

PHILIPS



Portable Production Camera

Type LDK 15L

Lightweight, versatile

Full studio quality

1 inch A.C.T. Plumbicon tubes

Triax and Multicore versions

**Interchangeable with LDK 5 or
LDK 25 in multi-camera applications**

Cable or radio modes of operation

**Encoded output, automatically
timed and phased**

**Hand-held or tripod operation,
1 inch and 7 inch viewfinder
options.**



The LDK 15L is the latest addition to the Philips range of colour cameras.

The LDK 5 and 25 production cameras are well established and acknowledged for their high standards of performance and reliability. The LDK 15L has been developed as a lightweight portable camera to match the quality of these cameras in both studio and outside broadcast applications and to add to the operational scope of the LDK 5 family by an interchangeable and compatible lightweight portable camera.

Designed for use with either the base station of the LDK 5 triax camera or the CCU of the LDK 25 multicore camera, the LDK 15L extends the scope of application of both cameras as an alternative portable camera head in multi-camera operations.

Used as an independent camera channel the LDK 15L has additional applications, in its radio and direct taping modes, making it particularly suitable for high quality field production and drama insert work.

The LDK 15L can be either hand-held or mounted on a lightweight tripod or pedestal. When tripod mounted the lens controls can be operated from the rear of the camera on the pan bars. An optional 7 inch viewfinder is available for tripod mounted applications offering the cameraman the facilities normally expected in full-size studio cameras.

The scope of the LDK 15L will include both studio and outside broadcast use. In the studio it will find application as a portable camera in audience participation and drama sequences,

and can be synchronised with other cameras in the studio.

In outside broadcast applications the LDK 15L will operate over the full 2000 metres of triax cable used by the LDK 5 camera.

The LDK 15L extends the flexibility of Pye TVT's range of outside broadcast vehicles, where designs for two and four camera systems including the LDK 15L, are already in operation by broadcasters for the production of sports events, documentaries on location, and drama applications.



Pye TVT Limited
The Broadcast Company of Philips



The Camera Head

The camera head, including the 1 inch viewfinder weighs less than 9 kg (19.6 lbs). In hand-held operation the low centre of gravity and low profile enable the camera to be easily controlled and stabilised on the cameraman's shoulder. The moulded shoulder support, fitted to the rear of the camera, enables it to be carried on either shoulder and a front support is provided to give added overall weight distribution and stability. A 1 inch high-definition electronic viewfinder can be positioned on either side of the camera head. The cameraman has at his disposal controls for contrast and brightness mounted on the viewfinder housing. Within the viewfinder the cameraman can also see two pilot lamps indicating 'on air' and camera call.

When setting up the camera the viewfinder can be used to display a variety of test signals. These are selected at the backpack. Similarly the viewfinder has a reverse feed to enable the cameraman to position his picture with a remote source which may be a composite from the vision mixer.

