

H03C

MODULATION (masers or lasers [H01S](#); coding, decoding or code conversion [H03M](#))

Definition statement

This place covers:

- Modulation, keying, or interruption of sinusoidal oscillations or electromagnetic waves, the modulating signal having any desired waveform.
- Amplitude modulation
- Angle modulation
- Amplitude and angle modulation produced simultaneously or at will by the same modulating signal
- Modulating electromagnetic waves

In this subclass, modulation is a process of applying information onto a sinusoidal carrier.

Relationships with other classification places

Transference of modulation from one carrier to the other and frequency changing is classified in [H03D 7/00](#). Frequency changers used to convert from baseband may, where appropriate, additionally be classified in [H03C](#).

[H03C](#) is used to classify modulators essentially at circuit level, e.g. transistor level. Higher level aspects, e.g. transmitters or transmission systems, particularly where the modulator type is only a black box or of a standard configuration, are generally classified in [H04B](#), [H04L](#) or with the specific application. In general, Demodulation is covered in [H03D](#). However, circuits usable both as modulator and demodulator are covered by [H03C](#).

References

Limiting references

This place does not cover:

Masers or lasers	H01S
Coding, decoding or code conversion	H03M

Informative references

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

Measuring, testing	G01R
Transference of modulation from one carrier to another and frequency changing	H03D 7/00
Amplifiers	H03F
Modulators specially adapted for use in dc amplifiers	H03F 3/38
Pulse Technique, , e.g. modulating non-sinusoidal oscillations	H03K
Modulating pulses	H03K 7/00
So-called modulators capable only of switching between predetermined states of amplitude, frequency or phase	H03K 17/00
Transmission	H04B

Details of transmission systems, e.g. suppression of noise and interference	H04B 1/00
Monitoring and testing arrangements for transmission systems	H04B 17/00
Transmission of digital information	H04L
Modulated carrier transmission systems for digital information	H04L 27/00
Synchronous modulators specially adapted for colour television	H04N 9/65

Special rules of classification

- Circuits usable both as modulator and demodulator are classified in [H03C](#).
- Quite frequently, an exclusive group assignment of documents to amplitude modulation ([H03C 1/00](#)) or angle modulation ([H03C 3/00](#)) is not feasible (and/or not given within the document). In these cases, the best match with a subgroup definition in either or both groups is decisive.
- Cases concerning a type of modulation that effects neither amplitude nor angle modulation, e.g. waveform modulation, should be classified in [H03C 99/00](#).

H03C 1/00

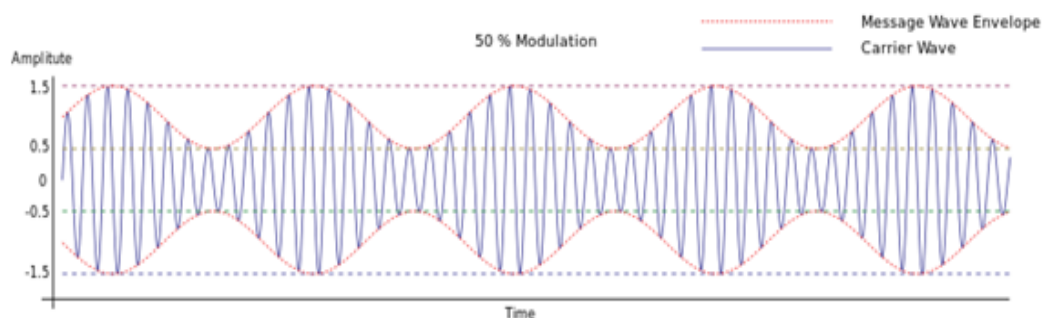
Amplitude modulation ([H03C 5/00](#), [H03C 7/00](#) take precedence)

Definition statement

This place covers:

Circuits and methods usable for modulation of a sinusoidal electromagnetic carrier wave whereby its amplitude is modified according to a modulating signal with frequency lower than that of the carrier. The modulating signal can be digital, resulting e.g. in Amplitude Shift Keying, or analog (see the example below).

