
Brushes incorporated into CD form factor discs for cleaning e.g. EP1411505
G11B 7/1245

the waveguides including means for electro-optical or acousto-optical deflection {{electro- or acousto-optical deflection in general G02F 1/29, G02F 1/33}}

References

Informative references
Attention is drawn to the following places, which may be of interest for search:

| Electro or acousto optical deflection in general | G02F 1/29, G02F 1/33 |

G11B 7/125

Optical beam sources therefor, e.g. laser control circuitry specially adapted for optical storage devices; Modulators, e.g. means for controlling the size or intensity of optical spots or optical traces {{electro-, magneto-, or acousto-optical modulators G02F 1/00; optical diaphragms G03B 9/02}}

References

Informative references
Attention is drawn to the following places, which may be of interest for search:

| Electro-, magneto-, or acousto-optical modulators | G02F 1/00 |
| Optical diaphragm | G03B 9/02 |
| Light emitting diodes | H01L 33/00 |
| Semiconductor lasers | H01S 5/00 |

G11B 7/1263

Power control during transducing, e.g. by monitoring

Definition statement
This place covers:
"Running optimum power control"

"walking optimum power control".

OPC carried out as a preparation when the medium is loaded or just before the transducing mode is started: G11B 7/1267 Power calibration

Glossary of terms
In this place, the following terms or expressions are used with the meaning indicated:

| Running OPC | Continuous adjustment of the writing power to the optimum power during recording. This compensates for changes in the optimum power during recording due changing conditions e.g. temperature change. (see for example the standard ECMA-394 "Recordable Compact Disc Systems CD-R - Multi-speed", Chapter 13 "Attachments", Annex 13 "Running OPC") |
Walking OPC

According to wo 2006 018810 "Walking OPC calibration as disclosed in WO 03/065357 adapts the writing power at different instances during the writing process”

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

| OPC, ROPC | running optimum power control |

In patent documents, the following words/expressions are often used as synonyms:

- "running optimum power control", "running OPC", "DRDW" and "dynamical power control"

G11B 7/127

Lasers; Multiple laser arrays {(lasers per se H01S)}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Light emitting diodes | H01L 33/00 |
| Lasers per se         | H01S       |
| Semiconductor lasers  | H01S 5/00  |

G11B 7/128

Modulators (G11B 7/1245 takes precedence)

Definition statement

This place covers:

Speckle modulation in holographic storage, the following should be assigned as appropriate:

- for the diffuser G11B 7/1392
- for multimode optical fibers G11B 7/1384

References

Limiting references

This place does not cover:

| The waveguides including means for electro-optical or acousto-optical deflection | G11B 7/1245 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Electro, magneto or acousto optical modulators | G02F 1/00 |
| Optical diaphragm                               | G03B 9/02 |
G11B 7/13

Optical detectors therefor \{(optical detectors per se G01J; demodulating light, transferring the modulation of modulated light, frequency changing of light G02F 2/00)\}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Type of Subject Matter</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical detectors per se</td>
<td>G01J</td>
</tr>
<tr>
<td>Demodulating light, transferring the modulation of modulated light, frequency changing of light</td>
<td>G02F 2/00</td>
</tr>
</tbody>
</table>

G11B 7/133

Shape of individual detector elements

Definition statement

This place covers:

Illustrative example of subject matter classified in this group:

![Diagram of optical detector elements]
G11B 7/135

Means for guiding the beam from the source to the record carrier or from the record carrier to the detector

Definition statement

This place covers:

Documents in which the invention information concerns a common optical path

Documents in which the invention information concern the relative arrangement of different optical elements

Anti-reflection films on optical elements where the particular type of element is not important

Further classification information:

There is no specific classification in G11B 7/00 for the manufacture of optical elements per se, therefore the manufacture of the optical elements is classified in the most relevant optical element group itself if this is closely related to the application of the element to optical recording/reproduction. (For mounting, aligning of elements in the head see G11B 7/22).

Where subgroups of G11B 7/135 are available for the means and for the function, both classification(s) for the elements and for the function are assigned.

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

| If the application concerns a system adapted for scanning different types of carrier such as CD & DVD | G11B 2007/0006 |
| If the application concerns recording/reproduction of multiple data layers | G11B 2007/0013 |

G11B 7/1353

Diffractive elements, e.g. holograms or gratings {(diffraction gratings per se G02B 5/18; holograms per se G02B 5/32; grating systems G02B 27/44)}

Relationships with other classification places

The borderline between G11B 7/1367 and G11B 7/1353 is not a distinct one, but generally diffraction gratings are regular, repetitive phase steps on a relatively small scale. In borderline cases both are assigned.

Gratings integrated into other elements e.g. lenses are assigned both relevant classes, unless noted otherwise below (e.g. in G11B 7/1367)

Classify also the function if a group exists e.g. diffractive elements used in Foucault (knife edge) method of generating focus error servo signals are also classified in G11B 7/1381
References

Limiting references

This place does not cover:

Irregular, non-repetitive phase steps on a relatively large scale  G11B 7/1367

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diffraction gratings per se</td>
<td>G02B 5/18</td>
</tr>
<tr>
<td>Holograms per se</td>
<td>G02B 5/32</td>
</tr>
<tr>
<td>Grating systems</td>
<td>G02B 27/44</td>
</tr>
</tbody>
</table>

G11B 7/1359  
Single prisms

Relationships with other classification places

Classify also the function if a specific group exists e.g. beam shaping  G11B 7/1398

G11B 7/1365  
Separate or integrated refractive elements, e.g. wave plates

Definition statement

This place covers:

- Integrated combinations of a refractive element, such as a coating element or phase plate, with another element, such as a lens, are classified in this group and in other appropriate groups for the other element.
- Polarisation plates.

Relationships with other classification places

Classify also the function if a specific group exists e.g. beam shaping:  G11B 7/1398

Plates used as beam splitters are classified in both  G11B 7/1365 and  G11B 7/1395

Special rules of classification

G11B 7/1365 is not assigned if the plate is merely a support for a diffraction grating with no particularly adapted feature

G11B 7/1367  
Stepped phase plates

Definition statement

This place covers:

For example, plates used in apparatus compatible with multiple disc standards to control the aberration at one or more wavelengths
Any plate with a lateral spatially varying effect on the phase of the beam (i.e. in the plane of the plate) e.g. Figure 4 WO 2006/135053

This class is also assigned when the spatial variation is integrated into another element such as an objective lens (since this is essentially equivalent to a plate with the phase structure cooperating with the lens).

Relationships with other classification places

The borderline between G11B 7/1367 and G11B 7/1353 is not a distinct one, but generally the phase steps referred to are not regular, repetitive steps as in most diffraction gratings and/or are on a larger scale that a diffraction grating. In borderline cases both are assigned.

Classify also the function if a specific group exists e.g. aberration correction G11B 7/13922.

G11B 7/1369

Active plates, e.g. liquid crystal panels or electrostrictive elements

Definition statement

This place covers:

- Acousto optical deflectors (because they work by changing the refractive index)
- Plates that are mechanically moved e.g. for aberration correction for one or more media types in apparatus compatible with different formats

Relationships with other classification places

Classify also the function if a specific group exists e.g. aberration correction G11B 7/13925 or G11B 7/13927.

G11B 7/1372

Lenses

Definition statement

This place covers:

Relative positioning of more than one type of lens (e.g. collimator and objective lens) e.g. for controlling magnification.

G11B 7/1374

Objective lenses {(optical objectives per se G02B 9/00)}

Definition statement

This place covers:

The SIL of compound objective lenses i.e. where SIL is between the objective lens and the optical data carrier

Further classification information.

Relationships with other classification places

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Objective lenses used in near-field apparatus, unless particularly adapted for the invention.</th>
</tr>
</thead>
<tbody>
<tr>
<td>G11B 7/1374</td>
</tr>
</tbody>
</table>

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Optical objectives per se</th>
</tr>
</thead>
<tbody>
<tr>
<td>G02B 9/00</td>
</tr>
</tbody>
</table>

G11B 7/1376

Collimator lenses {(collimators per se G02B 27/30)}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Collimators per se</th>
</tr>
</thead>
<tbody>
<tr>
<td>G02B 27/30</td>
</tr>
</tbody>
</table>

G11B 7/1378

Separate aberration correction lenses; Cylindrical lenses to generate astigmatism; Beam expanders

Relationships with other classification places

Lenses not coming within the scope of G11B 7/1374, G11B 7/1376 or G11B 7/1378 should be classified in G11B 7/1372.

Note that after a recent reorganization (Q4/2011) the scope of this group has changed from "other lenses".

G11B 7/1381

Non-lens elements for altering the properties of the beam, e.g. knife edges, slits, filters or stops (G11B 7/1353 - G11B 7/1369 take precedence)

Definition statement

This place covers:

Elements that:

• reduce stray light at the detector (e.g. US 2006 0062101)
• are used to generate servo signals (e.g. diffractive areas for focus error detection using the Foucault method)
• comprise one or more annular areas that diffract part of the beam out of the main beam, or that block part of the beam or that deliberately introduce a larger aberration into part of the beam, for the purpose of reducing noise e.g. in apparatus compatible with different standards, since this is a type of filtering
• optically modify the power of the beam (e.g. US 2010 165823, US 2003 0169667).
Elements for apodisation (e.g. for "super-resolution" i.e. to reduce the beam width of a main lobe of the beam below the diffraction limit for that wavelength) but G11B 7/1387 has precedence (i.e. if a lens for near-field apparatus includes a shielding element it is classified in G11B 7/1387, and not also G11B 7/1381).

Note that after a recent reorganization (Q4/2011) the scope of this group has been broadened (it is no longer has the qualifier "as it falls on the detector")

References

Limiting references

This place does not cover:

| Diffraactive elements, e.g. holograms or gratings | G11B 7/1353 |
| Double or multiple prisms, i.e. having two or more prisms in cooperation | G11B 7/1356 |
| Single prisms | G11B 7/1359 |
| Mirrors | G11B 7/1362 |
| Separate or integrated refractive elements, e.g. wave plates | G11B 7/1365 |
| Stepped phase plates | G11B 7/1367 |
| Active plates, e.g. liquid crystal panels or electrostrictive elements | G11B 7/1369 |

G11B 7/1384

Fibre optics

Definition statement

This place covers:

Waveguide elements (mostly older technology), because they work using a similar principle.

References

Limiting references

This place does not cover:

| Waveguide heads | G11B 7/1245 |

G11B 7/1387

using the near-field effect

Definition statement

This place covers:

In a hemispherical lens, the rays that come in at large angles (relative to optical axis) from the previous lens are totally internally reflected at the interface due to the refractive index difference BUT there is an evanescent wave which doesn't die to zero immediately. This can be used to read/write on a medium, as long as the medium is very close (e.g. if the hemispherical lens is on a flying head); Recording may also use the evanescent wave from a very fine tip held near a medium.

Warning: This subgroup was created in 2008 and the reclassification of documents published before 2009 has not been systematically done. For earlier documents G11B 7/12, G11B 7/122, G11B 7/123 should be searched.
A sharply elongated optical fibre may act as a local emitter, similar to scanning near field optical microscopy (SNOM)

**Relationships with other classification places**

Solid Immersion Lenses (SIL) are also be assigned Indexing Code G11B 2007/13727

Catadioptric lenses are also assigned Indexing Code G11B 2007/13725

G11B 7/1372 is not assigned if there is no particular adaptation of the (compound) objective lens.

Where a shielding element is involved, this group has precedence over G11B 7/1381

**References**

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

| Scanning near field optical microscopes | G01Q 60/18 |
| (non waveguide) optics using evanescent waves | G02B 27/56 |
| Optical recording carriers adapted to be used in near-field such as super-RENS (super resolution near field structure) media | G11B 7/24065 |

**Synonyms and Keywords**

In patent documents, the following words/expressions are often used with the meaning indicated:

| "evanescent field" | "the exponentially dying electromagnetic field near the surface, which does not cross a gap according to classical optics, because of total internal reflection" |

**G11B 7/139**

**Numerical aperture control means**

**Definition statement**

This place covers:

Means to control the angle of the outermost parts of the beam to the optical axis, therefore controlling the size of the spot at the focus.

For apparatus compatible with different standards this often involves some way to block the outer part of the beam for a particular wavelength (see e.g. US6396791 Figure 10(a)(b), paragraph 63, and the prior art shown in Figure 11, paragraph 14) using dichroic effects, diffraction grating or phase difference that affect one wavelength more than another, or polarisation (e.g. by using beams polarised in different directions for different wavelengths), but it may involve elements located elsewhere (e.g. US6160646 Figure 6-9, the asymmetrical grating in the central part of the lens is used for CD medium)

**G11B 7/139** is assigned for elements that allow a single lens to be used for different standards. Although switching between objective lenses in apparatus compatible with different standards e.g. CD, DVD, BD, changes the numerical aperture (as well as changing the aberration correction), such documents are not assigned G11B 7/139.
References

Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Objective lenses with NA &gt; 1 (i.e. for near field apparatus)</th>
<th>G11B 7/1387</th>
</tr>
</thead>
</table>

Informative references
Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Means for shaping the cross-section of the beam, e.g. into circular or elliptical cross-section</th>
<th>G11B 7/1398</th>
</tr>
</thead>
</table>

Special rules of classification
G11B 7/139 has precedence over G11B 7/1392 and subgroups.

G11B 7/1392
Means for controlling the beam wavefront, e.g. for correction of aberration
{(optical systems for aberration correction per se G02B 27/00) |

Definition statement
This place covers:
Spherical aberration, coma (also referred to as comatic aberration) and chromatic (i.e. varying with wavelength)

References

Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Numerical aperture control means</th>
<th>G11B 7/139</th>
</tr>
</thead>
<tbody>
<tr>
<td>Means for shaping the cross-section of the beam, e.g. into circular or elliptical cross-section</td>
<td>G11B 7/1398</td>
</tr>
</tbody>
</table>

Informative references
Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Optical systems for aberration correction per se</th>
<th>G02B 27/0025</th>
</tr>
</thead>
</table>

G11B 7/13922
(passive)

Definition statement
This place covers:
- The use of elements with one or more annular areas that diffract part of the beam out of the main beam, or that block part of the beam or that deliberately introduce a larger aberration into part of the beam, for the purpose of reducing noise.
• Passive elements that change the beam from a Gaussian intensity profile to a flat(ter) intensity profile.

**Relationships with other classification places**

In apparatus compatible with different standards:
• where the annular area is a phase step, the class G11B 7/1367 is also assigned,
• where the annular area blocks the beam, the class G11B 7/1381 is also assigned, because it is a type of filtering.

The element specifically adapted for this purpose should also be classified, e.g. lenses designed to minimize aberrations are classified here (as well as in G11B 7/1372 and subgroups).

**References**

**Limiting references**

*This place does not cover:*

| Numerical aperture control means | G11B 7/139 |

**Special rules of classification**

G11B 7/13922 is not assigned to lenses or plates adapted to control numerical aperture, since the purpose of this adaptation is to control the aberration (i.e. assigning this class would amount to assigning two classes for the same aspect).

