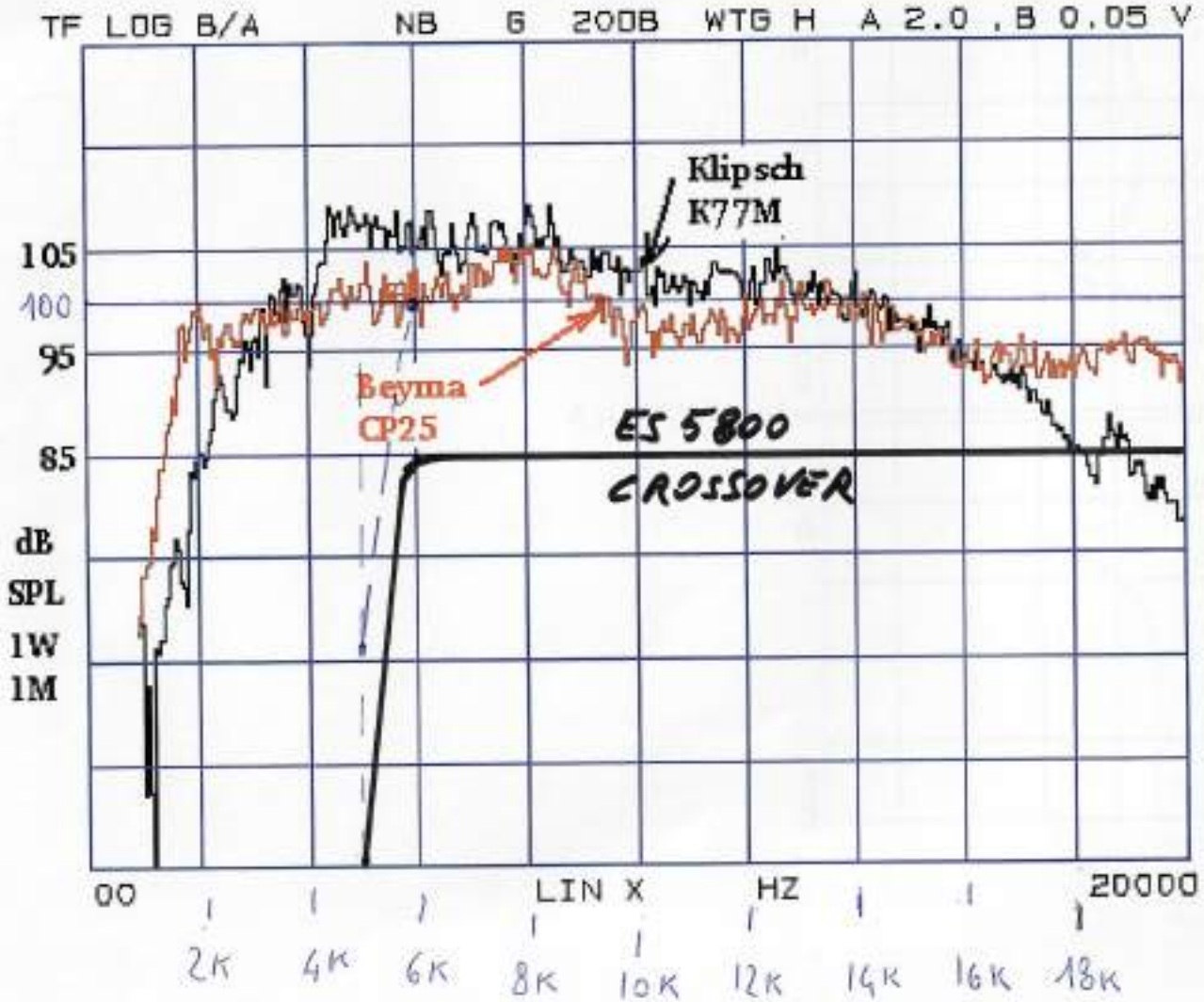
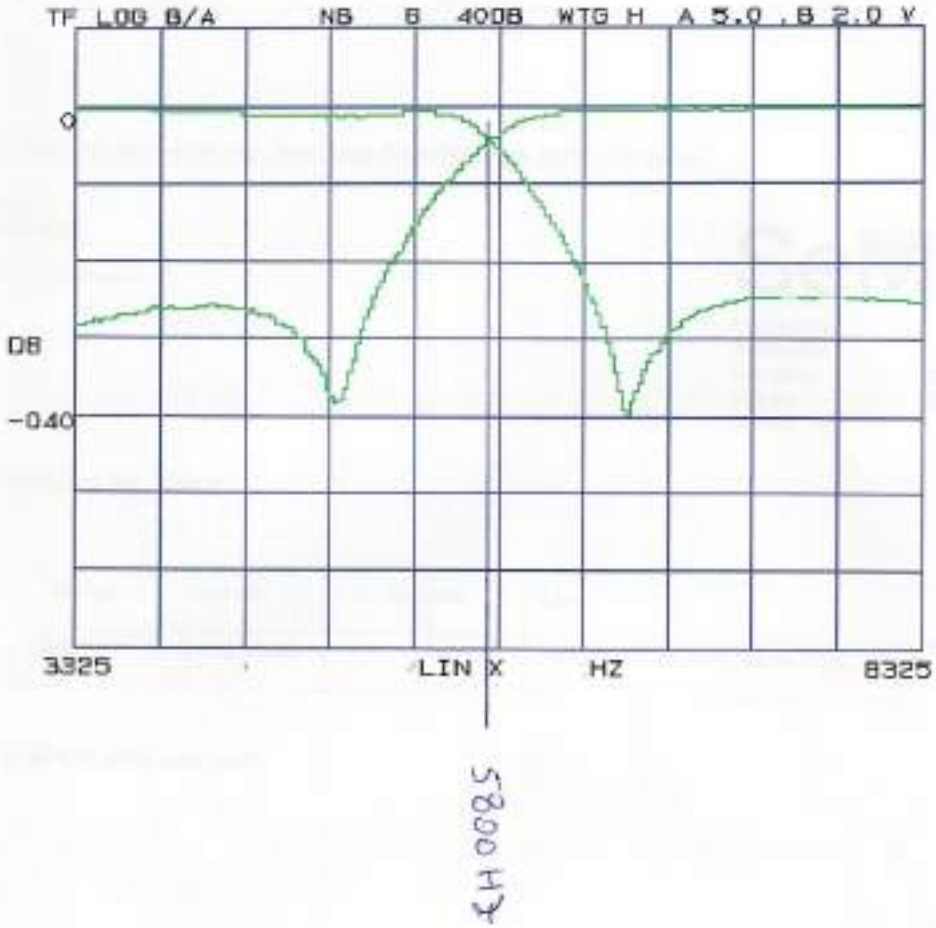

TF LOG B/A
NB 6 200B WTG H A 2.0 , B 0.05 V
Klipsch
K77M
105
100
95
Beyma
CP25
ES 5800
85
CROSSOVER
dB
SPL
1W
1M
00
LIN X
HZ
20000
2K
4K
6K
8K
10K
12K
14K
16K
18K

