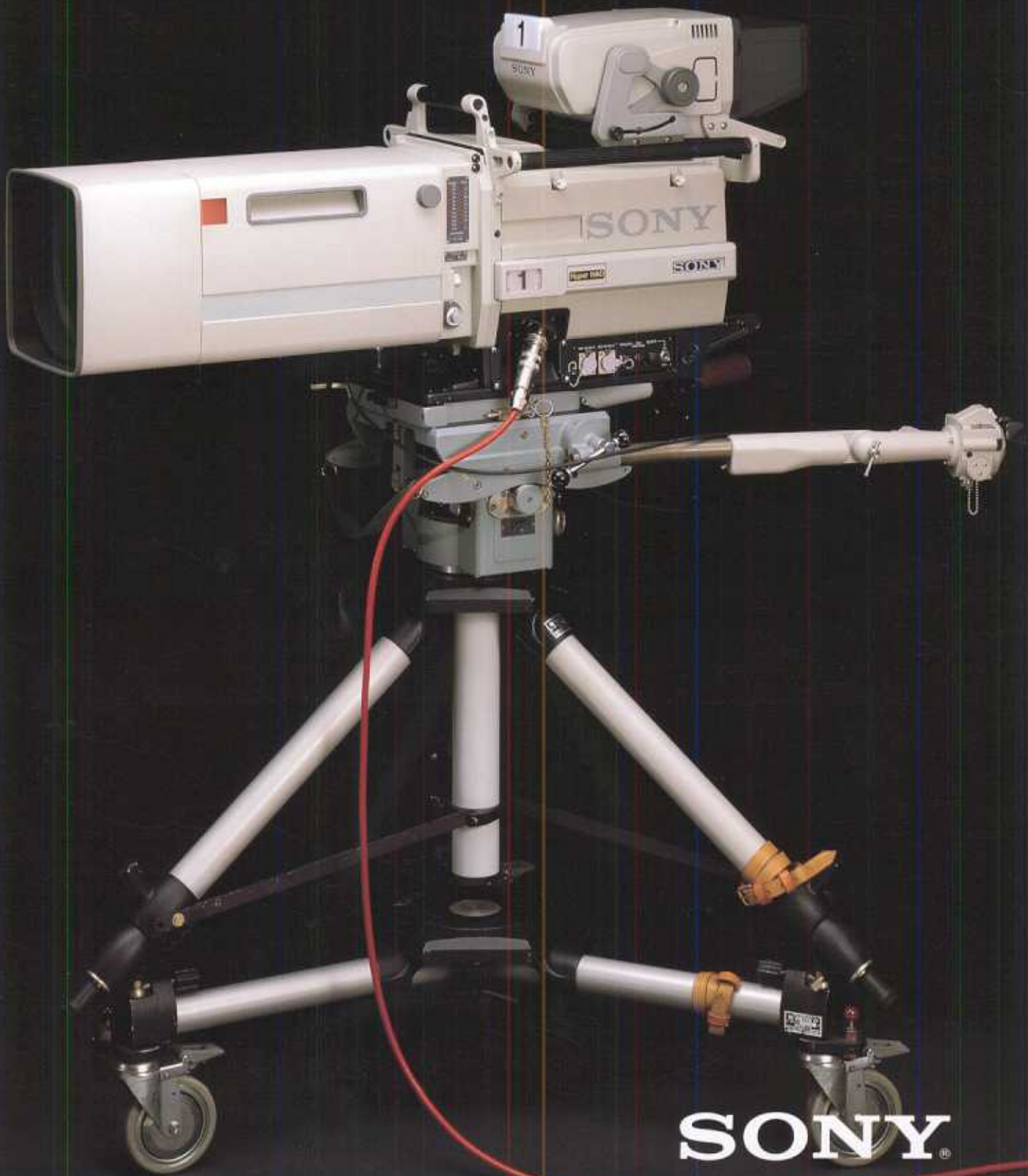
3-chip CCD Studio/OB Color Camera System

BVP-375

(NTSC)



SONY

The introduction of the Sony BVP-370 and BVP-270 CCD Studio/OB cameras firmly established CCDs as the definite replacement for pick-up tubes in every area—not only solving problems brought about by the limitations of tube imaging devices but also giving significant enhancements in picture quality to meet the critical demands of Studio/OB programming. These two cameras, both incorporating the original Sony Hyper HAD™ technology in their CCD sensors, have a well deserved reputation for picture quality and operational performance. The continuous research by Sony for even higher levels of CCD performance has now made possible the introduction of the BVP-375, an innovative CCD Studio/OB camera at the top of the Sony CCD camera range.