**G11B 7/13925**

*{active, e.g. controlled by electrical or mechanical means}*  

**Definition statement**

*This place covers:*
• The use of switchable objective lenses in apparatus compatible with different standards e.g. CD, DVD, BD, because the purpose of the switch includes changing the aberration correction (as well as changing the numerical aperture).
• Active elements that change the beam from a Gaussian intensity profile to a flat(ter) intensity profile.

The element specifically adapted for this purpose should also be classified.

**References**

**Limiting references**

*This place does not cover:*

| Numerical aperture control means | G11B 7/139 |

**Special rules of classification**

G11B 7/13922 is not assigned to lenses or plates adapted to control numerical aperture, since the purpose of this adaptation is to control the aberration (i.e. assigning this class would amount to assigning two classes for the same aspect).
G11B 7/13927
{during transducing, e.g. to correct for variation of the spherical aberration due to disc tilt or irregularities in the cover layer thickness}

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Tilt servo aspect | G11B 7/0956 |

G11B 7/1395
Beam splitters or combiners (G11B 7/1353, G11B 7/1356 take precedence {; beam splitting or combining per se G02B 27/10})

Relationships with other classification places
G11B 7/1365 is also assigned for plate beams splitters.

References
Limiting references
This place does not cover:

| Diffractive elements, e.g. holograms or gratings | G11B 7/1353 |
| Double or multiple prisms, i.e. having two or more prisms in cooperation | G11B 7/1356 |

Informative references
Attention is drawn to the following places, which may be of interest for search:

| Beam splitting or combining per se | G02B 27/10 |

G11B 7/1398
Means for shaping the cross-section of the beam, e.g. into circular or elliptical cross-section

Definition statement
This place covers:
The shape of a contour of equal intensity

G11B 2007/240025
{for storing optical interference patterns, e.g. holograms}

Relationships with other classification places

- If the holographic carrier is multilayered carrier also classify in G11B7/24S4, or coded in Indexing Code S11B7/24S4 if not "invention" information
- If one of the holographic layers has additional information (i.e. auxiliary information, control information, also classify or code, as appropriate in G11B 7/00781 or G11B 7/00781
Warning: This subgroup was created in the second half of 2009, and the reclassification from G11B 7/0065 has not been systematically done. For documents published before 2010, G11B 7/0065 and G11B 7/0065 should be searched.

References

Limiting references

This place does not cover:

| Volumetric holographic storage | G11B 2007/0009 |
| Holographic carriers in the form of a card or other rectangular shape, if not invention information | G11B7/24F2, G11B 2007/240008 |
| Holographic tape carriers, if not invention information | G11B7/24F4, G11B 2007/240017 |

G11B 7/24065

Layers assisting in recording or reproduction below the optical diffraction limit, e.g. non-linear optical layers or structures (cover layers for near-field media G11B 7/24059)

Definition statement

This place covers:

Optical recording carriers adapted to be used in near-field or adapted to provide resolution below the diffraction limit e.g. provided with layers that act as masks. For example, "Super-RENS" (super resolution near field structure) media in which a low melting temperature layer such as Sb that acts as a controllable aperture.

References

Limiting references

This place does not cover:

N: Conditioning of record carrier e.g. mechanised protection or means for reducing influence of physical parameters | G11B7/24C |

G11B 7/241

characterised by the selection of the material

Definition statement

This place covers:

Optical recording media such as CDs, DVDs, Blu-Ray discs and Holographic Versatile Discs (HVDs), Optical Cards etc. characterised by the materials.

Relationships with other classification places

- Polymers as such are covered by C08F and C08G
- Dyes as such are covered by C09B
- Photosensitive materials as such are covered by G03C
References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recording, reproducing or erasing methods</td>
<td>G11B 7/004</td>
</tr>
<tr>
<td>Record carriers Indicating prior or unauthorized use by changing the</td>
<td>G11B 23/282</td>
</tr>
<tr>
<td>physical properties of the record carrier - Limited play</td>
<td></td>
</tr>
<tr>
<td>Sheet materials for thermography incl. laser writable labels (e.g.</td>
<td>B41M 5/26</td>
</tr>
<tr>
<td>LightScribe®)</td>
<td></td>
</tr>
<tr>
<td>Sputtering targets for producing e.g. the reflective layer</td>
<td>C23C 14/3407</td>
</tr>
<tr>
<td>Photosensitive materials for photography</td>
<td>G03C 1/00</td>
</tr>
<tr>
<td>Materials for phase modulating patterns i.e. holographic images</td>
<td>G03F 7/001</td>
</tr>
</tbody>
</table>

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recording or reproducing by optical means, e.g. recording using a</td>
<td>G11B 2007/240025</td>
</tr>
<tr>
<td>thermal beam of optical radiation - Record carriers for holograms</td>
<td></td>
</tr>
</tbody>
</table>

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nanotechnology for information processing, storage or transmission, e.g.</td>
<td>B82Y 10/00</td>
</tr>
<tr>
<td>quantum computing or single electron logic</td>
<td></td>
</tr>
<tr>
<td>Recording methods involving bubble or bump forming</td>
<td>G11B 7/00452</td>
</tr>
<tr>
<td>Recording methods involving phase change effects</td>
<td>G11B 7/00454</td>
</tr>
<tr>
<td>Recording methods involving reflectivity, absorption or colour changes</td>
<td>G11B 7/00455</td>
</tr>
<tr>
<td>e.g. photochromic recording</td>
<td></td>
</tr>
<tr>
<td>Recording methods for holographic recording</td>
<td>G11B 7/0065</td>
</tr>
<tr>
<td>3D recording by using multiple recording layers (not holographic)</td>
<td>G11B 2007/0009</td>
</tr>
</tbody>
</table>

Special rules of classification

- In general only the subject matter of
  - claims
  - specific embodiments e.g. examples, figures...is classified.
- Materials disclosed in long non-binding listings are not classified.
- No classes are given for materials which are considered standard and consequently trivial e.g.:
  - Dielectric layers made of ZnS-SiO2, \( \text{(G11B 7/2578)} \)
  - Base layers made of polycarbonate if the polycarbonate is not further specified \( \text{(G11B 7/2534)} \)
  - Reflective layers made from silver if no specific alloy is mentioned \( \text{(G11B 7/259)} \)
- Recording layers:
  - made of or containing "dye" - if no specific dyes is mentioned \( \text{(G11B 7/246)} \)
  - made of "GeSbTe" - if the alloy is not further specified \( \text{(G11B7/243B)} \)
- Please also refer to Annex 1:
Annotated CPC G11B 7/241-G11B 7/2595

**Glossary of terms**

*In this place, the following terms or expressions are used with the meaning indicated:*

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D</td>
<td>three dimensional</td>
</tr>
<tr>
<td>Super-RENS</td>
<td>Super REsolution Near field Structure</td>
</tr>
<tr>
<td>Blue wavelength</td>
<td>390 - 500 nm</td>
</tr>
<tr>
<td>&quot;nanosize&quot; or &quot;nanoscale&quot;</td>
<td>related to a controlled geometrical size below 100 nanometres in one or more dimensions</td>
</tr>
</tbody>
</table>

**Synonyms and Keywords**

*In patent documents, the following abbreviations are often used:*

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>BD</td>
<td>Blu-Ray Disc</td>
</tr>
<tr>
<td>CD</td>
<td>Compact Disc</td>
</tr>
<tr>
<td>DVD</td>
<td>Digital Versatile Disc</td>
</tr>
<tr>
<td>HVD</td>
<td>Holographic Versatile Disc</td>
</tr>
<tr>
<td>COC</td>
<td>Cyclic Olefin Copolymer</td>
</tr>
</tbody>
</table>

*In patent documents, the following words/expressions are often used as synonyms:*

- "mask layer", "shutter layer" and "aperture control layer"
- "data layer" and "recording layer"
- "topcoat(ing)") and "outer layer"

*In patent documents, the word/expression in the first column is often used instead of the word/expression in the second column, which is used in the classification scheme of this place:*

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;substrate&quot;, &quot;support layer&quot; and &quot;board&quot;</td>
<td>&quot;base layer&quot;</td>
</tr>
<tr>
<td>&quot;colo(u)rant&quot; and &quot;pigment&quot;</td>
<td>&quot;dye&quot;</td>
</tr>
<tr>
<td>&quot;bonding&quot;</td>
<td>&quot;adhesion&quot;</td>
</tr>
<tr>
<td>&quot;compostable&quot;</td>
<td>&quot;(bio)-degradable&quot; for substrate/base materials</td>
</tr>
</tbody>
</table>

**G11B 7/26**

Apparatus or processes specially adapted for the manufacture of record carriers (processes involving a single technical art and for which provision exists elsewhere, see the relevant class, e.g. B29, G03 {manufacture of intermediate mediums, e.g. matrixes for processing G11B 23/0057})

**Definition statement**

*This place covers:*

Joining of disc substrates e.g. for DVDs.

G11B 7/26 or a subclass is assigned when the process involves a single technical art for which provision exists elsewhere but where the adaptation is specific to the optical record carrier.
In this subgroup, special care should be taken to circulate the document to classifiers for the relevant "single technical art" - see the informative references.

References

Limiting references

This place does not cover:

| Recovery of plastics or other constituents of waste material containing plastics               | B29B 17/00 |
| Joining of preformed parts; using adhesives                                               | B29C 65/48 |
| Methods or apparatus for laminating (e.g. by curing) by pressing                           | B32B 37/10 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Reconditioning e.g. cleaning of disk carriers (including destroying CDs)                  | G11B 23/505 |

G11B 7/261

{Preparing a master, e.g. exposing photoresist, electroforming}

References

Limiting references

This place does not cover:

| Electronic editing of signals on discs                                                  | G11B 27/034 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Photosensitive materials for photomechanical, e.g. photolithographic production of textured or patterned surfaces | G03F 7/004 |
| Exposure apparatus for photomechanical, e.g. photolithographic production of textured or patterned surfaces | G03F 7/20 |
| Making masks on semiconductor bodies for further photolithographic processing             | H01L 21/027 |

G11B 7/263

{Preparing and using a stamper, e.g. pressing or injection molding substrates (production of optical record carriers, e.g. optical discs B29D 17/005)}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Moulds or cores for shaping or joining of plastics                                        | B29C 33/00 |
| Injection moulding                                                                        | B29C 45/00 |
G11B 7/263 (continued)

Producing (from plastics) optically read record carriers, e.g. optical discs

G11B 7/265

{Apparatus for the mass production of optical record carriers, e.g. complete production stations, transport systems}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Category</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacuum work holders</td>
<td>B25B 11/005</td>
</tr>
<tr>
<td>Conveyors</td>
<td>B65G 25/00</td>
</tr>
</tbody>
</table>

G11B 7/266

{Sputtering or spin-coating layers (sputtering in general C23C 14/24; spin-coating in general B05D 1/005)}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Category</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spin coating</td>
<td>B05D 1/005</td>
</tr>
<tr>
<td>Sputtering</td>
<td>C23C 14/24</td>
</tr>
</tbody>
</table>

G11B 7/268

{Post-production operations, e.g. initialising phase-change recording layers, checking for defects (investigating the presence of flaws or contamination in optical discs G01N 21/9506)}

Definition statement

This place covers:
This class is assigned for writing the BCA, which occurs during manufacture (not done by end user apparatus).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Category</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photographic or thermographic registration for marking record carriers</td>
<td>G06K 1/126</td>
</tr>
</tbody>
</table>

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burst code area</td>
<td>see Glossary of terms Figure in G11B 7/00736</td>
</tr>
</tbody>
</table>
Synonyms and Keywords

In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA</td>
<td>Burst code area</td>
</tr>
</tbody>
</table>

**G11B 9/00**

Recording or reproducing using a method not covered by one of the main groups **G11B 3/00 - G11B 7/00**; Record carriers therefor (**G11B 11/00** takes precedence {driving or moving of heads **G11B 21/02**})

**Definition statement**

This place covers:

- Recording or reproducing using near-field interactions, e.g. recording by means directly associated with the tip of a microscopic electrical probe as used in Scanning Tunneling Microscopy (STM) or Atomic Force Microscopy (AFM) for inducing physical or electrical perturbations in a recording medium, the permanent effect of which being the writing of at least one information unit of a sequence disposed along a track; Reproducing such memorised information by such association of tip and means; Record carriers or media specially adapted for such transducing of information; Structure and manufacture of said microscopic probe and means for moving the microscopic probe or the record carrier relatively to each other for track access and/or for controlling the relative spacing;
- Recording or reproducing using ferroelectric record carriers and record carriers therefor;
- Recording or reproducing using record carriers with variable electric resistance and record carriers therefor;
- Recording or reproducing using electrostatic charge injection and record carriers therefor;
- Recording or reproducing using electron beams and record carriers therefor.

**Relationships with other classification places**

- Scanning probe Microscopy: **G01Q**
- Microstructural devices: **B81B**

**References**

**Limiting references**

This place does not cover:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>G11B 11/00</td>
<td>Recording on or reproducing from the same record carrier wherein for these two operations the methods are covered by different main groups of groups <strong>G11B 3/00 - G11B 7/00</strong> or by different subgroups of group <strong>G11B 9/00</strong>; Record carriers therefor driving or moving of heads <strong>G11B 3/02, G11B 5/48, G11B 7/08, G11B 21/02</strong></td>
</tr>
<tr>
<td>B41M 5/20</td>
<td>Marking using electrical current</td>
</tr>
<tr>
<td>G01B 7/34</td>
<td>Measuring roughness or irregularity of surfaces</td>
</tr>
</tbody>
</table>

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>G11B 21/02</td>
<td>Driving or moving of heads</td>
</tr>
<tr>
<td>B81B 7/00</td>
<td>Microstructural systems</td>
</tr>
</tbody>
</table>
Manufacture or treatment of nanostructures by manipulation of individual atoms or molecules, or limited collections of atoms or molecules as discrete units | B82B 3/00

Investigating or analysing materials by the use of electric, electro-chemical, or magnetic means | G01N 27/00

Scanning or positioning arrangements, i.e. arrangements for actively controlling the movement or position of the probe | G01Q 10/00

Monitoring the movement or position of the probe | G01Q 20/00

Particular type of SPM [Scanning Probe Microscopy] | G01Q 60/00

Applications, other than SPM, of scanning-probe techniques | G01Q 80/00

**Glossary of terms**

*In this place, the following terms or expressions are used with the meaning indicated:*

| Near-field interaction | A very short distance interaction using scanning-probe techniques, e.g. quasi-contact or evanescent contact between head and record carrier |

**Synonyms and Keywords**

*In patent documents, the following abbreviations are often used:*

| SP | Scanning Probe |
| SPM | Scanning Probe Microscopy |
| STM | Scanning Tunnel Microscopy |
| AFM | Atomic Force Microscopy |
| MFM | Magnetic Force Microscopy |
| SNOM | Scanning Near-field Optical Microscopy |
| SCM | Scanning Capacitance Microscopy |

**G11B 11/00**

Recording on or reproducing from the same record carrier wherein for these two operations the methods are covered by different main groups of groups G11B 3/00 - G11B 7/00 or by different subgroups of group G11B 9/00; Record carriers therefor {{(driving or moving of heads G11B 3/02, G11B 5/48, G11B 7/08, G11B 21/02)}}

**Definition statement**

*This place covers:*

Only the cases wherein the method of recording differs from the method of reproducing. The following recording methods (when associated to a different reproducing method) are covered:

- recording by perturbation of the physical or electrical structure;
- recording by deforming with non-mechanical means, e.g. laser, beam of particles;
- recording by electric charge or by variation of electric resistance or capacitance;
- recording by magnetic means or other means for magnetisation or demagnetisation of a record carrier, e.g. light induced spin magnetisation, demagnetisation by thermal or stress means in the
presence or not of an orienting magnetic field; and in particular magneto-optical recording, i.e.
using a beam of light or a magnetic field for recording by change of magnetisation and a beam of
light for reproducing, e.g. light-induced thermo-magnetic recording, spin magnetisation recording,
Kerr or Faraday effect reproducing;
- recording by optical means;
- recording by mechanical cutting, deforming or pressing;
- recording by near-field interactions.

