CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY (NOTE omitted)

H03 BASIC ELECTRONIC CIRCUITRY

H03K PULSE TECHNIQUE (measuring pulse characteristics G01R; modulating sinusoidal oscillations with pulses H03C; transmission of digital information H04L; discriminator circuits detecting phase difference between two signals by counting or integrating cycles of oscillation H03D 3/04; automatic control, starting, synchronisation or stabilisation of generators of electronic oscillations or pulses where the type of generator is irrelevant or unspecified H03L; coding, decoding or code conversion, in general H03M)

NOTES
1. This subclass covers:
   • methods, circuits, devices, or apparatus using active elements operating in a discontinuous or switching manner for generating, counting, amplifying, shaping, modulating, demodulating, or otherwise manipulating signals;
   • electronic switching not involving contact-making and braking;
   • logic circuits handling electric pulses.
2. In this subclass, the following expression is used with the meaning indicated:
   • "active element" exercises control over the conversion of input energy into an oscillation or a discontinuous flow of energy.
3. In this subclass, where the claims of a patent document are not limited to a specific circuit element, the document is classified at least according to the elements used in the described embodiment.

WARNINGS
1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
   H03K 17/695 covered by H03K 17/687
2. In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

3/00 Circuits for generating electric pulses; Monostable, bistable or multistable circuits (H03K 4/00 takes precedence; for digital function generators in computers G06F 1/02)

3/01 Details

3/011 Modifications of generator to compensate for variations in physical values, e.g. voltage, temperature { (to maintain energy constant H03K 3/015) }

3/012 Modifications of generator to improve response time or to decrease power consumption

3/013 Modifications of generator to prevent operation by noise or interference

3/014 Modifications of generator to ensure starting of oscillations

3/015 Modifications of generator to maintain energy constant

3/017 Adjustment of width or dutycycle of pulses (pulse width modulation H03K 7/08 ; to maintain energy constant H03K 3/015)

3/02 Generators characterised by the type of circuit or by the means used for producing pulses (H03K 3/64 - H03K 3/84 take precedence)

3/021 by the use, as active elements, of more than one type of element or means, e.g. BIMOS, composite devices such as IGBT

3/023 by the use of differential amplifiers or comparators, with internal or external positive feedback

3/0231 Astable circuits { (H03K 3/0315 takes precedence) }

3/02315 [Stabilisation of output, e.g. using crystal]

3/0232 Monostable circuits

3/0233 Bistable circuits

3/02332 [of the master-slave type]

3/02335 [provided with means for increasing reliability; for protection; for ensuring a predetermined initial state when the supply voltage has been applied; for storing the actual state when the supply voltage fails (digital storage cells each combining volatile and non-volatile storage properties G11C 14/00) ]

3/02337 [Bistables with hysteresis, e.g. Schmitt trigger (non-regenerative amplitude discriminators G01R 19/165) ]

3/0234 Multistable circuits

3/027 by the use of logic circuits, with internal or external positive feedback

3/03 Astable circuits

3/0307 [Stabilisation of output, e.g. using crystal]

3/0315 [Ring oscillators]
3/0322 . . . . .  {with differential cells}
3/033 . . . . . Monostable circuits
3/037 . . . . . Bistable circuits
3/0372 . . . . . {of the master-slave type}
3/0375 . . . . . {provided with means for increasing reliability; for protection; for ensuring a predetermined initial state when the supply voltage has been applied; for storing the actual state when the supply voltage fails (digital storage cells each combining volatile and non-volatile storage properties G11C 14/00)}
3/0377 . . . . . [Bistables with hysteresis, e.g. Schmitt trigger (non-regenerative amplitude discriminators G01R 19/165)]
3/038 . . . . . Multistable circuits
3/04 . . . . . by the use, as active elements, of vacuum tubes only, with positive feedback (H03K 3/023, H03K 3/027 take precedence)
3/05 . . . . . using means other than a transformer for feedback
3/06 . . . . . using at least two tubes so coupled that the input of one is derived from the output of another, e.g. multivibrator
3/08 . . . . . astable
3/09 . . . . . Stabilisation of output
3/10 . . . . . monostable
3/12 . . . . . bistable
3/13 . . . . . Bistables with hysteresis, e.g. Schmitt trigger
3/14 . . . . . multistable
3/16 . . . . . using a transformer for feedback, e.g. blocking oscillator with saturable core
3/22 . . . . . specially adapted for amplitude comparison, i.e. Multivibrators
3/26 . . . . . by the use, as active elements, of bipolar transistors with internal or external positive feedback (H03K 3/023, H03K 3/027 take precedence)
3/28 . . . . . using means other than a transformer for feedback
3/281 . . . . . using at least two transistors so coupled that the input of one is derived from the output of another, e.g. multivibrator
3/282 . . . . . astable
3/2821 . . . . . [Emitters connected to one another by using a capacitor]
3/2823 . . . . . [using two active transistor of the same conductivity type (H03K 3/2821 takes precedence)]
3/2825 . . . . . [in an asymmetrical circuit configuration]
3/2826 . . . . . [using two active transistors of the complementary type (H03K 3/2821 take precedence)]
3/2828 . . . . . [in an asymmetrical circuit configuration]
3/283 . . . . . Stabilisation of output [, e.g. using crystal]
3/284 . . . . . monostable
3/286 . . . . . bistable

