SK-81

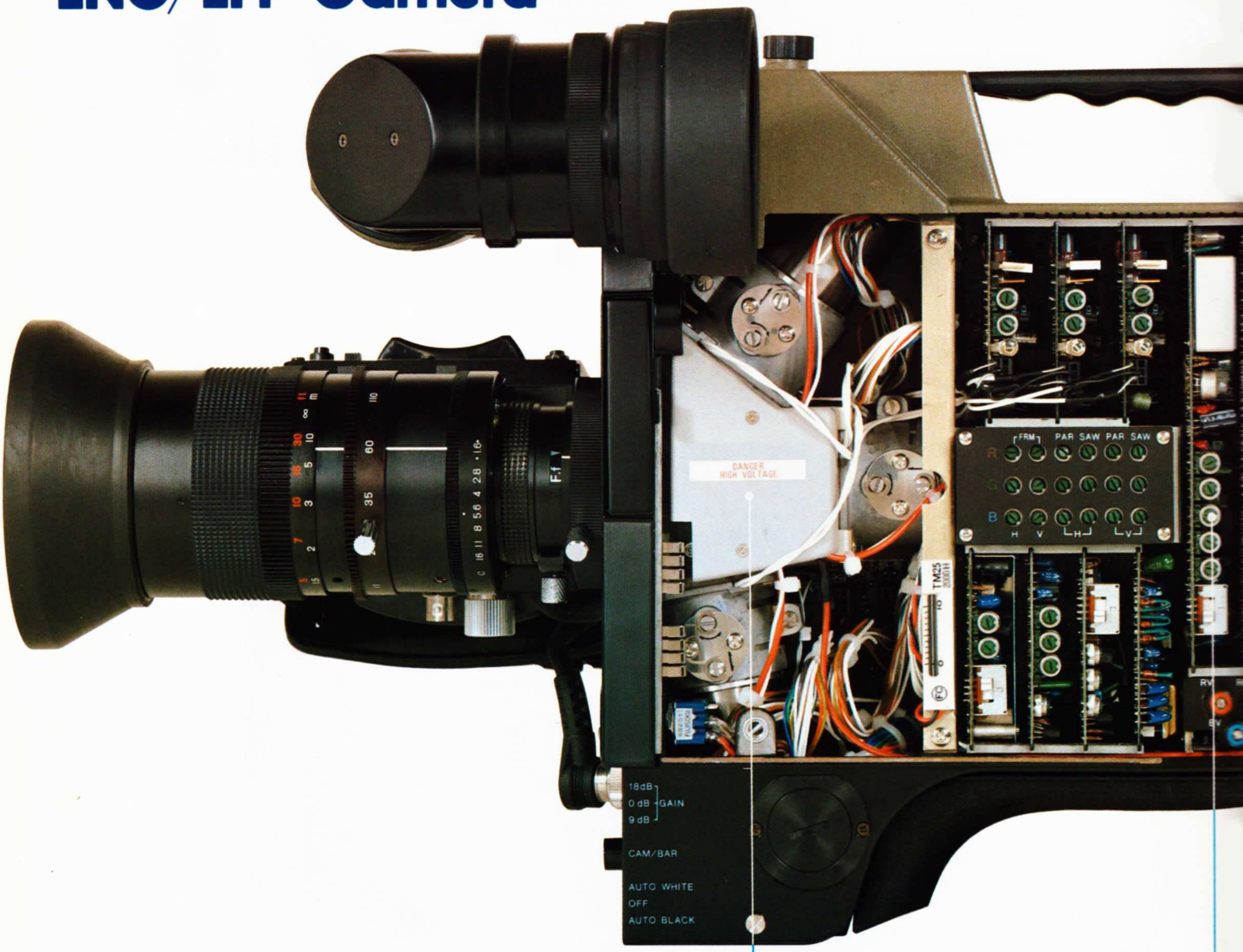
HITACHI HIGH-PERFORMANCE ENG/EFP CAMERA

type PAL



HITACHI
Hitachi Denshi, Ltd.

Unparalleled low-cost/high-performance ENG/EFP Camera



Features

- **High cost performance**

Low cost and broadcast picture quality has been realized by pursueing a limit of cost performance.