Relationships with other classification places

<table>
<thead>
<tr>
<th>Microstructural devices</th>
<th>B81B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scanning probe Microscopy</td>
<td>G01Q</td>
</tr>
<tr>
<td>Recording or playback apparatus using mechanically marked tape, e.g., punched paper tape, or using unit records, e.g. punched or magnetically marked cards</td>
<td>G06K</td>
</tr>
</tbody>
</table>

References

Limiting references

This place does not cover:

Reading only or recording only using mechanical, magnetic, optical or other methods is covered respectively by groups G11B 3/00, G11B 5/00, G11B 7/00, G11B 9/00

Driving or moving of heads G11B 3/02, G11B 5/48, G11B 7/08, G11B 21/02

Informative references

Attention is drawn to the following places, which may be of interest for search:

Recording by mechanical cutting, deforming or pressing, e.g. of grooves or pits; Reproducing by mechanical sensing; Record carriers therefor G11B 3/00

Recording by magnetisation or demagnetisation of a record carrier; Reproducing by magnetic means; Record carriers therefor G11B 5/00

Recording or reproducing by optical means, e.g. recording using a thermal beam of optical radiation, by modifying optical properties or the physical structure, reproducing using an optical beam at lower power by sensing optical properties; Record carriers therefor G11B 7/00

Recording or reproducing using a method not covered by one of the main groups G11B 3/00 - G11B 7/00; Record carriers therefor G11B 9/00

Special rules of classification

Recording by magnetic means or other means for magnetisation or demagnetisation of a record carrier G11B 11/10 takes precedence over G11B 11/08 recording by electric charge or by variation of electric resistance or capacitance.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Near-field interaction | Means a very short distance interaction using scanning-probe techniques, e.g. quasi-contact or evanescent contact between head and record carrier
Synonyms and Keywords

In patent documents, the following abbreviations are often used:

| MO          | Magneto-Optical |

G11B 13/00

Recording simultaneously or selectively by methods covered by different main groups {among G11B 3/00, G11B 5/00, G11B 7/00 and G11B 9/00}; Record carriers therefor {not otherwise provided for}; Reproducing therefrom {not otherwise provided for (G11B 9/14, G11B 11/002 take precedence; driving or moving of heads G11B 3/02, G11B 5/48, G11B 7/08, G11B 21/02)"

Definition statement

This place covers:

This group is limited to the combination of recording and reproducing on the same record carrier by more than one of the different method covered by groups G11B 3/00, G11B 5/00, G11B 7/00 and G11B 9/00

Recording simultaneously or selectively:
- magnetically and by stylus
- magnetically and optically
- optically and by stylus.

Using near-field interactions or transducing means and at least one other method or means for recording or reproducing

Relationships with other classification places

Microstructural devices: B81B

References

Limiting references

This place does not cover:

| Reading only or recording only using mechanical, magnetic, optical or other methods is covered respectively by groups | G11B 3/00, G11B 5/00, G11B 7/00, G11B 9/00 |
| Takes precedence | G11B 9/14 |
| Using recording by perturbation of the physical or electrical structure | G11B 11/002 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Recording by mechanical cutting, deforming or pressing, e.g. of grooves or pits; Reproducing by mechanical sensing; | G11B 3/00 |
|Recording by magnetisation or demagnetisation of a record carrier; Reproducing by magnetic means; | G11B 5/00 |
|Recording or reproducing by optical means, e.g. recording using a thermal beam of optical radiation, by modifying optical properties or the physical structure, reproducing using an optical beam at lower power by sensing optical properties; | G11B 7/00 |
Recording or reproducing using a method not covered by one of the main groups G11B 3/00 - G11B 7/00; G11B 9/00

Special rules of classification

- Assisted magnetic recording, e.g. thermally or microwave assisted magnetic recording are classified in G11B 5/00;
- Driving or moving of heads G11B 3/02, G11B 5/48, G11B 7/08, G11B 21/02

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Near-field interaction</td>
<td>Means a very short distance interaction using scanning-probe techniques, e.g. quasi- contact or evanescent contact between head and record carrier</td>
</tr>
</tbody>
</table>

G11B 15/00

Driving, starting or stopping record carriers of filamentary or web form; Driving both such record carriers and heads; Guiding such record carriers or containers therefor; Control thereof; Control of operating function (driving or guiding heads G11B 3/00 - G11B 7/00, G11B 21/00)

Definition statement

This place covers:
- Mechanism for loading/unloading/guiding single tape cartridges in/from tape drives.
- Libraries of tape cartridges in which the cartridges are transported from a random access magazine to a tape drive or vice versa.
- Means for guiding the tape within the tape drive.
- Means for extracting the tape from the cartridge.
- Means for controlling the tension of the tape within the tape drive.
- Means for sensing features present on the record carrier or on the cartridge.

Relationships with other classification places

The user interface aspects of tape drives are classified also in G11B 25/06.

Analogue recording or reproducing G11B 20/02.

Digital recording or reproducing G11B 20/10.

Transmission of digital information H04L.

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Classification</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recording/reproducing operations</td>
<td>G11B 5/00, G11B 7/00, G11B 9/00, G11B 11/00</td>
</tr>
<tr>
<td>Magnetic heads</td>
<td>G11B 5/127</td>
</tr>
<tr>
<td>Signal processing</td>
<td>G11B 20/00</td>
</tr>
</tbody>
</table>
| Record carriers, tape cartridges       | G11B 23/00
User interface aspects of drives

Recording/reproducing apparatuses in combination with television sets

Recording/reproducing apparatuses in combination with video cameras

Vibration damping means

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparatuses using web form record carriers, e.g. tapes</td>
<td>G11B 25/06</td>
</tr>
<tr>
<td>Apparatuses using web form record carriers in combination with non web</td>
<td>G11B 25/10</td>
</tr>
<tr>
<td>form record carriers; combi apparatuses</td>
<td></td>
</tr>
<tr>
<td>Telephones answering machines</td>
<td>H01M1/64</td>
</tr>
<tr>
<td>Telephones with dictation recording systems</td>
<td>H04M 11/10</td>
</tr>
<tr>
<td>Apparatuses for television signal recording</td>
<td>H04N 5/76</td>
</tr>
</tbody>
</table>

G11B 17/00

Guiding record carriers not specifically of filamentary or web form, or of supports therefor (guiding cards or sheets G06K 13/00)

Definition statement

This place covers:

• Mechanisms for loading/unloading/guiding single disk cartridges or naked disks in/from disk drives.
• Mechanisms in which the disks are transported from a consecutive access magazine to a disk drive.
• Libraries of disks or disk cartridges, in which the disks or cartridges are transported from a random access magazine to a disk drive and viceversa.

Relationships with other classification places

• Hard disk drives are classified in G11B 25/043.
• Analogue recording or reproducing G11B 20/02.
• Digital recording or reproducing G11B 20/10.
• Transmission of digital information H04L.
• Libraries of tape cartridges G11B 15/68.

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tape drives</td>
<td>G11B 15/00</td>
</tr>
<tr>
<td>Tape libraries</td>
<td>G11B 15/68</td>
</tr>
<tr>
<td>Driving means for disks turntables</td>
<td>G11B 19/20</td>
</tr>
<tr>
<td>Tape cartridges</td>
<td>G11B 23/04, G11B 23/087</td>
</tr>
<tr>
<td>Hard disk drives</td>
<td>G11B 25/043</td>
</tr>
</tbody>
</table>
Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Constructional details of computers</th>
<th>G06F 1/16, G06F 1/18, G06F 1/20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport of card shaped record carriers</td>
<td>G06K 13/00, G06K 17/00</td>
</tr>
<tr>
<td>Adhesive labels</td>
<td>G09F 3/00</td>
</tr>
</tbody>
</table>

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>Disk tray</th>
<th>Disk drawer, caddy, pallet, receiver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disks magazine</td>
<td>Storage means, stowage means, stocker</td>
</tr>
<tr>
<td>Disk accessor</td>
<td>Picker, gripper, take out, hand, transport unit, carriage, shuttle</td>
</tr>
</tbody>
</table>

G11B 19/00

Driving, starting, stopping record carriers not specifically of filamentary or web form, or of supports therefor; Control thereof; Control of operating function (guiding such record carriers G11B 17/00); {Driving both disc and head}

Definition statement

This place covers:

Any aspect of control regarding recording and reproducing devices which use carriers moving with respect to the transducer but which are not of filamentary (wire) or web (tape) form. This includes disks and drums, but is predominantly to do with disks.

Any form of control whether externally generated (e.g. user control, external shock) or internally (e.g. a response generated by the sensing of a feature of the record carrier).

Driving, starting and stopping such carriers, including details of control systems used for starting, stopping or altering the speed of motion of the carrier and details of the electromechanical arrangements used in driving, starting, speed-changing and stopping.

Relationships with other classification places

G11B 19/2009 and G11B 19/2036 are used to classify spindle motors for disk drives. Electric motors in general are also classified in H02K (Dynamo-electric machines), but only those specifically mentioned as having applications in disk drives are classified in G11B 19/2009 or G11B 19/2036.

G11B 19/2036 is used specifically for the classification of spindle motors characterised by having fluid-dynamic bearings. Such bearings per se are also classified in F16C 17/00, but only those specifically mentioned as having applications in disk drives are classified in G11B 19/2036.
G11B 19/00 (continued)

G11B 19/20 is used to classify any other spindle motor arrangements (e.g. for drums).

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Signal processing</th>
<th>G11B 20/00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editing, Indexing, Addressing</td>
<td>G11B 27/00</td>
</tr>
</tbody>
</table>

Special rules of classification

Control of operating function (G11B 19/02 and subgroups) should not be confused with speed control (G11B 19/20 and subgroups).

The development of battery-powered portable media devices using moving media has led to a number of applications regarding power-saving arrangements and methods. These are considered to have a control aspect, but not of operating function as such. They are generally classified in G11B 19/00.

An exception to this is methods and arrangements for powering down or reducing the speed of the spindle motor in order to save power during idle time, which aspects are classified in G11B 19/2072.

Any other control aspects which do not fall under G11B 19/02 or G11B 19/20 should be classified in G11B 19/00.

Most sub-groups of G11B 19/00 have definitions which are self-explanatory, but exceptions are shown below.

The definition of the G11B 19/04 sub-group according to the IPC is so general that it could cover almost any problem or error experienced while using a recording and reproducing device. It explicitly does NOT cover the following, however:

Data error detection and correction: this is to be found in G11B 20/18 and sub-groups.

Defect management i.e. the detection and management of bad sectors and reallocation of data to good sectors: this is to be found in G11B 27/00.

The sub-groups of G11B 19/04 are self-explanatory and cover the majority of problems often encountered. Other problems not explicitly mentioned are classified in G11B 19/04 itself.

G11B 20/00

Signal processing not specific to the method of recording or reproducing;
Circuits therefor

Definition statement

This place covers:

any kind of signal processing which is performed when reading data from or recording data to record carriers. This signal processing specifically includes analog and digital filtering, equalisation, carrier and symbol synchronization (adjustment of read/write clocks), and the corresponding ways of assessing and improving the quality of the recorded/reproduced signal. Modulation and demodulation techniques (i.e. the actual codes and the stochastical methods for recovering the bit sequences that are reproduced from a record carrier), in the context of recording and reproducing. Techniques of applying error correcting codes in recording / reproducing devices, and likewise how interleaving techniques can be used to mitigate the effects of local burst errors. Techniques for actually detecting media errors (e.g. bad sectors), or data structures and algorithms for coping with these errors, e.g. by relocating data from defective sectors to non-defective spare sectors. The sub-group G11B 20/12 also
covers the actual format of the record carriers (in the sense of how different kinds of data are arranged on the medium, e.g. documents which describe dedicated areas for storing specific kinds of user or control data, or documents which relate to the data structure of individual sectors). **G11B 20/00086** is a prominent sub-group, which comprises documents about all sorts of copy protection and digital rights management for record carriers. Since recent copy protection initiatives address the copyright protection issue with techniques which apply likewise to all kinds of different storage media, this sub-group nowadays also includes copyright protection for record carriers which do not necessarily involve any physical movement between a head and the medium.

**Relationships with other classification places**

- The scope of this group is in principle restricted to record carriers that involve some relative movement between the record carrier and a transducer, i.e. record carriers that are fed forward or spinned (gramophone/vinyl records: **G11B 3/00**; magnetic tapes/discs: **G11B 5/00**; optical cards/tapes/discs: **G11B 7/00**). Recording processes that do not involve any physical movement (i.e. semiconductor memories, **G11C**) were not considered under **G11B** in the past. This has changed to some extent, since various techniques (in particular: copy protection / DRM schemes, see **G11B 20/00086**) equally apply to both kinds of record carriers. Historically, there was also a strict separation from anything related to computer I/O (**G06F 3/00**). To some extent, this separation is about to diminish as well.

- The subject-matter classified in **G11B 20/00** is conceptually tied to, on the one hand, the technology classified in **G11B 5/00** and **G11B 7/00**, and on the other hand, the one classified in **G11B 27/00**. **G11B 5/00** and **G11B 7/00** define physical properties of magnetic and optical recording media, respectively, and the physical structure and the physical operation of different components in the corresponding drives. They also do involve some basic signal processing to the extent that certain signals need to be measured and evaluated in order to adjust the physical properties of the magnetic or optical heads (e.g., for optimising the power of the laser, or for choosing the appropriate write strategy). However, if some more elaborate signal processing is involved to improve the signal quality, or if formatting aspects are discussed which go beyond the mere physical structure of the medium, it would fall within the scope of **G11B 20/00**.

- The group **G11B 27/00** covers more high-level aspects, in the sense that it relates to data processing (e.g., editing) or data structures (e.g., tables of contents) which are independent of the specific signal processing that takes place right before writing data to or reading data from a medium (modulation, error correction, etc).

- The sub-group **H04N 5/76** deals with video recording, which covers as opposed to **G11B 20/00**, data processing techniques, which are specifically adapted to video signals and which are independent of the low-level processing required for actually writing the data on the record carrier, Sub-group **H04N 5/76** also covers aspects not specific to how the data actually appear on the medium. In particular, copy protection strategies for protecting broadcast video signals when recording them may be classified in **H04N 5/913**, but also in **G11B 20/00086** if they are specific to the medium used, or if they have applications beyond the limited context of a PVR or a STB.

- The sub-group **G06F 21/10** is used for general DRM concepts that are fully independent of the actual recording medium used. If the copy protection involves features of a storage medium, then it would be classified in **G11B 20/00086**.

