G02F

DEVICES OR ARRANGEMENTS, THE OPTICAL OPERATION OF WHICH IS MODIFIED BY CHANGING THE OPTICAL PROPERTIES OF THE MEDIUM OF THE DEVICES OR ARRANGEMENTS FOR THE CONTROL OF THE INTENSITY, COLOUR, PHASE, POLARISATION OR DIRECTION OF LIGHT, e.g. SWITCHING, GATING, MODULATING OR DEMODULATING; TECHNIQUES OR PROCEDURES FOR THE OPERATION THEREOF; FREQUENCY-CHANGING; NON-LINEAR OPTICS; OPTICAL LOGIC ELEMENTS; OPTICAL ANALOGUE/DIGITAL CONVERTERS

WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
   
   Subject matter covered by these groups is classified in the following CPC groups:

   G02F 1/13357 covered by G02F 1/1336 and subgroups

2. In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

1/00 Devices or arrangements for the control of the intensity, colour, phase, polarisation or direction of light arriving from an independent light source, e.g. switching, gating or modulating; Non-linear optics

NOTE

This group covers only:

- devices or arrangements, e.g. cells, the optical operation of which is modified by changing the optical properties of the medium of the devices or arrangements by the influence or control of physical parameters, e.g. electric fields, electric current, magnetic fields, sound or mechanical vibrations, stress or thermal effects;
- devices or arrangements in which the electric or magnetic field component of the light beams influences the optical properties of the medium, i.e. non-linear optics;
- control of light by electromagnetic waves, e.g. radio waves, or by electrons or other elementary particles.

1/0009 . . [Materials therefor]

NOTE

G02F 1/0009 and subgroups contain mostly non-patent literature

1/0018 . . [Electro-optical materials]
1/0027 . . [Ferro-electric materials]
1/0036 . . [Magneto-optical materials]

1/0045 . . [Liquid crystals characterised by their physical properties]
1/0054 . . [Structure, phase transitions, NMR, ESR, Moessbauer spectra]
1/0063 . . [Optical properties, e.g. absorption, reflection or birefringence (materials for non-linear optics G02F 1/355)]
1/0072 . . [Mechanical, acoustic, electro-elastic, magneto-elastic properties]
1/0081 . . [Electric or magnetic properties]
1/009 . . [Thermal properties]
1/01 . . for the control of the intensity, phase, polarisation or colour (G02F 1/29, G02F 1/35 take precedence)

WARNING

Group G02F 1/01 is impacted by reclassification into groups G02F 1/165, G02F 1/166, G02F 1/1673, and G02F 1/169.

All groups listed in this Warning should be considered in order to perform a complete search.

