

RouteMaster and Signal Ground Integrity



RouteMaster addresses two serious challenges to audio nirvana: The corruption of ground integrity by the torturous ground routing in today's music reproduction systems and the increasing noise levels on the ground line that have crept up on us over the last decades.

For single ended unbalanced analogue signals with connections between components made for example by RCA interconnects, the signals are measured between two points, a "Hot" signal is compared (referenced) to "Ground" giving two points of measurement, the difference between the two points being what we are interested in. Try measuring a room with a tape when the person holding the other end won't hold it exactly where it needs to be or even steadily.

Components connected by balanced e.g. XLR connectors have a "Hot" signal wire with positive voltages and a "Cold" signal wire with negative voltages both referenced to the third, zero volt "Ground" wire.

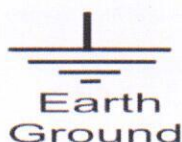
Consider the ground as the horizon, it should show which way is up and be extremely steady and unwavering, or with the tape analogy it should be steady, unwavering and in the right place.

Go back in time and the ground was usually a very simple affair; the signal was the signal and ground was ground: The chassis of equipment was metal and was safety grounded by the incoming power cable giving a direct connection to the ground pin of the power plug. The metal chassis was also the signal ground, e.g. the barrel of an RCA socket was directly bonded to the metal chassis. Safety Ground, Chassis Ground and Signal Ground were all one and the same.

With this system, grounds were connected from component to component both by their common connection to the premises wiring ground via the power cords into the wall and by the interconnection of signal leads between equipment

An occasional problem with this approach, caused by having simultaneous alternative routes to ground, is induced current "hum" loops. Hum loops are caused by circling currents; circling because the connection routes and varying resistances between points are neither uniform nor methodical. The "circles" required hunting down and breaking to stop the hum. But even with this occasional problem..... these were simpler days.

Today, things are substantially more complicated: We have to consider and approach a much more convoluted route map of grounds in our systems where we have not one but three "grounds" to concern us; they even get their own symbols!



Earth
Ground



Chassis
Ground

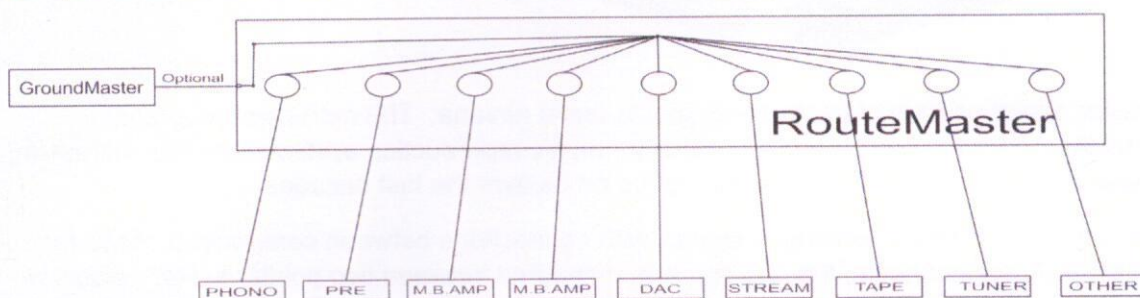


Signal
Ground

Currently the signal grounds on your various HiFi and AV components may adhere to any of a number of practices: At the original and most basic level that many equipment makers still adhere to chassis ground is the same as safety ground is the same as signal ground, but on some equipment chassis does not equal safety ground and on much equipment signal ground is "lifted" by x volts from chassis ground by a resistance or other device(s). But here connecting an item where these three grounds are unified to a component where they are not, will immediately result in that component having its signal ground "unlifted" and reunited with safety and chassis ground.

And so today, through the interconnection of signal leads to assorted components adhering to different grounding practices, a rather haphazard, cross confusion of the whole system signal ground map is created. Ground is an absolutely vital element of the signal, no less so that the "hot" and any incoherency in the ground is a sonic disaster.

RouteMaster reorganises the tangled web of your system's grounds in a coherent fashion directly locating all signal grounds to a single star point. Creating a stable and fixed horizon for all components to reference to, and navigate from.



RouteMaster accepts grounding reference connections from up to nine system components. Simply identify a spare input and connect it with the appropriate Ultra Connect cable. For the very optimum results all RouteMaster UltraConnects should be the same length and hence resistance.

