

## H03G

### CONTROL OF AMPLIFICATION

#### Definition statement

*This place covers:*

- Control of gain of amplifiers or frequency-changers
- Control of frequency range of amplifiers
- Limiting amplitude or rate of change of amplitude

#### References

##### Informative references

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

Amplifiers	<a href="#">H03F</a>
Impedance networks, e.g. attenuators	<a href="#">H03H</a>
Control of transmission in lines	<a href="#">H04B 3/04</a>

## H03G 1/00

### Details of arrangements for controlling amplification

#### Definition statement

*This place covers:*

Details of gain control loops. The invention can be found in the details. This is opposite to control systems in which the total system, including the loop, is the invention.

#### References

##### Informative references

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

Cascode amplifiers	<a href="#">H03F 1/22</a>
Differential amplifiers	<a href="#">H03F 3/45</a>
Resistor networks	<a href="#">H03H 7/24</a>

#### Special rules of classification

For arrangements combined with means for generating a controlling signal, or these means per se, see other main groups of [H03G](#).

## H03G 1/0023

{in emitter-coupled or cascode amplifiers ([H03G 1/0029](#) takes precedence)}

#### Definition statement

*This place covers:*

This is an important subgroup, including the emitter-coupled or cascode amplifiers. In these amplifiers, the gain is changed by e.g. a controlled resistor between coupled emitters.

**H03G 1/0029****{using field-effect transistors [FET]}****Definition statement***This place covers:*

The subgroup [H03G 1/0029](#) takes precedence and includes the same structures as [H03G 1/0023](#), but uses FETs instead of bipolar transistors.

**H03G 1/0035****{using continuously variable impedance elements}****Definition statement***This place covers:*

This subgroup includes continuously variable elements that change the gain in a continuous manner. The control signal is an analogue signal.

**H03G 1/0088****{using discontinuously variable devices, e.g. switch-operated}****Definition statement***This place covers:*

This subgroup includes discontinuously variable elements that change the gain. Discontinuously variable elements change the gain stepwise.

Often a digital signal controls the gain.

**H03G 1/02****Remote control of amplification, tone or bandwidth (combined with remote tuning or selection of resonant circuits [H03J](#))****References****Limiting references***This place does not cover:*

Remote control combined with remote tuning or selection of resonant circuits	<a href="#">H03J</a>
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**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Remote control in general	<a href="#">G05</a> , <a href="#">G08</a>
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## H03G 3/00

### Gain control in amplifiers or frequency changers

#### Definition statement

*This place covers:*

The gain of amplifiers or frequency changers is controlled without distortion of the input signal. The main concept of controlling is the feedback loop from the output of the amplifier to a controlling element. Other gain control concepts are possible.

#### References

##### Informative references

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

Amplitude control for seismic recording	<a href="#">G01V 1/24</a>
Modifications of amplifiers to reduce non-linear distortion	<a href="#">H03F 1/32</a>
Gated amplifiers	<a href="#">H03F 3/72</a>
Details of transmission systems for providing a predistortion of the signal in the transmitter and corresponding correction in the receiver	<a href="#">H04B 1/62</a> , <a href="#">H04B 1/64</a>
Arrangements for compensation undesirable properties of the transmission path between the modulator and demodulator using predistortion	<a href="#">H04L 27/367</a> , <a href="#">H04L 27/368</a>
Speech amplifiers in telephones	<a href="#">H04M 1/60</a>
Gain control peculiar to television receivers	<a href="#">H04N</a>
Details of television systems, automatic gain control in receiver circuitry of TVs	<a href="#">H04N 5/52</a>
Hearing aids	<a href="#">H04R 25/00</a>
Transmission Power control, power saving or power classes	<a href="#">H04W 52/00</a>

## H03G 3/001

### {Digital control of analog signals}

#### Definition statement

*This place covers:*

This subgroup includes important details of the digital domain used for controlling an analogue signal; e.g. multiplying DACs.