ES 5800 SQUAWKER-TWEETER CROSSOVER



5800 HZ

SeMtek (Seele Medientechnik) Inh. Arno Seele
Scheidfeldstr.18, 34471 Volkmarsen
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Herr
Carlo Borra
Via Pianacci 20

I-65015 Montesilvano
Italien

SeMtek

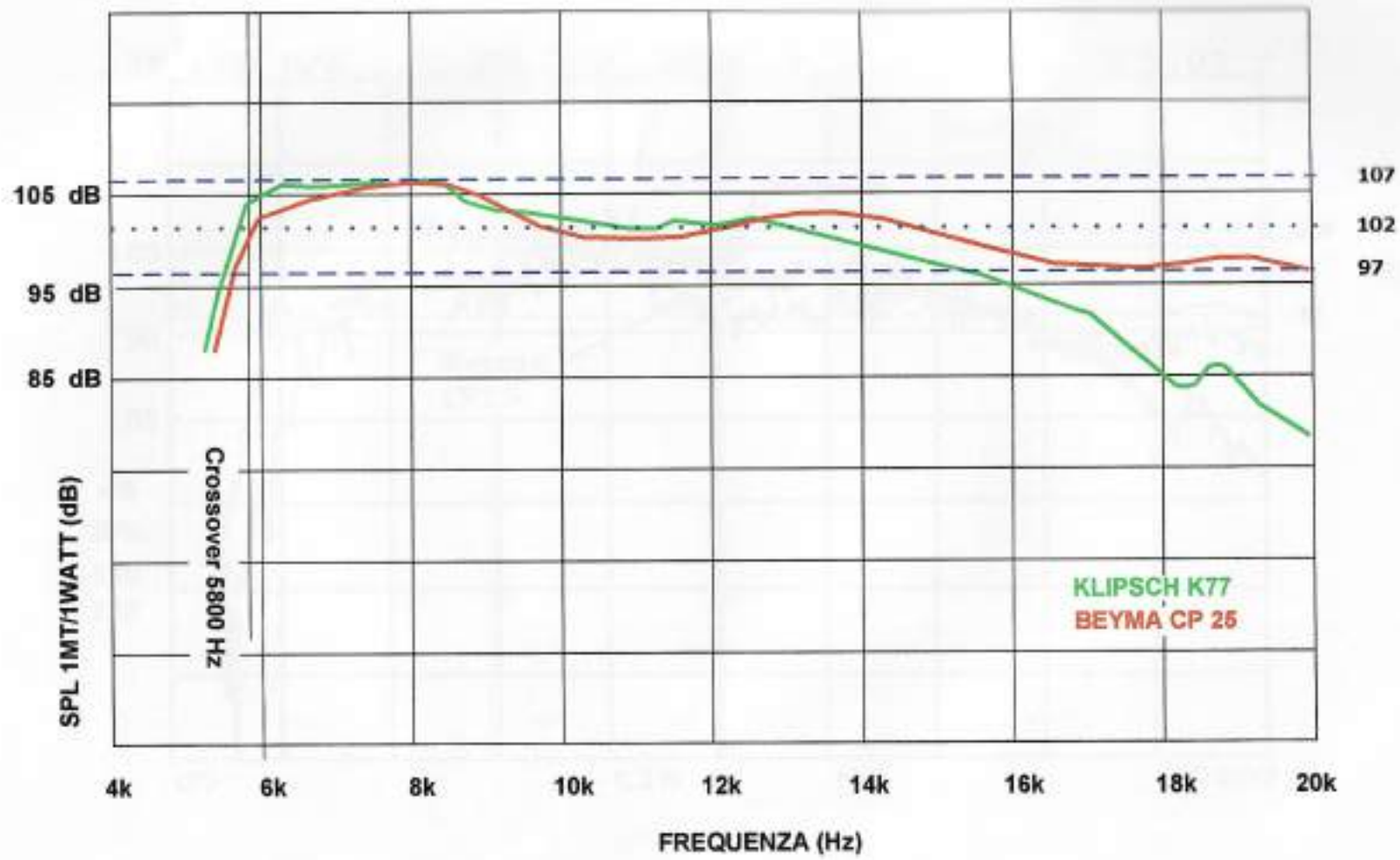
Kunden Nr.: 2976
Bearbeiter: A.Seele
Steuernr.: 27 869 00635
USt-Id: DE 204181777
Datum: 21.02.2007

Lieferschein Nr. 2913

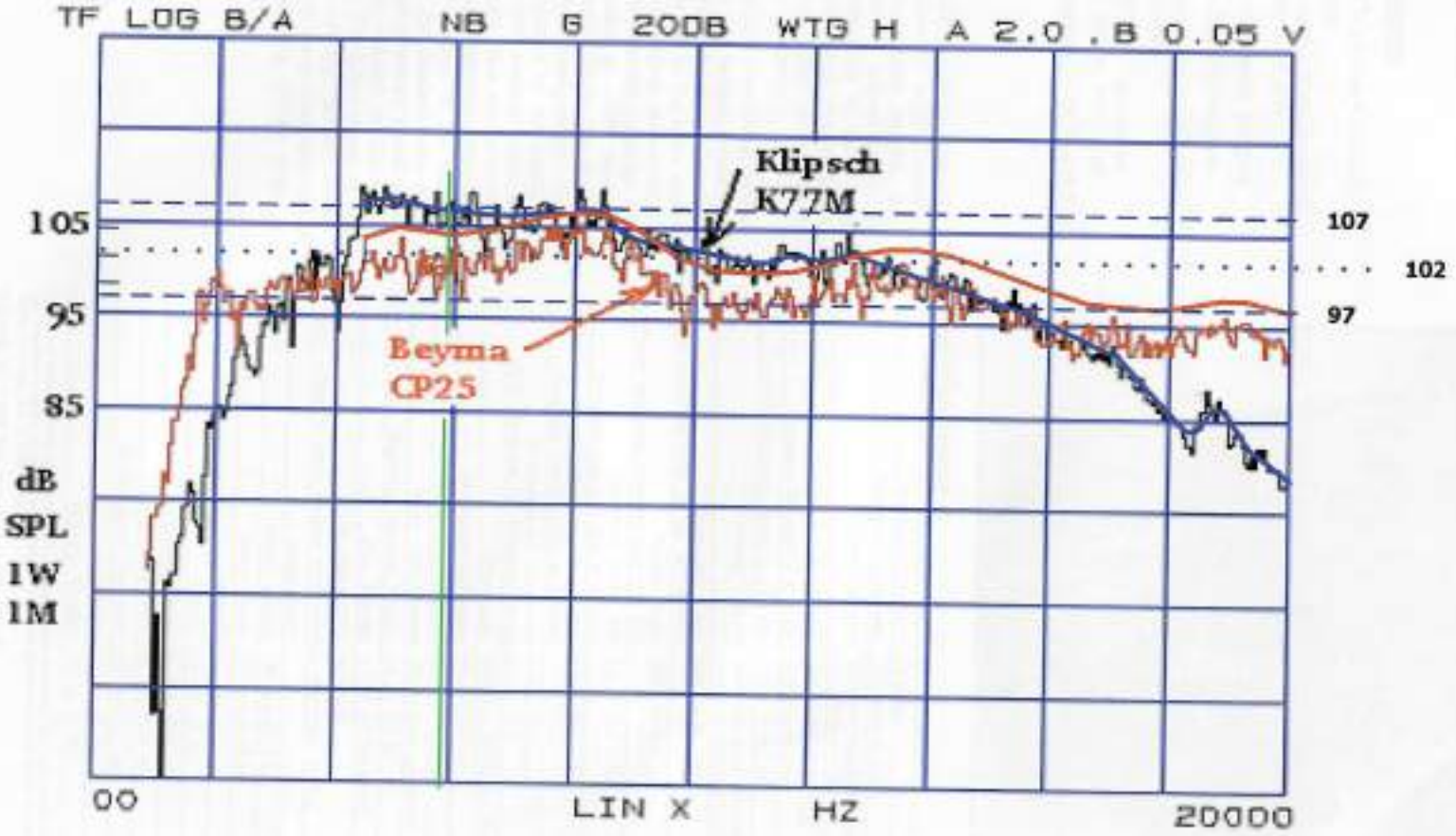
Pos	Menge		Art.-Nr.	Gewicht kg	Text
1	2,00		11231850		BEYMA CP 25 25W 105db 2kHz- 20kHz

