

TTV 1525 B

Colour camera channel

Features

Top-of-the-range camera providing a colour picture of very high standard for a variety of applications in studio and outside broadcasting.

- Flexibility

- normal operation in which the camera is operated conventionally from an individual operational control panel with possible transfer of controls to the remote-control panel,
- incremental operation allowing centralization and automatic control of the settings of a number of

cameras from a single operational control panel,

- operational facilities:

- storage of operational settings,
- possibility of adjusting any camera from two control panels operating in parallel,
- possibility of calling a camera either from the remote-control panel or from the operational control panel without having to change the settings,
- diascope built in the camera,

- automatic daily setting starting adjustments.

- Reliability

- excellent picture registration,
- high efficient sensibility even under low-illumination level,
- stable picture quality,
- rugged construction,
- rain-tightness,
- picture quality constant within -10°C to $+40^{\circ}\text{C}$.

- Economy of operation

- sensitivity allowing the use of the



- colour camera chain indoors with no additional lighting and outside with natural light and scenery,
- automatic daily setting starting adjustments and remote-control centralization,
 - possibility of non-specialized use of cameras and camera control units,
 - automatic diagnosis system.

Description

Whichever application is selected, the colour camera chain TTV 1525 B comprises:

- The camera CA 1525 B and accessories.
- The camera control unit CV 1525 which consists in a unit housing all the SOMAC type plug-in modules specific to the C.C.U. as well as the power supply converter and some options such as the encoder, chroma-key circuit and automatic control circuit.
- The Camera-CCU interconnection cable.

The operational control and remote control system:

- In normal mode, it consists of:
 - an operational control panel type PRN 1525,
 - a remote control panel type PRN 1525.
- In incremental mode, it consists of:
 - an operational control panel type PRI 1525 for 1 to 8 cameras,
 - a remote control panel type PTI 1525 for one camera,
 - an incremental switching matrix. It receives video signals from 4 cameras (extended to 8 cameras) and distributed to remote control and operational control panels.

A - Camera

The deflection yokes are designed with printed-circuit deflection coils which ensure proper reproducibility of picture geometries and thereby of convergences.

The electronic section of the camera is fully modular for easier maintenance.

Plug-in modules provide easy accessibility to the essential elements and to the controls.

The power supply dc-to-dc converters are fully self-contained and plugged-in at the rear of the camera.

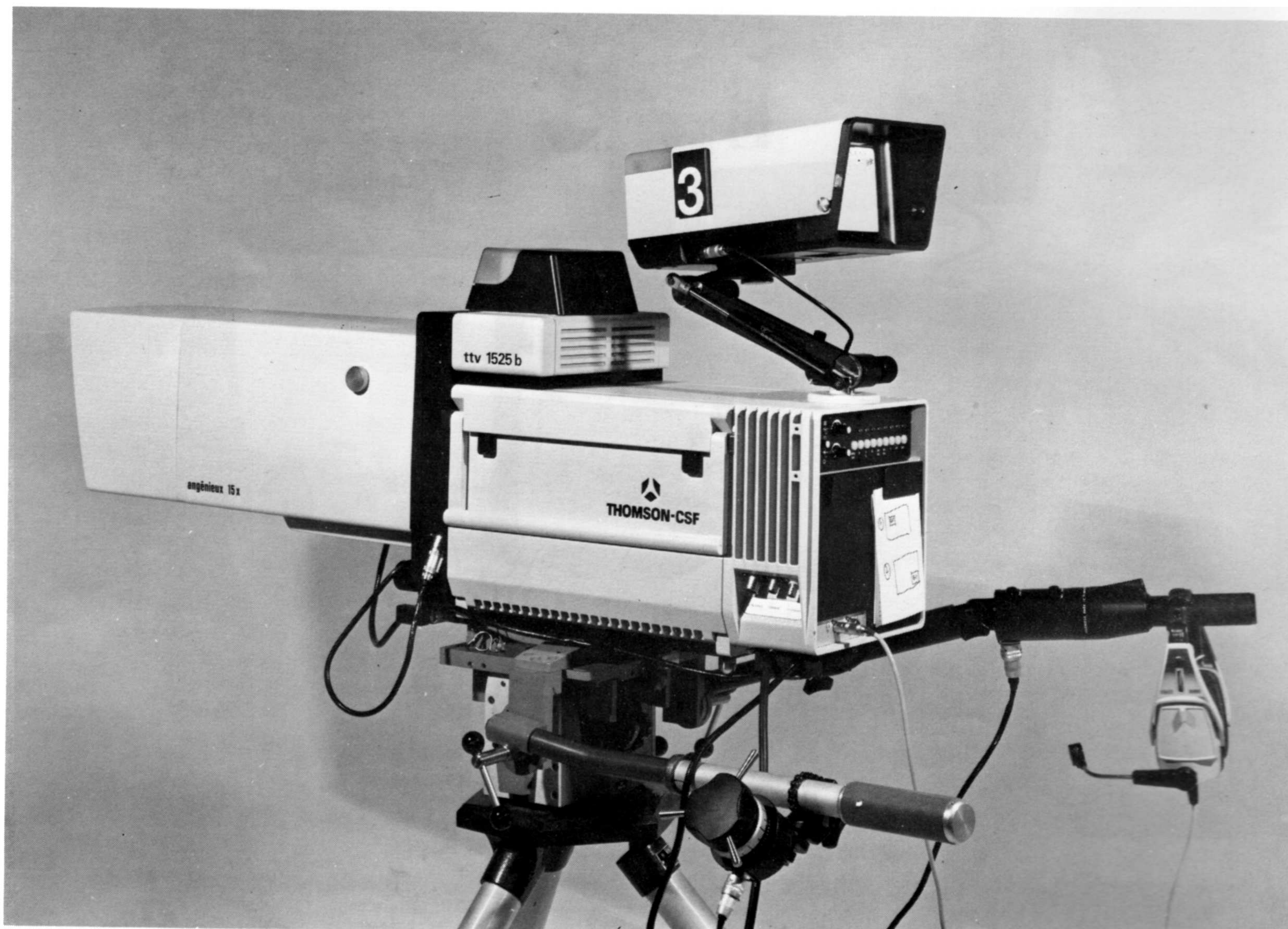
B - Optical system of the camera

Pick-up tubes, optical beam splitter and lenses are the vital sub-assemblies of the camera because the major characteristics of the camera depend on these features: sensitivity, signal-to-noise ratio, modulation depth, colour balance, geometry, etc.

