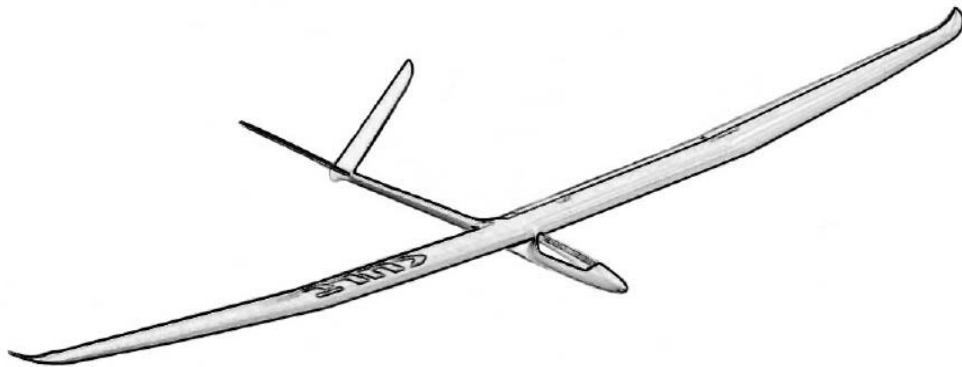




KULT

Building Instructions



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Congratulations on your purchase of a quality product from TANGENT!

At TANGENT we strive always to combine achievement with passion. As inspired model flyers ourselves, we are very proud to offer you the products which we ourselves have dreamed of, in our continued effort giving you, the discerning aeromodeller that competitive edge.

Working in close co-operation with some of the most dynamic and experienced sports pilots we have developed a taste for quality and technology to suit the most ambitious model flyers. All of our products have been developed within a stringent competitive environment following many stages of prototyping to achieve the highest possible levels of performance. With a TANGENT product you acquire far more than just a new model, but also many years of experience in manufacturing techniques as well as a guarantee of years of reliable service.

We appreciate the value of your spare time in the busy world in which we live and the need to make the best of every leisure moment available to us. The more we work, the more precious our spare time becomes and all the more important is the need to implement our dreams.

In TANGENT you have found a partner to help you realise your dreams - because you have earned it!

We are also mindful of our environment and make every effort, through each stage of production, to take steps to protect the world we live in for future generations of model flyers.

Thank you for choosing a quality product from TANGENT, we wish you every success with your new model.

The **TANGENT** Team

Preface

The original KULT was designed as a pure F3J machine, with minimum weight. However issues associated with the very low weight of just 2450g were quickly identified, the flight envelope being relatively restricted. The addition of ballast gave somewhat higher speeds, but not nearly fast enough for kind of model pilots we at TANGENT had in mind! We therefore set about some radical design changes of our own to bring you the current model.

Generous applications of Carbon reinforcing, and newly optimized main spar and D-box as well as improvements in the area of the V-tail were among the many changes we implemented in order to achieve the performance we desired. The increased take-off weight of 2850-3000g did nothing to restrict the thermal characteristics of the new KULT. The result is a truly versatile flying machine, optimised for F3J with keen F3B characteristics and a wide speed range, for the ultimate flying experience!

Please note:

This model aircraft kit is intended for the more experienced modeller and as such we have consciously avoided providing detailed descriptions of many of the standard building procedures involved.

Please familiarize yourself with the entire assembly procedure, including the selection of diagrams & photographs at the end of this document before commencing work.

Should you require further assistance with any aspect of the construction of this model, please feel free to contact us directly.

