AEROPLANE HEAVEN

You're virtually there.

COCKPIT & FLYING GUIDE

de Havilland DHC-1 T10

Chipmunk

FOR MICROSOFT FLIGHT SIMULATOR

This Chipmunk Cockpit and Flying guide has been produced to make getting acquainted with your new Chipmunk both simpler and more fun. To this end, this is not an "official" pilot's manual and should not be considered such.

We have included a copy of the official Pilot's Notes and Technical guide supplied by Flight Manuals OnLine. Please visit them at https://www.flight-manuals-online.com for other useful publications for all your favourite aircraft.

The de Havilland Canada DHC-1 Chipmunk was designed to replace the ageing Tiger Moth bi-plane trainer. Advanced for its day, the airframe was a mix of all alloy fuselage, fabric-covered wings with alloy leading edge panels and fabric-covered rudder, elevator, ailerons and flaps. The prototype first flew in 1946.

Designed and built in Canada for the RCAF, the Chipmunk was also adopted by the British RAF as their primary two-seat trainer. For Canada, the DHC-1 was also produced with a "bubble" canopy, akin to those used on current NA Sabres and P51D fighters.

The most common variant was the T10 which used the "long" conventional canopy. The RAF's Chipmunks were produced under licence in England by de Havilland.

Powered by a Gypsy Major engine developing 145 hp the Chipmunk had a top speed of 138 m.p.h. Fully aerobatic, the design was a firm favourite with pilots as it was beautifully balanced and had few if any vices - the perfect trainer. Dubbed " the poor man's Spitfire", the aeroplane is still flying with many private owners and aero-clubs around the world. 1,284 Chipmunks (including licenced production) were built.

de Havilland Canada DHC-1

LEADING PARTICULARS

Principal dimensions	
Span	34ft. 4 in.
Length, overall	25ft. 5 in.
Height, over canopy (tail down)	7ft. 0 in.
Ground angle	12 deg.
Fuselage width (maximum)	2ft. 6 in.
Fuselage height (including canopy)	4ft. 7 in.
Wing	
Chord at root ..	6ft. 7 in.
Chord (mean) ..	5ft. 0 in.
Gross wing area	172.5 Sq. ft.
Tail plane	
Span	11ft. 11 in.
Incidence	-1 - +15 deg.
Areas	
Ailerons (total)	13.9 Sq ft.
Flaps (total)	22 Sq ft.
Tailplane (without elevators)	17 Sq ft.
Elevators (total)	14 Sq ft.
Elevator trim tab	1.21 Sq ft.
Fin	5.9 Sq ft.
Rudder	7.4 Sq ft.
Control surface movements	
Ailerons	
UP	21 deg.
DOWN	16 deg.
Flaps	
DOWN	15 & 30 deg
Elevators	
UP	38 deg.
DOWN	15 deg.
Rudder (each way)	31 deg.
Engine	
Type	Gypsy Major 10 4 cyl. Inverted in-line air-cooled
Propeller	
Type	Fairey Reed Metal Fixed-pitch
Diameter	6ft. 9 in.
Tank capacities	
Fuel tanks (one flexible cell in each main plane):	12.5 gallons (imp.) EACH
Oil tank	2.5 gallons (imp.)

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The Chipmunk is a "tail-dragger". In other words, it has a castoring tail wheel and two solid main gear struts which are non-retractable.

It is not a large aircraft having a wing-span of just 34 feet and an overall length of around 25 feet.

The engine is accessible from either side by unlatching and lifting the light alloy engine covers, much like an old car bonnet (hood).

A fully detailed Gypsy Major engine has been included in this model. You can lift the starboard cover to inspect the detail, via a switch in the cockpit.

A simple, robust engine makes for ease of maintenance and all the key components are easily reached.

Note the uncompromising exhaust manifold and pipes exiting the bottom cowling. The prop is a metal fixed-pitch type and will pull the Chipmunk along to its 138 mph top speed.

Each wing has a tank incorporated in the main spar, close to the fuselage. The tank is filled using the fillers in the top of the wing and a fuel gauge is embedded in the wing surface adjacent to the filler in each wing.

