# TAPE TALK #1

*New FerroMaster Tapes Available*

National Audio continues to expand it's family of FerroMaster cassette tapes. Our research and testing constantly works to bring you new products while improving those already in use worldwide. We are proud to introduce these new tapes and manufacturing innovations:

- **C-90 tape available in C-256 and C-456 type I ferric and C-756 type II cobalt.**

- **Cobalt type II tape for both duplication and blank loading.**

National Audio is committed to the future of the cassette format. We welcome and value your business as we strive daily to make more and better tapes available.

National Audio Company, Inc.

**Manufactured in the U.S.A. by National Audio Company, Inc.**
Springfield, Missouri, U.S.A.
417. 863.1925 | NationalAudioCompany.com

# TAPE TALK #2

*New Tape Manufacturing Innovations*

**FerroMaster Tapes** feature National Audio's exclusive ***MAGNE-SHEEN*** tape coating and finishing process.

## WHAT IS MAGNE-SHEEN?

Magne-Sheen is the result of five years of research, testing and experience in magnetic tape coating and finishing.

## WHAT ARE THE BENEFITS OF MAGNE-SHEEN?

1. Higher output and flatter frequency response resulting from better tape contact with recording heads. Recording surface is compressed and polished in a two-stage, 6-roll calender applying a total 40,000 psi at 180 degree F.
2. No oxide shedding on recording heads. Better cross-linker binds oxide tightly to basefilm.
3. Reduced head wear--no abrasive coating.
4. Reduced print-through even at high input levels because of unparalleled oxide uniformity. Oxide coating is applied evenly on basefilm as it passes through two smoothing stations and magnetic particles are oriented by 9500 Gauss natural magnets before entering drying ovens.

## WHAT MAGNE-SHEEN ISN'T

During the 1970s and 1980s, many tapes destined for the consumer market were made using oxides with poor magnetic qualities, irregular particle sizes, and ultra-thin coating thickness. It became a common practice to apply a glossy "sealer" to the recording surface to make the tape appear better than it was.

National Audio has never applied this glossy, deceptive coating to any of our tapes. All of National Audio's FerroMaster tapes are made with high quality, magnetically powerful oxide. Nothing else touches your heads.

***YOU CAN'T SEE SUPERIOR SOUND QUALITY...YOU HEAR IT!***

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# TAPE TALK #3

*Bias and equalization for new #799 type II cobalt cassettes*

Output levels of new #799 cassettes may be either higher or lower compared to "new old stock" cassettes. This can result from a difference in coercivity of the magnetic oxides used to make old tapes as compared to the cobalt oxide used in #799 cassettes.

The cobalt oxide we use is the only one currently refined anywhere on earth. It is a true type II oxide with coercivity of 570 Oersteds (Oe). This is a magnetic characteristic of the oxide itself and cannot be changed.

A list of many previously used type II oxides follows:

| Tape brand | Coercivity (Oe) |
|---|---|
| AMPEX 619 chrome | 625 |
| AUREX 747 cobalt | 705 |
| AUREX 717 chrome | 530 |
| BASF CP "super" chrome | 710 |
| BASF CP "EXTRA" chrome | 700 |
| BASF magnetite | 415 |
| SKMA UCR chrome | 580 |
| SKMA UCX chrome/cobalt | 635 |
| SKMA HCX cobalt | 680 |
| TDK SA cobalt | 650 |
| TDK SA-X cobalt | 620 |


Coercivity 570 Oe Retentivity 1700 Gauss

Specification is for +2 dB over biasing at 6.3 kHz. 20 dB below reference level. Record Equalization — For optimum performance, record equalization should be set after biasing as the oxide in this tape responds somewhat differently due to its high performance characteristics.

Although all type II oxides should be recorded in the "high" bias position on cassette decks, there is a wide range of coercivity. To achieve maximum performance of any of these tapes, bias and equalization must be fine tuned for the tape being used. Since the oxide we use is likely to be the only type II available in the future, it is advisable to adjust bias and equalization for best recording results.

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# TAPE TALK #4

*The Return of a Classic*

FerroMaster C256 is “Classic” type I Ferric tape. It’s magnetic properties match those of the best ferric tapes of the past, manufactured by the great brands you remember.

For signal-to-noise ratio (head room), maximum output level, and clean running, FerroMaster C-256 compares very favorably with any ferric tape currently in production in Europe or China.

FerroMaster C256 does not require re-biasing if your duplication equipment is already set to IEC type I specifications. To achieve optimum performance from any tape, bias and equalization on your equipment should be calibrated for that tape. Specification is for +2 dB over biasing at 6.3 kHz, 20 dB below reference level.

FerroMaster C256 is a “Classic” type I ferric tape formulated for blank cassette loading and for high-speed duplication. It is available in both C-60 standard play and C-90 extended play tape thickness.

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# TAPE TALK #5

*The Gold Standard of the Music Industry*

FerroMaster C456 is ultra high-performance cassette duplicator tape. A master formulation more than 30 years in the making, C456 is the tape of choice for music releases by the major labels and more than 4000 independent labels world-wide. The finest ferric oxide ever formulated is now available on cassette tape.

