R2R and Tape Booster Plus Audio Plug-Ins Manual

R2R - The Essential Analog Tape Collection Audio Plug-In

Thank you for your purchase of The "R2R" Audio Plug-In!

We are pleased to present this commercial Plug-In that uses a special technology developed by Acustica Audio called Acqua. "Acqua" is a Stand-Alone interface engine that is "Powered By Nebula Technology". This allows us to make use of the most advanced sound generation processing currently available in software form.

CDSoundMaster has been involved for many years helping in the beta-testing, development, program creation, customer support, and content creation and editing of the Nebula engine as a community friend to the Acustica Audio team, and is an Official Third Party Commercial Library Developer for the Nebula Plug-In. Our Stand-Alone Plug-Ins that use the Acqua technology are also complimented by libraries created for the Nebula Plug-In. For "R2R" there is a library of additional programs. We highly recommend learning more about Nebula at www.Acustica-Audio.com You will need the Commercial version of NebulaPro to run the additional Nebula Library Programs. There is always a discount available for purchasing the "R2R" Nebula programs in addition to your Stand-Alone Plug-In. Just write us at Michael@CDSoundMaster.com

"R2R" Plug-In is a suite of programs created at 96kHz sample rate and will automatically convert itself to any different rate based upon the file, track, or session property supplied.

We recommend a minimum computer with the following:
Windows XP or higher compatible VST platform.
At least 1 Gig Ram (the more the better)
At least an AMD Dual Core CPU

Installation

Windows

If using Windows 7 or late XP, we recommend using right click "run as administrator" to resolve most issues with installation.

Make sure that all audio hosts are closed when installing.
Make sure that you chose the proper installation directory where your vstplugins are located. There are specific directories depending on whether you are running 32 bit plug-ins, both 32 bit and 64 bit, or only 64 bit.

Once finished installing, open an instance of R2R in your audio host. The first time R2R is opened it will generate a serial "SER" file in the directory where R2R is installed. email this "SER" file to CDSoundMaster and we will email you a response "AUT" file. Place this file in the same location as your "SER" and reload. R2R is now authorized and ready for use!

The Tape Machines

Studer A800 MKIII 2" 24Track
Otari MTR-10 1/4" Mastering Tape Machine
Revox B77 Pro
Akai 4000DS MKII
Sony TC-640
Lafayette Radio RK-142
Wollensak 1515

Tape Formulas

AMPEX 499
AMPEX/QUANTEGY 456
ATR
SCOTCH 206
MAXELL UD 3590
MAXELL UD XL 3590 B
SCOTCH 290
SCOTCH 111
SONY PR 150

Controls

Each program contains the following controls:

Input

This control operates the level entering the Plug-In. The processing chain is based upon the volume level entering the input, so use this to control all aspects of how you wish to approach the tape machine in your recording chain.

Increasing the input gain level will operate exactly as it does on the real analog tape machine. Louder input levels will generate higher levels of harmonic distortion and raise the range of volumetric dynamic response and the related frequency spectrum.

Lowering the input gain level reduces the amount of harmonic content generated by the tape machine and reflects the dynamic range being processed and the related frequency spectrum.

Output

The output control digitally regulates the final volume leaving the Plug-In. Get the level and response you desire from a combination of the input level and drive setting, and use the output control to set the final volume you wish to use. This control does not alter the analog processing effects that take place and is the ideal control for setting levels without changing the effect.

Drive

This control operates the increase and decrease of the natural harmonic content of the tape machine. It is based upon the real analog tape machine's character, and remains accurate to the actual response of the machine within several decibel's above and below the pre-loaded setting.

For the utmost realism in this setting, leave the drive control set to its neutral setting and use the input control to change both volume and drive together. Decreasing the drive control reduces the harmonic distortion while increasing the level raises the amount of harmonic content. When using the drive control instead of adjusting the input gain level, harmonic distortion is controlled separate from dynamic and frequency settings.

Since each tape machine has a very complex sonic signature that is composed of a combination of frequency, dynamic, and harmonic attributes, changing the amount of drive separate from the volume and frequency does alter the character, but can be useful for fine-tuning the effect desired on a given track, and every creative decision made should be based upon what sounds right to the user.

