T/2009 Issue 1

Sound & Vision Equipment Limited

EMI Television Division

The Surveyor II CCTV Camera

The Surveyor II is a fully self-contained, automatic camera which has been designed to minimise all costs associated with system installation, operation and maintenance when used for CCTV applications, especially those where maximum ruggedness and reliability are required.

Features

- *Minimum installation costs*
- *Minimum service and maintenance costs*
- *Sealed for use in wide range of environments*
- *Completely self-contained*
- *No external adjustments required*
- *Automatic sensitivity control*
- *Auto black level control*
- *Output video compatible with all suitable monitors and VTRs.*



Construction

The camera case comprises a heavy duty extruded aluminium centre section together with front and rear end castings. The end castings are each attached by four screws to the centre section and gaskets ensure that the assembly is sealed. The overall finish is a durable light grey epoxy paint.

The camera electronics are contained on four plug-in printed circuit boards which plug into a printed circuit mother board. This mother board and the pick-up tube assembly are attached to the front end casting and all electrical circuits are made, via connectors, to the rear end casting assembly.

The removal of the screws which fix the front end casting to the case allow the complete camera electronic assembly to be removed without disturbing the overall camera mounting. Once the camera electronic assembly has been exposed, the pick-up tube is quickly and easily replaced and any necessary re-alignment can be carried out in a few minutes.

The basic Surveyor II camera is provided with only two external connections, a coaxial cable for the video output and a mains input cable, which are both 4 metres long. The camera may be modified to work with a multiway camera cable carrying the video signal, input mains and control signals associated with lens and pan and tilt head function control, as well as a number of other signals available to and from the camera which are detailed later.

Any C mount lens can be attached to the front casting and adjustable focussing arrangements, which are accessible from the outside of the camera, permit a wide range of lens registers to be accommodated.

An insulated fixing wedge is provided which permits the Surveyor II to be attached to any suitable mounting using a 0.25 inch Whitworth screw. The mounting wedge can be moved along the central axis of the camera base to obtain correct balance when any type of lens, or other accessory, is fitted.

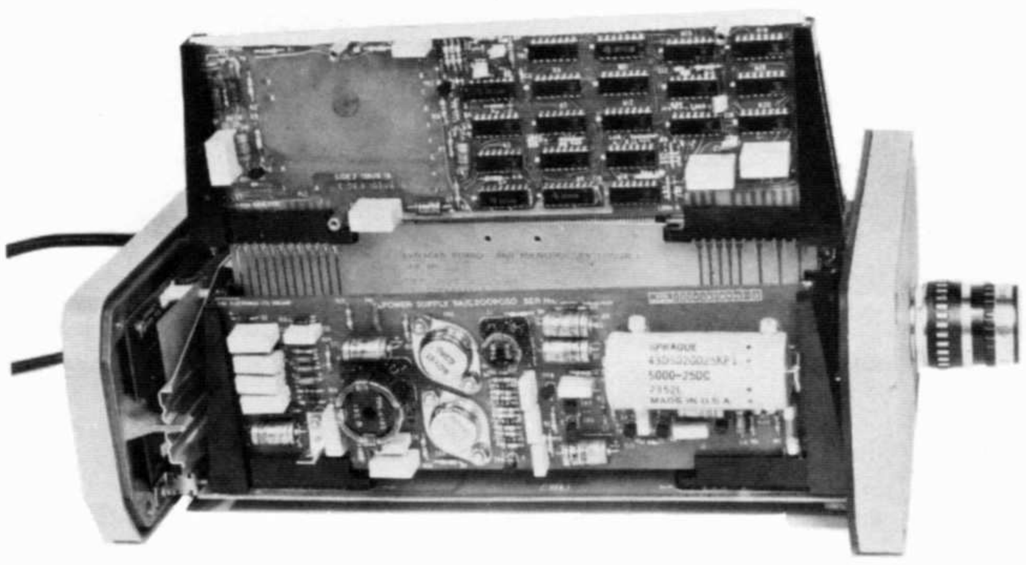
Electrical

The Surveyor II camera can be set to operate from a.c. mains at 100V to 125V or 200V to 250V, 50-60Hz, or from a 12V d.c. supply.

The camera is supplied fitted with an EMI Type 9677M electromagnetic vidicon tube, alternatives for which are available from most tube manufacturers. Automatic light control circuits maintain a substantially constant output signal level as the viewed light level varies. In addition, as the light level falls below a certain point the video bandwidth is electronically reduced to give a subjective improvement in quality by reducing the noise content of the video signal. This automatic compensation for variations of light input may be selected to be derived from either the peak or the mean level of the video signal and the application of the camera will determine which method of level detection will give the best results. Picture black level is held at a preset position so that a picture monitor will need no adjustments whatever the light level from the viewed scene.

