# CPC - COOPERATIVE PATENT CLASSIFICATION

**H** ELECTRICITY (NOTE omitted)

**H03** BASIC ELECTRONIC CIRCUITRY

**H03B** GENERATION OF OSCILLATIONS, DIRECTLY OR BY FREQUENCY-CHANGING, BY CIRCUITS EMPLOYING ACTIVE ELEMENTS WHICH OPERATE IN A NON-SWITCHING MANNER; GENERATION OF NOISE BY SUCH CIRCUITS (measuring, testing G01R; generators adapted for electrophonic musical instruments G10H; Speech synthesis G10L; masers, lasers H01S; dynamo-electric machines H02K; power inverter circuits H02M; by using pulse techniques H03K; automatic control of generators H03L; starting, synchronisation or stabilisation of generators where the type of generator is irrelevant or unspecified H03L; generation of oscillations in plasma H05H)

**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.

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### Generation of oscillations using amplifier with regenerative feedback from output to input

| 5/00 | |
| 5/02 | Details |
| 5/04 | Modifications of generator to compensate for variations in physical values, e.g. power supply, load, temperature |
| 5/06 | Modifications of generator to ensure starting of oscillations |
| 5/08 | with frequency-determining element comprising lumped inductance and capacitance |
| 5/10 | active element in amplifier being vacuum tube (H03B 5/14 takes precedence) |
| 5/12 | active element in amplifier being semiconductor device (H03B 5/14 takes precedence) |
| 5/1203 | the amplifier being a single transistor |
| 5/1206 | using multiple transistors for amplification |
| 5/1209 | the amplifier having two current paths operating in a differential manner and a current source or degeneration circuit in common to both paths, e.g. a long-tailed pair. (H03B 5/1215 takes precedence) |
| 5/1212 | the amplifier comprising a pair of transistors, wherein an output terminal of each being connected to an input terminal of the other, e.g. a cross coupled pair |
| 5/1215 | the current source or degeneration circuit being in common to both transistors of the pair, e.g. a cross-coupled long-tailed pair |
| 5/1218 | the generator being of the balanced type |
| 5/1221 | the amplifier comprising multiple amplification stages connected in cascade |

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| 5/1225 | the generator comprising multiple amplifiers connected in parallel |
| 5/1228 | the amplifier comprising one or more field effect transistors |
| 5/1231 | the amplifier comprising one or more bipolar transistors |
| 5/1234 | and comprising means for varying the output amplitude of the generator (H03B 5/1278 takes precedence) |
| 5/1237 | comprising means for varying the frequency of the generator |
| 5/124 | the means comprising a voltage dependent capacitance |
| 5/1243 | the means comprising voltage variable capacitance diodes |
| 5/1246 | the means comprising transistors used to provide a variable capacitance |
| 5/125 | the transistors being bipolar transistors |
| 5/1253 | the transistors being field-effect transistors |
| 5/1256 | the means comprising a variable inductance |
| 5/1259 | the means comprising a variable active inductor, e.g. gyrator circuits |
| 5/1262 | the means comprising switched elements |
| 5/1265 | switched capacitors |
| 5/1268 | switched inductors |
| 5/1271 | the frequency being controlled by a control current, i.e. current controlled oscillators |
| 5/1275 | having further means for varying a parameter in dependence on the frequency |
| 5/1278 | the parameter being an amplitude of a signal, e.g. maintaining a constant output amplitude over the frequency range |
| 5/1281 | the parameter being the amount of feedback |
active element in amplifier being semiconductor device

5/38 . . . frequency-determining element being connected via bridge circuit to closed ring around which signal is transmitted

5/40 . . . being a magnetostrictive resonator (H03B 5/42 takes precedence; selection of magneto-strictive material (H01F 1/00); H01L 41/00)

5/42 . . . frequency-determining element connected via bridge circuit to closed ring around which signal is transmitted

7/00 Generation of oscillations using active element having a negative resistance between two of its electrodes (H03B 9/00 takes precedence)

7/02 . . . with frequency-determining element comprising lumped inductance and capacitance

7/04 . . . active element being vacuum tube

7/06 . . . active element being semiconductor device

7/08 . . . being a tunnel diode

7/10 . . . active element being gas-discharge or arc-discharge tube

7/12 . . . with frequency-determining element comprising distributed inductance and capacitance

7/14 . . . active element being semiconductor device

7/143 . . . (and which comprises an element depending on a voltage or a magnetic field, e.g. varactor-YIG)

7/146 . . . (with several semiconductor devices)

9/00 Generation of oscillations using transit-time effects ([construction of tube and circuit arrangements not adapted to a particular application H01L; construction of the semiconductor devices H01L])

9/01 . . . using discharge tubes

9/02 . . . using a retarding-field tube (using klystrons H03B 9/04)

9/04 . . . using a klystron
Generation of oscillations by combining unmodulated signals of different frequencies (H03B 19/00 takes precedence; frequency changing circuits in general H03D)

