

An inside look at MiniCups

By Paul Bommer

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#65 MiniCup Ford F150 & #88 MiniCup Ford Fusion



2000 Ford F-150 MMI Chassis



2005 Ford Fusion NC Predator Chassis

“So what is a MiniCup anyway? Is it like a Bandolero or a go-kart?” I can’t say how many times I’ve been asked that question over the last four years. I usually respond with this canned answer while demonstrating the features and recounting some facts:

“No, it’s a ½ scale fully adjustable race car, with four corner coilovers, adjustable control arms, panhard bar, rack and pinion steering, and disc brakes powered by a Honda GX390 single cylinder engine mounted in the back. All the same stuff as a Late Model, just without the swaybars, and a lot less power, but it rolls through the corners as fast as the Late Models...yes, a 10 year old drives it...”

I’ve had a lot of practice at that answer. There has always been a high level of interest in the MiniCups regardless of who is asking the question, but I get an additional sense of amusement when veteran owners or drivers get a close up look at one of these cars and are surprised on just how intricate they really are. The one thing I can’t convey in a five minute conversation though are some of details of what it takes to get into one and run it successfully, so I’ve written an account of our experience as a team:

Our MiniCup team got started as an alternative to go-kart racing. While kart racing was fun, the unplanned off track excursions, driver ejections and occasional hay bale being set on fire was not. We needed a safer alternative. Looking around there wasn’t much else for kids in the 8 to 13 year old range to race. Eventually we found a kids division at Coastal Plains Raceway running MiniCups under the Future Stars Rules. We discovered that unlike karts, MiniCups had five point seat belts, racing seats, a full roll cage, mandatory radios, and a much wider racing surface to run on. After looking into it and deciding it had a lot more to offer, we located a MiniCup truck and that was the start of our first year in 2008. We had to use a truck body because the driver was so small at the time, he couldn’t see over the steering wheel with the laid back seating position of the cars!

Coastal was a great track, but being over two hours away it made for a very long weekend which was tough on driver and crew alike. Sometimes we wouldn't leave until 1am Sunday morning. After doing some talking with Wake County Speedway, we started our own Future Stars class in 2009, and have run every race since through to the end of the 2011 season.

Having had some limited experience with Late Models in a previous life, I thought I had some idea of how to make these cars run up front. Looking back, I certainly underestimated just how tough it would be. Just running one team car, (much less two in 2011), was a huge learning experience and reminds me never to take for granted how much effort it is for any team in any series to run up front consistently. Here are a few key points about things we've figured out along the way:

Engine

The engine is a standard electric start 13HP Honda GX390. Under the Future Stars Rules, the engines are mainly stock and must be inspected and sealed by EES or Mountain Machine. The only internal access to the engine is through the valve cover. We've found these to be very reliable, and only require a minimum amount of maintenance. At one point we had over two seasons on our engine before sending it out for an overhaul. The exhaust seat seal and valve springs are the only weak points we've really found. The seat is good for at least one full season, but the valve springs tend to drop off in performance after three or four races. They're inexpensive, so we just replaced them after every other race. What ever you do, make sure the piston is at TDC when changing the springs out so you don't inadvertently drop a valve inside the head or you will be paying someone to re-seal the engine...don't ask how I know this...

The Future Stars Rules also mandate the use of a 9HP carburetor to restrict the power, which in turn also restricts the rpm. 4500-4800 rpm is all we ever got in this trim. Being an air-cooled engine, they are *very* sensitive to air/fuel ratios and tend to run stronger on the lean side. Since the rules do allow adjustable jets and modification of the emulsion tube we were able to get some of the power back by carefully tuning the fuel curve to match the rpm on the track. This was critical to our success since these are slow turning, high torque motors with not much room for improvement of horsepower.



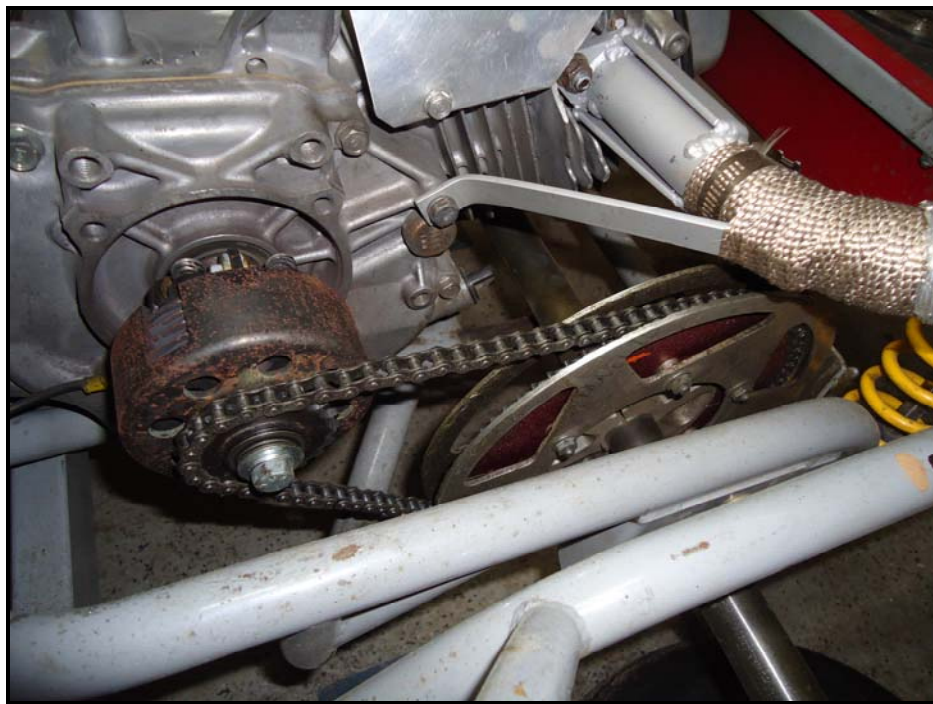
Honda GX390. Note the engine seals...



