

CPC**COOPERATIVE PATENT CLASSIFICATION****H03D****DEMODULATION OR TRANSFERENCE OF MODULATION FROM ONE CARRIER TO ANOTHER** (masers, lasers [H01S](#); circuits capable

of acting both as modulator and demodulator [H03C](#); details applicable to both modulators and frequency-changers [H03C](#); demodulating pulses [H03K 9/00](#); transforming types of pulse modulation [H03K 11/00](#); coding, decoding or code conversion, in general [H03M](#); repeater stations [H04B 7/14](#); demodulators adapted for ac systems of digital information transmission [H04L 27/00](#); synchronous demodulators adapted for colour television [H04N 9/66](#))

NOTE

This subclass covers only:

- demodulation or transference of signals modulated on a sinusoidal carrier or on electromagnetic waves;
- comparing phase or frequency of two mutually-independent oscillations.

H03D 1/00

Demodulation of amplitude-modulated oscillations ([H03D 5/00](#), [H03D 9/00](#), [H03D 11/00](#) take precedence)

H03D 1/02

. Details

H03D 1/04

.. Modifications of demodulators to reduce interference by undesired signals

H03D 1/06

.. Modifications of demodulators to reduce distortion, e.g. by negative feedback

H03D 1/08

. by means of non-linear two-pole elements ([H03D 1/22](#), [H03D 1/26](#), [H03D 1/28](#) take precedence)

H03D 1/10

.. of diodes

H03D 1/12

... with provision for equalising ac and dc loads

H03D 1/14

. by means of non-linear elements having more than two poles ([H03D 1/22](#), [H03D 1/26](#), [H03D 1/28](#) take precedence)

H03D 1/16

.. of discharge tubes

H03D 1/18

.. of semiconductor devices

H03D 1/20

.. with provision for preventing undesired type of demodulation, e.g. preventing anode detection in a grid detection circuit

H03D 1/22

. Homodyne or synchrodyne circuits {(receiver circuits [H04B 1/30](#))}

H03D 1/2209

.. {Decoders for simultaneous demodulation and decoding of signals composed of a sum-signal and a suppressed carrier, amplitude modulated by a difference signal, e.g. stereocoders}

H03D 1/2218

... {using diodes for the decoding}

H03D 1/2227

... {using switches for the decoding (diodes used as switches [H03D 1/2218](#))}

H03D 1/2236

... {using a phase locked loop}

H03D 1/2245

.. {using two quadrature channels ([H03D 1/2209](#) takes precedence)}

H03D 1/2254

... {and a phase locked loop}

H03D 2001/2263

.... {including a counter or a divider in the PLL}

H03D 1/2272

.. {using FET's ([H03D 1/2209](#), [H03D 1/2245](#) and [H03D 1/2281](#) take precedence)}

- H03D 1/2281 . . {using a phase locked loop ([H03D 1/2236](#) and [H03D 1/2254](#) take precedence)}
- H03D 1/229 . . {using at least a two emitter-coupled differential pair of transistors ([H03D 1/2209](#) to [H03D 1/2281](#) take precedence)}
- H03D 1/24 . . for demodulation of signals wherein one sideband or the carrier has been wholly or partially suppressed {(receiver circuits [H04B 1/302](#))}
- H03D 1/26 . by means of transit-time tubes
- H03D 1/28 . by deflecting an electron beam in a discharge tube ([H03D 1/26](#) takes precedence)

