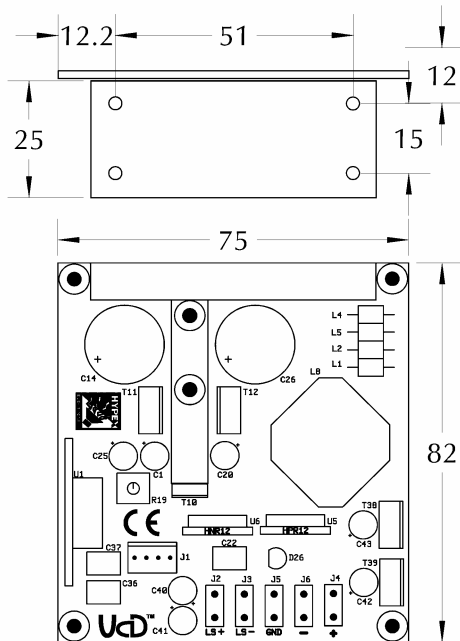


High Grade Audio Power Amplifier Module



Highlights

- Flat, fully load-independent frequency response
- Low output impedance
- Very low, frequency-independent THD
- Very low noise
- Fully passive loop control
- Consistent top performer in listening trials

Features

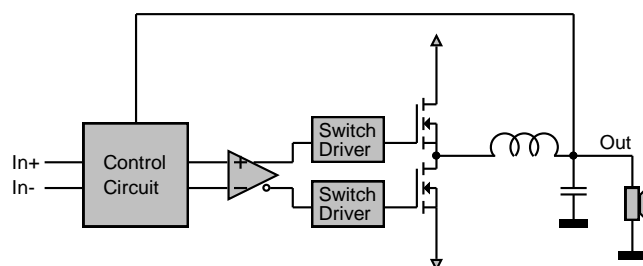
- Runs on unregulated +/- rails
- Pop-free start and stop control
- Differential audio input
- No compromise components
- LM4562 buffer OpAmp
- HxR12 ready
- Improved on-board buffer supply
- Overcurrent and overvoltage protection
- Weight: 160gms (5.5oz.)

Applications

- Monitor loudspeakers for recording and mastering studios
- Audiophile power amplifiers for professional and consumer use
- Public Address systems
- Home theatre systems
- Active loudspeakers

Description

The UcD400HG amplifier module is a self-contained high-performance class D amplifier intended for a wide range of audio applications, ranging from Public Address systems to ultrahigh-fidelity replay systems for studio and home use. Chief distinguishing features are flat frequency response irrespective of load impedance, nearly frequency-independent distortion behaviour and very low radiated and conducted EMI. Control is based on a phase-shift controlled self-oscillating loop taking feedback only at the speaker output.



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1 Performance data

Power supply = +/-65V, Load=4Ω, MBW=40kHz, unless otherwise noted

Item	Symbol	Min	Typ	Max	Unit	Notes
Output Power	P _R	-	400	-	W	THD=1%, Load=4Ω
		-	240	-	W	THD=1%, Load=8Ω
Distortion	THD+N	-	0.01	0.05	%	20Hz<f<20kHz ¹⁾ Pout<P _R /2
		-	-	0.004	%	20Hz<f<20kHz Pout=1W
Output noise	U _N	-	30	35	μV	Unwtd, 20Hz-20kHz
Output Impedance	Z _{OUT}	-	-	20	mΩ	f<1kHz
		-	-	150	mΩ	f<20kHz
Power Bandwidth	PBW		20-35		kHz	²⁾
Frequency Response		10	-	50k	Hz	+0/-3dB. All loads.
Voltage Gain	A _V	25.5	26	26.5	dB	
Supply Ripple Rejection	PSRR		65		dB	Either rail, all frequencies.
Efficiency	η		92		%	Full power
Idle Losses	P ₀		8		W	
Standby Current	I _{STRY}		10		mA	
Current Limit			20		A	Stop mode after limiting 40ms

Note 1: At higher audio frequencies there are not enough harmonics left in the audio band to make a meaningful THD measurement. High frequency distortion is therefore determined using a 18.5kHz+19.5kHz 1:1 two-tone IMD test.

Note 2: Dielectric losses in the output capacitor limit long term (>30s) full-power bandwidth to 15kHz.

