CPC COOPERATIVE PATENT CLASSIFICATION

G09G ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION

(lighting in general F21 ; arrangements for displaying electric variables or waveforms G01R 3/00; devices or arrangements for the control of light beams G02F 1/00; indicating of time by visual means G04B 19/00, G04C 17/00, G04G 9/00; arrangements for transferring data between computers and peripheral equipment G06F 3/00; visible signalling arrangements or devices G08B 5/00; traffic control systems G08G ; display, advertising, signs G09F , e.g. static indicating arrangements comprising an association of a number of separate sources or light control cells G09F 9/00; static indicating arrangements comprising integral associations of a number of light sources H01J , H01K , H01L , H05B 33/12; circuits in pulse counters for indicating the result H03K 21/18; coding, decoding or code conversion, in general H03M ; reproducing a picture or pattern using electric signals representing parts thereof and produced by scanning an original H04N)

NOTE

This subclass covers indicator consoles, i.e. arrangements or circuits for processing control signals to achieve the display, e.g. for the calling up, reception, storage, regeneration, coding, decoding, addressing of control signals.

This subclass does not cover the structural details of the indicating devices, such as panels or tubes per se, or assemblies of individual light sources, which are covered by the relevant subclasses, e.g. H01J , H01K , H01L , G02F , G09F , H05B .

Contrary to subclass H04N , in which are classified display devices capable of representing continuous brightness value scales, this subclass is limited to devices using only a discrete number of brightness values, e.g. visible/non-visible.

The visual effect may be produced by a luminescent screen scanned by an electron beam, directly by controlled light sources, by projection of light, from controlled light sources onto characters, symbols, or elements thereof drawn on a support, or by electric, magnetic, or acoustic control of the parameters of light rays from an independent source.

WARNING

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

G09G 5/32 covered by G09G 5/42
G09G 5/37 covered by G09G 5/39
G09G 5/373 covered by G09G 5/39
G09G 5/377 covered by G09G 5/39
G09G 5/38 covered by G09G 5/42
G09G 5/397 covered by G09G 5/395, G09G 5/399

G09G 1/00 Control arrangements or circuits, of interest only in connection with cathode-ray tube indicators; { General aspects or details, e.g. selection emphasis on particular characters, dashed line or dotted line generation; Preprocessing of data } (cathode-ray oscilloscopes G01R 13/20; { radar display arrangements G01S 7/04; display of digital non-picture data in television systems H04N 7/0255 })

G09G 1/002 . { Intensity circuits (G09G 1/06 to G09G 1/28 take precedence) }

G09G 1/005 . { Power supply circuits }

G09G 1/007 . { Circuits for displaying split screens }

G09G 1/02 . Storage circuits (G09G 1/06 to G09G 1/28 take precedence)

G09G 1/04 . Deflection circuits { Constructional details not otherwise provided for (electron-optical arrangements H01J 29/46, H01J 37/04, H01J 37/302) }

G09G 1/06 . using single beam tubes (G09G 1/26, G09G 1/28 take precedence), { e.g. three-dimensional or perspective representation, rotation or translation of display pattern, hidden lines, shadows (G09G 1/28 takes precedence; stereoscopic TV-systems, details thereof H04N 13/00; oscilloscopes for three-dimensional representation G01R 13/206; vectorscopes G01R 13/208) }

G09G 1/07 . . with combined raster scan and calligraphic display

G09G 1/08 . . the beam directly tracing characters, the information to be displayed controlling the deflection { and the intensity } as a function of time in two spatial co-ordinates, e.g. according to a cartesian co-ordinate system

G09G 1/10 . . . the deflection signals being produced by essentially digital means, e.g. incrementally

G09G 1/12 . . . the deflection signals being produced by essentially analogue means

G09G 1/14 . . the beam tracing a pattern independent of the information to be displayed, this latter determining the parts of the pattern rendered respectively visible and invisible

G09G 1/143 . . . { Circuits for displaying horizontal and vertical lines }

G09G 1/146 . . . { Flicker reduction circuits }

G09G 1/16 . . . the pattern of rectangular co-ordinates extending over the whole area of the screen, i.e. television type raster

G09G 1/162 . . . . { for displaying digital inputs as analog magnitudes, e.g. curves, bar graphs, coordinate axes, singly or in combination with alpha-numeric characters (cathode-ray oscilloscopes for displaying analog inputs, singly or in combination with alpha-numeric characters G01R 13/20; television receiver circuitry for displaying supplementary, e.g. alpha-numeric, information H04N 5/445) }

G09G 1/165 . . . . { Details of a display terminal using a CRT, the details relating to the control arrangement of the display terminal and to the interfaces thereto (details suitable for both CRT and flat panel G09G 5/003; specific for a flat panel G09G 3/2092) }

G09G 1/167 . . . . . { Details of the interface to the display terminal specific for a CRT (details suitable for both CRT and flat panel G09G 5/006, specific for a flat panel G09G 3/2096) }

G09G 1/18 . . . a small local pattern covering only a single character, and stepping to a position for the following character, e.g. in rectangular or polar co-ordinates, or in the form of a framed star

G09G 1/20 . using multi-beam tubes (G09G 1/26, G09G 1/28 take precedence)

G09G 1/22 . using tubes permitting selection of a complete character from a number of characters { (tubes therefor H01J 31/16) }

