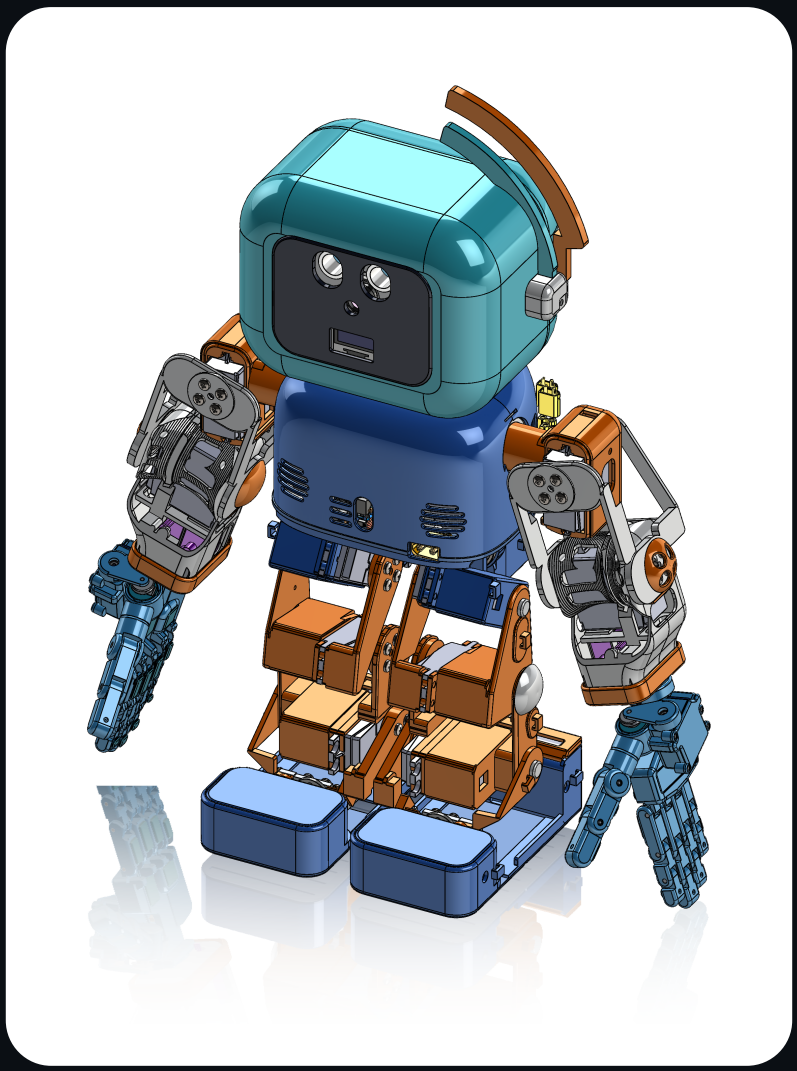
THARVIN

TOYS FOR TEENAGE ENGINEERS

THARVIN User Manual

Build, play and care



Humanoid robot kit · about 40 cm · 25 servos · ages 14+

by THELUCKg Solutions, Mysuru - 23 Oct 2026 - firmware 0.4.3, app 1.5

THELUCKg Solutions

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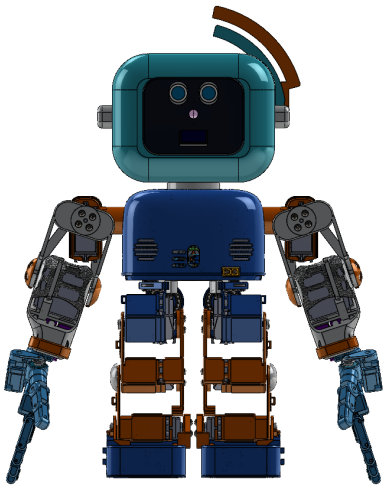
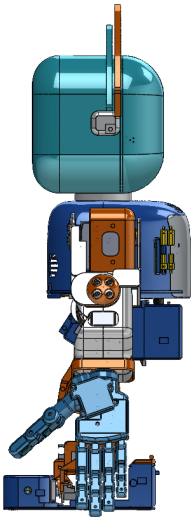
THARVIN User Manual 1.0 (23 Oct 2026), for firmware 0.4.3 and app 1.5. Pictures are from the final THARVIN CAD model.

1. Start here

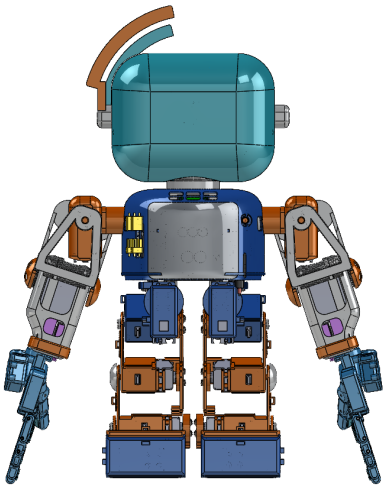
Welcome, engineer! THARVIN is a humanoid robot that you build yourself. It is about 40 cm tall and has 25 motors (servos). You drive it from your phone. It walks, jogs, kicks, dances, bowls and carries a small bottle.



Front



Side



Back

What THARVIN can do

THARVIN can	How
Walk forward, back, sideways and turn	phone sticks or gamepad
Jog	push the stick all the way
Keep its balance when pushed	tilt sensor in the body
Get up after a fall, on its front or its back	by itself, after 1.5 s
Kick a ball	buttons, or say "Hey Tharvin, kick"
Grip, carry and throw a 65 mm bottle	hands with strings and grip pads
Bowl (cricket) and play ten-pin bowling	play set in the box
Do 150+ moves and dances, 5 game modes	MOVES menu and mode buttons
Stop at a table edge or stairs	edge sensor in the chest
Watch the way ahead	ultrasonic "eyes" in the head
Hear "Hey Tharvin" + a command	offline, no internet needed

NOTE. These abilities were tested in the computer simulation of THARVIN (firmware 0.4.2).

How to use this manual

1. Read chapter 2 (safety) with an adult.
2. Check the box (chapter 3).
3. Charge the battery (chapter 5) and test the electronics (chapter 7) **before** you build.
4. Build in this order: legs, hips, torso, arms, hands, head (chapters 8 to 13).
5. Then play (chapters 15 to 18).

These boxes show up in the steps:

SAFETY. Read this. It protects you and the robot.

ADULT STEP. An adult must do this step or watch it.

TIP. Makes the step easier.

The START HERE envelope

Card	What it is
Quick-start card (A5)	QR code to theluckgsolutions.com/tharvin (manuals, app and support)
Safety sheet (A5)	read it with an adult
Tools card (A6)	tools you need (not in the box)
Parts checklist (A4)	tick every bag and pocket
Servo sticker sheet (A5)	spare joint stickers
Serial + warranty card (A6)	your robot's serial number

2. Safety first

THARVIN is for ages **14+**. It is not a toy for small children.

SAFETY: BATTERY. THARVIN has 8 lithium-ion cells in 3 packs. Treated badly, a cell can get hot, smoke or catch fire.

- Never short a pack. Keep metal (tools, coins, keys, foil) away from the plugs.
- Never use a pack that is dented, swollen, leaking, torn or smells.
- Never open, cut, solder, crush or heat a pack.
- Fit or remove packs only with the robot off and the **XT60 plug pulled apart**.
- Hot, smelly or smoking? Pull the XT60 plug if it is safe, move away, call an adult.

SAFETY: CHARGING. Use only the THARVIN charger from bag 22.

- Charge on a hard surface that cannot burn (tile, metal tray). Never on a bed, sofa or carpet.
- Stay nearby. Never charge overnight or unattended. Unplug when full.

SAFETY: PINCH POINTS. The big servos are strong (35 kg·cm each).

- Keep fingers, hair and sleeves out of the knees, hips, elbows and hands while THARVIN is on.
- Pick it up by the torso with both hands. Switch it off first when you can.

SAFETY: SMALL PARTS. The hands use tiny pins and pads. Choking hazard: keep away from children under 3. Open one bag at a time, over a tray.

SAFETY: WHERE TO PLAY. Play on a flat floor with 1 m of free space around THARVIN. Never on a table, near stairs or near water.

THARVIN protects itself too:

Protection	What it does
STOP button	stops every motor in less than 0.1 s
Low battery	slows down, sits, then switches the motors off
Heat	rests its legs or arms when the servos get warm
Fuses	a 20 A main fuse and a fuse for each shoe pack
Fall detection	relaxes the motors when it falls, then tries to get up
Lost phone link	stops by itself 0.8 s after the phone disconnects

Light: the edge sensor uses a Class 1 laser (eye-safe in normal use). Do not stare into it.

Privacy: camera and microphone data stay on the robot. Nothing is sent to the internet unless you add your own online AI key.

3. What's in the box

This list is for the **Complete Kit (SKU A)**. Boards come pre-soldered. Battery packs come pre-welded. You do **not** solder.

The Complete Kit box

Bags (numbered 01 to 22)

Open a bag only when its chapter says so.

Bag	Code	Name	What is inside	Pieces	Chapter
01	H1	Head trim	face plate, left + right ear tabs	3	13
02	H2	Head sensors	camera, ultrasonic eyes, OLED face	3	13
03	H3	Ear lights + mics	2 LED ear lights, 2 microphones	4	13
04	H4	Neck bearing	6806ZZ bearing	1	13
05	H5	Wi-Fi arcs	cyan + orange soft arcs (keep flat)	2	13
06	T1	Torso small parts	cell lid, power-button cap, button holder	3	10
07	T4	Brain boards	ESP32-S3 brain, 2 servo boards, tilt sensor, edge sensor, microSD board + 8 GB card, level-shifter board	7	7, 10
08	T5	Sound	amplifier, 29 mm speaker	2	7, 10
09	T6	Power set	power module, 6 V and 5 V boards, power-button board, 20 A fuse + holder, XT60 pair, 2 XT30 pairs, 4 small fuses, heat sensor, power button	14	7, 10
10	T7	Wiring	10 servo extension leads, wiring harness, 20 cable ties	31	6, 7, 10
11	R4	Arm clips	shoulder caps + rings, elbow caps, wrist bands (L + R)	10	11
12	R5-L	Left hand parts	palm, thumb, 12 finger segments, pulleys, whiffletree	33	12
13	R5-R	Right hand parts	same, for the right hand	33	12
14	R6	Hand pins, pads, string	50 pins and pegs (mini-bags by length), 24 grip pads, 2 m tendon string	75	12
15	L3	Soles	left + right sole (keep flat)	2	8

Bag	Code	Name	What is inside	Pieces	Chapter
16	L5	Leg clips + pins	knee pods, ankle cuffs, toe caps, thigh + shin covers, 6 pin caps, 4 ankle pins	20	8, 9
17	L6	Leg metal parts	2 aluminium ankle inserts, 2 bearings 6804ZZ	4	8, 9
18	A2	Screws	60 M3×6 (4 spare), 6 M3×8 + nuts, 8 M3×12, 4 M3×20	78	4
19	A3	Servo horns	18 aluminium disc horns (25T)	18	4
20	A6	Spares	20 A fuse, LED, button, 4 grip pads	7	19
21	P4	Play small parts	4 rack pegs, 4 cricket corner markers	8	16
22	B2	Charging set	USB-C cable 1 m, 2 M2.5×6 screws for the charge-port board (the charger and the port board come pre-wired to pack T)	3	5, 10

Foam pockets

The big parts sit in foam pockets in 3 trays. Each pocket has a label (for example **A1-15**).

