

COMBINED CAMERA – PROJECTORS

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Those familiar with the origins of the cinema will be aware that the very first practical unit for the projection of motion pictures onto a screen was in fact a camera-projector. The Lumiere Cinematograph was the first camera projector – it also operated as a printer, combining all three functions into a single unit meant that the Lumiere System enabled the numerous operators of the equipment to travel world-wide and produce the many actuality films that are now over 100 years old and which grace the shelves of film archives world wide.

A number of home movie equipment manufacturers have produced combination camera-projectors over the years – in most cases the compromises required to combine the functions of the two units resulted in neither unit providing performance approaching that of a purpose-designed individual unit.



The Cinématographe Lumière. (Lumière Museum)

A camera and a projector have some basic actions that at first look could perhaps be combined into a single unit and which may offer some cost saving and convenience. Before looking at a number of examples that have been produced over the years, a look at the basic requirements of a camera and a projector may be useful.

The Camera

A cine camera has certain basic requirements, which can be stated as –

- 1 A film transport mechanism, which is capable of moving the film frame by frame, holding it steady in the gate while the shutter is open, and advancing the film to the next frame while the shutter is closed.
- 2 A lens, capable of focusing the subject's image onto the film, with a method of adjusting the amount of light passing through it to the film
- 3 A shutter, which will pass the maximum amount of light during its 'open' phase and pass no light during its closed phase; the open phase to be as long as possible to allow maximum light transmission and therefore best low light performance.
- 4 A viewfinder, to provide a means of framing the image.
- 5 A means of holding unexposed film, usually within the body of the camera, in such a way that it does not become exposed to light; this generally means that the camera film is supplied in short lengths due to space limitations.
- 6 A means of holding the camera steady whilst filming.

The Projector

Whilst having some similar requirements to a camera, the projector has some important differences and this is where the compromises come in -

Items one and two above are essentially the same in a projector – certain 'niceties' such as a multiple pin claw and feed and take-up sprockets to assist with the handling of large size reels of film are desirable.

3. The shutter design needs to be quite different to that of a camera. The camera shutter is designed for best light transmission and generally has a closed segment of about 40% of the pull-down cycle, with an open segment of about 60%. The shutter has one 'open' segment for each frame of film transported through the gate. If such a shutter were used in a projector, a flicker rate equal to the frames per second (FPS) that the film is running at would result; at a silent speed of 16 FPS, this would result a severe flicker. For acceptable projection, the

flicker rate should be around 50 per second. This can only be achieved with a three-blade shutter for silent speed and a two-blade for sound speed.

4. A light source to illuminate the film for projection.
5. A means of holding the film to be projected, possibly in lengths much greater than that originally exposed in the camera, to allow the original camera films to be joined for a longer presentation.

Most of the camera projectors referred to later, offered several compromises (and therefore limitations) in some of the areas mentioned above. Flicker was not such a big problem as would be expected, as the illuminant was often only a small touch globe, a very dim picture resulted, limiting the image size to only a few centimeters in width.

The Midas 9.5mm

This is probably the most widely found camera-projector, first appearing in 1939. In Australia they appear to have been mainly sold post war, and in small quantities. To alleviate the need for a tripod in camera operation, the film drive in camera mode (only) was by battery-operated electric motor. The battery pack being housed in a clip-on compartment attached to the side of the camera. The film was housed in a cassette attached to the rear of the camera; a matching cassette mounted alongside was used for take up. The lens was Taylor-Hobson with variable aperture. In camera mode it operated fixed focus. A fold down viewfinder was mounted on the top of the body.



The Midas 9.5mm Camera-Projector.



The Midas in the open position.



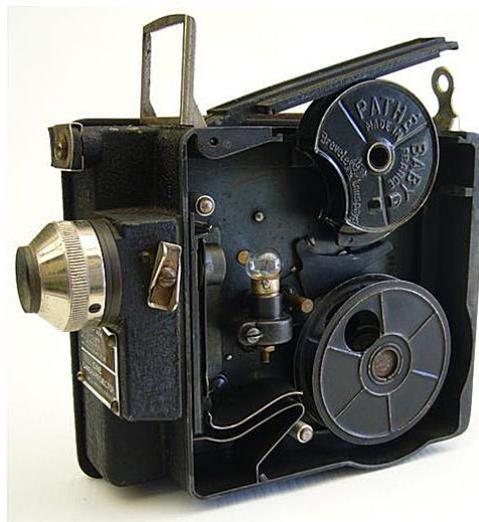
Rear section, with lamp holder and drive sprocket visible.

In projection mode, an internally mounted touch bulb was powered by the battery pack and film transportation was via a foldable handle protruding from the side of the unit. I have a number of home movie films in my collection taken with one of these cameras and the results are surprisingly good - one shot on Kodachrome, shows the royal visit decorations in Melbourne in 1954. Midas produced an updated model at a later date as well as a 'Super attachment', which enabled the use of 300 ft. reels.