3/2865 . . . . . {ensuring a predetermined initial state when the supply voltage has been applied; storing the actual state when the supply voltage fails (digital storage cells each combining volatile and non-volatile storage properties G11C 14/00)}
3/287 . . . . . using additional transistors in the feedback circuit (H03K 3/289 takes precedence)
3/288 . . . . . using additional transistors in the input circuit (H03K 3/289 takes precedence)
3/2885 . . . . . the input circuit having a differential configuration
3/289 . . . . . of the master-slave type
3/2893 . . . . . Bistables with hysteresis, e.g. Schmitt trigger
3/2897 . . . . . with an input circuit of differential configuration
3/29 . . . . . multistable
3/30 . . . . . using a transformer for feedback, e.g. blocking oscillator
3/313 . . . . . by the use, as active elements, of semiconductor devices with two electrodes, one or two potential-jump barriers, and exhibiting a negative resistance characteristic
3/315 . . . . . the devices being tunnel diodes
3/33 . . . . . by the use, as active elements, of semiconductor devices exhibiting hole storage or enhancement effect
3/335 . . . . . by the use, as active elements, of bipolar semiconductor devices with more than two electrodes and exhibiting avalanche effect
3/35 . . . . . by the use, as active elements, of bipolar semiconductor devices with more than two PN junctions, or more than three electrodes, or more than one electrode connected to the same conductivity region (H03K 3/023, H03K 3/027 take precedence)
3/351 . . . . . the devices being unijunction transistors (H03K 3/352 takes precedence)
3/352 . . . . . the devices being thyristors
3/3525 . . . . . Anode gate thyristors or programmable unijunction transistors
3/353 . . . . . by the use, as active elements, of field-effect transistors with internal or external positive feedback (H03K 3/023, H03K 3/027 take precedence)
3/354 . . . . . Astable circuits
3/3545 . . . . . [Stabilisation of output, e.g. using crystal]
3/355 . . . . . Monostable circuits
3/356 . . . . . Bistable circuits
3/356008 . . . . {ensuring a predetermined initial state when the supply voltage has been applied; storing the actual state when the supply voltage fails (digital storage cells each combining volatile and non-volatile storage properties G11C 14/00)}
3/356017 . . . . {using additional transistors in the input circuit (H03K 3/356104, H03K 3/3562 take precedence)}
3/356026 . . . . {with synchronous operation (H03K 3/356034, H03K 3/356052 take precedence)}
3/356034 . . . . {the input circuit having a differential configuration}
magnetic or dielectric devices
by the use, as active elements, of non-linear tubes
by the use, as active elements, of beam deflection devices, i.e. light-emitting and photoelectric cells
by the use, as active elements, of opto-electronic cells
by the use, as active elements, of electrochemical devices
by the use, as active elements, of superconductive devices
by the use, as active elements, of semiconductor devices
by the use, as active elements, of opto-electronic devices, i.e. light-emitting and photoelectric devices electrically- or optically-coupled
by the use, as active elements, of beam deflection tubes
by the use, as active elements, of non-linear magnetic or dielectric devices
the devices being parametrons
the devices being ferro-resonant
the devices being multi-aperture magnetic cores, e.g. transfluxors
the switching device being a spark gap
the switching device being a vacuum tube
the switching device being a gas-filled tube having a control electrode
the switching device being a semiconductor device
by the use of galvano-magnetic devices, e.g. Hall effect devices
Generators producing trains of pulses, i.e. finite sequences of pulses
by interrupting the output of a generator
time intervals between all adjacent pulses of one train being equal
with means for varying repetition rate of trains
Generating a single train of pulses having a predetermined pattern, e.g. a predetermined number
Generating trains of sinusoidal oscillations (by keying or interruption of sinusoidal oscillations; for transmission of digital information)
Generating trains of sinusoidal oscillations (by repetitive charge or discharge of a capacitor, analogue generators)
using digital techniques
having parabolic shape
having triangular shape
with high voltage - or current generators
{ using a Miller-integrator (H03K 4/08 takes precedence) }
having sawtooth shape
{ Protection of sawtooth generators }
using as active elements vacuum tubes only
in which a sawtooth voltage is produced across a capacitor
using two tubes so coupled that the input of each one is derived from the output of the other, e.g. multivibrator
