

Pit Droid shopping list

Everything you order for a life-size Pit Droid, with the exact size, the quantity and a drawing of the part. Tick the box when you have ordered it.

Two lists. **Order list 1** is the standard droid: bolts, nuts, rods and glue. **Order list 2** is the animatronic upgrade for the full build (head, both arms, waist and backpack), with **total** quantities, so there is nothing to add up. The last part lists the electronics. Building a standard droid only? You only need order list 1.

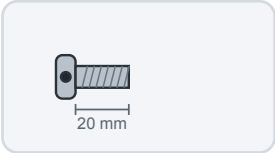
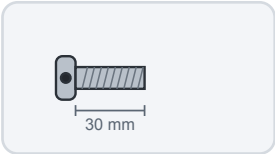
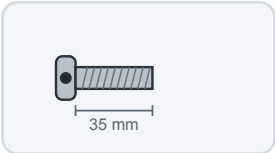
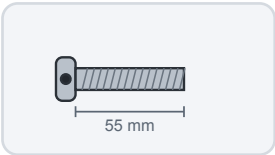
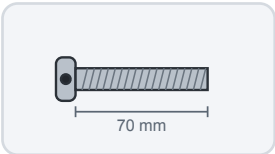
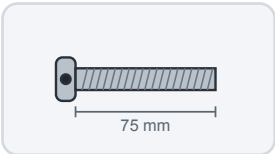
Check before you order. Sizes and quantities come from the designers' info sheets (Droid Division, Chris Osborne). The designs get updated, so check them against the sheets that come with your files.

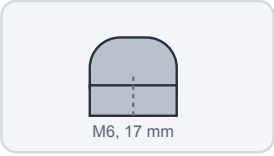
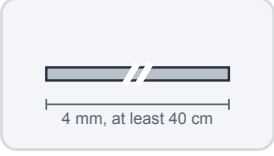
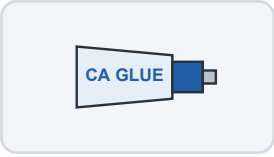
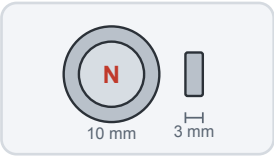
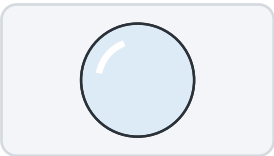
Position servos only. The servos must be standard position servos (you set an angle and they hold it). A 360 degree continuous rotation servo spins like a motor and cannot hold a head or arm at a set angle.

Drawings are schematic, they show the type and the size of the part, not the exact product of a shop. Links marked * are affiliate links: if you buy through them I may earn a small commission at no extra cost to you. It doesn't change what I recommend.

Order list 1: the standard droid

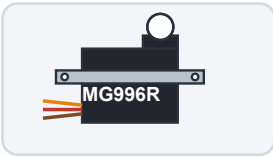
Bolts and nuts, rods, glue and finishing

☐		M6 furniture bolt, 20 mm Allen key type with a flat round head. Used for the elbows. For: Elbows	QUANTITY 2
☐		M6 furniture bolt, 30 mm Allen key type. May be longer, the length is not critical. 2 for the hips, 2 for the shoulders. For: Hips, shoulders	QUANTITY 4
☐		M6 furniture bolt, 35 mm Allen key type. For the ankles and knees. For: Ankles, knees	QUANTITY 4
☐		M6 furniture bolt, 55 mm Allen key type. For the hands and fingers. For: Hands	QUANTITY 2
☐		M6 furniture bolt, 70 mm Allen key type. Lower neck. Skip it if you build the animatronic head. For: Neck	QUANTITY 1
☐		M6 furniture bolt, 75 mm Allen key type. Upper neck. Use 70 mm if it feels too loose. Skip it if you build the animatronic head. For: Neck	QUANTITY 1