Example: Waveform of amplitude modulated carrier wave



- Means in, or combined with, modulating stage for reducing angle modulation
- Reduction of distortion in amplitude modulators
- Amplitude modulation by means of variable impedance
- Amplitude modulation by means of discharge devices
- Amplitude modulation by means of transit time tube
- Amplitude modulation by deflection of electron beam in discharge tubes
- Amplitude modulation by means of semiconductor devices having at least three electrodes, e.g. transistors
- Amplitude modulation by means of light sensitive elements, e.g. photo detectors
- Amplitude modulators with mechanically or acoustically driven parts
- Amplitude modulation by means of Hall effect devices

Definition statement

- Conversion of angle to amplitude modulation, e.g. by combining two phase shifted signals
- Amplitude modulation including suppression of carrier or one side-band
- Modulators in which amplitude of carrier component in output is dependent upon strength of modulation signal

Relationships with other classification places

While modulators modulating the angle as well as the amplitude of a signal are classified in [H03C 5/00](#), aspects of the amplitude modulation may still be classified in [H03C 1/00](#).

References

Limiting references

This place does not cover:

Amplitude modulation and angle modulation produced simultaneously or at will by the same modulating signal	H03C 5/00
Modulating electromagnetic waves	H03C 7/00

Informative references

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

Mixers per se	H03D 7/00
Balanced arrangements for transference of modulation from one carrier to another	H03D 7/14 , H03D 7/1425 , H03D 7/1441
Modifications of amplifiers to raise the efficiency, e.g. summing of phase-modulated signals	H03F 1/02
Summing of phase-modulated signals	H03F 1/0294
Automatic control of gain	H03G
Pulse amplitude modulation	H03K 7/02
Details of transmission systems	H04B 1/00
Modulated carrier transmission systems including digital amplitude modulation circuits	H04L 27/02

Special rules of classification

Documents should in general be classified in all subgroups which apply, e.g. a single sideband modulator may, in addition to [H03C 1/60](#), be classified in [H03C 1/36](#), if it is a transistor type.

Glossary of terms

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

by means of	The actual amplitude modulation is performed by these "means". It does not mean that such "means" are merely present in the circuit but fulfilling another purpose.
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Synonyms and Keywords

In patent documents, the following abbreviations are often used:

AM	Amplitude Modulation
SSB	single side band

DSB SC	Double side band suppressed carrier
VSB	vestigial side band

H03C 1/08

by means of variable impedance element ([H03C 1/28](#) - [H03C 1/34](#),
[H03C 1/46](#) - [H03C 1/52](#), [H03C 1/62](#) take precedence)

References

Limiting references

This place does not cover:

Amplitude Modulation by means of transit-time tube	H03C 1/28
Amplitude Modulation by means of a magnetron	H03C 1/30
Amplitude Modulation by deflection of electron beam in discharge tube	H03C 1/32
Amplitude Modulation by means of light-sensitive element	H03C 1/34
Amplitude Modulators with mechanically or acoustically driven parts	H03C 1/46
Amplitude Modulation by means of Hall-effect devices	H03C 1/48
Amplitude Modulation by converting angle modulation to amplitude modulation	H03C 1/50
Amplitude Modulators in which carrier or one side-band are wholly or partially suppressed	H03C 1/52
Amplitude Modulators in which amplitude of carrier component in output is dependent upon strength of modulating signal, e.g. no carrier output when no modulating signal is present	H03C 1/62

H03C 1/16

by means of discharge device having at least three electrodes
([H03C 1/28](#) - [H03C 1/34](#), [H03C 1/50](#), [H03C 1/52](#), [H03C 1/62](#) take precedence)

References

Limiting references

This place does not cover:

Amplitude Modulation by means of transit-time tube	H03C 1/28
Amplitude Modulation by means of a magnetron	H03C 1/30
Amplitude Modulation by deflection of electron beam in discharge tube	H03C 1/32
Amplitude Modulation by means of light-sensitive element	H03C 1/34
Amplitude Modulation by converting angle modulation to amplitude modulation	H03C 1/50
Amplitude Modulators in which carrier or one side-band are wholly or partially suppressed	H03C 1/52
Amplitude Modulators in which amplitude of carrier component in output is dependent upon strength of modulating signal, e.g. no carrier output when no modulating signal is present	H03C 1/62

