



U-matic Videocassette Recorder  
**VO-9600**  
(EIA/NTSC)



**SONY**®

# THE VO-9600— A U-matic That Does It Better

*The VO-9600 is a U-matic recorder/player which incorporates SP technology to offer significantly improved recording and playback performance. It also features various technical breakthroughs such as a Dolby\* C-Type Noise Reduction system, new circuitry, and many more. As a result, it offers considerable improvement in both video and audio performance and yet, it is compatible with conventional U-matic VTRs. Frame Code, a new absolute address code, permits accurate search and random access operation. By connecting an external computer or the RX-707 Auto Search Control Unit the application possibilities for programmed operations, point of purchase, point of information, and interactive training systems are considerably broadened. The VO-9600 is sure to be an indispensable tool for video communication systems.*



## HIGH QUALITY VIDEO

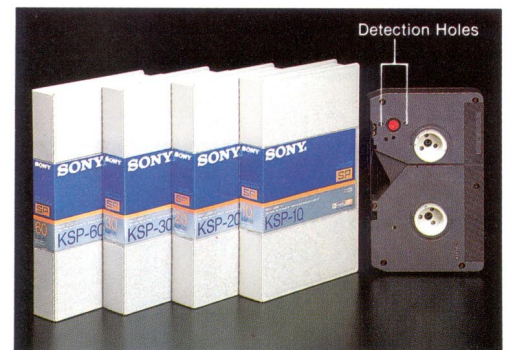
### Superior Performance (SP)

In order to respond to the needs for even more refined U-matic picture quality, the FM carrier frequency for luminance is increased by 1.2MHz, from the conventional 3.8 - 5.4MHz to 5.0 - 6.6MHz. The VO-9600 can handle more detailed information than conventional U-matic VTRs due to this higher recording frequency and the luminance resolution has been improved to 330 lines. Yet, it maintains compatibility with conventional U-matic VTRs because the luminance signal deviation (1.6MHz) and chroma sub-carrier frequency (688KHz) are unchanged.

In addition to the new carrier frequency allocation, the Superior Performance (SP) mode circuits incorporate state-of-the-art circuits such as the new Y/C separator, noise canceler, and CCD based dropout compensator. These circuits result in a significant reduction of luminance and chrominance ringing while improving luminance resolution. All of these factors lead to a marked rise in picture quality. Furthermore, the VO-9600 incorporates both SP and conventional modes for recording and playback.

### Automatic SP Mode Detection System

A new kind of videocassette has been developed to make the most of SP recording. The new videocassette contains two detection holes so that the SP recording mode can be automatically activated for any SP videocassette and the conventional recording mode can be activated for non-SP videocassettes. During playback, the SP U-matic recorder/player detects which FM carrier frequency is being used and shifts to the appropriate mode.



KSP Videocassettes

## HIGH QUALITY AUDIO

### Dolby C-Type Noise Reduction/Auto Detection System

Dolby C-Type NR is employed in the VO-9600 to obtain excellent audio quality. As a result, the audio S/N ratio has been improved to more than 70dB with Dolby NR on (measured by the CCIR/ARM filter, r.m.s.). The SP U-matic series also features an innovative Dolby NR auto detection system, which assures smooth operation for playing back various videocassettes recorded with Dolby NR either on or off. When recording in Dolby NR mode, which is possible only when using SP videocassettes, a Dolby NR pilot signal will be recorded on the audio channel. When the pilot signal is detected during the playback mode, the Dolby NR system is automatically activated. In the SP recording mode, the Dolby NR recording mode is selectable.

### Adoption of a New Sendust Head

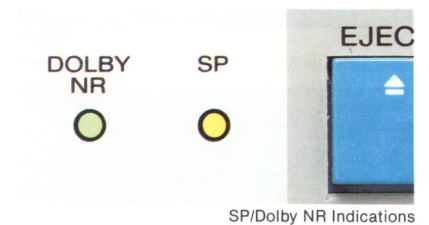
Thanks to the adoption of a new sendust head and record/playback circuits, the audio S/N ratio has been improved to more than 52dB (SP mode, without Dolby NR) and the audio frequency response has been also improved.