- **SATICON*II Tube**

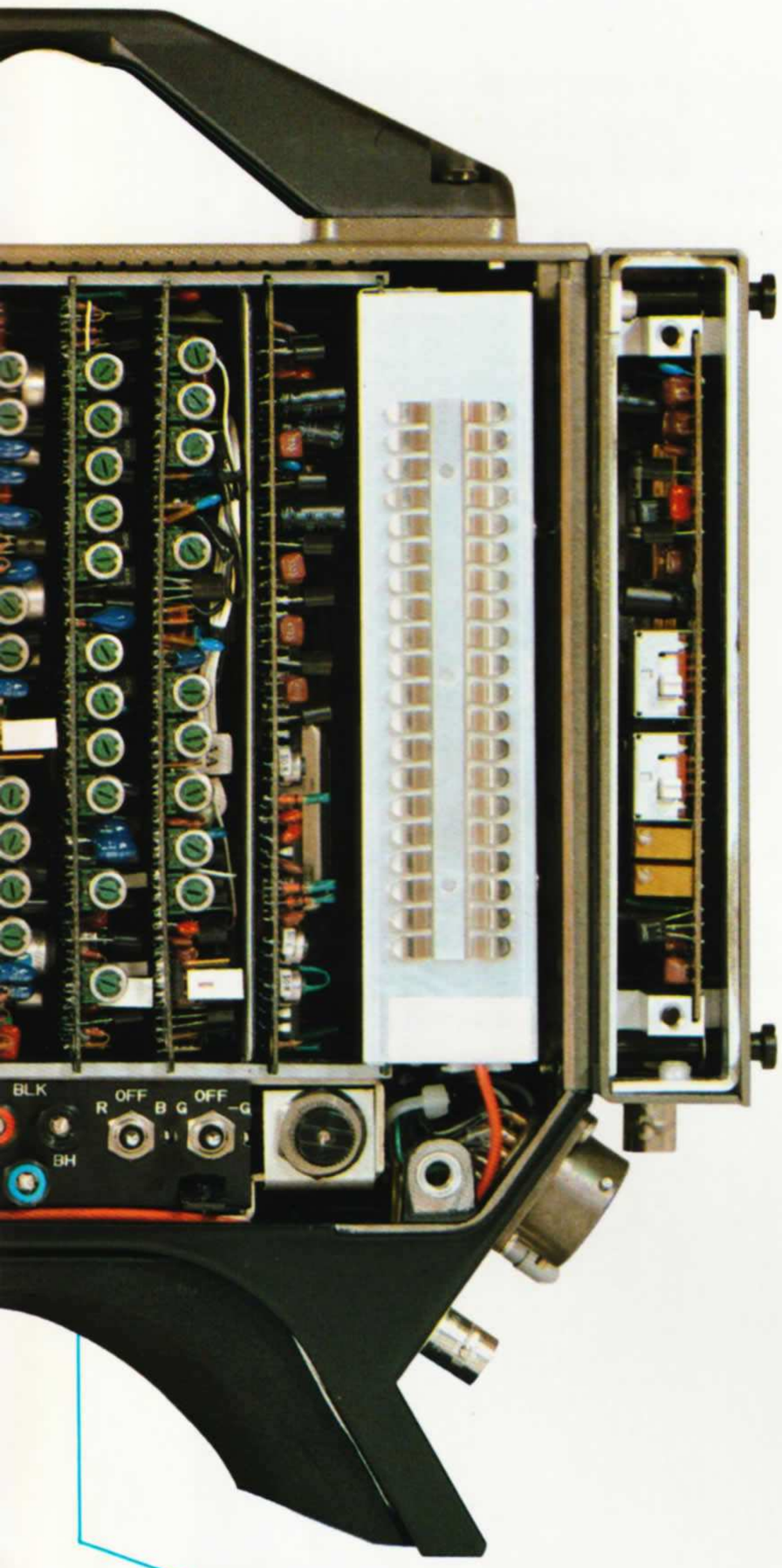
Newly developed SATICON-II pickup tube with anti-sticking target layer has greatly reduced high-light sticking retaining the former excellent picture quality.

- **Small-size and light-weight**

Camera housing of rugged magnesium alloy casting has the same small size as the SK-91 and weighs only 4.6kg (10.1 lb) including the 1.5-inch viewfinder–lightest in this class of cameras.

- **Interchangeable PC boards with the SK-91**

Almost all of the SK-81 PC boards have interchangeability with the SK-91 except for the power supply, deflection and newly designed small PC boards.



The Hitachi SK-81 is a low-cost/high-performance ENG/EFP camera that succeeded to excellent performance and light weight of the preceding EFP camera, Model SK-91.
The SK-81 is designed as a sister camera to the SK-91. Almost all of the printed circuit boards and all the accessories can be commonly used.
Succeeding to broadcast picture quality and many other features of the predecessor, the SK-81 is most suitable for ENG/EFP applications and as an emergency backup camera for studio use as well.

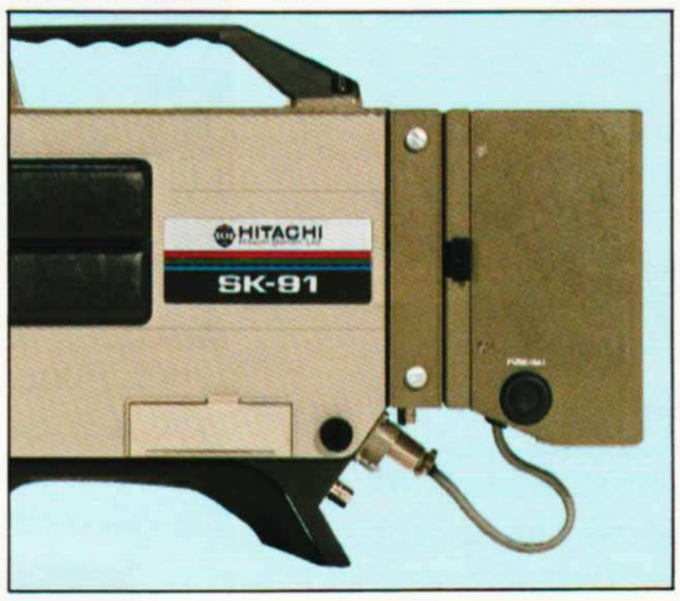
• Common accessories to the SK-91

The SK-81 interface to the external accessories is the same as the SK-91. All the accessories including AC Adaptor (AP-90), Operation Panel (OP-91), Remote Operation Unit (RU-90) can be commonly used for both the cameras.

