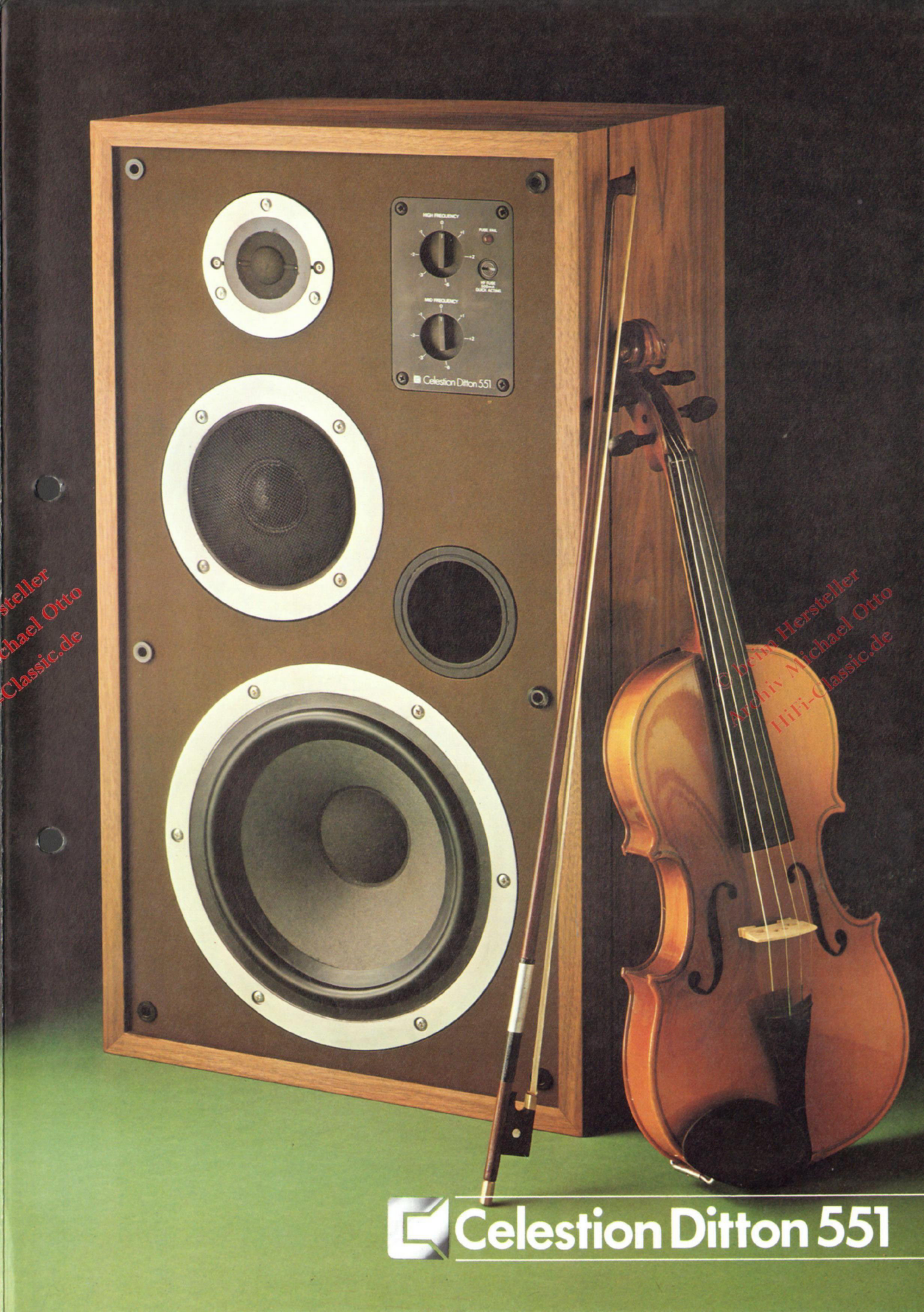


Celestion Ditton 551

Introduction

Ditton 551 from Celestion – a three way loudspeaker system capable of the highest standard of reproduction and offering a degree of flexibility enabling it to perform well with a wide range of programme material. The design features a vented box, which provides excellent extension of the low frequencies, while independent controls give the facility to boost or cut the midrange and treble frequencies. The treble unit is fuse protected to prevent damage in overload conditions.

