

Broadcast color monitor

BVM-1310/1410P/1410PM

(NTSC)

(PAL)

(PAL-M)



Sony
Broadcast

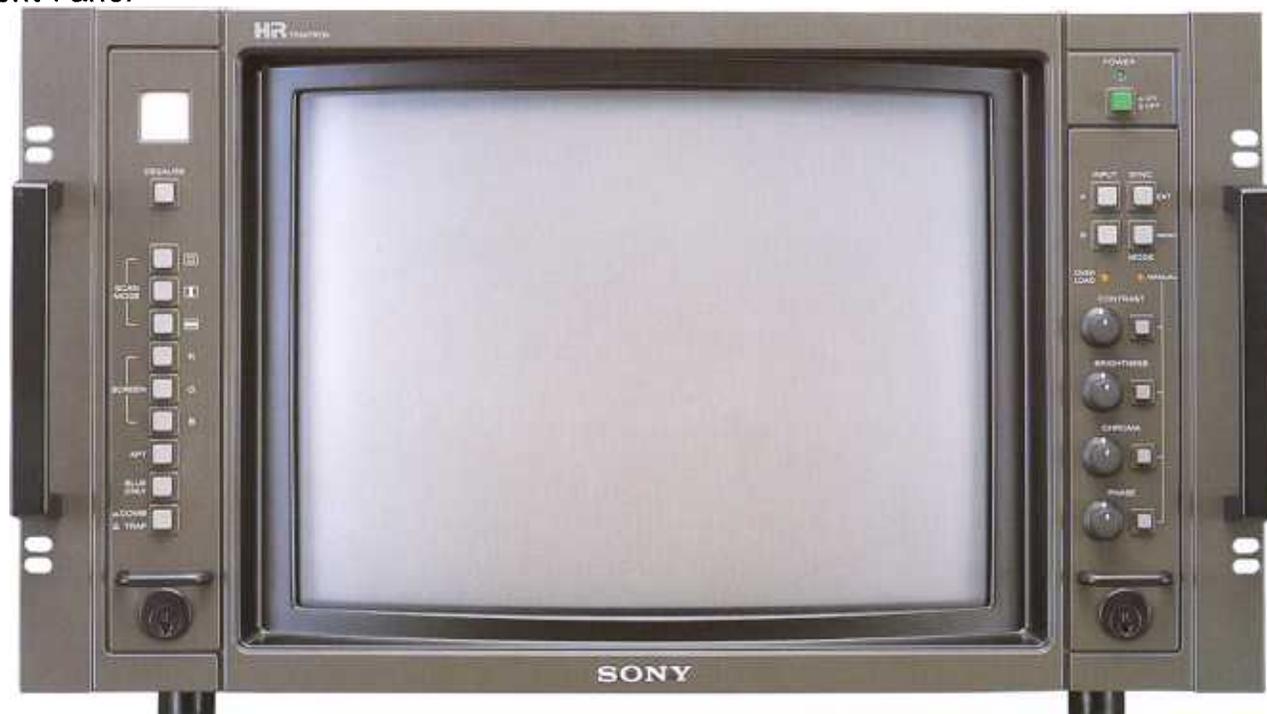
SONY

In recognizing a wide diversity of viewing requirements within today's Broadcast and production environments, Sony has systematically developed a broad and flexible range of color monitors. Each are tailored with specific performance capabilities and have features to address optimally specific applications. The BVM-1310/1410P/1410PM High Performance Color Monitor is designed to make precise evaluations of video signals. With the adoption of the Super Fine Pitch, One-gun 3-beam Aperture Grille CRT and advanced circuit technology, the BVM-1310/1410P/1410PM realizes 700 TV lines of center resolution and the stabilization of color temperature. By using optional plug-in type decoder boards, a maximum of 3 out of the 4 TV standard systems (NTSC, PAL, SECAM, PAL-M) can be used in any required combination. And now, with the optional computerized Auto Setup Kit, monitor setup, which requires so much time and skill to accomplish, can be performed easily and accurately within a mere 40 seconds. The BVM-Series monitors are the top of broadcast quality monitors for critical video evaluation.

