

**CPC****COOPERATIVE PATENT CLASSIFICATION****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** (optical transfer means between sensing member and indicating or recording part in connection with measuring [G01D 5/26](#) ; devices in which mathematical operations are carried out with optical elements [G06E 3/00](#) , {[G06E 3/001](#)} ; electrical signal transmission systems using optical means to convert the input signal [G08C 19/36](#) ; information-recording by electric or magnetic means and reproducing by sensing optical properties [G11B 11/00](#) ; static stores using optical elements [G11C 13/04](#) ; transmission systems employing electromagnetic waves other than radio waves, e.g. light, infra-red radiation, [H04B 10/00](#) ; optical multiplex systems [H04J 14/00](#) ; pictorial communication, e.g. television [H04N](#))

**WARNING**

The following IPC group is not used in the CPC scheme.

Subject matter covered by these groups is classified in the following CPC groups:

- [G02F 1/13357](#) covered by [G02F 1/1336](#) and subgroups

**G02F 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** (thermometers using change of colour or translucency [G01K 11/12](#) ; using changes in fluorescence [G01K 11/32](#) ; light guide devices [G02B 6/00](#) ; optical devices or arrangements using movable or deformable elements for controlling light independent of the light source [G02B 26/00](#) ; control of light in general [G05D 25/00](#) ; visible signalling systems [G08B 5/00](#) ; indicating arrangements for variable information by selection or combination of individual elements [G09F 9/00](#) ; control arrangements or circuits for visual indicators other than cathode-ray tubes [G09G 3/00](#) ; control of light sources [H01S 3/10](#) , [H05B 33/08](#) , [H05B 35/00](#) to [H05B 43/00](#) ; { photochromic filters [G02B 5/23](#) ; optical logic elements [G02F 3/00](#)})

**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

G02F 1/00  
(continued)

- 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.

G02F 1/0009

- . {Materials therefor}

#### **NOTE**

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

G02F 1/0018

- .. {Electro-optical materials}

G02F 1/0027

- ... {with ferro-electric properties (domain inversion in ferro-electric materials G02F 1/3558 ; ferro-electric materials in general H01G 7/02)}

G02F 1/0036

- .. {Magneto-optical materials (magnetic materials in general H01F)}

G02F 1/0045

- .. {Liquid crystals as far as the physical properties are concerned (chemical composition and properties of liquid crystals C09K 19/00)}

G02F 1/0054

- .. {Structure, phase transitions, NMR, ESR, Moessbauer spectra}

G02F 1/0063

- .. {Optical properties e.g. absorption, reflection, non-linear effects, birefringence (non linear optics in general G02F 1/35)}

G02F 1/0072

- .. {Mechanical, acoustic, electro-elastic, magneto-elastic properties}

G02F 1/0081

- .. {Electric or magnetic properties}

G02F 1/009

- .. {Thermal properties (thermometers using change of colour or translucency G01K 11/12 ; radiation pyrometry G01J 5/00)}

G02F 1/01

- . for the control of the intensity, phase, polarisation or colour (G02F 1/29 , G02F 1/35 take precedence; polarising elements per se G02B 5/30 ; static storage per se G11C; image tube screens acting as light valves by shutter operation H01J 29/12 ; such screens acting by discoloration H01J 29/14 ; { projection arrangements for television image reproduction, e.g. using eidophor H04N 5/74 ; recording by light G11B 7/00 to G11B 11/00)}

G02F 1/0102

- .. {Constructional details (G02F 1/1306 , G02F 1/133 take precedence)}

G02F 1/0105

- ... {Illumination devices (for liquid crystal cells **G02F1/13357** ; for display devices for electronic time pieces G04G 9/0041)}

G02F 1/0107

- ... {Gaskets, spacers, sealing of the cell; Filling and closing of the cell (for liquid crystal cells G02F 1/1339 , G02F 1/1341 ; for electrochromic or electrolytic cells G02F 1/161)}

G02F 1/011

- .. {in optical waveguides (G02F 1/0134 , G02F 1/01708 , G02F 1/025 , G02F 1/035 , G02F 1/0508 , G02F 1/0553 , G02F 1/065 , G02F 1/073 , G02F 1/095 , G02F 1/125 , G02F 1/1326 , G02F 1/225 take precedence; optical waveguides in general G02B 6/00)}

G02F 2001/0113

- ... {made of glass, e.g. silica-based optical waveguides}

G02F 1/0115

- ... {in optical fibres}

G02F 1/0118

- .... {by controlling the evanescent coupling of light from a fibre into an active, e.g. electro-optic, overlay}

G02F 1/0121	..	{Operation of the device; Circuit arrangements not otherwise provided for ( <a href="#">G02F 1/0327</a> , <a href="#">G02F 1/0516</a> , <a href="#">G02F 1/076</a> , <a href="#">G02F 1/092</a> , <a href="#">G02F 1/113</a> , <a href="#">G02F 1/13306</a> , <a href="#">G02F 1/163</a> take precedence)}
G02F 1/0123	...	{Circuits for the control or stabilisation of the bias voltage, e.g. automatic bias control [ABC] feedback loops}
G02F 1/0126	..	{by another light beam, i.e. opto-optical modulation ( <a href="#">G02F 1/01716</a> , <a href="#">G02F 1/0338</a> , <a href="#">G02F 1/0533</a> , <a href="#">G02F 1/0541</a> , <a href="#">G02F 1/0558</a> , <a href="#">G02F 1/135</a> , <a href="#">G02F 1/293</a> take precedence)}
G02F 1/0128	..	{based on electro-mechanical, magneto-mechanical, elasto-optic effects}
G02F 1/0131	...	{based on elasto-optic, i.e. photoelastic effect, e.g. mechanically induced birefringence ( <a href="#">acousto-optic devices G02F 1/11</a> )}
G02F 1/0134	....	{in optical waveguides}
G02F 1/0136	..	{for the control of polarisation, e.g. state of polarisation [SOP] control, polarisation scrambling, TE-TM mode conversion or separation ( <a href="#">G02F 1/0353</a> takes precedence)}
G02F 2001/0139	...	{Polarisation scrambling; Depolarisers}
G02F 2001/0142	...	{TE-TM mode conversion}
G02F 2001/0144	...	{TE-TM mode separation}
G02F 1/0147	..	{based on thermo-optic effects ( <a href="#">G02F 1/132</a> takes precedence; tenebrescent compositions <a href="#">C09K 9/00</a> ; radiation pyrometry <a href="#">G01J 5/00</a> ; thermometers using change of colour or translucency <a href="#">G01K 11/12</a> )}
G02F 1/015	..	based on semiconductor elements with at least one potential jump barrier, e.g. PN, PIN junction ( <a href="#">G02F 1/03</a> takes precedence)
G02F 2001/0151	...	{modulating the refractive index}
G02F 2001/0152	....	{by free carrier effects (Plasma)}
G02F 2001/0153	....	{by electro-refraction (Kramers-Kronig relation)}
G02F 2001/0154	....	{by electro-optic effects (LEO=Pockels, QEO=Kerr)}
G02F 2001/0155	...	{modulating the optical absorption}
G02F 2001/0156	....	{by free carrier absorption}
G02F 2001/0157	....	{by electro-absorption effects (FK, Stark, QCSE)}
G02F 2001/0158	.....	{with blue-shift of the absorption band}
G02F 2001/0159	.....	{with red-shift of the absorption band}
G02F 1/017	...	Structures with periodic or quasi periodic potential variation, e.g. superlattices, quantum wells
G02F 1/01708	....	{in an optical waveguide structure}
G02F 1/01716	....	{Optically controlled superlattice or quantum well devices}
G02F 1/01725	....	{with a non-rectangular quantum well structure, e.g. coupled, graded, stepped quantum wells}
G02F 2001/01733	.....	{Coupled or double quantum wells}
G02F 2001/01741	.....	{Asymmetrically coupled or double quantum wells}
G02F 2001/0175	.....	{with a spatially varied well profile, e.g. graded, stepped quantum wells}
G02F 2001/01758	.....	{with an asymmetric well profile, e.g. asymmetrically stepped quantum wells}
G02F 2001/01766	....	{Strained superlattice or quantum well devices}