These are a nice collectable unit, and can often come complete with original box and instructions. There are two items to watch when considering the purchase of a Midas - The internally mounted lamp holder is die cast and is frequently crystallized and useless, and the battery compartment will often be found with severe damage due to battery acid leakage.

The Campro 9.5mm

These machines were first seen on the market in 1935 and were made in England by Home Cine Cameras Ltd, London. They were widely advertised in the cine press of the day and then seemed to disappear completely. The unit utilised a clockwork motor for film advance, both in camera and projector mode. In camera mode, that unit accepted a Pathé 9.5mm film cassette held within the body of the camera. A basic frame type viewfinder on the top of the camera facilitated framing of the image. The lens was a fixed focus type with a variable aperture from F3.5 to F16. A basic film footage counter is incorporated on the handle side of the body.



The Campro in projection mode. Note the hinged section at the top to allow film reel to fit.

TAKE & PROJECT YOUR OWN MOVIES WITH THIS MACHINE



9.5-mm.

PRICE
7/16

● MOTOR DRIVEN CAMERA-PROJECTOR ●
A PRECISION INSTRUMENT
THAT GIVES CONSISTENTLY
GOOD RESULTS BOTH AS A
CAMERA & A PROJECTOR

STOCKED BY ALL LEADING DEALERS

In projector mode, a top section of the body hinged up to allow the processed film in

a Pathé type enclosed 30 ft. cartridge to be accommodated. The tape up was onto a small reel supplied with the unit. A small torch type globe located in the centre of the film chamber was powered from either a battery of a small transformer via two terminals on the rear of the camera body. The camera – projector was a sturdy unit; the body and side door were both made die cast – this resulted in a camera weighing it a 1.8Kgs.

The Screenus 9.5mm

This would have to be the worse example of a combined camera – projector. Film advance in both camera and projector mode is hand turned via a small handle mounted on the side of the unit. There is no provision to prevent the shutter remaining open during pauses in cranking. The fixed focus lens has just two aperture settings, fully open and about half open. The viewfinder is a simple right-angle viewer, similar to a box camera. The camera accepted a Pathé style film cassette.



The SCREENUS, showing the film chamber, reels and lamp holder. (Projection accessories shown: Reels and lamp holder are removed and a Pathé style camera film cassette inserted for camera use.

In camera mode the returned film in a Pathé cartridge is mounted within the body and a simple take up reel is driven by the lower take up. A small torch globe is held in a metal cylinder and is powered via two terminals at the rear. These unit appeared on the market in the UK in 1935, it was reported that the company went out of business not long after – the unit reappearing some time later, being aimed at the juvenile end of the market. This would seem most

appropriated, as the Screenus would seem to be nothing more than, a toy!

Although today these 9.5mm items represent interesting collectables, in the author's opinion, it is a pity that many manufacturers of 9.5mm equipment (including its inventor, Pathé), failed to utilize the real potential of the gauge; but continued to offer equipment with sub-standard performance, right up until its virtual demise in the late 1950s.

The WITTNAUER Standard 8mm

This American made Standard 8mm combined camera – projector appeared in 1959. In comparison to the forgoing units, this machine did offer reasonable performance in both functions.



The Wittnauer in camera mode.

As a camera, the Wittnauer did offer reasonable performance. Film advance was by a battery-operated motor at a single filming speed. A large footage meter was incorporated into the side of the camera. A four-lens turret holds a wide, standard, and a telephoto lens for camera use, as well as a dedicated lens for projection. The side-mounted viewfinder incorporated a top mounted slider adjustable to suit the lens selected.

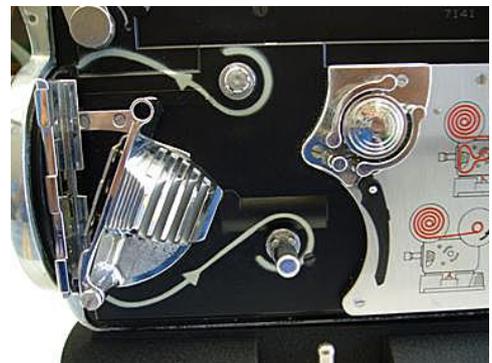
In projection mode, the camera head mounts onto a base unit, which incorporates an AC motor; this is coupled to the head via a shaft through the bottom of the head unit. As well a 2-pin connector couples power to the 300-watt projection lamp.

The projection lamp is mounted just behind the lens turret is off to one side of the film path. The light from the lamp is applied to the film via a 90-degree mirror located within the rear sprung pressure plate.

The two spool arms swing up to accept 400 ft reels of film. Now, here is where the Wittnauer is different to those described earlier – when the front spool arm is moved into place, a cam arrangement changes the shutter from a single blade for camera operation to three blades for projection operation. There is also a combined entry – exit film drive sprocket, which is used in projection mode only, essential for large spool operation. The Wittnauer is large in comparison to other Standard 8mm cameras; its elongated shape and weight of over 2 Kgs make it a cumbersome camera to operate.



The Wittnauer on its base in projector mode.



The gate assembly and reflector.