Carrying Case (CL-91A)



Battery Pack (BP-91)



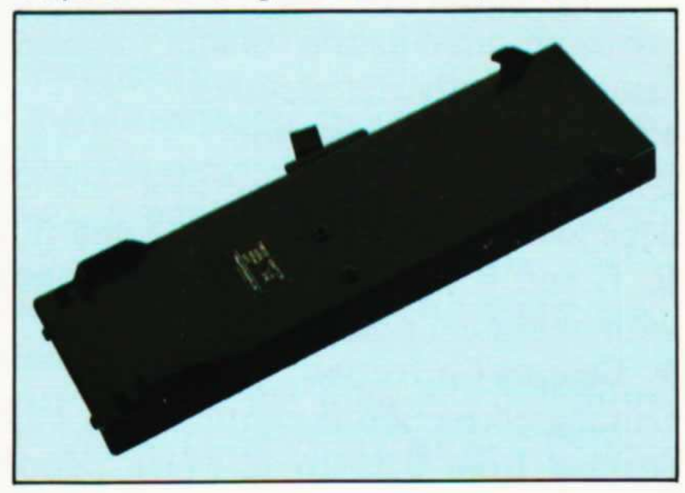
Battery Belt (PB-90)



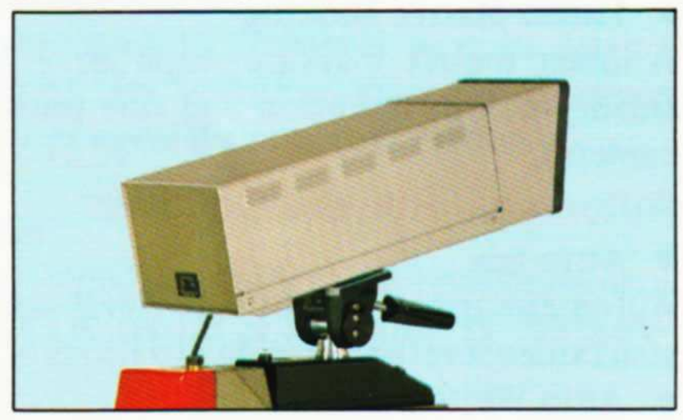
Cable Adaptor (CA-91H)

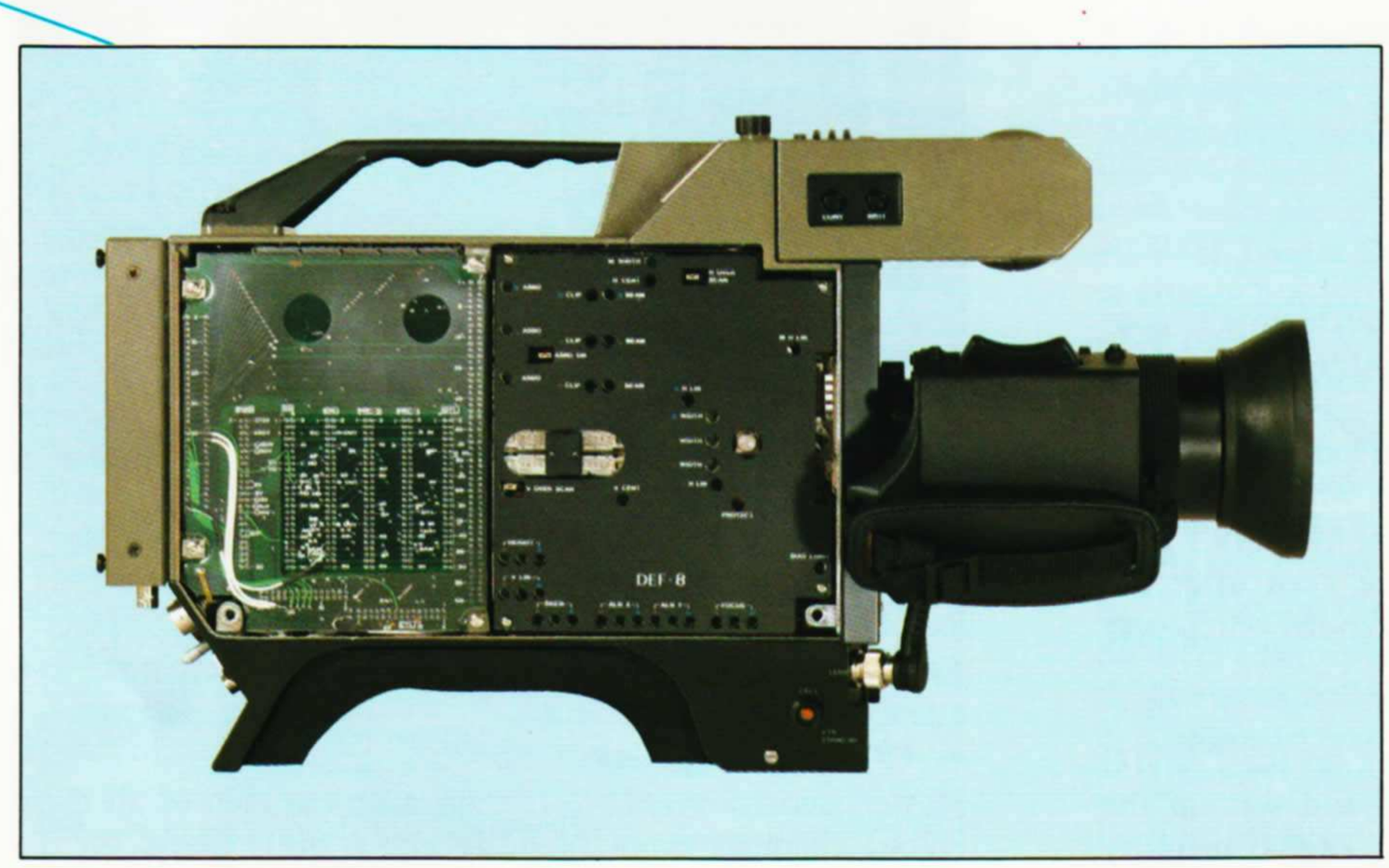


Tripod Mounting Attachment (TA-91)



