

ECLA**EUROPEAN 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 [G01R3/00](#); devices or arrangements for the control of light beams [G02F1/00](#); indicating of time by visual means [G04B19/00](#), [G04C17/00](#), [G04G9/00](#); arrangements for transferring data between computers and peripheral equipment [G06F3/00](#); visible signalling arrangements or devices [G08B5/00](#); 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 [G09F9/00](#); static indicating arrangements comprising integral associations of a number of light sources H01J, H01K, H01L, [H05B33/12](#); circuits in pulse counters for indicating the result [H03K21/18](#); 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)

[N: **WARNING** [C0807]

1. The following IPC groups are not used in the internal ECLA classification scheme. Subject matter covered by these groups is classified in the following ECLA groups:

G09G5/32	covered by	G09G5/42
G09G5/37	covered by	G09G5/39
G09G5/373	covered by	G09G5/39
G09G5/377	covered by	G09G5/39
G09G5/38	covered by	G09G5/42
G09G5/397	covered by	G09G5/395 , G09G5/399

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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.

G09G1/00

Control arrangements or circuits, of interest only in connection with cathode-ray tube indicators; [N: General aspects or details, e.g. selection emphasis on particular characters, dashed line or dotted line generation; Preprocessing of data] (cathode-ray oscilloscopes [G01R13/20](#); [N: radar display arrangements [G01S7/04](#); display of digital

on-picture data in television systems [H04N7/025D](#))

- G09G1/00I . [N: Intensity circuits ([G09G1/06](#) to [G09G1/28](#) take precedence)]
- G09G1/00P . [N: Power supply circuits]
- G09G1/00W . [N: Circuits for displaying split screens]
- G09G1/02 . Storage circuits ([G09G1/06](#) to [G09G1/28](#) take precedence)
- G09G1/04 . Deflection circuits [N: Constructional details not otherwise provided for (electron-optical arrangements [H01J29/46](#), [H01J37/04](#), [H01J37/302](#))]
- G09G1/06 . using single beam tubes ([G09G1/26](#), [G09G1/28](#) take precedence), [N: e.g. three-dimensional or perspective representation, rotation or translation of display pattern, hidden lines, shadows ([G09G1/28](#) takes precedence; stereoscopic TV-systems, details thereof [H04N13/00](#); oscilloscopes for three-dimensional representation [G01R13/20D](#); vectorscopes [G01R13/20E](#))]
- G09G1/07 . . with combined raster scan and calligraphic display
- G09G1/08 . . the beam directly tracing characters, the information to be displayed controlling the deflection [N: and the intensity] as a function of time in two spatial co-ordinates, e.g. according to a cartesian co-ordinate system
- G09G1/10 . . . the deflection signals being produced by essentially digital means, e.g. incrementally
- G09G1/12 . . . the deflection signals being produced by essentially analogue means
- G09G1/14 . . 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
- G09G1/14D . . . [N: Circuits for displaying horizontal and vertical lines]
- G09G1/14F . . . [N: Flicker reduction circuits]
- G09G1/16 . . . the pattern of rectangular co-ordinates extending over the whole area of the screen, i.e. television type raster
- G09G1/16D [N: 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 [G01R13/20](#); television receiver circuitry for displaying supplementary, e.g. alpha-numeric, information [H04N5/445](#))]
- G09G1/16T [N: 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 [G09G5/00T](#); specific for a flat panel [G09G3/20T](#))] [[N0605](#)] [[C0707](#)]
- G09G1/16T4 [N: Details of the interface to the display terminal specific for a CRT (details suitable for both CRT and flat panel [G09G5/00T4](#), specific for a flat panel [G09G3/20T4](#))] [[N0707](#)]
- G09G1/18 . . . 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
- G09G1/20 . using multi-beam tubes ([G09G1/26](#), [G09G1/28](#) take precedence)
- G09G1/22 . using tubes permitting selection of a complete character from a number of characters [N: (tubes therefor [H01J31/16](#))]

