Datasheet & Technical Information

Rev: 2024-02

3-Series Speakers

5-Series Speakers
5-Series Cable
5-Series STEREO Amplifier

7-Series Speakers
7-Series MONO Amplifier
7-Series DC/DC Converter

Z-Series Speakers

Z-Studio Speakers
Z-Studio 4C Amplifier

Technical information

Micro Precision 3-Series Crossover Version 1.1

Ausstattung der „Micro-Precision“ Frequenzweiche Serie 3.
Epoxydharzplatine, Glasfaserverstärkt mit 75 µm Cu Auflage (doppelte Auflage !). Layout mit kurzer Signalführung. Luftspule mit 1.4 mm Drahtstärke für maximalen Dämp- fungsfaktor und geringste Verluste. Angepasste Phase- nentzerrung für “Serie 3 Basselemente”. Mundorf MKP Kondensator mit nur 3% Toleranz.

Anschliessen der „Micro-Precision“ Frequenzweiche Serie 3.
1. Verbinden Sie die Ausgänge der Signalquelle (Radio oder Endstufe) mit „+Amplifier“ und „-Amplfier“ der Weiche.

2. Verbinden Sie das Bass/Mitteltonelement mit „+ Tiefmitteltöner (3)“ und „- Tiefmitteltöner (4)“. Achten Sie darauf, das bei Verwendung von „dicken“ Kabeln, keine Berührungen mit anderen Klemmen auf- treten.

Verbinden Sie den “- Pol” des Hochtöners mit Klemme 6.
Verbinden Sie den “+Pol” des Hochtöners mit Klemme 5.

Wenn der Hochtöner zu laut ist, drehen sie bitte den roten Jumper um 90 Grad um den Vorwiderstand zu aktivieren. Die Absenkung ist 2 dB.
Zum Schluss tauschen sie bitte die Polarität des Hochtöners um festzustellen welche Variante ein stimmigeres Klangbild ergibt.

Configuration of the "Micro Precision" crossover 3-Series.
Epoxy resin circuitboard, glass-fiber reinforced with 75 µm cu edition (doubled edition!). Layout with short signal guidance.
Aircoil with 1,4 mm of wire strength for max. damping-factor and low loss. Adapted phasecorrection for "Series 3 basselements”. Mundorf MKP condenser with only 3% tolerance for the tweeter.

Attach the "Micro Precision" crossover “Series 3”.

1. Connect the outputs of the signal source (radio or amplifier) with “+ Amplifier” and “- Amplifier” on 1+2.

2. Connect the 3.16 MK II Bass-Midrange item with "+ bass-mid(3)" & "- bass-mid (4)".
Pay attention when thick cables are used. No contact with other clamps should exist !

3. Connect the tweeters with clamp 5 and 6.
If tweeterlevel is to high, please turn the jumper 90 degree to activate the 2 dB. damping by resistor.

Finally exchange the polarity of tweeter (left&right) to determine which version a better result in.

Technical Data

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5-Series

Technical information

Micro Precision 5.28 MK II Tweeter

The **5.28 Tweeter** is a typical, long lasting Micro-Precision product. Work on details over many years.

History :

MK I : 1999-2005
MK II : 2005 > ….

2008-03 : Engraving „5“.
2014-01 : New text engraving.
2019-11 : New backside design.
2019-11 : Selected pair delivery.

Technical Data

Height total	29 mm	FS	1400 Hz
Outer Diameter	56 mm	Sensitivity	90 dB 2,83V/1m.
Cutout Diameter	43 mm	R-DC	3,2 Ω
Interior Depth	14 mm	Power handling	60 W
Drillcircle	49 mm / 120 deg.	Voicecoil	Aluminium
		Voicecoil diameter	28 mm
		Membrane	Coatet Silk
		Recommended . Filter	3000 Hz / 6dB
Weight	0.150 kg / Pair		

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Technical information

Micro Precision 5.8 Fullrange

History :
The 5.8 project started in the year 2003 with a yellow Glassfibermembrane.

2006-04 - The current model.
2013-11 - Improved magnetsystem.
2015-08 - Improved magnetsystem
2021-05 - Updated TSP & Simulation.

Details :
The 5.8 Widerange uses a very low weight paper membrane and paper voicecoil. This results in an extended frequencyrange from 150 Hz. up to 20.000 Hz.
The natural papermembrane has no coloration on midrange and, comparing to the small size, a full bodied sound.

The 5.8 can be used in cabinets from 1-20 Liter and should be highpassed.
150Hz. Slope 6 or 12dB/octave.

Technical Data

Height total [mm]	53,5	FS	125 Hz.
Outer Diameter [mm]	93,5	Moving Mass	2,1 gramm
Cutout Diameter [mm]	73	Impedance	8 Ω
Interior Depth [mm]	50	Powerhandling	30 W
Drillcircle [mm]	84.5 / 4.2 mm holes.	Voicecoil	Paper
		Voicecoil diameter	15 mm
		Membrane	Paper
		Recommend Filter	120 Hz - oo
Weight	0,870 Kg / Pair	Update	05.2021

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Technical information

Micro Precision 5.8 Fullrange

Measure		Unit
Re	6,60	Ω
Fs	125	Hz.
Qes	0,95	-
Qms	5,9	-
Qts	0,83	-
Le	0,2	mH.
VAS	0,98	Liter
Mms	2,07	Gramm
Cms	748	µM/Newton
Eff.	86	1W. / 1M.
Diam	62	mm.
Rms	0,28	R

Liter	Q	f3
0,2	2,02	313
0,5	1,42	220
1	1,17	178
2	1,01	156
5	0,9	140
10	0,86	133
20	0,84	131
100	0,83	128
200	0,82	128
Vented	**D/L cm**	**f3**
4,2	3/9	58

Cabinetdimension examples.

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Technical information

Micro Precision 5.16 MK II Basselement

History :
The 5.16 MK I Basselement was the first Micro-Precision product. I was constructed in 1999 to solve a lot of install problems. The production was not changed from 1999 - 2013. The product is successful and installers all over the world love to know the result before install.

Details MK I (1999-2013) :
Widerange to have perfect coupling to tweeter.
A lightwheight, open basket for best venting.
The Magnet does not eliminate venting.
Magnet is vented and coppered inside.
Glass-fiber membrane is lightweight & strong.
Perfect parameters for installation in door.

Additional Details MK II :
Improved membrane geometry.
CNC made magnetsystem.
DSP magnet surface.
New low loss surround.
Improved textile spider.

2017-07 : Improved by new glueing technology.
2021-08 : Improved by new spider parameter.
2022-01 : Improved backside design.

Technical Data

Height total [mm]	70	FS	49 Hz
Outer Diameter [mm]	170	Moving Mass	10 Gramms
Cutout Diameter [mm]	147	Impedance	4 Ω
Interior Depth [mm]	65	Power handling	70 W.
Drillcircle [mm]	162	Voicecoil	GF
Basket	Magnesium	Voicecoil diameter	25 mm
		Membrane	Glasfiber
		Recommended Filter	40 - 5.000 Hz.
Weight	1.4 Kg / Pair	Update :	08-2021

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Technical information

Micro Precision 5.16 Basselement

Parameter after 24 Hours burn in.

Measure		Unit
Re	4,1	Ω
Fs	43	Hz.
Qes	1.05	-
Qms	7.15	-
Qts	0.91	-
Le	0,19	mH.
VAS	30.0	Liter
Mms	11.32	Gramm
Cms	1200	µM/Newton
Eff.	89	dB 2.83V/1m
Rms	0.42	R

Liter	Qtc	f3
1		
2		
5		
10		
20		
100		
200		
Vented	**D/L cm**	**f3**
35		
70		

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Technical information

Micro Precision 5-Series, 2-Way Crossover 2014

Ausstattung der „Micro-Precision“ Frequenzweiche für 2-Wege Systeme.

Passive Systeme Systeme sind Aktiven Lösungen in einigen Bereichen überlegen. Das trifft jedoch nur zu, wenn die Qualität der Passivweiche hohen Standards entspricht.
Alle Micro-Precision Passivweichen entsprechen den hohen Anforderungen die von ambitionierten Anwendern gestellt werden.

1. Epoxydharzplatine, Glasfaserverstärkt
2. 75 µm Kupferauflage (doppelte Auflage).
3. Layout mit optimaler, kurzer Signalführung.
4.Luftspule 1.4mm Draht für maximalen Dämpfungsfaktor.
5. Zwei MKP (Polypropylen) Kondensatoren mit nur 5% Toleranz für flexible Hochtontrennfrequenzen.
6.Induktionsfreie Metalloxydwiderstände für Pegel-anpassung ohne Klangverlust.
7. Getrennte Eingänge für Bi-Amping.
8. 6dB Filter für optimale Dynamik.

Micro-Precision passiv crossover 5-Series 2014

Passiv speakersystems have some advantages comparing to activ systems. But this only happens when crossovers are produced on a very high standard.
All Micro-Precision crossovers are produced on a very high standard to satisfy the ambitious owner.

1. Expoxy resin board, glassfiber reinforced.
2. Double copperlayer.
3. Optimized, short signalpath.
4. 1.4mm aircoil. High dampingfactor and zero distortion.
5. Two MKP 5% Capacitors allow flexible tweetercontrol.
6. MOX resistors without induction.
7. Bi-Amping without problems.
8. 6dB filtering for best dynamic´s

This advanced model of passive crossover should be used only with the 5.16 MK II Basselement and all „Micro-Precision“ tweeters.

Technical Data

Height		Bass-Midrange	6dB + Phase EQ.
Outer dimension			
Weight		Tweeter	6dB / 3 crosspoints.

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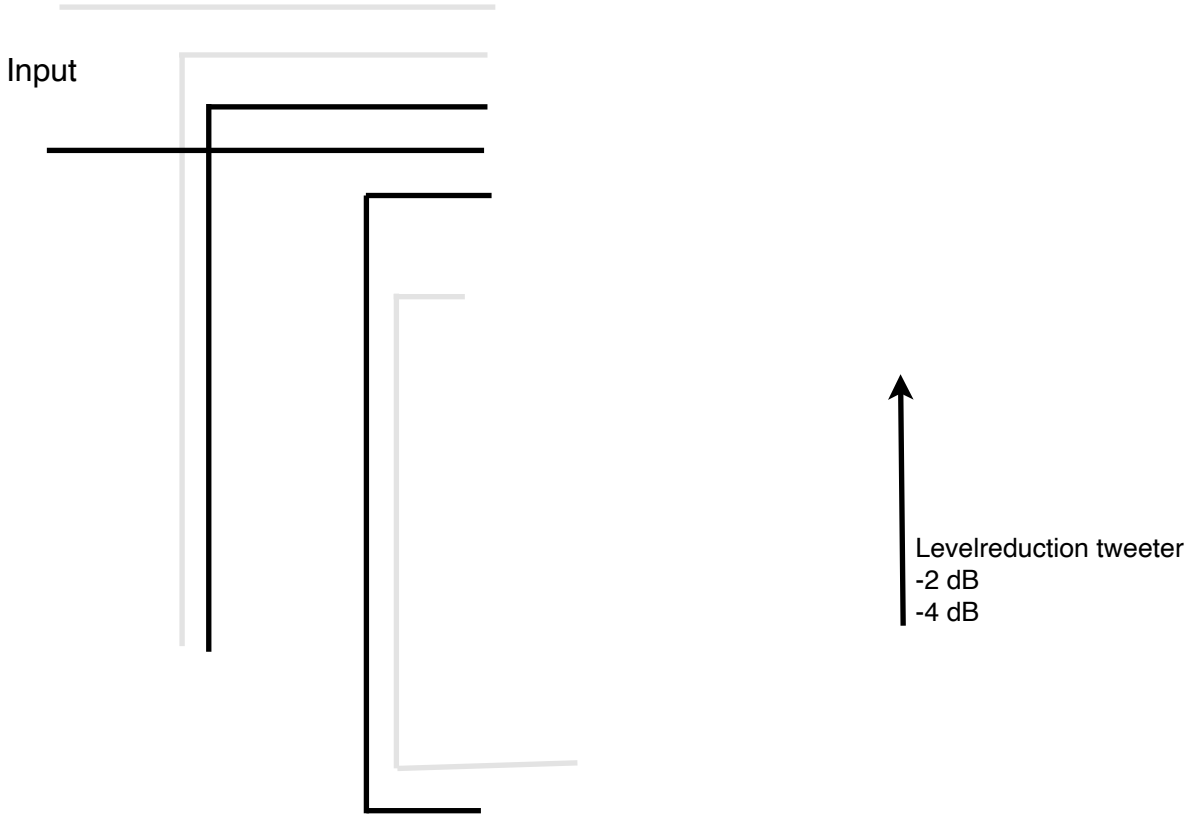
Technical information