## H03G 3/002

### {Control of digital or coded signals ([H03G 3/3089](#) take precedence)}

#### Definition statement

*This place covers:*

In this subgroup, mathematical methods in the digital domain are included. In this subgroup, either the control loop is not described in the description, or parts of the amplifier are very detailed.

## H03G 3/02

**Manually-operated control** ({[H03G 3/001](#) and [H03G 3/002](#) take precedence})

### Definition statement

*This place covers:*

In this subgroup, the amplification is manually controlled; e.g. buttons or sliders are included to be used by a person

## H03G 3/20

**Automatic control** ({[H03G 3/005](#) takes precedence;}) combined with volume compression or expansion [H03G 7/00](#))

### Definition statement

*This place covers:*

The gain control in amplifiers when the control is performed with an automatic system. The main automatic concept for controlling is the feedback loop from the output of the amplifier to a controlling element.

### References

#### Limiting references

*This place does not cover:*

Control by a pilot signal	<a href="#">H03G 3/005</a>
Combined with volume compression or expansion	<a href="#">H03G 7/00</a>

### Special rules of classification

The subject matter should be classified in the subgroups [H03G 3/22](#)–[H03G 3/348](#) as appropriate.

## H03G 3/30

**in amplifiers having semiconductor devices**

### Definition statement

*This place covers:*

This is a heading subgroup for the further automatic control subgroups having semiconductor devices.

This group is also used when the amplifiers are not further described and either presented in functional blocks or just obviously have semiconductor devices. Most systems are classified in the following classes

**H03G 3/3005**

{in amplifiers suitable for low-frequencies, e.g. audio amplifiers ([H03G 3/32](#), [H03G 3/34](#) take precedence)}

**Definition statement**

*This place covers:*

In this subgroup, analogue and digital audio systems are included. Digital audio systems should additionally be classified in [H03G 3/3089](#).

**H03G 3/3036**

{in high-frequency amplifiers or in frequency-changers ([H03G 3/3052](#), [H03G 3/32](#), [H03G 3/34](#) take precedence)}

**Definition statement**

*This place covers:*

This subgroup specially includes AGCs in high frequency amplifiers e.g., pre amplifiers

If the AGC is used in transmitters or if the AGC is used in power amplifiers, they are classified in the following sub groups.

**H03G 3/3042**

{in modulators, frequency-changers, transmitters or power amplifiers}

**Definition statement**

*This place covers:*

In this subgroup many examples of controlling the gain in amplifiers in transmitters e.g. in base stations, mobile phones, WLAN, and power amplifiers are included .

**References****Informative references**

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

Transmission power control in bidirectional transmission systems	<a href="#">H04W 52/04</a>
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**H03G 3/3047**

{for intermittent signals, e.g. burst signals}

**Definition statement**

*This place covers:*

Circuits to control the burst of the transmission signal. In this subgroup many examples for controlling amplifiers in transmitters e.g. in base stations, mobile phones, WLAN, and power amplifiers are included.

This subgroup is used if the burst is important for controlling the amplification.

**H03G 3/3052**

**{in bandpass amplifiers (H.F. or I.F.) or in frequency-changers used in a (super)heterodyne receiver ([H03G 3/32](#), [H03G 3/34](#) take precedence)}**

**Definition statement**

*This place covers:*

This subgroup is a heading subgroup for controlling the amplification of receivers and band pass amplifiers.

**H03G 3/3057**

**{using at least one diode as controlling device}**

**Definition statement**

*This place covers:*

This subgroup includes many amplifiers in RECEIVERS (mobile phones, WLAN....). This subgroup is used if especially a diode is important as controlling element.

**H03G 3/3063**

**{using at least one transistor as controlling device, the transistor being used as a variable impedance device}**

**Definition statement**

*This place covers:*

This subgroup includes many amplifiers in RECEIVERS (mobile phones, WLAN....). This subgroup is used if it is important that at least one transistor is used as controlling element.