### XLR Connectors for Balanced Audio Input/Output

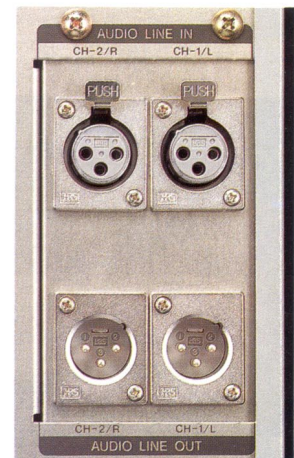
The VO-9600 adopts XLR balanced audio connectors for audio inputs/outputs to enhance the audio quality and system flexibility even further. XLR connectors allow connection to professional audio products and extended signal transmission.

### Audio Dubbing on CH-1

Additional audio, such as music or commentary, can be added to a videocassette which already has video signals on it by simply pressing the DUB/CH-1 and PLAY buttons simultaneously. Audio channel 1 is used for additional audio recording.



SP/Dolby NR Indications



XLR Connectors

## SYSTEM VERSATILITY

### Frame Code—New Address System for VTRs

With the optional FCG-700 Frame Code Generator, Frame Code, which is an absolute address code, can be generated frame by frame and recorded on the vertical blanking intervals of the video signal. The Frame Code is a 6 digit number from 000000 to 299999 and it appears on the LED display by setting the CTL/FRAME CODE switch to FRAME CODE when the optional BKU-701 Computer Interface Board is connected. Since accurate access is obtained with the Frame Code, random access and sophisticated program operation are possible with an external computer or the optional RX-707 Auto Search Control Unit.

### RS-232C Interface Capability

With the aid of the optional BKU-701 Computer Interface Board, which provides an RS-232C interface, the VO-9600 can be operated from an external computer or the RX-707 Auto Search Control Unit. Precise random access is extremely important because accurate auto search enables highly advanced interactive video applications.

### 33-pin Parallel Remote Control Interface

The VO-9600 is provided with a 33-pin parallel remote control interface and can be connected to the RM-500 or RM-580 to allow basic functions of the VTR to be controlled remotely.

### Real Time Counter

Real time that is counted by a CTL signal is displayed on the LED display. This LED display indicates an accurate tape running time (up to  $\pm 99$  min. 59 sec.). When the optional BKU-701 Computer Interface Board is connected, the Frame Code can be displayed on the LED display.

### Timer Operation

With the aid of a commercially available, optional AC on/off timer, unattended recording and playback can be executed.

### Time Base Corrector Connection/External SYNC IN

The VO-9600 is equipped with SC (sub carrier) IN, SYNC IN, and RF (OFF TAPE) connectors and, therefore, is capable of being connected to the BVT-810 Time Base Corrector (TBC). Synchronization with other video sources is possible through the external SYNC IN connector.