Lieferung per DHL,UPS, oder GLS.

KLIPSCH K77 VS BEYMA CP25
RISPOSTA IN FREQUENZA



KLIPSCH K77 VS. BEYMA CP25 TWEETER



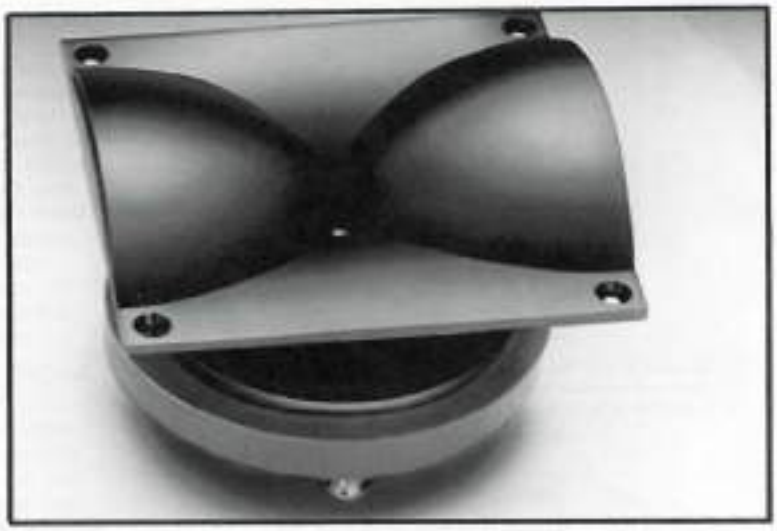
2404H Ultra-High Frequency Transducer

91

Professional Series

Key Features:

- Bi-Radial® Constant-Coverage horn design
- Constant 100° x 100° dispersion from 3 kHz to 20 kHz
- 40 watts continuous program
- 3 kHz to 21.5 kHz response
- Annular-ring diaphragm ferrite motor structure
- 44 mm (1.75 in) edgewound aluminum ribbon voice coil
- 105 dB sensitivity, 1 W, 1 m (3.3 ft)



Designed for use as an ultra-high frequency driver in multi-element, full range loudspeaker systems, the JBL Model 2404H delivers an unmatched combination of wide, tightly controlled dispersion, extended frequency response, high power capacity, and high efficiency

One key to this outstanding performance lies in the unique geometry of the driver's Bi-Radial horn[1] Developed with the aid of the latest computer design and analysis techniques, the horn provides constant coverage from its recommended crossover point of 3 kHz to beyond 20 kHz. The Bi-Radial compound flare configuration maintains precise control of the horn's wide 100° x 100° coverage angle, and the horn's rapid flare rate dramatically reduces second harmonic distortion. The uniform coverage of the horn is illustrated by the detailed polar data and the isobar (constant sound pressure) contours included in this specification sheet. The polar curves of the 2404 exhibit soft-edge pattern characteristics, due to the gradual drop-off of level with increasing off-axis angle.

Specifications:

Nominal Impedance:	8 ohms
Minimum Impedance:	7.2 ohms @ 3 kHz
Power Capacity[2]:	40 watts continuous program at 3 kHz or higher, 12 dB/octave slope
Sensitivity:	105 dB SPL (1 W, 1 m)
Frequency Response (± 3 dB):	4 kHz to 19 kHz
Usable Frequency Range (- 10 dB):	3 kHz to 21.5 kHz
Coverage Angles:	(Included angle between 6 dB down points, rated over 3.15 kHz to 20 kHz)
Horizontal Angle: (Flange mounting holes on top and bottom)	100 (+ 47, - 10)°
Vertical Angle: (Flange mounting holes on right and left)	100 (+ 42, - 14)°
Directivity Factor (Q): (Averaged over 3.15 kHz to 20 kHz)	6.8 (+ 1.5, - 2.3)
Directivity Index (Di): (Averaged over 3.15 kHz to 20 kHz)	8.3 (+ 0.9, - 1.8)
Recommended Crossover: (With minimum 12 dB/octave slope)	3 kHz or higher
Diaphragm:	0.05 mm (0.002 in) Aluminum alloy
Diaphragm Diameter:	44 mm (1.75 in)
Voice Coil Diameter:	44 mm (1.75 in)
Voice Coil Material:	Edgewound aluminum ribbon
Magnetic Assembly Weight:	1.9 kg (4.1 lb)
Flux Density:	1.75 T (17,500 gauss)
Force Factor (Bl):	5.25 N/A
Positive voltage to black terminal gives forward diaphragm motion	
Dimensions:	
Flange Height:	130 mm (5.12 in)
Flange Width:	130 mm (5.12 in)
Depth[3]:	
Overall:	128 mm (5 in)
Behind Baffle:	96 mm (3.76 in)
In Front of Baffle:	32 mm (1.25 in)
Baffle Cutout Diameter:	122 mm (4.8125 in)
Net Weight:	2.27 kg (5 lb)
Shipping Weight:	2.72 kg (6 lb)

[1]Continuous program power is defined as 3 dB greater than continuous sine wave power and is a conservative expression of the transducer's ability to handle normal speech and music program material. Below 2 kHz the input power should be limited to 5 watts (0.3 V RMS) or less.

[2]Axial level, 2.83 V RMS input, averaged over 3 kHz to 20 kHz.

[3]These dimensions apply to front mounting of the 2404 assembly. Rear mounting is not recommended due to the possible interference with the wide angular coverage pattern of the horn.

2404H Ultra-High Frequency Transducer

The coverage pattern of the Bi-Radial horn provides precise pattern control and excellent frequency response even at extreme oblique off-axis angles (off-axis both horizontally and vertically). This behavior is illustrated in this specification sheet with polar data taken at an oblique angle of 45° in addition to the usual horizontal and vertical polar curves. Additional data on the directional characteristics of the 2404 is illustrated in 10 kHz octave bandwidth isobar contours. These contours represent the sound pressure distribution in the front hemisphere of the horn. The contours show the excellent symmetrical soft-edge coverage that the Bi-Radial horn provides.