Pick-up tubes

the camera makes use of three lead oxide pick-up tubes of different diameters:

- One 1" tube for the pseudoluminance channel, such as XQ 2070/02 type.



- Two 2/3" tubes for the red and blue channels, such as XQ 2427 type.

This solution allows more rational use of the light flux available at the input of the beam splitter.

The tubes are of the "diode gun" type offering high resolution and allowing automatic beam current control up to eight times the normal illumination level of the target.

Optical beam splitter

Three-colour beam splitting of the light flux from the lens assembly is carried out in a prism beam splitter. It offers the optimum luminous effectiveness. It is designed for an effective diagonal of 16 mm and its aperture is consistent with the use of lenses up to f/1.5.

The optical beam splitter is completed with two convergent minifier lenses which reduce the picture diagonal to 11 mm for the red and blue tubes and concentrate the light flux on the 2/3" tubes.

The target bias light system of the red and blue channels is contained in the beam splitter. On the contrary, this system is built in the 1" tube.

Filter wheel

A filter wheel is provided in the optical system in front of the prism. This wheel comprises four positions for three remote controlled attenuator filters (no attenuation, neutral grey attenuator, density 0.6, neutral grey attenuator, density 1.5) and the diascope. The latter acts as a shutter when it is not illuminated.

The diascope incorporates a lighting system (magnifier, condenser, filters) placed on the side of the splitter. The test pattern, the lens and the reflecting mirrors are fitted in the thickness of the filter wheel.

The colour temperature correction is carried out electronically by video gain switching, beam setting compensation and modification of the colour masking coefficients.

lenses assemblies

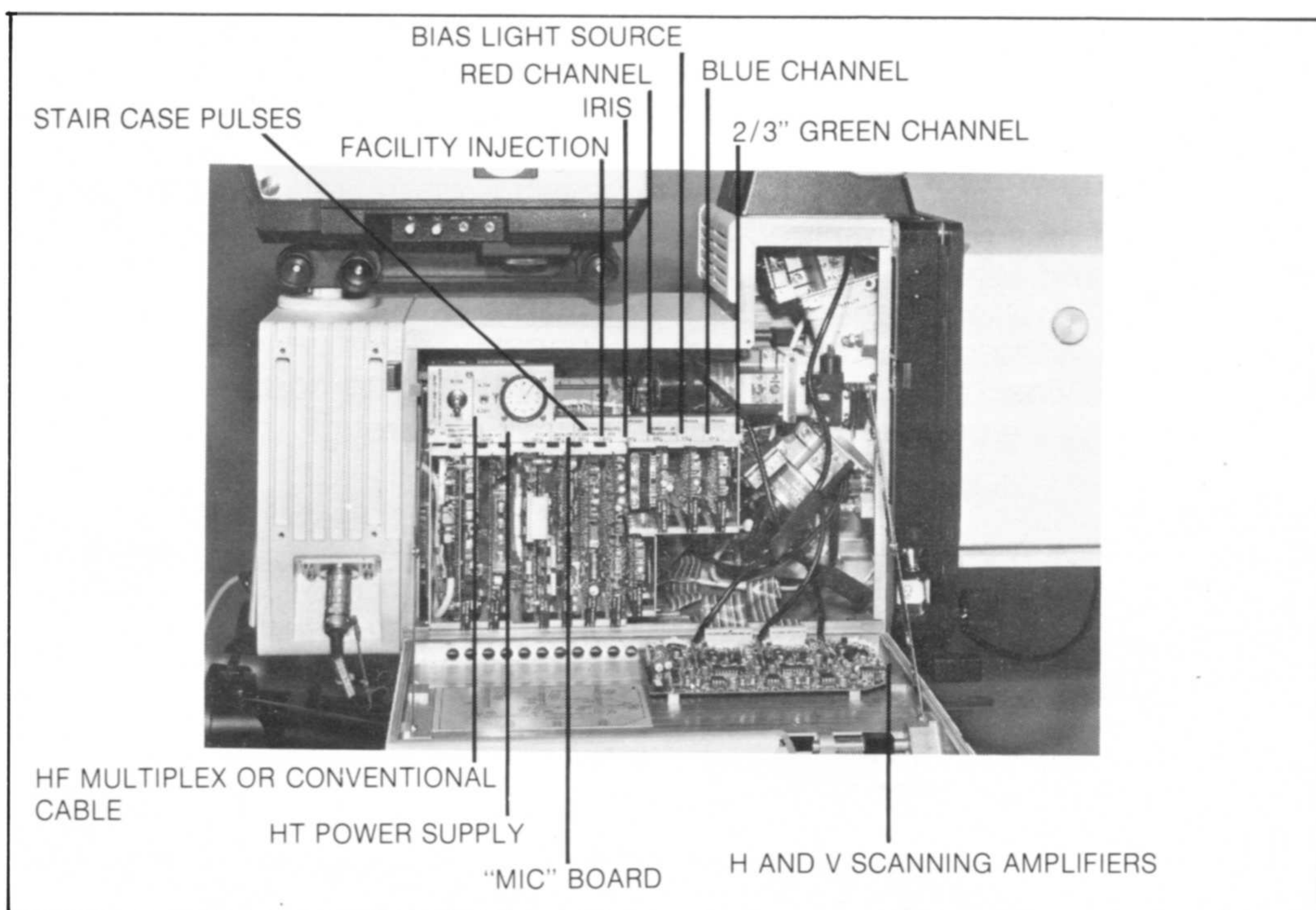
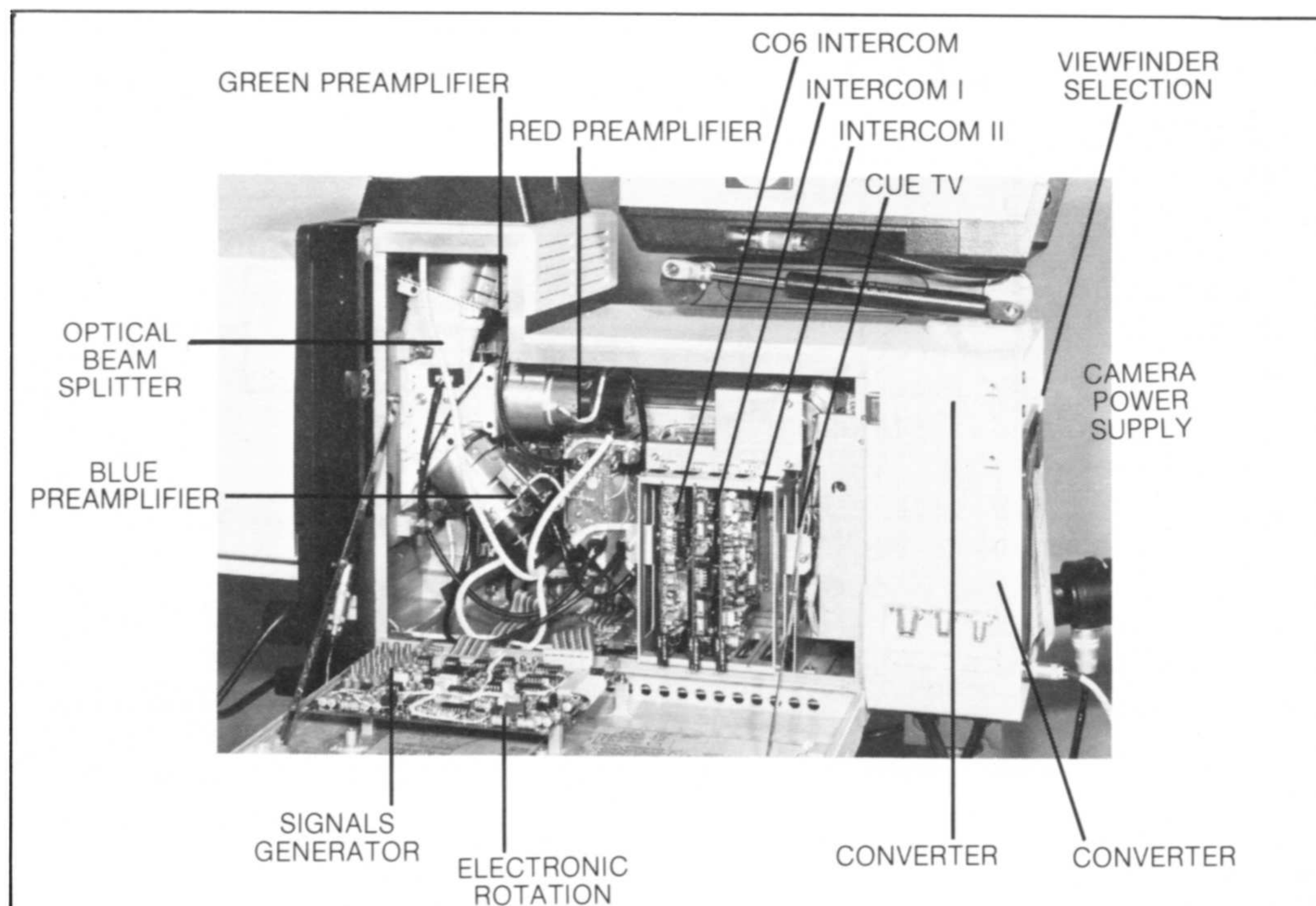
The camera TTV 1525 B can use a very wide range of lenses assemblies:

Heavy lenses supported by the front cast frame camera

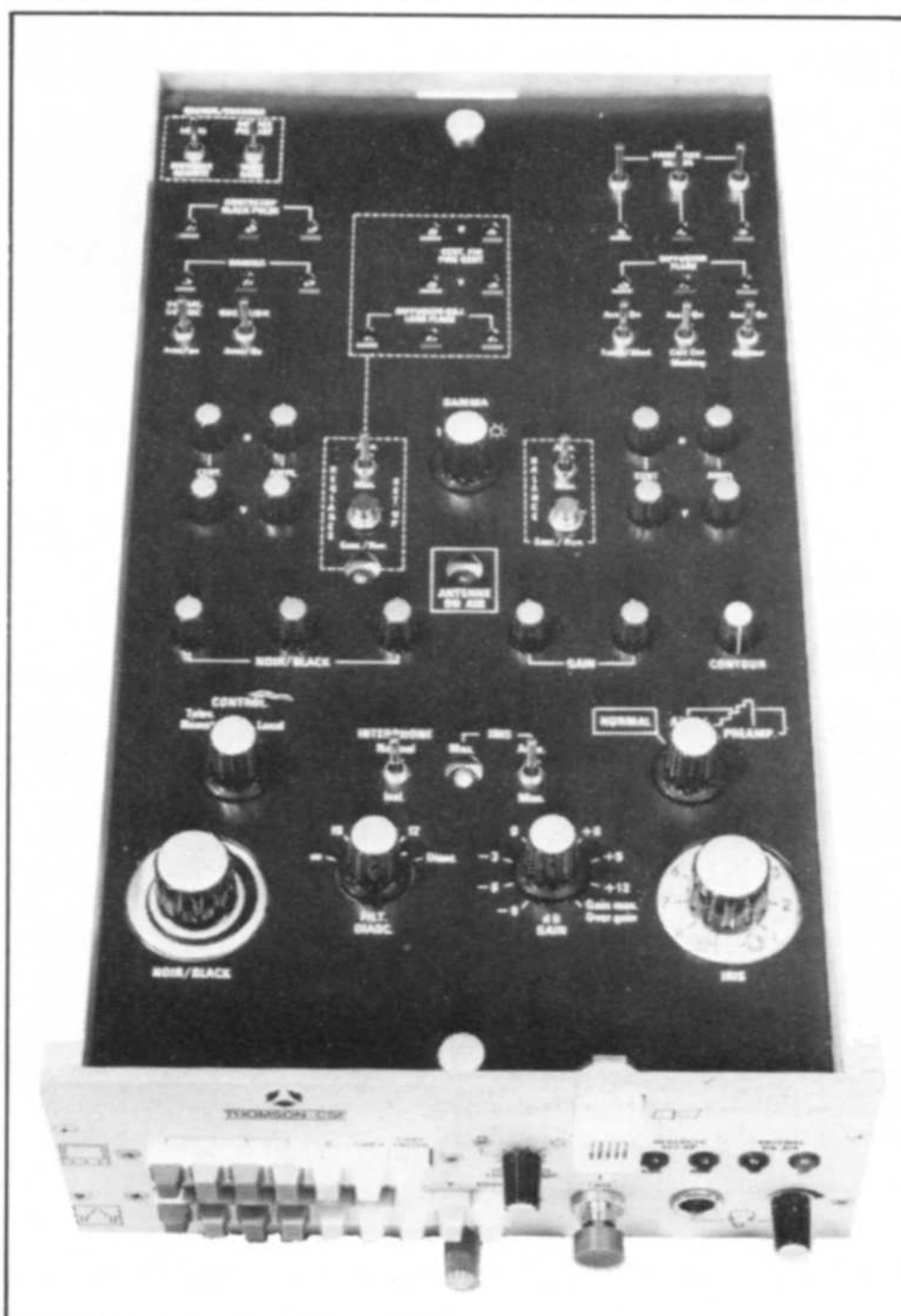
- ANGÉNIEUX:
 - 15 x 14 E 61,
 - 12 x 12.5 E 11,
 - 42 x 12.5 E 11,
 - 42 x 24 E 11.

