

**BETACAM SP**  
**2000PRO**

Videocassette Player  
**PVW-2650**  
(NTSC)



**SONY**



# A NEW STAR IN BETACAM SP 2000 PRO SERIES

The Betacam SP™ format has become a universal, high quality recording standard throughout the broadcast and post production industries. With the introduction of the affordable Betacam SP 2000 PRO series, the excellence of Betacam SP became available to industrial and corporate users, opening up exciting new production possibilities for commercial videographers.

Sony is now proud to announce a new member of the Betacam SP 2000 PRO family, the PVW-2650. This superb player, equipped with Dynamic Tracking (DT™), joins the PVW-2800 Recorder / Player, PVW-2600 Player, PVW-1/ DXC-537 and PVW-1/ DXC-327A Camcorders as an important addition to this versatile equipment range.

The Dynamic Tracking function, originated by Sony, enables the PVW-2650 to playback high quality, noise-free pictures over the range of -1 to +3 times normal speed. The PVW-2650 is also equipped with a built-in Time Base Corrector and Time Code Reader. As well as composite and component video outputs, an S-video Out and an U-matic Dub Out capability plus an RS-422A control port are provided. This comprehensive interfacing makes the PVW-2650 very easy to integrate into current editing systems.

With its cost effective combination of performance and advanced features, the PVW-2650 sets new standards and opportunities in industrial program creation.





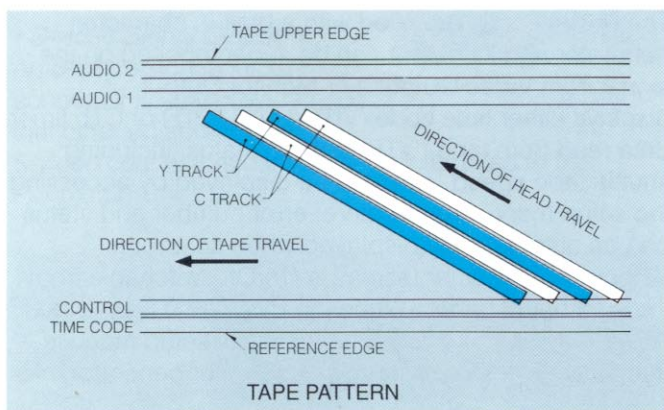
# FEATURES

## Superior Picture Quality

The PVW-2650 has superb playback picture quality, a result of its use of the world standard Betacam SP recording format. Betacam SP is a component recording format, in which the chrominance signals (R-Y, B-Y) are time compressed and recorded on one track by using CTDM (Compressed Time Division Multiplex) a technology originally developed by SONY. The luminance (Y) signal is recorded on a separate track so that cross color and cross luminance effects do not exist in this system. This component two-track recording technology is combined with high frequency FM carriers for each track, providing very wide bandwidths for both the luminance and chrominance signals. The overall result is that detailed luminance and chrominance information is reproduced, characteristics which create the excellent multi-generation picture performance of the Betacam SP format.

The performance advantages of Betacam SP can also be attributed to the use of the metal particle tape.

The PVW-2650 can playback both metal particle tapes and oxide tape. Any metal tape recorded by the PVW-2800, PVW-1 and BVW series Betacam SP VTRs, or oxide tape recorded by the BVW series VTRs, can be played back by the PVW-2650.



## Excellent Noiseless Playback – Dynamic Tracking

The PVW-2650 provides broadcast quality noiseless playback pictures within the range of -1 to +3 times normal tape speed due to the Dynamic Tracking technology originated by Sony. The highly advanced DT system has new head dither circuitry and computerized control to ensure accurate head tracking. The DT head are mounted on a ceramic bimorph, with positional information derived from strain gauges and fed back to the control system. In the VARIABLE mode, continuous noiseless pictures are reproduced over the range of -1 to +3 times normal playback speed in 54 steps.

