

Processing Today's Audio

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Presented by Jeff Keith, CPBE, NCE
Vorsis Senior Product Development Engineer
Wheatstone Corporation

Processing Today's Audio...

Three Primary Challenges:

- Excessive Mastering Levels

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- Excessive Mastering Levels
- Perceptual Codecs and their effects
- The Air Chain's "Level of Perfection"

Quality Detractors in the Endless Quest for Loudness

- Peak Clipping in source material

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Quality Detractors in the Endless Quest for Loudness

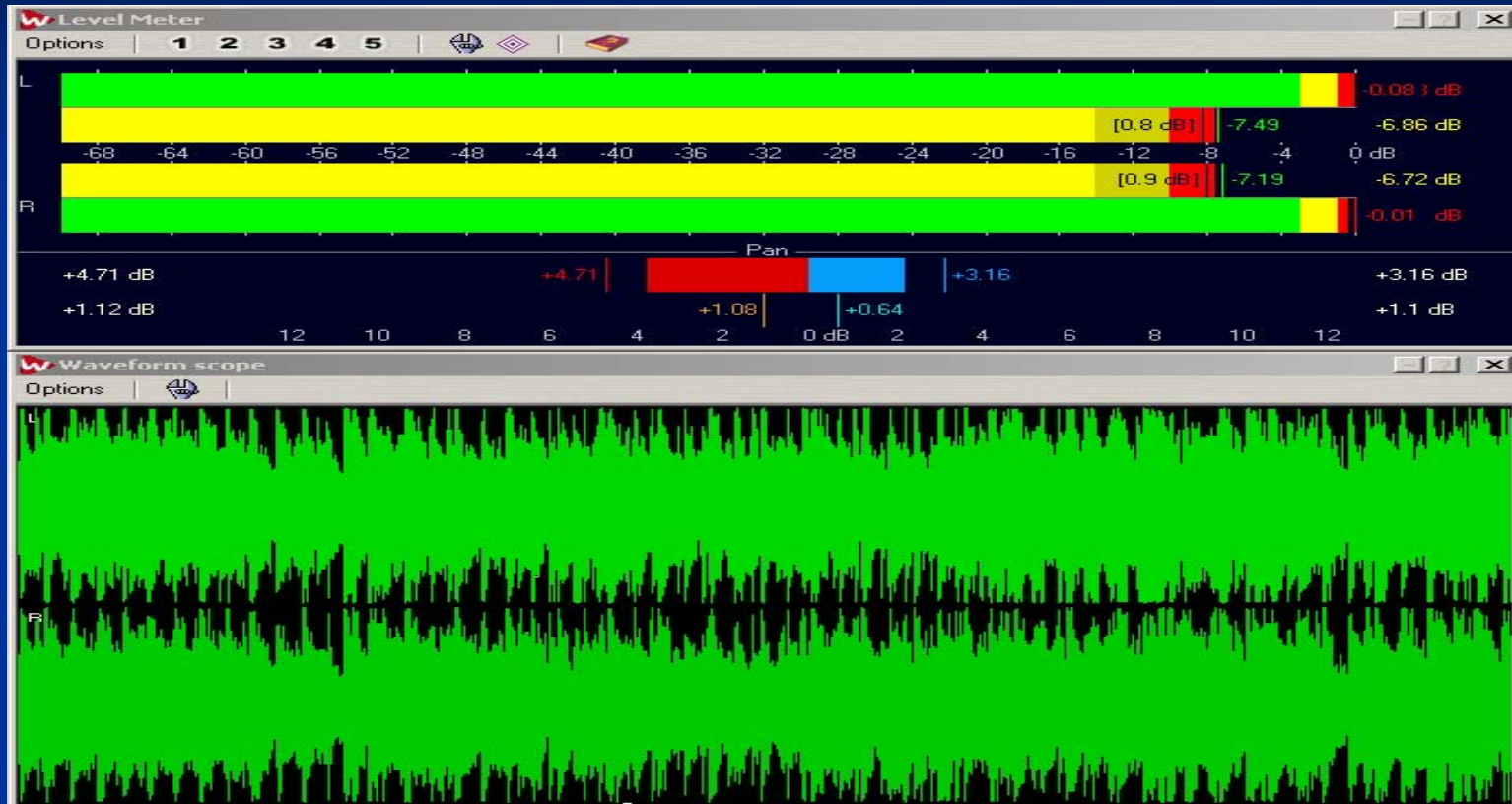
- Peak Clipping in source material
- Operating Levels too near 0dBFS
- On-air processing adding density to material that does not require it
- The on-air processor's Phase Rotator is *not* a benign 'fix-all'!