Features

- Auto Setup capability (optional BKM-1450, for NTSC, PAL, SECAM, RGB, Component)
- By using optional decoder boards (plug-in type), a maximum of 3 TV standard systems can be selected in the drawer.
- Stabilized color temperature is obtained by employing a newly developed beam control circuit.
- A unique picture setup switch facilities as an adjustment for accurate incoming video level alignment.
- Up to 6dB of aperture correction at 4.5MHz and 6.5MHz selectable.
- Pulse Cross function is provided to check the horizontal and vertical syncs simultaneously.
- Built-in cross hatch and white signal generator (100 IRE) for easy monitor alignment.
- Component (Y, R-Y, B-Y) and RGB input facilities are available.
- Optional component (Y, R-Y, B-Y) and RGB output facilities are available with the BKM-1440.
- Split screen (vertical only) for precise picture confirmation.
- VITC display facility (optional BKM-1460)
- Safe area display facility (with the optional BKM-1470)
- With the optional BKM-1480, black level signal generator is available for easy and precise adjustment of black level setting of monitor.
- Blue only mode with B/W display to evaluate noise component precisely.
- Two lockable pull-out drawers give access to convergence, color balance, level adjustment and other controls.
- Optional Comb Filter for NTSC (BKM-1411 or BKM-1412, BKM-1412 is supplied with the BVM-1310)
- Optional Comb Filter for PAL (with BKM-1422)
- Optional Digital 4:2:2 Input Adaptor Kit BKM-2085 and D-2 Serial Input Adaptor Kit BKM-2090 available.
- Auto/Manual Degaussing.
- Provides US and EBU standard phosphors to meet customer requirements.
- The AFC switch provides 3 modes (FAST/NORMAL/SLOW).
- Over Drive Protection circuit protects against picture tube damage.
- Super Fine Pitch CRT assures a center resolution of 700 TV lines at 40 fL.
- 19-inch rack mountable with the optional BKM-1400
- Raster size stability within 1% from 0 to 40 fL.
- Precise convergence; convergence errors are less than 0.3mm at center and 0.6mm at edge of area.

Front Panel



BVM-1310/1410P/1410PM

(NTSC) (PAL) (PAL-M)

Specifications

1. CRT PERFORMANCE

- 1.1 CRT Type: Super Fine Pitch In Line Stripe Grille
Aperture Grille (AG) pitch; 0.25mm
Center resolution; 700 TV lines
- 1.2 Screen Size: Diagonal; 33.08cm (13.02")
Width; 26.72cm (10.51")
Height; 20.03cm (7.88")

- 1.3 Chromaticity Coordinates:
US Standard phosphors (NTSC only)
BVM-1310

	x	y	u	v
RED	0.630	0.340	0.433	0.351
GREEN	0.310	0.595	0.130	0.375
BLUE	0.155	0.070	0.176	0.119

Tolerance = ±0.005

- EBU Standard phosphors
BVM-1410P/1410PM

	x	y	u	v
RED	0.64	0.33	0.451	0.349
GREEN	0.29	0.60	0.121	0.374
BLUE	0.15	0.06	0.175	0.105

Tolerance = ±0.005

1.4 Color Temperature:

- PRESET control**—Factory adjusted for 6500K white. When using an optional Auto Setup Kit, 4 different color temperature can be adjusted automatically.
- MANUAL control** is also available which allows alternative setting of color temperature.

1.5 Color Temperature Stability:

- Differential variations between, Red, Green, and Blue screens are less than 1% over 500 hour period. This high level of stability is guaranteed by the novel Beam Feedback Control system employed to stabilize CRT black level.

1.6 Preset Brightness Range: From below cut off to 1.5 fL

1.7 Maximum Brightness: More than 80 fL

1.8 Preset Contrast: 40 fL (at 100% white)

1.9 CRT Protection: High voltage is automatically switched off if either scans fail. A warning lamp on the front panel lights if the CRT is driven beyond preset limits.