Micro Precision 5-Series, 2-Way Crossover 2014

Basic connection with 5.28 Tweeter :

On this connection diagramm you see the standard configuration. The tweeter is connected to the „normal“ crossoverpoint.
If you prefer a deeper crossoverpoint, you have to connect the 5.28 to „TWL“. Please note, the deep crossoverpoint gives extra energy to the tweeter.



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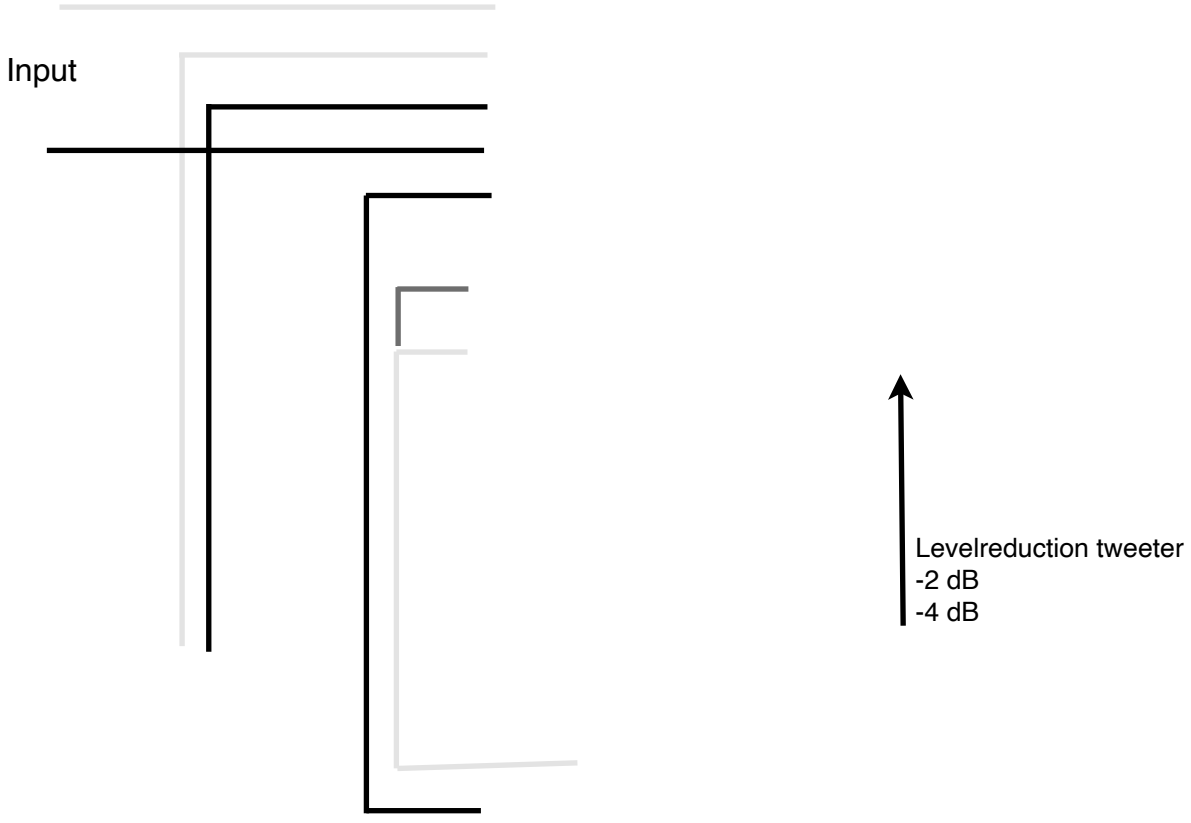
Technical information

Micro Precision 5-Series, 2-Way Crossover 2014

Basic connection with 7.28 Tweeter :

On this connection diagramm you see the standard configuration. The tweeter is connected to the deeper „TWL“ crossoverpoint.
If you prefer a **more** deeper crossoverpoint, you have to create a cable bridge from „TWL“ > „TWN“. Please note, the extra deep crossoverpoint gives extra energy to the tweeter.



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5-Series STEREO Amplifier. Clean industrial design.

Technical features.

1. Internal „Dual Board Design“. Splitting the power supply from the analog amplifier board to prevent radiation from power supply on signalpath. Very short and topology symmetrical signal path to prevent loss of detail.

2. Power supply input voltage from 9V to 15.5V DC. The unregulated powersupply gives more power by higher input voltage.

3. 12 V stepup converter to rail voltage from : +/-30V up to +/-40V (depending on input voltage / battery).

4. High grade, long lasting 105°C caps in all supply circuits. „Mundorf M-Lythic®“ Low ESR Power Capacitors 125°C on rail / main power storage.

5. 12.000 Ohm impedance input, low capacitance. DIP switch selector for input level with 1% tolerance metal resistor divider. No potentiometer in signalpath.

7. Dedicated „Sanken ®“ (JAPAN) Darlington transistors. Solid state technology with audiograde parts. Handassembling. No SMD.

9. Protections for reverse input voltage, output short circuit and DC voltage on speakeroutput, thermal shut off @ 90°C (analog sensor).

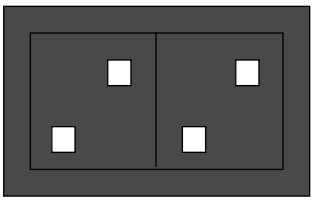
10. 4 mm. laboratory grade banana terminals for perfect speaker connection.

11. PCB wide copper tracks thickness 100 micron, gold plated to lower internal resistance.

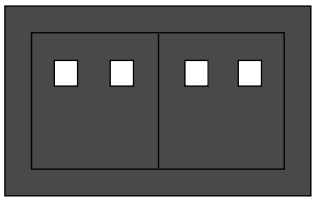
12. Full balanced current circuit for low distortion, extended response and stable bias during temperature change.

Technical features.

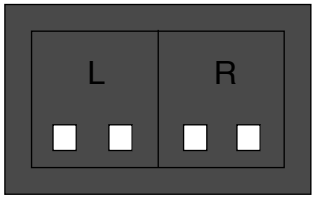
Setting the input sensitvity switch L&R.



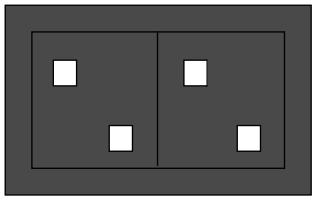
0,7 Volt / Gain 28



1,4 Volt / Gain 14



2,1 Volt / Gain 9,1



4,2 Volt / Gain 4,6

The input switch is used to have exact sensitvy on all channels. Potentiometers are not precise and not long time stable.

The sensitivity in VOLT declare the input voltage you need to get the full output (90 Watt / 19 Volt RMS).

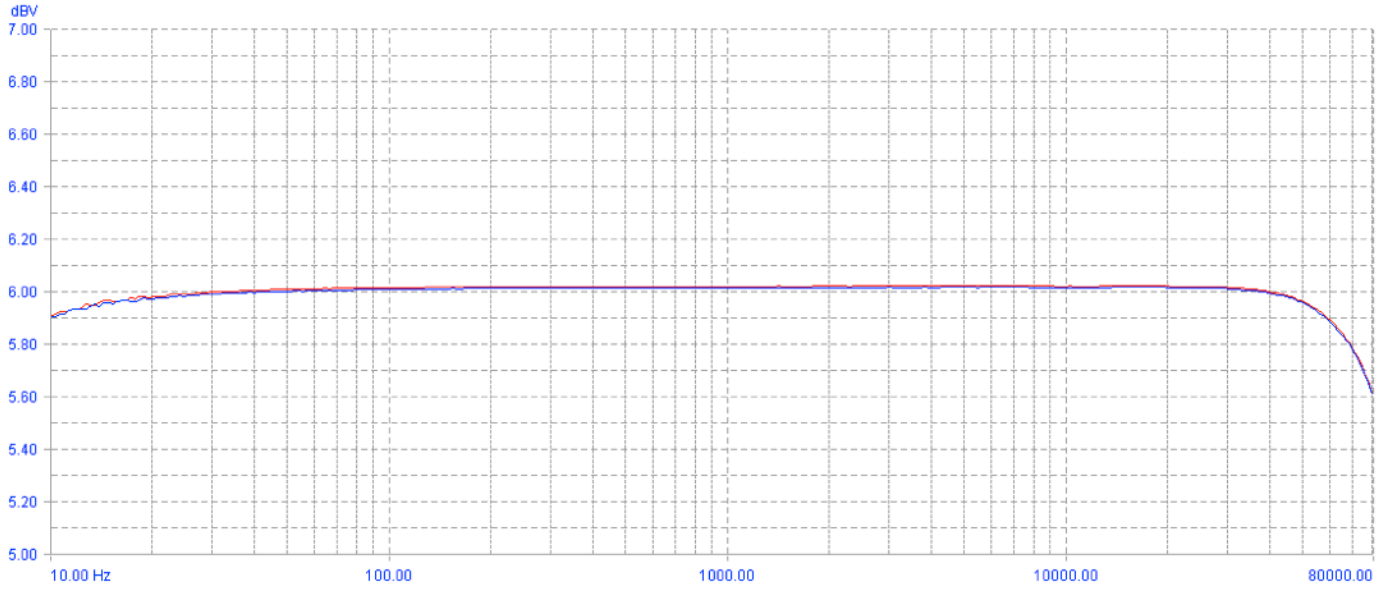
The gain parameter is the voltage amplification factor. For example :

