RSM DISTRIBUTION

presents

LARK

By
Charles Mackey

Photo _ Bob Hunt

- **Classic Legal Precision Stunter**

• **Wingspan**	**52”**
• **Length**	**39.5”**
• **Wing Area**	**570sq”**
• **Motor**	**35-46**

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Thank you for purchasing the RSM Lark kit. We are very grateful for your business and trust you will find this kit to be of the highest quality.

The aim of this building article is to guide you through the construction of the LARK kit.

We do understand that many of you are experienced builders and that you may have differing techniques to building and in these instances, please feel free to do so.

Before you start:

It is recommended that before you start you should prepare a flat, stable work surface to build over. The best surface is plate glass as it is true and flat. Alternatively a piece of drywall or similar will work well. The work surface should be a minimum of 4ft x 3ft to allow the wing to be built in one piece.

Read the plans and build article carefully. We recommend reading the build article thoroughly and referring to the plans as you do.

A note on Laser Cutting:

Laser cutting is the latest and most accurate way of cutting kits. The precision of the lasers means that parts are cut to exacting dimensions and will have next to perfect fits when assembled.

You will note that throughout the build article, we will refer to "cutting tags" off sheet wood parts. These tags are left on by the cutter to stop the parts falling loose from the sheets.

You may also notice that in some instances, the laser has not cut completely through the balsa or plywood parts and you may need to do some additional cutting. This is due to the laser heat, material thickness and density.

Finally, check the laser cut edges, if they are charred/ blackened, you will need to lightly sand these pieces for glues to work correctly. Whilst all care is taken in the cutting of these kits, there may be instances where the above occurs.

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Remove the wheelpant parts from the sheets.

Glue together and let dry

Once dry, carve and sand to shape.

When assembling the major pieces, ensure that the main wings are level

Ensure that the main wing and stab and level

Make sure the fin is vertical

Kit Contents - Parts list

Item	Quantity
Full Size Plan	1
Medium Silkspan	2
Plastic Canopy Piece	1
Laser Cut Rib Sheets	4
Laser Cut Stabilizer Sheets	2
Laser Cut Flap Sheets	2
Laser cut 3/8th Balsa Parts Sheet	1
Laser Cut Elevator Sheets	2
Laser Cut 1/16th Plywood Sheet	1
Laser Cut Fuselage Front Sheets	2
Laser Cut Fuselage Rear Sheets	2
Laser Cut Wing Tip Sheet	1
Laser Cut Wheel Pants Sides Sheet	1
Laser Cut Wheel Pant Centers	2
Laser Cut 1/8th Plywood Parts	1
1/8th Hardwood Dowel	1
1/4 x 1/4 x 36 Balsa	10
1/8 x 3/8 x 36 Balsa	2
1/16 x 3 x 36 Balsa	5
1/2 x 3 x 36 Balsa	1
1/16 x 2 x 36 Balsa	3
3/32 x 2 x 24 Balsa	2
3/4 x 3 x 2 Nose Block	1
Fin/ Rudder	1
Landing Gear Block Package	1
13" Arrow Shaft Pushrod	1
1/32 x 2 x 6 Plywood Mount Caps	2
1/8 x 3 x 9 Balsa	1
1/4 x 1 x 3 Balsa	1
1/2 x 1 x 7 1/2 Maple Motor Mounts	2
3/8 x 1/2 x 4 Motor Mount Brace	1
1/16 x 1/4 x 36 Balsa	14
1/8 x 3/4 x 36 Balsa	1
Hardware Package	1

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Wing Construction

Select the rib sheets and cut tags on rib sheets to release ribs R0– R13

Stack ribs to ensure you have two even piles of ribs R0—R13.

Lightly sand ribs if required to remove laser burns (if present)

Lay the 1/4 x 1/4 Spars over the plans, raise the tips by 1/8th inch and add shims to keep spars straight

Cut and join the two spars together in the centre

Take Rib R13 an and glue to lower spar in location on plan. Make sure it is square.

Add all the ribs to the lower spar, se a square or building triangle to make sure the ribs are vertical/straight

When you are happy the ribs line up with the \plans & are square. Glue into place.