G09G 1/24 . using tubes permitting selection of individual elements forming in combination a

character { (see provisionally also G09G 1/22) }

G09G 1/26 . using storage tubes { (tubes therefor H01J 31/58) }

G09G 1/28 . using colour tubes { (tubes therefor H01J 31/20) }

G09G 1/285 . . { Interfacing with colour displays, e.g. TV receiver }

G09G 3/00 **Control arrangements or circuits, of interest only in connection with visual indicators other than cathode-ray tubes** (optical scanning systems in general G02B 26/10)

G09G 3/001 . { using specific devices not provided for in groups G09G 3/02 to G09G 3/36, e.g. using an intermediate record carrier such as a film slide; Projection systems; Display of non-alphanumerical information, solely or in combination with alphanumerical information, e.g. digital display on projected diapositive as background (slide projectors per se G03B 23/00 = 42 HP) }

G09G 3/002 . . { to project the image of a two-dimensional display, such as an array of light emitting or modulating elements or a CRT }

G09G 3/003 . . { to produce spatial visual effects }

G09G 3/004 . { to give the appearance of moving signs }

G09G 3/005 . { forming an image using a quickly moving array of imaging elements, causing the human eye to perceive an image which has a larger resolution than the array, e.g. an image on a cylinder formed by a rotating line of LEDs parallel to the axis of rotation }

G09G 3/006 . { Electronic inspection or testing of displays and display drivers, e.g. of LED or LCD displays (testing individual LED's G01R 31/2635; testing lamps G01R 31/44; testing of optical features of LCD displays G02F 1/1309) }

G09G 3/007 . { Use of pixel shift techniques, e.g. by mechanical shift of the physical pixels or by optical shift of the perceived pixels }

G09G 3/008 . { forming an image on an image carrier by relative movement of a writing unit to the image carrier, e.g. on a photoconductive rotating belt, or on an electronic blackboard }

G09G 3/02 . by tracing or scanning a light beam on a screen

G09G 3/025 . . { with scanning or deflecting the beams in two directions or dimensions }

G09G 3/04 . for presentation of a single character by selection from a plurality of characters, or by composing the character by combination of individual elements, e.g. segments { using a combination of such display devices for composing words, rows or the like, in a frame with fixed character positions }

G09G 3/045 . . { Selecting complete characters }

G09G 3/06 . . using controlled light sources

G09G 3/08 . . . using incandescent filaments

G09G 3/10 . . . using gas tubes

G09G 3/12 . . . using electroluminescent elements (using cathode-ray tubes with phosphor screens G09G 1/00)

G09G 3/14 . . . . semiconductor devices, e.g. diodes

G09G 3/16 .. by control of light from an independent source

G09G 3/18 ... using liquid crystals

G09G 3/19 ... using electrochromic devices

G09G 3/20 . for presentation of an assembly of a number of characters, e.g. a page, by composing the assembly by combination of individual elements arranged in a matrix { no fixed position being assigned to or needed to be assigned to the individual characters or partial characters }

G09G 3/2003 .. { Display of colours (specific for liquid crystal displays G09G 3/3607) }

G09G 3/2007 .. { Display of intermediate tones }

G09G 3/2011 ... { by amplitude modulation }

G09G 3/2014 ... { by modulation of the duration of a single pulse during which the logic level remains constant }

G09G 3/2018 ... { by time modulation using two or more time intervals }

G09G 3/2022 .... { using sub-frames }

G09G 3/2025 ..... { the sub-frames having all the same time duration }

G09G 3/2029 ..... { the sub-frames having non-binary weights }

G09G 3/2033 ..... { with splitting one or more sub-frames corresponding to the most significant bits into two or more sub-frames }

G09G 3/2037 ..... { with specific control of sub-frames corresponding to the least significant bits }

G09G 3/204 ..... { the sub-frames being organized in consecutive sub-frame groups }

G09G 3/2044 ... { using dithering }

G09G 3/2048 .... { with addition of random noise to an image signal or to a gradation threshold }

G09G 3/2051 .... { with use of a spatial dither pattern }

G09G 3/2055 ..... { the pattern being varied in time }

G09G 3/2059 ... { using error diffusion }

G09G 3/2062 .... { using error diffusion in time }

G09G 3/2066 ..... { with error diffusion in both space and time }

G09G 3/207 ... { by domain size control (G09G 3/3637 takes precedence) }

G09G 3/2074 ... { using sub-pixels }

G09G 3/2077 ... { by a combination of two or more gradation control methods }

G09G 3/2081 .... { with combination of amplitude modulation and time modulation (space and time error diffusion G09G 3/2066) }

G09G 3/2085 .. { Special arrangements for addressing the individual elements of the matrix, other than by driving respective rows and columns in combination }

G09G 3/2088 ... { with use of a plurality of processors, each processor controlling a number of individual elements of the matrix }

G09G 3/2092 .. { Details of a display terminals using a flat panel, the details relating to the control arrangement of the display terminal and to the interfaces thereto (suitable for both CRT and flat panel G09G 5/003; specific for a CRT G09G 1/165) }

G09G 3/2096 ... { Details of the interface to the display terminal specific for a flat panel (suitable for both CRT and flat panel G09G 5/006; specific for a CRT G09G 1/167) }

G09G 3/22 .. using controlled light sources

G09G 3/24 ... using incandescent filaments

G09G 3/26 .... to give the appearance of moving signs

G09G 3/28 ... using luminous gas-discharge panels, e.g. plasma panels

G09G 3/2803 .... { Display of gradations (G09G 3/288 takes precedence) }

G09G 3/2807 .... with discharge activated by high-frequency signals specially adapted therefor

G09G 3/2813 .... using alternating current [AC] - direct current [DC] hybrid-type panels