☐	 M6, 17 mm	Cap nut, 17 mm M6 "cap nut" or "joint connector nut". May be shorter than 17 mm. 4 ankles and knees, 2 hands, 2 elbows, 2 neck (skip the 2 neck nuts for the animatronic head). For: Joints	QUANTITY 10
☐	 M6, 20 mm	Barrel nut, 20 mm M6 "barrel nut" or "cross dowel nut". May be shorter than 20 mm. 2 hips, 2 shoulders. For: Hips, shoulders	QUANTITY 4
☐	 4 mm, at least 40 cm	Rod, 4 mm diameter Fibreglass, carbon or metal. Shiny aluminium knitting needles work well. Cut into 130 mm and 220 mm (antennas) and 2 pieces of 10 mm (elbow pins). For: Antennas, elbows	QUANTITY 1
☐	 CA GLUE	Superglue (CA) Normal superglue. A weld-type glue is optional for large areas. For gluing the split parts together. For: Assembly	QUANTITY 1 or more
☐	 3DLac	Bed adhesive 3DLac spray, the designer's recommendation. For printing. For: Printing	QUANTITY 1
☐	 10 mm 3 mm	Magnets, 10 x 3 mm* Round neodymium. Back door and head dome. If you also build the animatronic waist, order 16 in one go (see order list 2). For: Door, dome Order on AliExpress	QUANTITY 12 (optional)
☐		Lens material Clear plastic bowl lid, 3 inch magnifying lens, flat clear bauble, Pringles lid or a mirror party mask. You choose in Part 7. For: Eye	QUANTITY 1

You print the dowels (5.7 x 17 mm) and the 10 mm filament pins yourself, so there is nothing to order. Optional poseable shoulder: 2 more 20 mm bolts and 2 more cap nuts. Search terms: joint connector bolts, furniture bolts, cross dowel bolts, barrel nuts. Order one spare bolt, they are cheap.

Servos

☐


MG996R servo*

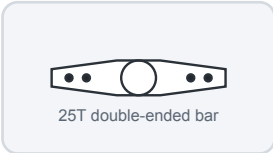
MG996R or MG946R, **position servo** (not continuous rotation, not 360 degrees). Preferably genuine TowerPro, because clones can have plastic gears. For the 2 arm servos you can choose a stronger 25 or 35 kg cm servo that lifts more. 2 head (turn and tilt), 2 arms (one each), 1 waist.

For: Head, arms, waist

[Order on AliExpress](#)

QUANTITY

5

☐


Servo horns

Comes with the MG996R: a set of plastic 25T horns including a double-ended bar. You cut the bar down for the waist swivel, so there is nothing to order. Check the set when the servos arrive. Only if the bar is missing, order one 25T double-arm servo horn.

For: Waist

QUANTITY

Included

Bearings, tubes, rods and shafts

☐


Bearing 6800-2RS*

Size 10 x 19 x 5 mm. The 2RS version has rubber seals.

For: Head

[Order on AliExpress](#)

QUANTITY

2

☐


Bearing MR126*

Size 6 x 12 x 4 mm. Sold as MR126ZZ (metal shield) or MR126-2RS (rubber seal), both are fine. **Not the 686**, that one is 6 x 13 x 5 mm.

For: Arms

[Order on AliExpress](#)

QUANTITY

4

☐


Bearing 6801*

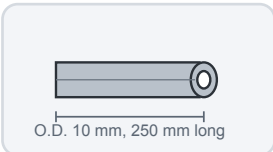
Size 12 x 21 x 5 mm. Sold as 6801-2RS or 6801ZZ, both are fine.

For: Waist

[Order on AliExpress](#)

QUANTITY

2

☐


Tube, 10 mm outside diameter*

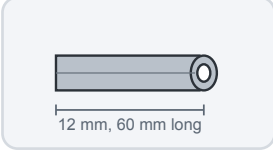
Hollow steel or aluminium tube. Order **1 tube of 250 mm** and cut it to length if needed (the designer's sheet gives 150 to 280 mm). Glued into the lower neck, it must reach at least halfway into it. Chamfer the ends so they cannot cut wires.