**H03G 3/3068**

**{Circuits generating control signals for both R.F. and I.F. stages}**

**Definition statement**

*This place covers:*

This subgroup includes many amplifiers in RECEIVERS (mobile phones, WLAN....). This subgroup is used if both R.F. stages and I.F. stages are controlled.

**H03G 3/3073**

**{Circuits generating control signals when no carrier is present, or in SSB, CW or pulse receivers}**

**Definition statement**

*This place covers:*

This subgroup includes receivers. This subgroup is e.g. used if the pulse is important for controlling the gain.

## H03G 3/3078

**{Circuits generating control signals for digitally modulated signals}**

### Definition statement

*This place covers:*

This subgroup includes many amplifiers in RECEIVERS (mobile phones, WLAN....)

This subgroup includes most of the modern receivers, since they are based on digital modulation, e.g. OFDM.....

## H03G 3/3089

**{Control of digital or coded signals}**

### Definition statement

*This place covers:*

This subgroup includes many digital audio systems. Digital audio systems should additionally be classified in [H03G 3/3005](#) or attached sub groups.

This subgroup is also used for digital hf systems.

## H03G 3/32

**the control being dependent upon ambient noise level or sound level**

### Definition statement

*This place covers:*

This subgroup includes many audio systems, whereby the noise signal is important for controlling the volume. These systems are often used in cars.

## H03G 5/00

**Tone control or bandwidth control in amplifiers**

### Definition statement

*This place covers:*

This main group mainly consists of audio amplifiers. The characteristic of an audio signal is changed, so that the sound of the signal is changed. This is the function of tone control. The second possibility is bandwidth control, which includes also the control of high frequency bandwidth.

### References

#### Limiting references

*This place does not cover:*

Impedance networks, e.g. resonant circuits, resonators, frequency selective filters	<a href="#">H03H</a>
Control of transmission, equalising in line transmission systems	<a href="#">H04B 3/04</a>
Modulated carrier systems; equalisers for modulated carrier systems	<a href="#">H04L 27/01</a>

**Informative references**

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

Hearing aids	<a href="#">H04R 25/00</a>
Control circuits for electronic adaptation of the sound field	<a href="#">H04S 7/00</a>

**H03G 5/005**

**{of digital signals}**

**Definition statement**

*This place covers:*

Modern audio systems are mostly digital systems. This subgroup mainly includes the digital tone control systems.

**References****Informative references**

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

Tone control or bandwidth control in amplifiers	<a href="#">H03G 5/00</a>
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**Special rules of classification**

If the system is a digital audio system, it should be additionally classified into [H03G 5/16](#), [H03G 5/165](#) or [H03G 5/18](#).

**H03G 5/02**

**Manually-operated control**

**Definition statement**

*This place covers:*

This subgroup covers the manual operation of the tone control.

**References****Informative references**

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

Variable bandpass or bandstop filters	<a href="#">H03H 7/12</a>
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**H03G 5/16**

**Automatic control**

**Definition statement**

*This place covers:*

This subgroup brings the automatic feature to the tone control.



## H03G 5/165

**{Equalizers; Volume or gain control in limited frequency bands}**

### Definition statement

*This place covers:*

This subgroup contains equalizers. The audio signal is divided into different bands and the bands are treated separately. Digital audio equalizers should also be classified in [H03G 5/005](#)

## H03G 7/00

**Volume compression or expansion in amplifiers {(frequency dependent [H03G 9/025](#))}**

### Definition statement

*This place covers:*

This main group mainly consists of audio amplifiers.

The controlling is independent of frequency. This main group includes: soft limiting, soft clipping, logarithmic amplifiers, and includes also: gain control which is linear in dB, Dolby compression.

### References

#### Limiting references

*This place does not cover:*

Frequency-dependent volume compression or expansion	<a href="#">H03G 9/025</a>
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#### Informative references

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

Logarithmic function generators	<a href="#">G06G 7/24</a>
Hearing aids	<a href="#">H04R 25/00</a>

## H03G 7/001

**{without controlling loop ([H03G 7/007](#), [H03G 7/02](#), [H03G 7/06](#) take precedence)}**

### Definition statement

*This place covers:*

This subgroup includes also limiting amplifiers, logarithmic amplifiers (also high frequency amplifiers) . In this context the controlling loop from the output of the system to the amplifier is missing. This results in that no strong time delay is present in the controlling.

