

THE NEWBIES STARTER GUIDE TO RECORD CUTTING BY MICHAEL DIXON

I deal almost exclusively with Newbies, so I've written a newbies starter guide that will give those who really have no knowledge of where to start a quick introduction to the many different facets of cutting records.

ABOUT THIS GUIDE AND ITS' AUTHOR:

My name is Michael Dixon and I have been cutting records since 2007. I have explored every aspect of the hobby/art/profession I possibly could and have experimented obsessively to find new methods, procedures, materials and techniques. I know a lot about this hobby, and am widely considered to be one of the most active and knowledgeable in this niche, but I do not know it all. There are many others out there who also know a lot and may have different experiences, ideas, and opinions than I. The guide below represents my opinions and experiences as someone who has been doing it for a long time. It is designed to give you a very quick overview and is not intended to be infallible or exhaustive. It does not necessarily reference or apply to all lathes/brands/etc. It gives you the loose rules, not every possible exception. For more info about me visit: <http://www.MichaelDixonVinylArt.com>

I sell machines, parts, accessories, embossing needles, and many other things at <http://www.RecordLatheParts.com>. I also sell tech support if you need some more information or help setting up your lathe.

THIS GUIDE IS NOT INTENDED FOR PEOPLE INTERESTED IN CUTTING PROFESSIONAL LACQUER MASTERS, IT IS MOSTLY APPLICABLE TO SHORT RUN RECORD CUTTING HOBBYISTS AND ENTREPRENEURS.

The main things to remember before getting started with record cutting:

YOU GET WHAT YOU PAY FOR, AND IT AIN'T CHEAP- You can cut corners and get decent results, but do not expect to be competing with professional mastering engineers or even experienced short run lathe cut providers immediately for a month's salary investment. Higher End Lathes with more features cost more.

YOU WILL SPEND A TON OF TIME WITH THE LEARNING CURVE- This is not a plug and play hobby. It is as much a black art as it is a science.

FIND SOMEONE TO TEACH YOU OR SPEND THE EXTRA MONEY FOR A GUARANTEED WORKING MACHINE – Unless you are very mechanically and

electronically inclined, the extra money invested in a restored machine from a reputable source (as opposed to an as-is eBay purchase out of grandpas' basement) will be the best investment you ever make in the hobby. As-Is Machines are almost always broken. The same is to be said with finding someone who can teach you. <http://Www.LatheCutCamp.com> is held about twice a year and is a great way to get that jump start for a very reasonable price.

IT'S NOT EASY, AND IT'S NOT FOR EVERYONE – If you have only a mild interest, or limited time/money to devote to this and need a hobby that you can jump right into without paying some serious dues... this AIN'T It. Take up miniature golf and light \$5,000 on fire and you will still be money ahead. However, if you are obsessed with the technology, science, and artistic aspects of the hobby, and get your satisfaction as much out of solving puzzles and overcoming obstacles as you do a finished product, then this MAY be for you.

NOTE: THERE ARE NO READILY AVAILABLE MODERN STEREO RECORD LATHES – There is the "Vinyl Recorder T560" by Souri, but search "Souri" on <http://www.Lathetrolls.com> to see why most of us do not consider it to be "readily available". Very few people are able to run the gauntlet required to purchase a lathe from Souri. But, if you can, it is a pretty decent machine for the money, because it is set up to cut stereo diamond styli discs. Cost is about \$10,000 when you include the machine, trip to Germany to train, high-torque turntable (SP15), shipping, etc.

THINGS THAT DETERMINE PRICE OF A MACHINE

There are a ton of variables that determine price. But ultimately, a lathe is worth what somebody is willing to pay for it and somebody else is willing to sell it for... simple supply and demand. However, there are some features that make some lathes better and more versatile, and therefore more desirable than others. Record Lathes are very similar to vintage cars.. the better condition, more features, better performance, and rarer it is, the more expensive it is.

FUNCTIONAL CONDITION - This is the biggest one. Due to the fact that many lathes in unknown condition are non-functional or require a lot of work, a restored, fully functional and guaranteed machine brings in a premium price. A "good deal" on a lathe is not a "good deal" if you never get it to work. So, if you buy an "as-is" machine, be ready to put in the work and the research to figure it out. There are a LOT of potential problems in these old machines.

