Please carefully read this guide before using the device. The Hitachi DVD Player has been designed to prevent fire, electrical shock, injury, or harmful radiation. It has been illegally fabricated in accordance with the Electrical Appliances Act. Therefore, when using the device, please follow advice in this service guide to keep it safe to use.

1. In brief

DV-K2 is a device for DVD playback.
This device is to be used by connecting it to the video input terminal of a TV set.

2. Features

- Disc navigation system facilitates program search.
- Speedy operation by 2x speed drive.
- Equipped with 2 mike input Karaoke

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 Specifications may be changed as improvements are made without advance notice. The marked price does not include consumption tax.

HITACHI
PRECAUTIONS FOR SAFETY (Please follow.)

Before undertaking repair work, please read through this [Precautions for safety].
The following points should be observed in order to prevent accidents from happening and to ensure the safety of the device.

- Degrees of danger or damage that can be caused by faulty operation are indicated by the following marks:

  ![WARNING] Under this mark, there is "Possible death or serious injury".

  ![CAUTION] Under this mark, there is "Possible injury or material damage".

- The following marks identify actions to be taken:

  ![WARNING] This mark indicates items to which "You should pay attention".

  ![CAUTION] This mark indicates items "You have to accomplish".

  ![WARNING] This mark indicates "Forbidden items".

You should pay attention.
Where a special attention is required, it is indicated by a label or stamp. For example, on the cabinet, chassis, or parts. Please respect the indicated items and the Precautions for use in the manual.

- You should be cautious against electric shock.
Please be careful during operations because there are high voltage and recharging parts inside. An electric shock or death may happen by touching them. When disassembling, assembling, or replacing a part, the power plug has to be pulled off. Touching by error a powered part may cause an electric shock, death, or injury.

- Please use designated parts.
Parts are characterized by unitiness and voltage resistance. Therefore, parts having these same characteristics must be used in replacement. Especially for parts important in insuring safety, identified by $\Delta$, in the wiring diagram or parts list, a part with the identical part number shall be used. If a part with a different part number is used, an electric shock or a fire may occur.

警告

- 注意

- 小心電擊

- 使用指定部件

警告

3. Specification

<table>
<thead>
<tr>
<th>Common</th>
<th>Model</th>
<th>DV-K2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser type</td>
<td>Semiconductor laser</td>
<td></td>
</tr>
<tr>
<td>Wave length</td>
<td>650nm (DVD)</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>AC100V/50/60Hz both</td>
<td></td>
</tr>
<tr>
<td>22W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>850g</td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>1.7W</td>
<td></td>
</tr>
<tr>
<td>24W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>41.5(W) x 31.5(D) x 8.8(H)</td>
<td></td>
</tr>
<tr>
<td>4.1 kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>5°C to 35°C</td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>15% to 75% (without condensation)</td>
<td></td>
</tr>
</tbody>
</table>

- 5 image output terminal [1 system] (S2 output)

| Y output level | 1Vp-p (75Ω) |
| C output level | 286mVp-p (75Ω) |

- Image Output terminal [1 system]

| Y output level | 1Vp-p (75Ω) under last synchronous signal |
| C output level | 286mVp-p (75Ω) |

- Audio output terminal [2 systems]

| 200mVrms (1KHz, 20dB) | Frequency characteristics |
| 2 channels | 6dB/oct (5kHz, 60dB) |
| 40kHz to 20kHz (EIAJ) | Dynamic range |
| 48kHz to 44kHz (EIAJ) | Total harmonic distortion |
| Measuring limits: less than 0.001% (PEAK) (EIAJ) |

Other terminals

| Optical digital output: (Digital Digital +AD3v, LPPCM, LPPCM, may be switched to OFF) optical connector |

| Accessories | Remote control (DV-RM2) | 1 |
| Single type battery (R6P) | 2 |
| AV cord | 1 |
| Power cord | 1 |

4. Name of parts

- Remote control set

<table>
<thead>
<tr>
<th>POWER BUTTON</th>
<th>OPEN/CLOSE BUTTON</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISPLAY BUTTON</td>
<td>ZOOM BUTTON</td>
</tr>
<tr>
<td>ANGLE BUTTON</td>
<td>DISC NAVI BUTTON</td>
</tr>
<tr>
<td>SUBTITLE BUTTON</td>
<td>AUDIO BUTTON</td>
</tr>
<tr>
<td>RETURN BUTTON</td>
<td>DISC MENU BUTTON</td>
</tr>
<tr>
<td>KARAOKE BUTTON</td>
<td>A-B BUTTON</td>
</tr>
<tr>
<td>-BUTTON</td>
<td>STEP BUTTON</td>
</tr>
<tr>
<td>PAUSE BUTTON</td>
<td>STOP BUTTON</td>
</tr>
</tbody>
</table>

| NUMERICAL BUTTON | CLEAR BUTTON |
| TITLE BUTTON | ENTER BUTTON |
| DIRECTION BUTTON | SET UP BUTTON |
| SKIP BUTTON | SPEED BUTTON |
| LAST BUTTON | PLAY BUTTON |
5. Description of adopted new technology

5-1 Digital signal circuit

(1) Data flow

Fig. 5-1 shows the block diagram of digital signal circuit.