{ (multivibrator generating other pulses H03K 3/00) }
using a single tube with positive feedback through transformer, e.g. blocking oscillator
{ (blocking oscillators generating other pulses H03K 3/00) }
using a single tube exhibiting negative resistance between two of its electrodes, e.g. transitron, dynatron
using a tube with negative feedback by capacitor, e.g. Miller integrator
Generating pulses by means of delay lines and not covered by the preceding subgroups
4/22 . . . . . combined with transitron, e.g. phantastron, sanatron
4/24 . . . . . Boot-strap generators
4/26 . . . . . in which a sawtooth current is produced through an inductor
4/28 . . . . . using a tube operating as a switching device
4/32 . . . . . combined with means for generating the driving pulses
4/34 . . . . . using a single tube with positive feedback through a transformer
4/36 . . . . . using a single tube exhibiting negative resistance between two of its electrodes, e.g. transitron, dynatron
4/38 . . . . . combined with Miller integrator
4/39 . . . . . using a tube operating as an amplifier
4/41 . . . . . with negative feedback through a capacitor, e.g. Miller-integrator
4/43 . . . . . combined with means for generating the driving pulses
4/48 . . . . . using as active elements semiconductor devices (H03K 4/787 - H03K 4/84 take precedence)
4/50 . . . . . in which a sawtooth voltage is produced across a capacitor
4/501 . . . . . the starting point of the flyback period being determined by the amplitude of the voltage across the capacitor, e.g. by a comparator
4/502 . . . . . the capacitor being charged from a constant-current source
4/52 . . . . . using two semiconductor devices so coupled that the input of each one is derived from the output of the other, e.g. multivibrator ((multivibrators generating other pulses H03K 3/00))
4/54 . . . . . using a single semiconductor device with positive feedback through a transformer, e.g. blocking oscillator ((blocking oscillators generating other pulses H03K 3/00))
4/56 . . . . . using a semiconductor device with negative feedback through a capacitor, e.g. Miller integrator
4/58 . . . . . Boot-strap generators
4/60 . . . . . in which a sawtooth current is produced through an inductor
4/62 . . . . . using a semiconductor device operating as a switching device
4/625 . . . . . {using pulse-modulation techniques for the generation of the sawtooth wave, e.g. class D, switched mode}
4/64 . . . . . combined with means for generating the driving pulses ((H03K 4/625 takes precedence))
4/66 . . . . . using a single device with positive feedback, e.g. blocking oscillator
4/68 . . . . . Generators in which the switching device is conducting during the fly-back part of the cycle
4/69 . . . . . using a semiconductor device operating as an amplifier
4/693 . . . . . {operating in push-pull, e.g. class B (H03K 4/696 takes precedence)}
4/696 . . . . . {using means for reducing power dissipation or for shortening the flyback time, e.g. applying a higher voltage during flyback time}
4/71 . . . . . with negative feedback through a capacitor, e.g. Miller-integrator
4/72 . . . . . combined with means for generating the driving pulses
4/725 . . . . . {Push-pull amplifier circuits}
4/787 . . . . . using as active elements semiconductor devices with two electrodes and exhibiting a negative resistance characteristic
4/793 . . . . . using tunnel diodes
4/80 . . . . . using as active elements multi-layer diodes
4/83 . . . . . using as active elements semiconductor devices with more than two PN junctions or with more than three electrodes or more than one electrode connected to the same conductivity region
4/835 . . . . . {using pulse-modulation techniques for the generation of the sawtooth wave, e.g. class D, switched mode}
4/84 . . . . . Generators in which the semiconductor device is conducting during the fly-back part of the cycle ((H03K 4/835 takes precedence))
4/86 . . . . . using as active elements gas-filled tubes (or spark-gaps)
4/88 . . . . . using as active elements electrochemical cells (or galvano-magnetic or photo-electric elements)
4/90 . . . . . Linearisation of ramp (modifying slopes of pulses H03K 604; scanning distortion correction for television receivers H04N 3/23; Synchronisation of pulses
4/92 . . . . . having a waveform comprising a portion of a sinusoid (generating sinusoidal oscillations H03B)
4/94 . . . . . having trapezoidal shape
5/00 Manipulating of pulses not covered by one of the other main groups of this subclass (circuits with regenerative action H03K 3/00; H03K 4/00; by the use of non-linear magnetic or dielectric devices H03K 3/45)

