APEX by Holzmodellbau Schweiger assembly instructions (version 3.0)

Some important notes in advance:
Please read these assembly instructions and safety precautions carefully before starting assembly and proceed step by step.

Ensure that you understand and can follow the individual construction steps. This kit is suitable for children aged 14 and above. Construction and operation only under the direct supervision of adults.

The flight model is suitable for use in RES competitions and for slope and thermal flying in calm weather.

Caution: High flight speeds are not permitted. At high altitudes and in windy conditions, the flight speed may not be correctly estimated.

The manufacturer accepts no liability for damage caused by non-intended use.

A non-intended use is, among other things, to assemble the kit differently, or to use the flight model differently than it is described in this assembly instructions. The building instructions and further information can be found on our website:
www.holzmodellbau-schweiger.de

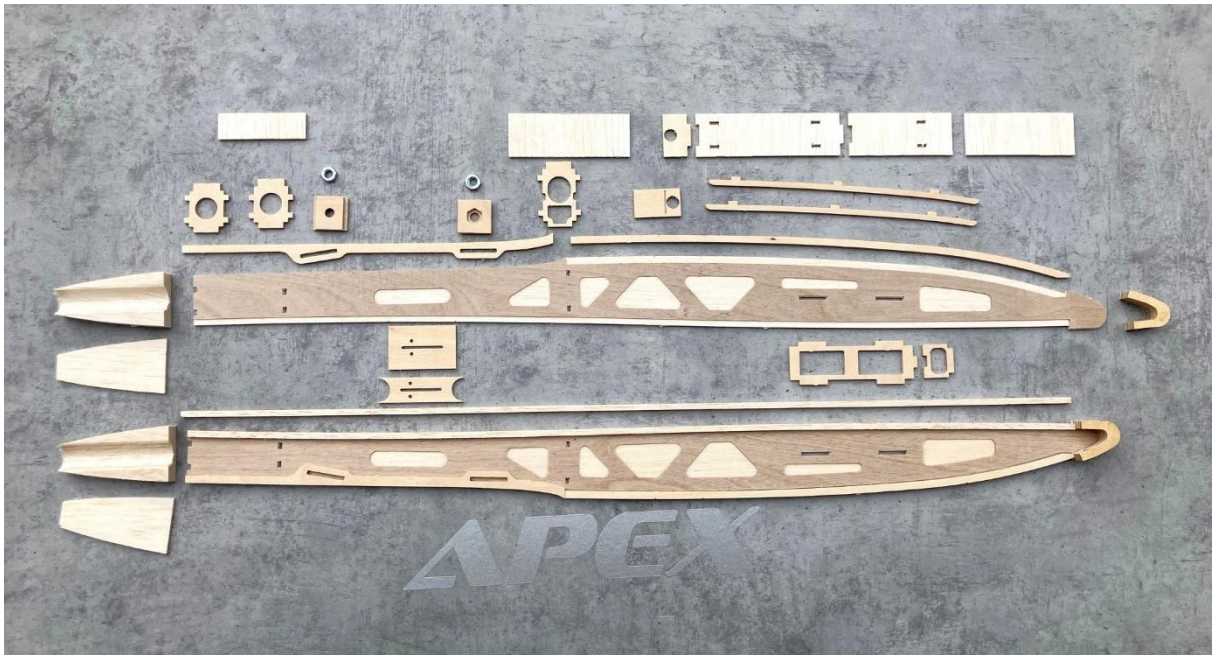
When building the model, observe all safety regulations when handling tools and adhesives. We use thick and thin superglue for the assembly of the model, unless otherwise specified. Attention must be paid to the clean bonding of the components.

- The operation of model aircraft of this type requires model aircraft liability insurance.
- Do not operate the model in adverse weather conditions (thunderstorms, strong winds, etc.)
- Do not operate the model near power lines or airports.
- Do not operate the model if it itself or the built-in components are damaged.

We will be happy to answer any questions you may have:
holzmodellbau-schweiger@outlook.com

Description fuselage:

Picture 1 shows all the parts that are required for the construction. The parts are arranged in the picture as they are installed. The 0.6mm plywood reinforcement R2 is already glued to the balsa side R1 with white glue.



Picture 1

As you can see in **Picture 2**, we use a roller for this. Then press the parts together for several hours. Care must be taken to build a right and a left side panel. The white glue gives the time needed to align the parts exactly. The roller allows for an even, thin application.

Picture 2

In the next step, the balsa strip R24 is glued flush to the fuselage sides at the bottom. Then the wing support made of plywood R3 and the canopy reinforcement R4 are glued flush to the fuselage sides at the top. In the case of part R3, care must be taken to remove any adhesive that may escape from the slots for the holder of the surface screw connection.

The two plywood fuselage tips R22 are glued to the side panels, as can be seen in the following **Picture 3**.

Picture 3

Note: the fuselage is the same width from the tip of the fuselage to the frame R9 and should therefore be built sideways on the construction board. This is the only way to ensure a distortion-free assembly. The frames R7, R8 & R9 have a small notch on the top for orientation.

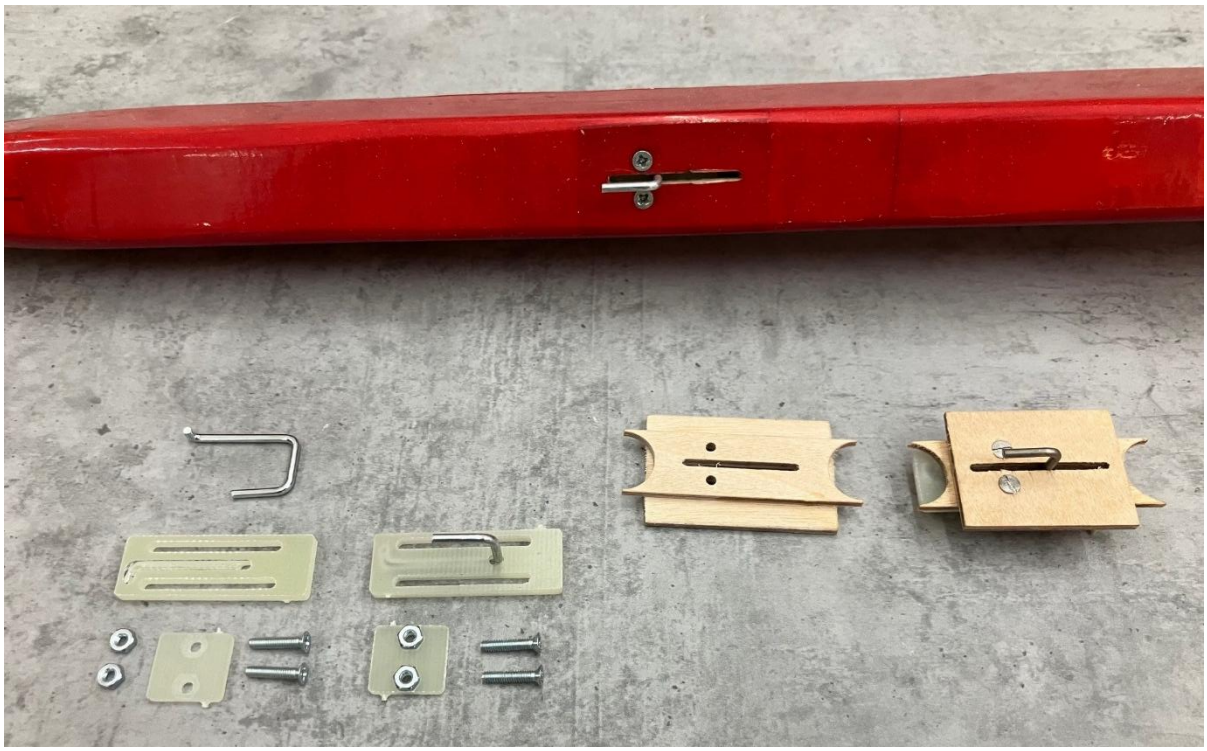
The two M5 nuts are glued into the 4mm plywood parts for the R23 surface screw from the accessory package.

Tip: sand the nuts on one side first to ensure secure bonding (with **UHU Plus Endfest*)**, for example).

All parts are plugged together, aligned and glued together lying sideways on the building board. The two plywood parts for the R23 surface screw connection are only inserted into the grooves and not glued. The frame R9 is also not glued, as it will be attached to the fuselage tube later. As you can see in **Picture 4**, the two plywood parts R10 and R11 can be glued together for the high start hook. It is important to ensure that the holes and slots are exactly on top of each other.

Tip: I use a greased 2mm drill bit as an aid, which I put through a hole for adjustment.