The result of this research is the Hyper HAD 1000™ sensor, which gives the BVP-375 the exceptionally high horizontal resolution of 800TV lines and dramatically reduces aliasing to a minimum. The sensitivity of over F8.0 and incredibly low smear level are also results of enhancements to the FIT Hyper HAD sensor while a 62dB signal-to-noise ratio and superb color reproduction are further examples of the outstanding performance of the BVP-375.

The BVP-375 also incorporates the all new Enhanced Vertical Definition System (EVS), giving greatly improved vertical resolution. New control functions such as skin tone detail, black gamma and master white clip control have also been added for optimum picture tonal adjustments.

The BVP-375 accommodates all the system components of the BVP-370 series, allowing great flexibility in building up complete Studio or OB camera systems that have very effective operational control functions. Betacam® CCD portable cameras can also be easily integrated into this system with seemless color matching.

A new achievement by Sony, the BVP-375 represents the pinnacle of CCD Studio/OB camera development.

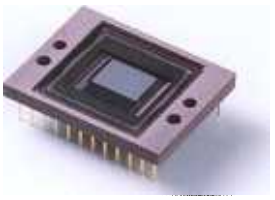
THE CAMERA HEAD

Innovative Hyper HAD 1000 CCD

The innovative Hyper HAD 1000 sensor is an achievement only made possible by Sony, the industry leader in CCD technology. The use of this sensor is one of the main contributory factors to the outstanding picture quality of the BVP-375 and its ability to meet the demands of the most critical of applications both in the studio and in the field.

• Extremely High Horizontal Resolution

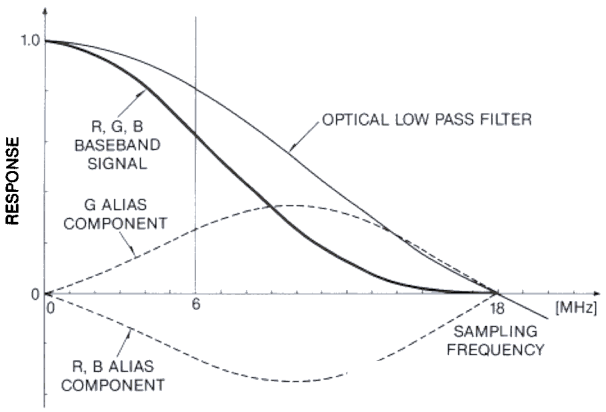
A total of 520,000 picture elements (480,000 effective picture elements) are packed into this innovative CCD sensor. This high packing density, coupled with advanced Sony sub micron manufacturing techniques which achieve highly accurate pixel spatial offset, has resulted in the outstanding horizontal resolution of 800TV lines.



Hyper HAD 1000 sensor

• Minimum Aliasing and Improved Frequency Response

The use of the Hyper HAD 1000 in the BVP-375 results in the extremely high sampling frequency of 18MHz. This high sampling frequency, in combination with an exclusive design of wideband optical low pass filter reduces aliasing to a level never achieved in conventional CCD cameras.
The frequency response of the Red, Green and Blue baseband signals is also significantly improved by these factors. The overall result is a very high depth of modulation with extremely low aliasing at frequencies up to 6MHz—the entire range used in video production.



• High Sensitivity

Despite the high packing density of the Hyper HAD 1000, the BVP-375 offers the incredibly high sensitivity of over F8.0 at 2000 lx without compromising its signal-to-noise ratio. This has only been made possible by further improving the original Sony Hyper HAD sensor technology, already well-proven in the BVP-370/270.

• Invisible Smear Level

The structure of the Hyper HAD sensor also significantly contributes to a reduction of vertical smear. The BVP-375 CCD imager combines Frame Interline Transfer techniques with all the advantages of the Hyper HAD sensor. This has resulted in the very low vertical smear level of the BVP-375, now reduced to the point where it is virtually invisible.

• Excellent Signal-to-Noise Ratio

By employing advanced electronic circuitry, the BVP-375 achieves the excellent signal-to-noise ratio of 62dB. Dark current is also considerably reduced due to the HAD sensor™ structure of the Hyper HAD sensor. This gives a corresponding reduction in fixed pattern noise, maintaining low noise characteristics in any situation.

• Superior Color Reproduction

Improvements to the CCD spectral response, together with optimum matrix correction, result in pictures with highly accurate color reproduction.