Mastering – 1987 vs. 2001



38 Special – 20th Century Fox – Original 1987 CD
Max Peaks = -2.4dBFS RMS = -13.5dBFS

Mastering – 1987 vs. 2001

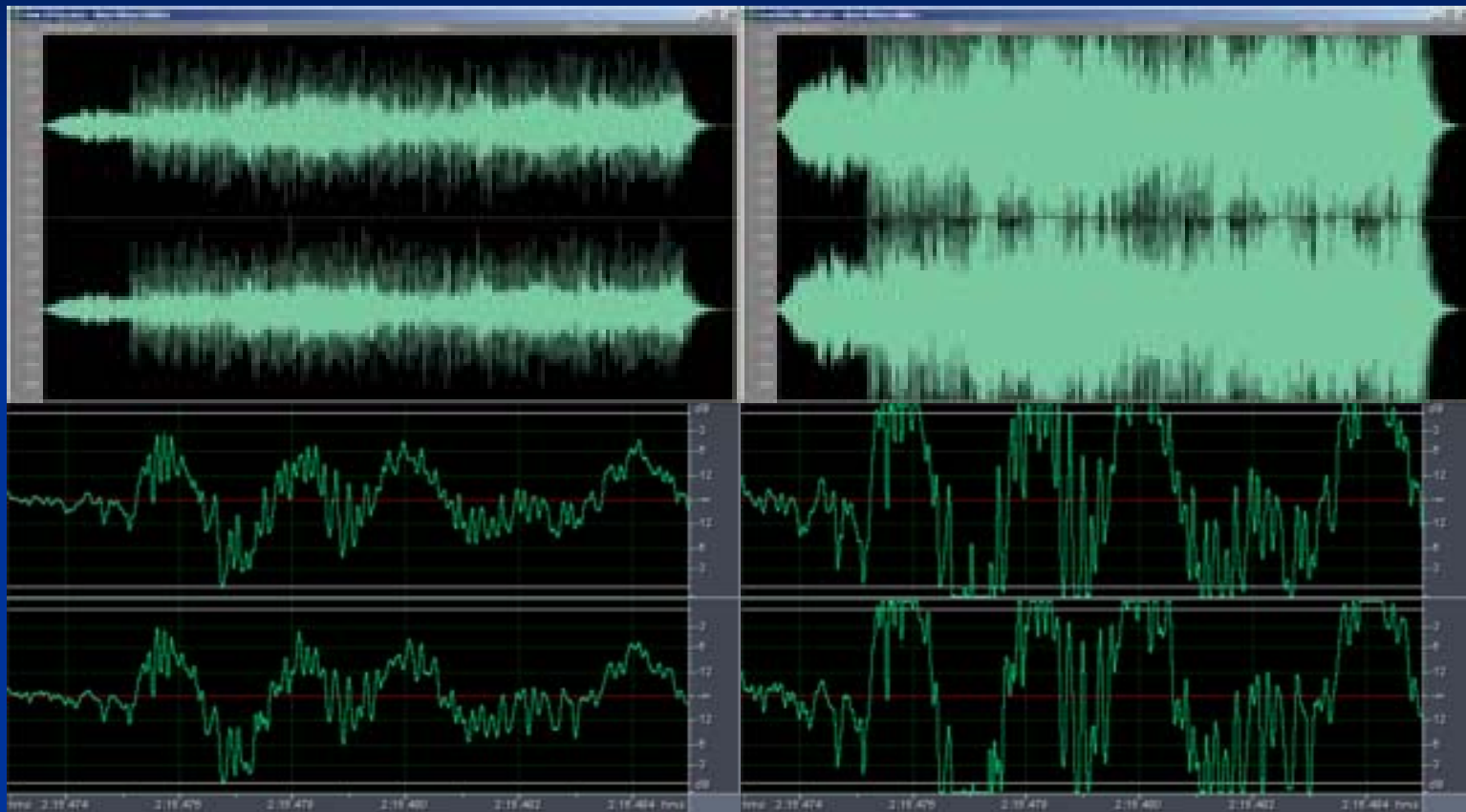


38 Special – 20th Century Fox – “Re-mastered” 2001

Max Peaks = - 0.08dBFS

