Champion 'XL'

A 65" span semi-scale 2-seat lightplane based on the 36" span free-flight kit designed for

Hobbies

of Dereham, Norfolk by Ron Warring c. 1957

Enlarged and slightly modified design by Jeremy Collins for 3541 electric motor and 3-function R/C

Sheet 1 of 2

F11
1/8" balsa

score and crack along centreline

battery hatch former

2 off 1/8" (3mm) liteply

instrument panel

mounting hole spacing for 4-Max mount, adjust for other makes

10mm x 2mm magnets in cowl and F1

6mm locating dowel

F1
6mm ply

Section on A - A

F3A
1/8" (3mm) ply

F2

Note: F3A glued to rear face of F3

F3 - 1/8" (3mm) ply

F5A
1/8" (3mm) ply

Note: F4A glued to rear face of F4

F4 - 1/8" (3mm) ply

F5A - 1/8" (3mm) ply

Note: F5A glued to rear face of F5

F5 - 1/8" (3mm) ply

R1

L/E laminated from 3 x 1/8" (3mm) balsa

see Sheet 2 for details of fin and rudder construction

fin ribs and spar from 1/4" (6mm) sq balsa

R4
rudder 1/4" (6mm) balsa

R2

R3

tailplane section at rib T1/T2

Prototype weight in flying trim 4 lbs (1.8 Kg)

1/4" (6mm) dowel

F11

balance point

F3A

F4A

F5A

1/16" (1.5mm) balsa across F8's

F8

F9
1/8" (3mm) ply

cowl is retained by 8mm x 2mm magnets and 6mm locating dowels; withdraw forward after removing prop

A

retain battery hatch with magnets

3S 2900 LiPo

3541/08 810KV 4-Max brushless motor

4 degrees downthrust

1/2" (12mm) triangular reinforcement

infill between F2 and F3 with 1/4" (6mm) balsa

cabin door frame built up from 3/16" (5mm) sq bass or hard balsa

cabin door is hinged with 'furry' CA hinges

6mm sq bass or spruce longerons with 6mm sq balsa spacers

reinforce longeron joint with 1/16" (1.5mm) spruce

F6

1/8" (3mm) ply mount for elevator servo (st'bd side)

F7

1/4" (6mm) bass infill

F11

F1

F2

F3

F4

F5

infill between F1 and F2 with 1/4" (6mm) balsa

1/8" (3mm) balsa cabin floor

Prototype model used 14" x 7" APC thin electric propeller

Prototype required approx 9 oz (250g) noseweight

Control surface movements:
Rudder 3/4" (20mm) each way
Elevator 3/4" (20mm) each way

A

1/4" (6mm) balsa infill between lower longerons F1 to F2 and F2 to F3

F10

1/4" (6mm) balsa infill between lower longerons aft of L/G plate to F4

1/4" (6mm) bass infill

forward section of longerons laminated from 4 x 1.5mm bass to reduce stress

F11 1/8" (3mm) ply

F6
1/4" (6mm) balsa

F7
1/4" (6mm) balsa

F9
2 off 1/8" (3mm) ply

F8
2 off 1/8" (3mm) ply

top

all motor mount parts from 1/4" (6mm) ply

right side

left side

motor mounting plate (viewed from front)

bottom

F10
Landing gear mounting plate
1/4" (6mm) ply
drill for 5mm spiked wing nuts, epoxied in place; glue firmly in place between lower longerons aft of F3

