SONY

CINE ALTA™

Sony Trinitron Color Video Monitor

# BVM-F24U

# CineAlta™ — Liberating Movie Makers

CineAlta – a name we proudly introduce to symbolize the bond between cinematography and Digital High Definition imaging. It distinguishes a Sony family of products and systems that offer new creativity in the production, post production and exchange of motion pictures. It brings together the quality and universality of 24-frame cinematography with the real-time capability, efficiency and flexibility of Digital High Definition technology. It stimulates the convergence of Motion Picture Film and Digital High Definition production on a global basis.

CineAlta products, delivering cinema-quality pictures at selectable frame-rates, are simplifying International Programme Exchange by minimizing the need for standards conversion. Equally, they are opening up new possibilities for international co-production. Movie making has been liberated with the creative empowerment of the cinematographer. It is facilitated by real-time HD image evaluation on-set, instant replay of a full-color high-resolution digital “take”, real-time image optimization while shooting, a 50-minute shooting load and, most importantly, by the significant cost-benefits associated with this digital medium.

CineAlta products also ensure a seamless bridge between 24-frame film originals and a final 24P digital master. A frame of film now has a one-to-one correspondence with a progressive HD frame. The CineAlta environment readily interfaces with the computer graphics world, liberating post production. The direct color conversion of progressive 24P masters to film, and to a multiplicity of international digital HDTV and SDTV distribution formats, are the final liberation.

# New Horizons in Production

Digital cinema production requires a new generation of high-performance monitors -- and the Sony BVM-F24U (viewable area, measured diagonally) High Definition Monitor meets the challenge. Specially designed as part of Sony's CineAlta™ family of high-definition electronic cinema products, this monitor employs a 16:9 aspect ratio Flat Surface HR Trinitron® CRT to support the production demands of digital cinema. These demands include digital cinematography, mastering of HD film transfers, post-production for electronic cinema, high level animation, and broadcast network studio production of prime time television programming.

Sony's new monitor supports a wide variety of signal formats in addition to the 1080/24P format -- including 1080/25P, 1080/30P, 1080/50I, 1080/60I, 1080/50P, 1080/60P and 720/60P, to suit emerging multi-format HD needs. The flexible input capability accepts both analog RGB and HD-SDI signals.

A unique advantage of this monitor is that low vertical frequency progressive HD-SDI signals are repeatedly scanned at either two or three times their original frame rates, effectively eliminating the flicker effect visible with conventional raster designs.

Achieved by the use of a built-in rate converter along with high scanning frequency of 54 kHz to 91.1 kHz (horizontal) and 48 Hz to 85 Hz (vertical), this advantage will be especially useful to permit 24P-created material to be viewed as either 48-frame or 72-frame progressive display.

Another important feature of this HD monitor is the dual link HD-SDI mode, that allows digital signal inputs such as 1080/24P (4:4:4), 1080/60I (4:4:4) or 1080/60P (4:2:2) for applications where the highest possible HD quality is required*.

In addition to it's versatility, the new monitor has inherited the outstanding features and functions already proven in the Sony BVM-D Series: digital uniformity correction, digital convergence, beam landing correction, and automatic presets for white balance, contrast and brightness.

Uncompromising performance and flexibility make it the perfect choice for high quality HD monitoring.

*Technically correct nomenclatures of 4:4:4 and 4:2:2 are 22:22:22 and 22:11:11, respectively.

# Signal Input Capabilities

## Multi-format Signal Support

The BVM-F24U monitor accepts a wide variety of HD signal formats due to its high scanning frequencies of 54 kHz to 91.1 kHz (horizontal) and 48 Hz to 85 Hz (vertical), as well as a built-in frame rate converter.
It accepts signal formats that are commonly used in digital cinema production as well as those required to meet various emerging multi-format HD needs for today and tomorrow.