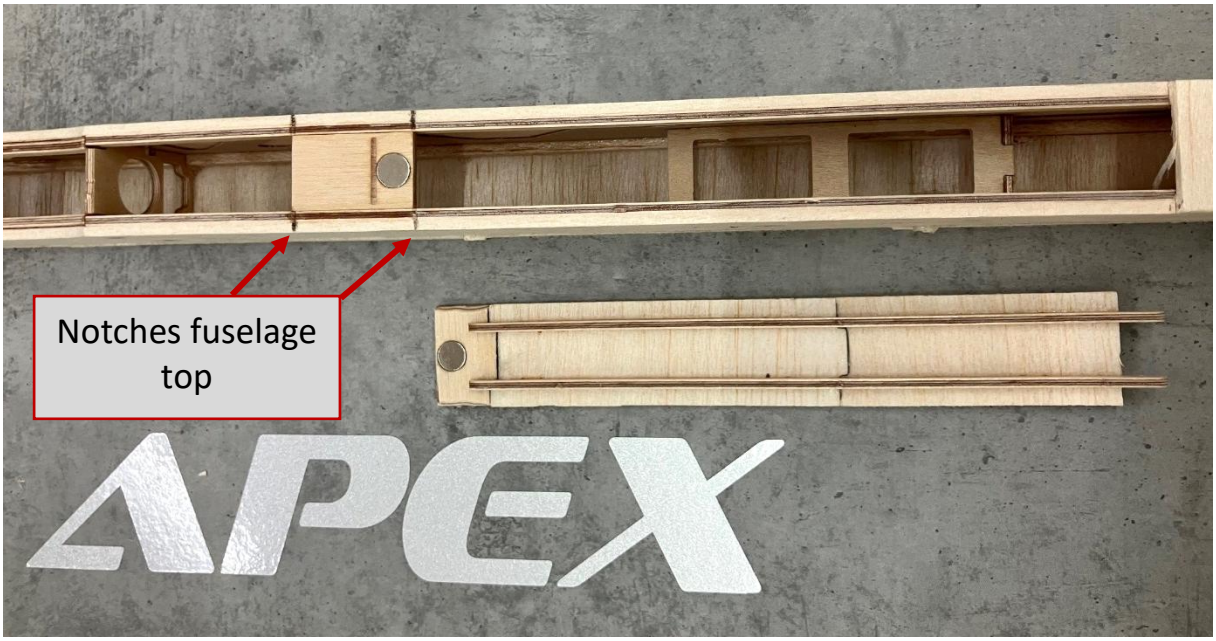
*** UHU Plus Endfest**: *UHU Plus Endfest Dual-Barrel Cartridge 50ml extrudes both parts of UHU's ultra strong epoxy adhesive in perfectly measured ratios from a user-friendly cartridge. UHU Plus Endfest has a working time of approximately 90 minutes. It is solvent free and used in model making, kit building, art and craft projects, repair and restoration.*



Picture 4

For the next step, the fuselage remains lying sideways on the building board. The two fuselage sides R1 have two small notches on the underside. These show the exact position for the plywood part R10. Part R10 is glued to the fuselage between the two markings, so that the two holes in R10 point towards the end of the fuselage. At the same time, part R11 is in the fuselage. Care must be taken to ensure clean bonding, as high loads occur at this fuselage site. The bottom of the fuselage is then closed from the tip of the fuselage to the high start hook board with the R25 balsa parts. The fuselage end remains open until the tail boom is glued in.

Let's continue with the top of the fuselage:
First, we glue a magnet (diameter 7mm) flush into the milling in the plywood part R12. Part R12 is the counterpart for the magnet in the canopy. There are three notches on the fuselage sides for orientation in the canopy area. Between the two markings at the canopy end, we glue the R12 part flush with the top. The magnet points to the tip of the fuselage. From the tip of the fuselage to the first mark, part R17 is glued to the top of the fuselage, as shown in the following **Picture 5**.

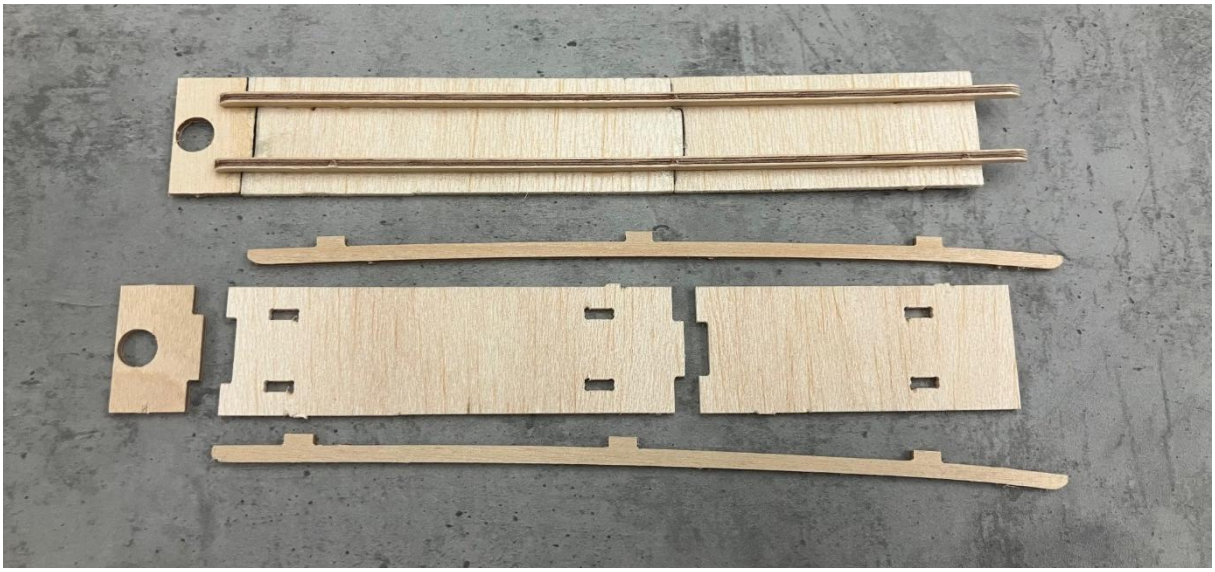


Picture 5

Canopy:

For the canopy, the balsa parts R14 and R15 as well as the plywood part R13 and the two stiffeners R16 are required, as they can be seen in **Picture 6**. First, the two balsa parts (R14, R15) are glued to the plywood part R13. Then the two R16 stiffeners are placed on the canopy and glued so that they protrude towards the fuselage tip. The canopy is inserted into the fuselage opening provided for this purpose.

The conclusion of this work is the gluing of the magnet into the canopy. It is important to pay attention to the correct polarity, as the magnet was already glued into the fuselage in the previous step. The component R17 is not yet glued to the top of the fuselage, as this makes it easier to set up the push rods. At the end, the hull, together with the canopy, is roughly sanded with sandpaper (grit 150 and finer).



Picture 6

Fuselage tube and pylon:
The fuselage tube made of CFK can be wet smoothed with water sandpaper. We recommend a grit of 400 or finer here. For the end of the fuselage, the components shown in **Picture 7** are needed: Four CFRP rods with a diameter of 2mm, two pieces each for the pylon, length 30mm and two pieces for the rudder, length 60mm. In addition, parts P1 and P2 (8mm balsa), P3 (0.6mm plywood) and the M3 nut.