- G09G1/24
 - using tubes permitting selection of individual elements forming in combination a character [N: (see provisionally also [G09G1/22](#))]
- G09G1/26
 - using storage tubes [N: (tubes therefor [H01J31/58](#))]
- G09G1/28
 - using colour tubes [N: (tubes therefor [H01J31/20](#))]
- G09G1/28M
 - . [N: Interfacing with colour displays, e.g. TV receiver]
- G09G3/00**

Control arrangements or circuits, of interest only in connection with visual indicators other than cathode-ray tubes ([optical scanning systems in general G02B26/10](#))
- G09G3/00B
 - [N: using specific devices not provided for in groups [G09G3/02](#) to [G09G3/36](#), 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 [G03B23/00](#) = 42 HP)]
- G09G3/00B2
 - . [N: to project the image of a two-dimensional display, such as an array of light emitting or modulating elements or a CRT] [[N1204](#)]
- G09G3/00B4
 - . [N: to produce spatial visual effects] [[N1204](#)]
- G09G3/00C
 - [N: to give the appearance of moving signs] [[C9510](#)]
- G09G3/00D
 - [N: 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] [[N1204](#)]
- G09G3/00E
 - [N: Electronic inspection or testing of displays and display drivers, e.g. of LED or LCD displays (testing individual LED's [G01R31/26C6T](#); testing lamps [G01R31/44](#); testing of optical features of LCD displays [G02F1/13B4](#))] [[N0707](#)]
- G09G3/00F
 - [N: Use of pixel shift techniques, e.g. by mechanical shift of the physical pixels or by optical shift of the perceived pixels] [[N1204](#)]
- G09G3/00G
 - [N: 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] [[N1204](#)]
- G09G3/02
 - by tracing or scanning a light beam on a screen
- G09G3/02A
 - . [N: with scanning or deflecting the beams in two directions or dimensions] [[N1204](#)]
- G09G3/04
 - 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 [N: using a combination of such display devices for composing words, rows or the like, in a frame with fixed character positions]
- G09G3/04B
 - . [N: Selecting complete characters]
- G09G3/06
 - . using controlled light sources
- G09G3/08
 - . . using incandescent filaments
- G09G3/10
 - . . using gas tubes
- G09G3/12
 - . . using electroluminescent elements ([using cathode-ray tubes with phosphor](#)

screens [G09G1/00](#))

- G09G3/14 semiconductor devices, e.g. diodes
- G09G3/16 . . by control of light from an independent source
- G09G3/18 . . . using liquid crystals
- G09G3/19 . . . using electrochromic devices

- G09G3/20 . 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 [N: no fixed position being assigned to or needed to be assigned to the individual characters or partial characters]