G02F 2001/01775	....	{involving an intersubband transition in one well, e.g. e1->e2}
G02F 2001/01783	....	{Quantum wire}
G02F 2001/01791	....	{Quantum box or dot}
G02F 1/025	...	in an optical waveguide structure ( <a href="#">G02F 1/017</a> , <a href="#">G02F 1/2257</a> ) take precedence)
G02F 1/03	..	based on ceramics or electro-optical crystals, e.g. exhibiting Pockels effect or Kerr effect ( <a href="#">G02F 1/061</a> takes precedence)
G02F 1/0305	...	{Constructional arrangements ( <a href="#">G02F 1/0327</a> to <a href="#">G02F 1/05</a> take precedence)}
G02F 1/0311	....	{Structural association of optical elements, e.g. lenses, polarizers, phase plates, with the crystal}
G02F 1/0316	....	{Electrodes}
G02F 1/0322	....	{Arrangements comprising two or more independently controlled crystals}
G02F 1/0327	...	{Operation of the cell; Circuit arrangements ( <a href="#">G02F 1/05</a> takes precedence)}
G02F 1/0333	...	{addressed by a beam of charged particles e.g. directed to an adjacent layer exhibiting secondary emission or bombardment-induced conductivity effect ( <a href="#">G02F 1/05</a> takes precedence; electrography, electrophotography <a href="#">G03G</a> ; screens for cathode ray tubes acting as light valves <a href="#">H01J 29/12</a> )}
G02F 1/0338	...	{structurally associated with a photoconductive layer or having photo-refractive properties ( <a href="#">G02F 1/05</a> takes precedence)}
G02F 1/0344	...	{controlled by a high-frequency electromagnetic wave component in an electric waveguide ( <a href="#">G02F 1/0356</a> , <a href="#">G02F 1/05</a> , <a href="#">G02F 1/2255</a> , <a href="#">G02F 1/3134</a> take precedence)}
G02F 1/035	...	in an optical waveguide structure
G02F 1/0353	....	{involving an electro-optic TE-TM mode conversion}
G02F 1/0356	....	{controlled by a high-frequency electromagnetic wave component in an electric waveguide structure}
G02F 1/05	...	with ferro-electric properties ( <a href="#">G02F 1/035</a> , <a href="#">G02F 1/055</a> take precedence; { domain inversion in ferro-electric materials <a href="#">G02F 1/3558</a> ; ferro-electric digital stores <a href="#">G11C 11/22</a> })
G02F 1/0508	....	{specially adapted for gating or modulating in optical waveguides}
G02F 1/0516	....	{Operation of the cell; Circuit arrangements}
G02F 1/0525	....	{addressed by a beam of charged particles, e.g. directed to an adjacent layer exhibiting secondary emission or bombardment-induced conductivity effect (electrography, electrophotography <a href="#">G03G</a> ; screens for cathode-ray tubes acting as light valves <a href="#">H01J 29/12</a> )}
G02F 1/0533	....	{structurally associated with a photo-conductive layer}
G02F 1/0541	....	{using photo-refractive effects (holography <a href="#">G03H</a> ; electro-optical digital static stores using an interference pattern <a href="#">G11C 13/044</a> )}
G02F 1/055	...	the active material being a ceramic ( <a href="#">G02F 1/035</a> takes precedence)
G02F 1/0551	....	{Constructional details}
G02F 1/0553	....	{specially adapted for gating or modulating in optical waveguides}
G02F 1/0555	....	{Operation of the cell; Circuit arrangements}
G02F 1/0556	....	{specially adapted for a particular application}
G02F 1/0558	....	{structurally associated with a photoconductive layer or exhibiting photo-refractive properties}

- G02F 1/061 .. based on electro-optical organic material ([G02F 1/07](#) , {[G02F 1/13](#)} take precedence)
- G02F 1/065 ... in an optical waveguide structure
- G02F 1/07 .. based on electro-optical liquids exhibiting Kerr effect
- G02F 1/073 ... {specially adapted for gating or modulating in optical waveguides}
- G02F 1/076 ... {Operation of the cell; Circuit arrangements}
- G02F 1/09 .. based on magneto-optical elements, e.g. exhibiting Faraday effect
- G02F 1/091 ... {based on magneto-absorption or magneto-reflection}
- G02F 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)}
- G02F 2001/094 ... {Based on magnetophoretic effect}
- G02F 1/095 ... in an optical waveguide structure
- G02F 1/0955 .... {used as non-reciprocal devices, e.g. optical isolators, circulators}
- G02F 1/11 .. based on acousto-optical elements, e.g. using variable diffraction by sound or like mechanical waves ({elasto-optic effect without wave propagation [G02F 1/0131](#) ; } acousto-optical deflection [G02F 1/33](#))}
- G02F 1/113 ... {Circuit or control arrangements}
- G02F 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)}
- G02F 1/125 ... in an optical waveguide structure
- G02F 1/13 .. based on liquid crystals, e.g. single liquid crystal display cells (liquid crystal materials [C09K 19/00](#))
- G02F 1/1303 ... {Apparatus specially adapted to the manufacture of LCDs}
- G02F 1/1306 ... {Details (not used, see sub-groups)}
- G02F 1/1309 .... {Repairing; Testing (testing of optical apparatus [G01M 11/00](#) ; electronic testing of displays or display drivers, e.g. of LCDs, [G09G 3/006](#))}
- G02F 1/1313 ... {specially adapted for a particular application}
- G02F 2001/1316 ... {Cleaning methods or materials for cleaning part of liquid crystal cell components during the manufacturing process}
- G02F 1/132 ... {Thermal activation of liquid crystals exhibiting a thermo-optic effect (thermometers using change of colour or translucency of liquid crystals [G01K 11/165](#) ; thermally addressed liquid crystal elements in a matrix [G09G 3/3603](#))}
- G02F 1/1323 ... {Arrangements for providing a switchable viewing angle}
- G02F 1/1326 ... {Liquid crystal optical waveguides or liquid crystal cells specially adapted for gating or modulating between optical waveguides}
- G02F 1/133 ... Constructional arrangements; Operation of liquid crystal cells; Circuit arrangements (arrangements or circuits for control of liquid crystal elements in a {segment display or a} matrix, not structurally associated with these elements,{ respectively [G09G 3/18](#) and }[G09G 3/36](#))}
- G02F 1/13306 .... {Circuit arrangements or driving methods for the control of single liquid crystal cells ([G02F 1/132](#) , [G02F 1/133382](#) take precedence)}
- G02F 2001/13312 ..... {Circuits comprising a photodetector not for feedback}