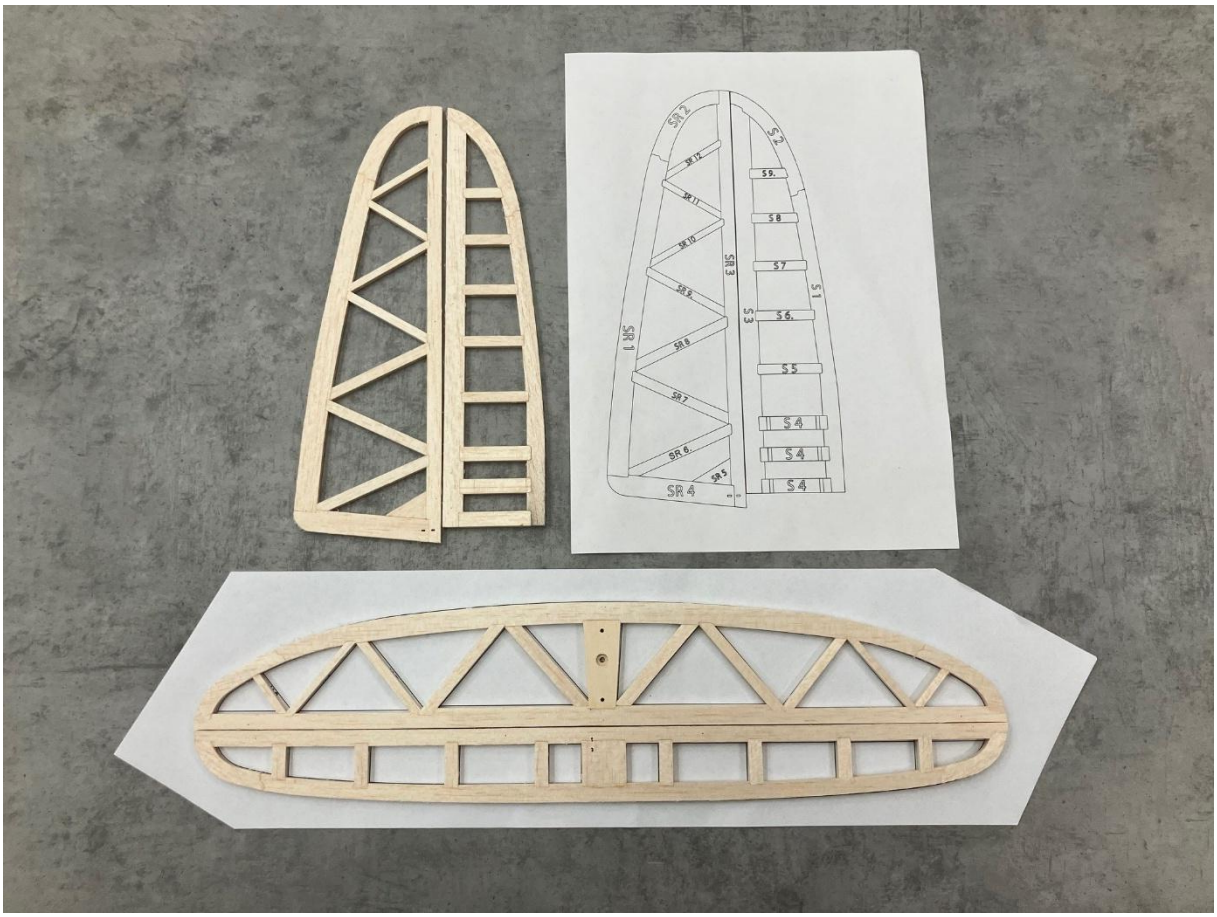
Picture 7

First, the M3 nut is glued into part P2. We proceed as follows: The milling in P2 for the nut is hardened with low-viscosity superglue. Then the nut is pressed into the grooved groove provided for this purpose and secured with some glue.

The fuselage frame R9 is now attached to the fuselage boom. The top of the fuselage tube is the side with the cut-outs (on the left, upper side) for the push rods. Insert the four carbon rods, the two shorter ones are for the pylon and protrude about 19mm upwards from the fuselage tube. The longer carbon rods for the rudder protrude about 48mm upwards from the fuselage tube.
Here, special care must be taken to ensure that the carbon rods align with the center of the axle of the fuselage. Otherwise, the finished tail unit cannot be parallel to the fuselage axis.

The pylon part P1 can now be attached and glued. For the P2 component, make sure that the M3 nut points downwards. Attach component P2 as well and glue it together. Only the component P3 must not be glued yet, as this will only happen later with the elevator.
The ends of the 4 carbon rods, which now protrude from the bottom of the fuselage boom, are carefully ground flat. Care must be taken to ensure that the fuselage tube itself is not damaged by grinding. Because even small damage weakens the hull boom considerably.

Rudder and elevator:
The 4mm balsa board with the parts for the elevator and rudder is needed for construction. The middle piece H3 for the screw connection of the horizontal stabilizer made of 4mm plywood is included in the accessory package. In addition, the three identical components S4 for the rudder are located on the 8mm balsa board. All components can be seen in **Picture 8**.



Picture 8

We assemble the elevator as follows:

- First, we attach the pictured parts for the framing of the tail unit to the blueprint (protected with foil) and glue them with a drop of low-viscosity superglue.
- Then we insert the remaining struts and glue them together as well.

The same procedure can also be used for rudder. Here we first staple the border together and then work our way up from the bottom to the top.

Tip: we harden the holes for the plug-in socket in the rudder. To do this, we insert a greased 2mm drill into the hole and put a drop of low-viscosity superglue on it.

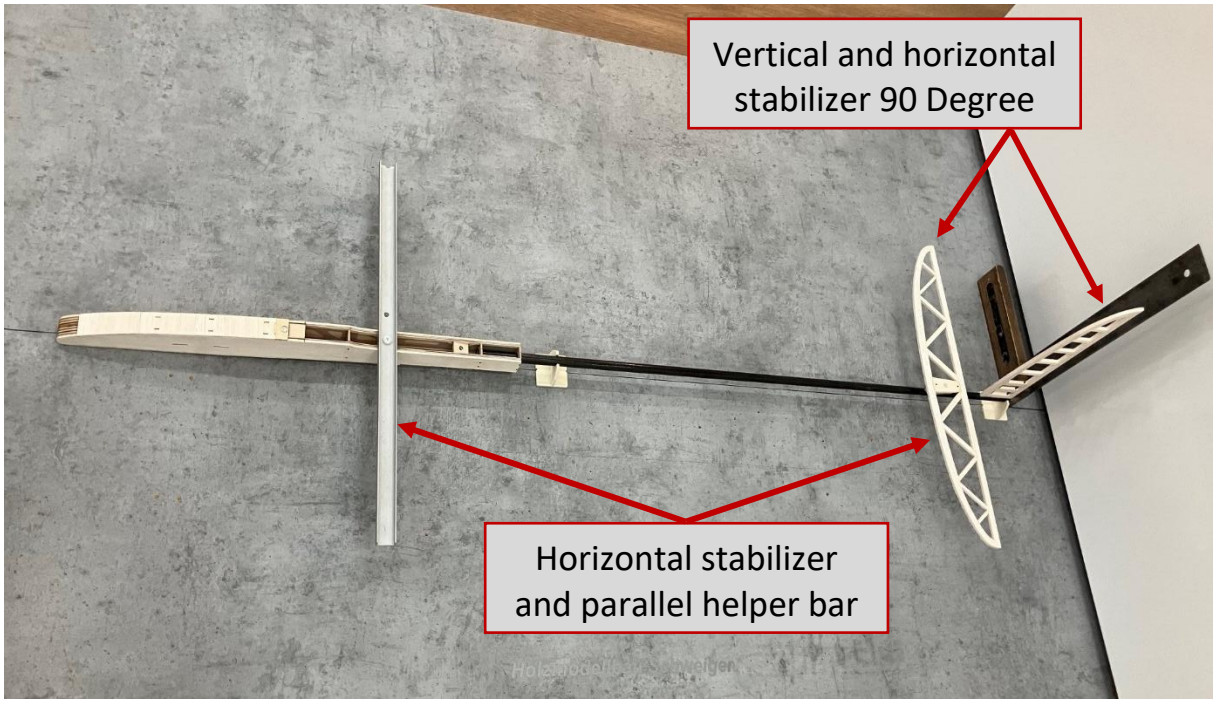
We also explain the structure of a similar tail in detail in our 4th tutorial:
https://www.youtube.com/watch?v=F4erVqr0to4

In the end, we put the rudder on the fuselage tube and screw the elevator onto the fuselage pylon. To do this, we put a little white glue on the fuselage pylon and glue the support extension P3 on it. Here again, it is important to make sure that the angle of elevator and rudder is exactly 90 degrees.

Tip: a lightly greased M3 steel screw helps with gluing so that it does not stick to the thread. We will go into more detail about the sanding of the tail unit in a later point.

Assembling the fuselage:
Now the hull tube can be joined to the hull boat. For this purpose, the surface support is checked again for protrusions to ensure a flat contact surface for the wing center section.

A straight line is drawn on the building board, reaching from the tip of the fuselage to the end of the fuselage. The two outriggers for the fuselage tube are positioned so that the support for the fuselage end is flush with the end of the fuselage boom. The second support is positioned 5cm behind frame R9. The hull tube is pushed into the hull boat so far that it protrudes 1mm from the frame R8. The hull frame R9, which was already threaded in the previous steps, can now be inserted (with the mark facing up) onto the end of the hull. This step is shown in **Picture 9** below.



Picture 9

A straight strip with a length of approx. 40cm, at an angle of 90 degrees to the fuselage axis is screwed onto the rear wing screw connection (this serves as an aid for alignment).

Now all parts can be aligned parallel to the drawn line. The fuselage tube lies neatly in the support feet; the fuselage lies flat with the fuselage tip on the building board and is in the middle of the line. The elevator is parallel to our screwed-on auxiliary rail. The fuselage side panels are pressed to the frame R9 with clamps.

Check the correct alignment again before gluing. The hull must lie in its support without tension. Only a correctly aligned fuselage ensures optimal flight characteristics.

When the hull boom is glued to the hull boat, the underside of the hull is closed with the balsa part R25. Between frame R8 and R9 the balsa part R19 is glued on the top.