1/0102 . . [Constructional details, not otherwise provided for in this subclass]
1/0105 . . [Illuminating devices]
1/0107 . . [Gaskets, spacers or sealing of cells; Filling and closing of cells]
1/011 . . [in optical waveguides, not otherwise provided for in this subclass]
1/0113 . . [Glass-based, e.g. silica-based, optical waveguides]
1/0115 . . [in optical fibres]
1/0118 . . . . [by controlling the evanescent coupling of light from a fibre into an active, e.g. electro-optic, overlay]
1/0121 . . . . [Operation of devices; Circuit arrangements, not otherwise provided for in this subclass]
1/0123 . . . . [Circuits for the control or stabilisation of the bias voltage, e.g. automatic bias control [ABC] feedback loops]
1/0126 . . . . [Opto-optical modulation, i.e. control of one light beam by another light beam, not otherwise provided for in this subclass]
1/0128 . . . . [based on electro-mechanical, magneto-mechanical, elasto-optic effects]
1/0131 . . . . [based on photo-elastic effects, e.g. mechanically induced birefringence]
1/0134 . . . . [in optical waveguides]
1/0136 . . . . [for the control of polarisation, e.g. state of polarisation [SOP] control, polarisation scrambling, TE-TM mode conversion or separation (G02F 1/0353 takes precedence)]
1/0139 . . . . [Polarisation scrambling devices; Depolarisers]
1/0142 . . . . [TE-TM mode conversion]
1/0144 . . . . [TE-TM mode separation]
1/0147 . . . . [based on thermo-optic effects (G02F 1/132 takes precedence)]
1/015 . . . . based on semiconductor elements with at least one potential jump barrier, e.g. PN, PIN junction (G02F 1/03 takes precedence)
1/0151 . . . . [modulating the refractive index]
1/0152 . . . . [using free carrier effects, e.g. plasma effect]
1/0153 . . . . [using electro-refraction, e.g. Kramers-Kronig relation]
1/0154 . . . . [using electro-optic effects, e.g. linear electro optic [LEO], Pockels, quadratic electro optical [QEO] or Kerr effect]
1/0155 . . . . [modulating the optical absorption]
1/0156 . . . . [using free carrier absorption]
1/0157 . . . . [using electro-absorption effects, e.g. Franz-Keldysh [FK] effect or quantum confined Stark effect [QCES]]
1/0158 . . . . [Blue-shift of the absorption band]
1/0159 . . . . [Red-shift of the absorption band]
1/017 . . . . Structures with periodic or quasi periodic potential variation, e.g. superlattices, quantum wells
1/01708 . . . . [in an optical waveguide structure]
1/01716 . . . . [Optically controlled superlattice or quantum well devices]
1/01725 . . . . [Non-rectangular quantum well structures, e.g. graded or stepped quantum wells]
1/01733 . . . . [Coupled or double quantum wells]
1/01741 . . . . [Asymmetrically coupled or double quantum wells]
1/0175 . . . . [with a spatially varied well profile, e.g. graded or stepped quantum wells]
1/01758 . . . . [with an asymmetric well profile, e.g. asymmetrically stepped quantum wells]
1/01766 . . . . [Strained superlattice devices; Strained quantum well devices]
1/01775 . . . . [involving an inter-subband transition in one well, e.g. e1->e2]
1/01783 . . . . [Quantum wires]
1/01791 . . . . [Quantum boxes or quantum dots]
1/025 . . . . [in an optical waveguide structure (G02F 1/017, G02F 1/2257) take precedence]
1/03 . . . . based on ceramics or electro-optical crystals, e.g. exhibiting Pockels effect or Kerr effect (G02F 1/061 takes precedence)
1/0305 . . . . [Constructional arrangements (G02F 1/0327 - G02F 1/05 take precedence)]
1/0311 . . . . [Structural association of optical elements, e.g. lenses, polarizers, phase plates, with the crystal]
1/0316 . . . . [Electrodes]
1/0322 . . . . [Arrangements comprising two or more independently controlled crystals]
1/0327 . . . . [Operation of the cell; Circuit arrangements (G02F 1/05 takes precedence)]
1/0333 . . . . [addressed by a beam of charged particles (G02F 1/05 takes precedence)]
1/0338 . . . . [structurally associated with a photoconductive layer or having photo-refractive properties (G02F 1/05 takes precedence)]
1/0344 . . . . [controlled by a high-frequency electromagnetic wave component in an electric waveguide (G02F 1/0356, G02F 1/05, G02F 1/2355, G02F 1/2354, G02F 1/2134 take precedence)]
1/035 . . . . [in an optical waveguide structure]
1/0353 . . . . [involving an electro-optic TE-TM mode conversion]
1/0356 . . . . [controlled by a high-frequency electromagnetic wave component in an electric waveguide structure]
1/05 . . . . with ferro-electric properties (G02F 1/035, G02F 1/055 take precedence)
1/0508 . . . . [specially adapted for gating or modulating in optical waveguides]
1/0516 . . . . [Operation of the cell; Circuit arrangements]
1/0525 . . . . [addressed by a beam of charged particles]
1/0533 . . . . [structurally associated with a photoconductive layer]
1/0541 . . . . [using photorefractive effects]
1/055 . . . . [the active material being a ceramic (G02F 1/035 takes precedence)]
1/0551 . . . . [Constructional details]
1/0553 . . . . [specially adapted for gating or modulating in optical waveguides]
1/0555 . . . . [Operation of the cell; Circuit arrangements]
1/0556 . . . . [specially adapted for a particular application]
1/0558 . . . . [structurally associated with a photoconductive layer or exhibiting photo-refractive properties]
1/061 . . . . based on electro-optical organic material (G02F 1/07, G02F 1/13 take precedence)
1/065 . . . . [in an optical waveguide structure]
1/07 . . . . based on electro-optical liquids exhibiting Kerr effect
1/073 . . . . [specially adapted for gating or modulating in optical waveguides]
1/076 . . . . [Operation of the cell; Circuit arrangements]
1/09 . . . . [based on magneto-optical elements, e.g. exhibiting Faraday effect]
1/091 . . . . [based on magneto-absorption or magneto-reflection]
1/092 . . . . [Operation of the cell; Circuit arrangements]
G02F

