

## \* PRINCIPLE OF OPERATION

These VCR units are composed of PIF, Video, power, System Control & Servo & Timer and OSD ( On screen Display ) circuit.

The PIF circuit consists of a tuner, a PIF & SIF circuit, and a modulator circuit. The incoming signals, induced in the VHF and UHF antenna are converted to stable, video and audio signal that may be fed to the Video and Audio circuit instead of the signals from the other Video equipments.

In the playback of monitoring mode, the signals of Video and Audio circuit may be either fed out directly to the other Video equipments such as monitor TV set, converted to TV signal ( RF wave ) in a low VHF channel to receive by a TV sets.

The Video circuit contains a recording and playback amplifier, a noise canceler, and the other functional circuit. The composite video signal input to the Video circuit is fed to the AGC and color circuit.

The AGC circuit uses the composite Video signal itself for AGC action. A part of the AGC output signal is fed as an E-E Video signal to the video line output terminal and RF modulator.

On the other hand, the other part of the AGC output signal inputs to Low Pass Filter to eliminate the C (chroma) signal component.

The result is that the Y (luminance) signal component is obtained. The Y passes the non-linear pre-emphasis circuit and converted to FM signal by the FM modulator. The FM Y signal is fed to the recording amplifier circuit.

In the color circuit, the composite Video signal inputs to the 3.58MHz Band Pass Filter to separate the C signal. The gain of C is controlled to a required amplitude by the ACC circuit. It, then is converted to 629KHz, which is fed to the recording amplifier circuit.

The recoding amplifier circuit superimposes the 629KHz converted low frequency C and FM Y signal. The superimposed Video signal is connected to the pair of Video heads. In playback, the Video signal picked up by the pair of Video heads is amplified through the playback amplifier. The FM Y signal passes the DOC (Dropout compensator) circuit, enters the noise canceler, and then comes into the non-linear de-emphasis circuit where the original Y signal is obtained. The 629KHz low frequency C signal, on the other hand, is converted to 3.58MHz. The Y and 3.58MHz C signal are mixed to playback the original NTSC composite Video signal.

The Audio circuit contains playback, recording, output amplifier, ALC erase oscillator, and electronic switching circuit. This circuitry has the same general arrangement as that of common monophonic tape recoder.

The RCC (Ringing Choke Converter) type SMPS (Switching Mode Power Supply) is applied to power circuit.

The OSD circuit is activated in superimpose and MENU mode.

DVD unit is composed of Power circuit, Video & Audio circuit, Digital Audio circuit, MPEG codec(Compressor/Decompressor) circuit, DVD CPU circuit, and ATAPI DVD Loader circuit.

Video/Audio circuit is same as that of VCR unit. It encodes the analog video signal(composite, Y-Cr-Cb, or RGB) to digital video signal to process the digital data, and encodes analog audio signals to digital audio signal.

It also decodes digital video signal to provide recognizable signal(composite, Y-Cr-Cb, or RGB) to video terminal, and decodes and amplifies digital audio signal to provide recognizable analog audio signals to audio amplifier terminal.

Digital Audio circuit transmits digital audio signal from MPEG codec circuit to the Optical and Coaxial audio output terminals.

MPEG codec circuit compresses the digital data with MPEG-2(for video) and MPEG-1 Layer-2(for audio) algorithm. The compressed data is transferred to ATAPI DVD Loader circuit for recording.

After parsing to raw DVD/CD stream, MPEG codec circuit transmits navigation(DVD) and TOC(VCD/CDDA/MP3) data to DVD CPU circuit. Also, after decompressing raw MPEG, AC3(or DTS), subtitle, and other DVD/VCD data, MPEG codec circuit transmits VIDEO/AUDIO signal to VIDEO/AUDIO circuit.

DVD CPU circuit controls all other circuits in DVD unit. It makes navigation menu and control data when recording is completed. Also, according to user operation, navigation and control data(DVD), TOC(VCD/CDDA/MP3) data, DVD CPU circuit controls DVD Loader circuit and MPEG codec circuit to record DVD+R(+RW) disc and playback DVD/CDDA/MP3 disc.

Receiving commands from DVD CPU circuit, ATAPI DVD Loader circuit writes compressed DVD data from MPEG codec circuit and DVD CPU circuit to DVD+R(+RW) disc. It also reads raw DVD, CD data from DVD, CD respectively, and transmits raw DVD, CDDA, MP3 data to DVD CPU circuit via MPEG codec circuit.

The ADC(Analog to Digital Converter) which is located in VCR audio part converts analog inputs which are line inputs(front,rears), PIF, radio signals, into PCM(Pulse Code Modulation) signal and transmits PCM data to MPEG IC which has a DSP IC built in.

The DSP IC in MPEG IC processes 2ch PCM data that is converted from analog signals and transferred directly from Loader.