H03L

AUTOMATIC CONTROL, STARTING, SYNCHRONISATION OR STABILISATION OF GENERATORS OF ELECTRONIC OSCILLATIONS OR PULSES (generation of oscillations H03B)

Definition statement

This place covers:

Automatic control circuits for generators of electronic oscillations or pulses; starting, synchronization, or stabilization circuits for generators where the type of generator is irrelevant or unspecified.

References

Limiting references

This place does not cover:

Generation of oscillations	H03B

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control or regulation of electric motors, electric generators or dynamo-electric converters; Controlling transformers, reactors or choke coils	H02P
Pulse technique	H03K

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

automatic control	covers only closed loop systems

H03L 1/00

Stabilisation of generator output against variations of physical values, e.g. power supply

Definition statement

This place covers:

Stabilisation of generator output against variations caused by environmental variations such as temperature, process variations when the generator is (partly) integrated on an electronic chip, aging of the components constituting the generator.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Against variations of temperature only	H03L 1/02
Automatic control	H03L 5/00, H03L 7/00

Modifications of generator, of oscillations using amplifier with regenerative feedback from output to input, to compensate for variations in physical values.	H03B 5/04
Modifications of generator, for generating electric pulses, to compensate for variations in physical values.	H03K 3/011

Special rules of classification

Documents disclosing compensation against temperature variations and against another physical parameter are classified in the subgroup H03L 1/02 in addition to H03L 1/00.

H03L 1/021

{of generators comprising distributed capacitance and inductance}

Definition statement

This place covers:

Said distributed capacitances and inductances could be also delay lines, microstrips, and the like.

H03L 1/023

{by using voltage variable capacitance diodes}

Definition statement

This place covers:

All devices having a variable capacitance e.g. Junction capacitors, MOS-capacitors, and the like.

H03L 1/04

Constructional details for maintaining temperature constant

Definition statement

This place covers:

also ovens for maintaining temperature constant

H03L 5/00

Automatic control of voltage, current, or power

Definition statement

This place covers:

Arrangements for automatic controlling the output level/amplitude of the generator. The output of the generator could be a voltage, current or power.

Special rules of classification

Control of voltage, current or power wherein the generators are not generators for electronic oscillations or pulses, e.g. level shifts, power management, power supply regulators, automatic transmission power control, are not classified in H03L.

H03L 5/02

of power

Definition statement

This place covers:

Arrangements for automatic controlling the output power level of the generator.

H03L 7/00

Automatic control of frequency or phase; Synchronisation

Definition statement

This place covers:

- Automatic control of the frequency or phase of the output of the generator;
- Synchronisation.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Tuning of resonant circuits in general	H03J
Synchronising in digital communication systems, see the relevant groups in class	H04

H03L 7/02

using a frequency discriminator comprising a passive frequency-determining element

Definition statement

This place covers:

All means for converting the frequency to any of voltage, current or digital signal e.g. frequency-to-voltage converter, frequency-to-current converter, frequency-to-digital converter.

H03L 7/04

wherein the frequency-determining element comprises distributed inductance and capacitance

Definition statement

This place covers:

Distributed capacitances and inductances could be also delay lines, microstrips, and the like.

H03L 7/06

using a reference signal applied to a frequency- or phase-locked loop

Definition statement

This place covers:

The reference signal is a frequency reference signal including constant frequency signal, data signal, and the like.

References

Limiting references

This place does not cover:

Modulation signal (e.g. US2008032649)	H03C 3/0908
Modulated signal (e.g. US5625319)	H03D 3/241

H03L 7/07

using several loops, e.g. for redundant clock signal generation

Definition statement

This place covers:

Using several loops, each loop having each its own controlled oscillator and/or phase shifter.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Using at least two phase detectors or a frequency and phase detector in the loop	H03L 7/087
Indirect frequency synthesis using more than one loop	H03L 7/22

H03L 7/0802

{the loop being adapted for reducing power consumption (H03L 7/14 takes precedence)}

Definition statement

This place covers:

the "loop" meaning a Phase-locked loop (PLL) or a Delay-locked loop (DLL).

H03L 7/0807

{concerning mainly a recovery circuit for the reference signal}

Definition statement

This place covers:

Recovery circuit for recovering the reference signal from the input signal, e.g. data signal.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Synchronisation of receiver with transmitter using the transitions of the received signal to control the phase of the synchronising-signal-generating means, e.g. using a phase-locked loop	H04L 7/033

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

DCR	data/clock recovery
CDR	clock/data recovery

H03L 7/081

provided with an additional controlled phase shifter {(H03L 7/0998 takes precedence)}

Definition statement

This place covers:

Controlled phase shifter in the loop e.g. delay element, phase selector, phase interpolator, and the like.