RMS = -7.2dBFS

Mastering – 2001 vs. 2005

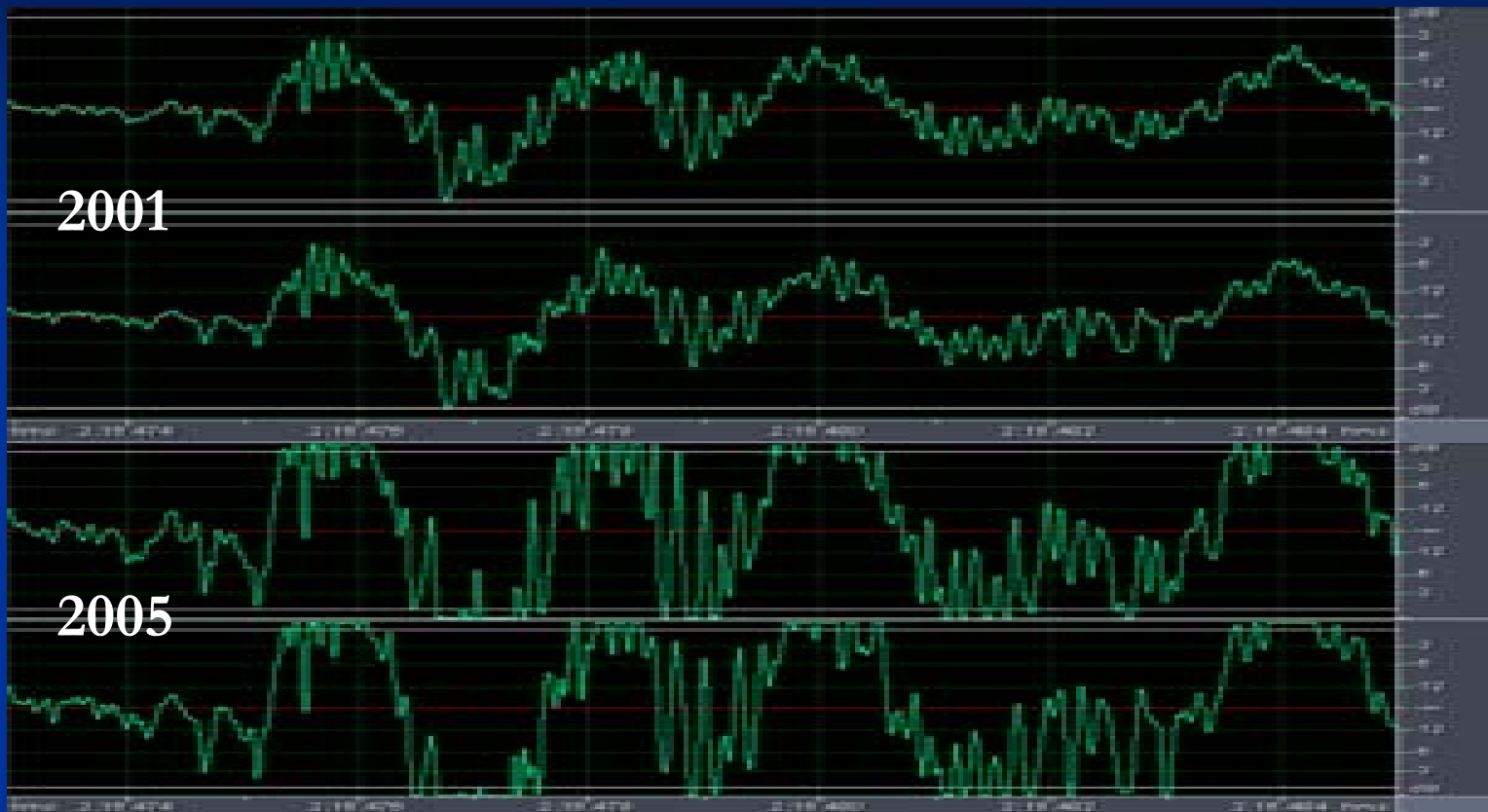


(38 Special – 20th Century Fox)

2001 “Re-Mastering”

2005 “Re-Mastered” again!

Mastering – 2001 vs. 2005



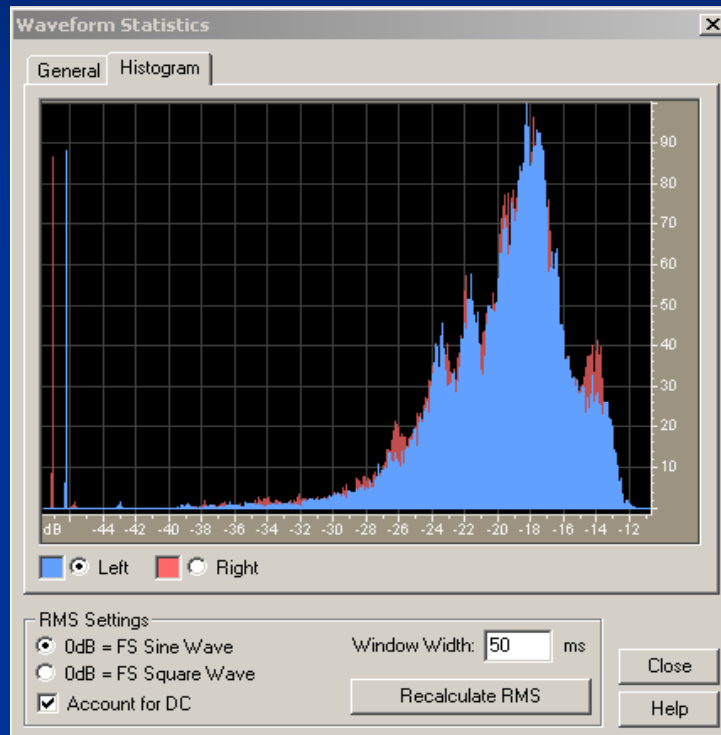
(38 Special – 20th Century Fox)