G02F 1/13318	.....	{Circuits comprising a photodetector}
G02F 2001/13324	.....	{Circuits comprising a solar cell}
G02F 1/1333	....	Constructional arrangements; {Manufacturing methods} ( <a href="#">G02F 1/135</a> , <a href="#">G02F 1/136</a> take precedence)
G02F 2001/133302	.....	{rigid substrate, e.g. inorganic}
G02F 1/133305	.....	{Flexible substrates, e.g. plastics, organic film}
G02F 1/133308	.....	{LCD panel immediate support structure, e.g. front and back frame or bezel}
G02F 2001/133311	.....	{Environmental protection, e.g. dust, humidity}
G02F 2001/133314	.....	{Back frame}
G02F 2001/133317	.....	{Intermediate frame, e.g. between backlight housing and front frame}
G02F 2001/13332	.....	{Front frame}
G02F 2001/133322	.....	{Mechanical guiding and alignment of LCD panel support components}
G02F 2001/133325	.....	{Method of assembling ( <a href="#">G02F 2201/465</a> takes precedence)}
G02F 2001/133328	.....	{Segmented frame}
G02F 2001/133331	.....	{Cover glass}
G02F 2001/133334	.....	{Electromagnetic shield}
G02F 2001/133337	.....	{Ion-diffusion preventing or absorbing layer}
G02F 1/13334	.....	{Plasma addressed liquid crystal cells [PALC] ( <a href="#">plasma panels H01J 17/49</a> )}
G02F 2001/133342	.....	{for double side displays}
G02F 1/133345	.....	{Insulating layers ( <a href="#">G02F 1/1335</a> , <a href="#">G02F 1/1337</a> , <a href="#">G02F 1/135</a> , <a href="#">G02F 1/136</a> take precedence)}
G02F 1/133348	.....	{Charged-particles, e.g. electron-beam, addressed liquid crystals cells (screen for cathode ray tubes acting as light valves <a href="#">H01J 29/12</a> ; electrophotography, electrophotography <a href="#">G03G</a> )}
G02F 1/133351	.....	{Manufacturing of individual cells out of a plurality of cells, e.g. by dicing}
G02F 2001/133354	.....	{Arrangements for aligning or assembling the substrates}
G02F 2001/133357	.....	{Planarisation layer}
G02F 1/13336	.....	{Combining plural substrates to produce large-area displays, e.g. tiled displays}
G02F 1/133362	.....	{Optically addressed liquid crystal cells ( <a href="#">G02F 1/135</a> takes precedence)}
G02F 1/133365	.....	{Cells in which the active layer comprises a liquid crystalline polymer (liquid crystalline polymers in general <a href="#">C09K 19/38</a> )}
G02F 2001/133368	.....	{cell having two substrates with different characteristic, e.g. hickness or material}
G02F 1/133371	.....	{Cells with varying thickness of the liquid crystal layer}
G02F 2001/133374	.....	{for displaying permanent signs or marks}
G02F 1/133377	.....	{Cells with plural compartments or having plurality of liquid crystal micro-cells partitioned by walls, e.g. one micro-cell per pixel}
G02F 1/13338	.....	{Input devices, e.g. touch-panels (specially adapted as input devices to computers <a href="#">G06F 3/033</a> ; touch-panels per se <a href="#">G06K 11/06</a> , keyboard switches per se <a href="#">H01H 13/70</a> )}

G02F 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}
G02F 1/133385	.....	{with cooling means, e.g. fans}
G02F 2001/133388	.....	{Constructional difference between the display region and the peripheral region}
G02F 2001/133391	.....	{Constructional arrangement for sub-divided displays}
G02F 2001/133394	.....	{Piezoelectric element associated with the cell}
G02F 2001/133397	.....	{for suppressing after-image or image-sticking}
G02F 1/1334	.....	based on polymer dispersed liquid crystals, e.g. microencapsulated liquid crystals {(compositions <a href="#">C09K 19/544</a> )}
G02F 1/13342	.....	{Holographic polymer dispersed liquid crystals}
G02F 2001/13345	.....	{Network or three-dimensional gel}
G02F 2001/13347	.....	{Reverse mode, i.e. clear in the off-state and scattering in the on-state}
G02F 1/1335	.....	Structural association of optical devices, e.g. polarisers, reflectors or illuminating devices, with the cell
G02F 1/133502	.....	{Antiglare, refractive index matching layers}
G02F 1/133504	.....	{Diffusing, scattering, diffracting elements (associated to illuminating devices <a href="#">G02F 1/133606</a> )}
G02F 2001/133507	.....	{Luminance enhancement films}
G02F 1/133509	.....	{Filters, e.g. light shielding masks (optical filters <a href="#">G02B 5/20</a> )}
G02F 1/133512	.....	{Light shielding layers, e.g. black matrix ( <a href="#">G02F 1/136209</a> takes precedence)}
G02F 1/133514	.....	{Colour filters (luminescent elements <a href="#">G02F 1/133617</a> )}
G02F 1/133516	.....	{Methods of making thereof, e.g. printing, electro-deposition, photolithography (photomechanical production of textured or patterned surfaces <a href="#">G03F</a> )}
G02F 2001/133519	.....	{overcoating}
G02F 2001/133521	.....	{Interference filters}
G02F 1/133524	.....	{Light-guides, e.g. fibre-optic bundles, louvered or jalousie light-guides}
G02F 1/133526	.....	{Lenses, e.g. micro-lenses, Fresnel lenses (lenses in general <a href="#">G02B 3/00</a> )}
G02F 1/133528	.....	{Polarisers (polarisers per se <a href="#">G02B 5/30</a> )}
G02F 2001/133531	.....	{Special arrangement of polariser or analyser axes}
G02F 1/133533	.....	{Colour selective polarisers ( <a href="#">G02F 1/1347</a> takes precedence)}
G02F 1/133536	.....	{Reflective polarizers ( <a href="#">G02F 1/13362</a> takes precedence)}
G02F 2001/133538	.....	{with a spatial distribution of the polarisation direction}
G02F 2001/133541	.....	{Circular polarisers}
G02F 2001/133543	.....	{Cholesteric polarisers}
G02F 2001/133545	.....	{Dielectric stack polarisers}
G02F 2001/133548	.....	{Wire-grid polarisers}

G02F 2001/13355	.....	{Polarising beam splitters [PBS]}
G02F 1/133553	.....	{Reflecting elements (associated to illuminating devices <a href="#">G02F 1/133605</a> )}
G02F 1/133555	.....	{Transflectors}
G02F 2001/133557	.....	{Half-mirror}
G02F 2001/13356	.....	{Particular location of the optical element}
G02F 2001/133562	.....	{on the viewer side}
G02F 2001/133565	.....	{inside the LC element, i.e. between the cell substrates}
G02F 2001/133567	.....	{on the back side}
G02F 1/1336	.....	{Illuminating devices (in general <a href="#">F21V</a> ; associated with display devices for electronic watches <a href="#">G04G 9/0041</a> )}

### **WARNING**

Groups [G02F 1/1336](#) - [G02F 1/133621](#) dos not correspond to former or current IPC groups. Concordance CPC : IPC for these groups is as follows: - [G02F 1/1336](#) - [G02F 1/133621](#) : [G02F 1/13357](#)