Add the top spars and mark where they cross, do not butt these together. Mark a diagonal across the spar

Notes

The inboard wing is 2" longer then the outboard wing. Delete R13 from the outboard wing to create this difference.

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Pin the 2 elevator assemblies together and square up

Lightly sand the assemblies so they are the exact same sizes.

Glue the 3/8 tips to the elevators

The completed elevator assembly

You should now have the complete stabiliser and elevator assembly ready to sand.

To make the fin, cut the 3 laser cut parts from the 1/4 sheet

Glue all edges and assemble over plans. Note that there is offset shown on the rudder

Once glued, leave to dry ready for sanding.

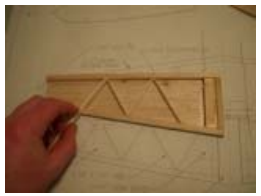
The elevator assembly is much the same as the stabiliser. Cut and glue the 1/4 stick to the sheeting

Assemble the "lucky boxes" by gluing the 3 parts of each together.

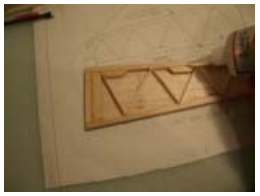
Mark the lucky box to fit in the elevator assembly s shown on plans

Cut and then glue the lucky box into place

Take the 1/16 x 1/4 stick and mark and cut as per the stabiliser



Glue in all the cross braces as you go



Cut and install the hinge braces. Mark the locations of the hinges to the leading edges

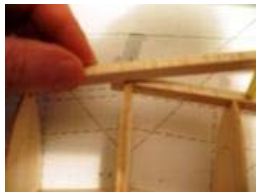
Glue on the 1/6 top sheet.

The assembly glued together. Note the hinge locations marked on the leading edge

Cut the spars to fit. Glue joint.

Lightly push the spars into the ribs and glue

Take the 1/4 x 1/4 leading edge and pin, then glue into place



Again, mark where the spars meet, cut and glue together

Take the 3/4 x 1/16 x 36 TE sheet and join to make one piece for the trailing edge

Mark the location of the TE sheet on the ribs, then glue into place

Mark the location of the 1/8th ply bellcrank support. Notch out the ribs so it sits flush with the top of the ribs

Glue the bellcrank support into place

Glue and pin the 1/16th leading edge sheeting to the leading edge.

When dry, bring the sheeting back to the main spar, glue and pin in place.

Once Dry, repeat the process on the other side. Glue the sheeting to the leading edge

Pin and allow to dry. Again, repeat the step of gluing to the spar and ribs

In the centre, overlap the sheets, mark the sheet where to cut when glued.

Mark the location of the spar at the centre and on the sheeting at the tips.

Lay a straight edge between the marks. Trim the sheeting to suit.

Cut through both LE sheets to create a nice joint line

This is how the joint should look

Glue the Sheeting to the rib and spar

Glue the centre section into the location marked on the bottom sheet

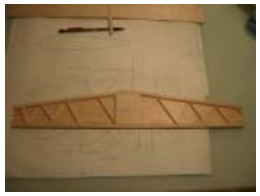
Mark the locations of the hinges to the trailing edge to install the hinge braces

Cut and glue in the 1/4 square hinge braces to the location marked

Mark and cut the 1/16 x 1/4 stick for cross braces

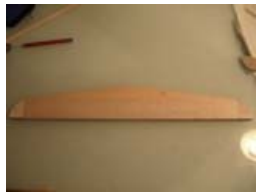
Glue the cross braces in place as per plan

Repeat on the other side to form the stabiliser



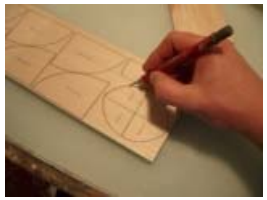
The assembly should no look like this. Glue the 1/16 sheet stab top on and set aside to dry

Glue the 3/8 sheet stab tips to both ends of the stabiliser



The completed stabiliser assembly can now be set aside for sanding.

STAB & ELEVATOR CONSTRUCTION

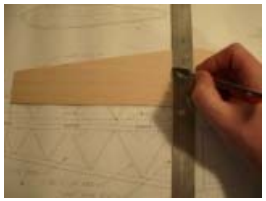


Cut the tags of the laser cut stab and elevator parts. There are 3/8 and 1/16th sheets

Here are the required parts for assembly of the stab and elevator

Glue the 4 pieces of 1/16th sheet that make up the middle of the stab together.