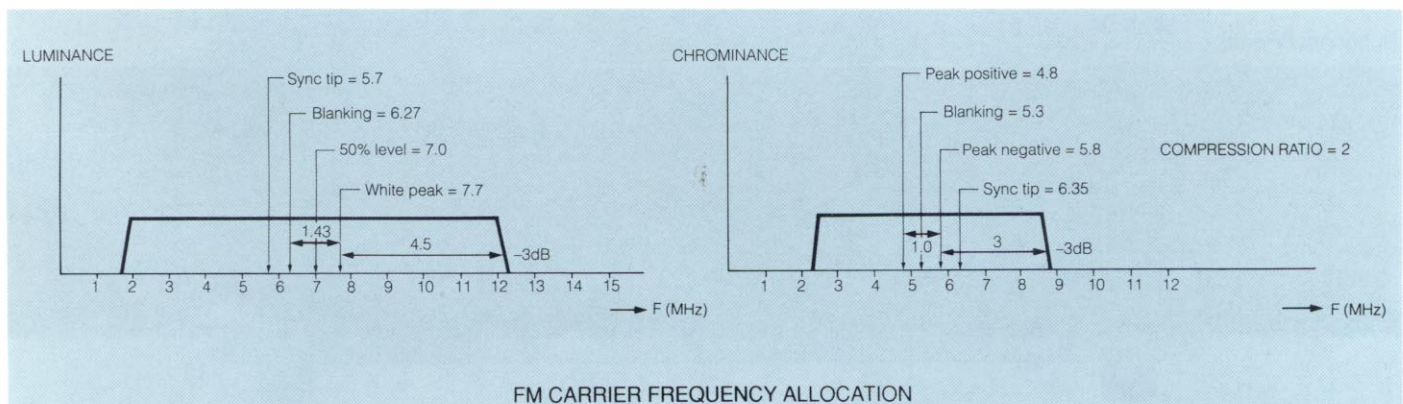
The PVW-2650 also features a JOG mode in which the tape is moved frame by frame in either direction in step with the rotation of the search dial. This mode also provides clear, still pictures.

## Variable Speed Playback Memory

The PVW-2650 provides Dynamic Motion Control (DMC) playback. This function memorizes the desired tape speed within the DT range of -1 to +3 times normal speed and plays back noiseless pictures at that speed. The PVW-2650, equipped with the built-in DMC facility, can perform DMC editing when used as a feeder with the PVW-2800.

## High Audio Quality

The PVW-2650 provides two longitudinal audio channels. The tape speed of the format and the adoption of the proven Dolby™ C-type NR (Noise Reduction) give the PVW-2650 high quality audio performance—a wide dynamic range, even at high frequencies, minimum distortion and an excellent S/N ratio.

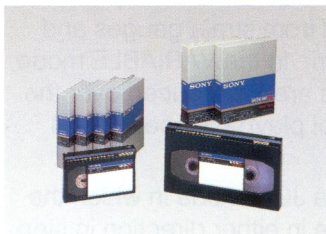




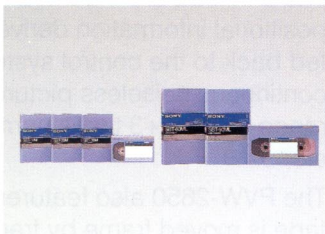
### Long Playback Time

The PVW-2650 accepts both L-size and S-size cassettes, giving playback times of over 90 minutes and 30 minutes respectively.

Both grades of Sony Betacam SP videocassettes, the BCT series and the SBT series, can be used in the PVW-2650. For the highest possible performance, the BCT series is recommended.



BCT series



SBT series

### Compact and Lightweight

Compactness and light weight are key factors designed into the PVW-2650, which weighs approximately 25kg (55lb 2oz), and is 5 units high (19-inch rack mountable). The power consumption is 130W.

### High Speed Picture Search

The PVW-2650 has a high speed picture search facility which provides recognizable monochrome pictures at up to 24 times normal speed in forward and reverse.

At speeds up to ten times normal these pictures are reproduced in color. In the jog mode, tape movement accurately follows the rotation of the search dial in both directions.

### Built-in Time Base Corrector

The PVW-2650 is equipped with a built-in TBC (Time Base Corrector) as standard, providing stable pictures without a requirement for additional time base correction. Advanced, high quality digital dropout compensation also ensures consistent picture performance.

### TBC Remote Control

In addition to the TBC controls built into the PVW-2650, remote adjustments can be made with an optional BVR-50 connected via a D-sub 15-pin cable to the rear panel connector (TBC REMOTE)

### Built-in Time Code Reader

Reading of both VITC (Vertical Interval Time Code) and LTC (Longitudinal Time Code) to the SMPTE format, together with user bits, is a standard feature of the PVW-2650.

### Color Framing

PVW -2650 is free from color framing as long as signals are fed directly from the component signal source.