5" Viewfinder (VF-501A)





Genlock Adaptor (GL-91)



Common Features of SK-81/SK-91 Family

New Design of Construction

- **Shock- and Vibration-Free**

A new shock-mounted optical system, with prism, yokes and tubes packaged as a single assembly, assures registration stability and makes the camera virtually impervious even to the severe shocks, vibrations and jolts encountered in transportation.

- **RF Interference-Free**

Improved shields for tubes, yokes and pre-amplifiers guarantee practically interference-free operation even in the 120dB electromagnetic field from MF to UHF.

Excellent Picture Quality

- **Improved Prism Beam-splitter**

A newly developed, high-speed (f1.4) prismatic beam-splitter, together with low-noise pre-amplifiers, provides high sensitivity and excellent signal-to-noise ratio. A deviation of optical registration due to temperature changes and a bias light shading of the prism are also improved substantially.

- **ABO (Automatic Beam Optimizer)**

The Hitachi developed ABO circuit greatly extends dynamic range, reduces comet-tailing and thereby guarantees easy highlight handling.

- **Shading Correction**

Adjustable H/V sawtooth, parabolic and portholing axis shading correction for each color channel, and also V sawtooth modulation shading correction are adopted to assure perfectly flat pictures.

- **2H Contour Correction**

2-line horizontal and vertical out-of-green signals, level dependent with coring and comb-filtering, are added to R, G and B channels to ensure optimum picture sharpness with minimum noise contribution.

- **Gamma Correction**

Gamma correction is continuously adjustable in each color channel from 0.35 to 1, which permits easy matching to other cameras.

- **Linear Matrix Masking**

A linear matrix masking amplifier is built in to get high-fidelity colour rendition and fine tone-matching among the cameras.

Automated Routine Controls

- **Auto Iris**

Automatic iris control by video level detection maintains constant video level under wide variations of lighting conditions.

- **Auto White Balance**

White balance is achieved automatically in half a second by turning the "AUTO WHT" switch, if a white object is focused in the center of the picture. Digital memory with a backup battery retains the white balance even after the camera power switch is turned to off (standby) or power supply is turned to off.

- **Auto Black Balance**

Black balance is also automatic by turning on the "AUTO BLK" switch, which closes the lens iris and sets up the video black level in each colour channel. Digital memory is used also for this control.

Simple and Easy Operation

- **Video Level Indicator**

For manual iris operation of lenses, a signal level indication of tiger stripes is superimposed on the viewfinder display. This indication may be switched off if unnecessary.



- **Auto Iris Closure**

A lens iris is automatically closed for protecting the camera tubes from possible damage due to highlight when the camera is turned to standby. It is also closed for 4 seconds after the "AUTO BLK" switch is turned on for setting up the video black level.



- **Power Supply Options**

The SK-81/91 may be powered from any of a conventional battery belt, an attachable battery pack, a car battery and an AC power adaptor. Low power consumption, single +12V DC assures continuous operation in excess of two hours with the battery belt or one hour with the attachable battery pack.

- **Low Battery Voltage Warning**

A flashing LED in the viewfinder alerts the cameraman to low battery voltage.

- **Power Switch**

The camera draws only 1W for the pickup tube heater and lens drive in the POWER OFF mode.
Return to the POWER ON mode is accomplished in ten and a few seconds.

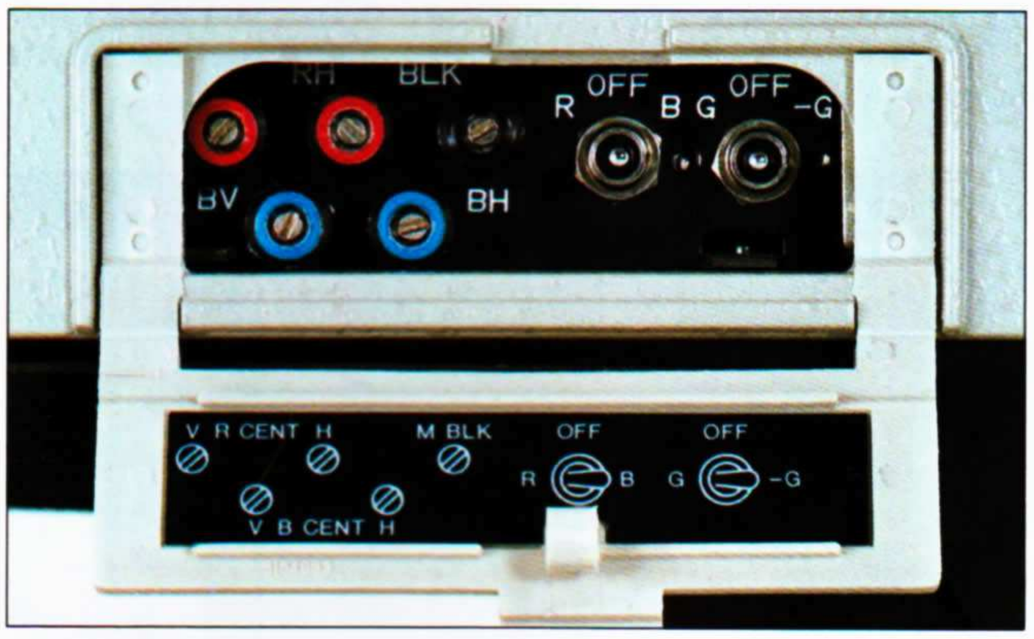
- **+9/+18dB High-Gain Switch**

Master gain of +9/+18dB operates on the gain of all three colour channels simultaneously and is quite useful for the

camera operation under extremely low light levels. Usable pictures with acceptable signal-to-noise ratio is provided down to 20 lux (2 fc) scene illumination at +18dB and f1.4.