G09G 3/282 .... using DC panels

G09G 3/285 ..... using self-scanning { (contains no documents, see provisionally G09G 3/282, G09G 3/29) }

G09G 3/288 .... using AC panels

WARNING

This groups is incomplete pending reclassification; see also group G09G 3/28

G09G 3/29 ..... using self-shift panels { with sequential transfer of the discharges from an input position to a further display position (tubes therefor H01J 17/49) }

G09G 3/291 ..... controlling the gas discharge to control a cell condition, e.g. by means of specific pulse shapes

G09G 3/292 ..... for reset discharge, priming discharge or erase discharge occurring in a phase other than addressing

G09G 3/2922 ..... { Details of erasing }

G09G 3/2925 ..... { Details of priming }

G09G 3/2927 ..... { Details of initialising }

G09G 3/293 ..... for address discharge

G09G 3/2932 ..... { Addressed by writing selected cells that are in an OFF state }

G09G 3/2935 ..... { Addressed by erasing selected cells that are in an ON state }

G09G 3/2937 ..... { being addressed only once per frame }

G09G 3/294 ..... for lighting or sustain discharge

G09G 3/2942 ..... { with special waveforms to increase luminous efficiency }

G09G 3/2944 ..... { by varying the frequency of sustain pulses or the number of sustain pulses proportionally in each subfield of the whole frame }

G09G 3/2946 ..... { by introducing variations of the frequency of sustain pulses within a frame or non-proportional variations of the number of sustain pulses in each subfield }

G09G 3/2948 ..... { by increasing the total sustaining time with respect to other times in the frame }

G09G 3/296 ..... Driving circuits for producing the waveforms applied to the driving electrodes

G09G 3/2965 ..... { using inductors for energy recovery }

G09G 3/297 ..... using opposed discharge type panels

G09G 3/298 ..... using surface discharge panels

G09G 3/2983 ..... { using non-standard pixel electrode arrangements }

G09G 3/2986 ..... { with more than 3 electrodes involved in the operation }

G09G 3/299 ..... using alternate lighting of surface-type panels

G09G 3/30 ... using electroluminescent panels

G09G 3/32 .... semiconductive, e.g. diodes

G09G 3/3208 ..... { organic, e.g. organic LEDs }

G09G 3/3216 ..... { using a passive matrix }

G09G 3/3225 ..... { using an active matrix }

G09G 3/3233 ..... { pixel circuitry controlling the light emitting element by determining the driving current through the light emitting element }

G09G 3/3241 ..... { the driving current through the light emitting element being set using a data current provided by the data driver, e.g. by using a two transistors current mirror }

G09G 3/325 ..... { the data current flowing through the driving transistor during a setting phase, e.g. by using a switch to connect the driving transistor to the data driver }

G09G 3/3258 ..... { pixel circuitry controlling the light emitting element by determining the voltage across the light emitting element }

G09G 3/3266 ..... { Details of drivers for scan electrodes }

G09G 3/3275 ..... { Details of drivers for data electrodes }

G09G 3/3283 ..... { the data driver communicating data to pixel by means of a current, i.e the data driver applies a current for setting the pixel }

G09G 3/3291 ..... { the data driver communicating data to pixel by means of a voltage, i.e the data driver applies a voltage for setting the pixel }

G09G 3/34 .. by control of light from an independent source

G09G 3/3406 ... { Control of illumination source (illumination devices structurally associated with liquid crystal cells G02F 1/13357) }

G09G 3/3413 .... { Details of control of colour illumination sources }

G09G 3/342 .... { using several illumination sources separately controlled corresponding to different display panel areas, e.g. along one dimension such as lines }

G09G 3/3426 ..... { the different display panel areas being distributed in two dimensions, e.g. matrix }

G09G 3/3433 ... { using light modulating elements actuated by an electric field and being other than liquid crystal devices and electrochromic devices (using liquid crystal devices G09G 3/36; using electrochromic devices G09G 3/38) }

G09G 3/344 .... { based on particles moving in a fluid or in a gas, e.g. electrophoretic devices (electrophoretic devices per se G02F 1/167) }

G09G 3/3446 ..... { with more than two electrodes controlling the modulating element }

G09G 3/3453 .... { based on rotating particles or microelements }

G09G 3/346 .... { based on modulation of the reflection angle, e.g. micromirrors (micromirrors devices per se G02B 26/0833) }

G09G 3/3466 .... { based on interferometric effect }

G09G 3/3473 .... { based on light coupled out of a light guide, e.g. due to scattering, by contracting the light guide with external means }

G09G 3/348 .... { based on the deformation of a fluid drop, e.g. electrowetting }

G09G 3/3486 ... { using light modulating elements actuated by a magnetic field }

G09G 3/3493 ... { using light modulating elements actuated by a piezoelectric effect }

G09G 3/36 ... using liquid crystals

G09G 3/3603 .... { with thermally addressed liquid crystals }

G09G 3/3607 .... { for displaying colours or for displaying grey scales with a specific pixel layout, e.g. using sub-pixels (display of colours in flat matrix panels other than liquid crystal displays G09G 3/2003; grey scales specific for television H04N 3/127) }

G09G 3/3611 .... { Control of matrices with row and column drivers }

G09G 3/3614 ..... { Control of polarity reversal in general }

G09G 3/3618 ..... { with automatic refresh of the display panel using sense/write circuits }

G09G 3/3622 ..... { using a passive matrix (G09G 3/3674 to G09G 3/3696 take precedence) }