However, when playing back the tape recorded from the composite source, the color framing function is needed for keeping the video signal impairment to the minimum. The Color Framing System of the PVW-2650 is the combination of the 4-field capstan servo function using the off-tape CF (Color Framing) ID pulse and the off-tape VISC (Vertical Interval Subcarrier) function which matches the decoding axis to the encoding axis. As a result, superior composite output is achieved.

### Character Display

The PVW-2650 is provided with a built-in character generator and its output can be superimposed on the signal from Video Output 3 or Monitor Output. It displays either time code (VITC/LTC/U-BIT) or CTL timer data read from tape. VTR function status, including shuttle tape speed, can also be displayed by accessing the setup menu. Furthermore, error number and status can be automatically displayed when an error is detected. Character display is On/Off switchable from the subcontrol panel. When the PVW-2650 is operated under the setup menu mode, the initial setup menu is automatically displayed by the character generator.

#### Subcontrol Panel





## Versatile System Interface

### • RS-422A Serial Interface (9-pin)

An RS-422A serial interface is provided for versatile editing system expansion and flexible system control. The PVW-2650 will interface with other RS-422A equipped Sony machines.

### • Y/R-Y/B-Y Component Video Signal Output

The PVW-2650 provides two types of connectors for Y/R-Y/B-Y component signal output, three BNC connectors or a Betacam 12-pin DUB connector. This component signal interface allows full advantage to be taken of the superb performance of the Betacam SP format.

### • Composite Video Signal Output

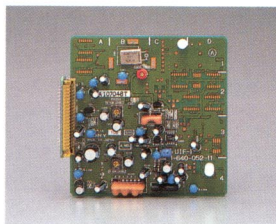
In addition to the component connectors, the PVW-2650 is equipped with composite video signal output connectors.

### • U-matic DUB Signal Output

With the optional BKW-2020 U-matic DUB Out Kit installed, the PVW-2650 can transfer Betacam SP material to a U-matic VTR through its 7-pin U-matic DUB output connector with minimum picture degradation. This transfer is made without the signal being affected by the performance of the Y/C separator in the U-matic VTR.

### • S-video Signal Output

An S-video signal output connector is also provided so that other equipment with S-video connectors can easily be interfaced to the PVW-2650.



BKW-2020

## User Friendly Dial Menu Operation

To meet the requirement for customized operations, the PVW-2650 is provided with an initial setup menu which has easy accessibility, simple operation and allows many functional parameters to be preset to help the operator. This initial setup menu is scrolled and modified by the search dial while being monitored via Video Output 3, Monitor Out, or on the LED Timer display. The modified menu is memorized in a non-volatile memory.

## Improved Serviceability

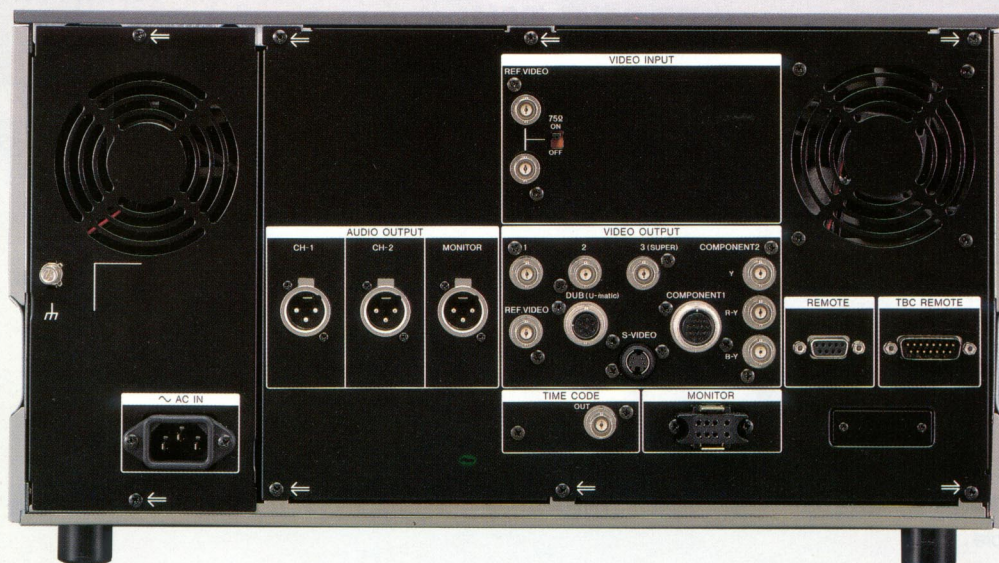
For easy maintenance and servicing, the PVW-2650 is provided with comprehensive self-diagnostics. A digital hour meter is also fitted to indicate the accumulated time of power on, drum rotation and tape running. It can also display the number of threading/ unthreading operations.