H03C 1/36

by means of semiconductor device having at least three electrodes ([H03C 1/34](#), [H03C 1/50](#), [H03C 1/52](#), [H03C 1/62](#) take precedence)

References

Limiting references

This place does not cover:

Amplitude Modulation by means of light-sensitive element	H03C 1/34
Amplitude Modulation by converting angle modulation to amplitude modulation	H03C 1/50
Amplitude Modulators in which carrier or one side-band are wholly or partially suppressed	H03C 1/52
Amplitude Modulators in which amplitude of carrier component in output is dependent upon strength of modulating signal, e.g. no carrier output when no modulating signal is present	H03C 1/62

H03C 1/50

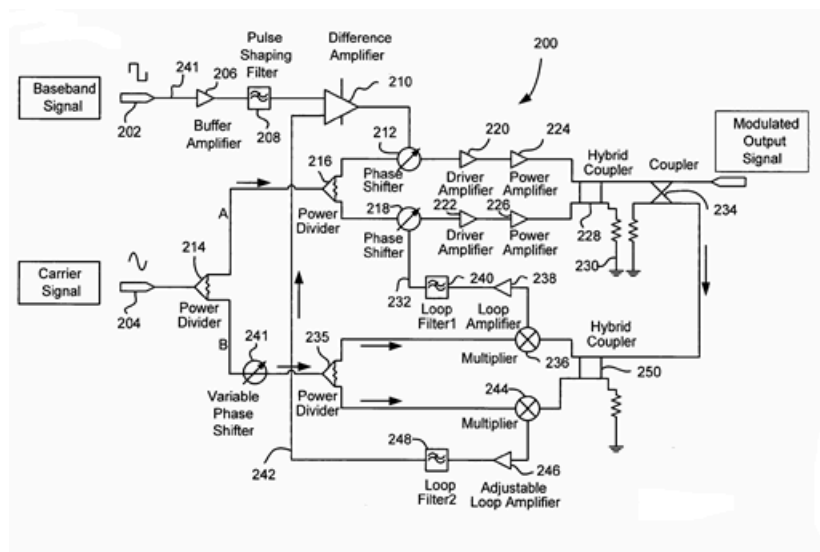
by converting angle modulation to amplitude modulation
([H03C 1/28](#) - [H03C 1/34](#), [H03C 1/46](#), [H03C 1/48](#) take precedence)

Definition statement

This place covers:

- Generation of an amplitude modulated signal by combining phase modulated signals
- Out-phasing modulators

Example:



Conversion of angle modulation (212) in amplitude modulation (228).

References

Limiting references

This place does not cover:

Amplitude Modulation by means of transit-time tube	H03C 1/28
Amplitude Modulation by means of a magnetron	H03C 1/30
Amplitude Modulation by deflection of electron beam in discharge tube	H03C 1/32
Amplitude Modulation by means of light-sensitive element	H03C 1/34
Amplitude Modulators with mechanically or acoustically driven parts	H03C 1/46
Amplitude Modulation by means of Hall-effect devices	H03C 1/48

H03C 1/52

Modulators in which carrier or one sideband is wholly or partially suppressed
([H03C 1/28](#) - [H03C 1/34](#), [H03C 1/46](#), [H03C 1/48](#) take precedence)

References

Limiting references

This place does not cover:

Amplitude Modulation by means of transit-time tube	H03C 1/28
Amplitude Modulation by means of a magnetron	H03C 1/30
Amplitude Modulation by deflection of electron beam in discharge tube	H03C 1/32
Amplitude Modulation by means of light-sensitive element	H03C 1/34
Amplitude Modulators with mechanically or acoustically driven parts	H03C 1/46
Amplitude Modulation by means of Hall-effect devices	H03C 1/48

H03C 1/547

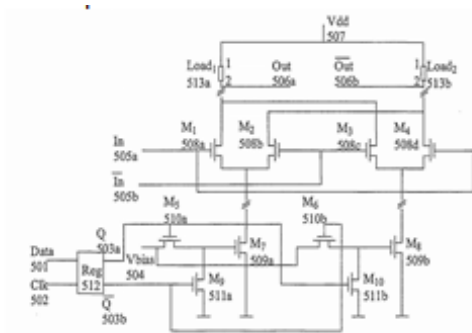
{using field-effect transistors}

Definition statement

This place covers:

Carrier suppression in a double balanced modulator using field effect transistors.

