

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