2001 RMS Level = -7.2dBFS

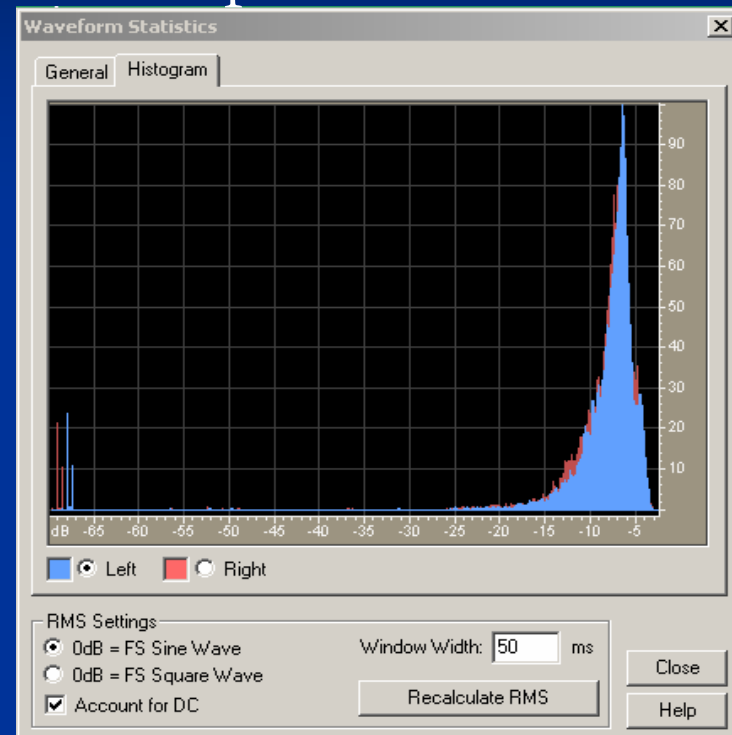
2005 RMS Level = -5.6dBFS

Mastering – 1987 vs. 2005

Loudness Profile Comparison



Original 1987 Recording
RMS Peak @ -18dBFS

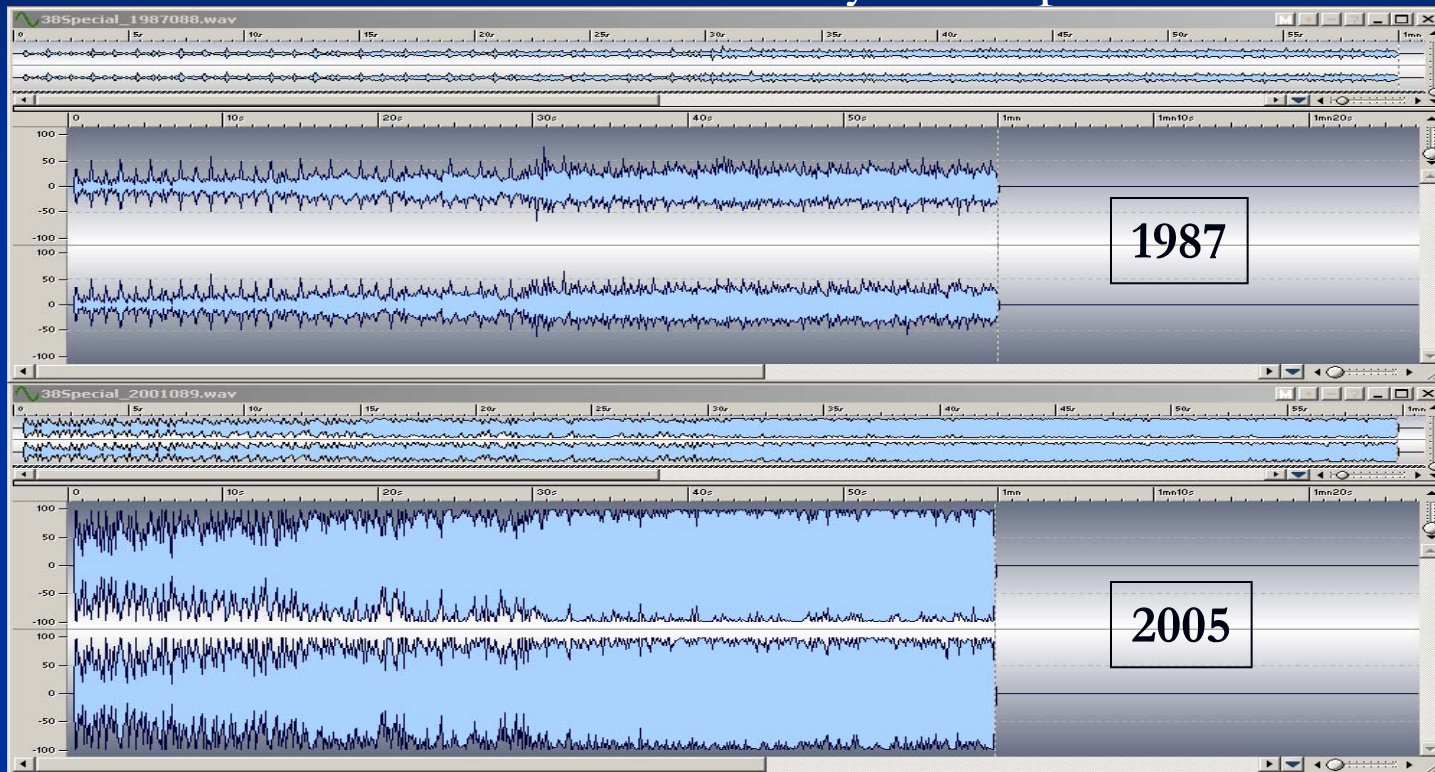


2005 “Re-Mastered Re-Master”
RMS Peak @ -5.6dBFS

(38 Special – 20th Century Fox)

Mastering – 1987 vs. 2005

Peak Level and Density Comparison



(38 Special – 20th Century Fox)

This is a challenge for any on-air audio processor!

Peak Operating Levels...

Why do we recommend -12dBFS?

- Allow headroom in A/D and D/A Converters!

Virtually all A/D, D/A and Sample Rate Converters can overshoot. When operated near 0dBFS clipping can occur within the converter.