What	How many	Chapter
Head set (core inside the face shell + back cap)	1 pocket	13
Torso set (chassis inside the front + back covers)	1 pocket	10
Leg parts: shoes, ankle cross, ankle outer, shin I + O, thigh I + O	pairs (L + R)	8
Hip parts: hip yoke, hip pod, hip hub, hip clamp	pairs (L + R)	9
Arm parts: shoulders, upper arms, forearm front + back	pairs / singles	11
18 big servos DS3235 + 7 micro servos MG90S	one pocket each, joint sticker on the case	6
Battery carton: pack T (torso) + 2 shoe packs	1 carton (red stripe)	5
Play set: 10 pins, rack (3 parts), ten-pin ball, kick ball	pockets	16

TIP. Every servo has a **joint sticker** (for example `L_KN` = left knee). Keep the stickers on. Chapter 6 shows every joint.

Not in the box: tools, glue, a USB-C phone adapter, a phone, a 60–65 mm plastic bottle (for the games).

4. Tools, screws and servo horns

Tools you need (not in the box)

Tool	Used for
Phillips screwdriver PH0 + PH1	horn screws and M3 screws
Multimeter	checking battery voltage
Small flush cutters + file	trimming micro-servo horns
Tweezers and small pliers	hand pins and strings
Small scissors	tendon string
Soldering iron with a stand (**ADULT STEP**, no solder used)	heat-staking board posts
CA glue or silicone glue	grip pads (if one comes loose)
A tray or muffin tin	sorting small parts
A computer with a USB-C **data** cable	code updates (chapter 20)
A phone (Android or iPhone)	driving THARVIN

Screws (bag 18)

Screw	How many	Where
M3×6	60 (4 spare)	4 per servo horn
M3×12	8	the 2 hip-roll horns (longer: they go through the hip bracket)
M3×20	4	ankles
M3×8 + nut	6	ankles (ankle outer part)

Servo horns (bag 19)

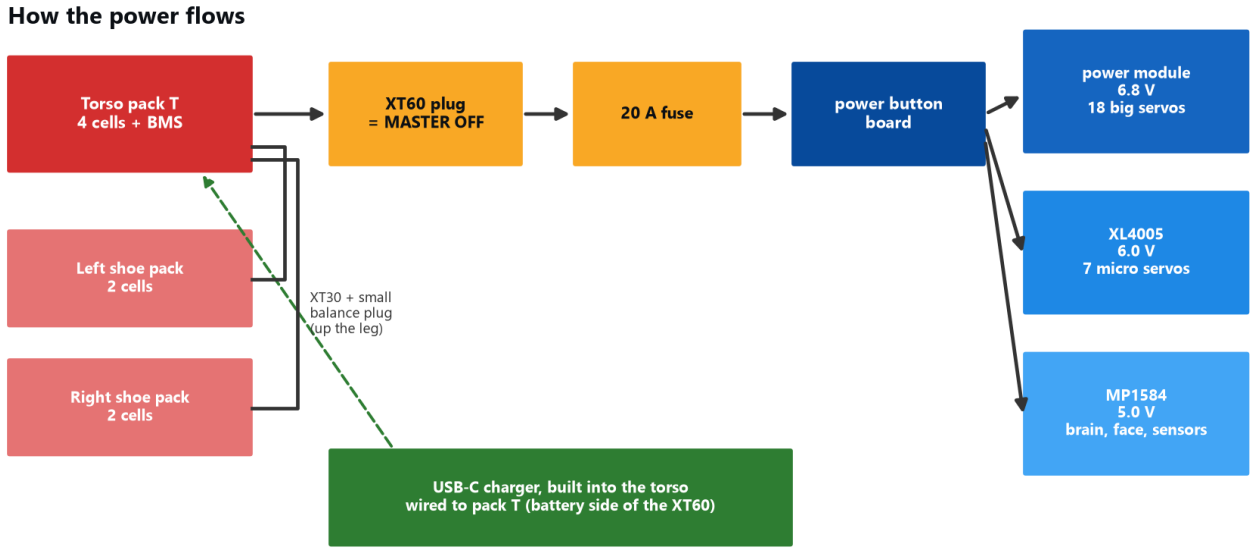
A **horn** is the round metal disc that the servo turns. Each big servo gets one 25T aluminium disc horn.

1. The horn's centre hole has 25 teeth. They fit the servo's output shaft (the **spline**).
2. Fix the horn to the printed part with **4 screws**.
3. Then press the horn onto the spline and fit the **centre screw** (it comes with the servo).

SAFETY. Fit a horn only when the servo is **centred** (chapter 7). If not, the joint will be crooked.

TIP. Do not over-tighten screws in plastic. Stop when the head touches. Tight enough, not stripped.

5. Batteries and charging



How the power flows

The 3 battery packs

Pack	Cells	Plug	Goes in
Pack T (torso)	4 cells (2S2P) + protection board (BMS) + the built-in USB-C charger and the USB-C charge-port board (pre-wired)	yellow XT60	torso cell cage; charger on the left side wall; port board in the back cover
Pack S-L (left shoe)	2 cells (2S1P)	yellow XT30 + small balance plug	left shoe heel
Pack S-R (right shoe)	2 cells (2S1P)	yellow XT30 + small balance plug	right shoe heel

All 8 cells are LG MJ1 18650, 3,500 mAh. Together they make one 7.2 V battery (8.4 V when full).

ADULT STEP. Open the red-stripe battery carton only at the battery steps (chapters 8 and 10).

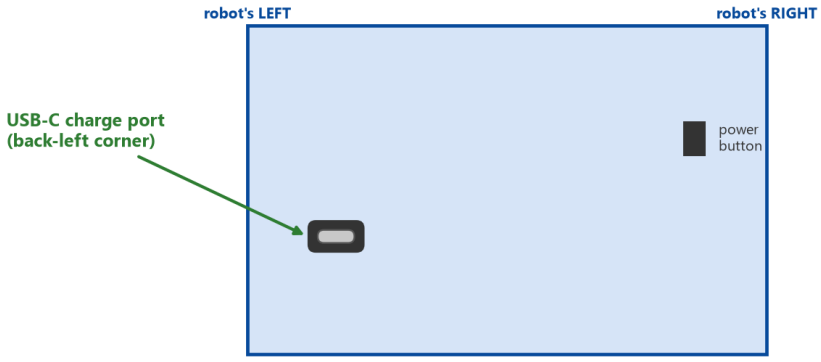
SAFETY. Before you connect the shoe packs, measure all 3 packs with a multimeter. They must be within **0.1 V** of each other. If not, do not connect them: contact support (chapter 23).

How to charge

The charger is **built into the torso**. It is wired to pack T on the battery side of the XT60, so it charges with the XT60 apart. You plug the charger cable into the **USB-C charge port on the back** of the torso (back-left corner).

Torso seen from the BACK: the USB-C charge port

Schematic from the CAD (00 Spec/chargeport_geometry.json), sizes to scale; head, arms and legs not shown.



The yellow XT60 master plug is low on the FRONT of the torso.

The USB-C charge port

1. Switch THARVIN off (1 tap on the power button, chapter 17).
2. Pull the yellow **XT60** plug apart (low on the front of the torso). This is the master switch: the rest of the robot is now off.
3. Plug the USB-C cable (bag 22) into the **charge port on the back**. The socket sits about 4.5 mm inside the opening, so use the slim cable from bag 22, or any USB-C cable whose plug body is no bigger than 12.4 × 6.5 mm. A thick plug may not reach the socket.
4. Plug the other end into a USB-C phone charger (adapter, not in the box).
5. From empty, charging takes about **7–8 hours**. Stay nearby. Never charge overnight.
6. The charger stops by itself when the battery is full (8.4 V). To check: unplug, push the XT60 together, switch on: the app shows the battery level.
7. When done: unplug the adapter, then the cable. Push the XT60 plug back together.

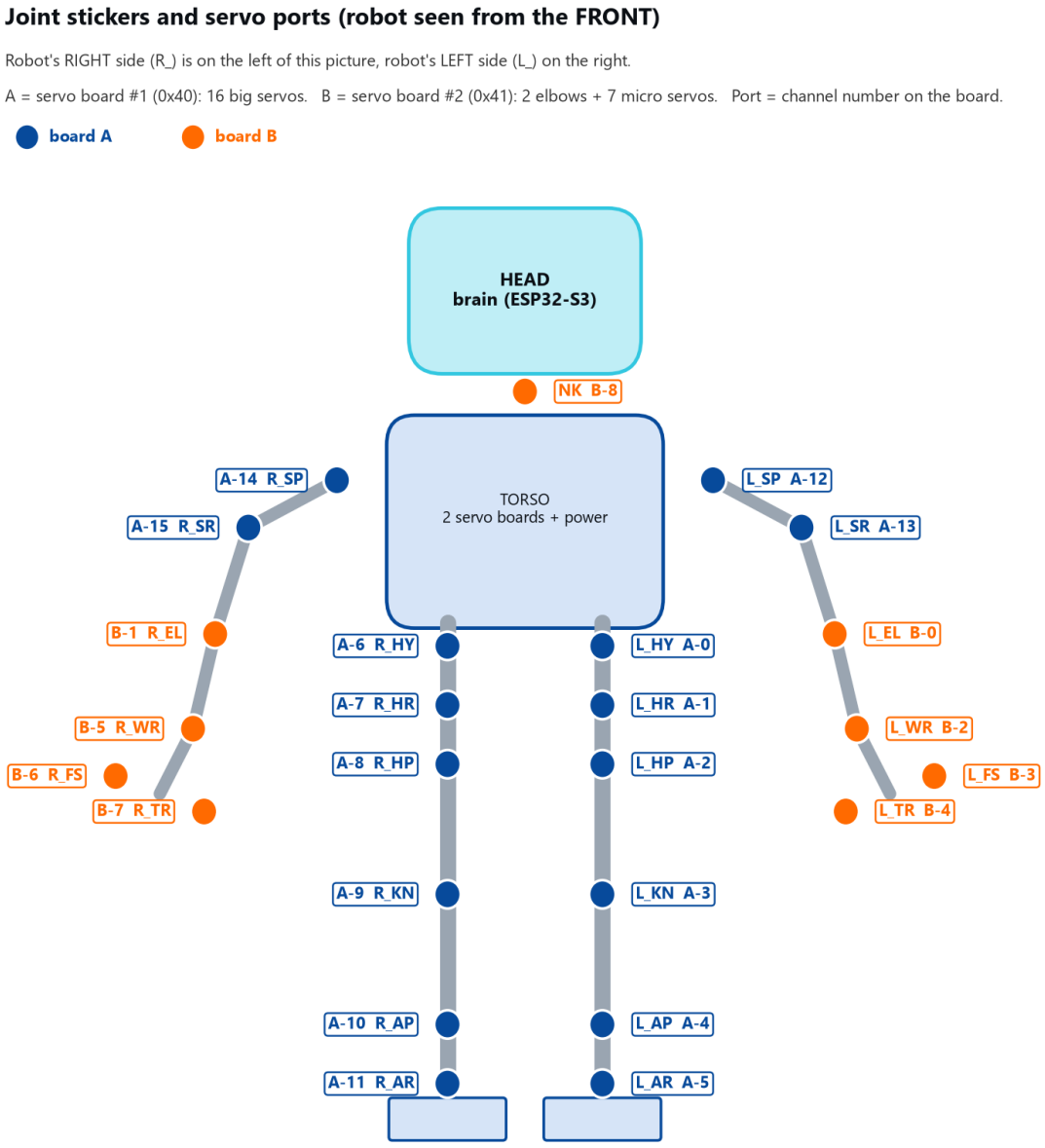
TIP. You do not need to take the packs out to charge. The shoe packs charge with pack T when they are plugged in.