Tripod Operation

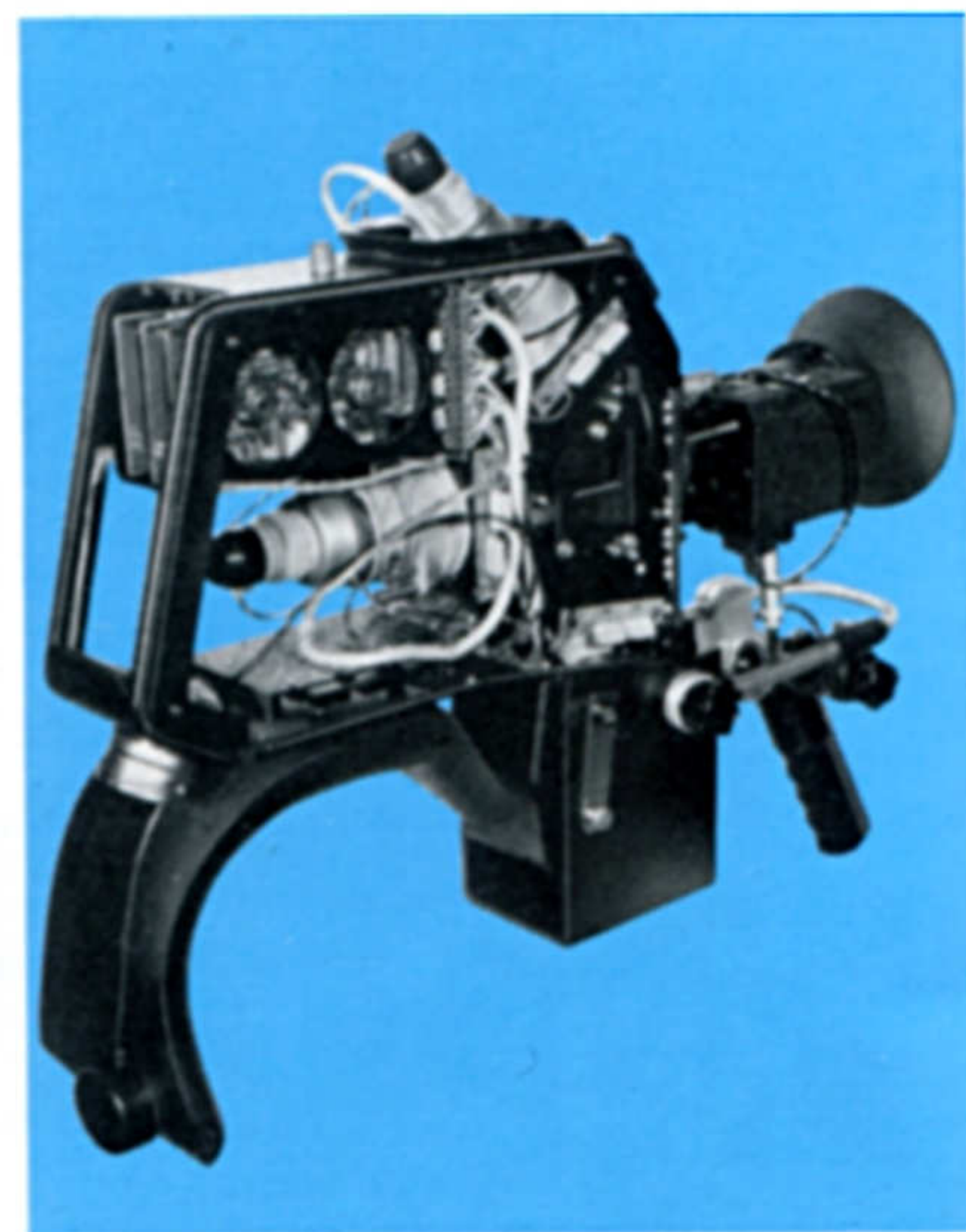
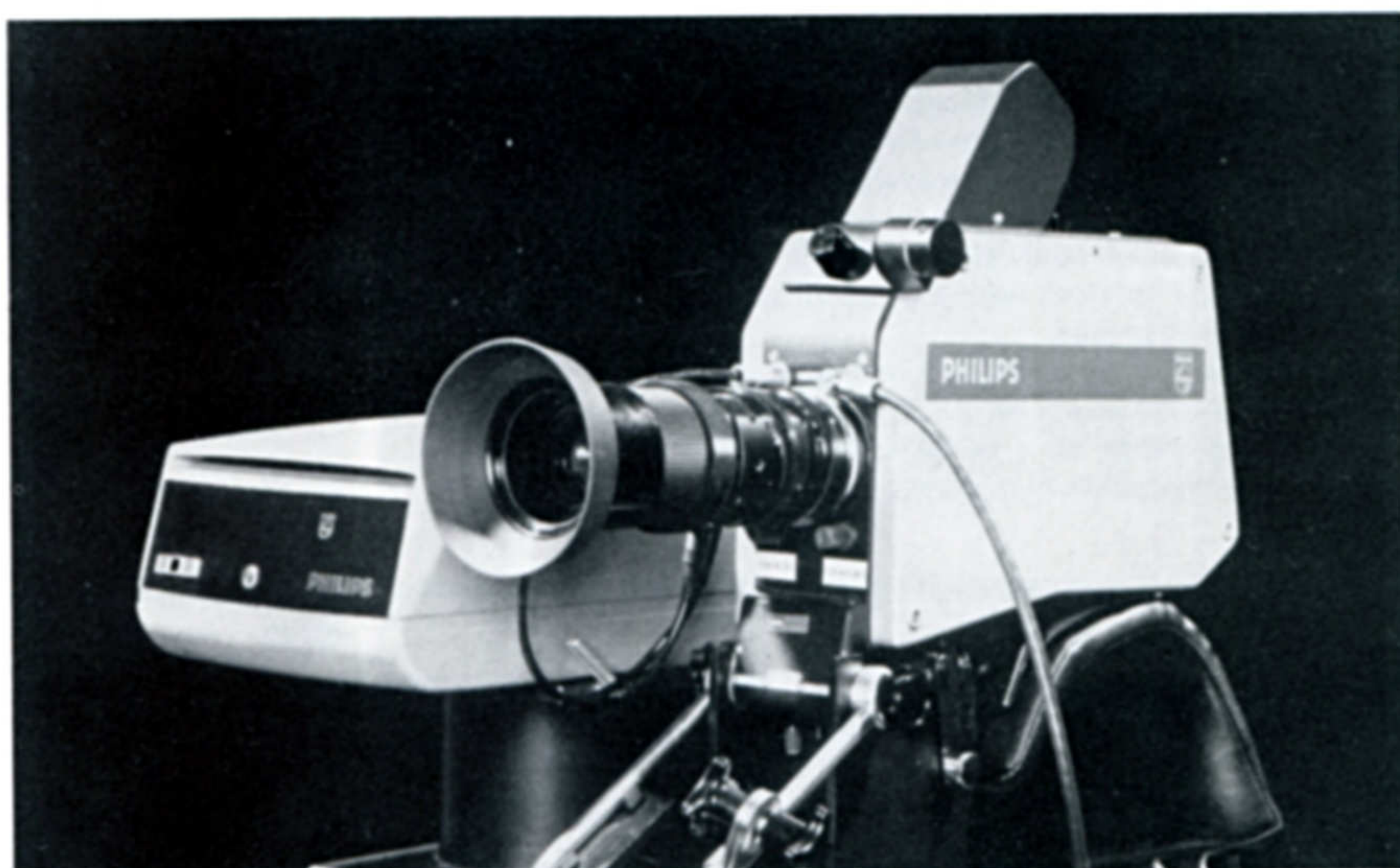
The LDK 15L is fitted with an integral wedge plate adaptor which enables the camera head to be quickly attached to a tripod. An optional 7 inch viewfinder, offering full studio facilities, is available and can be mounted on a tripod adaptor which carries it alongside the camera head.

