

G11B

INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER ([N: 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](#); electrography, 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 [N: or arrangements] specially adapted for [N: pictorial or] television signal recording [N: [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 subclass/group 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.

References relevant to classification in this subclass

This subclass/group does not cover:

Static information storage in which no relative movement takes place	G11C
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between an information storage element and a transducer	
Recording measured values in a way that does not require playback through a transducer	G01D 9/00
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 type of record carrier	G06K 1/18
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
Details of scanning-probe apparatus	G01Q 10/00 - G01Q 90/00
Circuits for coupling output of reproducer to radio receiver	H04B 1/20
Loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers or circuits therefor	H04R

Associated working of cameras or projectors with sound-recording or -reproducing means	G03B 31/00
Substation equipment for recording telephonic conversations or messages for absent subscribers	H04M 1/65
Television signal recording	H04N 5/76 , H04N 9/79

Informative references

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

Working of plastics; working of substances in a plastic state in general	B29
Layered products in general	B32B
Thermography	B41M 5/26
Containers, packaging elements or packages, specially adapted for particular articles or materials	B65D 85/00
Storing webs, tapes or filamentary material in general	B65H 75/00
Coating metallic material; coating material with metallic material; coating by vacuum evaporation, by sputtering, by ion implantation or by chemical vapour deposition, in general	C23C
Measuring electric or magnetic properties	G01R
Devices or arrangements for the control of the intensity, colour, phase, polarization or direction of light	G02F
Magneto-optical materials in general	G02F 1/0036
Photosensitive materials or processes for photographic purposes	G03C
Electrography; electrophotography; magnetography	G03G
Holographic processes or apparatus	G03H
Electric digital data processing	G06F
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
Static stores	G11C
Selection of magnetic materials; thin magnetic films	H01F
Thin magnetic films	H01F 10/00
Semiconductor lasers	H01S 5/00
Coding, decoding or code conversion, in general	H03M

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Record carrier	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
Head	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
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 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](#), [N: [G11B 13/00](#)] take precedence; [N: recording by cutting or deforming using laser beam [G11B 7/00](#), using electron beam [G11B 9/10](#)])

Definition statement

This subclass/group covers:

Mainly vinyl disks and apparatuses for playing them

References relevant to classification in this group

This subclass/group 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 to 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
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G11B 5/00

Recording by magnetisation or demagnetisation of a record carrier; Reproducing by magnetic means; Record carriers therefor ([G11B 11/00](#)[N: and [G11B 13/00](#)] take precedence)

Definition statement

This subclass/group 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.

Relationship between large subject matter areas

Marking record carriers in digital fashion: [G06K](#)

Selection of magnetic materials; thin magnetic films: [H01F](#)

Measuring electric or magnetic properties: [G01R](#)

References relevant to classification in this group

This subclass/group does not cover:

Magnetic flux sensitive sensors per se, i.e not specific for recording or reproducing	G01R 33/00
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	H01L 43/00
Digital input from or digital output to record carriers, Buffering and Formatting arrangements	G06F 3/06
Magnetic ID or credit cards	G06K 19/00
Record carriers	G11B 11/00 , G11B 13/00
Magneto-optical recording method and record carriers therefore, wherein the magnetic information is reproduced by optical means	G11B 11/105
Driving, starting or stopping carriers of filamentary (wire) or web (tape)	G11B 15/00

form	
Guiding record carriers not specifically of filamentary or web form (e.g. disks, cards)	G11B 17/00
Driving, starting or stopping carriers not specifically of filamentary or web form (e.g. disks, cards)	G11B 19/20
Static magnetic recording methods and memories, i.e. methods wherein there is no relative movement between the record carrier and the transducer	G11C 11/02

Informative references

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

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
Handling of record carriers	G06K 13/02
Record carriers characterised by the type of digital marking	G06K 19/06
Methods or arrangements for the sensing of record carriers	G06K 7/08
Head arrangements not specific for the method of recording or reproducing	G11B 21/00
Methods and devices for demagnetising of magnetic bodies (e.g. workpieces, sheet material)	H01F 13/00

Special rules of classification within this group

- [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.

[G11B5](#) partially overlaps with [H01F](#), [G01R](#), [H01L](#). The following general rules apply:

In [H01F10](#) 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.

Synonyms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

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.

Synonyms and Keywords

In patent documents the following abbreviations are often used:

PMR	Perpendicular Magnetic Recording
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MAMR	Microwave Assisted Magnetic Recording
TAMR or TMR	Thermally Assisted Magnetic Recording

G11B 5/004

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

References relevant to classification in this group

This subclass/group 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
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Special rules of classification within this group

This group refers to an obsolete technology.

G11B 5/008

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

Definition statement

This subclass/group 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 ([G11B5/00T2F](#) and [G11B 5/00852](#)) or cyclically driven heads ([G11B5/00T2R](#) and [G11B 5/0086](#))

References relevant to classification in this group

This subclass/group 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 within this group

- 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 discs ([G11B 17/00](#), [G11B 19/00](#) take precedence)

Definition statement

This subclass/group covers:

Recording, reproducing and erasing methods and corresponding apparatuses specific for magnetic recording discs (e.g. definition of tracks, control of skew

angle between head and tracks, subdivision in sectors etc.)

References relevant to classification in this group

This subclass/group 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 subclass/group, 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 subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

Improvement or modification of read or write signals (magnetic read/write channels, equalizers, Viterbi detectors etc.)	G11B 20/10009
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Informative references

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

Timing or synchronising arrangements	G11B 27/10
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Special rules of classification within this group

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 subclass/group, the following terms (or expressions) are used with the meaning indicated:

Shingled writing	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
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	third track is written that partially overwrites the second track, and so forth
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G11B 5/10

Structure or manufacture of housings or shields for heads

Definition statement

This subclass/group covers:

Structure or manufacture of head housing, e.g. sliders

Structure or manufacture of shields for shielding the head against electric or magnetic fields

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)	G11B 33/1493
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Special rules of classification within this group

- 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 **G11B5/39C2C4E**

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

ABS	Air Bearing Surface
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G11B 5/127

Structure or manufacture of heads, e.g. inductive

References relevant to classification in this group

This subclass/group does not cover:

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)	H01F 10/00
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Informative references

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

Lapping machines	B24B 37/00
Thin film devices manufacturing methods per se, metallic coating e.g. by evaporation, sputtering	C23C 14/00
Optical recording using near field effect	G11B7/135M
MR elements	G11C 11/16 H01F 10/3254 H01F 10/3272 H01L 43/08 G01R 33/093

Special rules of classification within this group

- 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.

- **G11B5/39C2C6** (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 subclass/group, the following terms (or expressions) are used with the meaning indicated:

ABS	Air Bearing Surface
AFM	Anti-FerroMagnetic
TMR	Tunnelling Magneto-Resistance
GMR	Giant Magneto-Resistance
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](#)) [N: protective structure of the head: see under structures, e.g. [G11B 5/3106](#)]

Definition statement

This subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

Fluid-dynamic spacing of heads from record carriers per se	G11B 5/60
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Special rules of classification within this group

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 [N: of record carriers [G11B 23/50](#)]

References relevant to classification in this group

This subclass/group does not cover:

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

Arrangements for functional testing of heads [N: (testing of the manufacturing process [G11B 5/127](#))]; Measuring arrangements for heads (measuring electric or magnetic properties [G01R](#); [N: measuring properties for shaping or assembling elements [G11B 5/127](#)])

Definition statement

This subclass/group covers:

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

Relationship between large subject matter areas

Measuring electric or magnetic properties: [G01R](#)

References relevant to classification in this group

This subclass/group 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 within this group

- 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 relevant to classification in this group

This subclass/group does not cover:

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

G11B 5/74

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

Definition statement

This subclass/group covers:

Record carriers (tapes, cards, disks) specially shaped, e.g. e.g., bit patterned

media, or discrete-track media

References relevant to classification in this group

This subclass/group does not cover:

Manufacturing of record carriers	G11B 5/84
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Informative references

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

Photomechanical, e.g. photolithographic, production of textured or patterned surfaces	G03F 7/00
Manufacturing of patterned magnetic recording media	G11B 5/855

Special rules of classification within this group

Acquisition of servo patterns and processing thereof [G11B 5/596](#)

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Patterned Media and Bit Patterned Media	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
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	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 there is no magnetic material in the spaces between the islands
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Synonyms and Keywords

In patent documents the following abbreviations are often used:

BPM	Bit-Patterned-Media
PM	Patterned Media
DTM	Discrete Track Media

G11B 5/86

Re-recording, i.e. transcribing information from one magnetisable record carrier on to one or more similar or dissimilar record carriers [N: (by varying the order of the information [G11B 27/029](#), [G11B 27/036](#))]

Definition statement

This subclass/group 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 laved disks

References relevant to classification in this group

This subclass/group does not cover:

Transferring data from one type of record carrier to another type of record carrier	G06K 1/18
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Re-recording by varying the order of the information	G11B 27/029 , G11B 27/036
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Special rules of classification within this group

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 [N: by modifying optical properties or the physical structure], reproducing using an optical beam at lower power [N: by sensing optical properties]; Record carriers therefor; ([G11B 11/00](#), [G11B 13/00](#) take precedence)

Definition statement

This subclass/group 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](#).