- G09G3/20C . . [N: Display of colours (specific for liquid crystal displays G09G3/36B)] [N0710]
- G09G3/20G . . [N: Display of intermediate tones] [N0710]
- G09G3/20G2 . . . [N: by amplitude modulation] [N0710]
- G09G3/20G4 . . . [N: by modulation of the duration of a single pulse during which the logic level remains constant] [N0710]
- G09G3/20G6 . . . [N: by time modulation using two or more time intervals] [N0710]
- G09G3/20G6F [N: using sub-frames] [N0710]
- G09G3/20G6F2 [N: the sub-frames having all the same time duration] [N0710]
- G09G3/20G6F6 [N: the sub-frames having non-binary weights] [N0710]
- G09G3/20G6F8 [N: with splitting one or more sub-frames corresponding to the most significant bits into two or more sub-frames] [N0710]
- G09G3/20G6F10 [N: with specific control of sub-frames corresponding to the least significant bits] [N0710]
- G09G3/20G6F14 [N: the sub-frames being organized in consecutive sub-frame groups] [N0710]
- G09G3/20G8 . . . [N: using dithering] [N0710]
- G09G3/20G8R [N: with addition of random noise to an image signal or to a gradation threshold] [N0710]
- G09G3/20G8S [N: with use of a spatial dither pattern] [N0710]
- G09G3/20G8S2 [N: the pattern being varied in time] [N0710]
- G09G3/20G10 . . . [N: using error diffusion] [N0710]
- G09G3/20G10T [N: using error diffusion in time] [N0710]
- G09G3/20G10T2 [N: with error diffusion in both space and time] [N0710]
- G09G3/20G12 . . . [N: by domain size control (G09G3/36C6B4 takes precedence)] [N0710]
- G09G3/20G14 . . . [N: using sub-pixels] [N0710]
- G09G3/20G20 . . . [N: by a combination of two or more gradation control methods] [N0710]
- G09G3/20G20A [N: with combination of amplitude modulation and time modulation (space and time error diffusion G09G3/20G10T2)] [N0710]
- G09G3/20S . . [N: Special arrangements for addressing the individual elements of the matrix, other than by driving respective rows and columns in combination] [N1204]
- G09G3/20S2 . . . [N: with use of a plurality of processors, each processor controlling a number of individual elements of the matrix] [N1204]
- G09G3/20T . . [N: 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 G09G5/00T; specific for a CRT G09G1/16T)] [N0605] [C0707]
- G09G3/20T4 . . . [N: Details of the interface to the display terminal specific for a flat panel (suitable for both CRT and flat panel G09G5/00T4; specific for a CRT

G09G1/16T4)] [N0707]

- G09G3/22 . . . using controlled light sources
- G09G3/24 using incandescent filaments
- G09G3/26 to give the appearance of moving signs
- G09G3/28 using luminous gas-discharge panels, e.g. plasma panels [C1208]
- G09G3/28G [N: Display of gradations (G09G3/288 takes precedence)] [N0708]
- G09G3/2807 with discharge activated by high-frequency signals specially adapted therefor [N1208]
- G09G3/2813 using alternating current [AC] - direct current [DC] hybrid-type panels [N1208]
- G09G3/282 using DC panels [N0309]
- G09G3/285 using self-scanning [N: (contains no documents, see provisionally G09G3/282, G09G3/29)] [N0409]
- G09G3/288 using AC panels [N0409] [C1208]

[N: **WARNING**

This groups is incomplete pending reclassification; see also group [G09G3/28](#) [N1208]

- G09G3/29 using self-shift panels [N: with sequential transfer of the discharges from an input position to a further display position (tubes therefor H01J17/49)]
- G09G3/291 controlling the gas discharge to control a cell condition, e.g. by means of specific pulse shapes [N1208]
- G09G3/292 for reset discharge, priming discharge or erase discharge occurring in a phase other than addressing [N1208]
- G09G3/292E {7 dots} [N: Details of erasing] [N1208]
- G09G3/292P {7 dots} [N: Details of priming] [N1208]
- G09G3/292R {7 dots} [N: Details of initialising] [N1208]
- G09G3/293 for address discharge [N1208]
- G09G3/293D {7 dots} [N: Addressed by writing selected cells that are in an OFF state] [N1208]
- G09G3/293E {7 dots} [N: Addressed by erasing selected cells that are in an ON state] [N1208]
- G09G3/293S {7 dots} [N: being addressed only once per frame] [N1208]
- G09G3/294 for lighting or sustain discharge [N1208]
- G09G3/294E {7 dots} [N: with special waveforms to increase luminous efficiency] [N1208]
- G09G3/294F {7 dots} [N: by varying the frequency of sustain pulses or the number of sustain pulses proportionally in each subfield of the whole frame] [N1208]
- G09G3/294N {7 dots} [N: 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] [N1208]
- G09G3/294T {7 dots} [N: by increasing the total sustaining time with respect to other times in the frame] [N1208]
- G09G3/296 Driving circuits for producing the waveforms applied to the driving electrodes [N1208]
- G09G3/296L [N: using inductors for energy recovery] [N1208]

