Whitepaper: GlidePath technology enables true low distortion at high output and minimizes cone excursion.

CloudPower Series
4 channel amplifier
with DSP and remote control

WHITEPAPER

FOREWORD

Class-D amplifier designs offer a lot of advantages. Due to their technology, they have a small footprint, low weight and the heat dispersion is much lower compared to other amplifier technologies. On top of these advantages, Apex has developed a direct drive technology which results in far less distortion and minimizes cone excursion under dynamic impulses.This is audibly experienced as a more punchy and tighter low end as observed by many engineers who have recently tested the amp.

GLIDEPATH TECHNOLOGY

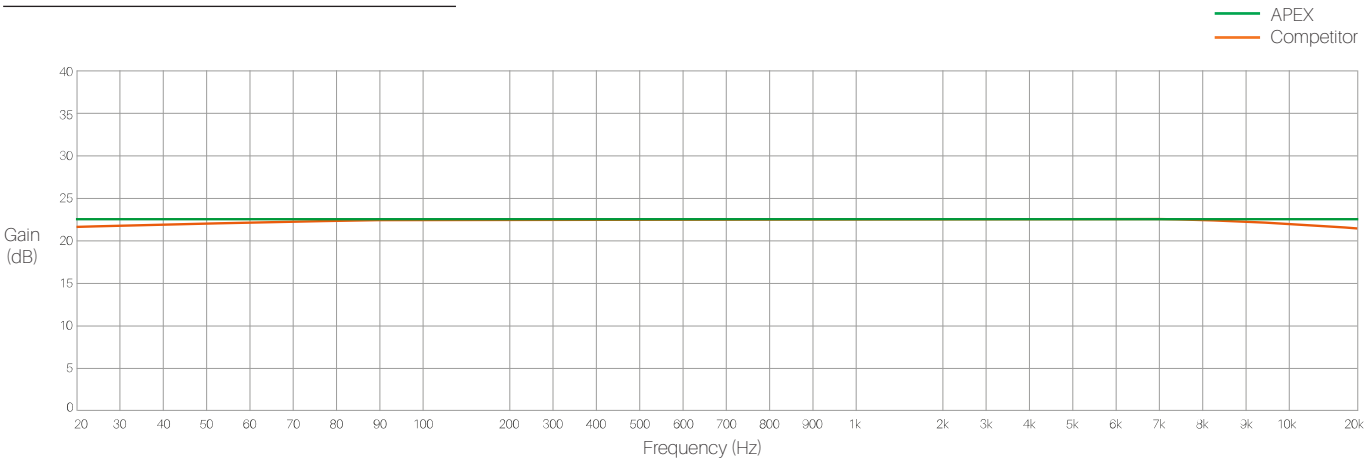
GlidePath direct drive architecture is a proprietary Class-D technology where the DSP system is an integral part of the amplifier system. Other than one capacitor at the audio input side to protect amplifying DC voltages, the audio signal path traveling through the ADC-DSP-DAC-AMPLIFIER is completely DC coupled.

TEST RESULTS

As described in the foreword, the result is clearly audible, especially in the low end. In this white paper, we will produce some measurement results alongside a comparison test with an industry standard competitor.