Relationship between large subject matter areas

- 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 19/06009](#) for the media e.g. [G06K 19/06028](#) 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 relevant to classification in this group

This subclass/group 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	G11B 23/0028

e.g. hub details are generally not specific to whether or not the recording is optical or magneto-optical	
Computer systems involving digital I/O from or to direct access storage devices involving optical discs	G06F3/06D

Special rules of classification within this group

The following "horizontal" Indexing Codes are assigned where appropriate:

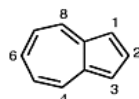
- [G11B 2007/0006](#) recording, reproducing or erasing systems adapted for scanning different types of carriers e.g. CD & DVD
- [G11B 2007/0009](#) recording, reproducing or erasing systems for carriers having data stored in three dimensions e.g. volume storage
- [G11B 2007/0013](#) recording, reproducing 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)

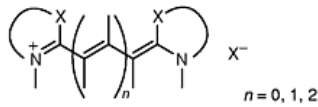
G11B7/244B:



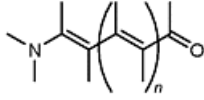
G11B7/246A: R1#N=N#R2

[G11B 7/247](#): styryl dye

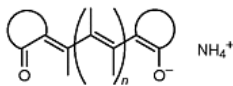
G11B7/247B:



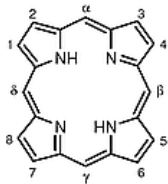
G11B7/247D:



G11B7/247F:



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 (US5846625);
- super-resolution film (US6385162);
- pyrotechnic layer (WO0000453);
- Servo layers (WO0178068);
- subbing layer (US4753861);
- ultraviolet absorption film (EP0259151);

[N: 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

G11B7/254B;

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 (**G11B7/254B**), see doc. No EP0123223);
- vibration prevention layer (US2003224136);

- lubricant layer as outermost layer (e.g. US2002054974)

G11B7/254D: 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)

G11B7/257B2;

Examples:

- high modulus layer (WO03021588);
- heat insulation layer (FR2435779);

G11B7/257D;

Examples:

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

G11B 7/0025

with cylinders or cylinder-like carriers [N: or cylindrical

sections or flat carriers loaded onto a cylindrical surface], e.g. truncated cones

Definition statement

This subclass/group covers:
Uncommon or outdated technology (in 2011)

G11B 7/003

with webs [N: , filaments or wires], e.g. belts, spooled tapes or films of quasi-infinite extent

Definition statement

This subclass/group covers:
Uncommon or outdated technology (in 2011)

G11B 7/0031

[N: using a rotating head, e.g. helicoidal recording]

Definition statement

This subclass/group 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

[N: for moving-picture soundtracks, i.e. cinema (cameras or projectors with sound recording or reproducing means [G03B 31/02](#))]

Definition statement

This subclass/group covers:
Uncommon or outdated technology (in 2011)

G11B 7/0033

with cards [N: or other card-like flat carriers, e.g. flat sheets of optical film]

Definition statement

This subclass/group 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 subclass/group 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

[N: arrangements for detection of physical defects, e.g. of recording layer]

Definition statement

This subclass/group 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 subclass/group covers:

Indexing Code [G11B 2007/00457](#) is assigned for two photon recording (including two photon recording in holographic data storage media)

G11B 7/00451

[N: involving ablation of the recording layer]

Definition statement

This subclass/group 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

[N: involving bubble or bump forming]

Definition statement

This subclass/group 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.

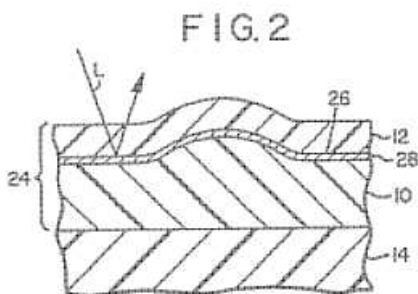


Figure from EP 338776

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

G11B 7/00453

[N: involving spectral or photochemical hole burning]

Definition statement

This subclass/group 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

[N: involving phase-change effects]

Definition statement

This subclass/group 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

[N: involving reflectivity, absorption or colour changes]

Definition statement

This subclass/group 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 relevant to classification in this group

This subclass/group 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

[N: Recording strategies, e.g. pulse sequences ([G11B 7/0062](#) takes precedence)]

References relevant to classification in this group

This subclass/group does not cover:

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

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:

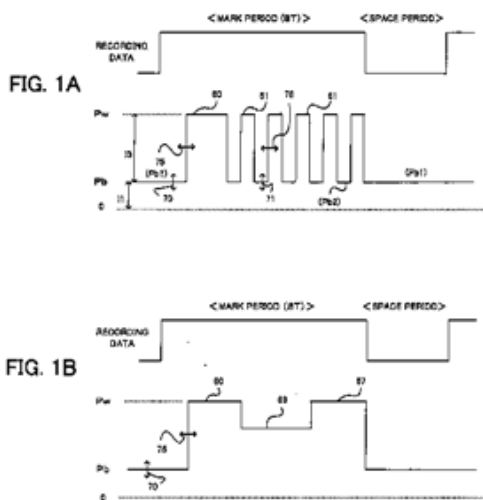


Figure taken from EP1548710

G11B 7/00458

[N: Verification, i.e. checking data during or after recording]

Definition statement

This subclass/group 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

[N: involving phase depth effects]

Definition statement

This subclass/group 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 areas resulting in constructive or destructive optical interference "phase depth")

G11B7/013D (Arrangement of the information on the record carrier) Details of discrete information structures, e.g. shape or dimensions of pits, prepits

(n.b. From 2012 revision of the IPC introduces new group [G11B 7/2407](#) for media characterised by the pits, and ECLA will be revised correspondingly)

G11B 7/0052

[N: involving reflectivity, absorption or colour changes]

Definition statement

This subclass/group 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 subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

Overwriting	G11B 7/006
Recording, reproducing or erasing by using optical interference patterns, e.g. holograms.	G11B 7/0065

G11B 7/00557

[N: involving phase-change media]

Definition statement

This subclass/group 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 subclass/group covers:

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

G11B 7/0062

[N: Overwriting strategies, e.g. recording pulse sequences with erasing level used for phase-change media]

Definition statement

This subclass/group 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 subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

Holographic storage of images	G03H
Where the recording mechanism of the holographic storage is of interest e.g. G11B 2007/00457 is assigned for two-photon recording of holograms	G11B 7/0045
Collinear holography: Where the object and reference beams are substantially parallel or coaxial before being focused (synonym: "coaxial", "common path", co-propagating)	G11B 2007/00653
Counter propagating holography: Where the object and reference beams are directed to opposite sides of the medium (synonym: "standing wave" or "stationary wave")	G11B 2007/00656

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

Arrangement of holographic information, including multiplexing of information	G11B 7/00772
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Arrangement of auxiliary information for holographic storage	G11B 7/00781
Concerning access of holographic information	G11B 7/083
Concerning structural aspect of media for holographic storages	G11B7/24Y

G11B 7/007

Arrangement of the information on the record carrier, e.g. form of tracks, [N: actual track shape, 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 subclass/group 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

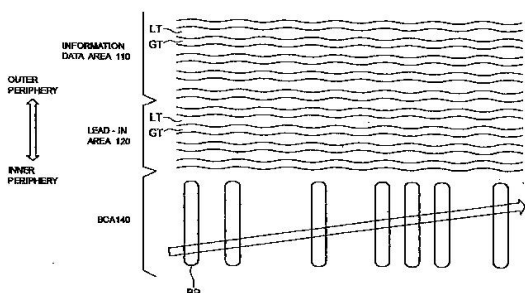
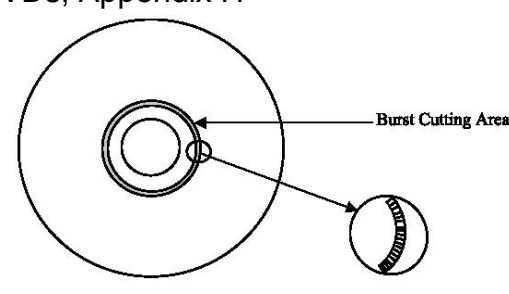
There are also ECMA standards for holographic discs (HVD-ROM, HVD)

G11B 7/00736

[N: Auxiliary data, e.g. lead-in, lead-out, Power Calibration Area (PCA), Burst Cutting Area (BCA), control information (sector headers or addresses in prepits [G11B 7/00745](#); address data in track wobble **G11B7/007T)]**

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

<p>Burst cutting area</p>	<p>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.</p>  <p>for more information see ECMA-267 standard for 120mm Read Only DVDs, Appendix H</p>  <p>Figure H.1 - Burst Cutting Area</p>
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Synonyms and Keywords

In patent documents the following abbreviations are often used:

<p>BCA</p>	<p>burst cutting area</p>
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In patent documents the following expression "read in (area)" is often used with the meaning "lead in (area)", based on Japanese applications.

In patent documents the following expression "read out (area)" is often used with the meaning "lead out (area)".

G11B 7/00772

[N: on record carriers storing information in the form of optical interference patterns, e.g. holograms]

Definition statement

This subclass/group 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 within this group

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 7/00781

[N: Auxiliary information, e.g. index marks, address marks, pre-pits, gray codes]

Definition statement

This subclass/group 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 at a distinct discrete location [N: e.g. digital information formats within a data block or sector]

Definition statement

This subclass/group 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

[N: for time base error correction by moving the light beam]

Definition statement

This subclass/group covers:

Uncommon or outdated technology (in 2011)

G11B 7/083

[N: relative to record carriers storing information in the form of optical interference patterns, e.g. holograms]

Definition statement

This subclass/group 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

[N: Methods for track change, selection or preliminary positioning by moving the head]

References relevant to classification in this group

This subclass/group does not cover:

Arrangements for moving the whole head	G11B 7/0857
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G11B 7/08511

[N: with focus pull-in only]

Definition statement

This subclass/group covers:

Changing layers in media with multiple data layers e.g. dual layer DVD.