CUTTER HEAD – See Guide Below

LINEAR/SWINGARM OVERHEAD – Linear overheads that do not pivot like a playback tonearm are preferable and usually heavier duty.

MULTIPLE PITCH FEEDSCREWS – Some lathes do not allow you to change out the feedscrew to adjust cutting pitch (how close or far apart you can place the grooves, and therefore how much music can be put on each side), and some lathes have extremely rare and hard to find or replace feedscrews (all ROK and Presto 6d, etc). If you only have one feedscrew, say 98-120LPI, you can only put between 2.5-3/5 min per 7". If it is an extremely fine pitch like 224-256, you can fit a TON of audio on a side, but you have to cut at very low volume, groove depth, and with low bass in order to avoid skipping.

33/45/78 RPM – Most vintage mono lathes were built before 45 RPM was a format, so very few offer 45 rpm as a standard option. 78 only Machines are the least desirable, and 33/45 machines are most desirable. Some machines can be retrofitted to cut at 45 as well as 33. The majority of stock vintage machines are 33/78.

MONO/STEREO – Very few stereo cutting heads exist, and (other than the Souri lathe) there are no machines under \$75,000 that have a production stereo head. There are, however, some homebrew heads and stereo heads in development for more affordable machines. Currently, the dynamic TKV head is the only readily available Stereo head on the market and they are made to order. Please contact me through www.RecordLatheParts.com if you would like to purchase one. They will mount on most vintage mono lathes without any heavy modification. Other than that, your only real option is mono. But honestly, what percentage of people playing your records are going to be doing so in headphones or sitting in between stereo separated speakers? Not many. The occasional audiophile cares, but most of them aren't going to like lathe cuts regardless. STEREO IS NOT A BIG CONCERN TO MOST PEOPLE WHO PLAY THESE, AND FEW WILL EVER KNOW THE DIFFERENCE. Also remember that in order to get true stereo, you must CUT with diamond/Petg or Sapphire Cutting Needles/Lacquer. See below for more on that.

CRANK – This allows you to create a lead in/lead out groove or between song gaps.

STURDINESS/ADJUSTMENTS – Heavier Duty lathes with more fine tuning options tend to perform better than light weight and less complex machines.

COSMETIC APPEARANCE – Most people are more concerned with functionality than appearance, though appearance can play a small part in

value.

LEVELS OF MACHINES

You can find vintage mono lathe from \$200-\$15,000 and more. Price depends on the things above.

Low End Machines

-Recordio, Wilco Gay, General Industries, Meissner, etc

These machines have crystal cutter heads which are almost useless unless restored because the crystal disintegrates over the years. You can find one for \$100-\$200, but even if you can find someone to restore the crystal head and the onboard amplifier, the results were be sub-mediocre at best. Recognizable as music, but not worth listening to in my opinion.

Low Middle Range, No Frills Mono Machines

-Presto k8, Presto 75A, Many REK-o-Kut lathes, etc.

These have no crank, only a single feedscrew pitch (usually coarse, so a maximum of around 3.5 min per 7", and lower end Magnetic cutter heads that usually peak out at 8k (can usually be upgraded). No lead in/lead out, usually limited to cutting with sapphire cutting needles or embossing polycarbonate. Not recommended to cut with diamond styli.

Middle Range, Lathe Cuts Industry Standard Mono Machines

-Presto 6N, ROK w/ Crank, Presto 8N, some Fairchild Lathes, etc.

These usually have a crank for lead in/out grooves and between song bands, and multiple options for feedscrew pitches

Upper Range Mono Machines

-Presto 8D, 8DG, 8DGV, Arcturus, etc – These machines are about as close as you will get to a Scully without dropping \$75,000+. They are very sturdy, heavy duty, and could relatively easily cut a decent mono master for pressing for personal use on low-stakes, low run records, but it will be difficult to compete with professional mastering guys with a Neumann or Scully unless you have serious skills and a specific niche.

GUIDE TO CUTTER HEADS

Audio Range of Cutter Heads – The better the cutter head, the higher the frequency range, the better sounding record it can make, and therefore and the higher the value. Also, usability is HIGHLY dependent on how each individual head has aged. I rate the heads below based on "possible usefulness", any individual head could be really amazing, really awful, or totally useless (if the coil is burnt out).

