Celestion Ditton 442

Introduction

Celestion Ditton 442 – a three-way loudspeaker system of the highest quality, offering reproduction to match. A combination of the most up-to-date design techniques and technology, together with Celestion's proven and unequalled experience has resulted in this superb instrument.
The handsome exterior of the cabinet is complimented by a grille of specially developed fabric.
Utilising drive units specifically designed and manufactured for it, the Ditton 442 also features fuse protection for the treble unit, to prevent damage in overload conditions.
When used in pairs, asymmetrical positioning of the mid range and treble drive units on the front baffle improves the directional characteristics of the loudspeakers. To help you obtain the very high standard of reproduction of which the Ditton 442 is capable, we suggest that you read carefully the information which follows :

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.

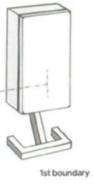
Maximum Rated Power

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).

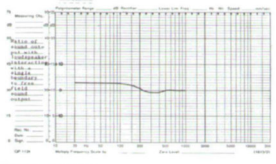
Loudspeaker positioning

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 effects 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. The first case has a single boundary below the loudspeaker at 400mm from the sound source.

Loudspeaker position



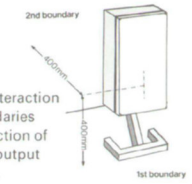
Loudspeaker interaction with a single boundary shown as a function of relative power output with frequency.



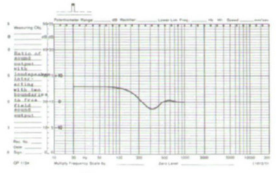
Frequency Hz

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



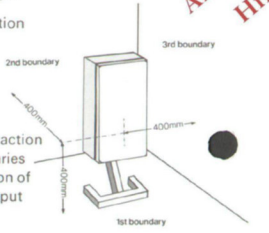
Loudspeaker interaction with two boundaries shown as a function of relative power output with frequency.



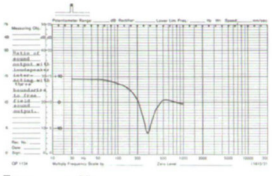
Frequency Hz

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 442 uses a sealed box design giving controlled and extended bass response below the bass resonant frequency of the system. 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 18mm high density particle board veneered both sides and the midrange unit is isolated from the bass unit in its own sealed enclosure.
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 442 have been specifically designed for inclusion in this system. The bass and treble units are updated versions of tried and proven Celestion units using up to the minute advances in material technology to give even better quality and reliability while the mid range is completely new. Some of the most interesting technical aspects of these drive units are detailed below :

Bass Unit FC121

1. 330mm diecast aluminium chassis for strength and stability.
2. Plasticised fibre cone terminated in neoprene roll surround for accurate bass reproduction.
3. Barium ferrite magnet. Motor unit weighs 3.2kg producing a flux density of 1.1 Tesla (11,000 Gauss).
4. 46mm high temperature polyamide voice coil former and high temperature adhesive system.
5. The unit operates in a sealed enclosure with a system Q of 1.1 giving a −3dB point of 45Hz.

Mid Range FC61

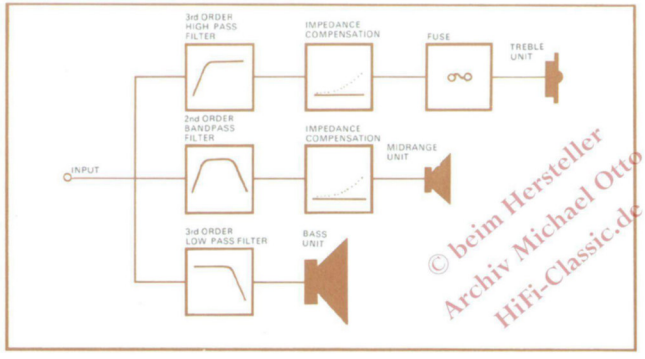
1. 130mm diecast aluminium chassis for strength and stability.
2. Plasticised paper cone with neoprene roll surround for accurate reproduction of the lower middle frequencies.
3. Barium ferrite magnet. Motor unit weighs 0.91kg and produces a flux density of 1.0 Tesla (10,000 Gauss).
4. 25mm voice coil.

Treble Unit HF2001

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

Dividing Network

The 14 element dividing network and treble unit fuse block diagram is shown below :



Treble Section:

The treble unit is fed from a compensation network 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.
If the fuse fails then a replacement should be fitted as soon as possible ; continued use with the blown fuse may cause damage to some other part of the loudspeaker system.

Mid Range Section:

The midrange unit is fed from a compensating network which equalises the rise in impedance due to the inductance of the voice coil to give a resistive load for the Butterworth second order bandpass filter.