The fuel gauge dials are configured to allow for the tilt when on the ground due to the tail-low stance of the aircraft. From the cockpit, when flying, the other scales are used to read the tank contents. A tank breather system of short tubes protrudes from the wing surfaces at this point.

Clambering up and onto the wing, the canopy is slid aft to reveal the two cockpits.

In the sim you must be in the virtual cockpit view to use the "T" handles to open the canopy (long "Birdcage" canopy). In the Bubble-canopy version, just click the hood-latch (red) at the top of the screen-frame.

It is usual for the instructor to sit in the rear cockpit but when flying solo, only the front cockpit is used. You will find that there is no starter in the rear cockpit.

In Microsoft Simulator 2020, you can use the camera drop down to select a range of cockpit views. Selecting "Pilot" will put you in the forward seat. "Co-Pilot" will place you in the rear (instructor) seat. So select the forward seat to set up the aircraft and start the engine etc. and switch to the "CoPilot" view if you want to fly from the rear cockpit.

Also from the rear cockpit, you have a choice to toggle on a pair of navigation gauges which sit on top of the coming between front and rear cockpits. The switch for this is down on the left wall.

The wings carry large flaps of conventional type, operated by a large lever in either cockpit via wires and pulleys – no hydraulics or electrics in this baby!

Outboard of the flaps are large area ailerons which contribute to the immense agility of these aircraft. There is a simple metal tab trimtab on the starboard aileron only which is adjusted on the ground prior to flight.

Navigation lights are carried in the wingtips and a landing/taxy light is incorporated in the port side gear strut fairing.

The struts are encased in aerodynamic fairings with the lower oleo jutting out beneath. The axles carry hydraulically activated disc brakes. If you look closely you will find individual brake pads have been modelled in our rendition!

Grooved tyres on cast alloy wheels complete the main gear specifications. Notice that on the Bubble-canopy version there are no aerodynamic covers on the legs and the left wing carries a retractable landing light in its lower surface.

Near the tail on each side of the fuselage are simple strakes which aid with lateral stability and control in a spin or tight turn. The tail section is all metal but is fitted with a fabric-covered rudder of large proportions for stable, effective control.

The elevators are also fabric covered and have a trim tab mounted to starboard which is cable operated from a wheel mounted in the seat pan module in each cockpit, for nose trimming. The rudder, like the starboard aileron, has a simple metal trim-tab, adjusted when on the ground prior to flight.

A robust, fully castoring tail wheel is fitted for easier ground handling. We have done much work in the area of ground handling and takeoff due to problems with this aspect of tail-draggers in the current simulator. We hope you will notice a difference!

Now let's climb aboard and familiarise ourselves with the cockpits.

CHOOSE TO FLY FROM FRONT OR REAR COCKPIT SIMPLY BY USING THE CAMERA MENU OF THE SIMULATOR.

YOUR CO-PILOT WILL AUTOMATICALLY APPEAR.

TOP TIP!

IF YOU DO NOT WANT PILOTS IN EITHER VIEW, GO TO THE FUEL/PAYLOAD DROP-DOWN IN THE SIMULATOR AND ZERO THE WEIGHT OF THE PILOT(S)

Almost every switch, knob and lever in the cockpit is functional. Make sure you use the panel guides to fully acquaint yourself with the layout and location of various systems before getting into any serious flying.

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AEROPLANE HEAVEN
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The Chipmunk cockpit.

The cockpits of the Chipmunk are to all extents identical. The front cockpit has the engine starter but otherwise carries the same equipment as the instructor's (rear) cockpit.

You will notice above your head on the left side of the canopy, there is a series of yellow handles and wires. This is the canopy opening and closing system. The handles are twisted, releasing catches at the front and rear of the canopy and the canopy will slide back.

For the Bubble-canopy version, use the central hood-latch mounted at the top of the screen-frame hoop.

ALL takeoffs and landings should be done with the canopy closed in the "Birdcage" version, optional with the Bubble-canopy.

