COOPERATIVE PATENT CLASSIFICATION

G PHYSICS

INSTRUMENTS

G09 EDUCATION; CRYPTOGRAPHY; DISPLAY; ADVERTISING; SEALS

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)

NOTES

1. 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.
2. 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.
3. 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.
4. 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

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.
1/14 . . . 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

1/143 . . . [Circuits for displaying horizontal and vertical lines]

1/146 . . . [Flicker reduction circuits]

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

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)]

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)]

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)]

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

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

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

1/24 . . . using tubes permitting selection of individual elements forming in combination a character { (see provisionally also G09G 1/22) }

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

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

1/285 . . . [Interfacing with colour displays, e.g. TV receiver]

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)

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

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

3/003 . . . [to produce spatial visual effects]

3/004 . . . [to give the appearance of moving signs]

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]

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)]

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

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]

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

3/025 . . . [with scanning or deflecting the beams in two directions or dimensions]

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]}

3/045 . . . [Selecting complete characters]

3/06 . . . using controlled light sources

3/08 . . . using incandescent filaments

3/10 . . . using gas tubes

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

3/14 . . . [Semiconductor devices, e.g. diodes]

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

3/18 . . . using liquid crystals

3/19 . . . using electrochromic devices

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]}

3/203 . . . [Display of colours (specific for liquid crystal displays G09G 3/3607)]

3/205 . . . [Electronic inspection or testing of displays G09G 1/00)]

3/207 . . . [Display of intermediate tones]

3/209 . . . [by amplitude modulation]

3/214 . . . [by modulation of the duration of a single pulse during which the logic level remains constant]

3/218 . . . [by time modulation using two or more time intervals]

3/222 . . . . . . [using sub-frames]

3/225 . . . . . . [the sub-frames having all the same time duration]

3/229 . . . . . . [the sub-frames having non-binary weights]

3/233 . . . . . . [with splitting one or more sub-frames corresponding to the most significant bits into two or more sub-frames]

3/237 . . . . . . [with specific control of sub-frames corresponding to the least significant bits]

3/240 . . . . . . [the sub-frames being organized in consecutive sub-frame groups]

3/244 . . . . . . [using dithering]
3/2948 . . . . . . . . (being addressed only once per frame)
3/2944 . . . . . . . . (by varying the frequency of sustain pulses or the number of sustain pulses proportionally in each subfield of the whole frame)
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)
3/2948 . . . . . . . . (by increasing the total sustaining time with respect to other times in the frame)
3/296 . . . . . . . . Driving circuits for producing the waveforms applied to the driving electrodes
3/2965 . . . . . . . . (using inductors for energy recovery)
3/297 . . . . . . . . using opposed discharge type panels
3/298 . . . . . . . . using surface discharge panels
3/2983 . . . . . . . . (using non-standard pixel electrode arrangements)
3/2986 . . . . . . . . (with more than 3 electrodes involved in the operation)
3/299 . . . . . . . . using alternate lighting of surface-type panels
3/30 . . . . using electroluminescent panels
3/32 . . . . . . . . semiconductive, e.g. using light-emitting diodes [LED]
3/3208 . . . . . . . . organic, e.g. using organic light-emitting diodes [OLED]
3/3216 . . . . . . . . using a passive matrix
3/3225 . . . . . . . . using an active matrix
3/3233 . . . . . . . . with pixel circuitry controlling the current through the light-emitting element
3/3241 . . . . . . . . the current through the light-emitting element being set using a data current provided by the data driver, e.g. by using a two-transistor current mirror
3/325 . . . . . . . . the data current flowing through the driving transistor during a setting phase, e.g. by using a switch for connecting the driving transistor to the data driver
3/3258 . . . . . . . . with pixel circuitry controlling the voltage across the light-emitting element
3/3266 . . . . . . . . Details of drivers for scan electrodes
3/3275 . . . . . . . . Details of drivers for data electrodes
3/3283 . . . . . . . . in which the data driver supplies a variable data current for setting the current through, or the voltage across, the light-emitting elements
3/3291 . . . . . . . . in which the data driver supplies a variable data voltage for setting the current through, or the voltage across, the light-emitting elements
3/34 . . . . . . . . by control of light from an independent source
using liquid crystals
piezoelectric effect
magnetic field
{ 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)}
{ using light modulating elements actuated by
different display panel areas, e.g. along one
dimension such as lines}
{ 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)}
{ based on particles moving in a fluid
or in a gas, e.g. electrophoretic devices
(electrophoretic devices per se G02F 1/167)}
{ based on particles moving in a fluid
or in a gas, e.g. electrophoretic devices
(electrophoretic devices per se G02F 1/167)}
{ based on rotating particles or microelements}
{ based on modulation of the reflection angle,
e.g. micromirrors (micromirrors devices per
se G02B 2608033)}
{ based on interferometric effect}
{ based on light coupled out of a light guide,
e.g. due to scattering, by contracting the light
guide with external means}
{ based on the deformation of a fluid drop,
e.g. electrowetting}
{ using light modulating elements actuated by a
magnetic field}
{ using light modulating elements actuated by a
piezoelectric effect}
{ with thermally addressed liquid crystals}
{ 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 3/203; grey scales specific
for television H04N 3/127)}
{ Control of matrices with row and column
drivers}
{ using automatic refresh of the display
panel using sense/write circuits}
{ using a passive matrix
(G09G 3/3674 - G09G 3/3696 take
precedence)}
{ using active addressing}
{ using liquid crystals having memory
effects, e.g. ferroelectric liquid crystals}
{ with transmission/voltage
characteristic comprising multiple
loops, e.g. antiferroelectric liquid
crystals}
{ 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)}
{ with use of subpixels}
{ with the matrix divided into sections}
{ using plasma-addressed liquid crystal
displays}
{ with the matrix divided into sections}
{ with a nonlinear element in series with
the liquid crystal cell, e.g. a diode, or
M.I.M. element}
{ Details of drivers for scan electrodes}
{ suitable for active matrices only}
{ suitable for passive matrices only}
{ Details of drivers for data electrodes}
{ suitable for active matrices only}
{ suitable for passive matrices only}
{ Generation of voltages supplied to
electrode drivers}
{ using electrochromic devices}

