SONY

MAV-555 Series

Multi-access Video Disk Recorder

Designed for both today's live, sports and news editing applications, and for the challenge of the transition to DTV systems

MAV
DISK RECORDER

Introduction

The MAV-555 Series are MPEG-based, multi-channel editing disk recorders. They combine advanced disk technology with a VTR-style of control proven in the day-to-day realities of broadcast operations.

The MAV-555 Series meet the recording and real-time editing requirements of today's live, sports, and news programming. Beyond today's application, the format-free advantages of disk recording will see the MAV-555 Series supporting DTV and the new Sony Super Motion™ format. There are two models in the series, differing only in the capacity of their disk drives, 9 GB and 18 GB.

MAV-555 shown

Many powerful features are built-in to the MAV-555 Series. These include multi-channel recording, powerful real-time editing functionality with a full range of video effects, high reliability RAID technology, and fast operation from a built-in control panel. All of this technology is contained in a single, 19-inch rack mounting unit the size of a conventional VTR. This compact size, combined with a unique shockproof HDD mounting, now adds disk recording technology to OB vehicle operations.

Although disk recorders have been marketed for use in applications that have previously been the prerogative of the VTR, they have seldom truly satisfied customer's needs, particularly because of their limited operational functionality. Providing the MAV-555 with a familiar, VTR-style, control panel introduces a level of intuitive operation never before available in a disk recorder.

Avoiding the need to render and re-record is a major feature that strengthens the real-time editing capability of the MAV-555. Another important attribute is that both the Sony 9-pin VTR Control Protocol and 9-pin Disk Control Protocol are available, enabling the powerful editing capabilities of the MAV-555 to be controlled from Sony BVE Series linear and DNE Series non-linear edit controllers, as well as non-Sony devices. Of course, these two control protocols can be used in parallel within the same system.

The advent of the MAV-555 has made the concept of practical, multi-channel, MPEG-based, frame accurate editing disk recorders a reality. From studio to OB vehicle, from linear control to non-linear control environment, and from today's SDTV system to the challenges of a rapid transition to DTV, the MAV-555 Series give you the power, speed, and flexibility to achieve your goals.

MAV-555 Series

Benefits

▶ For flexible and convenient operation.

- Selectable data rate to match application
- Operation at 30 Mbps, 40 Mbps and 50 Mbps
- Networking and SDTI I/O
- Simultaneous multi-channel operation

▶ More than a VTR replacement.

- The advantages of disk recording combined with familiar VTR-style operation
- Compatibility with RS-422A-based equipment
- Video effect capability
- Operational and maintenance costs reduced

▶ Expand MPEG-based disk application in studio and OB operations.

- A wide range of video and audio function boards, for both digital and analog signals, provide I/O flexibility
- All-in-one compact body with shock-protected hard disk mechanism
- Compatibility with Ethernet computer networks

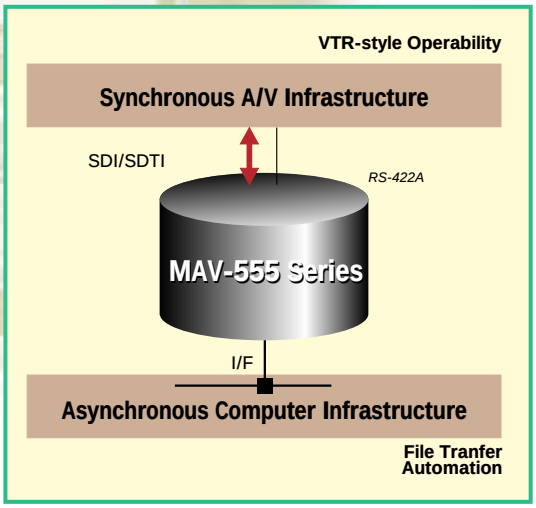
▶ Upgrading systems to DTV and Super Motion.

- Support a bandwidth of 144 Mbps (HDCAM format)
- Interfaces perfectly with the new Sony Super Motion system

Features

Simultaneous multiple I/O channels

The MAV-555 Series benefit from a major advantage of disk technology – the ability to combine simultaneous recording, editing and playback with a multiple input/output capability. This provides simultaneous multiple access to the same source material during recording, editing and play out. To maximize this advantage, the MAV-555 Series provide the choice of a standard SDI one input/one output configuration, or optional one input/three output, two input/two output configurations. Moreover, with an asynchronous I/F board installed, MAV-555 units can provide file transfer in a computer infrastructure.



Compact, all-in-one, design that includes a shock-proof HDD

To have a true disk recorder suitable for OB vehicle applications has been a long-term requirement from the market place. The MAV-555 Series meet this need. Their compact, all-in-one design accommodates a range of optional function boards, while a unique shock-absorbing mounting for the hard disk drive isolates it from external shocks and vibration.

Selectable bit rate

Adopting MPEG-2 4:2:2 Profile@Main Level with a GoP (Group of Pictures = Intra-frame) means that the choice of bit rate (30 Mbps, 40 Mbps or 50 Mbps) can be matched to any application. The MAV-555 Series will allow this choice of bit rate to be selected on a file-by-file basis.

	50 Mb/s	40 Mb/s	30 Mb/s
9GB HDD Version MAV-555/9	2 h 50 min	3 h 40 min	4 h 50 min
18GB HDD Version MAV-555/18	5 h 40 min	7 h 20 min	9 h 40 min

Fast scene search

A very significant advantage of disk recording is the speed at which information can be located and played back. To maximize this advantage requires an improvement in search functionality compared to a VTR. The MAV-555 Series maintain the conventional VTR-style jog/shuttle knob to provide playback from normal speed forward to normal speed in reverse in both Jog and Variable modes. The enhanced Shuttle mode enables scenes to be located very quickly and smoothly, without frame drop-out.
Of course, a digital jog sound function and quick cue up for marking points are also supported.

Network file browsing capability

The BZMA-505 MAV File Browsing Software has been specially developed to browse the complete file list of the MAV-555 recorders via an Ethernet computer network. With this new software, the following MAV-555 functions are controllable through a standard PC browser:

- **File searching**
- **Remote control**
- **Self-diagnosis/ Log extraction/ Set up**

Independently editable, high-quality audio channels

The MAV-555 models provides four, uncompressed, audio channels as 20-bit/48 kHz AES/EBU digital audio on each video channel. Split/ Slide/ Swap editing is independently supported for each individual audio channel.

Real-time editing capability

A most important function of the MAV-555 Series is their ability to execute real-time A/B roll editing, (including A/V split/slide and A/V level adjustments) without the need to render or re-record sequences.
The MAV-555 Series are compatible with both the Sony 9-pin VTR Control Protocol (RS-422A) and the 9-pin Disk Control Protocol, and either protocol can be used to control an individual channel. They provide interfacing with Sony BVE Series edit controllers, the Sony DTR-3000 Remote Controller and Sony non-linear editors for real-time control. This unique feature enables the MAV-555 recorders to be used in existing systems along with Sony edit controllers and non-linear devices. The MAV-555 Series have two Sony 9-pin VTR control ports, enabling their VTR-style control panel to control external VTRs for tape-to-disk editing.

Features

File transfer capability

The MAV-555 Series can synchronously transfer A/V files (30 Mbps, 40 Mbps and 50 Mbps) at up to twice normal speed via SDTI (Serial Digital Transport Interface, SMPTE 305M). Files can also be transferred asynchronously to match the requirement of a computer LAN, such as MAV Series servers. This is particularly useful in transferring A/V files during operations.

System flexibility

With the appropriate I/O boards* installed, the MAV-555 Series are compatible with most digital and analog A/V signal formats. Interface boards to handle inputs with a bandwidth of 144 Mbps for DTV and HDACM, and the simultaneous recording and playback of signals from the new Sony Super Motion system are part of the overall design.

*Super Motion board and HDCAM (HD) board will be available in 2Q 2000.

High reliability

Data protection and continuous operation are important design criteria in the MAV-555 Series. In the event of data loss, a parity drive compensates for this loss while RAID technology enables lost data to be rebuilt following an HDD failure. The File Management System data is duplicated to provide an extra level of operational security. A front-panel display shows system conditions.

