

# Unofficial Crash Course Guide and Reference A800 Touring Car Series

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# Introduction

While few would deny the potential and performance capabilities of the Awesomatix touring cars, many are intimidated by the steep learning curve. Although there are already several sources which cover just about everything needed to be fast with the car, they are spread over many documents, videos, and resources so it can be difficult to know where to start. Also, there are multiple approaches to many tasks which can be confusing and/or time consuming to figure out which are reliable. Finally, some of the useful information is very difficult to locate (or no longer available).

This document is meant to be a single guide, or reference, of everything needed to get up to speed with the A800 touring cars (specifically referencing the MMX/MMCX in most cases). I am not claiming everything mentioned will be the absolute best way to do everything, but will describe the methods, techniques, and references I use to keep my cars consistently performing great for 100% confidence in the car every time it is put on the track. There is no substitute for the hard work, time invested, and practice in becoming proficient with these cars, but hopefully this guide will help you eliminate much of the uncertainty about being able to get up to speed with the Awesomatix cars.

#### My disclaimer:

Although I will do my best to provide necessary info, or references, to build, maintain, and set up this car, it is not for everyone. First, this car for may not be ideal for newish TC racers (unless you are regularly working with someone else using the same car) or those that would rather "set and forget"-the time to setup is increased and needs to be checked regularly. I am not saying a less experienced racer could not be successful with it, but only that it will be more challenging to set up efficiently for some time which will likely reduce track time on practice days at first.

Next, while all TCs (and competitive cars) require a certain level of attention to detail, since Awesomatix is constantly on the cutting edge of innovation, I believe it takes a slightly higher level of attention to detail to be consistently successful. This is because often few (to no) other locals will have knowledge or experience which can be leveraged when new concepts are implemented; as a result you must either consider all details when early adopting a new concept, risk misusing new concepts (often setting back performance), or wait until other major companies adopt the new concepts once proven (which they regularly do) giving up much of the differential benefit. Finally, do not expect to build and maintain the car and have an instant or permanent advantage over any other car, in fact there is a good chance you will start out off pace (even with a good setup) when you go to another track. You need to be willing to learn to setup effectively through practice and testing, even if you have someone local that will constantly share their setups and changes you cannot depend on their setup to work for you.

#### Keep with it!

This may seem like a difficult challenge, but the benefits are undoubtedly worth it. This is the most consistent car I have ever driven, both while on the track and run to run, and the most enjoyable (a very popular opinion)! Also, there are setup capabilities that are not even possible on other current platforms, including benefits such as an ultra-low center of gravity, a far forward-thinking designer which is active on forums, and top-quality secondary market items/innovations (RCMaker, etc.).

# Getting started

#### Part Numbers are Also the Names

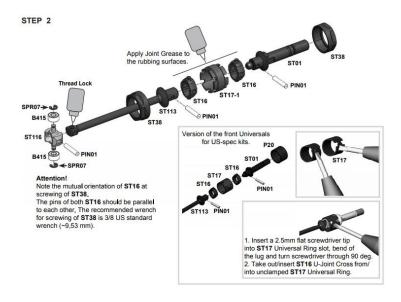
The part numbers can be confusing at first because they are also the name which seems to be very difficult to reference at first. However, since the names are not constantly translated to different languages this makes it easy to reference or find parts in many cases.

A few tips about part numbers- most part numbers reveal information that is useful for reference, the prefix is usually one or more letters that provides some information regarding the material: P is for plastic, WA is for washer, ST is steel, SPR is spring (or related to springs), SH is shim, SF is screw flathead, SB is screw button-head, OR is o-ring, AT is aluminum (and titanium maybe in the future?), C is for carbon, AM is for special Awesomatix parts, and a few others which are very obvious/less common (i.e. SWB for sway bar) or specific (HRB for Horizontal Rear Bodypost). The first few are very helpful for the build so keep them in mind and it will make it much easier! Some of these may not be exactly the intended reference prefixes in some cases, but they are extremely useful for building and quick reference.

