HITACHI

Portable Color Camera FP-C2

FP-C2



Dockable camera ensuring
high quality picture.
The FP-C2 is a high performance 3-chip CCD camera.
The camera configuration can be selected among
ENG, EFP, and studio.

The flexibility of the FP-C2 camera configuration offers increased production facility either for ENG, EFP or studio locations.

Expectations of viewer for color images are becoming more sophisticated, and they take high quality pictures for granted. To answer to this image, mobility is imperative to extend image acceptance as well as high quality pictures.
The last performance improvement over a short period of time of the solid-state image pickup device is remarkable, and the performance is upgraded to a level superior to that of the tube camera. The FP-C2 is the latest development for Hitachi Denshi to answer the technical demands to today's market.
The FP-C2 employs the latest CCD solid-state image pickup device to obtain high resolution, sensitivity, high signal-to-noise ratio and stability, as well as combined VTR-operation, which are today indispensable for TV broadcasting and industrial color cameras.
The FP-C2 offers the highest picture quality and most pleasing image by meeting the stringent specification demanded for ENG, EFP and studio productions.



ENG (Dockable camera configuration)

The one-piece recording camera provides mobility and high quality pictures by direct mounting of the Beta, Beta SP, or M II VTR.





ENG (Separate configuration)

The compact, lightweight, and battery-powered 3-CCD camera can be connected by the cable to the U-format, S-VHS, or ED Beta VTR.

EFP / studio configuration

The camera can be fitted with the 4.5-inch viewfinder for studio and EFP use, and controlled from either a 19" rack mounted CCU (RU-C1) with a multicore cable of 300m or a mini-operation panel (RC-C1) with a control cable of 200m.



The FP-C2 has been developed based on the following concepts.

To provide high quality picture without impairing mobility, the FP-C2 is designed to be dockable with a 1/2-inch broadcast VTR.

To provide high quality picture using either combined or separate VTR of various format.

To be compact, lightweight and fully portable to provide high quality picture in virtually all situations.

Utilize the latest "state of the art" CCD technology to ensure highest possible picture quality.

The new technology expands continuously the process of producing images that are sharp and true to live in color reproduction.

www.tvcameramuseum.org

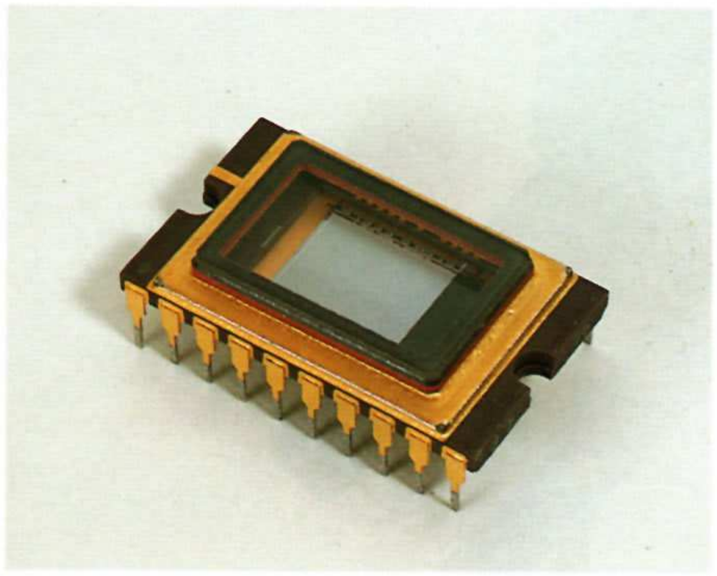
Technology opens up image possibilities to offer impressive sharp and clear pictures.



The latest CCD's are employed to ensure a high quality picture.

The selection of image pickup devices is a basic factor to obtain a high quality picture. The newly developed FP-C2 employs the interline transfer type CCD of 280,000 (330,000 for PAL) picture elements which has passed strict inspection of various parameters such as sensitivity, smear, flare, etc.