G09G3/297	. . . . .	using opposed discharge type panels [N1208]
G09G3/298	. . . . .	using surface discharge panels [N1208]
G09G3/298E	. . . . .	[N: using non-standard pixel electrode arrangements] [N1208]
G09G3/298E4	. . . . .	{7 dots} [N: with more than 3 electrodes involved in the operation] [N1208]
G09G3/299	. . . . .	using alternate lighting of surface-type panels [N1208]
G09G3/30	. . . . .	using electroluminescent panels
G09G3/32	. . . . .	semiconductive, e.g. diodes
G09G3/32A	. . . . .	[N: organic, e.g. organic LEDs] [N9812]
G09G3/32A6	. . . . .	[N: using a passive matrix] [N0806]
G09G3/32A8	. . . . .	[N: using an active matrix] [N0806]
G09G3/32A8C	. . . . .	{7 dots} [N: pixel circuitry controlling the light emitting element by determining the driving current through the light emitting element] [N0806]
G09G3/32A8C2	. . . . .	{8 dots} [N: 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] [N0806] [C0708]
G09G3/32A8C2S	. . . . .	{9 dots} [N: 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] [N0807]
G09G3/32A8V	. . . . .	{7 dots} [N: pixel circuitry controlling the light emitting element by determining the voltage across the light emitting element] [N0806]
G09G3/32A12	. . . . .	[N: Details of drivers for scan electrodes] [N0806]
G09G3/32A14	. . . . .	[N: Details of drivers for data electrodes] [N0806]
G09G3/32A14C	. . . . .	{7 dots} [N: the data driver communicating data to pixel by means of a current, i.e the data driver applies a current for setting the pixel] [N0806]
G09G3/32A14V	. . . . .	{7 dots} [N: the data driver communicating data to pixel by means of a voltage, i.e the data driver applies a voltage for setting the pixel] [N0806]
G09G3/34	. . . . .	by control of light from an independent source
G09G3/34B	. . . . .	[N: Control of illumination source (illumination devices structurally associated with liquid crystal cells G02F1/13357)] [C0707]
G09G3/34B2	. . . . .	[N: Details of control of colour illumination sources] [N0707]
G09G3/34B4	. . . . .	[N: using several illumination sources separately controlled corresponding to different display panel areas, e.g. along one dimension such as lines] [N0707]
G09G3/34B4A	. . . . .	[N: the different display panel areas being distributed in two dimensions, e.g. matrix] [N0707]
G09G3/34E	. . . . .	[N: using light modulating elements actuated by an electric field and being other than liquid crystal devices and electrochromic devices (using liquid crystal devices G09G3/36; using electrochromic devices G09G3/38)] [N0707]
G09G3/34E2	. . . . .	[N: based on particles moving in a fluid or in a gas, e.g. electrophoretic devices (electrophoretic devices per se G02F1/167)] [N0707]
G09G3/34E2A	. . . . .	[N: with more than two electrodes controlling the modulating element] [N0707]
G09G3/34E4	. . . . .	[N: based on rotating particles or microelements] [N0707]
G09G3/34E6	. . . . .	[N: based on modulation of the reflection angle, e.g. micromirrors]