Special rules of classification

This subgroup does not include additional phase shifter outside the loop e.g. in the reference path or in the output path.

H03L 7/0812

{and where no voltage or current controlled oscillator is used}

Definition statement

This place covers:

Delay-locked loops.

H03L 7/0814

{the phase shifting device being digitally controlled}

Definition statement

This place covers:

Controlled phase shifter which is digitally controlled e.g. by a register and/or an up-down counter.

H03L 7/083

the reference signal being additionally directly applied to the generator

Definition statement

This place covers:

Reference signal being additionally directly applied to the controlled oscillator in the loop.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Direct frequency synchronisation without loop	H03L 7/24

H03L 7/085

concerning mainly the frequency- or phase-detection arrangement including the filtering or amplification of its output signal (H03L 7/10 takes precedence; circuits for comparing the phase or frequency of two mutually-independent oscillations H03D 13/00)

Definition statement

This place covers:

- Frequency or phase detectors generating an up-down output pulse signal at a single terminal, e.g. an EXOR gate.
- Frequency or phase detectors comprising a time-to-digital converter (TDC).

References

Limiting references

This place does not cover:

Details of the phase-locked loop for assuring initial synchronisation or for broadening the capture range	H03L 7/10
Circuits for comparing the phase or frequency of two mutually-independent oscillations	H03D 13/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Demodulation of angle-modulated oscillations	H03D 3/00

H03L 7/089

the phase or frequency detector generating up-down pulses (H03L 7/087 takes precedence)

Definition statement

This place covers:

Phase or frequency detector generating up-down pulses at separate terminals of the detector.

H03L 7/0893

{the up-down pulses controlling at least two source current generators or at least two sink current generators connected to different points in the loop}

Definition statement

This place covers:

The up-down pulses being generated by the same phase or frequency detector.

H03L 7/0898

{the source or sink current values being variable (H03L 7/0896 takes precedence)}

Definition statement

This place covers:

Means for adjusting or tuning the value of the source or sink current.

the phase or frequency detector using a sampling device (H03L 7/087 takes precedence)

H03L 7/091

the phase or frequency detector using a sampling device (H03L 7/087 takes precedence)

Definition statement

This place covers:

Phase or frequency detectors comprising sampling devices such as flip-flops, A/D converters, or the like.

H03L 7/093

using special filtering or amplification characteristics in the loop (H03L 7/087 - H03L 7/091 take precedence)

Definition statement

This place covers:

Loop filtering, amplification, or any other manipulation of the signal provided by the phase/frequency detector which results in a control signal for the controlled oscillator of the loop.

H03L 7/095

using a lock detector (H03L 7/087 takes precedence)

Definition statement

This place covers:

Details of the lock detector.

Special rules of classification

Lock detectors without any detailed features. The lock detectors without detailed features are classified in other subgroups according to the purpose/use of the said lock detector.

H03L 7/097

using a comparator for comparing the voltages obtained from two frequency to voltage converters

Definition statement

This place covers:

Frequency to voltage converters converting the frequency of the reference signal and the frequency of the feedback signal to a voltage, current or digital signal. The voltage, current or digital signal is used by the comparator.

H03L 7/0991

{the oscillator being a digital oscillator, e.g. composed of a fixed oscillator followed by a variable frequency divider (H03L 7/0995 takes precedence; fixed oscillators with means for selecting among various phases H03L 7/0814)}

Definition statement

This place covers:

Digital oscillators which are analogly or digitally controlled.

References

Limiting references

This place does not cover:

Analog oscillators which are digitally or numerically controlled (DCO, NCO)	H03L 7/099

H03L 7/0992

{comprising a counter or a frequency divider}

Definition statement

This place covers:

Counter or frequency divider being part of the controlled digital oscillator.

References

Limiting references

This place does not cover:

Counters or frequency dividers which are part of the feedback path or output path outside the loop.	H03L 7/18

H03L 7/0994

{comprising an accumulator}

Definition statement

This place covers:

Digital oscillators comprising an accumulator e.g. Direct Digital Synthesizers (DDS).

References

Limiting references

This place does not cover:

Direct Digital Synthesizers DDS per se, which are not part of a PLL.	G06F 1/0321

H03L 7/10

for assuring initial synchronisation or for broadening the capture range

Definition statement

This place covers:

Means for speeding up the lock-in of the loop in general.

H03L 7/107

using a variable transfer function for the loop, e.g. low pass filter having a variable bandwidth

Definition statement

This place covers:

Low pass loop filter having a variable bandwidth for the purpose of assuring synchronisation or broadening the capture range of the PLL.