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FRONT COCKPIT

1. Generator warning light
2. Airspeed indicator
3. Artificial Horizon Indicator
4. Vertical Speed Indicator
5. Air vent control
6. Tachometer
7. Altimeter
8. Gyro Compass
9. AHI Cage knob
10. Turn and Slip Indicator
11. Chronometer
12. Gyro Adjust
13. Oil Temperature
14. Oil Pressure
15. Magneto switches
16. Electrical Power control
17. Compass
18. Engine starter
19. Throttle/Mix quadrant
20. Fuel cock
21. Flap control lever
22. Carb Heat control
23. Panel light and dimmer
24. Taxy/landing light
25. Navigation lights
26. Emergency lighting
27. Elevator trim control
28. Comms radios
29. Park Brake Lever

REAR COCKPIT

The rear cockpit is essentially the same as the front except for a couple of differences. There is no starter in the rear cockpit but you do have the two magneto switches.

The Chipmunk has been fitted with many varied "extras" over the years including navigational equipment and modern radios, GPS and so on. For those planning a little cross-country navigation, we have included an optional set of navigation instruments which can be toggled using the emergency light switch in the rear cockpit.

This positions a standard RMI gauge with NAV1 and ADF pointers. Alongside is a standard OMI with course adjustment knob in the right top of the instrument front face. Radio equipment for these instruments is mounted on the starboard cockpit rail and comprises a standard VHF Navigation tuner/receiver, and ADF tuner/receiver and a VHF Comms receiver.

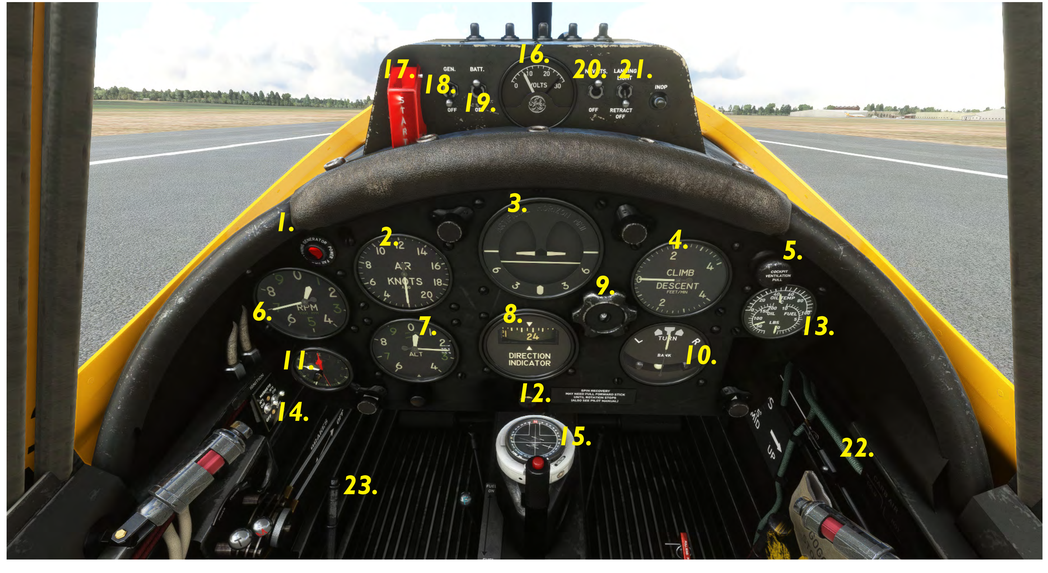
FUEL CONTENTS

To port and starboard of the main cockpit area, out on the wings, you will find the fuel gauges for each wing tank. Each tank holds 12.5 imperial gallons. THERE ARE SPECIAL CAMERA VIEWS FOR THESE GAUGES.

BUBBLE COCKPIT

This cockpit is essentially the same as standard except for a few extras. There is a switch panel directly ahead of the pilot. Here you will find switches for battery, generator and electric engine start, together with switches for exterior lights. There is also a triple-gauge for monitoring the engine.