1.10 Degaussing: Manual push button and automatic

1.11 Warm Up Period: 30 minutes to meet specifications.

2. RASTER and PICTURE PERFORMANCE

- 2.1 Normal Scan:
4×3 Aspect Ratio, Blanked raster < +5%, Raster size has internal adjustment
- 2.2 Underscan:
4×3 Aspect Ratio Approx. -3%, Picture and blanking boundaries displayed, Underscanned raster has additional internal adjustments.
- 2.3 Stability of Raster Size:
1% of picture height for a 0 to 100% APL change when 100% peak white set to 40 fL brightness.
- 2.4 Linearity of center H & V lines:
0.5% of the picture height
- 2.5 Geometry (all over screen):
1% of the picture height

- 2.6 Convergence:
0.3mm within circle centered on the screen and with a diameter equal to the vertical height.
0.6mm at any other point

2.7 High Voltage: 25kV typical

- 2.8 High Voltage Regulation:
When set at a beam current of 150μA there shall be less than ±0.5% change when the brightness is varied from 0 to 40 fL.

- 2.9 Hum Fluctuation:
Periodic movement or jitter of the raster is less than 0.2mm (0.07%) for any power hum interference.

3. INPUT FACILITIES

3.1 Video Inputs:

INPUT SIGNAL	SIGNAL LEVEL	INPUT CONNECTOR TYPE
Video A	Composite 1.0Vp-p ±6dB Non-composite 0.7Vp-p ±6dB	High impedance loop through, two BNCs
Video B	Composite 1.0Vp-p ±6dB Non-composite 0.7Vp-p ±6dB	High impedance loop through, two BNCs
Red/RY	Non-composite 0.7Vp-p ±6dB	High impedance loop through two BNCs (each)
Green/Y/Test	Composite 1.0Vp-p ±6dB Non-composite 0.7Vp-p ±6dB	
Blue/BY	Non-composite 0.7Vp-p ±6dB	
Sync	Negative going 0.3-8.0Vp-p	High impedance loop through, two BNCs

3.2 Power Inputs:

- 3-pin power plug
Voltage selector AC 100/120 & 220/240V
±10%, 142W (typical), 160W (max.)
Line frequency 48 to 66Hz

3.3 Control Inputs:

- Tally and Remote Control via 10-pin connector

3.4 Input Technical Specifications:

- The following specs apply to all video inputs

3.4.1 Return Loss:

- More than 46dB, up to 7MHz

3.4.2 Crosstalk (between inputs):

- More than 50dB, up to 7MHz

3.4.3 Hum Suppression:

- 50dB down with up to 4V RMS power hum when in floating ground mode.

4. OUTPUT FACILITIES

Output	Signal	Signal Level	Level if terminated	Connector Type
RY, BY Vector out (standard)	RY	PAL/NTSC: 0.68Vp-p for 75% Color Bars SECAM: 0.544Vp-p	—	BNC
	BY	PAL/NTSC: 0.5Vp-p for 75% Color Bars SECAM: 0.4Vp-p	—	BNC
*Component out (option)	Red/RY	1.4Vp-p	0.7Vp-p	BNC
	Green/Y	2.0Vp-p (with sync)	1.0Vp-p	
	Blue/BY	1.4Vp-p	0.7Vp-p	

*Using the optional BKM-1440, component out is available.

5. RGB PERFORMANCE

The following specs are measured from the RGB inputs to the input of the final stage CRT video drive amplifier. The specs apply to both 625 and 525 systems and therefore all waveform specs are quoted with 625 test waveforms:

5.1 Frequency Response:

- 100Hz to 8MHz ±1.0dB

5.2 Linear Waveform Distortion:

- 625 Line T-Step
Line-time waveform distortion; <1%
Short-time waveform distortion; <1%
50Hz squarewave
Field-time waveform distortion; <1%
2T pulse response
2T Pulse to Bar Ratio; < ±0.5% K rating
2T Pulse base line; < ±1% K rating

5.3 Non Linear Distortion:

- Line-time non linearity (measured with 5-rise stairsteps); <3%
Dynamic gain (for all APLs); <3%