There is nothing you can do to undo it!

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- Allow headroom in the Audio Processor's Phase Rotator! *What?*

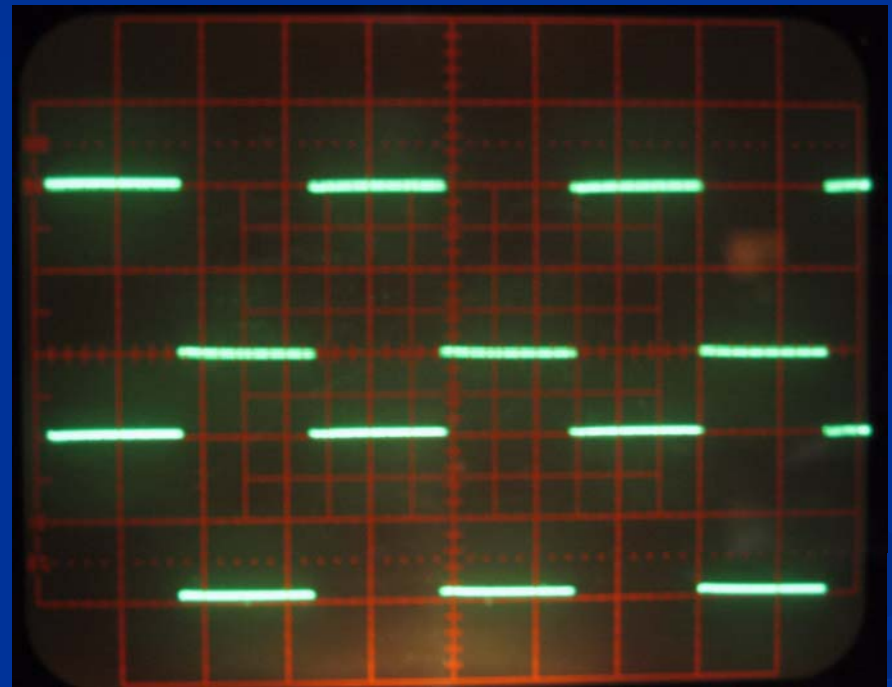
Phase rotators are used to remove asymmetry in program material. However they can actually *increase* the peak level of *clipped* program material *after* it has been applied to the processor's input *and* seen by its input level metering!

Why Phase Rotator Headroom?

Let's look at how Phase Rotators behave with the Square Waves that are being created during the mastering process...