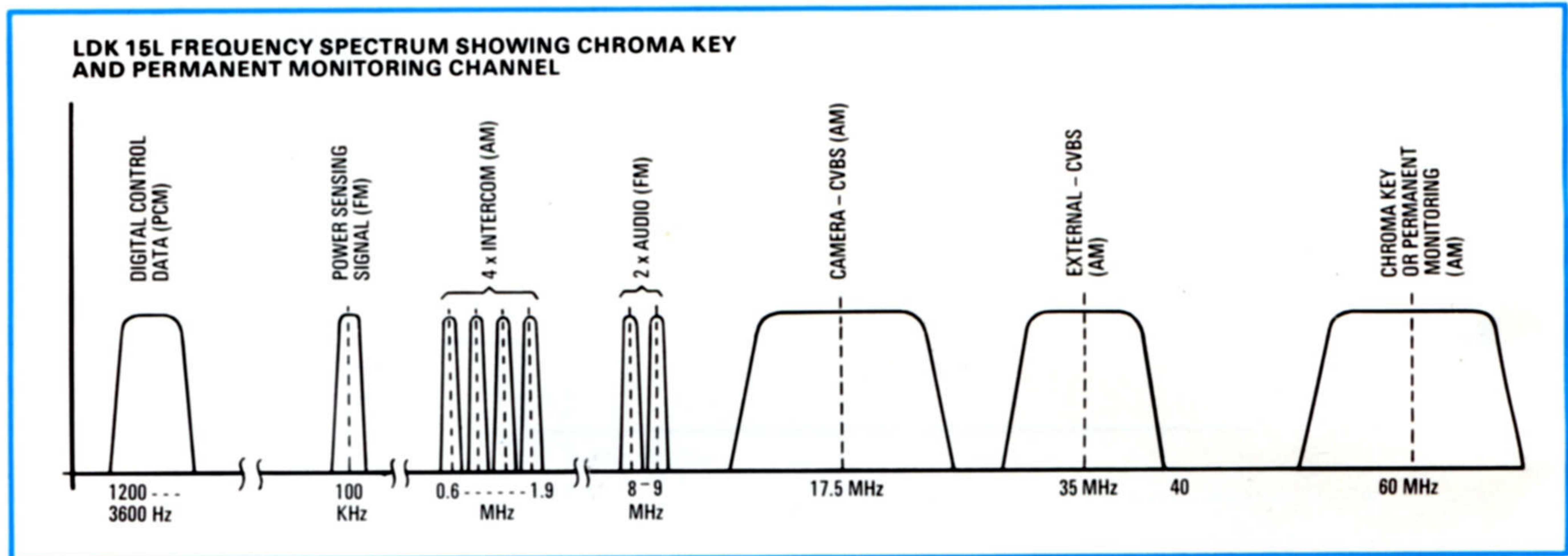
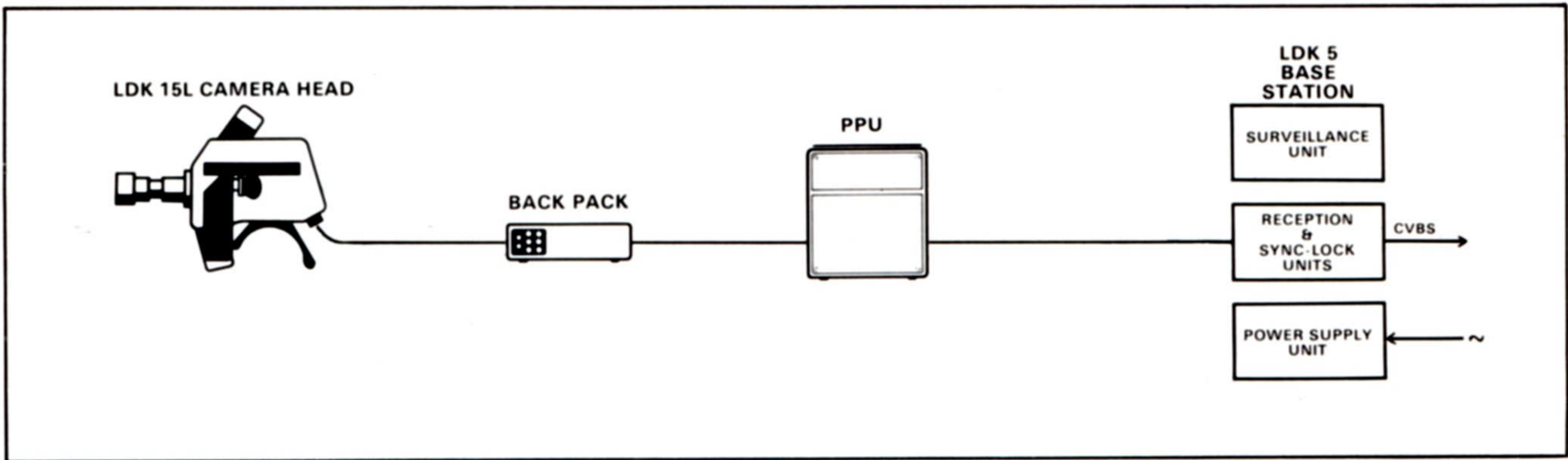
When tripod mounted the LDK 15L's lens controls can be extended to the pan bars by means of a servo system or Bowden cable, thus enabling full control of the camera from the rear as with conventional studio cameras.

Lenses

A wide range of lenses is available for direct bayonet fitting requiring no adaption, ranging in focal length between 12-120 mm and 26-260 mm and with apertures to f/2.0.

Between the lens and the beam-splitting prism are two three-position filter turrets, independently controlled from the front of the camera. The three positions are CAP, CLEAR and COLOUR FILTER for the front turret and CLEAR ND 0.9 and ND 1.8 for the rear turret. The colour filter (a Tiffen 85 daylight filter) and the two neutral density filters enable the





cameraman to adjust the camera instantaneously upon transition from artificial lighting to daylight conditions. In addition to the two turrets there is a filter holder in front of the prism in which another filter can easily be inserted if necessary for applications requiring special effects filters.

External Camera Controls

The only external controls on the camera are the filter turret controls, an iris control and a VTR start/stop or call button. The two latter controls are intended for use only in self-supporting camera operation, eg. in the direct-taping or in the radio mode. In the latter case, the start/stop button will switch the intercom transceiver. Two 'on air' lamps are located on top of the camera front and rear. They can be operated from either the PPU or the base station, depending on the requirements of a particular production.

The Back Pack

The second item of the LDK 15L camera system, the backpack, can be carried by the cameraman or fixed by integral mountings to the Portable Processing Unit (PPU). A maximum camera cable length of 50 metres between the camera head and the backpack allows full operational flexibility. Controls on the unit are few in number; three volume controls for engineering and production talkback and programme sound; colour balance controls which also control the selection of the CLUE circuit, and a viewfinder selector switch. In addition to these controls there is a microphone on/off switch and a headphone jack.