- by beating unmodulated signals of different frequencies

- by plural beating, i.e. for frequency synthesis (Beat in combination with multiplication or division of frequency (digital frequency synthesis using a ROM G06F 1/02; digital frequency synthesis in general H03K; indirect frequency synthesis using a PLL H03L 7/16))

- by repeated mixing in combination with division of frequency only

- using several similar stages

Generation of oscillations periodically swept over a predetermined frequency range (angle-modulating circuits in general H03C 3/00)

Simultaneous generation by a free-running oscillator of oscillations having different frequencies

Generation of oscillations providing a plurality of outputs of the same frequency but differing in phase, other than merely two anti-phase outputs

Generation of oscillations by methods not covered by groups H03B 5/00 - H03B 27/00, including modification of the waveform to produce sinusoidal oscillations (analogue function generators for performing computing operations G06G 7/26; use of transformers for conversion of waveform in ac-ac converters H02M 5/18)

Generation of noise currents and voltages (gas-filled discharge tubes with solid cathode specially adapted as noise generators H01J 17/005)

Indexing scheme relating to details of oscillators covered by H03B

- Types of oscillators
- Butler oscillator
- Clapp oscillator
- Colpitts oscillator
- Hartley oscillator
- Pierce oscillator
- Structural aspects of oscillators
- including a ring, disk or loop shaped resonator
- relating to the cutting angle of a crystal, e.g. AT cut quartz
- making use of ceramic material
- characterised by the substrate, e.g. material
- including parallel striplines
- relating to the pins of integrated circuits
- based on a monolithic microwave integrated circuit (MMIC)
- Circuit elements of oscillators
- including a device with a Schottky junction
- including a buffer amplifier
- including an emitter or source coupled transistor pair or a long tail pair
- including a current mirror
Aspects of oscillators relating to varying the frequency of the oscillations

Varying the frequency of the oscillations by manual means
- the means being an element with a variable capacitance
- the means being an element with a variable inductance
- the means being associated with an element comprising distributed inductances and capacitances
- the element being a cavity
- the element being a dielectric resonator
- the means being a manual switch
- Varying the frequency of the oscillations by electronic means
- the means being an element with a variable capacitance, e.g. capacitance diode

Varying the frequency of the oscillations by manual
- the means being associated with an element comprising distributed inductances and capacitances
- the element being a cavity
- the element being a magnetically variable element, e.g. an Yttrium Iron Garnet
- the means being an electronic switch for switching in or out oscillator elements
- the means comprising a diode
- the means comprising a transistor
- the means delivering several selected voltages or currents
- the means functioning digitally
- and being controlled by a processing device, e.g. a microprocessor

Varying beside the frequency also another parameter of the oscillator in dependence on the frequency
- the parameter being the amplitude of a signal, e.g. maintaining a constant output amplitude over the frequency range
- the parameter being the amount of feedback
- the parameter being another frequency, e.g. a harmonic of the oscillating frequency
- the parameter being the quality factor of a resonator
- the parameter being a bias voltage or a power supply

Aspects of oscillators relating to reduction of undesired oscillations

Reduction of undesired oscillations originated from distortion in one of the circuit elements of the oscillator
- the circuit element being the active device
- the circuit element being a limiter
- the circuit element being a frequency determining element

Reduction of undesired oscillations originated from natural noise of the circuit elements of the oscillator
- the noise being essentially white noise, i.e. frequency independent noise
- the noise being coloured noise, i.e. frequency dependent noise

Reduction of undesired oscillations originated from internal parasitic couplings, i.e. parasitic couplings within the oscillator itself

Reduction of undesired oscillations originated from outside noise or interferences, e.g. from parasitic couplings with circuit elements outside the oscillator
- the circuit element belonging to the power supply
- the circuit element belonging to transmitter circuitry
- the circuit element belonging to receiver circuitry
- the circuit element being a frequency divider

Reduction of undesired oscillations through filtering
- the means being an element with a variable inductance
- the means being associated with an element comprising distributed inductances and capacitances
- the element being a cavity
- the element being a magnetically variable element, e.g. an Yttrium Iron Garnet

Reduction of undesired oscillations originated from parasitic couplings with circuit elements outside the oscillator
- the circuit element belonging to the power supply
- the circuit element belonging to transmitter circuitry
- the circuit element belonging to receiver circuitry
- the circuit element being a frequency divider

Reduction of undesired oscillations through filtering or through special resonator characteristics
Reduction of undesired oscillations through modification of a bias voltage, e.g. selecting the operation point of an active device.

Reduction of undesired oscillations through a cancelling of the undesired oscillation.

By modifying the internal feedback of the oscillator.

By using a feedback loop external to the oscillator, e.g. the so-called noise degeneration.

Reduction of undesired oscillations originated from the oscillator in circuit elements external to the oscillator by means associated with the oscillator.

By avoiding coupling between these circuit elements.

Through shielding.

Through a frequency dependent coupling, e.g. which attenuates a certain frequency range.

By compensating through additional couplings with these circuit elements.