6. DECODER PERFORMANCE (NTSC/PAL)

6.1 Luminance:

NTSC performance

	WITHOUT NOTCH FILTER	WITH NOTCH FILTER	WITH COMB FILTER
Frequency response	±1.0dB 100Hz to 8MHz	-30dB at 3.58MHz	±1.5dB 100Hz to 8MHz
Linear waveform distortion			
2T pulse to Bar (525 lines)	< ±1% K	< ±2% K	< ±1% K
2T pulse to baseline (525 lines)	< ±1% K	< ±2% K	< ±1% K
525 T-step			
Line time distortion	<1%	<1%	<1%
Short time distortion	<1%	<1%	<1%
60Hz squarewave distortion	<1%	<1%	<1%

PAL performance

	WITHOUT NOTCH FILTER	WITH NOTCH FILTER	WITH COMB FILTER*
Frequency response	±1.0dB 100Hz to 8MHz	-30dB at 4.43MHz	±1.0dB 100Hz to 8MHz
Linear waveform distortion			
2T pulse to Bar (625 lines)	< ±1% K	< ±2% K	< ±1% K
2T pulse to baseline (625 lines)	< ±1% K	< ±2% K	< ±1% K
625 T-step			
Line time distortion	<1%	<1%	<1%
Short time distortion	<1%	<1%	<1%
50Hz squarewave distortion	<1%	<1%	<1%

*Using the optional BKM-1422, PAL comb filter is available.

6.1.1 Non linear distortion:

- Line time non linearity; <1%
Dynamic gain (for all APLs); <1%

6.2 Aperture Correction:

This can be internally selected to provide one of two modes of operation:
MODE 1 provides continuously adjustable (control on front panel) control of frequency response with up to 6dB boost at 6.5MHz. This control can be employed to compensate for the aperture loss of the CRT.
MODE 2 provides continuously adjustable control of frequency response, with up to 6dB boost at 4.5MHz. This control can be employed

for subjective enhancement of the displayed picture.

6.3 Chrominance/Luminance Parameters: NTSC performance

	WITH COMB FILTER	WITH NOTCH FILTER
Chrominance suppression in luminance	> 24dB at 3.58MHz	> 30dB at 3.58MHz
Luminance suppression in chrominance	> 20dB at 3.58MHz	—
Chrominance/Luminance delay	< 30nS	< 30nS

PAL performance

	WITH COMB FILTER*	WITH NOTCH FILTER
Chrominance suppression in luminance	> 30dB at 4.43MHz	> 30dB at 4.43MHz
Luminance suppression in chrominance	> 20dB at 4.43MHz	—
Chrominance/Luminance delay	< 30nsec	< 30nsec

6.4 Chrominance:

Demodulator axes
R-Y and B-Y (90° ±1° relative to each other)

Chrominance bandpass
1.3MHz equiband

*Hue regulation

Calibrated position; ±1°
Control range;

±15° (NTSC), ±10° (PAL/PAL-M)

*Saturation regulation

Calibrated position; ±3%
Variable range; ±6dB

*Chrominance can be adjusted automatically using the optional Auto Setup Kit.

6.5 Oscillator Performance:

Phase error

< 2° for burst frequency change of ±10Hz
< 2° for burst level change ±6dB
< 2° for ambient temperature change of 10°C
< 2° if time relation of sync and burst moves anywhere within allowable FCC or CCIR regulatory range

Subcarrier locking range

±200Hz (NTSC/PAL-M)
±300Hz (PAL)

SECAM PERFORMANCE

7.1 Luminance Channel:

Differential gain

Within 1% for a luminance from zero to 40 fL

Frequency response

Monochrome mode;
100Hz to 8MHz ±1dB
(aperture correction at zero)

Color mode (with notch filter);

Chrominance Filter removes frequencies in 4.25MHz and 4.406MHz
(-3dB at 2.7MHz)

7.2 Chrominance Channel:

High frequency de-emphasis (Bell filter)

Error; 3.9MHz to 4.75MHz ±0.5dB

Drift; within ±20kHz at 4.286MHz

Limiting ratio

Greater than 30dB

Linearity of the demodulator

Less than 3% at ±350kHz

Demodulator center frequency stability

Within ±3.0kHz

Color range

Preset at zero dB
More than ±6dB

7.3 Chrominance/Luminance:

Rise time RY/BY

500 nsec at 25% modulation

Time error

Less than 40 nsec

Gain error

Less than 5%

Aperture correction

Adjustable continuously up to 6dB boost at 4.5MHz, 6.5MHz (selectable)