The Surveyor II design includes the latest circuit techniques to provide superior resolution under most viewing conditions. For special applications, or when viewing unusual scenes, a variable amount of aperture correction can be added to the video signal, giving the effect of a sharper picture. The electronic circuits include certain preset adjustments which, once set, should not need re-adjustment during the life of the pick-up tube.

The Surveyor II includes a sync. pulse generator which provides fully interlaced scanning. The output signal closely conforms to CCIR or EIA recommendations and can be recorded on any suitable video tape recorder or displayed on any picture monitor. The pulse generator is locked to mains as standard, but the Surveyor II may be modified so that the s.p.g. can be locked either to a crystal or genlocked to another video signal.



The illustration shows a camera set up for maintenance and adjustment purposes. The camera electronics have been removed from the case and plugged into the end casting to re-establish the video output and power input circuits. One of the printed circuit boards is shown mounted on a circuit board extender.



A Surveyor II camera fitted with a sealed lens package.

www.tvcameramuseum.org

Data Summary – Surveyor II

Systems

625 lines/50 fields or 525 lines/60 fields. System selection by internal links.

Power Supply

100V to 125V, 200V to 250V r.m.s. 50Hz - 60Hz
OR
12V d.c.
Consumption approximately 25 watts.

Output

One 1.0V composite video signal, white positive, 0.7V video and 0.3V sync., to be terminated in 75 ohms. Waveform similar to CCIR or EIA recommendations including equalising pulses. Output can be adjusted to 1.4V peak-to-peak or made non-composite if required.

Operational Controls

None. The only controls are those on associated equipment.

Preset Controls

Preset controls are provided for beam, electrical focus, height, width, horizontal linearity, horizontal and vertical centering, output level, black level and aperture correction. Links permit the following alternatives:— output level:— 1V/1.4V, auto target control:— auto/manual, auto gain control:— auto/minimum gain, a.l.c. detector:— peak level/mean level, sync reference:— mains/crystal/genlock, line standard:— 525/625, horizontal and vertical scans:— normal/reverse, mains voltage selection taps and power earth:— chassis/isolated.

Sensitivity

The figures for sensitivity published by pick-up tube manufacturers are the only factors governing camera sensitivity at the maximum aperture of the lens in use. Typically, with an f/1.9 lens, minimum electronic gain will be maintained down to a light level of 900 lux and maximum electronic gain will occur at a light level of 15 lux with useable pictures to a significantly lower light level.

Resolution

Limiting resolution is a function of the lens and the monitor on which the picture is viewed and under optimum conditions is in excess of 550 lines. For special applications aperture correction can be added to the video, giving a subjective increase in picture definition.

Signal to noise ratio

With the camera operating under optimum conditions, the peak-to-peak signal to r.m.s. random noise ratio for a peak white signal will not be worse than 37dB.

Geometric distortion

Displacement of any part of the scan raster from its true position is within ± 2% of picture height or width, within a circle equal to picture width.

Automatic light level compensation

The camera video output level will not vary by more than ± 3dB over the light range 20 to 100000 lux for a lens aperture of f/1.9. The auto sensitivity control range will compensate for changes in light level of more than 5000:1.

Lenses

Any C mount (1 inch vidicon or 16mm cine) lens may be used and the camera focus is easily adjusted to allow for non-standard lens registers.

Pick-up tube

EMI electromagnetic Type 9677M or equivalent.

Spectral response

The spectral response of the EMI electromagnetic vidicon type 9677M is similar to that of panchromatic film.

Working temperature

- 20°C to + 50°C ambient for camera.

Environmental

The Surveyor II is fully sealed and a range of sealed lenses is available.

Connectors

Mains supply input: flying lead 4m (12 ft) long via sealed gland.
Video output: UR70 coaxial lead 4m (12 ft) long via sealed gland to camera, terminated with Belling Lee connector type L734/P/AL, mating connector supplied.