BKMA-505, Disk Recorder Control Panel

An optional front control panel for the MAV-555 Series, specially designed to combine the advantage of disk recording with conventional VTR-style operation.

It has the following features.

- VTR-style panel operation
- External VTR control
- Remote control of MAV-555 functions
- Rapid cueing
- Rapid retouching of edited material
- Single machine A/B roll editing
- Powerful editing capability, similar to Sony BVE-2000/910/9100 Series edit controllers (Edit Data Page)
- Six-inch display window

Options

Support components for BKMA-505:

– BKMA-506 Control Panel Case

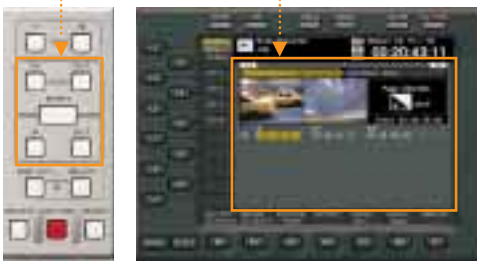
Easy source selection

Display the file list
Display the file information
- – File name
- – Duration
- – Clip picture

Select the file using the rotary encoder

Quick edit point setting

Player/Recorder select
Marking In/Out point
- – Edit data page
- – Clip picture



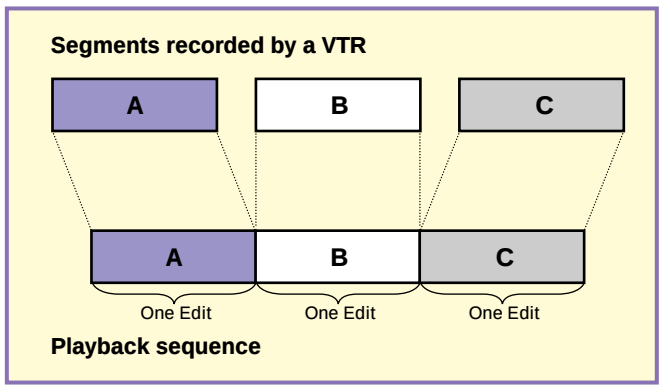
Intuitive selection of effect type

Effect type select

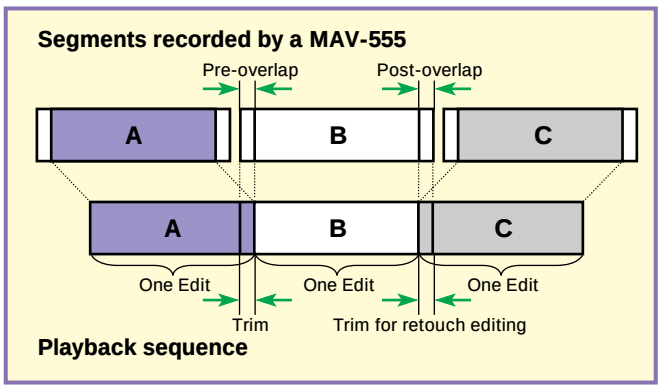
Parameter set
– Transition time

Pre/Post Overlap Recording – easy trim after edit

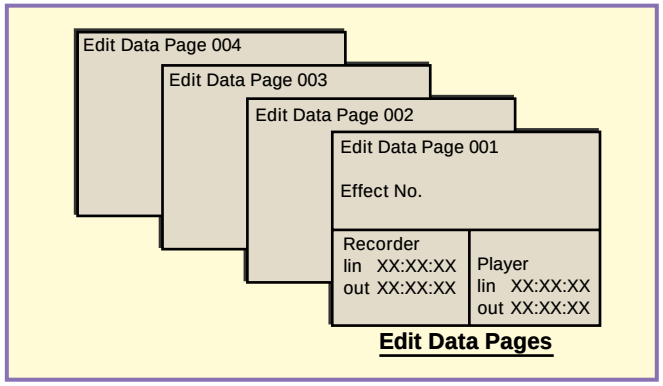
Current VTR Operation

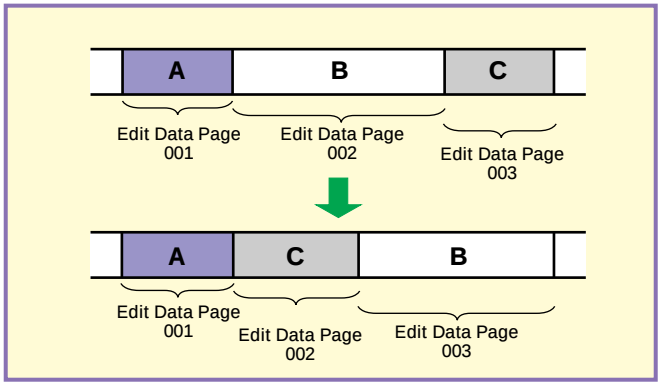


MAV-555 with BKMA-505 Control Panel Operation



Retouch Editng – adding an edit without re-recording





BKMA-505
Disk Recorder Control Panel

Detachable control panel for MAV-555.

BKMA-510
Input and Output Processor Boards

The BKMA-510 comprises a pair of boards that provide one input and one output for applications where an additional input and output are required. With the BKMA-510 boards installed, a MAV-555 provides two inputs and two outputs.

BKMA-510HD
HDCAM Input and Output Processor Boards

With the BKMA-510HD installed, the MAV-555 provides 1IN - 1OUT recording and playback of HD-SDI (1080i/59.94, 1.5 Gb/s) signal.

BKMA-511
A/D Converter Board

An audio/video, analog to digital converter board that supports both NTSC and PAL composite video signals. A BKMA-570 Analog Audio Expansion Unit is required when an analog audio signal is to be converted. The BKMA-570 is described in 4-2-10 below.

BKMA-512
D/A Converter Board

A audio/video digital to analog converter board that supports 525 and 625-line signals. This board provides an output with burnt-in time code and status information. A BKMA-570 Analog Audio Expansion Unit is required when a digital audio signal is to be converted.

BKMA-520
Input Processor Boards

The BKMA-520 comprises a pair of boards that provide two inputs for applications where additional inputs are required. With the BKMA-520 boards installed, a MAV-555 provides three inputs and one output.

BKMA-520SS
Super Motion Input Boards

The BKMA-520SS has three SDI inputs. With it installed, the MAV-555 can connect to a super motion camera system such as Sony BVP-9500WS Series to offer super motion recording and playback.

BKMA-530
Output Processor Boards

The BKMA-530 is a pair of boards that provide two SDI outputs for applications where additional outputs are required. With the BKMA-530 boards installed, a MAV-555 provides one input and three outputs.

BKMA-560**
Video Effect Board

A 2-D video effects board providing a variety of video effects, and is typically used for news and sports programming. In combination use with the BKMA-561 3-D Video Effects Board, 3-D video effects can also be created. BKMA-510 or BKMA-530 options are required for A/B roll editing.

Options

BKMA-540*
SDTI Board

This SDTI board provides one SDTI input and one SDTI output. With the BKMA-540 board installed, a MAV-555 can provide file transfer at up to two times normal speed at bit rates of 30/40/50 Mb/s through SDTI-CP as defined by the SMPTE 305M standard.

BKMA-550*
Asynchronous Network Board

An asynchronous network board that provides input and output for a computer LAN, such as Gigabit Ethernet. With the BKMA-550 board installed, a MAV-555 is able to provide asynchronous file transfer as a background.

BKMA-570
Analog Audio Expansion Unit

The BKMA-570 is a 2U rack mounting analog audio expansion unit that connects to the 50-pin connector on the MAV-555 to provide analog audio inputs and outputs through XLR-type audio Connectors.

MAVE-F555
Editing Panel

The MAVE-F555 is a desk-top controller, specially designed for the MAV-555 in non-linear editing and file selection. It can be used together with conventional Sony BVE Series edit controllers to obtain trim editing such as Insert, Delete, Shrink, etc. in a non-linear mode.

RMM-555
Rack Mount Kit

The RMM-555 is a 19-inch EIA rack mount kit comprising two slide rails and a pair of ears.

BKMA-506
Disk Recorder Control Panel Kit

A control panel case kit for BKMA-505.