G02F 2001/133601	.....	{for spatial active dimming}
G02F 1/133602	.....	{Direct backlight}
G02F 1/133603	.....	{with LEDs}
G02F 1/133604	.....	{with lamps}
G02F 1/133605	.....	{including specially adapted reflectors}
G02F 1/133606	.....	{including a specially adapted diffusing, scattering or light controlling members}
G02F 2001/133607	.....	{the light controlling member including light directing or refracting elements, e.g. prisms or lenses}
G02F 1/133608	.....	{including particular frames or supporting means}
G02F 1/133609	.....	{including means for improving the color mixing, e.g. white}
G02F 1/133611	.....	{including means for improving the brightness uniformity}
G02F 2001/133612	.....	{Electrical details}
G02F 2001/133613	.....	{including a particular sequence of light sources}
G02F 2001/133614	.....	{the light is generated by photoluminescence, e.g. a phosphor is illuminated by UV or blue light}
G02F 1/133615	.....	{Edge-illuminating devices, i.e. illuminating from the side ( <a href="#">G02B 6/0001</a> takes precedence)}
G02F 2001/133616	.....	{Front illuminating devices}
G02F 1/133617	.....	{Illumination with ultra-violet light; Luminescent elements or materials associated to the cell}
G02F 2001/133618	.....	{for ambient light}
G02F 1/13362	.....	{providing polarised light, e.g. by converting a polarisation component into another one (optical systems for polarising <a href="#">G02B 27/28</a> )}

G02F 1/133621	.....	{providing coloured light ( <a href="#">G02F 1/133617</a> , <a href="#">G02F 1/133533</a> take precedence)}
G02F 2001/133622	.....	{colour sequential illumination}
G02F 2001/133623	.....	{Inclined coloured light beams}
G02F 2001/133624	.....	{having a particular spectral emission}
G02F 2001/133625	.....	{Electron stream lamps}
G02F 2001/133626	.....	{providing two modes of illumination, e.g. day-night}
G02F 2001/133627	.....	{Projection-direct viewing}
G02F 2001/133628	.....	{with cooling means}
G02F 1/13363	.....	Birefringent elements, e.g. for optical compensation
G02F 2001/133631	.....	{with a spatial distribution of the retardation value}
G02F 1/133632	.....	{with refractive index ellipsoid inclined relative to the LC-layer surface}
G02F 2001/133633	.....	{using mesogenic materials}
G02F 1/133634	.....	{the refractive index $N_z$ perpendicular to the element surface being different from in-plane refractive indices $N_x$ and $N_y$ , e.g. biaxial or with normal optical axis}
G02F 2001/133635	.....	{Multifunctional compensators}
G02F 1/133636	.....	{with twisted orientation, e.g. comprising helically oriented LC-molecules or a plurality of twisted birefringent sublayers}
G02F 2001/133637	.....	{characterized by the wavelength dispersion}
G02F 2001/133638	.....	{Waveplates, i.e. plates with a retardation value of $\lambda/n$ }
G02F 1/1337	.....	Surface-induced orientation of the liquid crystal molecules, e.g. by alignment layers
G02F 1/133703	.....	{by introducing organic surfactant additives into the liquid crystal material ( <a href="#">C09K 19/56</a> takes precedence)}
G02F 1/133707	.....	{Structures for producing distorted electric fields, e.g. bumps, protrusions, recesses, slits in pixel electrodes}
G02F 1/133711	.....	{by organic films, e.g. polymeric films}
G02F 2001/133715	.....	{by first depositing a monomer}
G02F 1/133719	.....	{with coupling agent molecules, e.g. silane}
G02F 1/133723	.....	{Polyimide, polyamide-imide}
G02F 2001/133726	.....	{made of a mesogenic material}
G02F 2001/13373	.....	{Disclination line; Reverse tilt}
G02F 1/133734	.....	{by obliquely evaporated films, e.g. Si or SiO <sub>2</sub> films}
G02F 2001/133738	.....	{for homogeneous alignment}
G02F 2001/133742	.....	{for homeotropic alignment}
G02F 2001/133746	.....	{for high pretilt angle, i.e. > 15 degrees}
G02F 2001/133749	.....	{for low pretilt angle, i.e. < 15 degrees}
G02F 1/133753	.....	{with different alignment orientations or pretilt angles on a same surface, e.g. for grey scale or improved viewing angle}
G02F 2001/133757	.....	{with different alignment orientations}

G02F 2001/133761	.....	{with different pretilt angles}
G02F 2001/133765	.....	{without a surface treatment}
G02F 2001/133769	.....	{comprising an active, e.g. switchable alignment layer}
G02F 2001/133773	.....	{The alignment material or treatment is different for the two opposite substrates}
G02F 2001/133776	.....	{having structures i.e. unevenness locally influencing the alignment}
G02F 1/13378	.....	{by treatment of the surface, e.g. embossing, rubbing, light irradiation ( <a href="#">G02F 1/133711</a> , <a href="#">G02F 1/133734</a> , <a href="#">G02F 1/133753</a> take precedence)}
G02F 1/133784	.....	{by rubbing}
G02F 1/133788	.....	{by light irradiation, e.g. linearly polarised light photo-polymerisation}
G02F 2001/133792	.....	{by etching}
G02F 2001/133796	.....	{having conducting property}
G02F 1/1339	.....	Gaskets; Spacers, {also spacers with conducting properties ( <a href="#">electric line connectors H01R</a> )}; Sealing of the cell
G02F 1/13392	.....	{spacers dispersed on the cell substrate, e.g. spherical particles, micro-fibres}
G02F 1/13394	.....	{spacers regularly patterned on the cell substrate, e.g. walls, pillars ( <a href="#">G02F 1/133377</a> takes precedence)}
G02F 2001/13396	.....	{Spacers having different sizes}
G02F 2001/13398	.....	{Materials and properties of the spacer}
G02F 1/1341	.....	Filling or closing of the cell {( <a href="#">G02F 1/133365</a> , <a href="#">G02F 1/1334</a> take precedence)}
G02F 2001/13415	.....	{Drop filling process}
G02F 1/1343	.....	Electrodes {( <a href="#">reflective electrodes G02F 1/133553</a> )}
G02F 1/134309	.....	{characterised by their geometrical arrangement ( <a href="#">G09F 9/302</a> takes precedence)}
G02F 2001/134318	.....	{having a patterned common electrode}
G02F 1/134327	.....	{Segmented, e.g. alpha numeric display}
G02F 1/134336	.....	{Matrix}
G02F 2001/134345	.....	{Subdivided pixels, e.g. grey scale, redundancy}
G02F 2001/134354	.....	{the sub-pixels being capacitively coupled}
G02F 1/134363	.....	{for applying an electric field parallel to the substrate, i.e. in-plane switching [IPS]}
G02F 2001/134372	.....	{for fringe field switching [FFS] where the common electrode is not patterned, e.g. planar}
G02F 2001/134381	.....	{Hybrid switching mode, i.e. for applying an electric field both parallel and orthogonal to the substrates}
G02F 1/13439	.....	{characterised by their electrical, optical, physical properties; materials therefor; method of making}
G02F 1/1345	.....	Conductors connecting electrodes to cell terminals