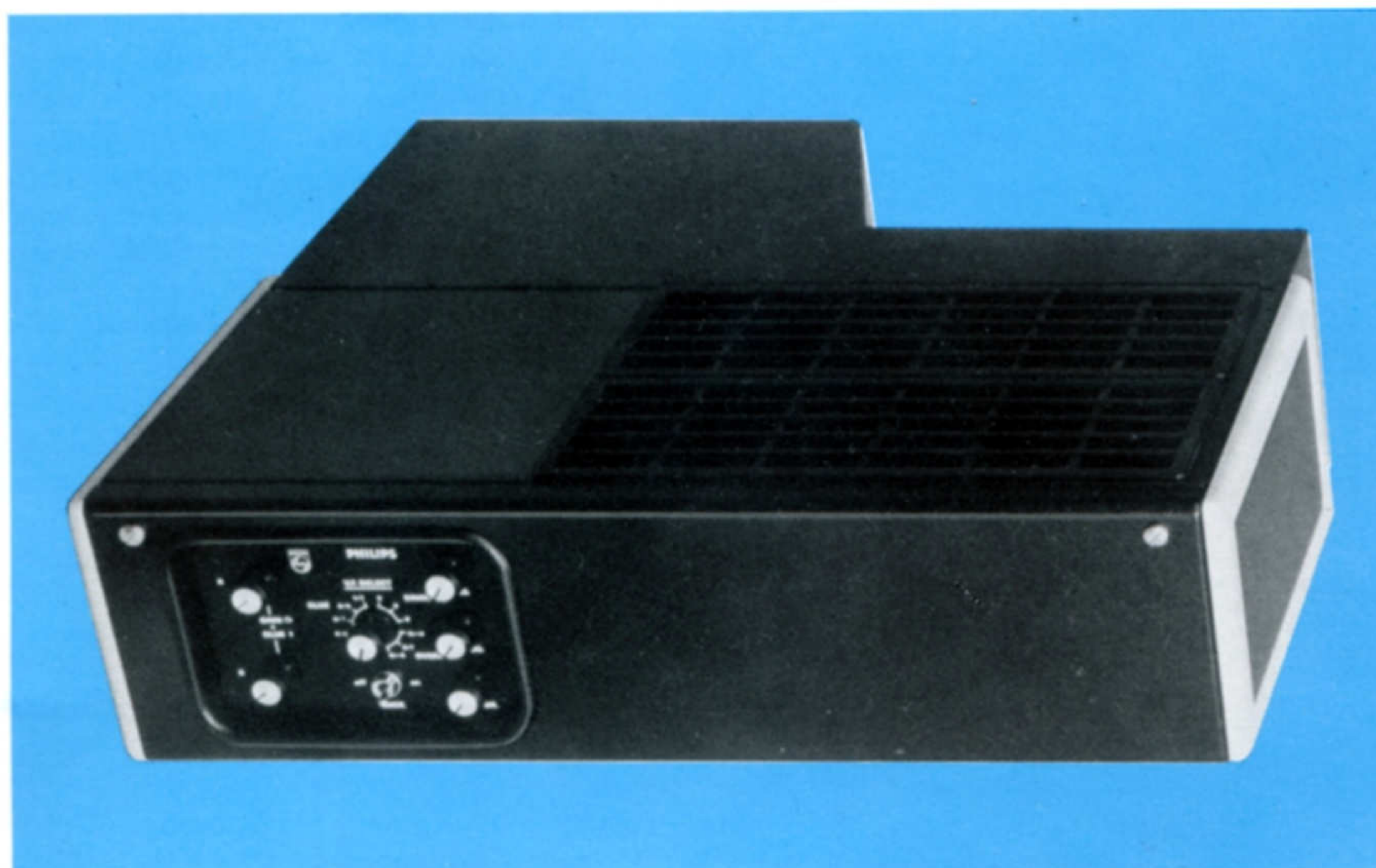
Portable Processing Unit

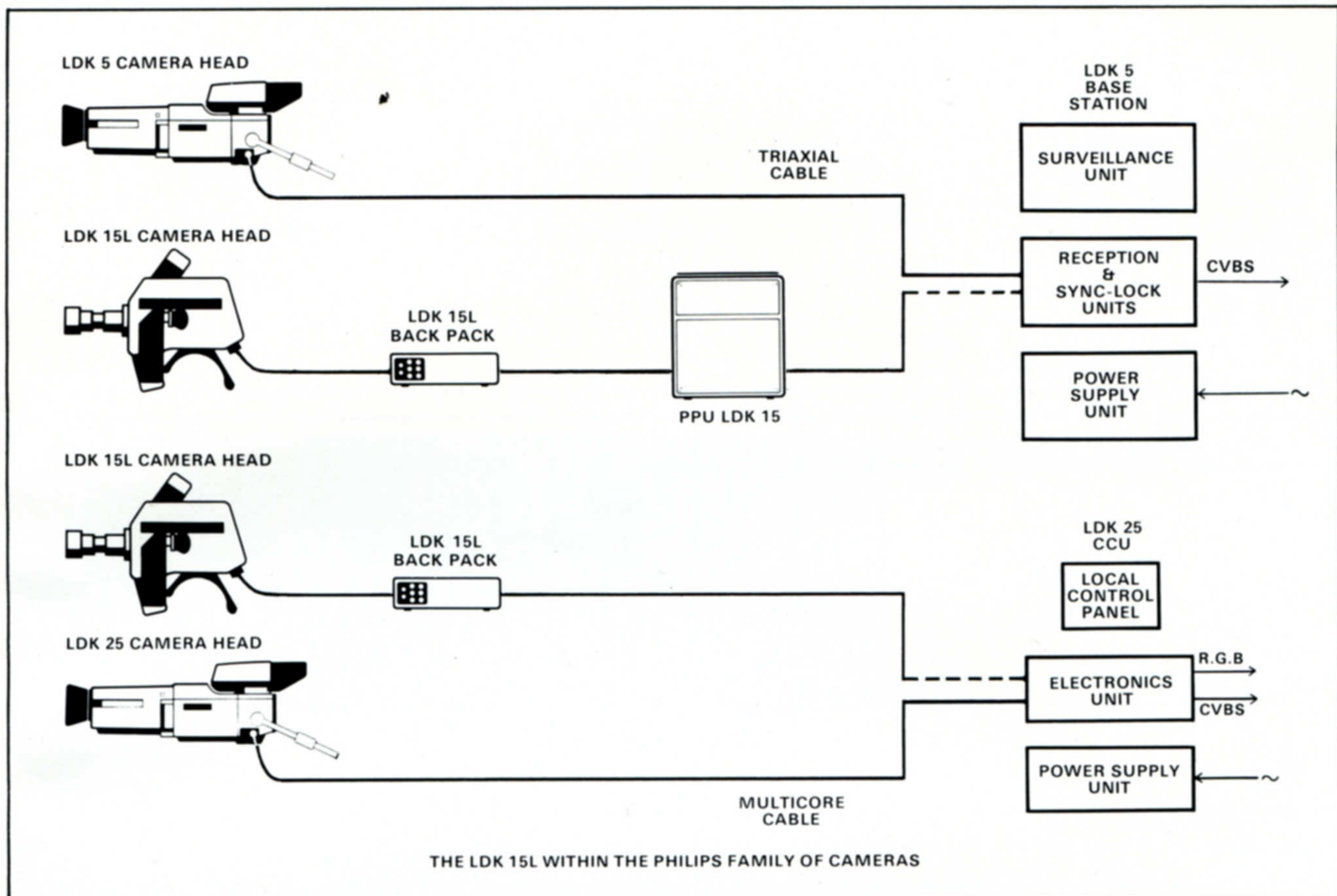
The PPU, employed when in the triax, radio or direct taping mode, is connected to the backpack by a 13 mm diameter multicore cable

(see cable lengths diagram). This unit contains most of the standard circuit modules that are housed in the camera head of the LDK 5, and thus contains most of the system dependent modules, which can be quickly replaced to enable the camera to operate with different system standards. Preset controls for the plug-in modules are provided within the unit. The only external controls on the PPU are for talkback.

Chroma Key/Permanent Monitoring Channel

An optional feature of the LDK 15L in the triax mode, extends the bandwidth of the Multiplexer to 60 MHz for Chroma Key, or permanent monitoring. This channel enables various video signals to be selected and utilised at the base station.