The Star Connection Chamber inside of the RouteMaster, already enhanced for silence by the use of a unique combination ferroelectric and other materials, can be further silenced and stabilized by connecting a GroundMaster or GroundMaster City version

If you already have a GroundMaster connected to your system safety earth connection through a Puritan conditioner or other connection, use a second GroundMaster connected to the same rod. The two GroundMasters automatically isolate from each other avoiding any circulating currents

Benefit can be gained by treating digital cabling shields (USB, RJ45 etc) independently from analogue signal grounds. Use a further RouteMaster to gather these connections, the airborne interferences being absorbed by these screens can then be nullified by routing to earth ground via an additional GroundMaster or GroundMaster City. This avoids these unwanted interference energies existing in the shields from where they otherwise are inductive and capacitively coupled to the digital signal carrying leads, corrupting these signals.

Going even further, noise present on case metalwork can again couple to intended signal paths and many users find it beneficial to gather all chassis connections to yet another RouteMaster dealing exclusively with chassis/case noise and treating this independently from the analogue signal grounds and digital lead shields RouteMasters. Connections are made by loosening a case screw and inserting a spade terminal Ultra Ground Connect under, gathering all case connections to a RouteMaster and sinking the noise present to planet earth ground through a further, separate, GroundMaster or GroundMaster City.

Notes:

Separate GroundMasters or GroundMaster CITYs are required for individual RouteMasters to separate out interference paths and to avoid ground loops.

When using multiple GroundMasters, only one ground rod is normally required as the GroundMaster isolates one interference dumping path from another.

The speaker negative/black output from amplifiers is not in all designs at ground potential and for this reason grounding of speaker outputs is never advised unless you are very certain of your amplifier's design characteristics as this may cause damage.

PURITAN

Audio Laboratories

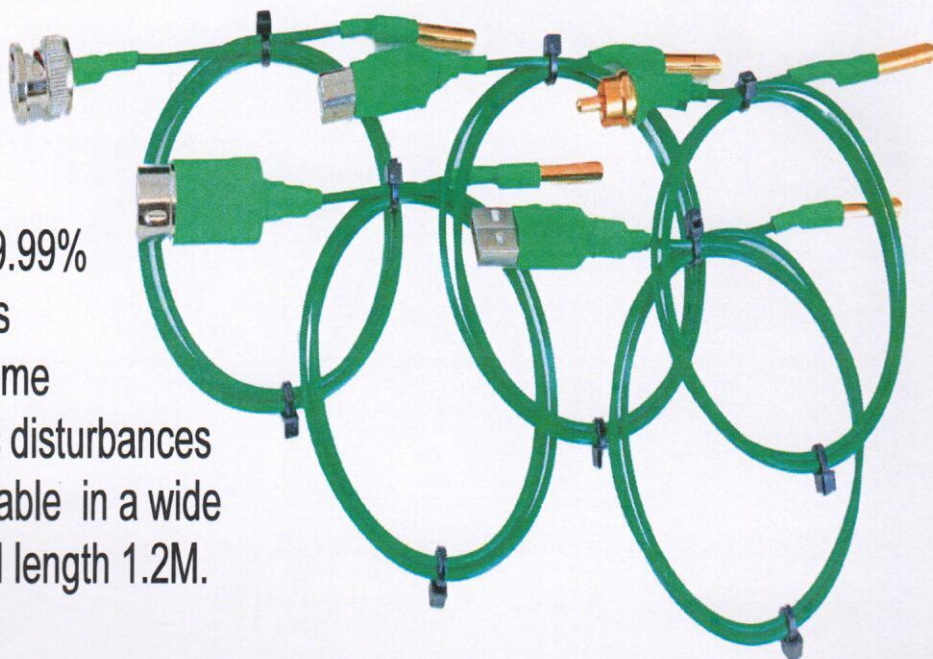
RouteMaster Ground Line Master Router

Unifies all of your signal grounds by providing the shortest and most coherent route to a common star grounding point which is encased in a rugged noise absorptive ferroelectric crystal chamber.



Ultra Ground Connects

Optimally adjusted cables providing the most desirable routing to the ground point. 99.99% oxygen free copper conductors optimised dielectrics and extreme flexibility avoiding microphonic disturbances and vibration distortions. Available in a wide range of terminations standard length 1.2M.



