Escapade Two VLA

Operators Manual

This manual applies to aircraft

G-________   Serial No: LAA ______

Approving Authority

Light Aircraft Association
Turweston Aerodrome
Nr Brackley
Northants
NN13 5YD
United Kingdom
by delegation from the United Kingdom Civil Aviation Authority

Manufacturer

The Light Aircraft Company Ltd
Hanger 4 Little Snoring Airfield
Little Snoring
Norfolk
NR21 0JL
United Kingdom

This manual is a legal document that is approved for use with Escapade Two VLA aircraft issued with a United Kingdom Homebuilt Permit to Fly. It must remain with the aircraft, and not be amended or altered without authority from either the LAA or UK CAA.

All pilots should read this manual before flying as pilot in command of the aircraft to which it refers.

Approved for issue:-

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TABLE OF AMENDMENTS

Amendment No.	Date incorporated	Signed
1	17 October 2003	(incorporated at printing)
2	2 November 2013	VLA Upgrade
3	17 December 2021	Paul R. Hendry-Scott

1 Introduction

1.1 The Escapade Two is a conventional 3-axis dual controlled VLA aeroplane. It was certified in the United Kingdom to the requirements of British Civil Airworthiness Requirements (BCAR) Section S issue 2; CS VLA

1.2 This manual is not intended to teach you to fly the aircraft, or to build it. Learning to fly should be accomplished under the supervision of a light aircraft flying instructor experienced on the type. At the time of writing it is legal to learn to fly, or complete differences training, on an Escapade Two so long as you are the sole owner of the aircraft (or a member of their immediate family). A separate build manual exists to instruct you in building an Escapade Two from a kit.

1.3 What this manual will do is provide the information that a qualified pilot requires to fly this aircraft safely (although a conversion by a QFI familiar with the type is recommended), and to carry out routine maintenance and minor repairs. All modifications to a British Escapade Two must be approved either by the Light Aircraft Association, or the UK Civil Aviation Authority. In general, the LAA offers the cheapest and most straightforward route for approving modifications.

1.4 The licenses that would be required to fly this aircraft (except under the supervision of an instructor) are a UK PPL, LAPL or NPPL A, with or without operating restrictions, NPPL(SEP), a UK or JAA PPL (SEP), a BCPL (Aeroplanes), a CPL (Aeroplanes) or an ATPL (Aeroplanes).

1.5 Pilots should also be aware that the tail wheel configuration of the Escapade Two requires slightly different handling during taxiing, take-off and landing to the nose wheel-configured aeroplane. It is therefore equally important that any pilot intending to fly the tail wheel configuration should obtain instruction in the correct handling techniques, from a qualified instructor, if unfamiliar with tail wheel aircraft.

1.6 This aircraft must be operated using two separate logbooks, one for the airframe and one for the engine (CAP 389 & 399). All entries must be made in the logbook in ink and within 7 days. If the aircraft is fitted with an in-flight adjustable propeller, a separate logbook must also be held for that; it is recommended that CAP400, which is issued by the CAA and available from most pilot shops is used for this purpose.

2 Description of the Aircraft

2.1 Ancestry. Like the Easy Raider, the Escapade Two was developed to meet the niche in the UK aviation market for a microlight that looked and handled like a conventional aircraft, but which conformed to the lower weight and license requirements of microlights and was easily towable and stowable. In addition to this, it has side-by-side seating and full dual controls. As a natural progression the Escapade Two continued in its development expanding its capability into a 499kg MTOW VLA 3 axis aircraft.

2.2 Construction. The Escapade Two fuselage is a powder coated tubular steel construction, covered with heat-shrunk polyester fabric and finished with a proprietary coating such as the Oratex system. The wings consist of parallel tubular spars with wooden ribs bonded to them, aluminium trailing edges and fibreglass tips. The wings also support both flaps and ailerons. All surfaces are covered in a modern heat-shrink fabric and finished as per the fuselage. The tail surfaces are also made of tubular steel construction, and are wire and tubing braced. The surfaces are finished as per the rest of the aircraft. The windscreen, windows and doors are made from thin transparent polycarbonate sheet.

2.3 Flying Controls.

2.3.1 Pitch control is through a conventional elevator controlled by dual control sticks in the cockpit. The linkage between them consists of a series of levers and push rods.

2.3.2 Pitch trimming is through a trim tab fitted to the left side of the elevator. This is operated using a mechanical system operated via a cable. An electrically operated system is also available controlled by a rocker switch on the instrument panel. The electric trim, if fitted, also uses an LED gauge adjacent to the rocker switch to show trimmer setting.

2.3.3 Roll control is through conventional ailerons, controlled by dual control sticks in the cockpit. The sticks are linked to the ailerons by a series of levers, cables and pulleys.

2.3.4 Yaw control is through a conventional rudder, both pilot and passenger have a set of pedals which are interlinked and control the rudders. Connection is by a series of levers, cables and pulleys. The rudder self centres aerodynamically

2.3.5 Earlier kits had drum brakes on the main wheels effect braking. These brakes are operated by heel pedals and provide both stopping and differential steering. Connection between the brakes and the heel pedals is by Bowden cable. Later kits are equipped with hydraulic disc brakes operated by toe brake pedals connected to master cylinders, optionally a set of interconnected slave cylinders can be installed to allow braking on the passenger side as well.

2.3.6 The tail wheel (if fitted) is steerable and connected to the rudder mechanism in the same sense (push right, yaw right, turn right). The nose wheel (if fitted) is of the self-castoring type. Low speed steering is achieved by differential braking.

2.3.7 Flaps are fitted to the aircraft and are operated by a central push button lever in the cockpit. Connection to the flaps is via cables. The flaps are not mechanically interconnected so that in the event of a cable failure a different flap setting on each wing can occur; however, flight-testing has shown this does not cause severe handling difficulties and is easily controlled by use of the rudder and stick.

3 Limitations

3.1 Introduction. This section includes the basic operating limitations for the `Escapade Two`. Additional limitations can be found on LAA TADS Sheet 345

3.2 Units. When noting limitations, it is important to ensure that the limitations that you are using use the same units and calibrations as the instruments in the cockpit. The limitations below show kts CAS (Calibrated Airspeed) but your aircraft may have an instrument in mph, and in any case will read IAS (Indicated Airspeed). The difference between IAS and CAS is basically the accuracy of your pitot-static system. The IAS limits for your aircraft were determined when the aircraft was test flown, and are shown in Annex A to this manual. These will also be a placarded in the cockpit, however space is allowed below for you to insert the IAS limitations and calibration details for your aircraft.