0.7 Volt in = 19,1 Volt out.
1,4 Volt in = 19,1 Volt out.
2.1 Volt in = 19,1 Volt out.
4.2 Volt in = 19,1 Volt out.

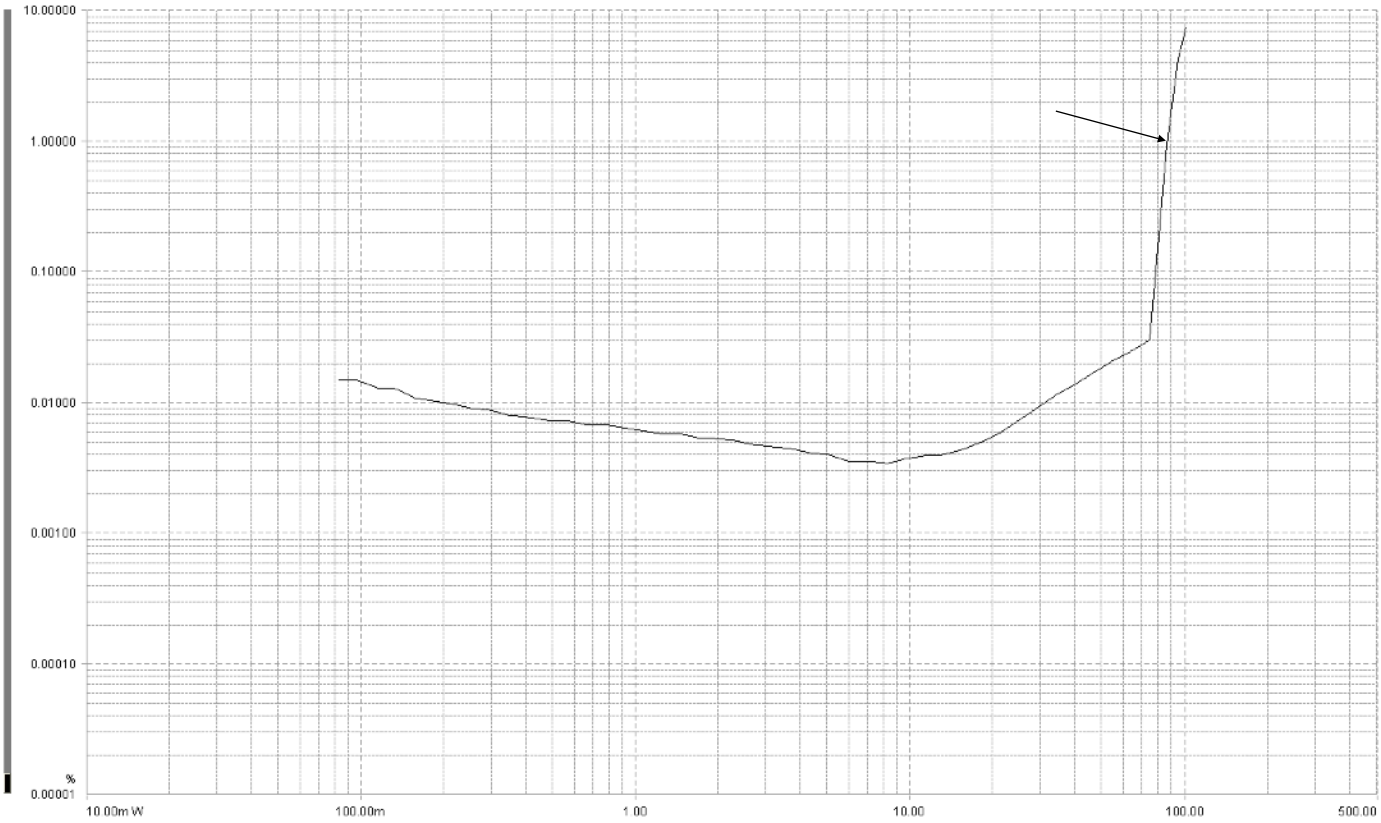
Technical specification 5-Series Stereo Amplifier.

Power : 2 Channel @ 13.8 Volt	
Power Typical @ 4 Ohm 1% THD	90 Watt
Power Typical @ 2 Ohm 1% THD	170 Watt
Power : 1 x in bridged mode	
Power Typical @ 8 Ohm 1% THD	-
Power Typical @ 4 Ohm 1% THD	-
Distortion K2 @ 1 Watt	0,003 %
Distortion K3 @ 1 Watt	0,004 %
Powersupply Frequency	48 kHz
Powersupply F.Resident	-67 dB
Frequency Response -1 dB	185.000 Hz
Frequency Response -3 dB	300.000 Hz
Tolerance R/L Channel	<> 0,06 dB
Signal / Noise Ratio	<> 112 dB
DC Offset on speaker output.	<> 0,1mV
Remote current.	2,50 mA
Idle current.	0,8 A
Stand by - No remote.	4 uA
Remote delay switch on	0,5 sec.
Remote delay shut off	0,3 sec.
Input impedance	12 kOhm
Input capacity	10 nF.
Damping Factor 10 Watt 100 Hz.	82
Damping Factor 10 Watt 1.000 Hz.	90
Damping Factor 10 Watt 10.000 Hz.	90
Turn on voltage min.	8 Volt
Shut off voltage.	8 Volt
Shut off thermal	+90 Cels.
Dimension	
Lenght	305/340mm
Wide	100mm
Hight	65mm
Weight	2.5 kg / net / pc.

Technical features.



Channel left & right @ 0.1 dB resolution. Both channel are 100% the same freq.response.



Outputpower @ 13.8 Volt = 2 x 90 Watt.

7-Series

Technical information

Micro Precision 7.28 MK III & MK IV Tweeter

History.

The 7.28 is a long term, traditional Micro-Precision product. Since year 2001, when MK I was born, we use the same dimension and design.
This consequent way gives a possibility to update or upgrade 10 years old tweeters to the latest technology, used in the 7.28 MK III M2M.
The 7.28 MK III is a 100% handmade by „Micro-Precision“ product.

Features :

CNC made aluminium housing.
CNC magnetsystem 1/1000mm tolerance.
Linear : 800Hz-22.000Hz +/-2dB.
Low FS to create perfect 2-way´s.
Hexagon grill for best dispersion.
Strong terminal.
Mountingaccesories available.

01.2008 MK III
07.2021 MK IV

Technical Data

Height total	48 mm	FS	840 Hz
Outer Diameter	56 mm / 43 mm (o.R)	Sensitivity	90 dB 2,83V/1m.
Cutout Diameter	40 mm	R-DC	3,5 Ω
Interior Depth	26 mm	Power handling	100 W
Drillcircle	48.5 mm / 120 deg.	Voicecoil	Aluminium
		Voicecoil diameter	28 mm
		Membrane	Coatet Silk
		Recommended . Filter	2500 Hz / 6dB
Weight	0.300 kg / Pair	Updated :	12. 20

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Technical information

Micro Precision 7.28 MK III Tweeter

You want to reduce the tweeter level in a passive, personal setup ? No problem.
Using a Micro-Precision crossover, just add a resistor in the „plus“ line of cable. The real reduction (measured, not by computer calculated level) is shown in the sheet.

Also available :
A version in black on special request.

Also available :
A small version on special request (7.28or).

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Technical information

Micro Precision 7.16 MK III Bass-Midrange

Natural substance membrane.
No soundcoloration.
Magnesium Basket.
Non inducting voicecoil former.
Lightweight & widerange construction.

History :
MK I : 2002 - 2004
MK II : 2004 - 2014
MK III : 2014 - x

Features MK III
New logo design on dustcap,
Reduction of moving mass < > 20%
Extreme low loss rubber surround.
New spider (6 rows) to improve linearity.
Internal aluminium shielding in Magnet to reduce K2/K3 distortion.

MK III : 05.2014
MK III : 01.2017. Improoved magnet.
MK III : 08.2017. Reduceing weight by new glueing tech inside.
MK III : 08.2017. New membrane geometry.
MK III : 07.2019. New upper poleplate design internal. New voice coil position.

Technical Data

Height total [mm]	73	FS	50
Outer Diameter [mm]	170	Moving Mass	9.3
Cutout Diameter [mm]	145	Impedance	4 Ω
Interior Depth [mm]	68	Power handling	60 W
Drillcircle [mm]	162	Voicecoil	NOX
		Voicecoil diameter	25 mm
		Membrane	Natural substance
		Recommended Filter	HP 63Hz/18dB
Weight	2.2 Kg / Pair		

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Technical information

Micro Precision 7.16 MK III Bass-Midrange

Measure		Unit
Re	4.2	Ω
Fs	49.9	Hz.
Qes	0,69	-
Qms	10.9	-
Qts	0.65	-
Le	0.10	mH.
VAS	23,24	Liter
Mms	9.34	Gramm
Cms	1085	µM/Newton
Eff.	88.7	1W. / 1M.
Diam	130	mm.
Rms	0.26	R

Liter	Q	f3
1		
2		
5		
10		
20		
100		
200	-	
Vented	**D/L cm**	**f3**
56		
20		
35		

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7-Series MONO Amplifier. Clean industrial design.

Technical features.

1. Internal „Dual Board Design“. Splitting the power supply from the analog amplifier board to prevent radiation from power supply on signalpath. Very short and topology symmetrical signal path to prevent loss of detail.

2. Power supply input voltage from 9V to 16V DC. Unregulated power supply type to prevent modulation by regulation.

3. 12 V stepup converter to rail voltage from : +/-30V up to +/-40V (depending on input voltage / battery). Same voltage for all stages, input, drivers and final transistors.

4. High grade, long lasting 105°C caps in all supply circuits. „Mundorf M-Lythic®“ Low ESR Power Capacitors 125°C on rail / main power storage.

5. 20.000 Ohm impedance input, low capacitance. DIP switch selector for input level with 1% tolerance metal resistor divider. „Nichicon Muse NP®“ capacitors in signal path. No potentiometer in signalpath.

6. Total discrete (no IC), double differential amplifier in double cascode configuration with current source mirror, for high input-output isolation. High impedance input and output, high bandwidth up to 150.000 Hz @ -3dB.

7. Power stage in triple darlington configuration with Sanken final transistor with very low VCE saturation. Dedicated „Sanken ®“ (JAPAN) drivers transistors.

8. “SilverMica®“ capacitors for feedback and compensations. Long term stable multi-turn trimmer for bias setup.

9. Protections for reverse input voltage, output short circuit and DC voltage on speakeroutput (both through relais), thermal shut off @ 85°C (analog sensor).

10. 4 mm. Laboratory grade banana terminals for perfect speaker connection.

11. PCB wide copper tracks thickness 100 micron, gold plated to lower internal resistance.

Clean industrial design.

In audiosystem / signalchain the correct and precise levelmatching is important. In modern systems the signalsource is a digital source (DSP) with a precise outputlevel. The connected amplifier input should be same precise as source output.

Potentiometers have no exact level setting position and also on the long term instable because of temperature, vibration and aging. Potentiometer material & construction is almost not good for signal transportation.

Our solution is the „4 digit multiswitch“ witch allow 16 different configuration on input sensivity. High precision, long term stable and no problem in signal path. Set the input switch to the output voltage of CD/ DSP/PREAMP regarding the sheet below. The level tolerance between S7-Mono amplifiers is 0.08 dB only.

Example (blue) :

Switch 1&2 up, switch 3&4 down = 1100 = 3.9V input for full output.

	Switch 1	Switch 2	Switch 3	Switch 4
Input / Volt				
1	0	0	0	0
1.2.	0	0	0	1
1.4.	0	0	1	0
1.6.	0	0	1	1
1.8.	0	1	0	0
2.0	0	1	0	1
2.2.	0	1	1	0
2.4.	0	1	1	1
3.1.	1	0	0	0
3.3.	1	0	0	1
3.5.	1	0	1	0
3.7.	1	0	1	1
3.9.	1	1	0	0
4.1.	1	1	0	1
4.3.	1	1	1	0
4.5.	1	1	1	1

Aspect of individual design.