FCG-700



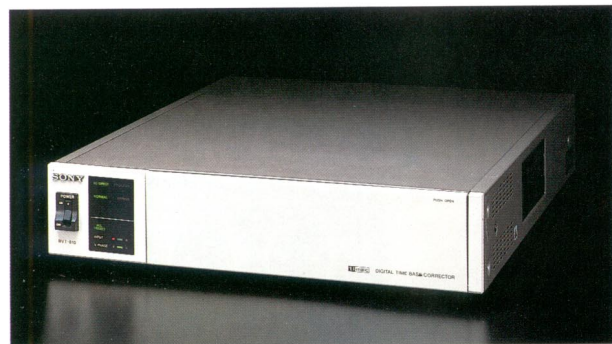
Frame Code Display



RX-707 and RS-232C Interface





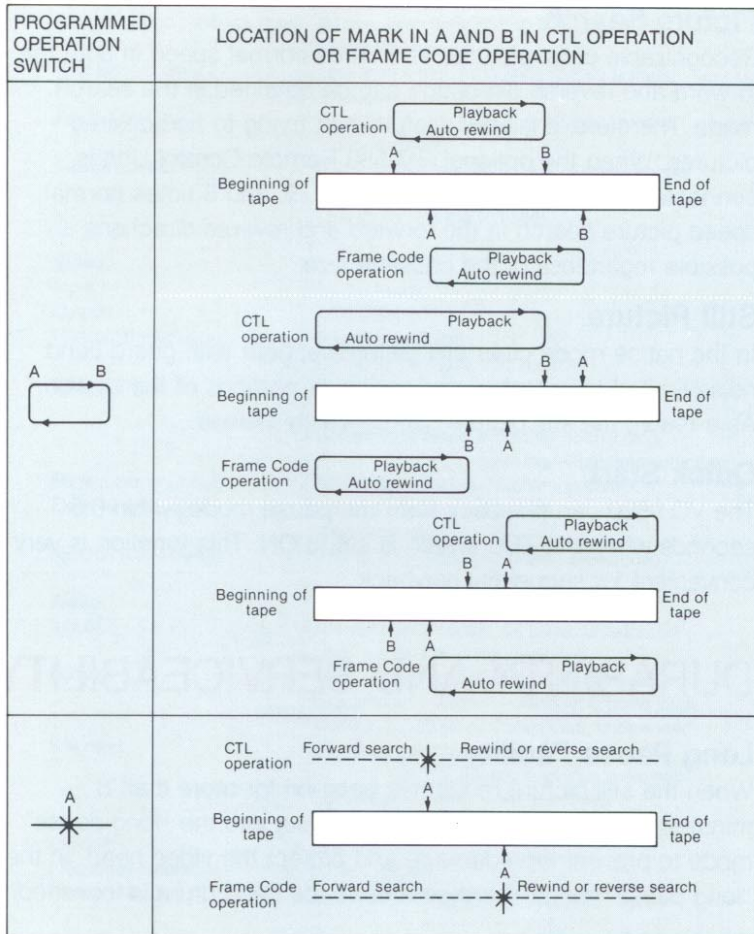
Real Time Display



BVT-810

## Programmed Operation

By setting two points with the MARK A and MARK B buttons, playback is repeated between the two points when the programmed operation switch is set to . The tape automatically stops at the point designated by MARK IN A when the programmed operation switch is set to . When the BKU-701 Computer Interface Board is installed, the points can be set by both CTL and Frame Code and therefore, two segments can be memorized.

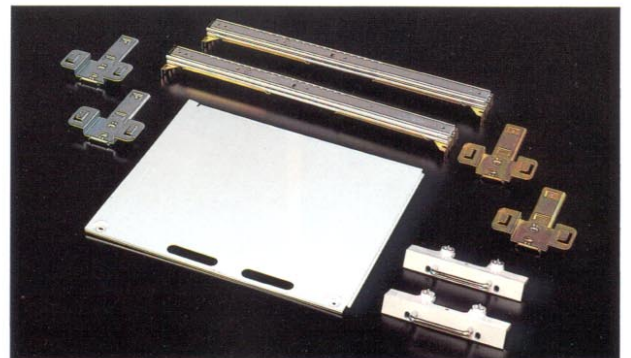


## RF Modulator

A playback picture can be monitored on an ordinary TV receiver (American television standard VHF, CH3 or CH4) when the optional RFK-634 RF Modulator is installed in a compartment on the rear panel.

## 4 Unit Height/Rack Mountable

The VO-9600 has a four unit high body and it is rack-mountable in a 19 inch EIA standard rack with the aid of the optional RMM-507 Rack Mount Kit. These features are not only space-saving but make maintenance more efficient.



RMM-507

## USER-FRIENDLY FUNCTIONS

### Wireless/Wired Remote Control RM-770 (optional)

The optional RM-770 Simple Remote Control Unit allows wireless remote control of the VO-9600. When the infrared receiver, which is supplied with the RM-770, is connected to the remote connector of the VO-9600, functional controls such as playback, record, fast forward, rewind and 5 times normal speed search in the forward and reverse directions can be controlled remotely. The RM-770 is also supplied with a flexible five meter cable which allows wired remote control of the VO-9600 as well.