3.3 Operational Limitations

3.3.1 The `Escapade Two` must only be flown in day VMC conditions, within sight of the surface. It may not be flown over built up areas.

3.3.2 The `Escapade Two` is certified to a "permit to fly" standard. This prohibits aerial work, other than flying instruction of the owner.

3.3.3 This aircraft is certified to a UK only standard, this means that permission is required from the host country to fly it overseas. However, a reciprocal agreement for homebuilt aircraft means that no permission is required for flights to other ECAC (European Civil Aviation Conference) member states.

3.3.4 For flight the following instruments must be fitted and serviceable: ASI, altimeter, compass, slip-ball, engine instruments as the engine manufacturer requires, or as are necessary to operate the engine within its limits, fuel quantity indicator and oil quantity indicator e.g. dipstick.

3.3.5 It is recommended that the `Escapade Two` is not flown where a crosswind component above 8 kts (tailwheel) or 10kts (nose wheel) is predicted until a pilot is very familiar with the handling of the aircraft.

3.3.6 Do not fly above 10,000ft standard pressure altitude without the use of personal oxygen.

3.4 Flight Limitations

3.4.1 Never exceed speed Vne is 120 kts IAS

3.4.2 Manoeuvring Speed Va is 70 kts IAS

3.4.3 Flap limiting speed. V_F is 67 kts IAS

3.4.4 Maximum Bank angles are 60° either way.

3.4.5 Maximum Pitch attitudes are 30° nose-up, 30° nose-down.

3.4.6 Normal acceleration limits are +4 / -2g.

3.4.7 At least 55kg (121 lb / 8 stone 9lb) must be in the cockpit for flight, no more than 120kg (264 lb / 18 stone 12lb) may be carried in each seat.

3.4.8 Maximum Take-off weight is 499kg.

3.4.9 Aerobatics and intentional spinning is prohibited.

3.4.10 No more than 35kg is to be carried in the baggage area.

3.5 Engine Limitations

3.5.1 The limitations for the engine are contained in Annex B; they are also placarded in the cockpit.

ASI Calibration Card for Escapade Two G- ____

Kts CAS (calibrated)	33 (V_{S0})	35 (V_{S1})	40	47 (Best climb / glide)	50 (Approach)	60	66 (V_F) (Flap limit)
_____IAS (Indicated)							
Stall speeds are MTOW; less at lower weights.							
Kts CAS (calibrated)	70 (V_A)	80	90	100	110	110	114 (V_{NE})
_____ IAS (Indicated)							

4 Flying the Escapade Two

4.1 General

The Escapade Two can have its wings folded to enable transportation on a trailer and/or storage in a smaller space, and to this end it is important that the procedures for this operation are followed precisely.

4.1.1. Folding the wings

- Undo the screws (or Camloc type fasteners if fitted) holding the turtledeck in place and remove the turtledeck completely.

- Remove the safety clip from the forward spar-securing pin.

- Holding onto the wing jury strut (to stop the wing swinging uncontrollably) push out the securing pin; the wing can then be folded back. Be aware that the tension will have been removed from the aileron cables, so they will drop as you move the wing back. A tip is to use a piece of pipe lagging foam on the trailing edge: if placed across the aileron and wing tip this will keep the aileron level and will also act as a cushion between the wing and fin. The wing is held in position by attaching the transport jury struts between the tabs on the horizontal stabiliser on the fuselage and the lift strut attachment point on the wing.

- Repeat the same procedure for the other wing. Secure the wing as above and ensure that all nuts on the transport jury strut are tight.
- If you intend to trailer the aircraft, be aware that the propeller needs to be secured otherwise wind action could turn the prop and it may hit parts of the trailer. Aircraft should be secured by both the main gear and nose/tail wheel when being transported on a trailer.

WARNING. Whilst it is safe to transport the aircraft on a trailer with the wings folded, under no circumstances tie the aircraft down by the undercarriage legs. Suitable tie-down points are the wheels and undercarriage attachment points. Tying the aircraft down by any other part can cause damage which may not be apparent during inspection but can cause failures during flight.

4.1.2. Unfolding the wings.

- Undo the transport jury strut nuts and remove the bolt from the lift strut, swing wing forward (use the lift strut) and carefully feed the spar end onto the headrack attachment point. Pull on the wing to align the pinhole, insert the pin and then the safety clip. Repeat the procedure for the other wing. Ensure that the transport jury struts are completely removed from the aircraft.
- Fit the turtledeck into position and secure with the five screws; camloc type fasteners if substituted must be secured.
- Ensure that any packaging/transportation material is removed from the aircraft.

4.2 Pre-Flight Inspection

4.2.1 Engine. Carry out an engine pre-flight inspection following the instructions contained in the Engine Manual at Annex B.

4.2.2 Aircraft. The following is a brief summary of the minimum pre-flight inspection; if you are unsure, it does no harm to increase the number of items on your inspection and you should also check the general condition of the fabric covering throughout the aircraft.

Inside the Cockpit

- Ignition switches OFF
- Parking brake (if fitted) ON
- Condition of throttle controls and throttle cable
- Condition of choke and choke cable
- Condition of carburettor heat lever and cable (if fitted)
- Condition and security of all flying controls
- Check condition of all instruments

- Check harnesses are properly fitted and not frayed
- Check all baggage is secure.
- Check seat adjustment pins are correctly functioning, that secondary seat restraint straps are serviceable and cushions are secure.
- Check sufficient fuel for the planned flight
- Check fuel hoses from the engine, and the fuel filter.
- Check condition of hydraulic brake lines (if fitted)

Underside

- If the aircraft has not flown within 24 hrs or since last fuelled, drain a small amount of fuel from the drain tap and check for water or sediment.
- If fitted verify security of radio aerial
- Condition of fabric.

