

R2D2 3rd leg mechanism assembly V1.0

Mike.Lambert1@NTLWorld.com

Or

Mike_Grafix@Hotmail.com

Please read these instructions before commencing.

The first stage is to modify the frames existing Ring 2. This will need 3 holes drilled (6mm) and a cut out. The holes should be as accurate as possible but if this is not possible then drill them slightly larger to take up any inaccuracy. The cut out doesn't have to be accurate. Just as neat as possible and adequate. Its purpose is to provide clearance. Drawings are supplied for Ring 2.

Assemble the centre section using the nylon sliding parts and the upper and lower mounting plates. Do not over tighten. This will miss form the nylon sliding parts and cause the mechanism to bind. Look at the diagram for the nuts, bolts and washers. After assembly place the 4 off bearing rods through the sliding and check for fit. These should be able to slide up and down with ease. If they are sticking slightly slacken off the bolts through the sliding parts. Spring washers are included in the kit to aid in anti vibration. The upper plate has a large hole and 4 off M5 holes. This is for possible future use and no parts are missing from the kit. The lower plate has 8 off 6mm holes for mounting the 3rd foot adaptor plate that is designed and supplied by Guy Averett.

Next, place the nylon bearing rod holders onto the bearing rods ensuring that the threaded end is not in the nylon bearing holder and place the assembly into the frame of the robot. The upper bearing rods align with the frames existing holes in ring 2. Align the nylon bearing holders in the lower set of holes in ring 5 of the frame and loosely place the counter sunk M6 screws. Slide the centre assembly up so that it sits on ring 2, place washers and bolts through the existing ring 2 holes into the bearing rods and lightly tighten. Check for free un-bound movement in the mechanism. If there is sticking then slacken the bolts and move the offending bearing rod slightly to fix this. It may be necessary to slightly drill out the holes in ring 2 to allow for more movement. Take your time with this step. When you are satisfied with free unbound travel tighten the upper and lower bearing rods and mounting block screws.

DO NOT LUBRICATE. Nylon is a self lubricating material and needs no lubrication. If you do lubricate with oil or grease then over time particles of dirt, grit and other foreign objects will stick to the bearing rods or sliding parts causing them to wear out and or either bind or seize.

The satellite motor is now fitted to the motor mount using the supplied M5 countersunk screws. . It may be necessary to file down the sides on the heads of the screws on the satellite motors rear casing. I have found some motors that use heads that protrude from the side of the motor casing. This causes the motor assembly to be difficult to fit into the mount. The motor mount is then fitted to Ring 2 as shown on the drawing using the supplied washers and bolts.

Fit the motor arm to the satellite output using the shorter M6 countersunk screws. Fit the link arm making sure that the 8mm hole is to the satellite motor arm. Screw an M8 dome headed bolt through this hole into the motor arm and on the threaded part that protrudes from the motor arm fit the ½ M8 nut. Slightly tighten the M8 bolt to remove slop but not cause binding and then lock using the ½ M8 nut. Fit the other end of the link arm to the lower plate using a washer and bolt. This bolts shank will tighten on the lower plates threaded hole and enable a nice tight fit.

That's the 3rd leg mechanism assembled.

Our development unit was driven at 24V with very satisfactory results. The brake is retained so that the leg can be locked down or up. However, with the gear ratio of the satellite motor and gearbox this may not be needed. Its just belts and braces.

The future :-

I developed this unit for Jon Reason. I also made him a JAG frame. I will be designing electronics and software to drive all 3 legs in 2-3-2 mode. It will have an input from the RC, drive both outer legs and the centre leg. The modifications needed will be micro switches fitted to the end stop

positions of ALL the legs (6 switches in total) and one micro switch fitted to some place in the mid travel position on the 3rd leg so that it moves and at a pre determined position it triggers the two outer legs. This unit will be fed with 24V, have onboard RC interface and 3 * H bridge FETs for all three motors as well as full control of the motors brakes.

The software and electronics will be made available to the group so that self build people can do it themselves.

I have also designed outer legs that have internal 2-3-2 actuation. I will be making the prototypes within the next 4 months for Jon and I will publish the final designs. There is a lot of machining and welding in the design but I think that the final product is well worth the effort.

If you have any comments then please contact me on either of the above email addresses.

Thankyou.

Mike Lambert.

The picture below shows Ring 2 and Ring 5 for illustration purposes only.