Battery care

- Play time: about **3 hours** of mixed play. This comes from the computer simulation of THARVIN (walking, moves and games, until the low-battery stop). Your real time depends on how you play.
- THARVIN warns you when the battery is low (orange ears, sleepy face). It slows down, sits, then switches the motors off. Charge it then.
- Storing longer than 2 weeks: charge to about half, pull the XT60 plug apart, keep it cool and dry.
- No hot cars, no direct sun. Do not charge below 0 °C or above 45 °C.
- After a hard fall, check the shoes and torso for cracks or a dented pack. If in doubt, do not charge.
- The packs work as one battery. Replace them only with THARVIN packs, all at the same time.

6. Wiring: servo ports and joint stickers

Every servo plugs into one **port** on one of the two **servo boards** in the torso. The brain (in the head) talks to them through the neck loom.



Joint stickers and servo ports

Joint codes

Code	Joint	Code	Joint
HY	hip yaw (leg turns left / right)	SP	shoulder pitch (arm forward / back)
HR	hip roll (leg out to the side)	SR	shoulder roll (arm out to the side)
HP	hip pitch (leg forward / back)	EL	elbow
KN	knee	WR	wrist
AP	ankle pitch (toes up / down)	FS	finger pull (closes the fingers)
AR	ankle roll (foot tilts sideways)	TR	thumb swing
NK	neck (head turns)	L_ / R_	robot's left / right side

Servo board #1 (address 0x40): 16 big servos

Port	Joint	Port	Joint
0	L_HY	8	R_HP
1	L_HR	9	R_KN
2	L_HP	10	R_AP
3	L_KN	11	R_AR
4	L_AP	12	L_SP
5	L_AR	13	L_SR
6	R_HY	14	R_SP
7	R_HR	15	R_SR

Servo board #2 (address 0x41): 2 elbows + 7 micro servos

Port	Joint	Port	Joint
0	L_EL	5	R_WR
1	R_EL	6	R_FS
2	L_WR	7	R_TR
3	L_FS	8	NK
4	L_TR	9–15	empty

Plug rule

1. Match the servo's **joint sticker** to the port in the tables.
2. The **brown** wire goes to the **GND** (−) row on the board. Orange (signal) goes to the outer row.
3. Check every plug twice. A plug turned round can damage the servo.
4. Use a servo extension lead (bag 10) where a servo cable is too short.
5. Leave a small loop of cable at every joint so it can move.

TIP. The wiring harness (bag 10) is pre-made. Its plugs fit only their own sockets: XT60, XT30 and the small balance plugs are all keyed (they go in one way only).

7. First power-on, CHECK PARTS page and servo centring

Do this on a table **before** you build. It tests every part and sets every servo to its centre.

YOU NEED. Bags 07, 08, 09, 10, pack T (battery carton), all 25 servos, a phone.

Set up on the table

1. Lay out the brain (ESP32-S3, it later goes in the head), the torso boards, the power set and the harness on the table.
2. Connect the harness plugs to the boards. The neck loom joins the brain to the torso boards. Each plug fits one socket only.
3. Plug all 25 servos into their ports (chapter 6). Lay them loose on the table. Nothing on the shafts yet.
4. **ADULT STEP:** connect pack T to the harness and push the XT60 plug together.

Switch on

1. Press the **power button** once.
2. The face (OLED) shows the THARVIN logo, then **READY**. The ears glow.
3. The face then shows the robot's Wi-Fi name **THARVIN-xxxx** and its password (**pw ...**). The two screens take turns.
4. THARVIN starts **limp**: the servos stay relaxed until you tell it to stand.

The CHECK PARTS page

About 3 seconds after power-on, THARVIN checks its parts.

- **All parts found:** you only see READY and the Wi-Fi page. Good.
- **A part is missing:** the face shows **CHECK PARTS** and the missing part. The ears flash orange.

Shown on the face	Part	What to check
IMU	tilt sensor (MPU6050, torso)	its plug and the neck loom; the face shows **NO IMU: NO WALK** and walking is switched off
SERVO-BOARD	servo board #1 or #2 (torso)	its plug and the neck loom; the A0 jumper on board #2
OLED	face screen (head)	its plug at the brain
CAM	camera (head)	its plug at the brain
TOF	edge sensor (VL53L0X, chest)	its plug; without it the edge guard is off
SD	microSD card (torso)	card pushed in fully; the board's plug
MIC	microphones (head)	the 2 mic plugs at the brain

Switch off (1 tap), fix the plug, switch on again.

Centre the servos

1. Join the robot's Wi-Fi on your phone (chapter 15) and open the app.
2. Tap **?** > **MORE** > **CLASSIC CONTROLLER**.
3. Send the command `centre`. Every servo moves to its middle position and holds.
4. Check that all 25 servos moved. A servo that does not move: check its plug (chapter 6).
5. Send `limp`. Switch off (1 tap). Pull the XT60 plug apart.

SAFETY. Keep fingers away from the servo shafts when you send `centre`.

TIP. Before you fit each horn in chapters 8 to 13, switch on and send `centre` again. Never turn a servo shaft by hand while it is powered.

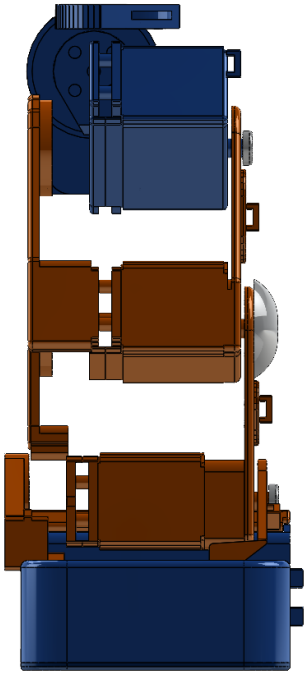
Horn angle

Most joints are **straight** at the servo centre. A few are bent. Fit the horn so the joint is at this angle:

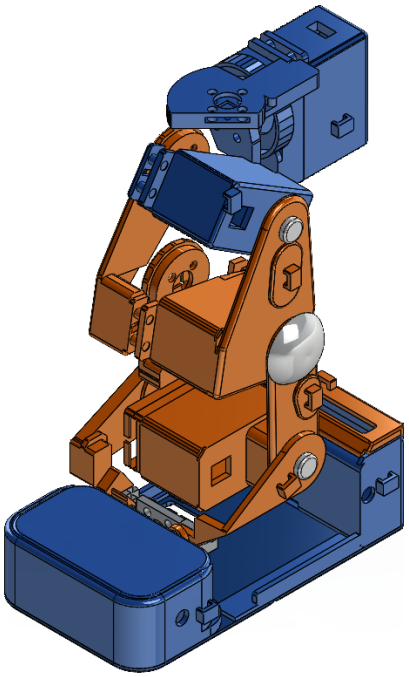
Joint	Angle at centre
HY, HR, AR, WR, NK	0° (straight)
L_HP / R_HP	hip bent 35° forward
L_KN / R_KN	knee bent 62°
L_AP / R_AP	ankle 12°
L_SP / R_SP	arm 60° forward
L_SR / R_SR	arm 65° out to the side
L_EL / R_EL	elbow bent 67°
L_FS / R_FS	fingers half closed (90° on the spool)
L_TR / R_TR	thumb 20° in

The 25 teeth let you get within 7° of the angle. Small errors are fixed in chapter 14 (trim).

8. Build: legs and feet



Left leg, front

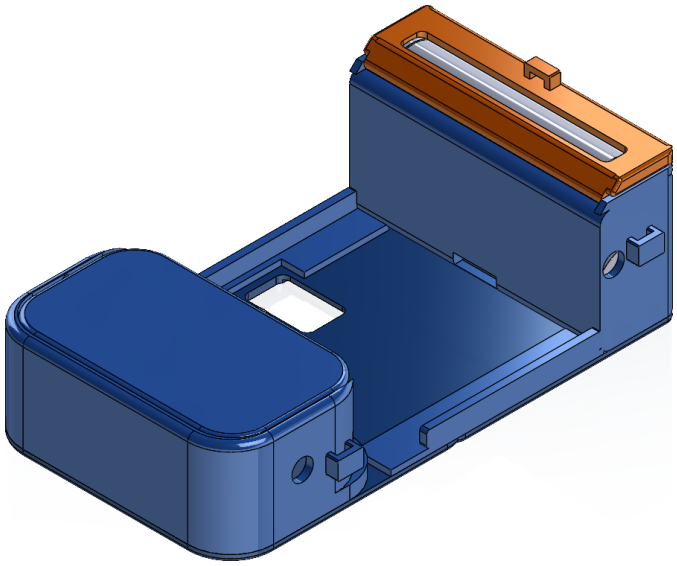


Left leg

Each leg has 6 big servos. Build the **left** leg first, then the right leg the same way (mirror parts, R_).

BAGS. Bag 15 (soles), bag 16 (leg clips + pins), bag 17 (ankle inserts), bag 18 (screws), bag 19 (horns). Pockets: shoes, ankle cross, ankle outer, shin I + O, thigh I + O. Servos: L_AR, L_AP, L_KN (and R_ for the right leg).

Step 1: foot



Left foot

1. Slide servo **L_AR** into the toe box of **L_SHOE**.
2. Push the two ankle pins (**L_AR_PINS_IN** and **L_AR_PINS_OUT**, bag 16) through the servo's mounting tabs into the shoe.

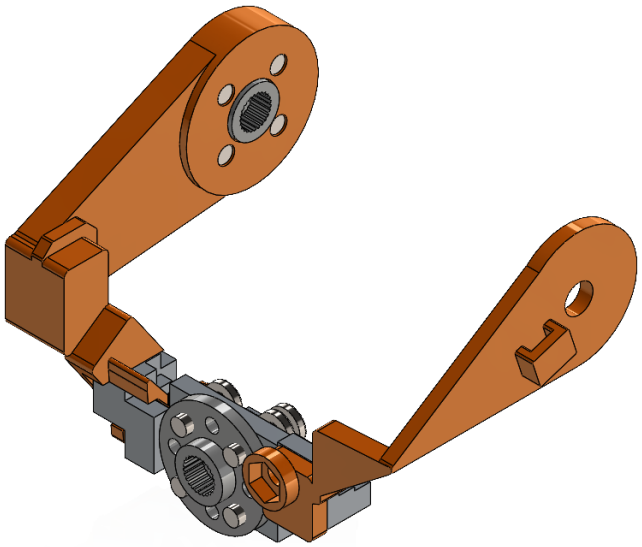
3. Snap the blue **L_TOE_CAP** over the servo.
4. Press the soft **L_SOLE** (bag 15) onto the bottom: its 4 pegs click into the shoe.