References relevant to classification in this group

This subclass/group does not cover:

Focus search for distinguishing between types of discs	G11B 19/127
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G11B 7/08564

[N: using galvanomirrors]

Definition statement

This subclass/group covers:

For example, multiplexing in holographic storage of data.

G11B 7/0904

[N: Dithered tracking systems]

Definition statement

This subclass/group covers:

Uncommon or outdated technology in 2011.

Methods in which the beam is driven back and forth to generate the tracking error signal.

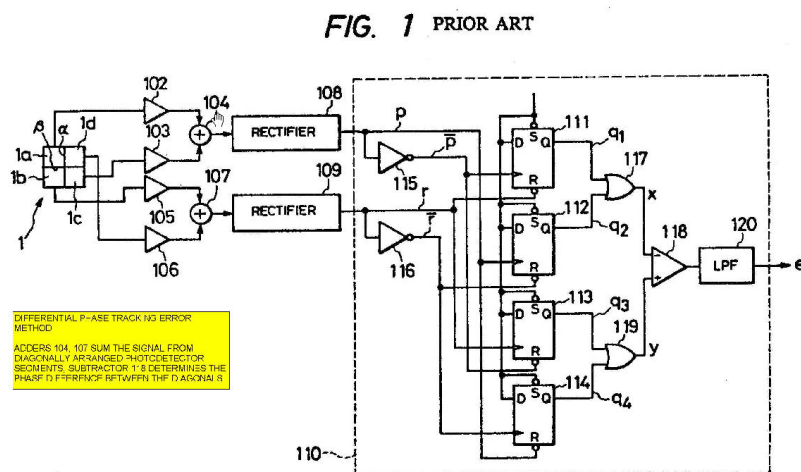
G11B 7/0906

[N: Differential phase difference systems]

Definition statement

This subclass/group 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

[N: 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 relevant to classification in this group

This subclass/group 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
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G11B 7/0909

[N: by astigmatic methods]

Definition statement

This subclass/group covers:

Illustrative example of subject matter classified in this group:

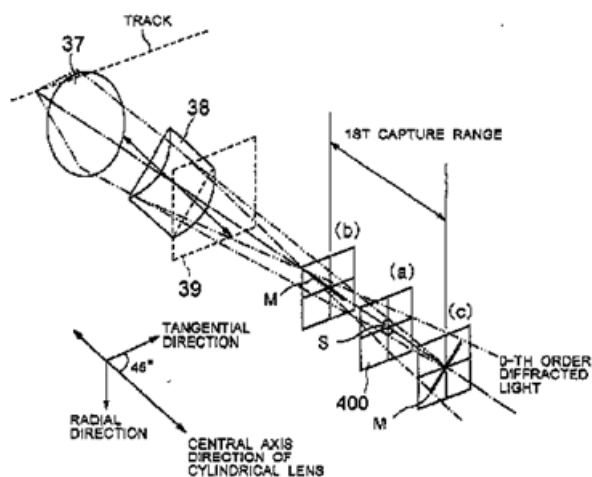


Figure from EP1220210

G11B 7/0912

[N: by push-pull method]

References relevant to classification in this group

This subclass/group does not cover:

Push-pull tracking	G11B 7/0901
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Synonyms and Keywords

In patent documents the expression "spot size focus error method" is often

used with the meaning "push-pull method".

G11B 7/0916

[N: Foucault or knife-edge methods]

Definition statement

This subclass/group covers:

Illustrative example of subject matter classified in this group:

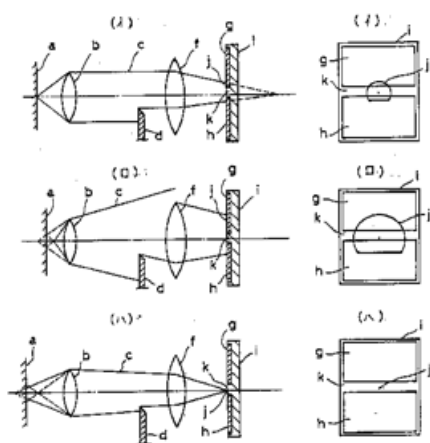


Figure taken from JP60010424

G11B 7/0917

[N: Focus-error methods other than those covered by [G11B 7/0909](#) to [G11B 7/0916](#)]

Definition statement

This subclass/group 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

[G11B/09B8F](#) far-field methods

[G11B 2007/0924](#) skewed beams method

G11B 7/0932

[N: Details of sprung supports]

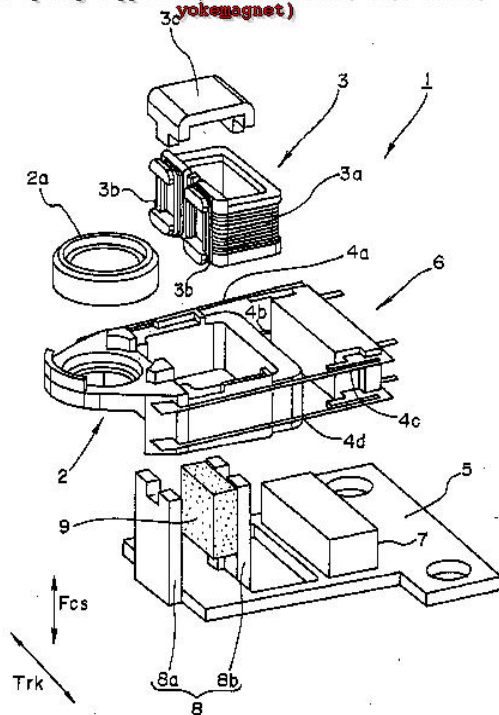
Definition statement

This subclass/group covers:

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

also contains other support systems such as liquid, magnetic, combinations.

4a-4d spring supports (2=lens holder; 3a,b=coils; 8=yoke magnet)



G11B 7/0933

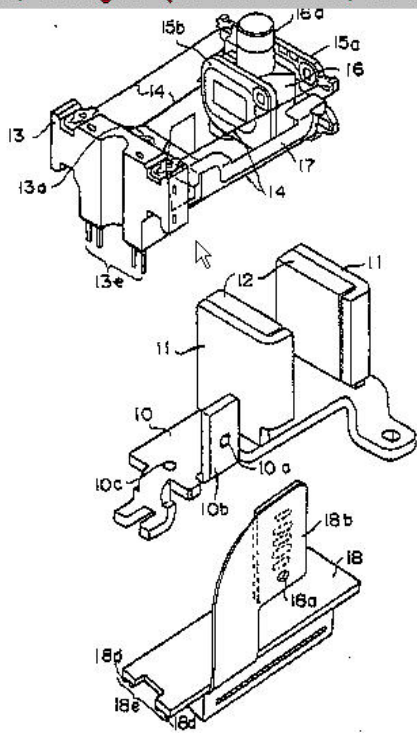
[N: Details of stationary parts]

Definition statement

This subclass/group covers:

Stationary parts: e.g. the magnets on the sled, e.g. the yokes and magnets of a "normal" four-wire-sprung actuator.

11-yoke; 12-magnet (16-lens holder, 14=springs)



G11B 7/0935

[N: Details of the moving parts]

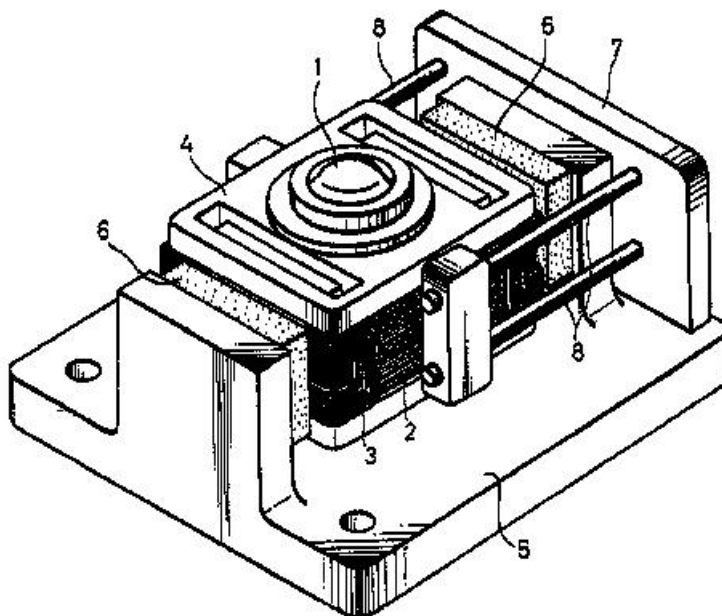
Definition statement

This subclass/group covers:

Moving parts: lens holder and coils (or, occasionally, magnets) attached to it.

Example:

2=focusing coil;3=tracking coil
(1=lens;4=holder;6=magnet;8=springs)



G11B 7/0945

[N: Methods for initializing servos, start-up sequences]

References relevant to classification in this group

This subclass/group does not cover:

Distinguishing between types of discs by using an initial focus search or scan	G11B 19/12
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G11B 7/0953

[N: to compensate for eccentricity of the disc or disc tracks]

Definition statement

This subclass/group covers:

Acting on the tracking actuator.

Synonyms and Keywords

In patent documents the expression "radial runout" is often used with the meaning "eccentricity".

G11B 7/0956

[N: 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 subclass/group covers:

Acting on focusing or tilt actuator

Synonyms and Keywords

In patent documents the expression "axial runout" is often used with the meaning "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](#)) [N: 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](#)])

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 subclass/group 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 [N: (electro- or acousto-optical deflection in general [G02F 1/29](#), [G02F 1/33](#))]

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
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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 [N: (electro-, magneto-, or acousto-optical modulators [G02F 1/00](#); optical diaphragms [G03B 9/02](#))]

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 subclass/group 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 subclass/group, the following terms (or expressions) are used with the meaning indicated:

In this group, the following 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
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In patent documents the following expressions "running optimum power control", "running OPC", "DRDW" and "dynamical power control" are often used as synonyms.