**<Digital Cinema Production/Post Production for Electronic Cinema >**
1080/24P, 1080/23.98P, 1080/24PsF* and 1080/23.98PsF*, 1080/25P

**<Broadcast Network Studios Production/High Level Animation>**
1080/30P, 1080/29.97P, 1080/30PsF*, 1080/29.97PsF*, 1080/50I, 1080/60I
720/60P
1080/50P, 1080/60P

*PsF: Progressive segmented frame

## SXGA Format Signal Support

The monitor accepts the following SXGA signals from computers used for graphics work, where precise image reproduction is required.

| Signal format | Horizontal frequency (kHz) | Frame rate (Hz) |
|---|---|---|
| 1280 x 1024/75 (VESA STD) | 80.0 | 75 |
| 1280 x 1024/85 (VESA STD) | 91.1 | 85 |

## HD-SDI Input Frame Rate Converter

The built-in rate converter stores frames of the input HD-SDI signal in buffer memory and allows selection of double or triple the original frame rate. This allows frames of a progressive scan signal to be repeatedly scanned at a high scanning rate, eliminating flicker effect for accurate picture evaluation.
The following describes how each progressive scan signal is converted and displayed on the CRT..

| Input signal | Internal rate conversion | Display frame rate |
|---|---|---|
| 1080/24P/23.98P | x2, x3 | 1080/48P/47.96P, 1080/72P/71.94P |
| 1080/25P | x2, x3 | 1080/50P, 1080/75P |
| 1080/24PsF/23.98PsF | x2, x3 | 1080/48P/47.96P, 1080/72P/71.94P |
| 1080/25PsF | x2, x3 | 1080/50P, 1080/75P |
| 1080/30P/29.97P, | x2 | 1080/60P/59.94P |
| 1080/30PsF/29.97PsF | x2 | 1080/60P/59.94P |

## Dual Link HD-SDI

1080/24P (4:4:4), 1080/60I (4:4:4) and 1080/60P (4:2:2) signal inputs are available in dual link HD-SDI mode, which uses two HD-SDI connections. The 4:4:4 signal can be displayed as either RGB or Y/Pb/Pr format by setting a simple menu adjustment.


# Display Capabilities

## 16:9 Aspect Ratio Flat Surface HR Trinitron CRT

Incorporating Sony's latest 16:9 aspect ratio Flat Surface HR Trinitron CRT, the BVM-F24U achieves a high resolution of 1000 TV lines. Its outstanding color uniformity and reproduction offer superb picture performance. The BVM-F24U is equipped with a SMPTE-C standard phosphor CRT.

## Pseudo Signal Display (Alternate-scan Display)

Pseudo signal display capability allows this HD monitor to display 1080/24PsF, 1080/25PsF and 1080/30PsF signals at the original vertical frame rates by scanning the same line twice before moving to the next line. In this mode, the PsF signals are displayed in their original segmented format. Pseudo signal display capability also enables the display of signal formats with horizontal frequencies lower than the CRT's minimum horizontal scan frequency of 54 kHz, including 1080/50I, 1080/60I, 720/60P signal formats.


# Operational Convenience

## Various Area Markers

The monitor is equipped with the following area markers:

- Cross marker that shows the picture center
- Safety area marker that shows the frame boundary, and supports various film aspect ratios
- Safe title marker that shows the title area
- Letter box/4:3 area marker, in which the unused raster area displays line, semi-transparent matte and full-black matte maskings.

Cross marker +
Safe title +
Aspect marker +
Semi-transparent matte

Cross marker +
Safe title +
Aspect marker

Cross marker +
Safe title +
Aspect marker +
Full black matte

Cross marker +
Safe title +
4:3 area marker +
Semi-transparent matte

## Separate Control Unit Design

A separate control unit design makes Sony's new monitor ideal for use in space-critical or remote environments. With an optional BKM-10R Central Control Unit or the BKM-11R Hand-held Control Unit connected, the monitor can be controlled from any console position. The optional BKM-34H Control Unit Attachment Kit allows the BKM-10R to be easily attached to the bottom of the monitor for table or shelf installation.

*BVM-F24U with optional BKM-10R and BKM-34H, BKM-11R and BKM-12Y.

## Flexible System Integration

One BKM-10R/11R Control Unit can remotely control up to 32 monitors, including BVM series, BVM-D Series and PVM L series monitors via the RS-485 serial remote interface. The control unit can also control individual monitors or monitor groups by designating the associated monitor address or monitor group numbers.

