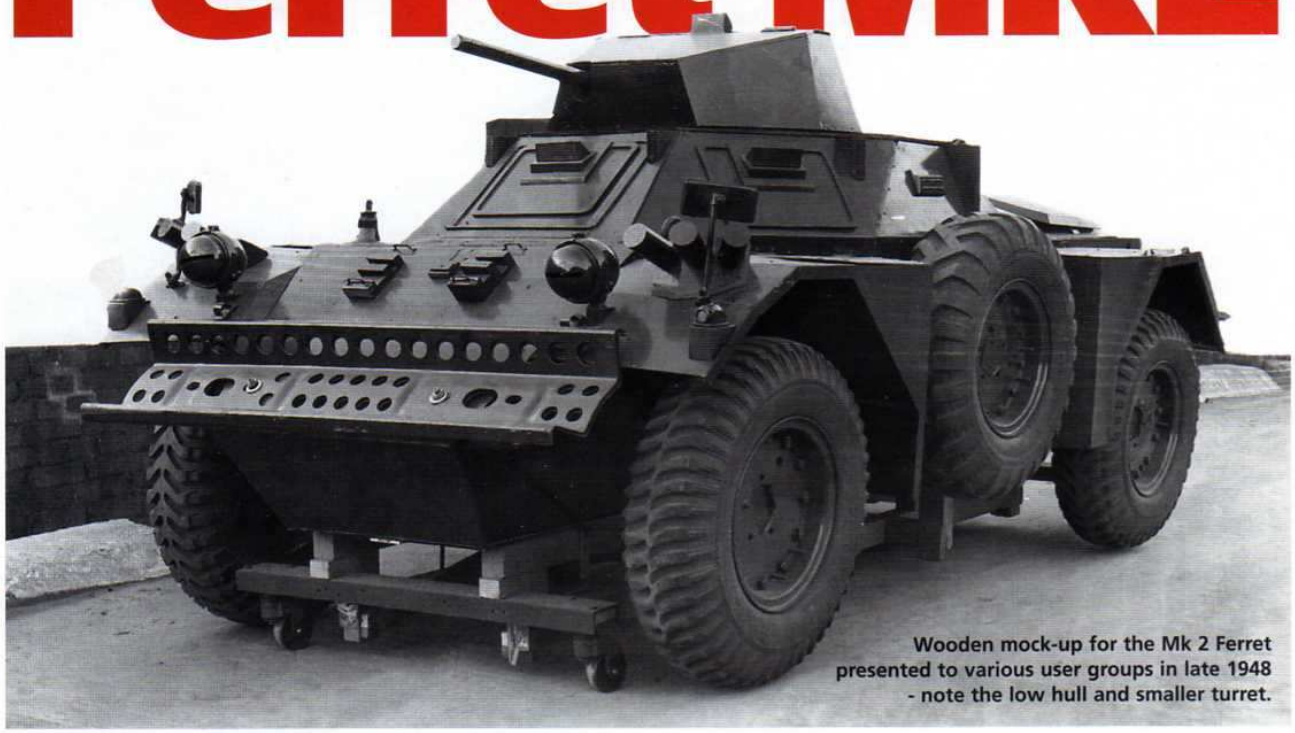
# Ferret Mk2



IWM, MVE 17029/1

Wooden mock-up for the Mk 2 Ferret presented to various user groups in late 1948 - note the low hull and smaller turret.

## The turreted Mk 2 Ferret was one of Britain's most successful post-war military vehicles... and was a damned fine design, to boot!