### Picture Search

Recognizable color pictures at 5 times normal speed in both the forward and reverse directions can be obtained in the search mode. Therefore, it is very useful when trying to find desired pictures. When the optional RM-580 Remote Control Unit is connected, STILL,  $1/30$ ,  $1/10$ ,  $1/5$ ,  $1/2$ , 1, 2, 5, and 8 times normal speed picture search in the forward and reverse directions is possible regardless of the cassette size.

### Still Picture

In the pause mode clear still pictures appear with guard band noise limited to only the upper or lower portions of the screen. As a result, the still picture can be easily viewed.

### Quick Start

The VO-9600 can playback from the pause mode within 0.5 seconds when the TBC switch is set to ON. This function is very convenient for sequential playback.

## DURABILITY AND SERVICEABILITY

### Long Pause Facility

When the still picture mode has been on for more than 8 minutes, the VO-9600 is automatically set into the "long pause" mode to prevent tape damage and protect the video head. In the "long pause" mode, the tape around the head drum is loosened.

### Digital Hour Meter

The actual time that the head has been used is counted by the digital hour meter and can be indicated on the LED display. The time is advanced by 50 hour increments and the meter can indicate up to 9950 hours.

### Self-Diagnostics

The VO-9600 features self-diagnostic functions and is capable of indicating various errors and defect messages for efficient service and maintenance.