Coupled to the horn is a constant area phasing plug and an annular ring diaphragm ferrite motor structure.

The phasing plug maintains constant phase and amplitude. The annular voice coil diaphragm is pneumatically formed of fatigue-resistant aluminum and utilizes an optimally constructed voice coil former and the latest in high temperature adhesive technology to substantially increase the driver's power capacity. A ferrite magnetic structure provides a high flux level for extended response and maximum efficiency while maintaining traditional JBL tolerances in assembly and manufacture.

1 Patent No. 4,308,932. Further information on the Bi-Radial horns can be found in a paper by D. Smith, D. Keele, and J. Eargle, Improvements in Modern Loudspeaker Systems, presented at the 63rd Convention of the Audio Engineering Society (May 1979). AES Preprint 1794 (F-4) available from JBL Professional.

Architectural Specifications:

The transducer shall have a measured sensitivity (SPL at 1 m with a 1 W input swept from 3 kHz to 20 kHz) of a least 105 dB on axis. On-axis frequency response measured under free field conditions at a distance of 1 m (3.3 ft) or more shall extend from 3 kHz to 20 kHz.

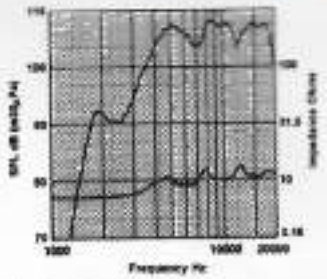
Horizontal and vertical dispersion shall be a constant 100° x 100° from 3 kHz to 20 kHz when measured at the 6 dB down points relative to on-axis frequency response characteristics using ⅓-octave band pink noise as the signal source. Nominal impedance shall be 8 ohms and power capacity shall be at least 40 watts normal program material.

The transducer shall have a maximum flange size of 130 mm x 130 mm (5.12 in x 5.12 in) and a depth of 128 mm (5 in) and weigh not less than 11 kg (5 lb). The horn shall be injection molded structural foam polycarbonate.

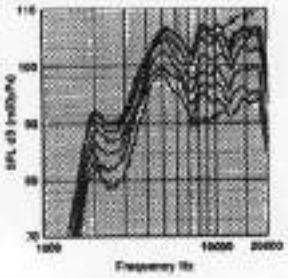
All magnetic assembly parts shall be machined from cast or extruded billet stock.

Voice coil diameter shall be 44 mm (1¾ in), operating in a magnetic field whose flux density measures at least 1.75 tesla (17,500 gauss). Voice coil wire shall be aluminum, milled to a ribbon then wound by hand on its edge and mated to an anodized aluminum diaphragm.

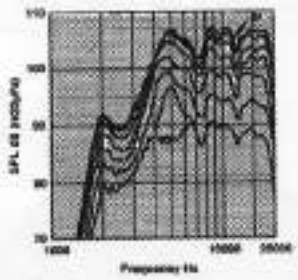
The transducer shall be JBL Model 2404H.



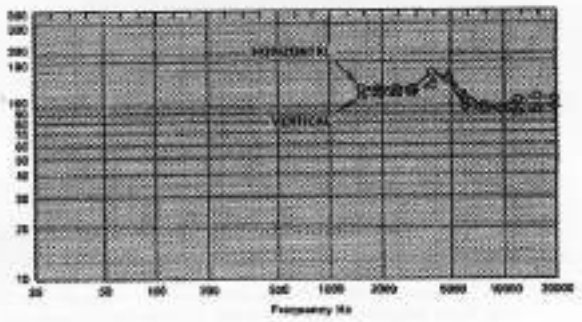
Frequency response and impedance.
Frequency response of the 2404, measured on axis at a distance of 1 meter with 1 watt (2.83 V RMS) applied, in a reflection-free environment, with impedance vs frequency curve. Unit free standing (without baffle).



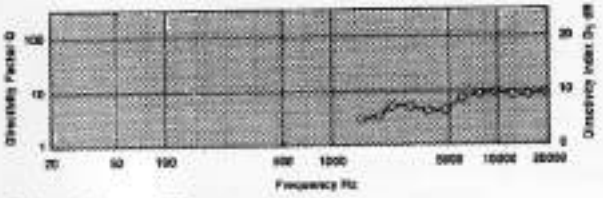
Horizontal off-axis response.
Horizontal off-axis response taken at 15 degree intervals out to 90 degrees off axis.



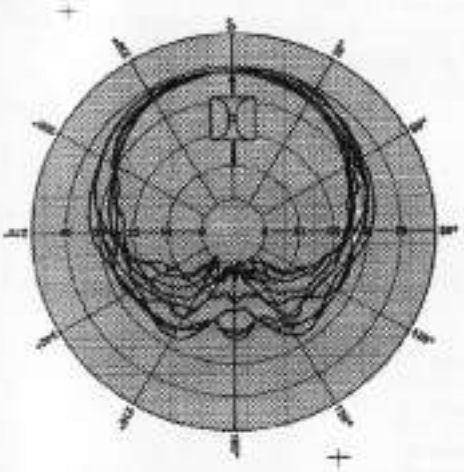
Vertical off-axis response.
Vertical off-axis response taken at 15 degree intervals out to 90 degrees off axis.



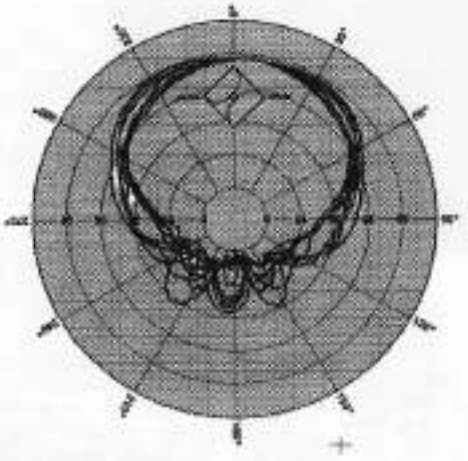
Beamwidth (- 6 dB) vs Frequency.



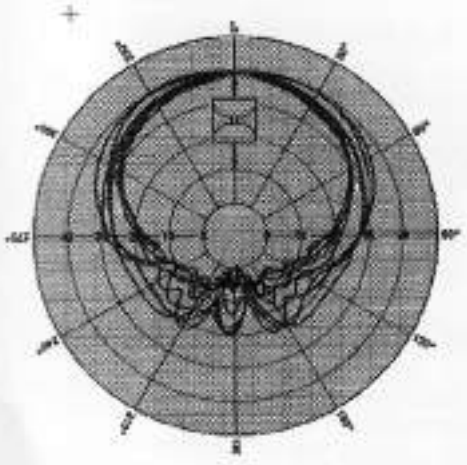
Directivity vs Frequency



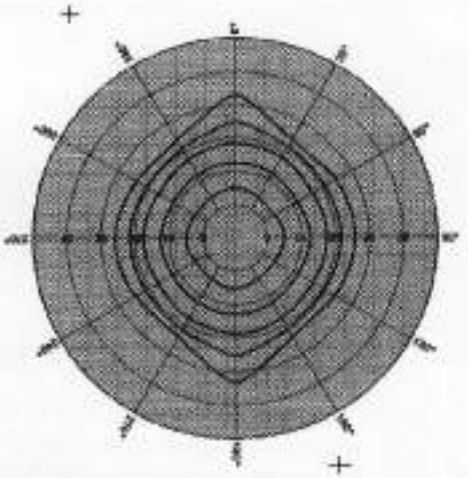
Horizontal polar response.
Composite ⅓-octave polar bandwidth responses of the 2404 in the horizontal plane over the range of 3.15 kHz to 20 kHz (1 meter measurement distance in an anechoic chamber, all polars normalized to on axis). Unit free standing (without baffle).