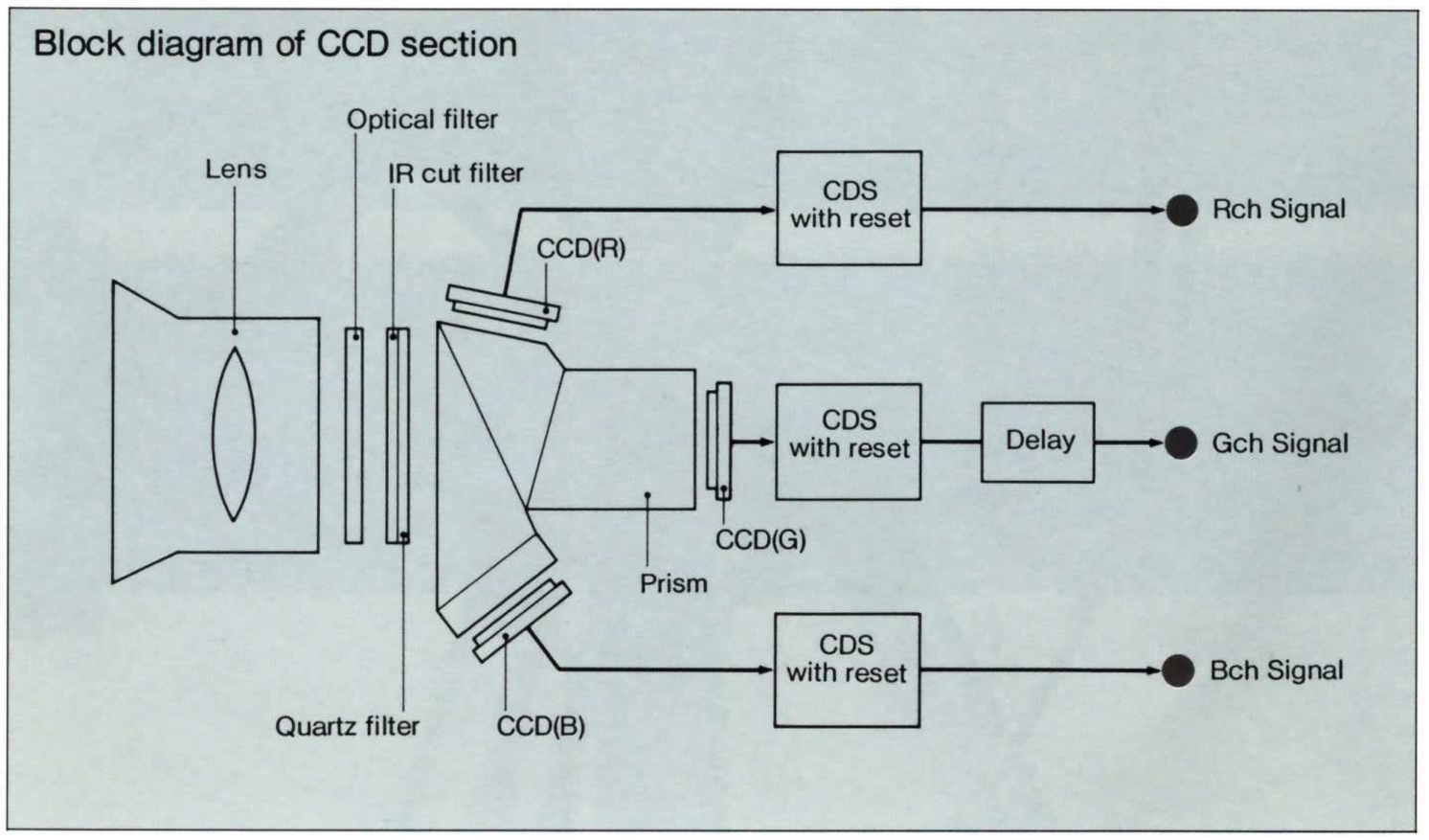
- High density CCD realizes high resolution.
- Large horizontal numerical aperture of picture elements ensures high sensitivity and less moire effect.



Resistance to high temperature is also fully taken into account to maintain high quality pictures.

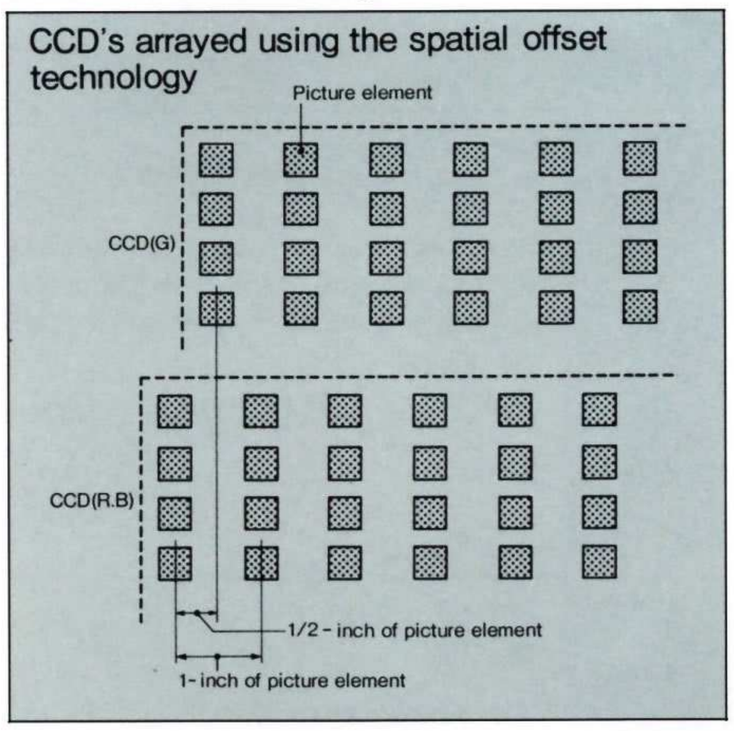
Generally, CCD cameras of professional specifications produce high quality pictures by means of 3-chip CCDs and prisms. The FP-C2 employs the ceramic support which has the same coefficient of thermal expansion as that of a high precision prism. The FP-C2 is provided with excellent registration stability against changing temperatures to maintain stable high quality pictures.

