

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

H03D 7/1425
(continued)

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