**NOTE**

In this group, the input signals are of the pulse type.

5/00006 . . . . . {Changing the frequency (modulating pulses H03K 7/00; frequency dividers H03K 21/00 - H03K 29/00; additive or subtractive mixing of two pulse rates into one G06F 7/605; pulse rate dividers G06F 7/681})
5/00013 . . . . . {Delay, i.e. output pulse is delayed after input pulse and pulse length of output pulse is dependent on pulse length of input pulse)
5/00019 . . . . . {Variable delay}
5/00026 . . . . . {controlled by an analog electrical signal, e.g. obtained after conversion by a D/A converter}
5/00032 . . . . . {Dc control of switching transistors}
5/00039 . . . . . {having four transistors serially}
5/00045 . . . . . {Dc voltage control of a capacitor or of the coupling of a capacitor as a load}
Phase shifter, i.e. the delay between the output and input pulse is dependent on the frequency, and such that a phase difference is obtained independent of the frequency.
Manipulating pulses having a finite slope and not covered by one of the other main groups of this subclass (circuits with regenerative action H03K 4/00)

Amplifying pulses \{(generation of a sawtooth current through an inductor by amplification H03K 4/28, H03K 4/39, H03K 4/43, H03K 4/62, H03K 4/69)\}

Changing slopes of pulses, e.g. S-correction \{(S-correction in television H04N 3/23)\}

Modulating pulses with a continuously-variable modulating signal

Amplitude modulation, i.e. PAM

Position modulation, i.e. PPM

Frequency or rate modulation, i.e. PFM or PRM

Duration or width modulation \{Duty cycle modulation\}

Combined modulation, e.g. rate modulation and amplitude modulation

Demodulating pulses which have been modulated with a continuously-variable signal

of amplitude-modulated pulses

of position-modulated pulses

of frequency- or rate-modulated pulses

of duration- or width-modulated pulses \{or of duty-cycle modulated pulses\}

of pulses having combined modulation

Transforming types of modulations, e.g. position-modulated pulses into duration-modulated pulses

Producing pulses by distorting or combining sinusoidal waveforms \{(shaping pulses H03K 5/01; combining sinewaves using elements operating in a non-switching manner H03B 21/00)\}

Electronic switching or gating, i.e. not by contact-making and -breaking \{gated amplifiers H03F 3/72; switching arrangements for exchange systems using static devices H04Q 3/52\}

Switching arrangements with several input- or output terminals \{(code converters H03M 5/00, H03M 7/00)\}

\{with several inputs only\}

\{with several outputs only\}

Modifications for accelerating switching

in thyristor switches

in composite switches

without feedback from the output circuit to the control circuit \{(H03K 17/0403, H03K 17/0406 take precedence)\}

in field-effect transistor switches \{(H03K 17/0412, H03K 17/0416 take precedence)\}

in bipolar transistor switches \{(H03K 17/0412, H03K 17/0416 take precedence)\}

by measures taken in the control circuit

in field-effect transistor switches

in bipolar transistor switches

Anti-saturation measures

by measures taken in the output circuit

in field-effect transistor switches

in bipolar transistor switches

by feedback from the output circuit to the control circuit \{(H03K 17/0403, H03K 17/0406 take precedence)\}

in field-effect transistor switches

in bipolar transistor switches
Modifications for eliminating interference voltages between physical values, e.g. of temperature

Modifications for compensating variations of permissible switched current

Modifications for increasing the maximum permissible switched voltage

Modifications for protecting switching circuit against overcurrent or overvoltage

Modifications for ensuring a predetermined initial state when the supply voltage has been applied (bi-stable generators H03K 3/12)

Modifications for ensuring a predetermined initial state (using parallel switching arrangements)

Modifications for providing a predetermined threshold before switching (shaping pulses by electronic clocks comprising means to be operated during their operation after the programme is completed)

Modifications for introducing a time delay before switching (modifications to provide a choice of time-intervals for executing more than one switching action H03K 17/296)

Modifications for temporary blocking after receipt of control pulses

Modifications for protecting switching circuit and the output circuit (using parallel switching arrangements)

Modifications for increasing the maximum permissible switched current

Modifications for introducing a time delay before switching (using diodes H03K 17/74)

Modifications for temporary blocking after receipt of control pulses

Modifications for ensuring a predetermined initial state without feedback from the output circuit to the control circuit

Modifications for introducing a time delay before switching (using microengineered devices, e.g. field emission devices)

Modifications for ensuring a predetermined initial state when the supply voltage has been applied (bi-stable generators H03K 3/12)

Modifications for protecting switching circuit against overcurrent or overvoltage

Modifications for increasing the maximum permissible switched voltage

Modifications for protecting switching circuit against overcurrent or overvoltage

Modifications for ensuring a predetermined initial state when the supply voltage has been applied (bi-stable generators H03K 3/12)

Modifications for introducing a time delay before switching (using diodes H03K 17/74)

Modifications for temporary blocking after receipt of control pulses

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Modifications for temporary blocking after receipt of control pulses

Modifications for ensuring a predetermined initial state when the supply voltage has been applied (bi-stable generators H03K 3/12)

Modifications for introducing a time delay before switching (using diodes H03K 17/74)
Switching arrangements with several input-output terminals, e.g. multiplexers, distributors (logic circuits H03K 19/00; code converters H03M 5/00, H03M 7/00)

the devices having only two electrodes and exhibiting negative resistance (the devices being tunnel diodes H03K 17/58)

having more than two PN junctions; having more than three electrodes; having more than one electrode connected to the same conductivity region

with galvanic isolation between the control circuit and the output circuit (H03K 17/78 takes precedence)

using acoustic means

using transformer coupling

for ac voltages or currents (H03K 17/722, H03K 17/735 take precedence)

for dc voltages or currents (H03K 17/722, H03K 17/735 take precedence)

with inductive load

Measures for enabling turn-off

Switching arrangements with several input-output terminals, e.g. multiplexers, distributors (H03K 17/722 takes precedence; logic circuits H03K 19/00; code converters H03M 5/00, H03M 7/00)

by the use, as active elements, of diodes (by the use of more than one type of semiconductor device H03K 17/567; by the use of tunnel diodes H03K 17/58; by the use of negative resistance diodes H03K 17/70)