- H03D 3/00** **Demodulation of angle-, {frequency- or phase-} modulated oscillations**
([H03D 5/00](#), [H03D 9/00](#), [H03D 11/00](#) take precedence)
- H03D 3/001 . {Details of arrangements applicable to more than one type of frequency demodulator ([H03D 3/28](#) takes precedence)}
- H03D 3/002 . . {Modifications of demodulators to reduce interference by undesired signals ([H03D 3/248](#) takes precedence)}
- H03D 3/003 . . {Arrangements for reducing frequency deviation, e.g. by negative frequency feedback (combined with a phase locked loop demodulator [H03D 3/242](#); changing frequency deviation for modulators [H03C 3/06](#))}
- H03D 3/004 . . . {wherein the demodulated signal is used for controlling an oscillator, e.g. the local oscillator}
- H03D 3/005 . . . {wherein the demodulated signal is used for controlling a bandpass filter (automatic bandwidth control [H03G](#); automatic frequency control [H03J 7/02](#))}
- H03D 3/006 . {by sampling the oscillations and further processing the samples, e.g. by computing techniques ([H03D 3/007](#) takes precedence)}
- H03D 3/007 . {by converting the oscillations into two quadrature related signals ([H03D 3/245](#) takes precedence)}
- H03D 3/008 . . {Compensating DC offsets}
- H03D 3/009 . . {Compensating quadrature phase or amplitude imbalances}
- H03D 3/02 . by detecting phase difference between two signals obtained from input signal ([H03D 3/28](#) to [H03D 3/32](#) take precedence; {muting in frequency-modulation receivers [H03G 3/28](#); limiting arrangements [H03G 11/00](#))}
- H03D 3/04 . . by counting or integrating cycles of oscillations {(arrangements for measuring frequencies [G01R 23/10](#))}
- H03D 3/06 . . by combining signals additively or in product demodulators
- H03D 3/08 . . . by means of diodes, e.g. Foster-Seeley discriminator
- H03D 3/10 in which the diodes are simultaneously conducting during the same half period of the signal, e.g. radio detector
- H03D 3/12 . . . by means of discharge tubes having more than two electrodes
- H03D 3/14 . . . by means of semiconductor devices having more than two electrodes
- H03D 3/16 . . . by means of electromechanical resonators
- H03D 3/18 . . by means of synchronous gating arrangements
- H03D 3/20 . . . producing pulses whose amplitude or duration depends on phase difference
- H03D 3/22 . . by means of active elements with more than two electrodes to which two signals are applied derived from the signal to be demodulated and having a phase difference related to the frequency deviation, e.g. phase detector
- H03D 3/24 . . Modifications of demodulators to reject or remove amplitude variations by means of locked-in oscillator circuits

- H03D 3/241 . . . {the oscillator being part of a phase locked loop}
- H03D 3/242 {combined with means for controlling the frequency of a further oscillator, e.g. for negative frequency feedback or AFC}
- H03D 3/244 {combined with means for obtaining automatic gain control}
- H03D 3/245 {using at least twophase detectors in the loop ([H03D 3/244](#) takes precedence; in general [H03L 7/087](#))}
- H03D 3/247 {using a controlled phase shifter (in general [H03L 7/081](#))}
- H03D 3/248 {with means for eliminating interfering signals, e.g. by multiple phase locked loops ([multiple loops](#) in general [H03L 7/07](#), [H03L 7/22](#))}
- H03D 3/26 . by means of sloping amplitude/frequency characteristic of tuned or reactive circuit ([H03D 3/28](#) to [H03D 3/32](#) takes precedence)
- H03D 3/28 . Modifications of demodulators to reduce effects of temperature variations ({[automatic frequency regulation in receivers H03J](#)}; [automatic frequency control H03L](#))
- H03D 3/30 . by means of transit-time tubes
- H03D 3/32 . by deflecting an electron beam in a discharge tube ([H03D 3/30](#) takes precedence)
- H03D 3/34 . by means of electromechanical devices ([H03D 3/16](#) takes precedence)

H03D 5/00 **Circuits for demodulating amplitude-modulated or angle-modulated oscillations at will** ([H03D 9/00](#), [H03D 11/00](#) take precedence)

H03D 7/00 **Transference of modulation from one carrier to another, e.g. frequency-changing** ([H03D 9/00](#), [H03D 11/00](#) take precedence; dielectric amplifiers, magnetic amplifiers, parametric amplifiers used as a frequency-changers [H03F](#))

