

ASSEMBLY GUIDE

Q500 Frame Kit

American Made. NDAA Compliant.

Carbon-fibre frame with four tube arms, twin-skid landing gear and an under-slung payload rail.



The completed Q500 airframe.

This guide takes the frame from a bag of parts to the complete airframe shown above. It is built in two stages: three sub-assemblies you make first (the landing-gear legs, the motor arms and the payload rail), and then a main-frame stage where everything bolts to the carbon main plate. The whole build is M3 screws, lock nuts and printed fittings – there is nothing to glue.

The Build at a Glance

Step	What you do
1	Landing-gear legs – make 2

Step	What you do
2	Motor arms – make 4
3	Payload rail – make 1
4	Leg sockets and legs onto the main plate
5	Standoffs and top plate
6	Payload rail onto the main plate
7	Arm mounts and arms – fit 4
8	Final checks

1 • Before You Start

Fastener rules – these apply to every step

- Every screw is M3, and every one is a socket-head cap screw – only the length changes from step to step, so sort the hardware by length before you begin. (Some screws are drawn with domed heads in the pictures; ignore that – they are all socket heads.)
- Every nut is an M3 nylon-insert lock nut. The only screws that don't take a nut are the eight M3 × 12 screws in Step 5, which thread into the standoffs.
- Snug, not tight. Carbon-fibre plates crack and tubes crush if you overtighten. Run each lock nut down until the nylon collar engages, then tighten until the parts are just firmly together. The lock nut does the rest.
- Tighten in pairs and diagonals. Wherever a fitting has four screws, take them all to finger-tight first, then snug them in a cross pattern so the fitting pulls down evenly.
- Through-bolted tubes. The leg T-pieces and the leg sockets are locked to their tubes by a screw that passes right through the fitting and the tube. Push the tube fully home, then rotate it until the cross-holes in the tube line up with the holes in the fitting before you push the screw through.

Tools

- 2.5 mm hex key or driver (all screws)
- 5.5 mm spanner or nut driver (M3 lock nuts)
- A soft mat or towel to protect the carbon while the frame is upside down

Reading the pictures

Each step has an exploded view of the parts and hardware for that step. Screws are drawn pulled back along the direction they go in, and the loose nuts are drawn on the side they end up on – so if the nuts are below a part in the picture, that's where they go. The frame views in Steps 4 and 6 are drawn with the frame upside down (legs pointing up) so you can see the underside; the text tells you which way up to work.

2 • Parts List

Check everything off before you start. Quantities are for one complete frame.

Frame parts

Part	Qty	Notes
Main plate (carbon)	1	Large octagonal plate with four rectangular cut-outs
Top plate (carbon)	1	Smaller slotted plate; sits on the standoffs
Standoff, M3 female-female	4	Between the main plate and top plate
Arm tube (carbon)	4	—
Arm mount (printed)	4	Bolts under each corner of the main plate
Motor mount (printed)	4	Fits on the outer end of each arm
Motor plate (carbon)	4	Bolts on top of each motor mount
Leg socket (printed)	2	Angled socket; bolts to the underside of the main plate
Leg upright tube (carbon)	2	The long tube of each leg
Skid tube (carbon)	2	The tube that touches the ground
Leg T-piece (printed)	2	Joins the upright to the skid
Skid end cap	4	Push-on caps for the skid ends
Rail plate (carbon)	1	Slotted plate at the bottom of the payload rail
Rod clamp (printed)	4	Gusseted saddles that hold the rods
Rail rod (carbon)	2	The two parallel rods of the payload rail

Hardware

All screws are M3 socket-head cap screws (2.5 mm hex). All nuts are M3 nylon-insert lock nuts.