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)
{ Arbitration of resources in a display system, e.g.
control of access to frame buffer by video controller
and/or main processor}
{ 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)}
{ Adapting incoming signals to the display format
during the display terminal}
{ 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)}
{ Clock recovery}

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 3/203; specific
for liquid crystal displays G09G 3/3607)}
{ memory planes}
{ using colour registers, e.g. to control
background, foreground, surface filling
(G09G 5/06 takes precedence)}
{ Control of mixing and/or overlay of colours
in general (G09G 5/022 and G09G 5/024 take
precedence)}
{ Circuits for converting colour display signals
into monochrome display signals}
{ using circuits for interfacing with colour displays}
e.g. using an all-points-addressable [APA] memory for rolling or scrolling

with a character-code memory

{Control of the character-code memory}

[comprising a loadable character generator (character generators see G09G 5/24)]

{Resolution modifying circuits, e.g. variable screen formats, resolution change between memory contents and display screen]

Generation of individual character patterns

{Circuits for displaying proportional spaced characters or for kerning}

[of ideographic or arabic-like characters]

for modifying the character dimensions, e.g. double width, double height

for enhancement of character form, e.g. smoothing

Control of display attribute

with means for controlling the display position (see provisionally G09G 5/42)

for rolling or scrolling

{for systems having a character code-mapped display memory}

{for systems having a bit-mapped display memory}

characterised by the display of a graphic pattern, e.g. using an all-points-addressable [APA] memory

{Graphics controllers}

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

Details of the operation on graphic patterns (G09G 5/38 takes precedence)

for modifying the size of the graphic pattern

for mixing or overlaying two or more graphic patterns (G09G 5/02, G09G 5/397 take precedence)

with means for controlling the display position

Control of the bit-mapped memory

Resolution modifying circuits, e.g. variable screen formats

Arrangements for updating the contents of the bit-mapped memory

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

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)

Not complete. See also G09G 5/395, G09G 5/399

using two or more bit-mapped memories, the operations of which are switched in time, e.g. ping-pong buffers

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

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

Details of flat display driving waveforms

Indexing scheme relating to details of a display terminal

Aspects of the constitution of display devices

Composition of display devices

Display panel composed of stacked panels

Video wall, i.e. juxtaposition of a plurality of screens to create a display screen of bigger dimensions

Structural and physical details of display devices

Matrix technologies

Integration of the drivers onto the display substrate

Details of dummy pixels or dummy lines in flat panels

Special arrangements specific to the use of low carrier mobility technology

Structural details of the set of electrodes

Layout of electrodes and connections

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

Flat panel display in which a field is applied parallel to the display plane

Pixel structures

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

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

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

with a reflective area and a transmissive area combined in one pixel, such as in transflectance pixels
or modulating elements, in the pixels together with light emitting or modulating elements, other than LCD or Passive matrix structure, i.e. with direct application of image producing elements.