- **Registration Controls**

H/V centering in R and B channels can be adjusted locally or remotely. (Remote control option).



- **Master Black Control**

Master black level can be controlled by up to ±30% locally or remotely. (Remote control option)

- **4-Position Filter Disc**

A filter disc includes 3200°K, 5600°K, 5600°K +1/8 ND filters, and a cap. These filters, together with the auto white balance and auto iris, provide sufficient colour temperature compensation and scene illumination correction. The filter disc is directly driven using no gear.



- **Split-Field Colour Bars**

A colour bar generator conforming to the EBU standards is built in, which makes it easy to set 100% modulation level in VTR recording.

- **Separate Video Outputs**

In addition to the two isolated encoded video outputs for line and VTR, a separate monitor output is provided. This delivers R, G, B, R-G, B-G or encoded video signal by switch selection.

- **Return Video Input**

An external synchronous or non-synchronous composite video signal may be switched in the viewfinder.

- **Genlock Input**

A built-in sync generator can be genlocked to an external colour composite or black burst signal with a genlock adaptor externally attached to the camera. Horizontal pulse timing and sub-carrier phase are adjustable.

- **Blanking Width Adjustment**

Horizontal blanking width can be adjusted from 10.3 to 11.5μs and vertical blanking width from 18 to 21 lines. This makes it possible to compensate for the errors introduced into the recorded video signal in the recording/time base correction/editing process.

- **High-Resolution Viewfinder**

A 1.5-inch, tiltable, high-brightness, high-resolution viewfinder with a magnifying eye-piece assures precise focusing and picture composition. A built-in peaking circuit further assists in attaining sharp optical focusing of the lens.
An optional 5-inch viewfinder is also available for studio use.

- **Viewfinder Indicators**

The 1.5-inch viewfinder includes the following indicators; Tally, White Balance, Video Level (tiger stripe), Battery Voltage and VTR Record.

- **Hi-Fi Microphone Amplifier**

A built-in microphone amplifier accepts a mike having output level from -45 to -60dBs. Two-time-constant limiting amplifier assures natural sounds even when a sound level varies abruptly.

- **VTR Trigger Button**

A trigger button is provided on the lens for remote control of a portable VTR. VTR record is indicated in the viewfinder with an LED.

Easy Maintenance

All the printed circuit boards can be pulled out easily. Mother board connection among the boards greatly reduces wiring and makes maintenance very easy. In order to permit easy setup of the camera in case of tube replacement, the SK-81/91 is provided with:

- Overscan deflection
- Calibrated test sawtooth
- Monitor video output for precise registration
- Individual shading compensation

Optional Systems Configuration

Ample accessories offer you various systems configuration serving your purpose.

(1) ENG system with VTR

The camera and VTR are connected with a 5 m (15 ft) VTR cable.

(2) EFP system with OP (Operation Panel)

By connecting the SK-81 with Cable Adaptor attached and the OP by a camera cable, the following items can be controlled at a distance of 50 m (150 ft).

1. Iris
2. Master Black
3. Red Black
4. Blue Black
5. Red Gain
6. Blue Gain
7. Cam/Bar Select
8. Auto White Balance and Auto Black Balance
9. Camera Call
10. Cable Compensation (15, 50 m)

(3) EFP system with ROU (Remote Operation Unit)

By connecting the SK-81 with Cable Adaptor attached and the ROU by a camera cable, the following items can be controlled at a distance of 300 m (900 ft). Individual R, G and B outputs are provided at the ROU.

1. Iris
2. Master Black
3. Red Black
4. Blue Black
5. Red Gain
6. Blue Gain
7. Red-H Centering
8. Red-V Centering
9. Blue-H Centering
10. Blue-V Centering
11. Cam/Bar Select
12. Detail ON/OFF
13. Auto White Balance
14. Camera Call
15. Cable Compensation (50 to 300 m in 50 m steps)

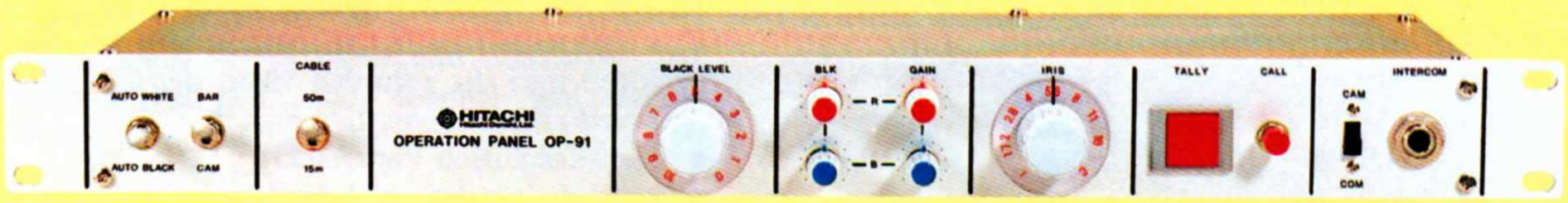
(4) Studio Application

By a combination with an optional 5-inch viewfinder and OP or ROU, the SK-81 turns into a useful backup camera for studio use.

