



'Graduate' Studio Television Camera



Fully professional performance

Plumbicon or Vidicon versions available

Free-standing or rack mounted CCU

Internal or external synchronising
6½ inch viewfinder

10 : 1 or 5 : 1 zoom lens versions

Professional talkback facilities

The 'Graduate' camera chain has been specifically designed to meet increasing demands for an economical yet fully professional broadcast quality studio camera chain. The new model combines the Philips Multi-Purpose Camera, the Philips 6½ inch viewfinder monitor and the Rank Taylor Hobson Varotal XXII 10 : 1 or 5 : 1 Zoom Lenses, in a very attractive camera housing.

The camera has already been chosen by many Colleges and Universities for its ability to produce excellent pictures under a wide variety of lighting conditions, and for the numerous standard facilities offered.

Although the 'Graduate' camera chain is primarily intended for use with a Plumbicon Camera Head, very satisfactory results can

also be achieved using the Vidicon version where sufficient light is available.

Both lenses have been chosen for their high degree of optical precision, low flare properties, rugged construction and fully sealed exterior.

The viewfinder hood, lens hood, and lens housing are all readily detachable, requiring no tools, and a hand fastener at the front of the main housing releases the top cover which may then be hinged up to reveal the camera interior. The housing itself is well ventilated and showerproof. A travelling case may be supplied for outside broadcast work.

Camera facilities include behind-camera

zoom and focus controls, programme sound and producer talkback, and cue lights on top of the camera and on the rear panel. A switch on the rear panel isolates the main cue light. The lens iris function may be controlled remotely. A floor manager's headset socket is provided, which duplicates the cameraman's headset facilities.

The talkback system enables the cameraman to receive instructions from the producer on one earphone, whilst listening to programme sound on the other. Separate gain controls for each earphone, together with a microphone On/Off switch and gain control are provided on panels at the rear of the camera housing. An alternative simplified intercommunication system is available if required.



CAMERA HEAD

This is either a Philips Plumbicon or Vidicon camera head, Type LDH 0151/00 or LDH 0150/00 respectively. With the exception of the low noise nuvistor input stage to the camera amplifier all circuits are solid state and arranged on two plug-in printed circuit boards. Two switches are located inside the head for reversal of horizontal and vertical scans. Protection circuits prevent damage to the pick-up tube in the event of horizontal or vertical scan failure.

CAMERA TUBE

A Plumbicon separate mesh pick-up tube XQ1021 or equivalent is normally provided. A wide variety of 1 inch vidicon tubes are available if the alternative camera head is chosen.

VIEWFINDER

This is a Philips 6½ inch viewfinder monitor Type EL 8100. The unit gives brilliant pictures with high contrast and high definition. Front controls include mains switch, brightness, contrast, picture height and line stability. Picture width may be adjusted from the rear.

LENSES

The camera is available with a choice of two standard lens packages :

- (a) Varotal XXII 10 : 1 Zoom Lenses :
f2.8, 21–210 mm, 45°–4½° approx horizontal angle, focusing range—infinity to 48 inch.
- (b) Monital 'M' 5 : 1 Zoom Lens :
f2.6, 25–125 mm, 40°–8° approx horizontal angle, focusing range—infinity to 67 inch.

Both lenses are supplied with a detachable lens hood, behind-camera manual controls for zoom and focus, and motorised remote iris. A servo controlled iris system is available for the Varotal XXII if specially required. A close-up attachment can be fitted to the monital 'M' which focuses down to 5 inches from the front element, and a similar adaptor focusing down to approximately 2 feet is available for the Varotal XXII.

TRIPOD MOUNTING

A special mounting plate has been designed to enable the camera to be used on all well known pedestal or heavy duty tripod mounts. The plate has three ⅜ inch Whitworth holes in the base, and is longitudinally adjustable to facilitate accurate balancing. Provision is made for fitting a Vinten wedge.

TALKBACK

A professional talkback system is provided within the camera housing.

Facilities offered include production talkback over one earphone of the headset and programme sound over the other. A moving coil microphone on the headset provides reverse talkback from the cameraman to the production desk.

Control panels on the rear of the camera provide separate headphone level controls for the talkback and programme sound signals, a microphone On/Off switch and adjustable gain control are also included.

All levels are at + 4dB (relative to standard level) to reduce cross talk to a minimum.

For small installations where professional studio talkback is not required, the camera may be offered with a simple intercommunication system.