- FUJI:
 - R 14 x 12.5 ESM 2.

Lightweight lenses with attachment "bayonet" type.



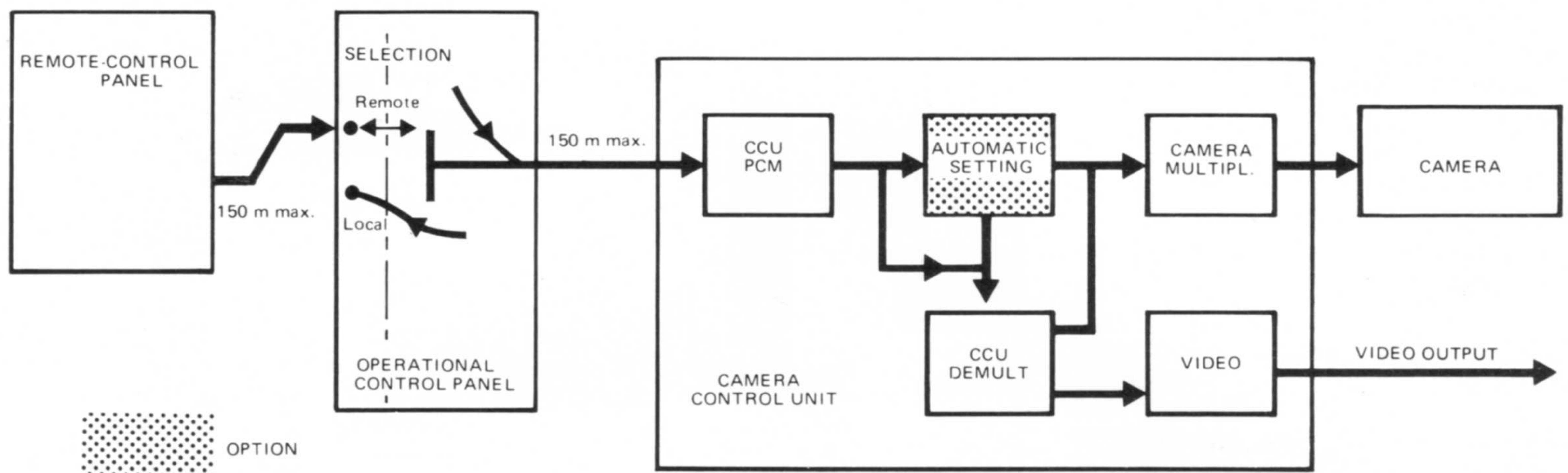
STANDARD OPERATIONAL CONTROL PANEL



STANDARD REMOTE CONTROL PANEL



BLOCK DIAGRAM OF THE SIMPLE SYSTEM



- **ANGENIEUX:**
- 15 x 12.5 D 2.
- **SCHNEIDER:**
- TV 24 - 25 VGN 2/17 - 170,
TV 27 - 25 VGN 2/17 - 340.
- **FUJI:**
- K 12 x 14 ERM 6.

C - 17 cm Viewfinder

It is mounted on a platform steerable in elevation and azimuth.

R, G, B, R-G, B-G, Y, encoded video and external video can be displayed by means of a video switching system controlled from the camera keyboard.