• Enhanced Vertical Definition System (EVS)

The BVP-375 incorporates the new Enhanced Vertical Definition System (EVS) which has been developed to give pictures with a major improvement in vertical resolution. In this system, the charges of a field (odd or even) are read out every 1/30 second in the same manner as in the frame integration mode, but with the electronic shutter activated at a speed of 1/60 second at an appropriate time. This allows the BVP-375 to offer a vertical resolution of 450TV lines with motion blur reduced to that of field rate integration. A new optical low pass filter has also been added to reduce the line flicker which usually occurs in frame integration mode.

Convenient System Operation

Along with the outstanding picture quality achieved by the Hyper HAD 1000 and its associated, highly advanced electronic circuitry, the BVP-375 is designed with a wide range of functions and facilities for efficient operation in both studios and the field. While offering all the operational advantages of BVP-370/270 cameras, new functions further increase the ability of the BVP-375 to meet the creative needs of its users.

• Electronic Shutter

The BVP-375 features a variable speed electronic shutter built into the CCD imager.
Shutter speeds—1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000 (seconds)

• Clear Scan™ and Extended Clear Scan

The Clear Scan and Extended Clear Scan (ECS) systems enable a precise shutter speed to be selected so that it can be matched with the computer display scanning frequency, eliminating the horizontal bands or flicker that usually occurs.
Clear Scan—60.2 to 6654Hz (260 steps)
Extended Clear Scan—30.4 to 58.3Hz (248 steps)

NOTE: For models with Serial Numbers below 10501, the BKP-376 Sony Upgrade board is required.

• Advanced Triax System

Sony's unique triax system employed by the BVP-375 system has been designed to match CCD camera performance. Utilizing wide band component (Y, R-Y, B-Y) video transmission, the highest quality images can be maintained for cable lengths up to 3000m.

• Flexible Intercom System

The BVP-375 is provided with two independent intercom channels, each of which can be connected to Production or Engineer line by switches on the camera head. When appropriate, either channels can be forced to connect to Production or Engineer line via a 9-pin remote control connector located on the CCU-370/DCU-371 rear panel. An independent program sound channel is also provided. Audio quality of the BVP-375's intercom system is further improved and either Dynamic or Carbon Mic can be used.

• Improved Mic System

Two XLR connectors of the BVP-375 associated with Audio Ch-1 and Ch-2 provide phantom power to external microphones. Gain level of each channel can be remotely controlled via the 9-pin remote connector on the rear panel of the CCU-370/DCU-371.

• Automatic Setup Function

The automatic setup of color balance (black/white balance, gamma, etc.) is provided and may be initiated from either the master setup unit or remote control panel via digital control. Thanks to the use of built-in microcomputers, optimized pictures are obtained after a very short setup period.

• Filing System

The BVP-375 is provided with the following four filing facilities to support camera system operation.

Reference file	— stores the standard setup data in the auto setup mode.
Setup file	— 8 types of setup data can be stored.
Scene file	— 64 types of color paint adjustment data can be stored.
Lens file	— 16 types of correction data to compensate for various lenses can be stored.

• Teleprompter Facility

By using the optional BKP-3700 teleprompter unit, facilities for mounting a teleprompter are provided with an extra video circuit to feed the prompter monitor via the CCU.

• Utility Power Outlet (100VA)

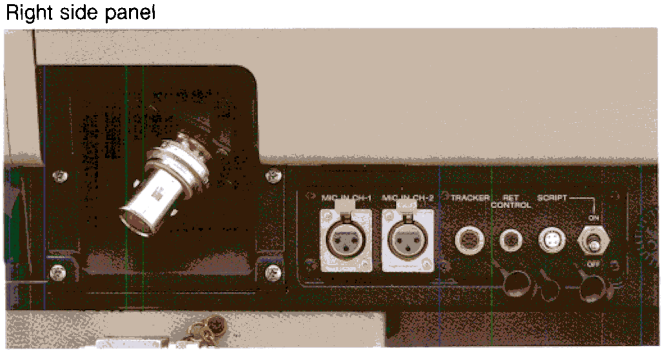
With the built-in power block, utility power is available (100VA) at the camera head through the triax cable from the CCU. This is convenient for using a prompter monitor or test equipment.

• Standalone Operation

By using the optional BKP-370 standalone unit, the BVP-375 can be used alone with a VTR.

Side Panels

Right side panel



Left side panel

• Enhanced Controls

As well as including all the controls of the BVP-370/270 series, which already provide sophisticated picture tonal adjustment, the BVP-375 adds some control innovations. Activating the Skin Tone Detail function allows the detail level for human skin tones to be suppressed to a low constant value, regardless of the detail level adjustments in other areas of the picture. The color range in which the detail level is suppressed is adjustable for PHASE, WIDTH and SATURATION.

