

PHILIPS



TELEVISION EQUIPMENT

The combined deflection and focusing assembly for each tube is housed in a fully casted metal which has been precision machined to an accuracy of 0.01 mm.

Vertical and horizontal deflection is achieved by means of a small number of electron tubes. The camera tube and electron gun are housed in a separate module which is mounted on the camera head. This module can be easily interchanged to suit either the CCR or SIA scanning system.

An encoder which generates colour bar data is also contained within this unit. Like the other modules, the encoder is built to the same standards as the other modules. It is built without service facilities and is completely sealed.

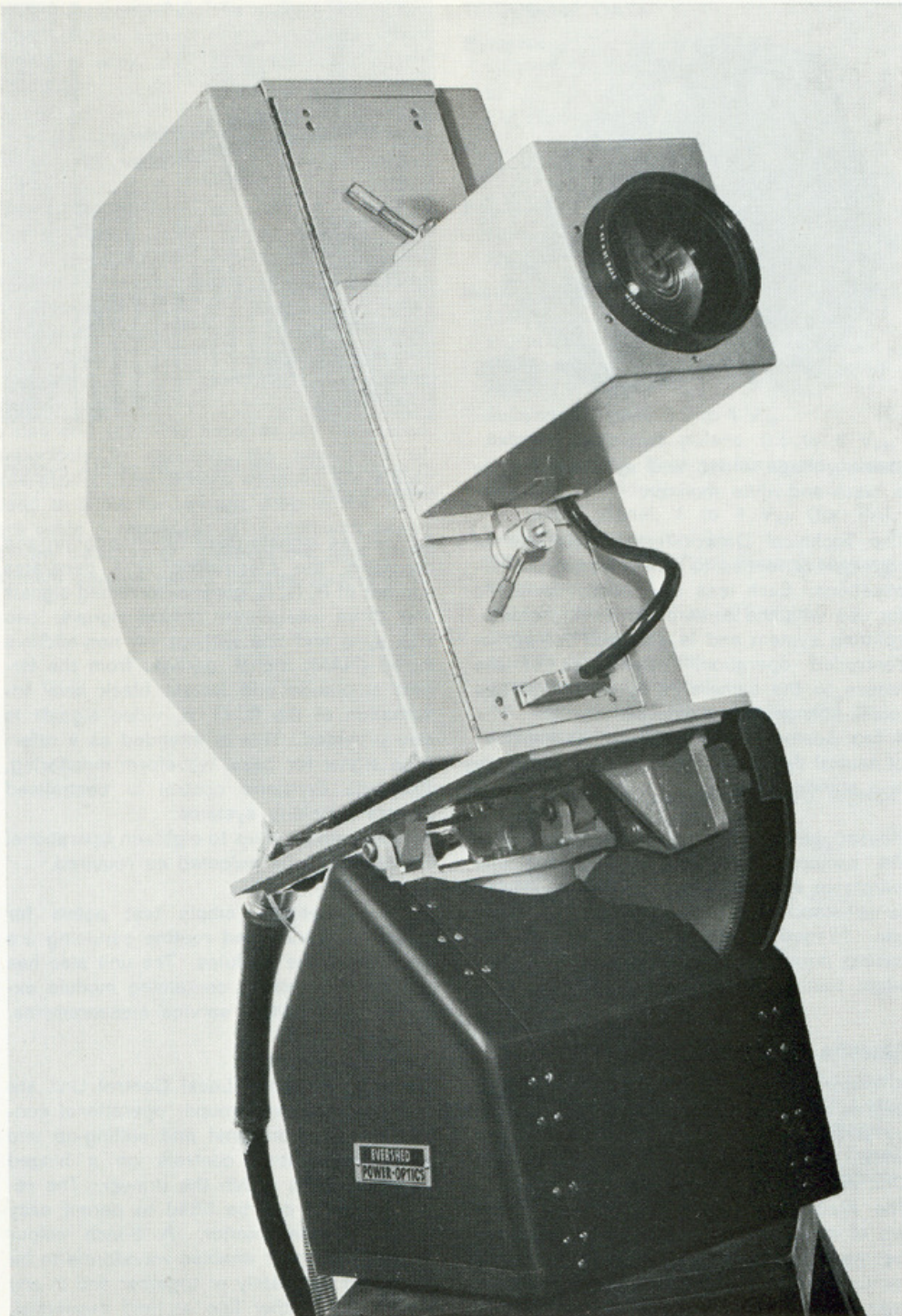
The camera has been specially designed for the construction of only one tube and is fully sealed against dust and moisture. It is built to the same standards as the other modules. It is built without service facilities and is completely sealed.