Oblique polar response.
Composite polar response of the 2404 in an oblique plane tilted at an angle of 45 degrees. Same test condition as horizontal.



Vertical polar response.
Composite polar responses of the 2404 in the vertical plane. Same test conditions as horizontal.



Frontal isobar contours.
10 kHz octave bandwidth (7.07 kHz to 14.14 kHz) constant sound pressure contours of 0 to — 15 dB in steps of — 3 dB. The contours are plotted on polar grid lines with on axis being the center of the plot. The data was gathered by taking an octave polar plot at all oblique angles from 0° (horizontal to 900° (vertical) in steps of 15°. Same test conditions as horizontal polar response.

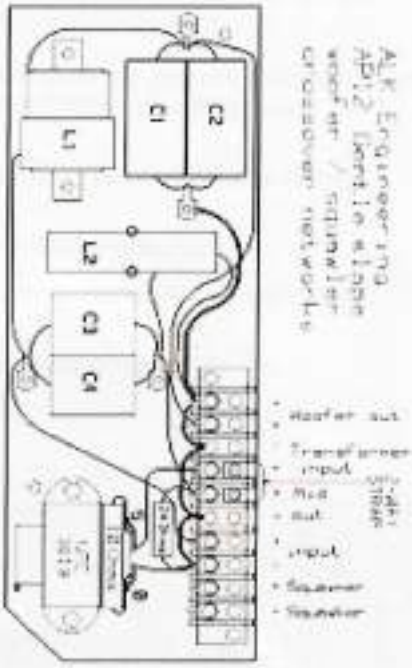
ELABORAZIONE DIFFUSORI KLIPSCHORN
Sostituzione del Xover AK-3 1998

Redatto da Carlo Borra il 12 Giugno 2008

Come già evidenziato nel precedente scritto, il crossover AK-3 si potrebbe ritenere adeguato se non fosse per la mancanza di un filtro che tagli la risposta in frequenza del driver K-55 verso le alte frequenze e per l'impossibilità di regolare il livello di uscita del midrange. Avendo escluso la possibilita' di modificare il crossover, è stato sostuito con un sistema di filtri sviluppato da ALK e costituito da 2 componenti:

AP12-AK3 per l'incrocio fra i medio bassi

Questo componente si aggiunge al network esistente all'interno del cabinet del woofer e realizza un sistema di filtraggio passivo con incrocio centrato sui 350 Hz come nel crossover originale. Il nuovo filtro e' costituito da componenti di ottima qualita', e' completo di regolazione del livello del midrange per mezzo di un autotrasformatore e corregge anche l'impedenza variabile del filtro originale, fornendo un carico costante di 6 Ohm all'amplificatore. Si puo' attenuare il livello del midrange agendo sull'autotrasformatore selezionando il valore di attenuazione richiesto per mezzo degli spinotti "faston" in dotazione. Nel nostro caso abbiamo optato per gli spinotti [0-3] quindi circa 5 – 6 dB di attenuazione .



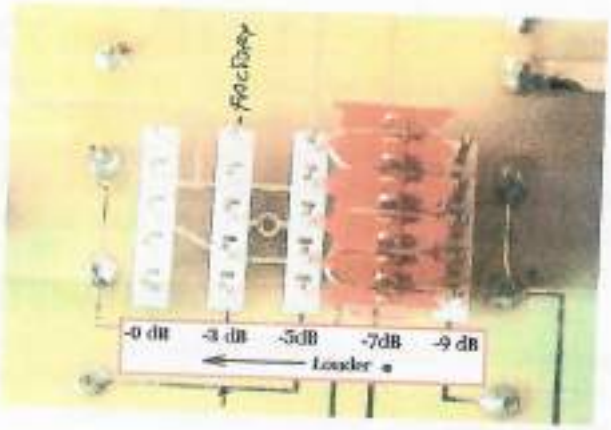
Plug (-) (+)	Attenuation dB
x - 5	2.6
1 - 5	3.4
0 - 4	3.8
2 - 5	4.6
x - 4	6.2
0 - 3	6.7
1 - 4	7.4
0 - 2	9.5
x - 3	10.4
0 - 1	12.5
0 - x	15.4

Factory setting

Normal setting

ES5800 per l'incrocio fra i medio alti.

Questo componente realizza un sistema di filtraggio passivo con taglio centrato sui 5800 Hz. E' basato anch'esso su componenti di elevata qualita' e ricalcolato per migliorare l'incrocio fra le trombe nonche' il tipo di carico visto dall'amplificatore, inclusa la rotazione di fase. Anche questo filtro consente di regolare il livello del tweeter per mezzo di un autotrasformatore. Nel nostro caso abbiamo optato per il massimo livello di uscita (0 dB).



Sensazioni d'ascolto dopo l'inserimento del crossover AP12-AK3 + ES5800

Il crossover di ALK introduce alcune variazioni percepibili sia nella risposta tonale del sistema che nel suo comportamento dinamico. In sintesi:

a) Il 'soundstage' viene allontanato dall'ascoltatore; gli strumenti solisti non sono piu' prepotentemente proiettati in avanti ma tendono a disporsi più in profondita'; la scena acustica e' piu' ampia e guadagna in tridimensionalità. Si perde un po' l'effetto 'live'.

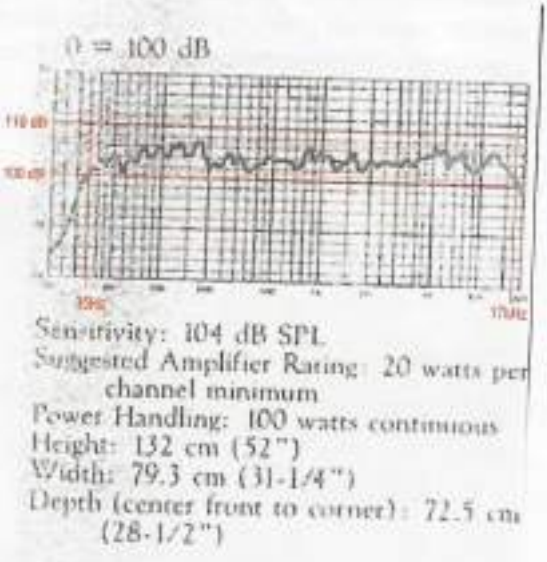
b) I bassi profondi suonano piu' asciutti ed arretrati; la modulazione e' piu' netta tuttavia si riduce l'effetto 'punch'.

c) le alte frequenze sono chiaramente piu' rifinite e gradevoli, sembrano ridotte le sibilanti.

d) il suono e' in generale piu' controllato ma meno coinvolgente emotivamente soprattutto per certi generi musicali.

e) La minore efficienza del crossover fa perdere al diffusore circa un paio di dB di sensibilità.