**WITH a total of 6626 produced, the BSA-designed Daimler Dingo was the most numerous, and successful, British scout car of WW2. It was fast, compact, quiet and highly manoeuverable. Although it remained in service into the 'fifties, in common with all wheeled armoured vehicles, there was no more production after VE Day and, in 1946, the War Department approached Daimler with a view to developing a post-war replacement for the Dingo following similar lines. The result was the Ferret, a small wheeled armoured reconnaissance vehicle which went on to repeat the success of the Dingo and which remained in British Army service for nigh on 40 years.**

The specification for what was to become the Ferret was drawn up in early 1946 and was passed around various committees in the War Department and Royal Air Force until early 1947. The Dingo had been criticised as being cramped and, although the general automotive layout and overall design of the hull of its replacement were similar, the opportunity was taken to enlarge the hull to be able to accommodate a three-man crew. The second criticism which had been levelled at the Dingo was that the automotive performance was poor - this was countered in the Ferret by using a Rolls-

IWM, MVE 326462

◀ This shows one of the four prototype, soft-skin, vehicles in its original form before the hull was raised - the three-door turret is fitted, and there are four, smaller engine-compartment covers.


Tank Museum

**Prototype number 3 photographed after the hull has been raised by the addition of a welded strip. This may be the same vehicle as shown in its original form (see page 16), but it has been registered LYN 53, and now carries its full complement of accessories. Note how the engine-compartment covers have been welded together in pairs.**

Royce B60 engine producing around 100bhp net, giving a power-to-weight ratio of 30bhp/ton and a top speed of 55mph on the road.

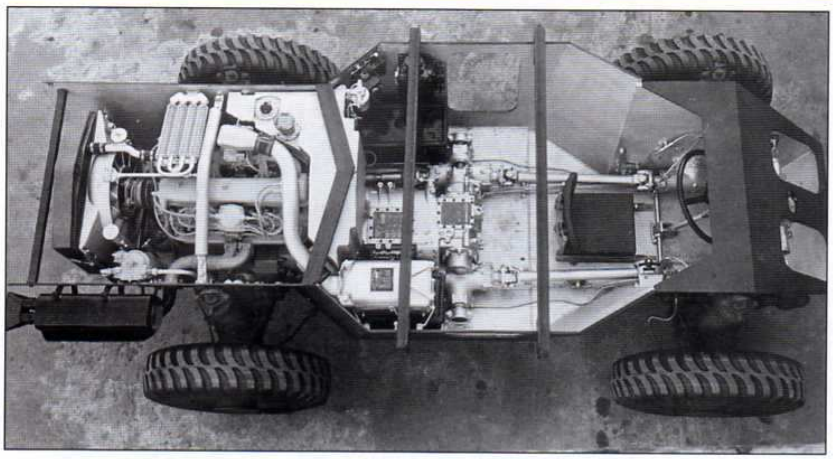
A final specification was issued in early May 1947 but a model of the proposed vehicle, together with general arrangement drawings, had already been produced by the Fighting Vehicles Design Department (FVDD) in late 1946. During 1947, both Humber and Daimler competed for the development work, but it seems to have been a foregone conclusion that the contract would go to Daimler. George Hally, managing director of the Daimler Motor Company, wrote to the War Office in September of that year bidding a price of £48,000 for the development work - this was broken down as £8150 for design development, £2300 for the manufacture of a full-size wooden mock-up, and the remainder, £37,500, for the production of two fully-operational soft-skin vehicles - this latter requirement was subsequently increased to cover four vehicles. These prices did not include the provision of an engine which was to be supplied by the Ministry at no cost to Daimler; similarly, the Ministry supplied tyres, batteries, wireless set, smoke dischargers, periscopes and a generator for each vehicle.

The Company had been given the go-ahead to start work on 17 September, but it was not until 10 August 1948, that Daimler received the Ministry of Supply contract (6/FV/425). Although the vehicle had already been given its 'FV700 series' designation, it was not yet named 'Ferret' and was unofficially being referred to at this time as 'Fieldmouse'.

Artist's impressions of the proposed vehicle were shown to various users at a meeting in Coventry in November 1948 and the wooden mock-up was delivered to the Fighting Vehicles Design Establishment (FVDE) - formerly FVDD - at Chertsey at the end of the year.