G11B 7/127

Lasers; Multiple laser arrays [N: (lasers per se [H01S](#))]

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 subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

The waveguides including means for electro-optical or acousto-optical deflection	G11B 7/1245
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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 [N: (optical detectors per se [G01J](#); demodulating light, transferring the modulation of modulated

light, frequency changing of light [G02F 2/00](#)]

Informative references

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

Optical detectors per se	G01J
Demodulating light, transferring the modulation of modulated light, frequency changing of light	G02F 2/00

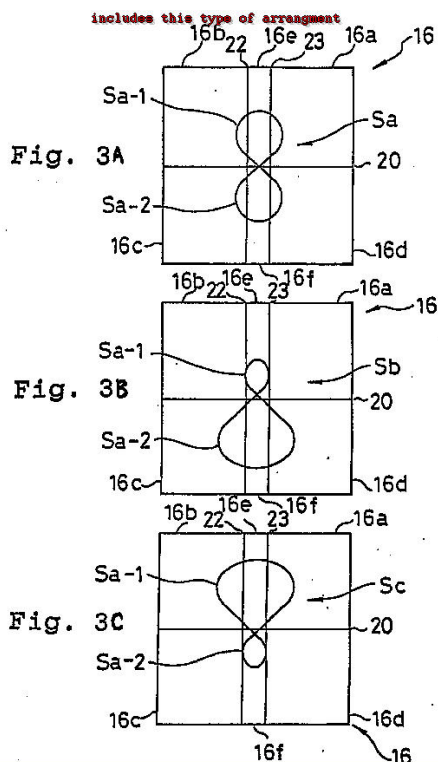
G11B 7/133

Shape of individual detector elements

Definition statement

This subclass/group covers:

Illustrative example of subject matter classified in this group:



G11B 7/135

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

Definition statement

This subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

Examples of places where the subject matter of this group is covered when specially adapted, used for a particular purpose, or incorporated in a large 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

Diffraction elements, e.g. holograms or gratings [N: (diffraction gratings per se [G02B 5/18](#); holograms per se [G02B 5/32](#); grating systems [G02B 27/44](#))]

Relationship between large subject matter areas

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 relevant to classification in this group

This subclass/group does not cover:

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

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

Diffraction gratings per se	G02B 5/18
Holograms per se	G02B 5/32
Grating systems	G02B 27/44

G11B 7/1359

Single prisms

Relationship between large subject matter areas

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 subclass/group 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.

Relationship between large subject matter areas

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 within this group

[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 subclass/group 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).

Relationship between large subject matter areas

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 than 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, electrostrictive

elements

Definition statement

This subclass/group 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

Relationship between large subject matter areas

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 subclass/group 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 [N: (optical objectives per se [G02B 9/00](#))]

Definition statement

This subclass/group covers:

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

Further classification information.

Relationship between large subject matter areas

Also assign Indexing Code for the specific type of lens ([G11B 2007/13722](#) for Fresnel lenses, [G11B 2007/13725](#) for catadioptric lenses, [G11B 2007/13727](#) for compound lenses)

References relevant to classification in this group

This subclass/group does not cover:

Objective lenses used in near-field	G11B 7/1374	58
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apparatus, unless particularly adapted for the invention.	
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Informative references

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

Optical objectives per se	G02B 9/00
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G11B 7/1376

Collimator lenses [N: (collimators per se [G02B 27/30](#))]

Informative references

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

Collimators per se	G02B 27/30
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G11B 7/1378

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

Relationship between large subject matter areas

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 subclass/group 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 relevant to classification in this group

This subclass/group 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
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 subclass/group covers:

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

References relevant to classification in this group

This subclass/group does not cover:

Waveguide heads	G11B 7/1245
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G11B 7/1387

using the near-field effect

Definition statement

This subclass/group 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)

Relationship between large subject matter areas

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](#)

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	G11B7/24R

Synonyms and keywords:

In patent documents the expression "evanescent field" is often used with the meaning "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 subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

Objective lenses with NA > 1 (i.e. for near field apparatus)	G11B 7/1387
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Informative references

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

Means for shaping the cross-section of the beam, e.g. into circular or elliptical cross-section	G11B 7/1398
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Special rules of classification within this group

[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 [N: (optical systems for aberration correction per se [G02B 27/0025](#))]

Definition statement

This subclass/group covers:

Spherical aberration, coma (also referred to as comatic aberration) and chromatic (i.e. varying with wavelength)

References relevant to classification in this group

This subclass/group does not cover:

Numerical aperture control means	G11B 7/139
Means for shaping the cross-section of the beam, e.g. into circular or elliptical cross-section	G11B 7/1398

Informative references

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

Optical systems for aberration correction per se	G02B 27/0025
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G11B 7/13922

[N: passive]

Definition statement

This subclass/group 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.

Relationship between large subject matter areas

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 relevant to classification in this group

This subclass/group does not cover:

Numerical aperture control means	G11B 7/139
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Special rules of classification within this group

[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

[N: active, e.g. controlled by electrical or mechanical means]

Definition statement

This subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

Numerical aperture control means	G11B 7/139
----------------------------------	----------------------------

Special rules of classification within this group

[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

[N: during transducing, e.g. to correct for variation of the spherical aberration due to disc tilt or irregularities in the cover layer thickness]

Informative references

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

Tilt servo aspect	G11B 7/0956
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G11B 7/1395

Beam splitters or combiners ([G11B 7/1353](#), [G11B 7/1356](#) take precedence) [N: (beam splitting or combining per se [G02B 27/10](#))]

Relationship between large subject matter areas

[G11B 7/1365](#) is also assigned for plate beams splitters.

References relevant to classification in this group

This subclass/group 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
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G11B 7/1398

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

Definition statement

This subclass/group covers:

The shape of a contour of equal intensity

G11B 7/24R

[N: Structures specially adapted for reproducing ([G11B7/24C](#) takes precedence)]

Definition statement

This subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

N: Conditioning of record carrier e.g. mechanised protection or means for reducing influence of physical parameters	G11B7/24C
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G11B 7/24Y

[N: for storing optical interference patterns, e.g. holograms]

Relationship between large subject matter areas

- 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 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 relevant to classification in this group

This subclass/group does not cover:

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
Volumetric holographic storage	G11B 2007/0009

G11B 7/241

characterised by the selection of the material

Definition statement

This subclass/group covers:

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

Relationship between large subject matter areas

- 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 relevant to classification in this group

This subclass/group does not cover:

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

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

Recording or reproducing by optical means, e.g. recording using a thermal beam of optical radiation - Record carriers for holograms	G11B7/24Y
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Informative references

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

Nano-technology for information processing, storage or transmission, e.g. quantum computing or single electron logic	B82Y 10/00
Recording methods involving bubble or bump forming	G11B 7/00452
Recording methods involving phase change effects	G11B 7/00454
Recording methods involving reflectivity, absorption or colour changes e.g. photochromic recording	G11B 7/00455
Recording methods for holographic recording	G11B 7/0065
3D recording by using multiple recording layers (not holographic)	G11B 2007/0009

Special rules of classification within this group

- 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, (**G11B7/257D**)

- Base layers made of polycarbonate if the polycarbonate is not further specified (**G11B7/253F2**)
- Reflective layers made from silver if no specific alloy is mentioned (**G11B7/258D**)
- Recording layers:
 - made of or containing "dye" - if no specific dyes is mentioned ([G11B 7/246](#))
 - made of "GeSbTe" - if the alloy is not further specified (**G11B7/243B**)
- Please also refer to Annex 1:

Annotated CPC [G11B 7/241](#)-**G11B7/258F**

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

3D	three dimensional
Super-RENS	Super REsolution Near field Structure
Blue wavelength	390 - 500 nm
"nano-size" or "nano-scale"	related to a controlled geometrical size below 100 nanometres in one or more dimensions

Synonyms and Keywords

In patent documents the following abbreviations are often used:

BD	Blu-Ray Disc
CD	Compact Disc
DVD	Digital Versatile Disc
HVD	Holographic Versatile Disc
COC	Cyclic Olefin Copolymer

In patent documents the following expressions/words

"mask layer", "shutter layer" and "aperture control layer"

"data layer" and "recording layer"

"topcoat(ing)" and "outer layer"

are often used as synonyms.

In patent documents the expression/word(s)

"substrate", "support layer" and "board is often used instead of "base layer"

"colo(u)rant" and "pigment" is often used instead of "dye"

"bonding" is often used instead of "adhesion"

"compostable" is often used instead of "(bio)-degradable" for substrate/base materials,

which are commonly used in the classification scheme of this group.

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) [N: manufacture of intermediate mediums, e.g. matrixes for processing [G11B 23/0057](#)]

Definition statement

This subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

Recovery of plastics or other constituents of waste material containing plastics	B29B 17/00
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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 disc carriers (including destroying CDs)	G11B 23/505
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G11B 7/261

[N: Preparing a master, e.g. exposing photoresist, electroforming]

References relevant to classification in this group

This subclass/group does not cover:

Electronic editing of signals on discs	G11B 27/034
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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

[N: Preparing and using a stamper, e.g. pressing or injection molding substrates (production of optical record carriers, e.g. optical discs [B29D 17/005](#))]

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
Producing (from plastics) optically read record carriers, e.g. optical discs	B29D 17/005

G11B 7/265

[N: Apparatus for the mass production of optical record carriers, e.g. complete production stations, transport systems]

Informative references

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

Vacuum work holders	B25B 11/005
Conveyors	B65G 25/00

G11B 7/266

[N: Sputtering or spin-coating layers (sputtering in general [C23C 14/24](#); spin-coating in general [B05D 1/005](#))]

Informative references

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

Spin coating	B05D 1/005
Sputtering	C23C 14/24

G11B 7/268

[N: 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 subclass/group covers:

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

Informative references

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

Photographic or thermographic registration for marking record carriers	G06K 1/126
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Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Burst code area	see Glossary of terms Figure in G11B 7/00736
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Synonyms and Keywords

In patent documents the following abbreviations are often used:

BCA	Burst code area
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G11B 9/00

Recording or reproducing using a method not covered by one of the main groups [G11B 3/00](#) to [G11B 7/00](#); Record carriers therefor ([G11B 11/00](#) takes precedence) [N: driving or moving

of heads [G11B 21/02](#)]

Definition statement

This subclass/group 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.