Sub-multiplexed active matrix panel, i.e. wherein several active elements per pixel in active matrix panels are used for selection purposes, e.g. logical AND for partial update.

Several active elements per pixel in active matrix panels are used for counteracting undesired variations, e.g. feedback or autozeroing.

Used to establish symmetry in driving, e.g. with polarity inversion.

Forming a digital to analog [D/A] conversion circuit.

Forming a linear amplifier or follower.

With level shifting.

Forming a memory circuit, e.g. a dynamic memory with one capacitor.

Being a dynamic memory without any storage capacitor, i.e. with use of parasitic capacitances as storage elements.

Being a dynamic memory with more than one capacitor.

Static memory circuit, e.g. flip-flop.

With additional control of the display period without amending the charge stored in a pixel memory, e.g. by means of additional select electrodes.

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.

Details of the physics of pixel operation.

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

Related to liquid crystal pixels.

Use of memory effects in nematic liquid crystals.

Chiral-nematic liquid crystals, including chiral-nematic liquid crystals, with transitions between focal conic, planar, and homeotropic states.

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

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-refrangent liquid crystals.

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.

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.

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

Several active elements per pixel in active matrix panels are used for selection purposes, e.g. logical AND for partial update.

Forming a digital to analog [D/A] conversion circuit.

Forming a linear amplifier or follower.

With level shifting.

Forming a memory circuit, e.g. a dynamic memory with one capacitor.

Being a dynamic memory without any storage capacitor, i.e. with use of parasitic capacitances as storage elements.

Being a dynamic memory with more than one capacitor.

Static memory circuit, e.g. flip-flop.

With additional control of the display period without amending the charge stored in a pixel memory, e.g. by means of additional select electrodes.

by means of changes in the pixel supply voltage.

with level shifting.

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.

Using a non-linear two-terminal element.

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

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

Having more than one selection line for a two-terminal active matrix LCD, e.g. Lechner and D2R circuits.

Command of the display device.

Addressing, scanning or driving the display screen or processing steps related thereto.

Addressing of scan or signal lines.

Simultaneous scanning of several lines in flat panels.

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.

Controlling the sequence of the scanning lines with respect to the patterns to be displayed, e.g. to save power.

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.

With collection of electrodes in groups for n-dimensional addressing.

With use of split matrices (G09G 3/3644 and G09G 3/3666 take precedence).

Details of interlacing.

Related to multiple interlacing, i.e. involving more fields than just one odd field and one even field.

De-interlacing.

Special driving of display border areas.

Field-sequential colour display.

Switching ON and OFF the backlight within one frame.

Scrolling of light from the illumination source over the display in combination with the scanning of the display screen.

Details of the generation of driving signals.

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

Precharge or discharge of column electrodes before or after applying exact column voltages.

Precharge or discharge of pixel before applying new pixel voltage.

Control of polarity reversal in general, other than for liquid crystal displays.
Details of flat display driving waveforms

Partial updating of the display screen

Arrangement of scan or data electrode drive circuits at the periphery of a panel not inherent to a split matrix structure

Arrangement of drivers for different directions of scanning

Details of a shift registers arranged for use in a driving circuit

Details of voltage level shifters arranged for use in a driving circuit

Details of output amplifiers or buffers arranged for use in a driving circuit

Details of sampling or holding circuits arranged for use in a driver for data electrodes

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

Details of updating of the display screen

Details of flat display driving waveforms

for resetting or blanking

Waveforms for resetting a plurality of scan lines at a time

Waveforms for resetting the whole screen at once

Waveforms comprising zero voltage phase or pause

Waveforms comprising a gently increasing or decreasing portion, e.g. ramp

Special waveforms for scanning, where no circuit details of the gate driver are given

Application of pulses of alternating polarity prior to the drive pulse in electrophoretic displays

Details of timing specific for flat panels, other than clock recovery

Control of display operating conditions

Improving the quality of display appearance

Compensation of DC component across the pixels in flat panels

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

with crosstalk due to leakage current of pixel switch in active matrix panels

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

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

Increasing the driving margin in plasma displays

Improving the luminance or brightness uniformity across the screen

Improving the black level

Compensation of deficiencies in the appearance of colours

Flicker reduction other than flicker reduction circuits used for single beam cathode-ray tubes