2 Absolute maximum ratings

Correct operation at these limits is not guaranteed. Operation beyond these limits may result in irreversible damage

Item	Symbol	Rating	Unit	Notes
Power supply voltage	V _B	+/-75	V	Unit shuts down when either rail exceeds 75V
Peak output current	I _{OUTP}	18	A	Unit current-limits at 18A
Input voltage	V _{IN}	+/-12	V	Either input referred to ground
Air Temperature	T _{AMB}	65	°C	
Heat-sink temperature	T _{SINK}	90	°C	User to select heat sink to insure this condition under most adverse use case

3 Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit	Notes
Power supply voltage	V_B	45 ¹⁾	57	67 ²⁾	V	
Load impedance	Z_{LOAD}	1			Ω	
Source impedance	Z_{SRC}			7	k Ω	Differential. Corresponds to 3dB noise increase.
Effective power supply storage capacitance	C_{SUP}	4700 ³⁾			μF	Per rail, per attached amplifier. 4 Ω load presumed.

1) Unit shuts down when either rail drops below 30V.

2) Unit shuts down when either rail exceeds 75V.

3) The effective power supply storage capacitance of Hypex SMPS is already in excess of 4700 μF . Do not add supplementary capacitance.

4 Connections

4.1 J1: Input and ON/OFF control

Connector type: 4-pin MOLEX[®] KK[®] series, part number 22-27-2041.

Pin	Function
1	ON/OFF control ¹⁾
2	Inverting Audio Input
3	GND
4	Noninverting Audio Input

Note 1: During initial power up this pin is disabled for a period of 1.5s. Unlike previous UcD400 models there is no delay after enabling the amplifier.

4.2 Input Characteristics

Item	Symbol	Min	Typ	Max	Unit	Notes
Input Impedance	Z_{IN}		100		k Ω	Either input to ground
Common Mode Rejection Ratio	CMRR		75		dB	All frequencies
Control voltage on pin 4, amplifier ON				3	V	
Control voltage on pin 4, amplifier OFF		12			V	Internally pulled up to 15V

Note: It is recommended to use an open collector output to control the on/off pin.

4.3 J2: Loudspeaker output (hot)

Connector type: 6,3x0,8 FASTON[®] tab.

4.4 J3: Loudspeaker output (cold)

Connector type: 6,3x0,8 FASTON[®] tab. Internally connected to GND. Note: This is the feedback reference. For best performance, do not use another ground connection for the loudspeaker.

4.5 J4: Positive power supply connection, +VB

Connector type: 6,3x0,8 FASTON[®] tab.

4.6 J5: Power supply ground connection, GND

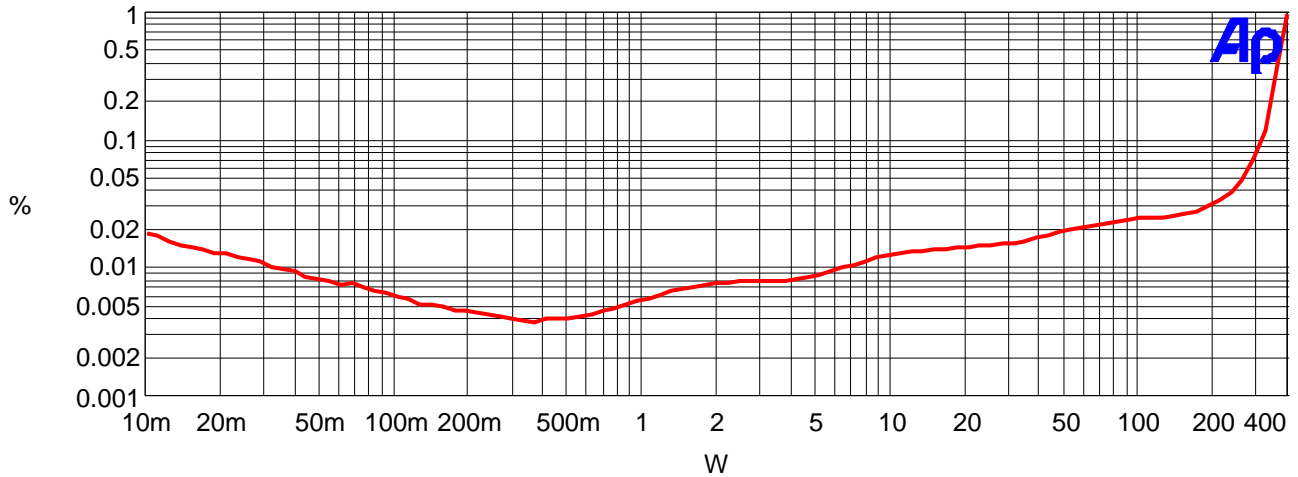
Connector type: 6,3x0,8 FASTON[®] tab.