Because of the „Industrial Design“ construction it is easy to do some individual changes on the outer appearance. The top plate can be ordered in many differnt color and design patterns. As an example we show a pattern in wood design on this page.

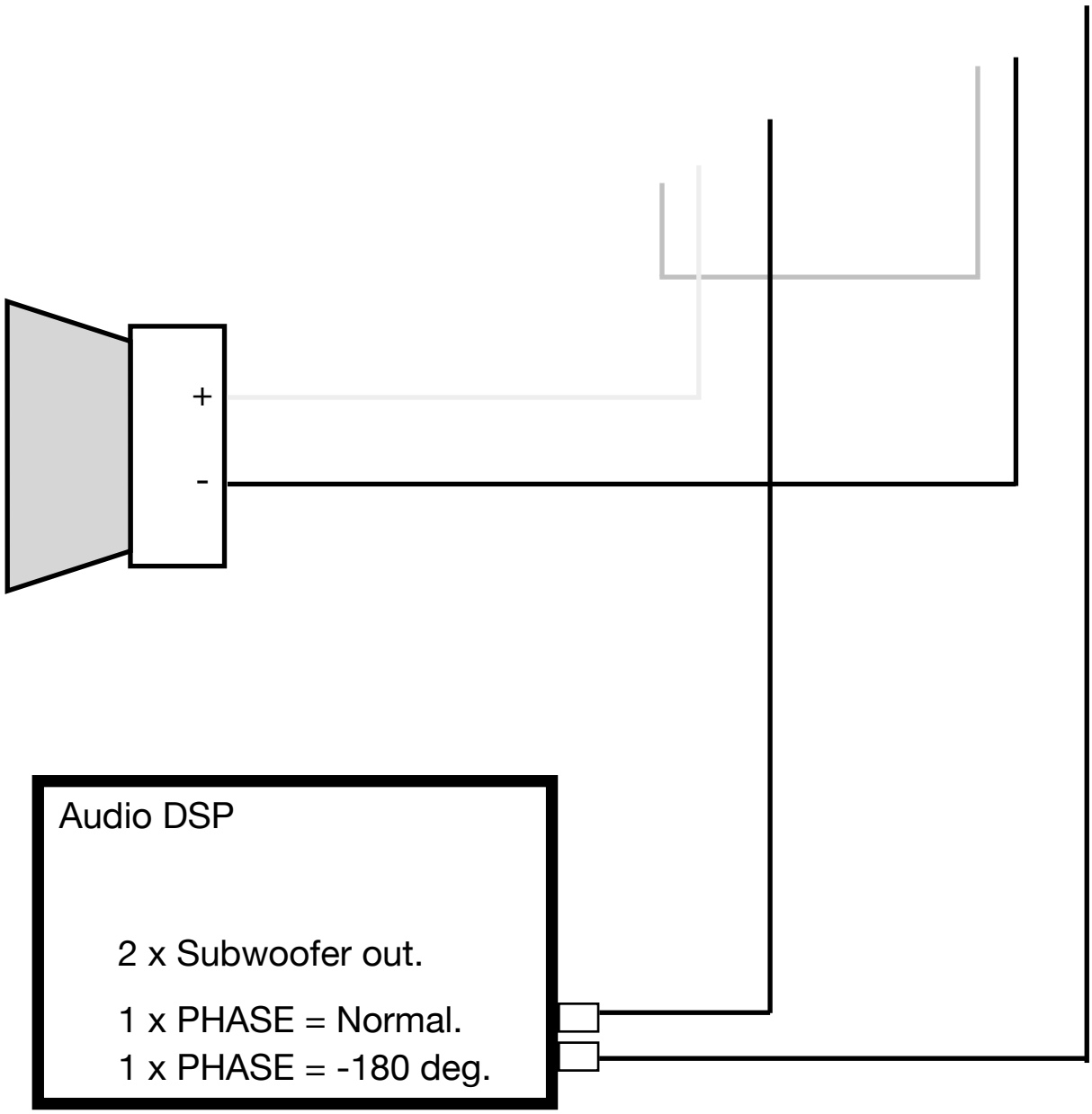
As a standard the amplfier is delivered in „white letters on matte black“.

Technical specification.

7-Series MONO Amplifier

Power : 1 X MONO @ 13.8 Volt	
Power Typical @ 4 Ohm 1% THD	150 Watt
Power Typical @ 2 Ohm 1% THD	280 Watt
Power : 2 x MONO in bridged mode	
Power Typical @ 8 Ohm 1% THD	300 Watt
Power Typical @ 4 Ohm 1% THD	500 Watt
Distortion K2 @ 1 Watt	0,001 %
Distortion K3 @ 1 Watt	0,001 %
Powersupply Frequency	43 kHz
Powersupply F.Resident	-83 dB
Frequency Response -1 dB	85.000 Hz
Frequency Response -3 dB	150.000 Hz
Tolerance R/L Channel (2 Amplifiers)	<> 0,08 dB
Signal / Noise Ratio	<> 112 dB
DC Offset on speaker output.	<> 1mV
Remote current.	3,00 mA
Idle current.	1,2 A
Stand by - No remote.	0,20 uA
Remote delay switch on	2,0 sec.
Remote delay shut off	0,1 sec.
Input impedance	39 kOhm
Input capacity	1 nF.
Damping Factor 10 Watt 100 Hz.	2073
Damping Factor 10 Watt 1.000 Hz.	2050
Damping Factor 10 Watt 10.000 Hz.	2035
Turn on voltage min.	11 Volt
Shut off voltage.	7,8 Volt
Shut off thermal	+85 Cels.
Dimension	
Lenght	305/340mm
Wide	100mm
Hight	65mm
Weight	2.5 kg / net / pc.

S7 Mono in bridged mode.



S7 Mono in packaging.

The packaging is made in Germany. Industrial elegance with perfect surface and mechanism. Each set comes with full measurement paperwork (4 pages) from the Micro-Precision laboratory.

7-Series DC/DC Converter. Clean industrial design.

How to use.

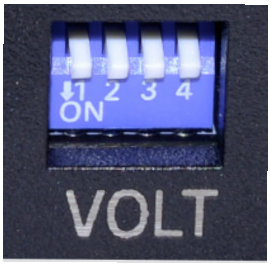
This DC/DC converter can drive most of the amps on market. The increase on amplifier input voltage can result in more output power and higher dynamics. The effect is depending on the amplifiere construction. **Please ask expert about the possibility**.

Micro-Precision amplifiers have internal power supplies and input stages that benefit a lot on the increasing voltage. Important is a very good power cabeling & distribution.

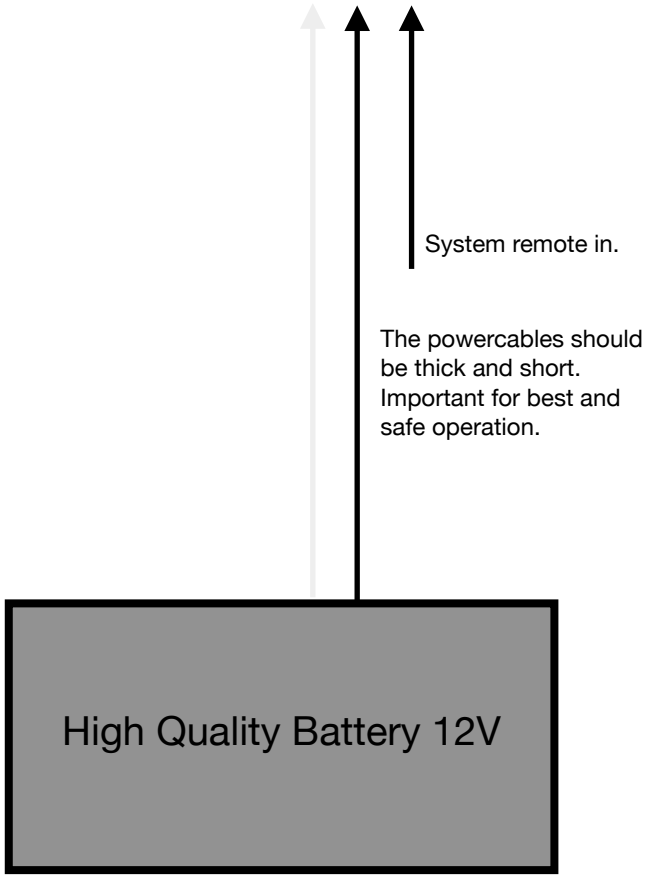
The 7-Series DC/DC converter can run 6 piece of 7-Series MONO for front system easyly. For low impedance subwoofer amplifier we do not recommend.

DIP Switch Configuration.

Switch	Output
0000	12,60 Volt
1000	12,80 Volt
1100	13,20 Volt
1110	14,00 Volt
1111	15,50 Volt
0001	14,20 Volt
0011	14,90 Volt
0111	15,30 Volt
1111	15,50 Volt

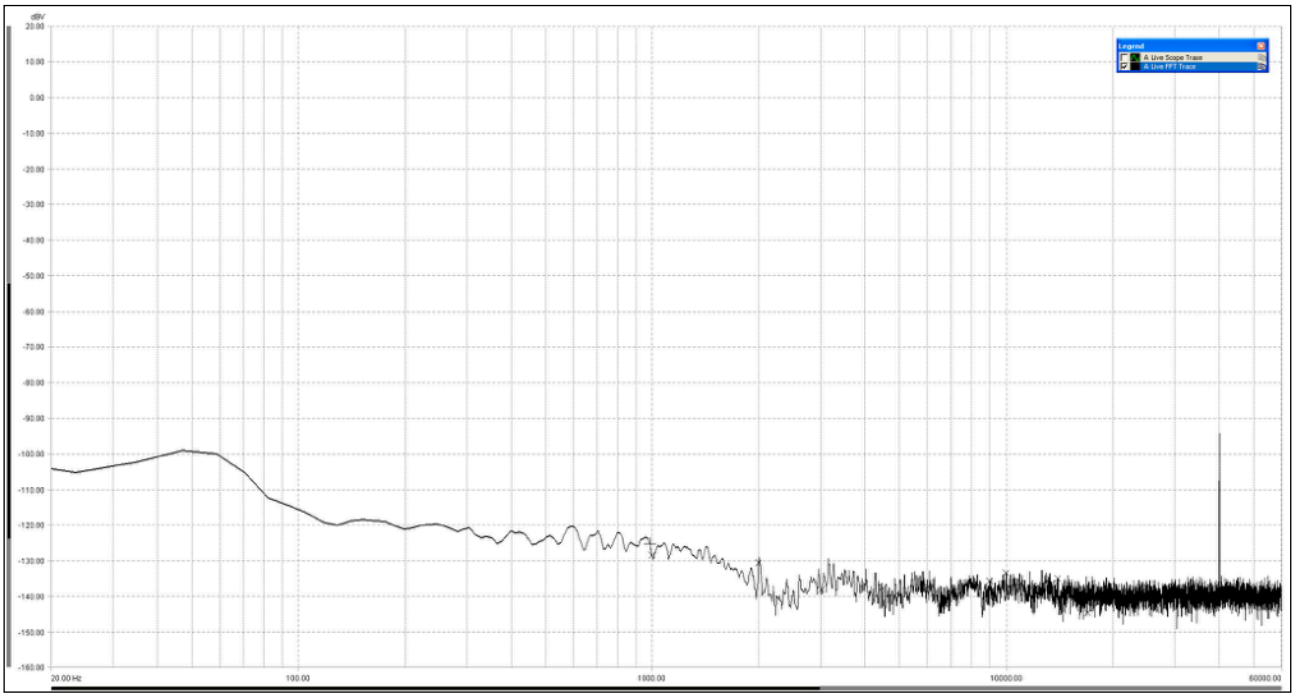


Example Setting :
1111 = 15.50V



Technical specification.