Improving the response speed

Reduction of after-image effects

in the context of movement of objects on the screen or movement of the observer relative to the screen

Reduction of sub-frame artefacts

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

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

by changing the viewing angle properties, e.g. widening the viewing angle, adapting the viewing angle to the view direction

using tables for spatial correction of display data

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

by monitoring each display pixel

Maintaining the quality of display appearance

Temperature compensation

Preventing or counteracting the effects of ageing

Compensation of drifts in the characteristics of light emitting or modulating elements

Dealing with screen burn-in prevention or compensation of the effects thereof

using evaluation of the usage time

Adjustment of display parameters

Manual adjustment

The adjustment depending on the type of the information to be displayed

Adjustment of illumination source parameters

for control of overall brightness

by amplitude modulation of the brightness of the illumination source
Aspects of display data processing

- Handling of images in compressed format, e.g. JPEG, MPEG
- Changes in size, position or resolution of an image
- Resolution change, inclusive of the use of different resolutions for different screen areas
- Vertical resolution change
- Horizontal resolution change
- Gradation resolution change
- Change or adaptation of the frame rate of the video stream

Changes in size, position or resolution of an image

- Horizontal resolution change
- Vertical resolution change
- Gradation resolution change
- Change or adaptation of the frame rate of the video stream

Handling or displaying different aspect ratios, or changing the aspect ratio

- Zooming at least part of an image, i.e. enlarging it or shrinking it

Improvement of perceived resolution by subpixel rendering

- Positioning
- Vertical positioning
- Horizontal positioning
- Centering horizontally or vertically
- Change of orientation of the displayed image, e.g. upside-down, mirrored

Colour space transformation

- Monochrome to colour transformation
- Mixing of images, i.e. displayed pixel being the result of an operation, e.g. adding, on the corresponding input pixels

Overlay of images, i.e. displayed pixel being the result of switching between the corresponding input pixels

- wherein one of the images is motion video
- Solving problems related to the presentation of information to be displayed
- related to small screens
- Determination of a pixel data signal depending on the signal applied in the previous frame

Solving problems of bandwidth in display systems

Parallel handling of streams of display data

Aspects of interface with display user

Detection of the display position w.r.t. other display screens

Arrangements for display data security

Aspects of the architecture of display systems

Graphics controller able to handle multiple formats, e.g. input or output formats

Display device controller operating with a plurality of display units

Use of more than one graphics processor to process data before displaying to one or more screens

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

Display system comprising arrangements, such as a coprocessor, specific for motion video images

Frame memory handling

- using a cache memory
- Tiling
- using interleaving
- using unified memory architecture [UMA]

Frame memory using additional data ports, not inclusive of standard details of the output serial port of a VRAM

Updating a frame memory using a transfer of data from a source area to a destination area

Frame memory using a Synchronous Dynamic RAM [SDRAM]

- Detecting light within display terminals, e.g. using a single or a plurality of photosensors
the light conveying information used for selecting or modulating the light emitting or modulating element

the light being detected by light detection means within each pixel

the light being ambient light

the light originating from the display screen

the originated light output being determined for each pixel

the light being detected by light detection means within each pixel

Calculation or use of calculated indices related to luminance levels in display data

Use of a frame buffer in a display terminal, inclusive of the display panel

Aspects of data communication

Networking aspects

Centralised management of display operation, e.g. in a server instead of locally

LAN communication management

Arrangements and methods specific for the display of internet documents

Exchange of auxiliary data, i.e. other than image data, between monitor and graphics controller

for monitor identification

using multiple communication channels, e.g. parallel and serial

using display data channel standard [DDC] communication

Consumer Electronics Control, i.e. control of another device by a display or vice versa

Details of image data interface between the display device controller and the data line driver circuit

Use of a protocol of communication by packets in interfaces along the display data pipeline

Use of DVI or HDMI protocol in interfaces along the display data pipeline

Use of low voltage differential signaling [LVDS] for display data communication

Use of wireless transmission of display information

Use of optical transmission of display information

Details of the management of multiple sources of image data

Detection of presence or absence of input display information or of connection or disconnection of a corresponding information source

Keyboard-Video-Mouse [KVM] switch

Specific applications

Applications of flexible displays

Electronic labels

Remotely controlled electronic signs other than labels

Biomedical applications

Automotive applications

Avionics applications

Electronic books and readers

Digital picture frames