Starting from the port side, inspect:

- Condition of door, windows, hinges and catches (if fitted)
- Condition of the undercarriage leg, bungee cord, brake cables or hydraulic lines and disc brake (if fitted), actuators and security of wheel and attachments.
- Condition of tyre, valve, and correctly inflated.
- Condition, security of nose gear, tyre (correctly inflated?) and valve - if this configuration is used
- Forward spar/ headrack clevis pins and safety clip/ring
- Fastening of the trailing edge spar to the headrack
- The fuel tank outlet connections
- Lift strut attachment to fuselage
- Fuel filler cap in position and secure. Vent clear and facing forward
- The port wing struts and jury struts and fastenings
- Ensure that transportation jury strut bolt has been removed from top of lift strut
- The port wing leading edge
- The port wing wingtip fairing
- The port strobe light (if fitted).

Walk around to the port wing trailing edge, inspect:

- The port aileron and its hinges, fixings and cable attachments
- Move the aileron, confirm there is no free play between it and the other wing aileron
- The port flap and its hinges, fixings and cable attachments
- Look over the upper and lower wing surfaces for any distortion or damage
- The flap return spring operation
- The flap and aileron cable condition (on exit from wing into fuselage)
- Turtledeck condition and security
- Fixing and security of GPS aerial (if fitted).

Walking back to the tail, check:

- Tension on the fuselage fabric
- Ensure that transportation jury struts and bolts have been removed from the horizontal stabiliser tabs.
- Condition of stabiliser wire fastenings and cable condition (carefully, a broken strand can be very sharp!)
- Stabiliser attachment fittings
- Elevator and rudder hinges
- Condition and attachment of the elevator trim tab and actuator connections

- Tension and condition of the tail plane fabric
- Condition and security of tail wheel if this configuration in use
- Rudder cables and shackles
- Look forward from behind the tail: any airframe distortion should be visible as an asymmetry.

<u>Walk to the starboard side and check:</u>

- Starboard elevator hinges
- Condition of stabiliser wire fastenings and cable condition (carefully, a broken strand can be very sharp!)
- Stabiliser attachment fittings
- Tension and condition of the tail plane fabric
- Elevator linkage and the pushrod.

<u>Moving forward along the fuselage inspect:</u>

- Tension on the fuselage fabric
- Look over the upper and lower starboard wing surfaces for any distortion or damage
- The flap return spring operation
- The flap and aileron cable condition (exit from wing into fuselage)

<u>Moving along rear edge of wing, inspect:</u>

- The starboard flap and its hinges, fixings and cable attachments
- The starboard aileron and its hinges, fixings and cable attachments
- Move the aileron, confirm there is no free play between it and the other wing aileron
- The starboard strobe light (if fitted)
- The starboard wing wingtip fairing.

<u>Walk around to the front of the wing, inspect:</u>

- The starboard wing leading edge
- The port wing struts and jury struts and fastenings
- Ensure that transportation jury strut bolt has been removed from top of lift strut
- Check security and fitting of Pitot and Static vents and that they are not obstructed
- Fuel filler cap in position and secure. Vent clear and facing forward
- Condition of the tyre, undercarriage leg, bungee rope brake cables or hydraulic lines and disc brake (if fitted), actuators and security of wheel and attachments
- Condition of tyre inflation valve.
- Fastening of the trailing edge spar to the headrack
- The fuel tank outlet connections
- Pitot and static tubing condition and connections
- Forward spar/ headrack clevis pins and rings
- Lift strut attachment to fuselage
- Condition of door, hinges and catches (if fitted)
- Condition and security of exhaust system and attachments
- Condition, cleanliness and security of the windscreen
- Condition and security of cowlings
- Air inlet (NACA) scoops secure and unobstructed (if fitted)
- Condition and security of propeller
- Condition and security of spinner (if fitted)

4.3 Starting. Standard manual pre-start checks are recommended. The actual starting procedures for a particular engine are contained in Annex B to this manual. Standard manual checks are as follows :-

1. Aircraft, Crew, Equipment, **Secure**
2. Ensure seat adjustment pins are correctly engaged and seat is locked in position, ensure restraint strap is correctly adjusted
3. **Throttle** full and free, then CLOSED
4. If engine cold, **choke** ON
5. **Throttle** CLOSED
6. **Area** around and behind aircraft clear
7. **Ignition** both switches ON.
8. **Pull**, start the engine. (Pull fits the acronym, normally an electric start will be fitted and operated by fully turning the spring-loaded ignition switch. After starting this switch should spring back to "both").

(It may be necessary to alter these depending upon engine fitted)

4.4 Taxying. – Nosewheel configuration. It is important to be aware that in the nosewheel configuration, the nosewheel is castoring and not steered by the rudder pedals. Steering is through a combination of wind effect on the rudder, and if a tight turning circle is needed, the use of differential braking – particularly at low speeds. A little practice is needed, but the aircraft can be steered effectively on the ground. In strong wings, keep the stick into wind.

4.5 Taxying – Tailwheel configuration. The aircraft will taxy on whatever course you wish without difficulty using a combination of throttle, brakes and tail wheel steering. In strong winds, keep the stick fully longitudinally with the wind, and laterally into wind (e.g. if the wind is coming from the half past one position, the stick should be at the half past four position). It is easiest to turn using the tail wheel steering (rudder pedals), but this can be supplemented for a very tight turn by using the brake on the side to which you are turning.

4.6 Prior to take-off. It is recommended that the following standard pre-take-off checks be used. The pilot must ensure that the engine has been run successfully at take-off power prior to take-off (and has in any case run for several minutes) and that the choke is off.

1. **Controls** full and free
2. **Check** seats are locked in position and restraint strap correctly adjusted
3. **Choke** off
4. **Harnesses** secure
5. **Instruments** all serviceable, reading correctly.
6. **Fuel** on, sufficient for the flight, filter clear of debris, pressure in limits.
7. **Flaps** full and free and set for take-off (normal operation would be 15° i.e. 1 first notch.)
8. **Ignition** checked for mag drop and selected to both on
9. **Trim** set to take-off position
10. **Wind** speed and direction checked, and suitable for safe take-off on selected runway
11. **Approach** to the selected runway clear of aircraft

12. **Power** checked, and the pilot is satisfied that the aircraft can sustain take-off power. (Engine checks are done at less than full power – see the engine manual, but pilots should check that sufficient power is available at the start of the take-off run.)