One of the last works on the hull is now the transition from hull boat to hull tube, which will be carried out with parts R21 and R23. These are first glued and then adjusted to the end of the fuselage.

Grinding of fuselage and tail unit:
When grinding the hull, as just mentioned, we start with the transition from the hull boat to the hull boom. To do this, the hull boom must be taped off to avoid damage caused by grinding. Caution here: if the CFK tube as a fuselage boom is damaged by grinding, a predetermined breaking point occurs at this point.

First, the fuselage end is adjusted to the fuselage contour. We use an abrasive batten with a grit of 150.

Tip: Sanding salts can also be easily built from the balsa residues, to which we glue the respective sandpaper.

To achieve even curves at the desired fuselage edges, we first grind a 45-degree phase on them. These phases are easier to control for uniformity and help us maintain an even radius. Once the desired hull shape has been created, all wooden parts are sanded over again with a finer sandpaper (grit approx. 240) to obtain a smoother surface. Optionally, the underside of the fuselage can also be hardened in the front area with liquid superglue.

To grind out the trailing edge of the tailplanes, we use a special sanding batten, as can be seen in **Picture 10**. Dimensions approx. 25x10cm. The sanding batten is only half covered with sandpaper on one side.

Picture 10

Afterwards, a guideline is drawn on the elevator and rudder along the end bar, in the middle.

As you can see in **Picture 10**, we place the tail on an 8mm thick plywood for elevation. During the subsequent sanding of the tail unit (with the prepared sanding batten), it is now important to make sure that the sanding batten rests on the trailing edge of the empennage and the edge of the table. So, we sand the trailing edge to a point from both sides (approx. 1mm) except for our guidelines. Note: The further away the empennage is from the edge of the table on its elevation, the flatter the grinding angle on the trailing edge becomes.

In contrast to the two trailing edges of the elevator and rudder, which we have just sharpened, we grind the nose strip of the tail units round. To do this, we sand a phase on both sides of the nose strip of the tail that takes up about a third of the wood thickness. This phase, in turn, helps us to grind an even curve over the entire edge arch. When sanding the curve, it is important to make sure that a curve is created at the end. Note: A tapered nose bar of the tail unit has a negative effect on the flight characteristics.

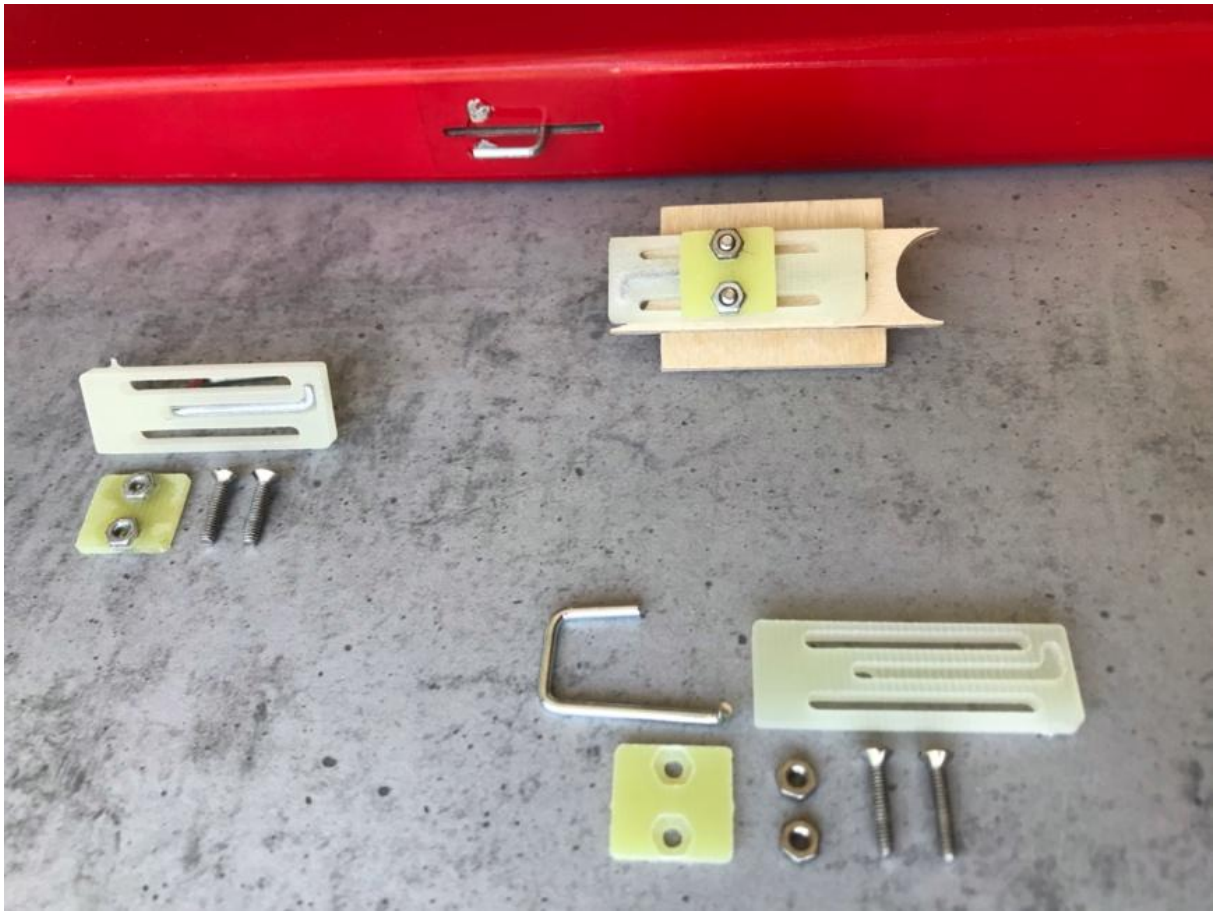
In the end, only the bevel for the rudder deflection is missing. In the elevator, the bevel is located on the underside of the tail, in the rudder on the left side, where the rudder horn will later be located. The level in the elevator must be sufficient to achieve a deflection of 10mm downwards. The rudder should be enough for 40 mm deflection in both directions.

We also explain the sanding of the tail in detail at the end of our 4th tutorial:
https://www.youtube.com/watch?v=F4erVqr0to4

High launch hook:
All parts for the assembly of the high launch hook are packed separately in the accessory package and are shown in the following **Picture 11**.

The hook and nuts are sanded to get a rough surface for gluing. They must then be cleaned with a grease-dissolving dilution. The parts themselves are glued with **UHU Plus Endfest**.

The finished high launch hook is only screwed in after the fuselage has been covered.



Picture 11

Installation of the push rod system:
The kit includes etched Teflon push rods with an inner diameter of 0.9mm. These are suitable for a linkage of 0.8mm. For the linkage itself, the two existing 0.8mm steel wires (length 110cm) are provided. As an optional accessory, 0.8mm CFRP rods (length 110cm) are also available on request. With this alternative linkage, weight saving of approx. 15-20g is possible.

To achieve a secure bonding of the push rods in the fuselage tube, we proceed as shown in **Picture 12**. One of the two 0.8mm steel wires is inserted into the push rod, which must be about 20mm back at the rear end of the push rod. This protrusion of the push rod over the steel wire is important so that the steel wire is not glued to the push rod later, should superglue escape from the fuselage boom.

The push rod is then inserted into the fuselage tube and fixed to the inside of the fuselage tube with the help of magnets.

Tip: the position of the push rods at the end of the fuselage boom is already specified by the milling. In the fuselage itself, however, the push rod should be placed in the middle of the height. This makes it easier to install a ballast chamber in the afternoon. It is also important to ensure that the push rod in the fuselage runs through the holes provided for this purpose in the R7 frame. In the same way, it must reach up to the servo board.

Now about 15 drops of low-viscosity superglue can be dripped along the push rod into the inside of the fuselage tube. So, the superglue runs down the push rod down the fuselage tube and glues it along the entire length. For this, however, the fuselage must also be held vertically when gluing.

Note: it is advisable to lay out a piece of newspaper at the bottom, as the superglue can drop out of the pipe.

Picture 12

Vorbereitung der Endleisten für die Tragflächen:
Before installation, the trailing edges are only adapted to the profile on the upper side and ground to a thickness of approx. 1mm. Here we again use the previously explained method (**Picture 10**) for grinding out the tail trailing edges. It is important to ensure that when grinding the trailing edges for the wing pieces B and C, a left and a right side are made.

The first and last ribs are placed on the trailing edge to mark the end of the ribs on it. Now the front part of the trailing edge that is not sanded out can be glued to our raised underlay with masking tape so that the trailing edge flushes with the edge of the underlay.
For the following sanding, a sanding batten is again necessary, which is only half covered with sandpaper on one side. With the side of the sanding batten, which is covered with sandpaper, the trailing edge can now be sanded evenly. By changing the distance of the pad to the edge of the table, we can influence the sharpening angle.