Step 2: shoe battery (ADULT STEP)

1. Pull the XT60 apart. Take pack **S-L** (left shoe) from the battery carton.
2. Lay it in the heel bay, plugs to the outer side of the foot.
3. Lead the XT30 and balance plug out through the lead hole. Close the bay with **L_ANKLE_CUFF** (orange, clicks in).

SAFETY. Never pinch the battery leads. Never swap the balance plug wires.

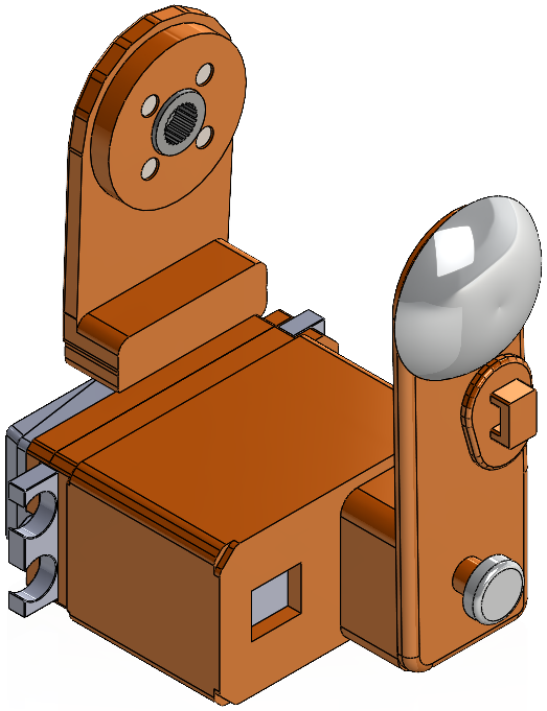
Step 3: ankle



Left ankle

1. Centre L_AR (chapter 7). Screw a disc horn onto the web of **L_ANKLE_CROSS** (M3 screws, bag 18).
2. Press the horn onto the L_AR spline with the foot flat (0°). Fit the centre screw.
3. Fit the aluminium **ankle insert** (bag 17) and **L_ANKLE_OUTER** with the 2 M3×8 screws.

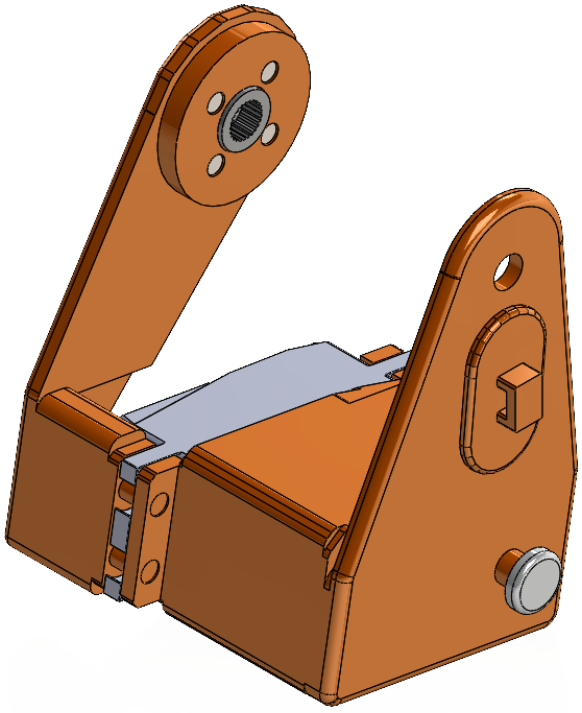
Step 4: shin



Left shin

1. Lay servo **L_AP** into **L_SHIN_I**. Close with **L_SHIN_O**: its printed pins go through the servo's tab holes.
2. Centre L_AP. Screw a horn into the ankle cross horn plate. Press the horn on at the AP angle (chapter 7). Fit the centre screw.
3. The outer arm of the ankle turns on the idler pin of L_SHIN_O. Press on the **L_AP_PIN_CAP** (bag 16).

Step 5: thigh and knee



Left thigh

1. Lay servo **L_KN** into **L_THIGH_I**. Close with **L_THIGH_O** (pins through the tab holes).
2. Centre L_KN. Fix a horn to the top of L_SHIN_I. Press it on with the knee bent 62°. Fit the centre screw.
3. Press on the **L_KN_PIN_CAP**, then the **L_KNEE_POD** dome over it.

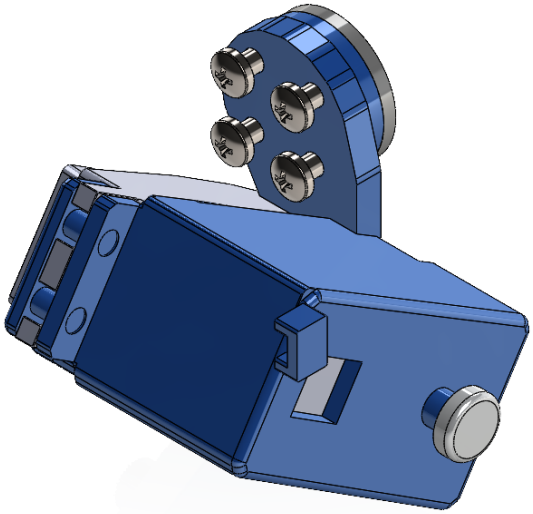
Step 6: covers

1. Snap on **L_THIGH_COVER** and **L_SHIN_COVER** (bag 16).
2. Lead the servo cables and the shoe battery leads up the back of the leg. Leave a loose loop at each joint. Tie with a cable tie (bag 10).

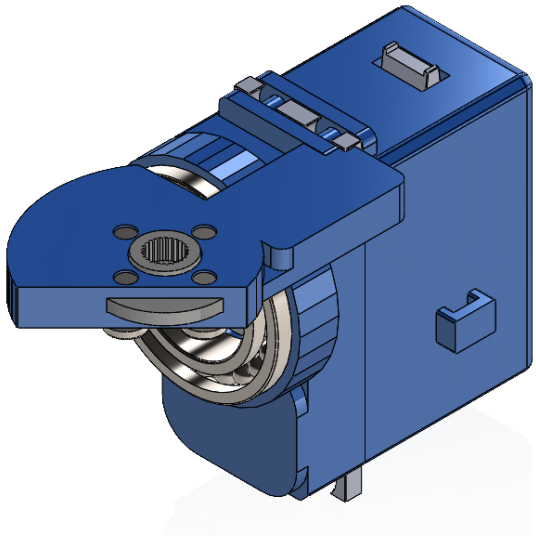
Now build the right leg the same way with the R_ parts, pack S-R and servos R_AR, R_AP, R_KN.

CHECK. Move the ankle and knee gently by hand (power off). Nothing rubs. No cable is pinched.

9. Build: hips



Left hip



Left hip yaw part

BAGS. Bag 16 (hip pin caps), bag 17 (6804ZZ bearings), bags 18 + 19. Pockets: hip hub, hip clamp, hip yoke, hip pod. Servos: L_HP, L_HR (and R_).

Step 1: hip pitch (HP)

1. Put servo **L_HP** into **L_HIP_HUB**. Lock it with **L_HIP_CLAMP**: its 4 pins go through the servo's tab holes.
2. Centre L_HP. Fix a horn to the top horn plate of L_THIGH_I. Press it on with the hip at 35°. Fit the centre screw.
3. The other side turns on the HP idler pin. Press on the **L_HP_PIN_CAP**.

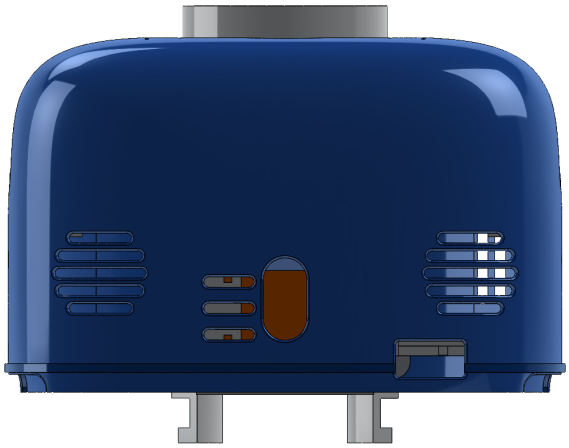
Step 2: hip roll (HR)

1. Press a **6804ZZ bearing** (bag 17) into its round seat in **L_HIP_YOKE**.
2. Put servo **L_HR** into L_HIP_YOKE. Close with **L_HR_POD** (the round back of the pod). The printed pins go through the tab holes.
3. Centre L_HR. Slide the hip hub's round journal into the bearing.
4. Fix the hub bracket to the HR horn with **4 × M3×12** screws (the longer ones). Press the horn on straight (0°). Fit the centre screw.

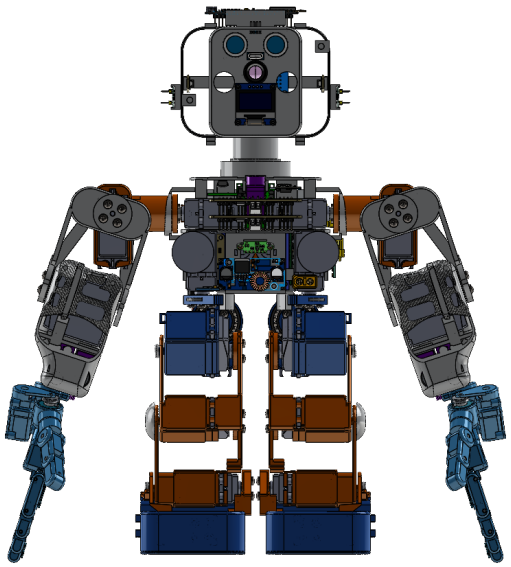
TIP. The bearing also slides over the horn disc. Push gently and straight.

Now build the right hip the same way. Keep the two finished legs aside. They join the torso in chapter 10.

10. Build: torso



Torso



Inside the torso

BAGS. Bags 06, 07 (all boards except the brain), 08, 09, 10, 18, 19. Torso set pocket. Servos: L_HY, R_HY, L_SP, R_SP, NK. Pack T (**ADULT STEP**).

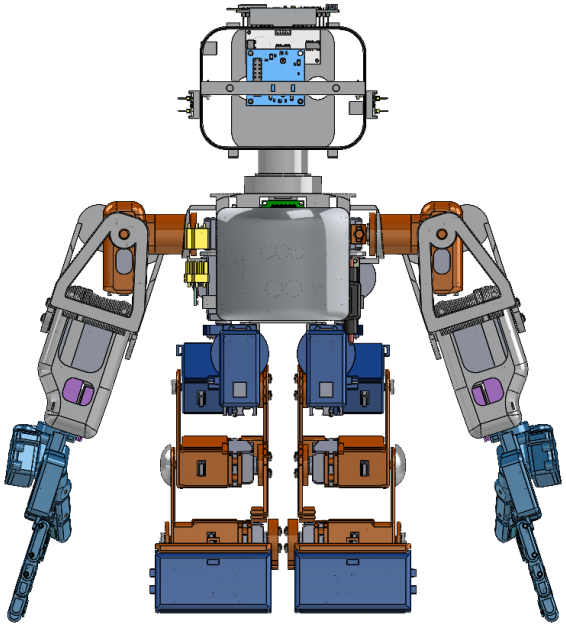
Step 1: open the torso set

1. Take the back cover off, then the front cover. The white **chassis** is inside.

Step 2: servos into the chassis

1. Slide the two hip-yaw servos **L_HY** and **R_HY** into the lower bays.
2. Slide the two shoulder servos **L_SP** and **R_SP** into the upper side bays.
3. Slide the neck servo **NK** (micro servo) into the centre slot under the chest plate, shaft up.
4. No screws: the front cover locks them in later.