-LOW END MONO – Crystal Cutter Head – pretty damn bad, WHEN it works, which is rare unless the crystal has been replaced in the last few years.

-LOWER MIDDLE MONO RANGE – Presto 5c, Audax Tombstone, RCA Tombstone MI-4889, Radiotone, etc – These came on lower end lathes and usually top out at around 8K.

-UPPER MIDDLE MONO RANGE – Presto 1C, Presto 1D, Audax Chrome RH-5, RCA Hi-fi, Fairchild, etc. - These came on standard transcription and are pretty standard for Lathe Cuts. Specs say they start to roll off at 10-12K, but I have many that perform very well up to 15K with proper equalization. These usually sound pretty nice and are the industry standard cutter head for many record cutters.

-HIGH END MONO HEADS – Grampian, MAG, Olsen, Van Epps, etc – These heads tend to have much stronger high-end capability with more clarity, but are harder to come by.

CUTTING TYPES:

There are THREE distinct types of record Cutting. The discs they create are DIFFERENT products with different pros and cons:

Sapphire Embossing Styli on Polycarbonate: The cheapest and easiest way to make a decent record. Slightly lower fidelity and volume, and the grooves are too shallow to track well for backmasking or queuing use for DJs. Needles and discs are the cheapest option. These are a much more affordable option for artists who want an affordable low run item for their merch table.

Diamond Cutting on PETG discs: You can cut a louder, higher fidelity record, but materials are much more expensive and you really need a middle range lathe or better, and you need a dashpot, suction system, stylus heat, etc. Due to the price point, they are used more often for one-offs, rather than merch items.

Sapphire Cutting Styli on Lacquer Dub Plates: These are becoming more rare because the main source of lacquer dub plates (Apollo) blew up. So, only old stock and leftover lacquers are available and nobody makes sapphire or ruby cutting styli anymore. This is where the outdated idea that "lathe cuts degrade after x plays and destroy your playback needle" because the lacquer is so soft it slowly gets scratched out of the groove onto the playback stylus.

DISC MATERIAL TYPES

These are the different types of blank record materials that are used by cutting hobbyists. They vary in the fidelity and needle life you will get from each type.

People have tried many other types of discs, but these are the most common, and in my opinion, the most useful.

(L) Lacquer /Dub Plates – Most record lathes were made to cut lacquers. However, they are expensive (\$15+ each), and have a tendency to degrade upon repeated plays, especially if not taken very good care of, and played with an absolutel minimal amount of tonearm weight. Vintage dub plates may still be cuttable if they are smooth, shiny, and not cracked.

(PC) Polycarbonate Plastic – The standard for affordability meets durability and fidelity Available from any plastic supplier, these discs are affordable and can yield a very nice sounding record.

(PVC) Pressed Blank Records and PVC Discs Pressed blanks can be ordered through a pressing plant in large quantities and Soft PVC blank discs are available from RecordBlanks.com, but only seem to work with tungsten embossing needles. Blank pressed records, only work with diamond cutting needles, and are, in my experience, not worth messing with. These are both very hard on styli.

(MS) Myshank Blanks - Steven says these are PVC, but must be a special formulation because they work much better than pressed PVC discs or soft pvc raw plastic. These are specially for use with diamond cutting styli

(CD) CDs – You can make a very nice sounding record using embossing on the bottom of a CD (the data side). You can cut up to 3 min of audio while maintaining 40 minutes of playable digital audio, since the grooves play from the outside in and the data reads from the inside out.

(LD/A) Laserdiscs and Acrylic – Laserdiscs are made out of Acrylic, and acrylic is widely available at plastics places. These must be cut (swarf is removed) using sapphire, ruby, and diamond cutting needles. Potential fidelity is very good, but this material will wear out needles very quickly. Many laserdiscs are warped, and even the slightest warp will cause skips or surface noise in the cut.

(PETG) PETG Plastic is similar to Polycarbonate. There are several different types and results seem to vary.