G09G 3/3625 ..... { using active addressing }

G09G 3/3629 ..... { using liquid crystals having memory effects, e.g. ferroelectric liquid crystals }

G09G 3/3633 ..... { with transmission/voltage characteristic comprising multiple loops, e.g. antiferroelectric liquid crystals }

G09G 3/3637 ..... { with intermediate tones displayed by domain size control (domain size control in flat matrix panels other than liquid crystal displays having memory effects G09G 3/207) }

G09G 3/364 ..... { with use of subpixels }

G09G 3/3644 ..... { with the matrix divided into sections }

G09G 3/3648 ..... { using an active matrix (G09G 3/367 to G09G 3/3696 take precedence) }

G09G 3/3651 ..... { using multistable liquid crystals, e.g. ferroelectric liquid crystals }

G09G 3/3655 ..... { Details of drivers for counter electrodes, e.g. common electrodes for pixel capacitors or supplementary storage capacitors }

G09G 3/3659 ..... { the addressing of the pixel involving the control of two or more scan electrodes or two or more data electrodes, e.g. pixel voltage dependant on signal of two data electrodes }

G09G 3/3662 ..... { using plasma-addressed liquid crystal displays }

G09G 3/3666 ..... { with the matrix divided into sections }

G09G 3/367 ..... { with a nonlinear element in series with the liquid crystal cell, e.g. a diode, or M.I.M. element }

G09G 3/3674 ..... { Details of drivers for scan electrodes }

G09G 3/3677 ..... { suitable for active matrices only }

G09G 3/3681 ..... { suitable for passive matrices only }

G09G 3/3685 ..... { Details of drivers for data electrodes }

G09G 3/3688 ..... { suitable for active matrices only }

G09G 3/3692 ..... { suitable for passive matrices only }

G09G 3/3696 ..... { Generation of voltages supplied to electrode drivers }

G09G 3/38 ... using electrochromic devices

G09G 5/00 **Control arrangements or circuits for visual indicators common to cathode-ray tube indicators and other visual indicators** (image data processing or generation, in general G06T)

G09G 5/001 . { Arbitration of resources in a display system, e.g. control of access to frame buffer by video controller and/or main processor }

G09G 5/003 . { Details of a display terminal, the details relating to the control arrangement of the

display terminal and to the interfaces thereto (specific for a CRT G09G 1/165; for a flat panel G09G 3/2092) }

G09G 5/005 . . { Adapting incoming signals to the display format of the display terminal }

G09G 5/006 . . { Details of the interface to the display terminal (specific for a display terminal using a CRT G09G 1/167; using a flat panel G09G 3/2096; circuits for interfacing with colour displays G09G 5/04) }

G09G 5/008 . . . { Clock recovery }

G09G 5/02 . characterised by the way in which colour is displayed { (details of colour display specific for CRTs G09G 1/28; specific for flat matrix panels other than liquid crystal displays G09G 3/2003; specific for liquid crystal displays G09G 3/3607) }

G09G 5/022 . . { using memory planes }

G09G 5/024 . . { using colour registers, e.g. to control background, foreground, surface filling (G09G 5/06 takes precedence) }

G09G 5/026 . . { Control of mixing and/or overlay of colours in general (G09G 5/022 and G09G 5/024 take precedence) }

G09G 5/028 . . { Circuits for converting colour display signals into monochrome display signals }

G09G 5/04 . . { using circuits for interfacing with colour displays }

G09G 5/06 . . using colour palettes, e.g. look-up tables

G09G 5/08 . Cursor circuits

G09G 5/10 . Intensity circuits

G09G 5/12 . Synchronisation between the display unit and other units, e.g. other display units, video-disc players

G09G 5/14 . Display of multiple viewports

G09G 5/16 . Display of right-to-left language

G09G 5/18 . Timing circuits for raster scan displays (specially adapted for television H04N ; { synchronisation between the display unit and other display units, videodisc player G09G 5/12 })

G09G 5/20 . Function-generator circuits, e.g. circle generators { line or curve smoothing circuits }

G09G 5/22 . characterised by the display of characters or indicia using display control signals derived from coded signals representing the characters or indicia, e.g. with a character-code memory

G09G 5/222 . . { Control of the character-code memory }

G09G 5/225 . . . { comprising a loadable character generator (character generators per se G09G 5/24) }

G09G 5/227 . . . { Resolution modifying circuits, e.g. variable screen formats, resolution change between memory contents and display screen }

G09G 5/24 . . Generation of individual character patterns

G09G 5/243 . . . { Circuits for displaying proportional spaced characters or for kerning }

G09G 5/246 . . . { of ideographic or arabic-like characters }

G09G 5/26 . . . for modifying the character dimensions, e.g. double width, double height

G09G 5/28 . . . for enhancement of character form, e.g. smoothing

G09G 5/30 . . Control of display attribute

G09G 5/32 . . with means for controlling the display position { (see provisionally G09G 5/42) }

G09G 5/34 . for rolling or scrolling

G09G 5/343 . . { for systems having a character code-mapped display memory }

G09G 5/346 . . { for systems having a bit-mapped display memory }

G09G 5/36 . characterised by the display of a graphic pattern, e.g. using an all-points-addressable (APA) memory

G09G 5/363 . . { Graphics controllers }

G09G 5/366 . . . { with conversion of CRT control signals to flat panel control signals, e.g. adapting the palette memory }

G09G 5/37 . . Details of the operation on graphic patterns (G09G 5/38T akes precedence)