BZMA-505
File Browsing Software

The BZMA-505 MAV File Browsing Software has been specially developed to browse the complete file list of a MAV-555 recorder via its Ethernet port. With this software, the following MAV-555 functions are controllable with a standard PC:

- File searching
- Remote control
- Self-diagnosis/Log extraction/Set up

* *BKMA-540 SDTI Board and BKMA-550 Asynchronous Network Board will be available within 2000.*

** *BKMA-560 Video Effect Board will be available in 3Q 2000.*

Product configuration

MAV-555 System Configuration Chart

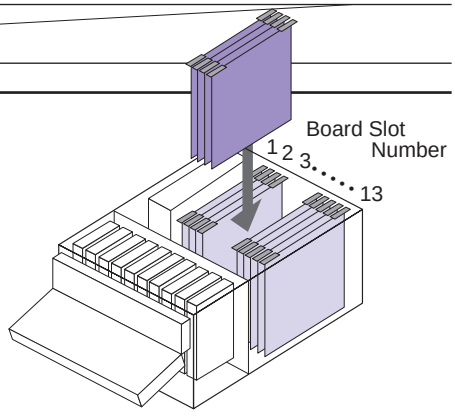
System Cofiguration	Required Options	Selectable Options					
		BKMA-511[*1] A/D Converter Board	**BKMA-512**[*1] D/A Converter Board	**BKMA-540**[*1] SDTI I/O Board **or** **BKMA-550**[*1] Network I/O Board	**BKMA-560**[*2] Video Effect Board	**BKMA-561**[*3] Video Effect DME Board	**BKMA-570** Analog Audio Expansion Unit
1 Input-1 Output	**N/A**	**1**	**1**	**1**	**N/A**	**N/A**	**1**
2 Inputs-2 Output	**BKMA-510**	**2** **1**	**2** **1**	**N/A** **1**	**1**	**1**	**1**
3 Inputs-1 Output	**BKMA-520**	**2** **1**	**1** **1**	**N/A** **1**	**N/A**	**N/A**	**1**
1 Input-3 Outputs	**BKMA-530**	**1** **1**	**3** **1**	**N/A** **1**	**1**	**1**	**1**
Super Motion 3 Inputs-1 Output	**BKMA-520SS**	**2** **1**	**1** **N/A**	**N/A** **1**	**1*[4]**	**1*[4]**	**1**
HD 1 Input-1 Output (or SD 1 Input-1 Output)	**BKMA-510HD**	**1**	**1**	**N/A**	**N/A**	**N/A**	**1**

Note *1 Refer to the MAV-555 Slot Structure diagram for combination details.
Note *2 Two play out ports are always required when BKMA-560 is required.
Note *3 The BKMA-560 option is required.
Note *4 The BKMA-530 dual output card is required for effects execution.

MAV-555 Slot Structure

Slot No.	Options						
1							
2	**BKMA-511**	**BKMA-540**	**BKMA-511**	**BKMA-540**	**BKMA-512**	**BKMA-540**	**BKMA-510HD**
3	**BKMA-512**	**or BKMA-550**		**or BKMA-550**	**BKMA-512**	**or BKMA-550**	
4	**BKMA-510**		**BKMA-520**		**BKMA-530**		
5							
6							
7							
8							
9	**BKMA-512**						
10	**BKMA-511**						
11							
12							
13	**BKMA-560/561**						

Note: Please refer to the BKMA-520SS Super Motion installation manual for installation and system structures,

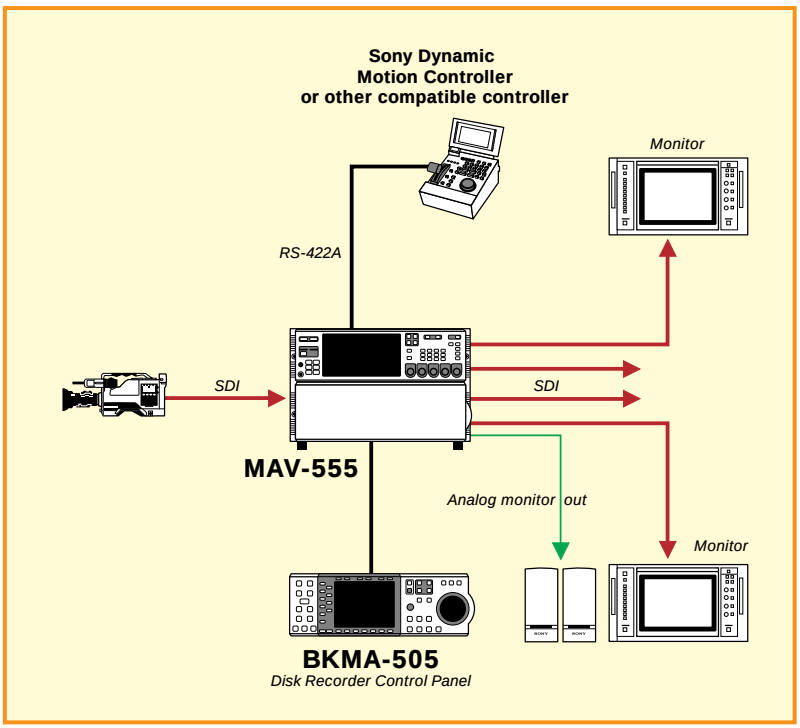


System configuration

(1) Live and Sports Applications

1-1. Slow and replay/highlight editing(1)

(multiple operation using a Sony Dynamic Motion Controller)



Advantages:

The system provides quick replay during recording and highlight editing while offering slow motion and replay in conjunction with Sony Dynamic Motion controller and BKMA-505.

Features:

- Simultaneous multiple operation
- A/B roll with effects
- Simultaneous highlight editing
- Quick Retouch editing
- Cue Point Import from a Sony Dynamic Motion Controller
- Quick cue up
- Simultaneous recording
- DMC (Dynamic Motion Control)
- File name entry from PC
- Instant replay
- VTR-like response
- Space and tape cost saving

Options Required:

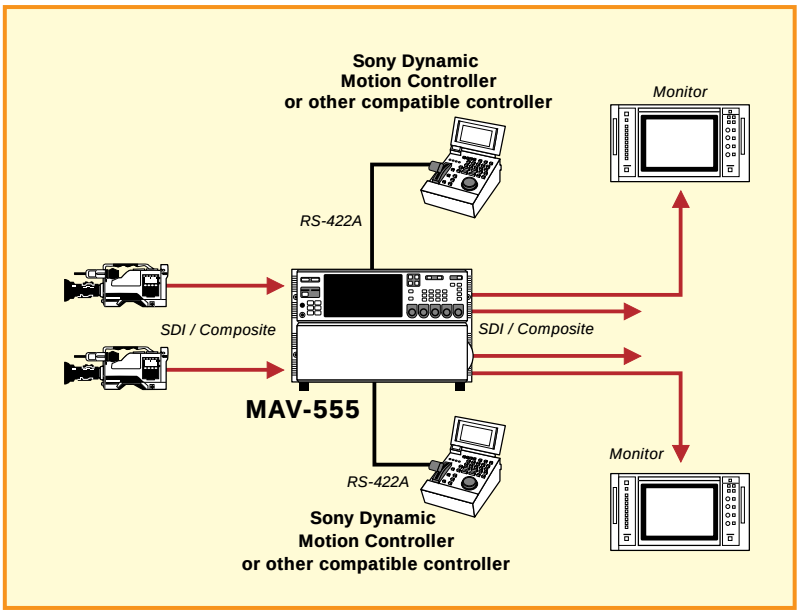
- BKMA-505, Disk Recorder Control Panel for editing control
- BKMA-530, Outputs Processor Boards for A/B roll editing

Other Options:

- BKMA-506, Disk Recorder Control Panel Case Kit
- BKMA-511, A/D Converter Board
- BKMA-512, D/A Converter Board
- BKMA-560, Video Effect Board for A/B roll with effects
- BKMA-570, Analog Audio Expansion Unit for analog input/output

1-2. Slow and replay/highlight editing(2)

(multiple operators using a Sony Dynamic Motion Controller or other compatible controller)



Advantages:

3rd party manufacturers such as DNF or Numeric Video, etc., can be used instead of BKMA-505 and Sony Dynamic Motion controller to provide both quick replay during recording and highlight editing while offering slow motion and replay.