The suffixes for screws, bearings, and a few others usually include useful numbering or a differentiating reference, which are very useful for initial builds especially. The last page of the manual gives a verbal description of most parts if you are still unsure about what a part number refers to. Note that bearing references do not indicate the thickness/depth, this is actually an industry norm for bearings to not include the thickness/depth in the abbreviated names; the bearing sizes- some have uncommon dimensions, but all must be exact to fit. Specifically: B85 is 5x8x2.0mm and B106RS is 6x10x3.0mm.

# US kits differ slightly

US spec kits have different front DCJ retaining parts, this is the only difference (see below). Both are reliable with perfectly free movement, just be aware if looking for a replacement. Also, the non-US version needs two 3/8in box wrenches or some equivalent tools such as the MR33 tool. The US kits require a thin 2.5mm flathead, get or make one, do not try to disassemble without this specific width!



# **Build tips**

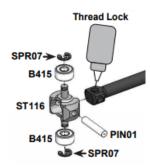
There are already complete build walkthroughs available so this will only include what I believe to be useful additions to the manual and helpful tips.

This is not a complete walkthrough but specific tips and references.

For a complete walkthrough from start to finish, refer to the build by Max Machler.

## Step 2

Thread lock is shown to be used on the ST113 to keep the PIN01 from falling out. I recommend using a thick grease instead (such as 1UP copper); while in the outdrive this pin cannot fall out, I have not had this pin fall out by using grease, even in a crash/break where this piece comes out of the outdrive. Same for the front and rear. This needs to have smooth and free movement.

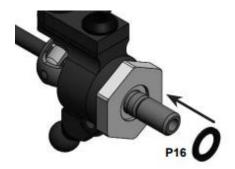


The basic Awesomatix tool is useful for the rear axle, if you have the US version of front axles this tool will not work for the front universal disassembly, at thinner flathead (2.5mm) is necessary.



Step 4

An easy way to get the P16 on is to simply tighten a setup wheel onto the axle or with a Bic pen.





# Dampers-Build

One of the most unique features of the Awesomatix series, the rotary dampers, can also be one of the most challenging to get right at first. The P63 in the MMX kits have greatly improved the consistency and increased time between rebuilds, but they can also be more difficult until a few key things are figured out. Note: this procedure contains some tips from the P63 guide <a href="here">here</a> as well as some of my own techniques. I recommend also reading that guide as there are additional explanations which can provide useful insight into the P63.

## Specific things you will need:

- Damper tool (or 9mm socket wrench)
- Q-tips
- Shock air pump
- O-ring grease (important especially for this method)
- 1. Disassemble the damper (including removal of the bearing), P63 can be left in the piston tube.
- 2. Fill an empty damper ~2/3 with oil.
- 3. Press P63 slightly into the piston and add a few drops of oil (into the larger end of piston's tube).
- 4. Insert the piston into the case completely.
- 5. While holding the piston to the bottom of the case, and vertically, rotate it back and forth several times to release air that may be trapped. Air will always appear to be released but do it anyway to be sure.



- 6. Repeat steps 1-5 for each damper.
- 7. Place the dampers into an air pump, pump as needed, and wait a few minutes.



\*Very important\*- from now until the bearing is pressed in keep the dampers vertical!

8. Cut the ends off a q-tip, and mark 12.5mm (the image an example, but you only need one mark for this procedure, additional marks can be useful for rebuilds using the optional ADC caps etc.). Insert the q-tip (dipstick) into the damper vein to keep oil from entering while the cap is put on.





- 9. Screw on the cap using your chosen tool, be very careful not to cross thread the cap, it should not be difficult if threading correctly.
- 10. Clean most of the oil out of the space where the o-ring will go.
- 11. Oil an o-ring with o-ring grease and press the o-ring *lightly (not fully)* into place using a 5.5 nut driver.





12. Insert the dipstick into the damper vein pressing a bit past the 12.5mm mark (1-2mm ONLY).



- 13. Press the o-ring back down, further this time, **repeat steps 12 and 13 until the seal is fully in place AND the dipstick measures 12.5mm**.
- 14. Press the bearing on firmly.