Keep in mind that setting an extremely high drive level on very loud input signals can result in inaccurate results and can even leave unwanted artifacts, so staying within a few decibels of the natural range of the machine is best.

Bypass

Clicking on this control disables the effect of the Plug-In and continues to pass sound through the Plug-In without altering the incoming signal. This feature is useful to compare settings back and forth, or to listen to compared results on individual tracks in the context of the mix. Click on this once to turn bypass on, and the Plug-In will pass the audio signal through dry and unaffected. Click on bypass a second time to turn bypass off, which will return the full effect chain to an "on" position and process the sound that runs through the Plug-In.

In addition, each program contains additional indicators for monitoring:

<u>Over Indicator</u>

The over indicator will let you know if the Plug-In has reached too high a level of gain. This visualization helps you to control the proper levels going into the program and leaving the program. If you wish to increase the input and receive an overload signal, then you should either reduce the amount of input or reduce the output to compensate. This indicator will work for any cause of the signal going above digital zero, but since the Plug-In has an exceedingly wide dynamic range and high bit depth, you are able to raise the input as high as the input control allows without corrupting the signal, as long as the output is reduced enough to compensate and return a level that causes no overs. It is still best practice not to push the volume or drive too far beyond typical levels.

<u>VU Meters</u>

The VU meters provide a constant visualization of the signal that is processed by the Plug-In. Each VU meter is specialized to follow the design of the actual tape machine, so there are small variations in exactly how sensitive their levels are that are produced. Each VU meter provides a constant average and constant peak response, meaning that it works to provide visualization of the loudest signal that occurs and maintaining regular updates to ongoing levels that are not at the peak volume.

Since the VU meter is primarily a cosmetic visualization and is provided for basic volume information and also for aesthetic enjoyment of the Plug-In, the user should employ added volume visualization as needed, whether using the host's primary levels or Plug-Ins that are designed to provide various level metering attributes.

About The Programs

R2R contains a total of 49 tape machine programs!
There are seven different tape machines represented in the collection, and each has been carefully created and edited for a specific response.

The "STU"

The "STU" contains the following four programs:
15 IPS Lo

This program emulates the machine running at 15 inches per second, and covers a dynamic range from very quiet signals up to a maximum of analog 0dB, or the machine's unity setting.

15 IPS Mid

This program emulates the machine running at 15 inches per second, and covers a dynamic range from quiet signals up to a maximum of analog +3dB. The machine is biased and calibrated specifically to achieve it's maximum level within spec, at +6dB, so +3dB max. dB is a perfect program to use for a maximum level that has more character than a 'flat' setting, but not as 'hot' a signal as +6dB.

15 IPS Hi

This program emulates the machine running at 15 inches per second, and covers a dynamic range from quiet signals up to a maximum of analog +6dB, or +6dB above the machine's unity level. This provides the user with the maximum range of character from the machine, with a harmonic content based upon the loudest appropriate signal for regular use. You can use this for the most characteristic 'colored' response that the "STU" is

known for. It is less colored at lower levels and can be driven the furthest into altered frequency and harmonic drive.

30 IPS

This program emulates the machine running at 30 inches per second, and covers a dynamic range from quiet signals up to a maximum of analog +0dB. For this program, the machine is calibrated for use in its cleanest mode and cleanest setting. This program represents the ideal use of the "STU" for cleaner tracking, group bus mix, and even final mastering if desired. Since the noise floor has been eliminated from the machine, it is not necessary to limit its use to tracks only, but is equally appropriate for two track use.

The "OTR"
The "OTR" contains the following twelve programs:

OTR 15 IPS 499 0dB

15 inches per second, set to unity gain 0dB analog using Ampex 499 1/4" Tape.

OTR 15 IPS 499 3dB

15 inches per second, set to +3dB analog using Ampex 499 1/4" Tape.

OTR 15 IPS 499 6dB

15 inches per second, set to +6dB analog using Ampex 499 1/4" Tape.

OTR 15 IPS ATR 0dB

15 inches per second, set to unity gain 0dB analog using ATR 1/4" Tape.

OTR 15 IPS ATR 3dB

15 inches per second, set to +3dB analog using ATR 1/4" Tape.

OTR 15 IPS ATR 6dB

15 inches per second, set to +6dB analog using ATR 1/4" Tape.