Features:

- Simultaneous multiple operation
- Simultaneous highlight editing (using 3rd party controller)
- Quick cue up
- Simultaneous recording
- DMC (Dynamic Motion Control)
- Instant replay
- VTR-like response
- Space and tape cost saving

Options Required:

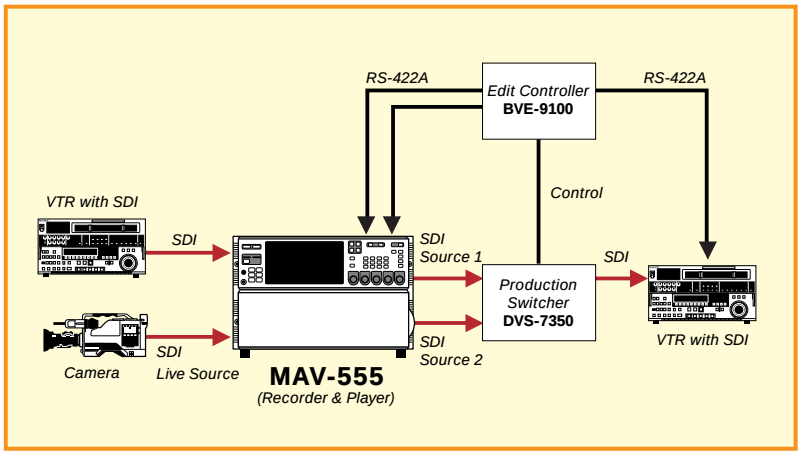
- BKMA-510, Input and Output Processor Boards for a second DTR

Other Options:

- BKMA-511, A/D Converter Board
- BKMA-512, D/A Converter Board
- BKMA-570, Analog Audio Expansion Unit for analog input/output

System configuration

1-3. Live recording and source player for linear editing system



Advantages:

The system provides sophisticated linear editing while offering live recording.

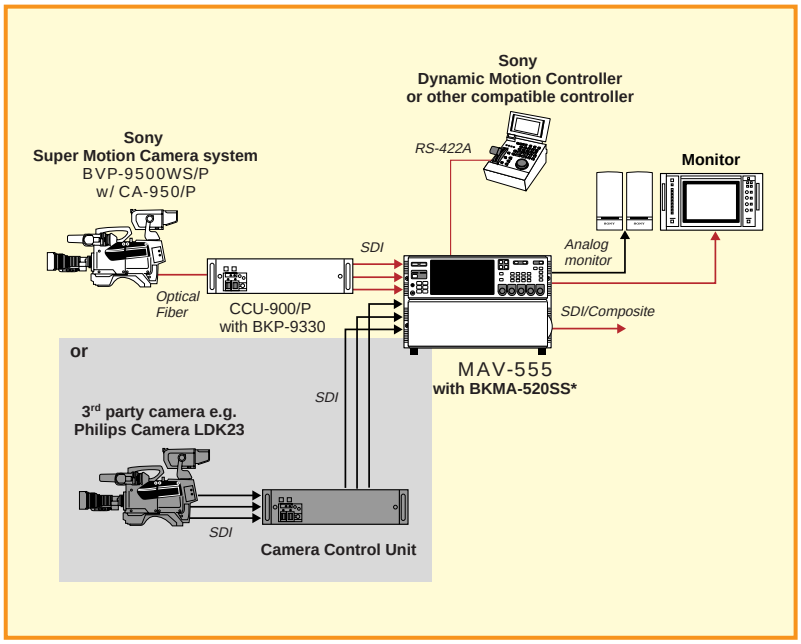
Features:

- Simultaneous feed record and edit
- Linear editing
- Instant replay
- Utilizes current equipment
- Quick cue up
- VTR-like response
- Space and tape cost saving

Option:

- BKMA-510 Input and Output Processor Boards

1-4. Super Motion system



Advantages:

In combination use with BKMA-520SS, the MAV-555 can connect to a super motion camera system to provide recording and playback of a very smooth and high quality super slow motion picture.

Features:

- Simultaneous miltiple operation
- Quick cue up
- VTR-style scene search
- Excellent picture quality
- Instant replay

Option required:

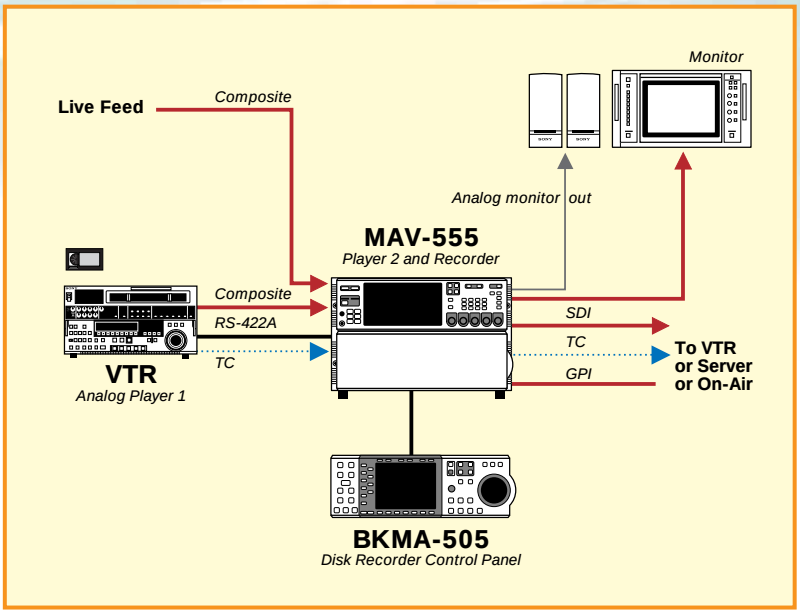
- BKMA-520SS, Super Motion Boards

* Signal Converter Board is required in connection with 3rd party camera

(2) News Editing Application

2-1. A MAV-555 used as recorder and player in an analog environment

(in a non-linear editing system with direct on air in conjunction with BKMA-505)



Advantages:

An MAV-555 can be used to replace two VTRs - recorder and player, while offering non-linear editing with the BKMA-505 as well as machine to machine editing.

Features:

- Linear and non-linear editing
- Record edited material onto VTR
- Simultaneous Feed Record and Edit
- Background feed recording
- Cut editing, A/B roll with effects
- Voice Over editing
- Direct on-air by GPI trigger
- VTR-like response
- External VTR control(P& R)
- Audio split editing
- Quick cue up
- Instant replay
- Space - and tape cost saving

Options Required:

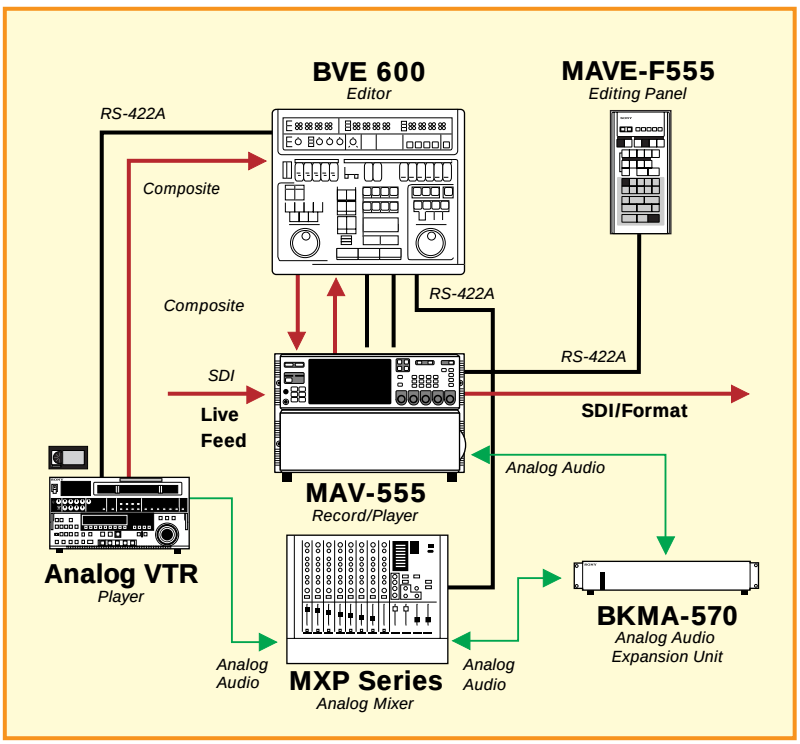
- BKMA-505, Disk Recorder Control Panel for editing control
- BKMA-510, Input and Output Processor Boards for simultaneous inputs, A/B roll editing