## H03G 7/002

{in untuned or low-frequency amplifiers, e.g. audio amplifiers ([H03G 7/007](#), [H03G 7/001](#), [H03G 7/008](#), [H03G 7/02](#), [H03G 7/06](#) take precedence)}

### Definition statement

*This place covers:*

This subgroup mainly consists of audio amplifiers.

The controlling is independent of frequency.

This subclass also includes systems, if the audio system is only presented in the application in the form of functional blocks.

If the system is a digital audio system it should be put into [H03G 7/002](#) and [H03G 7/007](#)

## H03G 7/007

{of digital or coded signals}

### Definition statement

*This place covers:*

Modern audio systems are mostly digital systems. This subgroup mainly includes the digital volume compression and expansion systems.

If the system is a digital audio system it should be put into [H03G 7/002](#) and [H03G 7/007](#)

## H03G 9/00

**Combinations of two or more types of control, e.g. gain control and tone control**

### Definition statement

*This place covers:*

This main group mainly consists of audio amplifiers. At least two types of controlling are combined into one invention.

### References

#### Informative references

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

Hearing aids	<a href="#">H04R 25/00</a>
Control circuits for the electronic adaptation of the sound field	<a href="#">H04S 7/00</a>

**H03G 9/005****{of digital or coded signals}****Definition statement***This place covers:*

Modern audio systems are mostly digital systems. This subgroup includes the digital systems in which at least two types of controlling are combined into one invention.

This subgroup contains many psycho-acoustic systems.

**H03G 9/02****in untuned amplifiers****Definition statement***This place covers:*

This subgroup mainly consists of audio amplifiers. At least two types of controlling are combined into one invention.

This subclass also includes applications, where the audio system is only presented in the application in the form of functional blocks.

**References****Informative references**

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

Combined tone controls for low and high frequencies	<a href="#">H03G 5/00</a>
Volume compression or expansion in amplifiers	<a href="#">H03G 7/00</a>

**H03G 9/025**

**{frequency-dependent volume compression or expansion, e.g. multiple-band systems ([H03G 9/10](#), [H03G 9/18](#) take precedence)}**

**Definition statement***This place covers:*

This sub group mainly consists of audio amplifiers. This subgroup contains frequency-dependent volume compression or expansion.

This subclass also includes applications, where the audio system is only presented in the application in the form of functional blocks.

This subgroup includes many psycho-acoustic systems.

## H03G 9/26

in untuned amplifying stages as well as in frequency-selective amplifying stages

### References

#### Informative references

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

Gain control in untuned amplifying stages as well as in frequency-selective amplifying stages	<a href="#">H03G 3/00</a>
Tone control or bandwidth control	<a href="#">H03G 5/00</a>
Volume compression or expansion in amplifiers	<a href="#">H03G 7/00</a>

## H03G 11/00

Limiting amplitude; Limiting rate of change of amplitude

### Definition statement

*This place covers:*

This main group covers clipping systems, where the clipping covered by this group is defined to include a hard cut. Compression is when the amplitude of a signal is limited using soft clipping. Compression and soft clipping are classified in [H03G 7/00](#).

### References

#### Informative references

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

Volume/level/amplitude compression/soft clipping	<a href="#">H03G 7/00</a>
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## H03G 11/002

{without controlling loop ([H03G 11/004](#), [H03G 11/006](#), [H03G 11/008](#), [H03G 11/02](#), [H03G 11/04](#), [H03G 11/06](#), [H03G 11/08](#) take precedence)}

### Definition statement

*This place covers:*

This subgroup includes clipping systems without feedback loop. As no feedback loop is used, the systems have no delays, and no over swinging.