Black gamma control is also provided on the BVP-375 for improved accuracy of color reproduction and picture matching between cameras. This function allows the slope of the linear part of the R,G and B transfer characteristic to be adjusted over a range of approximately 3.5 to 4.5 without affecting the gamma curve above the cross point. The BVP-375 also allows control of master white clip from the MSU Master Setup Unit.

As a further convenience, a viewfinder box cursor memory is incorporated allowing subjects to be framed easily and accurately. Three combinations of box H position, V position, height and width can be memorized and assigned to the three cursor buttons on the camera switch panel.

• High Performance 7-inch Viewfinders

Two high performance viewfinders are available for the BVP-375—the BVF-7700 7-inch color viewfinder, especially convenient for cases where color needs be identified by the operator, and the BVF-77, a 7-inch monochrome viewfinder with extremely high horizontal resolution. Both viewfinders are very compact in size, light in weight and economical in power consumption. Their reduced heights give comfortable camera operation on pedestals as well as bringing the viewfinder screen as close as possible to the lens axis.

A new tilt mechanism designed into these viewfinders allows a wider tilt range, as well as maintaining camera balance when the viewfinder is in its low, middle or high position. The peaking circuitry has also been enhanced to provide a wider peaking control range to suit any operation preferences. Large, very easy to see tally lamps are used for Red and Green tally indication, with the Red tallies located at both the top and bottom of the viewfinder screen. The camera tally lamp is also large and very easy to see.

The CRT scan of the BVF-77 can be switched to 80% of normal size for further comfortable camera operation when using the optional VFH-770 OB viewfinder hood.

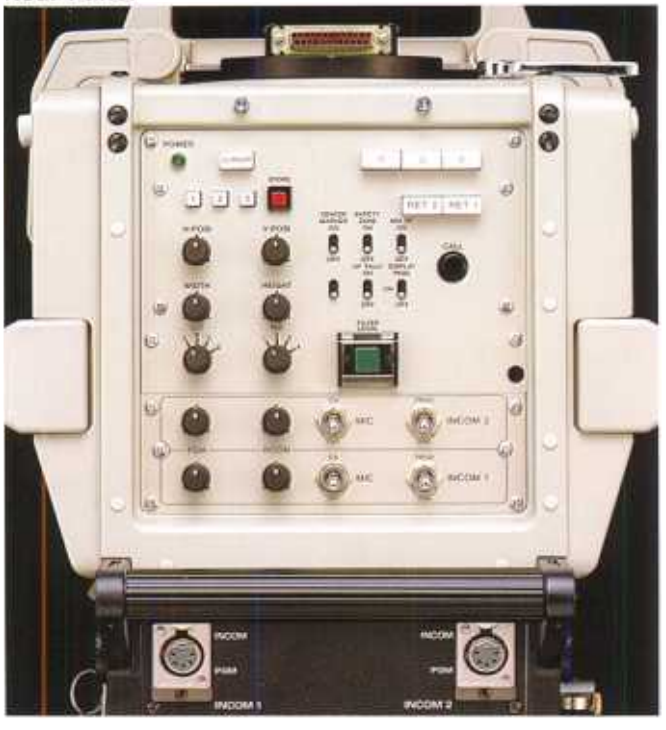
Easy Maintenance

The BVP-375 is also designed to provide maximum ease of service and maintenance. CCD sensors are stable and do not deteriorate, so an absolute minimum of routine maintenance is required and no daily realignment of any kind is necessary. Plug-in high density circuit board structure and the sophisticated self-diagnostic facility are incorporated for enhanced serviceability.

BVF-7700

BVF-77

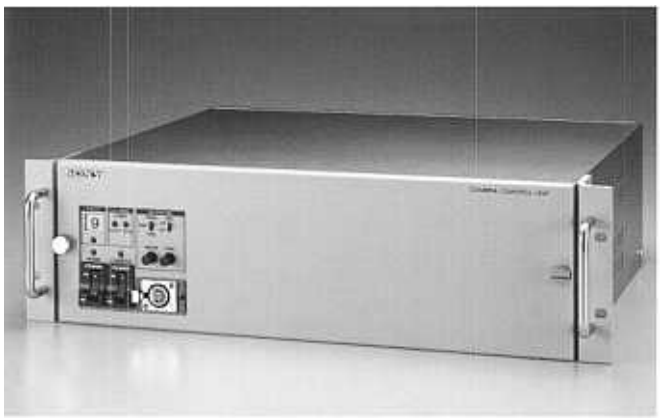
Rear Panel



TOTAL SYSTEM

The BVP-375 has been designed to share all the system components of the BVP-370 series, already well-proven for their ability to achieve maximum operational performance in CCD Studio/OB camera systems. By appropriate selection and combination of these components, a variety of systems from the very basic to the most sophisticated can be built-up to precisely meet each user's operational needs.