In conclusione, mentre la modifica ai driver ha comportato dei miglioramenti senza controindicazioni apparenti, la sostituzione del crossover presenta vantaggi ma anche qualche ombra; la validita' di tale intervento dipende molto dalla catena a monte dei diffusori ed al gusto dell'ascoltatore fermo restando che il crossover consente di riallineare facilmente il midrange al resto dei driver.



(*) immagine del documento originale delle specifiche tecniche delle Klipschorn

AP12-XXX networks

The AP12-xx series networks are designed to operate with the Klipsch K33 woofer which represents an impedance of 6 Ohms in series with 1 mHy voice coil inductance. The inductance becomes part of the filter leaving the 6 Ohm component to become the actual resistive load impedance seen by the amplifier. It will operate in a 2-way system or in a 3-way system with the addition of a separate squawker / tweeter crossover such as the ES5800 from the 4 or 8 ohms amplifier connection.

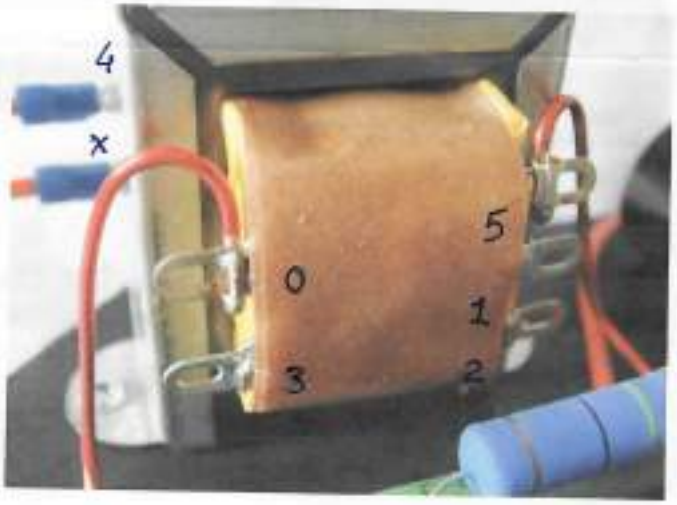
Driver level and the transformer

High frequency drivers are somewhat more efficient than the Klipsch woofer. This requires that the squawker driver or high frequency driver level in a two-way system be reduced slightly. With the reduced losses of the higher quality components used in the new crossover and a long list of other factors, it is difficult to know exactly what the "correct" level should be. A method has been worked out to allow you to adjust the level to your taste. A resistor pad attenuator could be used, but an autotransformer will allow the needed attenuation without divorcing the amplifiers damping factor from the speaker driver. This yields better frequency and transient response. The "normal" setting is between -3.8 and -9.5 dB. This can be considered a starting place. Change the settings to suit your own taste. Whatever setting sounds right IS right!

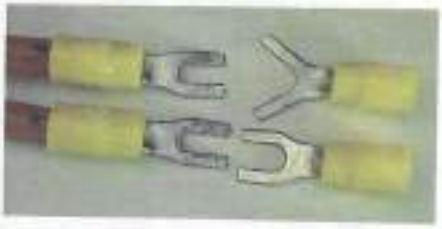
A transformer reduces the level by reducing the voltage applied to the driver as a direct function of its turns ratio. A transformer however, has the disadvantage of increasing the load impedance presented to the amplifier by the square of this ratio. By calculating the impedance ratio of various transformer tap connections, it is possible to determine the value of swamping resistor to connect across the input of the transformer to yield a nearly perfect impedance match to the filter and amplifier. Although it would not seem logical that the impedance of the driver in use would not matter, it doesn't. So long as the driver being used has an efficiency rating in the 105 to 110 dB range, the impedance reflected back through the transformer will be nearly the same. A table of transformer settings is provided below.

The settings can be changed by simply pulling the connectors off and pushing different ones on. The table below indicates the attenuation using different tap connections. Note that some options do NOT connect the squawker driver to common ground (tap 0) but rather between two other taps.

	Plug (-) (+)	Attenuation dB	
	x - 5	2.6	
→	1 - 5	3.4	
	0 - 4	3.8 Ohms	
	2 - 5	4.6 < 16	
FACTORY -	x - 4	6.2 < 16	Normal
	0 - 3	6.7 < 16, 8	settings
•	1 - 4	7.4 < 8	
	0 - 2	9.5 < 8	
	x - 3	10.4	
	0 - 1	12.5	
	0 - x	15.4	



Big cables



Many installations make use of very heavy speaker cables such as "Monster cable". Finding a spade lug that will both fit the #6 screws on the barrier blocks and the heavy wire can be a problem. A simple and inexpensive solution is to modify spade terminals intended for larger screw sizes. An example is Gardener Bender terminals (10-116) available at Lowes building supply stores. These are intended for 12 - 10 AWG wire and #8 - #10 screws. Simply spread the two "fingers" using pliers and bend them back on a tighter radius. This looks to be difficult but is actually very easy to do.

Two-way operation

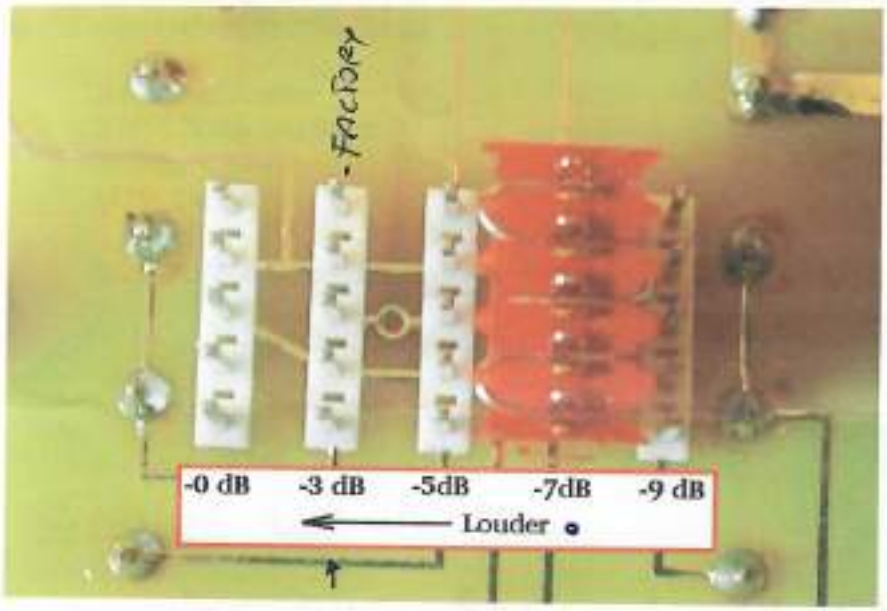
A two-way strap may be installed to connect the high frequency output of the woofer / squawker crossover back to the transformer. In this configuration all frequencies above the crossover will go through the transformer to the high frequency driver. The strap connects the **Mid in** to the **High out** barrier block connections.