15. Check the dipstick level again, if it goes in less than 12.5mm the o-ring was not seated fully before putting the bearing in; you must start with step 1, it is important that the P63 depth is equal for all 4. This can take some practice so do not be surprised if it takes a few tries at first!

Once a damper is in a holder and SPR02X is installed, SPR02x should move smoothly. It will feel much thicker than conventional dampers/shocks. This is to be expected!

Be sure the damper set screw is seated into the indent as shown.



When tightening the damper holder clamp, tighten using your fingers only to keep from overtightening.

#### Damper Build Troubleshooting

- Problem: If the completed damper has a gritty bearing feel, this is air in the damper 90% of the time. However, it is not obvious whether there is air, or the bearing is gritty. The piston hole is so small that it may feel different than what you expect.
   Solution: Take the entire damper apart, including the bearing, seal, piston, and P63. Check that the bearing is perfectly free and smooth (replace it if necessary) and start back at step 1 above being careful to not miss any steps.
- 2. Problem: If when checking the P63 depth either: 1. the dipstick goes all the way to ~15mm and/or 2. there is obviously a lot of oil filling in the tube.
  Solution: Take the entire damper apart, including the bearing, seal, piston, and P63. Press the end of P63 on a flat surface which will cause it to fill the vein better. This happens when P63 is pushed in too far and suctions to the damper case and/or oil is leaking past the edge of the P63.
- 3. **Problem: Unable to set/push P63 to at least 12.5mm after placing the seal Solution:** Press the dipstick a bit more, try holding it a couple mm past 12.5mm to try to bleed more oil. This is caused by o-ring grease not being used, the o-ring was pushed in too far before enough oil was bled, or a worn-out seal.



# Step 7

The P03 can be very brittle when snapping on initially, these need to be pressed on firmly but without directly pressing with a hard surface. A hard surface "can" work but is more likely to crack the P03. I prefer to place a folded-up shop towel over the P03 and press them on using a flat surface cushioned by the towel. This is a reliable way and I have not broken one this way. Do not be surprised if you do though at first, the kit comes with extras! Also, once installed, these do not break easily since they are snuggly between the arm and suspension ball. These should be COMPLETELY free with the arm and P07 clip (installed later).



## Step 9, Diff build

This diff is great, no scales necessary for a 100% consistent diff. Take the time to watch the <a href="RCMaker diff build">RCMaker diff build</a> video first, there are a few different ways to do this which work well, but that is the method I prefer.

The diff pulley orientation can be confusing (or easily misinterpreted) even with the cross section shown in the manual; a simple way to orient them correctly- both the diff and spool pulley are installed on the side closer to the **center of car**. The **diff pulley** is **offset towards the car center**. The **spool pulley** is **offset away from the center of the car**.

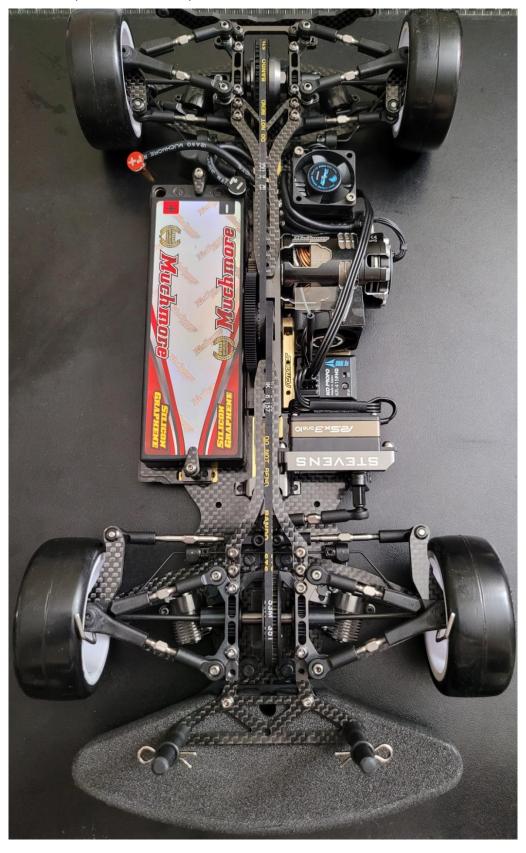
#### Step 26

After connecting P01 to P02, it is useful to put some CA on the edge between them. Once dry, spread them apart "breaking" the CA apart somewhat (not separating P01/P02 entirely) so that they are freely adjustable. This keeps them from coming apart under stress without impeding operation at all.