4.7 Take-off. Take-off is conventional for a tailwheel aircraft. As full power is applied, the stick is held fully forward, until the tail rises when the stick is moved aft to the neutral position and checked until sufficient flying speed has been obtained. During the take off roll the aircraft is kept straight by using the rudder pedals. Take–off for the nose wheel version is also conventional for the type i.e. full power is applied and a small amount of aft stick is held to lighten the load on the nose wheel. Rotate at **35 kts** ________ IAS] and the aircraft should fly-off at around **40 kts CAS** [_______ IAS**]**. An initial climb should be established at 50 **kts CAS** [_______ IAS**],** it is not advisable to allow the speed to fall below the best climb speed of **47 kts CAS** [________ IAS] during the climb-out. In crosswinds, the aircraft will weathercock into wind immediately it is airborne. Flaps (15°) if set can be retracted once 300ft has safely been achieved, although this is only necessary for very short-field take-offs.

4.8 Landing. After checking that airspeed is within the white arc (flap limiting range) and trimmer neutral, flap for landing should be set initially at 15° (1st notch) on base leg with 30° (2nd notch) being selected on finals. If a very short landing is required then the final stage of flap 40° can be deployed on short-finals. Be aware that pitch changes will occur with the use of flap. It is not, however, recommended to trim out the full-flap trim change and the control force should be held on the stick. Generally the `Escapade Two` should be landed from an approach speed of about **50 kts CAS** [__________ IAS] for nose wheel, slightly (~3 kts) less for tailwheel, although in turbulent conditions, handling can be improved by increasing this by 5-10 kts and possibly by using less flap than normal. Round out should be initiated at around 8-10 ft and hold-off 1-2ft above the runway. The aircraft should be kept straight, using the rudder. Touchdown should be at about the stall speed. Once experience is gained, pilots may prefer to reduce approach speeds when flying at lower weights.

4.9 Landing in a Crosswind – Nosewheel Configuration. Landing in even a small crosswind component can create a significant amount of drift on the approach; however, crosswinds of up to 10 kts may be handled without significant difficulty. The preferred approach is to fly a "crabbed approach" straightening with the rudder in the last few feet and holding the aircraft on the runway centreline using the stick. Once main wheel touchdown has been made, a slight forward movement of the stick is usually required to prevent the aircraft bouncing back into the air. The stick should then be brought back as airspeed decreases during the landing roll.

4.10 Landing in a Crosswind – Tailwheel. Crosswinds of up to 8kts may be handled without significant difficulty. The preferred approach is to fly a "crabbed approach" straightening with the rudder in the last few feet and holding the aircraft on the runway centreline using the stick. It is possible that the into wind and tail wheels touch the ground simultaneously. The stick should then be brought back as airspeed decreases during the landing roll. In particularly strong or gusty conditions, the pilot may find a 2-wheel landing preferable.

CAUTION – It is possible that the crosswind may not be constant. Care must be exercised near the point of landing to keep the aircraft flying along the line of the airstrip immediately before straightening the aircraft for landing.

4.11 Cruise. If set up correctly, it should be possible to trim the Escapade Two to within **2 kts**, by use of the pitch trimmer, with power set as required. Pilots used to open-cockpit microlights are reminded that the doors (if fitted) may reduce the aircraft's directional stability and therefore occasional checks of the slip-ball are worthwhile for efficient flight – for this reason a serviceable slip-ball is a mandatory instrument in the Escapade Two.

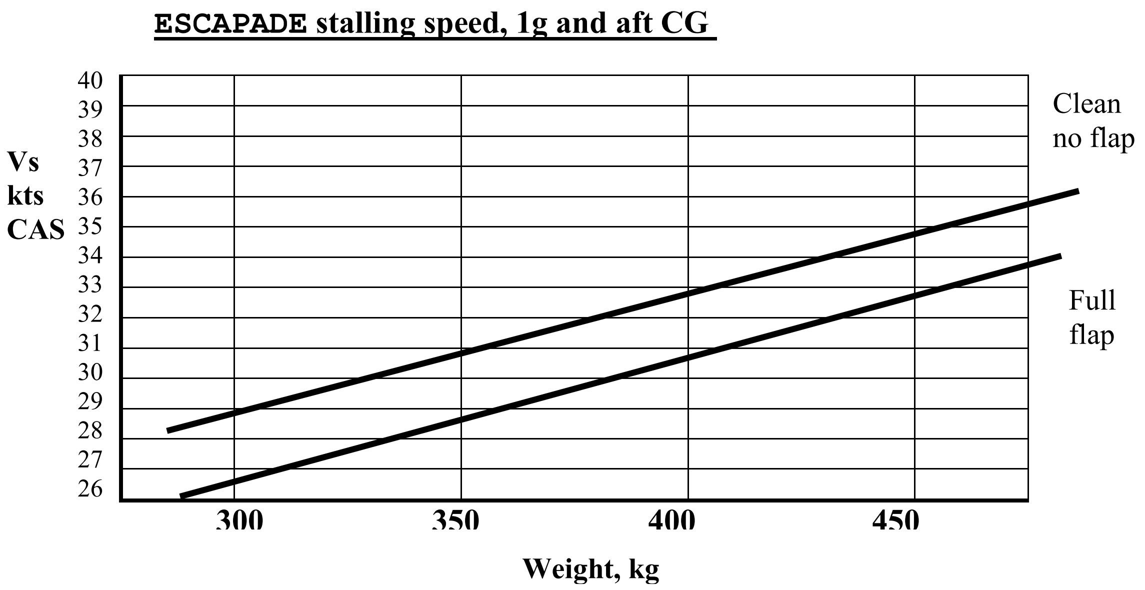
4.12 Turning. Turning is conventional for this class of aircraft, with a modest amount of rudder co-ordination required. The maximum permitted bank angle is 60°, which result in quite high back-stick forces, and a corresponding increase in power to maintain a balanced turn. As with any other aircraft, the stall speed will increase with bank angle. However, the nearly full back stick required to stall the Escapade Two gives a good warning of the impending stall.

4.13 Flight in Turbulence. The Escapade Two has a higher wing loading than most microlights and hence flies well in turbulence. In turbulence it is best to maintain a reasonably fast cruising speed, which will reduce the effects of gusts and crosswind components; however, do not fly above the manoeuvre speed of **70 kts** CAS [___________ IAS] in turbulence. Below this speed, the worst thing a gust can do to you is stall the wing or one of the control surfaces. Above this speed, it is possible for strong gusts to overstress the aircraft.

4.14 Stalling.

4.14.1 The graph below shows the aircraft stalling speed at standard conditions (1kts/s deceleration, wings level, idle power) at various weights. However, note that this is in kts CAS, and the ASI may under-read considerably at low speeds (see Annex A) giving a much lower apparent stalling speed. Stalling speed may increase slightly with forward CG.