1/093 . . . [used as non-reciprocal devices, e.g. optical isolators, circulators (G02F 1/0955 takes precedence)]
1/094 . . . [based on magnetostrictive effect]
1/095 . . . in an optical waveguide structure
1/0955 . . . [used as non-reciprocal devices, e.g. optical isolators, circulators]
1/11 . . . based on acousto-optical elements, e.g. using variable diffraction by sound or like mechanical waves (acousto-optical deflection G02F 1/33)
1/113 . . . [Circuit or control arrangements]
1/116 . . . [using an optically anisotropic medium, wherein the incident and the diffracted light waves have different polarizations, e.g. acousto-optic tunable filter (AOTF) (G02F 1/125 takes precedence)]
1/125 . . . in an optical waveguide structure
1/13 . . . based on liquid crystals, e.g. single liquid crystal display cells
1/1303 . . . [Apparatus specially adapted to the manufacture of LCDs]
1/1306 . . . [Details]
1/1309 . . . [Repairing; Testing]
1/1313 . . . [specially adapted for a particular application]
1/1316 . . . [Methods for cleaning the liquid crystal cells, or components thereof, during manufacture: Materials therefor]
1/132 . . . [Thermal activation of liquid crystals exhibiting a thermo-optic effect]
1/1323 . . . [Arrangements for providing a switchable viewing angle]
1/1326 . . . [Liquid crystal optical waveguides or liquid crystal cells specially adapted for gating or modulating between optical waveguides]
1/133 . . . Constructional arrangements; Operation of liquid crystal cells; Circuit arrangements (arrangements or circuits for control of liquid crystal elements in a matrix, not structurally associated with these elements G09G 3/36)
1/13306 . . . [Circuit arrangements or driving methods for the control of single liquid crystal cells (G02F 1/132, G02F 1/13382 take precedence)]
1/13312 . . . [Circuits comprising photodetectors for purposes other than feedback]
1/13318 . . . [Circuits comprising a photodetector]
1/13324 . . . [Circuits comprising solar cells]
1/1333 . . . Constructional arrangements;
1/133302 . . . [Rigid substrates, e.g. inorganic substrates]
1/133305 . . . [Flexible substrates, e.g. plastics, organic film]
1/133308 . . . [Support structures for LCD panels, e.g. frames or bezels]
1/133311 . . . [Environmental protection, e.g. against dust or humidity]
1/133314 . . . [Back frames]
1/133317 . . . [Intermediate frames, e.g. between backlight housing and front frame]
1/13332 . . . [Front frames]
1/133322 . . . [Mechanical guidance or alignment of LCD panel support components]
1/133325 . . . [Assembling processes]
1/133328 . . . [Segmented frames]
1/133331 . . . [Cover glasses]
1/133334 . . . [Electromagnetic shields]
1/133337 . . . [Layers preventing ion diffusion, e.g. by ion absorption]
1/13334 . . . [ Plasma addressed liquid crystal cells (PALC)]
1/133342 . . . [for double-sided displays]
1/133345 . . . [Insulating layers (G02F 1/135, G02F 1/137, G02F 1/135, G02F 1/136 take precedence)]
1/133348 . . . [Charged particles addressed liquid crystal cells, e.g. controlled by an electron beam]
1/133351 . . . [Manufacturing of individual cells out of a plurality of cells, e.g. by dicing]
1/133354 . . . [Arrangements for aligning or assembling substrates]
1/133357 . . . [Planarisation layers]
1/13336 . . . [Combining plural substrates to produce large-area displays, e.g. tiled displays]
1/133362 . . . [Optically addressed liquid crystal cells (G02F 1/135 takes precedence)]
1/133365 . . . [Cells in which the active layer comprises a liquid crystalline polymer]
1/133368 . . . [Cells having two substrates with different characteristics, e.g. different thickness or material]
1/133371 . . . [Cells with varying thickness of the liquid crystal layer]
1/133374 . . . [for displaying permanent signs or marks]
1/133377 . . . [Cells with plural compartments or having plurality of liquid crystal microcells partitioned by walls, e.g. one microcell per pixel]
1/13338 . . . [Input devices, e.g. touch panels]
1/133382 . . . [Heating or cooling of liquid crystal cells other than for activation, e.g. circuits or arrangements for temperature control, stabilisation or uniform distribution over the cell]
1/133385 . . . [with cooling means, e.g. fans]
1/133388 . . . [with constructional differences between the display region and the peripheral region]
1/133391 . . . [Constructional arrangement for subdivided displays]
1/133394 . . . [Piezoelectric elements associated with the cells]
1/133397 . . . [for suppressing after-image or image-sticking]
1/1334 . . . [based on polymer dispersed liquid crystals, e.g. microencapsulated liquid crystals]
1/13342 . . . [Holographic polymer dispersed liquid crystals]
1/13345 . . . [Network or three-dimensional gels]
1/13347 . . . [working in reverse mode, i.e. clear in the off-state and scattering in the on-state]
1/1335 . . . [Structural association of cells with optical devices, e.g. polarisers or reflectors]
1/133502 . . . [Antiglare, refractive index matching layers]
{ Illuminating devices }

{ Polarisers }

{ Lenses, e.g. microlenses or Fresnel louvered or jalousie light-guides }

{ Light-guides, e.g. fibre-optic bundles, for spatial active dimming on the back side }