# Final Setup

Review the explanation of spring/damper rates in the manual, try to get an idea of how it works based on the leverage and spring contact points. The setting technique explanation is very instructive! Most of the final car setup is the same as other TCs (or similar). Refer to the attached base setups for getting started on low to medium traction asphalt or on carpet.

Complete car example with several options installed:



# Routine Maintenance

\*To be expanded\*

Damper Rebuild Notes:

This procedure is like the build, except:

- 1. Oil above the P63 in the large section of the tube needs to be free of oil, otherwise P63 cannot move as necessary over different temps (reducing performance and/or requiring a rebuild again much sooner)- Clean out this space using a q-tip or another method, you do not need to clean all oil out of the small part of the tube, oil here can assist free movement.
- 2. Check the damper bearings EVERY rebuild, this bearing can be damaged in an impact due to the tight tolerances or simply wear out over time. I recommend using a bearing measurement tool or even the AT41-2 and applying a tiny bit of lateral force while turning. If it is not COMPLETELY free after cleaning it (motor spray/ cleaner etc.) then it should be replaced.



# Misc. Notes/ References That You Will Find Useful Sooner or Later

Look through tips/guides on Petitrc but be aware that several of them are for specific car versions or parts so not all will be relevant or useful now. Some of the tips below I learned from that site (or based on info learned from there), so I do not claim inventions of several of them. The misc. tips I have are:

- Do not try to remove P03 from the suspension balls, this "can" be done successfully but they are brittle and will crack very often if this is attempted.
- Similar to shimming TC arms on other cars to remove play/slop, keep play between the arms and p03 minimal, refer <a href="here">here</a> for how to do so. I prefer to spread CA in the arm space and sand with 240/400 grit sandpaper (rolled up) for easy and consistent maintenance.
- Whenever changing the caster settings (front or rear), be sure to adjust the bump steer spacers accordingly!
- Stock ball studs are 4.8mm and directly compatible with Yokomo BD9/BD10 ballcups
  - Also commonly replaced with XRAY ballcups, but these are 4.9mm so you would need to replace studs as well if you do so.
  - Outer ball ends (top and bottom, so 8 total) are 5.0mm, be sure to not replace these with a different size, there are no alternatives to P01/P02 (nor does there need to be!).
- The setup sheets available on Petitrc have a built-in spring rate calculator. Useful for determining approximate differences "between" changes.
  - The rates given by the built-in calculator do not include the effect of using the 15% or 25% PSS screws. It is not a single value as it is progressive. The 15%/25% PSS screw contacts the spring at different points compared to the 0%.
  - The built-in calculator does not adjust for different arm lengths
  - o There is a useful phone <a href="mapp">app</a> with a calculator which considers arm lengths etc.

Additional, useful references to review (now or as needed):

- o PSS instructions
- o ADC Manual
- o Steering link setup
- <u>RCmaker support videos</u>- these were made prior to the MMX but the concepts and information are still relevant and useful!
- More to be added over time!

# What spares do you need and what is recommended?

I often hear people state that "a car this expensive shouldn't need any extras or different parts to work", I empathize with feeling this way, but this car doesn't actually "need" anything to perform perfectly. Not all parts are ever going to be ideal for all conditions regardless of the company. Also, this car is updated regularly, often with running upgrades to the kit instead of a new model every year with tiny changes (often making old parts incompatible in the process). In addition, when you get this car nearly every *performance* option is part of the kit, which is not the industry norm by any stretch. Most other "options" are for convenience (ADC) or condition specific (carpet- soft springs etc.).

It can be difficult to say what spare parts will be "needed", but if you want to be sure you are ready for nearly everything, my list is below. Some of these spares are maintenance items etc. too.