Lay the 1/16 balsa stab bottom sheet over the plans and mark the locations of the centre section



.Continue to mark the locations of the cross braces to the bottom sheet

Take a 1/4sq stick and mark and cut to length on the trailing edge of stab

Mark and cut 1/4sq stick to the leading edge of the stab also.

Pin the leading edge 1/4sq stock to the sheet and overlay the two pieces to create a lap joint

Glue all 1/4sq pieces to the bottom sheet.

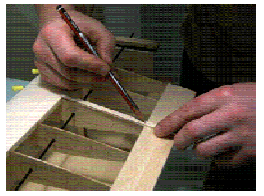
Pin and leave to dry.

Take some more 1/16th sheet for the centre sheeting. Mark and cut to length

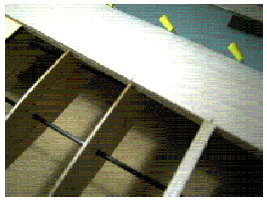
Join the 1/16th sheet to cover the entire centre section

Glue in place. Note: Try not to have square edges on the sheeting

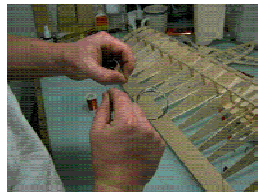
Take the 1/16 x 1/4 cap strip stock, mark and cut to length.



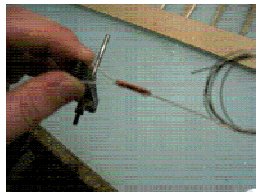
Repeat this step until you have all the capstrips cut. Glue in place



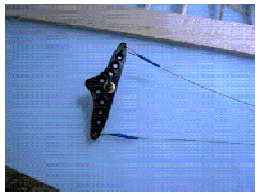
TIP: If you put a small pencil mark in the rib location on the sheeting it gives a reference point to make sure the caps are centred.



Bellcrank: Cut the leadout wire in half. Install into the bellcrank in your favoured way.



We like to use the copper wire binding method, but crimps are fine



The assembled bellcrank ready to install

Cut the extra material from the ribs. For this we taped a No 11 blade to a handle to work at 90 degrees.

Put the bellcrank post in to ply support hole in the bottom of the wing.

Install the top bellcrank support as per the bottom one. Glue in place.

Install the LE sheeting the same way as the bottom sheet.

Repeat on the other side

Install the centre sheeting as per the bottom. This time leave access for the push-rod exit. Glue in place

Landing gear: Assemble the maple undercarriage blocks

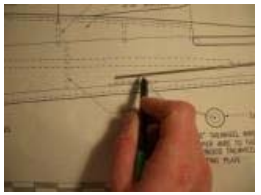
Glue the up-stand block and leave to dry

Trim the paper template to fit correctly.

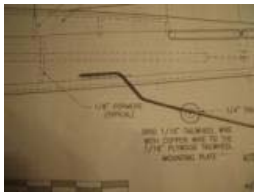
Remove the template and lay over the canopy material. Amrk the out

Lightly score the canopy where shown on plans to make fit.

Glue and pin canopy in place, leave to dry.



Take the 1/16th piece of music wire and mark the bend locations for the tail wheel



Bend the wire to suit. Lay over plans to check the bends are accurate.

Glue the 2 1/32 ply tail wheel mounts together and mark the location on the fuselage

Put the tail wheel wire into place, Wrap the wire and ply mount with copper wire, then epoxy

Drill a hole in the location marked earlier, install the ply mount inside the fuselage , glue in place

Hollow out the bottom block to approx 1/8th thick

Glue the bottom block in place to the rear of the fuselage.

Temporarily install the tank you are going to use to check the fit

Take the 1/8: tank floor and glue in place

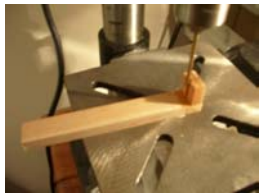
Mark the location of the cooling vents on fuselage.

Install the cowl, and use a dremel tool or similar to cut the holes.