Example:



H03C 1/62

Modulators in which amplitude of carrier component in output is dependent upon strength of modulating signal, e.g. no carrier output when no modulating signal is present ([H03C 1/28](#) - [H03C 1/34](#), [H03C 1/46](#), [H03C 1/48](#) take precedence)

References

Limiting references

This place does not cover:

Amplitude Modulation by means of transit-time tube	H03C 1/28
Amplitude Modulation by means of a magnetron	H03C 1/30
Amplitude Modulation by deflection of electron beam in discharge tube	H03C 1/32
Amplitude Modulation by means of light-sensitive element	H03C 1/34
Amplitude Modulators with mechanically or acoustically driven parts	H03C 1/46
Amplitude Modulation by means of Hall-effect devices	H03C 1/48

H03C 3/00

Angle modulation ([H03C 5/00](#), [H03C 7/00](#) take precedence)

Definition statement

This place covers:

- Circuits and methods usable for angle, i.e. frequency and/or phase modulation
- Means in, or combined with, modulating stage for reducing amplitude modulation
- Linearization of angle modulators
- PLL modulators and other modulators with regulation of mean frequency
- Angle modulation by variation of reactance
- Angle modulation by variation of resistance
- Angle modulation by variation of impedance driven mechanically or acoustically
- Angle modulation using transit-time or discharge tubes
- Angle modulation using light-sensitive elements
- Conversion of amplitude modulation to angle modulation, e.g. using quadrature modulators
- Angle modulation using electromechanical devices

Relationships with other classification places

While modulators modulating the angle as well as the amplitude of a signal are classified in [H03C 5/00](#), aspects of the angle modulation may still be classified in [H03C 3/00](#).

References

Limiting references

This place does not cover:

Amplitude modulation and angle modulation produced simultaneously or at will by the same modulating signal	H03C 5/00
Modulating electromagnetic waves	H03C 7/00

Informative references

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

Generation of oscillations including frequency tuning	H03B
Mixers per se	H03D 7/00
Reduction of nonlinear distortion in amplifiers (particularly regarding H03C 3/406 and H03C 5/00)	H03F 1/32
Tuning of resonant circuits	H03J
Pulse/frequency modulators	H03K 7/04 , H03K 7/06
PLLs and other frequency regulation arrangements in general	H03L 7/00
PLL with fractional dividers	H03L 7/1974
Transmitters and details of transmission	H04B 1/00
Modulated carrier transmission systems including digital phase or frequency modulation circuits	H04L 27/10 , H04L 27/18

Glossary of terms

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

FM	Frequency Modulation
PLL	Phase Locked Loop
VCO	Voltage Controlled Oscillator
by means of	The actual amplitude modulation is performed by these "means". It does not mean that such "means" are merely present in the circuit but fulfilling another purpose.

H03C 3/06**Means for changing frequency deviation****Definition statement**

This place covers:

Means for modifying the frequency modulation characteristics, e.g. the frequency range or bandwidth or the sensitivity of frequency deviation with respect to the modulating signal.

References**Informative references**

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

Demodulation of angle-modulated oscillations	H03D 3/00
Arrangements for reducing frequency deviation, e.g. by negative frequency feedback	H03D 3/003
Details by means of a variable resistive element, e.g. tube	H03D 3/24
The oscillator combined with means for controlling the frequency of a further oscillator, e.g. for negative frequency feedback	H03D 3/242