Block diagram of CCD section



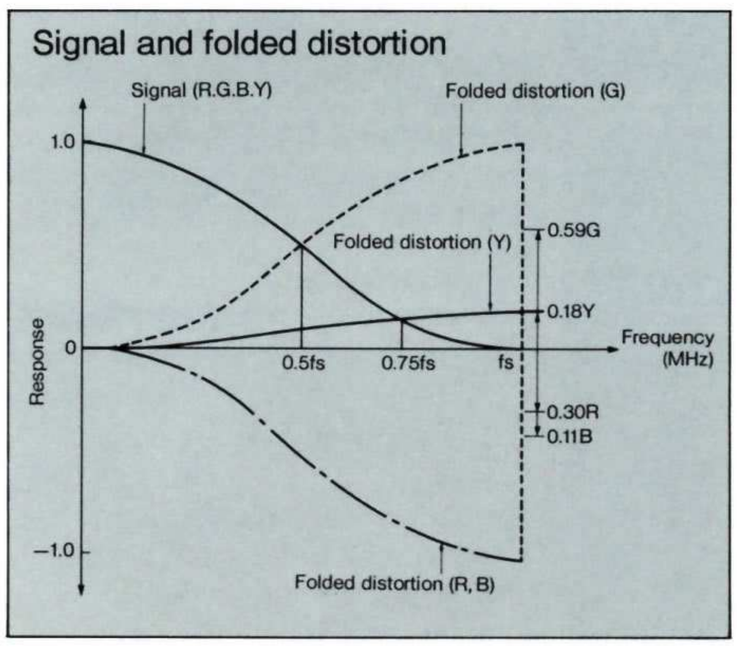
To ensure high resolution, new technology is employed in the manufacturing of the camera.

Luminance signal resolution of 660 lines has been achieved by means of high precision "image pickup cladding technology (spatial offset technology)" and prism heat-resistance design.



The moire effect has been reduced and is only noticeable at high frequency, thus improving the image quality.

Folded distortion is caused by sampling in the CCD camera. The folded distortion will cause moire to deteriorate picture quality especially when shooting a striped object. To reduce moire, the FP-C2 employs an optimized quartz filter. The spatial offset technology for higher resolution also contributes to reduction of moire.



To reproduce high grade color fidelity, the optimized IR cut filter is fitted to the camera head.

The solid-state image pickup device is highly sensitive in the long wave length, and is also sensitive to the infrared ray. Because of this characteristic, the IR cut filter is necessary to obtain high fidelity color reproduction. Especially when shooting at 3200K, the R signal is suppressed by means of an optical filter to equalize the two signals (as the R signal is double the G signal).

Microprocessor control is used to enhance picture quality in real times.

- Two-memory auto white balance of the first in this class
- Auto black balance to provide stable black
- Auto setups to automate various kinds of balance
- Micro processor-controlled auto iris to provide natural pictures
- Self-diagnosis display function for various auto functions
- Auto knee function to offer natural picture without white suppression

To assist the professional use, the FP-C2 will provide various functions.

- Masking circuit to allow fine color adjustment
- Flare compensation circuit to produce even and pure picture
- Character generator circuit to superimpose titles on the pictures.
- Memory backup to retain various pieces of information

Various accessories are prepared to expand the horizons of shooting possibilities

Viewfinder easy to view

The 1.5-inch viewfinder employs a quick start CRT. The visibility adjustment mechanism is built in the ocular section consisting of two large lenses for easy viewing.

Various options to constitute EFP systems

The remote control box transmits the 8-bit digital signal serially to perform various kinds of control for sure. The camera cable of the remote operation unit can be extended up to 300m (1,000ft) in addition to various control functions.

Remote Control Box RC-C1



General: When controlling the FP-C2 remotely or when using the FP-C2 as an EFP or studio camera. Three remote control boxes can be monuted on the optional MA-C1 rack mount.

●Specifications

Serial data output	:1.5 Vp-p/high impedance
Maximum cable length	:200m (HC-5B2 by Hirakawa)
Power requirement	:9V DC
Ambient temperature	:5 to 40°C (41 to 104°F)
Power consumption	:0.3W approx.
Dimensions	:140(W)×88(H)×56.6(D) mm (5.5×3.5×2.2 in)
Weight	:0.7kg (1.5 lb) approx.

Control items
- R GAIN
- B GAIN
- CAM/BAR selection
- HIGH GAIN (0, +9, +18dB) selection
- MASTER BLACK LEVEL
- R BLACK LEVEL
- B BLACK LEVEL
- WHITE BALANCE (MEMORY 1/PRESET/MEMORY 2) selection
- SC PHASE
- H PHASE
- IRIS CONTROL
- IRIS (MANUAL/REMOTE/AUTO) selection
- MON selection
- AUTO WHITE
- AUTO BLACK
- AUTO SETUP

Remote Operation Unit RU-C1



General: The Hitachi RU-C1 is a remote operation unit used for the FP-C2 color camera. The RU-C1 is used when controlling the FP-C2 at a control room, or from a remote place when the camera is used as an EFP, studio or observation camera. With the RU-C1 video and control signals, and power are transmitted at the same time by a single camera cable. The maximum distance between the camera and the RU-C1 is 300 m.