Relationship between large subject matter areas

Scanning probe Microscopy: [G01Q](#)

Micro-structural devices: [B81B](#)

References relevant to classification in this group

This subclass/group does not cover:

Marking using electrical current	B41M 5/20
Measuring roughness or irregularity of surfaces	G01B 7/34
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 to G11B 7/00 or by different subgroups of group G11B 9/00 ; Record carriers therefor [N: driving or moving of heads G11B	G11B 11/00

, G11B 5/48 , G11B 7/08 , G11B 21/02]	
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Informative references

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

Micro-structural systems	B81B 7/00
Manufacture or treatment of nano-structures 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
Driving or moving of heads	G11B 21/02

Glossary of terms

In this subclass/group, 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
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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](#) to [G11B 7/00](#) or by different subgroups of group [G11B 9/00](#); Record carriers therefor [N: driving or moving of heads [G11B 3/02](#), [G11B 5/48](#), [G11B 7/08](#), [G11B 21/02](#)]

Definition statement

This subclass/group 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.

Relationship between large subject matter areas

Micro-structural devices	B81B
Scanning probe Microscopy	G01Q
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

References relevant to classification in this group

This subclass/group 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
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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 to G11B 7/00 ; Record carriers therefor	G11B 9/00

Special rules of classification within this group

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 subclass/group, 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
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Synonyms and Keywords

In patent documents the following abbreviations are often used:

MO	Magneto-Optical
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G11B 13/00

Recording simultaneously or selectively by methods covered by different main groups [N: among [G11B 3/00](#), [G11B 5/00](#), [G11B 7/00](#) and [G11B 9/00](#)]; Record carriers therefor [N: not otherwise provided for]; Reproducing therefrom [N: not otherwise provided for ([G11B9/00A](#), [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 subclass/group 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 styli
- magnetically and optically
- optically and by styli.

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

Relationship between large subject matter areas

Micro-structural devices: [B81B](#)

References relevant to classification in this group

This subclass/group 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	G11B9/00A
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 to G11B 7/00 ;	G11B 9/00

Special rules of classification within this group

- 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 subclass/group, 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
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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](#) to [G11B 7/00](#), [G11B 21/00](#))

Definition statement

This subclass/group 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 viceversa.
- 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.

Relationship between large subject matter areas

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 relevant to classification in this group

This subclass/group does not cover:

Recording/reproducing operations	G11B 5/00 , G11B 7/00 , G11B 9/00 , G11B 11/00
Magnetic heads	G11B 5/127
Signal processing	G11B 20/00
Record carriers, tape cartridges	G11B 23/00
User interface aspects of drives	G11B 25/00
Recording/reproducing apparatuses in combination with television sets	G11B 31/00

Recording/reproducing apparatuses in combination with video cameras	G11B 31/006 , H04N 5/225
Vibration damping means	G11B 33/08

Informative references

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

Apparatuses using web form record carriers, e.g. tapes	G11B 25/06
Apparatuses using web form record carriers in combination with non web form record carriers; combi apparatuses	G11B 25/10
Telephones answering machines	H01M1/64
Telephones with dictation recording systems	H04M 11/10
Apparatuses for television signal recording	H04N 5/76

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 subclass/group 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.

Relationship between large subject matter areas

- 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 relevant to classification in this group

This subclass/group does not cover:

Transport devices	B65G
Tape drives	G11B 15/00
Tape libraries	G11B 15/68
Driving means for disks turntables	G11B 19/20
Tape cartridges	G11B 23/04 , G11B 23/087
Hard disk drives	G11B 25/043
Chassis of disk drives	G11B 33/02
Vibration damping means	G11B 33/08
Electrical connections	G11B 33/12
Preventing/reducing contamination of the disk drive	G11B 33/14

Informative references

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

Constructional details of computers	G06F 1/16 , G06F 1/18 , G06F 1/20
Adhesive labels	G09F 3/00
Transport of card shaped record carriers	G06K 13/00 , G06K 17/00

Synonyms and Keywords

In patent documents the following abbreviations are often used:

Disk tray	Disk drawer, caddy, pallet, receiver
Disks magazine	Storage means, stowage means, stocker
Disk accessor	Picker, gripper, take out, hand, transport unit, carriage, shuttle

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](#)); [N: Driving both disc and head]

Definition statement

This subclass/group 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.

Relationship between large subject matter areas

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

References relevant to classification in this group

This subclass/group does not cover:

Signal processing	G11B 20/00
Editing, Indexing, Addressing	G11B 27/00

Special rules of classification within this group

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 subclass/group 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 stochastic 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.

Relationship between large subject matter areas

- 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 (grammophone/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 **G06F21/00N7D** 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 **G06F21/00N1D2** 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 relevant to classification in this group

This subclass/group does not cover:

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

Computer storage devices in which each record medium is protected by	G06F 11/10
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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)	
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
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 within this group

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

Glossary of terms

In this subclass/group, 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:

(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
ADIP	Address In Pregroove, address data modulated onto the wobble frequency of an optical disc, used e.g. on a DVD+R
AES	Advanced Encryption Standard, also called Rijndael, designed to supersede DES, published as FIPS 197
AGC	Adaptive Gain Control, Automatic Gain Control

AIT	Advanced Intelligent Tape, standard for magnetic tape recording
AKE	Authentication and Key Exchange
ATIP	Absolute Time In Pregroove, CD-R/RW term for control information which is retrievable from a wobbled pre-groove, see also ADIP
ATRAC	Adaptive Transform Acoustic Coding, lossy compression scheme for audio data
AV	Audio/Video
AWGN	Additive White Gaussian Noise
BCA	Burst Cutting Area, barcode pattern appearing as radial stripes at the inner rim of an optical disc
BCH code	Bose Chaudhuri Hocquenghem code, a specific class of error-correcting block codes
BD	Blu-ray Disc
BD-J	Blu-Ray Disc Java, a specific variant of the Java programming language which is implemented in BD players
BPSK	Binary Phase Shift Keying
BSC	Binary Symmetric Channel
C2	Cryptomeria Cipher, Feistel network-based block cipher
CBC	Cipher Block Chaining, encryption mode in which each block of a message is XORed with the encrypted previous block before being encrypted
CBHD	China Blue High Definition disc, competes with the BD format

CCI	Copy Control Information, two bits indicating Copy Free, Copy No More, Copy Once, or Copy Never
CD	Compact Disc
CE	Consumer Electronics, typically standalone devices designed specifically for processing audio/video data, unlike a general-purpose computer
CGMS	Copy Generation Management System, similar to CCI
CIRC	Cross-interleaved Reed Salomon code, the ECC used on CDs
CPPM	4C Content Protection for Prerecorded Media
CPRM	4C Content Protection for Recordable Media
CPSA	5C Content Protection System Architecture
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check, a specific EDC
CSS	Content Scrambling System, copy protection scheme used on prerecorded DVDs
D	usually, the unit delay operator
DA	Data Area
DAC	Digital to Analog Converter
DAT	Digital Audio Tape
DC	Direct Current, Bias, Offset

DCT	Discrete Cosine Transform
DDS	Disc Definition Structure, control structure recorded, e.g., in the DMA of a DVD-RAM; also : Digital Data Storage
DES	Data Encryption Standard, published as FIPS 46
DFE	Decision Feedback Equaliser
DFT	Discrete Fourier Transform
DLT	Digital Linear Tape, standard for magnetic tape recording
DM	Delta Modulation
DMA	Defect Management Area, sometimes also: Defect Managed Area; also: Direct Memory Access
DMCA	Digital Millenium Copyright Act
DPCM	Differential PCM
DPSK	Differential Phase Shift Keying
DRM	Digital Rights Management
DSA	Digital Signature Algorithm, published as FIPS-186
DSP	Digital Signal Processor
DSV	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
DTCP	5C Digital Transmission Content Protection
DVD	Digital Versatile Disc, Digital Video

	Disc
DVR	Digital Video Recorder, usually used as a synonym of PVR
E2PR	see EEPR
ECB	Electronic Codebook, encryption mode in which each block of a message is encrypted separately
ECC	Error Correcting Code, code used for repairing a bit sequence that was altered by the transmission channel
EDC	Error Detecting Code, provides enough redundancy for detecting errors, but not necessarily for correcting them
EEPR	PR channel with transfer function $(1-D)(1+D)^3$
EFM	Eight-to-Fourteen Modulation, the modulation code used for CDs, transforms 8 input bits into 14-bit codewords
EFM+	Eight-to-Sixteen Modulation, the modulation code used for DVDs, transforms 8 input bits into 16-bit codewords
EKB	Enabling Key Block, data structure on a recording medium which authorises devices to process encrypted content
EPR4	PR channel with transfer function $(1-D)(1+D)^2$
FE	Frequency Encoding, frequency modulation
FEC	Forward Error Correction, error correction without a return channel, no retransmission of data