H03C 3/09

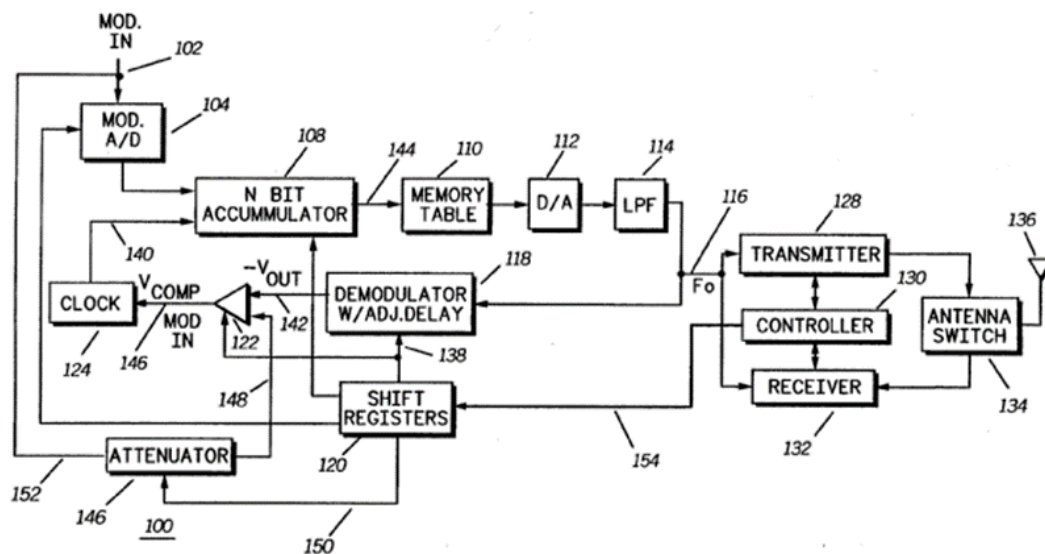
Modifications of modulator for regulating the mean frequency

Definition statement

This place covers:

Modifications of angle modulators for regulating the mean frequency, e.g. by using feedback techniques to reduce jitter and spurious output frequencies in direct synthesisers with a modulation output.

Example:



Regulation of mean frequency in a modulator without PLL, using a demodulator in the feedback path

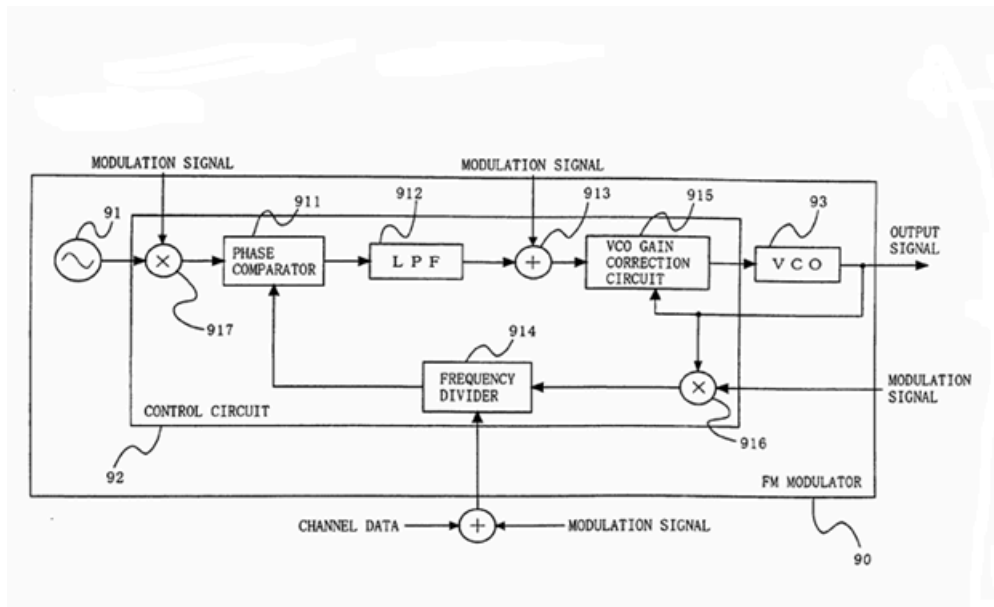
H03C 3/0908

{using a phase locked loop}

Definition statement

This place covers:

Example:



Regulation of mean frequency in a modulator with PLL, using three point modulation ([H03C 3/0941](#)) in divider ([H03C 3/0925](#)), reference clock ([H03C 3/0966](#)) and in front of the VCO ([H03C 3/095](#)) and at a mixer ([H03C 3/0983](#)).

References

Informative references

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

PLL with frequency divider/counter in general	H03L 7/18
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H03C 3/0933

{using fractional frequency division in the feedback loop of the phase locked loop}

References

Informative references

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

PLL synthesisers with fractional dividers	H03L 7/1974
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H03C 3/10

by means of variable impedance ([H03C 3/30](#) - [H03C 3/38](#) take precedence)

Definition statement

This place covers:

Circuits or methods using an element with variable impedance for angle modulation.