Landing gear template. Make from 3mm dural

Bolt to fuselage bottom with 5mm nylon bolts

seat back
2 off thin card

seat cushion
2 off 1/8" (3mm) balsa

front seat base
2 off 3/32" (2.5mm) balsa

rear seat base
2 off 3/32" (2.5mm) balsa

cowl laminated from 12mm balsa

F8

3541/08 810Kv brushless motor

3S 2900 LiPo

cabin floor

3 degrees right thrust

1/2" (12mm) triangular reinforcement

F8

Fuselage Construction

Make up two basic sideframes from spruce or bass longerons. Note that the forward lower longerons are laminated from 4 1/16" (1.5mm) strips to reduce stresses. Glue strips together with aliphatic glue and pin in place while glue is still wet, clamping laminations together with clothes pegs if needed. Scarf joint to the rear lower longerons. Note that the upper longerons have a joint at the tailplane leading edge which should be reinforced with a strip of bass/spruce on the inside face. Upright spacers forward of the wing trailing edge are spruce or bass and balsa aft of this point. The cabin door is on the port side frame only. Make up the motor mount from 1/4" (6mm) ply. Hole spacing shown is for 4-Max motor - adjust if necessary. Glue to F1 ensuring down- and right-thrust are in the correct orientation. Glue upper former doublers F3A, F4A and F5A to their respective formers. Lay starboard sideframe flat on board and glue in place F1 to F5. When dry add port sideframe, checking for square and alllow to dry. Pull sideframes together at rear and glue, checking for square and true. When dry add F6 and F7 and balsa cross spacers. Add triangular braces to F1. Fit 5mm spiked blind nuts to the landing gear plate F10 and glue in place behind F3. Add 1/4" (6mm) infill between lower longerons between F1-F2, landing gear plate and F4. Add F8's behind cabin and 1/16" (1.5mm) top, flexing down to dihedral angle in F5A. Add tailskid F11. Fit instrument panel and sheeting to F2. Add cabin interior detail as required. Make up battery access hatch. Fit windscreen and glazing after covering, then add wing dowel, threading through F3 and F4. Make up removable motor cowling, retaining in place with magnets and locating dowels.

removable cowling rear former

1/16" (1.5mm) ply

10mm x 2mm magnets in cowl and F1

6mm locating dowel

windscreen glazing template
(cut oversize and trim to fit)

starboard forward glazing frame

1/8" (3mm) liteply

port rear glazing frame

1/8" (3mm) liteply

cabin door glazing frame

1/8" (3mm) liteply

starboard rear glazing frame

1/8" (3mm) liteply

F1 position

F2 position

former positions shown for reference only

note no upright spacers at F1 and F2 positions, F1 and F2 are full width of fuselage

1/4" (6mm) balsa infill

1/4" (6mm) balsa infill

forward section of longerons laminated from 4 x 1.5mm bass to reduce stress

1/4" (6mm) bass infill

reinforce longeron joint with 1/16" (1.5mm) spruce on inside face

1/8" (3mm) ply mount for elevator servo (st'bd side)

1/4" (6mm) bass infill

Basic sideframe, door on port side only; dotted lines show starboard side structure in this area

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Sheet 2 of 2

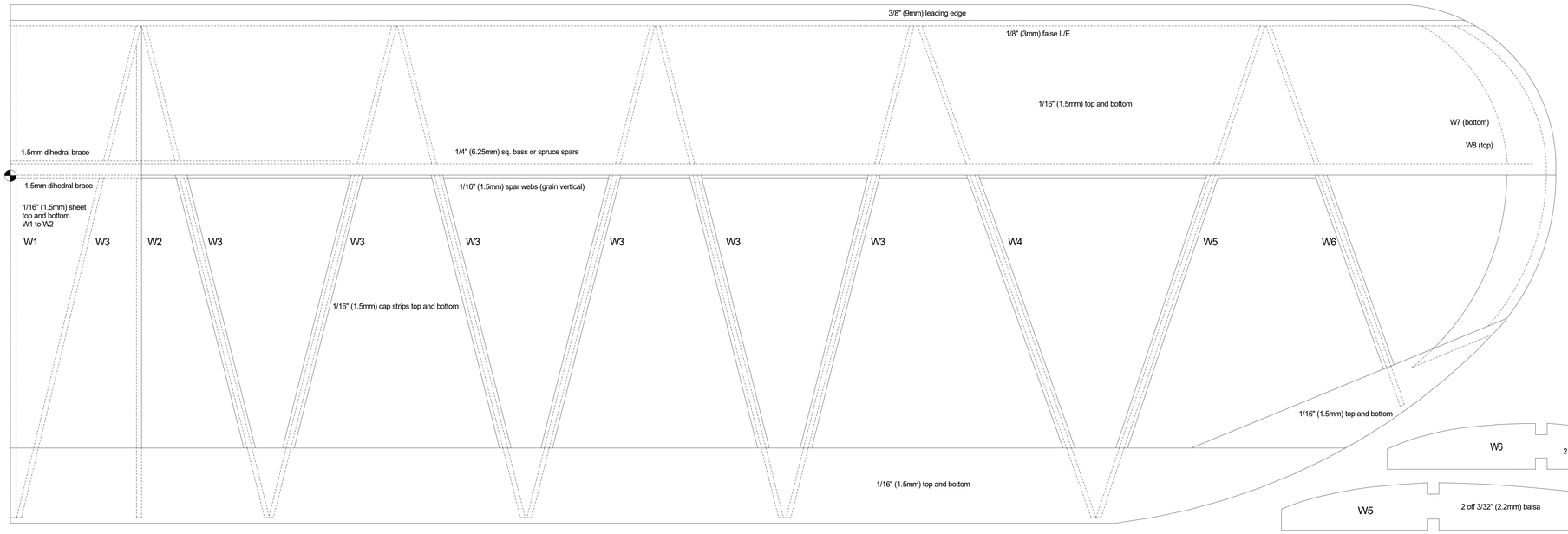
Wing Construction

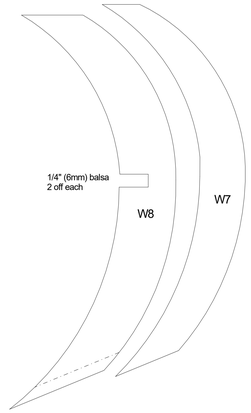
Commence construction with port wing half.

