1/10 MID MOTOR FRONT-WHEEL-DRIVE BUGGY

Dear customer,

The project of the front-wheel-drive buggy is very close to my heart. I was interested to find out what a FWD buggy is like to drive. Without modern production cars out there, I decided to design my own car and shared my project on o0ple. The response from fellow members sparked my enthusiasm and first driving impressions hit off a project that now has lasted over 7 years that has resulted in the ORB FF210, and now the ORB Forward.

Along the way, many people supported my efforts with kind words, ideas, feedback, lessons in vehicle dynamics, media exposure, parts and sponsorships. I am very thankful to the people who helped me, the project would not be where it is now without them, nor would I enjoy the RC hobby as much as I do.

Hereby I would also like to thank you for purchasing the ORB Forward. May it bring you lots of joy!

Sincerely,

Paul Dijkstra
Designer at ORB Racing
1/10 MID MOTOR FRONT-WHEEL-DRIVE BUGGY

**Required parts**

The ORB Forward is a conversion kit, meaning you will need a donor car. The conversion is compatible with:

- #90021 - RC10 B6.1D
- #90021L - RC10 B6.1D
  (with addition of #91717 idler)

Tires, rims, electronics and tools are not included and must be bought separately.

**Customer support**

For information on our products, placing orders, questions, advice (for example on car setup) or to provide us feedback, you can contact us at:

orbracing@gmail.com
www.facebook.com/orbracing

On our facebook page you will also find the latest updates, news and product releases.

**Spare parts**

7100 Aluminium chassis
7101 Rear wishbone
7102 Rear wishbone brace
7103 Rear axle holders (L+R)
7104 Rear stabilizer (kit version)
7105 Rear hinge pins (x2)
7106 Rear hanger (set)
7107 Suspension pillow balls (x4)
7108 Wing mount (set)
7109 Rear bulkhead (L+R)
7110 Wing mount plate
7111 Rear shock tower
7112 Battery plate
7113 Battery post + transmission brace eyelet
7114 Transmission case (set)
7115 Motor plate
7116 Front shock tower
7117 Camber link plate
7118 Steering plate
7119 Steering bellcranks (L+R)
7120 Steering rack brace
7121 Front inboard hangers (x2)
7122 Kickup plate
7123 Chassis connector plate
7124 Steering knuckles (L+R)
7125 C-hubs (L+R)
7126 Front wishbone
7127 Front inner hinge pins (x2)
7128 Front outer hinge pins (x2)
7129 Front hanger
7130 Front hanger braces (x2)
7131 3x35mm grub screw (x3)
7132 Spur gear cover
7133 Sidepods (set)
7134 ESC Capacitor mount
7135 Steering rod
7136 Front spring cups and limiters (set)
7137 Bodyshell
7138 Instruction manual
7139 Sticker set (tentative)

**Option parts**

7200 Carbon fibre chassis
7201 Front stabilizers (set)
7202 Rear stabilizer (set)
7203 Short front shock tower
STEP 1

REAR WISHBONES

Build left and right side (left wishbone shown)

Ensure stabilizer arm rotates freely

Adjust rear toe-in by adding shims between hub and wishbone

Note orientation of hub:
- Notch always on top (camber setting)
- Notch forward: standard wheelbase
- Notch rearward: +4mm wheelbase

Components:
- M3x10 CS
- 7104
- M3x6 BH
- 5x10x4
- M3x12 BH
- 81682
- 7101
- 7102
- 7103
- M3x10 BH
- 7104
- M3x10 BH
- M3x10 BH
- M3x12 BH
Mount right side (shown assembled) in the same way as the left side.

- M3x6 BH
- M3 WASHER
- M3x8 CS
- 7104
- 7106
- 7107
- 7104

Ensure stabilizer rotates freely.

Outside High
Inside Low
Note hinge pin height!

- 7100 > Aluminium chassis (Standard)
- 7200 > Carbon fibre chassis (Option part)
Keep 2.5mm between screw head and bulkhead (to mount battery brace)
STEP 5

BATTERY MOUNT

- 91729
- M3x6 BH
- 7112
- 91049
- 91730
- 7113
- M3x16 CS
- M3x12 CS
Apply grease in groove to protect gears from dirt and dust

Slide nyloc nuts into pockets
Ensure the nuts line up with hole
For best performance, a ball differential is recommended. Best results are achieved with the differential set slightly tighter than in a RWD buggy.

To maximize the life-time of your differential, it is recommended to break it in. It is also recommended to upgrade to a ceramic caged thrust bearing.