Item	Qty	Used in
M3 × 12 socket head	16	Step 4 — leg sockets (8); Step 5 — standoffs (8)
M3 × 16 socket head	16	Step 2 — motor mounts (8); Step 3 — rod clamps (8)
M3 × 18 socket head	16	Step 2 — motor mounts
M3 × 20 socket head	8	Step 6 — payload rail
M3 × 30 socket head	10	Step 1 — leg T-pieces (8); Step 4 — leg sockets (2)
M3 × 35 socket head	16	Step 7 — arm mounts
M3 nylon-insert lock nut	74	Every step except Step 5
Total screws	82	—

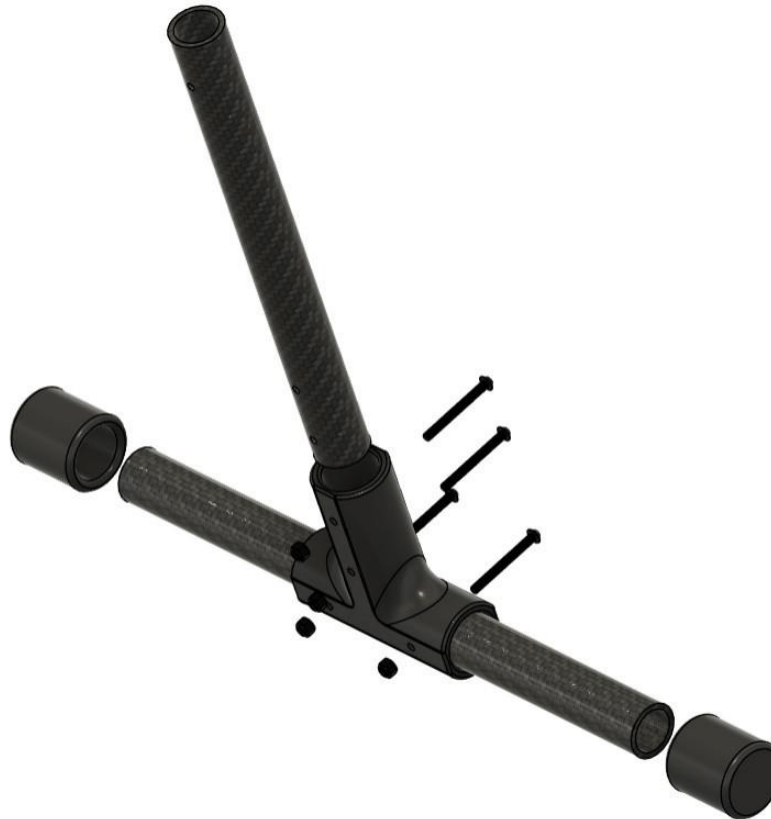
Tip Lay the hardware out in labelled piles by length now. Every step tells you exactly which screws it uses, and a wrong length is the most common build mistake: too short and it won't reach the nut, too long and it fouls the part behind.

3 • Assembly – Part A: Sub-Assemblies

Build these three first. They are independent of each other, so the order doesn't matter.

STEP 1

Landing-gear legs – make 2



One leg: upright tube, T-piece, skid tube and two end caps, with the four M3 x 30 screws and their lock nuts.

Parts: 1 leg T-piece, 1 upright tube, 1 skid tube, 2 skid end caps – per leg.