FFT	Fast Fourier Transform
FIR	Finite Impulse Response
FM	Frequency Modulation, frequency encoding
FSK	Frequency Shift Keying
HD	High Density; also: High Definition
HDCP	High Bandwidth Digital Content Protection
HDD	Hard-Disk Drive
ID	Identifier, unique number, such as a serial number
IF	Intermediate Frequency
IID	Independently and Identically Distributed
ISCR	International Standard Recording Code, globally unique identifier for sound recordings and music videos
ISI	Inter-Symbol Interference
KEK	Key Encrypting Key, a cryptographic key used for encrypting another key
LBN	Logical Block Number
LDPC code	Low Density Parity Check code, also known as Gallager codes
LFSR	Linear Feedback Shift Register
LIA	Lead-In Area, area near the inner rim of an optical disc
LMS	Least Mean Squares
LOA	Lead-Out Area, area near the outer

	rim of an optical disc
LPP	Land Pre-Pit, prerecorded address information on, e.g., a DVD-R
LSN	Logical Sector Number
LTO	Linear Tape Open, also marketed as Ultrium, standard for magnetic tape recording
MAC	Message Authentication Code; also : Medium Access Control
MAP	Maximum A-Posteriori
MD	Mini Disk
MD5	Message Digest Algorithm 5, cryptographic hash algorithm
MFM	Modified Frequency Modulation, Delay Modulation, Miller Code
MKB	Media Key Block
ML	Maximum Likelihood
MMC	Multi-Media Command, command specifically designed for accessing multimedia data on a recording medium
MMSE	Minimum Mean Squared Error, a general paradigm for setting up the objective function in the context of parameter optimisation
MO	Magneto-Optical
MP3	MPEG-1 Layer 3, lossy data compression for audio data
MPEG	Moving Picture Experts Group
MRW	Mount Rainier, specific format for

	rewritable optical discs
MSE	Mean Square Error
NA	Numerical Aperture; also: Not Applicable (N/A)
NRZ	Non Return to Zero
NRZI	Non Return to Zero Inverted
OPC	Optimum Power Calibration, adjusting the laser power of an optical write head
OTP	Opposite Track Path, recording on a multi-layer disc alternates between radially outwards on one layer and radially inwards on the following layer
PAM	Pulse Amplitude Modulation
PBN	Physical Block Number
PC	Personal Computer
PCA	Power Calibration Area, specific area used for OPC
PCM	Pulse Coded Modulation
PDL	Primary Defect List, lists defective sectors found at formatting a disc
PE	Phase Encoding, phase modulation
PI	Parity Inner, parity bits of the inner code of a product code
PIC zone	Permanent Information and Control Data zone, prerecorded area of a Blu-Ray disc
PLL	Phase Locked Loop
PM	Phase Modulation, phase encoding

PO	Parity Outer, parity bits of the outer code of a product code
PR	Partial Response; a PR(a,b,c) channel maps binary samples x,y,z to $a*x*D+b*y*D^2+c*z*D^3$
PR4	Class 4 Partial Response channel, PR channel with transfer function $(1-D^2)$
PRML	Partial Response Maximum Likelihood
PSK	Phase Shift Keying
PSN	Physical Sector Number
PTP	Parallel Track Path, on all layers of a multi-layer disc, recording proceeds from the inner to the outer diameter
PVR	Personal Video Recorder, usually used as a synonym of DVR
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
RAM	Random Access Memory, rewritable storage
RC4	a specific cryptographic stream cipher ("Rivest Cipher 4")
RDS	Running Digital Sum; see also DSV
RF	Radio Frequency
RLL	Run Length Limited
RLS	Recursive Least Squares
RS code	Reed-Solomon code
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 20/0007

[N: 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 7/26](#); data compression per se [H03M 7/30](#))]

Definition statement

This subclass/group 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).

Informative references

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

Image compression	G06T 9/00
Lossy or lossless audio compression, e.g. MP3 encoding, speech encoding etc., streaming, transcoding	G10L 19/00
Time compression for audio data, e.g. by increasing the pitch	G10L 21/04
Theory of data compression	H03M 7/30
Data compression in computer networks	H04L 29/0604

Video compression for transmission purposes	H04N 7/26
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G11B 20/0086

[N: 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 subclass/group 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.

Informative references

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

Cryptography for protecting computer memory devices	G06F 12/1408
Security arrangements for protecting various kinds of record carriers	G06F21/00N1D
Mutual authentication	G06F21/00N5A4
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	G06F21/00N7D
Software watermarking	G06F21/00N7P2

Testing the integrity of files, message authentication	G06F21/00N9C
Secure communication between devices or processes, see also H04L 9/00	G06F21/00N9T
Record carriers with integrated chips in general	G06K 19/07
Record carriers comprising integrated circuitry, e.g. CDs with transponder tags	G06K 19/07
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
Transponder cards	G06K 19/0723
Record carriers with RFID tag	G06K 19/14
Data processing for e-commerce	G06Q30/00C
Image watermarking	G06T 1/0021
A/V downloading, e.g. buying MP3 files on the web	G07F 17/16
Audio watermarking	G10L19/00W
Testing for media defects	G11B 20/1816
Record carrier with additional integrated circuitry, such as transponder tags	G11B 23/0042
Physical arrangements for indicating or preventing unauthorised use of record carriers, e.g. cassettes which can be locked mechanically etc.	G11B 23/28
Time limited playback by modifying physical properties of the record	G11B 23/282

carrier	
Digital codes on the record carrier	G11B 23/284
Labels, i.e. visible patterns, formed on an optical disc, e.g. by modifying the pit width or the groove width	G11B7/007L
Optical discs having specific layers or comprising specific materials which limit the time the disc can be played back	G11B 7/24
Network protocols for multimedia communication, e.g., home networks, authorised domains, also: downloading music etc.	H04L 29/06027
Secure data transmission over networks	H04L29/06C6B
Content encryption in computer networks	H04L 29/06659
Secret or secure communication in general	H04L 9/00
Distributing encryption keys	H04L 9/08
User or message authentication, digital signatures	H04L 9/32
Public key certificates	H04L 9/3294
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
Scrambling TV signals for transmission/broadcast	H04N 7/167
Downloading video from a server,	H04N 7/173

video on demand, etc., the client actively requesting a content from the server	
DRM and copyright management for video signals	H04N7/24C12P
Video watermarking	H04N 7/26372
Mutual authentication	G06F 2211/003
Public key encryption	G06F 2211/008
Protocols for symmetric cryptography	T04L29/06C6D2
Protocols for asymmetric cryptography	T04L29/06C6D4
Protocols for digital signatures, certificates	T04L29/06C6D4A
Protocols for key distribution	T04L29/06C6D6
Hierarchical key distribution	T04L29/06C6D6A
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	H04N 2005/91328
Inserting a watermark for TV signal recording	H04N 2005/91335
Inserting an authentication signal for TV signal recording	H04N 2005/91342
Scrambling for TV signal recording	H04N 2005/91364

Special rules of classification within this group

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

[N: Circuits for stereophonic or quadraphonic recording or reproducing]

Definition statement

This subclass/group covers:

Recording multichannel signals, e.g., stereo or quadraphonic signals, but also if more than 2 or 4 channels are involved.

Informative references

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

Stereo or multi-channel audio processing	G10L19/00M
Earpieces for telephones	H03R1/10
Stereo broadcasting, AM/FM radio transmission	H04H5/00
Audio signal processing for stereo playback	H04S 1/002
Audio processing with more than two channels, e.g., surround sound systems	H04S 3/00
Pseudo-stereo systems	H04S 5/00
Electronically adapting the sound field	H04S7/00E

G11B 20/02

Analogue recording or reproducing

Definition statement

This subclass/group covers:

Analogue recording or reproducing, e.g. audio cassettes, grammophone 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).

Informative references

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

Recording PCM signals digitally	G11B 20/10527
Angle modulation in general	H03C 3/00
Demodulating angle modulated signals	H03D 3/00
Pulse modulation	H03K 7/00
Pulse demodulation	H03K 9/00

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 subclass/group 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](#)).

Informative references

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

Information transfer via an I/O bus, bus controllers, interface protocols,	G06F 13/28
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direct memory access (DMA) architectures	
Digital I/O for computers, e.g. hard disk controllers	G06F3/06M
Operating tape devices, e.g. starting, stopping, altering the speed	G11B 15/00
Operating recording and playback devices for record carriers other than tapes, including user interfaces	G11B 19/00
Dictating devices, dictaphones	G11B 25/00
Editing A/V data, data formats, addressing and indexing	G11B 27/00
Radio recorders	G11B 31/003
Physical connectors for disc or phase drives, e.g., cables, USB or IDE sockets, etc.	G11B 33/122
Mountings for plural disk drives	G11B 33/128
Magnetic recording	G11B 5/00
Optical recording; for holographic recording see also G11C 13/042	G11B 7/00
Semiconductor memories	G11C
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 within this group

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

G11B 20/10009

[N: Improvement or modification of read or write signals]

Definition statement

This subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

Code-related aspects of clock adjustment, e.g. documents which describe specific synchronisation patterns	G11B 20/1403
Specific modulation schemes to be applied to a wobbled pre-groove	G11B 20/1419

Informative references

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

Measuring noise, SNR, jitter, phase jitter in general	G01R 29/26
Interpolation, smoothing, least mean squares	G06F 17/17
A/D converters for computer interfaces	G06F 3/05
Magnetic recording, hardware aspects	G11B 5/00

Optical recording, hardware aspects	G11B 7/00
Applying suitable write strategies, i.e. giving an optical mark the desired shape by burning it as a certain sequence of write pulses	G11B 7/00456
Measuring jitter specifically on optical discs	G11B 7/005
Algorithms/circuits for keeping an optical head on the track	G11B 7/09
Optimum power calibration	G11B7/125C2
Gain control for digital amplifiers	H03G 3/3089
Phase-locked loops	H03L 7/06
AD/DA converters in general	H03M 1/00
Calibrating AD converters in general	H03M 1/1014
DC removal for AD converters in general	H03M 1/1023
Equalisers for line transmission	H04B 3/04
DC equalisers in transmitters and receivers	H04L 25/03
Removing inter-symbol interference in such a DC equaliser	H04L 25/03006
Adaptive equalizers for transmission lines	H04L 25/03885
Modulators for data transmission	H04L 27/36
Digital PLL in a transmitter-receiver setup	H04L 7/0331

G11B 20/10A1

[N: using predistortion during writing]

Definition statement

This subclass/group 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 20/10A2

[N: Baseline correction]

Definition statement

This subclass/group 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 20/10A3

[N: using means to compensate for data shift, e.g. pulse crowding effect]

Definition statement

This subclass/group 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

[N: Audio or video recording; Data buffering arrangements ([G11B 20/12](#) to [G11B 20/18](#) take precedence)

Definition statement

This subclass/group 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](#).