LDK 5 Base Station

The base station, used when the LDK 15L is operated in the triax or radio modes is divided into four sections: the reception unit, the sync-lock unit, the surveillance unit and the camera power supply unit. The reception, surveillance and camera power supply units are all designed to occupy half the standard rack width of 480 mm (19 in). The sync-lock unit is a module which can be plugged into the reception unit, or accommodated together with the sync-lock modules from other base stations, into an optional unit arranged at any point where the camera signals should be in time-coincidence with the studio reference. All three units are self-contained as far as supplies are concerned, and are interconnected by cables at the reception unit.

The reception unit contains a power supply module and three other modules containing the

electronic circuitry for video and audio demodulation and distribution. This unit is pre-wired to take the sync-lock module.

The sync-lock module contains all the circuits for timing comparison of the camera signal with the studio reference. This studio reference can be either separate sync subcarrier and PAL identification signals or a video signal containing sync and burst (black burst).

The surveillance unit consists of a single module containing the base station part of the digital control circuitry. The camera operational controls are arranged on the front panel of the unit and facilities for the connection of remote operational controls are also available.

The camera power unit comprising two modules, a power supply and a regulator, provides the 100V d.c. supply for the PPU, camera and viewfinder.

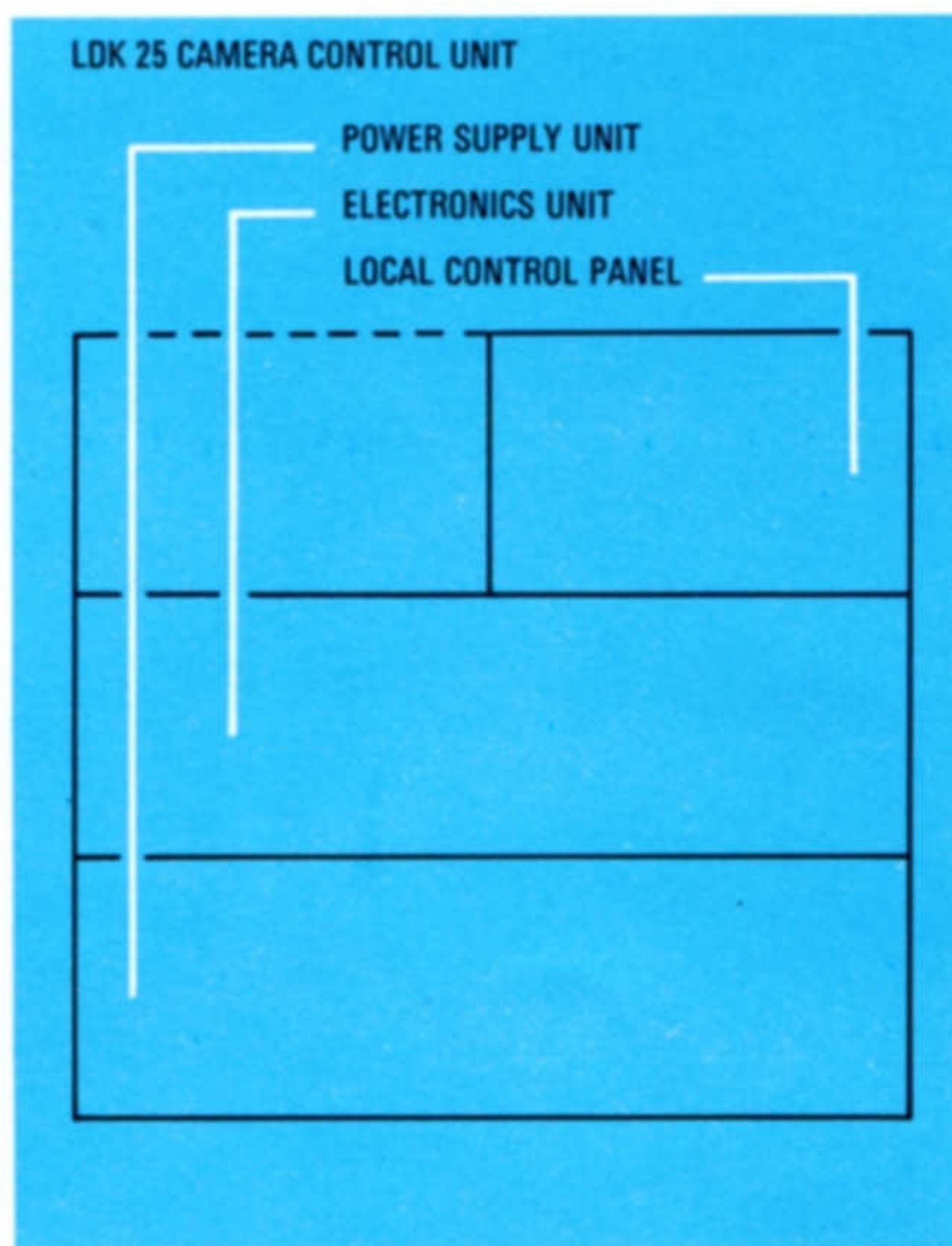
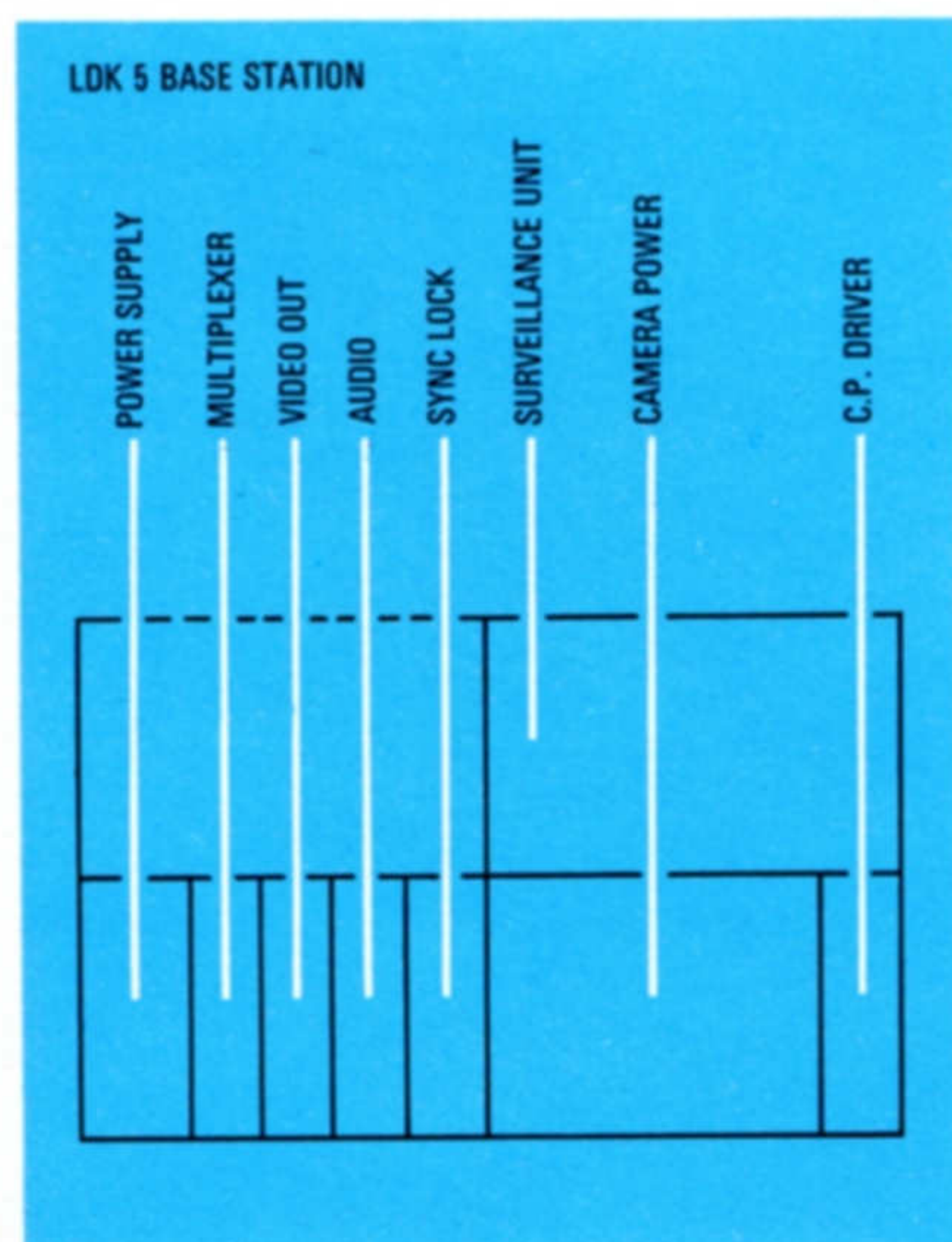
LDK 25 Camera Control Unit