Hardware for this step

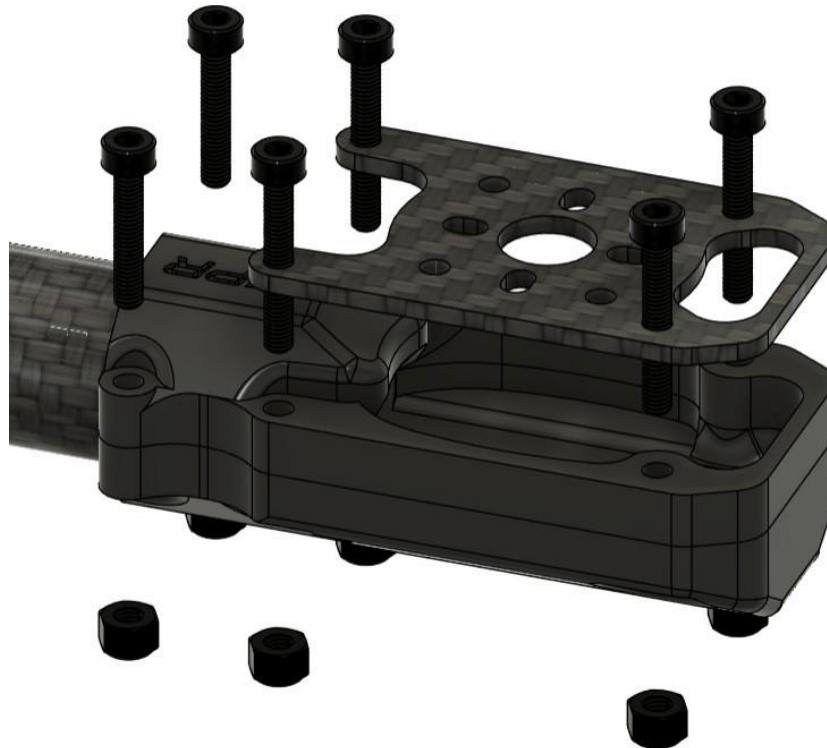
Item	Per leg	Total (2 legs)
M3 x 30 socket head	4	8
M3 lock nut	4	8

1. Push the upright tube into the round socket of the T-piece until it bottoms out. Rotate the tube until its cross-holes line up with the holes in the socket. The upright has a second set of cross-holes near its free end – those are for the leg socket in Step 4, so leave that end clear.
2. Slide the skid tube through the cross-bore of the T-piece and centre it, with the same length of tube either side of the T. Rotate it until its cross-holes line up with the holes in the T-piece.

3. Push the four M3 × 30 screws through the T-piece, passing through the tubes, and fit a lock nut on each on the far side. Tighten until the T-piece grips both tubes firmly — no further.
4. Push an end cap onto each end of the skid tube.
5. Build the second leg the same way. The two legs are identical.

STEP 2

Motor arms – make 4



One motor mount: the arm tube enters the socket on the left; the carbon motor plate sits on top with six screws through it and lock nuts underneath.

Parts: 1 arm tube, 1 motor mount, 1 motor plate – per arm.

Hardware for this step

Item	Per arm	Total (4 arms)
M3 × 18 socket head	4	16
M3 × 16 socket head	2	8
M3 lock nut	6	24

1. Push one end of the arm tube into the socket of the motor mount until it bottoms out. The other end of the tube stays bare – it goes into the arm mount on the frame in Step 7.
2. Sit the motor plate on top of the mount with its holes lined up. The narrow slotted tab on the plate goes at the outer end, away from the arm.
3. The mount is taller at the arm end, so the longer screws go there: drop the four M3 × 18 screws through the four holes nearest the arm, and the two M3 × 16 screws through the two holes at the outer end.

4. Fit a lock nut to each of the six screws under the mount. Take them all to finger-tight, then snug them in a cross pattern until the plate sits flat on the mount and the arm can't twist in its socket.
5. Repeat for the other three arms. All four should be identical.

Tip *If you're going to fit anything in the recess under the motor plate (an ESC, for example), do it now — once the plate is bolted down the recess is closed.*

STEP 3

Payload rail – make 1



The payload rail: two carbon rods held in four gusseted clamps on the slotted rail plate. The screws go up from under the plate; the nuts sit on top of the clamps.

Parts: 1 rail plate, 4 rod clamps, 2 rail rods.

Hardware for this step

Item	Per clamp	Total (4 clamps)
M3 × 16 socket head	2	8
M3 lock nut	2	8

1. Set the four rod clamps on the top face of the rail plate, one at each corner, with their saddles facing up and their screw holes over the holes in the plate. The two clamps on each side must face the same way so their saddles line up.
2. Push two M3 × 16 screws up through the plate into each clamp from underneath, and fit a lock nut on top of each. Leave them a turn loose for now.
3. Push a rod into the saddles of the two clamps on each side. Set both rods so they overhang the plate by the same amount at each end – or wherever your payload needs them.
4. Square everything up so the rods are parallel and the clamps sit flat, then tighten all eight nuts.