## Detachable Control Panel

The control panel of the PVW-2650 can be tilted at up to 90 degrees. Alternatively, the control panel can be removed from the machine to provide remote control from a distance of up to 5m by using the optional BKW-2010 Control Panel Extension Kit and BK-803 Control Panel Case.

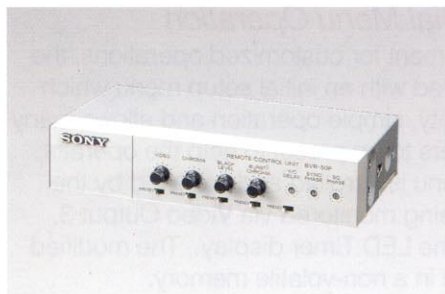
## 19-inch EIA Standard Rack Mountable

With the optional RMM-110 Rack Mount Kit, the PVW-2650 can be mounted into a 19-inch EIA standard rack without taking off the side panels.





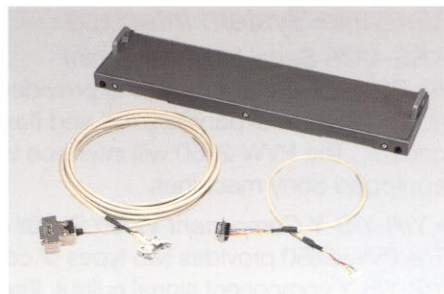
# OPTIONAL ACCESSORIES



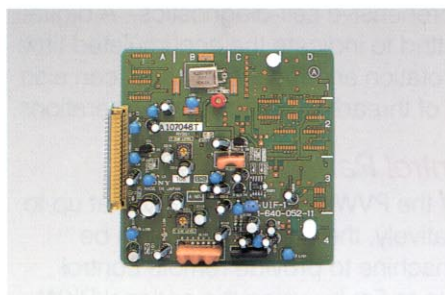
**BVR-50**  
TBC Remote Controller



**BVX-10**  
Component Color Corrector



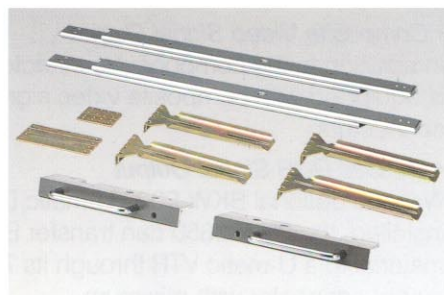
**BKW-2010**  
Control Panel Extension Kit



**BKW-2020**  
U-matic DUB Output Kit



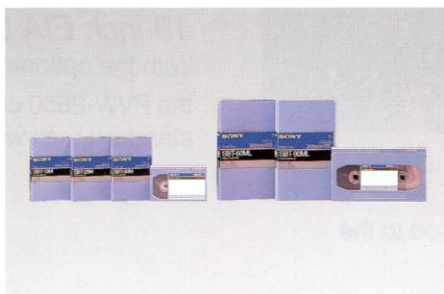
**BK-803**  
Control Panel Case



**RMM-110**  
Rack Mount Kit



**BCT-5M/10M/20M/30M**  
(Small Cassette)  
**BCT-5ML/10ML/20ML/30ML/60ML/90ML**  
(Large Cassette)  
Metal Particle Videocassette Tapes



**SBT-10M/20M/30M**  
(Small Cassette)  
**SBT-60ML/90ML**  
(Large Cassette)  
Metal Particle Videocassette Tapes



**RCC-5G/10G/30G**  
**(5m)(10m)(30m)**  
Remote Control Cable



**VDC-C5 (5m)**  
12-pin Dubbing Cable

# SPECIFICATIONS

## General

Power requirements	AC 90 to 132V, 48 to 64Hz
Power consumption	130W
Operating temperature	5°C to 40°C (41°F to 104°F)
Storage temperature	-20°C to 60°C (-4°F to 140°F)
Humidity	Less than 80% (relative humidity)
Weight	Approx. 25 kg (55 lb 2 oz)
Tape speed	11.86 cm/s
Playback time	More than 90 min with BCT-90ML More than 30 min with BCT-30M
Fast forward time	Less than 3 min with BCT-90ML
Rewind time	Less than 3 min with BCT-90ML
Search speed SHUTTLE	19 steps, still to 24 times normal speed, forward and reverse
JOG	Frame by frame, forward and reverse
Dynamic tracking range	-1 to +3 times normal speed