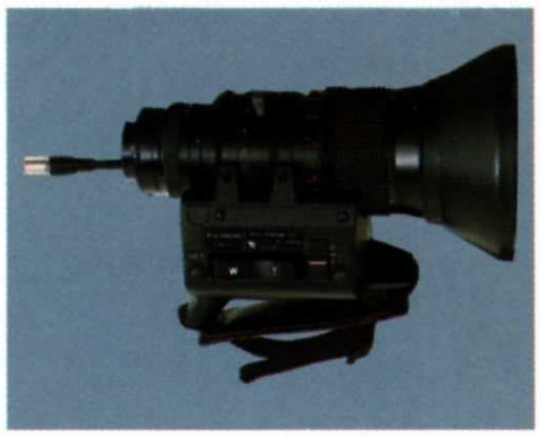
●Specifications

Color system	:NTSC, PAL-B
Output signals	
● Line output1	:VBS 1.0 Vp-p/75 ohms
● Line output2	:VBS 1.0 Vp-p/75 ohms
● MON output	:VBS 1.0 Vp-p/75 ohms
● RGB output	:V0.7Vp-p/75 ohms or only G output VS 1.0 Vp-p/75 ohms
● Audio output	:0 dBm/600 ohms
Input signals	
● AUX video input	:VBS 1.0 Vp-p/75 ohms or loop through
● GENLOCK input	:VBS 1.0 Vp-p/75 ohms or loop through
● Serial-data input	:1.5 Vp-p/high impedance
● Tally input	:Contact or voltage (24V DC) supply
● Intercom	:24 Vp-p/220 ohms
Power requirements	:117/220/240V AC 50/60 Hz
Power consumption	:45W approx.
Maximum cable length	:300 m
Ambient temperature	:5 to 40°C (41 to 104°F)
Dimensions	:482(W)×88(H)×302(D) mm (18.9×3.5×11.8 in)
Weight	:7.6kg (16.7 lb) approx.

Control items
- R GAIN
- B GAIN
- CAN / BAR selection
- HIGH GAIN (0, +9, +18 dB) selection
- MASTER BLACK LEVEL
- R BLACK LEVEL
- B BLACK LEVEL
- WHITE BALANCE (MEMORY 1/PRESET/MEMORY 2) selection
- SC PHASE
- H PHASE
- IRIS CONTROL
- IRIS (MANUAL/REMOTE/AUTO) selection
- MON selection
- AUTO WHITE
- AUTO BLACK
- AUTO SETUP
- CALL
- TALLY

www.tvcameramuseum.org

Accessories



12×zoom lens
A12×10BRM-7

Zoom ratio :12×
Focal length :10 to 120mm
f-number :1.7
Mount :Bayonet
Filter mounting:72mm (dia.), 0.75mm pitch
Weight :1.3kg(2.9lb) approx.



15×power zoom lens
J15×9.5B4KRSH

Zoom ratio :15×
Focal length :9.5 to 143mm
f-number :1.8
Mount :Bayonet
Filter mounting:86mm (dia.), 1mm pitch
Weight :1.4kg(3.0lb) approx.



1.5-inch viewfinder
GM-7A

The GM-7A is a compact and light-weight viewfinder for an ENG application.
Picture tube :1.5inch
Resolution :420TV lines approx.
Power requirements:9V DC, 1W approx.
Weight :500g(1.1 lb) approx.



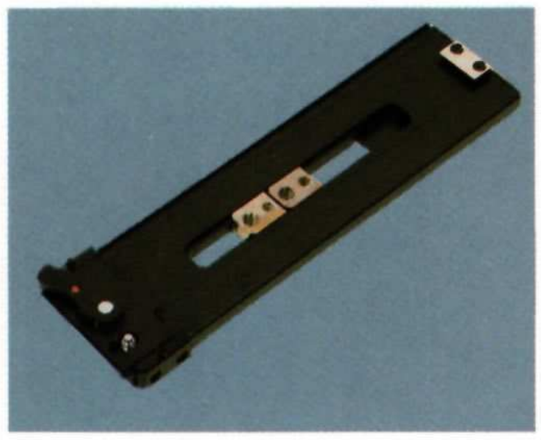
Lens cable kits
ZL-15W/ZL-7W

The ZL-15W/ZL-7W are used for zooming and focusing of the power zoom lens when the camera is used in a studio.
ZL-15W :For J series
ZL-7W :For A series



4.5-inch viewfinder
GM-5

The GM-5 is a high resolution viewfinder for studio use. The GM-5 can be freely positioned to allow viewing in any camera angle.
Picture tube :4.5-inch
Resolution :500TV lines approx.
Power requirements:12V DC, 9W approx.
Weight :1.5kg (3.3lb) approx.



Tripod adaptor
TA-C1

The simply mountable TA-C1 is used when mounting the camera to a tripod.
Dimensions :90(W)×28(H)×323(D)mm (3.5×1.1×12.7in)
Weight :700g(1.5lb) approx.



AC adaptor
AP-60A

The AP-60A is an AC adaptor, which feeds 12V DC to the FP-C2
Power requirements:117/220/240V AC, 50/60Hz
Output power:12V DC 2A
Dimensions :100(W)×115(H)×235(D) mm(3.9×4.5×9.2 in) approx.
Weighht :3.7kg(8.1 lb) approx.



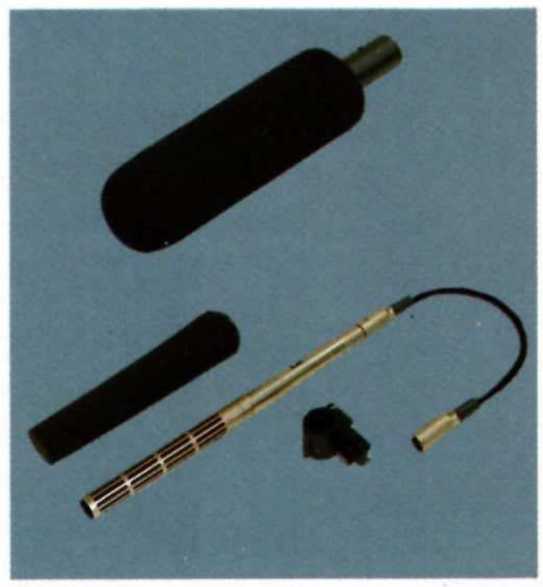
AC adaptor/charger
AP-61

The AP-61 is an AC adaptor/charger which can charge the DP-15.
Power requirements:117/220/240V AC 50/60Hz
Output power:12V DC, 2A
Dimensions:100(W)×115(H)×235(D) mm (3.9×4.5×9.2in)
Weight :4kg (8.8lb) approx.