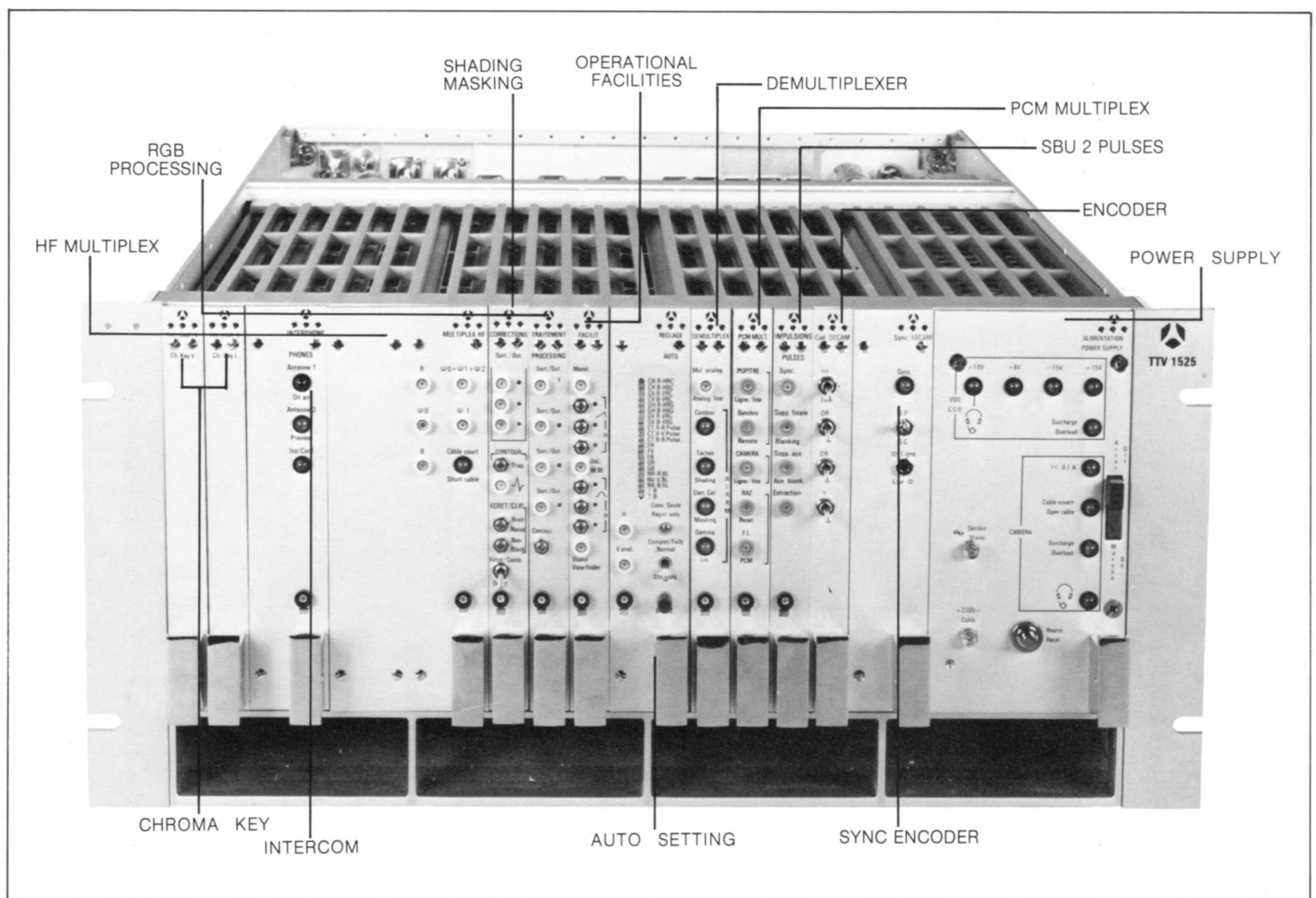
D - Camera control unit

The CCU consists in a frame to the 19" standard and 5 rack units high. All the circuits are grouped in SOMAC type modules.

The three R, B and pseudo-luminance Ψ_0 signals from the camera undergo the following processing operations in the camera control unit:

- Omnidirectional contour enhancement, is fitted from the control panels.
- White shading correction.
- Masking through matrixing.

- Transfer (or gamma) correction.
- The CCU also supplies the video signals which will be available at the rear of this unit for monitoring on the waveform monitor or on the picture monitor and those which be transmitted to the viewfinder via the camera.



- Possibility of fully self-contained operation with a built-in SECAM, PAL or NTSC encoder (optional), a bar pattern generator and a sync generator with gen-lock.
- Built-in chroma-key circuit (optional).

E - Servo-control systems

These systems comprise:

- Automatic starting adjustment.
- Automatic iris control.
- Automatic white balancing.

These functions are grouped in one of the modules of the CCU.

Automatic starting adjustment (optional)

Starting adjustment is automatically performed by acting on the push-button provided on the operational control panel.

Such adjustment covers:

- Black levels.
- White levels (gains).
- Grey levels (gamma).
- Flare correction.
- Black pulse.
- Horizontal and vertical centring, amplitudes and linearities.

The adjustment process consists in comparing the quantity to be measured on the red or blue channels with a green channel reference value obtained from the diascope test pattern illuminated by an internal calibrated light source.

Several measurements are performed, until the errors are zero.

Then the operator can make use of the operational controls provided on the remote-control panel and of the sweep centring and amplitude fine-setting controls located on the operational control panel.

Automatic iris control

This control automatically sets the aperture.

Automatic white balance

This function rapidly balances the video levels in a white area of the scene to be transmitted. The order is initiated on either panel.

F - Single HF multiplex cable

The HF multiplex is designed to carry the signals between the functional sections of the camera and of the CCU through a single triaxial cable whose length may reach 1500 metres (B type cable, 13 mm dia.).

In the camera, the HF multiplex function is grouped on two PC boards connected through a same connector:

- The R G B modulator.
- The viewfinder demodulator.

In the camera control units, the HF multiplex function is housed in a module 4 units wide which comprises:

- The multiplex PC board carrying:
 - the three red, green and blue channel demodulators,
 - the viewfinder modulator,
 - The "H, 2 H delay" PC board.

The HF multiplex frequencies are assigned as shown on the opposite curve:

- blue carrier : 8.33 MHz
- green carrier : 24.98 MHz
- red carrier : 41.64 MHz

- For the three red, green and blue carriers, the amplitude modulation system holds the bandwidth constant regardless of the cable length.
- The green channel transmits at 25 MHz, which enables the cable to

be as long as 1 500 metres with the optimum signal-to-noise ratio.

- The sound channels are transmitted separately from the video and PCM channels in frequency modulation mode.
 - intercom to CCU: 1.7 MHz carrier.
 - intercom to camera: 2.7 MHz carrier.
- The viewfinder back video channel is modulated at 59 MHz and the "Cue TV" signal (optional) at 70 MHz. Both these signals are transmitted in frequency modulation mode.
- This HF multiplex link can be replaced by a conventional link making use of a multicoaxial cable whose length may reach 600 metres max.

G - Remote control — PCM multiplex

Remote-control orders are transmitted in digital mode through a PCM multiplex link.