G02F 1/13452	.....	{Conductors connecting driver circuitry and terminals of panels ( <a href="#">H01L 21/00</a> takes precedence; electrical details inside the cell <a href="#">G02F 1/133</a> ;)}
G02F 1/13454	.....	{Drivers integrated on the active matrix substrate ( <a href="#">G02F 1/136277</a> takes precedence)}
G02F 2001/13456	.....	{cell terminals on one side of the display only}
G02F 1/13458	.....	{Terminal pads}
G02F 1/1347	.....	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 {(colour projection displays with liquid crystal valves <a href="#">H04N 9/3197</a> )}
G02F 1/13471	.....	{in which all the liquid crystal cells or layers remain transparent, e.g. FLC, ECB, DAP, HAN, TN, STN, SBE-LC cells ( <a href="#">G02F 1/13475</a> takes precedence)}
G02F 1/13473	.....	{for wavelength filtering or for colour display without the use of colour mosaic filters}
G02F 1/13475	.....	{in which at least one liquid crystal cell or layer is doped with a pleochroic dye, e.g. GH-LC cell ( <a href="#">G02F 1/13476</a> takes precedence)}
G02F 1/13476	.....	{in which at least one liquid crystal cell or layer assumes a scattering state}
G02F 2001/13478	.....	{based on selective reflection}
G02F 1/135	.....	Liquid crystal cells structurally associated with a photoconducting or a ferro-electric layer, the properties of which can be optically or electrically varied {( <a href="#">G02F 1/133348</a> takes precedence)}
G02F 2001/1351	.....	{light-absorbing or blocking layer}
G02F 2001/1352	.....	{light-reflecting layer}
G02F 1/1354	.....	{having a particular photoconducting structure or material}
G02F 2001/1355	.....	{material or manufacturing process thereof}
G02F 2001/1357	.....	{electrode structure}
G02F 1/1358	.....	{the supplementary layer being a ferro-electric layer}
G02F 1/136	.....	Liquid crystal cells structurally associated with a semi-conducting layer or substrate, e.g. cells forming part of an integrated circuit ( <a href="#">G02F 1/135</a> takes precedence)
G02F 2001/13606	.....	{having means for reducing parasitic capacitance}
G02F 2001/13613	.....	{the semiconductor element is formed on a first substrate and thereafter transferred to the final cell substrate}
G02F 1/1362	.....	Active matrix addressed cells {( <a href="#">G02F 1/134336</a> , <a href="#">G02F 1/134363</a> take precedence)}
G02F 1/136204	.....	{Arrangements to prevent high voltage or static electricity failures}
G02F 1/136209	.....	{Light shielding layers, e.g. black matrix, incorporated in the active matrix substrate, e.g. structurally associated with the switching element}
G02F 1/136213	.....	{Storage capacitors associated with the pixel electrode}
G02F 2001/136218	.....	{Shield electrode}
G02F 2001/136222	.....	{Color filter incorporated in the active matrix substrate}

G02F 1/136227	.....	{Through-hole connection of the pixel electrode to the active element through an insulation layer}
G02F 2001/136231	.....	{for reducing the number of lithographic steps}
G02F 2001/136236	.....	{using a gray or half tone lithographic process}
G02F 1/13624	.....	{having more than one switching element per pixel}
G02F 2001/136245	.....	{having complementary transistors}
G02F 2001/13625	.....	{Patterning using a multi-mask exposure}
G02F 2001/136254	.....	{Checking; Testing}
G02F 1/136259	.....	{Repairing; Defects}
G02F 2001/136263	.....	{Line defect}
G02F 2001/136268	.....	{Switch defect}
G02F 2001/136272	.....	{Auxiliary line}
G02F 1/136277	.....	{formed on a semiconductor substrate, e.g. silicon}
G02F 2001/136281	.....	{having a transmissive semiconductor substrate}
G02F 1/136286	.....	{Wiring, e.g. gate line, drain line}
G02F 2001/13629	.....	{Multi-layer wirings}
G02F 2001/136295	.....	{Materials; Compositions; Methods of manufacturing}
G02F 1/1365	.....	in which the switching element is a two-electrode device {(G02F 1/136277 takes precedence)}
G02F 1/1368	.....	in which the switching element is a three-electrode device {(G02F 1/136277 takes precedence)}
G02F 2001/13685	.....	{Top gate}
G02F 1/137	...	characterised by a particular electro- or magneto-optical effect, e.g. field-induced phase transition, orientation effect, guest-host interaction, dynamic scattering
G02F 2001/13706	....	{the LC having positive dielectric anisotropy}
G02F 2001/13712	....	{the LC having negative dielectric anisotropy}
G02F 1/13718	....	{based on a change of the texture state of a cholesteric liquid crystal}
G02F 1/13725	....	{based on guest-host interaction (G02F 1/13762 , G02F 1/13737 , take precedence)}
G02F 1/13731	....	{based on a field-induced phase transition (G02F 1/13781 takes precedence)}
G02F 1/13737	.....	{in liquid crystals doped with a plechroic dye}
G02F 1/13743	....	{based on electrohydrodynamic instabilities or domain formation in liquid crystals}
G02F 1/1375	.....	{using dynamic scattering}
G02F 2001/13756	....	{the liquid crystal selectively assuming a light-scattering state (G02F 1/1334 , G02F 1/13718 take precedence)}
G02F 1/13762	....	{containing luminescent or electroluminescent additives (luminescent materials in general C09K 11/00 ; compositions of liquid crystals comprising additives C09K 19/52 to C09K 19/603 ; electroluminescent light sources H05B 33/00)}
G02F 1/13768	....	{based on magneto-optical effects}

G02F 2001/13775	....	{Polymer stabilized liquid crystal layers}
G02F 1/13781	....	{using smectic liquid crystals ( <a href="#">G02F 1/141</a> takes precedence)}
G02F 2001/13787	....	{Hybrid alignment cells ( <a href="#">G02F 1/1393</a> takes precedence)}
G02F 2001/13793	....	{Blue phases}
G02F 1/139	....	based on orientation effects in which the liquid crystal remains transparent
G02F 1/1391	.....	{Bistable or multi-stable liquid crystal cells ( <a href="#">G02F 1/141</a> takes precedence)}
G02F 1/1392	.....	{using a field-induced sign-reversal of the dielectric anisotropy}
G02F 1/1393	.....	{the birefringence of the liquid crystal being electrically controlled, e.g. ECB-, DAP-, HAN-, PI-LC cells ( <a href="#">G02F 1/1396</a> , <a href="#">G02F 1/141</a> take precedence)}
G02F 1/1395	.....	{Optically compensated birefringence [OCB]- cells or PI- cells}
G02F 1/1396	.....	{the liquid crystal being selectively controlled between a twisted state and a non-twisted state, e.g. TN-LC cell ( <a href="#">G02F 1/141</a> takes precedence)}
G02F 1/1397	.....	{the twist being substantially higher than 90°, e.g. STN-, SBE-, OMI-LC cells}
G02F 2001/1398	.....	{the twist being below 90°C}
G02F 1/141	.....	using ferroelectric liquid crystals
G02F 2001/1412	.....	{Antiferroelectric liquid crystals}
G02F 2001/1414	.....	{Deformed helix ferroelectric [DHL]}
G02F 1/1416	.....	{Details of the smectic layer structure, e.g. bookshelf, chevron, C1 and C2}
G02F 1/1418	.....	{using smectic liquid crystals, e.g. based on the electroclinic effect}
G02F 1/15	..	based on electrochromic elements {(electrochromic materials <a href="#">C09K 9/00</a> )}
G02F 2001/1502	...	{complementary cell}
G02F 2001/1504	....	{having an inorganic electrochromic layer and a second solid organic electrochromic layer}
G02F 1/1506	...	{based on electrolytic deposition of a non-organic material on or in the vicinity of an electrode}
G02F 1/1508	....	{using a solid electrolyte}
G02F 2001/151	...	{the electrochromic material comprises ferrocene compounds}
G02F 2001/1512	...	{the electrochromic layer comprises a mixture of anodic and cathodic compounds}
G02F 2001/1515	...	{the electrochromic material is made of polymer}
G02F 2001/1517	...	{based on cyano complex compound, e.g. Prussian blue}
G02F 2001/1519	...	{the electrolyte is made of polymer}
G02F 1/1521	...	{based on oxidation reduction in organic liquid solutions, e.g. viologens solutions}
G02F 1/1523	...	{based on solid inorganic materials, e.g. transition metal compounds, e.g. in combination with a liquid or solid electrolyte ( <a href="#">G02F 1/1506</a> takes precedence)}
G02F 1/1525	....	{characterised by a particular ion transporting layer, e.g. electrolyte ( <a href="#">H01M 6/18</a> , <a href="#">H01M 10/08</a> take precedence)}
G02F 1/1527	....	{based on iridium oxide or hydroxide}