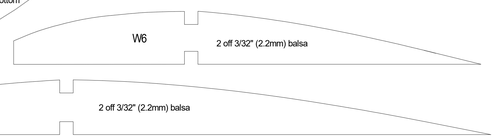
Pin down lower sheeting, capstrips and trailing edge. Glue lower spar in place. Glue dihedral braces in place each side of lower spar. Add ribs (noting angle of W1 to match dihedral gauge) and false leading edge. Add upper spar, cracking at W6 position (see tip section detail sketch). Glue in place wingtip pieces W7 and W8. Add trailing edge sheeting, rebating the rear of W8 to accommodate the tip sheeting. Add inter-rib webs. Now add upper leading edge sheeting, centre-section sheeting and capstrips. Trim leading-edge sheeting back to false leading edge and add leading edge. Plane and sand leading edge and tips to section. Repeat for starboard wing, joining the port wing (propped up to dihedral angle) once the starboard lower spar has been glued in place.

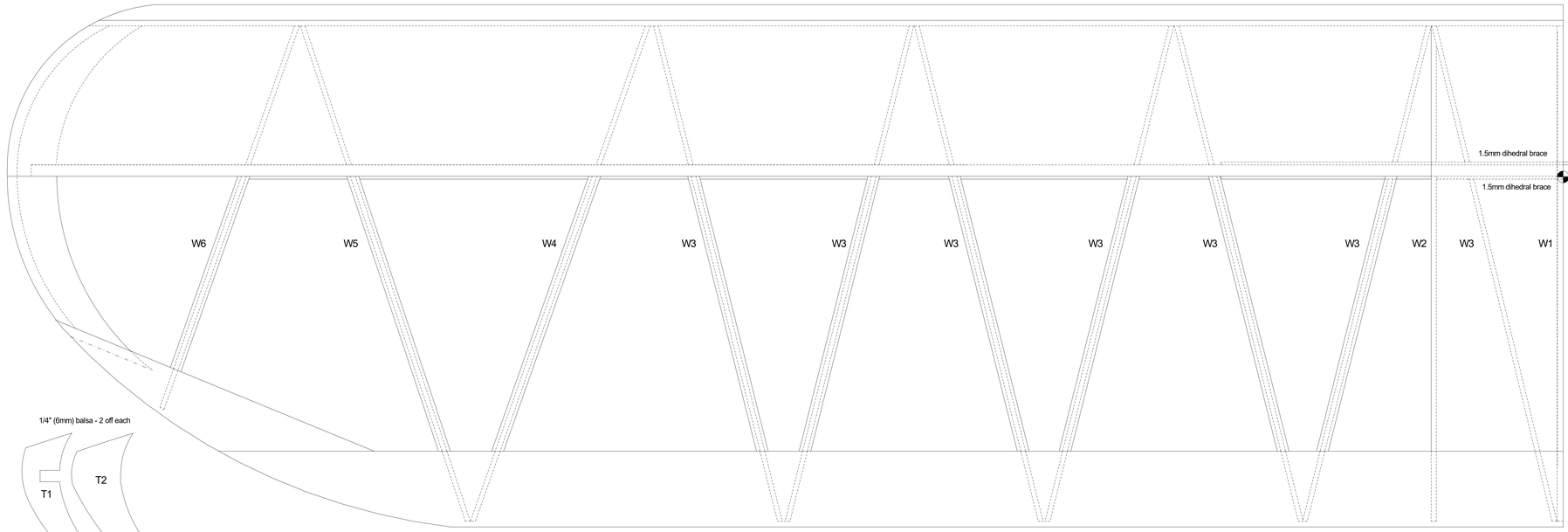
Tailplane Construction

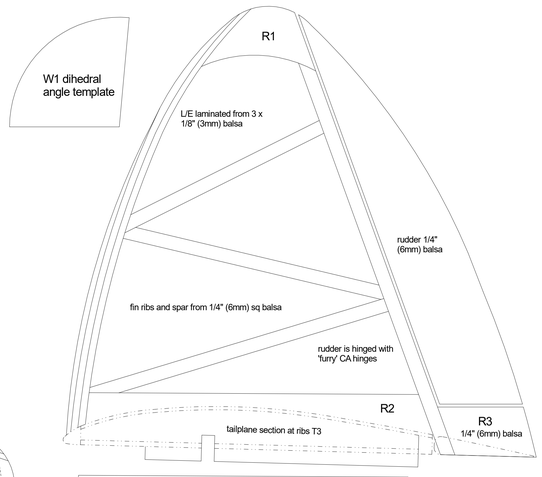