DC restoration

Back porch type

Back porch level;

Within 1% of peak luminance 10% to 90% APL

R-Y/B-Y Crosstalk > 50dB

8. SYNCHRONIZATION

8.1 Sync Input Return Loss:

> 46dB up to 7MHz

8.2 Vertical Hold:

Digital countdown systems

Free running frequency of oscillator;

Automatic { Mode 1; 42Hz to 50Hz

Mode 2; 50Hz to 60Hz

Stability of free running frequency; within 1Hz

8.3 Horizontal Hold:

Free running frequency of oscillator

15.75kHz ±1kHz with H-hold control or

15.625kHz ±1kHz with H-hold control

Horizontal oscillator locking range

Pull in; ±500Hz

Holding; ±500Hz

Free running stability

within ±100Hz

AFC Time Constant

Three horizontal time constants are provided
(0.5ms, 2.0ms, and 7.0ms)

8.4 Sync Stability:

On INTERNAL sync the stability of the raster shall be preserved under the following conditions:

Video Input Level; ±6dB about nominal

Picture level changes

+3dB to -40dB and sync level

changes -6dB.

Line-sync white-noise immunity; 26dB

Field-sync white-noise immunity; 26dB

8.5 AFC:

Switchable (FAST/NORMAL/SLOW)

Slow AFC displays timing errors of incoming sync with a selected horizontal Time Constant of 7.0ms.

Fast AFC largely corrects for incoming timing errors with a selected horizontal time constant of 0.5ms.

Normal AFC is set at 2.0ms

8.6 Blanking Intervals:

Horizontal retrace time; 10µs

Horizontal blanking; Adjustable

Vertical retrace time; < 0.6ms

Vertical blanking; < 19H for normal scan

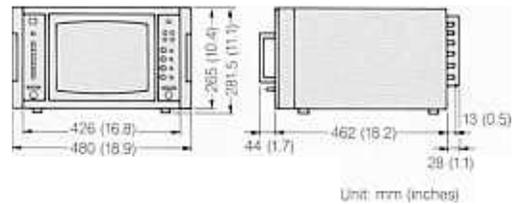
< 15H for under scan

Interlace; Better than 45/55

9. PHYSICAL CHARACTERISTICS

9.1 Weight: Approx. 32kg (68.3 lb)

9.2 Dimensions:



9.3 Environmental:

Operating temperature range; 0°C to +40°C

Optimum temperature range; 20°C to +30°C

Humidity; 0 to 90% non-condensing

Altitude; 3,050m (10,000 feet)

9.4 X-ray Radiation:

Complies with DHHS rules 21 CFR

Subchapter J sec 1020.10

PTB (for West Germany)

DNHW (for Canada)

9.5 Electro Magnetic Compatibility:

Complies with FCC rules part 15 (Computing Device Class A)

10. SUPPLIED ACCESSORIES

BKM-1410 NTSC Decoder Board (BVM-1310)

BKM-1412 NTSC Comb Filter Adaptor (BVM-1310)

BKM-1420 PAL Decoder Board (BVM-1410P)

BKM-1421 PAL-M Decoder Board (BVM-1410PM)

AC power cord

Extension board

10-pin connector

Tally number plates

Operation and maintenance manual

* Design and specifications subject to change without notice.

Accessory Chart

	BVM-1310	BVM-1410P	BVM-1410PM
BKM-1400 Rack Mount Kit (slide rails, screws)	Optional	Optional	Optional
BKM-1410 NTSC Decoder	Supplied	Optional	Optional
BKM-1411 NTSC Comb Filter	Optional	Optional	Optional
BKM-1412 NTSC Comb Filter	Supplied	Optional	Optional
BKM-1420 PAL Decoder	Optional	Supplied	Optional
BKM-1421 PAL-M Decoder	Optional	Optional	Supplied
BKM-1422 PAL Comb Filter	Optional	Optional	Optional
BKM-1430 SECAM Decoder	Optional	Optional	Optional
BKM-1440 RGB/Component Adaptor	Optional	Optional	Optional
BKM-1450 Auto Setup Adaptor	Optional	Optional	Optional
BKM-1460 VITC Adaptor	Optional	Optional	Optional
BKM-1470 Safe Area Display Board	Optional	Optional	Optional
BKM-1480 Black Level Signal Generator	Optional	Optional	Optional
BKM-2053 Probe for Auto Setup	Optional	Optional	Optional
BKM-2085 Digital 4:2:2 Input Adaptor Kit	Optional	Optional	Optional
BKM-2090 D-2 Serial Input Adaptor Kit	Optional	Optional	Optional