• CCU-370 Camera Control Unit



CCU-370

The CCU-370 Camera Control Unit provides wideband component (Y, R-Y, B-Y) video transmission via the triax cable and offers superior video/audio performance characteristics. An operating range of up to 3000 meters (2400 meters for return video) is possible by using the ϕ14.5mm triax cable. Mic audio level control and intercom switching control can be executed via each 9-pin remote connector provided on the CCU rear panel. Serviceability is also improved by the adoption of integral printed circuit boards including the triax board. This compact CCU unit is 19 inches wide, 3 rack units high, and has very low power consumption.

CCU-370 Rear Panel

• DCU-371 Digital Camera Control Unit

DCU-371

The DCU-371 has been engineered to provide component serial digital video signals as well as analog video signals, maintaining the design concept of the CCU-370. Signal interfacing with cameras is achieved by well proven analog triax system, allowing the DCU-371 to form a flexible interface between existing analog camera systems and digital production systems.

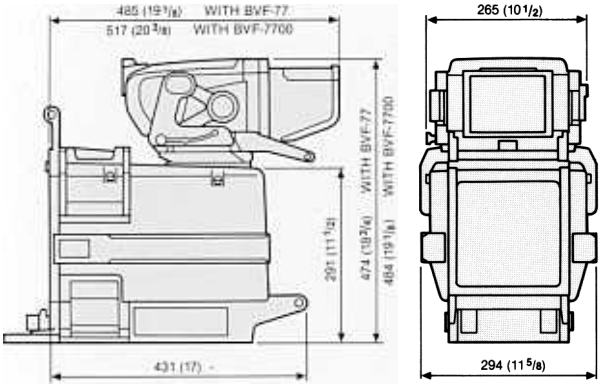
DCU-371 Rear Panel

SPECIFICATIONS

BVP-375 Camera Head

Pickup device system	3-chip 2/3-inch Frame Interline Transfer CCD
Picture elements	Total: 1038 (h) × 504 (v) Effective: 980 (h) × 494 (v)
Optical system	F1.4 prism system
Filter wheels	
Sensitivity	More than F8.0 at 2000 lx (3200K, 89.9% reflectance)
	Approx. 7.5 lx (F1.4 lens, +18dB gain)
	62dB (typical)
	800 TV lines (luminance at center)
	0.05% (all zones without lens)
	Below measurable level (without lens)
	Triax (Kings type) AC utility out: Max. 100VA Monitor out (BNC): 1.0Vp-p, 75Ω for Return/VF video Script (4-pin): DC 12V, 5W with ON/OFF switch *1Prompter out (BNC): 1.0Vp-p, 75Ω *2Encoded video out (BNC): 1.0Vp-p, 75Ω *2VTR (26-pin): CCZ-type
Input signals	Mic in (2-CH, XLR 3-pin): −60dBs, balanced *2Reference in (BNC) : VBS/BS, 1.0Vp-p, 75Ω (0.286Vp-p, sync) *2Remote (12-pin) : Simple remote control unit (RM-3601) connector *2AC in: AC 120V ±10%, 50/60Hz
Others	Tracker (10-pin): For Intercom/PGM/Tally Intercom/PGM (2-CH independent): XLR 5-pin, ENG/PRD selectable Lens connector: 36-pin
Operating temperature	−20°C to +45°C (−4°F to +113°F)
Storage temperature	−20°C to +50°C (−4°F to +122°F)
Weight (Approx.)	Camera head unit: 20 kg (44 lb 1 oz) (w/o viewfinder)

Dimensions (Approx.)



Unit: mm (inch)

*1 Optional BKP-3700 teleprompter unit is required.
*2 Available for only optional standalone camera operation using BKP-370.