G02F 1/153	...	Constructional arrangements
G02F 1/1533	....	{structural features not otherwise provided for}
G02F 2001/1536	.....	{additional, e.g. protective, layer inside the cell}
G02F 1/155	....	Electrodes
G02F 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)-----}
G02F 2001/1555	.....	{Counter electrode}
G02F 2001/1557	.....	{Side by side arrangements of working and counter electrodes}
G02F 1/157	....	Structural association of optical devices, e.g. reflectors or illuminating devices, with the cell
G02F 1/161	....	Gaskets; Spacers; Sealing of the cell; Filling or closing of the cell
G02F 1/163	...	Operation of electrochromic cells; Circuit arrangements
G02F 2001/1635	....	{the pixel comprises active switching elements, e.g. TFT}
G02F 1/167	..	based on electrophoresis
G02F 2001/1672	...	{of the microcup type}
G02F 2001/1674	...	{comprising a dry toner particle}
G02F 2001/1676	...	{having a particular electrode}
G02F 2001/1678	...	{having a particular composition or particle type}
G02F 1/17	..	based on variable absorption elements ( <a href="#">G02F 1/015</a> to <a href="#">G02F 1/167</a> take precedence; { tenebrescent compositions <a href="#">C09K 9/00</a> })
G02F 1/172	...	{based on a suspension of orientable dipolar particles, e.g. suspended particles displays}
G02F 1/174	...	{based on absorption band-shift, e.g. Stark - or Franz-Keldysh effect ( <a href="#">G02F 1/015</a> , <a href="#">G02F 1/178</a> take precedence)}
G02F 1/176	...	{using acid- based indicators}
G02F 1/178	...	{based on pressure effects ( <a href="#">G02F 1/195</a> takes precedence)}
G02F 1/19	..	based on variable reflection or refraction elements ( <a href="#">G02F 1/015</a> to <a href="#">G02F 1/167</a> take precedence)
G02F 1/195	...	{by using frustrated reflection (digital reflection using controlled total internal reflection <a href="#">G02F 1/315</a> )}
G02F 1/21	..	by interference
G02F 2001/211	...	{Sagnac type}
G02F 2001/212	...	{Mach-Zender type}
G02F 2001/213	...	{Fabry-Perot type}
G02F 2001/215	...	{Michelson type}
G02F 1/216	...	{using liquid crystals, e.g. liquid crystal Fabry-Perot filters}
G02F 2001/217	...	{Multi mode interference type}
G02F 1/218	...	{using semi-conducting materials}
G02F 1/225	...	in an optical waveguide structure
G02F 1/2252	....	{in optical fibres}

- G02F 1/2255 . . . . {controlled by a high-frequency electromagnetic component in an electric waveguide structure}
- G02F 1/2257 . . . . {the optical waveguides being made of semiconducting material}
- G02F 1/23 . . for the control of the colour ([G02F 1/03](#) to [G02F 1/21](#) take precedence)
- G02F 1/25 . . . as to hue or predominant wavelength
- G02F 1/29 . . for the control of the position or the direction of light beams, i.e deflection ({optical coupling means [G02B 6/26](#) ; optical-mechanical scanning in general [G02B 26/10](#) ; static stores with electric or magnetic read-in and optical read-out [G11C](#); lasers provided with means to change the location from which, or the direction in which, laser radiation is emitted [H01S 3/101](#))
- G02F 2001/291 . . {Two-dimensional analog deflection}
- G02F 1/292 . . {by controlled diffraction or phased-array beam steering (controlled diffraction for optical switching [G02F 1/31](#))}
- G02F 1/293 . . {by another light beam, i.e. opto-optical deflection}
- G02F 2001/294 . . {Variable focal length device}
- G02F 1/295 . . {Analog deflection from or} in an optical waveguide structure]
- G02F 1/2955 . . . {by controlled diffraction or phased-array beam steering (controlled diffraction for optical waveguide switching [G02F 1/313](#))}
- G02F 1/31 . . Digital deflection, {i.e. optical switching} ([G02F 1/33](#) takes precedence)
- G02F 2001/311 . . . {Cascade arrangement of plural switches}
- G02F 1/313 . . . in an optical waveguide structure
- G02F 1/3131 . . . . {in optical fibres}
- G02F 1/3132 . . . . {of directional coupler type (all-optical modulation, gating or switching using a non-linear directional coupler [G02F 1/3521](#))}
- G02F 1/3133 . . . . . {the optical waveguides being made of semiconducting materials}
- G02F 1/3134 . . . . . {controlled by a high-frequency electromagnetic wave component in an electric waveguide structure}
- G02F 2001/3135 . . . . . {vertical structure}
- G02F 1/3136 . . . . {of interferometric switch type}
- G02F 1/3137 . . . . {with intersecting or branching waveguides, e.g. X-switches and Y-junctions}
- G02F 1/3138 . . . . . {the optical waveguides being made of semiconducting materials}
- G02F 1/315 . . . based on the use of controlled internal reflection
- G02F 1/33 . . Acousto-optical deflection devices {(circuit or control arrangements therefor [G02F 1/113](#))}
- G02F 1/332 . . . {comprising a plurality of transducers on the same crystal surface, e.g. multi-channel Bragg cell}
- G02F 1/335 . . . having an optical waveguide structure
- G02F 1/35 . . Non-linear optics (optical bistable devices [G02F 3/02](#) ; lasers using stimulated Brillouin or Raman effect [H01S 3/30](#))
- G02F 1/3501 . . {Constructional arrangements of non-linear optical devices, e.g. shape of non-linear crystals (constructional arrangements of electro-optic devices [G02F 1/0305](#))}
- G02F 2001/3503 . . . {Structural association of optical elements, e.g. lenses, with the nonlinear optical device}
- G02F 2001/3505 . . . {Coatings; Housings; Supports}