Step 3: boards



Inside, seen from the back: the brain sits in the head, the power plate on the torso back

1. Press each torso board onto its printed posts (pictures above): 2 servo boards, tilt sensor, edge sensor (low on the chest, looking down), microSD board, level shifter, amplifier, power-button board. (The brain goes in the head, chapter 13.)
2. **ADULT STEP:** lock each board by heat-staking. Touch each post tip with a hot soldering iron (no solder) for 1–2 s until it mushrooms over the hole.
3. Fit the speaker behind its grille.
4. Fit the power module and the two small power boards as the picture shows. The power module sits on the aluminium plate inside the back cover.
5. Glue the **button holder** (bag 06) on the boss inside the back cover. Put the **button cap** through it.

Step 4: wiring

1. Plug the harness in as in chapter 7. Plug in all servos (chapter 6).
2. Keep thick power wires away from the thin signal wires.
3. Tie loose cables with cable ties. No cable may touch a moving part.

Step 5: pack T and the charger (ADULT STEP)

1. XT60 apart. Slide **pack T** into the cell cage from the back, leads first.
2. The USB-C charger and the small USB-C charge-port board come pre-wired to pack T. Stand the charger board upright on the robot's left side wall, behind the speaker.
3. Screw the charge-port board onto the rib inside the back-left corner of the back cover with the 2 M2.5×6 screws (bag 22), its USB-C socket in the opening (chapter 5 picture). Lay the spare wire as a loose loop so the back cover can come off.
4. Strap the leads with a cable tie.
5. Snap the orange **TORSO_CELL_LID** into the cage (2 side bumps click in).
6. Measure at the XT60: **6.4–8.4 V**, + on +.

Step 6: legs onto the torso

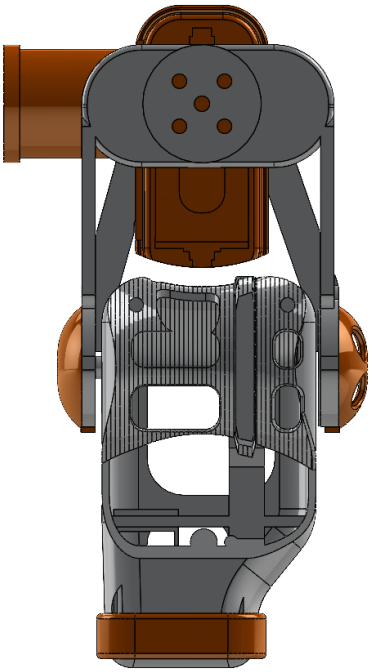
1. Centre L_HY. Fix a horn to the top plate of L_HIP_YOKE.
2. Press the horn onto the L_HY spline, leg pointing straight ahead (0°). Fit the centre screw.
3. Plug the left leg's servo leads and the shoe battery plugs (XT30 + balance plug) into the harness.
4. Repeat for the right leg.

SAFETY. Plug in the shoe packs only after the voltage check in chapter 5.

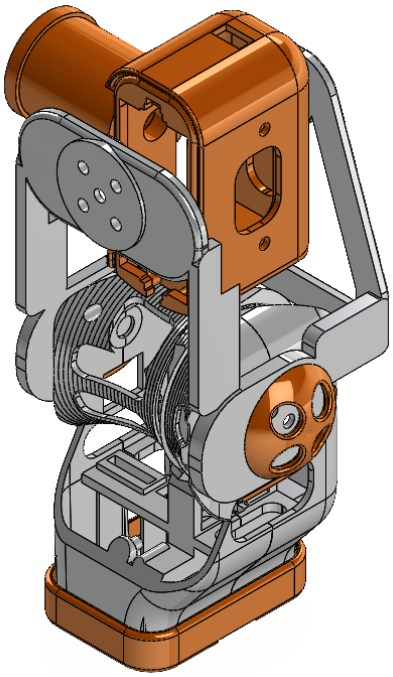
Step 7: covers

The covers go on **after the arms** (chapter 11), because the shoulder sits between them. For now, put the torso on its back on a soft cloth.

11. Build: arms



Left arm

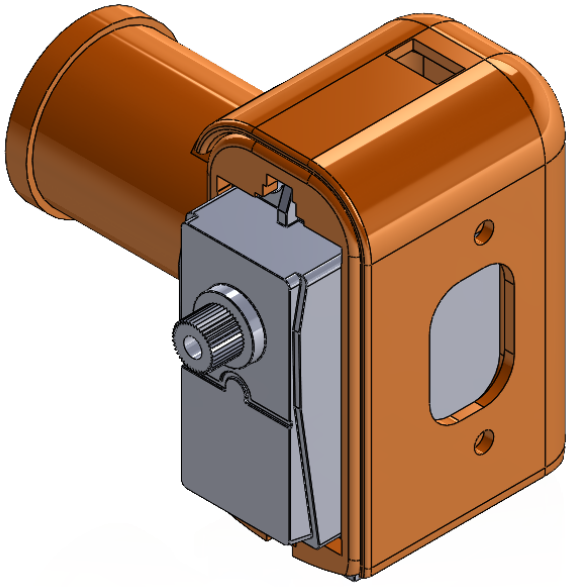


Left arm

Each arm has 3 servos you fit here: shoulder roll (SR), elbow (EL), wrist (WR) and the finger-pull servo (FS).

BAGS. Bag 11 (orange arm clips), bags 18 + 19. Pockets: shoulders, upper arms, forearm front + back. Servos: L_SR, L_EL, L_WR, L_FS (and R_).

Step 1: shoulder

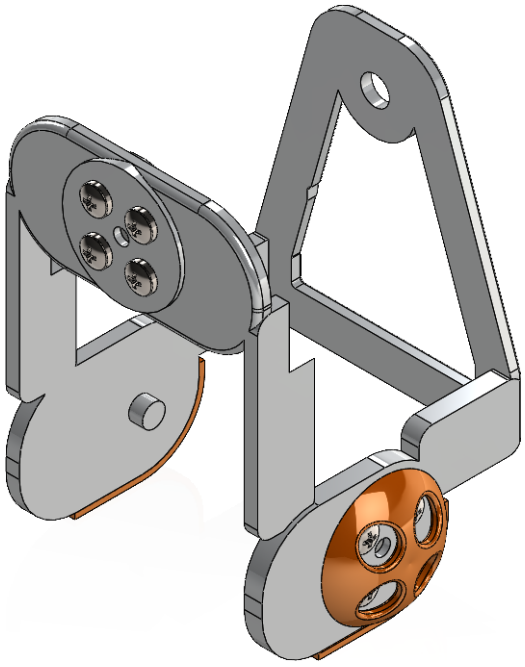


Left shoulder

1. Put servo **L_SR** into the cradle of **L_SHOULDER**.
2. Slide the orange **L_SHOULDER_RING** over the front until it clicks. It traps the servo tabs.

3. Centre L_SP (in the torso). Fix a horn to the shoulder horn plate. Press it onto the L_SP spline with the arm 60° forward. Fit the centre screw.

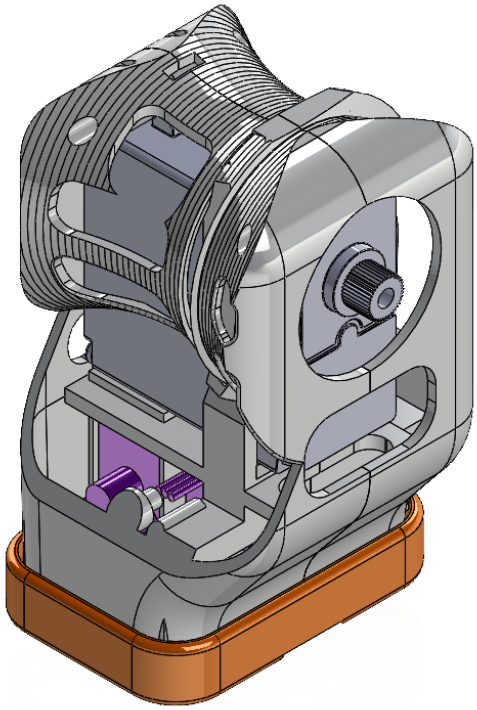
Step 2: upper arm



Left upper arm

1. Fix a horn to **L_UPPERARM**.
2. Centre L_SR. Press the horn on with the arm 65° out. Fit the centre screw.
3. Clip the orange **L_SHOULDER_CAP** over the pod.

Step 3: forearm



Left forearm

1. Lay **L_FOREARM_B** flat. Drop in servo **L_EL** at the top, **L_WR** at the bottom and **L_FS** beside it.
2. Lay the cables in the channel to the elbow.
3. Close with **L_FOREARM_F**. Its pins click into the back half.

Step 4: elbow

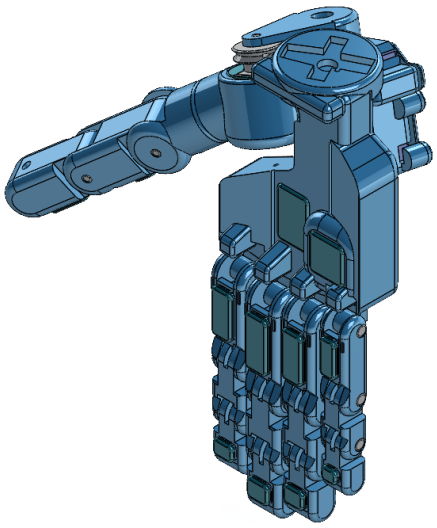
1. Fix a horn to the outer plate of the upper arm.
2. Centre L_EL. Put the forearm between the two plates. Press the horn on with the elbow bent 67°. Fit the centre screw.
3. Snap the orange domes on: **L_ELBOW_CAP_O** outside, **L_ELBOW_CAP_I** inside.
4. Slide **L_WRIST_BAND** on from the hand end. It also holds the forearm halves together.

Now build the right arm the same way.

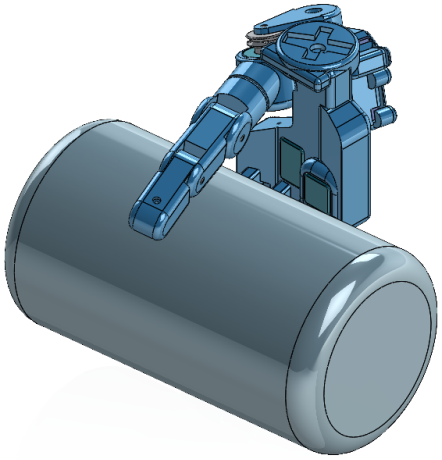
Step 5: torso covers

1. **Front cover:** hook the top edge into the chest, swing it in until the side bumps click. It locks all torso servos.
2. **Back cover:** hook the top edge, press until its 2 hooks drop in and 2 bumps click.
3. Check: the XT60, the power button and the speaker grille line up with their holes.