The mock-up represented the turreted reconnaissance vehicle and, even at this stage, is recognisably a Ferret. The hull shape and the position of various lamps, hatches, accessories, etc would be familiar to any present-day Ferret owner or enthusiast and, similarly, the small angular turret was similar to the final form which was eventually adopted and was equipped with a passable mock-up of the familiar .30 calibre Browning. Although just one variant seems to have been produced, at this stage it was planned that there would be four different hull configurations. The turreted version that would later become the production Mk 2 was designated FV701B, and there was a similar turreted version using a semi-enclosed turret, referred to as FV701D; neither of the turrets offered 360° traverse and this was felt to be a distinct disadvantage. There were also two turretless versions referred to as the Mk 1 - the open-topped vehicle designated FV701C, and an enclosed version with a two-piece armoured-steel roof, numbered FV701A.

The mock-up was shown to various user groups and, with various small modifications, was felt to be acceptable and Daimler was given approval to proceed with producing the first two prototypes which were to be open-topped, Mk 1, variants. The work started in 1949 and the first prototype was delivered in June 1950 with the second following soon after. Prototypes three and four, both of which were of turreted Mk 2 variants, were delivered in May 1951. Registered LYN 53 and LYN 54, the vehicles were put through a series of trials at the Fighting Vehicles Proving Establishment (FVPE), and LYN 54 was subsequently handed over to the Royal Armoured Corps for extended field trials.



Tank Museum

Cut-away instructional vehicle giving an excellent view of the automotive layout - note the drive-shafts running forwards from the transmission on either side of the hull.

Early production Mk 2 vehicle in typical pose with the two-door turret open. This vehicle is from a batch of 107 Mk 2s ordered under contract 6/FV/14231 in 1955.

Both vehicles incorporated various improvements which had arisen as a result of the trials of the first two prototypes. For example, the sides of the hull were increased in height, the four-piece engine covers of the of the Mk 1 prototypes were welded together to form the familiar two-piece covers used on the production vehicle, the air intake louvres at the rear were modified, the transfer-box input bevel gears were strengthened, the bevel-box ratios were increased, and there were modifications to the steering gear.

LYN 53 was run for some 30,000 miles in the UK and Germany and LYN 54 was stripped for inspection after just 5000 miles. Inevitably, there were detailed criticisms, particularly regarding the rate of wear of the suspension pivots which led to the proposed system of grouped lubrication points being abandoned - but the vehicle was generally felt to be acceptable subject to further minor modifications. There was one exception. The enclosed turret, which had already been partially redesigned, was categorically stated to be 'unacceptable'. It was said to be cramped and difficult to operate, and rain was able to penetrate through the turret ring, covering the floor of the vehicle and particularly wetting the driver's feet. More work was clearly required and, as an interim measure, on early Mk 2 vehicles the same turret as that used on the Saracen Mk 1 was adopted.

However, design changes notwithstanding, a contract for a further six pre-production vehicles - these were Mk 1 vehicles intended for further assessment - was issued in January 1951. The first 'real' production contract was 6/FV/4267 issued in April of that same year. The contract called for a mixture of Mk 1 and Mk 2 vehicles - the 274 Mk 2s, which were registered 86BA20-88BA19, were actually the first production vehicles to be manufactured and were delivered in mid-1952. The 593 Mk 1s following in October.

This was the first of a large number of production contracts covering the next almost-20 years.

**The Ferret described**

The Ferret was constructed around an immensely-strong monocoque hull of armoured steel, on which the automotive components were mounted. The hull was a welded structure consisting of some 30 separate plates ranging in thickness from 4-14mm in the original configuration, with subsequent increases in thickness of 4-6mm for up-armoured vehicles (Mk 2/3 onwards). The ballistic characteristics were better than the Dingo which it replaced. A welded armoured-steel bulkhead was used to divide the hull into separate engine and crew compartments and, although somewhat cramped, the hull could accommodate three men. Escape hatches were provided on either side and at the front for the driver, and there were three,


IWM, MVE 29678/10

**It was not uncommon for Mk 1 Ferrets to be converted to Mk 2 configuration and vice-versa - the contract records suggest that this early vehicle, 37BA42, actually started life as a Mk 1.**

periscope-equipped, forward vision hatches, and two at the rear; on early vehicles the lateral forward hatches were rectangular but they were subsequently enlarged by making the forward edge follow the angle of the hull. A small windscreen could be fitted into the opened main forward hatch.