G09G 5/373 . . . for modifying the size of the graphic pattern

G09G 5/377 . . . for mixing or overlaying two or more graphic patterns (G09G 5/02 , G09G 5/397T ake precedence)

G09G 5/38 . . with means for controlling the display position

G09G 5/39 . . Control of the bit-mapped memory

G09G 5/391 . . . Resolution modifying circuits, e.g. variable screen formats

G09G 5/393 . . . Arrangements for updating the contents of the bit-mapped memory

G09G 5/395 . . . Arrangements specially adapted for transferring the contents of the bit-mapped memory to the screen (G09G 5/399 takes precedence)

G09G 5/397 . . . . Arrangements specially adapted for transferring the contents of two or more bit-mapped memories to the screen simultaneously, e.g. for mixing or overlay (G09G 5/02 takes precedence) { Warning Not complete. See also G09G 5/395, G09G 5/399 }

G09G 5/399 . . . using two or more bit-mapped memories, the operation of which are switched in time, e.g. ping-pong buffers

G09G 5/40 . characterised by the way in which both a pattern determined by character code and another pattern are displayed simultaneously, or either pattern is displayed selectively, e.g. with character code memory and APA, i.e. all-points-addressable, memory

G09G 5/42 . characterised by the display of patterns using a display memory without fixed position correspondence between the display memory contents and the display position on the screen

G09G 2230/00 Details of flat display driving waveforms

G09G 2290/00 Indexing scheme relating to details of a display terminal

G09G 2300/00 Aspects of the constitution of display devices (not used, see subgroups)

G09G 2300/02 . Composition of display devices

G09G 2300/023 . . Display panel composed of stacked panels

G09G 2300/026 . . Video wall, i.e. juxtaposition of a plurality of screens to create a display screen of

bigger dimensions

G09G 2300/04 . Structural and physical details of display devices

G09G 2300/0404 . . Matrix technologies

G09G 2300/0408 . . . Integration of the drivers onto the display substrate

G09G 2300/0413 . . . Details of dummy pixels or dummy lines in flat panels

G09G 2300/0417 . . . Special arrangements specific to the use of low carrier mobility technology

G09G 2300/0421 . . Structural details of the set of electrodes

G09G 2300/0426 . . . Layout of electrodes and connections

G09G 2300/043 . . . Compensation electrodes or other additional electrodes in matrix displays related to distortions or compensation signals, e.g. for modifying TFT threshold voltage in column driver

G09G 2300/0434 . . . Flat panel display in which a field is applied parallel to the display plane

G09G 2300/0439 . . Pixel structures

G09G 2300/0443 . . . with several sub-pixels for the same colour in a pixel, not specifically used to display gradations (G09G 3/364 takes precedence)

G09G 2300/0447 . . . . for multi-domain technique to improve the viewing angle in a liquid crystal display, such as multi-vertical alignment [MVA]

G09G 2300/0452 . . . Details of colour pixel setup, e.g. pixel composed of a red, a blue and two green components

G09G 2300/0456 . . . with a reflective area and a transmissive area combined in one pixel, such as in transflectance pixels

G09G 2300/046 . . . with an emissive area and a light-modulating area combined in one pixel

G09G 2300/0465 . . . Improved aperture ratio, e.g. by size reduction of the pixel circuit, e.g. for improving the pixel density or the maximum displayable luminance or brightness

G09G 2300/0469 . . Details of the physics of pixel operation

G09G 2300/0473 . . . Use of light emitting or modulating elements having two or more stable states when no power is applied

G09G 2300/0478 . . . related to liquid crystal pixels

G09G 2300/0482 . . . . Use of memory effects in nematic liquid crystals

G09G 2300/0486 . . . . . Cholesteric liquid crystals, including chiral-nematic liquid crystals, with transitions between focal conic, planar, and homeotropic states

G09G 2300/0491 . . . . Use of a bi-refringent liquid crystal, optically controlled bi-refringence [OCB] with bend and splay states, or electrically controlled bi-refringence [ECB] for controlling the color

G09G 2300/0495 . . . . Use of transitions between isotropic and anisotropic phases in liquid crystals, by voltage controlled deformation of the liquid crystal molecules, as opposed to merely changing the orientation of the molecules as in e.g. twisted-nematic [TN], vertical-aligned [VA], cholesteric, in-plane, or bi-refringent liquid crystals

G09G 2300/06 . Passive matrix structure, i.e. with direct application of both column and row voltages to the light emitting or modulating elements, other than LCD or OLED

G09G 2300/08 . Active matrix structure, i.e. with use of active elements, inclusive of non-linear two terminal elements, in the pixels together with light emitting or modulating elements

G09G 2300/0804 . . Sub-multiplexed active matrix panel, i.e. wherein one active driving circuit is used at pixel level for multiple image producing elements

G09G 2300/0809 . . Several active elements per pixel in active matrix panels

G09G 2300/0814 . . . used for selection purposes, e.g. logical AND for partial update

G09G 2300/0819 . . . used for counteracting undesired variations, e.g. feedback or autozeroing

G09G 2300/0823 . . . used to establish symmetry in driving, e.g. with polarity inversion

G09G 2300/0828 . . . forming a digital to analog [D/A] conversion circuit

G09G 2300/0833 . . . forming a linear amplifier or follower

G09G 2300/0838 . . . . with level shifting

G09G 2300/0842 . . . forming a memory circuit, e.g. a dynamic memory with one capacitor

G09G 2300/0847 . . . . being a dynamic memory without any storage capacitor, i.e. with use of parasitic capacitances as storage elements