Valve springs; EES 5 coil (left) & MMI 6 coil (right)

Drivetrain

The drivetrain consists of a drum or disk style of clutch with standard kart gears and chain. The MiniCups are very heavy compared to a kart, (minimum of 550lbs), so we learned the hard way to pay a lot of attention in this area. The standard chains would only hold up for two or three races before showing signs of stress, so we upgraded to the heavy-duty gold chain. Then we got by on two chain sets per season. Clutches on the other hand, weren't so simple. Due to the cost we stuck with the drum style of clutch for nearly a full season, but could never get it to work reliably. Prepping the shoes for every race worked, but it would never fully 'bite' on the starts with the weight of a MiniCup. Finally we forked over the cash for a disk style of clutch, (Horstman), and never looked back. It still requires a lot of maintenance, but after the initial cost, it proved to be cheaper in the long run, and was adjustable as well.



Multi-disk clutch & gear assembly

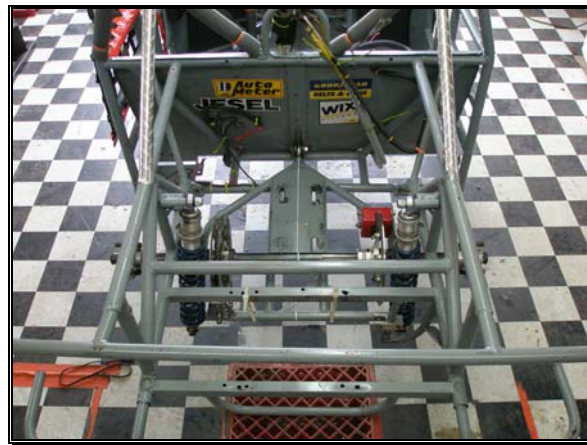
Chassis & Suspension

With coilovers, control arms, weights, Panhard bar, etc, there are an infinite number of ways to trip yourself up here. *Everything* is adjustable. If you don't have much experience aligning or setting up a chassis you will either have to find someone who does or learn it yourself. Our alignments were accurate to less than 1/16", and the driver could even sense a 1/32" change in the Panhard bar length! We had to use scales, tire pyrometers, and Micron data to figure out the setups just like on a Late Model. It's a bit intimidating at first, but once you wrap your mind around it you'll be tough to beat.

There are a few maintenance items to be aware of here too. The rear wheel bearings, especially the right rear, tend to wear out after four or five races. While they won't come apart, they will drag heavily on the motor when worn. The front wheel bearings on the other hand, will last all season unless the wheel takes a hit or if you experiment with lubrication other than wheel bearing grease. Take my advice – stick with the grease. Jam nuts on the hiems are a critical area too. These love to loosen up when least expected and ruin an otherwise perfect chassis. We painted match marks on ours for quick visual checks between runs and applied blue loc-tite where appropriate.



LF coilover assembly



Rear coilovers & engine cradle assembly



Micron data is a must have for testing...

Tires

The Future Stars Rules allow American Racer or Hoosier 780s. Since the Hoosiers are the softer of the two, we ran those exclusively. They are treadless, race spec rubber, and have a pretty wide range of temperatures that they can be run in. Track temperatures of 50 to +100°F didn't seem to affect the grip much and they only took one lap to come up to full speed. The only time they ever lost grip was in the dead of summer when the track exceeded +130°F. As for wear, the first two runs are the best. After that they will drop off a bit, plateau for another couple of races, and drop off again after that. The tread depth doesn't seem to change much, but the durometer slowly creeps up. We noticed a drop off in performance with even a two point change in durometer. Unlike kart racing, soaking or prepping of the tires is not allowed. That being said, one good set of tires will last a full season, especially if you have an older set on hand for practices.