Note Remember which face the clamps are on. In Step 6 the whole rail turns over and bolts to the underside of the frame with the rods facing the main plate, so the rail plate becomes the lowest part of the airframe.

3 • Assembly – Part B: The Main Frame

Everything now bolts to the main plate. Step 4 is done with the plate upside down on the mat; after that the frame can stand on its own legs for the remaining steps.

STEP 4

Leg sockets and legs onto the main plate



Frame shown upside down. Each leg socket bolts to the underside of the main plate with four M3 × 12 socket heads; the M3 × 30 screw passes sideways through the socket and the upright.

Parts: Main plate, 2 leg sockets, and the 2 legs from Step 1.

Hardware for this step

Item	Per leg	Total (2 legs)
M3 × 12 socket head	4	8
M3 × 30 socket head	1	2
M3 lock nut	5	10

1. Lay the main plate on the mat, underside up (the underside is the face the leg sockets and payload rail bolt to; the standoffs and top plate go on the other face).
2. Set a leg socket over each of the two leg positions – the four-hole pattern on opposite sides of the plate that matches the socket's flange. The sockets are angled: turn each one so it leans outward, away from the centre of the plate, so the legs will splay out.
3. Bolt each socket down with four M3 × 12 socket heads through the flange, and lock nuts on the other side of the plate. Finger-tight, then snug in a cross pattern.

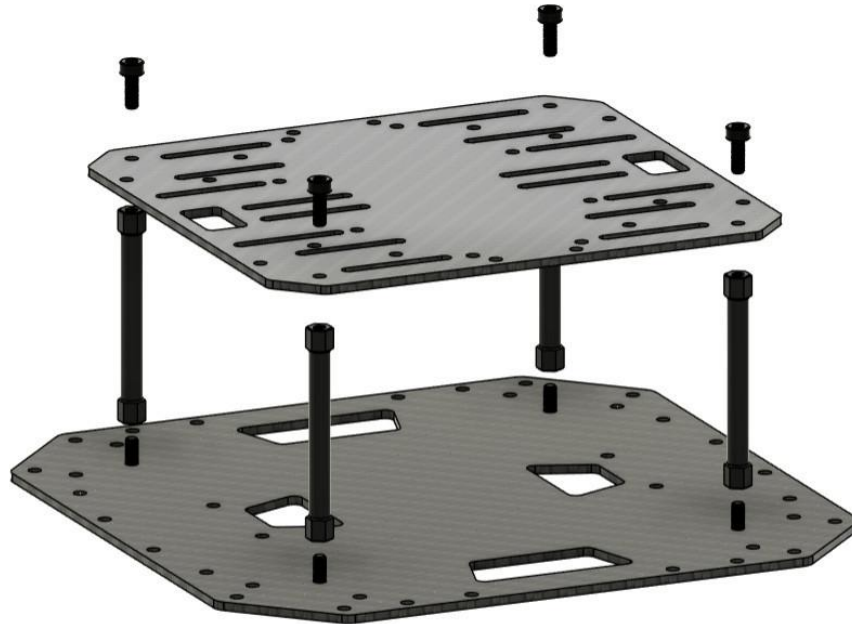
4. Push the upright of one leg into its socket until it bottoms out, and rotate it until the cross-holes near the top of the upright line up with the cross-hole in the socket. The skid should end up running parallel to the nearest edge of the plate.
5. Push the M3 × 30 screw through the socket and the upright from the outside, and fit a lock nut on the inside. Snug only.
6. Fit the second leg the same way. Check that both skids are parallel and the same height.
7. Turn the frame over and stand it on its legs. From here on it can stand on its own for the remaining steps.



Both legs fitted, frame still upside down.