Video performance	Metal particle tape	Oxide tape
Bandwidth		
Luminance (50% modulation)	30Hz to 4.5MHz $\pm 0.5$ -4.0 dB	30Hz to 4.0MHz $\pm 0.5$ -6.0 dB
Color difference (50% modulation)	30Hz to 1.5MHz $\pm 0.5$ -3.0 dB	30Hz to 1.5MHz $\pm 0.5$ -3.0 dB
S/N ratio		
Luminance (Component IN/OUT)	More than 51dB	More than 48dB
Chrominance		
AM	More than 53dB	More than 50dB
PM	More than 53dB	More than 50dB
Differential gain	Less than 3%	Less than 3%
Differential phase	Less than 3°	Less than 3°
K-factor (2T pulse)	Less than 2%	Less than 3%
Y/C delay	Less than 20 ns	Less than 20 ns

Audio performance	Metal particle tape	Oxide tape
Frequency response	50Hz to 15kHz $\pm 1.5$ -3.0 dB	50Hz to 15kHz $\pm 3.0$ -3.0 dB
S/N ratio (at 3% distortion level)	More than 72dB	More than 50dB (Dolby NR off)
Distortion T.H.D. (at 3% distortion level)	Less than 1%	Less than 2%
Wow and flutter	Less than 0.1% rms	Less than 0.1% rms

## Signal inputs

REF VIDEO IN (BNC)	1.0Vp-p, 75 $\Omega$
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## Signal outputs

VIDEO OUT 1 (BNC)	Composite video, 1.0Vp-p, 75 $\Omega$ , sync negative
VIDEO OUT 2 (BNC)	Composite video, 1.0Vp-p, 75 $\Omega$ , sync negative
VIDEO OUT 3 (BNC)	Composite video, 1.0Vp-p, 75 $\Omega$ , sync negative, with or without character insertion
COMPONENT OUT 1 (12-pin male)	
Luminance	1.0Vp-p, 75 $\Omega$ , sync negative
Color difference	R-Y: 0.7Vp-p, 75 $\Omega$ , B-Y: 0.7Vp-p, 75 $\Omega$
COMPONENT OUT 2 (BNC x 3)	
Luminance	1.0Vp-p, 75 $\Omega$ , sync negative
Color difference	R-Y: 0.7Vp-p, 75 $\Omega$ , B-Y: 0.7Vp-p, 75 $\Omega$
AUDIO LINE OUT (XLR 3-pin male) CH1/2	+4dBu, 600 $\Omega$ , balanced
AUDIO MONITOR OUT (XLR 3-pin male) CH1/2	+4dBu, 600 $\Omega$ , balanced
U-matic DUB OUT (with an optional BKW-2020)	Y: 1.7Vp-p, 51 $\Omega$ C: 0.9Vp-p, 51 $\Omega$
S-video OUT	Y: 1.0Vp-p, 75 $\Omega$ C: 0.286Vp-p (burst), 75 $\Omega$
TIME CODE OUT (BNC)	1.2Vp-p, 75 $\Omega$

## Others

REMOTE IN/OUT	9-pin, female
TBC REMOTE	15-pin, male
MONITOR	8-pin, female
HEADPHONES	JM-60 headphone stereo jack

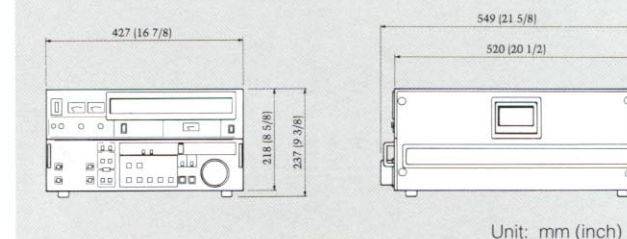
## Processor adjustment range

Video level	$\pm 3$ dB
Chroma level	$\pm 3$ dB
Setup level	0 to +15 IRE
Hue	$\pm 15^\circ$
System SC phase	360°p-p
System sync phase	+3 to -1 $\mu$ s
Y/C delay	$\pm 50$ ns

## Supplied accessories

AC power cord (1), Remote control cable RCC-5G (9-pin) (1),  
Operation manual (1)

## Dimensions



\* The specifications of "video/audio performance oxide tape" were measured by playing back material on a standard PVW-2650 that had been recorded on a standard BVW series Betacam SP VTR.