G02F 2001/3507	...	{Arrangements comprising two or more nonlinear optical devices}
G02F 2001/3509	...	{Shape, e.g. shape of end face}
G02F 1/3511	..	{Self-focusing or self-trapping of light; Light-induced birefringence; Induced optical Kerr-effect (photorefractive effects of electro-optic crystals <a href="#">G02F 1/0338</a> , <a href="#">G02F 1/0541</a> , of ceramics <a href="#">G02F 1/0558</a> ; opto-optical modulation <a href="#">G02F 1/0126</a> ; opto-optical deflection <a href="#">G02F 1/293</a> )}
G02F 1/3513	...	{Soliton propagation}
G02F 1/3515	..	{All-optical modulation, gating, switching, e.g. control of a light beam by another light beam ( <a href="#">G02F 1/353</a> , <a href="#">G02F 1/37</a> , <a href="#">G02F 1/39</a> take precedence)}
G02F 1/3517	...	{using an interferometer}
G02F 1/3519	....	{of Sagnac type, i.e. nonlinear optical loop mirror [NOLM]}
G02F 1/3521	...	{using a directional coupler}
G02F 1/3523	..	{Non-linear absorption changing by light e.g. bleaching (laser Q-switching using bleachable media <a href="#">H01S 3/113</a> )}
G02F 1/3525	..	{Optical damage}
G02F 1/3526	..	{using two-photon emission or absorption processes (Raman effect <a href="#">H01S 3/30</a> )}
G02F 2001/3528	..	{for producing a supercontinuum}
G02F 1/353	..	{Frequency conversion, i.e. wherein a light beam with frequency components different from those of the incident light beams is generated (second harmonic generation <a href="#">G02F 1/37</a> ; optical parametric generation or amplification <a href="#">G02F 1/39</a> ; transferring the modulation of modulated light <a href="#">G02F 2/004</a> ; optical pumping of a laser by another laser <a href="#">H01S 3/094</a> ; nonlinear optical devices inside a laser cavity <a href="#">H01S 3/108</a> )}
G02F 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}
G02F 1/3534	...	{Three-wave interaction, e.g. sum-difference frequency generation ( <a href="#">G02F 1/3532</a> takes precedence)}
G02F 1/3536	...	{Four-wave interaction}
G02F 1/3538	....	{for optical phase conjugation ( <a href="#">H01S 3/10076</a> takes precedence)}
G02F 2001/354	...	{Third or higher harmonic generation}
G02F 2001/3542	...	{Multi-pass arrangements, i.e. arrangements to pass light a plurality of times through the same element, e.g. by using an enhancement cavity}
G02F 1/3544	...	{Particular phase matching techniques}
G02F 2001/3546	....	{Active phase matching, e.g. by electro- or thermo-optic tuning}
G02F 2001/3548	....	{Quasi-phase-matching [QPM], e.g. using a periodic domain inverted structure}
G02F 1/355	..	characterised by the materials used
G02F 1/3551	...	{Crystals}
G02F 1/3553	....	{having the formula MTiOYO <sub>4</sub> , where M=K, Rb, Tl, NH <sub>4</sub> or Cs and Y=P or As, e.g. KTP}
G02F 1/3555	...	{Glasses}
G02F 1/3556	...	{Semiconductor materials, e.g. quantum wells}
G02F 1/3558	...	{Poled materials, e.g. with periodic poling; Fabrication of domain inverted structures, e.g. for quasi-phase-matching [QPM]}

- G02F 1/361 . . . Organic materials
- G02F 1/3611 . . . . {containing Nitrogen}
- G02F 1/3612 . . . . . {Heterocycles having N as heteroatom}
- G02F 1/3613 . . . . {containing Sulfur}
- G02F 1/3614 . . . . . {Heterocycles having S as heteroatom}
- G02F 1/3615 . . . . {containing polymers}
- G02F 1/3616 . . . . . {having the non-linear optical group in the main chain}
- G02F 1/3617 . . . . . {having the non-linear optical group in a side chain}
- G02F 1/3618 . . . . {Langmuir Blodgett Films}
- G02F 1/3619 . . . . {Organometallic compounds}
- G02F 1/365 . . in an optical waveguide structure ([G02F 1/377](#) , [G02F 1/395](#)) take precedence)
- G02F 1/37 . . for second-harmonic generation {([G02F 1/3532](#) takes precedence)}
- G02F 2001/372 . . . {means for homogenizing the output beam}
- G02F 2001/374 . . . {Cerenkov radiation}
- G02F 1/377 . . . in an optical waveguide structure
- G02F 1/3775 . . . . {with a periodic structure, e.g. domain inversion, for quasi-phase-matching [QPM] ([G02F 1/383](#) takes precedence)}
- G02F 1/383 . . . . of the optical fibre type
- G02F 1/39 . . for parametric generation or amplification of light, infra-red or ultra-violet waves ([G02F 1/3532](#) takes precedence; } electrical parametric amplifiers [H03F 7/00](#))
- G02F 2001/392 . . . {Parametric amplification}
- G02F 1/395 . . . {in optical waveguides}
- G02F 1/397 . . . {Amplification of light by wave mixing involving an interference pattern, e.g. using photorefractive material}

**G02F 2/00**

**Demodulating light; Transferring the modulation of modulated light; Frequency-changing of light** ([G02F 1/35](#) takes precedence; photoelectric detecting or measuring devices [G01J](#), [H01J 40/00](#) , [H01L 31/00](#) ; demodulating laser arrangements {e.g. switching, gating} [H01S 3/10](#) ; demodulation or transference of modulation of modulated electro-magnetic waves in general [H03D 9/00](#))

- G02F 2/002 . {using optical mixing ([homodyne](#), [heterodyne](#) systems [H04B 10/142](#))}
- G02F 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}
- G02F 2002/006 . . {All-optical wavelength conversion}
- G02F 2002/008 . . {Opto-electronic wavelength conversion, i.e. involving photo-detection of the first optical carrier}
- G02F 2/02 . Frequency-changing of light, e.g. by quantum counters ([luminescent materials](#) [C09K 11/00](#))

**G02F 3/00**

**Optical logic elements** ({[optical computing](#) [G06E](#)} ; electric pulse generators using opto-electronic devices as active elements [H03K 3/42](#) ; logic circuits using opto-electronic devices [H03K 19/14](#)); **Optical bistable devices**

- G02F 3/02 . Optical bistable devices

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

## **G02F 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](#) .

## **G02F 2201/00**      **Constructional arrangements not provided for in groups [G02F 1/00](#) to [G02F 7/00](#)**

- G02F 2201/02 . fibre
- G02F 2201/04 . monomode
- G02F 2201/05 . multimode
- G02F 2201/06 . integrated waveguide
- G02F 2201/063 .. ridge; rib; strip loaded
- G02F 2201/066 .. channel; buried
- G02F 2201/07 . buffer layer
- G02F 2201/08 . light absorbing layer
- G02F 2201/083 .. infra-red absorbing
- G02F 2201/086 .. UV absorbing
- G02F 2201/12 . electrode
- G02F 2201/121 .. common or background
- G02F 2201/122 .. having a particular pattern
- G02F 2201/123 .. pixel
- G02F 2201/124 .. interdigital
- G02F 2201/125 .. delta-beta
- G02F 2201/126 .. push-pull
- G02F 2201/127 .. travelling wave
- G02F 2201/128 .. field shaping
- G02F 2201/14 . asymmetric
- G02F 2201/15 . periodic
- G02F 2201/16 . series; tandem
- G02F 2201/17 . Multi-pass arrangements, i.e. arrangements to pass light a plurality of times through the same element, e.g. by using an enhancement cavity
- G02F 2201/18 . parallel
- G02F 2201/20 . delay line
- G02F 2201/205 .. of fibre type