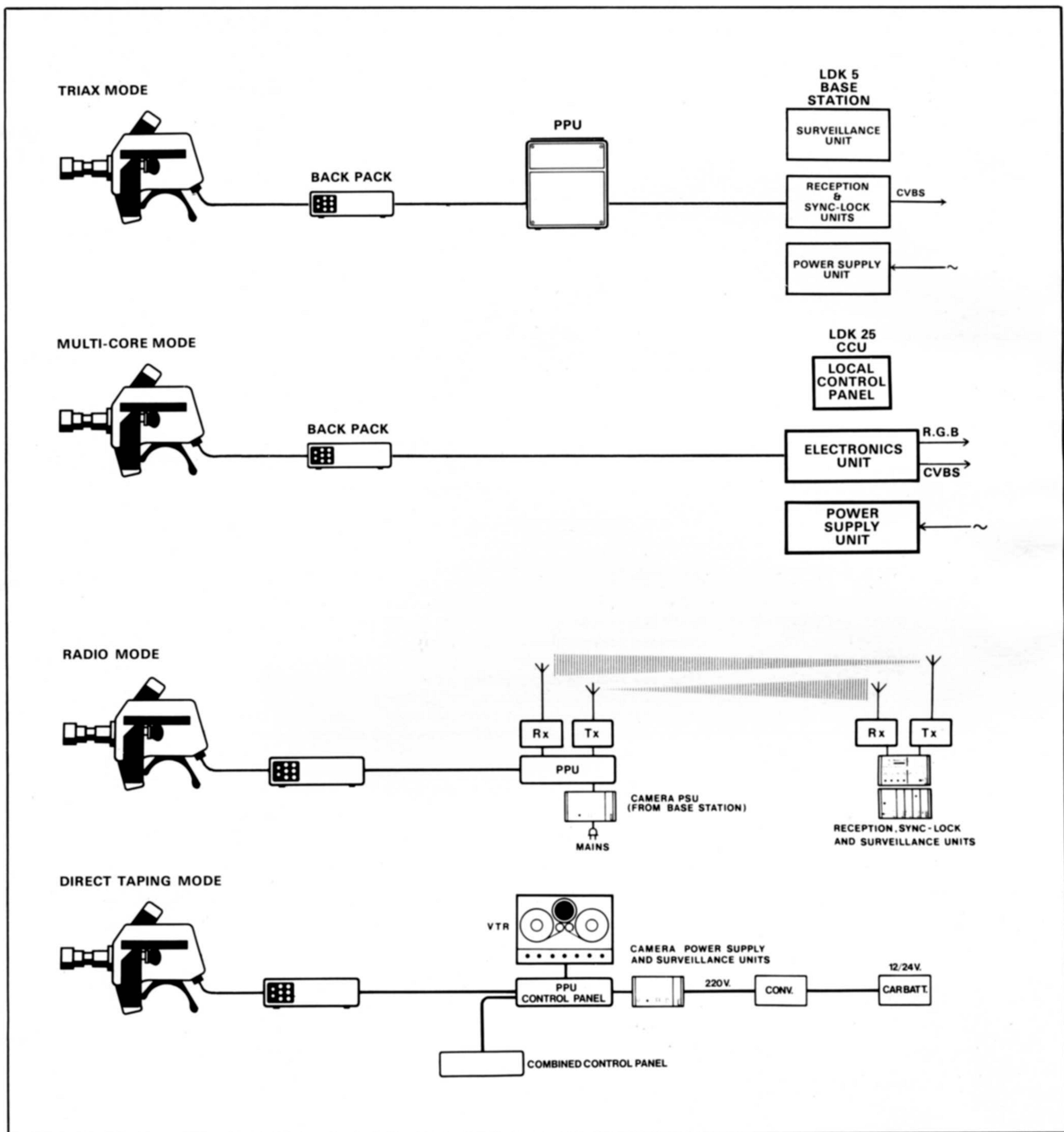
This unit used when the LDK 15L is operated in the multicore mode, consists of three assemblies: the electronics unit; the local control panel; and the power supply unit. The electronics unit and the power unit are both designed to occupy the full standard rack width of 480 mm (19 in) whilst two local control panels can be accommodated in a standard rack width.

The electronics unit contains all the main elements of the signal processing channels including circuits for cable length compensation, linear matrixing, switchable gamma correction, level-dependent contours, contrast compression and white clipping. Optional units and modules are also available for automatic colour balance and centring control. The coder has three CVBS output signals encoded for either PAL, NTSC or SECAM. An optional variable matrix is available.