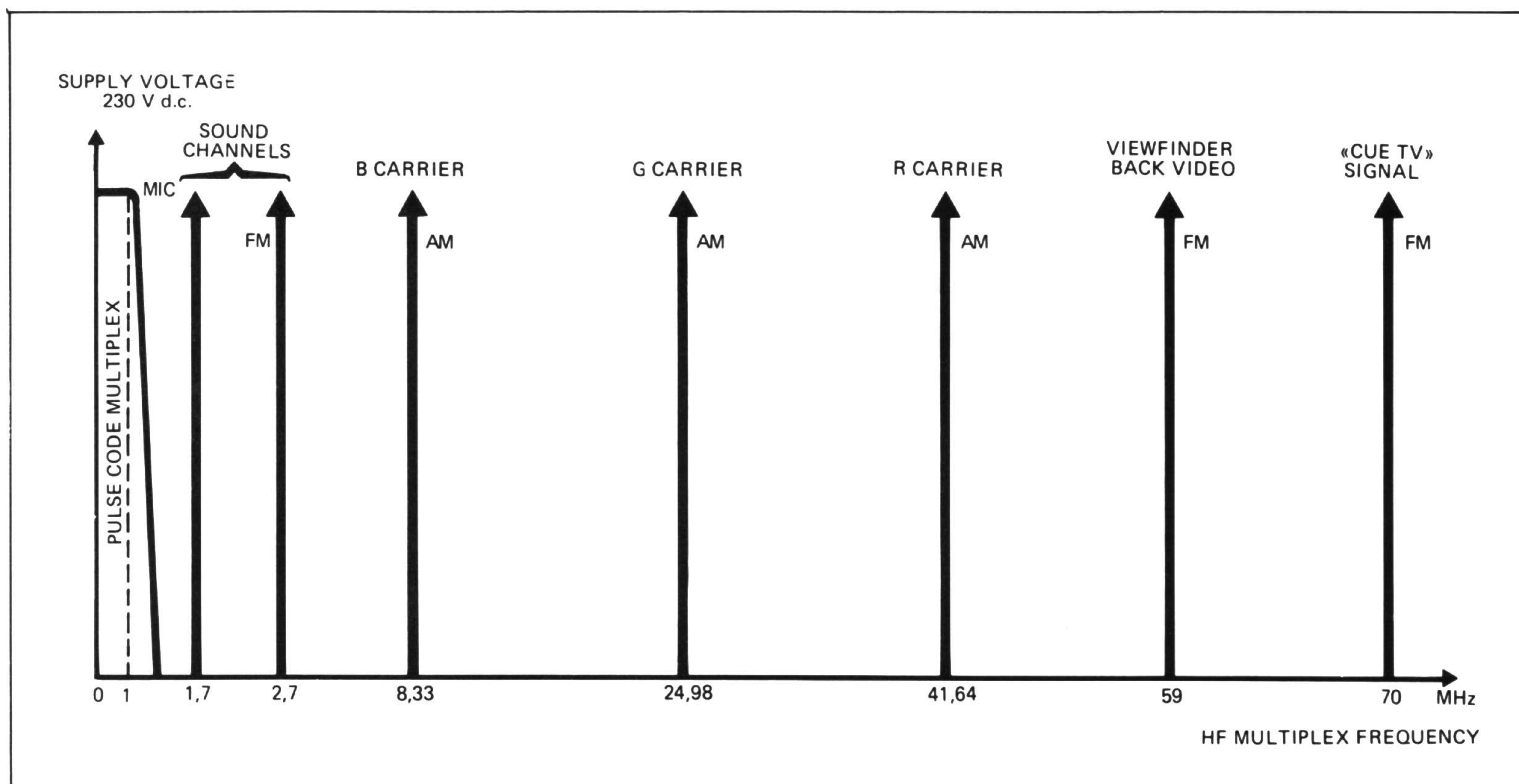
The link transmits the control information: about 35 analog commands, 60 On/Off orders and 12 feedback monitoring signals.

Such multiplexing offers the advantage of interconnecting the panels with each other and with the camera control unit through simple bifilar cables, which allows fairly long distances between the various functional units of the equipment.

H - Operational modes

The camera can be operated according to two operational modes:

- Normal mode
Conventional operation is controlled from an individual operational control panel with transfer of com-



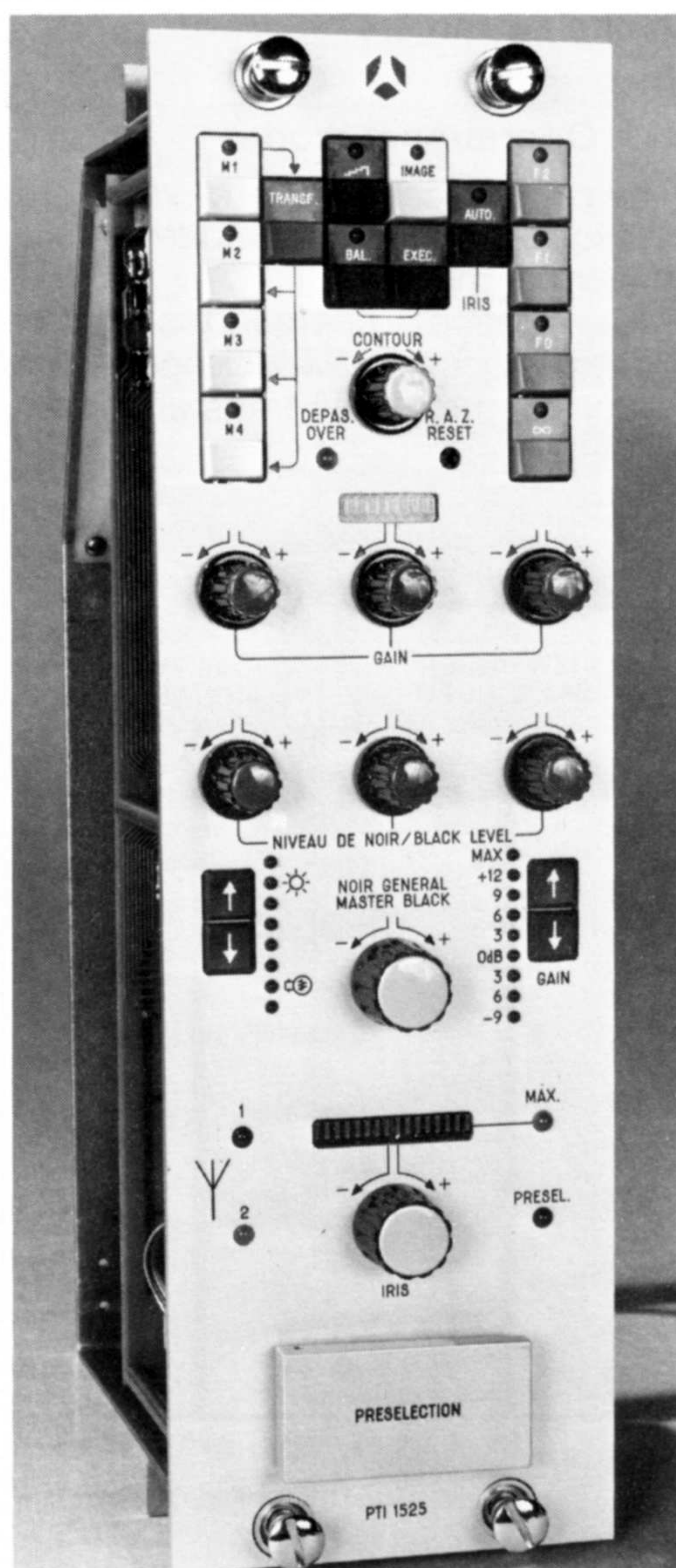
mands to the remote-control panel (see block diagram). This is normal mode. This mode of operation is currently used with a simple system.