RC- Functions:

Ailerons / Flaps
Butterfly (Crow)
Elevator
Rudder
Aerotow Release (Optional)

Technical Data

Wingspan:	3400 mm
Wing Area:	72 dm ² /q
Aerofoil:	MH 32
Fuselage Length:	1156 mm
Weight:	from 2350g
Wing Loading:	from 40 g/dm ²
Centre of Gravity:	100 mm
Longitudinal Dihedral:	+1 Degree

Kult Set-Up	Up	Down	
Rudder	12 mm	8 mm	
Elevator	8 mm	6 mm	
Aileron	20 mm	10 mm	
Flap – thermal setting		3 mm	
Aileron – thermal setting		2 mm	
Flap – speed setting	1 mm		
Aileron – speed setting	0 mm		
Landing Mode			
Flap		Maximum	Butterfly
Aileron	12 mm		Butterfly
Elevator		~1,5 - 2,5 mm	Reach

The recommended Centre of Gravity is set 100 mm aft of the root leading edge.
The flaps are typically be adjusted for about half the travel of the ailerons. Mixing of flaps with Elevator (snap-flap) is recommended for optimal thermal characteristics.

Note:

The set-up described above is recommended for the initial test flights, following which you will no-doubt wish to adjust the control surfaces to suit your individual style of flying.

Please refer to the selection of photographs included with these instructions.

Parts List - KULT

Kit Contents:

- GRP Fuselage
- Carbon Canopy
- Ready to cover wings & tail-plane
- Set of wooden parts including servo tray
- Set of wire parts
- Hardware pack
- TA-Servolocks
- Building instruction sheet

Hardware pack

Socket (small)	Plastic	Elevator locking	2
Eye bolt	Aluminum M4	Aileron / Flap control horns	4
Socket (large)	Plastic	Wing locks	2
GRP Spring	GRP	Canopy retainer (rear)	1
Clevis	M2,5	Linkages	12
Solder clevis adaptor	M2,5	Linkages	4
Threaded rod	M2,5	Linkages	4
Rudder horn long	Steel	V-tail control horns	2
High-grade steel wing joiner	D12*270	Wing joiner	1
Carbon rod	D10*120	Wing joiner reinforcement	1
Nut	M2,5	Lock nut	12
Steel pin	D3*50	V-tail joiners	4
Reducing sleeve	D3/4*30	V-tail joiners	4
Steel pin	D3*50	Wing incidence pins	2
Hook	Steel	Tow hook	1
Threaded screw	Steel	Tow hook assembly	1
Lock nut	Steel	Tow hook assembly	1

Set of wooden parts

Grooved block	Abachi	Bowden cable support	2
CNC Servo Tray	Wood/carbon	Servo tray	1
Hard wood dowel	D10*8mm	Control horn mounting	4
Hardwood block	12*12*50mm	Tow hook mounting	1
Beech dowel	D6*50mm	Canopy retainer (front)	1

Wire set

Steel wire	D1,3*1400mm	V-tail control linkages	2
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Servo frames

Servo frames	Plywood	Mounting servo covers	4
Servo cover (left)	Plastic	Aileron / Flap	2
Servo cover (right)	Plastic	Aileron / Flap	2
Installation instructions	Printed paper		1
Screw	Steel	Servo cover fixing	16

The V-Tail

The V-tail is designed such that it may be easily removed from the fuselage using two sets of alignment pins located into the fuselage tail section and the proven multi-LOCK mechanism. Both V-tail halves are supplied pre-sanded, but may require a little finishing to compensate for minor production tolerances. For the V-tail joiner, use either the 3mm steel pins, or optional 4mm carbon rods.

In the case of the 3mm Steel pins, be sure to use the supplied Brass tubes as guides in the fuselage – as follows:

Examine the holes in the fuselage tail section and check the spacing with those in the V-tail halves. Open out the holes in the fuselage to $\text{Ø} 4$ mm to accommodate the Brass tubes, which are bonded securely into the fuselage tail section. Prepare the Steel pins which are to be bonded into corresponding the V-tail halves, checking carefully that everything fits beforehand.

Some builders may prefer to cut the Brass tubes off flush with the fuselage, and then install four additional 4mm Brass tubes (not supplied) into the corresponding holes in the V-tail halves. In all cases, please note that there is a second solid rib inside the V-tail halves into which the joiner must engage.