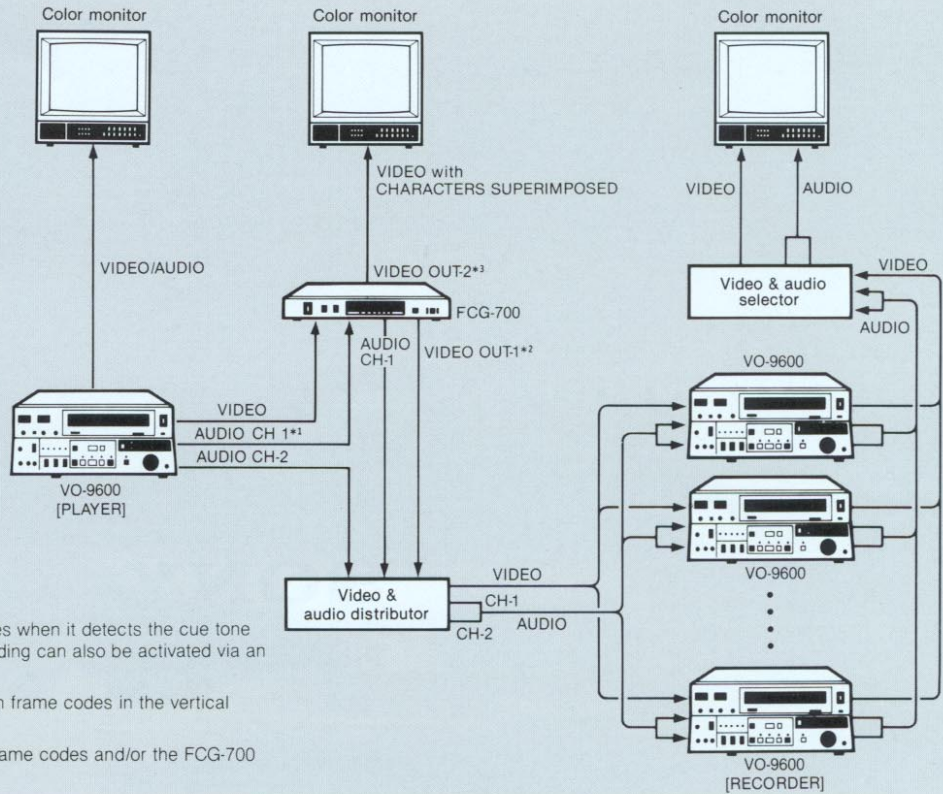
RM-770



Digital Hour Meter

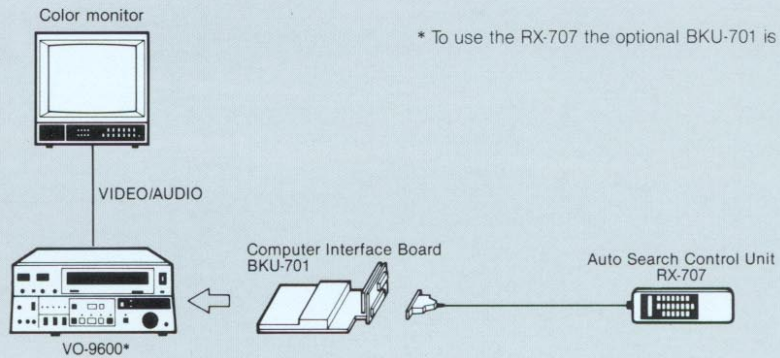
# System Versatility

## 1. Frame Code Recording



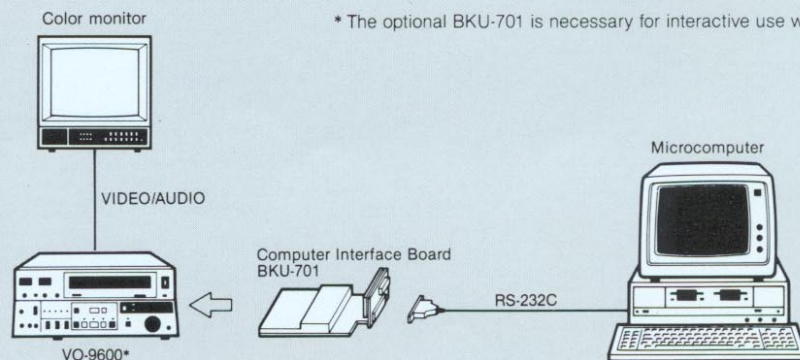
- \*1 The FCG-700 begins generating frame codes when it detects the cue tone recorded on audio CH-1. Frame Code recording can also be activated via an external trigger or manually.
- \*2 Video signals from the VIDEO OUT-1 contain frame codes in the vertical blanking intervals.
- \*3 Pictures from the VIDEO OUT-2 can have frame codes and/or the FCG-700 status superimposed on them.