- Incremental mode
Incremental mode is a more flexible mode of operation. It consists of the centralization and the storage of the settings of a number of cameras from a single operational control panel, in both the C.C.U. and the camera. The camera memory remains powered by a battery and retains the stored settings even if the camera is disconnected.

The individual operational control panel common to several cameras in which the information is transmitted by means of devices inactive during inoperative periods and addressing increments to the memories. It comprises controls for maintenance settings and the operational controls of "addressed" camera.

The incremental remote control panel (only one by camera) provides the storage of 4 operational settings.

INCREMENTAL REMOTE CONTROL PANEL

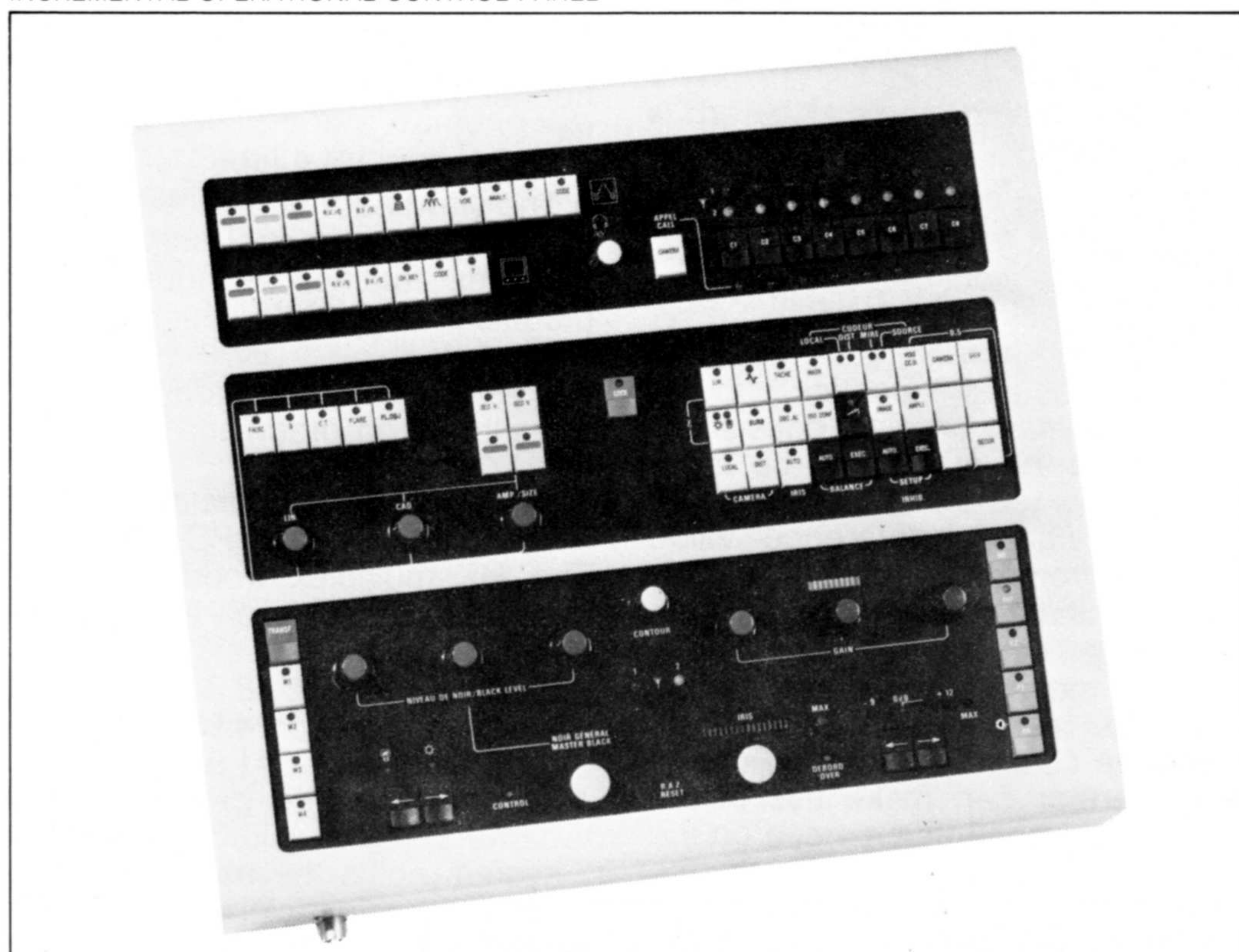


The switching matrix receives video signals and controls 8 cameras.

It can receive 2 incremental control panels.

- storage of settings: during operation with the incremental R/S a number of different settings can be previously stored in the memory, for instance in the case where the camera which is following a mobile must sequentially transmits several scenes with different, but repeated settings.

