

# PHILIPS



BROADCASTING EQUIPMENT

## Plumbicon\* Colour Television Camera Chain, Type LDK 13

**Portable colour television camera**

**For on-the-spot news coverage and interviews**

**Light-weight and small-size**

**Broadcast quality pictures**



The design of this portable colour television camera was made possible by the development of a new 5/8-in Plumbicon tube, a miniature tube roughly half the size of the standard Plumbicon. The equipment consists of a very small, light-weight camera with zoom lens, viewfinder and shoulder brace, and an intermediate unit (back-pack) with carrying harness. It is intended for use in conjunction with the standard CCU of the Plumbicon Studio Colour Camera Chain, Type LDK 3S.

Small size and low weight — camera with lens and viewfinder 5.5 kg, interconnecting cable 1 kg, and intermediate unit 8.1 kg — make this camera equipment particularly

suitable for use in outside broadcasting for on-the-spot covering of various events. It is equally suitable for application in the medical field, not only for televising surgical operations but also for use in conjunction with optical instruments in microscopy and endoscopy.

The interconnecting cable between camera and intermediate unit is also available in a standard length of 10 m, so that in outside broadcast work the intermediate unit can be carried as back-pack by an assistant of the cameraman, or when it is carried by the cameraman himself, he may lay it down and move about with the camera proper within a certain area.

The electronic viewfinder, a 1-in direct viewing type, has been specially designed for this camera, and weighs only 1 kg. The shoulder brace used is standard accessory with Arriflex cine cameras. The intermediate unit is connected to the CCU, which will normally be located in an outside broadcast van, by means of a single camera cable. The CCU provides PAL or NTSC-coded colour signals with and without sync pulses, as well as a gamma-corrected RGB signal triplet for external use.

\* Registered trade mark for television camera tubes



### The Camera

The camera is built into an aluminium alloy cast housing having deep-drawn aluminium covers with locking device. The base plate of the housing is fitted with a standard 3/8-in threaded hole for mounting the camera on a tripod. Apart from the blanking amplifier, the camera only contains the pick-up section comprising the colour-splitting prism, the three camera tubes with associated deflection units, and the first video pre-amplifier of each colour channel. The remaining circuitry normally housed in a camera, is accommodated in the intermediate unit.

The whole pick-up section is incorporated in a dust-free, aluminium cast block fixed to the front of the camera housing, to which the lens is also mounted by means of a quick-locking bayonet device. This mechanical design results in an outstanding optical precision and a lasting stability.

The camera is equipped with a specially designed Schneider zoom lens, type Vario-gon, f/1.6, 13 to 65 mm, with servo-controlled iris and manually controlled focus and zoom. The new, more efficient colour-splitting prism employed, is preceded by a  $\lambda/4$ -filter to reduce objectionable effects due to incident, polarised light. A four-position filter wheel is arranged between lens and prismatic colour-splitter. A cap filter is not required, because the lens iris can be completely closed.

The miniature, 5/8-in Plumbicon tubes are electrostatically focused. Apart from the overall picture sharpness achieved, this method of focusing has the additional advantage of obviating the need of focusing

coils in the deflection coil assemblies, so that these coil assemblies could be considerably reduced in size and weight. The deflection units have vernier controls for optical focusing and picture rotation.

The video pre-amplifiers and the blanking amplifier of the camera are of the plug-in type. The video pre-amplifiers, which employ thin film techniques, apply the primary colour signals with an amplitude of 200 mV to the intermediate unit.

### The Intermediate Unit

The circuitry of this unit is mounted on plug-in printed boards. It includes: pulse generation, horizontal scanning, scan failure protection, focusing, video amplification, viewfinder cable length correction, test signal generation intercommunication and signalling. The video amplifiers have an output signal level of 0.5 V. The test signal generator provides a line sequential sawtooth signal that can be fed to the camera pre-amplifiers.

The unit has a spare location lodging a module extender, to facilitate service measurements. It is further fitted with a blower for forced-air cooling. A side panel contains sockets for a second headset, a head-phone, a commentator's microphone, and an extra viewfinder, in addition to viewfinder display selectors. This unit, which is provided with a mountaineer's carrying harness for use in outside broadcast work, is connected to the CCU by means of a single, Felten & Guilleaume camera cable, type 756-3, with a maximum length of 300 m.