## 2. Random Access and Program Operation with Frame Code

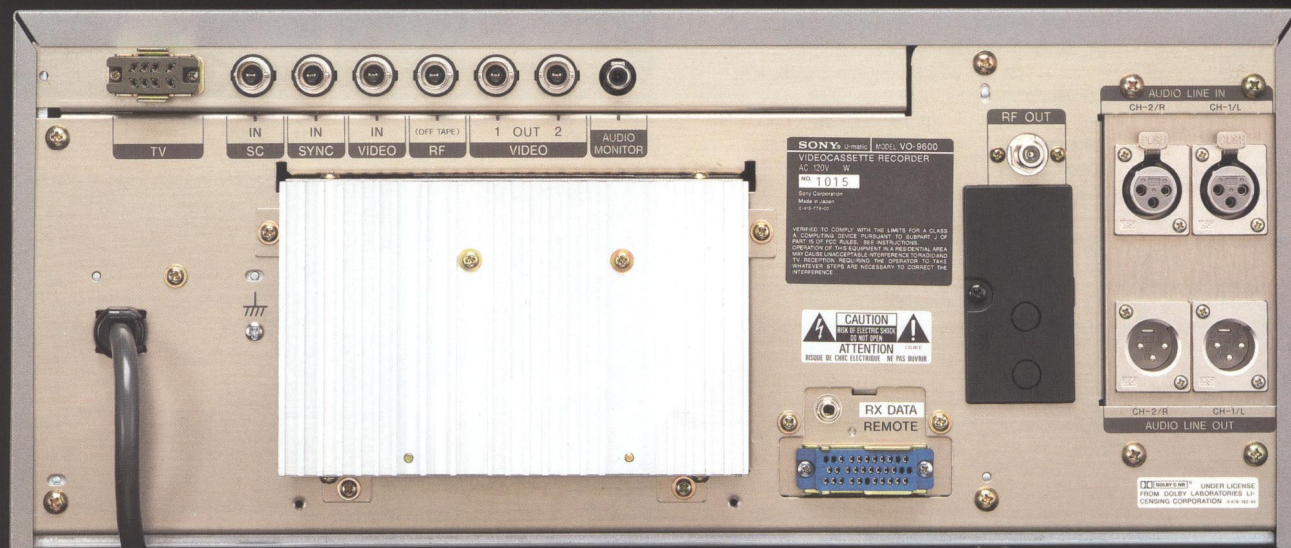
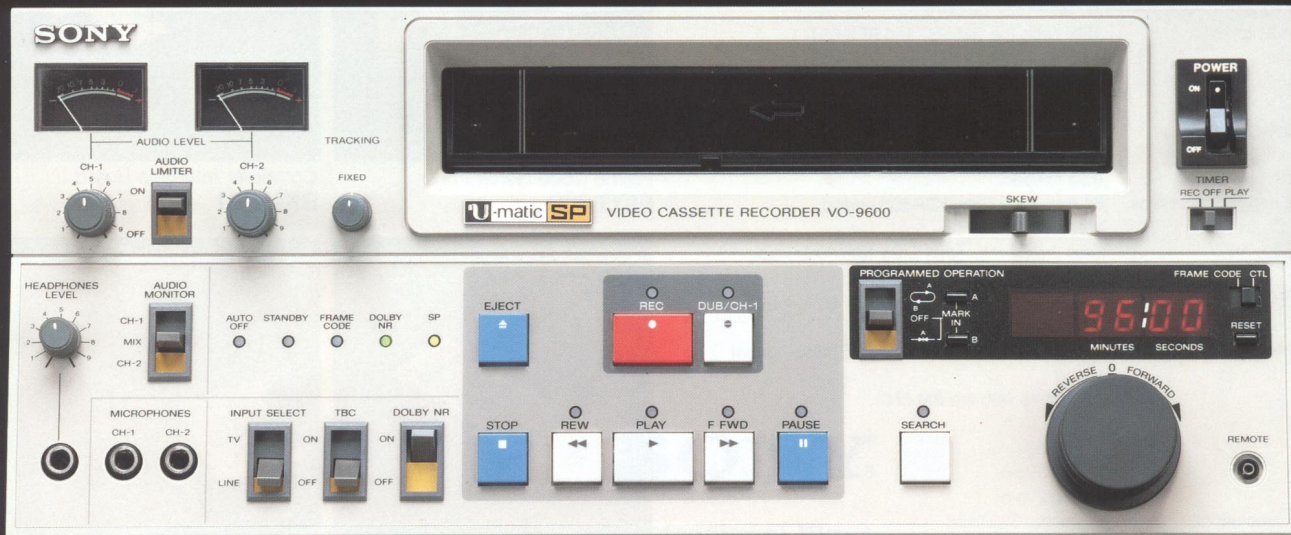


\* To use the RX-707 the optional BKU-701 is necessary.

## 3. Interactive Video with Frame Code



\* The optional BKU-701 is necessary for interactive use with a microcomputer.





## Specifications

### General

Video recording system:	Rotary 2-head helical scan system Luminance: FM recording Chrominance: SC low-range conversion recording
Video signal system:	EIA monochrome, NTSC color
Operating temperature:	5°C ~ 40°C (41°F ~ 104°F)
Power requirements:	AC 90 ~ 132V, 50/60Hz ±10%
Operating voltage:	AC 90 ~ 132V 50/60Hz
Power consumption:	75W (with the RM-580 and RFK-634)
Dimensions:	Approx. 424(W) × 192(H) × 492(D)mm (16 <sup>3</sup> / <sub>4</sub> × 7 <sup>5</sup> / <sub>8</sub> × 19 <sup>3</sup> / <sub>8</sub> " )
Weight:	Approx. 18 kg (39 lb 11 oz)
Videocassette:	Sony KSP, KSP-S, KCA-BRS, KCA-K, KCS-BRS, KCS-K type or equivalent
Tape speed:	9.53 cm/sec.
Recording and playback time:	60 min. (with Sony KSP-60 U-matic Videocassettes)
Fast forward time:	Less than 4 min. (with Sony KSP-60 U-matic Videocassettes)
Rewind time:	Less than 4 min. (with Sony KSP-60 U-matic Videocassettes)
Search speed:	STILL, ±1/30, 1/10, 1/5, 1/2, 1, 2, 5 times normal speed (±8 times with the RM-580)