- H03D 7/005 . {by means of superconductive devices}
- H03D 7/02 . by means of diodes ([H03D 7/14](#) to [H03D 7/22](#) take precedence)
- H03D 7/04 . . having {a partially} negative resistance characteristic, e.g. tunnel diode
- H03D 7/06 . by means of discharge tubes having more than two electrodes ([H03D 7/14](#) to [H03D 7/22](#) take precedence)
- H03D 7/08 . . the signals to be mixed being applied between the same two electrodes
- H03D 7/10 . . the signals to be mixed being applied between different pairs of electrodes
- H03D 7/12 . by means of semiconductor devices having more than two electrodes ([H03D 7/14](#) to [H03D 7/22](#) take precedence)
- H03D 7/125 . . {with field effect transistors}
- H03D 7/14 . Balanced arrangements
- H03D 7/1408 . . {with diodes}
- H03D 7/1416 . . {with discharge tubes having more than two electrodes}
- H03D 7/1425 . . {with transistors}

WARNING

Subgroups [H03D 7/1433](#) to [H03D 7/1491](#) are incomplete pending reclassification; see also this group and its other subgroups

- H03D 7/1433 . . . {using bipolar transistors ([H03D 7/145](#) takes precedence)}
- H03D 7/1441 . . . {using field-effect transistors ([H03D 7/145](#) takes precedence)}
- H03D 7/145 . . . {using a combination of bipolar transistors and field-effect transistors}

- H03D 7/1458 . . . {Double balanced arrangements, i.e. where both input signals are differential}
- H03D 7/1466 . . . {Passive mixer arrangements}
- H03D 7/1475 . . . {Subharmonic mixer arrangements}
- H03D 7/1483 . . . {comprising components for selecting a particular frequency component of the output}
- H03D 7/1491 . . . {Arrangements to linearise a transconductance stage of a mixer arrangement}
- H03D 7/16 . . Multiple-frequency-changing
 - H03D 7/161 . . {all the frequency changers being connected in cascade}
 - H03D 7/163 . . . {the local oscillations of at least two of the frequency changers being derived from a single oscillator}
 - H03D 7/165 . . {at least two frequency changers being located in different paths, e.g. in two paths with carriers in quadrature (combined with amplitude demodulation [H03D 1/2245](#), combined with angle demodulation [H03D 3/007](#); N-path filters [H03H 19/002](#))}
 - H03D 7/166 . . . {using two or more quadrature frequency translation stages}
 - H03D 7/168 {using a feedback loop containing mixers or demodulators}
 - H03D 7/18 . . Modifications of frequency-changers for eliminating image frequencies {(H03D 7/16 takes precedence)}
 - H03D 7/20 . . by means of transit-time tubes
 - H03D 7/22 . . by deflecting an electron beam in a discharge tube ([H03D 7/20](#) takes precedence)

H03D 9/00**Demodulation or transference of modulation of modulated electromagnetic waves (demodulating light, transferring modulation in light waves [G02F 2/00](#))**

- H03D 9/02 . . Demodulation using distributed inductance and capacitance, e.g. in feeder lines
- H03D 9/04 . . for angle-modulated oscillations
- H03D 9/06 . . Transference of modulation using distributed inductance and capacitance
 - H03D 9/0608 . . {by means of diodes}
 - H03D 9/0616 . . . {mounted in a hollow waveguide ([H03D 9/0641](#) takes precedence)}
 - H03D 9/0625 . . . {mounted in a coaxial resonator structure}
 - H03D 9/0633 . . . {mounted on a stripline circuit}
 - H03D 9/0641 {located in a hollow waveguide}
 - H03D 9/065 . . {by means of discharge tubes having more than two electrodes}
 - H03D 9/0658 . . {by means of semiconductor devices having more than two electrodes}
 - H03D 9/0666 . . . {using bipolar transistors ([H03D 9/0683](#) takes precedence)}
 - H03D 9/0675 . . . {using field effect transistors ([H03D 9/0683](#) takes precedence)}
 - H03D 9/0683 . . . {using a combination of bipolar transistors and field effect transistors}
 - H03D 2009/0691 . . {by means of superconductive devices}

H03D 11/00**Super-regenerative demodulator circuits {(applications in responders [G01S](#))}**

- H03D 11/02 . . for amplitude-modulated oscillations
- H03D 11/04 . . by means of semiconductor devices having more than two electrodes
- H03D 11/06 . . for angle-modulated oscillations
- H03D 11/08 . . by means of semiconductor devices having more than two electrodes