12. Build: hands



Hand open



Hand gripping

How the hand works: the finger-pull servo (FS) in the forearm pulls **one string**. In the palm, a little lever system (the **whiffletree**) shares that pull between the 4 fingers and the thumb. So the fingers wrap around a bottle evenly. A second micro servo (**TR**) on the back of the hand swings the thumb.

BAGS. Bag 12 (left hand), bag 13 (right hand), bag 14 (pins, pads, string). Servos: L_TR, R_TR.

SAFETY. Tiny parts. Work over a tray. Open one pin mini-bag at a time.

NOTE. Inside the bags, left-hand parts are named `R6_...` and right-hand parts `L6_....` Go by the **bag label**: bag 12 = left hand, bag 13 = right hand.

Step 1: fingers

1. Each finger has 3 segments. Join them with 2 mm pins (bag 14).
2. Each pin mini-bag is marked with its length. The right pin sits flush on both sides.
3. Every joint must swing freely. Then pin each finger to the palm.

Step 2: thumb

1. Fit the soft thumb link and the thumb hub on the thumb pulley.
2. Join the 3 thumb segments with pins.
3. Drop servo **L_TR** into the pod on the back of the hand. Fit the thumb pulley on its shaft (servo centred). Snap the pod cover on.

Step 3: strings

1. Cut one string per finger and one for the thumb from the 2 m card.
2. Thread each string from the fingertip down through the channel inside the segments to the palm.
3. In the palm, tie the 5 strings to the whiffletree. Run the main string out through the wrist to the forearm.
4. **FS spool** (in the hand bag): cut the 4 arms of a micro-servo cross horn to 6.5 mm. Push it into the pocket under the spool. Centre L_FS, press the spool onto its shaft, fit the screw. Thread the main string through the hole in the spool and knot it inside.

5. Close the palm with the palm back cover.
6. With FS at "open", the fingers are straight and the main string is just tight.

Step 4: grip pads

1. Clean the grip faces. Stick on the 12 pre-cut pads per hand (palm, finger and thumb pads).
2. A pad that comes loose: one drop of CA glue.

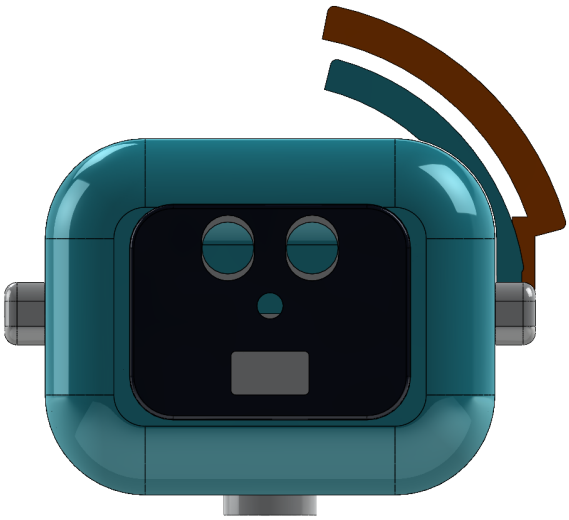
Step 5: hand onto the wrist

1. Trim a micro-servo cross horn: cut its 2 long arms to 10 mm from the centre (flush cutters, file smooth).
2. Centre L_WR. Put the horn on the wrist spline, press the palm's cross pocket onto it, hand straight. Fit the screw.

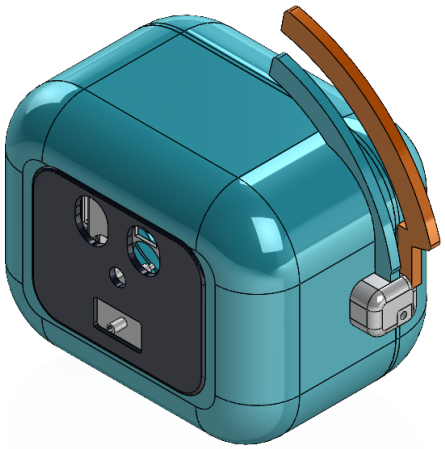
Now build the right hand the same way.

CHECK. Switch on, open the app, close and open the hand (MOVES > HANDS). All fingers move together.

13. Build: head



Head, front



Head

BAGS. Bags 01–05, head set pocket, bag 07 (the ESP32-S3 brain), bag 10 (neck loom in the harness).

Step 1: open the head set

1. Take off the round back cap. Tilt the face shell forward off the core.

Step 2: brain and sensors on the core

1. Press the **ESP32-S3 brain** (bag 07) onto its posts on the back of the core, its USB-C ports toward the back cap.
2. Slide the ultrasonic eyes (bag 02) in behind the front plate, the two round cans pointing forward.
3. Put the camera on its posts, lens through its hole.
4. Put the OLED face on its posts, screen forward.
5. **ADULT STEP:** heat-stake the brain, camera and OLED posts (as in chapter 10).
6. Fit an ear light (bag 03) in the window on each side, LED facing out.
7. Slide a microphone onto the pad on the outside of each side wall, sound hole facing out.

Step 3: neck

1. Press the **6806ZZ bearing** (bag 04) onto the neck turret under the core.
2. Thread the neck loom up through the wire hole in the core floor, one plug at a time.
3. Leave about **70 mm** of loom as a loose loop below the core. This lets the head turn.
4. Plug the loom and each sensor into the brain.

Step 4: face and ears

1. From inside the face shell, push the dark **face plate** (bag 01) into its opening.
2. Push each **ear tab** into its hole until it clicks. The left tab has the arc posts.
3. Push the two soft **Wi-Fi arcs** (bag 05) onto the posts: cyan inside, orange outside.

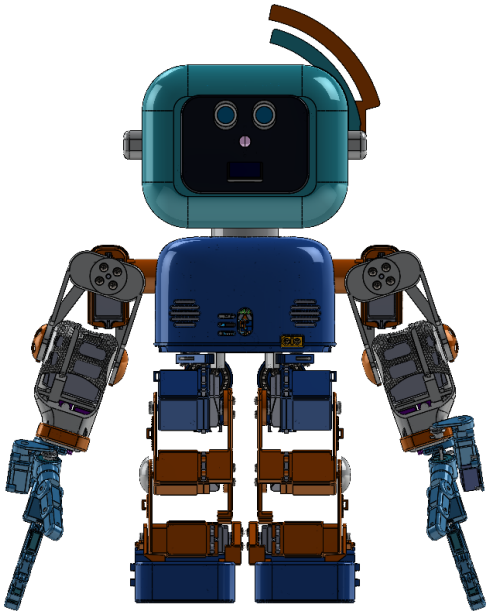
Step 5: close the head

1. Slide the back cap onto the 2 rear pins of the core.
2. Hook the face shell under the top hooks of the core. Swing the chin down until the 2 chin snaps click.

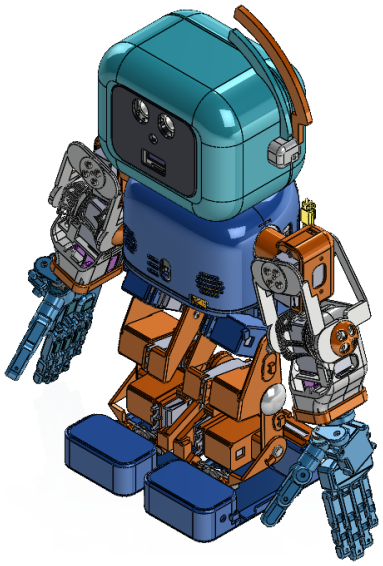
Step 6: head onto the torso

1. Centre NK. Trim the micro-servo cross horn (2 long arms to 10 mm).
2. Put the head's bearing into the neck seat on top of the torso. The horn keys into the cross pocket under the turret. Head facing forward. Fit the screw.
3. Lead the loom down through the chest slot. Tie it.
4. Turn the head by hand to both sides (power off). The loom must not pull or rub.

14. Final check and first stand-up



THARVIN, assembled



THARVIN, assembled

Final check

☐	Check
☐	Every snap clicked. Every horn has its centre screw.
☐	No cable is pinched in a joint. Cable loops at every joint.
☐	Every servo plug on its port, brown wire on GND.
☐	All 3 packs connected. XT60 together.
☐	Move each joint gently by hand (power off). Nothing rubs.
☐	THARVIN lies **on its back on the floor**.

First stand-up

1. Switch on (1 tap). Join the Wi-Fi, open the app (chapter 15).
2. Hold THARVIN lightly by the torso.
3. Tap **STAND UP** in the app (or say "Hey Tharvin, stand", or hold the power button 1 s).
4. THARVIN stands up slowly.

Trim (fine-tune the joints)

If a leg is not straight or a foot is not flat:

1. Open **? > MORE > CLASSIC CONTROLLER**.
2. Send `balance off`, then `stand`.
3. Send small trims, for example `trim L_AR 1` or `trim L_AR -1` (degrees).
4. Repeat until the legs are straight, the feet flat and the head looks ahead.
5. Send `balance on`, then `save`. Trims are kept when you switch off.

> **TIP.** A joint that needs more than 10° of trim has its horn one tooth off. Refit the horn (chapter 7).

15. The phone app

THARVIN makes its **own Wi-Fi**. Your phone joins it. No internet and no router are needed.

The THARVIN controller

Get the app

Phone / computer	How
Android	install the **THARVIN app (THARVIN.apk, version 1.5)** from **theluckgsolutions.com/tharvin** (app page). Allow "install unknown apps" when Android asks.
iPhone / iPad	join THARVIN's Wi-Fi, open **Safari**, go to **192.168.4.1**, tap Share > **Add to Home Screen**.
Windows PC	install **THARVIN_Windows_Setup.exe** (THARVIN Controller + Flasher). Drive with the **keyboard and mouse** (table below); STOP is always top right, or press **Esc**.
Any browser	join THARVIN's Wi-Fi, open **http://192.168.4.1**. No install.

The **App Install Guide** has every step with pictures.

Keyboard and mouse (laptop / PC)

On a laptop or PC (THARVIN Controller for Windows, or a desktop browser) you drive with the keyboard and mouse. The keys do exactly what the on-screen sticks and buttons do.

Key	What it does
W / S	walk forward / back
A / D	side-step left / right
Left / Right arrow	turn left / right
Up / Down arrow	head looks left / right
Shift (hold)	RUN (with W)
Space	main action of the play mode
K L J I	buttons A B X Y
U / O · N / M	LB / RB · LT / RT

Key	What it does
1 – 8	A, B, X, Y, LB, RB, LT, RT
Numpad 8 / 4 / 6 / 2	D-pad up / left / right / down
F1 – F5	TACTIX / CRUISER / STREET / BLITZ / CORE DUEL
Tab	next play mode
R	REL: let go of a held pose
G	AUTO on / off (beta: floor only, stay nearby)
V	MOVES list
Esc or **X**	**STOP**, always, on every screen
? or H	show this key list on the screen
Mouse	click any button, drag the sticks, mouse wheel on a slider

GOOD TO KNOW. Let go of the walk keys and THARVIN stops walking. If you click into another window while driving, THARVIN stops. Each button shows its key in the corner.