4.7 J6: Negative power supply connection, -VB

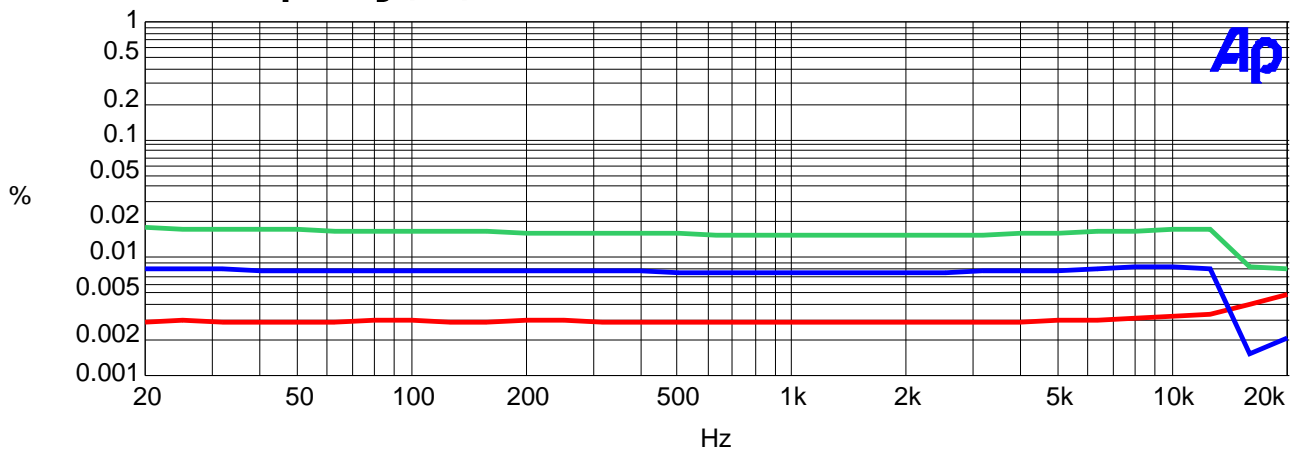
Connector type: 6,3x0,8 FASTON[®] tab.