To fit the wing, you need to remove the lower section of the fuselage.

Mark and cut at the location shown on the plan.

Canopy: To make cutting the canopy sheet the right size, use a paper template to get the correct shape



Drill a 1/8" hole though the blocks to take the gear wire

The completed landing gear blocks should look like this

Mark the location on the landing gear on the LE sheeting as shown on plans. (This is from R4-R7)

Cut the sheeting and trim the ribs to fit the blocks. Glue the blocks in with 30 minute epoxy.

Tape the blocks in place until dry

The Landing gear blocks installed. You can add plywood bracing if you want to beef up this area.

Take the trailing edge stick wood and join to make one length

Glue the trailing

Tape or pin the trailing edge in place, leave to dry.

Wingtips: Remove all the laser cut parts from the sheets

Glue one tip block to the top of the tip sheet, do this on both tip sheets.

The wingtip components. Select one of the tips as the outboard one. We will work on this now.

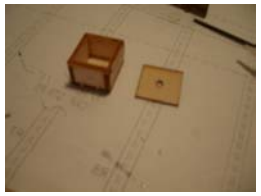
Glue another tip block to the lower surface of each tip sheet.

The assembly should look like this

Take the tip piece and glue in place. Repeat on the lower side

Weight box: Remove the laser cut ply parts from the sheet.

Glue the parts together. These are cut to work like a jigsaw. Very easy to assemble.



The weight box assembly should look like this

Carve and sand the cowl to shape.

Install the engine temporarily to get correct alignment.

Mark the location of the glow plug, venturi

Cut and sand the openings to allow the cowl to fit over the engine

Mark and cut the outlet for the exhaust stack (Note: this is oversize to accept muffler

Install the 1/8" cowl hold-down to the fuse. (Install 4/40 blind nuts to rear first)

Install the cowl with 4/40 bolts temporarily.

Sand the fuselage bottom to shape. Sand the cowl to fit flush with the fuselage

Break the tack glue points on the fuselage bottom and remove, hollow out, then re-glue

Cut the fuse top sides to shape, sand lightly the cut edges

Apply glue to the fuselage sides, formers and top

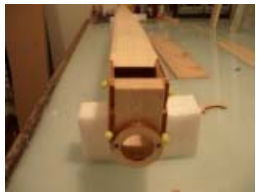
Pin the fuselage top side in place and leave to dry

Repeat the process on the other side. Leave to dry.

Pin the Fin in place and mark the location on the fuselage top.

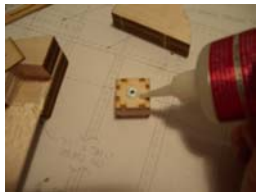
To keep the area where the fin is installed flat, lay a 1/4: wide strip of tape to the top if the fuselage. Sand fuse-lage to rough shape

Take the 2 laser cut cowl sides and pin in place.



Glue the 3/4" front block in place.

Glue the 1/8" plywood nose ring half, and cowl hold-down in place.



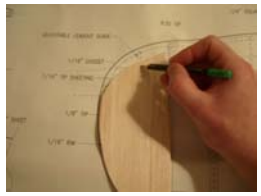
Install the blind nut into the bottom of the box and glue in place.

Mark the location of the weight box the wingtip block.

Cut out he balsa to accept the box and glue in place. Leave a 1/16th or bigger at the bottom for a balsa cover.

Glue a 1/16th cover onto the box lid. This will give you some material to shape when sanding

The wingtip box installed. Note: The balsa cover sits flush with the top of the block



Inboard tip: On the inboard tip, mark the location of the adjustable leadout guide.

Mark and cut a slot for the guide to fit into. This is a reference point at this stage

Pin a tip block to the top of the wingtip and mark the location of the guide. Un-pin, and cut a slot for the guide in the block.

Remove excess tip wood to allow the lines to pass through the tip.

Glue the tip piece in plane and glue in the adjustable guide.

Glue to other tip piece in place to the lower side. Glue the other tip block in place also.

Pin the complete wingtip assemble to the wing.

Mark the wing patter onto the wingtip assemble to give you reference lines to shape to.

Use a razor plane to remove all access wood to the reference lines you just made.