CAMERA CONTROL UNIT (TYPE LDH 0160)

All operating controls are mounted on a front panel which hinges down to give access to plug-in modules. The front panels of some of these modules contain preset controls for setting up the camera chain. An extension board is provided to facilitate testing of the modules outside the cabinet during operation. Space is available inside the control unit for four additional modules, two bays being already wired to take the sync pulse generator modules LDH 4300 and the other two being spares. An input socket is provided for a test signal (max 1 V pp) to permit exact adjustment of the amplifier channel. The same camera control unit may be used with either a Plumbicon or a Vidicon camera head.

CONTROLS

Controls are provided on the front panel of the Camera Control Unit for the adjustment of black level, video gain, beam focus, beam current and target voltage. Switches are provided for 'Standby' and 'Operation', 'On/Off' for automatic gain control, for gamma correction, and for video polarity for 'Positive', 'Negative' and 'Negative Film' (the 'Negative Film' position provides automatic video gain control to compensate for viewing films or various densities if the camera is used for telecine purposes).

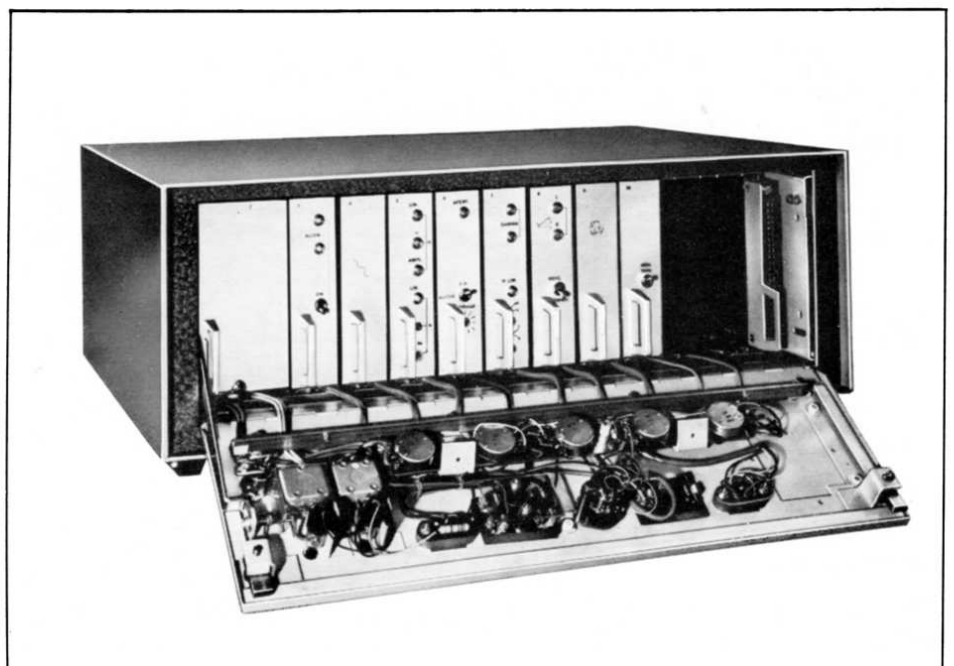
The camera lens iris setting and the video gain and black level controls may be remoted on to separate controls mounted on the operating desk.

PRESET CONTROLS

On the front panels of the modules in the Camera Control Unit are controls for: alignment (horizontal and vertical); linearity; amplitude and shift of horizontal and vertical scanning; aperture correction; cable length compensation (adjustable in seven steps from 0 to 300 m); automatic gain control for average or peak level operation; gamma correction in white and black regions; white limiter; pedestal; video output voltage; sync amplitude for each video output; switch for target voltage (Vidicon/Plumbicon). For a Plumbicon tube the target voltage is fixed at 45 volts, but may be varied for use with a Vidicon.

SYNCHRONISATION

The camera chain may be driven from standard CCIR external station synchronising pulses or from internal sync pulse generator modules Type LDH 4300 housed in the camera control unit. These modules may be used to drive a number of camera chains to provide a fully synchronous system. For major schemes it is recommended that a separate



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CCIR standard S.P.G. (i.e. Type EL 8250) is used as the main source of syncs, and that the LDH 4300 modules are available in one Camera Control Unit as a standby system. Changeover from external to internal syncs can be effected by operating one switch.