References**Limiting references**

This place does not cover:

Angle modulation by means of transit-time tube	H03C 3/30
Angle modulation the tube being a magnetron	H03C 3/32
Angle modulation by deflection of electron beam in discharge tube	H03C 3/34
Angle modulation by means of light-sensitive element	H03C 3/36
Conversion of amplitude to angle modulation	H03C 3/38

H03C 3/222

{using bipolar transistors ([H03C 3/227](#) takes precedence)}

References**Limiting references**

This place does not cover:

Using a combination of bipolar transistors and field effect transistors	H03C 3/227
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H03C 3/225

{using field effect transistors ([H03C 3/227](#) takes precedence)}

References**Limiting references**

This place does not cover:

Using a combination of bipolar transistors and field effect transistors	H03C 3/227
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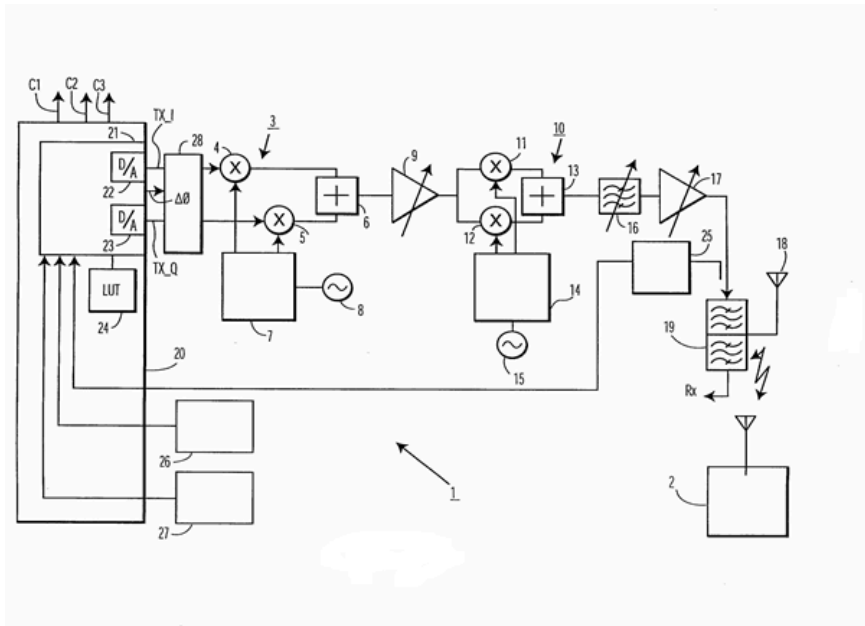
H03C 3/403

{using two quadrature frequency conversion stages in cascade}

Definition statement

This place covers:

Example:



Conversion of amplitude modulation by using two quadrature frequency conversion stages in cascade (4, 5 and 11, 12)

H03C 3/42

by means of electromechanical devices ([H03C 3/28](#) takes precedence)

References

Limiting references

This place does not cover:

Angle modulation using variable impedance driven mechanically or acoustically	H03C 3/28
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H03C 5/00

Amplitude modulation and angle modulation produced simultaneously or at will by the same modulating signal ([H03C 7/00](#) takes precedence)