(PPP) Plastic Picnic Plates – These can be used with good sapphire cutting needles. The fidelity is actually pretty good, but the cheap plastic causes a fair amount of surface noise. Thin plastic plates don't seem to cut as well as thicker ones. Results may vary,

CUTTING NEEDLE TYPES

These are the different types of needles that are widely used amongst hobbyists and are followed by possible disc types, HOWEVER, it is important to know that some materials sound better/worse than others and go through cutting needles faster/slower. Cutting removes material (swarf) and has the possibility of higher fidelity but removes material from the disc and therefore requires suction and stylus heat to do correctly. Embossing is a much less expensive and less complicated, but slightly lower in volume and fidelity, technique that does not remove material and does not require suction or heat. The grooves are slightly shallower, however, fidelity can actually be quite good.

Tungsten Stylus Embossing – These are very affordable needles however, the groove tends to be much wider, and the high end clarity is severely limited. Works better on hip hop and electronic and acoustic songwriters than dense music like metal, rock, psych, etc. Surface noise is higher and fidelity is lower. DISC TYPES: (PVC, PC, PETG)

Backwards Sapphire Cutting Needle Embossing – One can use a Sapphire Cutting Needle from Apollo Masters (or non-chipped NOS vintage sapphire/ruby cutting needle), turned 180 degrees backwards to emboss a groove. Some cutters still prefer this (Audiogeography, MEEP, etc), but I don't like it personally for several reasons: Cutting Sapphires are hard to come by and expensive (now that Apollo has burned down), it is somewhat difficult to dial them in, as they must be exactly 180 degrees backwards, which is tricky to achieve, etc). (PC, CD)

Sapphire/Ruby Embossing Needles – My favorite as the best balance between cost of needles/discs and fidelity. The needles are affordable, available, and very easy to use, and the high end clarity and surface noise as compared to Tungsten embossing needles is extreme. While not "high-fidelity", with experience and good equipment, one can cut a very nice sounding record that the majority of casual listeners won't notice any huge difference between an embossed record and a pressed record. I sell these at <http://www.RecordLatheParts.com> (PC, CD)

Sapphire/Ruby Cutting Needles – Available for \$135ish from Apollo Masters (no longer the case since Apollo burned down), and occasionally pop up on ebay (though unless they are sealed, their usefulness is questionable, because even the tiniest tip defect (invisible to the naked eye) can keep them from cutting a decent record. (L, PPP, LD/A)

Diamond Cutting Needles – This is the highest fidelity with longest lasting disc combination that I know of, but is one of the most expensive and complicated. The needles are available starting at \$250ish from Myshank.com (and possibly others). These are recommended to be used with the proprietary blanks that Myshank.com sells. I do not personally use these all that often, but from those who do, most agree that Myshank blanks sound the best and give the longest lasting needle life. This requires suction and stylus heat. Occasionally, someone will list a Sapphire cutting needle on ebay as a "diamond needle". There were no long or short shank diamonds made before the year 2000. Unless this person appears extremely knowledgeable, it is likely that they are mistaken and just assume that the clear sapphire is a diamond. (PC, PVC, PETG, LD/A)

WHAT ELSE DO I NEED ONCE I HAVE A MACHINE?

The machine is just part of the equipment. All of it is easy to acquire from Amazon or Guitar Center and for \$100-300 per item. You also need:

- Blanks
- Cutting or Embossing Needles
- Amplifier – Most people use a stereo PA power amplifier (at least 225W per side)
- Mixer – I use cheap 2-channel Behringer to run my stereo signal into so I can sum the stereo audio signal into a mono signal.
- 31 band equalizer
- Playback turntable (preferably a good turntable and playback setup for checking surface noise and fidelity, and a crappy Crosley style turntable for checking tracking on cheap turntables).
- Audio Source (Ipad, Laptop, etc)
- iRiaa curve – can be done in free software like audacity, or I sell an in-line processing box for real time audio at <http://www.RecordLatheParts.com>.

*Note – You can use the second channel of both your amplifier and your equalizer to adjust sound during playback of your test discs to hear what equalizer changes will do in real time, and then make those adjustments on your cutting chain before your next test/final cut.

If you have any questions, or would like to set up a Tech Support call (\$75/hr, 2 hour minimum), please contact me at Lathecuts(AAT)yahooooo(Dawt)Cawm