Superbly finished enclosures with specially developed grille fabric will enhance the most elegant decor – should you wish to remove the grille, the front baffle and drive units are fully finished to give an attractive, professional appearance.

When used in pairs, asymmetrical positioning of the mid range and treble drive units on the front baffle of the Ditton 551 improves the directional characteristics of the loudspeakers. The Ditton 551 is capable of exemplary performance – in order to maximise the potential in your system however, we suggest that you read carefully the following paragraphs.

Amplifier Requirements

The basic requirement of an amplifier in any high fidelity system is that sufficient power be available for the loudspeaker to produce the necessary loudness in the listening room with minimal distortion, and without fear of causing loudspeaker damage. The final choice of amplifier power will depend on a number of variables, including the size and shape of the room and also the amount of soft furnishing and decor. As a guide, a recommended range of amplifier powers is given in the specifications.

An understanding of the two major causes of loudspeaker failure will assist in the selection of the most suitable amplifier. The two most common causes of failure due to misuse are described separately below but can occur together.

Mechanical

Each of the individual drive units in the system has been designed with a diaphragm capable of a given excursion, and damage can result if this is exceeded. For example in the bass unit this can occur if the bass and/or volume controls are used to excess, or the loudness control used at high listening levels. In these circumstances there will be a dramatic rise in audible distortion : such overload can be avoided by careful use of the amplifier controls.

In some cases subsonic signals, e.g., from a warped record, can cause excessive excursion of the bass unit and in this case the use of a low frequency (rumble) filter is recommended.

Thermal

Thermal failure is caused by overheating drive unit voice coils beyond their design capability. Such failure can be caused in treble units by using an amplifier with an inadequate power reserve, which can, if the volume control is used to excess cause the amplifier to 'clip' the output signal. This creates very large amounts of high frequency distortion which will cause overheating and failure. When such a condition occurs the high frequencies will sound distorted – this can be avoided by careful use of the amplifier controls. Bear in mind that it is quite common to reach the maximum output of the amplifier before the volume control is turned to its 'maximum' setting.

The loudspeaker power ratings shown in the specifications are given in two forms based on extensive laboratory and field trials.

Continuous Sine Wave Rating

The continuous sine wave input voltage fed to the loudspeaker system at any frequency within the stated band for which no mechanical or thermal degradation occurs, during a period of ten minutes.

Maximum Rated Power

The maximum peak power that is recommended for safe operation with normal programme material (on condition that the amplifier is producing a clean signal – not clipping).

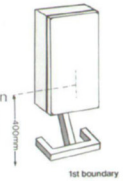
Loudspeaker positioning

Because of the interaction of the loudspeakers and your room it is advisable to experiment with various loudspeaker locations.

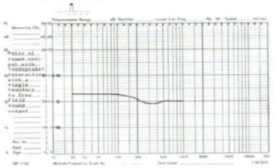
To assist you in choosing a suitable position the next section deals with the effect various configurations have on the output from a loudspeaker.

The loudspeaker system has been designed to radiate into 2π steradians (half space) and this condition is achieved when the sound source (in this case the bass unit) is approximately 400mm (16ins) from a single boundary (in this case the floor). The following three conditions show how the various boundaries affect the power output from a loudspeaker. In the first case we start with a single boundary below the loudspeaker at 400mm from the sound source.

Loudspeaker position.



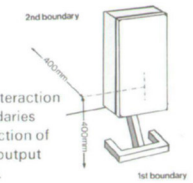
Loudspeaker interaction with a single boundary shown as a function of relative power output with frequency.