CCU-370 Camera Control Unit

Input signals	Camera in: Triax (Kings type) Return video 1,2 in (BNC, loop-through): VBS, 1.0Vp-p, 75Ω Reference in (BNC, loop-through): VBS/BS, 1.0Vp-p, 75Ω (0.286Vp-p, sync) *1Prompter in (BNC, loop-through): 1.0Vp-p, 75Ω
Output signals	Encoded video out (BNC): VBS, 1.0Vp-p, 75Ω × 3 VBS/VB, 1.0Vp-p, 75Ω R/G/B video out (BNC): 0.714Vp-p, 75Ω Y/R-Y/B-Y out (BNC): Y 1.0Vp-p, 75Ω R-Y/B-Y 0.7Vp-p, 75Ω Picture monitor out (BNC): 1.0Vp-p, 75Ω Waveform monitor out (BNC): 0.714Vp-p, 75Ω (Encoder out: 1.0Vp-p, 75Ω) Monitor out (BNC): 0.714Vp-p, 75Ω (Encoder out: 1.0Vp-p, 75Ω) Sync out (BNC): 0.3Vp-p, negative, 75Ω Waveform mode out: 4-pin Mic out (XLR 3-pin): 0dBs/−20dBs balanced, 2 channels
Input/output connectors	MSU: 16-pin loop-through RCP: 16-pin REMOTE: D-sub 9-pin × 2 (for AUDIO remote control)
Communications	Intercom (RTS): XLR 3-pin loop-through (rear panel) Intercom (4 wire: optional)/Tally/PGM: 19-pin (rear panel) Intercom/PGM: XLR 5-pin (front panel)
Power requirements	AC 120V ±10%, 50/60Hz
Power consumption	Approx. 350VA with full system operation
Operating temperature	0°C to +45°C (32°F to +113°F)
Maximum cable length	*23000m with φ14.5mm triax cable (Fujikura)
	17 kg (37 lb 8 oz)
Dimensions (Approx.)	424(W) × 133(H) × 380(D)mm (16 3/4 × 5 1/4 × 15 inches)

*1 Optional BKP-3700 teleprompter unit is required.
*2 2400m for return video

DCU-371 Digital Camera Control Unit

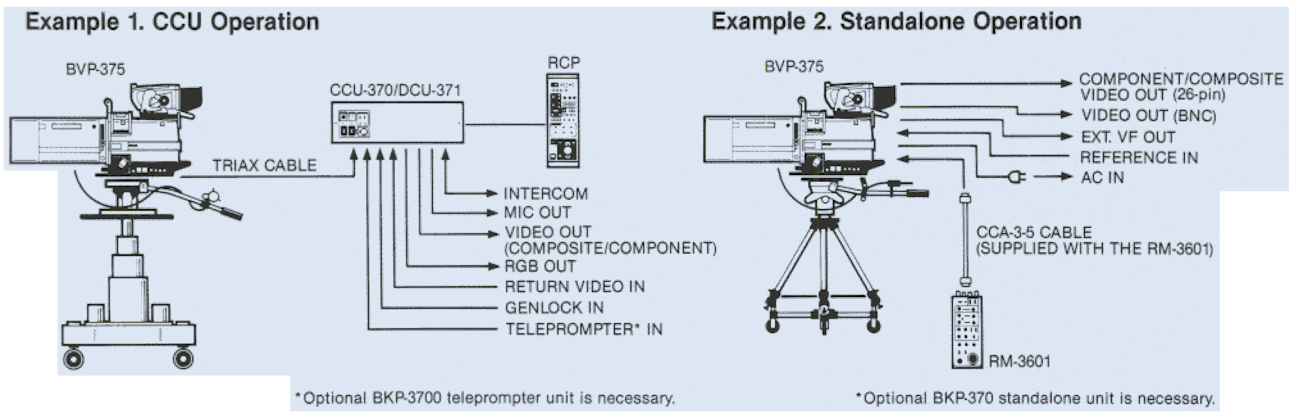
Input signals	Camera in: Triax (Kings type) Return video 1,2 in Digital (BNC): Component Serial Digital (270 Mb/s) × 2 Analog (BNC loop-through): VBS, 1.0Vp-p, 75Ω × 2 Reference in (analog) (BNC, loop-through): VBS/BS, 1.0Vp-p, 75Ω *1Prompter in (analog) (BNC, loop-through): VBS, 1.0Vp-p, 75Ω
Output signals	Digital out (BNC): Component Serial Digital (270 Mb/s) × 3 Encoded video out (analog, BNC): VBS, 1.0Vp-p, 75Ω × 2 *2R/G/B video out (analog, BNC): 0.7Vp-p, 75Ω *2Y/R-Y/B-Y video out (analog, BNC): Y: 1.0Vp-p, 75Ω R-Y/B-Y: 0.7Vp-p, 75Ω Picture monitor out (analog, BNC): 1.0Vp-p, 75Ω Waveform monitor out (analog, BNC): 0.714Vp-p, 75Ω Monitor out (analog, BNC): 0.714Vp-p, 75Ω Waveform mode out: 4-pin Mic out (analog) (XLR 3-pin): 0dBs/−20dBs balanced, 2 channels
Input/output connectors	MSU: 16-pin loop-through RCP: 16-pin REMOTE: D-sub 9-pin × 2 (for MIC GAIN and INTERCOM remote control)
Communications	Intercom (RTS): XLR 3-pin loop-through Tally/PGM: 19-pin Intercom/PGM (Front panel): XLR 5-pin
Power requirements	AC 120V ±10%, 50/60Hz
	Max 400VA
	0°C to +45°C (+32°F to +113°F)
Maximum cable length	*33000m with φ14.5mm triax cable
Weight (Approx.)	20.5 kg (45 lb 3 oz)
Dimensions	424(W) × 132(H) × 450(D)mm (16 3/4 × 5 1/4 × 17 3/4 inches)