Maximum output current	90,00	Ampere
Maximum output voltage	15.50	Volt
Minimum input voltage	10,50	Volt
Internal loss	0,40	Volt
Idle current without load	0,040	Ampere
Remote output max.	0,500	Ampere
Thermal shut off	85,00.	Celsius
Switching frequency	40.000	Hertz
HF-Noise	-140,00	dB.
Fuses	3 x 30	Ampere
Dimension	340/310 x 100 x 65	mm



Z-Series

Technical information

Micro Precision Z-Series MK II Tweeter

After 10 years production the new Z-Tweeter MK II the new Z-Tweeter MK II is available.

The new Z-MK II Tweeter features :
100% CNC produced and carefully assembled.

A new, big chamber magnetsystem for less compression on higher listeniglevels. The magnetsystem is mounted on a 3-Point decoupler on the bottom. This prevents ringing and distortion from the housing.

Massive terminals with hexagonscrews.
Reduced „sharp -S- tones“ in vocals.
Damping with natural wool.

High level beyond 20.000 Hz.
Perfect impedancecurve.
Diameters similar to our 5 & 7-Series tweeters.

Technical Data

Height total	48 mm	FS	818 Hz
Outer Diameter	56 mm	Sensitivity	89 dB 2,83V/1m.
Cutout Diameter	40 mm	R-DC	3,5 Ω
Interior Depth	26 mm	Power handling	100 W
Drillcircle	48.5 mm / 120 deg.	Voicecoil	Aluminium
		Voicecoil diameter	28 mm
		Membrane	Coatet Silk
		Recommended . Filter	2500 Hz / 6dB
Weight	0.300 kg / Pair	Updated :	09. 2011

Technical information

Micro Precision Z-Series MK II Tweeter

Terminals :
Hexagon 1,5 or Torx T 6 Screwdriver.
The screw is M3*6mm.

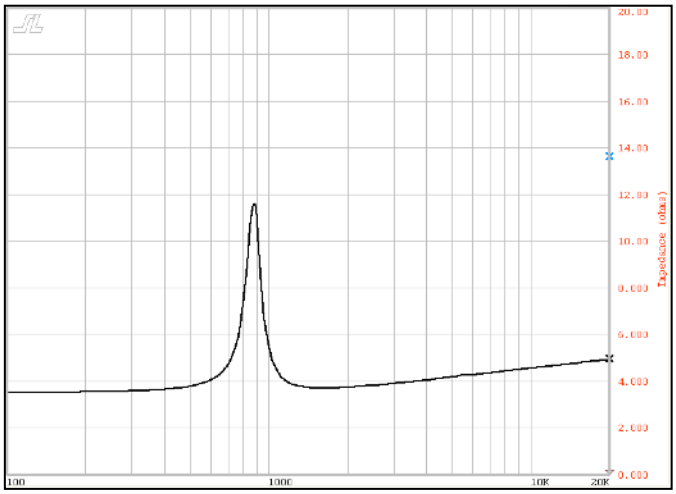
Terminals made for WBT0442.
2.5sqmm wire-end sleeve.

Please do not twist the terminals.
Please use flexible cables or thin solid core silvercables.

Filtering :
Passisve filters 8 μF (min) up to 15 μF (max).
Designed for 6dB/oct. filters.
In all our 5, 7 & Z-Crossovers we have the possibilty to add the two capacitors by connecting them in paralell.

Measurements :
Extreme low distortion from 1.000 > 20.000 Hz.
K2 < > 0,09% - K3 < > 0,05%

K2 & K3 distortion curve measured with reference equipment @ 2.83V.



Technical information

Micro Precision Z 170 MK IV Bass-Midrange

Please do not touch the membrane. Never.

Ask your local distributor to get more information.
Enjoy the wonderful sound after perfect install.

Thanks a lot.. Thomas Hoffmann

Technical information

Micro Precision Z 170 Bass-Midrange

Features :

The Z-170 MK IV, released „April 2009“.
The MK IV is the next evolution. Comparing to MK III improved magnet system with copper shielding. Less distortion, extended frequency response.

History :

Update 9.2011 :
New surround geometry with less mechanical resistance.

Update 11.2013 :
New spider, new voicecoil. Less mechanical resistance because of the new parts & geometry. QTC is now 0.7. New parameters on next page.

Update 10.2014 :
100% CNC made magnet system. Aluminium shielding inside.

New model 01.2024 CU M8 :
New, 100% CNC made magnet system with massive CU shielding inside. M8 Membrane.

Technical Data

Height total [mm]	74	FS	38 Hz
Outer Diameter [mm]	170	Moving Mass	12,2
Cutout Diameter [mm]	145	Impedance	4 Ω
Interior Depth [mm]	69	Powerhandling	60 W
Drillcircle [mm]	162	Voicecoil	Aluminium
		Voicecoil Diameter	25 mm
		Membrane	Z
		Filter	63 Hz / 18dB
Weight	2,1 Kg / Pair	Update	9. 2011

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Technical information

Micro Precision Z 170 MK IV Bass-Midrange

< 11.2013 Data after 24h.

Measure		Unit
Re	4,87	Ω
Fs	38,3	Hz.
Qes	0,57	-
Qms	3,33	-
Qts	0,49	-
Le	0,25	mH.
VAS	35,32	Liter
Mms	12,21	Gramm
Cms	1411	µM/Newton
Eff.	87,2	1W. / 1M.
Diam	130	mm.
Rms	0,88	R

> 11.2013 Data after 24h.

Measure		Unit
Re	4,15	Ω
Fs	47,83	Hz.
Qes	0,87	-
Qms	9,43	-
Qts	0,79	-
Le	0,20	mH.
VAS	22,51	Liter
Mms	12,3	Gramm
Cms	899	µM/Newton
Eff.	87,2	1W. / 1M.
Diam	130	mm.
Rms	0,39	R

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Z-Studio

Technical information

Micro Precision Z-Studio Tweeter

Features :
No tolerances.
Fully CNC made.
Very high efficiency.
Very strong magnetic field.
Very high dynamic & resolution.
Mounting accessory available.

History :
02.2008 > 1st. release.
08.2009 > Capton former.
05.2014 > Pure silver wire. No terminals.
01.2018 > Wires have now color „black&blue“.
01.2020 > **MK II** New membrane, voicecoil & magnet geometry.

Technical Data

Height total	35mm	FS	1150 Hz
Outer Diameter	67mm	Sensitivity	94dB/W/m.
Cutout Diameter	52,6mm	R-DC	3.8 Ω
Interior Depth	30mm	Power handling	140/600W.
Drillcircle	59,6mm	Voicecoil	CAPTON
Qts :		Voicecoil diameter	25mm
Re :		Membrane	Silk
FS :		Recommended . Filter	2200Hz/6dB/oct.
Le :		Updated :	1. 2020

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Technical information

Micro Precision Z-Studio Tweeter

Mountingacc. Aluminiumring & Screws.

How to use the Z-Studio Tweeter :

This tweeter has very strong magnetsystem. Please take care, no small iron parts in the environment !
Car-Audio installer are advised to install the aluminium ring first. After all mechanical work is done, the tweeter could be fitted.

Please do NOT connect massive cables to the connectors. Take your time to choose the right cable. Flexible 2.5 sqmm or a solid core 1mm pure silverwire is recommended.

The tweeter needs many hours of run-in to show the total performance. Please take time before setting up the sound.

To protect the tweeter in fresh installed active systems please use a capacitor in the speakercable. < > 10uf in a high quality is good. After complete install and setup the cap can be removed. This is our advice, because active systems show often problems on the tweeterchannel..

Enjoy Z-Studio !

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Technical information

Micro Precision Z-Studio 100 Midrange

Features :

Membrane specially made for transparent midrange.
Surround geometry CAD constructed for best linearity.
Maximized membrane surface in a small diameter.
Membrane + Coil weight = 2,9 Gramm.

Carefully assembled basket. 100% CNC produced.
No tolerances, no ringing.
Brass dampingelements.
Maximized venting effects coil and spider.
35 mm interior depth.
This speaker needs filtering highpass > 150 Hz.
.
Update 11.2019 : New basket construction.

Upgrade 02.2023 :
New Membrane „M8“.
New assembling technology.
Wide frequency range extension.

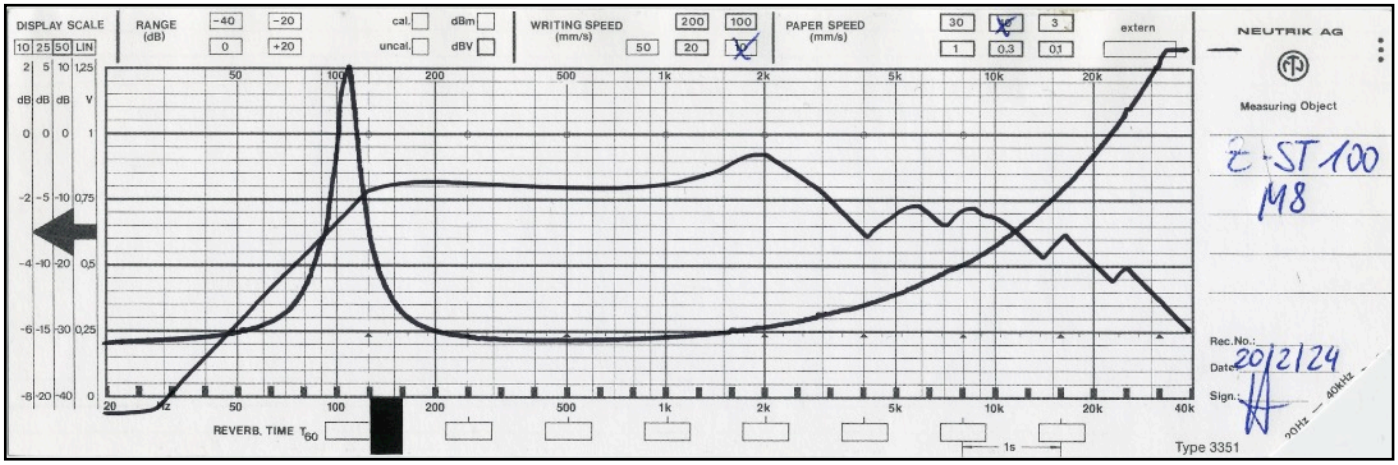
measured with reference equipment @ 2.83V.