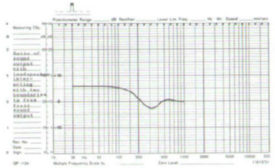
Frequency Hz

In this condition the power output from the loudspeaker is corrected into 2π steradians. Moving the loudspeaker close to a wall, so that the sound source is an equal distance from the floor and wall, will increase the low frequency output as shown below.

Loudspeaker position.



Loudspeaker interaction with two boundaries shown as a function of relative power output with frequency.

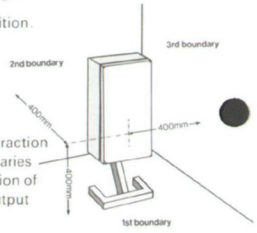


Frequency Hz

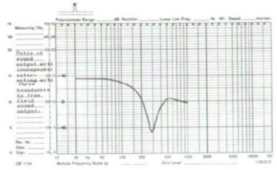
In this case the bass output will be 3dB greater with an accompanying small loss of lower mid range (200-500Hz) energy.

In some cases this may be acceptable in a normal domestic environment. However, if we now place the loudspeaker an equal distance from two walls and the floor we will have a situation in which a considerable amount of bass boost is produced but at the expense of a severe loss of information in the lower mid range.

Loudspeaker position.



Loudspeaker interaction with three boundaries shown as a function of relative power output with frequency.



Frequency Hz

In a domestic environment the situation is complicated by consideration of ceilings and other walls with varying reflective characteristics. It is, therefore, important to consider these interactions when trying various locations.

Design and Specification

Interaction between bass unit and the enclosure determines the low frequency performance of a loudspeaker system. The Ditton 551 uses a vented box design giving significant improvement in low frequency response compared with the equivalent sealed box design. As this form of loading requires less excursion from the bass unit all the design requirements can be met with a reduction in bass unit size. Since the design principle upon which the low frequency performance of the loudspeaker is based relies upon the enclosure being inert, all the cabinet walls are constructed from 18 mm high density particle board veneered both sides.

In order to improve the frequency response and directional characteristics of the loudspeaker, the mid range and treble drive units have been located asymmetrically, and the loudspeakers should be positioned in the listening room with the treble units innermost, the off-axis response having been optimised for this configuration. The drive units in the Ditton 551 have been specifically designed for use in this system and are refinements of tried and proven Celestion units using up to the minute advances in materials technology for even better quality and reliability. Some of the most interesting technical details of these drive units are detailed below :

Bass Unit PC101

1. 290 mm diecast aluminium chassis for stability and strength.
2. Fibre cone with a lossy mass at the voice coil in order to damp resonances and a P.V.C. roll surround for low distortion at low frequencies.
3. 50 mm voice coil using glass fibre laminated former for exceptional resistance to thermal degradation.
4. Barium ferrite magnet. Motor unit weighing 2.9kg produces a flux density of 1.1 Tesla (11,000 Gauss).
5. Bass unit operates in a vented enclosure with a quasi-Butterworth third order alignment with a system Q of 0.3 giving a −3dB point of 38Hz.

Mid Range MD701

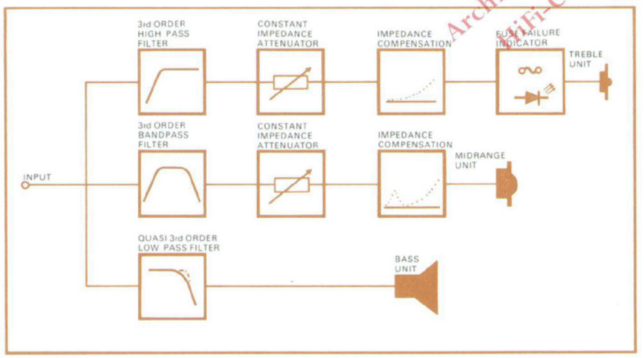
1. Diecast aluminium mounting plate for stability and strength.
2. P.V.C. impregnated cellulose fibre woven soft dome diaphragm.
3. 46mm diameter voice coil.
4. Barium ferrite magnet. Motor unit weighing 2.7kg produces a flux density of 1.5 Tesla (15,000 Gauss).