Align the model horizontally on the work bench and use the supplied triangular template to carefully check the alignment of the V-tail halves before applying any glue. Apply thickened epoxy to the Brass tubes and the Steel pins only once you are fully satisfied with the alignment of all the parts. Use masking tape and a release compound to ensure that the parts remain separable. Hold the tail-plane, with the template still in place, using strips of adhesive tape until the resin has cured.

The Fuselage

The first consideration should be the arrangement of the radio control equipment within the available space. There is ample space to accommodate everything you need, including a vario, if required.

Taking advantage of the unrestricted access to the fuselage, start by fixing the reinforcing block in the belly of the fuselage to accommodate the tow-hook (if used) using thickened epoxy. The centre of the reinforcing block should be positioned 103cm from the tail of the fuselage – measured towards the nose. Drill a 3.5mm hole in the block to coincide with the centre of the reinforcing block and then tap it out to accommodate the M4 thread of the tow-hook. Screw the tow-hook into the block and secure with a washer and lock-nut.

Once you have decided which battery you will be using, consider the best position for the servo tray, which should be as far forward as possible, but still allow the battery to be removed when required.

The servo tray should also be positioned such that the servo output arms will align correctly with the steel control linkages in the pre-installed Bowden tubes.

Now mark out the position of the servo tray on the inside of the fuselage.

Thoroughly clean the surface of the fuselage where the joint is to be made using a suitable abrasive and glue the servo tray in place with thickened epoxy and leave to cure.

Your choice of radio control equipment can now be installed in the fuselage. Please feel free to contact us should you require any advice with your selection.

Assemble the control linkages using the supplied steel control linkages (cut to length) and the supplied soldered clevis adaptors, metal clevises and lock-nuts.

The canopy is attached after carefully checking and adjusting it as necessary to fit the fuselage opening.

The canopy is held in place using a hardwood peg in the nose and a GRP spring at the rear, both of which are glued in place using thickened epoxy. You will need to drill a hole in the front of the fuselage to accommodate the hardwood canopy retaining peg.

The Wings

The flying surfaces are factory installed and fastened via highly effective elastic-hinge which is pre-molded into the wings during manufacture. The flying surfaces are largely finished and should require very little additional work to ensure that they are free-moving.

The wing servo wells are already pre-cut to accept the supplied servo frames which are designed to accommodate a variety of 13mm servos available in the market. The servo cables, also pre-installed, need to be fed into the servo frames before the frames are bonded into the wells using epoxy resin. Please refer to the instructions provided with the TA Servo Locks for details on servo fixing.

Prepare the electrical connection between fuselage and wings, by installing suitable electrical connectors into the fuselage wing roots and corresponding wing root ribs. Please take care to ensure that there is sufficient width in the wing root to accommodate the connectors of your choice and adjust the position accordingly.

Next prepare the control surface linkages – for ailerons and flaps.

Bore holes in the lower surface of the ailerons and flaps up to the level of the opposite upper skin – naturally taking due care not to damage the upper skins. Then glue the supplied hardwood dowels into the holes using thickened epoxy and allow to cure thoroughly before drilling 4mm holes into the centre hardwood plugs to accommodate the aluminium eye-bolt control horns.

The control horns are similarly glued into the hardwood plugs using thickened epoxy.

Finally the linkages between servo output horn and the control horns can be completed using threaded rods and matching metal clevises and lock-nuts. Be sure to allow for sufficient adjustment range.

CAUTION ! For optimal control movement, please use the innermost holes in the servo output arms and the outer holes on the aileron and flap control horns!

The openings for the wing joiner and plastic wing locks are prepared during manufacture, and the wing locks are pre-installed in the fuselage wing roots.

The supplied steel wing incidence pins are inserted into the wing root ribs and corresponding holes in the fuselage wing roots. Once fully satisfied with the alignment and wing incidence, the steel incidence pins may be glued into the wing roots using thickened epoxy. Some builders may prefer to reinforce the incidence pin locating holes in the fuselage sides with suitable Brass tubing (not supplied).