5 Typical Performance Graphs

5.1 THD vs. Power (1kHz, 4Ω)

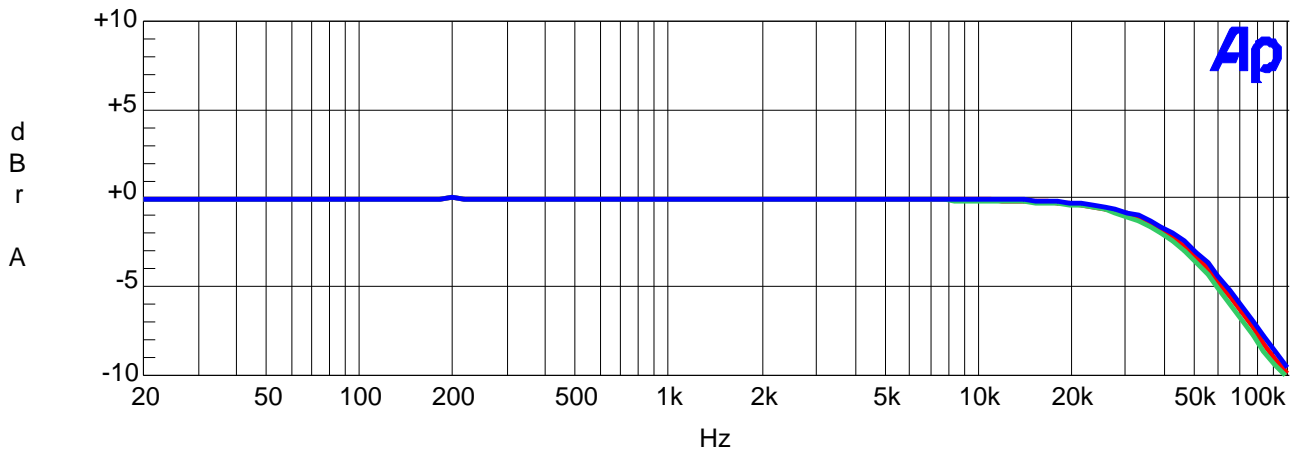


5.2 THD vs. Frequency (8Ω)



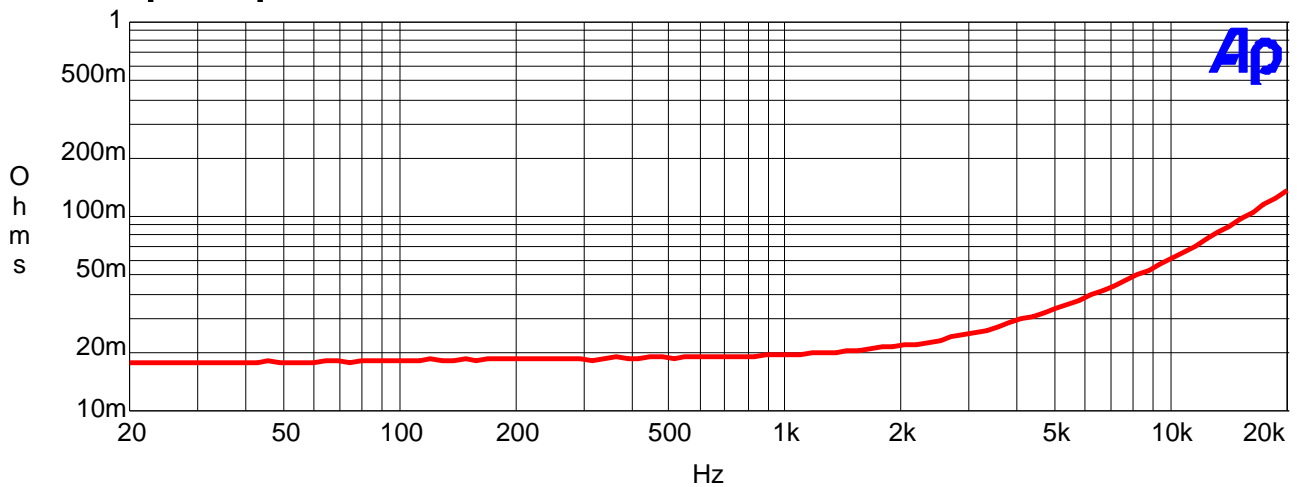
From top to bottom: 40W, 10W, 1W

5.3 Frequency Response (4Ω, 8Ω and open circuit)

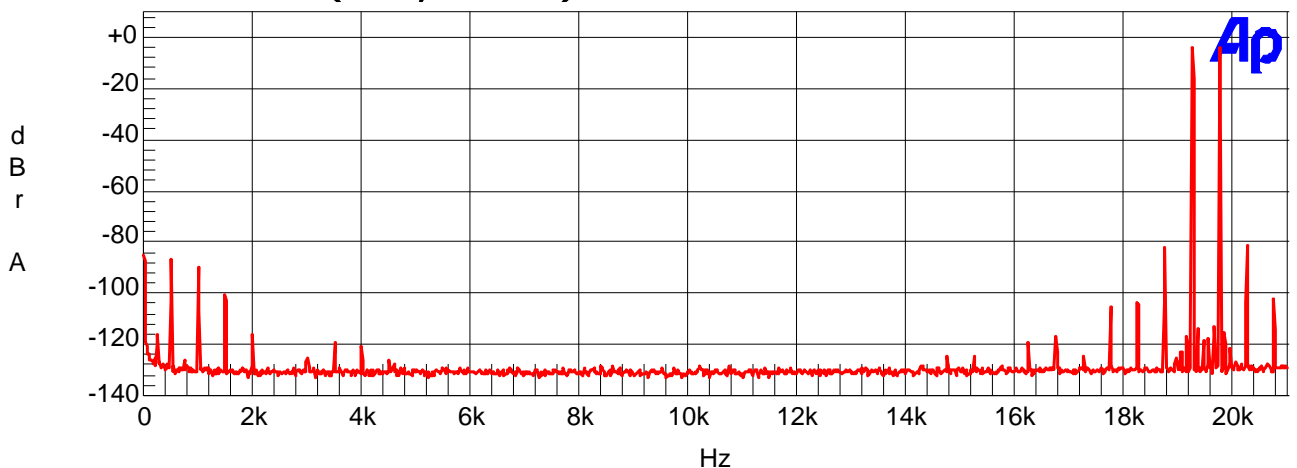


From top to bottom: open circuit, 8Ω, 4Ω

5.4 Output Impedance



5.5 19+20kHz IMD (10W, 4 ohms)



DISCLAIMER: This subassembly is designed for use in music reproduction equipment only. No representations are made as to fitness for other uses. Except where noted otherwise any specifications given pertain to this subassembly only. Responsibility for verifying the performance, safety, reliability and compliance with legal standards of end products using this subassembly falls to the manufacturer of said end product.

LIFE SUPPORT POLICY: Use of Hypex products in life support equipment or equipment whose failure can reasonably be expected to result in injury or death is not permitted except by explicit written consent from Hypex Electronics BV.

Document Revision	PCB Version	Description	Date
R1	UcD400HGV1/2	Initial draft.	
R2	UcD400HGV2: from SN 06091204_0001	OVP level increased to 75V to for compatibility reasons SMPS400/67.	29.04.2009
R3	UcD400HGV2	Current limiter value correct (21A): 18A.	24.11.2009
R4	UcD400HGV2	Format changed	09.03.2012
R5	UcD400HGV2	Recommended operating conditions updated	25.05.2012