All connected monitors can be adjusted with the same setting or can execute the same operation with multiple control panels.

## Monitor Memory Card

The optional BKM-12Y Monitor Memory Card can save and load monitor setup or adjustment data via the BKM-10R/11R Monitor Control Unit. When multiple monitors are integrated in the system, the BKM-12Y is capable of exchanging data between monitors so that the same setup and adjustment status are easily retained.

# Adjustment Capabilities

## Auto White Balance Functions

The color temperature can be automatically adjusted by the auto white balance function via the Minolta CA100, Philips PM 5639, Thoma TF6, Graseby SLS 9400, and Sony BKM-14L** Auto Setup Probe.

**Sony BKM-14L is required for auto uniformity and landing adjustment.

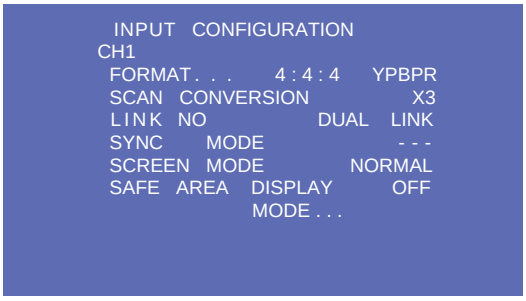
## Stable Color Temperature

The internal beam current feedback circuit maintains a constant color temperature for exceptional stability.

# On-screen Menus for Adjustment and Operation

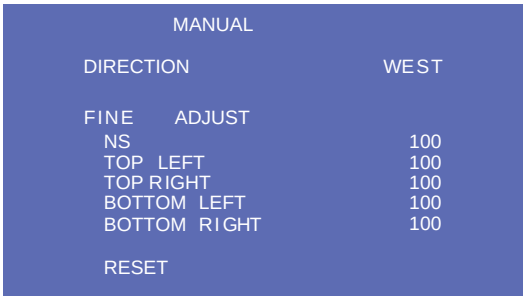
## Input Configuration

Settings for the type of input signal, frame conversion rate, and safe area display, etc. can all be made from the Input Configuration menu.



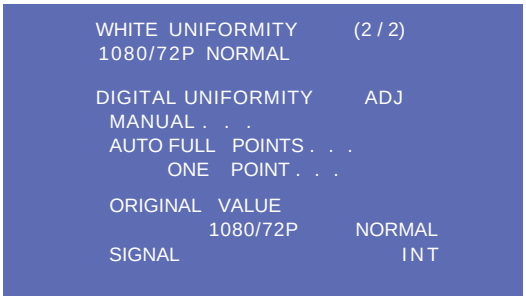

## Beam Landing Correction

The monitor is capable of correcting beam landing shift that may occur as a result of changes in the terrestrial magnetic field. This correction can be implemented manually, or automatically with the use of the optional BKM-14L Auto Setup Probe.



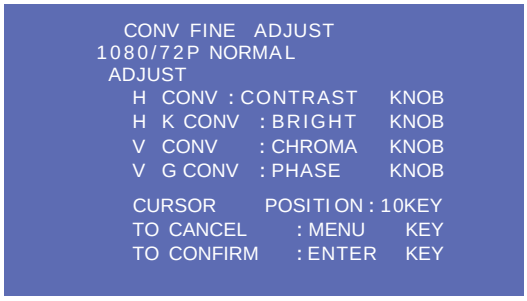

## Digital Uniformity

The built-in digital uniformity system can be used to achieve perfect uniformity on every point of the monitor screen -- even along the peripheral area. Uniformity can be adjusted to match the installation conditions of the monitor using a variable coordinate location system. Both single-point and entire screen area adjustments are available. Automatic adjustment is also available using the optional BKM-14L Auto Setup Probe.