H03D 13/00	Circuits for comparing the phase or frequency of two mutually-independant oscillations {(measuring phase G01R 25/00 ; phase-discriminators with yes/no output G01R 25/005)}
H03D 13/001	. {in which a pulse counter is used followed by a conversion into an analog signal}
H03D 13/002	.. {the counter being an up-down counter}
H03D 13/003	. {in which both oscillations are converted by logic means into pulses which are applied to filtering or integrating means}
H03D 13/004	.. {the logic means delivering pulses at more than one terminal, e.g. up and down pulses}
H03D 13/005	. {in which one of the oscillations is, or is converted into, a signal having a special waveform, e.g. triangular}
H03D 13/006	.. {and by sampling this signal by narrow pulses obtained from the second oscillation}
H03D 13/007	. {by analog multiplication of the oscillations or by performing a similar analog operation on the oscillations}
H03D 13/008	.. {using transistors}
H03D 13/009	.. {using diodes}
H03D 99/00	Subject matter not provided for in other groups of this subclass
H03D 2200/00	Indexing scheme relating to details of demodulation or transference of modulation from one carrier to another covered by H03D
H03D 2200/0001	. Circuit elements of demodulators
H03D 2200/0003	.. Rat race couplers
H03D 2200/0005	.. Wilkinson power dividers or combiners
H03D 2200/0007	.. Dual gate field effect transistors
H03D 2200/0009	.. Emitter or source coupled transistor pairs or long tail pairs
H03D 2200/0011	.. Diodes
H03D 2200/0013	... Diodes connected in a ring configuration
H03D 2200/0015	... Diodes connected in a star configuration
H03D 2200/0017	.. Intermediate frequency filter
H03D 2200/0019	.. Gilbert multipliers
H03D 2200/0021	.. Frequency multipliers
H03D 2200/0023	.. Balun circuits
H03D 2200/0025	.. Gain control circuits
H03D 2200/0027	... including arrangements for assuring the same gain in two paths
H03D 2200/0029	.. Loop circuits with controlled phase shift
H03D 2200/0031	.. PLL circuits with quadrature locking, e.g. a Costas loop
H03D 2200/0033	.. Current mirrors
H03D 2200/0035	.. Digital multipliers and adders used for detection
H03D 2200/0037	.. Diplexers
H03D 2200/0039	.. Exclusive OR logic circuits
H03D 2200/0041	. Functional aspects of demodulators

H03D 2200/0043	..	Bias and operating point
H03D 2200/0045	..	Calibration of demodulators
H03D 2200/0047	..	Offset of DC voltage or frequency
H03D 2200/0049	..	Analog multiplication for detection
H03D 2200/005	..	Analog to digital conversion
H03D 2200/0052	..	Digital to analog conversion
H03D 2200/0054	..	Digital filters
H03D 2200/0056	...	including a digital decimation filter
H03D 2200/0058	...	using a digital filter with interpolation
H03D 2200/006	..	Signal sampling
H03D 2200/0062	...	Computation of input samples, e.g. successive samples
H03D 2200/0064	..	Detection of passages through null of a signal
H03D 2200/0066	..	Mixing
H03D 2200/0068	...	by computation
H03D 2200/007	...	by using a logic circuit, e.g. flipflop, XOR
H03D 2200/0072	...	by complex multiplication
H03D 2200/0074	...	using a resistive mixer or a passive mixer
H03D 2200/0076	...	using a distributed mixer
H03D 2200/0078	...	using a switched phase shifter or delay line
H03D 2200/008	..	Hilbert type transformation
H03D 2200/0082	..	Quadrature arrangements
H03D 2200/0084	..	Lowering the supply voltage and saving power
H03D 2200/0086	..	Reduction or prevention of harmonic frequencies
H03D 2200/0088	..	Reduction of intermodulation, nonlinearities, adjacent channel interference; intercept points of harmonics or intermodulation products
H03D 2200/009	..	Reduction of local oscillator or RF leakage
H03D 2200/0092	..	Detection or reduction of fading in multipath transmission arrangements
H03D 2200/0094	..	Measures to address temperature induced variations of demodulation
H03D 2200/0096	...	by stabilising the temperature
H03D 2200/0098	...	by compensating temperature induced variations