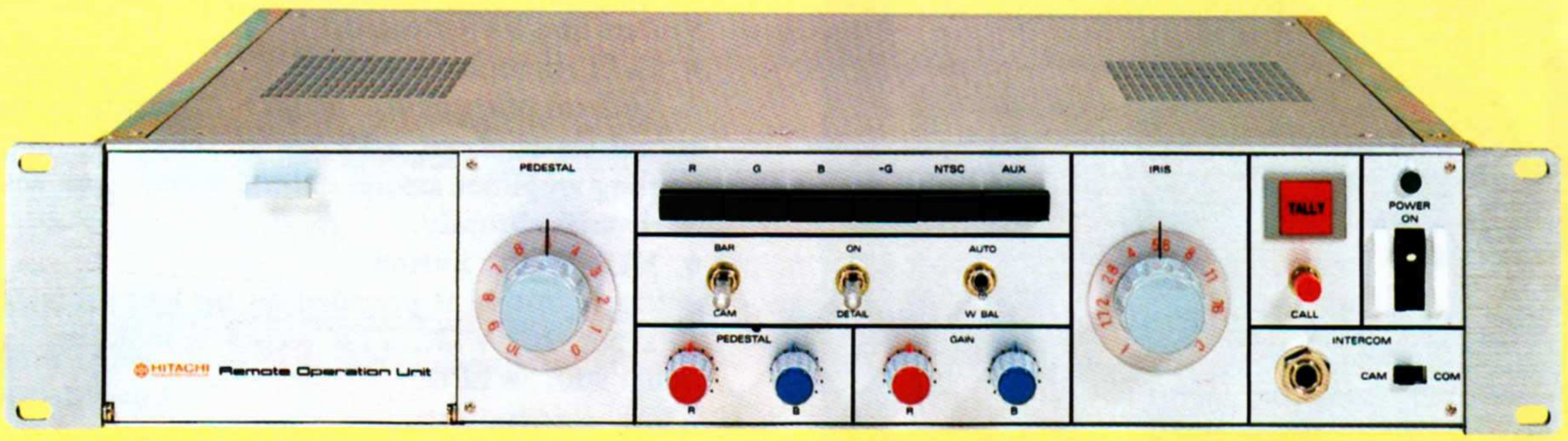


Connector Panel

OP



ROU



Applications

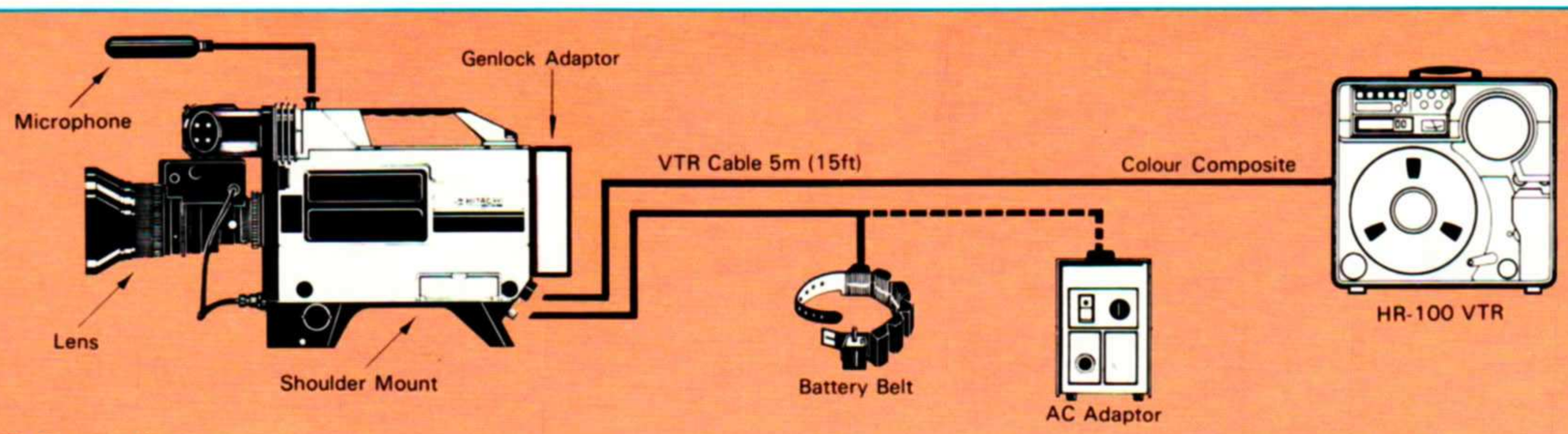


Fig. 1 ENG Operation

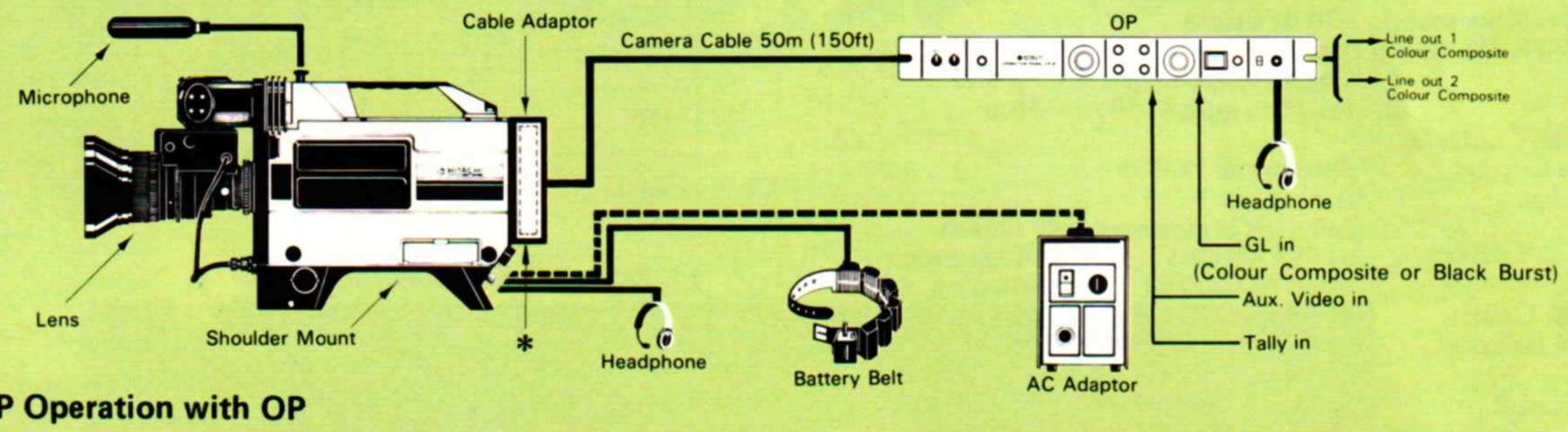


Fig. 2 EFP Operation with OP

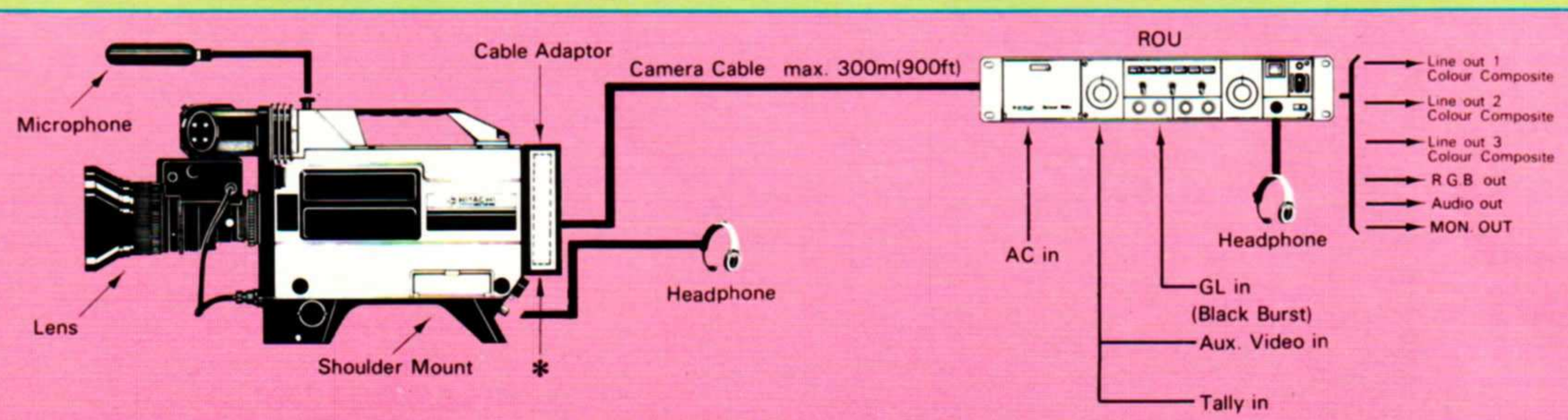


Fig. 3 EFP Operation with ROU

When the length of the cable exceeds 100m(300ft), Battery Belt or AC Adaptor must be used at the head, or a separate power source must be provided at the ROU.

*In the operation with OP or ROU, it is necessary to pull out the GL-PV circuit board from the Genlock Adaptor and put it in the Cable Adaptor.

Suggested Compositions

Component	Type	Applications			
		1	2	3	4
Camera Head w/Tubes	SK-81	●	●	●	●
1.5" Viewfinder	VF-153	●	●	●	
Standard Accessories a. Shoulder Mount c. Extension Board b. Camera Cover d. Carrying Case e. Spare Fuses f. Operation Manual	ACC-81	●	●	●	●