					omirrors devices per se G02B26/08M4)] [N0707]
G09G3/34E8	.	.	.	.	[N: based on interferometric effect] [N0707]
G09G3/34E10	.	.	.	.	[N: based on light coupled out of a light guide, e.g. due to scattering, by contracting the light guide with external means] [N0707]
G09G3/34E12	.	.	.	.	[N: based on the deformation of a fluid drop, e.g. electrowetting] [N1204]
G09G3/34M	.	.	.	.	[N: using light modulating elements actuated by a magnetic field] [N0707]
G09G3/34P	.	.	.	.	[N: using light modulating elements actuated by a piezoelectric effect] [N0707]
G09G3/36	.	.	.	.	using liquid crystals
G09G3/36A	.	.	.	.	[N: with thermally addressed liquid crystals]
G09G3/36B	.	.	.	.	[N: 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 G09G3/20C; grey scales specific for television H04N3/12L)] [C0710]
G09G3/36C	.	.	.	.	[N: Control of matrices with row and column drivers]
G09G3/36C2	.	.	.	.	[N: Control of polarity reversal in general]
G09G3/36C4	.	.	.	.	[N: with automatic refresh of the display panel using sense/write circuits]
G09G3/36C6	.	.	.	.	[N: using a passive matrix (G09G3/36C12 to G09G3/36C16 take precedence)] [C9710]
G09G3/36C6A	.	.	.	.	[N: using active addressing] [N9510]
G09G3/36C6B	.	.	.	.	[N: using liquid crystals having memory effects, e.g. ferroelectric liquid crystals] [C9903]
G09G3/36C6B2	.	.	.	.	{7 dots} [N: with transmission/voltage characteristic comprising multiple loops, e.g. antiferroelectric liquid crystals] [N9903]
G09G3/36C6B4	.	.	.	.	{7 dots} [N: with intermediate tones displayed by domain size control (domain size control in flat matrix panels other than liquid crystal displays having memory effects G09G3/20G12)] [N9903] [C0710]
G09G3/36C6B6	.	.	.	.	{7 dots} [N: with use of subpixels] [N9903]
G09G3/36C6S	.	.	.	.	[N: with the matrix divided into sections]
G09G3/36C8	.	.	.	.	[N: using an active matrix (G09G3/36C10 to G09G3/36C16 take precedence)] [C9710]
G09G3/36C8B	.	.	.	.	[N: using multistable liquid crystals, e.g. ferroelectric liquid crystals] [C9710]
G09G3/36C8C	.	.	.	.	[N: Details of drivers for counter electrodes, e.g. common electrodes for pixel capacitors or supplementary storage capacitors] [N9809]
G09G3/36C8M	.	.	.	.	[N: 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] [N9809]
G09G3/36C8P	.	.	.	.	[N: using plasma-addressed liquid crystal displays] [N9411]
G09G3/36C8S	.	.	.	.	[N: with the matrix divided into sections]
G09G3/36C10	.	.	.	.	[N: with a nonlinear element in series with the liquid crystal cell, e.g. a diode, or M.I.M. element]
G09G3/36C12	.	.	.	.	[N: Details of drivers for scan electrodes] [N9710] [C9806]
G09G3/36C12A	.	.	.	.	[N: suitable for active matrices only] [N9710]
G09G3/36C12P	.	.	.	.	[N: suitable for passive matrices only] [N9710]
G09G3/36C14	.	.	.	.	[N: Details of drivers for data electrodes] [N9710] [C9806]
G09G3/36C14A	.	.	.	.	[N: suitable for active matrices only] [N9710]

G09G3/36C14P	. . . . . [N: suitable for passive matrices only] [N9710]
G09G3/36C16	. . . . . [N: Generation of voltages supplied to electrode drivers] [N9710]
G09G3/38	. . . using electrochromic devices
G09G5/00	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) [C9411]
G09G5/00A	. [N: Arbitration of resources in a display system, e.g. control of access to frame buffer by video controller and/or main processor] [N0711]
G09G5/00T	. [N: 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 G09G1/16T; for a flat panel G09G3/20T)] [N0605] [C0708]
G09G5/00T2	. . [N: Adapting incoming signals to the display format of the display terminal] [N0707]
G09G5/00T4	. . [N: Details of the interface to the display terminal (specific for a display terminal using a CRT G09G1/16T4; using a flat panel G09G3/20T4; circuits for interfacing with colour displays G09G5/04)] [N0707]
G09G5/00T4C	. . . [N: Clock recovery] [N0707]
G09G5/02	. characterised by the way in which colour is displayed [N: (details of colour display specific for CRTs G09G1/28; specific for flat matrix panels other than liquid crystal displays G09G3/20C; specific for liquid crystal displays G09G3/36B)] [C0710]
G09G5/02A	. . [N: using memory planes]
G09G5/02B	. . [N: using colour registers, e.g. to control background, foreground, surface filling (G09G5/06 takes precedence)]
G09G5/02C	. . [N: Control of mixing and/or overlay of colours in general (G09G5/02A and G09G5/02B take precedence)]
G09G5/02M	. . [N: Circuits for converting colour display signals into monochrome display signals]
G09G5/04	. . [N: using circuits for interfacing with colour displays] [C0606]
G09G5/06	. . using colour palettes, e.g. look-up tables
G09G5/08	. Cursor circuits
G09G5/10	. Intensity circuits
G09G5/12	. Synchronisation between the display unit and other units, e.g. other display units, video-disc players
G09G5/14	. Display of multiple viewports
G09G5/16	. Display of right-to-left language
G09G5/18	. Timing circuits for raster scan displays (specially adapted for television H04N; [N: synchronisation between the display unit and other display units, videodisc player G09G5/12])
G09G5/20	. Function-generator circuits, e.g. circle generators [N: line or curve smoothing circuits]
G09G5/22	. 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 [C0401]