OTR 30 IPS 499 0dB

30 inches per second, set to unity gain 0dB analog using Ampex 499 1/4" Tape.

OTR 30 IPS 499 3dB

30 inches per second, set to +3dB analog using Ampex 499 1/4" Tape.

OTR 30 IPS 499 6dB

30 inches per second, set to +6dB analog using Ampex 499 1/4" Tape.

OTR 30 IPS ATR 0dB

30 inches per second, set to unity gain 0dB analog using ATR 1/4" Tape.

OTR 30 IPS ATR 3dB

30 inches per second, set to +3dB analog using ATR 1/4" Tape.

OTR 30 IPS ATR 6dB

30 inches per second, set to +6dB analog using ATR 1/4" Tape.

The "RVX"
The "RVX" contains the following twelve programs:

7.5 IPS 499 3dB

7.5 inches per second, set to +3dB analog using Ampex 499 Tape.

7.5 IPS 499 6dB

7.5 inches per second, set to +6dB analog using Ampex 499 Tape.

7.5 IPS ATR 0dB

7.5 inches per second, set to 0dB analog using ATR Tape.

15 IPS 499 0dB

15 inches per second, set to 0dB analog using Ampex 499 Tape.

15 IPS 499 3dB

15 inches per second, set to +3dB analog using Ampex 499 Tape.

15 IPS 499 6dB

15 inches per second, set to +6dB analog using Ampex 499 Tape.

15 IPS ATR 0dB

15 inches per second, set to 0dB analog using ATR Tape.

15 IPS ATR 3dB

15 inches per second, set to +3dB analog using ATR Tape.

15 IPS ATR 6dB

15 inches per second, set to +6dB analog using ATR Tape.

The "AK"

The "AK" contains the following eight programs:

Hi MAX-UD-XL-3590B

7.5 inches per second using Maxell UD-XL-3590B Tape.

Hi SC-206

7.5 inches per second using Scotch 206 Tape.

Hi SC-111

7.5 inches per second using Scotch 111 Tape.

Hi SC-290

7.5 inches per second using Scotch 290 Tape.

Hi S-PR-150

7.5 inches per second using Sony PR 150 Tape.

Lo SC-111

3.75 inches per second using Scotch 111Tape.

Lo MAX-UD-3590

3.75 inches per second using Maxell UD-3590 Tape.

Lo MAX-UD-XL-3590B

3.75 inches per second using Maxell UD-XL-3590B Tape.

The "SNY"

The "SNY" contains the following eleven programs:

Hi-SC-290

7.5 inches per second using Scotch 290 Tape.

Hi-S-PR-150

7.5 inches per second using Sony PR 150 Tape.

Hi-A-Q-456

7.5 inches per second using Ampex/Quantegy 456 Tape.

Hi-MAX-UD-3590

7.5 inches per second using Maxell UD-3590 Tape.

Hi-SC-206

7.5 inches per second using Scotch 206 Tape.

Hi-MAX-UD-XL-3590B

7.5 inches per second using Maxell UD-XL-3590B Tape.

Hi-SC-111

7.5 inches per second using Scotch 111 Tape.

Low-MAX-UD-3590

3.75 inches per second using Maxell UD-3590 Tape.

Low-SC-290

3.75 inches per second using Scotch 290 Tape.

Low-SC-111

3.75 inches per second using Scotch 111 Tape.

Low-A-Q-456

3.75 inches per second using Ampex/Quantegy 456 Tape.

The "Lafayette Radio"

The "Lafayette Radio" contains the following four programs:

MAX-UD-3590

Maxell UD-3590 Tape.

SC-206

Scotch 206 Tape.

Q-456

Ampex/Quantegy 456 Tape.

SC-290

Scotch 290 Tape.

The "Wollensak 1515"
The "Wollensak 1515" contains the following program:

S-PR-150

Sony PR 150 Tape.

About The Tape Machines

R2R contains a virtual living museum of reel to reel analog tape recorders ranging from early tube designs to popular consumer favorites, to some of the finest machines ever made!

The following models have been meticulously recreated for digital recording in this collection:

The Studer A800 MKIII - Considered to be one of the finest 24 track machines ever made. This specific machine sampled is in near mint condition, and is responsible for numerous famous recordings. This r2r has been sampled at 15 and 30 IPS using Ampex 499 tape.