Zoom Lens	A12×9BERM-67	●*1	●*1	●*1	●*1
Zoom Lens	A14×9.5BERM-7	●*1	●*1	●*1	●*1
Zoom Lens	A10×11BRM-37	●*1	●*1	●*1	●*1
Battery Belt	PB-90	●*2	●*2	▲	
Battery Pack (w/Attachment)	BP-91	●*2	●*2	▲	
Battery Charger	BC-91	●	●	▲	
AC Adaptor	AP-90	▲	▲	▲	●
Operation Panel (w/Cable Adaptor)	OP-91(w/CA-91H)		●		●*3
Remote Operation Unit (w/Cable Adaptor)	RU-90(w/CA-91H)			●	●*3
5" Viewfinder (w/Attachment)	VF-501A				●
Tripod Mounting Attachment	TA-91	▲	●	●	●
Shoulder Mount (w/Breast Pad)	SM-91	▲	▲	▲	
Heating Cover	HC-91	▲	▲	▲	
Microphone	MKH-416TU	▲	▲	▲	▲
VTR Cable 5 m (15 feet) for HR-100	C-501-V2	●*4			
for BVU-50	C-501-V3	●*4			
for BVH-500	C-501-V4	●*4			
for CR-4400	C-501-V5	●*4			
Camera Cable 50 m (150 feet)	C-502-C3		●	▲	▲
Camera Cable 100 m (300 feet)	C-103-C3			●	▲