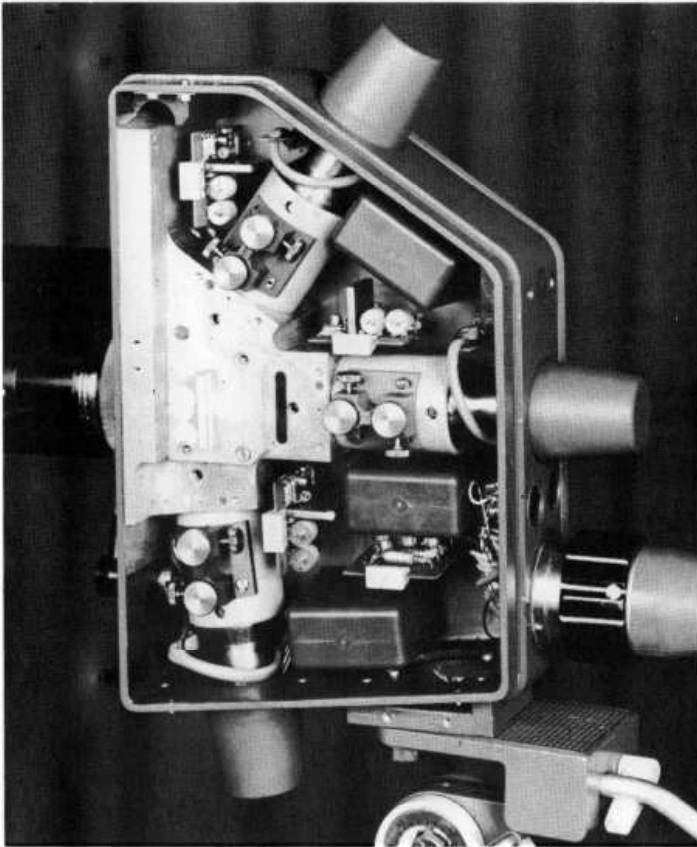
### The Camera Control Unit

As mentioned before, the camera chain is used in conjunction with the standard, modular CCU of the Plumbicon Studio Colour Camera Chain LDK 3S. This CCU consists of three major subassemblies: Local Control Unit, Electronics Unit and Power Supply Unit. These subassemblies, which are connected by cables at the rear, can be accommodated either in a 19-in rack or in three separate cabinets.

The Local Control Unit includes a pull-out drawer with operational controls at the front panel and setting-up and colour registration controls at the top panel, and the Colour Waveform Monitor, Type LDK 4910. The Electronics Unit comprises two rows of modules containing the circuitry for: video processing including contour enhancement, encoding, pulse generation and timing, vertical scanning, focusing and beam alignment, picture switching, CLUE switching, test signal generation, communication, signalling and remote control.

The Power Supply Unit consists of one row of modules containing the regulated power supply circuitry for the camera chain. Voltage supplies for video and scanning circuits have been separated to minimize interference. All power supplies for the camera are automatically adapted to the various lengths of camera cable used.

A useful optional extra for this CCU is the Double Local Control Panel, type LDK 4930/20. This unit enables the LDK 13 to be used in conjunction with the CCU of an already available colour camera chain LDK 3S, so that two cameras can be operated alternately on the same CCU.



## TECHNICAL DATA

### Scanning systems

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

### Power supply

110, 117, 220 and 234 V  $\pm$  5%, adjustable  
by voltage selectors; 50 - 60 Hz

### Input signals

Composite blanking signal (B) } 0.75 to 4 V<sub>pp</sub>,  
Synchronising signal (S) } negative going  
Colour carrier (Sc), 0.5 to 4 V<sub>pp</sub>  
External burstgate pulses (bg), 0.5 to 4 V<sub>pp</sub>,  
negative going (internal burstgate pulses are  
provided)