- The sub-group **G06F 21/80** covers computer-related access protection for magnetic and optical storage media. If this access protection is part of a copy-protection scheme, e.g., for A/V data, then it should be classified in **G11B 20/00086** instead.
References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

| Computer storage devices which use signal processing when accessing a record carrier, but the main focus is on the processing needed for the I/O interface rather than on some specific processing tailored to the recording medium | G06F 3/06 |
| Computer storage devices in which each record medium is protected by common error correction codes, as found in G11B 20/18, but the main focus is on aspects that are specific to the application in computer systems (e.g., redundant hardware, such as RAID systems) | G06F 11/10 |
| PVRs, STBs, which record broadcast data streams on a record carrier, wherein the recorder makes use of signal processing technology generally covered in G11B 20/00, but the main focus is either on a very specific signal processing that is especially adapted to TV signals and or on the broadcasting / transmission aspects | H04N 5/76 |

Special rules of classification

The main group G11B 20/00 is not used for classification. Documents are classified in its subgroups instead.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

| Linear replacement | defect management by relocating the data of defective sectors to a separate spare area |
| Slipping algorithm | defect management by shifting the beginning of the user area, at the expense of the primary spare area, so as to compensate for defective sectors listed in the PDL. Each defective sector will be replaced by the first good sector following the defective sector. |
| Skip replacement | defective sectors are skipped; data recording continues at a subsequent good sector |
| Pre-pit | pre-recorded address pattern on a recordable optical disc |
| Wobble | radially oscillating pattern of the recording track of an optical disc |

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

<p>| (d,k) constraint | constraint on the minimum and maximum runlength between two transitions of a NRZI modulated signal |
| 17PP | Parity Preserving RLL(1,7) code, the modulation code used for Blu-Ray discs |
| AAC | Advanced Audio Coding, lossy compression scheme for audio data, standardised in MPEG-2 and MPEG-4 |
| AACS | Advanced Access Content System, copy protection scheme used on Blu-Ray discs, HD-DVDs, etc. |
| ADC | Analog to Digital Converter |</p>
<table>
<thead>
<tr>
<th>ADIP</th>
<th>Address In Pregroove, address data modulated onto the wobble frequency of an optical disc, used e.g. on a DVD+R</th>
</tr>
</thead>
<tbody>
<tr>
<td>AES</td>
<td>Advanced Encryption Standard, also called Rijndael, designed to supersede DES, published as FIPS 197</td>
</tr>
<tr>
<td>AGC</td>
<td>Adaptive Gain Control, Automatic Gain Control</td>
</tr>
<tr>
<td>AIT</td>
<td>Advanced Intelligent Tape, standard for magnetic tape recording</td>
</tr>
<tr>
<td>AKE</td>
<td>Authentication and Key Exchange</td>
</tr>
<tr>
<td>ATIP</td>
<td>Absolute Time In Pregroove, CD-R/RW term for control information which is retrievable from a wobbled pre-groove, see also ADIP</td>
</tr>
<tr>
<td>ATRAC</td>
<td>Adaptive Transform Acoustic Coding, lossy compression scheme for audio data</td>
</tr>
<tr>
<td>AV</td>
<td>Audio/Video</td>
</tr>
<tr>
<td>AWGN</td>
<td>Additive White Gaussian Noise</td>
</tr>
<tr>
<td>BCA</td>
<td>Burst Cutting Area, barcode pattern appearing as radial stripes at the inner rim of an optical disc</td>
</tr>
<tr>
<td>BCH code</td>
<td>Bose Chaudhuri Hocquenghem code, a specific class of error-correcting block codes</td>
</tr>
<tr>
<td>BD</td>
<td>Blu-ray Disc</td>
</tr>
<tr>
<td>BD-J</td>
<td>Blu-Ray Disc Java, a specific variant of the Java programming language which is implemented in BD players</td>
</tr>
<tr>
<td>BPSK</td>
<td>Binary Phase Shift Keying</td>
</tr>
<tr>
<td>BSC</td>
<td>Binary Symmetric Channel</td>
</tr>
<tr>
<td>C2</td>
<td>Cryptomeria Cipher, Feistel network-based block cipher</td>
</tr>
<tr>
<td>CBC</td>
<td>Cipher Block Chaining, encryption mode in which each block of a message is XORed with the encrypted previous block before being encrypted</td>
</tr>
<tr>
<td>CBHD</td>
<td>China Blue High Definition disc, competes with the BD format</td>
</tr>
<tr>
<td>CCI</td>
<td>Copy Control Information, two bits indicating Copy Free, Copy No More, Copy Once, or Copy Never</td>
</tr>
<tr>
<td>CD</td>
<td>Compact Disc</td>
</tr>
<tr>
<td>CE</td>
<td>Consumer Electronics, typically standalone devices designed specifically for processing audio/video data, unlike a general-purpose computer</td>
</tr>
<tr>
<td>CGMS</td>
<td>Copy Generation Management System, similar to CCI</td>
</tr>
<tr>
<td>CIRC</td>
<td>Cross-interleaved Reed Salomon code, the ECC used on CDs</td>
</tr>
<tr>
<td>CPPM</td>
<td>4C Content Protection for Prerecorded Media</td>
</tr>
<tr>
<td>CPRM</td>
<td>4C Content Protection for Recordable Media</td>
</tr>
<tr>
<td>CPSA</td>
<td>5C Content Protection System Architecture</td>
</tr>
<tr>
<td>CPU</td>
<td>Central Processing Unit</td>
</tr>
<tr>
<td>CRC</td>
<td>Cyclic Redundancy Check, a specific EDC</td>
</tr>
<tr>
<td>CSS</td>
<td>Content Scrambling System, copy protection scheme used on prerecorded DVDs</td>
</tr>
<tr>
<td>D</td>
<td>usually, the unit delay operator</td>
</tr>
<tr>
<td>DA</td>
<td>Data Area</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>DAC</td>
<td>Digital to Analog Converter</td>
</tr>
<tr>
<td>DAT</td>
<td>Digital Audio Tape</td>
</tr>
<tr>
<td>DC</td>
<td>Direct Current, Bias, Offset</td>
</tr>
<tr>
<td>DCT</td>
<td>Discrete Cosine Transform</td>
</tr>
<tr>
<td>DDS</td>
<td>Disc Definition Structure, control structure recorded, e.g., in the DMA of a DVD-RAM; also: Digital Data Storage</td>
</tr>
<tr>
<td>DES</td>
<td>Data Encryption Standard, published as FIPS 46</td>
</tr>
<tr>
<td>DFE</td>
<td>Decision Feedback Equaliser</td>
</tr>
<tr>
<td>DFT</td>
<td>Discrete Fourier Transform</td>
</tr>
<tr>
<td>DLT</td>
<td>Digital Linear Tape, standard for magnetic tape recording</td>
</tr>
<tr>
<td>DM</td>
<td>Delta Modulation</td>
</tr>
<tr>
<td>DMA</td>
<td>Defect Management Area, sometimes also: Defect Managed Area; also: Direct Memory Access</td>
</tr>
<tr>
<td>DMCA</td>
<td>Digital Millenium Copyright Act</td>
</tr>
<tr>
<td>DPCM</td>
<td>Differential PCM</td>
</tr>
<tr>
<td>DPSK</td>
<td>Differential Phase Shift Keying</td>
</tr>
<tr>
<td>DRM</td>
<td>Digital Rights Management</td>
</tr>
<tr>
<td>DSA</td>
<td>Digital Signature Algorithm, published as FIPS-186</td>
</tr>
<tr>
<td>DSP</td>
<td>Digital Signal Processor</td>
</tr>
<tr>
<td>DSV</td>
<td>Digital Sum Variation, the difference between the minimum and maximum RDS; DSV may also denote the Digital Sum Value, which is a synonym of the RDS</td>
</tr>
<tr>
<td>DTCP</td>
<td>5C Digital Transmission Content Protection</td>
</tr>
<tr>
<td>DVD</td>
<td>Digital Versatile Disc, Digital Video Disc</td>
</tr>
<tr>
<td>DVR</td>
<td>Digital Video Recorder, usually used as a synonym of PVR</td>
</tr>
<tr>
<td>E2PR</td>
<td>see EEPR</td>
</tr>
<tr>
<td>ECB</td>
<td>Electronic Codebook, encryption mode in which each block of a message is encrypted separately</td>
</tr>
<tr>
<td>ECC</td>
<td>Error Correcting Code, code used for repairing a bit sequence that was altered by the transmission channel</td>
</tr>
<tr>
<td>EDC</td>
<td>Error Detecting Code, provides enough redundancy for detecting errors, but not necessarily for correcting them</td>
</tr>
<tr>
<td>EEPR</td>
<td>PR channel with transfer function (1-D)(1+D)^3</td>
</tr>
<tr>
<td>EFM</td>
<td>Eight-to-Fourteen Modulation, the modulation code used for CDs, transforms 8 input bits into 14-bit codewords</td>
</tr>
<tr>
<td>EFM+</td>
<td>Eight-to-Sixteen Modulation, the modulation code used for DVDs, transforms 8 input bits into 16-bit codewords</td>
</tr>
<tr>
<td>EKB</td>
<td>Enabling Key Block, data structure on a recording medium which authorises devices to process encrypted content</td>
</tr>
<tr>
<td>EPR4</td>
<td>PR channel with transfer function (1-D)(1+D)^2</td>
</tr>
<tr>
<td>FE</td>
<td>Frequency Encoding, frequency modulation</td>
</tr>
<tr>
<td>FEC</td>
<td>Forward Error Correction, error correction without a return channel, no retransmission of data</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>FFT</td>
<td>Fast Fourier Transform</td>
</tr>
<tr>
<td>FIR</td>
<td>Finite Impulse Response</td>
</tr>
<tr>
<td>FM</td>
<td>Frequency Modulation, frequency encoding</td>
</tr>
<tr>
<td>FSK</td>
<td>Frequency Shift Keying</td>
</tr>
<tr>
<td>HD</td>
<td>High Density; also: High Definition</td>
</tr>
<tr>
<td>HDCP</td>
<td>High Bandwidth Digital Content Protection</td>
</tr>
<tr>
<td>HDD</td>
<td>Hard-Disk Drive</td>
</tr>
<tr>
<td>ID</td>
<td>Identifier, unique number, such as a serial number</td>
</tr>
<tr>
<td>IF</td>
<td>Intermediate Frequency</td>
</tr>
<tr>
<td>IID</td>
<td>Independently and Identically Distributed</td>
</tr>
<tr>
<td>ISCR</td>
<td>International Standard Recording Code, globally unique identifier for sound recordings and music videos</td>
</tr>
<tr>
<td>ISI</td>
<td>Inter-Symbol Interference</td>
</tr>
<tr>
<td>KEK</td>
<td>Key Encrypting Key, a cryptographic key used for encrypting another key</td>
</tr>
<tr>
<td>LBN</td>
<td>Logical Block Number</td>
</tr>
<tr>
<td>LDPC code</td>
<td>Low Density Parity Check code, also known as Gallager codes</td>
</tr>
<tr>
<td>LFSR</td>
<td>Linear Feedback Shift Register</td>
</tr>
<tr>
<td>LIA</td>
<td>Lead-In Area, area near the inner rim of an optical disc</td>
</tr>
<tr>
<td>LMS</td>
<td>Least Mean Squares</td>
</tr>
<tr>
<td>LOA</td>
<td>Lead-Out Area, area near the outer rim of an optical disc</td>
</tr>
<tr>
<td>LPP</td>
<td>Land Pre-Pit, prerecorded address information on, e.g., a DVD-R</td>
</tr>
<tr>
<td>LSN</td>
<td>Logical Sector Number</td>
</tr>
<tr>
<td>LTO</td>
<td>Linear Tape Open, also marketed as Ultrium, standard for magnetic tape recording</td>
</tr>
<tr>
<td>MAC</td>
<td>Message Authentication Code; also : Medium Access Control</td>
</tr>
<tr>
<td>MAP</td>
<td>Maximum A-Posteriori</td>
</tr>
<tr>
<td>MD</td>
<td>Mini Disk</td>
</tr>
<tr>
<td>MD5</td>
<td>Message Digest Algorithm 5, cryptographic hash algorithm</td>
</tr>
<tr>
<td>MFM</td>
<td>Modified Frequency Modulation, Delay Modulation, Miller Code</td>
</tr>
<tr>
<td>MKB</td>
<td>Media Key Block</td>
</tr>
<tr>
<td>ML</td>
<td>Maximum Likelihood</td>
</tr>
<tr>
<td>MMC</td>
<td>Multi-Media Command, command specifically designed for accessing multimedia data on a recording medium</td>
</tr>
<tr>
<td>MMSE</td>
<td>Minimum Mean Squared Error, a general paradigm for setting up the objective function in the context of parameter optimisation</td>
</tr>
<tr>
<td>MO</td>
<td>Magneto-Optical</td>
</tr>
<tr>
<td>MP3</td>
<td>MPEG-1 Layer 3, lossy data compression for audio data</td>
</tr>
<tr>
<td>MPEG</td>
<td>Moving Picture Experts Group</td>
</tr>
<tr>
<td>MRW</td>
<td>Mount Rainier, specific format for rewritable optical discs</td>
</tr>
<tr>
<td>MSE</td>
<td>Mean Square Error</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Definition</td>
</tr>
<tr>
<td>--------------</td>
<td>------------</td>
</tr>
<tr>
<td>NA</td>
<td>Numerical Aperture; also: Not Applicable (N/A)</td>
</tr>
<tr>
<td>NRZ</td>
<td>Non Return to Zero</td>
</tr>
<tr>
<td>NRZI</td>
<td>Non Return to Zero Inverted</td>
</tr>
<tr>
<td>OPC</td>
<td>Optimum Power Calibration, adjusting the laser power of an optical write head</td>
</tr>
<tr>
<td>OTP</td>
<td>Opposite Track Path, recording on a multi-layer disc alternates between radially outwards on one layer and radially inwards on the following layer</td>
</tr>
<tr>
<td>PAM</td>
<td>Pulse Amplitude Modulation</td>
</tr>
<tr>
<td>PBN</td>
<td>Physical Block Number</td>
</tr>
<tr>
<td>PC</td>
<td>Personal Computer</td>
</tr>
<tr>
<td>PCA</td>
<td>Power Calibration Area, specific area used for OPC</td>
</tr>
<tr>
<td>PCM</td>
<td>Pulse Coded Modulation</td>
</tr>
<tr>
<td>PDL</td>
<td>Primary Defect List, lists defective sectors found at formatting a disc</td>
</tr>
<tr>
<td>PE</td>
<td>Phase Encoding, phase modulation</td>
</tr>
<tr>
<td>PI</td>
<td>Parity Inner, parity bits of the inner code of a product code</td>
</tr>
<tr>
<td>PIC zone</td>
<td>Permanent Information and Control Data zone, prerecorded area of a Blu-Ray disc</td>
</tr>
<tr>
<td>PLL</td>
<td>Phase Locked Loop</td>
</tr>
<tr>
<td>PM</td>
<td>Phase Modulation, phase encoding</td>
</tr>
<tr>
<td>PO</td>
<td>Parity Outer, parity bits of the outer code of a product code</td>
</tr>
<tr>
<td>PR</td>
<td>Partial Response; a PR(a,b,c) channel maps binary samples x,y,z to a<em>x</em>D+b<em>y</em>D^2+c<em>z</em>D^3</td>
</tr>
<tr>
<td>PR4</td>
<td>Class 4 Partial Response channel, PR channel with transfer function (1-D^2)</td>
</tr>
<tr>
<td>PRML</td>
<td>Partial Response Maximum Likelihood</td>
</tr>
<tr>
<td>PSK</td>
<td>Phase Shift Keying</td>
</tr>
<tr>
<td>PSN</td>
<td>Physical Sector Number</td>
</tr>
<tr>
<td>PTP</td>
<td>Parallel Track Path, on all layers of a multi-layer disc, recording proceeds from the inner to the outer diameter</td>
</tr>
<tr>
<td>PVR</td>
<td>Personal Video Recorder, usually used as a synonym of DVR</td>
</tr>
<tr>
<td>QAM</td>
<td>Quadrature Amplitude Modulation</td>
</tr>
<tr>
<td>QPSK</td>
<td>Quadrature Phase Shift Keying</td>
</tr>
<tr>
<td>RAM</td>
<td>Random Access Memory, rewritable storage</td>
</tr>
<tr>
<td>RC4</td>
<td>a specific cryptographic stream cipher (“Rivest Cipher 4”)</td>
</tr>
<tr>
<td>RDS</td>
<td>Running Digital Sum; see also DSV</td>
</tr>
<tr>
<td>RF</td>
<td>Radio Frequency</td>
</tr>
<tr>
<td>RLL</td>
<td>Run Length Limited</td>
</tr>
<tr>
<td>RLS</td>
<td>Recursive Least Squares</td>
</tr>
<tr>
<td>RS code</td>
<td>Reed-Solomon code</td>
</tr>
</tbody>
</table>
RSA | public-key encryption algorithm developed by Rivest, Shamir and Adleman
---|---
SA | Spare Area, replacement area, area on a recording medium used for replacing defective sectors
SAC | Secure Authenticated Channel
SACD | Super Audio CD
SAIT | Super AIT, variant of AIT having a higher capacity
SDL | Secondary Defect List, lists defective sectors found when trying to record data on a disc
SDM | Sigma-Delta Modulation
SDMI | Secure Digital Music Initiative
SHA | Secure Hash Algorithm, cryptographic one-way function published as FIPS 180
SNR | Signal to Noise Ratio
STB | Set-Top Box
TCM | Trellis Coded Modulation
TDL | Tapped Delay Line
TOC | Table Of Contents
VCO | Voltage Controlled Oscillator
VCPS | Video Content Protection System, DRM standard for DVD+R and DVD+RW
VCR | Video Cassette Recorder
VFO | Variable Frequency Oscillator
WO | Write Once, not rewritable
WORM | Write Once Read Many, not rewritable
XOR | exclusive OR
ZF | Zero Forcing, zero forcing equalisers multiply the read signal with the reciprocal of the transfer function of the recording channel