### References

#### Limiting references

*This place does not cover:*

Using discharge tubes	<a href="#">H03G 11/004</a>
In circuits having distributed constants	<a href="#">H03G 11/006</a>
Of digital or coded signals	<a href="#">H03G 11/008</a>
By means of diodes	<a href="#">H03G 11/02</a>

Limiting level dependent on strength of signal	<a href="#">H03G 11/04</a>
Limiters of angle-modulated signals	<a href="#">H03G 11/06</a>
Limiting rate of change of amplitude	<a href="#">H03G 11/08</a>

## H03G 11/004

{using discharge tubes ([H03G 11/008](#) takes precedence)}

### Definition statement

*This place covers:*

This subgroup includes inventions where a discharge or vacuum tube is the important element for clipping.

### References

#### Limiting references

*This place does not cover:*

Of digital or coded signals	<a href="#">H03G 11/008</a>
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## H03G 11/006

{in circuits having distributed constants ([H03G 11/008](#) takes precedence)}

### Definition statement

*This place covers:*

This subgroup includes inventions where circuit with a distributed constant, e.g. transmission line, is the important element for clipping.

### References

#### Limiting references

*This place does not cover:*

Of digital or coded signals	<a href="#">H03G 11/008</a>
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## H03G 11/008

{of digital or coded signals}

### Definition statement

*This place covers:*

Modern audio systems are mostly digital systems. This subgroup includes the digital systems which clip the audio signal in a hard way.

### References

#### Informative references

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

By means of diodes	<a href="#">H03G 11/02</a>
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**H03G 11/02**

by means of diodes ({[H03G 11/008](#), } [H03G 11/04](#), [H03G 11/06](#), [H03G 11/08](#) take precedence)

**Definition statement**

*This place covers:*

This subgroup includes inventions where the diode is the important element for clipping.

**H03G 11/04**

Limiting level dependent on strength of signal; Limiting level dependent on strength of carrier on which signal is modulated {([H03G 11/008](#) takes precedence)}

**Definition statement**

*This place covers:*

This subgroup includes inventions where the strength of a signal is the important factor to define the clipping level.

**References****Limiting references**

*This place does not cover:*

Of digital or coded signals	<a href="#">H03G 11/008</a>
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**H03G 11/06**

Limiters of angle-modulated signals; such limiters combined with discriminators (discriminators having an inherent limiting action [H03D 3/00](#))

**Definition statement**

*This place covers:*

This subgroup includes inventions where angle-modulated signals are limited.

**References****Limiting references**

*This place does not cover:*

Discriminators having an inherent limiting action	<a href="#">H03D 3/00</a>
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**H03G 11/08**

Limiting rate of change of amplitude {([H03G 11/008](#) takes precedence)}

**Definition statement**

*This place covers:*

This subgroup includes inventions where the rate of change of a signal is limited.

## References

### Limiting references

*This place does not cover:*

Of digital or coded signals	<a href="#">H03G 11/008</a>
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## H03G 99/00

**Subject matter not provided for in other groups of this subclass**

### Definition statement

*This place covers:*

Control of amplification not covered elsewhere in [H03G](#).

[H03G 1/00](#) contains details of the arrangement for controlling.

[H03G 99/00](#) is defined to include applications which could not be placed in an other main /subgroup. This main group is mainly created for organizational reasons. Usually it should be empty.

## References

### References out of a residual place

*Examples of places in relation to which this place is residual:*

Details of arrangements for controlling amplification	<a href="#">H03G 1/00</a>
Gain control in amplifiers or frequency changers	<a href="#">H03G 3/00</a>
Tone control or bandwidth control in amplifiers	<a href="#">H03G 5/00</a>
Volume compression or expansion in amplifiers	<a href="#">H03G 7/00</a>
Combinations of two or more types of control, e.g. gain control and tone control	<a href="#">H03G 9/00</a>
Limiting amplitude; Limiting rate of change of amplitude	<a href="#">H03G 11/00</a>