The control panel accommodates all operational controls for the camera. In addition, facilities are provided to enable a colour bar signal to be selected, and also for remoting the master gain, master black, filter wheel, colour temperature, individual gain and individual black level controls, to one or more joystick or slide control panels.

The Power Supply Unit provides the d.c. voltages used to power the electronics unit and the camera head via the multicore cable. A sensing circuit compensates for varying copper losses resulting from differing cable lengths.





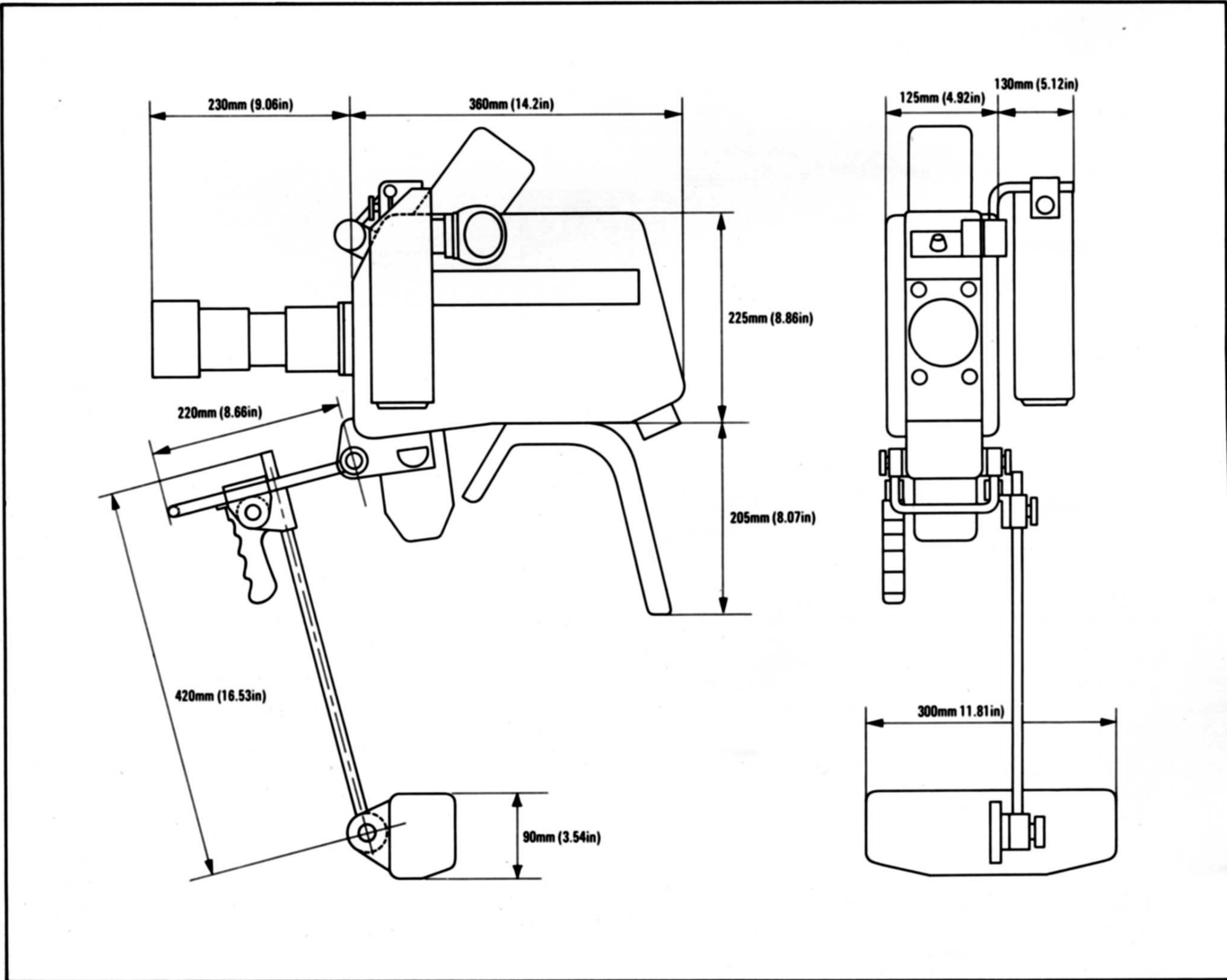
Modes of Operation

Four typical modes of operation are illustrated in the diagram above. The triax and multicore modes are those most likely to occur in practice. In each case the base station or CCU may be located either in an outside broadcast vehicle, or in the studio control room together with units from other cameras. In the triax mode the camera will be connected to the LDK 5 base station via the portable processing unit and runs of triax cable up to a maximum of 2000 m are possible. In the multicore mode where the camera is connected directly to the CCU of the LDK 25, a multicore cable run of up to 600 m is possible. The full self-supporting radio mode of operation may be employed when the camera is used for outside broadcasts originating in a mobile vehicle, ie. car, boat, helicopter, etc. In this mode a small radio transceiver, together with its aerials, can be fitted on top of the PPU, and used for the transmission of signals to and from the base station. The base stations will normally be

located in an OB vehicle, which will also be fitted with suitable receivers, transmitters and aerials for the RF link to the camera vehicle on the one hand and the television centre on the other. Alternative modes of radio operation can be envisaged depending on local conditions and the requirements of a particular production. In the triax, multicore and radio mode it is probable that the camera will operate in conjunction with a remote studio, and therefore locked to the master timing signal from this studio. On the other hand in the direct taping mode, where the camera CVBS signal is recorded by a VTR at the site of an outside broadcast, only the surveillance and power supply units of the standard base station are required, in addition to a power supply and a VTR. The cameraman can start and stop the VTR by means of a button on the camera and the camera viewfinder can be employed to monitor the recorded material during replay.

Cable Lengths for LDK 15L

LDK 15L Viewfinder Size	Camera Head to Backpack	Backpack to Portable Processing Unit	Portable Processing Unit to Base Station	Base Station
1 in	Multicore Cable 50 M	Multicore Cable 150 M	Triaxial Cable 2000 M with 14 mm Ø 1000 M with 11 mm Ø 500 M with 8 mm Ø	LDK 5
7 in	Multicore Cable 50 M	Multicore Cable 100 M	Triaxial Cable 2000 M with 14 mm Ø	LDK 5
1 in	Multicore Cable 50 M	Backpack mounted on PPU	Triaxial Cable 2700 M with 14 mm Ø 1350 M with 11 mm Ø 675 M with 8 mm Ø	LDK 5
7 in	Multicore Cable 50 M	Backpack mounted on PPU	Triaxial Cable 2300 M with 14 mm Ø 1150 M with 11 mm Ø 575 M with 8 mm Ø	LDK 5
1 in	Multicore Cable 50 M	No PPU required Direct link between backpack and CCU	Multicore Cable 600 M	LDK 25 CCU
7 in	Multicore Cable 50 M	No PPU required Direct link between backpack and CCU	Multicore Cable 300 M	LDK 25 CCU



TECHNICAL DATA

Systems:

PAL (B, G, H, I) 625 lines, 50 field/s.
PAL-M, 525 lines, 60 field/s.
NTSC, 525 lines, 60 field/s.
SECAM, 625 lines, 50 field/s.