FerroMaster C456 delivers the high output and frequency response previously available only from the best type II tapes. It features a signal-to-noise ratio (head room) far surpassing any other ferric tape, while providing deep, mellow base, warm mid-range, and crystal clear high frequencies.

C456 is formulated to be recorded on high-speed reel-to-reel duplicators at very high levels. FerroMaster C456 will almost certainly deliver higher output than any other ferric type I tape. To achieve optimum performance from any tape, bias and equalization on your equipment should be calibrated for that tape. Specification is for +2 dB over biasing at 6.3 kHz, 20 dB below level. For optimum performance, record equalization should be set after biasing, as the oxide in this tape responds somewhat differently due to its high performance characteristics.

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# TAPE TALK #6

*Cobalt Type II Tape For The 21st Century*

## NATIONAL AUDIO HEARS YOU!

Some cassette applications require type II tape.

- Many 4-track cassette decks were designed to record only on high-bias type II tape.
- Dedicated home recording enthusiasts have exhausted most remaining supplies of "new old stock" high-bias blank cassettes.
- Professional music duplication companies have been searching for type II tape for their most critical releases for the last 20+ years!

## NATIONAL AUDIO'S # C756 COBALT TAPE MEETS ALL OF THESE NEEDS!

- FerroMaster C756 is an excellent replacement for chrome tape offering better bass and mid-range performance, traditional type II high frequencies, and far less head abrasion.
- Output levels of new C756 tape may be either higher or lower compared to "new old stock" cassettes. This can result from a difference in coercivity of the magnetic oxides used to make old tapes as compared to the cobalt oxide used in C756 tape.
- The cobalt oxide we use is the only one currently refined anywhere on Earth. It is a true type II oxide with coercivity of 570 Oersteds (Oe). This is a magnetic characteristic of the oxide itself and cannot be changed.
- Although all type II oxides should be recorded in the "high" bias position on cassette decks, there is a wide range of coercivity. To achieve maximum performance of any tape, bias and equalization must be fine-tuned for the tape being used. Since the oxide we use is likely to be the only type II available in the future, it is advisable to adjust bias and equalization for best recording results.

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# TAPE TALK #7

***Magnetic Performance Comparison Of All Currently Manufactured Tapes***

| | NAC - USA C256 FERRIC | NAC-USA C456 FERRIC | NAC-USA C756 COBALT | RTM-FRANCE "FOX" FERRIC | PANAREC-CHINA HX FERRIC |
|---|---|---|---|---|---|
| 1. Sensitivity @ 315 Hz | -1.9 dB | -2.6 dB | -1.2 dB | -2.2 dB | -0.9 dB |
| 2. Sensitivity @ 10 KHz | -10.5 dB | -13.0 dB | -12.2 dB | -6.5 dB | -13.1 dB |
| 3. Maximum Output Level @ 315 Hz (MOL) | +2.4 dB | +7.1 dB | +12.0 dB | +2.2 dB | +3.4 dB |
| 4. Saturated Output Level @ 10 KHz (SOL) | -5.5 dB | -7.2 dB | -6.9 dB | -6.5 dB | -6.3 dB |
| 5. Bias Noise | -62 dB | -62.4 dB | -65.4 dB | -62 dB | -58.2 dB |
| 6. Audio Signal/Noise Ratio | >57.4 dB | >57.9 dB | >68.0 dB | >52.1 dB | >52.1 dB |
| 7. Coercivity | 370 Oe | 325 Oe | 570 Oe | 370 Oe | 370 Oe |
| 8. Retentivity | 1700 G | 1700 G | 1700 G | 1500 G | 1500 G |

## TEST NOTES

**1, 2. Sensitivity** — The magnitude of the output when reproducing a tape recorded with a signal of given magnitude and frequency. The sensitivity of an audio or instrumentation tape is normally expressed in dB relative to the sensitivity of a reference tape measured under the same recording conditions. Lower dB values indicate better performance.

**3. Maximum Output Level (MOL)** — In audio tape, that record level which produces a 3rd harmonic distortion component at 3.0%. Higher dB values indicate better performance.

**4. Saturated Output Level (SOL)** — The condition reached in magnetic tape recording where output does not increase with increased input and hence distortion increases significantly.

**5. Bias Noise** — The noise level (bias only) measured on a tape when only bias is recorded without audio signal.

**6. Signal-to-Noise Ratio** — The ratio, usually ex-pressed in decibels, between the loudest un-distorted tone a system can handle and the noise remaining when the signal is reduced to zero. often referred to as "head room".

**7. Coercivity** — Measured in Oersteds, the measurement of a magnetic characteristic. The demagnetizing force required to reduce the magnetic induction in a magnetic material to zero from its saturated condition.