#### **Recommended spares:**

P01, P02, P03 (get 2 sets), P04, P05, P07, P138, P138S, P14X, P15L, P16, Am78X1, AM06WL, AM14LS\*, AM23-1\*, AM180, AM19-FX, ST16, AT120XB, OR155V-4, OR05S and/or OR05V, Belts (351mm, same as Yokomo, Xray, ARC, etc.), C04M1-LA (can buy separate but this has two spares of each f/r), SB, IFJ, IRJ, ST113\*, spare turnbuckles\* (std or your choice), 6x10x3mm bearings, Spurs, B85, G07 & G08 (or a spare diff, these are durable and long lasting but good to have a spare, especially for mod), PIN01 (these don't break but are super tiny and can be easy to lose), PIN02 (same), P46R (very long lasting but also extremely tiny).

#### \*Alternatives to some spares:

- ST113-US great alternative to ST113 for mod on some tracks where the drive shaft could bend
- **AM06WL-US**, I have never actually broken an AM06WL, even in very damaging hits, but this is popular advice.
- **RCMaker <u>front</u> and <u>rear</u> steering arms** great alternatives because these won't bend (which can/will happen to stock ones), they also look sweet and add a bit more flex.
- **1up turnbuckle set** very durable but still extremely lightweight.

**Minimalist spares**- things needed to be reasonably confident about making it through a weekend+, but not going to a big race with just this car yet (or you know someone that would help you out if needed): P03, P04, P07, P16, C04M1+9.0, AM14LS, AM06WL, IFJ, ST113, B106, B85, spurs and turnbuckles.

## Should I get all these spares or just buy a second car?

- Assuming you are only interested in using spares of those also included in the kit, including std. turnbuckles and bearings- Getting another kit would cost ~30% more than buying all the spares instead.
- Assuming you are using each of the alternatives above- Getting another kit would cost ~42% more than buying the spares instead.
- Getting another kit **cost ~76% more** than buying just the minimalist spares list.

So, it may be worth it to just buy another kit if you are only interested in using the standard parts which are also in the kit, less so if you are planning to use several alternatives. However, another kit would also include a chassis, topdeck, spare complete dampers, spare diff, more of some of the spares (bulkheads etc.), so for some it may be worth it and some not. Either choice can be reasonable!

#### Highly recommended tools for the car, you need these or some equivalent (not included in the kit):

- Caster tools, such as <u>these</u> or this <u>here</u>. Standard (first link) are quick and convenient, especially with two pairs, the electronic one is very accurate though and works with ANY setup station.
- Shock air pump (Ride (RID29100) works great, and the dampers fit perfectly in the holder without falling through)- a pump is HIGHLY recommended for this car
- RCMaker <u>Suspension ball wrench</u>, the MMX uses low profile suspension balls so the t01 tool, although still usable, is not ideal (it can damage P03 if not careful, especially if using a very few arm suspension mount spacers).
- <u>Tweak stick</u> for Awesomatix- unless you have/want someone to help you every single time... A standard tweak stick WILL NOT WORK since there are not shock towers!
- MR33 tool (or damper tool \*not used with ADC\*, diff tool, and two 3/8in box wrenches)