Switching arrangements with several input-output terminals, e.g. multiplexers, distributors (logic circuits H03K 19/00; code converters H03M 5/00, H03M 7/00)

using opto-electronic devices, i.e. light-emitting and photoelectric devices electrically- or optically-coupled

controlling field-effect transistor switches

controlling (bipolar) semiconductor switches with more than two PN-junctions, or more than three electrodes, or more than one electrode connected to the same conductivity region

controlling bipolar transistors

controlling bipolar transistors

using photocurrent transistors

using non-linear magnetic devices; using non-linear dielectric devices (H03K 17/95, H03K 17/97 take precedence)

Switching arrangements with several input-output terminals, e.g. multiplexers, distributors (logic circuits H03K 19/00; code converters H03M 5/00, H03M 7/00)

the devices being transfluxors

the devices being thin-film devices

the devices being twisters

By the use, as active elements, of beam-deflection tubes

by the use, as active elements, of galvano-magnetic devices, e.g. Hall-effect devices (H03K 17/95, H03K 17/97 take precedence)

by the use, as active elements, of superconductive devices
time-pieces with no moving parts G04G 21/08

(a) using digital techniques

(b) using non-linear magnetic devices

(c) using galvanomagnetic devices

(d) using inductive coils

(e) with a galvanically isolated probe

(f) controlled by an oscillatory signal

(g) forming part of an oscillator

(h) with variable frequency

(i) with variable amplitude

(j) in a resonant circuit

(k) controlled by an oscillatory signal

(l) forming part of an oscillator

(m) with variable frequency

(n) with variable amplitude

(o) using a capacitive detector

17/96 Touch switches (specially adapted for electronic time-pieces with no moving parts GO4G 21/08)

(a) characterised by the type or shape of the sensing electrodes

(b) characterised by the number of electrodes

(c) using one electrode only per touch switch

17/969 Touch switches (giving the object to be touched in physical contact with the detector)

(a) where the electrode is the object to be switched

(b) where the electrode is a plant

(c) using two electrodes per touch switch

(d) using three electrodes per touch switch

17/9618 Touch switches (with a plurality of detectors, e.g. keyboard)

(a) Capacitive touch switches

(b) using a plurality of detectors, e.g. keyboard

(c) using a force resistance transducer

(d) Optical touch switches

(e) using a plurality of detectors, e.g. keyboard

17/9631 Touch switches (using a light source as part of the switch)

(a) using organic light emitting devices, e.g. light emitting polymer [OEP] or OLED

(b) using a pulsed light source

17/9638 Switches controlled by moving an element forming part of the switch

17/968 using opto-electronic devices

17/969 having a plurality of control members, e.g. keyboard

17/97 having a magnetic movable element

19/00 Logic circuits, i.e. having at least two inputs acting on one output (circuits for computer systems using fuzzy logic G06N 7/02); Inverting circuits

19/000 Multistate logic (G06K 19/002 takes precedence)

(a) Modifications of input or output impedance

(b) Arrangements for reducing power consumption

19/001 in bipolar transistor circuits

19/003 in field-effect transistor circuits

19/006 (by using a control or a clock signal, e.g. in order to apply power supply)

19/009 (by energy recovery or adiabatic operation)

19/0021 (Modifications of threshold (for electronic switching or gating H03K 17/30))

19/0024 in bipolar transistor circuits

19/0027 in field-effect transistor circuits

19/003 in bipolar transistor circuits

19/00315 in field-effect transistor circuits

19/00323 (Delay compensation)

19/0033 (Radiation hardening)

19/0038 (In field effect transistor circuits)

19/00346 (Modifications for eliminating interference or parasitic voltages or currents)

19/00353 in bipolar transistor circuits

19/0061 in field effect transistor circuits

19/00369 (Modifications for compensating variations of temperature, supply voltage or other physical parameters)

19/00367 in bipolar transistor circuits

19/00384 in field effect transistor circuits

19/00392 (by circuit redundancy (H03K 19/0075 takes precedence))

19/007 Fail-safe circuits

19/0075 (by using two redundant chains)