*1 Optional BKP-3700 teleprompter unit is required.
*2 Output signal is selected between either analog RGB or Y/R-Y/B-Y.
*3 2400m for return video
0dBs=0.775Vrms

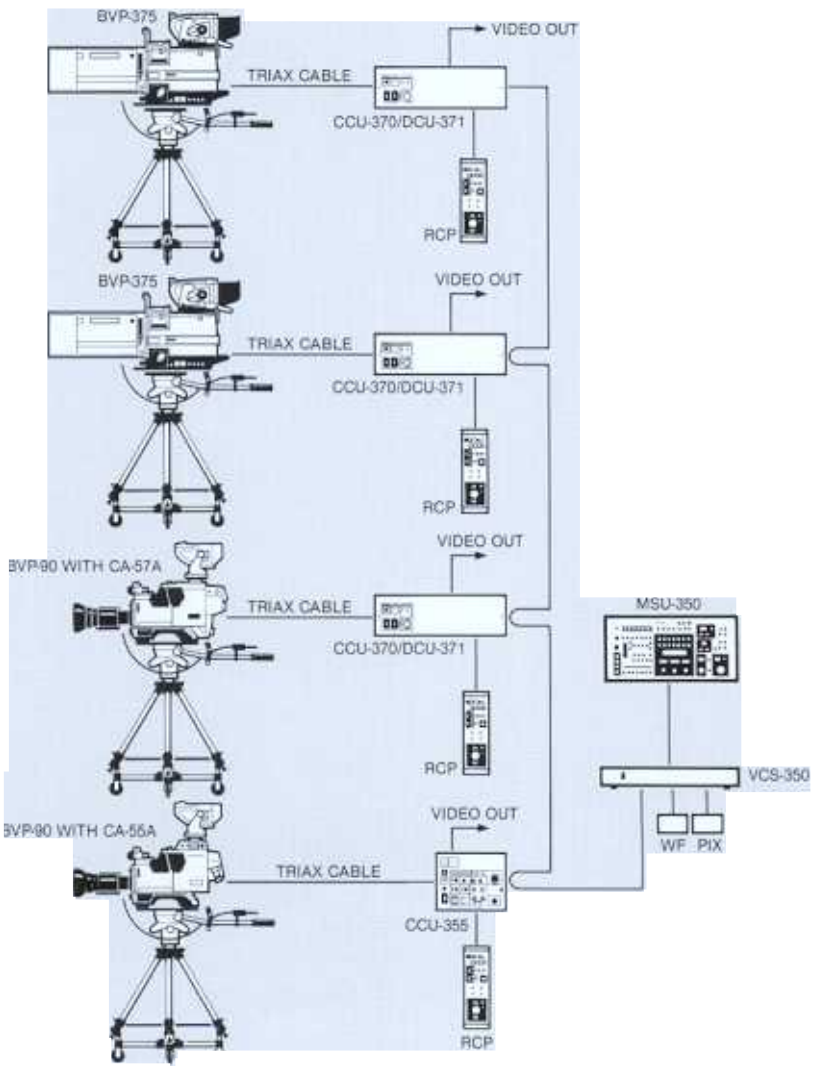
SYSTEM FLEXIBILITY

As well as making full use of the system flexibility provided by the BVP-370 series peripheral equipment, the BVP-375 can also be fully integrated into systems with the BVP-90 Betacam CCD Portable Camera.

Typical System Connection



Example 3. Multiple CCD Camera Operation



• MSU-350 Master Setup Unit

MSU-350

The MSU-350 system allows central control of color adjustment and setup of multiple cameras in a very simple manner. In addition to the CCU-370 and DCU-371, portable Sony Camera Control Units such as the CCU-350 and CCU-355 can be controlled by the MSU-350. This system consists of the MSU-350 and the VCS-350. The MSU-350 can control up to eight camera/CCU units when used with one VCS-350 unit. By adding one more VCS-350 unit, the MSU-350 can setup a total of 15 camera/CCU units.