Angular sheet-metal wheel arches were bolted to the hull, carrying three electrically-operated smoke launchers at the front. There were big stowage bins along each side shaped to fit the hull - three on the right, and two on the left. The spare wheel was carried on the left between the front and rear stowage bins and was attached to the left-hand escape hatch.

The turret was a two-door design (three door on Mk 2/2), mounted on a 30in ring which allowed manual traverse through a full 360°, or with rack-and-pinion traverse on the Mk 2/6 and Mk 2/7 vehicles. Typically, the opened rear door of the turret provided a useful seat for the vehicle commander, giving an excellent view of the road ahead. Originally, the Mk 2 was armed with a .30 calibre Browning mounted to the right-side of the turret in such a way as to permit 15° depression and 45° elevation; a metal guard rail was fitted at the rear of the hull to prevent the engine compartment being damaged during uncontrolled firing. Towards the end of the vehicle's service life, the Browning was replaced by a 7.62mm general-purpose machine gun (GPMG). The Mk 2/6 was fitted with launchers for the BAC Vigilant wire-guided anti-tank missile on the turret sides.

Although during the course of production, the vehicle was progressively up-armoured, the basic hull design remained virtually unchanged until the development of the so-called 'big-wheeled' Mk 3 in 1963/64 and the subsequent introduction of the Mk 4 FV711 in 1964 and the FV712 Mk 5 in 1967.

The Mk 2 Ferret was equipped for three basic roles, as follows:

- FV701. Reconnaissance vehicle carrying a small rotating turret mounting either a .30 calibre Browning or a 7.62mm general purpose machine gun (GPMG). It was produced through a number of sub marks as set out in the panel; most of these simply reflected an increase in the thickness of armour or other detail changes. Note that the Mk 2/2, which was a field modification and used only in the Far East, had a fixed collar interposed between the hull and the turret to provide increased visibility.

- FV702. Armoured control and guidance vehicle (ACV) for the Orange William wire-guided anti-tank missile. Development vehicles only.

- FV703. Conversion of the Mk 2/3 (VHF) mounting two British Aircraft Corporation (BAC) Vigilant wire-guided anti-tank missiles. The missiles were fitted to either side of the turret, with re-load missiles carried in a stowage bin fitted to the left-hand side in place of the spare wheel. The missiles were optically guided through a magnifying sight and joystick controller, and could be fired from inside the vehicle or remotely by using a separation sight and controller. 125 vehicles only.

At least one, otherwise standard, Mk 2/3 was fitted with rubberised flotation bags along each side and at the front - this was designated 'Car, scout, 4x4, recce, floating, FV701H; Daimler Ferret Mk 2/3', but there was no series production.


FV701H - the so-called 'floating' Ferret shown with the bladders inflated and the engine-compartment dam in place.

Tank Museum

Tank Museum

The Mk 2/2 was modified in the field by the inclusion of a fixed collar between the hull and the turret.


IWM, FES 63/2/42

The opened turret allowed the Ferret commander to seat himself on the rear door. This is a Mk 2/3 dating from 1959.