Full studio performance is achieved by means of a small number of electron tubes. The camera tube and electron gun are housed in a separate module which is mounted on the camera head. This module can be easily interchanged to suit either the CCR or SIA scanning system.

An encoder which generates colour bar data is also contained within this unit. Like the other modules, the encoder is built to the same standards as the other modules. It is built without service facilities and is completely sealed.

Plumbicon* Colour Camera Chain, Type LDK 33

- Fully remote-controlled camera system with servo-operated lens drive
- Suitable for remotely controlled pan and tilt head mounting
- Outstanding picture sharpness due to 'contours-from-green' signal processing
- Modular type CCU with integral encoder and colour-bar generator
- Full studio performance



* Registered Trade Mark for television camera tubes.

This highly versatile colour camera chain has been designed as an economical alternative to the sophisticated, manned viewfinder cameras, in televising programmes where a fixed-position camera, having efficient panning and tilting facilities, would be sufficient. Such programmes for instance are news presentations, studio interviews, caption scanning, telecine, etc.

While equal in performance to the more complex live camera chains, it is far simpler to operate and smaller in size. One, or more, cameras can be remotely controlled by one operator or alternatively by an automatic programme selector.

An important feature of the LDK 33 is that the electronic circuit modules of the camera control unit (CCU) are basically identical to those of the type LDK 3 studio camera chain. Therefore only one set of replacement modules is required for servicing both systems.

THE CAMERA

Excellent resolution and high performance together with reliability and ease of maintenance are inherent features of the Philips Plumbicon Colour Camera. Due to an exclusive prismatic colour-splitting optical system maximum colorimetric response is ensured.

Each of the camera's three colour channels employs a separate-mesh Plumbicon tube, resulting in improved overall resolution. Also, as each tube exhibits an extended linear transfer characteristic, there is no degeneration in resolution during excessive highlight excursions.

In addition to the three video pre-amplifiers which, of necessity, have to be located close to the Plumbicon tube assembly, the camera contains the deflection and video output circuitry, a saw-tooth generator for setting-up purposes and a scanning protection circuit. The solid-state circuitry employing silicon transistors throughout remains extremely stable over a wide range of temperature variations. Also, as the circuits are powered from regulated DC power supplies, they are free from the influence of mains voltage fluctuations.

The input stage of each video pre-amplifier, generally the principal source of video noise, has been specially designed to ensure an exceptionally high signal-to-noise ratio. This has been achieved by using selected low-noise Field Effect Transistors connected in an improved cascode arrangement. The juxtapositioning of each amplifier with its respective Plumbicon tube, so as to minimise the video signal path from tube to amplifier, also assists in attaining this very low noise figure.

A calibrated saw-tooth generator which can be switched to the input of each video pre-amplifier by the C.C.U. operator, facilitates the setting-up of the entire video processing channels.

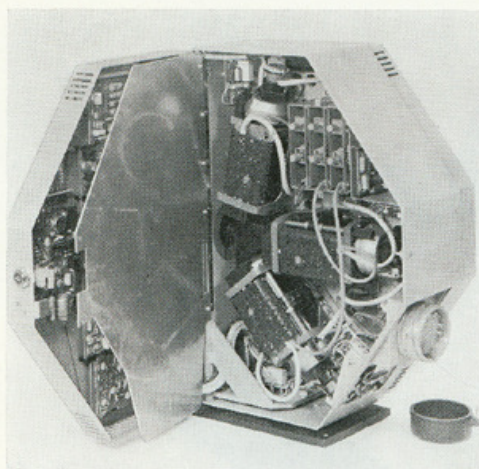
In the event of horizontal or vertical scan failure, the camera's protection circuit automatically switches the complete camera chain to 'stand-by'.

The combined deflection/focusing assembly for each tube is housed in an alloy casting which has been precision machined so as to ensure accurate alignment.

Vernier adjustment is provided to facilitate precise optical focusing. When tube replacement is necessary, the complete assembly can be easily removed and rapidly replaced without further mechanical alignment.

Apart from a small number of essential presets, the camera does not possess any external setting-up or operating controls, these functions being carried out by the CCU operator.

The camera has been primarily designed for the connection of only one Felten and Guillaume camera cable type 756-1. However, as the cable socket wiring is terminated at a taper-pin block, other makes of cable can be used without serious modification. A separate output socket provides



mains voltage, video and sync signals for a black-and-white monitor.

The Technical Data offers a selection of high-quality lenses to suit a variety of applications. Each lens is optically corrected for use with the camera's prismatic colour-splitting system and is designed for servo-controlled operation. Attachment of the lenses to the camera is by means of two 'quick-change' lever devices.