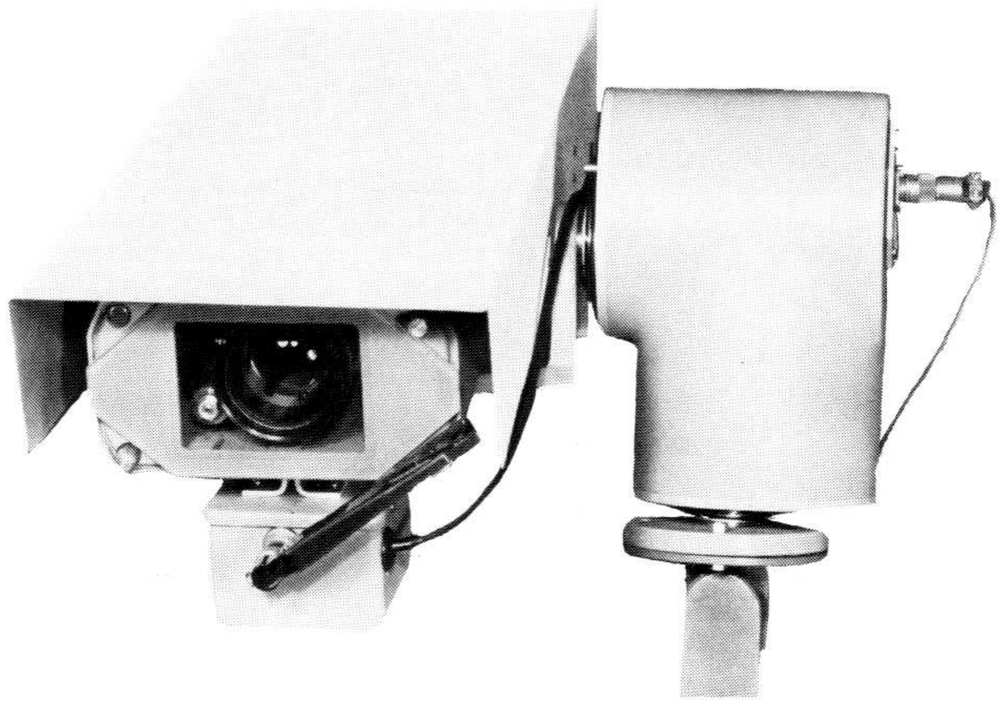
Dimensions and Weight

The figures are for the Surveyor II with pick-up tube, but without lens or other accessories.

Height	*Width*	*Length*	*Weight*
110mm	210mm	330mm	5.9kg
(4.4 in)	(8.4 in)	(13 in)	(13 lb)

www.tvcameramuseum.org

Accessory Equipment and Facilities



The illustration shows how a Surveyor II may be modified and fitted with accessories to permit operation in an exposed environment. A sealed lens package with a screen wiper is fitted to the camera and the lens and camera are protected from direct sunlight and precipitation by a weathershield. The camera is mounted on a remotely controlled pan and tilt head.

A sunshutter which can be remotely and/or automatically controlled may be fitted inside the camera. This acts to block the light from the target of the pick-up tube, so minimising image retention and prolonging tube life. A windscreen cleaner can be attached to the lens package. This includes a wiper blade which removes precipitation and dirt from the window of the lens package. The wiper blade is self-parking outside the picture area.

A crystal may be fitted to the camera to provide a stable frequency reference to which the sync. pulse generator may be locked or alternatively an optional genlock board may be fitted. This permits the camera video signal to be locked to an incoming reference video signal and a phasing control is provided so that the signals from a number of cameras can be synchronised together.

As an aid to maintenance, a focus rock generator is available, which will help to obtain correct focus when the camera is being aligned.

Many adaptations to the standard Surveyor II camera require additional circuits to be made to the camera. These circuits can be established by up to four separate cables, or all circuits can be carried by a single multi-conductor camera cable. The incoming cable(s) enter the rear casting and are terminated on a terminal board which is part of the rear casting assembly, the additional facilities available at this terminal board being:— the genlock signal input, a second video output, camera pulse outputs, remote black level control, remote output level control, connections for lens zoom, iris and focus control and loop through connections for a motorised pan and tilt head and screen wiper.

Schedule of Equipment

1 Surveyor II camera including pick-up tube, Operating Instructions T/70090M and Test Chart TL.1883, but excluding lens.

2 Ancillaries:—
- a) Lens
- b) Circuit board extender Type 2009090
- c) Focus Rock Generator Type 2009098
- d) Service Instructions TL.1876

Ordering or Enquiry Information

When ordering a standard Surveyor II camera, please state your requirement by quoting from the schedule of equipment, also give details of any lenses required.

When ordering a system incorporating the Surveyor II camera, fitted with any accessory equipment, the Surveyor System Brochure (T/1010) will help to determine the exact requirements. In addition, the Systems Engineering Department of EMI Television Division will be pleased to plan complex or non-standard systems for either new installations or the extension of existing installations.

The company reserves the right to modify the design or specification without notice.

Sound & Vision Equipment Limited

EMI Television Division
252 Blyth Rd., Hayes, Middlesex, UB3 1HW, England
Telephone: 01-573 3888 Ext: 2205 or 2180
Cables: Emisound, London Telex: 25145

Northern Area Office
46a Bramhall Lane South,
Bramhall, Stockport, Cheshire,
SK7 1AH, England
Telephone: 061-439 5558/9

T/2009 Issue 1

A member of the EMI group of companies
International leaders in music, electronics and leisure

Printed in England by Live Services Ltd, Middlesex, UK 1m/9/74

www.tvcameramuseum.org