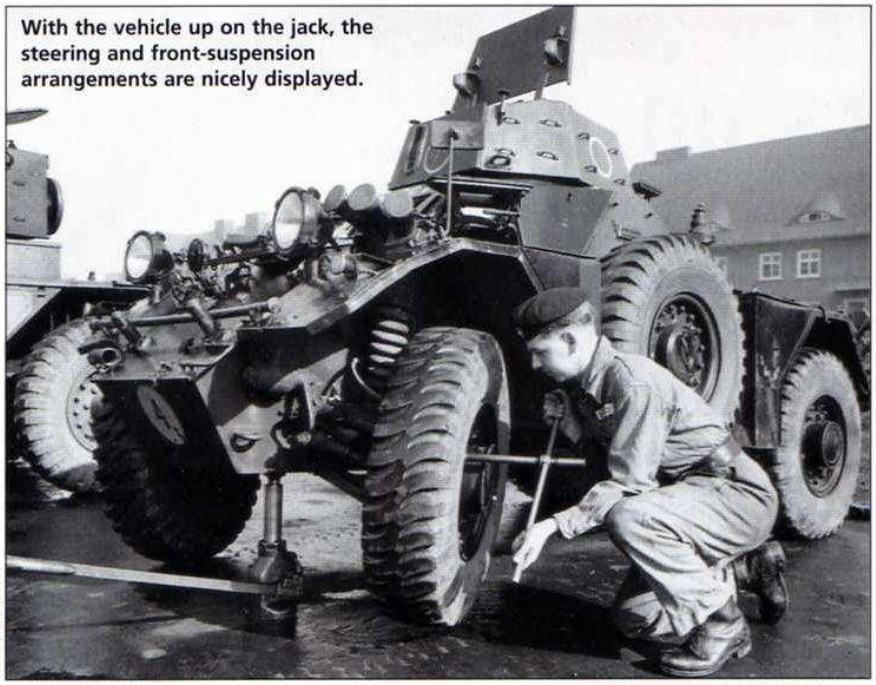
All variants were powered by a dry-sump Rolls-Royce B60 six-cylinder petrol engine of 4260cc, rear-mounted with the radiator facing the rear of the vehicle. Front and rear wheels were permanently driven - without the benefit of a central differential - via a Daimler fluid power coupling and Wilson-type pre-selector epicyclic gearbox providing five speeds in both forward and reverse. The gearbox was mounted to the floor on the 'crew' side of the bulkhead, with the drive-shafts arranged in an 'H' pattern inside the hull; bevel boxes at each wheel station carried the drive to the wheel hubs which were fitted with epicyclic reduction gears. A two-speed generator was fitted to allow the vehicle to maintain sufficient power for radio operation while idling.

Helical coil springs were used to provide independent suspension, with forged upper and lower wishbones handling wheel movement; the inboard ends of the wishbones were bolted directly to the hull. Double-action telescopic dampers were fitted inside the springs, and were mounted to the hull at the top end by means of welded brackets. As far as possible, the steering gear was installed inside the hull, and consisted of a recirculating-ball system operating on the front wheels only; the steering wheel, which was mounted on a vertical column, followed the angle of the front of the hull which gave it an awkward reversed-rake - this takes some getting used to when driving the vehicle.

Dunlop cross-country 'run-flat' tyres, 900x16, were mounted on two-piece 6.50x16in rims.

**Production**

Production of the Mk 2 continued until 1971 when the last delivery was made to Abu Dhabi - the last batch of British Army vehicles was made in 1967. During this time some 1836 Mk 2 vehicles were supplied under 28 contracts, although some were certainly converted from Mk 1 configuration, and others were similarly converted to Mk 1 configuration; the total number of (all types of ) Ferrets supplied to the British Army was around 3000, with another 1700 or so built for export. Indeed, as well as being used by the British Army, the Ferret was supplied to Australia, Bahrain, Burma, Burundi, Cameroon, Canada, Central African Republic, Gabon, Gambia, Ghana, Indonesia, Jordan, Kuwait, Libya, Madagascar, Malaysia, New Zealand, Nigeria, Portugal, Qatar, South Africa, Rhodesia (Zimbabwe), Saudi Arabia, Somalia, Sri Lanka (Ceylon), Upper Volta, Yemen, Zambia... and France! In the mid-fifties, the French Army purchased a



With the vehicle up on the jack, the steering and front-suspension arrangements are nicely displayed.