Tailplane and fin/rudder construction is straightforward apart from leading edges, which are laminated from strips of balsa. Glue the required number of strips together with aliphatic glue and while still wet pin in place, clamping laminations with clothes pegs if necessary. Allow to dry before adding remaining structure. Angled tailplane ribs are drawn slightly overlength - trim to exact size on assembly. Leading edges are later planed down to match ribs. The rudder servo is let into the upper surface of the tailplane after covering, feeding the servo lead through the bottom sheeting. Cover tailplane and fin before glueing fin in place. Elevator and rudder are hinged with 'furry' cyanoed hinges. Tailplane assembly is glued to fuselage.

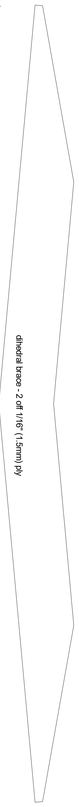


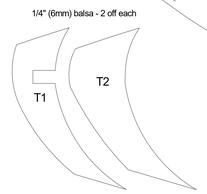


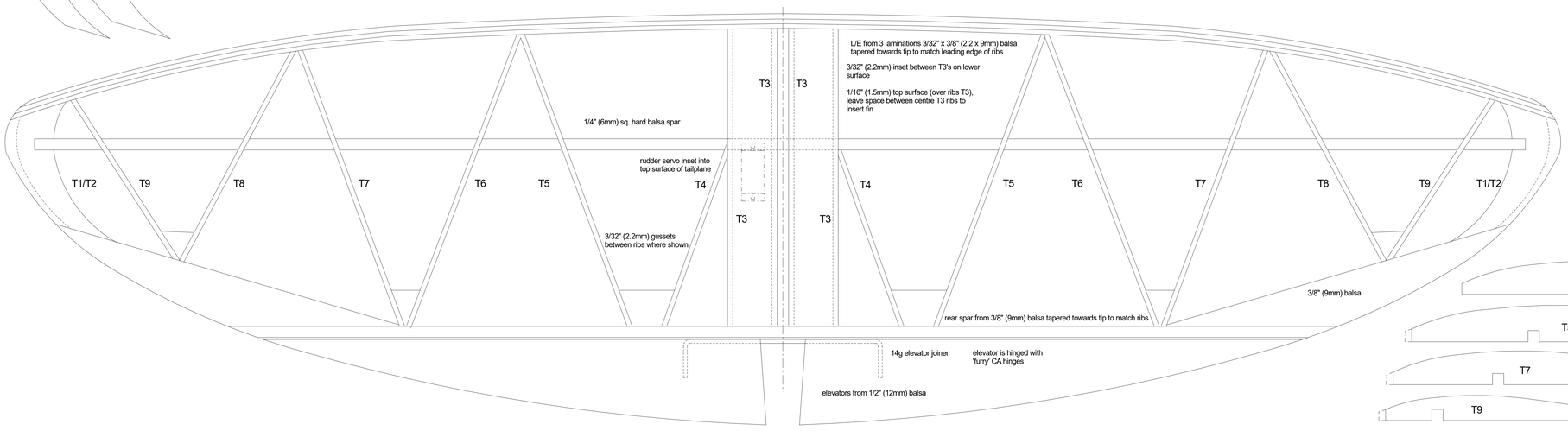


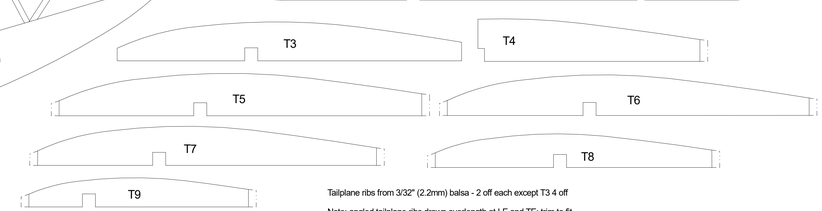












Tailplane ribs from 3/32" (2.2mm) balsa - 2 off each except T3 4 off

Note: angled tailplane ribs drawn overlength at LE and TE; trim to fit