{ Transflectors }

{ Reflective polarisers (G02F 1/13362 takes precedence) }

{ Colour filters }

{ Colour selective polarisers takes precedence }
G02F

I/13373 . . . . . . . [Disclination line; Reverse tilt]
I/133734 . . . . . . . [by obliquely evaporated films, e.g. Si or SiO₂ films]
I/133738 . . . . . . . [for homogeneous alignment]
I/133742 . . . . . . . [for homeotropic alignment]
I/133746 . . . . . . . [for high pretilt angles, i.e. higher than 15 degrees]
I/133749 . . . . . . . [for low pretilt angles, i.e. lower than 15 degrees]
I/133753 . . . . . . . [with different alignment orientations or pretilt angles on a same surface, e.g. for grey scale or improved viewing angle]
I/133757 . . . . . . . [with different alignment orientations]
I/133761 . . . . . . . [with different pretilt angles]
I/133765 . . . . . . . [without a surface treatment]
I/133769 . . . . . . . [comprising an active, e.g. switchable, alignment layer]
I/133773 . . . . . . . [the alignment material or treatment being different for the two opposite substrates]
I/133776 . . . . . . . [having structures locally influencing the alignment, e.g. unevenness]
I/13378 . . . . . . . [by treatment of the surface, e.g. embossing, rubbing or light irradiation (G02F 1/133711, G02F 1/133734, G02F 1/133753 take precedence)]
I/133784 . . . . . . . [by rubbing]
I/133788 . . . . . . . [by light irradiation, e.g. linearly polarised light-photo-polymerisation]
I/133792 . . . . . . . [by etching]
I/133796 . . . . . . . [having conducting property]
I/1339 . . . . . . . Gaskets; Spacers; Sealing of cells
I/13392 . . . . . . . [spacers dispersed on the cell substrate, e.g. spherical particles, microfibres]
I/13394 . . . . . . . [spacers regularly patterned on the cell substrate, e.g. walls, pillars (G02F 1/133777 takes precedence)]
I/13396 . . . . . . . [Spacers having different sizes]
I/13398 . . . . . . . [Spacer materials; Spacer properties]
I/1341 . . . . . . . Filling or closing of cells
I/13415 . . . . . . . [Drop filling process]
I/1343 . . . . . . . Electrodes ((reflective electrodes G02F 1/135553)]
I/134309 . . . . . . . [characterised by their geometrical arrangement]
I/134318 . . . . . . . [having a patterned common electrode]
I/134327 . . . . . . . [Segmented, e.g. alpha numeric display]
I/134336 . . . . . . . [Matrix]
I/134345 . . . . . . . [Subdivided pixels, e.g. for grey scale or redundancy]
I/134354 . . . . . . . [the sub-pixels being capacitively coupled]
I/134363 . . . . . . . [for applying an electric field parallel to the substrate, i.e. in-plane switching [IPS]]
I/134372 . . . . . . . [for fringe field switching [FFS] where the common electrode is not patterned]
I/134381 . . . . . . . [Hybrid switching mode, i.e. for applying an electric field with components parallel and orthogonal to the substrates]
I/13439 . . . . . . . [characterised by their electrical, optical, physical properties; materials therefor; method of making]
I/1345 . . . . . . . Conductors connecting electrodes to cell terminals
I/13452 . . . . . . . [Conductors connecting driver circuitry and terminals of panels (H01L 21/60 takes precedence; electrical details inside the cell G02F 1/133)]
I/13454 . . . . . . . [Drivers integrated on the active matrix substrate (G02F 1/136277 takes precedence)]
I/13456 . . . . . . . [Cell terminals located on one side of the display only]
I/13458 . . . . . . . [Terminal pads]
I/1347 . . . . . . . Arrangement of liquid crystal layers or cells in which the final condition of one light beam is achieved by the addition of the effects of two or more layers or cells
I/13471 . . . . . . . [in which all the liquid crystal cells or layers remain transparent, e.g. FLC, ECB, DAP, HAN, TN, STN, SBE-LC cells (G02F 1/13475 takes precedence)]
I/13473 . . . . . . . [for wavelength filtering or for colour display without the use of colour mosaic filters]
I/13475 . . . . . . . [in which at least one liquid crystal cell or layer is doped with a pleochroic dye, e.g. GH-LC cell (G02F 1/13476 takes precedence)]
I/13476 . . . . . . . [in which at least one liquid crystal cell or layer assumes a scattering state]
I/13478 . . . . . . . [based on selective reflection]
I/135 . . . . . . . Liquid crystal cells structurally associated with a photoconducting or a ferroelectric layer, the properties of which can be optically or electrically varied (G02F 1/13348 takes precedence)
I/1351 . . . . . . . [Light-absorbing or blocking layers]
I/1352 . . . . . . . [Light-reflecting layers]
I/1354 . . . . . . . [having a particular photoconducting structure or material]
I/1355 . . . . . . . [Materials or manufacture processes thereof]
I/1357 . . . . . . . [Electrode structure]
I/1358 . . . . . . . [the supplementary layer being a ferroelectric layer]
I/136 . . . . . . . Liquid crystal cells structurally associated with a semi-conducting layer or substrate, e.g. cells forming part of an integrated circuit (G02F 1/135 takes precedence)
I/13606 . . . . . . . [having means for reducing parasitic capacitance]
I/13613 . . . . . . . [the semiconductor element being formed on a first substrate and thereafter transferred to the final cell substrate]
I/1362 . . . . . . . Active matrix addressed cells (G02F 1/134336, G02F 1/134363 take precedence)
I/136204 . . . . . . . [Arrangements to prevent high voltage or static electricity failures]
interaction or dynamic scattering
phase transition, orientation effect, guest-host
magneto-optical effect, e.g. field-induced
taken selectively, G02F 1/13718
{ based on electrohydrodynamic instabilities
}{ based on an electrochromic effect
}{ using a solid electrolyte
}{ containing luminescent or
electroluminescent additives
}{ based on magneto-optical effects
}{ Polymer-stabilized liquid crystal layers
}{ using smectic liquid crystals (G02F 1/141
 takes precedence)
}{ Hybrid-alignment cells (G02F 1/1393 takes
 precedence)
}{ Blue phases
}{ based on orientation effects in which the
liquid crystal remains transparent
}{ Bistable or multi-stable liquid crystal
cells (G02F 1/141 takes precedence)
}{ using a field-induced sign-reversal of the
dielectric anisotropy
}{ the birefringence of the liquid crystal
being electrically controlled, e.g. ECB-,
DAP-, HAN-, PI-LC cells (G02F 1/1396,
G02F 1/141 take precedence)
}{ Optically compensated birefringence
[OCB] - cells or PI - cells
}{ the liquid crystal being selectively
controlled between a twisted state and
a non-twisted state, e.g. TN-LC cell
(G02F 1/141 takes precedence)
}{ the twist being substantially higher
than 90°, e.g. STN-, SBE-, OMI-LC
cells
}{ the twist being below 90°
}{ using ferroelectric liquid crystals
}{ Antiferroelectric liquid crystals
}{ Deformed helix ferroelectric [DHL]
}{ Details of the smectic layer structure,
e.g. bookshelf, chevron, C1 and C2
}{ using smectic liquid crystals, e.g. based
on the electroclinic effect
}{ based on an electrochromic effect