For: Head (neck)

[Order on AliExpress](#)

QUANTITY

1

☐


Metal tube, 12 mm diameter*

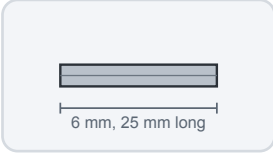
60 mm long. For the waist swivel.

For: Waist

[Order on AliExpress](#)

QUANTITY

1

☐


Rod, 6 mm diameter*

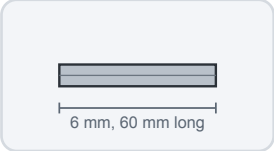
25 mm long, steel, aluminium or brass, or cut from the unthreaded part of a long bolt. Tilt pivots of the head.

For: Head

[Order on AliExpress](#)

QUANTITY

2

☐


Metal shaft, 6 mm diameter*

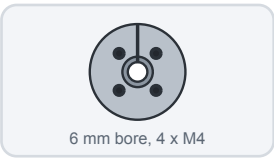
60 mm long, round or D-shaft. The arm axles.

For: Arms

[Order on AliExpress](#)

QUANTITY

2

☐


Clamping hub ("sonic hub")

6 mm bore for the 6 mm shaft, with four M4 mounting holes in a square of 16 x 16 mm to match the printed arm lever. Check the hole spacing and the number in the pack before you order.

For: Arms

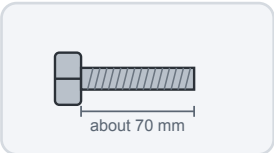
[Order on Amazon.nl](#)

QUANTITY

2

Bolts, nuts and washers

You can order these on AliExpress too, but they are probably cheaper at your local hardware shop. Take this list with you and check the sizes there.

☐


M6 bolt

Plain M6 bolt, about 70 mm. The sheet gives no length, so this is the same as the standard lower neck bolt. Check it when test fitting. Not a binding post screw.

For: Neck to torso

QUANTITY

2

☐

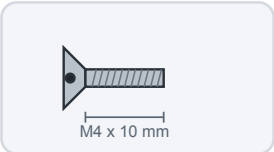

M6 square nut

M6 square nut (DIN 557), sits in a square slot in the printed neck. A round sleeve does not fit.

For: Neck to torso

QUANTITY

2

☐


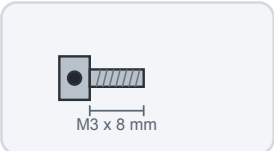
M4 x 10 mm countersunk bolt

With 8 M4 washers.

For: Arms

QUANTITY

8

☐


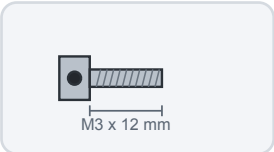
M3 x 8 mm bolt

M3 x 10 is OK. With 8 washers. Servo mounts.

For: Arms

QUANTITY

8

☐


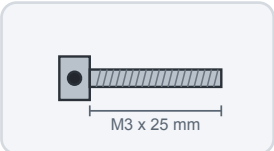
M3 x 12 mm cap head bolt

With 2 washers.

For: Waist

QUANTITY

2

☐


M3 x 25 mm cap head bolt

One bolt for the adaptor collar.

For: Waist

QUANTITY

1

☐


M3 square nut

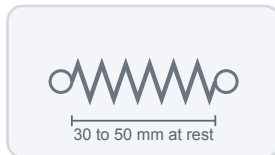
8 for the arms, 3 for the waist.

For: Arms, waist

QUANTITY

11

Springs, magnets and linkage



Tension spring*

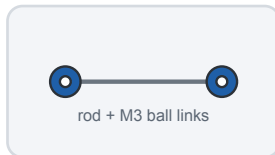
Light **extension** spring with a hook on each end (not a compression spring). The sheet gives no size. Look for about 5 to 8 mm outside diameter, 0.4 to 0.6 mm wire, 30 to 50 mm long at rest. A spring assortment is the easiest buy: keep the lightest one that stops the head drooping.