Other Options:

- BKMA-511, A/D Converter Board
- BKMA-512, D/A Converter Board
- BKMA-570, Analog Audio Expansion Unit for analog input/output

2-2. A MAV-555 used as recorder and player in an analog environment with linear editing system

(in a BVE-600 linear editing system in combination use with a MAVE-F555)



Advantages:

In combination with the MAVE-F555 Editing Panel, the MAV-555 can fully utilize existing linear A/B Roll editing systems such as the Sony BVE-600.
This provides File Create/ Select/ Delete and Non-linear edit functions that cannot be found in conventional editors. Transfer to OA (On Air) servers is possible and on-line recording/playout is also possible during editing as a Background Job.

Features:

- Simultaneous feed record and edit
- Utilizes current equipment
- Linear editing
- VTR-like response
- Instant replay
- Cut editing

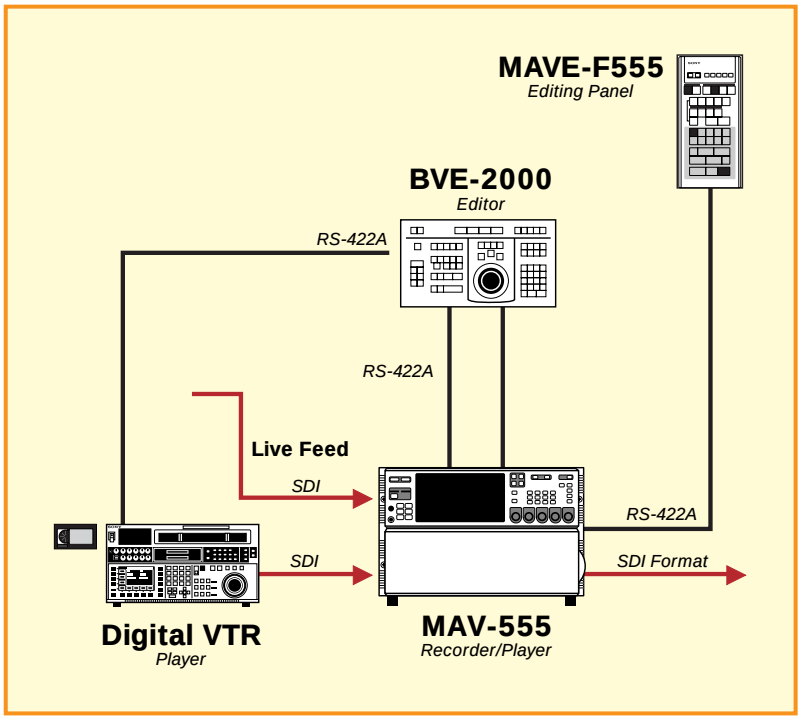
Options:

- MAVE-F555, Editing Panel for editing control and file selection
- BKMA-511, A/D Converter Board
- BKMA-512, D/A Converter Board
- BKMA-570, Analog Audio Expansion Unit for analog input/output

System configuration

2-3. A MAV-555 used as recorder and player in a digital environment with linear editing system

(in a BVE-2000 linear editing system used in combination with a MAVE-F555)



Advantages:

Using the MAVE-F555 Editing Panel, the MAV-555 can utilize existing linear A/B Roll editing system such as the Sony BVE-2000. The additional features required for Non-Linear access, such as File Create/ Select/ Delete are supported: these cannot be found in conventional editors. As mentioned before, transfer to OA (On-Air) servers, on-line recording/playout, and editing with Background functions are all possible.
The MAV-555 combined with the BVE-2000 provides more power to conventional VTR based suites, faster editing while minimizing retraining time.

Features:

- Linear editing
- Cut editing
- Instant replay
- VTR-like response
- Simultaneous feed record and edit
- Background playout
- Quick Cue up
- A/B roll with effects
- Utilizes current equipment

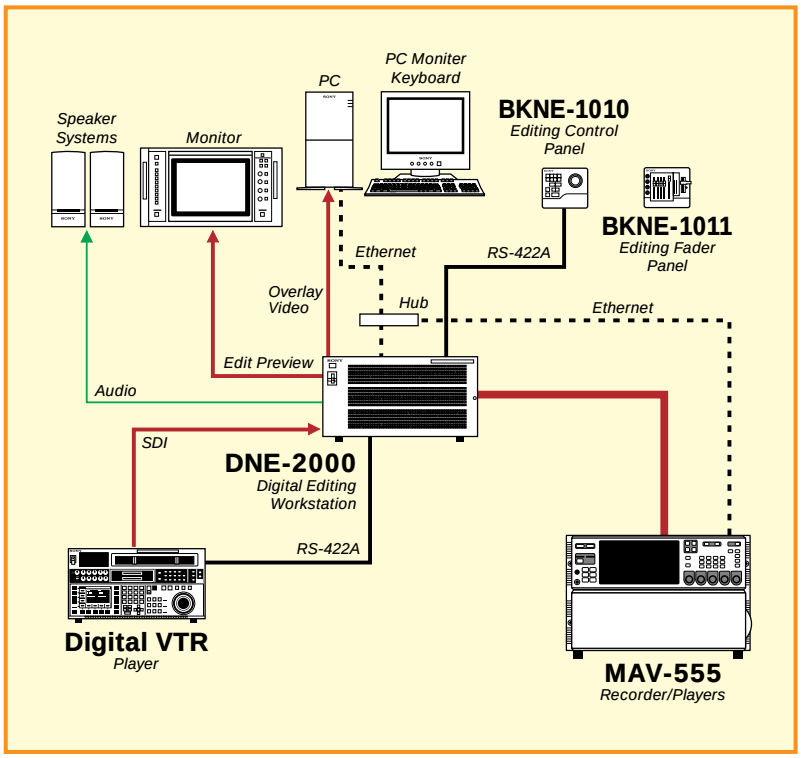
Option required:

- MAVE-F555, Editing Panel for editing control and file selection
- BKMA-510, Input and Output Processor Boards

Other option:

- BKMA-560, Video Effect Board for A/B roll with effects

2-4. MAV-555 in a DNE-2000 stand-alone, non-linear editing system



Advantages:

This non-linear system provides the ability to re-edit the material easily and quickly in order to produce different versions that vary in length, content, or presentation style.

Features:

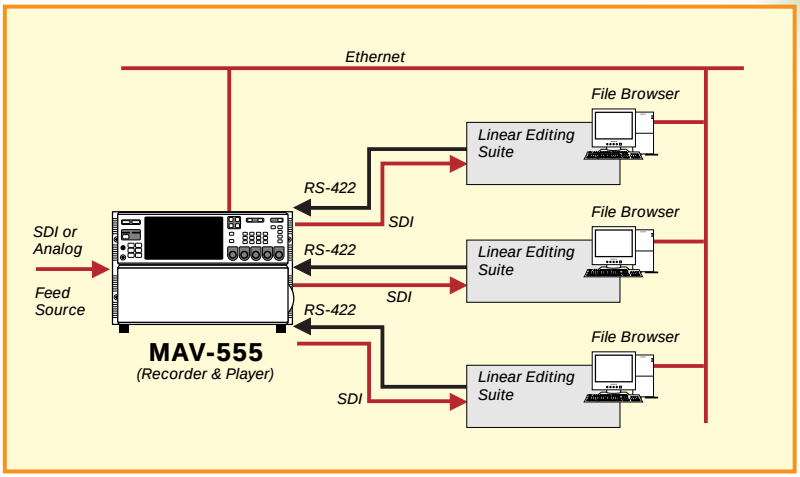
- Non-Linear editing with GUI
- A/B roll editing
- Instant replay
- Background playout
- Quick cue up
- VTR-like response

DNE-2000 Configurations:

- DNE-1000 Processor
- BKV-100 Live Video Overlay Board
- BKNE-1010 Editing Control Panel
- BKNE-1011 Editing Fader Panel
- BKNE-1020 Audio Processor Board
- BKNE-1030 Extended Input and Keyer Board
- BKNE-1040 Video Effects Board
- BZNE-2020 Operating Program
- MAV-555 Multi-access Video Disk Recorder
- BKMA-530 Output Processor Board

(3) Implementation of MAV-555 into news production

3-1. A feed recording and source player for linear editing system



Advantages:

To increase news editing efficiency, three editing suites can share the same material during feed recording.