Technical Data

Height total	39.5 mm	FS	110 Hz
Outer Diameter	109.5 mm	Moving Mass	2,9 gramm
Cutout Diameter	90.0 mm	Impedance	8 Ω
Interior Depth	34.5 mm	Power handling	Depending on Filter
Drillcircle	102.8 mm	Voicecoil	GF - CCAW
		Voicecoil diameter	25mm
		Membrane	M8
		Recommended . Filter	150 - 5.000 Hz.
Weight	610 gr. / Pair	Updated :	11.2015

Technical information

Micro Precision Z-Studio 100 M8 Midrange



Parameter	Value	Lower Limit	Upper Limit
F_S	108,52 Hz	----	----
Q_{MS}	5,15	----	----
Q_{ES}	1,14	----	----
Q_{TS}	0,94	----	----
S_D	54,11 cm^2	----	----
R_E	8,38 Ω	----	----
L_E	---- mH	----	----
R_2	---- Ω	----	----
L_2	---- mH	----	----
K_{rm}	0,0045	----	----
E_{rm}	0,5843	----	----
K_{xm}	0,0021	----	----
E_{xm}	0,8277	----	----
R_{MS}	0,40 Ns/m	----	----
C_{MS}	0,70 mm/N	----	----
M_{MS}	3,06 g	----	----
V_{AS}	2,92 l	----	----
Bl	3,91 Tm	----	----
η_o	0,31 %	----	----

Technical information

Micro Precision Z-Studio 170 M8 Bass - Midrange

Features :

Z-Studio 170 released in 05.2008.
It was the logical step after release „Z-Studio Tweeter“. The result is a perfect bass-midrange with **extreme** low distortion from 50-5.000 Hz. The result is a new dimension of detail and dynamic without compression.
From the beginning we followed the idea to have a removeable magnetsystem. The reason to have this possibility is, updating or upgrading the magnet-system without touching the precious membrane.
Membrane specially made for clearest midrange and bass. Membraneweight : 2.2 gramm only.
Surroundgeometry CAD constructed & produced for best linear movement and perfect 0-point.

Carefully assembled basket. 100% CNC produced.
No tolerances, no ringing. Brass dampingelements.
Maximized venting, effects coil and spider.

History :

Update 9.2011 : New surround geometry with less mechanical resistance.
Update 11.2013 : New spider, new voicecoil. Less mechanical resistance because of the new parts & geometry. QTC is now 0.7. New parameters on page 3.
Update 12.2015 : New magnet system. Internal triple shielding. Improved venting. New visual backside design.
Update 11.2019 : New basket construction.
Upgrade 02.2023 : New Membrane „M8“. New assembling technology. Wide frequency range extension.

Technical Data

Height total	79,2 mm	Surround	Rubber / Low-Loss
Outer Diameter	170,0 mm	Sensitivity	89 dB/W
Cutout Diameter	145,0 mm	Impedance	4 Ω
Interior Depth	72,2 mm	Power handling	70/150 W
Drillcircle	162,0 mm	Voicecoil	GF
		Voicecoil diameter	25 mm
		Membrane	M8
		Recommended Filter	HP 63 Hz/12dB
Weight	0,728 Kg / piece.	Updated :	2024-02

Technical information

Micro Precision Z-Studio 170 Bass - Midrange

All measurements are made in open baffle.
A cabinet will change the response.

F_S	56,41 Hz	----	----
Q_{MS}	13,09	----	----
Q_{ES}	0,93	----	----
Q_{TS}	0,87	----	----
S_D	143,14 cm^2	----	----
R_E	3,72 Ω	----	----
L_E	---- mH	----	----
R_2	---- Ω	----	----
L_2	---- mH	----	----
K_{rm}	0,0137	----	----
E_{rm}	0,4636	----	----
K_{xm}	0,0038	----	----
E_{xm}	0,6527	----	----
R_{MS}	0,25 Ns/m	----	----
C_{MS}	0,85 mm/N	----	----
M_{MS}	9,42 g	----	----
V_{AS}	24,56 l	----	----
Bl	3,65 Tm	----	----
η_o	0,45 %	----	----

Technical information

Micro Precision Z-Studio 245 Woofer

Z-Studio 245 was released in 06.2008. The Z-Studio 245 is no „Subwoofer“ to compress air. The Z-Studio 245 is made to improve energy in voice, guitar, piano and other instruments.
From 2008 - 2015 some cosmetic changes on magnet surface.

05.2016
New voice coil winding. New TS-Parameters.
See next page.

Basic box design: Vented, 31 Liter.

Port D/L :
50mm / 106mm
70mm / 236mm

Technical Data

Height total	116,00 mm	Surround	Rubber
Outer Diameter	268,00 mm	Sensitivity	89 dB/W
Cutout Diameter	233,00 mm	Impedance	4 Ω
Interior Depth	102,00 mm	Power handling	100 W
Drillcircle	257,00 mm	Voicecoil	Aluminium
		Voicecoil diameter	50 mm
RDC	4.2 Ohm	Membrane	Z
FS	25 Hz.	Recommended .	30 - 2.000 Hz
Weight		Updated :	05. 2017

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Technical information

Measure		Unit
Re	4.2	Ω
Fs	25	Hz.
Qes	0.32	-
Qms	2.14	-
Qts	0.27	-
Le		mH.
VAS	145	Liter
Mms	42,91	Gramm
Cms	996	µM/Newton
Eff.	89	1W. / 1M.
Diam	205	mm.
Rms	0.02	R

To the left the new model.
Below the old model.

Measure		Unit
Re	5,34	Ω
Fs	23,01	Hz.
Qes	1,03	-
Qms	1,98	-
Qts	0,68	-
Le	0,27	mH.
VAS	172	Liter
Mms	42,91	Gramm
Cms	1114	µM/Newton
Eff.	85	1W. / 1M.
Diam	205	mm.
Rms	3,12	R

Liter	Q	f3
10	1,3	59
20	1,1	46
40	0,94	38
60	0,85	35
80	0,79	33
100	0,76	32
Vented	**D/L cm**	**f3**
40	4/40	36 / +5dB
60	5/45	31 / +3dB

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Projekt „Verstärker 1“ (Z-ST 4c)

Projekt „Verstärker 1“ (Z-ST 4c)

Historie :

Das Project „Verstärker 1“ wurde gestartet im Jahr 2013. Es sollte ein aussergwöhnlicher Verstärker werden, abseits der aktuellen Standards. Die sehr inspirierende Zusammenarbeit mit meinem Freund & Entwickler Detlef, endete in 2018 weil er aus gesundheitlichen Gründen, leider verstarb.
Danach startete ich eine erneute Zusammenarbeit mit einem ambitionierten, Italienischen Entwicklerteam. Dieses Team ist bestens aufgestellt. Gesamtkonzept, Entwicklung, Planung und Produktion. Alles in einem Team. Das Resultat spricht für sich.

Team :
Thomas : Gesamtkonzept
Roberto : Entwicklung & Produktion
Colpo. : Entwicklung & Produktion
Licio : Administration
Cemil : Gute Laune und Hinweise.

Folgende, generelle Strukturen stehen im Pflichtenheft.
1. „Form follows Function“.
2. In 20 Jahren ist eine Reparatur möglich.
3. SMD Bauteile vermeiden. Sie erschweren Reparaturen.
4. Ein Endverstärker ist eine notwendige, technische Konstruktion mit erheblichen Einflüssen.
5. Kein ideologisches Life Style Produkt.

Netzteil :
3 Stück 30 Ampere (90A) primäre Sicherung.
8 Stück Schalttransistoren á 80 (2x240A) Ampere.
8 Stück High Speed Schaltdioden um Schaltrauschen zu minimieren.
2 Stück Hochstromsiebdrosseln um Störungen von Schaltfrequenzen zu minimieren.
4 Stück Speicherkondensatoren primär 22.000 uF aus dem **MUNDORF** Sortiment.
8 Stück Speicherkondensatoren sekundär 4.700uF aus dem **MUNDORF** Sortiment.

Das Netzteil erzeugt verschiedene, notwendige Spannungen :

System :
+ 5 Volt für den Microcontroler und Referenz für Regelung.
+ 12 Volt für die Relais Einschaltung.
Audio :
+/- 15 Volt Pegel Kontrolle.
+/- 67 Volt Vorspannung
+/- 47 Volt Vorstufe / Treiberstufe
+/- 40 Volt Endverstärker

Treiber :
Hochvolt Technologie in diskreter Schaltungstechnik.
Keine Operationsverstärker (IC) im Signalweg.
Nur diskret (Hochohmige FET-Transistor) aufgebaute OP Verstärker.
Per Präzisionspotentiometer einstellbarer Bias.
AUDIONOTE KAISEI Koppelkondensatoren.

Endverstärker :
Sanken 4 Stück á 160 Watt Transistoren / Kanal.
CADDOCK 16 Stück 1% Emitter Präzisions Widerstände.
PANASONIC Hochstrom Relais für Lautsprecher an/aus.
High Quality Lautsprecherschraubanschlüsse mit 4mm Banana durch Kabel mit der Platine optimal verbunden. Keine Verluste auf Leiterbahnen.

Projekt „Verstärker 1“ (Z-ST 4c)

Eingangsbeschaltung :
Brückbar von 4 Kanal > 2 Kanal.
Brückbar von 4 Kanal > 2 +1 Kanal.

LED Kontrollanzeige für den sequentiellen Brückenbetrieb.

Eingangspegel per programmierbarer **Widerstandsmatrix in 0.5 dB Schritte**n anpassbar.
Keine problematischen Potentiometer im Signalweg.
Keine Filterfunktionen in diesem Verstärker. Lineare Phase & Amplitude.

Hochohmige FET Transistor Eingangsstufe um die Signalquelle nicht unnötig zu belasten.
20.0 kOhm konstanter Eingangswiderstand unabhängig vom Pegelsteller.
Eingangskapazität 5pF.

Koppelkondensatoren der Eingangsstufe : **AUDIONOTE KAISEI & MUNDORF MCAP EVO**

Optional kann der Verstärker auch ohne Widerstandsnetzwerk geliefert werden. Das wäre dann ein „direkter Eingang“ ohne Pegelsteller.

Programmierbares Widerstandsnetzwerk

Eingangsspannung	Pegelsteller	Ausgang V	Ausgang W
0.1 Volt	0	2 Volt	1 Watt @ 4 Ohm
0.2 Volt	10	2 Volt	1 Watt @ 4 Ohm
0.3 Volt	20	2 Volt	1 Watt @ 4 Ohm
0.5 Volt	30	2 Volt	1 Watt @ 4 Ohm
1.0 Volt	40	2 Volt	1 Watt @ 4 Ohm
3.0 Volt	60	2 Volt	1 Watt @ 4 Ohm
5.5 Volt	70	2 Volt	1 Watt @ 4 Ohm

Microcontroller Display.
Anzeige der Betriebsspannung (min. 9.0V -max. 16.0 Volt) und der Arbeitstemperatur.
Anzeige der Kanalbezogenen Pegelabsenkung (Kanal 1-4).

Schutzschaltungen.
Überhitzung : Einprogrammierte 85 Grad per Microcontroller.
Überlastung ; Kurzschluss.
Unterspannung : Abschaltung bei 10V. Diese Option ist per Controler abschaltbar.

Temperatur.
Bei passiver Kühlung im Normalbetrieb ca. 45 Celsius.
Durch großen Kühlkörper und Seitenteile kein Lüfter notwendig.
Abschaltung bei 85 Grad Celsius.