CAMERA CABLE

A BICC Mk IV camera cable is fitted between the camera and a studio wallbox, and a Philips 25-way camera cable Type LDH 8102 between the wallbox and the Camera Control Unit.

SPECIFICATION

Standards:

Applicable to :

Type LDH 0150/00
Type LDH 0151/00
Type LDH 0160/00
Type LDH 0160/02

CCIR 625 lines, 50 fields per sec, or
EIA 525 lines, 60 fields per sec, 2:1
interlaced, using the sync pulse generator
LDH 4300/00. The camera may also be
driven from station syncs

Power Supply:

Mains voltages 110, 117, 220, 234V, +10%
—15% (nominal set by voltage selector)
at 50 or 60 Hz ± 2 Hz when sync pulse
generator LDH 4300 is used. Power con-
sumption approximately 75 VA including
viewfinder

Frequency Response:

Without aperture correction :

Camera chain for CCIR and EIA
standards; flat within ± 0.5 dB to
5 MHz, —3 dB at 7 MHz measured
with a high resistance current source
replacing the tube

Picture Geometry:

Camera:

Max deviations within $\pm 1\%$ of
picture height

Viewfinder :

Max deviations less than 2% of
picture height

Sensitivity:

A minimum of 75 nA signal current from
camera tube will give a 1 V non-composite
video output signal when used for
625/525 line working

Illumination Level:

160 Lux reflected light for a signal-to-
noise ratio of 45 dB with iris set at $f2.8$

Signal-to-Noise Ratio:

R.M.S. noise voltage with respect to 1 V
pp non-composite video signal output at
signal current of $0.3 \mu A$ without aperture
and gamma corrections :

Approx —45 dB for 625/525 line
working measured with a 5 MHz
weighting filter

Aperture Correction:

For 625/525 line version:

Adjustable to +10 dB at 5 MHz with
respect to 0.5 MHz with maximum
at approx 7 MHz

Gamma Correction:

Adjustable from 0.4 to 0.6, the black and
white regions being independently variable
for optimum conditions. White level is
independent of gamma setting. Gamma
correction may be switched off (i.e. if used
with a Vidicon)

Black Level Control:

Black level adjustable between —30%
and +15% without gamma correction, and
between —30% and +40% with maximum
gamma correction; white level independent
of black level setting

White Clipper:

Coarse white clipping at 140% of camera
signal. Additional fine adjustment of white
clipping between 90% and 120%

Cable Length Compensation:

Adjustable in 7 steps for camera cable
0 to 300 m long

Stability:

Camera chain fully complies with specifi-
cation within 5 minutes of switching on

Permissible Ambient Temperature:

From $-10^{\circ}C$ to $+45^{\circ}C$ tropicalised
design

Dimensions:

Camera :

Overall height to top of cue light,
 $17\frac{3}{4}$ in (45 cm)
Overall length (less hoods) $39\frac{3}{8}$ in
(100 cm) with 10:1 zoom
Overall width $9\frac{1}{2}$ in (24 cm)

Control Unit :

Cased Version :

Height : $6\frac{3}{4}$ in (17.5 cm)
Width : $17\frac{3}{8}$ in (45.2 cm)
Depth : $13\frac{1}{2}$ in (34 cm)

Rack Mounting :

Height : $5\frac{1}{2}$ in (13.3 cm)
Width : 19 in (48 cm)
Depth : $13\frac{1}{2}$ in (33.5 cm)

Weights:

Camera :

Complete with 10:1 zoom lens,
85 lbs approx (38.5 kg)

Control Unit :

Cased Version :

32 lb (14.5 kg)

Rack Mounting :

30 lb (13.5 kg)

Versions Available:

1. Graduate Plumbicon Camera Chain
with :
LDH0151—Camera head complete
with pick-up tube,
EL8100 $6\frac{1}{2}$ in Viewfinder,
Varotal $f2.8$ 10:1 zoom lens, and
full broadcast type talkback facilities
LDH0160/02 — Rack mounting
camera control unit
2. As (1) above, but with case mounted
camera control unit
3. As (1) or (2) but with Monital 5:1
zoom lens
4. As (1), (2) or (3) but with simplified
talkback system
5. As any of above but with LDH0150
vidicon camera head

Accessories and Cables:

Data on cables, extension boards, junction
boxes, etc. for any installation is available
on request

*Specification details subject to change
without notice*



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