Battery pack
DP-15

The DP-15 is used when operating the CK-2B with the battery. The DP-15 can be installed on the rear of the FP-C2 by using the BA-15 battery adaptor.
Battery :Ni-Cd
Voltage :12V DC
Capacity :2 AH/5 HR
Dimensions :110(W)x140(H)x46(D)mm (4.3x5.5x1.8in)approx.
Weight :1.1kg(2.4lb) approx.



Microphones MC-C2/ME-80

High performance microphones for the FP-C2
MC-C2
Impedance:10kΩ
Dimensions:45mm (dia.), 270(L)mm (without hood)
Weight :85g approx.
ME-80
Impedance:200Ω
Dimensions
Microphone head section:22mm(dia.)
Power supply section:19mm(dia.)
Total length:313mm
Total weight:205g approx.
Mic cable C-300MA and micholder MH-C1 are optional.



VTR cable for U-format VTR

This is used to connect the camera to an U-format VTR.
5m VTR cable:C-501VR
2m VTR cable:C-201VR

VTR cable for S-VHS VTR

This is used to connect the camera to an S-VHS VTR.
5m VTR cable:C-501VZ
2m VTR cable:C-201VZ

VTR cable for BETACAM

This is used to connect the camera in separate configuration to a BETACAM (SP) VTR.
5m VTR cable:C-501VW
2m VTR cable:C-201VW

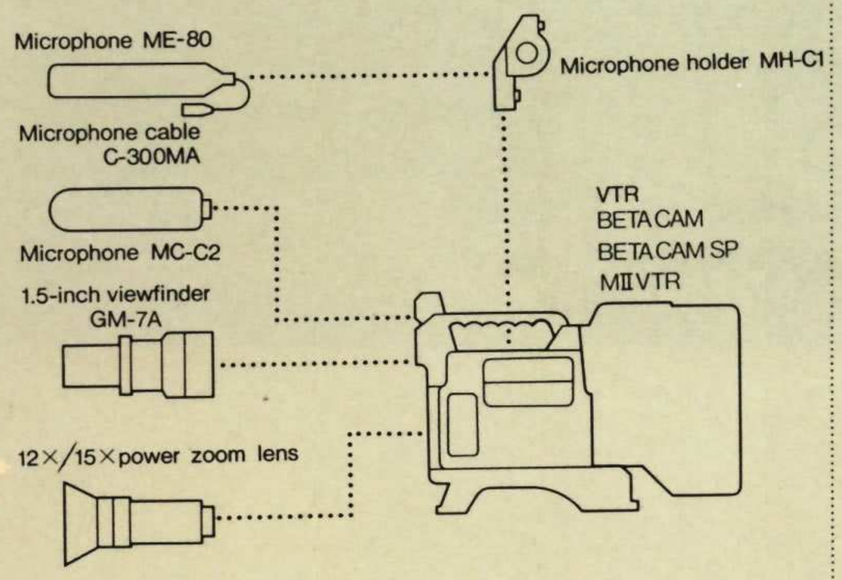


VTR cable for VHS VTR

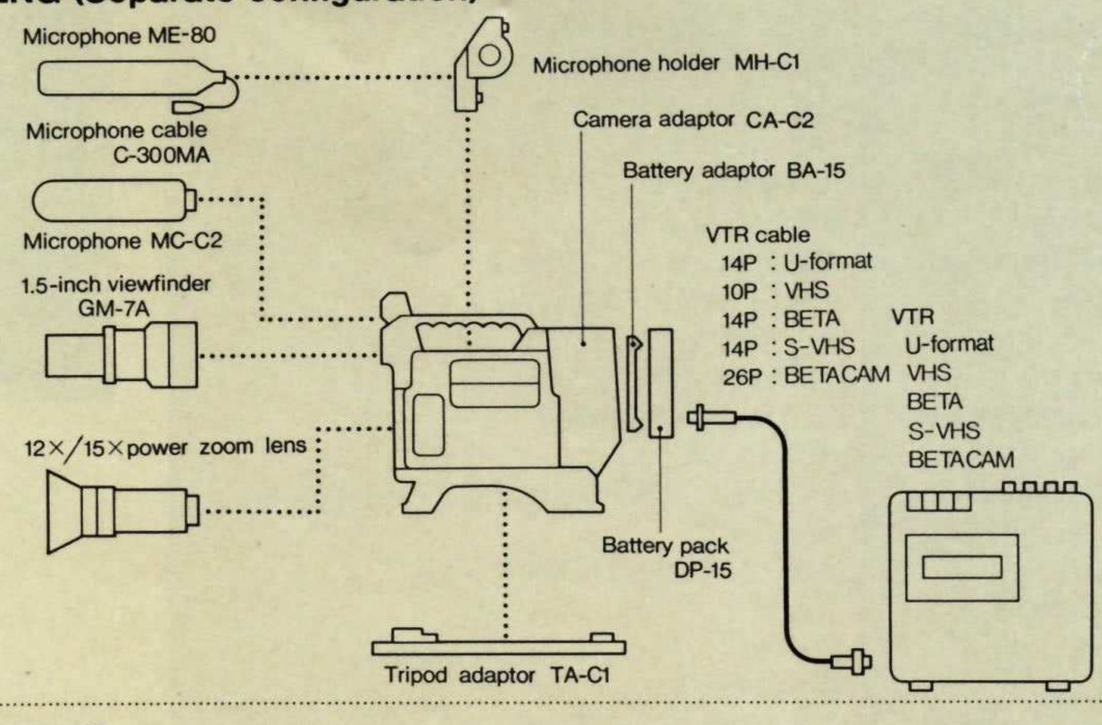
This is sued to connect the camera to a VHS VTR.
5m VTR cablle:C-501VT
2m VTR cable:C-201VT
Use also this VTR cable for U-format VTR with 10p.