4.14.2 Graph



4.14.3 Wings Level, Power Off. The aircraft can safely be stalled at a deceleration rate of up to 5 Kts/sec. The Escapade Two exhibits benign, traditional stall characteristics. There is very little aerodynamic warning of the approach to the stall; however, adequate warning is provided by the high pitch attitude and low IAS. The stall is instantly recognizable, by the nose drop and frequently results in full back stick; there is no tendency for the aircraft to drop a wing at the stall. Recovery is immediate upon centralising the stick and applying power and results in a height loss between stall and recovery, of approximately 100 ft if power is used, and 200 ft to establish a steady glide if power is not used.

4.14.4 Wings Level, Power On. With power applied the stall is similar to the idle case; however, stall speeds are reduced by 2 Kts CAS and much higher nose attitudes (approximately 25°nose up pitch) are experienced. Once again there is no tendency for a wing drop.

4.14.5 In Turning Flight. Stalling speed in the turn will be increased in the normal manner for any fixed wing aeroplane. Stall warning is afforded in turning flight by a relatively nose-up attitude, and back-stick. Stall recovery is immediate upon releasing back-pressure on the stick, height loss in the recovery can also be achieved by applying or increasing power.

4.14.6 Aerobatics. Aerobatics are not permitted in this aircraft.

4.15 Departures from Controlled Flight.

4.15.1 The Spin. Deliberate spinning of the Escapade Two is prohibited. It is however possible, through mishandling of the aircraft, inadvertently to enter a spin, either through stalling the aircraft in a turn or by failing to keep the rudder pedals straight at low speeds. Should this happen, the spin will be seen by a steep nose-down attitude and the aircraft will be rotating rapidly. To recover from this, close the throttle and centralise the rudder pedals and stick. The aircraft will recover rapidly, but may recover into a steep dive from which it is important to recover quickly (so as to avoid exceeding Vne) but not too quickly, otherwise the 4g limit can inadvertently be exceeded.

If flaps were selected during the spin and recovery, then it is likely that in the recovery the flap limiting speed will be exceeded. If this has happened, then land, if possible flapless, as soon as possible and have the entire flap structure and mechanism examined by a LAA inspector or other suitably qualified person before any further flight.

4.15.2 Other Departures. Other departures from controlled flight are likely either to be due to damage to the aircraft, or hazardous flying conditions. In either case, land as soon as possible and examine the aircraft, particularly the flying controls, for any damage.

5 Performance.

5.1 Performance data for your particular aircraft will be at Annex A. When using the data for planning purposes, apply sensible safety factors such as are contained in CAA Safety Sense leaflet 7B (Aircraft performance), part of which is reproduced here by kind permission of the CAA.

5.2 The best climb speed is **47 kts CAS** [________ IAS]. Whilst in general, at speeds different from that performance will be worse, when selecting a climb speed, always remember that should anything go wrong, more speed gives you more time to sort your problems out. Although climb performance may change between aircraft and with conditions, the best climb speed should not change significantly. Specific performance figures for your aircraft will be in Annex A.

5.3 The best glide speed is **47 kts** CAS [___________ IAS], at which a glide ratio of **7.5:1, or about 1.2nm per 1000 ft** may be expected.

5.4 Because microlight aircraft are very strongly affected by weight, engine condition, propeller matching, wind and air temperature, it is very hard to give any reliable information concerning the cruise performance of the Escapade Two. The captain is encouraged to plan very conservatively until sufficient experience is gained of the fuel consumption and cruising speeds at the conditions in which s/he normally flies the aircraft.

5.5 Take-off performance for short dry grass for your aircraft is contained in Annex A.

Using the figures above, the following additional safety factors should be applied to the distance to clear a 15metre obstacle (taken from CAA GA Safety Sense leaflet 7B). If unsure, always use these factors to ensure you have sufficient take-off distance available.

10% increase in weight	Multiply take-off distance by 1.2
Per 1000 ft runway height above Sea Level	Multiply take-off distance by 1.1
Per 10°C increase in temperature above 15°C	Multiply take-off distance by 1.1
Wet grass	Multiply take-off distance by 1.1
Dry Tarmac or concrete	Divide take-off distance by 1.1
Per 2% uphill slope	Multiply take-off distance by 1.1
Per 5kts tailwind component	Multiply take-off distance by 1.2
Soft ground or snow	Multiply take-off distance by 1.25

Landing performances for short dry grass for your aircraft are contained in Annex A.

Using the figures above, the following additional safety factors should be applied to the distance to clear a 15metre obstacle on the approach (taken from CAA GA Safety Sense leaflet 7B). If unsure, always use these factors to ensure you have sufficient runway to avoid using the considerately provided hedge at the far end of the runway.

10% increase in weight	Multiply landing distance by 1.1
Per 1000 ft runway height above Sea Level	Multiply landing distance by 1.05
Per 10°C increase in temperature above 15°C	Multiply landing distance by 1.05
Wet grass	Multiply landing distance by 1.1
Dry Tarmac or concrete	**Divide** landing distance by 1.1
Per 2% downhill slope	Multiply landing distance by 1.1
Per 5kts tailwind component	Multiply landing distance by 1.2
Soft ground or snow	Multiply landing distance by 1.25

6 Emergencies

6.1 Engine Failure Before Take-Off. Close throttle, apply brake (if fitted), switch off.

6.2 Engine Failure After Take-Off (EFATO). Lower nose to establish an approach speed of at least 50 kts CAS [___________ IAS], land straight ahead or near to straight ahead
DO NOT ATTEMPT TO TURN BACK from below 500ft.

6.3 Engine Failure In Flight. Lower nose, maintain best glide speed, select a landing site, make emergency radio call if time permits, as time permits check for possible reasons for engine failure and attempt re-start (e.g. ignition switches, fuel cock, lack of fuel pressure), if field is flat land into wind, otherwise uphill. Apply braking only if it is essential to stop within the distance available, and never before all 3 wheels are on the ground.

6.4 Engine Fire in Flight. Close fuel cock, open throttle fully, make emergency call if time permits, treat as engine failure in flight. Vacate aircraft as soon as possible after landing.

6.5 Fire in the cockpit. Close all ventilation, switch off all electrical devices (not the ignition unless there is an engine fire also), land immediately and vacate the aircraft.