Note on Board Installation

B1 through B5 compartments accept the optional boards as follows:

Board name (Function)		Compartment name					
		B5	B4	B3	B2	B1	BA
BC	BKM-1410 (NTSC Decoder)	○	○	○	○	○	×
BB	BKM-1411 (NTSC Comb Filter)	×	○	○	○	○	×
BT	BKM-1412 (NTSC Comb Filter)	○	○	○	○	○	×
BD	BKM-1420 (PAL Decoder)*1	○	○	○	○	○	×
BM	BKM-1421 (PAL-M Decoder)*1	○	○	○	○	○	×
BT (PAL)	BKM-1422 (PAL Comb Filter)	○	○	○	○	○	×
BE	BKM-1430 (SECAM Decoder)	○	○	○	○	○	×
BF	BKM-1440 (RGB/Component) (output)*7	×	×	○	×	×	×
BN/BP	BKM-1450 (Auto Setup Adaptor)*2	○	○	×	×	×	×
BL	BKM-1460 (VITC)*3	×	×	×	○	×	×
BQ	BKM-1470 (Safe Area Display)*3	×	×	×	○	×	×
BS	BKM-1480 (Black Level Signal Generator)	○	○	○	○	○	×
BV	BKM-2085** *6 *7 (Digital 4:2:2 Input Adaptor Kit)	×	×	×	×	○	×
BA3		×	×	×	×	×	○
BU	BKM-2090** *6 *7 (D-2 Serial Input Adaptor Kit)	×	×	×	×	○	×
BA3		×	×	×	×	×	○

○ : can be installed × : cannot be installed

*1BKM-1420 and BKM-1421 cannot be installed simultaneously.

*2BKM-1450 occupies two compartments, B4 and B5.

*3BKM-1460 and BKM-1470 cannot be installed simultaneously.

*4BKM-2085 consists of two boards, BV and BA3.

Make sure to replace the factory-set BA board with the BA3 board.

*5BKM-2090 consists of two boards, BU and BA3.

Make sure to replace the factory-set BA board with the BA3 board.

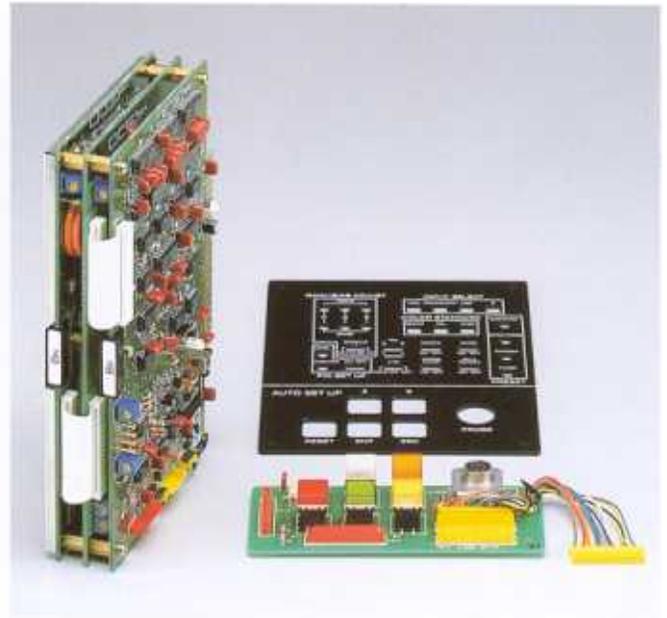
*6BKM-2085 and BKM-2090 cannot be installed simultaneously.