STEP 5

Standoffs and top plate



Four standoffs between the main plate and the top plate. Four M3 × 12 screws come up from under the main plate; four more go down through the top plate.

Parts: 4 standoffs, top plate.

Hardware for this step

Item	Per standoff	Total
M3 × 12 socket head	2	8
M3 lock nut	none	none

1. Stand the four standoffs on the top face of the main plate at the four inner holes that match the corner holes of the top plate.
2. Fix each standoff with an M3 × 12 socket head driven up from the underside of the main plate. Hold the standoff with your fingers so it doesn't spin. These screws thread straight into the standoffs – no nuts.
3. Sit the top plate on the standoffs and fix it with the other four M3 × 12 socket heads from above. Snug is enough.

Tip Step 6 puts eight lock nuts on the top face of the main plate, directly under the top plate. There is room to get a spanner in between the plates, but if you'd rather have the top face clear, fit only the standoffs now and add the top plate as the very last step.

STEP 6

Payload rail onto the main plate



Frame shown upside down. The rail turns over so the rods face the main plate; eight M3 × 20 socket heads go through the rail plate and the main plate, with the lock nuts on the top face of the main plate.

Parts: The payload rail from Step 3.

Hardware for this step

Item	Per corner	Total
M3 × 20 socket head	2	8
M3 lock nut	2	8

1. Turn the rail over so the rods face upward toward the frame, and offer it up to the underside of the main plate, centred, with the rods running front to back (parallel to the skids). The rods end up between the rail plate and the main plate, and the rail plate is the lowest part of the frame.
2. Line up the two holes at each corner of the rail plate with the matching holes in the main plate.
3. Push the eight M3 × 20 socket heads up through the rail plate and the main plate — the heads stay on the rail plate — and fit a lock nut to each on the top face of the main plate.
4. Take all eight to finger-tight, check the rail is square to the frame, then snug them evenly.

Tip Push all eight screws through the rail plate first and hold them there with a strip of tape over the heads. You can then offer the whole rail up with one hand and start the nuts with the other.

STEP 7

Arm mounts and arms – fit 4



One corner: the arm mount sits under the corner of the main plate and takes four M3 × 35 socket heads from above; the arm pushes into the round socket.

Parts: 4 arm mounts, and the 4 motor arms from Step 2.

Hardware for this step

Item	Per arm	Total (4 arms)
M3 × 35 socket head	4	16
M3 lock nut	4	16

1. Drop four M3 × 35 socket heads down through the four holes at one corner of the main plate.
2. Push an arm mount up onto the screw tips from below, with its round socket pointing outward from the corner, away from the centre of the frame. Fit a lock nut to each screw under the mount. Finger-tight, then snug in a cross pattern.
3. Push the bare end of a motor arm into the socket until it bottoms out, with the motor plate facing up and level. Make sure it is fully home – the socket is what holds the arm.
4. Repeat for the other three corners. Sight across the frame: all four motor plates should be level and at the same height.

Tip Bolt the mount to the plate before you fit the arm – it is much easier to push the arm home against a mount that is already fixed than to juggle both at once.

STEP 8

Final checks



The completed frame.

Go over the whole frame once before you fit any electronics:

- Every screw has its nut. 82 screws, 74 lock nuts — the only screws without a nut are the eight M3 × 12 in the standoffs. Each nut should show at least a thread or two of screw through the nylon.
- Arms. All four are fully home in their sockets and the four motor plates are level with each other.
- Legs. Both uprights are pinned in their sockets, the skids are parallel, and the frame sits flat on a level surface without rocking.
- Payload rail. Centred, square to the frame, rods parallel, all eight nuts on the top face of the main plate snug.
- Top plate. All eight M3 × 12 screws in; the plate doesn't rock on the standoffs.
- Nothing overtightened. No cracked printed fittings, no crushed tube ends, no bowed carbon around a nut.

The airframe is complete. Motors bolt to the four motor plates; the slotted top plate and rail plate take straps or ties for the electronics and battery.

Contact

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