Breaking in your differential
A well prepared differential makes the difference between lasting a few batteries or the entire season, and costs less than 30 minutes!

When assembling your differential, tighten it only loosely initially. Assemble the transmission and connect the electronics. Lock the left outdrives with a screwdriver and run the motor at low RPM for 8 minutes. After this, unlock the left outdrive, lock the right and run for another 8 minutes. Next, tighten the differential to its final setting and run it at low RPM for 2 more minutes for each side. Your differential is now ready to race!

Upgrade to ceramic caged thrust bearing
The best $10 upgrade you can give your car; it will outlast your outdrives! Companies like Avid RC, Schelle Racing, ProTek and Revolution Design offer 2.5x6x3mm thrust bearings with Tungsten Carbide and/or Silicon Nitride (Ceramic) balls.

Video: https://www.youtube.com/watch?v=GF0vSoI65X0
TRANSMISSION ASSEMBLY

Apply Diff Lube
#6591

M3x12 BH
M3x16 BH
M3x20 BH

Tighten bolts gently to ensure transmission rotates freely!
Whereas a RWD uses the slipper clutch for stability, the FWD needs it merely to protect the gears.

A loose slipper clutch on the FWD compromises forward drive. For maximum drive, use a very tight setting.
STEP 11
FRONT SHOCK TOWER

- M3x20 BH
- M3x12 BH
- M3x20 BH
- M3x12 BH
- 7116
- 91816
- 91816
Fully tighten, then untighten until steering rack rotates freely
MOUNTING OF STEERING RACK

STEP 14

M3x25 BH

7120

M3x25 BH
STEP 17

DRIVESHAFTS

Build left and right side (left driveshaft shown)

Note the axle has holes for the CVA pin at two different depths. Use the shallowest / outermost hole. Team Associated refer to this in the B6.10 manual as the '65mm hole location.'
Build left and right side (left C-hub shown)

Fully tighten bolts, then untighten them until the steering knuckle rotates freely
STEP 19

FRONT WISHBONES

Build left and right side (left wishbone shown)

7126
7127
7201 Option part
31510
31510
7128
Note two options for kickup and roll center:
Top hole = standard setting
STEP 21

CAMBER LINKS AND TIE-RODS

Build left and right side (left side shown mounted)
Ensure the pinion and spur gear mesh correctly.
Depending on the servo model, it may be required to add shims (M3 washers) between the mounting tabs of the servo and the mounting posts on the chassis.

It is recommended to use a full-size servo with a torque of at least 12.0kg-cm (166 oz-in)
Adjust link length to line up the #7113 eyelet with the hole in the gear casing.
STEP 27

FRONT SHOCKS

Build left and right side (left side shown)

Supplied in RC10 B6.10 kit, Associated big bore shocks V2, featuring:
- 31mm Shock body (91482)
- 27.5mm Shock shaft (91619)
- Short shock eyelet (91820)

Supplied in the conversion kit:
- Front limiter 6mm (7136)
- Spring cup (7136)
- Front spring (Associated #91332 or similar)

For oil and piston settings, please refer to the setup guide in the back of the instruction manual.

For best performance at elevated grip levels, the car may be upgraded with shorter shock bodies (#91480), shock shafts (#91615) and optional short shock tower (#7202).
Build left and right side (left side shown)

Supplied in RC10 B6.1D kit. Associated big bore shocks V2, featuring:
- 23mm Shock body (91490)
- 21mm Shock shaft (91615)
- Short shock eyelet (91820)
- Front spring, white, 3.40lb/in (91831)

The rear dampers are built as in the B6.1D manual, without additional or conversion-specific parts.

For oil and piston settings, please refer to the setup guide in the back of the instruction manual.
STEP 29

WING + WHEELS

Build left and right side (left side shown assembled)

Rear wing (91741)
In picture: Xray #363510 (not included)

9690 (White)
9691 (Yellow)
Rims and tires not included

9695 (White)
9696 (Yellow)
Rims and tires not included

M3x12 CS

91826
Build left and right side (left side shown)

Cut bodyshell as shown in the pictures, with cutouts for the rear bulkhead, gear cover, steering link and front stabilizer. After painting, mount the bodyshell using velcro.