1. Generator warning light
2. Airspeed indicator
3. Artificial Horizon Indicator
4. Vertical Speed Indicator
5. Air vent control
6. Tachometer
7. Altimeter
8. Gyro C ompass
9. AHI Cage knob
10. Turn and Slip Indicator
11. Chronometer
12. Gyro Adjust
13. Engine Gauge
14. Magneto switches
15.Compass
16. Volt meter
17. Engine starter
18. Generator Switch
19. Battery Switch
20. Navigation lights
21. Taxy/landing light
22. Carb Heat control
23. Park Brake Lever



USING THE P8 COMPASS.

The P8 “grid”compass is a traditional “marine”style compass that was used in a wide variety of aircraft from basic trainers like the D.H. Tiger Moth to the front-line Supermarine Spitfire.

Known for its reliability, it is often considered, quite wrongly, to be difficult and confusing to operate. It is in fact, quite simple and once mastered, will always give perfect readings and rock-steady navigation.

Let’s begin with the basic components

1. **Adjustable compass card**
2. **Fixed “lubber”line**
3. **Compass needle**
4. **Card ring lock**
5. **The compass “T” grid**

The compass needle will, of course, like all compass needles point to magnetic North. In the case of the P8, the needle has a “cross”shape denoting the North pointer of the needle or “top” of the needle.

To find the heading of your aircraft, rotate the compass card ring 1. until the “T”shaped bars sit over the body of the needle and the red North box on the compass card is opposite the needle cross. Now read off the figure under the lubber line 2, (white tip) and you have the heading of your aircraft.

The P8 can also be used as a navigational aid by pre-setting a given course for later use.

Spin the card until the desired course in degrees is under the white tip of the lubber line and lock the ring in place by using the ring lock (4).

Now when you are ready to take up the new course, simply turn the aircraft until the cross of the needle falls under the “T”and opposite the red North box.

This compass can also be used to check the accuracy of your gyro compass.

USING THE OPTIONAL NAVIGATION SUITE.

Your Chipmunk is fitted with a basic navigation and communications radio suite. The three radio heads are fitted to the starboard wall of the rear cockpit. A Comms radio (COM1) is also fitted to the starboard wall of the front cockpit.

Click on the switch marked “ SWITCH_NavGear” and the two navigation instruments will appear in a binnacle atop the coming directly in front of you.

Tune the radios to the correct frequencies and you will be able to navigate using basic IFR.

THE OFFICIAL PILOT’S NOTES.

Thanks to the generosity of Flight Manuals On Line, we are able to bring you copies of the original and official RAF Pilot’s Notes and a set of original and genuine Pilot’s Checklists. Please support Peter at https://www.flight-manuals-online.com and select from his remarkable collection of flight manuals and technical materials on a huge range of aeroplanes.

The Pilot’s Notes are not only an excellent way to get to know your Chipmunk and how to fly the machine but will teach correct procedures.

We have taken care to model and code this simulation to enable you to use the vast majority of the official notes and checklists in the simulator.

Flying the Chipmunk.

The De Havilland DHC-1 is an easy aircraft to fly, providing you follow the prescribed operations and obey some simple rules.

The T-10 trainer is fully aerobatic but must be flown with strict adherence to limitations.

We assume from here on in that you have familiarised yourself with the cockpit(s) and location of major controls.

You have checked the aircraft over according to the checklists and are aboard the cockpit of choice. ***(Please remember that the Chipmunk needs to be started from the front cockpit.)***

SIMULATED "COLD, DARK" STARTS

Simulator set to "Hard"

Set the start point with ALL switches off and all controls to minimums and SAVE the flight.

Reload the flight.

Parkbrake lever ON

Check fuel levels in wing tanks.
1) Move electrical power control to ground power
A GPU (ground power unit) will appear in outside view, connected to the external electrical socket on the port side of the fuselage.
2) Open fuel cock
3) Set mixture control to full rich
4) Crack the throttle ½ inch
5) Switch both magnetos switches to ON
6) Click on starter flap
7) Pull starter ring
8) Switch electrical control to battery
9) Check generator light is out.

Ensure starter flap is returned to its original position.

Carburettor air temperature control

By means of a controllable shutter, warmed air can be drawn through a flame trap, close to the engine, or cold air through the duct and the scoop on the starboard cowling. A cable and pulley assembly is connected to a control for each occupant, with a locking gate in the front cockpit and a return spring on the assembly.