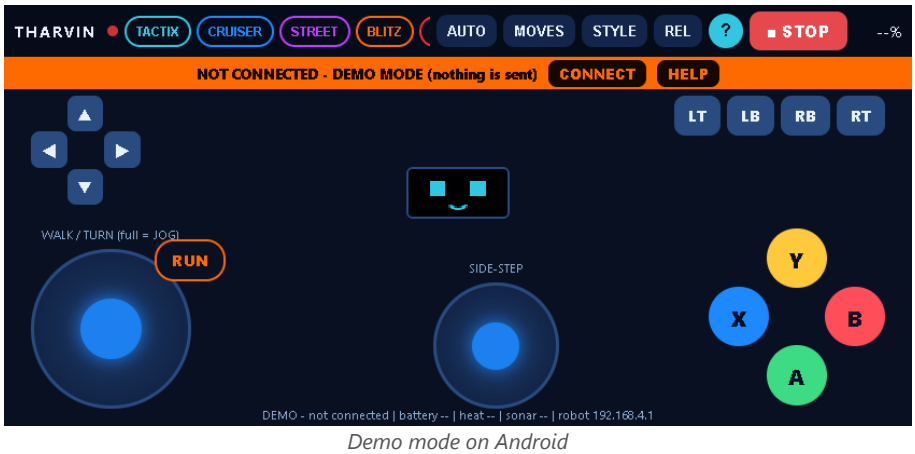
Connect

1. Switch THARVIN on. The face shows **THARVIN-xxxx** and the password.
2. Phone **Settings > Wi-Fi** > join **THARVIN-xxxx**. Type the password from the face.
3. "No internet"? Tap **Stay connected** / **Keep**.
4. Open the app. The dot at the top turns **green** = live.
5. Turn the phone **sideways**: two thumbs, two sticks.

GOOD TO KNOW. Each robot has its own password. Up to 2 phones can join at once.

Demo mode (works offline)

Without the robot, the app opens in **DEMO MODE** (orange banner). Every screen, menu and help page works, so you can learn the controls. Nothing is sent. The app goes live by itself when THARVIN's Wi-Fi is there.



Demo mode on Android

16. Controls and games

Sticks

Control	What it does
Left stick up / down	walk forward / back. A little = slow, all the way = fast
Left stick held all the way forward	THARVIN speeds up into a **jog**
Left stick left / right	turn
Right stick left / right	side-step (crab walk)
Let go of both sticks	finishes its step and stops
RUN (hold)	jog at the speed of the left stick

Top bar

Button	What it does
STOP (red)	stops everything at once. On every screen.
TACTIX ... CORE DUEL	the 5 game modes (the ears change colour)
MOVES	every move, in groups: CLASSIC, HANDS, STANCES, DANCE, FIGHT ...
STYLE	how THARVIN walks (see below)
AUTO	AUTO mode (see below)
REL	lets go of a held pose
?	help, quick start, CLASSIC CONTROLLER

The 5 game modes

The buttons A B X Y, LB RB, LT RT and the arrows (D-pad) change with the mode.

Button	TACTIX	CRUISER	STREET	BLITZ	CORE DUEL
A	bob	jab	jab	bob	lunge
B	crouch stance	cross	hook	crouch stance	shove
X	reload	bob	bob	reload	jab
Y	aim	drive pose	elbow	barrier	palm blast
LB	peek left	phone	robot pop	throw ready	block
RB	peek right	fight stance	fight stance	dome	core stance
LT	aim pistol	wave	shuffle step	aim	dodge left
RT	fire!	pick up / put down bottle	disco point	fire!	dodge right
up	heal	salute	beckon	heal	core burst
down	go low	shrug	point	wave	low punch
left	ping	beckon	shake no	spin left	combo finisher
right	throw	point	nod yes	spin right	uppercut

Moves like fire, barrier and dome are **poses** (THARVIN acts them out).

Secret combos

Press the buttons quickly, within **1.2 seconds**. Arrows = U D L R. The face says **SECRET!**

Combo	Move	Combo	Move
D D B	moonwalk	R U Y	dab
X Y X Y	robot dance	L R L R	floss
U U A	victory flip	Y Y D	freeze
L R L B	taunt beckon	U X U X	wave arms
L B B Y	taunt chest	L L L A	spin
D R A	kung-fu stance	Y X B A	signature
U D A	kung-fu salute	D A A Y	power up

Stealth walk (sneak)

THARVIN has 17 walking styles. Three are sneaky: **stealth**, **sneaky** and **cartoon sneak**. They are slow, low, careful steps.

1. Tap **STYLE**.
2. Choose **walk_stealth**, **walk_sneaky** or **walk_cartoon_sneak**.
3. Walk with the left stick. THARVIN keeps that style until you choose another.

By voice: say **"Hey Tharvin, sneak"** (or "Hey Tharvin, walk quietly"). Back to normal: "Hey Tharvin, normal walk".

AUTO mode (beta)

In AUTO mode THARVIN plays by itself: it walks around, looks around with its head, does moves and reacts to people.

SAFETY: AUTO IS BETA. Floor only. Stay nearby and watch it. **It can fall**, and it can bump into things. Clear thin chair legs, glass and anything fragile away.

Start: tap **AUTO** > **START AUTO**. Or press **R3** (click the right stick) on the gamepad. Or tap the power button **2 times** (chapter 17).

Stop: touch either stick or any button, or tap **STOP**. Or press R3 again. THARVIN stops at once.

Settings (AUTO panel, saved in the robot):

Setting	Range	Start value
Explore radius (how far from its start point)	50–400 cm	150 cm
Time	0 (no limit) – 60 min	10 min
Curiosity (reacts to what the camera sees)	off / low / normal / high	normal
Sound	on / off	on
Edge guard (edge sensor)	on / off	**on: keep it on**

The **edge sensor** helps THARVIN stop at table edges and stairs (chapter 18). AUTO is still for the **floor** only.

If THARVIN falls in AUTO and cannot get up, it shows a sad face and calls for help. Stand it up by the body and hold it upright for 1.5 s. If you lift it, it stops at once.

Bluetooth gamepad

Any **BLE** gamepad in "Xbox mode" works. Put the pad in pairing mode near THARVIN. It connects by itself. The phone can stay connected too.

Gamepad	Does
Left stick	walk + turn (click while pushing = run)
Right stick	side-step

Gamepad	Does
A B X Y, LB RB, LT RT, D-pad	the mode buttons and secret combos
START	next game mode
BACK / SELECT	let go of a pose; press again = stop
L3 (click left stick)	get up after a fall
R3 (click right stick)	AUTO on / off

Older Bluetooth pads (PS4, PS5, Switch Pro) do **not** connect. They are not BLE.

Voice: "Hey Tharvin"

Always say **"Hey Tharvin"** first, then the command. It works offline (English).

Say "Hey Tharvin" and then	THARVIN
"walk forward" / "turn left" / "come here"	walks
"stand up" / "sit down" / "get up"	stands, sits, gets up
"kick" / "front kick" / "side kick"	kicks
"dance" / "robot dance" / "moonwalk"	dances
"say hello" / "bow" / "high five"	waves, bows ...
"sneak" / "march" / "jog"	changes how it walks
"TACTIX mode" ... "core duel mode"	changes the game mode
"bowl" / "go bowling"	bowls
"battery level" / "what is your name"	answers
"stop"	stops

SAFETY. Voice is not a safety stop. To stop THARVIN fast, use the **STOP** button in the app, BACK on the gamepad, or tap the power button 3 times. A plain "stop" without "Hey Tharvin" is not heard reliably.

NOTE: EXPERIMENTAL EXTRAS (NOT VERIFIED). Chat with an online AI needs your own online AI key and the internet. It is not tested and is not part of what THARVIN is sold with.

The play set

Game	How
Kick	put the light-blue kick ball in front of a foot. Press the kick button or say "Hey Tharvin, kick".
Ten-pin bowling	stand the rack on the floor, the single front tube nearest THARVIN, the head pin **1.05 m** in front of its toes. Drop a pin into each tube, lift the rack straight up. Hold the grey ball in THARVIN's open right palm until the fingers close (about 0.4 s), then let go. Say "Hey Tharvin, go bowling".
Cricket bowling	use an empty 60–65 mm plastic bottle with a little water (100–150 g). Put the 4 corner markers (bag 21) on a 30 × 30 cm square in front of THARVIN as the target zone. Say "Hey Tharvin, bowl".
Carry a bottle	CRUISER mode, RT = pick up / put down. THARVIN walks with the bottle. Only a 60–65 mm bottle up to 150 g.

17. Power button

The power button is the small round button on the **back** of the torso.

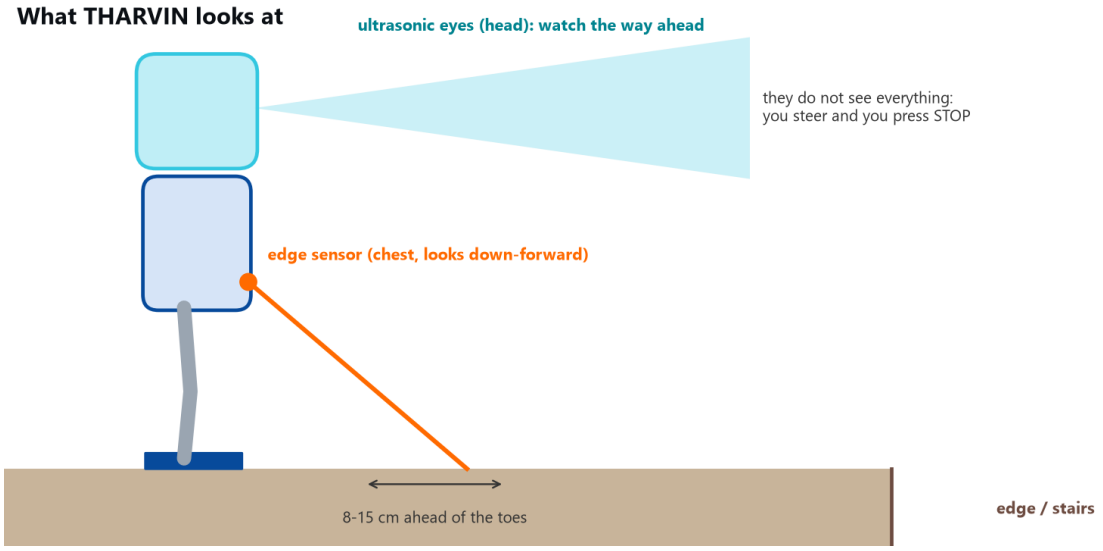
You do	THARVIN does
Press (when off)	switches on, limp, shows READY
Hold 1 s (when limp)	stands up
1 tap	**safe off**: says bye, saves everything, sits down, relaxes the motors, switches off
2 taps	next mode: READY → AUTO → DEMO (dance) → READY. The face and ears show the mode.
3 taps	STOP and sit down (AUTO / DEMO off)
Hold 10 s	factory reset (below)
Hold 15 s	emergency power cut for a frozen robot. Nothing is erased.
Pull the XT60 plug apart	everything off at once (storage, and before working inside)

TIP. Taps must be quick (under 0.6 s each, close together).

Factory reset

1. Hold the button. From 2 s THARVIN sits down. The face counts down and the ears flash red.
2. Let go before 10 s = cancelled.
3. At 10 s, let go. The face asks to confirm and offers a backup in the app.
4. Press once more within 30 s to erase. No press = cancelled.
5. It erases learned moves, names, maps, photos and settings. It **keeps** the servo calibration (trims).