6.6 Emergency Landing on Water. Try to land into wind with as high a nose-up attitude as possible. Before impact, pilot and passenger must be prepared to release their harnesses, it may also be beneficial to release the doors before impact. If wearing lifejackets, do not inflate them until outside the aircraft. Note that it is very hard to judge height above water.

6.7 Emergency Landing in Trees. Ensure harness(es) tight; try for low bushy trees as far as possible. Try to impact with as steep a nose-up attitude as possible.

6.8 Inadvertent Flight in Hail or heavy rain. Turn carburettor heat on (if fitted); reduce power to avoid propeller damage, fly out of the weather as soon as possible.

6.9 Inadvertent Flight in Icing Conditions. Turn carburettor heat on (if fitted), fly out of conditions as soon as possible, land as soon as possible.

7 Weight and Balance.

7.1 So long as it is kept within the placarded operating limits, and no unapproved modifications have been made since construction (including the alteration of ballast if any was fitted for initial approval), the Escapade Two can be flown with any permitted fuel, pilot and passenger weights without falling outside of its permitted CG limits. However, pilots should be aware that stick forces and displacements will become lighter with aft CG (typically a lightweight pilot, full fuel and a passenger) and heavier with forward CG (typically low fuel, and light weight pilot). Flying outside of the permitted CG limits at either extreme is potentially dangerous.

7.2 Normally next to the fuel fillers the aircraft will be fitted with a placard or placards showing the maximum fuel load that can be carried for any given total cockpit (pilot + passenger + baggage) load. It is important to obey these limitations, otherwise performance values will be incorrect and, far more importantly, it is possible to overstress and damage the aircraft.

7.3 The Escapade Two CG datum is at the leading edge of the wing. Measurements are in inches and kg.

7.4 The moment arms of the seats, fuel tank(s) and other items are shown in the Weight and CG report at Annex C.

7.5 The Escapade Two will have been weighed when first built, and must be re-weighed at intervals as laid down by the LAA and CAA (typically every 5 years or when it is modified or repaired).

7.6 Weighing should be carried out by a LAA inspector. A copy of the W&CG report must be retained in this manual at Annex C. Also, at each weighing, details of the weighing must be entered in the aircraft logbook. Full instructions on how to weigh an aircraft are contained on the LAA website, sample and actual weight and balance forms in Excel can be downloaded.

8 Routine Maintenance.

8.1 Below are the service intervals to be followed for the airframe. For engine maintenance see Annex B.

8.2 It is also permitted for the pilot to make small aileron adjustments at the aileron wire turnbuckles if the aircraft has a natural turn.

8.3 Who May Certify Maintenance?

8.3.1 PPL holders who are owners or part owners of the aircraft being maintained.

8.3.2 A LLAA inspector who is approved for the class of aircraft.

8.3.3 A Part M or JAR-145 aircraft maintenance organisation who have available to them an appropriately qualified LAA inspector.

8.4 Record of Maintenance

8.4.1 The Escapade Two must possess two separate logbooks for the airframe and engine (e.g. CAP 398 and CAP 399). All entries must carry a signature, date and PPL number or LAA inspector number.

8.4.2 Check A (daily) need not be recorded in the aircraft logbooks unless a defect is found.

8.4.3 Check B (50hrs / 6 months) and the annual inspection must always be recorded in the appropriate logbooks. A list of all parts replaced must always be given and the invoices or certificates of conformity for these parts must be retained, along with all other aircraft maintenance records, until at least two years after destruction or permanent withdrawal from use of the aircraft.

8.4.4 If the aircraft is run on unleaded fuel in accordance with AN98b, an entry stating that this is the case must be in both logbooks, at the date on which unleaded fuel was first used.

8.5 Preparing the Aircraft for Inspection

8.5.1 Carry out a visual inspection before cleaning the aircraft. Any fretting damage may be visible from powdery deposits around a bolt hole. Leaks or fatigue cracks may sometimes be detected by visible deposits in surface dust or dirt.

8.5.2 The aircraft may then be cleaned if required using a weak solution of mild detergent in water. Take care not to get water into electrical devices, venturis, pitot heads or static ports. Ensure that the aircraft is then dried thoroughly.

8.5.3 If the aircraft has been stored outside, all frost, snow or excessive dew or rain must also be carefully removed.

8.5.4 Inspection must be carried out in a clean environment, with good light. A torch, small mirror and dye-penetrant kit (available from TLAC) can often also be useful.

8.6 When to Carry out Maintenance

Check A

- Before the first flight of the day.
- Before any further flight if the aircraft has been left unattended on an airfield for any period of time.

Check B

- At 50hr or 6 month intervals, except when a Check C or annual inspection is carried out instead.
- If necessary, Check B interval may be extended by up to 5hrs or 18 days, but the next check time must still be taken from the due date of the previous inspection.

Annual

- Once per year, timed to co-incide with the annual permit renewal, or at 150 hr intervals (extendable by up to 15 hrs if required).
- This may not be extended in time, however if the aircraft is "rested" for some time, the intervals for all other checks may be reset by carrying out an annual inspection.

Note: Airframe and Engine Hours
Inevitably, airframe and engine hours rarely, if ever, match up. Whilst it is permissible to separate airframe and engine maintenance intervals, this becomes very complicated. It is recommended that whichever has the highest hours (usually the engine) is used as the basis for inspection and maintenance intervals.

8.6.1 Check A - the Daily Inspection (DI)

Paperwork

- Check permit to fly is valid
- Confirm no A, B or Annual checks are due.
- Check that all defects entered into the logbooks are acceptable, or have been rectified.