19/01 Modifications for accelerating switching

19/013 in bipolar transistor circuits
H03K

19/0133 . . . [by bootstrapping, i.e. by positive feed-back]
19/0136 . . . [by means of a pull-up or down element]
19/017 . . . in field-effect transistor circuits
19/01707 . . . [in asynchronous circuits]
19/01714 . . . [by bootstrapping, i.e. by positive feed-back]
19/01721 . . . [by means of a pull-up or down element]
19/01728 . . . [in synchronous, i.e. by using clock signals]
19/01735 . . . [by bootstrapping, i.e. by positive feed-back]
19/01742 . . . [by means of a pull-up or down element]
19/0175 . Coupling arrangements; Interface arrangements (interface arrangements for digital computers G06F 3/00, G06F 13/00)
19/017509 . . . [Interface arrangements]
19/017518 . . . [using a combination of bipolar and field effect transistors [BIFET]]
19/017527 . . . [with at least one differential stage]
19/017536 . . . [using opto-electronic devices]
19/017545 . . . [Coupling arrangements; Impedance matching circuits]
19/017554 . . . [using a combination of bipolar and field effect transistors [BIFET]]
19/017563 . . . [with at least one differential stage]
19/017572 . . . [using opto-electronic devices]
19/017581 . . . [programmable]
19/01759 . . . [with a bidirectional operation]
19/018 . using bipolar transistors only
19/01806 . . . [Interface arrangements]
19/01812 . . . [with at least one differential stage]
19/01818 . . . [for integrated injection logic (I2L)]
19/01825 . . . [Coupling arrangements, impedance matching circuits]
19/01831 . . . [with at least one differential stage]
19/01837 . . . [programmable]
19/01843 . . . [with a bidirectional operation]
19/0185 . using field effect transistors only
19/018507 . . . [Interface arrangements]
19/018514 . . . [with at least one differential stage (H03K 19/018528 and H03K 19/018542 take precedence)]
19/018521 . . . [of complementary type, e.g. CMOS]
19/018528 . . . [with at least one differential stage]
19/018555 . . . [of Schottky barrier type [MESFET]]
19/018542 . . . [with at least one differential stage]
19/01855 . . . [synchronous, i.e. using clock signals]
19/018557 . . . [Coupling arrangements; Impedance matching circuits]
19/018564 . . . [with at least one differential stage (H03K 19/018578 takes precedence)]
19/018571 . . . [of complementary type, e.g. CMOS]
19/018578 . . . [with at least one differential stage]
19/018585 . . . [programmable]
19/018592 . . . [with a bidirectional operation]
19/02 . using specified components (H03K 19/0005 - H03K 19/0021, H03K 19/0003 - H03K 19/0175 take precedence)
19/04 . using gas-filled tubes
19/06 . using vacuum tubes (using diode rectifiers H03K 19/12)
19/08 . using semiconductor devices (H03K 19/173 takes precedence; wherein the semiconductor devices are only diode rectifiers H03K 19/12)
19/0806 . . . [using charge transfer devices (DTC, CCD)]
19/0813 . . . [Threshold logic]
19/082 . using bipolar transistors {(in combination with field-effect transistor H03K 19/094)}
19/0823 . . . [Multistate logic]
19/0826 . . . [one of the states being the high impedance or floating state]
19/084 . Diode-transistor logic
19/0843 . . . [Complementary transistor logic [CTL]]
19/0846 . . . [Schottky transistor logic [STL]]
19/086 . Emitter coupled logic
19/0863 . . . [Emitter function logic [EFL]; Base coupled logic [BCL]]
19/0866 . . . [Stacked function logic [STFL]; Base coupled logic [BCL]]
19/088 . Transistor-transistor logic
19/09 . . . Resistor-transistor logic
19/091 . . . Integrated injection logic or merged transistor logic
19/0912 . . . [Static induction logic [STIL] (when the logic function is fullfilled by a fet H03K 19/094)]
19/0915 . . . [Integrated schottky logic [ISL]]
19/0917 . . . [Multistate logic]
19/094 . using field-effect transistors
19/09403 . . . [using junction field-effect transistors (H03K 19/096 takes precedence)]
19/09407 . . . [of the same canal type]
19/0941 . . . [of complementary type]
19/09414 . . . [with gate injection or static induction [STIL] (H03K 19/0912 takes precedence)]
19/09418 . . . [in combination with bipolar transistors [BIFET]]
19/09421 . . . [Diode field-effect transistor logic (H03K 19/0956, H03K 19/096 take precedence)]
19/09425 . . . [Multistate logic (H03K 19/096 takes precedence)]
19/09429 . . . [one of the states being the high impedance or floating state]
19/09432 . . . [with coupled sources or source coupled logic (H03K 19/096 takes precedence)]
19/09436 . . . [Source coupled field-effect logic [SCFL]]
19/0944 . . . using MOSFET [or insulated gate field-effect transistors, i.e. IGFET] (H03K 19/096 takes precedence)
19/09441 . . . [of the same canal type]
19/09443 . . . [using a combination of enhancement and depletion transistors]
19/09445 . . . [with active depletion transistors]
19/09446 . . . [using only depletion transistors]
19/09448 . . . [in combination with bipolar transistors [BIMOS]]
19/0948 . using CMOS [or complementary insulated gate field-effect transistors]
19/09482 . . . [using a combination of enhancement and depletion transistors]
19/09485 . . . [with active depletion transistors]
19/09487 . . . [using only depletion transistors]
using twistors
using saturable magnetic devices
using parametrons
using ferro-resonant devices
using transfluxors
using thin-film devices
using diode rectifiers (diode-transistor logic (H03K 19/0966 takes precedence))
using opto-electronic devices, i.e. light-emitting and photoelectric devices electrically- or optically-coupled (optical logic elements per se (H03K 19/0966 takes precedence))
using tunnel diodes
using clock signals, e.g. of I/O or coupling register (H03K 19/17712 takes precedence)
using Schottky type FET [MESFET]
using diode rectifiers (diode-transistor logic (H03K 19/0984))
using single-electrode devices, e.g. light-emitting devices (H03K 19/17716 takes precedence)
using thyristors
using Schottky type FET [MESFET]
using field-effect transistors
using Schottky type FET [MESFET] (H03K 19/0966 takes precedence)
using Schottky type FET [MESFET] (H03K 19/0966 takes precedence)
using Schottky type FET [MESFET]
for speed up configuration or reconfiguration
for memories
for reliability
for security
for powering on or off
Structural details for adapting physical parameters
for supply voltage
for input/output [I/O] voltages
for operating speed
for physical disposition of blocks
using galvano-magnetic devices, e.g. Hall-effect devices
using dielectric elements with variable dielectric constant, e.g. ferro-electric capacitors
using ferro-resonant devices
using superconductive devices
characterised by electromagnetic coupling and injection of the control current
EXCLUSIVE-OR circuits, i.e. giving output if input signal exists at only one input; COINCIDENCE circuits, i.e. giving output only if all input signals are identical
using bipolar transistors
using field-effect transistors
using Schottky type FET [MESFET]
Majority or minority circuits, i.e. giving output having the state of the majority or the minority of the inputs
Pulse counters comprising counting chains; Frequency dividers comprising counting chains (H03K 23/00 [H03K 2020.08] takes precedence)