18. Edge sensor and ultrasonic eyes



What THARVIN looks at

Edge sensor (chest)

A small laser distance sensor (VL53L0X) in the lower chest looks at the floor **8–15 cm ahead of the toes**.

- When the floor drops away (a table edge, a stair), THARVIN **refuses to walk forward** and backs off.
- It is **on** by default. You can switch it in the AUTO panel ("edge guard") or with the command `edge on` / `edge off`.
- In tests on the computer model it stopped at the edge **160 times out of 160**.
- It only looks **forward**. Walking backwards is allowed only over floor it has just walked on.
- Dark rugs and shiny tiles are hard to see. THARVIN then walks slower.

SAFETY. The edge sensor is a safety net, not a licence to play on tables. Always play on the floor.

Ultrasonic eyes

The two round "eyes" in the head are an ultrasonic distance sensor. They **watch the way ahead** and tell THARVIN how far away things are.

- They do not see everything: thin chair legs, glass and soft cloth are hard for them.
- Do not count on them to stop THARVIN. You steer, and you press **STOP**.
- If something is very close in front of the eyes, the face may say "blocked ahead" and THARVIN will not walk forward. Move it away.
- No jogging when something is close in front.

19. Care for servos

Servos are the muscles of THARVIN. Treat them well and they last.

- **Never force a joint by hand** while THARVIN is on. Never hold a leg or arm while it moves.
- **Let it rest.** "WARM" or "TOO HOT" on the face, blue ears, sleepy face = the servos are warm. It rests by itself. Wait a few minutes.
- **No jumping, no stairs, no sand, no water.** Hobby servos are not made for that.
- **Low battery = weak servos.** Charge when the ears turn orange.
- **A servo buzzes or gets hot standing still:** switch off. The joint may push on a stop. Re-centre and refit the horn (chapter 7), then trim (chapter 14).
- **After a hard fall:** check every horn screw. Tighten a loose one.
- **Switch off** before you carry THARVIN for a long time or put it in its box.
- **Keep it clean.** Dust and hair in the joints make the servos work harder.

Spare parts

Bag 20 has a spare 20 A fuse, ear LED, power button and 4 grip pads. Bag 18 has 4 spare M3×6 screws. Every printed part can be reprinted in the same material and colour. For spare servos and packs, contact support (chapter 23).

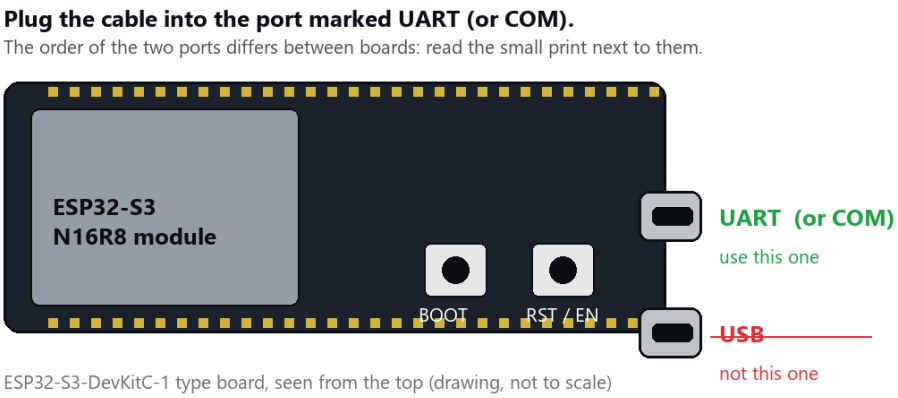
End of life

Electronics and battery packs go to an e-waste or battery collection point. Never put packs in household waste.

20. Updating the code

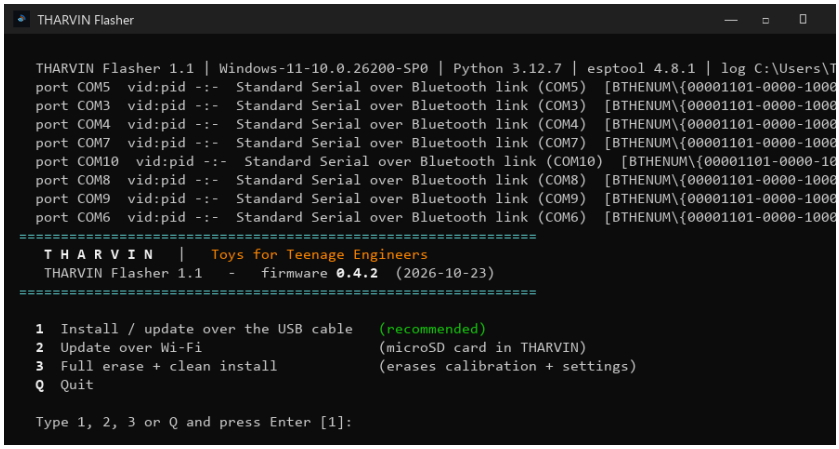
The robot's code is called **firmware**. THARVIN comes with firmware 0.4.3 loaded. New firmware versions add features and fixes.

The **Insert Code Guide** (5 pages, with pictures) has every step. In short:



The brain board: use the UART port

1. On a Windows PC, install **THARVIN_Windows_Setup.exe**.
2. Switch THARVIN off. The brain sits in the back of the head: take off the round back cap. Plug a USB-C **data** cable into the port marked **UART** (not the one marked USB).
3. Start **THARVIN Flasher**, type **1**, press Enter.
4. Wait for the big green **OK**. Do not unplug during the update.
5. Switch on. The face shows READY. Your trims and settings are kept.



The Flasher menu

> **TIP.** No COM port found? Install the USB driver named in the guide. Board not answering? Hold BOOT, tap RST, let go of BOOT, try again.

Want to write your own code? The firmware is C++ on the Arduino framework (PlatformIO). The Insert Code Guide shows where the source is.

21. Troubleshooting

Problem	Likely cause	What to do
Nothing happens at the power button	XT60 apart; battery flat; fuse blown	Push the XT60 together; charge; check the 20 A fuse (adult).
Switches on, then off	battery low	Charge.
Face shows CHECK PARTS	a plug is loose	See the table in chapter 7.
Face shows NO IMU: NO WALK	tilt sensor not found	Check its plug. Walking is off for safety.
Face shows CHECK NTC	heat sensor not connected	It still works. Ask an adult to check the wire.
No THARVIN-xxxx in the Wi-Fi list	still starting; 2 phones already joined	Wait for READY; disconnect the other phone.
App stays in DEMO MODE	phone left the robot's Wi-Fi	Re-join THARVIN-xxxx; tap Stay connected; mobile data off.
One servo does not move	plug on the wrong port or turned round	Check the sticker, port and brown wire (chapter 6).
Servo buzzes or gets hot	horn one tooth off; joint on a stop	Re-centre, refit the horn, trim (chapters 7, 14).
Leans or falls when standing	trims not set; low battery	Trim and save (chapter 14); charge.
Stays down after a fall	soft or uneven floor, low battery, or old firmware	Stand it up gently by the body; charge; check that it runs firmware 0.4.2 or newer (chapter 20).
Will not walk forward	edge sensor sees an edge, or something is very close in front of the eyes ("blocked ahead")	Move it away from the edge or the object.
Walks slowly, no jog	battery low, servos warm, or something within 80 cm	Charge; let it rest; clear the way.
Refuses to walk	it holds the bottle	Put the bottle down (RT in CRUISER).
Fingers do not close / open	string slack or too tight	Re-tension the string (chapter 12).
Bottle slips out	pads dirty or bottle too heavy	Clean the pads; bottle max 150 g.
Gamepad will not connect	not a BLE pad	Use a BLE pad in Xbox mode.
"Hey Tharvin" not heard	noise; too far	Speak closer, or use the app.
Ears flash red, countdown on the face	power button held	Let go before 10 s.
Does not charge	cable not fully in the port on the back; adapter off or too weak	Push the USB-C plug in fully; try another phone charger.
Battery hot, smelly or swollen	damaged pack	**Pull the XT60 if safe, move away, call an adult.** Never charge it again.

22. Specifications

Item	Value
Height / mass	about 40 cm / about 3.1 kg
Servos	25: 18 × DS3235 (35 kg·cm, 270°) + 7 × MG90S micro servos
Brain	ESP32-S3 N16R8 (16 MB flash, 8 MB PSRAM) in the head; 2 × PCA9685 servo boards in the torso
Sensors	tilt sensor (MPU6050), edge sensor (VL53L0X), ultrasonic eyes (HC-SR04), camera (OV7670), 2 microphones (INMP441)
Face, lights, sound	0.96 in OLED face, 2 LED ears, amplifier + 29 mm speaker
Battery	8 × LG MJ1 18650 3,500 mAh in 3 packs (torso 2S2P, 2 shoes 2S1P), 7.2 V
Charger	2S 8.4 V USB-C charger built into the torso; USB-C charge port on the back (cable in the box)
Play time	about 3 h mixed play (simulation)
Control	own Wi-Fi (THARVIN-xxxx, up to 2 phones), BLE gamepad, voice "Hey Tharvin" (offline, English), power button
Moves	150+ moves and dances, 17 walking styles, 5 game modes
Safety	STOP < 0.1 s, low-battery cut, heat protection, fuses, fall detection, edge sensor
Printed parts	219 pieces (PETG, PLA+, TPU)
Firmware / app	firmware 0.4.3 (C++, Arduino framework); app 1.5
Age	14+

23. Warranty and support

THARVIN - Toys for Teenage Engineers by THELUCKg Solutions, Mysuru

Item	Details
Brand	THARVIN - Toys for Teenage Engineers
Maker	THELUCKg Solutions (Trade name: THARVIN)
Address	#7, Prashanthi, 2nd Cross, E Block, SBM Colony, Bogadi, Mysuru, Karnataka - 570026, India
GSTIN / Udyam	29PDYPS1998K1ZQ / UDYAM-KR-22-0155633
Customer care	+91 76765 85706, Mon–Sat, 10 AM – 6 PM IST
Customer care e-mail	tharvintoysforteenageengineers@gmail.com (also theluckgsolutions@gmail.com)
Manuals, app & support	theluckgsolutions.com/tharvin
Product	THARVIN humanoid robot kit (SKU A Complete Kit / SKU B Ready-Built Robot)
Serial number	on the serial label on the box and on the serial + warranty card
Warranty	**6 months** on electronics, servos and battery packs against manufacturing defects; **30 days** on 3D-printed parts against defects or damage in transit
Not covered	wear parts (servo horns, grip pads, tendon line), misuse, falls from height, water, wrong charger or charging, opened battery packs, modified firmware or hardware

How to make a warranty claim

1. Find the serial number: the serial label (QR) on the box, or the serial + warranty card.
2. E-mail the serial number with photos or a video of the fault to **tharvintoysforteenageengineers@gmail.com**.
3. We answer during care hours: Mon–Sat, 10 AM – 6 PM IST.

Returns

Case	What happens
A part is missing or damaged in transit	report it within **48 hours** of delivery with an **unboxing video**: free replacement
Unopened kit	return it within **7 days** of delivery; you pay the return shipping
Opened kit	not returnable; faulty parts are replaced under the warranty
Refund	within 7–10 working days after we receive the return

When you contact support, have ready: the serial number, the firmware version (? > MORE > CLASSIC CONTROLLER), what happened, and a photo or video.

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