G09G 2300/0852 . . . . being a dynamic memory with more than one capacitor

G09G 2300/0857 . . . . Static memory circuit, e.g. flip-flop

G09G 2300/0861 . . . . with additional control of the display period without amending the charge stored in a pixel memory, e.g. by means of additional select electrodes

G09G 2300/0866 . . . . . by means of changes in the pixel supply voltage

G09G 2300/0871 . . . with level shifting

G09G 2300/0876 . . Supplementary capacities in pixels having special driving circuits and electrodes instead of being connected to common electrode or ground; Use of additional capacitively coupled compensation electrodes

G09G 2300/088 . . using a non-linear two-terminal element

G09G 2300/0885 . . . Pixel comprising a non-linear two-terminal element alone in series with each display pixel element

G09G 2300/089 . . . Pixel comprising a non-linear two-terminal element in series with each display pixel element, the series comprising also other elements

G09G 2300/0895 . . . having more than one selection line for a two-terminal active matrix LCD, e.g. Lechner and D2R circuits

G09G 2310/00 Command of the display device

G09G 2310/02 . Addressing, scanning or driving the display screen or processing steps related thereto

G09G 2310/0202 . . Addressing of scan or signal lines

G09G 2310/0205 . . . Simultaneous scanning of several lines in flat panels

G09G 2310/0208 . . . . using active addressing

G09G 2310/021 . . . . Double addressing, i.e. scanning two or more lines, e.g. lines 2 and 3; 4 and 5, at a time in a first field, followed by scanning two or more lines in another combination, e.g. lines 1 and 2; 3 and 4, in a second field

G09G 2310/0213 . . . controlling the sequence of the scanning lines with respect to the patterns to be displayed, e.g. to save power

G09G 2310/0216 . . . Interleaved control phases for different scan lines in the same sub-field, e.g. initialization, addressing and sustaining in plasma displays that are not simultaneous for all scan lines

G09G 2310/0218 . . . with collection of electrodes in groups for n-dimensional addressing

G09G 2310/0221 . . . with use of split matrices (G09G 3/3644 and G09G 3/3666 take precedence)

G09G 2310/0224 . . Details of interlacing

G09G 2310/0227 . . . related to multiple interlacing, i.e. involving more fields than just one odd field and one even field

G09G 2310/0229 . . De-interlacing

G09G 2310/0232 . . Special driving of display border areas

G09G 2310/0235 . . Field-sequential colour display

G09G 2310/0237 . . Switching ON and OFF the backlight within one frame

G09G 2310/024 . . Scrolling of light from the illumination source over the display in combination with the scanning of the display screen

G09G 2310/0243 . . Details of the generation of driving signals

G09G 2310/0245 . . . Clearing or presetting the whole screen independently of waveforms, e.g. on power-on (G09G 2310/063 takes precedence)

G09G 2310/0248 . . . Precharge or discharge of column electrodes before or after applying exact column voltages

G09G 2310/0251 . . . Precharge or discharge of pixel before applying new pixel voltage

G09G 2310/0254 . . . Control of polarity reversal in general, other than for liquid crystal displays

G09G 2310/0256 . . . . with the purpose of reversing the voltage across a light emitting or modulating element within a pixel

G09G 2310/0259 . . . with use of an analog or digital ramp generator in the column driver or in the pixel circuit

G09G 2310/0262 . . The addressing of the pixel, in a display other than an active matrix LCD, involving the control of two or more scan electrodes or two or more data electrodes, e.g. pixel voltage dependent on signals of two data electrodes

G09G 2310/0264 . . Details of driving circuits

G09G 2310/0267 . . . Details of drivers for scan electrodes, other than drivers for liquid crystal, plasma or OLED displays

G09G 2310/027 . . . Details of drivers for data electrodes, the drivers handling digital grey scale data, e.g. use of D/A converters

G09G 2310/0272 . . . Details of drivers for data electrodes, the drivers communicating data to the pixels by means of a current

G09G 2310/0275 . . . Details of drivers for data electrodes, other than drivers for liquid crystal, plasma or OLED displays, not related to handling digital grey scale data or to communication of data to the pixels by means of a current

G09G 2310/0278 . . . Details of driving circuits arranged to drive both scan and data electrodes

G09G 2310/0281 . . . Arrangement of scan or data electrode driver circuits at the periphery of a panel not inherent to a split matrix structure

G09G 2310/0283 . . . Arrangement of drivers for different directions of scanning

G09G 2310/0286 . . . Details of a shift registers arranged for use in a driving circuit

G09G 2310/0289 . . . Details of voltage level shifters arranged for use in a driving circuit

G09G 2310/0291 . . . Details of output amplifiers or buffers arranged for use in a driving circuit

G09G 2310/0294 . . . Details of sampling or holding circuits arranged for use in a driver for data electrodes

G09G 2310/0297 . . . Special arrangements with multiplexing or demultiplexing of display data in the drivers for data electrodes, in a pre-processing circuitry delivering display data to said drivers or in the matrix panel, e.g. multiplexing plural data signals to one D/A converter or demultiplexing the D/A converter output to multiple columns

G09G 2310/04 . Partial updating of the display screen

G09G 2310/06 . Details of flat display driving waveforms

G09G 2310/061 . . for resetting or blanking

G09G 2310/062 . . . Waveforms for resetting a plurality of scan lines at a time

G09G 2310/063 . . . Waveforms for resetting the whole screen at once

G09G 2310/065 . . Waveforms comprising zero voltage phase or pause

G09G 2310/066 . . Waveforms comprising a gently increasing or decreasing portion, e.g. ramp