WARNING

Group G02F 1/15 is impacted by
reclassification into groups G02F 1/1514 and
G02F 1/1516.
All groups listed in this Warning should be
considered in order to perform a complete
search.

2001/1502 . . . [complementary cell]
2001/15025 . . . [having an inorganic electrochromic layer
and a second solid organic electrochromic
layer]

1/153 . . . caused by oxidation-reduction reactions in
organic liquid solutions, e.g. viologen solutions
1/1506 . . . caused by electrodeposition, e.g. electrolytic
deposition of an inorganic material on or close
to an electrode
1/1508 . . . [using a solid electrolyte]
characterised by the electrochromic material, e.g. by the electrodeposited material

**WARNING**

Group G02F 1/1514 is incomplete pending reclassification of documents from group G02F 1/15.
Groups G02F 1/15 and G02F 1/1514 should be considered in order to perform a complete search.

2001/15145 . . . . {the electrochromic layer comprises a mixture of anodic and cathodic compounds}

comprising organic material

**WARNING**

Group G02F 1/1516 is incomplete pending reclassification of documents from group G02F 1/15.
Groups G02F 1/15 and G02F 1/1516 should be considered in order to perform a complete search.

1/15165 . . . . {Polymers}
2001/1517 . . . . {Cyano complex compounds, e.g. Prussian blue}
2001/1518 . . . . {Ferrocene compounds}
1/1523 . . . . comprising inorganic material

**WARNING**

Group G02F 1/1523 is impacted by reclassification into group G02F 1/1524.
Groups G02F 1/1523 and G02F 1/1524 should be considered in order to perform a complete search.

1/1524 . . . . Transition metal compounds

**WARNING**

Group G02F 1/1524 is incomplete pending reclassification of documents from group G02F 1/1523.
Groups G02F 1/1523 and G02F 1/1524 should be considered in order to perform a complete search.

1/15245 . . . . {based on iridium oxide or hydroxide}
1/1525 . . . . {characterised by a particular ion transporting layer, e.g. electrolyte}
1/153 . . . . Constructional details
1/1533 . . . . {structural features not otherwise provided for}
2001/1536 . . . . {additional, e.g. protective, layer inside the cell}
1/155 . . . . Electrodes
2001/1552 . . . . {Inner electrode, e.g. the electrochromic layer being sandwiched between the inner electrode and the support substrate----this group, now to be changed, should already been created by implementation of a previous DOC14 (prior to the one referred to above)----}
2001/1555 . . . . {Counter electrode}
2001/1557 . . . . {Side by side arrangements of working and counter electrodes}

1/157 . . . . Structural association of cells with optical devices, e.g. reflectors or illuminating devices
1/161 . . . . Gaskets; Spacers; Sealing of cells; Filling or closing of cells
1/163 . . . . Operation of electrochromic cells, e.g. electrophodeposition cells; Circuit arrangements therefor
2001/1635 . . . . {the pixel comprises active switching elements, e.g. TFT}
2001/164 . . . . {the electrolyte is made of polymers}
1/165 . . . . based on translational movement of particles in a fluid under the influence of an applied field

**WARNING**

Group G02F 1/165 is incomplete pending reclassification of documents from groups G02F 1/01, G02F 1/17, and G02F 1/19.
All groups listed above should be considered in order to perform a complete search.