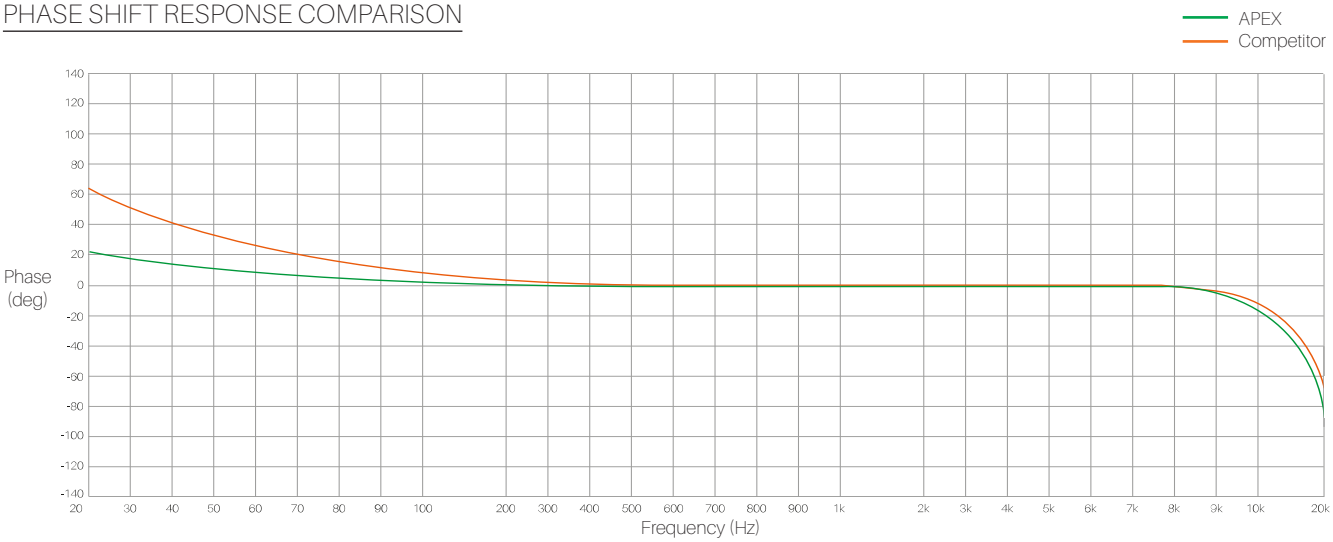
Test conditions:
Device A: SMA-1 (integrated GlidePath DSP)
Device B: industry standard competitor amp module with the same power rating mated with the supplied DSP module
For both devices: all DSP filtering bypassed.

FREQUENCY RESPONSE COMPARISON



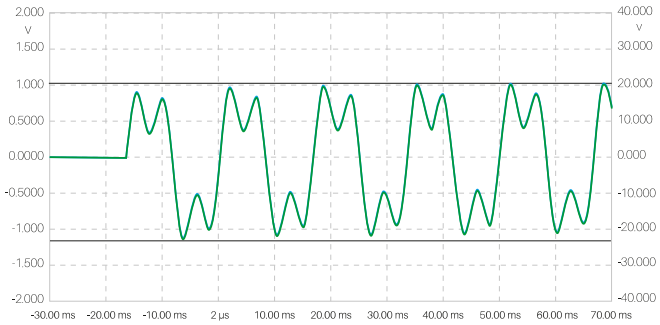
In the comparison frequency response, we can see that both responses are nearly flat apart from a slight roll-off at the high and low extremes. This is more than sufficient flat to power a speaker with an intended response from 60Hz-16K. The Apex GlidePath architecture has a -3dB point of 2Hz, the competitor has a -3dB point of 15Hz.

PHASE SHIFT RESPONSE COMPARISON

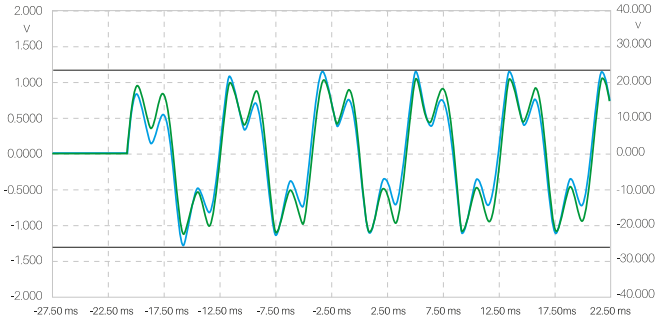


From the phase response curves we see more phase shift with the competitor (red line) due to the AC coupling within the amplifier system.

TRANSIENT RESPONSE COMPARISON

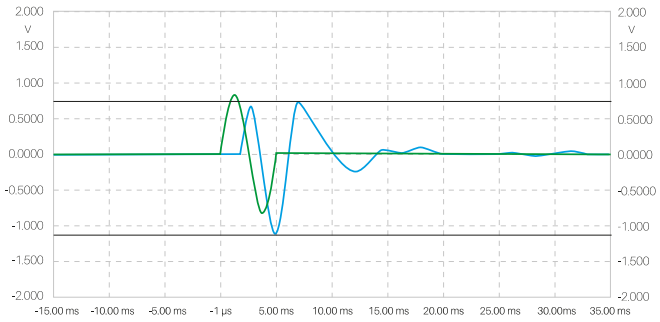


Apex GlidePath driven with 5 cycles of 60Hz mixed with a 180Hz/-6db signal. The graph shows barely any deviation between input and output. The loudspeaker receives peak levels of +20,4V and -21,9V. The deviation between plus and minus peak levels is about 5%.