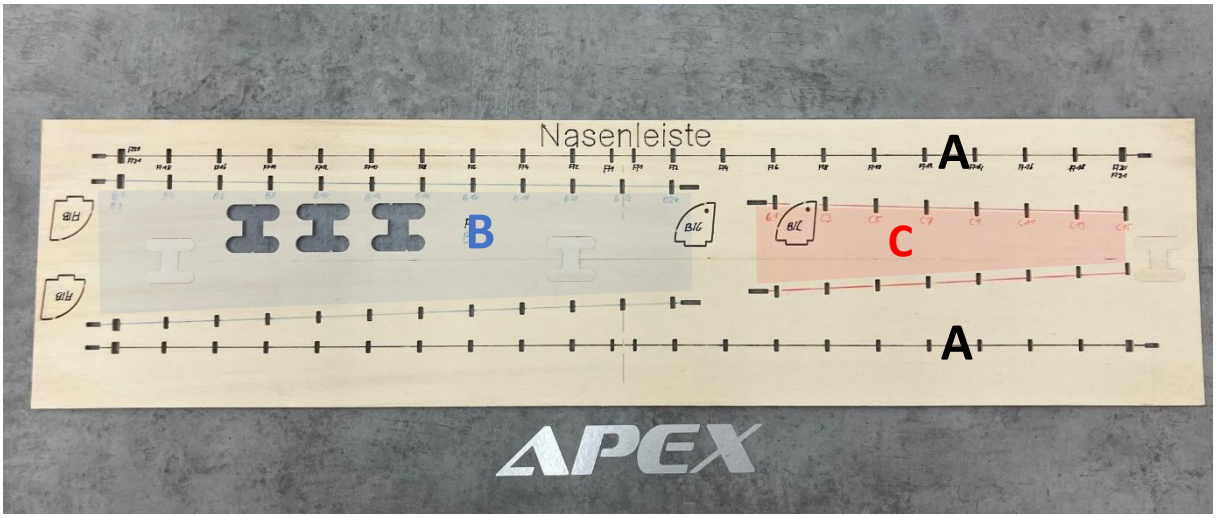
Tip: In our case, the height of the base corresponds to 5mm, so a distance of 5-6cm from the trailing edge to the edge of the table is required.

Another tip: When the trailing edge is almost finished, it is removed from the base and the back 5mm of the top is soaked with low-viscosity superglue. After hardening, it can be finished sanding.

Description of the wings:
Let's start with the slipway for the wings:
For these, we separate out the stops for the individual wing parts A, B, C. The two stops with one bore are for the transition of the wing parts B and C. The four stops without drilling are for the transition of wing sections A and B.
The construction slipway is then checked for possible milling residues in the slots and cleaned if necessary. Prepared in this way, it can be placed on a straight construction board and screwed in place to ensure that the slipway is mounted without distortion and flat to the surface.

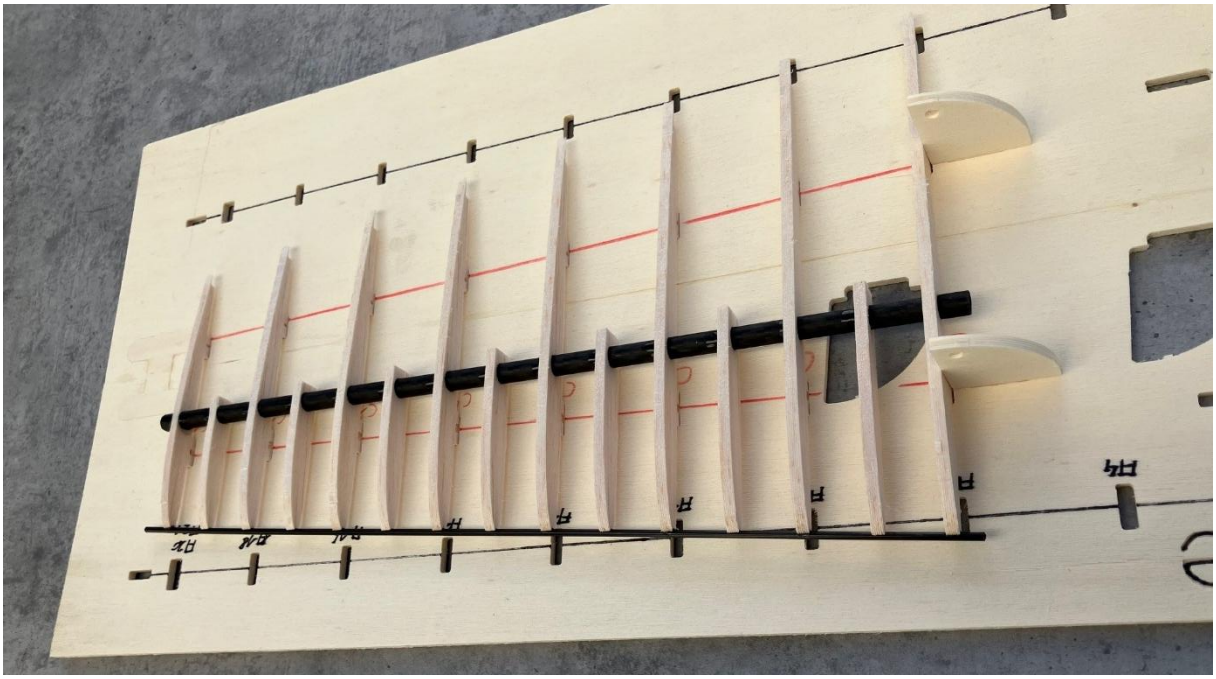
Wing part C:
On the building slipway, we mark the wing area C, because we want to start with it. In addition, the numbers of the individual ribs can also be labeled here. The order of numbering is ascending from the center of the wing. **Picture 13** shows the labeled building board.

The CFK tube (diameter 6mm) is cut to a length of 26cm and cleaned with a grease-dissolving thinner. From the two CFRP tubes (diameter 2mm, total length 70cm) a piece of 26cm is cut for wing part C and a piece of 40cm for wing part B. These cut-to-length CFK tubes are the nose strip for the respective surface pieces.



Picture 13

Now the individual ribs, ascending in order of numbering, can be carefully threaded onto the wing spar. The threaded surface ribs C1-C15 are aligned according to the distance between the construction slipways and carefully inserted into the slots provided for this purpose. The ribs can then be aligned exactly vertically with the rib comb. Make sure that the rib C1 is tilted to 5.75 degrees with the rib stop. This step is shown in **Picture 14** below.



Picture 14

At the end, we check the correct alignment of all ribs again and glue all whole ribs (not the half-ribs) to the tube.

Tip: for correct alignment, we use weights to fix the wing part cleanly. We use a low-viscosity superglue for gluing. Only rib C1 is not yet glued to the spar, as it can be more easily adapted to the following wing part B.

We use the 2mm CFK tube as the nose strip, which is carefully inserted into the milled openings provided for this purpose. First, the nose strip is glued only to the whole ribs. This means that the half-ribs can then be neatly aligned and glued together again with the comb.

Now the wing part C can be removed from the slipway and the support feet on the underside can be removed. The trailing edge is attached to the ribs from below, as the profile of the underside of the wing is straight in the rear area. This flat surface allows the wing part to be fixed on a building board covered with foil. Correctly aligned, the attached trailing edge can be glued to the wing.

Care must be taken to ensure that the rib C1 is glued at an angle of 5.75 degrees. This is ensured if the rib C1 lies neatly against the stop.
For the edge arch, the components C16 and C17 are required. The nasal ridge is removed after rib C13. Component C16 is fitted between the ribs C13 and C15. The half-rib C14 must be shortened accordingly. Then C16 is glued to the rib C15. After sanding the edge arch, the surface part C is completed for the time being, as can be seen in **Picture 15**.
To create the second surface part C, the slipway must be turned. This is the only way to build a left and a right-wing side.

Picture 15

Wing part B:
In principle, wing part B is constructed in the same way as wing section C, with particular attention to the exact preparation of the slipway and subsequent alignment. First, we cut the CFK tube with a diameter of 10mm, as well as the nose strip (CFK tube 2mm) to a length of

400mm. Both pipes are then cleaned with a grease-dissolving thinner. Glue the plywood rib B1 to B2.

Tip: For a precise fit, the two dowel pins can already be inserted into the 2.5mm holes. Make sure that a right and a left rib are built. Then the glued rib B1/B2 can be carefully placed on the spar to check whether the rib can be tilted 5 degrees. If this is not possible, the hole for the spar must be slightly reworked. We also check the rib B25 to see if it allows a slant of 5.75 degrees when attached to the spar. From now on, all ribs can be carefully threaded onto the spar and aligned one after the other. Once all ribs are aligned, all whole ribs are first glued to the spar with low-viscosity superglue. Thread the 2mm CFRP nose strip into the recesses and glue it to the whole ribs as well. The half-ribs now follow suit, which are aligned and glued.