Phase Rotator's Output
When Switched "OUT"

Processor Input
400Hz Square Wave



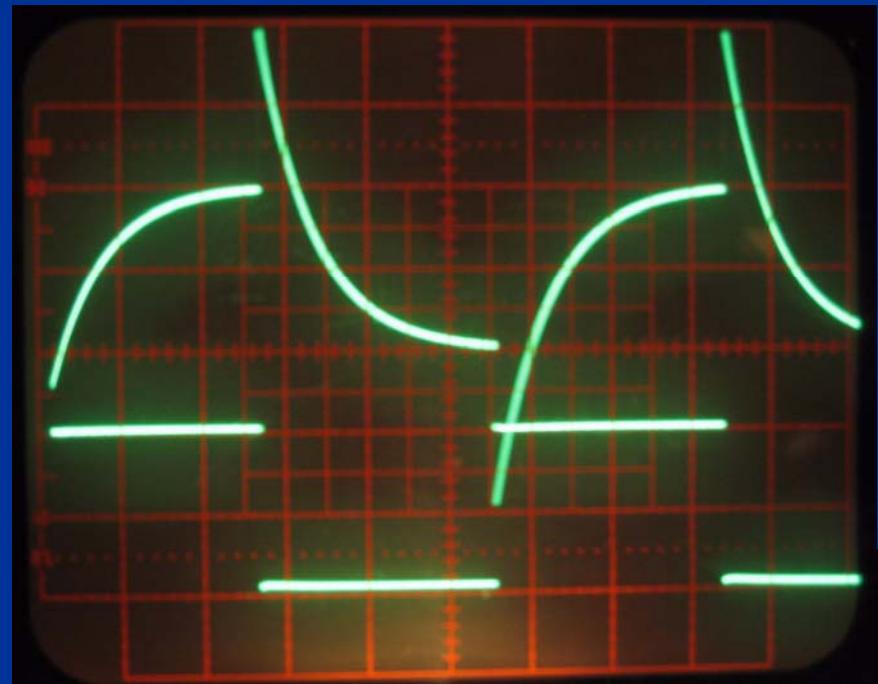
Notice that both waveforms are ~2 divisions peak to peak!

Why Phase Rotator Headroom?

(It's not pretty!)

Phase Rotator's Output
When Switched "IN"

Processor Input
400Hz Square Wave



The peak level is now 3X the original amplitude - a 10dB increase!

Back to Peak Operating Levels...

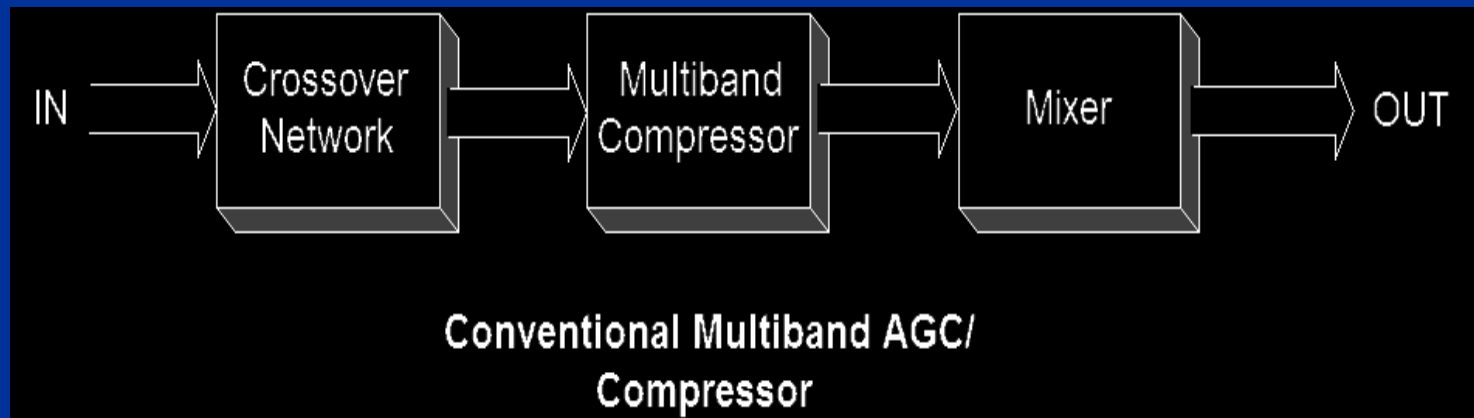
Why we recommend -12dBFS!

- Minimum recommended headroom = 10dB.
- But ... the *actual* requirement is unknown.
- When in doubt, leave a little more headroom!

Operating with audio processor peak input levels of no more than -12dBFS should be 'safe' for virtually all programming situations and input waveforms.