\* 0dBu = 0.775 Vrms

Design and specifications subject to change without notice.

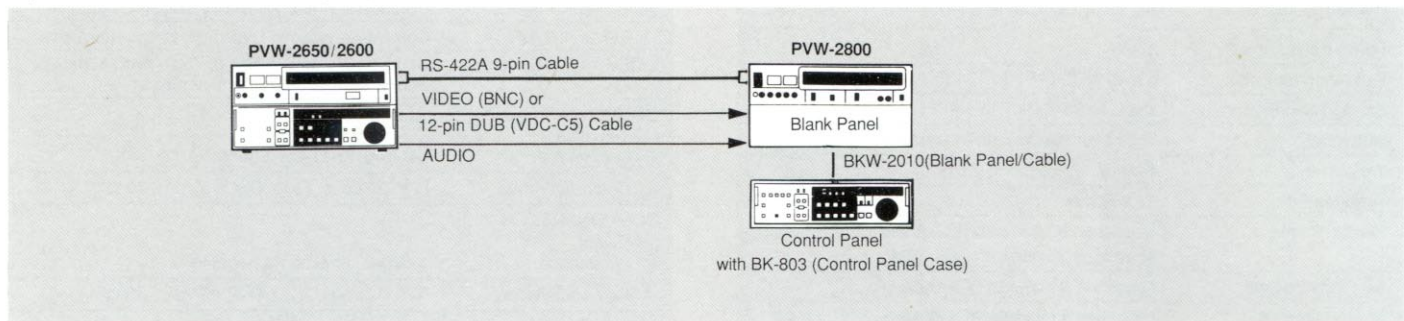
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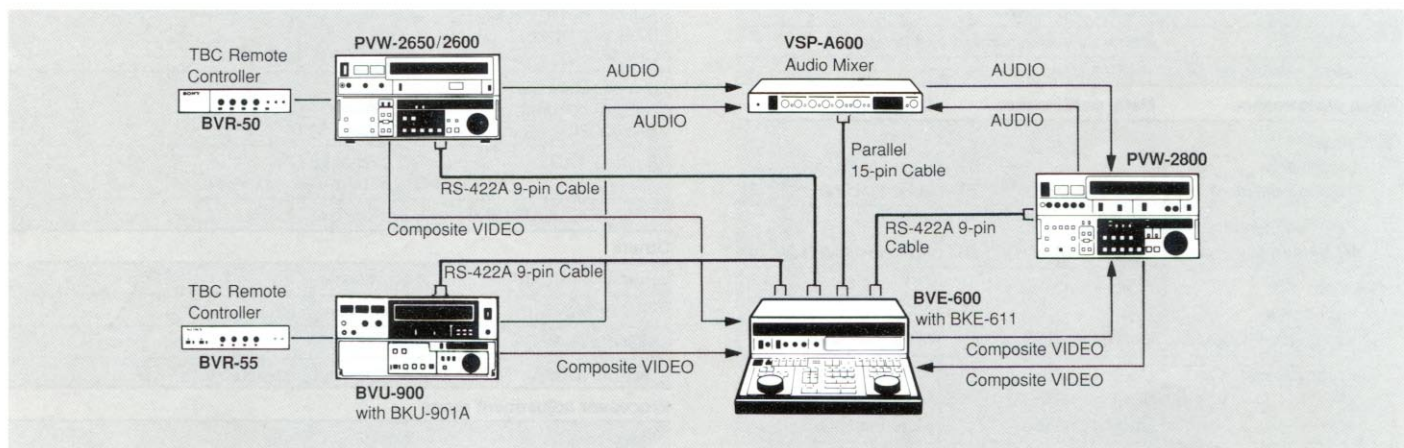


# TYPICAL CONNECTIONS

## 1) VTR to VTR Editing System



## 2) A/B Roll Composite Editing System



## 3) A/B Roll Component Editing System