G11B 20/00007

{Time or data compression or expansion (audio compression based on psychoacoustics G10L 19/00; data processing for reproducing audio data at different playback speeds G10L 21/04; video compression H04N 19/00; data compression per se H03M 7/30)}

Definition statement

This place covers:

Data compression in the context of recording, both for A/V signals (ATRAC, MP3 etc) and for digital signals in general, e.g. subband coding, transform coding. Also analogue compression, e.g. "time compression/expansion" by altering the density at which the data are recorded, e.g. on an analog tape.)
References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image compression</td>
<td>G06T 9/00</td>
</tr>
<tr>
<td>Lossy or lossless audio compression, e.g. MP3 encoding, speech encoding etc., streaming, transcoding</td>
<td>G10L 19/00</td>
</tr>
<tr>
<td>Time compression for audio data, e.g. by increasing the pitch</td>
<td>G10L 21/04</td>
</tr>
<tr>
<td>Theory of data compression</td>
<td>H03M 7/30</td>
</tr>
<tr>
<td>Data compression in computer networks</td>
<td>H04L 29/0604</td>
</tr>
<tr>
<td>Video compression for transmission purposes</td>
<td>H04N 19/00</td>
</tr>
</tbody>
</table>

G11B 20/00086

(Circuits for prevention of unauthorised reproduction or copying, e.g. piracy (indicating unauthorised use of record carriers in general G11B 23/28; scrambling for television signal recording H04N 5/913; network architectures or network protocols for network security H04L 63/00; cryptographic mechanisms or cryptographic arrangements for secret or secure communication H04L 9/00))

Definition statement

This place covers:

Copy protection for record carriers; preventing unauthorised access to recorded data; providing means for recognising unauthorised use of data or for distinguishing between authorised and illicit copies; tracing back users, recording devices, or media manufacturers; encryption, decryption, and scrambling algorithms; distributing, updating or revoking encryption keys; secure content acquisition and transmission for recording contents on record carriers; limiting access to a content to certain conditions (certain duration, geographical region, restricted set of users or devices, restricted number of copies, reduced quality). For both digital and analog recording.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labels, i.e. visible patterns, formed on an optical disc, e.g. by modifying the pit width or the groove width</td>
<td>G11B 2007/00727</td>
</tr>
<tr>
<td>Optical discs having specific layers or comprising specific materials which limit the time the disc can be played back</td>
<td>G11B 7/24</td>
</tr>
<tr>
<td>Testing for media defects</td>
<td>G11B 20/1816</td>
</tr>
<tr>
<td>Record carrier with additional integrated circuitry, such as transponder tags</td>
<td>G11B 23/0042</td>
</tr>
<tr>
<td>Physical arrangements for indicating or preventing unauthorised use of record carriers, e.g. cassettes which can be locked mechanically etc.</td>
<td>G11B 23/28</td>
</tr>
<tr>
<td>Time limited playback by modifying physical properties of the record carrier</td>
<td>G11B 23/282</td>
</tr>
<tr>
<td>Digital codes on the record carrier</td>
<td>G11B 23/284</td>
</tr>
<tr>
<td>Cryptography for protecting computer memory devices</td>
<td>G06F 12/1408</td>
</tr>
</tbody>
</table>
Digital rights management and copyright protection in a more general context, commonly with computers accessing the data, not necessarily bound to the features of specific record carriers | G06F 21/10
---|---
Software watermarking | G06F 21/16
Mutual authentication | G06F 21/445
Testing the integrity of files, message authentication | G06F 21/50
Secure communication between devices or processes, see also H04L 9/00 | G06F 21/60
Security arrangements for protecting various kinds of record carriers | G06F 21/78
Mutual authentication | G06F 2211/003
Public key encryption | G06F 2211/008
Record carriers with integrated chips in general | G06K 19/07
Record carriers comprising integrated circuitry, e.g. CDs with transponder tags | G06K 19/07
Transponder cards | G06K 19/0723
Record carriers with active circuitry for preventing them to be read out | G06K 19/07336
Record carriers with built-in fingerprint detectors or other biometrical devices | G06K 19/07354
Record carriers with RFID tag | G06K 19/14
Data processing for e-commerce | G06Q 30/06
Image watermarking | G06T 1/0021
A/V downloading, e.g. buying MP3 files on the web | G07F 17/16
Audio watermarking | G10L 19/018
Secret or secure communication in general | H04L 9/00
Distributing encryption keys | H04L 9/08
User or message authentication, digital signatures | H04L 9/32
Protocols for digital signatures, certificates | H04L 9/3247
Public key certificates | H04L 9/3263
Secure data transmission over networks | H04L 29/0602
Network protocols for multimedia communication, e.g., home networks, authorised domains, also: downloading music etc. | H04L 29/06027
Content encryption in computer networks | H04L 29/06659
Protocols for symmetric cryptography | H04L 29/06666
Protocols for asymmetric cryptography | H04L 29/06673
Protocols for key distribution | H04L 29/06707
Hierarchical key distribution | H04L 29/06727
Copy protection for picture information; security feature of banknotes | H04N 1/00838
Image watermarking | H04N 1/32144
Copy protection, e.g. scrambling, for TV signal recording | H04N 5/913
Inserting a copy protection signal in the vertical blanking interval | H04N 2005/91314
Inserting a record or copy inhibit flag for TV signal recording | H04N 2005/91321
Inserting a CGMS flag for TV signal recording
Inserting a watermark for TV signal recording
Inserting an authentication signal for TV signal recording
Scrambling for TV signal recording
Scrambling TV signals for transmission/broadcast
Downloading video from a server, video on demand, etc., the client actively requesting a content from the server
Video watermarking
DRM and copyright management for video signals

Special rules of classification
Although the definition of the sub-class G11B suggests otherwise, the copy protection techniques which are classified in G11B 20/00086 are not necessarily limited to storage media which involve a relative movement between the medium and the transducer, but they relate to all sorts of physical record carriers in general.

G11B 20/00992
{Circuits for stereophonic or quadraphonic recording or reproducing}

Definition statement
This place covers:
Recording multichannel signals, e.g., stereo or quadraphonic signals, but also if more than 2 or 4 channels are involved.

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

Stereo or multi-channel audio processing
Earpieces for telephones
Stereo broadcasting, AM/FM radio transmission
Audio signal processing for stereo playback
Audio processing with more than two channels, e.g., surround sound systems
Pseudo-stereo systems
Electronically adapting the sound field

G11B 20/02
Analogue recording or reproducing

Definition statement
This place covers:
Analogue recording or reproducing, e.g. audio cassettes, gramophone records, laser discs etc. A further refinement of this subgroup addresses error detection and correction (G11B 20/025),
direct recording or reproducing (G11B 20/04), recording and reproducing angle-modulated signals (G11B 20/06, mostly FM modulated audio signals), recording and reproducing pulse-modulated signals (e.g. FM audio in video tapes).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recording PCM signals digitally</td>
<td>G11B 20/10527</td>
</tr>
<tr>
<td>Angle modulation in general</td>
<td>H03C 3/00</td>
</tr>
<tr>
<td>Demodulating angle modulated signals</td>
<td>H03D 3/00</td>
</tr>
<tr>
<td>Pulse modulation</td>
<td>H03K 7/00</td>
</tr>
<tr>
<td>Pulse demodulation</td>
<td>H03K 9/00</td>
</tr>
</tbody>
</table>

G11B 20/10

Digital recording or reproducing (digital computers in which at least part of the computation is effected electrically, arrangements for handling digital data G06F; transmission of digital information H04L)

Definition statement

This place covers:

Digital recording or reproducing. Processing pipeline of a typical recording apparatus: an A/V signal is compressed (G11B 20/00007), error correction codes are added (G11B 20/1833, G11B 20/1866), the signal is modulated (G11B 20/14), equalisers and filters improve the signal quality (G11B 20/10009), then the signal is recorded to the record carrier according to a given format (G11B 20/12).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnetic recording</td>
<td>G11B 5/00</td>
</tr>
<tr>
<td>Optical recording; for holographic recording see also G11C 13/042</td>
<td>G11B 7/00</td>
</tr>
<tr>
<td>Operating tape devices, e.g. starting, stopping, altering the speed</td>
<td>G11B 15/00</td>
</tr>
<tr>
<td>Operating recording and playback devices for record carriers other than tapes, including user interfaces</td>
<td>G11B 19/00</td>
</tr>
<tr>
<td>Dictating devices, dictaphones</td>
<td>G11B 25/00</td>
</tr>
<tr>
<td>Editing A/V data, data formats, addressing and indexing</td>
<td>G11B 27/00</td>
</tr>
<tr>
<td>Radio recorders</td>
<td>G11B 31/003</td>
</tr>
<tr>
<td>Physical connectors for disc or phase drives, e.g., cables, USB or IDE sockets, etc.</td>
<td>G11B 33/122</td>
</tr>
<tr>
<td>Mountings for plural disk drives</td>
<td>G11B 33/128</td>
</tr>
<tr>
<td>Digital I/O for computers, e.g. hard disk controllers</td>
<td>G06F 3/0601</td>
</tr>
<tr>
<td>Information transfer via an I/O bus, bus controllers, interface protocols, direct memory access (DMA) architectures</td>
<td>G06F 13/28</td>
</tr>
<tr>
<td>Semiconductor memories</td>
<td>G11C</td>
</tr>
</tbody>
</table>
Transmission of digital information | H04L
---|---
Video recorders | H04N 5/76
Hard disk recorders | H04N 5/781
Optical video recorders | H04N 5/85
Video transmission | H04N 7/24

**Special rules of classification**

It is the default group for anything which cannot be classified elsewhere.

**G11B 20/10009**

{Improvement or modification of read or write signals}

**Definition statement**

*This place covers:*

Modifying and improving the read or write signals (i.e. removing jitter, increasing the SNR), e.g. by using equalisers and filters; anything about how to adjust the frequency and phase of the read/write clock or the bit clock of the demodulation circuit, e.g. clock adjustment with a PLL; anything related to PRML techniques (Partial Response Maximum Likelihood); A/D conversion, recovering the bit string from the analogue HF signal; maximum likelihood estimation and related techniques for recognising the correct bit sequences, e.g. using the Viterbi algorithm. Wobble detection can also be classified here if the document is linked to clocking.