Excessive Audio Density

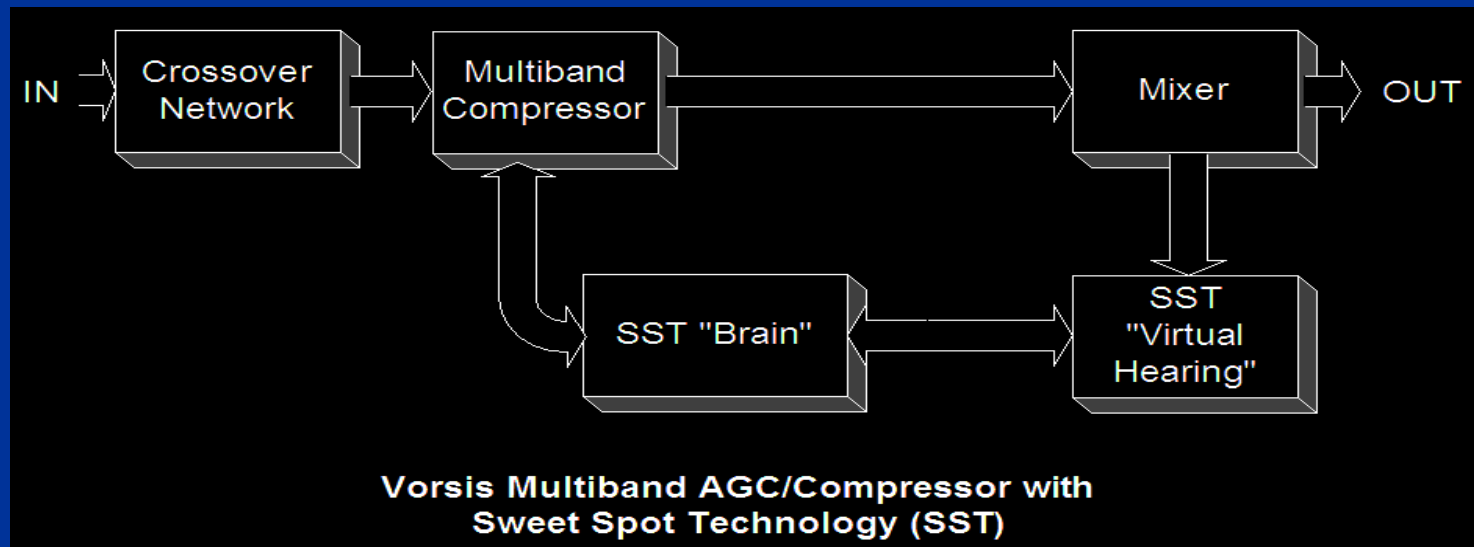
- Conventional audio processors *add* density to the incoming program material...
even if it is not needed



The popular AGC scheme shown above knows nothing about the audio at the output of the mixer.

Preventing Excessive Audio Density

- Vorsis audio processors equipped with SST *do not* add density to the incoming program material - *unless* it is needed!



SST knows everything
about the audio at the output of the mixer!

The On-Air “Bass Race”

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- Increased bass requires *lots* of headroom
- Bass must be kept out of the main clipper
- Bass should be ‘artistic’, not boomy or muddy
- Simple Bass Equalization is inadequate!

What is the answer?

A New Bass Management System!



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Why?

- Today's music has more bass than ever before

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- Stations *still* want more loudness...

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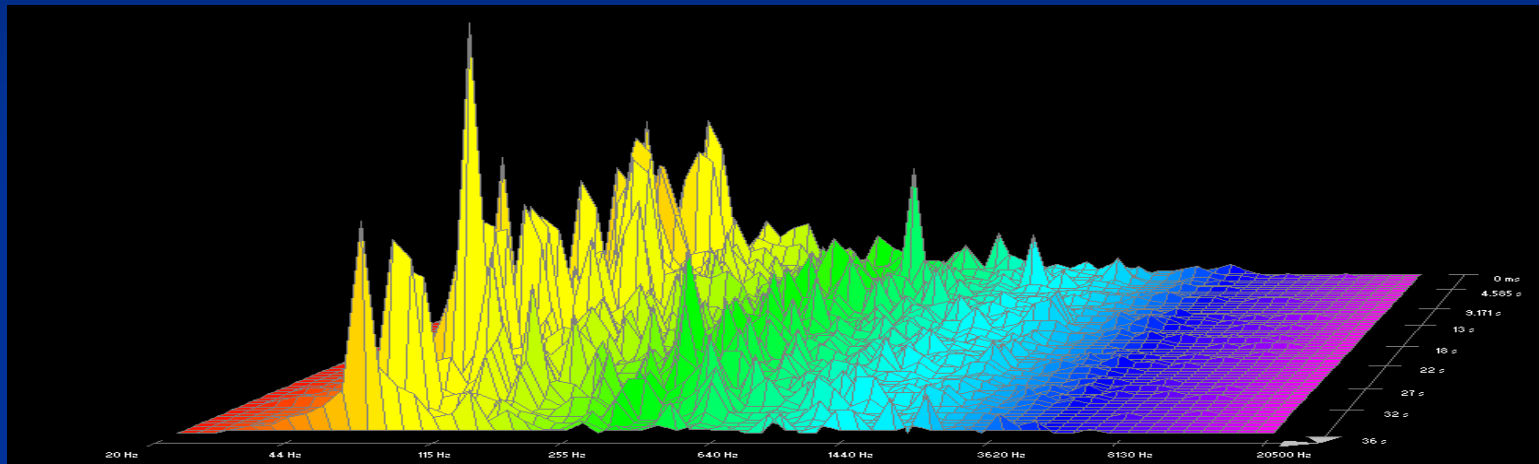
Antiquated bass clipper technologies cannot effectively cope with all of the above simultaneously.