G09G 2310/067 . . Special waveforms for scanning, where no circuit details of the gate driver are given

G09G 2310/068 . . Application of pulses of alternating polarity prior to the drive pulse in electrophoretic displays

G09G 2310/08 . Details of timing specific for flat panels, other than clock recovery

G09G 2320/00 Control of display operating conditions

G09G 2320/02 . Improving the quality of display appearance

G09G 2320/0204 . . Compensation of DC component across the pixels in flat panels

G09G 2320/0209 . . Crosstalk reduction, i.e. to reduce direct or indirect influences of signals directed to a certain pixel of the displayed image on other pixels of said image, inclusive of influences affecting pixels in different frames or fields or sub-images which constitute a same image, e.g. left and right images of a stereoscopic display

G09G 2320/0214 . . . with crosstalk due to leakage current of pixel switch in active matrix panels

G09G 2320/0219 . . Reducing feedthrough effects in active matrix panels, i.e. voltage changes on the scan electrode influencing the pixel voltage due to capacitive coupling

G09G 2320/0223 . . Compensation for problems related to R-C delay and attenuation in electrodes of matrix panels, e.g. in gate electrodes or on-substrate video signal electrodes

G09G 2320/0228 . . Increasing the driving margin in plasma displays

G09G 2320/0233 . . Improving the luminance or brightness uniformity across the screen

G09G 2320/0238 . . Improving the black level

G09G 2320/0242 . . Compensation of deficiencies in the appearance of colours

G09G 2320/0247 . . Flicker reduction other than flicker reduction circuits used for single beam cathode-ray tubes

G09G 2320/0252 . . Improving the response speed

G09G 2320/0257 . . Reduction of after-image effects

G09G 2320/0261 . . in the context of movement of objects on the screen or movement of the observer relative to the screen

G09G 2320/0266 . . Reduction of sub-frame artefacts

G09G 2320/0271 . . Adjustment of the gradation levels within the range of the gradation scale, e.g. by redistribution or clipping

G09G 2320/0276 . . . for the purpose of adaptation to the characteristics of a display device, i.e. gamma correction

G09G 2320/028 . . by changing the viewing angle properties, e.g. widening the viewing angle, adapting the viewing angle to the view direction

G09G 2320/0285 . . using tables for spatial correction of display data

G09G 2320/029 . . by monitoring one or more pixels in the display panel, e.g. by monitoring a fixed reference pixel

G09G 2320/0295 . . . by monitoring each display pixel

G09G 2320/04 . Maintaining the quality of display appearance

G09G 2320/041 . . Temperature compensation

G09G 2320/043 . . Preventing or counteracting the effects of ageing
G09G 2320/045 . . . Compensation of drifts in the characteristics of light emitting or modulating elements
G09G 2320/046 . . . Dealing with screen burn-in prevention or compensation of the effects thereof
G09G 2320/048 . . . using evaluation of the usage time

G09G 2320/06 . Adjustment of display parameters
G09G 2320/0606 . . Manual adjustment
G09G 2320/0613 . . The adjustment depending on the type of the information to be displayed
G09G 2320/062 . . . Adjustment of illumination source parameters
G09G 2320/0626 . . for control of overall brightness
G09G 2320/0633 . . . by amplitude modulation of the brightness of the illumination source
G09G 2320/064 . . . by time modulation of the brightness of the illumination source
G09G 2320/0646 . . . Modulation of illumination source brightness and image signal correlated to each other
G09G 2320/0653 . . . Controlling or limiting the speed of brightness adjustment of the illumination source
G09G 2320/066 . . for control of contrast
G09G 2320/0666 . . for control of colour parameters, e.g. colour temperature
G09G 2320/0673 . . for control of gamma adjustment, e.g. selecting another gamma curve
G09G 2320/068 . . for control of viewing angle adjustment
G09G 2320/0686 . . with two or more screen areas displaying information with different brightness or colours
G09G 2320/0693 . . Calibration of display systems;

G09G 2320/08 . Arrangements within a display terminal for setting, manually or automatically, display parameters of the display terminal

G09G 2320/10 . Special adaptations of display systems for operation with variable images
G09G 2320/103 . . Detection of image changes, e.g. determination of an index representative of the image change
G09G 2320/106 . . Determination of movement vectors or equivalent parameters within the image

G09G 2330/00 Aspects of power supply; Aspects of display protection and defect management

G09G 2330/02 . Details of power systems and of start or stop of display operation
G09G 2330/021 . . Power management, e.g. power saving
G09G 2330/022 . . . in absence of operation, e.g. no data being entered during a predetermined time
G09G 2330/023 . . . using energy recovery or conservation
G09G 2330/024 . . . . with inductors, other than in the electrode driving circuitry of plasma displays
G09G 2330/025 . . Reduction of instantaneous peaks of current
G09G 2330/026 . . Arrangements or methods related to booting a display
G09G 2330/027 . . Arrangements or methods related to powering off a display
G09G 2330/028 . . Generation of voltages supplied to electrode drivers in a matrix display other than LCD

G09G 2330/04 . Display protection
G09G 2330/045 . . Protection against panel overheating

G09G 2330/06 . Handling electromagnetic interferences [EMI], covering emitted as well as received electromagnetic radiation

G09G 2330/08 . Fault-tolerant or redundant circuits, or circuits in which repair of defects is prepared

G09G 2330/10 . Dealing with defective pixels

G09G 2330/12 . Test circuits or failure detection circuits included in a display system, as permanent part thereof