System configurations

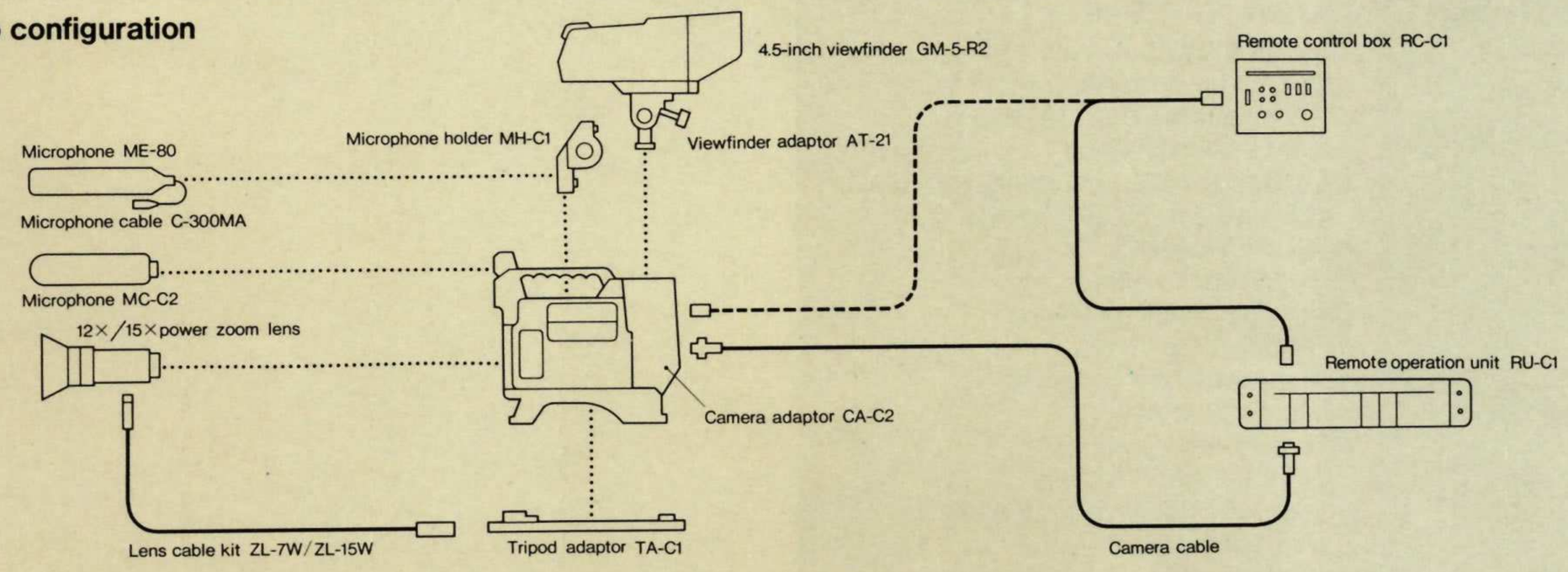
ENG (Dockable camera configuration)



ENG (Separate configuration)



EFP/studio configuration



Standard composition

Equipment	Model name	Q'ty
Camera head	FP-C2	1
Camera adaptor	CA-C2	1
1.5-inch viewfinder	GM-7A	1
15× powered zoom lens	J15×9.5B4KRSH	1
Tripod adaptor	TA-C1	1
Carrying case	CL-C2	1
Standard accessories	——	1 set