**References**

**Limiting references**

*This place does not cover:*

- Code-related aspects of clock adjustment, e.g. documents which describe specific synchronisation patterns
- Specific modulation schemes to be applied to a wobbled pre-groove

**Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

<table>
<thead>
<tr>
<th>Magnetic recording, hardware aspects</th>
<th>G11B 5/00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical recording, hardware aspects</td>
<td>G11B 7/00</td>
</tr>
<tr>
<td>Applying suitable write strategies, i.e. giving an optical mark the desired shape by burning it as a certain sequence of write pulses</td>
<td>G11B 7/00456</td>
</tr>
<tr>
<td>Measuring jitter specifically on optical discs</td>
<td>G11B 7/005</td>
</tr>
<tr>
<td>Algorithms/circuits for keeping an optical head on the track</td>
<td>G11B 7/09</td>
</tr>
<tr>
<td>Optimum power calibration</td>
<td>G11B 7/1267</td>
</tr>
<tr>
<td>Measuring noise, SNR, jitter, phase jitter in general</td>
<td>G01R 29/26</td>
</tr>
<tr>
<td>A/D converters for computer interfaces</td>
<td>G06F 3/05</td>
</tr>
<tr>
<td>Interpolation, smoothing, least mean squares</td>
<td>G06F 17/17</td>
</tr>
<tr>
<td>Gain control for digital amplifiers</td>
<td>H03G 3/3089</td>
</tr>
<tr>
<td>Phase-locked loops</td>
<td>H03L 7/06</td>
</tr>
</tbody>
</table>
AD/DA converters in general

Calibrating AD converters in general

DC removal for AD converters in general

Equalisers for line transmission

Digital PLL in a transmitter-receiver setup

DC equalisers in transmitters and receivers

Removing inter-symbol interference in such a DC equaliser

Adaptive equalizers for transmission lines

Modulators for data transmission

G11B 20/10194

{using predistortion during writing (G11B 20/10055 takes precedence)}

Definition statement

This place covers:
Applying pre-distortion (e.g. by modifying the timing) during writing, e.g. by modifying the signal according to the known characteristics of the read/write channel

G11B 20/10203

{baseline correction (DC correction by choosing codewords of the modulation code G11B 20/1426)}

Definition statement

This place covers:
Correcting the DC baseline of the read signal, slicing (adapting the threshold at which the signal will be recognised as a binary zero or one)

G11B 20/10212

{compensation for data shift (e.g. pulse crowding effects)}

Definition statement

This place covers:
Compensating for data shift, e.g. addressing the fact that the timing of a peak value might be affected (advanced, delayed) by inter-symbol interference (ISI)

G11B 20/10527

{Audio or video recording; Data buffering arrangements (G11B 20/12 - G11B 20/18 take precedence)}

Definition statement

This place covers:
Initially, G11B 20/10527 was supposed contain all documents about how to record PCM audio data. Nowadays it also comprises many documents about how to use intermediate memories (buffers), e.g., playback buffers for ensuring a seamless playback of a recorded video stream while reading
the data intermittently in high-speed bursts, or recording buffers for making sure that even in case
discontinuous data reception the recording process will not be interrupted; G11B 20/10527 will
particularly be assigned if the aspect “memory” is important (e.g., addressing within the buffer,
adjusting the read/write clock of the buffer, etc.). In the past (when people started recording digitised
audio signals on record carriers), G11B 20/10527 was also used for documents about A/D conversion,
filtering, quantisation errors, dithering, oversampling, or sampling frequency conversion; these aspects
are now classified in G11B 20/10009.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Description</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffers for preventing read/write errors in recording/playback apparatuses, e.g., for portable devices</td>
<td>G11B 19/044</td>
</tr>
<tr>
<td>Data compression in the context of recording, also for audio data</td>
<td>G11B 20/00007</td>
</tr>
<tr>
<td>I/O interfaces for radio receivers</td>
<td>G11B 31/003</td>
</tr>
<tr>
<td>Buffering for I/O devices of computers, caching</td>
<td>G06F 3/0656</td>
</tr>
<tr>
<td>Sound input/output</td>
<td>G06F 3/16</td>
</tr>
<tr>
<td>Audio streaming</td>
<td>G10L 19/167</td>
</tr>
<tr>
<td>Audio transcoding</td>
<td>G10L 19/173</td>
</tr>
<tr>
<td>Audio filtering in combination with compression</td>
<td>G10L 19/26</td>
</tr>
<tr>
<td>Audio filtering, speech enhancement</td>
<td>G10L 21/00</td>
</tr>
<tr>
<td>Audio processing for audio quality enhancement</td>
<td>G10L 21/0205</td>
</tr>
<tr>
<td>Noise filtering for audio signals</td>
<td>G10L 21/0208</td>
</tr>
<tr>
<td>Audio compression</td>
<td>G10L 21/04</td>
</tr>
<tr>
<td>I/O buffers for semiconductor memories</td>
<td>G11C 7/10</td>
</tr>
<tr>
<td>Audio amplifiers</td>
<td>H03G 3/3005</td>
</tr>
<tr>
<td>Audio processing circuitry for TV receivers</td>
<td>H04N 5/60</td>
</tr>
<tr>
<td>Interfaces between A/V recorders and other devices</td>
<td>H04N 5/765</td>
</tr>
<tr>
<td>Interfaces to a digital video camera</td>
<td>H04N 5/77</td>
</tr>
<tr>
<td>Buffer level management for the transmission of digital TV signals</td>
<td>H04N 21/44004</td>
</tr>
<tr>
<td>Recording devices in a set-top box</td>
<td>H04N 21/4627</td>
</tr>
<tr>
<td>Audio signal processing for stereo playback</td>
<td>H04S 1/002</td>
</tr>
<tr>
<td>Digital audio processing for stereo signals</td>
<td>H04S 1/007</td>
</tr>
<tr>
<td>Audio processing with more than two channels, e.g., surround sound systems</td>
<td>H04S 3/00</td>
</tr>
<tr>
<td>Pseudo-stereo systems</td>
<td>H04S 5/00</td>
</tr>
</tbody>
</table>
G11B 20/12
Formatting, e.g. arrangement of data block or words on the record carriers
{(within interface between computers and data recorders G06F 3/06)}

Definition statement
This place covers:
Formatting, e.g. arrangement of data block or words on the record carriers. General low-level structure of a record carrier (what to store where), e.g. the format of sector headers, the size of the lead-in area, etc.

Relationships with other classification places
Broadly speaking, the sub-group G11B 20/12 covers formatting aspects which are at an intermediate level between, on the one hand, those covered by G11B 27/00 and, on the other hand, those covered by G11B 5/00 or G11B 7/00. The group G11B 27/00 relates to formatting aspects at the higher system level (e.g., formatting aspects which one would usually associate with the operating system, including specific file formats and the format of control structures such as the TOC, but also the format of playlists and data formats for organising separate A/V data streams, etc.). The groups G11B 5/00 (magnetic recording media) and G11B 7/00 (optical recording media) cover aspects that pertain to the physical structure of the recording medium, such as the physical arrangement of separate layers, and physical characteristics such as the chemical components of which the recording medium is made, the shape of the media, etc.

References
Limiting references
This place does not cover:

| Documents related to defect management                        | G11B 20/18   |
| File format conversion                                       | G06F 16/1794 |
| File format or the syntax of recorded video streams           | H04N 7/24   |

Informative references
Attention is drawn to the following places, which may be of interest for search:

| Wobble format of optical discs                                 | G11B 7/0053  |
| Optical aspects of the Burst Cutting Area, BCA, lead-in, lead-out, Power Calibration Area | G11B 7/00736 |
| Physical structure of optical media with multiple layers       | G11B 7/2403  |
| Detecting the data format of a data carrier                    | G11B 19/125  |
| Formatting aspects related to defect management, e.g., documents defining the structure of DMAs, TDDS, SDLs, PDLs, etc. | G11B 20/18  |
| High-level formatting, e.g. file formats, formatting aspects particular to the operating system, file indices such as a TOC | G11B 27/00  |
| Formatting aspects of computers exchanging data with disk drives | G06F 3/0661 |
| Record carriers having barcodes                               | G06K 19/06028 |
Special rules of classification

Usually, if a document defines formatting aspects related to defect management, e.g. structure of DMAs, TDSS, SDLs, PDLs, etc., then this document should be classified in G11B 20/18; if a document defines the location of such a structure on the medium (e.g. DMA1 and DMA2 being radially opposed), it should be classified in both G11B 20/12 and G11B 20/18.

G11B 20/1201
{on tapes}

Definition statement

This place covers:

Formatting aspects of tape storage devices; a distinction is made between tapes with longitudinal tracks, G11B 20/1202, transverse tracks, G11B 20/1207, and combinations of both, G11B 20/1211; if applicable, a further distinction can be made between tapes which are specifically designed for storing A/V data (G11B 20/1204) and those designed for storing computer data (G11B 20/1205).

G11B 20/1215
{on cards (optical aspect of optical cards G11B 7/0033)}

Definition statement

This place covers:

Formatting aspects record media if the form factor is a card.

References

Limiting references

This place does not cover:

| Optical aspects of optical cards | G11B 7/0033 |

G11B 20/1217
{on discs}

Definition statement

This place covers:

Formatting aspects of magnetic or optical disks; this is where most documents in G11B 20/12 are currently being classified; a distinction can be made between recording A/V data, G11B 20/1251, recording computer or control/management data, G11B 20/1252, and recording mixtures of both, G11B 20/1254; of some relevance is G11B 20/1258, disks having a structure defined by multiple radial zones, e.g. zone constant angular velocity discs, ZCAV.

Special rules of classification

This sub-group comes with various complementing Indexing Codes, which are not mirrored by respective ECLA symbols, see in particular G11B 2220/2545 + for various CD formats, G11B 2020/1257 for the count key data format, G06F 3/04815 for the floppy disk formats, and G11B 2020/1259 for hybrid discs having a ROM and a RAM area.
G11B 20/1261
{on films, e.g. for optical moving-picture soundtracks (optical aspect G11B 7/0032)}

Definition statement
This place covers:
Formatting aspect of films, i.e. transparent record carriers which are primarily meant for recording photographic frames and accompanying audio or control data.

References
Limiting references
This place does not cover:

| Formatting aspects of how to record movies on digital tapes or different kinds of disks | G11B 20/1201, G11B 20/1217 |

G11B 20/1262
{with more than one format/standard, e.g. conversion from CD-audio format to R-DAT format}

Definition statement
This place covers:
Record carriers involving more than one format/standard, e.g. conversion from CD-audio format to R-DAT format, disks having a CD and a DVD layer, discs storing normal PCM signal and additional MP3 tracks, etc.

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Optical aspects of how to record the same data in two different forms of an optical record carrier | G11B7/20 |

G11B 20/14
using self-clocking codes

Definition statement
This place covers:
In the strict sense, self-clocking codes for digital recording. Today virtually all codes are self-clocking, however, current record carriers do not have a separate track for bit clock synchronisation. G11B 20/14 hence encompasses all kinds of modulation codes (e.g., the EFM code used on audio CDs).

Relationships with other classification places
This group covers different coding schemes in the context of recording and reproducing apparatuses. Documents which discuss theoretical aspects of these coding schemes in general, without any
reference to an application in recording / reproduction context, will commonly be classified in subgroups of H03M 5/00 instead.

**References**

**Limiting references**

This place does not cover:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error correcting codes, error detecting codes in the context of recording and reproducing systems</td>
<td>G11B 20/1833</td>
</tr>
<tr>
<td>Theory of error correcting codes, error correcting codes per se</td>
<td>H03M 13/00</td>
</tr>
</tbody>
</table>

**G11B 20/1403**

(characterised by the use of two levels)

**Definition statement**

This place covers:

Although originally being meant to comprise binary modulation codes in general, this sub-group is now mainly used for documents about synchronisation patterns for bit clock recovery.

**References**

**Limiting references**

This place does not cover:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchronisation of separate data streams, e.g. audio and video channels</td>
<td>G11B 27/10</td>
</tr>
<tr>
<td>Synchronisation patterns for stream synchronisation</td>
<td>G11B 27/3027</td>
</tr>
<tr>
<td>Theory of binary codes in general, not in the specific context of record carriers</td>
<td>H03M 5/04</td>
</tr>
</tbody>
</table>

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sync patterns specifically for the servo patterns of hard disks</td>
<td>G11B 5/59688</td>
</tr>
<tr>
<td>Certain old documents about sync patterns in general</td>
<td>G11B 27/3027</td>
</tr>
</tbody>
</table>

**G11B 20/1407**

(code representation depending on a single bit, i.e. where a one is always represented by a first code symbol while a zero is always represented by a second code symbol)

**Definition statement**

This place covers:

Bit-by-bit coding, binary codes having one symbol representing a zero and another symbol representing a one, no interdependence between subsequent information bits.
References

Limiting references

This place does not cover:

| Theory of bit-by-bit coding in general, not in the specific context of record carriers | H03M 5/06 |

G11B 20/1411

{conversion to or from pulse width coding}

Definition statement

This place covers:

Pulse width modulation. A signal to be recorded is encoded by varying the pulse width of a square wave at a constant frequency. Examples: delta modulation, sigma-delta modulation.

References

Limiting references

This place does not cover:

| Sigma-delta encoded audio signals | G11B 20/10527 |
| Theory of pulse width modulation in general, not in the specific context of record carriers | H03M 5/08 |

G11B 20/1415

{conversion to or from pulse frequency coding}

Definition statement

This place covers:

Pulse frequency modulation, information encoded by altering the repetition rate of the pulses, every pulse having the same fixed length. As pulse width modulation, this modulation scheme alters the duty cycle of the square wave.

References

Limiting references

This place does not cover:

| Theory of pulse frequency modulation in general, not in the specific context of record carriers | H03M 5/10 |
G11B 20/1419

{to or from biphase level coding, i.e. to or from codes where a one is coded as a transition from a high to a low level during the middle of a bit cell and a zero is encoded as a transition from a low to a high level during the middle of a bit cell or vice versa, e.g. split phase code, Manchester code conversion to or from biphase space or mark coding, i.e. to or from codes where there is a transition at the beginning of every bit cell and a one has no second transition and a zero has a second transition one half of a bit period later or vice versa, e.g. double frequency code, FM code}

Definition statement

This place covers:

E.g. binary phase modulation (Manchester codes); also phase or frequency modulation of wobbles. G11B 20/1419 generally relates to codes where a one is coded as a transition from a high to a low level during the middle of a bit cell and a zero is encoded as a transition from a low to a high level during the middle of a bit cell or vice versa, e.g. split phase code, Manchester code conversion to or from biphase space or mark coding, i.e. to or from codes where there is a transition at the beginning of every bit cell and a one has no second transition and a zero has a second transition one half of a bit period later or vice versa, e.g. double frequency code, FM code. Biphase level codes in general: H03M 5/12.

References

Limiting references

This place does not cover:

| Theory of biphase level codes in general, not in the specific context of record carriers | H03M 5/12 |

G11B 20/1423

{Code representation depending on subsequent bits, e.g. delay modulation, double density code, Miller code}

Definition statement

This place covers:

Basic coding schemes wherein the input bits are not coded independently of each other, but their code representation depends on subsequent bits, e.g. delay modulation, double density code, Miller code.

G11B 20/1426

{conversion to or from block codes or representations thereof}

Definition statement

This place covers:

Binary block codes. This very prominent subgroup also includes run-length limited (RLL) codes and various kinds of DSV optimised codes, e.g. the Modified Frequency Modulation (MFM) used on floppy discs, the EFM and EFM+ codes used on CDs and DVDs, or the 17PP code used on Blu-Ray discs.
References

Limiting references
This place does not cover:

Theory of block codes in general, not in the specific context of record carriers

G11B 20/1488
{characterised by the use of three levels}

Definition statement
This place covers:
Ternary codes, i.e. modulation codes wherein the code may contain three different symbols which are commonly represented by three discrete signal levels.

References

Limiting references
This place does not cover:

Partial response signals exhibiting three possible signal levels
Theory of ternary codes in general, not in the specific context of record carriers

G11B 20/1492
{two levels are symmetric, in respect of the sign to the third level which is "zero"}

Definition statement
This place covers:
Ternary codes wherein the possible signal levels are -a, 0, and a.

G11B 20/1496
{characterised by the use of more than three levels}

Definition statement
This place covers:
n-ary digital modulation codes with n=4 and above, e.g. quaternary modulation codes (4 possible signal levels, i.e. each symbol can per se convey two bits).

References

Limiting references
This place does not cover:

Partial response signals with n>3 signal values
Theory of n-ary codes, n>3, in general, not in the specific context of record carriers
G11B 20/16

using non self-clocking codes, i.e. the clock signals are either recorded in a separate clocking track or in a combination of several information tracks

Definition statement

This place covers:

Non self-clocking codes, i.e. the clock signals are not derivable from the modulated data sequence itself (which is the case for any modern RLL code) but instead they are either recorded in a separate clocking track or in a combination of several information tracks.