Treble Unit HF2001

1. Hot pressed polyethylene terephthalate polymer diaphragm.
2. Barium ferrite magnet. Motor unit weighing 0.65kg produces a flux density of 1.3 Tesla (13,000 Gauss).
3. 19mm polyamide impregnated voice coil former with high temperature adhesive system.

Dividing Network

The 15 element dividing network and fuse fail indicator block diagram is shown below :



Treble Section:

The treble unit is fed from a constant impedance attenuator enabling the level to be adjusted by up to 2dB boost and more than 6dB cut as required, and a compensation network is included to ensure that the Butterworth third order high pass filter feeds into a resistive load. This ensures an accurate control of the treble unit with minimum losses. A 500mA quick acting fuse protects the treble unit from overload and a 6 element circuit is used to indicate a fuse failure.

The protection circuit reduces the power to the treble unit and also powers the light emitting diode as a visual indication of overload. Replacing the fuse link restores the system to normal operation. If the fuse fails then a replacement should be fitted as soon as possible ; continued use with the LED flashing may cause damage to some other part of the loudspeaker system.

Mid Range Section:

The 50mm soft dome midrange unit is fed from a constant impedance attenuator, with the same range of adjustment as the treble unit. In addition a compensating network equalises both the rise in impedance due to the inductance of the voice coil and fundamental resonance, to give a resistive load for the Butterworth third order bandpass filter.

Bass Section:

The bass unit is fed via a quasi-Butterworth third order low pass filter to correct for the directivity of the unit and hence maintain a flat on-axis amplitude response.

Specification

Overall dimension
H 720mm 28½ins.
W 395mm 15½ins.
D 328mm 13 ins.

Internal volume
65 litres

Net weight
25kg

Packed weight pair
62kg

Impedance
8 ohms

Amplifier requirements (Continuous rated sinewave output)
20 watts to 140 watts

Frequency response
38Hz to 20kHz ± 3dB into 2π steradians (half space)

Crossover frequencies
600Hz, 4.5kHz

Power ratings
(1) Maximum rated power 140 watts programme

(2) Continuous sinewave rating
22 volts 20Hz to 600Hz
14 volts 600Hz to 4.5kHz
11 volts 4.5kHz to 20kHz

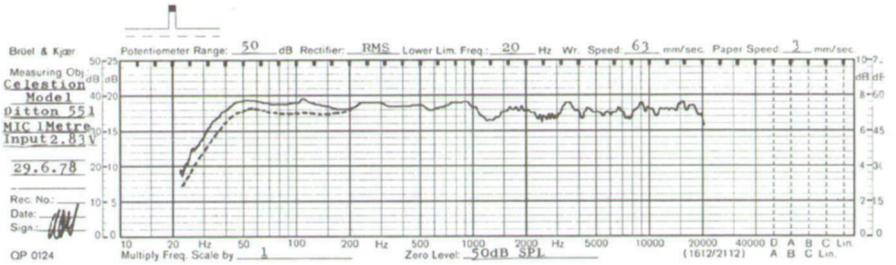
Sensitivity
3.25 watts of pink noise input produce 90dB SPL at one metre on axis in an anechoic environment

Controls
Mid range and treble levels independently adjustable from +2dB lift to greater than 6dB cut

Finish
Available in : Oiled American Walnut, Elm, Black Ash

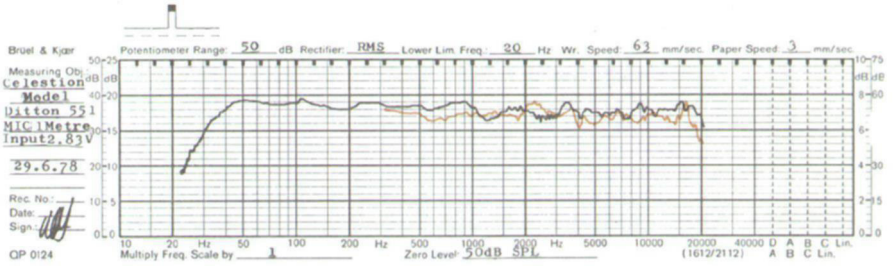
Frequency Response Curves

On-axis amplitude response :



The on-axis response is taken in anechoic conditions down to 200 Hz and then into 2 steradians (half space) down to 20 Hz, shown in black. The off-axis response is taken at 30° (in the preferred direction) and is shown in brown.