VCS-350

VCS-350 Rear Panel

• RCP Remote Control Panel

Three types of remote video operational control panels address a wide range of production needs from the very basic to the most sophisticated. Type I (RCP-3710/3711) for simple control, Type II (RCP-3720/3721) for advanced control in general applications, and Type III (RCP-3730/3731) for special applications each have a choice of Joystick or Dial type for iris/master-black control.

RCP-3710

RCP-3720

RCP-3730

MSU-350 Master Setup Unit

Input/output connectors	CCU/VCS 16-pin loop-through AUX D-sub 37-pin INCOM/PGM 19-pin (rear panel) RTS/CLEARCOM-TW12 LINE IN XLR 3-pin LINE OUT XLR 3-pin INCOM/PGM Double jack (front panel) TALLY OUT D-sub 25-pin
Power requirements	AC 90V to 264V, 50/60Hz
Power consumption	12W
Operating temperature	0°C to 45°C (32°F to 113°F)
Weight (Approx.)	4 kg (8 lb 13 oz)
Dimensions (Approx.)	400(W) × 66(H) × 177(D)mm (15 3/4 × 2 5/8 × 7 inches)

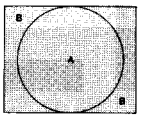
VCS-350 Video Selector

Input signals	Pix (BNC × 8): 1.0Vp-p, VBS/VS, 75Ω WF (BNC × 8): 1.0Vp-p, VBS/V, 75Ω
Output signals	Pix (BNC): 1.0Vp-p, VBS/VS, 75Ω WF (BNC): 1.0Vp-p, VBS/V, 75Ω SYNC OUT (BNC): 0.3Vp-p, 75Ω WF MODE: 4-pin
Input/output connectors	CCU/MSU: 16-pin loop-through
Power requirements	AC 90V to 264V, 50/60Hz
Power consumption	8W
Operating temperature	0°C to 45°C (32°F to 113°F)
Weight (Approx.)	4 kg (8 lb 13 oz)
Dimensions (Approx.)	424(W) × 44(H) × 350(D)mm (16 3/4 × 1 3/4 × 13 7/8 inches)

RCP-3710/3711/3720/3721/3730/3731 Remote Control Panel

Connectors	CCU connector: 16-pin Preview connector: 6-pin
Power supply	DC 30V
Power consumption	RCP-3710/3711: 3W RCP-3720/3721: 4W RCP-3730/3731: 5W
Maximum cable length	200m
Weight (Approx.)	RCP-3710: 1.7 kg (3 lb 12 oz) RCP-3711: 1.5 kg (3 lb 5 oz) RCP-3720: 2.2 kg (4 lb 14 oz) RCP-3721: 2.0 kg (4 lb 7 oz) RCP-3730: 2.5 kg (5 lb 8 oz) RCP-3731: 2.3 kg (5 lb 3 oz)

BVF-7700/77 7-inch Viewfinder

	BVF-7700 (color)	BVF-77 (monochrome)
CRT	7-inch 70-degree deflection Aperture grille pitch 0.21mm (center) 0.30mm (corner)	7-inch 90-degree deflection
Screen size	116 × 87mm	120 × 90mm
Tilting angle	+60°/−40°	+60°/−40°
Brightness	More than 154 cd/m² (45fL)	More than 500 cd/m² (146fL)
Resolution	More than 350 lines (center) More than 300 lines (corner)	800 lines (center) 600 lines (corner)
Geometric distortion	A zone: within 1.0% B zone: within 2.0%	Within 1.0%
Convergence	A zone: less than 0.2mm B zone: less than 0.3mm 	—
Linearity	Within 1.5% in Zone A	Within 3%
Stability of raster size	Within 2%	Within 2%
Controls	Contrast/Brightness/Peaking Peaking SW/Degauss SW Power SW	Contrast/Brightness/Peaking Peaking SW/Power SW Scan size SW
Aperture correction	0 to 20dB	0 to 15dB
Color temperature	6500K + 8MPCD	—
Power requirements	DC 10.5 to 17.0V DC 12.0V (typical)	DC 10.5 to 17.0V DC 12.0V (typical)
Power consumption	40W	23W
Weight (Approx.)	6.2 kg (13 lb 11 oz)	5.0 kg (11 lb)
Dimensions (Approx.)	265(W) × 188(H) × 359(D)mm (10 1/2 × 7 1/2 × 14 1/4 inches)	265(W) × 178(H) × 321(D)mm (10 1/2 × 7 1/8 × 12 3/4 inches)

Design and specifications subject to change without notice.

Distributed by

BC-00371-A
MK2596HP9304P1-005.75

Sony Corporation