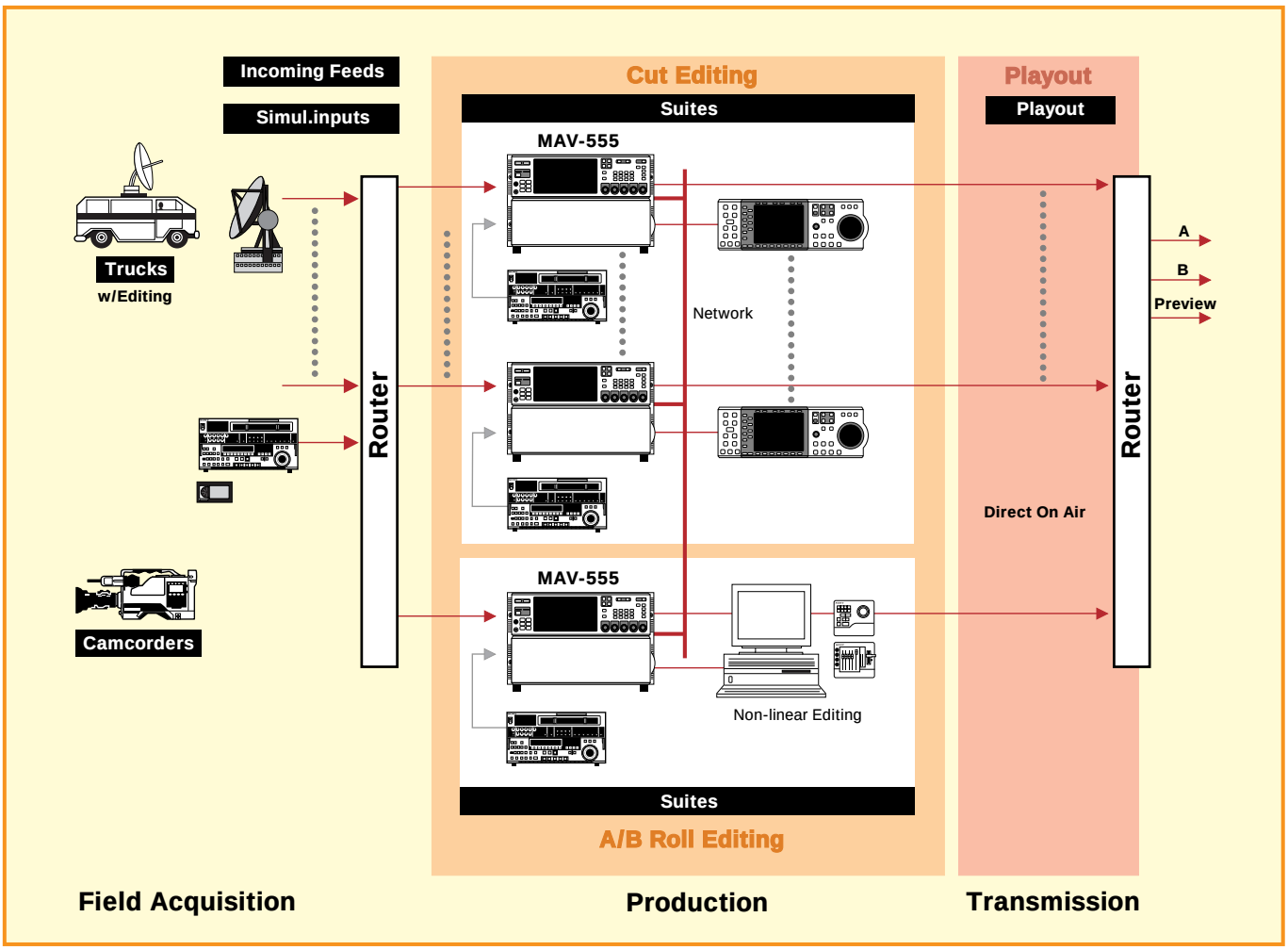
Features:

- Simultaneous feed record and edit
- A/B roll editing
- Instant replay
- Utilizes existing equipment
- File browsing and file selection
- Quick cue up
- VTR-like response
- Space and tape cost saving

Option:

- BKMA-530 Output Processor Boards
- BZMA-505 File Browsing Software

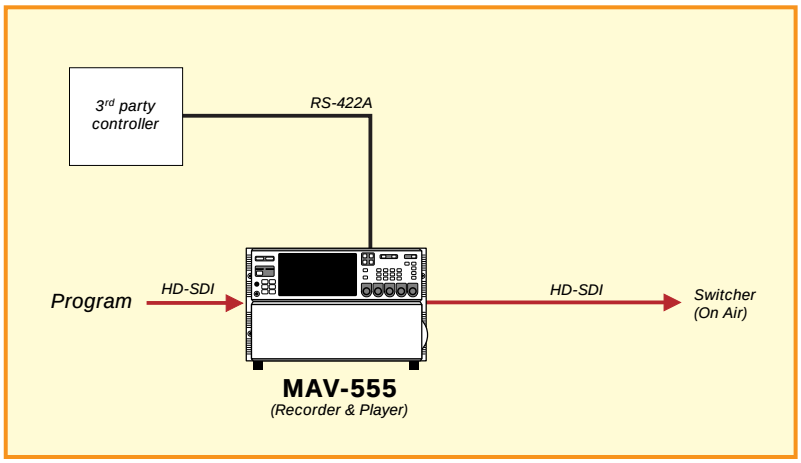
3-2. New disk-based news production



System configuration

(4) Implementation of MAV-555 into HD program production

4-1. A MAV-555 used in a HD transmission



Advantages:

This system provides HD playout such as slow replay and time shift playback during HD recording.

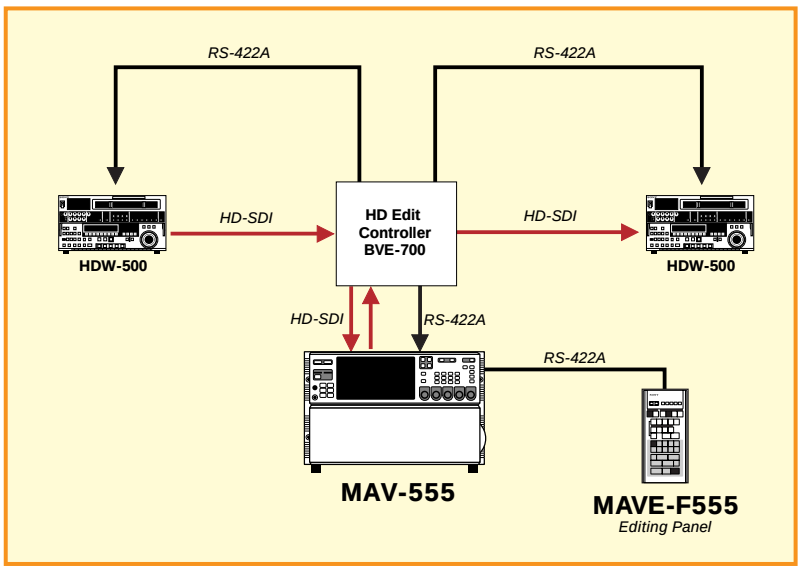
Features:

- Simultaneous feed record and trimming
- Cut editing
- Instant replay
- Quick cue up
- VTR-like response

Option:

- BKMA-510HD HDCAM Input and Output Processor Boards

4-2. A MAV-555 used as editing buffer or cache



Advantages:

By using the MAV-555 as editing buffer/cache, editing efficiency can be much enhanced.