Bass Section:

The bass unit is fed via a Butterworth third order low pass filter.

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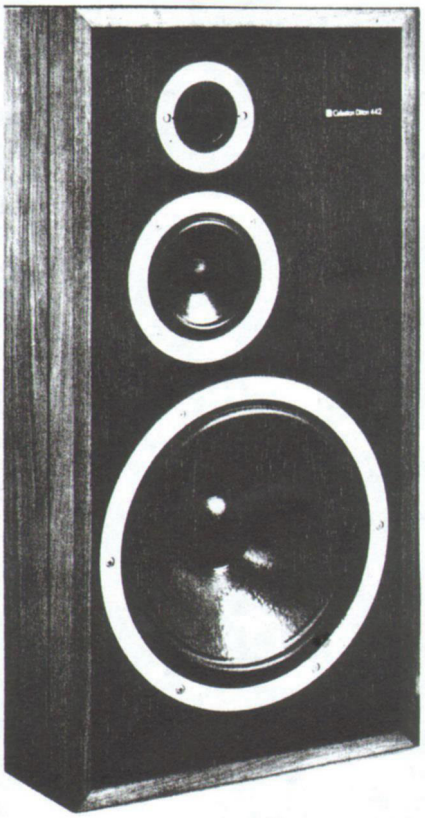
Ditton 442

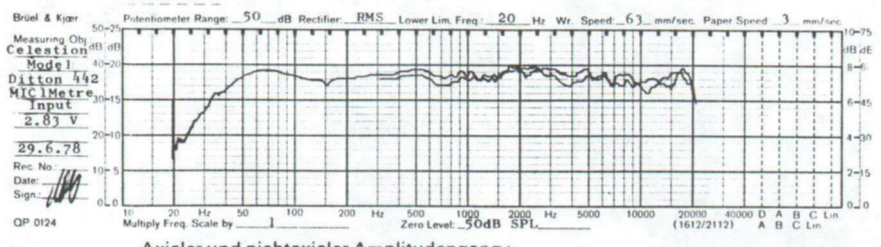


Spezifikation
Außenabmessungen:
H 762 mm
B 390 mm
T 290 mm
Innenvolumen:
54 Liter
Nettogewicht je Box:
24 kg
Gewicht Paar verpackt:
60 kg
Impedanz:
8 Ohm
Verstärkerleistung (gleitender Sinus):
20 bis 120 Watt
Frequenzgang:
45 Hz bis 20 kHz ± 3 dB
in 2-π-Steraden (Halbschritt)
Übergangsfrequenzen:
600 Hz 4,5 kHz
Nennleistungen:
(1) Nennhöchstleistung 120 W
(2) Gleitender Sinus
14 V 20 Hz bis 600 Hz
11 V 600 Hz bis 4,5 kHz
9 V 4,5 kHz bis 20 kHz
Empfindlichkeit:
2,9 W rosa Rauschen erzeugen
90 dB Schallpegel bei 1 m achsorientiert in schalltoten Bedingungen.
Gehäuseausführung:
Erhältlich in Amerikanischer Walnuß, Rüster, Schwarzesche.

Die Wiedergabe ist sehr transparent und zeigt die Qualität, die lebendige Musik ausmacht. Die Bässe sind klar definiert, ohne daß sie dadurch dominieren. Extreme Klangspitzen werden ohne eine Spur von Überlastung gemeistert. Die Höhen sind brillant und frisch...
Eine der herausragenden Eigenschaften ist der perfekte räumliche Eindruck. Eine dreidimensionale Wiedergabe – unabhängig vom Platz des Zuhörers...
Der Ditton 442 bietet problemlosen Musikgenuß ohne lästig zu werden – auch über längere Zeiträume. Er gehört zweifellos in die obere Qualitätsklasse.
Wenn Sie also einen Lautsprecher mit hervorragender Wiedergabequalität suchen, sollten Sie den 442 ausprobieren...
Wir prüften den 442 in mehreren Bereichen – geradliniger Frequenzgang, Belastbarkeit usw. – und alle Tests zeigten außerordentlich zufriedenstellende Ergebnisse. Der Ditton 442 ist unter allen Voraussetzungen ein hervorragender Lautsprecher...
Ohne Zweifel ist ganz klar, daß jahrelange Erfahrung und technisches und musikalisches Know-how dazu gehören, solch einen Lautsprecher bauen zu können.

Aus „Canadian Stereo Guide"

Frequenzcharakteristiken



Axialer und nichtaxialer Amplitudengang:

SONDERPREIS Esche schwarz

Amerikanisch-nußbaum

Specification

Overall dimensions
H 762mm 30ins.
W 390mm 15$\frac{3}{8}$ ins.
D 290mm 11$\frac{7}{16}$ ins.