G11B 20/18

Error detection or correction; Testing {, e.g. of drop-outs}

Definition statement

This place covers:

Detecting and correcting errors, e.g. erroneous bits or sectors; testing the medium for defects. This sub-group covers, e.g., the detection of bad sectors, strategies for replacing these sectors by other sectors, the application of various kinds of error correction codes and error detection codes so as to reliably recover the recorded bit sequence, the usage of interleaving schemes for spreading the effect of local defects, the actual detection of such defects by verification and certification processes, the idea of mitigating the effects of a local defect by data interpolation, and the documentation of defects by maintaining different kinds of defect lists.

References

Limiting references

This place does not cover:

Defect management by using redundant hardware (e.g. RAID systems per se) G06F 11/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Testing the correct function of read/write heads for magnetic disk drives | G11B 5/455 |
| Detecting defects on optical discs | G11B 7/00375 |
| Read-after-write verification for optical discs | G11B 7/00458 |
| Protection against errors caused by vibration or physical shock | G11B 19/042 |
| Protection against errors caused by free fall | G11B 19/043 |
| Protection against power failures in recording/playback apparatuses | G11B 19/047 |
| Testing disk drives | G11B 19/048 |
| Controlling recording/reproduction using identification or authentication marks | G11B 19/12 |
| Finding physical defects on optical discs by optical inspection | G01N 21/9506 |
| Testing digital circuits | Q01R 31/317 |
| Detecting and correcting errors in computer systems, e.g., repairing inconsistencies / bad sectors on file system level, without the use of error correcting codes | Q06F 11/07 |
G11B 20/1803
{by redundancy in data representation}

Definition statement

This place covers:
Obtaining additional robustness by simple redundancy, i.e. by recording the same data multiple times at different locations.

References

Limiting references

This place does not cover:

Redundancy generating ECC schemes that are more advanced than such a simple repetition code

G11B 20/1806

{Pulse code modulation systems for audio signals (G11B 20/1803 takes precedence)}

Definition statement

This place covers:
Approaches particularly designed for audio signals (G11B 20/1809: purely by interleaving, i.e. for mitigating the perceptual effect of a burst error; G11B 20/1813: by error correcting codes involving parity symbols).
**G11B 20/1816**

*{Testing}*  

**Definition statement**  

*This place covers:*  

Testing the medium, recognising bad sectors, determining whether the medium is actually usable. If such tests take place during the recording/playback operation, see also G11B 27/36 (monitoring). If the test involves recording a particular test pattern, the document will be classified in G11B 20/182.

**G11B 20/1833**

*{by adding special lists or symbols to the coded information (G11B 20/1806, G11B 20/1866 take precedence)}*

**Definition statement**  

*This place covers:*  

Any error-correcting code (ECC) or Error-Detecting Code (EDC) used on record carriers.

**References**  

**Limiting references**  

*This place does not cover:*  

| ECC in the specific context of dedicated computer hardware | G06F 11/00 |
| Theory of ECC, not in the specific context of record carriers | H03M3/13 |

**G11B 20/1866**

*{by interleaving (G11B 20/1809 takes precedence)}*

**Definition statement**  

*This place covers:*  

Any interleaving used for mitigating the effects of read/write errors, also if being combined with additional parity symbols.

**Special rules of classification**  

ECC schemes, which also use an interleaver (e.g., LDPC and turbo codes) must also be classified in G11B 20/1833 or H03M 13/00.

**G11B 20/1876**

*{Interpolating methods}*

**Definition statement**  

*This place covers:*  

Interpolation, missing or defective information is recovered by estimating the correct data values based on adjacent data items.
G11B 20/1879

{Direct read-after-write methods}

**Definition statement**

*This place covers:*

Read-after-write methods. During a normal recording operation, a data item is read from the medium for immediate verification that it has been recorded correctly.

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Optical / physical aspects of read-after-write methods when applied to optical discs | G11B 7/00458 |

G11B 20/1883

{Methods for assignment of alternate areas for defective areas}

**Definition statement**

*This place covers:*

In case of defective areas (e.g., bad sectors), relocating the data that was supposed to be recorded to the defective area to another area. This other area can be part of a dedicated spare area (linear replacement), or it can be a sector following the defective sector (skip replacement). Subgroups for applying this principle to tapes (G11B 20/1886) and discs (G11B 20/1889).

G11B 20/20

for correction of skew for multitrack recording

**Definition statement**

*This place covers:*

Correcting skew for multitrack recording, mainly in the context of magnetic tapes.

G11B 20/22

for reducing distortions

**Definition statement**

*This place covers:*

Strategies for reducing distortions, i.e. occasionally occurring degradations of the signal quality.

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Reducing noise or correcting distortions on record carriers | G11B 23/0007 |
Special rules of classification
This subgroup is obsolete. New documents about signal quality enhancement must also be classified in G11B 20/10009.

G11B 20/24

for reducing noise {(control of amplification in general, e.g. dependent upon noise level H03G)}

Definition statement
This place covers:
Strategies for reducing noise, i.e. systematically occurring degradations of the signal quality.

Obsolete technology

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Reducing noise or correcting distortions on record carriers | G11B 23/0007 |
| Noise filtering for audio signals                          | G10L 21/0208 |

Special rules of classification
This subgroup is obsolete. New documents about noise removal must also be classified in G11B 20/10009.

G11B 21/00

Head arrangements not specific to the method of recording or reproducing

Definition statement
This place covers:
Any details of head arrangements for any type of moving record carrier which are not already covered by subgroups specific to a particular method of recording.

G11B 21/00 has two main areas: Driving and Moving (G11B 21/02) and Supporting (G11B 21/16).

Relationships with other classification places
G11B 21/02 and subgroups have parallel structures in G11B 5/54 - G11B 5/58 and their subgroups and these should be used for details regarding magnetic recording.

G11B 21/02 and subgroups have parallel structures in G11B 7/085 and G11B 7/09 and subgroups and these should be used for details regarding optical recording.

Most other areas (G11B 3/00, G11B 9/00, G11B 11/00, G11B 13/00) also have their own structures which deal with the aspects covered in general by G11B 21/00, which are often very specific to the technology in use (e.g. Scanning Tunnelling Microscopy). These aspects should not be classified in G11B 21/00.
Special rules of classification

In practice, most of the details of heads are specific to the recording method and should be classified in those subgroups, unless there is no suitable place for them.

NB: the above practice has not always been followed in the past, which has led to much double classification between specific areas and the general area, predominantly in G11B 5/00 (magnetic recording).

As noted above, where possible, documents should be classified in recording-method-specific areas only.

G11B 21/12 is used to classify documents regarding loading and unloading of heads to and from magnetic disks, particularly emergency head unloading in the case of e.g. power failure or mechanical shock.

G11B 21/22 is used to classify arrangements for supporting or holding magnetic heads and arms while they are outside the recording area e.g. ramps, buffers and latches.

G11B 23/00

Record carriers not specific to the method of recording or reproducing; Accessories, e.g. containers, specially adapted for co-operation with the recording or reproducing apparatus {Intermediate mediums; Apparatus or processes specially adapted for their manufacture (processes involving a single technical art and for which provision exists elsewhere, see the relevant class, e.g. B29, B41M, B05D, C08L, F16N)}

Definition statement

This place covers:
• Disk shaped record carriers, disk cartridges, tape cartridges, reels of tapes.
• Apparatuses or processes for the manufacture of cartridges.
• Record carriers with means for indicating/preventing prior or unauthorised use
• Disks with visible labels
• Reconditioning or destruction of record carriers.

Relationships with other classification places

Punched cards, magnetic or optical cards, conveying cards, G06K.

References

Limiting references

This place does not cover:

| Materials for record carriers                      | G11B 5/62, G11B 7/241 |
| Manufacture of record carriers                    | G11B 5/84, G11B 7/26  |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Record carriers characterised by the form          | G11B 5/74, G11B 7/24 |
| Circuits for preventing unauthorised use or copy   | G11B 20/00086        |
| Magnetic or optical cards, conveying cards         | G06K                 |
Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form factor</td>
<td>the size of a cartridge</td>
</tr>
</tbody>
</table>

Synonyms and Keywords

In patent documents the following expressions/words “cartridge”

<table>
<thead>
<tr>
<th>Term</th>
<th>Synonyms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cartridge</td>
<td>cassette, container, magazine</td>
</tr>
</tbody>
</table>

G11B 25/00

Apparatus characterised by the shape of record carrier employed but not specific to the method of recording or reproducing (individual parts of apparatus G11B 3/00 - G11B 23/00, G11B 33/00), {e.g. dictating apparatus; Combinations of such apparatus}

Definition statement

This place covers:
Mechanical structure of such apparatuses.

Documents which do not find a more appropriate classification in the depending subgroups.

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Area</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recording/reproducing methods</td>
<td>G11B 5/00, G11B 7/00, G11B 9/00, G11B 11/00, G11B 20/00, G11B 27/00</td>
</tr>
<tr>
<td>The aspect of controlling the operating functions</td>
<td>G11B 15/02, G11B 19/00</td>
</tr>
<tr>
<td>The aspect of driving, starting, stopping the tape</td>
<td>G11B 15/18</td>
</tr>
<tr>
<td>The aspect of guiding the tape within the apparatus</td>
<td>G11B 15/60</td>
</tr>
<tr>
<td>The aspect of guiding the tape cartridges within the apparatus</td>
<td>G11B 15/675</td>
</tr>
<tr>
<td>Library of tape cartridges</td>
<td>G11B 15/68</td>
</tr>
<tr>
<td>Recording and reproducing apparatuses in combination with television sets</td>
<td>G11B 31/00</td>
</tr>
<tr>
<td>Recording and reproducing apparatuses in combination with video cameras</td>
<td>G11B 31/006, H04N 5/225</td>
</tr>
<tr>
<td>Registering or indicating the working of vehicles</td>
<td>G07C 5/00</td>
</tr>
<tr>
<td>Static data storage memories</td>
<td>G11C, H01L 27/108 - H01L 27/115</td>
</tr>
<tr>
<td>Telephones with dictation recording systems</td>
<td>H04M 1/10</td>
</tr>
<tr>
<td>Telephone answering machines</td>
<td>H04M 1/64</td>
</tr>
</tbody>
</table>
Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registering or indicating the working of vehicles</td>
<td>G07C 5/00</td>
</tr>
<tr>
<td>Registering performance data other than driving of vehicles</td>
<td>G07C 5/0891</td>
</tr>
<tr>
<td>Telephone answering machines</td>
<td>H04M 1/64</td>
</tr>
<tr>
<td>Telephones with dictation recording systems</td>
<td>H04M 11/10</td>
</tr>
<tr>
<td>Apparatuses for television signal recording</td>
<td>H04N 5/76</td>
</tr>
</tbody>
</table>

G11B 25/04

using flat record carriers, e.g. disc, card

Definition statement

This place covers:

- Apparatus for card shaped record carrier.
- Feeding or guiding non disc shaped (i.e. mainly card shaped) record carriers G11B 17/0408.

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Card shaped record carrier having a circular recording area</td>
<td>G11B 23/0014</td>
</tr>
<tr>
<td>Hard disk drives</td>
<td>G11B 25/043</td>
</tr>
<tr>
<td>Card shaped record carriers and apparatus for such carriers</td>
<td>G06K</td>
</tr>
</tbody>
</table>

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods or arrangements for sensing record carrier</td>
<td>G06K 7/08</td>
</tr>
<tr>
<td>Record carriers characterised by the type of digital marking</td>
<td>G06K 19/067</td>
</tr>
</tbody>
</table>

G11B 25/043

{using rotating discs}

Definition statement

This place covers:

The mechanical aspects of disk drives in which the disk or disks are permanently installed (e.g. hard disk drives HDD)

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heads of HDD</td>
<td>G11B 5/127</td>
</tr>
<tr>
<td>Motors for HDD</td>
<td>G11B 19/2009</td>
</tr>
</tbody>
</table>
G11B 25/046
{using stationary discs, or cards provided with a circular recording area (driving heads relatively to stationary record carriers for mechanical transducing G11B 3/40; automatic feed mechanism producing a transducing traverse of the head across stationary disk tracks G11B 21/043)}

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| The card shaped record carrier having a circular recording area | G06K, G11B 23/0014 |
| Methods and arrangements for sensing card shaped record carriers | G06K 7/00 |
| Record carriers characterised by the type of digital marking | G06K 19/067, G06K 7/0021 |

G11B 25/06
using web-form record carriers, e.g. tape

References
Limiting references
This place does not cover:

| Mechanisms which find adequate | G11B 15/00 |

G11B 25/063
{using tape inside container}

Glossary of terms
In this place, the following terms or expressions are used with the meaning indicated:

| Tape container | tape cassette, tape cartridge |

G11B 25/066
{adapted for use with containers of different sizes or configurations; adaptor devices therefor}

Glossary of terms
In this place, the following terms or expressions are used with the meaning indicated:

| Form factor | It refers to the specific (possibly standard) shape and dimension of a cartridge |
G11B 25/08
using filamentary record carriers, e.g. wire

Definition statement
This place covers:
Apparatuses using wire shaped record carriers.

G11B 25/10
Apparatus capable of using record carriers defined in more than one of the sub-groups G11B 25/02 - G11B 25/08; {Adaptor devices therefor}

Definition statement
This place covers:
combi apparatus,
apparatus which combine a tape player(s) with a disc player(s),
apparatus which combine a tape or disc player with a hard disc drive (HDD).

References
Limiting references
This place does not cover:
The aspect of backing up data

Informative references
Attention is drawn to the following places, which may be of interest for search:
Re-recording, i.e. transcribing information from one optical record carrier on to one or more similar or dissimilar record carriers

G11B 27/00
Editing; Indexing; Addressing; Timing or synchronising; Monitoring; Measuring tape travel

Definition statement
This place covers:
Editing;
editing operations performed on audio or video content recorded on the type of recording medium historically falling under the subclass G11B and extended to any type of recording medium storing physically audio and video content in a permanent manner, resulting in a modified or new recorded content. This covers as well the physical implementations of operations such as cut, paste, merge, adding sound track as well as the definition of the editing operations to be performed within an editor (non-destructive editing, playlist arrangements, editing operations in a video editor).

Indexing and addressing;
details concerning the type of information attached to a recording content which allows to access
said content as well as information indicating reproduction of a sequence of addressed parts of
recorded contents (play list typically). This can be with respect to the physical details of the recording
medium (subcodes, lead-in, lead-out in case of a CD, AIT track for tape, prepits for DVD) carrying the
information as long as the type of the recording medium falls under the subclass G11B. In addition,
it covers the case of indexing or addressing information in a audio or video content which are not
specific to the physical characteristics of the recording medium such as table of content, metadata
and other information which allow navigation within a file containing audio video content (typically a
specific file format with indexing and addressing information embedded) or other special modes of
reproduction. Special modes of reproduction (trickplay, repeat) are also classified in G11B 27/00.

Timing or synchronizing;
Details relating to the synchronized reproduction of different components making up an audio video
recording. By extension, synchronization of content between a main unit and an auxiliary video or
audio player.

Monitoring;
Monitoring concerns the supervision of the progress of recording or reproducing, mainly monitoring
power failure during recording or reproduction and logging the use of medium or apparatus for fault
prevention It covers also the testing of the medium as a direct step in a recording and reproducing
method and the use of information about the execution of the reproduction and/or recording (flags,
power failure).

Measuring tape travel;
obsolete. Technical details concerning the measuring of tape travel are classified in G11B 15/00.