PURITAN RouteMaster Ground Line Master Router

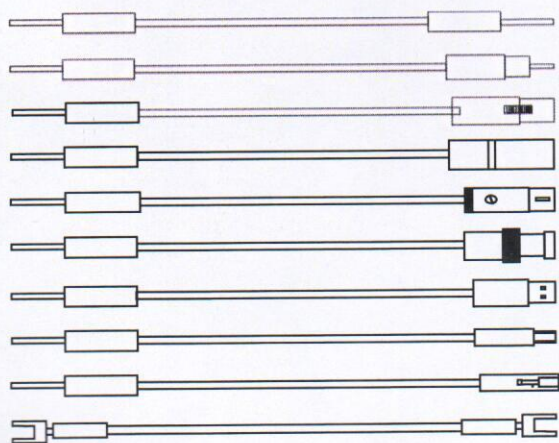
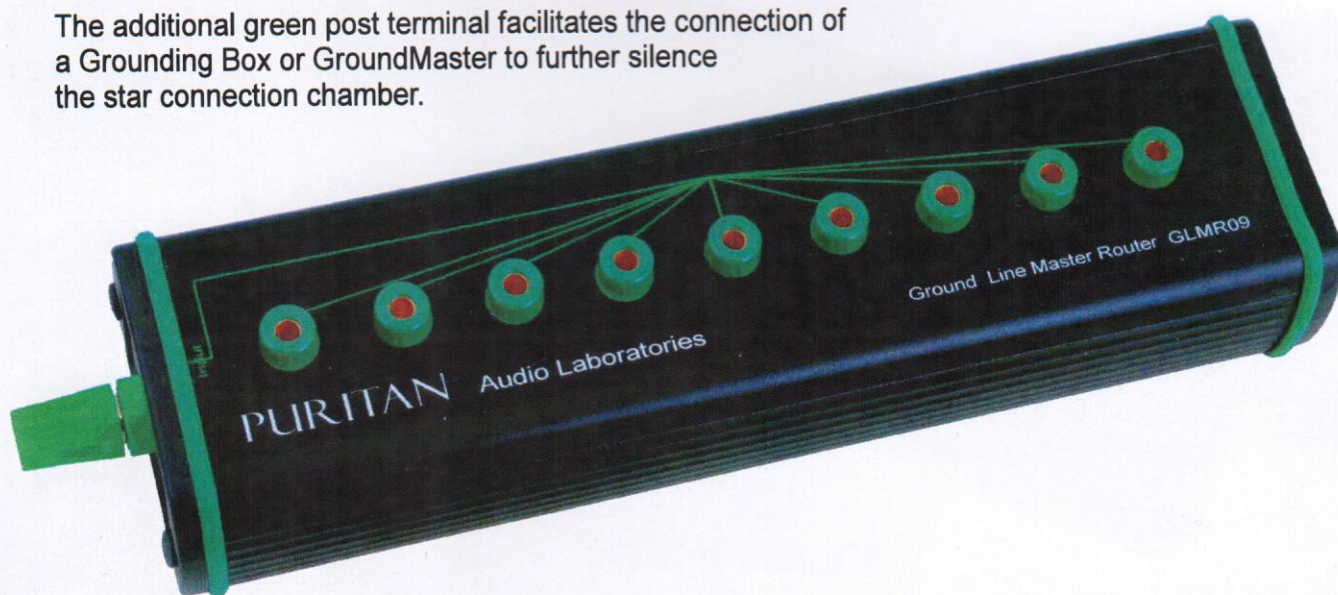
The integrity of very low level signals is vital to ultimate fidelity. With the RouteMaster we are addressing the relationship of minuscule voltages and currents to a reference point "Ground". The "signal grounds" on your various HiFi and AV components may adhere to any of a number of differing practices:

At the original and most basic level, grounds are unified; chassis ground is the same as safety ground is the same as signal ground, but on some equipment chassis does not equal safety ground and on much equipment signal ground is "lifted" by x volts from Chassis Ground by a low ohm resistor or other device(s).

Of course connecting, say via RCA an item where these three grounds are unified to a component where they are not, will result in the second component having its signal ground reunited with safety ground etc. And through the interconnection of all signal leads a rather haphazard cross confused route map of signal grounds across the whole system is created.

RouteMaster reorganises this tangled web in a coherent fashion by routing all signal grounds directly via specially formulated ultra low noise connects to a single star point avoiding looping through other components and ensuring a stable zero volt base. In this manner a steady and fixed uniform "horizon" is created for all components to navigate from allowing significant advances in definition.

The additional green post terminal facilitates the connection of a Grounding Box or GroundMaster to further silence the star connection chamber.



Connection of components to the RouteMaster Ground Line Master Router is by the highly optimised Ultra Ground Connects. These specially formulated, highly flexible, minimal resistance, ultra low microphony custom cables are available to connect to 4mm, RCA, XLR Male, XLR Female, DIN, BNC, USB-A, USB-B, RJ45 and spade terminals.