Rough shape both tips to the desired shape. You will sand thee later, so this does not have to be perfect.

Glue the wingtips to the wing.

The wingtips installed
Note: there should be a slight overhang on the tips to accept the flaps.

Trim balsa along edge of F5 to finish flush.

Select and mark the 1/8 x 3/4 stock for the fuselage top.

Do the same with the 1/8 x 1/2 stock and glue together

Apply glue to the top of the formers, install the piece you just glued. Leave to dry

Glue the two tail 1/2" tail block pieces together and apply glue to the rear of the fuselage

Glue the tail block in place. Make sure to glue to the fuselage top.

Use a razor plane or rough sandpaper to shape the tail block to correct profile

Take 1/16th sheet and mark and cut to length for the fuselage sides (top).

Cut the pattern from the plan, tack to the sheet stack the 1/16th sheet and hold firm

Lay the 1/16 sheet on the plans and mark length over the section from nose block to canopy

Cut the sheet to length

Glue one side to the fuse-lage, pin and let dry

Spray the sheet with water to soften, do not spray too heavily. Just enough to wet

Use an iron to heat and steam the sheet to shape over the formers

Once steamed the sheet will hold the shape

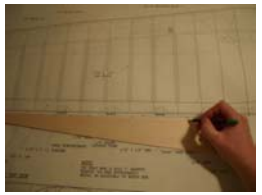
Mark the top of the fuselage onto the sheet

Cut along the mark to give a new edge to join to the fuselage

Turn the fuselage over and glue the formers and side

Note: Bending the 1/16 sheet around the formers can be done in a number of ways. The above method is this builders preferred method only. Use you favoured technique for this process.

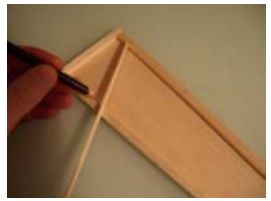
Flaps: Remove the laser cut parts from the sheets



Mark the location of the1/16 brace pieces onto the flap bottom.

Glue the !/4 x 1/4 stock to the trailing edge, leading edge and sides

The flap should now look like this.

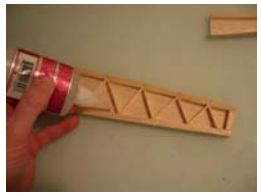


Mark and cut the 1/16th diagonal bracing to fit.

Glue the bracing into place

Cut the flap where the laser cutting marks show, the tip piece glues to the wing,

As seen here, the flap is to the left, the additional wing-tip to the right. Install the "lucky boxes" (see elevator assembly)



Apply glue to the top of the flap structure, the 1/4sq and cross bracing.

Glue the top sheeting to the flap to complete. Repeat the process on the other side.

Take the wire flap joiner and mark the locations for the bends. Bend the wire to suit

Take a sharpened piece of brass rod and cut a groove into the flap to allow the joiner wire to sit flush

Install the joiner wire to check fit. Repeat on other side

Position and pin the flaps into the final location. Mark where the control horn meets the trailing edge

Cut a small relief in the trailing edge to allow the horn to sit flush, and have full movement

Mark and cut the slots for the hinges. Use a hinge slotting tool or similar

Cut a hinge barrel relief slot into the LE of the flap to allow a closer fit

The hinge barrel should sit flush with the LE of the flap.

Tack glue the nose ring and install to the front of the fuse.

Use a razor plane to shape the balsa top block to blend into the nose ring

Continue to shape the nose of the plane with the razor plane and course sand paper.

Remove the top block and hollow out to 1/8th thick-ness

Apply glue to the fuselage sides and 1/8th sheet where top block will meet

Glue top block in place.

Apply glue to nose ring

Install nose ring lining up with the pencil lines you put on earlier.

Remove additional material from the nose filler block with a Dremel tool or sand-paper

Mark the location of the engine lugs using a dead centre locator or pencil

Remove the engine and drill 4/40 holes through bearers on the marks

Install the 4/40 blind nuts to the top of the bearers. (you will need to enlarge the holes to fit these)

Mount the engine with 4/40 bolts. This is for aligning the spinner/nose ring

Take the 3/8 Top block and mark to size (we did this before mounting engine)

Cut top block to size

Tack glue top block in place (you need to break these tacks later)

Take the 1/8 ply nose ring and centre around engine (use a spinner to get the exact location.