Aircraft

- See section 4.2

8.6.2 Checks A,B and Annual

	Check A Pre-flight	Check B (50 hrs / 6 months)	Annual (or 150 hrs)
Fuselage			
Check all pressure instruments for cracks, leaks and stiction			✓
Check all pressure instruments for function and legibility	✓		
Check all airframe members for cracks, dents, corrosion or deformation		✓	✓
Check fuselage fabric for tears, ripples and other damage	✓	✓	✓
Check all fasteners for security, condition or fretting		✓	✓
Check all rig / derig connections, rings & clips	✓	✓	✓
Check all bracing cables for tension, corrosion or kinks.	✓	✓	✓
Check doors (if fitted) for security and cracks		✓	✓
Check seats for fraying, cracks, security (adjustment pin operation and seat restraint strap for condition)		✓	✓
Check harnesses and belts		✓	✓
Check flying control runs for condition and lubrication	✓	✓	✓
Check operation of all controls	✓	✓	✓
Undercarriage			
Check structure for damage or deformation	✓	✓	✓
Check tyre pressures (12psi dependant on type)	✓	✓	✓
Check freedom & play in bearings		✓	✓
Check brakes for wear or damage		✓	✓
Lubricate all joints and bearings		✓	✓
Check steering mechanisms for wear and lubrication.		✓	✓
Unlace cover and check condition and security of shock cords.		✓	✓
Heel brakes			
Check operation, inspect, adjust and lubricate cables.	✓	✓	✓
Check pads for damage and thickness.	✓	✓	✓
Hydraulic brakes			
Check operation, clean pads and disc.	✓	✓	✓
Check brake pads for sufficient thickness.	✓	✓	✓
Verify that brake discs are not badly scored or damaged	✓	✓	✓
Verify fluid levels and no bubbles in lines.		✓	✓
Propeller			
Inspect blades for nicks and splits	✓	✓	✓
Inspect hub for security and condition		✓	✓
Check for vibration on run-up	✓	✓	✓
Inspect leading edge protection (if fitted) for security	✓	✓	✓
Check blade pitch (if ground adjustable)			✓
Fuel System			
Inspect tank(s) for cracks, leaks, abrasion and water	✓	✓	✓
Drain or flush tank			✓
Inspect tank mount for security or chafing		✓	✓
Inspect all fuel pipes and hose for cracks or perishing. Always replace if unsure.			✓
Inspect system for leaks		✓	✓
Inspect and clean or replace fuel filter.			✓

	Check A Pre-flight	Check B (50 hrs / 6 months)	Annual (or 150 hrs)
Disconnect hose at pulse pump and confirm fuel flows from tanks.		✓	✓
Check operation of fuel tap.		✓	✓
Inspect primer bulb (if fitted) for perishing.			✓
Check gascolator if fitted for water	✓		
Electrical			
Check electrolyte level of unsealed batteries.	✓		✓
Check security of battery mounting, leaks, connection security.		✓	✓
Check all wiring for condition and security.		✓	✓
Check condition of all switches			✓
Wing			
Check leading and training edge for damage	✓	✓	✓
Check all members for cracks, dents, deformation, corrosion or fretting.		✓	✓
Check all cables and thimbles for tension, corrosion, fraying, kinking or fretting.	✓	✓	✓
Check all fasteners for security (Nyloc self locking nuts are to be replaced with new items if removed for inspection).		✓	✓
Check critical structural fasteners for corrosion and deformation.		✓	✓
Check condition and abrasion of stitching and gluing of fabric.			✓
Check main spar join for wear or deformation.		✓	✓
Inspect all rig & derig points for condition and operation.	✓	✓	✓
Ailerons			
Check for full and free movement.	✓	✓	✓
Check for any excessive freeplay between ailerons, and between aileron and control sticks.		✓	✓
Check control deflections match TADS			✓
Inspect all hinges, brackets, push-pull rods, bellcranks, control horns, cables, pulleys and lubricate		✓	✓
Check control cables and stops have correct tension and friction.			✓
Rudder			
Check for full and free movement.	✓	✓	✓
Check connections to tail wheel steering		✓	✓
Check for any excessive freeplay between rudder and pedals.		✓	✓
Check control deflections match TADS.			✓
Inspect all hinges, brackets, push-pull rods, bellcranks, control horns, cables, pulleys and lubricate		✓	✓
Check control cables and stops have correct tension and friction.			✓
Elevator			
Check for full and free movement.	✓	✓	✓
Check for any excessive freeplay between ailerons, and between aileron and control sticks.		✓	✓
Check control deflections match TADS.			✓
Inspect all hinges, brackets, push-pull rods, bellcranks, control horns, cables, pulleys and lubricate		✓	✓
Check condition and operation of pitch trimmer.		✓	✓
Check all control cables and stops have correct tension and friction.			✓
Check trim Bowden cable for security at elevator end	✓	✓	✓
Doors			
Check condition of doors, bracing, hinges, and latches.		✓	✓

	Check A Pre-flight	Check B (50 hrs / 6 months)	Annual (or 150 hrs)
Rear Fuselage			
Inspect all rear fuselage structure through access points.			✓

9 Repairs

9.1 General.

Repairs should either be carried out as described below, or to a scheme approved by the LLAA. After making any repairs, you should always obtain a "second inspection" from an LAA inspector, who should sign in the logbook that they have inspected the repair and consider it safe. Where this is not possible, at the next permit renewal draw the repair to the attention of your inspector who should oversign your own entry.

9.2 Repairs to bolted tubular structure, springs, pulleys, cables, bolts, nuts, etc. Any damage to such parts must not be repaired and the aircraft must not be flown once the damage has been identified. Identical replacement parts must be fitted before any further flight, and their installation inspected and signed-off in the logbook by a LAA inspector. The invoice (legally referred to as the Certificate of Conformity) for the parts fitted must kept with the aircraft logbook. If it is not possible to obtain replacement parts, consult the LAA Technical Office for advice.

9.3 Repairs to the Engine. These should be carried out in accordance with the maintenance manual for the engine fitted.

9.4 Repairs to Instruments. Microlight aircraft instruments are not usually repairable and should be replaced.

9.5 Repairs to Fuel Hose. Any fuel hose that found to be cracked or damaged must not be repaired. Forward of the firewall it must be replaced with fire-retardant re-enforced rubber fuel hose. Polyurethane transparent fuel hose can only be used rear of the firewall. PVC hose must not be used with fuel under any circumstances. Take care not to over-tighten cable ties used to secure hose, since this can cause a flow restriction.

9.6 Damaged Wiring. Replace with fireproof or fire resistant wiring of the same or higher current rating, secured in the original manner.

9.7 Repairs to Batteries (if fitted). A damaged battery must be replaced and all surrounding structure thoroughly inspected for acid damage.

9.8 Repairs to Tyres. An inner tube puncture may be repaired. If there is damage to the tyres that shows the inner canvas, replace the tyre in question.

9.9 Damage to a Fuel Tank. The fuel tank should be drained and removed from the aircraft. Both fibreglass main and aluminium tanks can be normally be repaired, it is unlikely that the rotation moulded (plastic) tanks will be repairable. If a tank becomes impossible to see the fuel level through, either the tank must be replaced with a new item, or a separate fuel gauge may be fitted (which must be approved by LAA modification).