- G09G5/22A . . [N: Control of the character-code memory][N0309]
- G09G5/22A2 . . . [N: comprising a loadable character generator (character generators per se [G09G5/24](#))] [N0309]
- G09G5/22A4 . . . [N: Resolution modifying circuits, e.g. variable screen formats, resolution change between memory contents and display screen] [N0309]
- G09G5/24 . . Generation of individual character patterns
- G09G5/24A . . . [N: Circuits for displaying proportional spaced characters or for kerning]
- G09G5/24B . . . [N: of ideographic or arabic-like characters] [N9507]
- G09G5/26 . . . for modifying the character dimensions, e.g. double width, double height
- G09G5/28 . . . for enhancement of character form, e.g. smoothing
- G09G5/30 . . Control of display attribute
- G09G5/32 . . with means for controlling the display position [N: (see provisionally [G09G5/42](#))] [N0309]

- G09G5/34 . for rolling or scrolling [C0401]
- G09G5/34A . . [N: for systems having a character code-mapped display memory] [N0309]
- G09G5/34B . . [N: for systems having a bit-mapped display memory] [N0309]

- G09G5/36 . characterised by the display of a graphic pattern, e.g. using an all-points-addressable (APA) memory [C0401]
- G09G5/36C . . [N: Graphics controllers] [N0104]
- G09G5/36C2 . . . [N: with conversion of CRT control signals to flat panel control signals, e.g. adapting the palette memory] [N0104]
- G09G5/37 . . Details of the operation on graphic patterns ([G09G5/38](#) takes precedence) [N: (contains no documents)] [N0309]
- G09G5/373 . . . for modifying the size of the graphic pattern [N: (contains no documents)] [N0309]
- G09G5/377 . . . for mixing or overlaying two or more graphic patterns ([G09G5/02](#), [G09G5/397](#) take precedence) [N: (contains no documents)] [N0309]
- G09G5/38 . . with means for controlling the display position [N: (contains no documents)] [N0309]
- G09G5/39 . . Control of the bit-mapped memory [N0309]
- G09G5/391 . . . Resolution modifying circuits, e.g. variable screen formats [N0309]
- G09G5/393 . . . Arrangements for updating the contents of the bit-mapped memory [N0309]
- G09G5/395 . . . Arrangements specially adapted for transferring the contents of the bit-mapped memory to the screen ([G09G5/399](#) takes precedence) [N0309]
- G09G5/397 Arrangements specially adapted for transferring the contents of two or more bit-mapped memories to the screen simultaneously, e.g. for mixing or overlay ([G09G5/02](#) takes precedence) [N: Warning Not complete. See also [G09G5/395](#), [G09G5/399](#)] [N0309] [C0711]
- G09G5/399 . . . using two or more bit-mapped memories, the operation of which are switched in time, e.g. ping-pong buffers [N0309]

- G09G5/40 . 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

- G09G5/42 . 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 [N0309]