*7When BKM-2080 or BKM-2090 is installed, BKM-1440 cannot be used.

Optional Board and Accessory



BKM-2053 (Probe for Auto Setup)



BKM-1450 (Auto Setup Adaptor)

Side Panel



*Photo shows the BVM-1310

Monitor Auto Setup (with the BKM-1450 and BKM-2053)

With the optional Auto Setup Kit, automatic monitor setup is now available.

The main features of the Monitor Auto Setup Kit are:

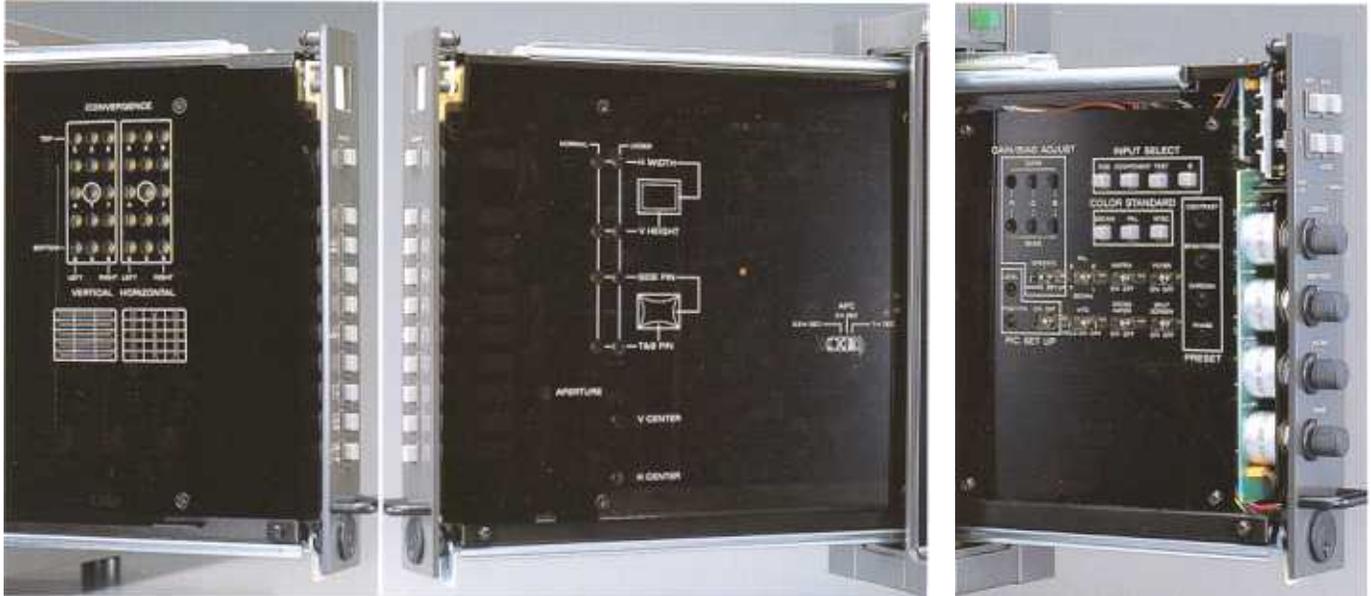
- Quick and precise monitor setup of BVM-1310/1410P monitors within 40 seconds (30 seconds for color temperature and 10 seconds for chroma adjustments)
- Several adjustment parameters including: 1. White balance (6500K and other color temperatures in memory); 2. Black level and setting; 3. Chroma gain and phase (hue)
- Compatible with NTSC/PAL/SECAM/RGB/Component
- Using the auto setup adaptor (BKM-1450) and probe (BKM-2053), the color analyzer function is provided. It compares the white data read from a monitor with the one stored in the probe, and the ratio of R, G, and B are each digitally displayed on the monitor screen. By referring to this ratio, the white balance of a monitor which is not equipped with auto setup function can be adjusted.
- Can match one monitor to another when the monitors are equipped with the same type phosphors.
- Prompter for operational instructions and error messages
- Auto or manual modes can be selected.