Plastic wing locks are used to secure the wing/fuselage joints. The sockets have already been installed in the fuselage wing root, now the matching plugs are required to be glued into the wing roots to complete the joint. First check the plugs fit the holes provided in the wing roots and adjust if necessary. Once the holes have been adequately prepared, glue the plugs into the wing roots and with the steel wing joiner installed, engage the wings firmly with the mating sockets and ensure correct alignment. Take due care when completing this step to avoid the effects of any excess epoxy. We recommend that you first cover the fuselage wing roots with kitchen film (or similar material) to protect the fuselage, and apply a releasing agent to the locks themselves while the epoxy cures. Once cured, the wing locks are easily separated by applying firm pressure, by hand, along the leading edge of the wing.

Finish

Once all the mechanical linkages are in place and have been adjusted, its time to consider the final finishing. If the model is to be finished using a heat sensitive film, we recommend that all wooden surfaces be carefully sanded with a fine grade paper to achieve a smooth finish. To avoid wrinkles and bubbles in the film, we recommend that you seal the wooden areas with a suitable primer coat before final sanding with a very fine grade paper (e.g. 1200 grit) before rubbing down with a lint free cloth just prior to covering.

When covering the moving surfaces equipped with e-flaps (elastic hinges), take care to apply the film with the moving surfaces fully deflected so as not to restrict the movement.

CAUTION!

KULT, like other quality TANGENT models employ LSCTP-Technology to achieve the desired optimum strength to weight ratio. Extensive use of carbon cloth is utilised during manufacture which among its many desirable properties also provides a high degree of thermal conductivity around the polystyrene cores.

Remember that polystyrene melts at 70⁰C and take due care when applying heat-sensitive films so as not to use excessive heat which will irrecoverably damage the foam cores.

Safety Considerations

Our hobby is very important to us and as such it is essential that we recognise the responsibilities associated with the building and flying of model aircraft:

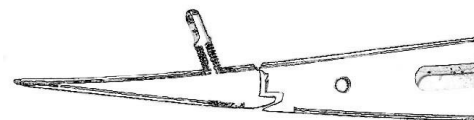
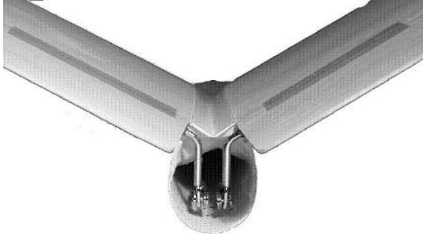
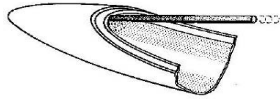
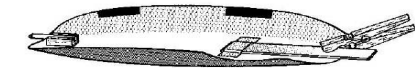
- Carefully built models exhibit outstanding flying characteristics and the highest levels of reliability and safety.
- Always carry out thorough pre-flight checks – observing structural integrity of the model as well as correct movement and sense of all the flying surfaces.
- Always carry out a Range Check on all new models or following any change of RC components.
- Always check that your channel is free before switching on your transmitter.
- Adequate third-party insurance is essential. Check the local laws governing model flying in your region before flying your model.
- Give due consideration to others when flying aerobatic manoeuvres and never fly low and/or fast over other people.
- Always be aware of the vulnerability of each individual component of your RC system and maintain it responsibly.
- Always give due consideration to other model flyers, provide ample air-space and observe the local system of channel allocation.

If in doubt – please ask.

If you are unsure about any aspect of flying your model safely, please do not hesitate to contact us via our helpline – we will gladly assist!

Always remember to carry out a proper range test before the first flight!

Selected diagrams



Installation of the locating peg (front) and leaf spring (rear) of the canopy.

Carefully remove just enough material from the fuselage moulding to accommodate the locating peg and achieve a perfect fit.

Typical layout of the radio compartment.

This example includes an optional vario system

Wing fixing points.

V-tail fixing points.

V-tail torque rods.

Correct alignment of V-tail torque rods as seen from rear of fuselage.

Installation of supplied servo frame and cover.

The servo is bonded to the underside of the servo cover.

Installation of the aileron/flap control horn.