Three-way operation

When a separate tweeter is to be used in a three-way configuration the two-way strap can be removed and replaced with a three wire cable that will carry everything above woofer's range to a separate squawker / tweeter crossover network. It will also carry the frequency range for the squawker back to the transformer. The barrier block is marked green, white and black for the cable that is provided with the ES5800 network. Any passive crossover designed for an 8 Ohm system may be used.

NOTE: The photographs are of the ES700T network. The AP12 series networks are marked the same way and the connections are the same.

ES5800 Squawker / tweeter network



The 5800 Hz squawker / tweeter crossover provides an adjustable attenuator equalize the tweeter level with the squawker. Normal settings with the Klipsch K77 and most quality tweeters will be -5 or -7 dB. Higher numbers result in lower tweeter levels. Moving the plug to the right results in quieter highs and a "softer" sound. -9 dB is the softest setting and 0 dB is the loudest highs resulting a "crisper" sound. As with the tap settings for the squawker, what sounds right is right!

The ES5800 is designed to operate with the ES700T, ES600T, ES500T or AP12 sereis woofer / squawker networks. A 3-wire cable is provided that carries everything above woofer frequency range to the ES5800 and returns the squawker signal (below 5800 Hz) back to the transformer located on the woofer / squawker network. The barrier block terminals are marked green, white and black corresponding to the wire colors in the cable. The tweeter is connect to the barrier block on the ES5800.

Installation

Place the old screws through the holes in the new network and tap each lightly with a small hammer. This will make marks which will locate where to drill pilot holes. It is not recommended that you tighten the mounting screws completely. These should be left about one quarter turn from tight. This will prevent the bottom cushions from being compressed.

Make sure each driver is connected to the connections marked for it on the network and that the + terminal is connected to the + terminal of each driver.

Power handling

No extreme measures have been taken to protect the tweeter from damage caused by high power levels. These protection circuits cause distortion and are therefore considered inappropriate for an upgrade designed solely for improved sound quality such as this. The extreme filter slopes used in the ES5800 network reduce unwanted low frequencies very rapidly. This allows the tweeter to operate at a lower average level for any given volume setting than with normal first, second or even third order crossover networks. Keep in mind however that extreme

levels will either blow the woofer fuse or the tweeter! In the case of two-way operation, a high frequency wide range driver is also better protected from low frequencies by extreme-slopes but is still vulnerable to extreme levels.

ALK Engineering
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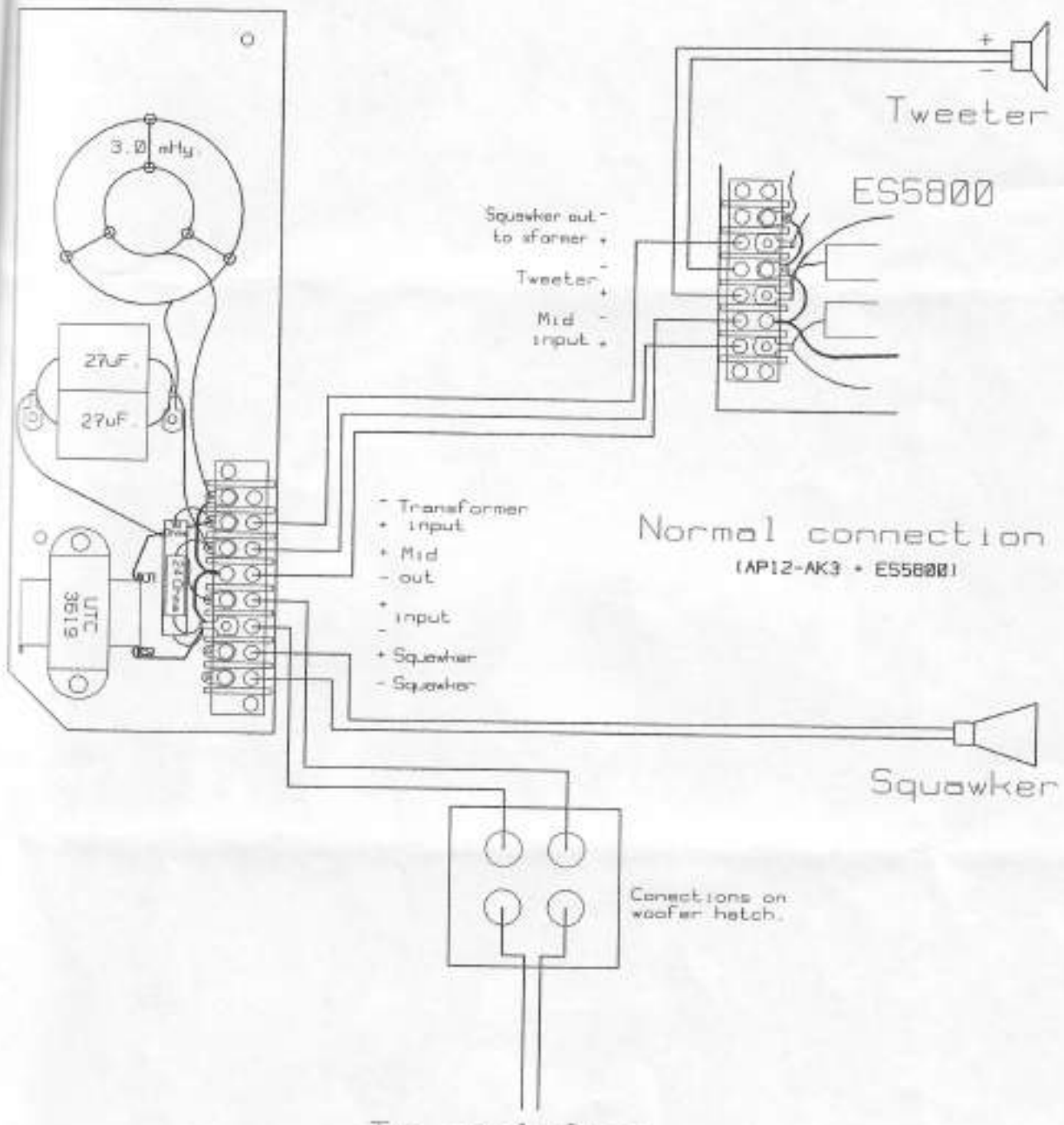
Salisbury, Maryland 21801
(410) 546-5573

http://www.alkeng.com

SETTINGS 18-12-2006

SQUAWKER = 1 - 5 (- 3,6 dB)