Masse.
325 x 550 x 90mm.

Projekt „Verstärker 1“ (Z-ST 4c)

Ruhestom gesamt : 5 Ampere = 4 Kanäle a´ 1.25 Ampere.
Der Ruhestrom ist abhängig von der Bias Voreinstellung. Über den Bias wird die prozentuale Verteilung von Klirrfaktor Harmonisch (K2) oder Unharmonisch (K3) eingestellt. Der Bias hat einen Effekt auf Klang / Ruhestrom / Betriebstemperatur.

Messwerte :

Eigenrauschen : A-Bewertet. -90dBV
Frequenzgang : 5 - 250.000 Hz @ -1dBV
Frequenzgang : 5 - 420.000 Hz @ -3dBV

Leistung 4 Ohm Last : 160 Watt @ 1% THD+N
Leistung 2 Ohm Last : 280 Watt @ 1% THD+N
Leistung 4 Ohm BR. : 580 Watt @ 1% THD+N
Leistung 2 Ohm BR. : Nicht zulässig.

Dämpfungsfaktor 10W : 2700
DC Offset typisch : 0,006 Volt.
Interne Signallaufzeit : 0.001 Millisekunde.

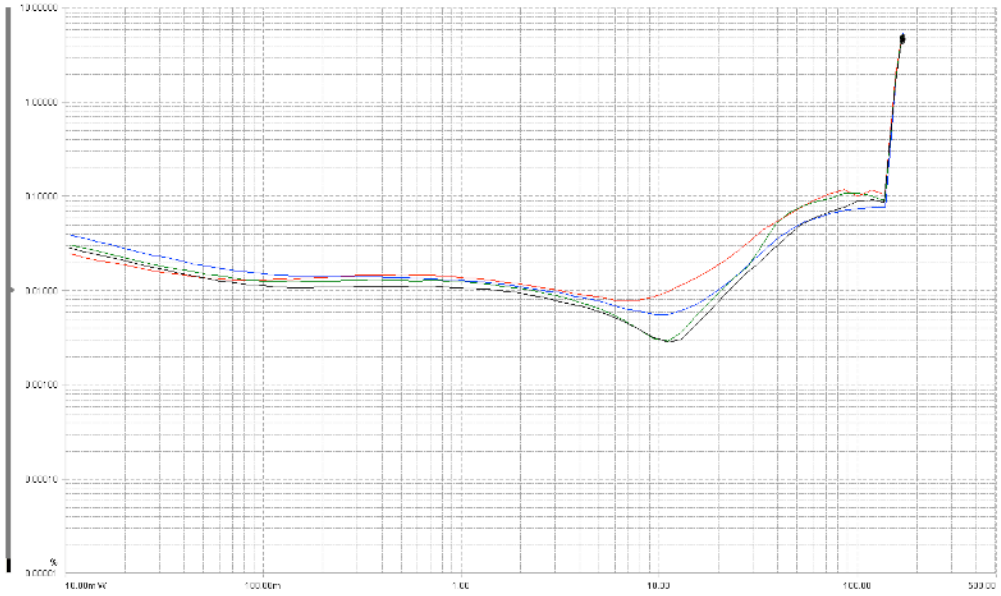
Klirrfaktor K2 (typisch) : 0.002 % @ 5 Watt.
Klirrfaktor K3 (typisch) : 0.005 % @ 5 Watt.

Pegelgleichheit : Generator 1.00Volt - Pegelsteller auf „20“ = 10Watt 4Ohm

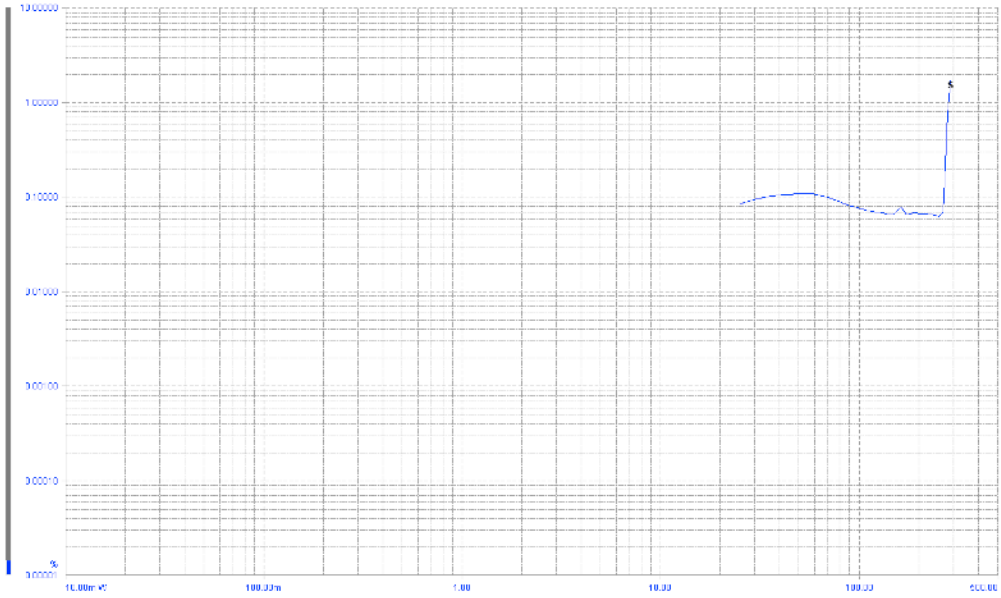
Kanal	Pegel dBV	Mittelwert dBV	Abweichung dBV
1	16,117	16,12025	0,00325
2	16,157		-0,03675
3	16,094		0,02625
4	16,113		0,00725
		Maximale Abweichung	**0,063 dBV**

Projekt „Verstärker 1“ (Z-ST 4c)

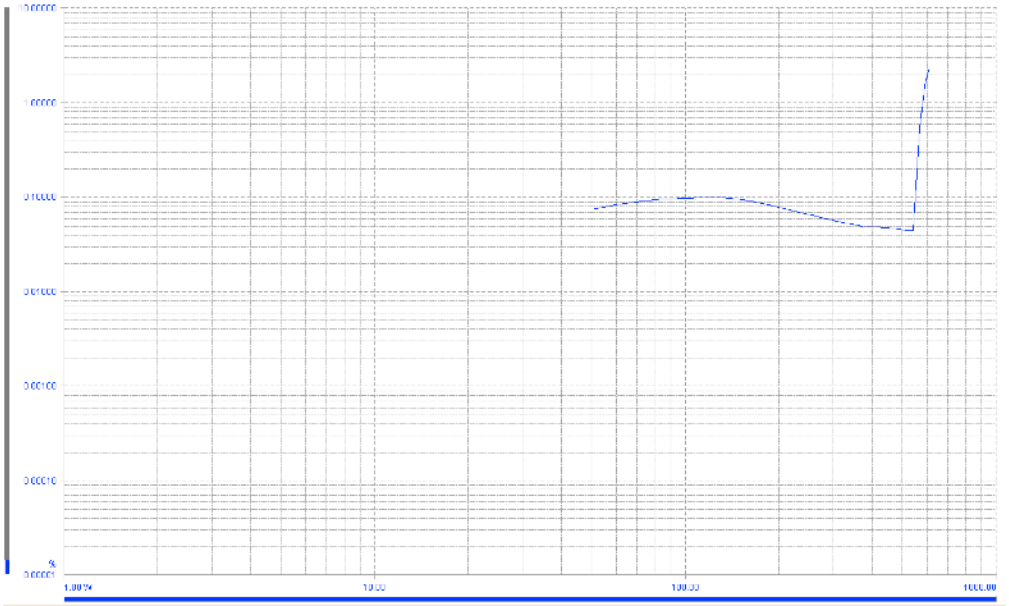
Leistung @ 4 Ohm.
4 Kanäle gemessen.



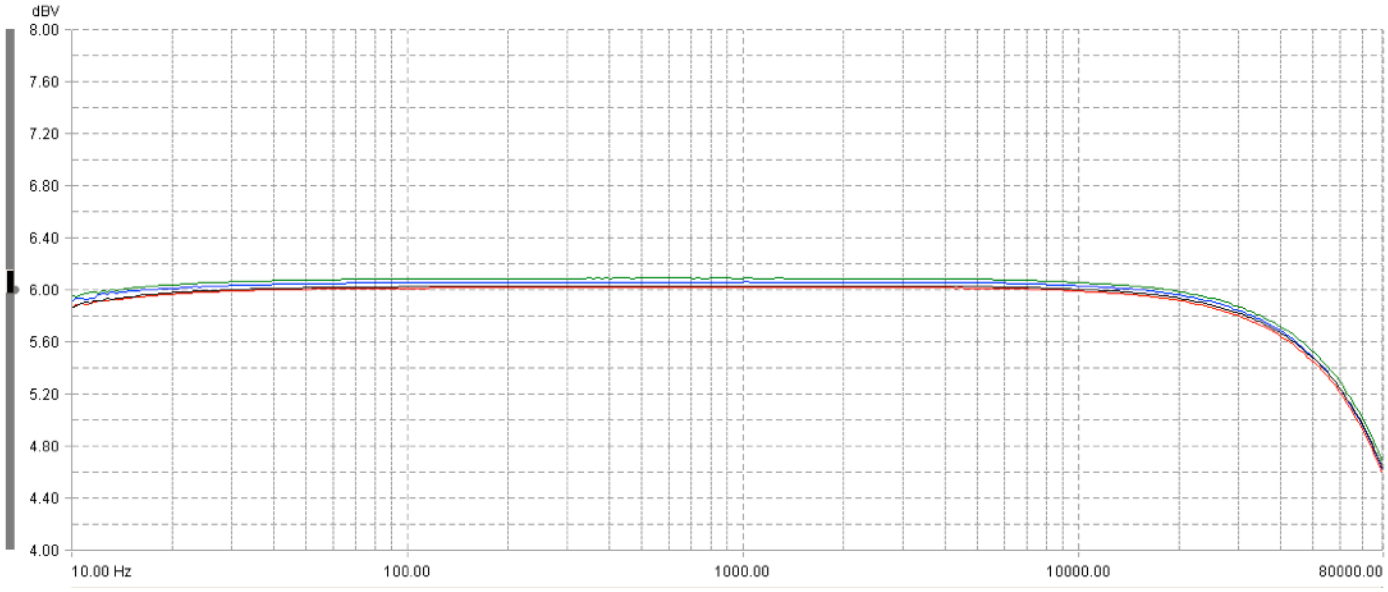
Leistung @ 2 Ohm.