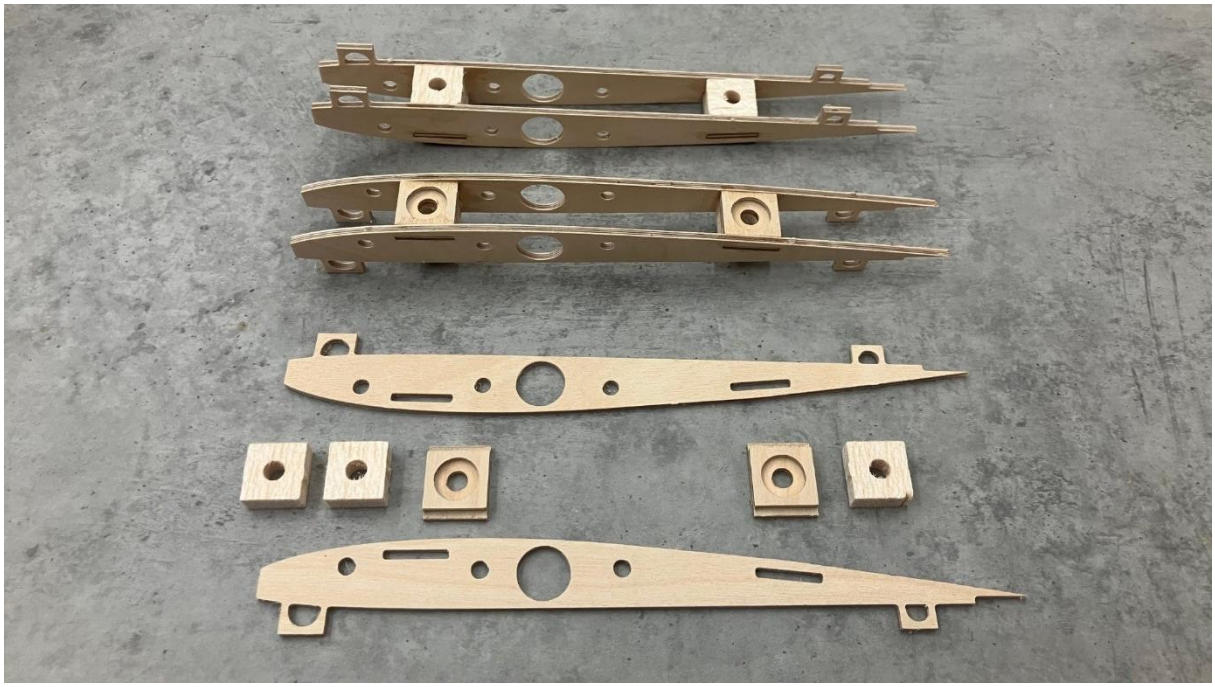
The surface part B can now be removed from the slipway, the ribbed feet can be separated, and the trailing edge can be attached, as shown in the following **Picture 16**.

Picture 16

Wing part A:
Cut the CFK tube with a diameter of 12mm and the nose strips (CFRP tube 2mm) to a length of 725mm. The plywood ribs A21 are glued to the balsa ribs A20 as before in wing part B, again making sure to make a right and a left rib.

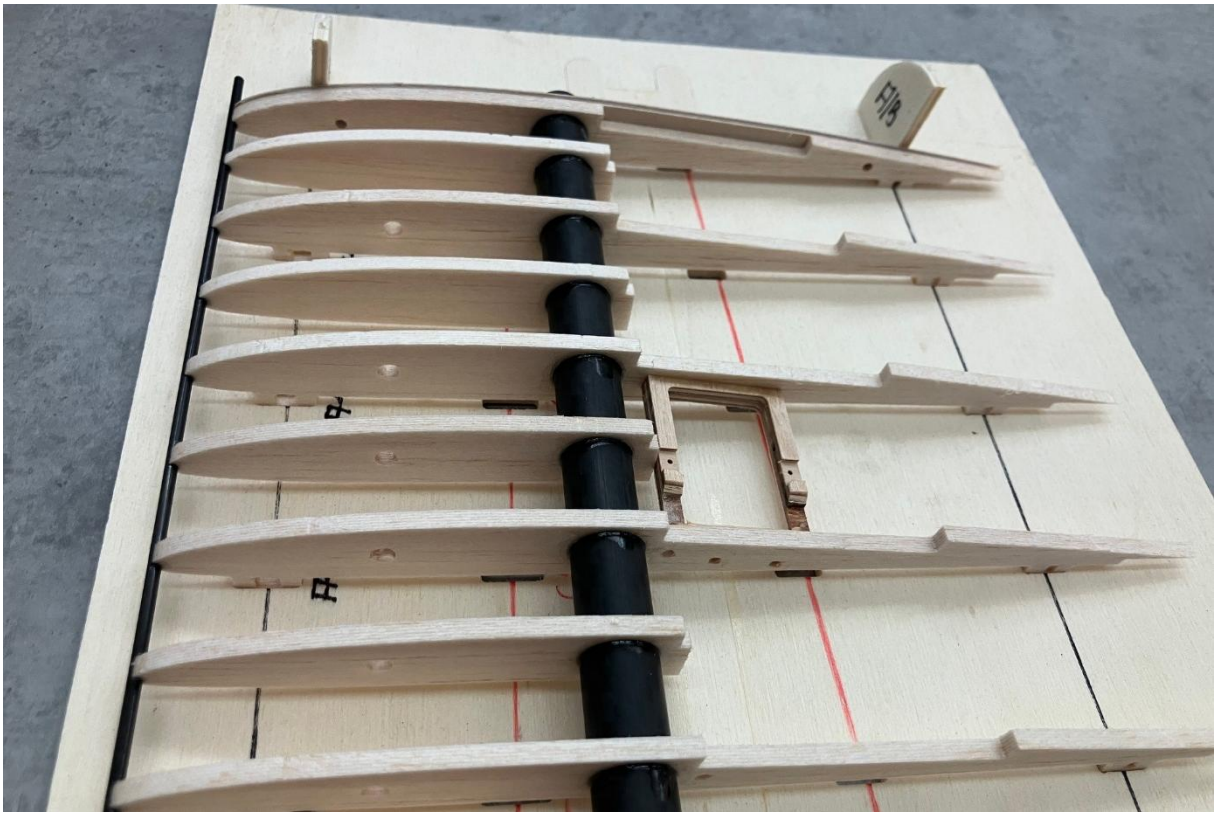
We start with the center piece for bolting the wing to the fuselage. For this we need the two plywood ribs A1, the three balsa parts A24 (6 mm balsa) and the two 4mm plywood parts A30 from the accessories. Parts A30 have a round recess for the screw head of the surface fitting. The two A1 ribs are pushed centrally onto the spar. The two surface screws A30 are inserted between the two ribs and aligned on the construction slipway. Care must be taken to ensure the exact alignment of the ribs, as they must be at right angles to the slipway.

Only then can the components be glued, with the recess for the screws pointing upwards. The components can then be removed from the slipway to glue the A24 balsa blocks under the A30 surface screw. When gluing, make sure that the holes for the screws are exactly on top of each other. The spacer blocks can then be sanded flush with the underside of the wing, as shown in the following **Picture 17**.