TWEETER = - 3 dB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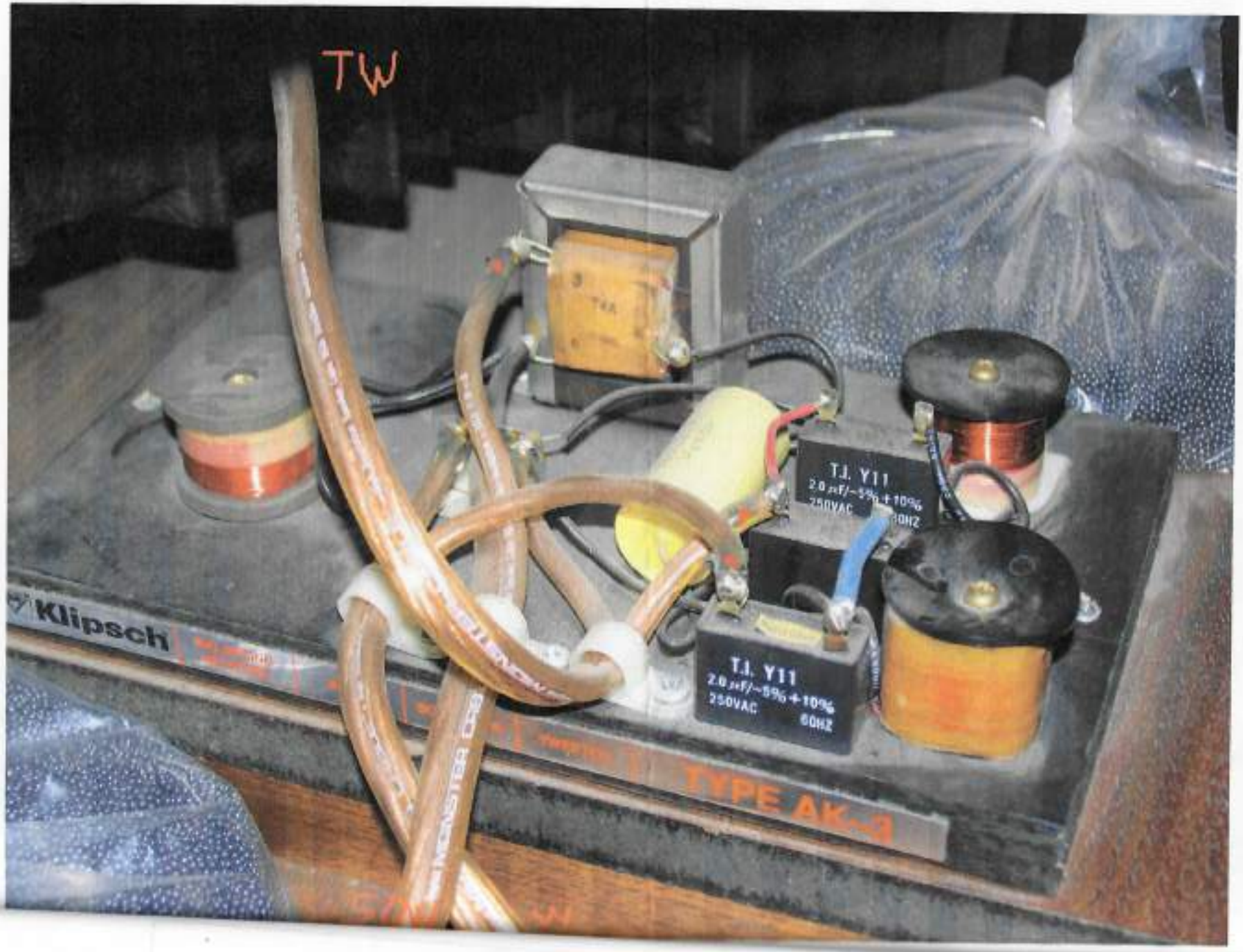
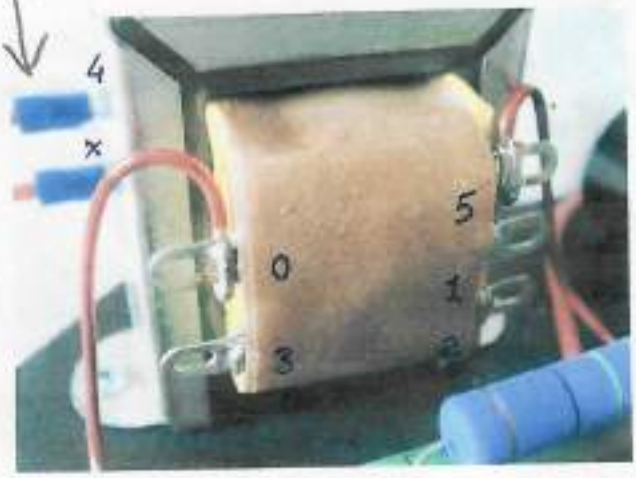
3619
Squawker out
to xformer +
-
Tweeter
+
Mid -
input +
Tweeter
+
-
ES5800
- Transformer
+ input
+ Mid
- out
+
input
-
+ Squawker
- Squawker
Normal connection
(AP12-AK3 + ES5800)
Squawker
Conections on
woofer hatch.
To amplifier


TW
Klipsch
T.J. Y11
2.0 mF/-5% +10%
250VAC
60HZ
T.J. Y11
2.0 mF/-5% +10%
250VAC
60HZ
TYPE AK-3

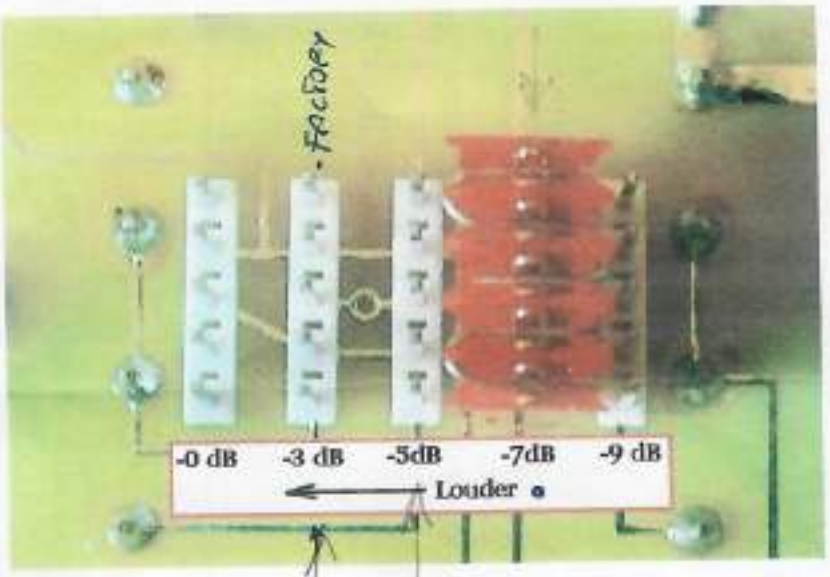

TW
Klipsch
T1 Y11
T1 Y11

01/02/2011

Plug (-)	(+)	Attenuation dB	Δ	
x	5	2.6	0	
1	5	3.4	−0,8	
0	4	3.8	−1.2	12/2008 →
2	5	4.6	−2	
x	4	6.2	−3.6	FACTORY → Normal settings
0	3	6.7	−4.1	*
1	4	7.4	−4.8	*
0	2	9.5	−6.9	
x	3	10.4	−7.8	
0	1	12.5	−9.9	
0	x	15.4	−12,8	



0-3	7.8	5.2
1-4	7	4.4



28/12/2008

RILEVATI

x-5	0
1-5	-0.8
0-4	-1
2-5	-2
x-4	-3.6
1-4	-4.4
0-3	-5.2

01/02/2011