### Video


Input:	1.0 ± 0.3Vp-p
Output:	1.0 ± 0.2Vp-p
Horizontal resolution:	SP mode: 330 lines Conventional mode: 250 lines
S/N ratio:	SP mode: more than 46dB (color) more than 48dB (monochrome) Conventional mode: more than 46dB (color) more than 48dB (monochrome)
SC (subcarrier) input:	1.0V (0.5 ~ 3.0V) p-p, 75 ohms, unbalanced
External sync input:	2.5V (1.0 ~ 5.0V) p-p, 75 ohms, unbalanced, sync negative
RF OUT (OFF TAPE):	0.5V (0.3 ~ 1.0V) p-p, 75 ohms, unbalanced

### Audio

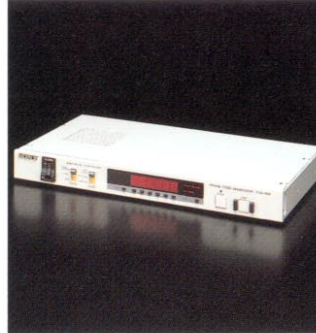
Inputs:	Microphones: -60dB, 3K ohms, unbalanced Line: +4dB, 10K ohms, balanced
Outputs:	Line: +4dBm (at 600 ohm load), balanced Headphone: -26dB ~ -46dB (at 8 ohms load) Monitor: -5dB (at 47K ohm load), unbalanced SP mode: more than 52dB (at 3% distortion without audio NR) Conventional mode: more than 50dB (at 3% distortion)
S/N ratio:	
Distortion:	Less than 2%
Frequency response:	50Hz ~ 15kHz
Wow and flutter:	Less than 0.18% rms

<b>Supplied accessory:</b>	Operation manual RF unit cover
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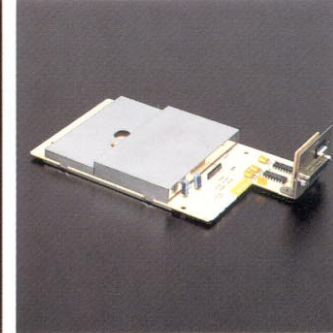
Design and specifications subject to change without notice.

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## Optional accessories



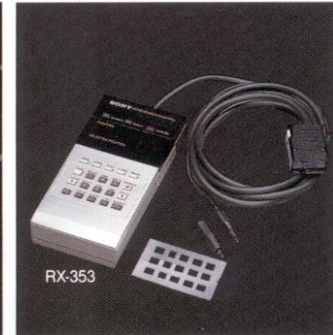
Frame Code Generator  
FCG-700



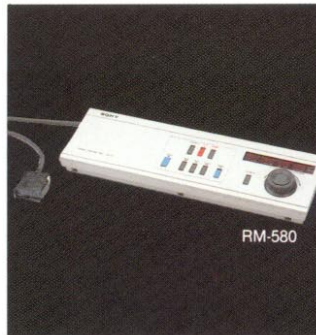
Computer Interface Board  
BKU-701



Auto Search Control Unit  
RX-707



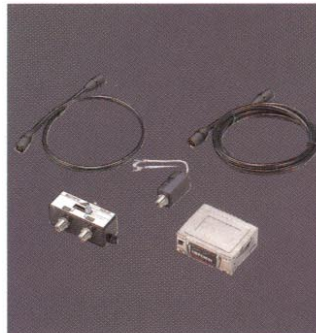
Auto Search Control Unit  
RX-303/353



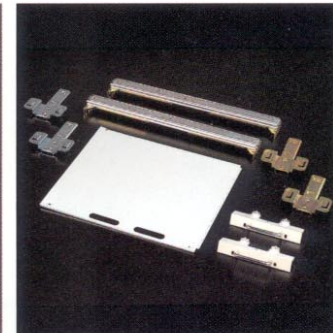
Remote Control Unit  
RM-500/580



Remote Control Unit  
RM-770



RF Kit  
RFK-634



19" Rack Mount Kit  
RMM-507