INCREMENTAL OPERATIONAL CONTROL PANEL



SWITCHING MATRIX



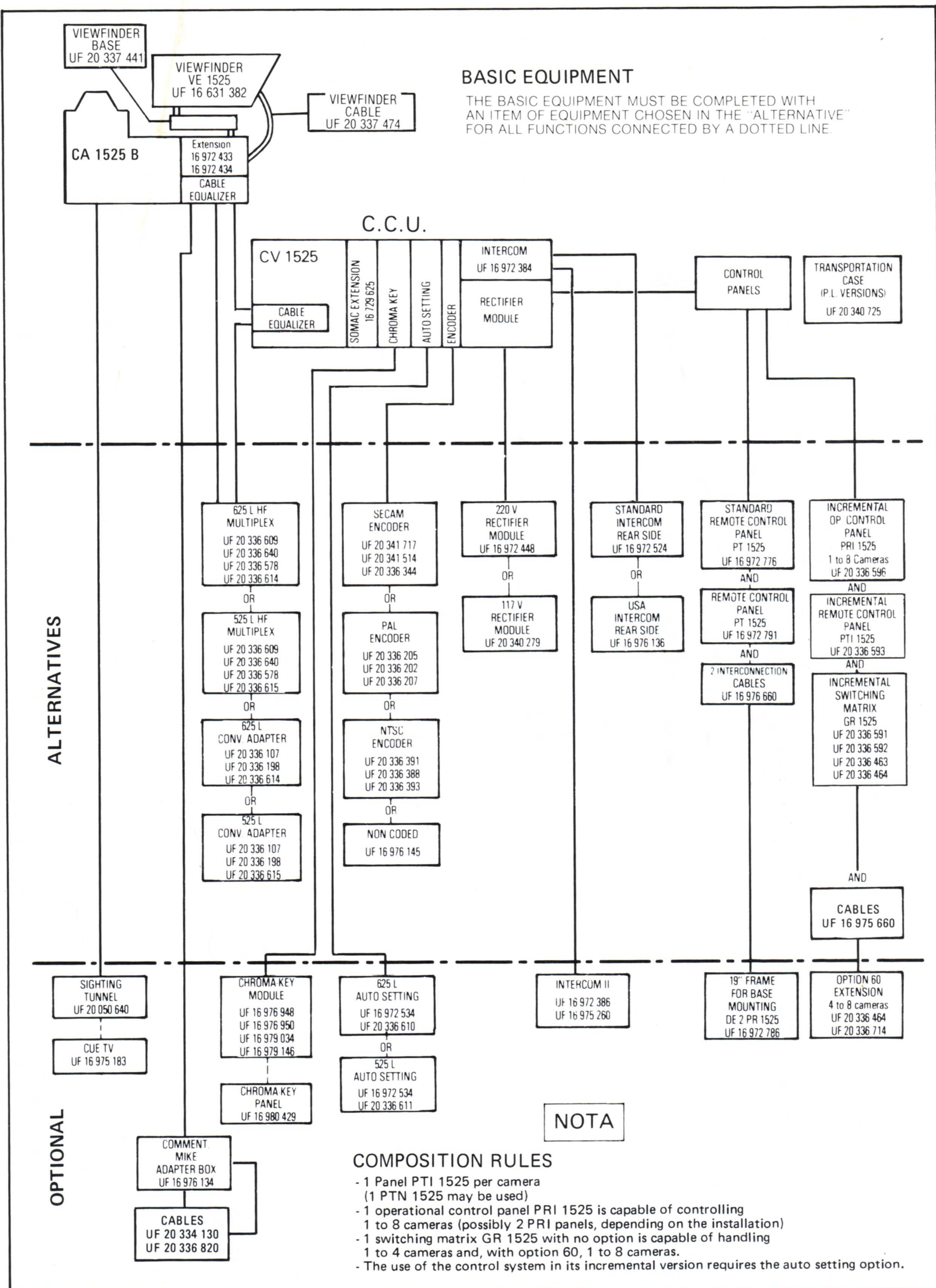
Data summary

- Power requirements:
One-phase mains:
 - 220 V à 240 V ± 10 %.option 117 V
 - 50 Hz ± 2 Hz 60 Hz
 - Consumption (depending on selected options):
 - camera: 125 W approx.
 - CCU: 130 W approx. i.e.:
 - 250 W approx. for the studio version,
 - Operating temperature range:
 - 10 °C to + 40 °C (+ 50 °C tubes unguaranteed tubes).
 - An isothermic protective cover allows operation down to — 30 °C.
 - TV systems:
 - 625 lines - 50 Hz SECAM or PAL
 - 525 lines - 60 Hz NTSC.
 - Camera cables:
 - triaxial cable, 13 mm dia., B2 type, 1 500 metres max.
 - triaxial "A" cable, 9 mm dia, 750 metres max.
 - conventional multicoaxial cable, 14 mm dia., 600 metres max.
 - "Diode gun" lead oxide pick-up tubes:
- 1" dia. tube with built-in-bias light for the green channel, type: 2070/02 G or P 8190 G,
 - 2/3" dia. tube for the red and blue channels, type: XQ 2427 or P 8460.
 - The "Cue TV" amplifier 2 MHz up to 600 m (triaxial and conventional cable).
 - Sound circuits:
 - 2 separate intercom systems:
 - programme back sound to the camera,
 - commentator sound.
 - Sensitivity:
For a colour temperature of 3200 °K, an illumination level of 800 lucas (on a reference white area of 60% reflectance) and lens iris at f/2.8, the signal-to-noise ratios at the luminance output, with 5 MHz band width, are:
 - S/N (rms) ≥ 49 dB
 - S/N (weighted) ≥ 60 dB (with no correction - typical value: 63 dB).
 - Sensitivity efficient down to + 12 dB: Scene illumination: 100 lucas with S/N ≥ 37 dB on Y and numerical lens iris f: 2.
- At full modulation, the limiting sensitivity is around twenty lucas on the scene (f/1.5 and gain G = + 18 dB).

 - Modulation depth:
At 5 MHz with no aperture correction: minimum value 40%, typical value 50%.
 - Geometry distortions:
 - within a circle of diameter equal to 0.8 picture height: ≤ 1% of height.
 - out of this circle: ≤ ± 2% of picture height.
 - Convergence:
Convergence errors:
 - ≤ 30 ns in zone 1 (typical value 20 ns)
 - ≤ 70 ns in zone 2 (typical value 50 ns)
 - ≤ 120 ns in zone 3 (typical value 80 ns).
 - Gamma correction:
The nominal gamma law is equal to 0.45 with possible adjustment for each tube.
Two transfer laws are provided for use in studio or outdoors respectively to restore contrasts in ratios 25 or 50 with no compression.

Mechanical specifications

BASIC UNITS	HEIGHT MM	WIDTH MM	DEPTH MM	WEIGHT KG
Camera CA 1525 (excluding lens and viewfinder)	445	270	537	30
Camera with viewfinder hinged down	480			12.3
17 cm viewfinder VE 1525	130	170	300	4.5
Camera control unit CV 1515	225	480	475	10
Operational control panel: - Standard PRN 1525	90	205	350	7
- Incremental PRI 1525	140	380	420	1
Remote control panel: - Standard PTN 1525 - Incremental PTI 1525	190	115	370	2
Matrix GR 1525	220	480	500	6



Detailed technical data will be sent on request.



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