PURITAN Audio Laboratories

Email: info@puritanaudiolabs.com

Tel: +44-1491-680444

Puritan Audio Labs GroundMaster CITY and RouteMaster system by Terry London



Imbedded in my review of the Rockna Audio Wavelight DAC I shared my total amazement when I inserted the Puritan Audio Laboratories GroundMaster device into the Puritan Audio Laboratories PSM-136 power conditioner to ground my system. The effect on the performance of my system was a type of "audio alchemy," concerning the purity of tonality of instruments; a level of transparency that allowed the smallest micro-details to be heard. The sense of ease and overall dynamics/wallop of the music was also increased. These qualitative improvements were not subtle but were easily heard in a system that had tweaked to the max to get every last scintilla of musical reproduction. I explained that to use the GroundMaster device; you had to drive an eight-foot copper grounding rod in your backyard at least six feet from your home's foundation and run a copper wire directly to the ground pin of the Puritan AC conditioner. More than ten readers relayed their experiences as well. They described installing the GroundMaster and copper grounding rod, and all reported that they too were bedazzled with the effects this had on their system. Another aspect of this experience that was quite eye-opening was the cost vs. performance ratio. The Ground Master costs \$290, and the external copper grounding rod and wire added another \$30 to the total installation. I have seen many audiophiles spend thousands of dollars on tweaks and, at most get minimal sonic improvements in their systems. So, here's a grounding system that costs less than \$400 that can dramatically kick up the performance of any system's enjoyment.

Because of my experience with the original Puritan Audio Laboratories GroundMaster, when the resident genius of this company, Mike Lester, was coming out with two new products,

the GroundMaster City, which retails for \$250, and the RouteMaster (which retails for \$700). I was asked to be a Beta tester to compare the original GroundMaster to the Ground Master City and the new device, the RouteMaster. The US importer, Brian Tucker of Pro Audio LLC, and retailer Mike Kay of Audio Archon expedited this. I am not an electrical engineer, so for the technical explanations/questions about these devices, I would refer you to either the Puritan Audio Laboratories website or Brian Tucker or Mike Kay if you want to inquire about how this grounding system works. I know what its effect is on the performance of my system are, but not as clear about how it goes about doing its "audio alchemy" to achieve this remarkable improvement.

Mike Lester developed the GroundMaster City to bring this grounding device to listeners who cannot connect to an external eight-foot copper grounding rod outside. Individuals who live in hi-rise apartments or condos with rules understand this all too well. The GroundMaster City comprises a small black box connected to a high-quality three-prong plug via a 3" cord. Additionally, a wire is provided to connect the GroundMaster City to a power conditioner. To run the experiment to compare the performance of the GroundMaster/external grounding rod to the GroundMaster City, I removed the original and replaced it with the new GroundMaster City. After hours of comparison, my verdict was that the Ground Master City got at least 90-percent of the performance of the GroundMaster/external grounding rod combo. So, if you can't or don't want to bother with installing an external seven-foot copper grounding rod, you now have the option of getting virtually all the sonic benefits with just plugging the GroundMaster City into your wall socket.

Mike Lester discovered that using signal grounding (not chassis grounding) in what's called a Star grounding configuration and isolating this grounding grid (instead of going through an AC power conditioner) increased the already superb sonic changes to an even higher level of performance. Hence, the RouteMaster was born to do all the routing between your components and GroundMaster or GroundMaster City.

The RouteMaster is a small box with nine connections and comes with high-quality wires (your lengths may differ) with banana plugs for the RouteMaster's inputs and different inputs (RCA, XLR) for the inputs of your system's gear. The RouteMaster is connected to the GroundMaster or GroundMaster City through a single wire attachment.

When my system was connected entirely to the GroundMaster City and the RouteMaster, the improvements were not subtle. Everything I described in the opening of this review (purity of tonality, disappearing noise floor, increased dynamics, more open soundstage, etc.) went to a higher level. I quickly heard these improvements even compared to the vast improvements I experienced with the original GroundMaster/external grounding rod through the power conditioner!

Remember, the total cost of the GroundMaster City and RouteMaster is \$950. Based on what I shared regarding the tremendous improvements in tonality and spatial qualities, I believe these devices are some of the most amazing bargains in high-end audio. For comparison, Nordost offers a very similar grounding system/device called the QKORE6 which they sell for \$5,000. They also charge \$220 for each grounding wire compared to the \$60 that Puritan Audio charges for each of their wires. I don't know how others validate charging exorbitant sums of money. Puritan Audio Labs has two new products that cost less than \$1000 combined, and that will take your system to a higher level of sonic excellence while keeping you engaged in the music.

TERRY LONDON