For the best adhesion of the velcro on the sidepod, it is recommended to sand the surface of the sidepod and degrease (with brake cleaner) before applying the velcro.
Driving style

The car drives very different from a RWD or 4WD. Adjust your driving style to get the best results. FWD has slower acceleration, but higher cornering speeds than RWD. In addition, FWD is naturally stable on-power, which allows you to apply throttle through most of your lap. Here is some advice for the FWD driving style:

- Driving smoothly is key to good lap times. Avoid over-steer particularly: it is detrimental to corner speed;
- Upon approaching a corner, slow down by coasting and turning in or gentle braking. Too much weight transfer to the front makes the car unstable;
- When you are at 1/4 into the corner, start re-applying power and gently increase it. Use the amount of power/throttle to control your corner radius;
- A slightly wider line into the corner retains speed and a (relatively) straight exit enables harder acceleration;
- When jumping, use the throttle to adjust the car’s pitch. NEVER touch the brakes as this can turn the car upside down mid-air;
- Avoid (large amounts of) wheelspin off the ramp. It can cause the car to jump with the nose down and you end up with too little throttle available to adjust the pitch.
Setup Guide (1 of 3)

We have highlighted some important setup aspects for you to help you get the best performance from your car.

Wheels / tires

The front end uses rear / wide tires, which provides a lot of sideways grip. It is advised to fit 4WD front tires on the rear end of the same tread / type as the front end. Moulded inserts up front can reduce tire ballooning and increase stability.

Ride height & droop

Ride height is measured below the differential and at the rear tip of the chassis. Measure the car ready-to-run. The standard ride height is 17mm front, 19mm rear.

Measure droop by lifting the car until the wheels touch the ground ever so slightly. A good starting point for droop is 29mm front, 39mm rear. Adjust shock length to reach this droop setting.
Setup Guide (2 of 3)

We have highlighted some important setup aspects for you to help you get the best performance from your car.

**Shocks**

For a balanced car it is extremely important that the front and rear of the car respond equally quick.

To test shock response speed, push down on the sidepods near the servo and ESC (the front-to-rear centre of gravity) until the chassis hits the ground. Let go of the car and let the chassis rise up on its own. The front and rear ride height should be reached simultaneously. A slower front reduces grip and causes understeer. A slower rear causes an unstable car and unpredictable oversteer.

The following start setup for the shocks is advised:

<table>
<thead>
<tr>
<th></th>
<th>Front</th>
<th>Rear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>3.90 lb/in</td>
<td>3.40 lb/in</td>
</tr>
<tr>
<td></td>
<td>(91332)</td>
<td>(91831)</td>
</tr>
<tr>
<td>Shock oil</td>
<td>250 cst</td>
<td>450 cst</td>
</tr>
<tr>
<td>Piston</td>
<td>3 x 1.2mm*</td>
<td>2 x 1.6mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(91626)</td>
</tr>
</tbody>
</table>

*Drill from piston blanks (not included). The 3 x 1.2mm pistons increase pack, which reduces bottoming out when landing jumps.

Front and rear should rise back up to ride height simultaneously.
Setup Guide (3 of 3)

We have highlighted some important setup aspects for you to help you get the best performance from your car.

Front and rear toe

Front toe should have a neutral to slightly toe-out setting. Rear toe is a very powerful tool to tune the car balance. The rear end should have just enough grip to prevent it from sliding out. If the car understeers, reduce rear toe-in. If the rear is loose, increase rear toe-in. See step 1 of the manual for rear toe adjustment.

Rear hinge pin inclination

The rear hinge pins are inclined (low on the inside, high on the outside). The inclined rear hinge pins provide extra sideways grip, but requires a rear stabilizer at all times.

For very bumpy tracks, the rear end may ‘fishtail’ (bounce from left to right) on throttle. You can swap the outside left and right hangers around so the hinge pins sit horizontal (no hinge pin inclination) and the rear stabilizer may also be detached. At the cost of some sideways grip on the rear, the car will handle more neutrally over bumpy terrain.

Weight & balance

With RWD and 4WD, normally there is a trade-off between a light car (quick but easily unsettled) and a heavy car (slow but stable). With the superior stability of FWD, it is possible to minimize the weight of the car without major stability drawbacks. Using a shorty is therefore advised.

When using a shorty LiPo, it is also possible to choose three different battery positions. It is advised to run the battery in the most forward position for maximum forward drive. If grip is high, a rearward battery position may provide more stability into corners at the cost of some forward drive.

Differential & slipper clutch

A ball differential is advised for the most consistent and smooth response. A slightly tighter setting than a RWD buggy is preferred.

The slipper clutch is not necessary for stability. It should be set very tight to maximize forward drive. It may even be replaced by a slipper eliminator / direct drive kit.