IWM, R26334

Army PR

FVRDE trials vehicle for the FV702 Vigilant ATGW-equipped variant; two re-load missiles are carried in the bin fitted in place of the spare wheel.

number of Ferrets and issued these for troop trials, with a view to setting up a license arrangement for manufacture - although this did not happen, the influence of the Ferret can be clearly seen in the more-heavily armed Panhard AML90.

In the late 'sixties, the Mk 2 started to be replaced by the rather-less successful Royal Ordnance Fox and by the FV100 series Alvis Scimitar series - known respectively as the CVR(W) and CVR(T) - in fact, there was no direct replacement. A handful of Ferrets remained in service with the British Army until the Gulf War in 1991, although most of the remaining vehicles were of the Mk 1 and Mk 1/2 variants. The British Army's current FCLV programme - 'future command and liaison vehicle' - seeks to develop a modern replacement for the Ferret.

In 1962, a REME Technical Group converted this Mk 2 into a small, air-portable armoured recovery vehicle and put it through a series of trials.


REME Museum

## Technical specification

**Nomenclature:** see list of variants.

**Engine:** Rolls-Royce B60 Mk 3A or Mk 6A; six cylinders; 4260cc; overhead inlet valves, side exhaust; power output, 96-109bhp at 3750rpm; torque, 195 lbf/ft at 2000rpm.
**Transmission:** 5F5R, fluid flywheel coupling and pre-selector gearbox; full-time 4x4.
**Suspension:** independent suspension all round using coil springs, with upper and lower wishbones to handle wheel movement.
**Brakes:** hydraulic.
**Construction:** integral armoured-steel hull.
**Electrical system:** 24V.

### Dimensions

Length, 151in; width, 75in; height, 74in.
Wheelbase, 90in.
Weight, 8102 lb.

### Variants

The Mk 2 Ferret was produced in three basic variants - FV701, FV702 and FV703 - with additional variations on each of these as set out in the list below:

***Car, scout, 4x4, recce; Daimler Ferret:***
- *FV701E;* Mk 2, Mk 2M, Mk 2 (VHF), Mk 2M (VHF), Mk 2 (VHF) GPMG
- *FV701F;* Mk 2/1, Mk 2/1 (VHF), Mk 2/1M (VHF)
- *FV701G;* Mk 2/2, Mk 2/2M
- *FV701H;* Mk 2/3, Mk 2/3M, Mk 2/3 (VHF), Mk 2/3M (VHF), Mk 2/3 (VHF) GPMG
- *FV701K;* Mk 2/4, Mk 2/4M, Mk 2/4 (VHF), Mk 2/4M (VHF)
- *FV701L;* Mk 2/5, Mk 2/5M, Mk 2/5 (VHF), Mk 2/1M (VHF), Mk 2/5M (VHF) GPMG
- *FV701L;* Mk 2/7, Mk 2/7 (VHF), Mk 2/7M (VHF), Mk 2/7 (VHF) GPMG
- *FV701L;* Mk 2/8

***Car, scout, 4x4, recce, floating; Daimler Ferret:***
- *FV701H;* Mk 2/3

***Car, scout, 4x4, ACV, GW, Daimler Ferret:***
- *FV702;* Mk 2

***Car, scout, 4x4, recce/GW, Daimler Ferret:***
- *FV703;* Mk 2/6 (VHF)

The code 'M' following the 'mark' number means that the suspension components were redesigned to reduce the effects of mine blast; 'VHF' means the vehicle was equipped for Larkspur VHF radios; 'GPMG' means that the .30 calibre Browning was replaced by a 7.62mm general-purpose machine gun; GW means that the vehicle was equipped with wire-guided anti-tank missiles, either the BAC Vigilant or the earlier Orange William.

**Classic Military Vehicle Magazine** has allowed me to use two Articles about the development and the service career of the Daimler Ferret.

Classic Military Vehicle Magazine December 2002 Issue 19 page's 16-21