**8. Retentivity** — The maximum value of the residual flux density corresponding to saturation flux density.

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## MAGNETIC TEST EQUIPMENT - NAC LAB

- Vibrating  Sample Magnometer
- Walker Scientific/Digital Measuring Systems Model 1660 VSM system
- Field Meter DMS32FG Gaussmeter
- Complete System ID REBUIIK-98032001 (DMS/@Walker Scientific)
- Calibration Std 5mm Square Nickel MicroSense 029350-A05 #029350-A05 (1.4274 emu/0,0260g)
- HP quad core PC running EasyVSM (MicroSense) software

## AUDIO TEST EQUIPMENT - NAC LAB

- TASCAM 122MKIII #0280054 test cassette deck factory level calibration
- House reference tapes (BASF reference and local reference, cross tested and confirmed)
- Signal source (Osc) Leader LAG120B #08977421 sine wave generator of test signals
- AC level meter #1 Leader LMV 181A #1617630 monitors generator output level
- Gain set step attenuator HP 353A #6247A70332 600 ohm in and out 0 dB-100dB in 0.1dB steps
- AC level meter #2 Leader LVM 181A #4090828 monitors input level at input to deck
- Oscilloscope Tektronics 2447A #8032659 used to monitor noise and distortion
- HP 322A #985-01842 distortion/level meter (deck output level and distortion measurement meter)
- 3 cassettes of each type of tape to be tested, loaded, and wound/rewound prior to testing
- Audio monitoring system for operator convenience
- Termination resistors (1%)
- All active test components (Osc/source, level meters, attenuators, term resistors, and distortion/ level meter calibrations are confirmed prior to any measurements being performed

## AUDIO TEST PROCEDURE - NAC LAB

The following is done step by step on each type of tape and repeated on each type independently:

- Check deck recording 0 reference at 1 KHz w/ osc output at 1KHz and 0 dB w/ deck indicating 0 on input meters and output meters.
- Decrease osc. frequency  to 315 Hz. Increase osc.attenuator value until deck output indicates 0 dB. The attenuator value indicates the tape sensitivity at 315 Hz while recording.
- Reset attenuator to 0.0 dB and increase osc. frequency to 10KHz, then increase input attenuator until output returns to 0 while recording. The attenuator value is the 10 KHz sensitivity.
- Return osc.frequency to 315 HZ and attenuator to 0.0. Connect scope to deck output and get good 4-5 cycle display of sine wave. While recording, increase osc.output until distortion starts to appear on the waveform and deck output stops increasing, indicating saturation or max output at 315 Hz. Amount of increase above 0 dB on the oscillator AC VTVM is the saturation level. The value on the output VTVM is the max output level. Set all back to 0 dB then perform the same sequence at 10 KHz for 10 KHz saturation while recording.
- Bias noise: Set all to 0 dB insert tape sample and record a stripe of reference level, reset counter to 000 and remove audio input for one minute. Rewind and verify reference is at 0 on playback. Output VTVM reading should be 0 or very near it at end of reference recorded tone. Silence level measured on the output VTVM will be the bias noise.
- Signal to noise is the difference in output (0 dB at 315 hz) and noise as measured above.

# TAPE TALK #8

*New #C731 Ultra-High Output Type I Tape*

National Audio continues to expand its family of FerroMaster cassette tapes. Our research and testing constantly works to bring you new products while improving those already in use worldwide. We are proud to introduce #C731 ultra-high output normal bias (370 oe) 120 EQ type I tape for real-time recording enthusiasts.

This new formulation is a blend of gamma ferric and cobalt oxides. At traditional recording levels, it will perform much like our C256 type I tape. The difference is: you can record C731 at much higher levels (up to +4 db) without saturation! C731 also delivers exceptional high frequency response. C731 is available in both standard play and C-90 extended play formats.

National Audio is committed to the future of the cassette format. We welcome and value your business as we strive daily to make more and better tapes available.

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# TAPE TALK #9

*FerroMaster™ Tape Manufacturing News*

National Audio is the world's foremost manufacturer of audio cassette recording tape. We specialize in audio cassette pancakes, making 4,000,000 feet of tape every eight hours. At the present time, we produce two types of Ferric type I and a cobalt type II tape in both C60 and C90 formats. Our FerroMaster™ tapes are used by all of the major labels and by more than 5,000 independent labels for their music releases.

This communication is your introduction to our new Tape Talk newsletter. We will be sending it to you beginning next week for eight consecutive weeks and as frequently as we develop new types of tape and manufacturing processes in the future. National Audio is committed to the cassette tape industry. We wish the best of success for you as we restore and expand this great recording format together.

## *The Gold Standard of the Music Industry*

**FerroMaster C256™** Classic Ferric Normal Bias Type I tape for blank cassettes is compatible with all cassette decks and duplicators.

**FerroMaster C456™** Ultra High Performance Normal Bias Type I tape is specifically formulated for open-reel high-speed music duplication.

**FerroMaster C756™** Cobalt High Bias Type II tape is designed for critical applications in cassette decks and open-reel music duplication.

- C-60 Standard Play tape 9,500 feet (2,896 m) per pancake
- C-90 Extended Play tape 12,800 feet (3,901 m) per pancake
- 30 pancakes per carton

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