The Otari MTR-10 - This is a beautiful sounding 1/4" 2 track mastering r2r sampled at 15 and 30 IPS using Ampex 499 and ATR tapes.

The Studer Revox B77 Pro - This machine has developed its own cult following as one of the most highly sought after sounds. Although created for consumer, semi-pro, and professional use in varying forms, and considering that there is nothing spectacular about the electronics used, this Revox uses some of the best sounding tape heads ever made, and is known to be built like a tank. The result is an unmistakable sound that is sure to quickly become a favorite in your mixes! This machine has been sampled at 7.5 and 15 IPS using Ampex 499 and ATR tape.

The 1950's Wollensak 1515 - This r2r is an early stereo tube design created by Wollensak in partnership with 3M and Revere. The tube preamp and high quality heads have helped to build a reputation for this machine not only as an excellent studio tape effect, but also as a guitar amplifier! This machine has been sampled at 3.75 IPS using several tapes, and the tube preamp and tone control dial have both been sampled independently for use on any track!

The 1950's Lafayette Radio RK-142 - This incredibly rare r2r is a mono tube full track device that runs at 7.5 IPS and uses the full width of tape when recording.

The 1970's Sony TC-640 - This is an excellent consumer solid state r2r sampled using multiple tape formulas at 3.75 and 7.5 IPS.

The 1970's Akai 4000DS MKII - This is among the most popular consumer r2r's ever, and is still a favorite among collectors. It has been sampled at 3.75 and 7.5 IPS using multiple tape formulas.

About The Technology

The R2R Audio Plug-In is based on an advanced sampling technology called V.V.K.T., or Vectorial Volterra Kernels Technology.

This process creates large chunks of streaming data that replay live when rendering sound. All R2R programs are sampled at 96kHz.

The result is the most accurate reproduction of these analog machines in their digital form.

R2R recreates frequency response, dynamic response, and harmonic distortion.

Frequency Spectrum:

Every tape machine, tape speed, and tape media produces a unique response in the frequency range from the lowest lows to the highest highs. Certain elements produce a signature sound that is based on how high the gain level is recorded, how much non-linearity is produced, and how much tape surface is covered and using which tape formula. The combinations are virtually endless, so we have taken a fully comprehensive approach to providing every desired result. Frequency response is unique to the machine, speed, and tape, but not only in one dimension. Every volume change has its effect, and every frequency has its effect. The frequency spectrum undergoes a complete reproduction of the original machine, at is loudest, minimal, and quiet settings. As an example, a Studer may respond close to flat at +0dB, but at +6dB it may exhibit a slightly higher arch and slope, giving a slightly warmer sound. In a single program, the entire dynamic range from quiet to a maximum peak volume, is collected in an entire series. So, as your music interacts with the program, it responds dynamically, and there is subtle variation in the frequency response.

Dynamic Response:

A wide volume range is sampled in every program and results in harmonics that are different from loud to quiet settings. This provides an extremely rare, variable, and expansive variety of options to capture exactly the sound desired. In a single process, sound is generated from loud levels to quiet levels, and the result is edited to reproduce this process in all its complexity and vividness.

Harmonic Response:

Harmonic Distortion is a unique fingerprint to analog hardware just like eq or any other signature variable. Harmonics have a technical and musical significance in how they influence resulting sound. In the same manner that an eq makes alterations to a signal at specific cycles, harmonics overlay and intertwine the fundamental elements of sound generation. An analog device in perfect performance will generate very low harmonic distortion. But, each machine becomes more colorful and generates a trademark sound in a very complex manner when levels are increased. The hotter the signal, and the more tape media real estate used to print sound, the more significant the results are in coloring the sound. Harmonics can color sound in similar ways to eq, and also similar to compression and limiting. While it does not affect transients, it is like subtle increases in volume created by the overlapping of coincidental and sympathetic vibrating frequencies. The way this interacts becomes a desirable effect that can be used to impress a more natural and musical sound to digital recordings. Just like other elements, this response is dynamic, meaning that it is unique in a dynamic manner, thus it changes with the volume layers that are recorded, edited, and reproduced. Since different tape elements can generate a unique response on less linear machines, in many cases multiple tape media are sampled.