**Relationships with other classification places**
The group G11B 27/00 is in close relationship with the area of television recording H04N 5/76,
computers G06F and the other domains of the subclass G11B, notably, G11B 20/00 for the formatting
aspects related to channel encoding modulation, error correction, spatial arrangement of different
kinds of information on the medium and G11B 5/00, G11B 7/00 for the physical aspect (shape, layer,
structure, etc...) of the recording medium.

In particular, the group G11B 27/00 deals with content management (space management, erasure
of programs) concerning pre-recorded material or recorded material such as television programs,
one these programs have been recorded on the recording medium. The other aspects of television
recording such as the reservation of programs to be recorded are not dealt with in G11B 27/00 but in
H04N 5/76, unless it involves using information pertaining to the recording medium usage (dedicated
recording area, free space, other meta information such as date for erasure).

The group G11B 27/00 does not deal with the details of the video coding technique found in subgroup
H04N 19/00 but is concerned with the application thereof in a corresponding editing and addressing
operation or if it refers to coding parameters that are recorded for indexing purposes.

The group is also linked to G06F 16/00 (database structures), and deals with the specific application
to audio, video and leaves out the general and not specific database management techniques.

Synchronization aspects related to the extraction of a bitstream from the recording (e.g. bit clock
extraction during channel decoding) are covered in the group G11B 20/00 and not G11B 27/00.

Likewise, the basic error corrections, or defect area management, are dealt with in G11B 20/18 and
not G11B 27/00.

In General G11B 20/00 deals with lower level (Channel, buffering) whereas in G11B 27/00, the main
focus is at the system level.
References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testing the correct function of read/write heads for magnetic disk drives</td>
<td>G11B 5/455</td>
</tr>
<tr>
<td>Testing recording/reproducing heads</td>
<td>G11B 7/00, G11B 5/00</td>
</tr>
<tr>
<td>Detecting defects on optical discs</td>
<td>G11B 7/00375</td>
</tr>
<tr>
<td>Testing disk drives</td>
<td>G11B 19/048</td>
</tr>
<tr>
<td>Synchronization linked to channel decoding</td>
<td>G11B 20/10009, G11B 20/1403</td>
</tr>
<tr>
<td>Management of defective sectors, error correction</td>
<td>G11B 20/18</td>
</tr>
<tr>
<td>Finding physical defects on optical discs by optical inspection</td>
<td>G01N 21/9506</td>
</tr>
<tr>
<td>Peripheral management in general</td>
<td>G06F 3/00</td>
</tr>
<tr>
<td>User interface in general</td>
<td>G06F 3/048</td>
</tr>
<tr>
<td>RAID systems in general</td>
<td>G06F 2003/0692</td>
</tr>
<tr>
<td>Testing computer peripherals</td>
<td>G06F 11/2268</td>
</tr>
<tr>
<td>Image processing</td>
<td>G06T</td>
</tr>
<tr>
<td>Audio broadcast recording</td>
<td>H04H1/02</td>
</tr>
<tr>
<td>Television studio equipment</td>
<td>H04N 5/222</td>
</tr>
<tr>
<td>Television broadcast recording</td>
<td>H04N 5/76</td>
</tr>
<tr>
<td>Video Broadcasting</td>
<td>H04N 7/24</td>
</tr>
<tr>
<td>A/V synchronization in transmission</td>
<td>H04N 7/52</td>
</tr>
<tr>
<td>Video display of recorded content</td>
<td>H04N 9/00</td>
</tr>
<tr>
<td>Video/audio coding aspects</td>
<td>H04N 19/00, G11B 20/00</td>
</tr>
<tr>
<td>Network broadcasting</td>
<td>H04N 21/20, H04N 7/24</td>
</tr>
</tbody>
</table>

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music or video database</td>
<td>G06F 16/00</td>
</tr>
<tr>
<td>(tape) libraries</td>
<td>G06F 3/06, G11B 15/68</td>
</tr>
<tr>
<td>Pvr</td>
<td>H04N 5/76</td>
</tr>
<tr>
<td>Camera with a recording entity</td>
<td>H04N 5/772</td>
</tr>
</tbody>
</table>

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car navigation</td>
<td>G01C 21/26</td>
</tr>
<tr>
<td>File backup; hierarchical storage management</td>
<td>G06F 11/14</td>
</tr>
<tr>
<td>Interfaces, busses, program control of peripheral devices</td>
<td>G06F 13/10</td>
</tr>
<tr>
<td>Dictation systems (e.g. testimony)</td>
<td>G06F 17/241</td>
</tr>
<tr>
<td>Databases, retrieval</td>
<td>G06F 16/00</td>
</tr>
</tbody>
</table>
"Multimedia"; File format
| G06F 16/40 |
Intelligent playlist building; Library content management
| G06F 16/4387; G06F 16/70; G06F 16/60; G06F 16/783 |
(graphical/manual/vr) user interfaces in general, also eye tracking, brain signals
| G06F 3/033, G06F 3/048 |
General User interface
| G06F 3/048 |
Storage media in computer environment (I/O, device drivers)
| G06F 3/06 |
Application software, xlets
| G06F 9/44 |
Video object recognition
| G06K 9/00 |
Business methods (selling, renting, ordering DVDs, accounting, billing)
| G06Q 30/00 |
Animation (editing)
| G06T 13/00, G06T15/70 |
Image analysis e.g. motion based segmentation
| G06T 7/20 |
Payment aspects in relation with video playback
| G07F 17/16 |
Surveillance systems
| G08B 13/24, G08B 13/196, H04N 7/18 |
Learning systems
| G09B 5/00 |
DJ equipment, scratching, midi, music analysis (rhythm, genre,...)
| G10H 1/00, G10H 1/36 |
Karaoke
| G10H 1/00, G10K 15/04 |
Musical instruments
| G10H 7/00 |
Speech analysis
| G10L 19/00 |
Audio coding
| G10L 19/167 |
Audio processing in general
| G10L 21/00 |
Picture (photo) editing
| G10T11/60, H04N 1/387 |
Magneto-optical, minidisc (physical level details)
| G11B 11/00 |
Tape in general (physical/mechanical level, servo)
| G11B 15/00 |
Disc changers, jukeboxes (mechanical details)
| G11B 17/00 |
Control of operating function at player/recorder level
| G11B 19/02 |
Malfunction prevention
| G11B 19/04 |
Recognizing media
| G11B 19/12 |
DRM, copy protection, encryption
| G11B 20/00086 |
Recording/reproducing signal processing, buffering; Digital recording
| G11B 20/10 |
Recording format (sector level); Format (disc)
| G11B 20/12 |
Error detection/correction, defect lists
| G11B 20/18 |
Medium container/cartridge details
| G11B 23/023, G11B 33/02 |
Recording or reproducing apparatus associated with related apparatus (cameras, projectors,...)
| G11B 31/00 |
Apparatus constructional details
| G11B 33/00 |
Specific for magnetic recording (hdd)
| G11B 5/00 |
Hdd testing
<p>| G11B 5/127 |</p>
<table>
<thead>
<tr>
<th>Classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>G11B 7/007</td>
<td>Optical disc formats (physical level details)</td>
</tr>
<tr>
<td>G11C 7/16</td>
<td>Solid state memories</td>
</tr>
<tr>
<td>H04H 60/00</td>
<td>Broadcast equipment</td>
</tr>
<tr>
<td>H04H60/26, H04H 60/56</td>
<td>User behavior with respect to received broadcast signal</td>
</tr>
<tr>
<td>H04H 60/38</td>
<td>User preferences in broadcasting</td>
</tr>
<tr>
<td>H04H60/69</td>
<td>Broadcast metadata</td>
</tr>
<tr>
<td>H04L 12/2805</td>
<td>A/V home networks (HAVI, UPnP)</td>
</tr>
<tr>
<td>H04L 29/06027</td>
<td>Protocols for multimedia communication</td>
</tr>
<tr>
<td>H04N 1/387, G06T 11/60</td>
<td>Still image editing</td>
</tr>
<tr>
<td>H04N 21/40</td>
<td>Multimedia set top box</td>
</tr>
<tr>
<td>H04N 21/20</td>
<td>Multimedia server</td>
</tr>
<tr>
<td>H04N 5/147, G06F 16/4387; G06F 16/70; G06F 16/60; G06F 16/783</td>
<td>Scene detection</td>
</tr>
<tr>
<td>H04N 5/222</td>
<td>Studio equipment</td>
</tr>
<tr>
<td>H04N 5/225, H04N 5/262</td>
<td>TV studio equipment</td>
</tr>
<tr>
<td>H04N 5/445, G09G 5/00</td>
<td>OSD, subtitle and menu display</td>
</tr>
<tr>
<td>H04N 5/76</td>
<td>Television recording; (Broadcast) video recording in general</td>
</tr>
<tr>
<td>H04N 5/772</td>
<td>Still cameras (capturing aspects)</td>
</tr>
<tr>
<td>H04N 5/783</td>
<td>Trick mode reproduction (no matter what recording medium)</td>
</tr>
<tr>
<td>H04N 7/15</td>
<td>Video conferencing</td>
</tr>
<tr>
<td>H04N 7/16, H04N 7/24, H04N7/73, H04N 21/00</td>
<td>Video transmission</td>
</tr>
<tr>
<td>H04N 19/00</td>
<td>Video source coding</td>
</tr>
</tbody>
</table>

**Special rules of classification**

A document relevant to **G11B 27/00** (e.g. containing invention information or additional information relating to **G11B 27/00** EC) will be given an **G11B 27/00** EC group.

Indexing Codes are not used.

Circulation rules:
- When a camera is involved: **H04N 5/772**
- Scene detection: **H04N 5/147**
- When auxiliary content is retrieved from a network to supplement primary information on a recording medium: **H04N 7/24, H04N 21/00**
- When a PVR is involved: **H04N 5/76**
- When a set-top box: **H04N 7/24**
- Building a collection of information concerning video or audio items: **G06F 16/00**
- When the data are arranged on the recording medium (of the type covered by the subclass **G11B**) in a specific way: **G11B 20/12**

Check also to the neighbouring fields listed in the informative references for circulation.
Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOC</td>
<td>(Table of content) : collection of information allowing the definition and retrieval of individual pieces of audio and video content.</td>
</tr>
<tr>
<td>EDL</td>
<td>(Edit Decision List); collection of information (part of content used, editing commands to be executed and their chronological and spatial order, leading when executed to the creation of a piece of audio/video content)</td>
</tr>
<tr>
<td>Playlist</td>
<td>Collection of information in sequential order defining the reproduction order of recorded content, e.g. (user defined) program chain in dvd, mp3 playlist; merely a list of objects that are to be reproduced in sequence with no common timeline defined</td>
</tr>
</tbody>
</table>

Synonyms and Keywords

In patent documents the following expressions/words are often used as synonyms (or close concepts):

- "Comment", "annotation" and "label"
- "Defect", "damage", "scratch" and "corrupted"
- "Edit point", "edit mark", "In point", "Out Point", "Mark in", "Mark out", "cue point" and "cue mark"
- "Random" and "shuffle"
- "Segment", "portion", "part", "fragment", "section" and "sequence"
- "Summary", "abstract", "highlight" and "digest"

G11B 31/00

Arrangements for the associated working of recording or reproducing apparatus with related apparatus (with cameras or projectors G03B 31/00; recording/reproducing of music for electrophonic musical instruments G10H 1/0033; automatic arrangements for answering calls or for recording messages for absent subscribers H04M 1/64; telephonic communication systems adapted for combination with dictation recording and playback systems H04M 11/10; connection of TV recorder with other related apparatus, e.g. TV camera or receiver, in which the TV signal is significantly involved H04N, e.g. H04N 5/225, H04N 5/765; combination of radio or TV with other apparatus, e.g. with vehicles H05K 11/00)

Definition statement

This place covers:

Apparatus where the recording and reproducing device is interfaced with the user.

Take-up mechanisms for earphones cable.

Relationships with other classification places

Television signal recording H04N 5/78, H04N 5/84.

Registering or indicating the working of vehicles (black boxes) G07C 5/00.

Electrically operated educational appliances in combination with videotapes or videodisks G09B 5/00.
References

Limiting references

This place does not cover:

| Constructional details or arrangements of data processing systems | G06F 1/16 |
| Output arrangements for transferring data from processing unit to output unit | G06F 3/00 |
| Accessing, addressing, or allocating within memories | G06F 12/00 |
| Protection against unauthorised use of memories | G06F 12/14 |
| Transfer of information between memories, I/O devices or central processing units | G06F 13/00 |
| Recording/reproducing of accompaniment for use with an external source, e.g. karaoke systems | G10H 1/361 |
| Transmission systems | H04B |
| Transmission of digital information | H04L |
| Data switching networks | H04L 12/00 |
| Loudspeakers, microphones | H04R |
| Wireless communication network | H04W |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Portable videocameras | H04N 5/225 |
| The recording apparatus and the television camera being placed in the same enclosure | H04N 5/772 |

G11B 33/00

Constructional parts, details or accessories not provided for in the preceding groups (containers, packaging elements or packages specially adapted for record carriers B65D 85/00)

Definition statement

This place covers:

- Chassis for recording/reproducing apparatuses.
- Portable recording/reproducing apparatuses.
- Covers, lids, front bezels of recording/reproducing apparatuses.
- Jewel boxes and similar containers, packaging containers for single disks or for multiple disks, racks for disks.
- Means for dampening vibrations or sounds.
- Means for indicating the working conditions of recording/reproducing apparatuses (e.g. displays).
- Layout of components within the housing.
- Electrical connections of/within recording/reproducing apparatuses.
- Docking stations for recording/reproducing apparatuses.
- Means for reducing/controlling the influence of the temperature in recording/reproducing apparatuses.
• Means for reducing contaminations.
• Means for shielding against electromagnetic interference, means for grounding.

**Relationships with other classification places**

• Constructional details of computers, personal computers, laptops \[G06F 1/16, G06F 1/18, G06F 1/20.\]
• Electrical connectors \[H01R.\]
• Cabinets for electrical apparatuses \[H05K 5/00.\]
• Furniture aspects of cabinets \[A47B 81/06.\]
• Anti-theft devices for disks or cartridges \[E05B 73/0023.\]

**References**

**Limiting references**

This place does not cover:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magazines for naked disks or for cartridges, which are part of the recording/reproducing apparatuses.</td>
<td>G11B 15/68, G11B 17/22, G11B 17/30, G11B 23/023, G11B 23/03</td>
</tr>
<tr>
<td>Hard disk drives</td>
<td>G11B 25/043</td>
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<td>Photocopy machines</td>
<td>G03G</td>
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</tbody>
</table>

**Informative references**

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<table>
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<tr>
<td>Liquid crystal displays LCD</td>
<td>G02F 1/13</td>
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<tr>
<td>Constructional details of computers, personal computers, laptops</td>
<td>G06F 1/16, G06F 1/18, G06F 1/20</td>
</tr>
<tr>
<td>Electrical connectors</td>
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<td>Cabinets for electrical apparatuses</td>
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<td>Heat transfer</td>
<td>H05K 7/20, F28D 15/00, H04B 1/036, G06F 1/20, H01L 23/34</td>
</tr>
</tbody>
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