Informative references

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

Buffering for I/O devices of computers, caching	G06F3/06B
Sound input/output	G06F 3/16
Audio filtering in combination with compression	G10L19/14P
Audio streaming	G10L19/14S
Audio transcoding	G10L19/14T
Audio filtering, speech enhancement	G10L 21/00
Noise filtering for audio signals	G10L21/02A1
Audio processing for audio quality enhancement	G10L 21/0205
Audio compression	G10L 21/04
Buffers for preventing read/write errors in recording/playback apparatuses, e.g., for portable devices	G11B 19/044
Data compression in the context of recording, also for audio data	G11B 20/00007
I/O interfaces for radio receivers	G11B 31/003
I/O buffers for semiconductor memories	G11C 7/10
Audio amplifiers	H03G 3/3005
Recording devices in a set-top box	H04N5/00M10
Audio processing circuitry for TV	H04N 5/60

receivers	
Interfaces between A/V recorders and other devices	H04N 5/765
Interfaces to a digital video camera	H04N 5/77
Buffer level management for the transmission of digital TV signals	H04N7/24C2
Audio signal processing for stereo playback	H04S 1/002
Digital audio processing for stereo signals	H04S 1/007
Audio processing with more than two channels, e.g., surround sound systems	H04S 3/00
Pseudo-stereo systems	H04S 5/00

G11B 20/12

Formatting, e.g. arrangement of data block or words on the record carriers [N: (within interface between computers and data recorders [G06F 3/06](#))]

Definition statement

This subclass/group 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.

Relationship between large subject matter areas

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 **G11B27/00AND**, on the other hand, those covered by **G11B5/00OR [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](#)

(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 relevant to classification in this group

This subclass/group does not cover:

File format conversion	G06F 17/30005
Documents related to defect management	G11B 20/18
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:

Formatting aspects of computers exchanging data with disk drives	G06F3/06D
Formatting aspects of computers exchanging data with tape drives	G06F3/06T
Record carriers having barcodes	G06K 19/06028
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
Wobble format of optical discs	G11B 7/0053
Optical aspects of the Burst Cutting Area, BCA, lead-in, lead-out, Power	G11B 7/00736

Calibration Area	
Physical structure of optical media with multiple layers	G11B7/24S

Special rules of classification within this group

Usually, if a document defines formatting aspects related to defect management, e.g. structure of DMAs, TDDS, 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

[N: on tapes]

Definition statement

This subclass/group 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

[N: on cards (optical aspect of optical cards [G11B 7/0033](#))]

Definition statement

This subclass/group covers:

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

References relevant to classification in this group

This subclass/group does not cover:

Optical aspects of optical cards	G11B 7/0033
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G11B 20/1217

[N: on discs]

Definition statement

This subclass/group 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 within this group

This sub-group comes with various complementing Indexing Codes, which are not mirrored by respective ECLA symbols, see in particular **S11B20/12D2+** for various CD formats, [G11B 2020/1257](#) for the count key data format, **S11B20/12D15** for the floppy disk formats, and [G11B 2020/1259](#) for hybrid discs having a ROM and a RAM area.

G11B 20/1261

[N: on films, e.g. for optical moving-picture soundtracks (optical aspect [G11B 7/0032](#))]

Definition statement

This subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

Formatting aspects of how to record movies on digital tapes or different kinds of disks	G11B 20/1201 , G11B 20/1217
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G11B 20/1262

[N: with more than one format/standard, e.g. conversion from CD-audio format to R-DAT format]

Definition statement

This subclass/group 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.

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
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G11B 20/14

using self-clocking codes

Definition statement

This subclass/group 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).

Relationship between large subject matter areas

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 relevant to classification in this group

This subclass/group does not cover:

Error correcting codes, error detecting codes in the context of recording and reproducing systems	G11B 20/1833
Theory of error correcting codes, error correcting codes per se	H03M 13/00

G11B 20/1403

[N: characterised by the use of two levels]

Definition statement

This subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

Synchronisation of separate data streams, e.g. audio and video channels	G11B 27/10
Synchronisation patterns for stream synchronisation	G11B 27/3027
Theory of binary codes in general, not in the specific context of record carriers	H03M 5/04

Informative references

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

Certain old documents about sync patterns in general	G11B 27/3027
Sync patterns specifically for the servo patterns of hard disks	G11B 5/59688

G11B 20/1407

[N: 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 subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

Theory of bit-by-bit coding in general, not in the specific context of record carriers	H03M 5/06
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G11B 20/1411

[N: conversion to or from pulse width coding]

Definition statement

This subclass/group 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 relevant to classification in this group

This subclass/group 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

[N: conversion to or from pulse frequency coding]

Definition statement

This subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

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

[N: to or from biphasic 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 biphasic 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 subclass/group 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 biphasic 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. Biphasic level codes in general: [H03M 5/12](#).

References relevant to classification in this group

This subclass/group does not cover:

Theory of biphasic level codes in general, not in the specific context of record carriers	H03M 5/12
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G11B 20/1423

[N: Code representation depending on subsequent bits, e.g. delay modulation, double density code, Miller code]

Definition statement

This subclass/group 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

[N: conversion to or from block codes or representations thereof]

Definition statement

This subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

Theory of block codes in general, not in the specific context of record carriers	H03M 5/145
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G11B 20/1488

[N: characterised by the use of three levels]

Definition statement

This subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

Partial response signals exhibiting three possible signal levels	G11B 20/10009
Theory of ternary codes in general, not in the specific context of record carriers	H03M 5/16

G11B 20/1492

[N: two levels are symmetric, in respect of the sign to the third level which is "zero"]

Definition statement

This subclass/group covers:

Ternary codes wherein the possible signal levels are -a, 0, and a.

G11B 20/1496

[N: characterised by the use of more than three levels]

Definition statement

This subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

Partial response signals with $n>3$ signal values	G11B 20/10009
Theory of n-ary codes, $n>3$, in general, not in the specific context of record carriers	H03M 5/20

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 subclass/group 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, [N: e.g. of drop-outs]

Definition statement

This subclass/group 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 relevant to classification in this group

This subclass/group does not cover:

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

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

Finding physical defects on optical discs by optical inspection	G01N 21/9506
Testing digital circuits	G01R 31/317
Detecting and correcting errors in computer systems, e.g., repairing inconsistencies / bad sectors on file system level, without the use of error	G06F 11/07

correcting codes	
Error correcting codes for computers	G06F 11/08
Computers performing error processing by retrying	G06F 11/1402
Backup and data recovery, possibly by mirroring	G06F11/14A4B
Error correction at file system level	G06F 11/1435
Computers recovering from power failure	G06F 11/1441
Storage systems, error concealment by using spares	G06F11/20L
RAID systems	G06F11/20L4M6
Testing and diagnosis of idle hardware	G06F 11/22
Verifying the correctness of markings on a record carrier	G06K 5/00
Testing while recording	G06K 5/02
Verifying the correct alignment of markings	G06K 5/04
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

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
Testing digital memory circuits for defects / correct operation	G11C 29/00
Theory of error correcting codes	H03M 13/00
Monitoring audio equipment, e.g. loudspeakers or microphones	H04R 29/00

G11B 20/1803

[N: by redundancy in data representation]

Definition statement

This subclass/group covers:

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

References relevant to classification in this group

This subclass/group does not cover:

Redundancy generating ECC schemes that are more advanced than such a simple repetition code	G11B 20/1833
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G11B 20/1806

[N: Pulse code modulation systems for audio signals ([G11B 20/1803](#) takes precedence)]

Definition statement

This subclass/group 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

[N: Testing]

Definition statement

This subclass/group 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

[N: by adding special lists or symbols to the coded information ([G11B 20/1806](#), [G11B 20/1866](#) take precedence)]

Definition statement

This subclass/group covers:

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

References relevant to classification in this group

This subclass/group 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

[N: by interleaving ([G11B 20/1809](#) takes precedence)]

Definition statement

This subclass/group covers:

Any interleaving used for mitigating the effects of read/write errors, also if

being combined with additional parity symbols.

Special rules of classification within this group

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

[N: Interpolating methods]

Definition statement

This subclass/group covers:

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

G11B 20/1879

[N: Direct read-after-write methods]

Definition statement

This subclass/group 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.

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
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G11B 20/1883

[N: Methods for assignment of alternate areas for defective areas]

Definition statement

This subclass/group 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 subclass/group covers:

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

G11B 20/22

for reducing distortions

Definition statement

This subclass/group covers:

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

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 23/007
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Special rules of classification within this group

This subgroup is obsolete. New documents about signal quality enhancement must also be classified in [G11B 20/10009](#).