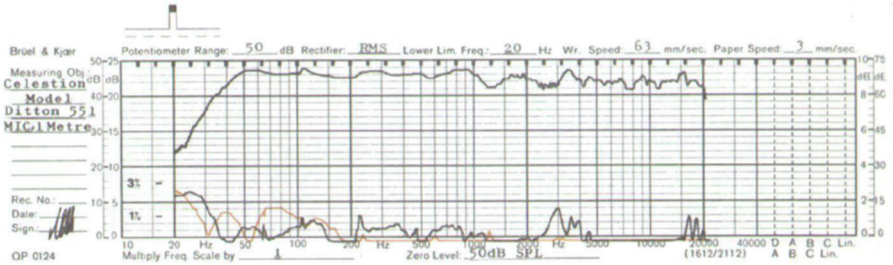
Off-axis amplitude response :



Taken at 30° off-axis (preferred direction). On-axis response is shown for reference.

Off-axis shown in brown

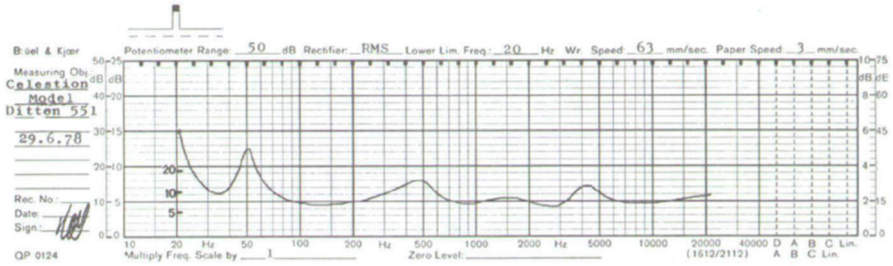
Harmonic distortion :



Second and third order harmonic distortion taken with loudspeaker producing 96 dB SPL fundamental at 1 metre on axis shown at the top of the graph. Third order harmonic distortion is shown in brown, second order harmonic distortion is shown in black.

Third order harmonic distortion shown in brown

Impedance :



Curve shows variation of impedance with frequency on logarithmic scales.

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HI FI LAUTSPRECHER
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gültig ab 1.8.82

Ditton 551

Spezifikation
Außenabmessungen:
H 720 mm
B 395 mm
T 328 mm
Innenvolumen:
65 Liter
Nettogewicht je Box:
25 kg
Gewicht Paar verpackt:
62 kg
Impedanz:
8 Ohm
Verstärkerleistung (gleitender Sinus):
20 bis 140 W
Frequenzgang:
38 Hz bis 20 kHz ± 3 dB
in 2-π-Steraden (Halbschritt)
Übergangsfrequenzen:
600 Hz 4,5 kHz
Nennleistungen:
(1) Nennhöchstleistung 140 W
(2) Gleitender Sinus
22 V 20 Hz bis 600 Hz
14 V 600 Hz bis 4,5 kHz
11 V 4,5 kHz bis 20 kHz
Empfindlichkeit:
3,25 W rosa Rauschen erzeugen
90 dB Schallpegel bei 1 m
Achsorientierung in schalltoter Umgebung
Regler:
Mitten- und Hochtonbereich separat einstellbar von 2 dB aufwärts bis mehr als 6 dB abwärts
Gehäuseausführung:
Erhältlich in Amerikanischer Walnuß, Rüster, Schwarzesche

Sonderpreis Amerikanisch Walnuß [redacted]
Ulme

Esche schwarz [redacted]

Sitz der Gesellschaft: Pirmasens
Geschäftsführer: Dipl.-Ing. Daniel Dan Prenn
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