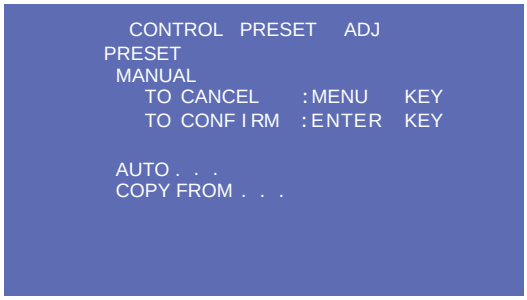

## Digital Convergence

The built-in digital convergence circuit allows high-resolution images to be reproduced on every point of the monitor screen, even in the peripheral area. Using the on-screen menu, the convergence crosspoints can be individually selected and the adjustment can be implemented accurately to any point on the screen to meet any installation requirement.




## Standard or Variable Matrix

The BVM F24U monitor conforms to ITU 709 colorimetry for standardized reproduction of production material intended for final viewing through broadcast, cable, or satellite distribution. Because Electronic Cinema colorimetry must conform to different film standards, a variable matrix is also available which can be assigned to any input configuration.



### Status Display

Several parameters of the monitor can be measured by using the status menu.These include CRT operation time and software version. Serial number information is also available for simple inventory and capital equipment management. Also included is information describing the inputs and indicating how each is configured.

CH STATUS

| CH | LN | FORMAT | CV | NAME |
|---|---|---|---|---|
| 01 | 12 | 444RGB | X2 | PROG |
| 02 | 1 | 444YPBPR | ASD | PROG |
| 03 | _ | ANARGB | | PROG |
| 04 | 12 | 422YPBPR | X1 | PROG |
| 05 | 12 | 444RGB | ASD | PROG |
| 06 | 2 | 422YPBPR | X3 | PROG |
| 07 | 12 | 444RGB | X3 | PROG |
| 08 | 12 | 444RGB | X2 | PROG |
| 09 | 12 | 444YPBPR | X3 | PROG |
| 10 | 1 | 422YPBPR | ASD | PROG |

# Other Features

- **On-screen menus for setting various functions, operating conditions and configurations**
- **Analog RGBHV input for simple connection to most computers**
- **RS-485 serial remote interface and relay contact parallel remote control function**
- **Built-in test signal generator for crosshatch, 100% white signal, 20% gray signal, gray scale, and PLUGE (Picture Line Up Generating Equipment)**
- **Pulse cross function for simultaneous checking of the horizontal and vertical synchronization signals**
- **Auto and manual degaussing**
- **Built-in CRT protection circuit**

# Optional Accessories

BKM-10R,
Central Control Unit

BKM-11R,
Hand-held Control Unit


BKM-12Y,
Memory Card

BKM-14L,
Auto Set-up Probe

BKM-34H,
Control Unit Attachment Kit for BKM-10R with 24-inch Monitor (viewable area, measured diagonally)

RCC-5G/10G/30G,
9-pin Cable for RS-485/422 Serial Remote Control

# HD-SDI Input and Display Available Signal Formats

**Aspect ratio: 16:9**
**Total lines: 1125 lines**
**10-bit system**

Signal standard
Single (4:2:2) type signal: conforming to SMPTE 274M/292M
Dual (4:4:4) type signal: conforming to SMPTE 274M

| Input signal | | | Display signal |
|---|---|---|---|
| **Input signal format** (System/Frame rate (Hz)/Scanning) | **Horizontal frequency** (kHz) | **Interface** | **Display signal format** (System/Frame rate (Hz)/Scanning) |
| 1920 x 1080/24/Progressive | 27.000 kHz | Single (4:2:2) | 1920 x 1080/48, 72/Progressive |
| | | Dual (4:4:4) | |
| 1920 x 1080/25/Progressive | 28.125 kHz | Single (4:2:2) | 1920x1080/50, 75/Progressive |
| | | Dual (4:4:4) | |
| 1920 x 1080/30/Progressive | 33.750 kHz | Single (4:2:2) | 1920 x 1080/60/Progressive |
| | | Dual (4:4:4) | |
| 1920 x 1080/24/Progressive (sF) | 27.000 kHz | Single (4:2:2) | 1920 x 1080/24/Progressive (sF), |
| | | Dual (4:4:4) | 1920 x 1080/48, 72/Progressive |
| 1920 x 1080/25/Progressive (sF) | 28.125 kHz | Single (4:2:2) | *1920 x 1080/25/Progressive (sF), |
| | | Dual (4:4:4) | 1920 x 1080/50, 75/Progressive |
| 1920 x 1080/30/Progressive (sF) | 33.750 kHz | Single (4:2:2) | *1920 x 1080/30/Progressive (sF), |
| | | Dual (4:4:4) | 1920 x 1080/60/ Progressive |
| 1920 x 1080/50/2:1 Interlace | 28.125 kHz | Single (4:2:2) | *1920 x 1080/50/2:1 Interlace |
| | | Dual (4:4:4) | |
| 1920 x 1080/60/2:1 Interlace | 33.750 kHz | Single (4:2:2) | *1920x1080/60/2:1 Interlace |
| | | Dual (4:4:4) | |
| 1920 x 1080/50/Progressive | 56.250 kHz | Dual (4:4:4) | 1920 x 1080/50/Progressive |
| 1920 x 1080/60/Progressive | 67.500 kHz | Dual (4:2:2) | 1920 x 1080/60/Progressive |