G09G 2340/00 Aspects of display data processing

G09G 2340/02 . Handling of images in compressed format, e.g. JPEG, MPEG

G09G 2340/04 . Changes in size, position or resolution of an image
G09G 2340/0407 . . Resolution change, inclusive of the use of different resolutions for different screen areas
G09G 2340/0414 . . . Vertical resolution change
G09G 2340/0421 . . . Horizontal resolution change
G09G 2340/0428 . . . Gradation resolution change
G09G 2340/0435 . . . Change or adaptation of the frame rate of the video stream
G09G 2340/0442 . . Handling or displaying different aspect ratios, or changing the aspect ratio
G09G 2340/045 . . Zooming at least part of an image, i.e. enlarging it or shrinking it
G09G 2340/0457 . . Improvement of perceived resolution by subpixel rendering
G09G 2340/0464 . . Positioning
G09G 2340/0471 . . . Vertical positioning
G09G 2340/0478 . . . Horizontal positioning
G09G 2340/0485 . . . Centering horizontally or vertically
G09G 2340/0492 . . Change of orientation of the displayed image, e.g. upside-down, mirrored

G09G 2340/06 . Colour space transformation

G09G 2340/08 . Monochrome to colour transformation

G09G 2340/10 . Mixing of images, i.e. displayed pixel being the result of an operation, e.g. adding, on the corresponding input pixels

G09G 2340/12 . Overlay of images, i.e. displayed pixel being the result of switching between the corresponding input pixels
G09G 2340/125 . . wherein one of the images is motion video

G09G 2340/14 . Solving problems related to the presentation of information to be displayed
G09G 2340/145 . . related to small screens

G09G 2340/16 . Determination of a pixel data signal depending on the signal applied in the previous

frame

G09G 2350/00 **Solving problems of bandwidth in display systems**

G09G 2352/00 **Parallel handling of streams of display data**

G09G 2354/00 **Aspects of interface with display user**

G09G 2356/00 **Detection of the display position w.r.t. other display screens**

G09G 2358/00 **Arrangements for display data security**

G09G 2360/00 **Aspects of the architecture of display systems**

G09G 2360/02 . Graphics controller able to handle multiple formats, e.g. input or output formats

G09G 2360/04 . Display device controller operating with a plurality of display units

G09G 2360/06 . Use of more than one graphics processor to process data before displaying to one or more screens

G09G 2360/08 . Power processing, i.e. workload management for processors involved in display operations, such as CPUs or GPUs

G09G 2360/10 . Display system comprising arrangements, such as a coprocessor, specific for motion video images

G09G 2360/12 . Frame memory handling

G09G 2360/121 . . using a cache memory

G09G 2360/122 . . Tiling

G09G 2360/123 . . using interleaving

G09G 2360/125 . . using unified memory architecture [UMA]

G09G 2360/126 . . The frame memory having additional data ports, not inclusive of standard details of the output serial port of a VRAM

G09G 2360/127 . . Updating a frame memory using a transfer of data from a source area to a destination area

G09G 2360/128 . . Frame memory using a Synchronous Dynamic RAM [SDRAM]

G09G 2360/14 . Detecting light within display terminals, e.g. using a single or a plurality of photosensors

G09G 2360/141 . . the light conveying information used for selecting or modulating the light emitting or modulating element

G09G 2360/142 . . . the light being detected by light detection means within each pixel

G09G 2360/144 . . the light being ambient light

G09G 2360/145 . . the light originating from the display screen

G09G 2360/147 . . . the originated light output being determined for each pixel
G09G 2360/148 . . . . the light being detected by light detection means within each pixel

G09G 2360/16 . Calculation or use of calculated indices related to luminance levels in display data

G09G 2360/18 . Use of a frame buffer in a display terminal, inclusive of the display panel

G09G 2370/00 Aspects of data communication

G09G 2370/02 . Networking aspects
G09G 2370/022 . . Centralised management of display operation, e.g. in a server instead of locally
G09G 2370/025 . . LAN communication management
G09G 2370/027 . . Arrangements and methods specific for the display of internet documents

G09G 2370/04 . Exchange of auxiliary data, i.e. other than image data, between monitor and graphics controller
G09G 2370/042 . . for monitor identification
G09G 2370/045 . . using multiple communication channels, e.g. parallel and serial
G09G 2370/047 . . . using display data channel standard [DDC] communication

G09G 2370/06 . Consumer Electronics Control, i.e. control of another device by a display or vice-versa

G09G 2370/08 . Details of image data interface between the display device controller and the data line driver circuit

G09G 2370/10 . Use of a protocol of communication by packets in interfaces along the display data pipeline

G09G 2370/12 . Use of DVI or HDMI protocol in interfaces along the display data pipeline

G09G 2370/14 . Use of low voltage differential signaling [LVDS] for display data communication

G09G 2370/16 . Use of wireless transmission of display information

G09G 2370/18 . Use of optical transmission of display information

G09G 2370/20 . Details of the management of multiple sources of image data

G09G 2370/22 . Detection of presence or absence of input display information or of connection or disconnection of a corresponding information source

G09G 2370/24 . Keyboard-Video-Mouse [KVM] switch

G09G 2380/00 Specific applications

G09G 2380/02 . Applications of flexible displays

G09G 2380/04 . Electronic labels

G09G 2380/06 . Remotely controlled electronic signs other than labels

G09G 2380/08 . Biomedical applications

G09G 2380/10 . Automotive applications

G09G 2380/12 . Avionics applications

G09G 2380/14 . Electronic books and readers

G09G 2380/16 . Digital picture frames