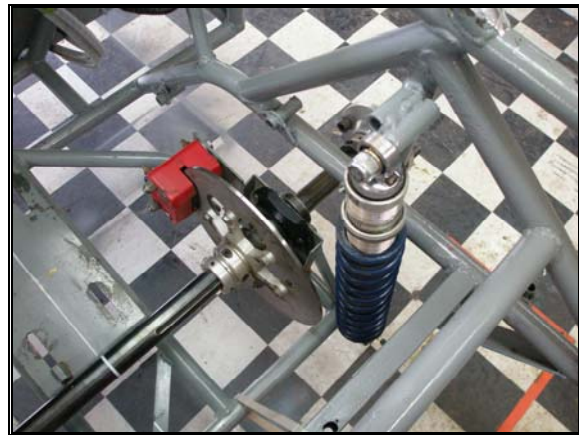
Checking durometer...note the graining across the tire. These run over 130°F depending on track temperature

Brakes

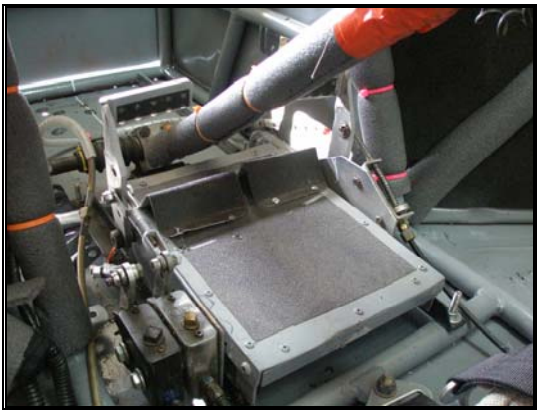
Don't overlook this one. Since the cars are power limited, they tend to run the race track like a superspeedway – wide open. Given that fact, it's easy to ignore the brakes, but don't do it. The MiniCups use the brakes designed for a kart with less than ½ the weight, so needless to say they don't stop so well unless everything is in good working order. We found that the master cylinder seals need to be replaced every season, and the brake pads readjusted every other race. If you can, adjust the bias slightly toward the front to keep it tracking straight under heavy braking. It's not very expensive or time consuming but is a deciding factor on whether or not your driver can avoid a wreck or become part of one instead. Note that these systems use DOT 5 brake fluid. Do not try to use DOT 3 or 4 or you will find your soft seals become a bit too soft... (Another lesson learned).



Front brake assembly



Rear brake assembly



Master cylinder & brake pedal assembly, (lower left)

Drivers

With all of the technical details above, I don't want to overlook the drivers. When we started this series, all the kids already had several years of karting experience under their belts. As time went on, we had new teams and drivers join the fray without much experience. For the most part, they did well, but what became evident very quickly is that a group of teams with a wide range of speed and ability all on the same track at the same time was not a good combination. Wake County Speedway has since added a driver training course that is mandatory, (and free of charge), for rookie drivers. It gives them the basics on starts, racing line, braking, line changes, radios, etiquette, etc. There is also technical and setup assistance for those unfamiliar with MiniCups to help get them started.

Looking back at the last four years, I can honestly say that the drivers are what impressed me the most, whether they were 7 or 14 or anywhere in between. They learned quickly, and with few exceptions, conducted themselves maturely and raced each other cleanly, even when running door to door, lap after lap. Best of all, most didn't make excuses either. If you aren't sure about the level of challenge these cars bring to young drivers then consider this; even on restricted power, these cars run lap times faster than the UCARs, (four cylinder stocks), since they can run wide open and hit the corners as quickly as the Late Models. They run so fast that Wake County Speedway is now mandating a restrictor plate for the 2012 season! Even CJ Faison of the NASCAR K&N Pro East series once told us that the handling characteristics of these cars are just like a Late Model, and can be tough to master.



Competition can be fierce, but we keep the attitude light hearted...this is the 'good' side!

Well, that's a brief overview of some of the things we've learned over the last four years running MiniCups. Hopefully it will give someone a good idea on what they'll need to be successful, and maybe avoid some of the pitfalls that we ran into along the way. If it looks like a lot to absorb, it is. Take note though, that the teams for the most part work well with each other and share information pretty freely. The speedway is a big help in this area too, as they try to encourage participation anyway they can. It's been a very fun and competitive class as the door 'donuts' will attest to. Number one for us though was the safety factor. We've seen many a wreck ranging from looping the car in a corner to full on contact with the wall and even a barrel roll down the backstretch once. It didn't happen often, but it did happen. Out of all the incidences, the worst injury was some shoulder bruising from an improperly tightened set of belts. That was it. (Oh, and the occasional bruised ego as well). The cars are as tough as the drivers too; all were repaired and back racing except one.



Full roll cage with padding & window netting...



Note the padding all around the driver, especially the legs

These cars are very technical, but the results are rewarding if you can put the effort into it. Our team was fortunate enough to earn two championships in two consecutive years, (#65 Lawson Flood – 2010, #88 Will Bristle - 2011). The #65 alone accounted for 1/3 of all the wins and over ½ of the top 2 MiniCup finishes at Wake County Speedway with a bent chassis older than the driver. (It's nicknamed 'The Pretzel' if that gives you any idea of what the chassis is like underneath). While it's tough to walk away on a high note, we are looking forward to moving on to the Legends starting next year with just some training and practice. With any luck we may even make a few races...starting waaaaay in the back. (But I'll bet we don't stay there long!).



A nod to Down & Dirty...