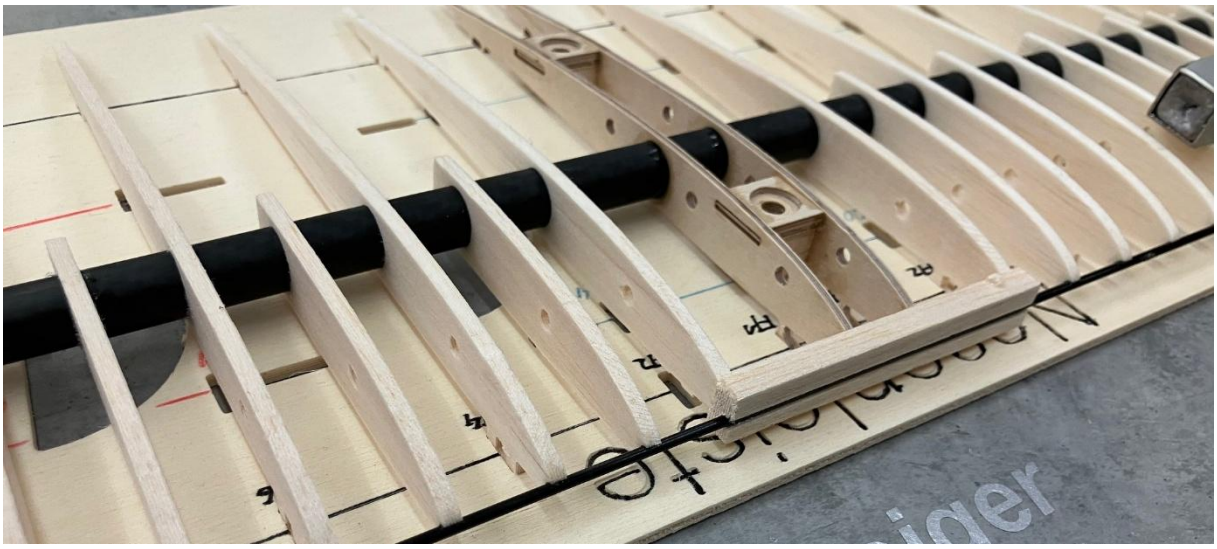
Picture 17

The middle piece for the surface screw connection is then pushed open in the middle of the 12mm CFRP spar. This means that the balsa ribs A2-A15 can then be threaded on from both sides. This is followed by rib A16, for which the servo frame of the accessory package is also required. The servo frame is inserted with its pins into the ribs A14-A16 provided for this purpose. The servo frame is intended for the KST-X06H-V6 flap servo. When plugging in, make sure that the two tenons with 2x2mm are intended for the rib A14 and the two pegs 3x2mm for the rib A16. This means that the servo frame cannot be inserted the wrong way around. Now the remaining ribs A17-A21 can be slid on, as can be seen in the following **Picture 18**.



Picture 18

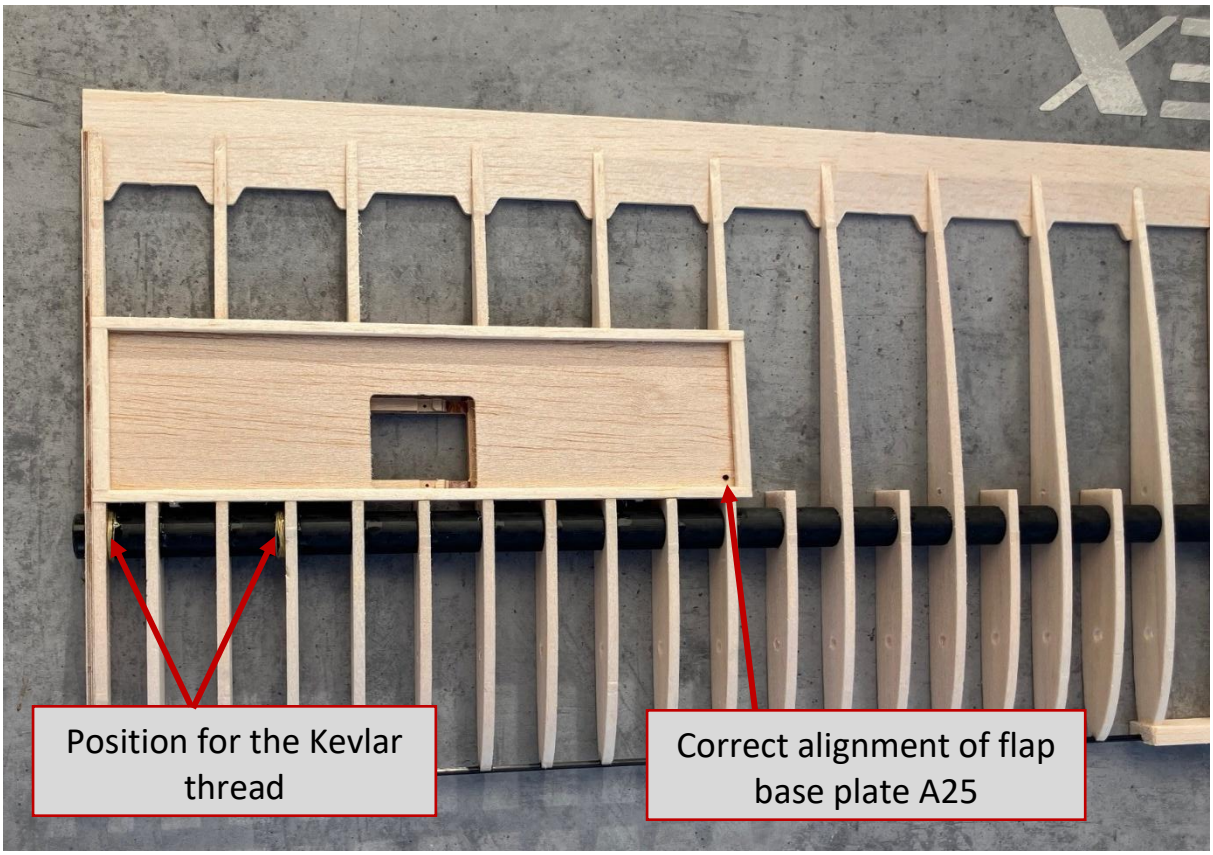
In the case of the previous wing sections, the threaded ribs are aligned with the help of the slipway and the combs and the whole ribs are glued to the spar. When threading the nose strip, pay attention to the additional balsa strip A23, in which the nose strip must also be threaded in the middle. After that, the half-ribs and the balsa strip A23 can also be glued to the ribs A1 and A2. In the end, A23 forms the nose strip of the middle piece for the later planking, as shown in the following **Picture 19**.



Picture 19

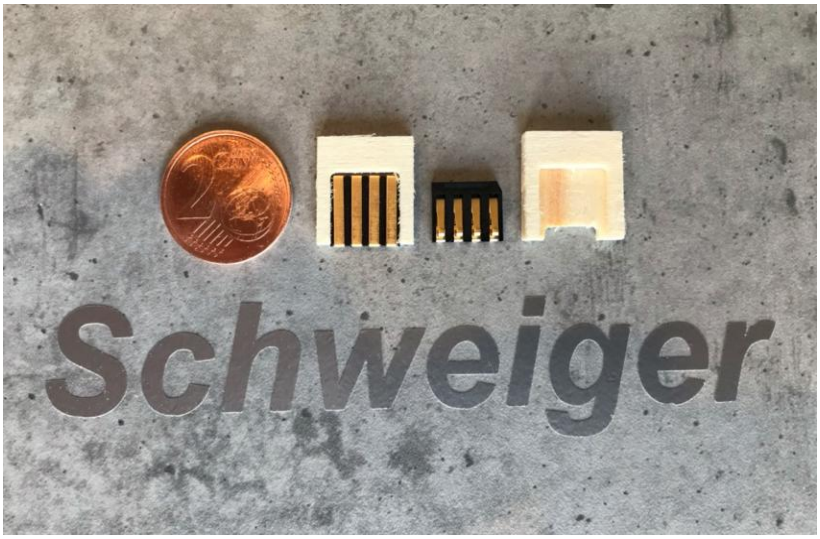
Note: If a strong force is applied to the wing plug during take-off, it can happen that the spar bursts open at the point of the wing joiner. To achieve this, Kevlar reinforcement is still easy to insert in the following construction step. For this purpose, the enclosed Kevlar thread is used. The wing part A is taken from the construction board, behind the rib A20 and in front of the rib A17 we wrap the spar tightly eight times with the Kevlar thread. To fix it, the thread is then soaked with low-viscosity superglue, the exact position can also be seen in **Picture 20**.

The surface piece can be placed back in the slipway, as the next step is to assemble the flap pocket. We start with the base plate of the A25 flap, which is glued into the recess of the top of the rib A10-A20 provided for this purpose. A25 has a hole in one corner for orientation (cf. **Picture 20**), which is positioned so that it points towards the nose bar and the center of the face. With this orientation, the flap servo is in the right position.
Then the balsa strips A26 and A27 are glued to the base plate of the flap, as they form the border of the brake flap. With the finished flap pockets, the wing part can be removed from the construction board, the support feet on the underside of the ribs can be separated and the trailing edge can be glued on.



Picture 20

The next step is dedicated to wing planking. Before this can take place, it must be decided how the brake flap servos should be wired.



We use a 4-pin spring contact for the power connection from the wing to the fuselage, as can be seen in **Picture 21**. This is also available from us as an accessory. As you can see in the picture, this accessory also includes milled plywood parts, which take the spring plug precisely into the sash mount.

Picture 21

This requires experience in soldering. Once the servo cables have been pulled into the wing and connected to the fuselage, the upper and lower wing planking is adjusted and glued. The upper planking is to be sharpened to the trailing edge.