Special Notes:

Each machine has a unique sound and a value that goes beyond a simple emulation. The sonic fingerprint that each complex program provides can lead to much creativity in your production work. We highly recommend experimenting with tape in places you may not have thought of. For example, use the early vintage tube machines in place of low-fi or special effect eq's. More than just changing frequencies, they will interacts with your audio in a pleasing manner and may provide something very unique.

The Akai is known as a 'special weapon' by many producers for use on stereo electric guitar for the unique frequency spectrum and harmonics, and can have a similar textural effect to high end ribbon microphones on the dimensional overtones of the guitar.

The Studer is a beautiful, elegant sounding machine that has a unique, fluid, musical quality even in its most subtle settings. We recommend using it in 15 IPS for slightly more color on vocal tracks, parts that have extended sustain and warm tones and in full sessions.

The Otari is a remarkable sounding machine with a lot of punch and clarity. It is strong at emphasizing the space around parts in a mix. If you are working with dense mixes that need better isolation on drums or separation in transients, the Otari at 30 IPS is incredible in this articulation. But, since multiple instances are available, you can now use it for as many individual tracks as desired!

A word about tracks levels

We receive a lot of questions about how to record levels, adjust file volume, and setting tracks levels.

Our philosophy in creating this set of tools is to be accurate, straight forward, and easy to integrate into your work flow. There are different mixing practices that come and go in recording, so there is truly no single perfect way to translate analog into digital when it comes to file rendering and level metering, but we do believe that there is an ideal process to make this choice as flexible as possible.

We mimic the actual analog volume response of the original machine in every program created. Digital +0dB is considered the maximum actual peak level that an analog device can go before entering into overload or inaccurate, unwanted distortion. This means that if your actual recorded file is normalized to +0dB digital full scale, then you can load it directly into these programs and expect to get the response of hitting the tape machine setting at that volume. So, for instance, a digital +0dB track loaded to the Studer 15 IPS Hi program, will hit the analog machine at +6dB.

This concept works well for hitting things with the most color if desired, but works equally well for those employing various standards of setting tracks at monitored levels like the K-System and the sort. By following low average levels like -18dBFS, -12dB rms, -6dB digital peak, etc., you are always still interacting with the programs in a completely dynamic manner, but you will be hitting them at a lower input volume. So, the result of lower digital levels will also result in hitting your analog machines at lower levels. This works equally well considering that the noise floor has been eliminated, so there is no need for concern about going into hiss. So, if you want to hit things hot, use hot levels. If you want to use low levels for dynamic mixing conditions or calibrated files set to your monitored output reading, then you are equally prepared to hit the analog sound of the machines at lower settings. If you wish to increase the amount of drive and non-linear response from any given program with lower volume tracks, simply increase the program's input and reduce the output by the same amount. If this becomes your regular practice, chains and presets are easy to make and can be rendered in batch processes to save time!

Tape Booster Plus Audio Plug-In

Thank you for purchasing Tape Booster Plus!
We believe that you will find this to be one of the most valuable hidden gems in your Plug-In collection and hope that you find it useful.

About Tape Booster Plus

Tape Booster Plus has been created to introduce the most accurate sounding real tape saturation to the digital recording format. It uses the same V.V.K.T. Technology mentioned in the R2R Manual and has been developed to enhance your specific R2R Tape Machines, but it can also be used on its own as an accurate generalized tape saturation effect. Where R2R provides a vast collection of specific tape machines and their dynamically changing frequency spectrum and harmonic distortion responses, Tape Booster Plus makes use of this advanced technology to add an additional instance or chain of instances of added harmonic saturation drive to increase the gain level of your R2R machines. Tape Booster Plus increases the volume of a mix without harming its peaks and without changing the overall frequency spectrum. It can make mixes breath easier and help glue things together in a way that only tape does!

Installation

Windows

If using Windows 7 or late XP, we recommend using right click "run as administrator" to resolve most issues with installation.

Make sure that all audio hosts are closed when installing.
Make sure that you chose the proper installation directory where your vstplugins are located. There are specific directories depending on whether you are running 32 bit plug-ins, both 32 bit and 64 bit, or only 64 bit.

Once finished installing, open an instance of Tape Booster Plus in your audio host.