Specifications

GENERAL • Type: Built-in microprocessor automatically controls white balance, black level,

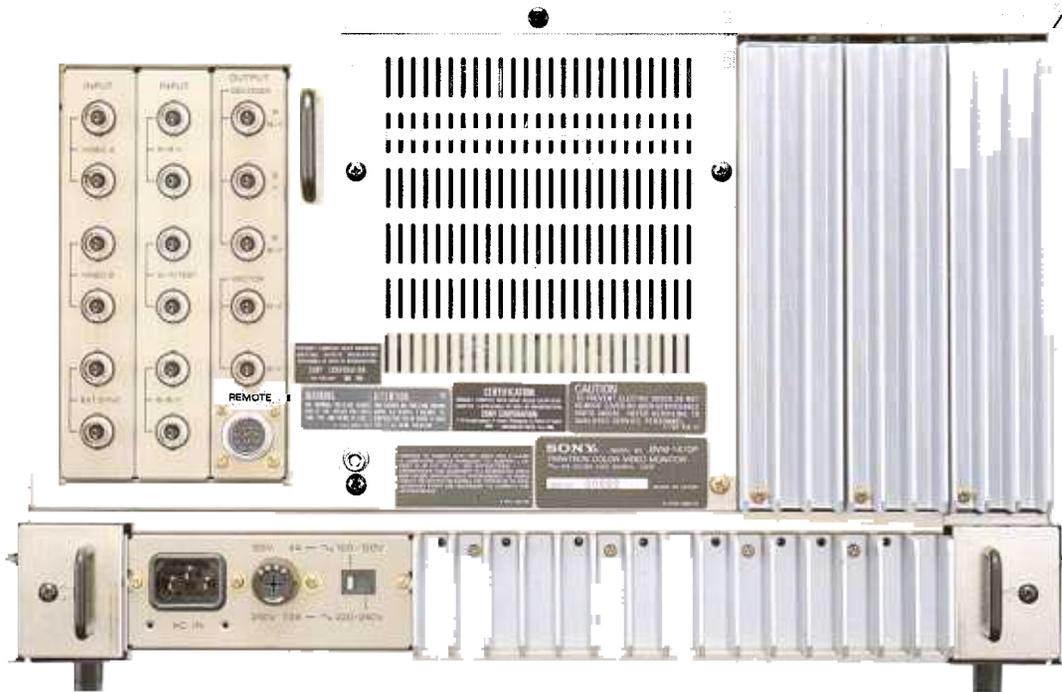
chroma gain, and chroma phase • Temperature: Operating: 0 to 40°C (32 to 104°F) / Storage: -10 to 60°C (14 to 140°F) • Power requirements: supplied from the monitor • Auxiliary components: No extra component is required outside the monitor except probe
AUTO WHITE BALANCE AND BLACK LEVEL • Standard white: Maximum 4 standard-whites/reference colors can be memorized; MEMORY 1 D65: Factory adjusted to Sony American Standard phosphors or EBU phosphors; Memory 2 through 4: Adjustable for any standard-white which the user wishes to match to 50 nits minimum (15 fL) / 200 nits maximum (60 fL) white balance and black level • Memory: Memory type: Non-volatile memory / Memory life: More than 100 years • Range of brightness at high light (100 IRE): 50 nits minimum (15 fL) / 200 nits maximum (60 fL) • Maximum brightness will be limited by applied monitors
 • Short-term repeatability: Chromaticity is less than ±0.002 in the x, y CIE chromaticity coordinates / Luminance is less than 5% • Color temperature setup time typical: Within 30 seconds • Ambient light: The probe almost completely reduces the effects of incident ambient light when fixed to the CRT.
AUTO CHROMA GAIN AND PHASE SETUP • Setting errors: less than 1% typical (Chroma gain error) / less than 1° (Chroma phase error) • Depending on input signal • Setup time: Within 10 seconds • Input signals: Full Field Bars or Split Bars (EIA or SMPTE) for NTSC, SECAM/EBU bars or 100% bars for PAL / 100% bars or 75% bars for RGB, component. • Setting errors depends on the accuracy of input signal.

Adjustments in the Drawer



Rear Panel

*Photo shows the BVM-1410P



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