References

Limiting references

This place does not cover:

Low pass loop filter having a variable bandwidth for other purposes.	H03L 7/093

H03L 7/12

using a scanning signal

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Tuning circuits with automatic scanning over a band of frequencies	H03J 7/18

H03L 7/14

for assuring constant frequency when supply or correction voltages fail

Definition statement

This place covers:

Arrangements and methods for assuring constant output frequency of the generator when the reference signal fails or is interrupted, or when the control signal of the controlled oscillator of the PLL or the controlled delay of the DLL fails or is interrupted.

Automatic control for assuring constant frequency when input or correction signals are interrupted.

H03L 7/185

using a mixer in the loop (H03L 7/187 - H03L 7/195 take precedence)

Definition statement

This place covers:

Mixer in addition to the frequency divider or counter.

References

Limiting references

This place does not cover:

Indirect frequency synthesis using means for coarse tuning the voltage-controlled oscillator of the loop	H03L 7/187
Indirect frequency synthesis using means for coarse tuning the voltage-controlled oscillator of the loop comprising a D/A converter for generating a coarse tuning voltage	H03L 7/189
Indirect frequency synthesis using at least two different signals from the frequency divider or the counter for determining the time difference	H03L 7/191
Indirect frequency synthesis using a frequency divider/counter comprising a commutable pre-divider, e.g. a two modulus divider	H03L 7/193
Indirect frequency synthesis using a frequency divider or counter in the loop in which the counter of the loop counts between two different non zero numbers, e.g. for generating an offset frequency	H03L 7/195

Informative references

Attention is drawn to the following places, which may be of interest for search:

Mixer without a frequency divider or counter	H03L 2207/12

H03L 7/187

using means for coarse tuning the voltage controlled oscillator of the loop (H03L 7/191 - H03L 7/195 take precedence)

References

Limiting references

This place does not cover:

Indirect frequency synthesis using at least two different signals from the frequency divider or the counter for determining the time difference	H03L 7/191
Indirect frequency synthesis using a frequency divider/counter comprising a commutable pre-divider, e.g. a two modulus divider	H03L 7/193
Indirect frequency synthesis using a frequency divider or counter in the loop in which the counter of the loop counts between two different non zero numbers, e.g. for generating an offset frequency	H03L 7/195

Special rules of classification

When the means for coarse tuning the controlled oscillator is not specific for frequency synthesizers, the document would be (additionally) classified in the subgroup H03L 7/10.

H03L 7/191

using at least two different signals from the frequency divider or the counter for determining the time difference (H03L 7/193, H03L 7/195 take precedence)

Definition statement

This place covers:

At least two different signals generated by the frequency divider or the counter or derived from frequency divider or counter output are used by the phase/frequency detector.

H03L 7/193

the frequency divider/counter comprising a commutable pre-divider, e.g. a two modulus divider

Definition statement

This place covers:

Also multi-modulus dividers.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of pulse counters or frequency dividers	H03K 21/00
Pulse counters comprising counting chains; Frequency dividers comprising counting chains	H03K 23/00
Pulse counters with step-by-step integration and static storage; Analogous frequency dividers	H03K 25/00
Pulse counters in which pulses are continuously circulated in a closed loop; Analogous frequency dividers	H03K 27/00
Pulse counters comprising multi-stable elements, e.g. for ternary scale, for decimal scale; Analogous frequency dividers	H03K 29/00

H03L 7/195

in which the counter of the loop counts between two different non zero numbers, e.g. for generating an offset frequency (H03L 7/193 takes precedence)

References

Limiting references

This place does not cover:

Indirect frequency synthesis using a frequency divider or counter comprising a commutable pre-divider, e.g. a two modulus divider	H03L 7/193

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of pulse counters or frequency dividers	H03K 21/00
Pulse counters comprising counting chains; Frequency dividers comprising counting chains	H03K 23/00
Pulse counters with step-by-step integration and static storage; Analogous frequency dividers	H03K 25/00
Pulse counters in which pulses are continuously circulated in a closed loop; Analogous frequency dividers	H03K 27/00
Pulse counters comprising multi-stable elements, e.g. for ternary scale, for decimal scale; Analogous frequency dividers	H03K 29/00

H03L 7/1976

{using a phase accumulator for controlling the counter or frequency divider}

Definition statement

This place covers:

Also Delta-Sigma modulators used for controlling the counter or frequency divider.

H03L 7/22

using more than one loop

Definition statement

This place covers:

More than loop having each its own controlled oscillator and/or phase shifter.

References

Limiting references

This place does not cover:

More than loop sharing a controlled oscillator and/or phase shifter with or without use of a switching means.	H03L 7/087

H03L 7/24

using a reference signal directly applied to the generator

Definition statement

This place covers:

Also, injection-locked oscillators, oscillator arrays, mutually-coupled oscillators.

H03L 7/26

using energy levels of molecules, atoms, or subatomic particles as a frequency reference

Definition statement

This place covers:

Also, atomic clocks.