9.10 Damage to the Fabric. Do not attempt to fly if there is damage to the wing or fuselage covering fabric. Repairs should be carried out in accordance with FAA Airworthiness Circular AC43.13-1B chapter 2 section 4, taking care to ensure that the same materials are used as at original build, or - if the aircraft has subsequently been re-covered - the last re-covering.

10 Damage to The Welded Steel Frame. If there is damage, either corrosion or bends to parts of the welded steel frame, do not attempt to straighten any damage, and do not attempt to overpaint or repair corrosion. Any repair must be approved by the LAA or CAA and is likely to require cutting out the damaged section, welding in a replacement, painting the repair, and then externally sleeving the repair. Guidance notes on such repairs are to be found in FAA Airworthiness Circular AC 43.13-1B chapter 4 section 5.

10 Vital Statistics

Weight values for this `Escapade Two` are at Annex C and a description of the aircraft is at Section 2. The following describes the basic dimensions of the aircraft:

	SI		Imperial
Length	5.19m		19ft
Length wings folded	6.1m		19.5ft
Height tail wheel version	1.75m		5ft 9in
Height nose wheel version	2.18m		7ft 2in
Span	8.70m		28.5ft
Mean chord	1.14m		45in
Wing area	10.04m²		108ft²
Sweepback angle		0 °	
Washout		1.5°	
Fin area	0.38m²		4.09ft²
Rudder area	0.53m²		5.7ft²
Horizontal tailplane area	0.75m²		8.07ft²
Elevator area	0.76m²		8.18ft²
Undercarriage track width	1.93m		6ft 4in
Fuel capacity	70 litres		17.5 US galls
Tyre Pressure (Mainwheels)	80 kPa		12 psi
Tyre Pressure (Nosewheel)	133 kPa		20 psi

Instruments that must / may be fitted.

ASI	Altimeter	RPM	EGT
Required (scale to at-least 1.05 V_{NE} once calibrated	Required	Required	Required (2-stroke engines only)

Compass	Coolant temp	CHT	Fuel Pressure	VSI	Slip ball
Required	At least one required		Optional	Optional	Required

(Some engine manuals *may* require additional instruments to those shown above.)

ANNEX A

Operating Limitation and Placards.

(Note that the wording on an individual aircraft's Operating Limitations document takes precedence, if different.)

1. Maximum number of occupants authorised to be carried: Two

2. The aircraft must be operated in compliance with the following operating limitations, which shall be displayed in the cockpit by means of placards or instrument markings:

2.1 Aerobatic Limitations
Aerobatic manoeuvres are prohibited.
Intentional spinning is prohibited.

2.2 Loading Limitations
Maximum Total Weight Authorised: 499 kg
CG Range: 9.0" to 15.5" aft of datum
Datum Point is: leading edge of the wing

2.3 Engine Limitations
Maximum Engine RPM: 5800
Maximum continuous engine RPM: 5500

2.4 Airspeed Limitations
): 120 kts IAS
Max Indicated Airspeed Flaps Extended: 67 kts IAS
Maximum Indicated Airspeed (V

2.5 Other Limitations
NE
The aircraft shall be flown by day and under Visual Flight Rules only.
Smoking in the aircraft is prohibited.

Additional Placards:

"Occupant Warning - This Aircraft has not been Certificated to an International Requirement"

Mandatory Permit Directives

None applicable specifically to this aircraft type.

LAA Required Modifications (including LAA issued AILs, SBs, etc)

MOD/345/001 Increase tail bracing wires from 3/32" to 1/8" to comply with factored cable load requirements.

MOD/345/002 Add spacers at the joint between the elevator pushrod and the torque tube lever in the cockpit, to allow the attach bolt to be pinched up tight to prevent the rod-end rotating about the bolt with movements of the elevator.

MOD/345/003 Restriction to tailwheel configuration only. Balloon-type mainwheel tyres must be fitted.
MOD/345/004 Fitment of upgraded, strengthened main undercarriage legs, main undercarriage 'vee' and undercarriage attachment bolts.

Special Inspection Points

In February 2010, the BMAA alerted its owners to the possibility of cracks developing in horizontal tail support struts. Cracks had been found in a number of examples where the tubular steel strut had been flatted to facilitate attachment to the tailplane spar. The paint in that area should be checked for cracks or blistering. The strut should be robustly pulled and twisted to help identify any cracks present. Should any struts be suspect, they should be removed from the aircraft, the affected end cleaned of paint and the area inspected more closely (e.g. using a dye-penetrant test).

Following a suspected gust-load incident, flutter was experienced on a mechanically operated trim-tab, resulting in rapid oscillations of the control column. It was discovered that the Bowden cable outer had slipped through the retaining clamp at the elevator end, resulting in enough slack to allow the tab to flutter under the right conditions. Operators with the mechanical trim-tab system should check the Bowden cable clamp as part of the daily inspection.

Ailerons	Up: 30° ±5° Down: 30° ±5°
Elevators	Up: 28° ±2° Down: 16° ±2°
Elevator tab	Up: 20° ±5° Down: 40° ±5°
Rudder	Left 28° ±2° Right 28° ±2°
Flap	Down 0° - 15° ±2° - 28° ±2° - 40° ±2°

ANNEX B

ENGINE MANUAL

The operators and maintenance manual for the engine fitted to this aircraft is to follow this page.

ANNEX C

WEIGHT AND BALANCE REPORT

ANNEX D

MINOR MODIFICATIONS FITTED TO THIS AIRCRAFT SINCE INITIAL PERMIT ISSUE

Minor modification approval sheets are to follow this page

Minmod No.	Description	Sign and date incorporated

ANNEX E

MAJOR MODIFICATIONS FITTED TO THIS AIRCRAFT SINCE INITIAL PERMIT ISSUE

MOD No.	Issue	Description	Sign and date incorporated

ANNEX F

INSTRUCTIONS AND MANUALS FOR OTHER DEVICES FITTED TO THIS AIRCRAFT

No.	Description	Issue or date	Approval Mod No, or original equipment
F1			
F2			
F3			
F4			
F5			
F6			
F7			
F8			
F9			
F10			
F11			
F12			
F13			
F14			
F15			
F16			
F17			