23/001 [using elements not covered by groups H03K 23/2002 and H03K 23/74 - H03K 23/84]

23/002 [using semiconductor devices (H03K 23/78; H03K 23/80; H03K 23/84 take precedence)]

23/004 [Counters counting in a non-natural counting order, e.g. random counters]

23/005 [using minimum change code, e.g. Gray Code]

23/007 [using excess three code]

23/008 [using biquinary code]

23/40 Gating or clocking signals applied to all stages, i.e. synchronous counters ((H03K 23/74 - H03K 23/84 take precedence))

23/42 Out-of-phase gating or clocking signals applied to counter stages

23/425 [using bistables]

23/44 using field-effect transistors ((H03K 23/46 and H03K 23/425 take precedence))

23/46 using charge transfer devices, i.e. bucket brigade or clocked coupled devices

23/48 with a base or radix other than a power of two (H03K 23/42 takes precedence)

23/483 with a base which is an odd number

23/486 with a base which is a non-integer

23/50 using bi-stable regenerative trigger circuits (H03K 23/42 - H03K 23/48 take precedence)

23/502 with a base or radix other than a power of two (H03K 23/54 takes precedence)

23/505 with a base which is an odd number

23/507 with a base which is a non-integer

23/52 using field-effect transistors

23/54 Ring counters, i.e. feedback shift register counters (H03K 23/52 takes precedence)

23/542 with crossed-couplings, i.e. Johnson counters

23/544 with a base which is an odd number

23/546 with a base which is a non-integer

23/548 [Reversible counters]

23/56 Reversible counters (H03K 23/52 [and H03K 23/54] take precedence)

23/58 Gating or clocking signals not applied to all stages, i.e. asynchronous counters (H03K 23/74 - H03K 23/84 take precedence)

23/582 with a base or a radix different of a power of two

23/584 with a base which is an odd number

23/586 with a base which is a non-integer

23/588 Combination of a synchronous and an asynchronous counter

23/60 with field-effect transistors

23/62 reversible

23/64 with a base or radix other than a power of two (H03K 23/40 - H03K 23/62 take precedence)

23/66 with a variable counting base, e.g. by presetting or by adding or suppressing pulses

23/662 by adding or suppressing pulses

23/665 by presetting

23/667 by switching the base during a counting cycle

23/68 with a base which is a non-integer

23/70 with a base which is an odd number (H03K 23/66 takes precedence)

23/72 Decade counters (H03K 23/66 takes precedence)

23/74 using relays

23/76 using magnetic cores or ferro-electric capacitors

23/763 using superconductive devices

23/766 using thin-film devices

23/78 using opto-electronic devices

23/80 using semiconductor devices having only two electrodes, e.g. tunnel diode, multi-layer diode

23/82 using gas-filled tubes

23/825 using vacuum tubes

23/84 using thyristors or unijunction transistors

23/86 reversible (H03K 23/40 - H03K 23/84 take precedence)

25/00 Pulse counters with step-by-step integration and static storage; Analogous frequency dividers

25/02 comprising charge storage, e.g. capacitor without polarisation hysteresis

25/04 using auxiliary pulse generator triggered by the incoming pulses

25/12 comprising hysteresis storage

27/00 Pulse counters in which pulses are continuously circulated in a closed loop; Analogous frequency dividers (feedback shift register counters H03K 23/54)

29/00 Pulse counters comprising multi-stable elements, e.g. for ternary scale, for decimal scale; Analogous frequency dividers