1/166 . . . . characterised by the electro-optical or magneto-optical effect

**WARNING**

Group G02F 1/166 is incomplete pending reclassification of documents from group G02F 1/01, G02F 1/17, and G02F 1/19.
All groups listed above should be considered in order to perform a complete search.

1/167 . . . . by electrophoresis

**WARNING**

Group G02F 1/167 is incomplete pending reclassification into groups G02F 1/1675, G02F 1/16753, G02F 1/16755, G02F 1/16756, G02F 1/16757, G02F 1/1677, G02F 1/1679, and G02F 1/1685.
All groups listed in this Warning should be considered in order to perform a complete search.

1/1671 . . . . involving dry toners
1/1673 . . . . by magnetophoresis

**WARNING**

Group G02F 1/1673 is incomplete pending reclassification of documents from group G02F 1/01, G02F 1/17, and G02F 1/19.
All groups listed above should be considered in order to perform a complete search.

1/1675 . . . . Constructional details

**WARNING**

Group G02F 1/1675 is incomplete pending reclassification of documents from groups G02F 1/167, G02F 1/17, and G02F 1/19.
All groups listed above should be considered in order to perform a complete search.
Structures for supporting or mounting cells, e.g. frames or bezels

**WARNING**
Group G02F 1/16753 is incomplete pending reclassification of documents from group G02F 1/167, G02F 1/17, and G02F 1/19.
All groups listed above should be considered in order to perform a complete search.

Substrates

**WARNING**
Group G02F 1/16755 is incomplete pending reclassification of documents from group G02F 1/167, G02F 1/17, and G02F 1/19.
All groups listed above should be considered in order to perform a complete search.

Insulating layers

**WARNING**
Group G02F 1/16756 is incomplete pending reclassification of documents from group G02F 1/167, G02F 1/17, and G02F 1/19.
All groups listed above should be considered in order to perform a complete search.

Microcapsules

**WARNING**
Group G02F 1/16757 is incomplete pending reclassification of documents from group G02F 1/167, G02F 1/17, and G02F 1/19.
All groups listed above should be considered in order to perform a complete search.

Electrodes

**WARNING**
Group G02F 1/16761 is incomplete pending reclassification of documents from group G02F 1/1676, G02F 1/16762, and G02F 1/16766.
All groups listed in this Warning should be considered in order to perform a complete search.

Side-by-side arrangement of working electrodes and counter-electrodes

**WARNING**
Group G02F 1/16761 is incomplete pending reclassification of documents from group G02F 1/1676.
All groups listed above should be considered in order to perform a complete search.

Substrates

**WARNING**
Group G02F 1/16762 is incomplete pending reclassification of documents from group G02F 1/1676.
All groups listed above should be considered in order to perform a complete search.

For active matrices

**WARNING**
Group G02F 1/16766 is incomplete pending reclassification of documents from group G02F 1/1676.
All groups listed above should be considered in order to perform a complete search.

Structural association of cells with optical devices, e.g. reflectors or illuminating devices

**WARNING**
Group G02F 1/16767 is incomplete pending reclassification of documents from group G02F 1/167, G02F 1/17, and G02F 1/19.
All groups listed above should be considered in order to perform a complete search.

Gaskets; Spacers; Sealing of cells; Filling or closing of cells

**WARNING**
Group G02F 1/1677 is incomplete pending reclassification of documents from group G02F 1/167, G02F 1/17, and G02F 1/19.
All groups listed above should be considered in order to perform a complete search.

Having two or more microcells partitioned by walls, e.g. of microcup type

**WARNING**
Group G02F 1/1681 is incomplete pending reclassification of documents from group G02F 1/167, G02F 1/17, and G02F 1/19.
All groups listed above should be considered in order to perform a complete search.

Operation of cells; Circuit arrangements affecting the entire cell

**WARNING**
Group G02F 1/1685 is incomplete pending reclassification of documents from group G02F 1/167, G02F 1/17, and G02F 1/19.
All groups listed above should be considered in order to perform a complete search.
based on orientable non-spherical particles having a common optical characteristic, e.g. suspended particles of reflective metal flakes

**WARNING**

Group G02F 1/169 is incomplete pending reclassification of documents from groups G02F 1/17 and G02F 1/19.

All groups listed above should be considered in order to perform a complete search.

based on variable-absorption elements not provided for in groups G02F 1/015 - G02F 1/169

**WARNING**

Group G02F 1/17 is impacted by reclassification into group G02F 1/165, G02F 1/166, G02F 1/167, G02F 1/1675, G02F 1/16753, G02F 1/16755, G02F 1/16756, G02F 1/16757, G02F 1/1677, G02F 1/1679, G02F 1/1685, G02F 1/169.