Internal volume
54 litres

Net weight each
24kg

Packed weight pair
60kg

Impedance
8 ohms

Amplifier requirements
(Continuous rated sinewave output)
20 watts to 120 watts

Frequency response
45Hz to 20kHz ± 3dB into 2π steradians (half space)

Crossover frequencies
600Hz
4.5kHz

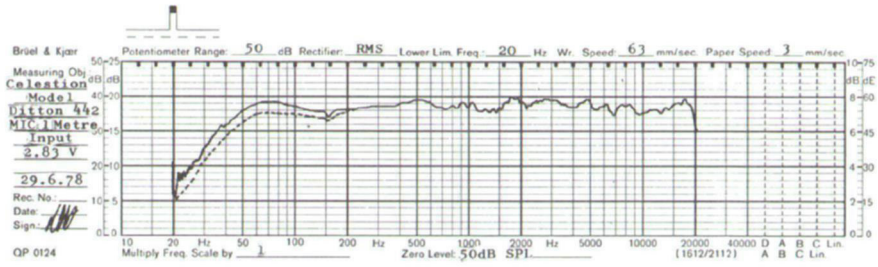
Power ratings
(1) Maximum rated power – 120 watts programme
(2) Continuous sinewave rating
14 volts 20Hz to 600Hz
11 volts 600Hz to 4.5kHz
9 volts 4.5kHz to 20kHz

Sensitivity
2.9 watts of pink noise input produce 90dB SPL at one metre on axis in anechoic conditions.

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

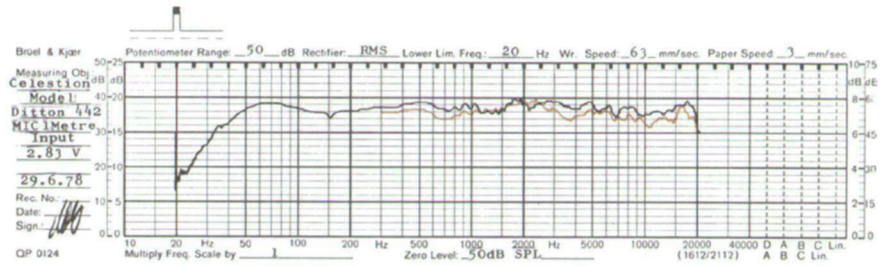
Frequency Response Curves

On-axis amplitude response



The on-axis response is taken in anechoic conditions down to 200Hz and then into 2π steradians (half space) down to 20Hz. The dotted curve shows the correction for the loudspeaker radiating into 4π steradians (full space).

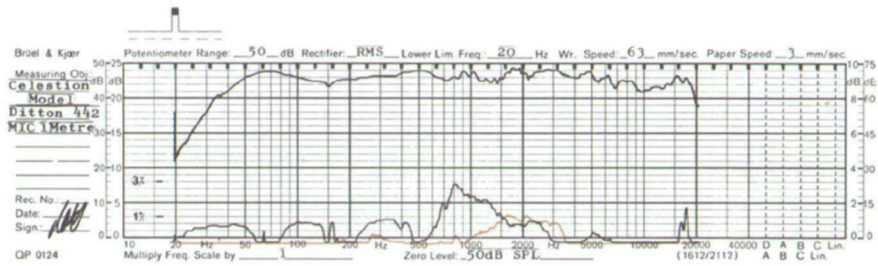
Off-axis amplitude response



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

Off-axis shown in brown

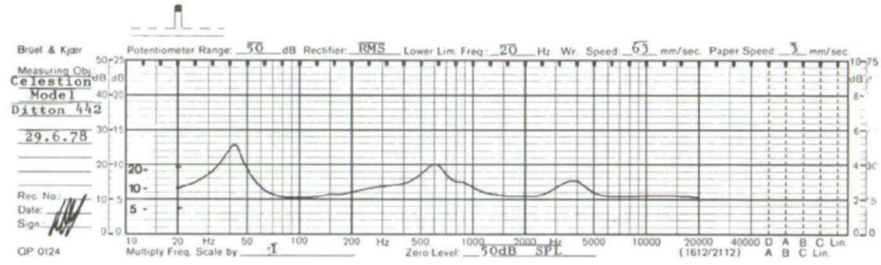
Harmonic distortion



Second and third order harmonic distortion taken with loudspeaker producing 96dB SPL fundamental at 1 metre on axis.

Third order harmonic distortion shown in brown

Impedance



Curve shows variation of impedance with frequency on logarithmic scales.

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