29/04 using multi-cathode gas discharge tubes

29/06 using beam-type tubes, e.g. magnetrons, cathode-ray tubes

99/00 Subject matter not provided for in other groups of this subclass

2217/00 Indexing scheme related to electronic switching or gating, i.e. not by contact-making or -breaking covered by H03K 17/00

2217/0009 AC switches, i.e. delivering AC power to a load

2217/0018 Special modifications or use of the back gate voltage of a FET

2217/0027 Measuring means of, e.g. currents through or voltages across the switch

2217/0036 Means reducing energy consumption

2217/0045 Full bridges, determining the direction of the current through the load

2217/0054 Gating switches, e.g. pass gates

2217/0063 High side switches, i.e. the higher potential [DC] or life wire [AC] being directly connected to the switch and not via the load

2217/0072 Low side switches, i.e. the lower potential [DC] or neutral wire [AC] being directly connected to the switch and not via the load

2217/0081 Power supply means, e.g. to the switch driver

2217/009 Resonant driver circuits

2217/94 Characterised by the way in which the control signal is generated

2217/9405 Activated by voice or sound

2217/9401 Calibration techniques
Touch switches

Proximity switches

Using an optical detector

Characterised by the type of activation

Using a light barrier

Passive activation of light sensor, e.g. by ambient light

Making use of reflection

Having more than one emitter

Having more than one receiver

Optical multi axis

Increasing reliability, fail-safe

Proximity switches

Using a magnetic detector

Detection of ferromagnetic and non-magnetic conductive targets

Ferromagnetic case

Negative resistance, e.g. LC inductive proximity switches

Involving transponders

Touch switches

Using acoustic waves, e.g. ultrasound

By reflection

With propagation, SAW or BAW

Constructional details for touch switches

(For capacitive touch switches see H03K 2217/9607)

Using conductive paint

Details of electro-mechanic connections between different elements, e.g.: sensing plate and integrated circuit containing electronics

Piezoelectric snap spring

Combination of touch switch and LC display

By temperature detection, i.e. body heat

Inductive touch switches

Mechanical, e.g. by displacement of a body, a shielding element, or a magnet, in or out of the sensing area

With human activation, e.g. processes requiring or being triggered by human intervention, user-input of digital word or analog voltage

Automatic threshold calibration; e.g. threshold automatically adapts to ambient conditions or follows variation of input

Calibration involving digital processing

Multiple detection, i.e. where different switching signals are generated after operation of the user is detected at different time instants at different locations during the actuation movement by two or more sensors of the same or different kinds

Means for reducing energy consumption

Cascode connected switches

With evaluation of actuation pattern or sequence, e.g. tapping

Rotary switches

With optical detection

With magnetic detection

With capacitive detection

With acoustic detection

Transmission of parameters among sensors or between sensor and remote station

Wireless transmission

Wired transmission, e.g. via bus connection or similar

Using an optical detector

Characterised by the type of activation

Using a light barrier

Detection of ferromagnetic and non-magnetic conductive targets

Ferromagnetic case

Negative resistance, e.g. LC inductive proximity switches

Involving transponders

Touch switches

Using acoustic waves, e.g. ultrasound

By reflection

With propagation, SAW or BAW

Constructional details for touch switches

(Details of shielding arrangements see H03K 2217/9607)

Using conductive paint

Details of electro-mechanic connections between different elements, e.g.: sensing plate and integrated circuit containing electronics

Piezoelectric snap spring

Combination of touch switch and LC display

By temperature detection, i.e. body heat

Inductive touch switches

Key-pad combined with display, back-lit

Detection of leakage or discharge current across the touching body to ground

Double function: touch detection combined with detection of a movable element

Fail-safe touch switches, where switching takes place only after repeated touch

With tactile or haptic feedback

Thumbnails, potentiometer, scrollbar or slider simulation by touch switch

Capacitive touch switches

Safety of capacitive touch and proximity switches, e.g. increasing reliability, fail-safe

Characterised by the detection principle

Re-timing; e.g. measurement of variation of charge time or discharge time of the sensor

Phase comparison, i.e. where a phase comparator receives at one input the signal directly from the oscillator, at a second input the same signal but delayed, with a delay depending on a sensing capacitance

Charge-transfer

Amplitude comparison

Characterised by circuit details

Switched capacitor

Capacitive differential; e.g. comparison with reference capacitance

Involving bridge circuit

Constructional details of capacitive touch and proximity switches

With spring electrode

Details of shielding arrangements

Comprising an electrode which is floating

Emitter-receiver or "fringe" type detection, i.e. one or more field emitting electrodes and corresponding one or more receiving electrodes

Sensor being a wire or a strip, e.g. used in automobile door handles or bumpers

With illumination

Using a single or more light guides

Using organic light emitting devices, e.g. light emitting polymer [OEP] or OLED

Switches controlled by moving an element forming part of the switch

The moving element acting on a force, e.g. pressure sensitive element

With illumination

Using a single or more light guides

Using organic light emitting devices, e.g. light emitting polymer [OEP] or OLED

Safety, e.g. fail-safe switching requiring a sequence of movements