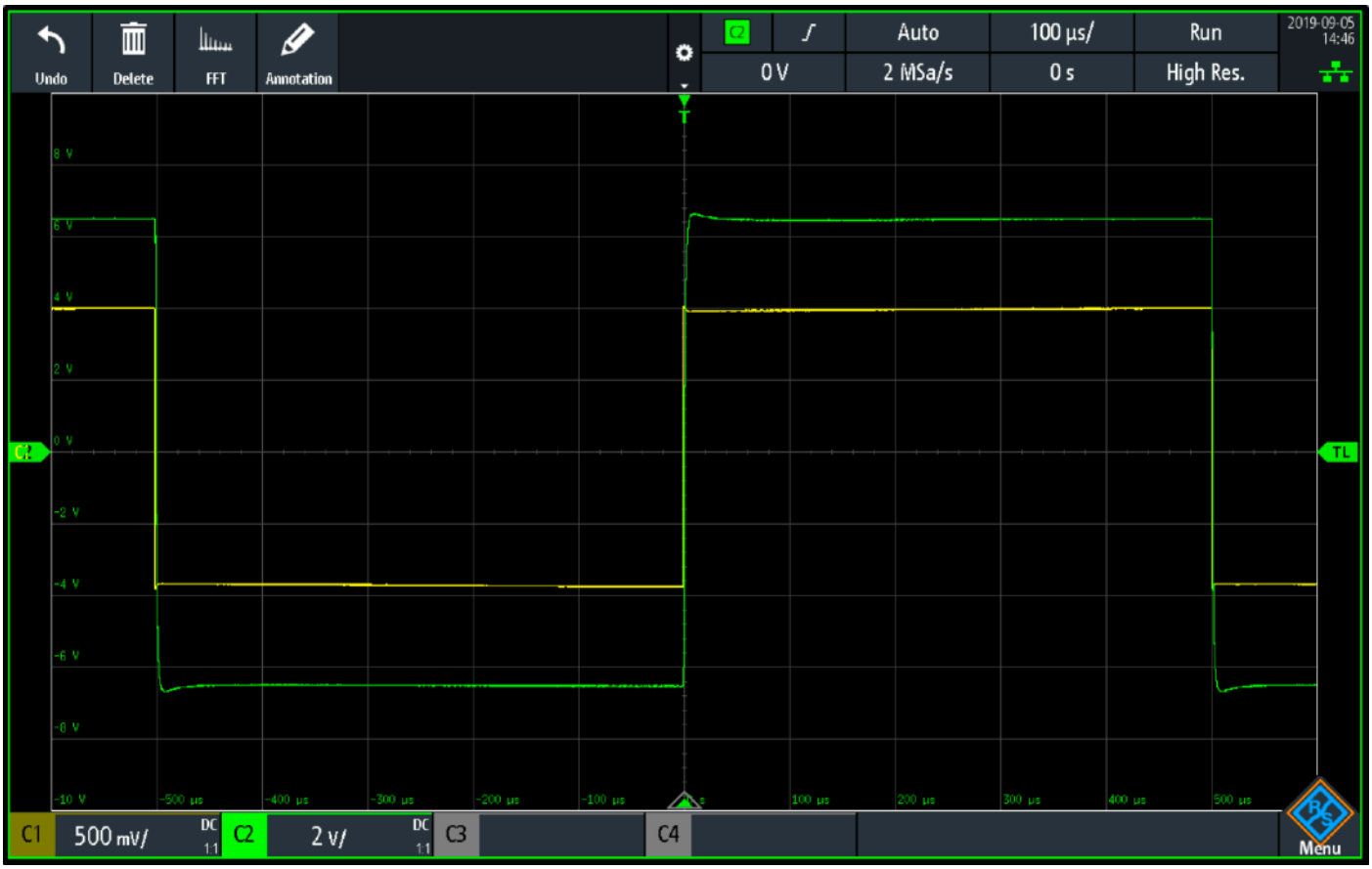
Leistung @ 4 Ohm gebrückt.



Projekt „Verstärker 1“ (Z-ST 4c)



Frequenzgang Kanal 1, 2, 3, 4. Keine Abweichungen. Alle Kanäle vollkommen identisch 10-70.000 Hz.



Rechteck 1kHz.
Gelb : Generator.
Grün : Verstärker.

Projekt „Verstärker 1“ (Z-ST 4c)

Anzeige nach Systemstart. Betriebspannung und Kühlkörpertemperatur.

Nach drücken des Drehreglers erscheint die Pegeleinstellung für den Kanal 1. Werkseitig auf 20 voreingestellt.

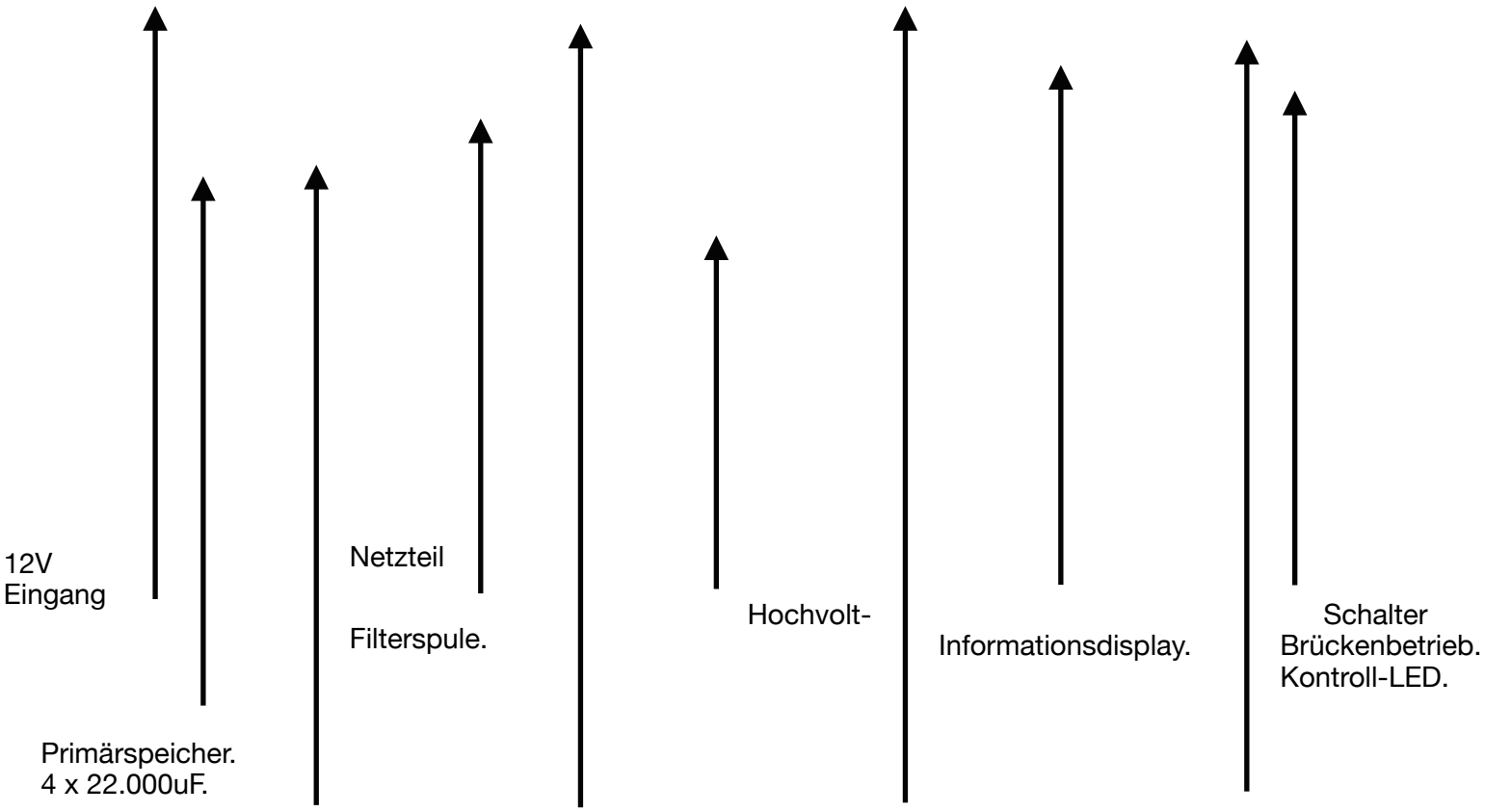
Nach drücken des Drehreglers erscheint die Pegeleinstellung für den Kanal 2. Werkseitig auf 20 voreingestellt.

Nach drücken des Drehreglers erscheint die Pegeleinstellung für den Kanal 3. Werkseitig auf 20 voreingestellt.

Nach drücken des Drehreglers erscheint die Pegeleinstellung für den Kanal 4. Werkseitig auf 20 voreingestellt.

Mit dem erreichen der Abschaltgrenze von 10V schaltet das System den Verstärker ab. Das System muss neu gestartet werden (aus/einschalten).

Projekt „Verstärker 1“ (Z-ST 4c)



Projekt „Verstärker 1“

There was a sound that could only be heard with this power amp, and it was a unbelievable attractive and solid sound, and I was surprised at the ability to reproduce the expansion of the sound field space.

Sentence = Kenji Mayuzumi

In the early 1980s, I was shocked by the appearance of the super-dreadnought power amplifier, the Audison HR100, but listening to the Micro-Precision revived the excitement of those days. The company's representative Thomas Hoffman's passion and commitment to audio equipment development was extraordinary, and it was unfortunately demonstrated in the Z-Studio series speakers.

Gaining confidence in the success of the speaker, he started developing a super-dreadnought power amplifier. Z-Studio Amplifier-1 version 1.0 was announced, but production ended with about 30 units. Immediately an improved version of version 1.1 was released. It's an exceptionally priced product for a car audio device, but when you look inside, you can understand it. All of the parts that make up the amplifier boast top-notch high-quality sound and high precision. In addition, the internal construction has been devised to prevent adverse effects on the amplifier circuit from the power supply, and the wiring between each circuit has been minimized to thoroughly pursue sound quality.

There is a sound that can only be heard with this power amplifier, and it is unbelievable attractive, so it can be said that it is an irresistible existence for audiophiles like me. If you sympathize with this sound, you will want to install it no matter what the size and price of the amplifier, the power supply situation of the car, etc., it is a product with such a mysterious charm. Anyway, I was surprised at the ability to accurately reproduce the expansion of the sound field space with a well-constructed sound.

The sound image, the stage, the reality, and the persuasive power of the sound, all the items are all the supreme one that gives a "good" dream.

Sentence = Hiroshi Wakimori

Micro-Precision is a German high-end brand established in 1999. As the name suggests, the truth lies in the details, and we pursue product precision that is orders of magnitude higher. The Z-Studio speakers that have already been introduced to the Japanese market are the essence of that, and the ultra-precisely processed units overwhelm the viewer.

The Z-Studio 4ch Amplifire version 1.1 is the brand's first mass-produced power amplifier bearing the Z-Studio name. It is said that it was developed over many years by Thomas Hoffman, who leads the brand, and four engineers.

A large number of elements are lined up in an orderly manner in a large housing of 585 x 325 x 90 mm. World-famous parts such as toroidal core transformers with a 10 mm thick aluminum case, precision resistors from the familiar German company Mundorf and US company Caddock Electronics, etc. are gathered together. You can also see the appearance of Japanese Sanken transistors through the transparent acrylic panel. There may be an image that a large amplifier shows its true character only after putting in a large amount of power, but this unit is different. At low volume, it behaves lightly like a small amp, and delivers a nice, just-focused sound. You can enjoy a silky sound with eyes aligned like a high-quality woven fabric. And when you turn up the volume, a powerful sound comes out while keeping the delicate sound. You can enjoy the real thrill of high-power drive without breaking the shape of the sound even if you play it at a loud volume that you can bathe in the whole body. Furthermore, the sound image, stage, reality, and the persuasive power of the sound-every item can even be confirmed by fingering while listening to the sound. Of course, everything is "OK". The DS-SA1 that I listened to in combination also seemed to happily follow the unit. The supreme one that gives you a dream.

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