PAL identification pulse (Kp), 1 to 4 V<sub>pp</sub>  
All amplitudes across 75  $\Omega$  (loop-through  
sockets)

#### Supplementary:

Encoder test signal or VIT signal  
Line-up test signal  
Overlay picture signal  
Overrule picture signal

All signals VB, 0.7 V<sub>pp</sub>, positive going,  
across 75  $\Omega$

### Output signals

1 x R, G, B gamma-corrected (VB) signals,  
0.7 V<sub>pp</sub>, positive going  
1 x R, G, B linear (VB) signals, 0.7 V<sub>pp</sub>,  
positive going  
1 x composite colour signal (CVB), 1 V<sub>pp</sub>,  
positive going  
2 x composite colour signal (CVBS), 1 V<sub>pp</sub>,  
positive going

2 x synchronising signal (S), 4 V<sub>pp</sub>, negative  
going  
All signals across 75  $\Omega$

### Scene illumination

1000 lux with a reflection factor of 60%, for  
a signal-to-noise ratio of 39 dB in the Y-  
channel; with lens aperture f/2; no aperture  
correction; gamma correction 0.6; and maxi-  
mum contour enhancement

### Resolution

Without aperture correction, the typical  
modulation depth in the centre of the picture  
at 3 MHz and 5 MHz will be 55% and  
25%, respectively, in the three colour  
channels.

### Colour registration

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

In an ellipse with axes 0.9 of the picture  
height and width, deviations will be no more  
than the distance equal to a horizontal  
scanning time of 50 nanoseconds;

Within a circle of a diameter equal to the  
picture width, deviations will be no more  
than 100 nanoseconds;

Outside this circle, deviations will be no  
more than 200 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°C from  
the temperature during registration setting  
(within the range of -10 to +45°C) will  
not cause mutual picture shifts larger than

50 nanoseconds

### Geometry error

Maximum 1% of the picture height within  
the ellipse;  
maximum 2% outside the ellipse (lens dis-  
tortion excepted)

### Signal-to-noise ratio

43 dB in each channel, at a signal current  
of 150 nA, without aperture, contour and  
gamma corrections, measured in a band-  
width of 5 MHz at 40% of the nominal  
white level

### Gain control

Master selection in three stages:

- 6 dB, 0 dB, + 6 dB;  
individual control for  $\pm$  3 dB in each  
channel

### Frequency response

Without aperture correction:

$\pm$  1 dB up to 5 MHz;  
- 3 dB at 7 MHz

### Aperture correction

Preset for maximum of + 10 dB correction  
at 5 MHz;  
preset for amplitude threshold between 0  
and 100% of the nominal white level

### Gamma correction

3-step selector for:  
linear operation,  
gamma = 0.35 to 0.6 (adjustable) and  
gamma = 0.6 to 1 (adjustable)  
Reciprocal deviations smaller than 0.5%  
relative to the nominal white level

**Black level adjustment**

Master control for adjustment between — 40 and + 50% of the nominal white level

Individual control for adjustment between — 15 and + 15% of the nominal white level

**Camera lens**

Schneider, type Variogon, f/1.6, 13 to 65 mm, with servo-controlled iris, and manually controlled focus and zoom

**Camera cable**

Felten & Guillaume, type 756-1, maximum permissible length 1000 m;

Felten & Guillaume, type 756-3, maximum permissible length 300 m

**Encoder with colour-bar generator**

In five modules. Versions available for PAL or NTSC system

**Contour extractor**

In two modules. Versions for CCIR or EIA standard

**Colour Waveform Monitor**

Type LDK 4910

**Warming-up period**

Very good colour registration is obtained after two minutes. The operating values specified are reached and remain stable after 30 minutes

**Permissible ambient temperature**

— 10 to + 45 °C

**Dimensions**

See sketches

**Weights**

Camera without lens or viewfinder:	3.5 kg
Camera with lens:	4.5 kg
Viewfinder:	1 kg
Shoulder brace:	1.5 kg
Interconnecting cable (2 m):	1 kg
Interconnecting cable (10 m):	5 kg
Intermediate unit:	8.1 kg
Carrying harness:	0.2 kg