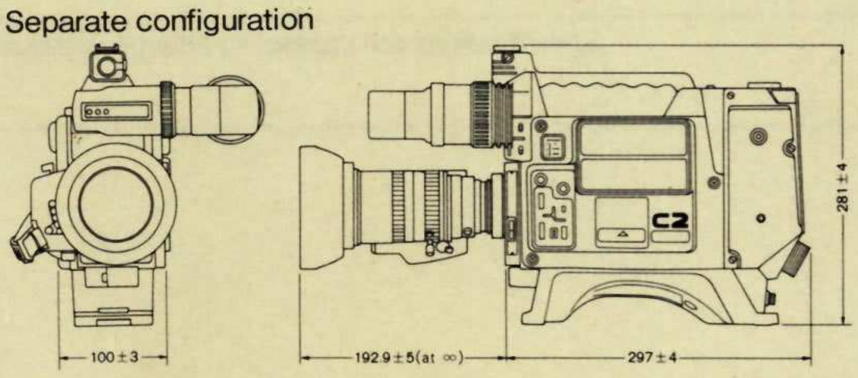
Main optional accessories

Product name	Model name	Product name	Model name
Power zoom lens	A16×9.5 BRM-17B	Microphone	MC-C2
AC adaptor	AP-60A	Microphone	ME-80
Battery	DP-15	Microphone cable	C-300MA
Battery adaptor	BA-15	Microphone holder	MH-C1
Remote control box	RC-C1	VTR cable U-format 2m/5m	C-201VR/C-501VR
Remote operation unit	RU-C1	VTR cable VHS 2m/5m	C-201VT/C-501VT
4.5-inch viewfinder	GM5$^{N}_{P}$	VTR cable S-VHS 2m/5m	C-201VZ/C-501VZ
Lens cable kit	ZL-7W	MII adaptor	CA-C2M
Lens cable kit	ZL-15WR	S-VHS adaptor	CAC2SJ
Camera cable	15m/50m/100m		