VBMS can!

What is VBMS?

The “Vorsis Bass Management System”

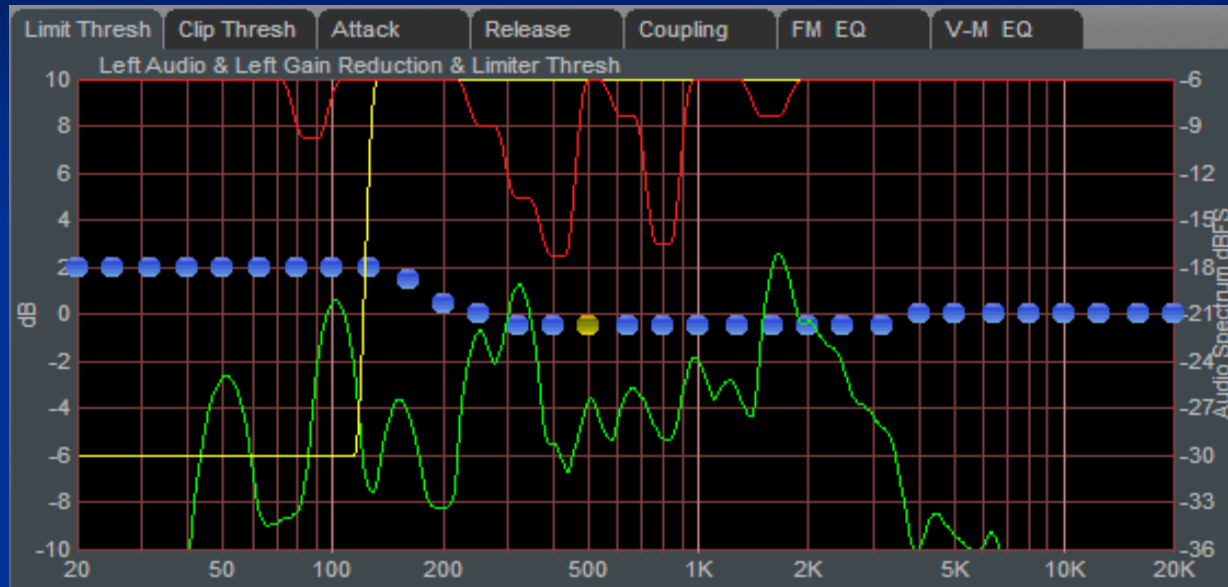
The Advanced Bass Management System for On-Air Processing



Above is a spectrogram of Nelly Furtado’s 2001 single “I’m Like a Bird”. Note the large bass energy peak between 45Hz and 118Hz!

Music mastered like this is why our new Vorsis Bass Management System was invented.

The “Vorsis Bass Management System”



AP2000 Final 31 Band Limiter Screen

Within the 31-band limiter, TWELVE of the limiter bands and a specialized distortion control system work to artistically *improve* on-air bass punch while absolutely preventing intermodulation distortion in the main clipper.

31 Bands? Why 31 Bands?

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- Far less limiting depth is required in order to achieve greater competitive loudness.
- Very narrow frequency bands psychoacoustically mask the work that the limiters must do.
- Allows far greater control for perfecting the station's on-air sound.

About Codecs

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- Codecs are optimized for music or speech – never both!
- A codec using a ‘gentle’ 4:1 compression ratio removes 75% of the original audio!

Door Prize Question:



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What is the World's Best Sounding
Codec?

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Codec?

Ready?

Door Prize Question:

What is the World's Best Sounding
Codec?

Are You Sure?

Door Prize Question:

What is the World's Best Sounding
Codec?

It's No Codec!

(but you knew that)

How to Make a Codec Sound Better

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- Have a Codec-based STL? The on-air processor goes *after* the STL

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- There are also ‘lossless’ codecs available which may work well for your application

Broadcast Plant / Air Chain

Getting that “Big Market” Sound

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- Avoid use of ‘MP3’s’ wherever possible
- Use care in the production studio

Broadcast Plant / Air Chain

Summary

It's not "just the processing". It's also "obsessive" attention to myriad small details. By themselves these details have very little impact on the overall sound of the station, but together they add up to a powerful advantage over your competition!

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Post-session questions?



Visit us in Suite 342
for a personal introduction to
Vorsis Audio Processors!

Vorsis is a Division of Wheatstone Corporation
600 Industrial Drive
New Bern, North Carolina, USA
(252) 638-7000

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