All groups listed above should be considered in order to perform a complete search.

based on a suspension of orientable dipolar particles, e.g. suspended particles displays]

[based on absorption band-shift, e.g. Stark - or Franz-Keldysh effect (G02F 1/015, G02F 1/178 take precedence)]

[using acid- based indicators]

[based on pressure effects (G02F 1/195 takes precedence)]

based on variable-reflection or variable-refraction elements not provided for in groups G02F 1/015 - G02F 1/169

**WARNING**

Group G02F 1/19 is impacted by reclassification into group G02F 1/165, G02F 1/166, G02F 1/167, G02F 1/1675, G02F 1/16753, G02F 1/16755, G02F 1/16756, G02F 1/16757, G02F 1/1677, G02F 1/1679, G02F 1/1685, G02F 1/169.

All groups listed above should be considered in order to perform a complete search.

[by using frustrated reflection (digital reflection using controlled total internal reflection G02F 1/312)]

by interference

[Sagnac type]

[Mach-Zehnder type]

[Fabry-Perot type]

[Michelson type]

[using liquid crystals, e.g. liquid crystal Fabry-Perot filters]

[Multimode interference type]

[using semi-conducting materials]

in an optical waveguide structure

[controlled by high-frequency electromagnetic component in an electric waveguide structure]

[the optical waveguides being made of semiconducting material]
1/3523  . . . [Non-linear absorption changing by light, e.g. bleaching]
1/3525  . . . [Optical damage]
1/3526  . . . [using two-photon emission or absorption processes]
1/3528  . . . [for producing a supercontinuum]
1/353  . . . [Frequency conversion, i.e. wherein a light beam is generated with frequency components different from those of the incident light beams]
1/3532  . . . [Arrangements of plural nonlinear devices for generating multi-colour light beams, e.g. arrangements of SHG, SFG, OPO devices for generating RGB light beams]
1/3534  . . . [Three-wave interaction, e.g. sum-difference frequency generation (G02F 1/3532 takes precedence)]
1/3536  . . . [Four-wave interaction]
1/3538  . . . [for optical phase conjugation (H01S 3/10076 takes precedence)]
1/354  . . . [Third or higher harmonic generation]
1/3542  . . . [Multipass arrangements, i.e. arrangements to make light pass multiple times through the same element, e.g. using an enhancement cavity]
1/3544  . . . [Particular phase matching techniques]
1/3546  . . . [Active phase matching, e.g. by electro- or thermo-optic tuning]
1/3548  . . . [Quasi phase matching [QPM], e.g. using a periodic domain inverted structure]
1/355  . . . characterised by the materials used
1/3551  . . . [Crystals]
1/3553  . . . [having the formula MTiOYO4, where M=K, Rb, TI, NH4 or Cs and Y=P or As, e.g. KTP]
1/3555  . . . [Glasses]
1/3556  . . . [Semiconductor materials, e.g. quantum wells]
1/3558  . . . [Poled materials, e.g. with periodic poling; Fabrication of domain inverted structures, e.g. for quasi-phase-matching [QPM]]
1/361  . . . [Organic materials]
1/3611  . . . [containing Nitrogen]
1/3612  . . . [Heterocycles having N as heteroatom]
1/3613  . . . [containing Sulfur]
1/3614  . . . [Heterocycles having S as heteroatom]
1/3615  . . . [containing polymers]
1/3616  . . . [having the non-linear optical group in the main chain]
1/3617  . . . [having the non-linear optical group in a side chain]
1/3618  . . . [Langmuir Blodgett Films]
1/3619  . . . [Organometallic compounds]
1/365  . . . [in an optical waveguide structure (G02F 1/377, (G02F 1/395) takes precedence)]
1/37  . . . [for second-harmonic generation [(G02F 1/3532 takes precedence)]
1/372  . . . [Means for homogenizing the output beam]
1/374  . . . [Cherenkov radiation]
1/377  . . . [in an optical waveguide structure
1/3775  . . . (with a periodic structure, e.g. domain inversion, for quasi-phase-matching [QPM] (G02F 1/383 takes precedence)]
1/383  . . . of the optical fibre type
1/39  . . . [for parametric generation or amplification of light, infra-red or ultra-violet waves]
1/392  . . . [Parametric amplification]
1/395  . . . [in optical waveguides]
1/397  . . . [Amplification of light by wave mixing involving an interference pattern, e.g. using photorefractive material]

2/00  Demodulating light; Transferring the modulation of modulated light; Frequency-changing of light (G02F 1/35 takes precedence)
2/002  . . . [using optical mixing]
2/004  . . . [Transferring the modulation of modulated light, i.e. transferring the information from one optical carrier of a first wavelength to a second optical carrier of a second wavelength, e.g. all-optical wavelength converter]
2/006  . . . [All-optical wavelength conversion]
2/008  . . . [Opto-electronic wavelength conversion, i.e. involving photo-electric conversion of the first optical carrier]
2/02  . . . Frequency-changing of light, e.g. by quantum counters

3/00  Optical logic elements; Optical bistable devices
3/02  . . . Optical bistable devices
3/022  . . . [based on electro-, magneto- or acousto-optical elements (G02F 3/028 takes precedence)]
3/024  . . . [based on non-linear elements, e.g. non-linear Fabry-Perot cavity (G02F 3/028 takes precedence)]
3/026  . . . [based on laser effects]
3/028  . . . [based on self electro-optic effect devices (SEED)]

7/00  Optical analogue/digital converters

NOTE
This group covers only converters based in substantial manner on elements which are provided for in group G02F 1/00.