The first time Tape Booster Plus is opened it will generate a serial "SER" file in the directory where it is installed. This file is called “R2R.SER”. Email this "SER" file to CDSoundMaster and we will email you a response "AUT" file. Place this file in the same location as your "SER" and reload. Tape Booster Plus is now authorized and ready for use!

The Programs

Tape Booster Plus contains two programs; Tape Booster Plus 96kHz and 44.1kHz.

They appear as follows:

We recommend using the 44.1kHz version of Tape Booster Plus for recordings that have been recorded at 44.1kHz, in a session at this rate, or for final mixes or masters that will end up at 44.1kHz. It has been specifically designed to operate upon this range of frequencies for the most realistic tape result.

We recommend using the 96kHz program for recordings that are 96kHz and for mixes or masters that will be finalized at 48kHz or higher. This program requires a slightly different process to include the more complex harmonic content that exists above the fundamental harmonic order and will give best results for recordings at this higher rate.

You are welcome to use either version with any file if you desire to do so, but we have created these two variations to make the process of adding perceived tape volume as easy and natural as possible.

When Tape Booster Plus is first opened, it is pre-programmed to the maximum setting that we recommend for use on the average track at that sample rate. We recommend loading the program and leaving it alone in most cases, but you are free to adjust controls as desired.

For subtle tape saturation, use a single instance on a bus group, master, or single channel. You can decrease the drive setting for very subtle saturation.

For more profound tape drive or for actual audible distortion, use several instances of Tape Booster Plus in serial, and if using hot track levels, reduce each drive setting by a few decibels to avoid overdoing the effect. The result can be huge steps of gain.

The Controls:

Input

This control operates the level entering the Plug-In. The processing chain is based upon the volume level entering the input, so use this to control all aspects of how you wish to approach the tape machine in your recording chain.

Increasing the input gain level will operate exactly as it does on the real analog tape machine. Louder input levels will generate higher levels of harmonic distortion and raise the range of volumetric dynamic response and the related frequency spectrum.

Lowering the input gain level reduces the amount of harmonic content generated by the tape machine and reflects the dynamic range being processed and the related frequency spectrum.

Output

The output control digitally regulates the final volume leaving the Plug-In. Get the level and response you desire from a combination of the input level and drive setting, and use the output control to set the final volume you wish to use. This control does not alter the analog processing effects that take place and is the ideal control for setting levels without changing the effect.

Drive

This control operates the increase and decrease of the harmonic content created and is independent of the input gain. When using the input control, harmonic content changes along with the volume, but when adjusting the drive on its own, it does not affect volume, and only affect harmonics.

Keep in mind that setting an extremely high drive level on very loud input signals can result in inaccurate results and can even leave unwanted artifacts, so staying within a few decibels of the natural range of the machine is best.

About CDSoundMaster's 3 Stages Of Tape

We are very enthusiastic about the concept that we have developed for recreating tape in the digital domain, but because it is unique it requires some explanation. For the full background on our 3 Stages of Tape, please visit the VTM-M2 F.A.Q. Page on our website and enjoy some reading.

The short version of the story is that we spent a great number of years studying tape and deciding on a process that would recreate the process with the highest amount of accuracy.

Tape has certain traits that tend to be general and universal, and has other traits that are impossible to separate from each individual machine.

To create a single tape machine plug-in would simply not make sense, as there are so many special qualities that different machines possess. But, how many machines should be referenced or emulated, and if a truly comprehensive process is employed for each machine, we run into several issues. The end result is that we need to embrace the best technology for all aspects of the unique analog sound.

The process developed by Acustica Audio, V.V.K.T., does a remarkable job at creating the most important sonic aspects of high end analog hardware. It does this better than any other technology to date. It is ideal for representing individual tape machines in every manner we use them on a regular basis, up to the point of extreme drive and limiting/compression artifacts. At this point, there are certain characteristics that are common among all tape media and all tape machines when pushed into even extreme conditions. So, we developed a 3 Stage Process that provides the perfect combination of specific real machines, an easy 'set it and forget it' process for generating incredibly realistic tape saturation, and our own unique algorithmic process in a 3rd stage in our VTM-M2 saturating tape compressor Plug-In. This final stage is useful on its own but is ideal when used in combination with R2R and Tape Booster Plus. Again, for the full story, please read online. We believe that you will find your digital tape experience to be complete, comprehensive, fulfilling, and highly accurate.