Notes: Frame rate 24, 30, and 60 Hz: Also compatible with 1/1.001
Dual link 4:4:4 mode: Selectable RGB/YPbPr signal format
Progressive (sF): Progressive segmented frame Format with '*' mark: Pseudo signal display

**Aspect ratio: 16:9**
**Total lines: 750 lines**
**10-bit system**

Signal standard
Single (4:2:2) type signal: Conforming to SMPTE 296M/292M
Dual (4:4:4) type signal: Conforming to SMPTE 296M

| Input signal | | | Display signal |
|---|---|---|---|
| **Input signal format** (System/Frame rate (Hz)/Scanning) | **Horizontal frequency** (kHz) | **Interface** | **Display signal format** (System/Frame rate (Hz)/Scanning) |
| 1280 x 720/60/Progressive | 45.000 kHz | Single (4:2:2) | *1280 x 720/60/Progressive |
| | | Dual (4:4:4) | |

Notes: Frame rate: Also compatible with 1/1.001 Dual link 4:4:4 mode: Selectable RGB/YPbPr signal format
Format with '*' mark: Pseudo signal display

# Analog RGB Available Signal Formats

| **Input signal format** (System/Frame rate (Hz)/Scanning) | **Aspect ratio** | **Total lines** | **Horizontal Frequency** (Hz) | **Others** |
|---|---|---|---|---|
| 1920 x 1080/48/Progressive | 16:9 | 1125 | 54.000 | |
| 1920 x 1080/72/Progressive | 16:9 | 1125 | 81.000 | |
| 1920 x 1080/50/Progressive | 16:9 | 1125 | 56.250 | Conforming to SMPTE 274M |
| 1920 x 1080/75/Progressive | 16:9 | 1125 | 84.375 | |
| *1920 x 1080/60/Progressive | 16:9 | 1125 | 67.500 | H.BLK: 2.803 μs format |
| 1280 x 1024/75/Progressive | 16:9 | 1066 | 79.976 | SXGA (5:4, conforming to VESA standard) |
| 1280 x 1024/85/Progressive | 16:9 | 1072 | 91.146 | SXGA (5:4, conforming to VESA standard) |

Notes: Frame frequency (48, 60, 72 Hz): Also compatible with 1/1.001
Format with '*' mark: Not available for 1080/60P format (SMPTE 274M: H.BLK 1.886 μs) of analog RGB