# **Highly recommended options:**

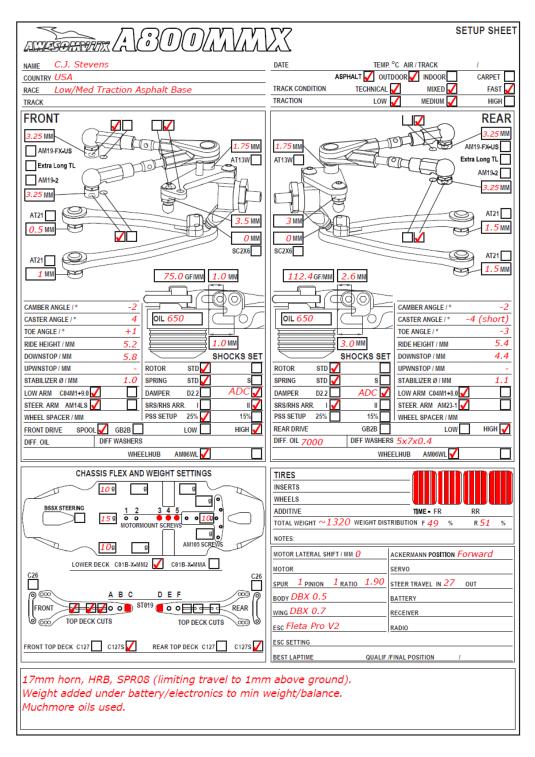
- SB3x5AL 2 sets minimum per car (3 sets recommended)- these can improve the tweak resistance of the camber mounts and are preferable for the topdeck screws generally.
- AM12X or RCMaker battery mount set- both are much more reliable than stock ones
- AT15 (2 sets per car)- can save wheel hub bearings
- SH5x7x0.4 the most popular (and usually best in my opinion) shims to use in the diff vs. WA03
- SPR08
- Carpet:
  - o Priority:
    - BSR heavy or XRAY hard bumper for use on Black CRC carpet- adds weight where you want it and greatly improves durability
    - SPR01S (Soft springs) for front and rear
  - Recommended:
    - AT144 + BW52 shorty weight and mount
    - ST113-US
- Asphalt:
  - o ST69-25 for front

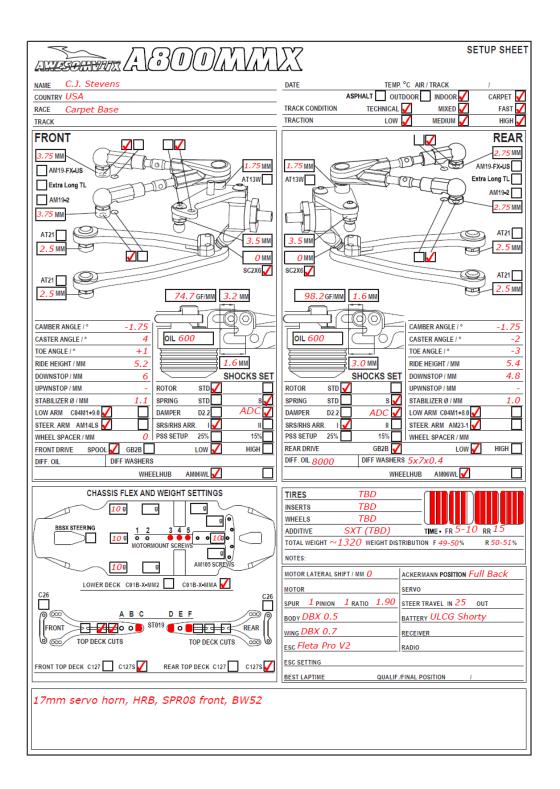
#### Nice options, but not "necessarily needed":

- ADC this makes life MUCH easier for maintenance AND build/rebuild whether you have been using the car for a long time or are new. Be sure to use ~200cst heavier oil for similar damping.
- HRB
- BC1 or AT144
- AM24-20
- <u>RCMaker options</u> lots of great options, really improves the market for this car, my top recommendations:
  - Floating electronics mounts (<u>ESC</u> and <u>receiver/fan</u>), make rebuilds nice since all electronics can easily be removed while adding weight where you want it anyway
  - Slimflex topdecks 1.6 and/or 2.0 (chassis is nice too)- improves flex options significantly
  - o <u>Adjustable belt tensioner</u> for spec classes- can run the rear belt extremely loose
  - <u>A800 Bearing set</u> Abec 7 for the wheels make them more reliable and ceramics everywhere else reduces drag, also better price than most comparable ceramic sets

# Base/ Starting Setups – Low/Med Traction Asphalt & Carpet

There are many, many setups available on PetitRC for the A800 series, perhaps more than I have seen for any other car, but it can be useful to have good starting setups for day 1 on *common* surfaces. These are mod TC base setups, but also solid starting points for spec/blinky as well. Note: **for kit damper caps use 200cst lower weight oil in dampers!** 





# A800MMX Quick Reference

\*To be added\*