● Components necessary for each application of 1 to 4
▲ Available for special applications
* Select one out of those bearing the same number

1. ENG Application
2. EFP Application with OP
3. EFP Application with ROU
4. Studio Application

Specifications

● Ratings

1. Scan Standard: (CCIR) 625/50 fields
2. Colour Standard: PAL-B
3. Pickup Tubes: 2/3-inch SATICON*[1]-II
4. Optical System: Dichroic prism (f1.4) with built-in bias light
5. Lens Mount: Bayonet
6. Filter Complement: 3200°K, 5600°K, 5600°K +1/8 ND, cap
7. Viewfinder: (Standard) 1.5-inch CRT (Option) 5-inch CRT
8. Inputs Signals
   a) Genlock: Colour composite 1.0±0.3Vp-p or Black burst; Sync 0.3±0.1Vp-p, Burst 0.3± 0.1Vp-p
   b) VF, AUX: Colour composite 1.0Vp-p
   c) Audio (Mike): −45 to −60dBs
9. Output Signals
   a) Line: Colour composite 1.0Vp-p
   b) Monitor: Selectable from R, G, B, R-G, B-G, and color composite 1.0Vp-p
   c) Audio (Mike amp.): −20 or 0dBm
   d) For VTR (Multi-pin connector): Colour composite 1.0Vp-p and Program audio −20 or 0dBm
10. Operating Controls
    a) Beam Current: Automatic (ABO)
    b) Lens Iris: Auto/Man
       Lens iris is automatically closed at "STANDBY" and for 4 seconds after "AUTO BLK" is turned on.
    c) Master Gain: 0, +9, +18dB selectable
    d) White Balance: Automatic (digital control, with a backup memory)
    e) R, B Gain: Manually controllable by ±3dB at OP or ROU
    f) Master Black: ±30%
    g) Black Balance: Automatic (digital control, with a backup memory)
    h) R, B Black: Manually controllable by ±10% at OP or ROU
    i) R, B H/V Centering: Controllable at Camera, ROU
11. Overall System Delay
    a) H Timing: Adjustable −0.5 to +2μs
    b) SC Phase: Adjustable 0 to 360°
12. Blanking Width
    a) H: Adjustable 10.3 to 11.5μs
    b) V: Adjustable 18 to 21 lines
13. Power Requirement:

Unit	Requirement
Camera	12V DC (10.5 to 17V), approx. 23W*
AC Adaptor	100/117/220/240V AC ±10% 50/60 ±5Hz 70VA
ROU	100/117/220/240V AC ±10% 50/60 ±5Hz 30VA**

*includ. 1.5" VF ** exclud. camera power

14. Dimensions and Weight

Unit		Height	Width	Depth	Weight	
Camera	mm	260	90	295	kg	4.6*
	in	10.2	3.5	11.6	lb	10.1*
OP	mm	49	482	140	kg	3.0
	in	1.9	19	5.5	lb	6.6
ROU	mm	88	482	378	kg	11
	in	3.5	19	14.9	lb	24.2

*includ. 1.5" VF

15. Environmental Conditions
    a) Operating Temperature: −20 to +45°C (−4 to +113°F)
    b) Relative Humidity: 35 to 90%
    c) Operating Altitude: Up to 3,000 m (10,000ft) ASL
    d) RF Interference: 120dBμ from MF to UHF

*[1] Trade mark

● Performance

1. Sensitivity: f4, 2000 lux (200fc) at 3200°K, gray chart of 89.9% reflectance, 0dB video gain
2. Min. Illumination: f1.4, 20 lux (2 fc) at +18dB video gain
3. Signal-to-Noise Ratio: 52dB (Typical) at Y-channel output, G-channel signal current of 0.2μA, Gamma OFF, Detail OFF
4. Horizontal Resolution: 550 lines at centre, 400 lines (min.) at corners
5. Amplitude Response: More than 30% at 400 TV lines, at centre
6. Registration Accuracy
   a) Zone 1 (Within a circle of a diameter equal to 80% picture height): 0.1% of picture height
   b) Zone 2 (Within a circle of a diameter equal to picture height): 0.2% of picture height
   c) Zone 3 (Outside of Zone 2): 0.4% of picture height
7. Geometric Distortion
   a) Zone 2: 1% b) Zone 3: 2%
8. Microphone Amplifier
   a) Distortion: 1% at 1kHz b) Signal-to-Noise Ratio: 50 dB
9. Stability: Specifications are satisfied without re-adjustment over variations of ±10°C (±18°F) from the setup temperature, within the range of −20 to +45°C (−4 to +113°F) except for the following items.
   a) Video Level Variations: Within ±2%
      Inter-Channel Deviations: Less than 2%
   b) Black Level Variations: Within ±14 mV
   c) Registration Zone 1: Within ±0.1%
   d) Colour Bar Level Variations: Within ±3%
      Phase Variations: Within ±2° (with reference to burst phase)

Specifications are subject to change without notice.

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