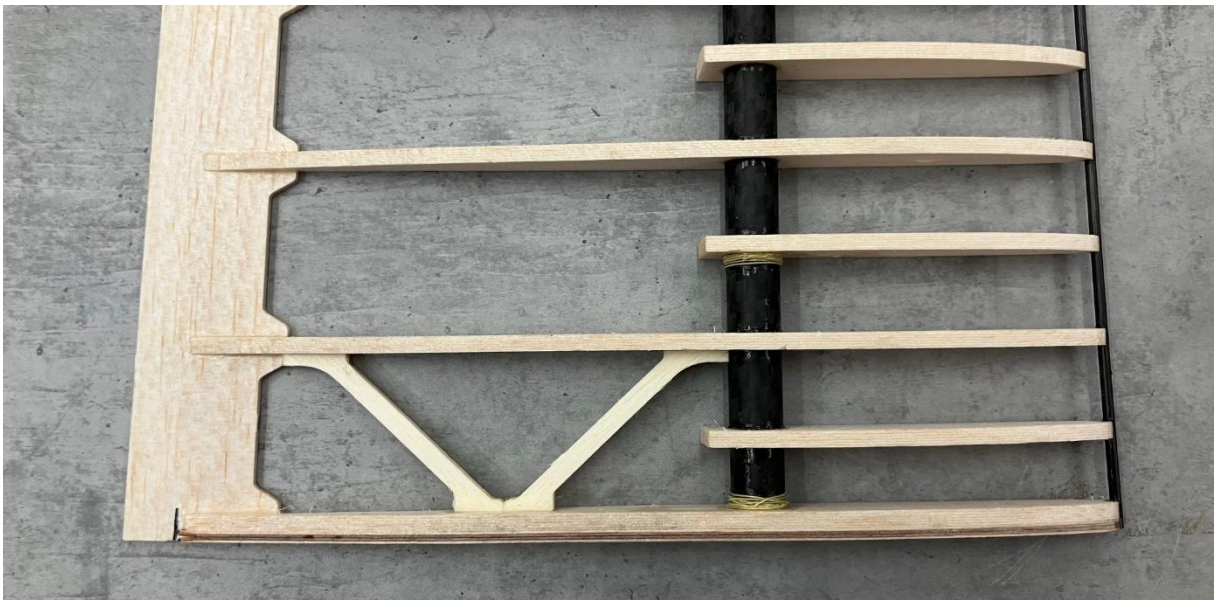
For the brake flaps, the balsa parts K1-K5 are cut out and placed on the laid-out blueprint, protected with foil. The components are fixed with needles and glued. In the next step, the brake flaps can be fitted into the flap pockets. The brake flaps should have about 0.5mm of air all around. The flaps are correctly positioned when the holes for the magnets point to the end bar and the wider bar K5 to the center of the surface, as can also be seen in **Picture 22**.

Picture 22

The 4mm magnets are glued into the flap on the same pole, so that they are flushed with the underside of the flap. It is important to make sure that the flaps are not swapped again in the following steps. The flaps are then inserted into the pockets, and the counterparts of the

magnets are placed on the underside of the base plate. In this way, the magnets align automatically and can be glued. The attraction of the magnets is chosen so that they are secured during flight but can still be easily opened by the brake flap servo.
In the following, the upper side of the wing profile is slightly sanded over, while the flaps are still in their pockets. This allows the brake flaps to adapt exactly to the wing profile. It is important to note that the wing profile is not changed when sanding over slightly. Now the CFK tubes, which are still slightly protruding, can also be cut flush at the root ribs of the individual wing parts.

Joiners:
The GFK wing joiners for the individual wing parts are carefully fitted into the CFK spars of the wings. To do this, the edges of the joiners are first slightly rounded off with a flat file. The joiner is carefully adjusted with an even removal of material on the top and bottom until it sits tightly in the wing spars. Subsequently, only the joiners of the wing parts A-B with the balsa parts A31 will be widened on both sides. They can then be ground round until they fit perfectly into the wing spars.
Now, with the help of the finished joiners, the surface parts A-B can be adapted to each other. To prevent the wing parts from twisting in flight, we glue the 2.5mm CFK dowel pins into the wing middle section. For this purpose, the dowel pins should be slightly sharpened before gluing them in.
Like wing part A, wing part B must also be protected against possible bursting with the enclosed Kevlar thread. Thus, behind the root rib B2 and in front of the half-rib B5, the wing spar is tightly wrapped with the thread and soaked with low-viscosity superglue.



Picture 23

We continue with the two A30 stiffeners, which are glued between the root rib B2 and rib B4. The exact position can be seen in the previous **Picture 23**.
Thus, the two surface parts B-C can now be joined together. For this purpose, the GRP joiner is inserted into the spar and then glued together with the surfaces of the root ribs.

Installation of the brake flap servos:
The KST X06H is intended for this purpose. The long servo arm is extended by the servo arm extension (1mm GFK) from the accessory package by screwing it onto the servo arm. We have also provided a video showing how it works: **https://youtu.be/d9o5HwRrMTI**

The screwed-on servo arm extension must then be cut out in the flap base plate. The servo used points with the servo arm screw connection to the center of the wing and to the nose bar. The servo travel is to be chosen so that the brake flap can be opened perpendicular to the wing and closed completely, as shown in the following **Picture 24**.

Picture 24

Final work:
Before the fuselage can be closed at the top in front of the wing with the balsa part R18, we glue the internal push rods. To do this, we insert the 0.8mm steel wire of the rudder linkage into the push rod. For the rudder servo in the fuselage, the rear recess in the servo board is provided. The push rod is shortened to such an extent that the servo linkage can move freely at the maximum deflection. If this is the case, the push rod is glued to the inside of the fuselage from frame R7 to approx. component R12.

Caution here: The height of the glued push rod must match the height of the servo arm. In the following, the opposite push rod of the elevator is also glued. The only difference here is that the length of the push rod must extend to the front recess in the servo board.

Now the wing part A can be screwed onto the fuselage and the top of the fuselage can be closed with the balsa part R18.

To glue the plywood parts of the R23 wing screw in the fuselage, the wing part A is removed again. The R23 components are now in the correct position and can be glued. Gluing the surface screw connection is important, as this connection additionally stiffens the fuselage. Before the model can be covered with foil, all components are screwed together and checked for function. A final check of the exact angles is also important, as correction is still possible before stringing. If all angles are correct, the model is finely sanded at the end and carefully freed from dust residues, as can be seen in **Picture 25**.

Picture 25

Covering the model:
When covering the components, it is particularly important to stretch the foil evenly on both sides of the model. It is also important to ensure that both sides of a component are exposed to an even pull. If this is not the case, the component will twist in on itself and thus significantly negatively affect the flight characteristics of the model.
We recommend the ORACOVER films for covering the APEX. If the model is covered with an ORACOVER light film, this results in a weight saving of approx. 30g. However, this film is much more sensitive than the standard film due to its lower weight.

When the model is finished, glue the GRP rudder horns into the grooves provided. The longer rudder horn is intended for the elevator, the shorter one for the rudder. The linkages are to be attached to the outer holes of the rudder horns, as this allows an optimal rudder deflection to be achieved. The high launch hook can now also be screwed in and the remaining RC components installed.

Tip: Picture 26 shows one way in which the rudder linkage can be secured, but still removed for transport. The silicone drops are easy to attach and secure the frame from slipping out.

Picture 26

RC Components:
We recommend a 2S LiPo battery for the flight operation of the model, for example a TATTU LiPo battery, R-LINE, 2S/550mAh, or a 2S LiPo battery ROXXY Evo 2S/500mAh. Due to their compact design, these batteries are ideal for installation in the nose of the fuselage. When operating with a 2S LiPo battery, we recommend the following servos that can handle the 7.4V voltage:

- Elevator and Rudder: KST X08
- Brake flaps: KST X06H-V6

A Zepsus magnetic switch NANO is also recommended for easy switching on and off. All RC components mentioned are available on request from Holzmodellbau-Schweiger.

Basic settings before the first flight:

- Center of gravity: for the first flight, a center of gravity of about 68mm (measured from the nose bar of the wing) should be chosen. In the following flights, you can carefully feel your way back to 71mm.
- Rudder deflections: elevator +/- 8mm, rudder each li/re 30mm, brake flaps maximum deflection 90 degrees (add a little elevator to the brake flaps).
- High launch hook starting with approx. 358mm measured from the fuselage tip. This value can be maxed out to approx. 362mm, depending on the chosen center of gravity and the EWD (adjustment angle difference) of the mode.

Note: for the first flights, light throws from the hand are advisable to find the right rudder settings. Afterwards, the first starts should be made on the bungee cord with less pre-tensioning so that the correct position of the high take-off hook can be determined.

The building instructions will show you a suggestion on how to assemble the model. If you still have suggestions or suggestions for improvement, we look forward to your feedback.

Please do not forget to attach the corresponding APEX stickers after the model has been covered. These are indispensable factors for optimal flight performance **;-)**

We wish you a lot of fun with your finished APEX and always a good flight!

The last picture shows the APEX designer Eser Kismir and Josef Schweiger from Holzmodellbau Schweiger.