For: Head

[Order on AliExpress](#)

QUANTITY

1



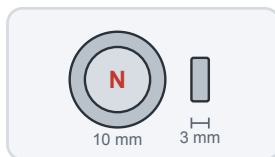
Servo linkage

Model-shop rods and M3 ball links, or the printable rod ends (nothing to order). 2 sets for the head, 1 for each arm. The space is tight, so wire rods or ball links may be easier than printed links.

For: Head, arms

QUANTITY

4 sets



Magnets, 10 x 3 mm*

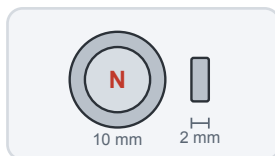
Same magnets as in order list 1, so one order of 16 covers both. For the waist.

For: Waist

[Order on AliExpress](#)

QUANTITY

4 (optional)



Magnets, 10 x 2 mm*

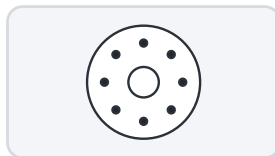
See the backpack sheet. For the backpack door.

For: Backpack

[Order on AliExpress](#)

QUANTITY

Per design (optional)



Round servo disc*

Only if you turn the head with gears instead of a lever: a round servo disc that fits the printed gear (a smaller disc from a 24T servo fits better). Also 1 M3 x 8 mm bolt.

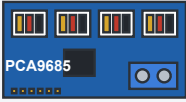
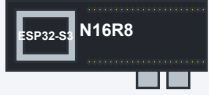
For: Head (gears)

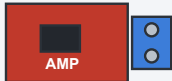
[Order on AliExpress](#)

QUANTITY

1 (gear option only)

The designs don't force one system: the designer lists puppet control, radio control, an Arduino or a Pololu Maestro and leaves the choice to you. This list is for an ESP32-S3 with a PCA9685 servo driver. If you prefer a Pololu Maestro or an RC receiver, you don't need the ESP32-S3 and the PCA9685.

☐		Servo tester* Any cheap one with a knob and a centre mode, running on 4.8 to 6 V. A must-have for centring servos before fitting. For: Everything Order on AliExpress	QUANTITY 1
☐		PCA9685 servo driver* 16 channel, I2C, blue board with 16 three-pin servo outputs and a screw terminal for servo power. We use 5 channels and keep 11 spare. It cannot run on its own, it needs the ESP32-S3. For: Everything Order on AliExpress	QUANTITY 1
☐		ESP32-S3-DevKitC-1 N16R8* The brain that tells the PCA9685 which angle each servo goes to. Order the N16R8 version (16 MB flash, 8 MB PSRAM). Four wires go to the PCA9685: 3.3 V, GND, SDA, SCL. Runs from USB-C or its own supply, not from the servo power. GPIO 35, 36 and 37 are used by the PSRAM, don't use them. For: Everything Order on AliExpress	QUANTITY 1
☐		Power supply 5 to 6 V, able to deliver several amps , separate from the controller's own power. Weak power means jittering and resets. My own advice, not from the design sheets. For: Everything	QUANTITY 1
☐		Fuse and main switch Inline fuse and a switch. For: Safety	QUANTITY 1 of each
☐		Servo extension leads For the long runs from body to head. The number depends on where you mount the controller. For: Head, arms	QUANTITY As needed
☐		Wire, connectors, heat shrink General wiring set. For: Everything	QUANTITY 1 set
☐		Battery (only if mobile) In the body or backpack, not in the head, because head weight affects servo life. For: Backpack	QUANTITY 1

☐		Amplifier (optional)* Small audio amplifier for the droid sounds. Droid Division includes a folder with Pit Droid sounds. For: Backpack Order on AliExpress	QUANTITY 1
☐		Speaker (optional)* Small speaker that matches the amplifier (check impedance and power in the amplifier listing). Fits in the backpack. For: Backpack Order on AliExpress	QUANTITY 1

Always centre the servos with the tester before you fit the arms. A 35 kg cm servo is powerful and can break glued joints, printed parts and fingers.

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