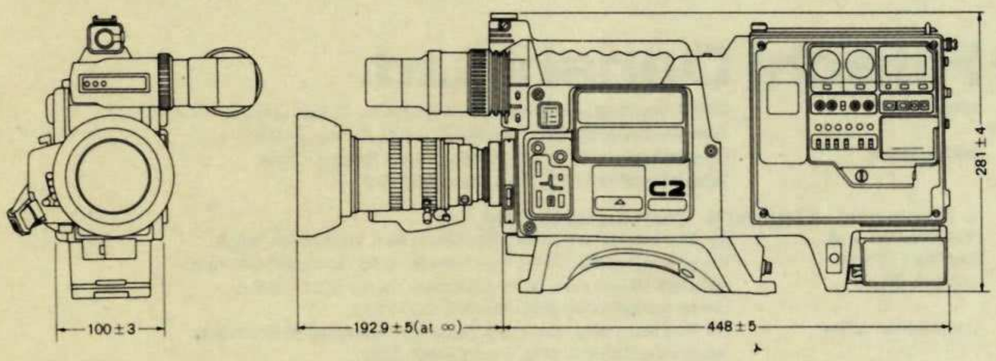
Dimensions

Unit : mm

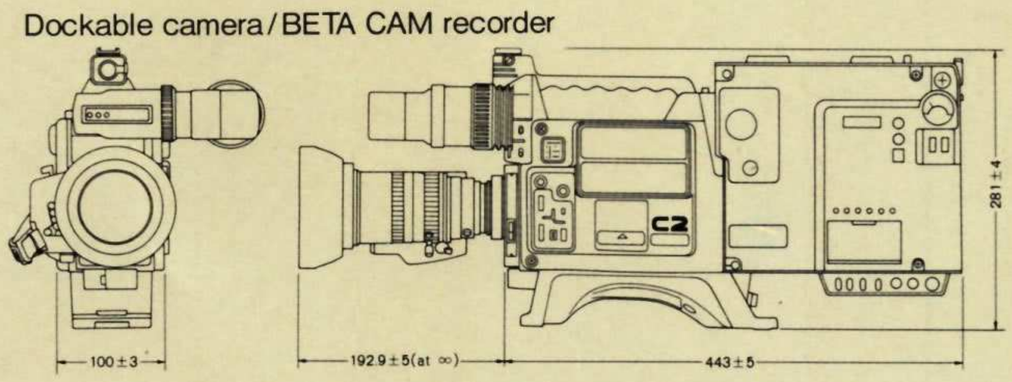
Separate configuration



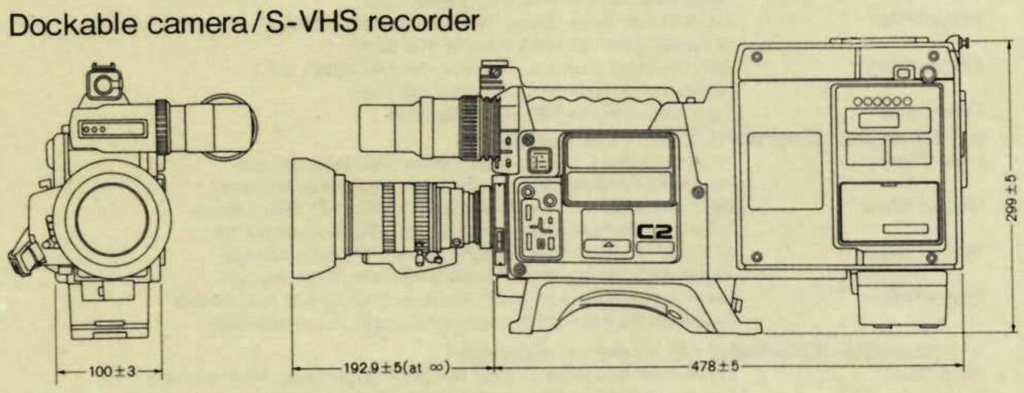
Dockable camera/MII recocorder



Dockable camera/BETA CAM recorder



Dockable camera/S-VHS recorder



Specifications

Color system	NTSC, PAL-B
Imaging device	2/3-inch 3-chip imaging device
Pickup system	RGB 3-chip system
Number of effective pixels	NTSC:574(H)x499(V) PAL:574(H)x581(V)
Imaging area	8.90(H)x6.74(V)mm (equivalent to 2/3-inch pick-up tube)
Encoding system	IQ (NTSC), UV (PAL)
Sync system	Internal and genlock
Horizontal resolution	660 TV lines (at center)
S/N	60 dB (NTSC) (typical), 57 dB (PAL) (typical)
Sensitivity	2000 ℓux, f5.6
Minimum sensitivity	25 ℓux, f1.8 (+18 dB)
Gamma correction	0.35 to 1.0
Geometric distortion	All zones: 0% (excluding lens characteristics)
Optical filter	3200K, 5600K, 5600K+1/8 ND
Vertical contour correction	2H
Lens mount	Bayonet
Sensitivity selection	0 dB, +9 dB, +18 dB
Input signals	①Genlock (BNC or multi connector) VBS 1.0 Vp-p±3 dB or black burst/ 75 ohms (sync 0.3V ±0.1 Vp-p, burst 0.3V±0.1 Vp-p) ②Viewfinder AUX input (multi connector) VBS 1.0Vp-p ±3 dB/75 ohms
Output signals	Video output (BNC) VBS 1.0Vp-p/75 ohms VTR output (multi connector) VBS 1.0Vp-p/75 ohms RGB output (multi connector) 0.7 Vp-p/75 ohms YC output (multi connector) Y : VS 1.0 Vp-p/75 ohms C : BURST 0.286 Vp-p/75 ohms (PAL:0.3Vp-p) Component output (multi connector) x1 set Audio output (multi connector) –20 dBm or –60 dBm
Auto functions	Auto white balance Auto black balance Auto iris Auto knee Auto black level Self-diagnosis function Auto setup
Power requirement	12V DC
Power consumption	11W approx. (including GM-7A and CA-C2)
Dimensions	100(W)x300(H)x217(D) mm (3.9x11.8x8.5 in)
Weight	4.2kg (9.2 lb) (including GM-7A, excluding lens)

GM-7A 1.5″ viewfinder	
Input signal	VS 1Vp-p, sync negative
Picture tube	1.5-inch B/W, direct heating type
Resolution(horizontal)	Approx. 420 lines
LED display	B, T, L, H (4 kinds)
Controls	Brightness, contrast, front tally ON/OFF, peaking ON/OFF
Power requirement	9V DC
Power consumption	Approx. 4W
Weight	Approx. 0.5kg(1.1lb)

Specifications are subject to change without notice.

Hitachi Denshi, Ltd.

Head Office : 23-2,Kanda-Suda-cho 1-chome, Chiyoda-ku, Tokyo, Japan.
Telephone:(03)255-8411, Fax:(03)257-1433, Telex:J24178

Beijing Office : Xiyuan-Hotel room No. 546 Erligou, Xijiao Beijing China.
Telephone:89-0721 EX. 546, Fax:1-802-1841

▪ Hitachi Denshi America.Ltd.

Headquarters and New York Office : 150 Crossways Park Drive, Woodbury, New York 11797, U.S.A.
Telephone:(516)921-7200, Fax:516-496-3718, Telex:510-221-1899

Chicago Office : 250 East Devon Ave., suite 115 Itasca, Illinois 60143, U.S.A.
Telephone:(312)250-8050, Fax:312-250-8054

Los Angeles Office : 371 Van Ness Way, Suite 120 Torrance, California 90501, U.S.A.
Telephone:(213)328-6116, Fax:213-328-6252

Dallas Office : 14169 Proton Road, Dallas, Texas 75244-3604, U.S.A.
Telephone:(214)233-7623, Fax:214-458-9284

Atlanta Office : 3610 Clearview Parkway, Doraville, Georgia 30340, U.S.A.
Telephone:(404)451-9453, Fax:404-458-8356

Parts Center : Telephone:(516)921-7200:(800)426-3620

▪ Hitachi Denshi,Ltd. (Canada)

Head Office : 65 Melford Drive, Scarborough, Ontario M1B 2G6, Canada
Telephone:(416)299-5900, Fax:(416)299-0450, Telex:652-5324

Eastern Office : 8096 Trans-Canadienne, St-Laurent, Quebec H4S 1M5, Canada
Telephone:(514)332-6687, Fax:(514)335-1664, Telex:582-4768

Western Office : 3433-12th St North-East, Calgary, Alberta T2E 6S6, Canada
Telephone:(403)291-4388, Fax:(403)250-1634, Telex:382-5861

Ottawa Office : 159 Colonnade Road, Unit #3, Nepean, Ontario, K2E 7J4, Canada
Telephone:(613)727-3930, Fax:(613)727-3955, Telex:053-4533

▪ Hitachi Denshi (Europa) GmbH

Head Office : Weiskircher Straβe 88, D-6054 Rodgau 1 (Jügesheim), West Germany
Telephone:(06106)13027, Fax:(06106)16906, Telex:417-849

▪ Hitachi Denshi (U.K.) Ltd.

Head Office : 13/14 Garrick Industrial Centre, Irving Way, Hendon, London, NW9 6AQ United Kingdom
Telephone:(01)202-4311, Fax:01-202-2451, Telex:27449

Leeds Office : Video House, 55 Manor Road, Leeds, LS11, 5PZ, United Kingdom
Telephone:0532-430294, Fax:0532-459263

DV-E289Q Printed in Japan (B) '89-8