# BVM-F24U Specifications

| | | | BVM-F24U |
|---|---|---|---|
| **General** | | | |
| Signal format | | | 54 kHz to 91.1 kHz |
| Type | | | Display unit |
| Power requirements | | | 100 V to 240 V AC±10%, 50/60 Hz |
| Power consumption (Max.) | | | 225 W |
| Dimensions | mm | | 565.5 (W) x 436.8 (H) x 609.3 (D) |
| | inch | | 22 3/8 (W) x 17 1/4 (H) x 24 1/8 (D) |
| Weight | | | Approx. 119 lb. 1 oz (54 kg) |
| CRT | CRT type | | 24-inch HR Trinitron (flat surface, 16:9 aspect) |
| | AG pitch | | 0.25 to 0.28 mm, 90° deflection, Ø29.1mm in-line gun |
| | Visual screen (Viewable area, measured diagonally) | 5:4 | 361.6 (W) x 271.2 (H) mm, (452 mm) |
| | | 16:9 | 482.1 (W) x 271.2 (H) mm, (553.1 mm) |
| | Phosphor | | SMPTE-C |
| **Inputs/Outputs** | | | |
| Video | RGB | | BNC type x 3 (75 Ω), 0.7 Vp-p (1 Vp-p, Sync on Green) +3 dB/-6 dB, positive |
| | HD-SDI<br>*Single Link (4:2:2), Dual Link (4:2:2), Dual Link (4:4:4) | | BNC type x 2 (75 Ω) with monitor out, 1.485 Gb/s (Data rate)<br>Single Link Mode (Line1 or Line2): 2 inputs, Dual Link Mode (Link A and Link B): 1 input<br>*Delay time range between Link A and Link B: Within ±1/2 H |
| External sync | | | BNC type x 2 (75 Ω) |
| | Composite SYNC | | 0.3 to 5.0 Vp-p, positive/negative tri-level sync signal input or negative bi-level sync signal input |
| | Separate HS/VS | | 0.3 to 5.0 Vp-p, positive sync/negative sync (Auto Selection) |
| Remote | OPTION | | RS-232C for BKM-11R Mini DIN 8-pin |
| | CONTROL UNIT | | RS-422 for BKM-10R D-sub 9-pin |
| | REMOTE 1/Serial remote | | RS-485 serial interface, D-sub 9-pin, with loop-through |
| | REMOTE 2/Parallel remote | | D-sub 9-pin (x 1, Short to ground) |
| | ISR | | D-sub 9-pin (x 1) |
| **Video signal performance** | | | |
| Frequency response | | | 48 Hz to 60 MHz +1 dB/-3 dB (x 2, Pseudo Display)<br>48 Hz to 90 MHz +1 dB/-3 dB (x 3) |
| Matrix | | | ITU-709 |
| DC restoration | | | Back porch type, Black level fluctuation: less than 1% for 10 to 90% APL input signal variation |
| **Synchronization** | | | |
| Retrace time | Horizontal blanking time | | Less than 2.49 μs |
| | Vertical blanking time | | Less than 333 μs |
| **Raster and picture performance** | | | |
| Normal scan | | | 5% over scan of the effective picture area |
| Under scan | | | 3% under scan of the effective picture area |
| Linearity | | | Within a central area bounded by a circle with a diameter equal to the picture height,<br>less than 0.5 % of the picture height, and outside the same area, about 1 % of the picture height. |
| Color temperature | | | STD (D65)/COL1 (D61)/COL2 (D65),<br>user adjustable |
| Convergence | | | Within a central area bounded by a circle with a diameter equal to the picture height,<br>Less than 0.3 mm with a central area bounded by a circle and less than 0.5 mm at any other point. |
| Preset brightness | | | 100 cd/m² (30 fL) (when a 1.0 Vp-p 100% white signal is input) |
| Stability of raster size | | | Less than 1% of picture height (at 100 cd/m² peak luminescence, 10 to 90% APL) |
| Scan delay | Horizontal | | Approx. 3/8 line |
| | Vertical | | Approx. 1/2 field |
| Center resolution | | | 1000 TV lines (16:9) |
| **Operating conditions** | | | |
| Operating temperature | | | 0 to 35 °C (32 to 95 °F) Optimum operating range 20 to 30 °C (68 to 86 °F) |
| Storage temperature | | | -10 to 40 °C (14 to 104°F) |
| Humidity | | | 0 to 90% (no condensation) |
| **Others** | | | |
| Supplied accessories | | | AC cable (x 1), AC plug holder (x 1), Fuse (x 1), Operation manual (x 1), Quick reference (x 1) |
| Regulation compliance | | | UL 1950/CSA 950 (cUL listed), FCC Class-A, IC Class-A, DHHS, DNHW |

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