G11B 20/24

for reducing noise [N: (control of amplification in general, e.g. dependent upon noise level [H03G](#))]

Definition statement

This subclass/group covers:

Strategies for reducing noise, i.e. systematically occurring degradations of the signal quality.

Obsolete technology

Informative references

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

Noise filtering for audio signals	G10L21/02A1
Reducing noise or correcting distortions on record carriers	G11B 23/0007

Special rules of classification within this subgroup

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 subclass/group 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](#)).

Relationship between large subject matter areas

[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 within this group

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 [N: 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 subclass/group 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.

Relationship between large subject matter areas

Punched cards, magnetic or optical cards, conveying cards, [G06K](#).

References relevant to classification in this group

This subclass/group does not cover:

Manufacture of record carriers	G11B 5/84 , G11B 7/26
Materials for record carriers	G11B 5/62 , G11B 7/241

Informative references

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

Magnetic or optical cards, conveying cards	G06K
Antennas	H01H 1/00
Circuits for preventing unauthorised use or copy	G11B 20/00086
Record carriers characterised by the form	G11B 5/74 , G11B 7/24

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Form factor	the size of a cartridge
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Synonyms and Keywords

In patent documents the following expressions/words "cartridge"

Cartridge	cassette, container, magazine
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G11B 25/00

Apparatus characterized by the shape of record carrier employed but not specific to the method of recording or

reproducing (individual parts of apparatus [G11B 3/00](#) to [G11B 23/00](#), [G11B 33/00](#)), [N: e.g. dictating apparatus; Combinations of such apparatus]

Definition statement

This subclass/group covers:

Mechanical structure of such apparatuses.

Documents which do not find a more appropriate classification in the depending subgroups.

References relevant to classification in this group

This subclass/group does not cover:

Registering or indicating the working of vehicles	G07C 5/00
The aspect of controlling the operating functions	G11B 15/02 , G11B 19/00
The aspect of driving, starting, stopping the tape	G11B 15/18
The aspect of guiding the tape within the apparatus	G11B 15/60
The aspect of guiding the tape cartridges within the apparatus	G11B 15/675
Library of tape cartridges	G11B 15/68
Recording and reproducing apparatuses in combination with television sets	G11B 31/00
Recording and reproducing apparatuses in combination with video cameras	G11B 31/006 , H04N 5/225
Recording/reproducing methods	G11B 5/00 , G11B 7/00 , G11B 9/00 , G11B 11/00 , G11B 20/00 , G11B 27/00
Static data storage memories	G11C , H01L 27/108 - H01L 27/115
Telephones with dictation recording	H04M 1/10

systems	
Telephone answering machines	H04M 1/64

Informative references

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

Registering or indicating the working of vehicles	G07C 5/00
Registering performance data other than driving of vehicles	G07C 5/0891
Telephone answering machines	H04M 1/64
Telephones with dictation recording systems	H04M 11/10
Apparatuses for television signal recording	H04N 5/76

G11B 25/04

using flat record carriers, e.g. disc, card

Definition statement

This subclass/group covers:

- Apparatus for card shaped record carrier.
- Feeding or guiding non disc shaped (i.e. mainly card shaped) record carriers [G11B 17/0408](#).

References relevant to classification in this group

This subclass/group does not cover:

Card shaped record carriers and apparatus for such carriers	G06K
Card shaped record carrier having a circular recording area	G11B 23/0014

Hard disk drives	G11B 25/043
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Informative references

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

Methods or arrangements for sensing record carrier	G06K 7/08
Record carriers characterised by the type of digital marking	G06K 19/067

G11B 25/043

[N: using rotating discs]

Definition statement

This subclass/group covers:

The mechanical aspects of disk drives in which the disk or disks are permanently installed (e.g. hard disk drives HDD)

References relevant to classification in this group

This subclass/group does not cover:

Heads of HDD	G11B 5/127
Motors for HDD	G11B 19/2009

G11B 25/046

[N: using stationary discs, or (rotating) cards provided with a circular recording area (automatic feed mechanism producing a transducing traverse of the head across stationary disc tracks [G11B 21/043](#); driving heads relatively to stationary record carriers for mechanical transducing [G11B 3/40](#))]

Informative references

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

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
The card shaped record carrier having a circular recording area	G06K , G11B 23/0014 .

G11B 25/06

using web-form record carriers, e.g. tape.

References relevant to classification in this group

This subclass/group does not cover:

Mechanisms which find adequate	G11B 15/00
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G11B 25/063

[N: using tape inside container]

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Tape container	tape cassette, tape cartridge
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G11B 25/066

[N: adapted for use with containers of different sizes or configurations; adaptor devices therefor]

Glossary of terms

In this subclass/group, 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
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G11B 25/08

using filamentary record carriers, e.g. wire

Definition statement

This subclass/group 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](#) to [G11B 25/08](#); [N: Adaptor devices therefor]

Definition statement

This subclass/group 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).

Reference relevant to classification in this group

This subclass/group does not cover:

The aspect of backing up data	G11B 7/28 , G06F 11/14
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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 7/28
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G11B 27/00

Editing; Indexing; Addressing; Timing or synchronising;

Monitoring; Measuring tape travel

Definition statement

This subclass/group 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](#).

Relationship between large subject matter areas

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, once 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 7/26](#) 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 17/30](#) (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 relevant to classification in this group

This subclass/group does not cover:

Testing computer peripherals	G06F 11/2268
Peripheral management in general	G06F 3/00
User interface in general	G06F 3/048
RAID systems in general	G06F3/06D
Image processing	G06T

Finding physical defects on optical discs by optical inspection	G10N21/95B
Testing disk drives	G11B 19/048
Synchronization linked to channel decoding	G11B 20/10009 , G11B 20/1403
Management of defective sectors, error correction	G11B 20/18
Testing the correct function of read/write heads for magnetic disk drives	G11B 5/455
Testing recording/reproducing heads	G11B 7/00 , G11B 5/00
Detecting defects on optical discs	G11B 7/00375
Audio broadcast recording	H04H1/02
Network broadcasting	H04N5/00N , H04N 7/24
Television studio equipment	H04N 5/222
Television broadcast recording	H04N 5/76
Video Broadcasting	H04N 7/24
Video/audio coding aspects	H04N 7/26 , G11B 20/00
A/V synchronization in transmission	H04N 7/52
Video display of recorded content	H04N 9/00

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

Music or video database	G06F 17/30
(tape) libraries	G06F 3/06 , G11B 15/68
Pvr	H04N 5/76

Camera with a recording entity	H04N 5/772
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Informative references

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

Car navigation	G01C 21/26
File backup; hierarchical storage management	G06F 11/14
Interfaces, busses, program control of peripheral devices	G06F 13/10
Dictation systems (e.g. testimony)	G06F 17/241
Databases, retrieval	G06F 17/30
"Multimedia"; File format	G06F 17/30017
Intelligent playlist building; Library content management	G06F17/30M5
(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 , G06F 17/60
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 , G08B15/00B , 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	G10L11/00A
Audio coding	G10L19/14A1
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);	G11B 20/12

Format (disc)	
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	G11B 5/127
Optical disc formats (physical level details)	G11B 7/007
Solid state memories	G11C 7/16
Broadcast equipment	H04H 60/00
User behavior with respect to received broadcast signal	H04H60/26 , /56
User preferences in broadcasting	H04H 60/38
Broadcast metadata	H04H60/69
A/V home networks (HAVI,UPnP)	H04L 12/2805
Protocols for multimedia communication	H04L 29/06027
Still image editing	H04N 1/387 , G06T 11/60
Multimedia settop box	H04N5/00M
Multimedia server	H04N5/00N
Scene detection	H04N 5/147 , G06F17/30M5
Studio equipment	H04N 5/222

Tv studio equipment	H04N 5/225 , /262
OSD, subtitle and menu display	H04N 5/445 , G09G 5/00
Television recording; (Broadcast) video recording in general	H04N 5/76
Still cameras (capturing aspects)	H04N 5/772
Trick mode reproduction (no matter what recording medium)	H04N 5/783
Video conferencing	H04N 7/15
Video transmission	H04N 7/16 , H04N 7/24 , H04N7/73 , H04N 21/00
Video source coding	H04N 7/26

Special rules of classification within this group

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](#), **G06F17/30M5**- 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 17/30](#)
- 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 subclass/group, the following terms (or expressions) are used with the meaning indicated:

TOC	(Table of content) : collection of information allowing the definition and retrieval of individual pieces of audio and video content .
EDL	(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
Playlist	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

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](#); [N: 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 subclass/group covers:

Apparatus where the recording and reproducing device is interfaced with the user.

Take-up mechanisms for earphones cable.

Relationship between large subject matter areas

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 relevant to classification in this group

This subclass/group does not cover:

Constructional details or arrangements of data processing systems	G06F 1/16
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

Output arrangements for transferring data from processing unit to output unit	G06F 3/00
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:

The recording apparatus and the television camera being placed in the same enclosure	H04N 5/772
Portable videocameras	H04N 5/225

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 subclass/group 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.

Relationship between large subject matter areas

- 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 relevant to classification in this group

This subclass/group does not cover:

Photocopy machines	G03G
Magazines for naked disks or for cartridges, which are part of the recording/reproducing apparatuses.	G11B 15/68 , G11B 17/22 , G11B 17/30 , G11B 23/023 , G11B 23/03
Hard disk drives	G11B 25/043

Informative references

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

Liquid crystal displays LCD	G02F 1/13
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
Heat transfer	H05K 7/20 , F28D 15/00 , H04B 1/036 , G06F 1/20 , H01L 23/34