- G02F 2201/30 . grating
- G02F 2201/302 . . grating coupler
- G02F 2201/305 . . diffraction grating
- G02F 2201/307 . . Reflective grating, i.e. Bragg grating
- G02F 2201/34 . reflector
- G02F 2201/343 . . cholesteric liquid crystal reflector
- G02F 2201/346 . . distributed (Bragg) reflector
- G02F 2201/36 . Airflow channels, e.g. constructional arrangements facilitating the flow of air
- G02F 2201/38 . Anti-reflection arrangements
- G02F 2201/40 . Arrangements for improving the aperture ratio
- G02F 2201/42 . Arrangements for providing conduction through an insulating substrate
- G02F 2201/44 . Arrangements combining different electro-active layers, e.g. electrochromic, liquid crystal or electroluminescent layers
- G02F 2201/46 . Fixing elements
- G02F 2201/465 . . Snap -fit
- G02F 2201/48 . Flattening arrangements
- G02F 2201/50 . Protective arrangements
- G02F 2201/501 . . Blocking layers, e.g. against migration of ions
- G02F 2201/503 . . Arrangements improving the resistance to shock
- G02F 2201/505 . . Arrangements improving the resistance to acoustic resonance like noise
- G02F 2201/506 . . Repairing, e.g. with redundant arrangement against defective part
- G02F 2201/508 . . . Pseudo repairing, e.g. a defective part is brought into a condition in which it does not disturb the functioning of the device
- G02F 2201/52 . RGB geometrical arrangements
- G02F 2201/54 . Arrangements for reducing warping-twist
- G02F 2201/56 . Substrates having a particular shape, e.g. non-rectangular
- G02F 2201/58 . Arrangements comprising a monitoring photodetector

**G02F 2202/00****Materials and properties**

- G02F 2202/01 . dipole
- G02F 2202/02 . organic material
- G02F 2202/021 . . low molecular weight
- G02F 2202/022 . . polymeric
- G02F 2202/023 . . . curable
- G02F 2202/025 . . . . thermocurable
- G02F 2202/026 . . charge transfer complex
- G02F 2202/027 . . Langmuir-Blodgett film
- G02F 2202/028 . . photobleached
- G02F 2202/04 . dye
- G02F 2202/043 . . pleochroic
- G02F 2202/046 . . fluorescent

G02F 2202/06	. dopant
G02F 2202/07	. poled
G02F 2202/08	. glass transition temperature
G02F 2202/09	. inorganic glass
G02F 2202/10	. semiconductor
G02F 2202/101	.. GaxAs and alloy
G02F 2202/102	.. InxP and alloy
G02F 2202/103	.. a-Si
G02F 2202/104	.. poly-Si
G02F 2202/105	.. single crystal Si
G02F 2202/106	.. CdxSe or CdxTe and alloys
G02F 2202/107	.. ZnS or ZnSe and alloys
G02F 2202/108	.. quantum wells
G02F 2202/12	. photoconductor
G02F 2202/13	. photorefractive
G02F 2202/14	. photochromic
G02F 2202/16	. conductive
G02F 2202/20	. LiNbO3, LiTaO3
G02F 2202/22	. Antistatic materials or arrangements
G02F 2202/28	. Adhesive materials or arrangements
G02F 2202/30	. Metamaterials
G02F 2202/32	. Photonic crystals
G02F 2202/34	. Metal hydrides materials
G02F 2202/36	. Micro or nano materials
G02F 2202/38	. Sol-gel materials
G02F 2202/40	. Materials having a particular birefringence, retardation
G02F 2202/42	. Materials having a particular dielectric constant
G02F 2202/99	. Test HW
<b>G02F 2203/00</b>	<b>Function characteristic</b>
G02F 2203/01	. transmissive
G02F 2203/02	. reflective
G02F 2203/023	.. total internal reflection
G02F 2203/026	.. attenuated or frustated internal reflection
G02F 2203/03	. scattering
G02F 2203/04	. wavelength independent
G02F 2203/05	. wavelength dependent
G02F 2203/055	.. wavelength filtering
G02F 2203/06	. Polarisation independent
G02F 2203/07	. Polarisation dependent

- G02F 2203/09 . transfective
- G02F 2203/10 . plasmon
- G02F 2203/11 . involving infrared radiation
- G02F 2203/12 . spatial light modulator
- G02F 2203/13 . involving THZ radiation
- G02F 2203/15 . involving resonance effects, e.g. resonantly enhanced interaction
- G02F 2203/16 . involving spin polarization effects
- G02F 2203/17 . involving soliton waves
- G02F 2203/18 . adaptive optics, e.g. wavefront correction
- G02F 2203/19 . linearised modulation; reduction of harmonic distortions
- G02F 2203/20 . Intrinsic phase difference, i.e. optical bias, of an optical modulator; Methods for the pre-set thereof
- G02F 2203/21 . Thermal instability, i.e. DC drift, of an optical modulator; Arrangements or methods for the reduction thereof
- G02F 2203/22 . diffractive
- G02F 2203/24 . beam steering
- G02F 2203/25 . Frequency chirping of an optical modulator; Arrangements or methods for the pre-set or tuning thereof
- G02F 2203/255 . . Negative chirp
- G02F 2203/26 . Pulse shaping; Apparatus or methods therefor
- G02F 2203/28 . focussing or defocussing
- G02F 2203/30 . Gray scale
- G02F 2203/34 . Colour display without the use of colour mosaic filters
- G02F 2203/48 . Variable attenuator
- G02F 2203/50 . Phase-only modulation
- G02F 2203/52 . Optical limiters
- G02F 2203/54 . Optical pulse train (comb) synthesizer
- G02F 2203/56 . Frequency comb synthesizer
- G02F 2203/58 . Multi-wavelength, e.g. operation of the device at a plurality of wavelengths
- G02F 2203/585 . . Add/drop devices
- G02F 2203/60 . Temperature independent
- G02F 2203/62 . Switchable arrangements whereby the element being usually not switchable
- G02F 2203/64 . Normally black display, i.e. the off state being black
- G02F 2203/66 . Normally white display, i.e. the off state being white
- G02F 2203/68 . Green display, e.g. recycling, reduction of harmful substances
- G02F 2203/69 . Arrangements or methods for testing or calibrating a device
- G02F 2203/70 . Semiconductor optical amplifier [SOA] used in a device covered by [G02F](#)
  
- G02F 2413/00** **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**
- G02F 2413/01 . Number of plates being 1

- G02F 2413/02 . Number of plates being 2
- G02F 2413/03 . Number of plates being 3
- G02F 2413/04 . Number of plates greater than or equal to 4
- G02F 2413/05 . Single plate on one side of the LC cell
- G02F 2413/06 . Two plates on one side of the LC cell
- G02F 2413/07 . All plates on one side of the LC cell
- G02F 2413/08 . with a particular optical axis orientation
- G02F 2413/09 . with a spatial distribution of the retardation value
- G02F 2413/10 . with refractive index ellipsoid inclined, or tilted, relative to the LC-layer surface O plate
- G02F 2413/105 . . with varying inclination in thickness direction, e.g. hybrid oriented discotic LC
- G02F 2413/11 . The refractive index  $N_z$  perpendicular to the element surface being different from in-plane refractive indices  $N_x$  and  $N_y$ , e.g. C plate
- G02F 2413/12 . Biaxial compensators
- G02F 2413/13 . Positive birefringence
- G02F 2413/14 . Negative birefringence
- G02F 2413/15 . with twisted orientation, e.g. comprising helically oriented LC-molecules or a plurality of twisted birefringent sublayers