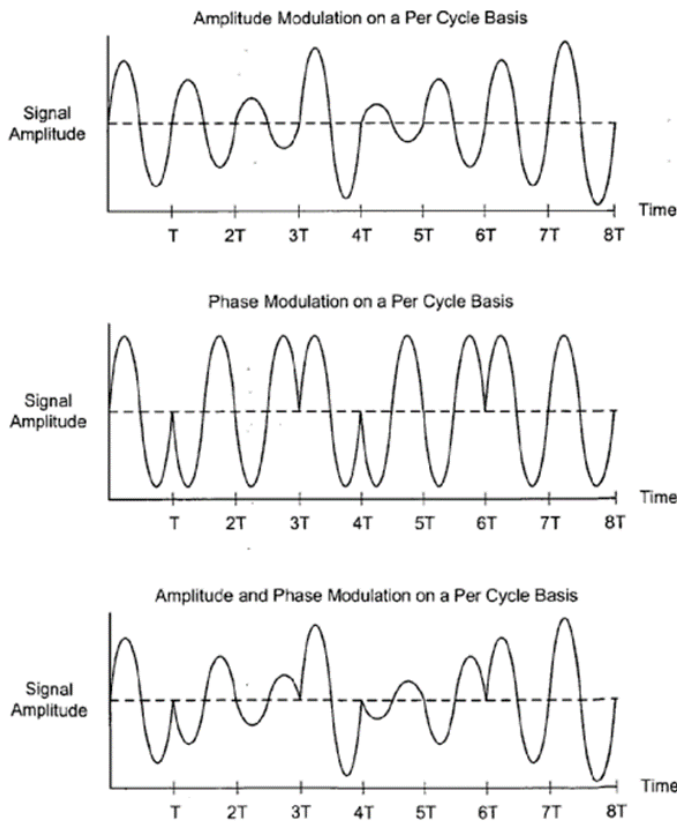
Definition statement

This place covers:

- Circuits selectable between FM and AM modulation
- Polar or phase-amplitude modulation by means of transistor circuits
- Polar or phase-amplitude modulation by means of transit time tubes

Definition statement

Example:



Polar modulation resulting in simultaneous amplitude and phase modulation.

References

Limiting references

This place does not cover:

Modulating electromagnetic waves	H03C 7/00
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Informative references

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

Conversion of angle to amplitude modulation	H03C 1/50
Conversion of amplitude to angle modulation	H03C 3/38
Modifications of amplifiers to raise the efficiency of amplifying modulated radio frequency waves in discharge-tube amplifiers; to raise the efficiency of amplifiers acting also as modulators in discharge-tube amplifiers	H03F 1/06
Phase-modulated carrier systems	H04L 27/18
Amplitude- and phase-modulated carrier systems, e.g. quadrature-amplitude modulated carrier systems	H04L 27/34

Glossary of terms

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

"by the same modulating signal"	also includes the common case where the modulation signal is split into two components
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H03C 7/00

Modulating electromagnetic waves (devices or arrangements for the modulation of light [G02F 1/00](#))

Definition statement

This place covers:

- Modulation of electromagnetic waves, e.g. microwaves
- Modulation of electromagnetic waves in transmission lines, waveguides, cavity resonators or radiation field of antennas.

References

Limiting references

This place does not cover:

Devices or arrangements for modulating light	G02F 1/00
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Informative references

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

Generation of oscillations, directly or by frequency-changing	H03B
Pulse Technique, e.g. modulating non-sinusoidal oscillations	H03K

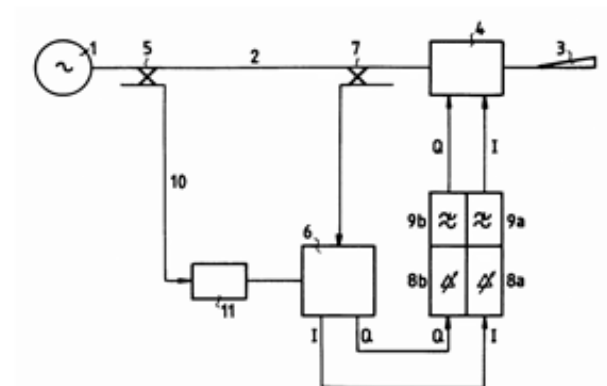
H03C 7/025

{using semiconductor devices}

Definition statement

This place covers:

Example:



Microwave modulator using transmission line (2), vector modulator (4) and quadrature detector (6).

H03C 7/04

Polarisation of transmitted wave being modulated {(H03C 7/022 takes precedence)}

References

Limiting references

This place does not cover:

Using ferromagnetic devices, e.g. ferrites	H03C 7/022
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H03C 99/00

Subject matter not provided for in other groups of this subclass

Definition statement

This place covers:

Modulation, keying, or interruption of sinusoidal oscillations or electromagnetic waves not covered by other groups of this subclass.

H03C 2200/00

Indexing scheme relating to details of modulators or modulation methods covered by H03C

Definition statement

This place covers:

- Particular circuit elements of modulators
- Functional aspects of modulators