A four-position filter wheel, for the insertion of neutral density or colour-correction filters is a standard fitting.

Housed within a robust aluminium casing, the camera's functional styling and low weight in no way detracts from its ability to withstand the rigours of continuous studio use. Hinged covers at either side of the casing permit easy access to the interior when routine servicing is necessary.

CAMERA CONTROL UNIT

A major feature of the CCU is its high degree of flexibility. This has been achieved by arranging the circuits into three prime units; the Electronics Unit, Local Control Unit and Power Supply Unit.

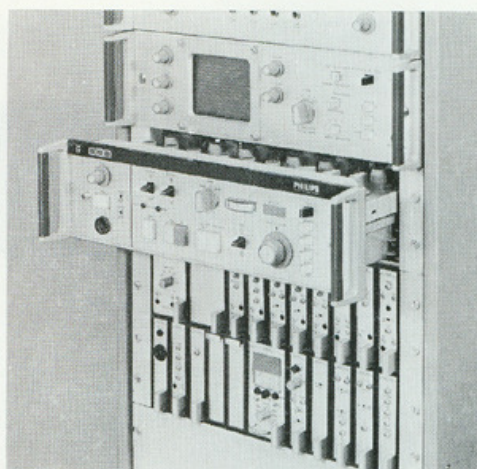
The Electronics and Power Supply Units are of modular design. The three units can be mounted either in a standard 19-inch rack or in three separate cabinets, whichever is most convenient. When mounted separately, the distance between the Elec-

tronics Unit and the Power Supply Unit can be up to 10 metres and that between the Electronics Unit and Local Control Unit up to 100 metres.

Electronics Unit

This unit contains the video processing, intercommunication, signalling and remote operation circuitry. The very latest electronic techniques have been used throughout to ensure outstanding precision and stability of performance. The contour extractor circuit, which operates on the 'contours-from-green' principle is divided over two modules. One of these, the delay module, can be readily interchanged to suit either the CCIR or EIA scanning system.

An encoder, with integrated colour-bar generator, is also contained within this unit. Like the delay module, the encoder is available in two versions; PAL and NTSC, the associated colour-bar generator operating



in accordance with the CCIR or EIA system respectively.

As well as signals used for monitoring and encoding, the Electronics Unit generates one set of R, G, B, gamma-corrected signals and three composite colour signals; two with sync and one without. A non-additive mixed (NAM) signal, derived from the largest amplitude and lowest black level information of the R, G, B, video signals is also provided. This is intended as a reference signal for basic waveform monitoring, automatic exposure control or centralised camera matching systems.

Remote control of up to eighteen operational functions can be selected as required.

Where necessary, ample test points for signal monitoring and routine servicing are available at the modules. The unit also has two spare locations containing module extenders to facilitate service measurements.

Local Control Unit

The controls of the Local Control Unit are arranged into two groups; operational controls on the frontpanel and setting-up and colour registration controls on a hinged recessed panel within the drawer. The recessed panel can be lifted to permit easy access to the interior. A 5-inch colour waveform monitor enables waveforms to be compared separately or together and in any combination, either line or field sequential. The built-in "X" amplifiers provide an X-Y

facility for comparing the gamma characteristics of the colour signals without interfering in any way with the programme production.

A service probe input for monitoring at various module test points is an additional feature.

Power Supply Unit

The regulated power supply provides the entire camera chain with all the necessary AC and DC voltages and currents. Like the Electronics Unit, the circuitry is of modular design, the modules being contained in the upper part of the unit. The lower part is intended for fitting an optional ventilation unit.

Video and scanning supplies are generated separately to minimise the possibility of interaction. The camera supplies are stabilised to allow for voltage drop in the camera cable. A regulating AC circuit with motor driven transformer, protects the lens drive system against mains voltage fluctuations.

TECHNICAL DATA

Systems:

CCIR 625 lines, 50 fields/s
or
EIA 525 lines, 60 fields/s

Power supply:

110, 117, 220 and 234 V \pm 5%, 50 - 60 Hz

Power consumption:

camera chain without lens servo system:
260 VA

Input signals:

composite blanking signal (B) }
composite sync. signal (S) } 0.75 to 4 V_{pp},
negative going
subcarrier signal, 0.5 to 4 V_{pp}
external burstgate pulses, 0.5 to 4 V_{pp},
negative going, (internal burstgate pulses
are also provided)
"K"-pulse signal, 1 to 4 V_{pp} (for PAL
encoding system only)
All signals into 75 Ω (loop-through sockets)
supplementary:
encoder test signal or VIT signal
line-up test signal
overlay picture signal
overrule picture signal
All signals VB, monochrome, 0.7 V_{pp},
positive going, into 75 Ω