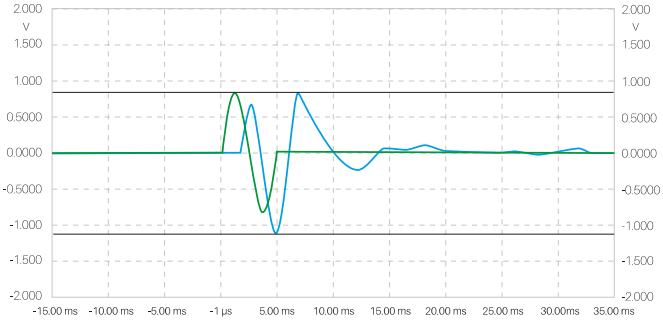


Competitor driven with 5 cycles of 60Hz mixed with a 180Hz/-6db signal.The graph shows that the output initially has less voltage at the first part of the sinewave, but overs-hoots on the negative side. This effect fades out gradually in the next cycles. The loudspeaker receives peak levels of +22,85V and -25,1V. The deviation between plus and minus peak levels is about 10%.

CONE EXCURSION COMPARISON

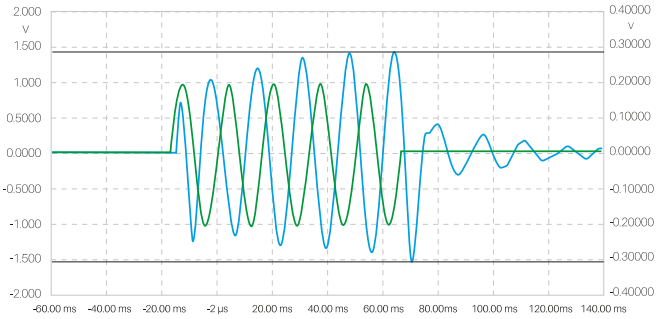


Green line: GlidePath 200Hz 1 cycle. Blue line: actual cone excursion. At the first part of the sine, the cone goes up to 0,7V and drops down to -1,13V in the second part and goes up again to 0,74V as the signal stops.

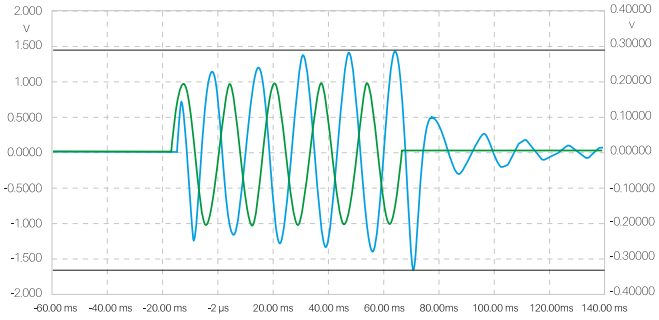


Green line: competitor 200hz 1 cycle. Blue line: actual cone excursion. At the first part of the sine, the cone goes up to 0,64V and drops down to -1,13V in the second part and goes up again to 0,82V as the signal stops.

From this comparison we can conclude that the competitor amp has less output under short initial impulse (-10%) and the cone swings further after the signal stops even at 200Hz (+10% excursion).



DirectDrive module driven with a 50Hz 5 cycles burst. The GlidePath direct drive architecture has a peak cone excursion of +286mv and-308mV. The trail output after the signal stops has a peak output of 80mV



Competitor module driven with a 50Hz 5 cycles burst. This module has a peak cone excursion off +287mV and-328mV. The trail output after the signal stops has a peak output of 100mV

CONCLUSION

The superior sonic performance experienced by engineers in the field is clearly proven by these measurements.

We can conclude that GlidePath direct drive architecture

- has a slightly better frequency response;
- a far better phase shift response;
- a nearly perfect transient response;
- will clip later due to the fact that the peak levels on both sides of the sinus are close to equal;
- has more output at the initial impulse (+10%) and the cones swings less after the signal stops even at 200Hz (-10% excursion).