Features:

- Linear-style
- Quick cue up
- VTR-like response
- A/B roll editing
- Instant replay
- Utilizes current equipment

Option:

- BKMA-510HD HDCAM Input and Output Processor Boards
- MAVE-F555 Editing Panel

Specifications

General

Power requirements:	AC 100 V ~ 240 V, 50/60 Hz
Power consumption:	Max. 600W (including all option boards)
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:	20% to 90% (relative humidity)
Weight:	50 kg (110 lb) (including all option boards)
Dimensions: (Excluding protruding parts)	424 (W) x 266 (H) x 631 (D) mm (16 3/4 x 10 1/2 x 24 7/8 inches)

Operational Performance

Recording/Playback time:	
MAV-555/9:	Max. 4 h 50 min @30 Mb/s (4 h 50 min @30 Mb/s / 3 h 40 min @40 Mb/s / 2 h 50 min @50 Mb/s selectable)*1
MAV-555/18:	Max. 9 h 40 min @30 Mb/s (9 h 40 min @30 Mb/s / 7 h 20 min @40 Mb/s /5 h 40 min @50 Mb/s selectable)*1
Search Speed:	
SHUTTLE mode:	Max. ±500 times normal speed (Maximum speed range ±32 /...±100 .../±500 selectable)
JOG mode:	±4 times normal speed -1 ~ +1: field by field, DJS -4 ~ -1, +1 ~ +4: G-shuttle
VAR mode:	±1 times normal speed /±2 times normal speed*2 selectable, field by field, DJS
Cue up time:	Min. 0.5 seconds
Time shift:	Min. 60 frames
Clip:	Min. duration 1 frame,up to 5,000 clips

Note*1 When choosing audio at 16 bit/sample
Note*2 Using optional BKMA-530 (Output Processor Boards) and 2 ports

Digital Video Performance

CODEC:	
Compression:	MPEG2 4:2:2 Profile@ML GOP N=1 (intra)
Bit rate:	Max. 50 Mb/s (50 Mb/s / 40 Mb/s / 30 Mb/s selectable)
Encoding samples:	Y:720/ line, B-Y/R-Y:360/ line
Encoding lines:	525:1 - 3,10 - 265,273 - 525 625:7 - 310,320 - 623
Sampling frequency:	Y: 13.5 MHz, R-Y/B-Y:6.75 MHz
Quantization:	8 bits/sample
Digital input to digital output:	
Bandwidth:	Y: 0.5 - 5.75 MHz +0.5/-0.75 dB R-Y/B-Y: 0.5 - 2.75 MHz +0.5/-0.75 dB
Analog composite input to analog composite output:	
S/N ratio:	More than 53 dB
Differential gain:	Less than 2%
Differential phase:	Less than 2°
Y/C delay:	Less than 20 ns
K-factor (2T pulse):	Less than 1%
LF non-linearity:	Less than 3% (including quantization noise)

Digital Audio Performance

Sampling frequency:	48 kHz
Quantization:	20 bits/sample, 16 bits/sample (selectable)
Analog input to output:	
A/D and D/A quantization:	20 bits/sample
Frequency response:	20 Hz to 20 kHz +0.5/-1.0 dB (0 dB at 1 kHz)
Dynamic range:	More than 95 dB (at 1 kHz, emphasis ON, 20 bits/sample)
Distortion:	Less than 0.05% (at 1 kHz, emphasis ON, ref. level=+4 dBm)
Cross talk:	Less than –85 dB (at 1 kHz, between any two channels, 20 bits/sample)
Head room:	20 dB (18 dB selectable)
Emphasis:	T1=50 µs, T2=15 µs (ON/OFF selectable)
Input reference level:	+4 dBm (+4/ 0 / -3 / -20 dBm selectable)

Processor Adjustment Range

Video:	
Video level:	±3 dB / -∞ to 3 dB selectable
Chroma level:	±3 dB / -∞ to 3 dB selectable
Set up/Black level:	±30 IRE / ±210 mV
Hue/Chroma phase:	±30°
System phase (coarse):	±30 µs (37 ns step)
(fine):	±37 ns (0.14 ns step)
Audio:	
Input level:	-∞ to 12 dB
Output level:	-∞ to 12 dB
Output phase:	±30 frames in FULL mode, ±100 samples in FINE mode
Audio mixer:	
Fade Time:	0 to 10 s in FULL mode, 0 to 500 ms in FINE mode

Analog Signal Input

Video reference:	BNC (x2 loop-through connection), composite, 0.3 Vp-p, 75 Ω, sync negative
Analog composite (option*1):	BNC (x2 loop-through connection) x 2 ports, 1.0 Vp-p, 75 Ω, sync negative
Analog audio (option*1 *2):	XLR (x4) x 2 ports -60 dBu,high impedance, balanced / +4 dBu, high impedance, balanced / +4 dBu, 600 Ω termination balanced selectable
Timecode reference:	BNC x1, 0.5 Vp-p – 18 Vp-p, 3.3 kΩ, unbalanced
Timecode:	BNC (x1) x2 ports, 0.5 Vp-p - 18 Vp-p, 3.3 kΩ, unbalanced

Note*1 Using optional BKMA-511 (A/D Converter Board)
Note*2 Using optional BKMA-570 (Analog Audio Expansion Unit)

Analog Signal Output

Analog composite (option*1):	BNC (x2) x 3 ports, 1.0 Vp-p, 75 Ω, sync negative
Analog audio (option*1 *2):	XLR (x4) x 3 ports, +4 dBu at 600 Ω load, low impedance, balanced
Time code:	BNC (x1) x3 ports 2.2 Vp-p at 600 Ω load, low impedance unbalanced
Video monitor:	BNC x1, composite,1.0 Vp-p, 75 Ω, sync negative with character super
Audio monitor L/R:	XLR x2 +4 dBu at 600 Ω load, low impedance, balanced
Headphones:	JM-60 stereo phone jack -∞ to –12 dBu at 8 Ω load, unbalanced

Note*1 Using optional BKMA-511 (A/D Converter Board)
Note*2 Using optional BKMA-570 (Analog Audio Expansion Unit)

Specifications

Video Effects

Sampling frequency:	Y: 13.5 MHz, R-Y/B-Y: 6.75 MHz, K: 13.5 MHz
Quantization:	8 bits/sample
Delay:	1 frame
When using BKMA-560	
Effects:	DSK, Split Screen
Pattern:	
Switcher:	Cut, Dissolve, Wipe, Pattern Wipe
When using BKMA-561	
Effect:	Location, Lighting
Pattern:	
Switcher:	Rotary Wipe, Matrix Wipe
Picture:	Solarisation, Posterisation
2D:	Mosaic, Real Paint, Stained Glass, Rotation, Zoom, Compression, PinP, Slide, Mirror, Stream, Accordion
3D:	Rotation, Compression, Perspective, Flip, Tumble, Door, Album Turn
Non Linear:	Page Turn, Page Roll, Sphere, Twist, Wave, Melt

Digital Signal Input/Output

Inputs	
SDI:	BNC (w/2 active-through connection) x 2 ports (w/BKMA-510), and 3 ports (w/BKMA-520) SMPTE 259M
SDTI (option*1):	BNC x1
Digital audio:	BNC (stereo pair x2) x 2ports, AES/EBU

Outputs	
SDI:	BBNC (x2) x 3 ports, SMPTE 259M
SDTI (option*1):	BNC (x1)
Digital audio:	BNC (stereo pair x2) x 3 ports, AES/EBU
Video monitor:	BNC x1, SMPTE 259M, with character super

Note*1 Using optional BKMA-540 (SDTI Board)

Remote

RS-422A:	
Remote In 1/2/3/4:	D-Sub9 (F) x4, Sony 9-pin VTR protocol, Sony 9-pin Disk protocol
Remote In/Out 1/2:	D-Sub9 (F) x2, for external VTR control (Sony 9-pin VTR protocol)
Remote Parallel I/O:	D-SUB 50-pin (F) x1, 24 inputs (5 V CMOS), 24 outputs (Open collector)
Ethernet:	RJ45 x1, 10Base-T
Spare:	D-SUB 9-pin (F) x1