2201/00  Constructional arrangements not provided for in groups G02F 1/00 - G02F 7/00
2201/02  fibre
2201/04  monomode
2201/05  multimode
2201/06  integrated waveguide
2201/063  . . . ridge; rib; strip loaded
2201/066  . . . channel; buried
2201/07  . . . buffer layer
2201/08  . . . light absorbing layer
2201/083  . . . infra-red absorbing
2201/086  . . . UV absorbing
2201/12  . . . electrode
2201/121  . . . common or background
2201/122  . . . having a particular pattern
2201/123  . . . pixel
2201/124  . . . interdigital
2201/125  . . . delta-beta
2201/126  . . . push-pull
2201/127  . . . travelling wave
2201/128  . . . field shaping
2201/14  . . . asymmetric
2201/15  . . . periodic
Materials and properties

2202/00  Materials and properties
2202/01  dipole
2202/02  organic material
2202/021  low molecular weight
2202/022  polymeric
2202/023  curable
2202/025  thermoreactive
2202/026  charge transfer complex
2202/027  Langmuir-Blodgett film
2202/028  photobleached
2202/04  dye
2202/043  pleochroic
2202/046  fluorescent
2202/06  dopant
2202/07  poled
2202/08  glass transition temperature
2202/09  inorganic glass
2202/10  semiconductor
2202/101  GaAs and alloy
2202/102  InP and alloy
2202/103  a-Si
2202/104  poly-Si
2202/105  single crystal Si
2202/106  CdSe or CdTe and alloys
2202/107  ZnS or ZnSe and alloys
2202/108  quantum wells
2202/112  photoconductor
2202/113  photorefractive
2202/114  photochromic
2202/116  conductive
2202/20  LiNbO<sub>3</sub>, LiTaO<sub>3</sub>
2202/22  Antistatic materials or arrangements
2202/28  Adhesive materials or arrangements
2202/30  Metamaterials
2202/32  Photonic crystals
2202/34  Metal hydrides materials
2202/36  Micro- or nanomaterials
2202/38  Sol-gel materials
2202/40  Materials having a particular birefringence, retardation
2202/42  Materials having a particular dielectric constant

2203/00  Function characteristic
2203/01  transmissive
2203/02  reflective
2203/023  total internal reflection
2203/026  attenuated or frustrated internal reflection
2203/03  scattering
2203/04  wavelength independent
2203/05  wavelength dependent
2203/055  wavelength filtering
2203/06  Polarisation independent
2203/07  Polarisation dependent
2203/09  transflective
2203/10  plasmon
2203/11  involving infrared radiation
2203/12  spatial light modulator
2203/13  involving THz radiation
2203/15  involving resonance effects, e.g. resonantly enhanced interaction
2203/16  involving spin polarization effects
2203/17  involving soliton waves
2203/18  adaptive optics, e.g. wavefront correction
2203/19  linearised modulation; reduction of harmonic distortions
2203/20  Intrinsic phase difference, i.e. optical bias, of an optical modulator; Methods for the pre-set thereof
2203/21  Thermal instability, i.e. DC drift, of an optical modulator; Arrangements or methods for the reduction thereof
2203/22  diffractive
2203/24  beam steering
2203/25  Frequency chirping of an optical modulator; Arrangements or methods for the pre-set or tuning thereof
2203/255  Negative chirp
2203/26  Pulse shaping; Apparatus or methods therefor
2203/28  focussing or defocussing
2203/30  Gray scale
2203/34  Colour display without the use of colour mosaic filters
2203/48  Variable attenuator
Phase-only modulation
Optical limiters
Optical pulse train (comb) synthesizer
Frequency comb synthesizer
Multi-wavelength, e.g. operation of the device at a plurality of wavelengths
Add/drop devices
Temperature independent
Switchable arrangements whereby the element being usually not switchable
Normally black display, i.e. the off state being black
Normally white display, i.e. the off state being white
Green display, e.g. recycling, reduction of harmful substances
Arrangements or methods for testing or calibrating a device
Semiconductor optical amplifier [SOA] used in a device covered by G02F

Indexing scheme related to G02F 1/13363,
i.e. to birefringent elements, e.g. for optical compensation, characterised by the number, position, orientation or value of the compensation plates
Number of plates being 1
Number of plates being 2
Number of plates being 3
Number of plates greater than or equal to 4
Single plate on one side of the LC cell
Two plates on one side of the LC cell
All plates on one side of the LC cell
with a particular optical axis orientation
with refractive index ellipsoid inclined, or tilted, relative to the LC-layer surface O plate
with varying inclination in thickness direction, e.g. hybrid oriented discotic LC
Biaxial compensators
Positive birefringence
Negative birefringence
with twisted orientation, e.g. comprising helically oriented LC-molecules or a plurality of twisted birefringent sublayers