To select hot air, the control handle is moved rearwards and into the down position, against the spring tension.

Take-off and climb should normally he made in COLD but, should icing conditions be suspected, HOT air may be used. In the latter case it should be remembered that some loss of maximum power will be experienced.

Warm the engine at 1,000 to 1,200 RPM, to an oil temperature of 30 degrees. observing the instruments. Increase RPM to 1,500 and check each magneto by momentarily switching each off. A drop in RPM should be seen.

Also, check that the generator warning lamp is OUT.

Open throttle to full power and check the RPM which should be at 2,000 to 2,100. Do not hold on full power for more than a few seconds or beyond the time it takes for the tachometer to settle.

The aircraft can be manoeuvred on the ground with judicious use of throttle and differential braking. The fully-castoring tail wheel will assist with turning.

Whilst taxying check the operation of the artificial horizon, direction indicator, and turn and slip indicator. The maximum crosswind component in which the aircraft has been demonstrated to be safe for taxying is 30 knots. This wind speed relates to a height of 33 ft.

Once aligned on the runway, do your final checks, acquire clearance and prepare for takeoff.

With park-brake released, open the throttle GRADUALLY to full power, keeping straight with rudder. There will be a tendency to swing to starboard so correct with the rudder, GENTLY.

Fly off the runway at around 45 knots indicated and when at a safe height, raise the flaps if you have used them. N.B. Select half-flap for short takeoffs.

Climb with full throttle at a speed of 70 knots, maintaining full rich mixture until at attitude. Then reduce mixture for maximum running, whilst monitoring oil temperature. **WARNING! IF ENGINE TEMPERATURE EXCEEDS 100° AT ANY TIME ON THE GROUND OR IN THE AIR, THE ENGINE WILL FAIL.**

Carburettor icing will be indicated by rough running and loss of engine power. If icing conditions are suspected, select the carburettor air control to HOT.

If icing does not clear immediately after the selection of HOT air, manipulation of the throttle may assist.

GENERAL FLYING

Trim out for neutral handling. The aircraft is naturally very stable and reacts predictably to control inputs. With flaps down, the nose trim will generally be down. More power will result in a slight nose-up trim.

When using flaps, the aircraft will stall at speeds below 35 knots.

Mixture control is critical to good engine management and must be constantly adjusted to suit altitudes. Generally speaking, the higher you go, the leaner the mixture should be. However, ALWAYS use full rich mixture in a dive.

In cruising flight, HOT air should be used continuously unless the ambient air temperature exceeds 30°C. DO NOT exceed 2,100RPM in cruise. Recommended cruise speed is 85 -90 knots.

AEROBATICS

Your Chipmunk is fully aerobatic.

Before performing aerobatic manoeuvres, carry out cockpit checks, paying particular attention to engine monitoring gauges and mixture control.

All aerobatic manoeuvres may be carried out at the maximum all-up-weight of 2,100lb. Take care not to exceed the airspeed limitations.

It is recommended that the following acrobatic manoeuvres are performed at the indicated airspeeds quoted:

Roll 120 knots
Loop 130 knots
Barrel Roll 120 knots
Half Roll off the top of loop 130 knots

Note: The aircraft is not designed for sustained inverted flight.

STALLING

Stalling speeds for the aircraft are:

Flaps down 43 knots
Flaps UP 47 knots

SPINNING

Before carrying out practice spins complete the relevant checklist and take note of the limitations. For training safety, the aeroplane is intentionally difficult to spin properly in almost all centre of gravity positions.

Therefore it is usually necessary to apply aileron against the intended direction of spin, in addition to the normal pro-spin control movements. Entry with central aileron will probably cause the aeroplane to describe a semi-spiral. This is often confused with a true spin.

More information on spins,aerobatics and general flying techniques is contained in the official Pilot's Notes included with this package.

We hope you enjoy your de Havilland Canada DHC-1 Chipmunk as much as we enjoyed building it. Good luck, happy flying and stay safe.

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