Power Supply:

110, 117, 220 and 230 V \pm 10%; 50 or 60 Hz.

Power consumption:

500 W (approx).

Input signals: (using LDK 5 Base Station)

- a) 'Colour black' or CVBS loop through 75 Ω with sync component of 0.15 to 0.6 Vp.p.
- b) Composite sync loop through 75 Ω 1-8 Vp.p. negative; plus subcarrier loop through 75 Ω , 0.5-2 Vp.p.; plus PAL identification loop through 75 Ω , 1-8 Vp.p.
- c) The camera's own CVBS signal, 75 Ω non loop-through.
- d) External viewfinder input, 75 Ω , standard level loop-through.

The input signals must have the correct relationship between subcarrier frequency and line frequency. The camera signals are correctly timed with respect to the sync-lock input terminals with input combinations 'a' and 'c' or 'b' and 'c'.

Output signals: (using LDK 5 Base Station)
4 \times coded composite colour signal (CVBS), 1 \times CVBS + VIT signal 1 \times CVBS monitor or chroma key signal with optional channel.

All signals positive going, 1 Vp.p. into 75 Ω .

Input signals: (using LDK 25 Camera Control Unit)

Composite sync, Blanking, Burst gate, PAL ident. (optional) each -0.75 V to -4.0 Vp.p.
Subcarrier 0.5 V to 2.0 Vp.p.
Test video (comp.) 1.0 Vp.p.
External viewfinder input 1.0 Vp.p.
All inputs provided with loop-through 75 Ω connections.

Output signals: (using LDK 25 Camera Control Unit)

3 \times coded composite signal (CVBS)
1.0 Vp.p. into 75 Ω
1 each RGB for chroma-key
0.7 Vp.p. into 75 Ω
1 \times picture monitor
1.0 Vp.p. into 75 Ω
1 \times waveform monitor
0.7 V to 1.0 Vp.p. into 75 Ω
1 \times staircase parade waveform

Scene illumination:

1000 lux (100 ft cd) for a signal-to-noise ratio of 45 dB in the Y-channel; lens iris f/2.8 (f/2.8 is about equivalent to f/4 with 30 mm Plumbicon tubes); reflection factor 60%; with linear matrix; without contour correction; with 5 MHz band-pass filter; at 40% of peak white.

Resolution:

In the Y-channel, without contour correction; more than 50% modulation depth at 400 lines. (Dependent on the Plumbicon tube).

Colour Registration:

Deviation of Red or Blue in any direction with respect to Green: Within a circle of 0.8 of the picture height (Zone 1), deviations will be no more than the distance equal to a horizontal scanning time of 25 nanoseconds. Within a circle of diameter equal to picture width (Zone 2), deviations will be no more than 65 nanoseconds. Outside this circle (Zone 3), deviations will be not more than 125 nanoseconds.

Geometry error:

Maximum 0.5% of the picture height, within an ellipse with axes 0.9 of picture height and width; in the remaining picture area, maximum 1%; lens errors not taken into account.

Gain control:

Master selector for: 0 dB, +6 and +12 dB; individual controls for plus or minus 3 dB in Red and Blue.

Colour temperature control:

5-step selector for: +1000, +2000, +3000, +4000 and +5000° K, above the nominal colour temperature of 3200° K.
Two 3-position filter turrets for the optical filters: cap; clear; colour no. 85; and clear, N.D. 0.9 and N.D. 1.8. Slide for insertion of additional filter.

Gamma correction:

Selector for linear operation and gamma = 0.5 or 0.35.

Black level adjustment:

Master control for adjustment between -65% and +35% of the nominal white level; individual control in Red and Blue for adjustment between -20% and +20% of the nominal white level.

Contour correction:

Negative contour modulation; level-dependency and comb filter; noise slicer.

Lenses:

A wide range of lenses is available ranging from 12/120 mm to 26/260 mm.

Permissible ambient temperature range:
-15 to +45°C.

Viewfinders:

1 inch electronic viewfinder with high definition CRT; 7 inch viewfinder with picture tube Type M17-141W; screen diagonal 170 mm (6 3/4 in); high brightness 250 ft lamberts, X-ray radiation conforming to DHEW Rules 21 CFR 278.

Weights:

Camera head, including tubes, viewfinder, shoulder support, etc. 8.9 kg (19.6 lbs) approx.
Backpack plus harness: 7.5 kg (16.5 lbs) approx.
PPU: 15 kg (33 lbs) approx.

Dimensions:

Camera head (see dimensioned sketch)
Backpack (h \times w \times d):
350 \times 387 \times 110 mm
(13.75 \times 15.25 \times 4.25 in)
PPU (h \times w \times d):
405 \times 387 \times 180 mm
(16 \times 15.25 \times 7.12 in)

ORDERING INFORMATION

Camera head and backpack	LDK 15/01
1 inch Viewfinder	LDK 4307/01
7 inch Viewfinder	LDK 4305/00
Tripod adaptor for 7 inch Viewfinder	LDK 6504/00
Set of camera numbers	LDK 6991/01
Camera head support	LDK 6505/01
2m Cable Head-Backpack	LDK 8130/00
10m Cable Head-Backpack	LDK 8130/01
50m Cable Head-Backpack (Max)	LDK 8130/02
10m Cable Backpack-PPU/CCU	LDK 8106/00
50m Cable Backpack-PPU/CCU	LDK 8106/06
100m Cable Backpack-PPU/CCU	LDK 8106/01
Portable Processing Unit	LDK 4355/00
System Dependent Modules for PPU:	
PAL	LDK 4320/00
NTSC	LDK 4320/50
PAL-M	LDK 4320/60
SECAM	LDK 4320/70
LDK 5 Base Station	LDK 4300, LDK 4310, LDK 4315, LDK 4321, LDK 4322
LDK 25 Camera Control Unit	LDK 4350/00
Camera headset	LDK 8111/12
Backpack and PPU headset	LDK 8111/10
Set of camera tubes:	XQ 1080G, XQ 1080B, XQ 1085R
or:	XQ 1500G, XQ1500B, XQ1505R

Specification details subject to change without notice.



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