Mark with pencil the nose ring location.

Mark and cut slots into the trailing edge of the wing and dry fit the flaps.

Once all hinges are in place an flaps are aligned, pin in the neutral position, Make sure they cannot move.

With the flaps pinned, bend, cut and install the pushrod from the bellcrank.

Take the stab assembly and also mark the joiner wire for bending.

Bend and install the joiner. Install the hinges the same way as the flaps.

Take the carbon pushrod and cut to length. Bend

Fuselage Construction

Locate all the fuselage pieces and cut tags from sheets

Assemble all pieces to ensure they are all there

Take the 1/8 balsa sides and glue the front sections to the rear to form a complete side

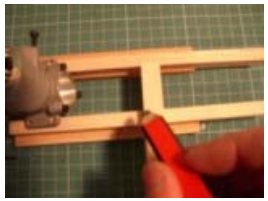
Tip: It helps to hold the pieces together with tape when gluing

Mix some slow cure epoxy to glue the ply doublers to the fuse sides

Lightly coat the ply with the epoxy, do this to both doublers. Make sure you have a left and right side

Glue the doublers to the fuse sides, weight down and let dry

Take the maple motor mounts and sit the engine you are going to use between them to get the right spacing.



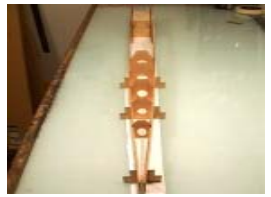
Take the maple cross pieces and mark to fit between bearers

Assemble the entire motor crutch and fuselage sides. Square up and weight down. Leave to dry.

We now move to the rear of the fuselage. We have set up a basic jig to hold the fuselage to the right shape

Install fuselage formers F6 to F10 between the fuselage sides. Line up with the marks on the fuse sides.

Make sure the formers are square and glue into place



The fuselage should now look like this.

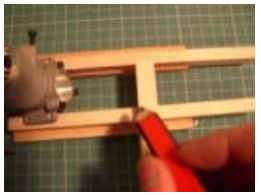
Take formers F3-F5 and install to the front of the fuselage. Make sure they are square

Ensure the formers are at the same height, Glue into place

Install the 3/4 x 3/8 nose block

Place the engine into the fuselage and hold in place temporarily with a rubber band

Note: For the fuselage assembly, we took some 1/8" plywood cut to an "L" shape and glued to the glass worktop at regular spaces along the plan. This is an easy method to ensure the curvature of the fuselage is constant. You can use a fuselage jig to achieve the same effect.



Do this in 3 locations as per plans

Cut the cross braces to length and square off ends with sand paper

Mark the locations of the cross braces onto the bearers in the locations shown

Tack glue the cross braces to the bearers. Making sure they are square.

Take a 1/8th Drill and drill through the bearer into the cross brace to insert dowel

You can now break the tack glue joints, ready to epoxy the engine crutch together.

Use slow cure epoxy to glue the cross braces to the bearer.

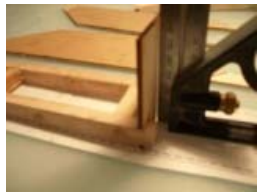
Cut the 1/8th dowel to length and epoxy into the bearers and cross braces. Leave to dry

Mark the locations of the engine crutch on the fuselage. Make sure these are accurate.

Transfer the marks to the other fuselage side again ensure these are accurate

Here is the basic assembly for the motor crutch and fuselage front

Mark the location of fuselage former F2 on the bearers



Epoxy F2 in place with slow cure epoxy making sure it is square to the bearers

Apply epoxy to the 3/32 plywood crutch brace and install onto the crutch assembly

Once dry the motor crutch is complete.

This step is NOT necessary but for added stiffness we have added 1/8 balsa to the top of the crutch

Apply slow cure epoxy to the motor crutch assembly, both sides.

At this time, we are also taking the opportunity to fuel proof the engine/tank bay with epoxy

Tip: Use 3m repositionable spray to affix cut out sections of plan to the glass worktop. This gives a flat usable surface to work off, and you can build directly over the plan.

Once finished, you can easily peel the plan off the glass.