Output signals:

1 x R, G, B gamma-corrected signals
(VB), 0.7 V_{pp}, positive going
1 x composite colour signal (CVB),
1 V_{pp}, positive going
2 x composite colour signal (CVBS),
1 V_{pp}, positive going
2 x composite sync. signal (S),
4 V_{pp}, negative going
All signals into 75 Ω

Scene illumination:

1500 Lux (150 ft. cd.) for a signal-to-noise
ratio better than 40 dB in the Y-channel;
at f/4; aperture correction 6 dB at 5 MHz;
gamma correction 0.6; contour enhance-
ment operating at 60% of maximum boost
250 Lux (25 ft. cd.) for just acceptable
pictures with lens iris f/2.2

Resolution:

With aperture correction, 100% modulation
depth at 5 MHz can be obtained in
each channel without contour enhance-
ment

Registration accuracy:

Deviations of Red or Blue in any direction
with respect to Green:

In an ellipse in the centre of the scanned
picture with axes 0.9 of picture height and
width, deviations will be not greater than
the distance equal to a horizontal scan-
ning time of 40 nanoseconds

Within a circle having a diameter equal to
the picture width, deviations will be not
greater than 80 nanoseconds

Outside this circle, deviations will be not
greater than 120 nanoseconds

Registration drift:

Deviations of Red or Blue in any direction
with respect to Green:

variations of the ambient temperature of
the camera of no more than $\pm 10^\circ\text{C}$
from the temperature during registration
setting (within the range of -10° to
 $+45^\circ\text{C}$) will not cause mutual picture
shifts larger than 50 nanosec.

Picture geometry:

Maximum deviation 0.5% of the picture
height within the ellipse (see "Registra-
tion accuracy");

Maximum deviation 1% in the remaining
picture area

Lens errors are not taken into account

Signal-to-noise ratio:

45 dB in each channel at a signal current
of 300 nanoAmp.; without aperture, con-
tour and gamma corrections; within a
bandwidth of 5 MHz; black-level at 40%
of peak white

Gain control:

Master selector for:

-6 dB (pre-set position for line-up);
0 dB;

+6 dB

Individual input gain adjustable of ± 3 dB
in each channel

Frequency response:

Without aperture correction;

± 0.5 dB up to 5 MHz,

-3 dB at 7 MHz

Aperture correction:

Pre-set for amplitude boosting of maxi-
mum +10 dB at 5 MHz;

pre-set for amplitude threshold between
0 and 100% of white-level

Gamma correction:

3-step selector for:

linear operation;

gamma = 0.35 to 0.6 (adjustable);

gamma = 0.6 to 1 (adjustable)

Gamma tracking at peak white-level

 $\leq 0.5\%$ **Black-level adjustment:**

Master control for adjustment between

-40% and +50% of nominal white-level;

individual control for adjustment between

-15% and +15% of nominal white-level

Contour enhancement:

Amount of enhancement:

variable up to $0.7 V_{PP}$ for a pulse with
a risetime of 100 nanoseconds

Frequency boost:

horizontal

vertical

} maximum 6 dB at 3.5 MHz

Noise figure:

better than 55 dB, for 5 MHz bandpass
filter**Lenses:**

Recommended types of zoom lens:

Angénieux 6x22; f/2.8, 22 - 132 mm,

Angénieux 10x18J1; f/2.0, 18 - 180 mm,

Angénieux 10x25; f/4.5, 25 - 250 mm

Recommended types of fixed focus lens:

Schneider TV Procolor; f/2.0, 75 mm,

Schneider TV Procolor; f/2.4, 110 mm,

Schneider TV Procolor; f/2.8, 150 mm

Note: in principle, any type of lens corrected for use with the prismatic colour splitter and the Plumbicon camera tube can be applied.

Camera cable:

Standard camera cable:

Felten & Guillaume, type 756-1

Selectable corrections are provided for a maximum cable length of 1000 metres (3000 ft)

Warming-up period:

For the performance data specified, a warming-up period of 30 minutes should be taken into account;

2 minutes after switching on, fully acceptable colour pictures will be obtained

Permissible ambient temperature:

From -10 to +45 °C.

Dimensions:

See dimensioned sketches

All dimensions are in mm

Weights:

Camera without lens: 25 kg

Electronics Unit: 34 kg

Local Control Unit: 36 kg

Power Supply Unit: 29 kg