BKMA-510HD HDCAM Input and Output Boards

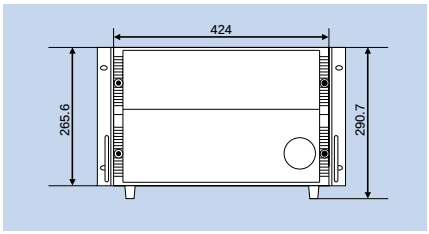
GENERAL	
Number of ports:	2 (Input x 1, Output x 1)
Recording time:	Approx. 1 hour (when using MAV-555/09) Approx. 2 hours (when using MAV-555/18)
VIDEO	
Sampling frequency:	Y 74.25/1.001 MHz Pb/Pr 37.125/1.001 MHz
Quantization:	10 bit (Input/Output Interface)
Compression format:	DCT Intra-frame 8 bit data reduction HDCAM format
AUDIO	
Sampling frequency:	48 KHz
Frequency response:	20 Hz - 20 KHz
Quantization:	20 bits/sample
Number of channels:	4 channels (Uncompressed)
Wow and flutter:	Below measurable limit
INPUT/OUTPUT	
Input	
Reference:	Black Burst 0.286 Vp-p, sync negative
VIDEO:	HD SDI (1.5 Gb/s) 1080i/59.94
AUDIO:	AES/EBU Audio or HD SDI Audio
Output	
VIDEO:	HD SDI (1.5 Gb/s) 1080i/59.94
AUDIO:	AES/EBU Audio or HD SDI Audio
Monitor (SUPER):	D1 SDI (270M), Analog composite (NTSC)
OPERATION	
SHUTTLE mode:	Max. ±500 times normal speed (Maximum speed range ±32 /...±100 .../±500 selectable)
JOG mode:	±4 times normal speed -1 ~ +1: field by field, DJS -4 ~ -1, +1 ~ +4: G-shuttle
VAR mode:	±1 times normal speed field by field, DJS
Processor Adjustment	
VIDEO system:	MASTER LEVEL Y LEVEL Pr LEVEL Pb LEVEL SET UP LEVEL SYNC PHASE
Audio system:	Input level: -∞ ~ +12 dB Output level: -∞ ~ +12 dB

BKMA-520SS Super Motion Input Boards

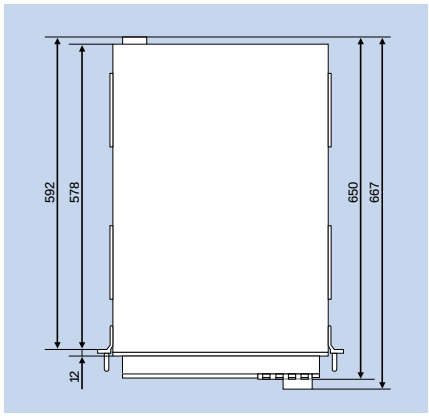
Super Motion Mode	
Ports:	Super Motion REC port x 1 (R1) Output port x 1 (P2)
Super Motion REC port (R1)	
Video:	SDI IN x 3 (*1)
Audio:	Analog 4-ch or AES/EBU 4-ch selectable (*2)
Time code:	Line (R1) TC or System TC selectable
Output port (P2)	
Video:	SDI and Composite (*3)
Audio:	Analog 4-ch, AES/EBU 4-ch, and SDI 4-ch (*3)
Super slow speed range:	-2/3 ~ +2/3 (*7)
Recording time (during super motion recording)	
	(When using MAV-555/18) (When using MAV-555/09)
30 Mb/s:	Approx 3 hr 00 min. Approx 1 hr 30 min
40 Mb/s:	Approx 2 hr 20 min. Approx 1 hr 10 min
50 Mb/s:	Approx 2 hr 00 min. Approx 1 hr 00 min
3 IN Mode	
Ports:	Input port x 3 (R1, R2, R3) Output port x1 (P2)
Input port (R1, R2, R3)	
Video:	SDI or Composite selectable (*4)
Audio:	Analog 4-ch, AES/EBU 4-ch or SDI 4-ch selectable (*4)
Time code:	Line TC or System TC selectable (*5)
Output port (P2)	
Video:	SDI and Composite (*3)
Audio:	Analog 4-ch, AES/EBU 4-ch, and SDI 4-ch (*3)

Note *1:Input signals should synchronize with REF signal.
Note *2: BKMA-511 and BKMA-570 are needed in case of analog signals.
Note *3: BKMA-512 and BKMA-570 are needed in case of analog signals.
Note *4: BKMA-511 and BKMA-570 are needed in case of analog signals. R3 is only for digital input.
Note *5: R3 is only available for system TC.
Note *6: BKMA-512 and BKMA-570 are needed in case of analog signals.
Note *7: BKMA-530 is reguired.

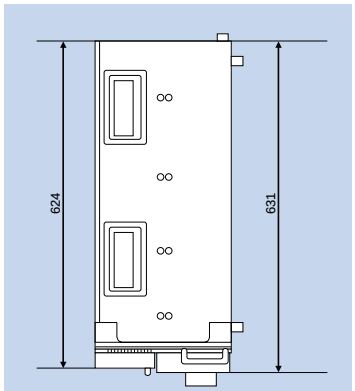
Front View

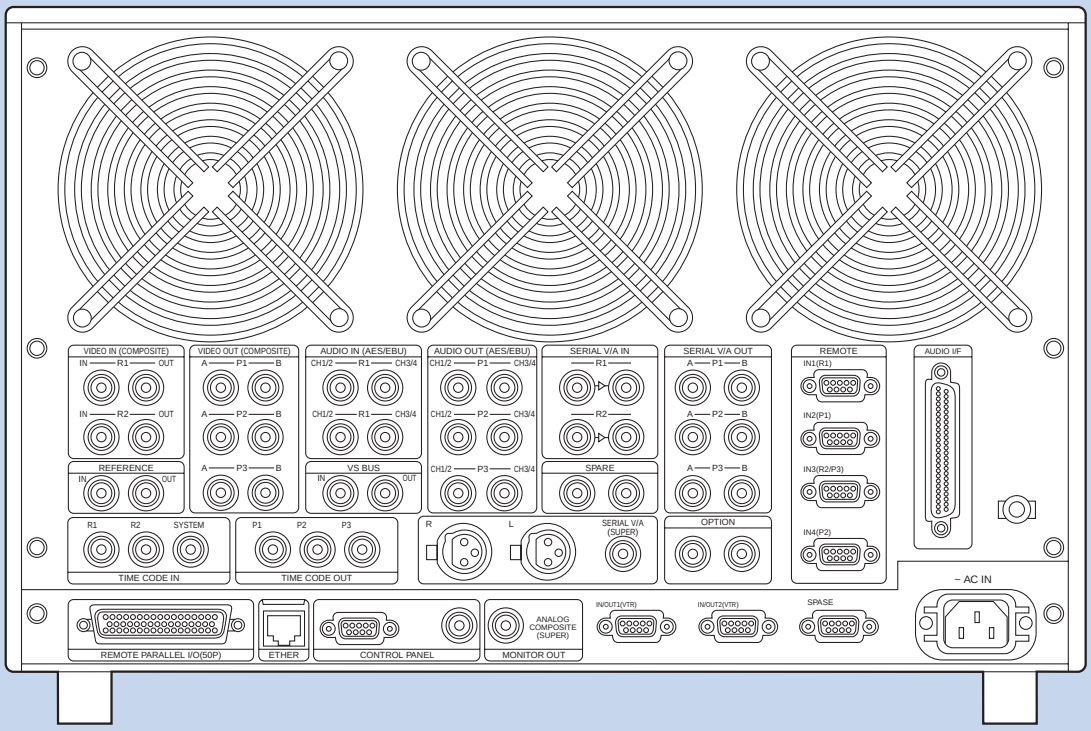


Top View



Side View





MAV-555 Connector Panel

SONY

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