DISC data read by DVD ROM DRIVE are stored in TRACK BUFFER (IC1603) by SH MICOM (IC1601) and through I/F GATE ARRAY (IC1101). Then the stored data will be read out from TRACK BUFFER in response to demand by A/V DECODER (IC1201) and input in A/V DECODER through I/F GATE ARRAY. Finally, A/V DECODER will demodulate/decode the data according to their contents and output Audio data to Audio DAC (IC1502), and video data to Video ENCODER (IC2202).
The following is the description of the functions of each IC:

**IC1101 I/F GATE ARRAY**
- Execute data transfer timings from ATAPI to TRACK BUFFER, and from TRACK BUFFER to AV DECODER.
- The I/F GATE ARRAY, SYSTEM CLOCK, CLOCK of VIDEO INTERFACE signals, and CLOCK of AUDIO INTERFACE signals operate by inputting 30MHz, 27MHz, and 16.934/18.432, 36.864 MHz, respectively.
- 5V

**IC1601 SH MICOM**
- Execute data transfer, presetting and control of each IC.
- 5V

**IC1602 FLASH MEMORY**
- Store memory for SH MICOM software.
- 5V

**IC1603 TRACK BUFFER**
- Buffer memory for data transfer.
- 5V

**IC1604 EEPROM**
- Storage memory for LAST KEY operation data.
- 5V

**IC1201 AV DECODER**
- Execute decompression (decoding) of data compressed by MPEG.
- 3.3V

**IC2203-IC2207 BUFFER RAM**
- Memory used for decompression (decoding) of data compressed by MPEG and controlled by AV DECODER.
- 5V

**IC1504 PLL**
- Generates 16.934 (18.432, 36.864) MHz of audio interface signals.
- 5V

5-2 Video circuit (DEC substrate)

8bit Y/Cs DIGITAL VIDEO STREAM output from AV DECODER is input in VIDEO ENCODER B1865A (IC202). VIDEO ENCODER is preset in IC in MASTER MODE that generates reference signals and receives 27MHz from SYSTEM CLOCK and outputs H,V synchronous signals to AV DECODER.

By presetting of internal register, VIDEO DECODER generates:

- NTSC (North America, Japan, Taiwan)
- PAL (Europe, Asia)
- standard analog video signals.

Filter circuit eliminates high frequency components of analog video signals output from VIDEO DECODER. Afterwards in S2 processor circuit DC voltage is superposed on C signals then output 2 types of video signals: COMPOSITE VIDEO SIGNALS and Y/C(S2) VIDEO SIGNALS to RJK substrate via SP connector (PG2201).

The following is a description of VIDEO CIRCUIT along signal flow:
5-2-1 VIDEO ENCODER B1865A (IC2202)

(1) MULTIPLEXER SECTOR
It transforms input DIGITAL VIDEO STREAM (input at R–G pins) in 8bit parallel data then separates them in Y DATA and CvCz DATA and changes simultaneously the rate (6.75MB/S + 13.5MB/S).

(2) CONVERTER SECTOR
It generates various internal timing signals with the synchronous signal as standard by adding synchronous signals generated in IC to Y DATA, according to the conditions set in the internal register or by adding BURST signals to CvCz DATA. At the same time it outputs these synchronous signals to AV DECODER (Output at R–G pins). BLANK signal (Input of L level at T pin) is input from SH MCM when power is turned ON or OFF to prevent screen flickering. In addition, when power is turned ON, RESET signal (Input of L level at T pin) is input to reset the register in IC.

Moreover, writing in the internal register (presetting) is done via PC BUS (R–G pins).

(3) ENCODER SECTOR
The following R–G data are inserted in VIDEO DATA according to preset conditions in the internal register:
- Closed caption
- NTSC Mode: 21 lines and 284 lines/ PAL Mode: 22 lines and 335 lines.
- CGMS (Copy Guard Management System)
- 20 lines and 280 lines of NTSC.
- Macrovision Copy Prevention System

Finally, it generates DIGITAL INTENSITY DATA, DIGITAL CHROMA DATA, and DIGITAL COMPOSITE DATA.

(4) DAC CONVERTER (DAC/SECTOR)
It consists of 10bit DAC, it transforms DIGITAL VIDEO DATA in ANALOG VIDEO DATA for output. Under control of output voltage by DAC pins (R, G, B, S, pins), it output 3 kinds of ANALOG VIDEO SIGNALS:
- ANALOG COMPOSITE VIDEO SIGNALS (CVBS/10 pin), output voltage 1.0Vpp.
- ANALOG INTENSITY SIGNALS (Y/9 pin), output voltage 1.0Vpp.
- ANALOG CHROMA SIGNALS (C/B pin), output voltage 280mVpp.

5-2-2 S2 Processing Circuit
S2 is a standard used in wide television sets possessing screen size switching function in NTSC mode. By inputting VIDEO signals formed by superposing DC voltage on C signal at S input terminal it switches automatically to TV display size. The DC voltage superposed on C signal varies according to the ASPECT RATIO of VIDEO SIGNALS.

(1) Case of SQUEEZE SIGNAL (R1)
H-level voltage input in SQUEEZE INPUT: Q2202 and Q2201 are powered and +4V DC voltage is superposed on C signal output line.

(2) Case of LETTER BOX SIGNAL (R2)
H-level voltage input in LETTER INPUT: Q2205, Q2204, and Q2203 are powered and +1.8V DC voltage is superposed on C signal output line.

5-3 VIDEO OUTPUT CIRCUIT (RJK substrate)
ANALOG COMPOSITE VIDEO SIGNALS (CVBS), ANALOG INTENSITY SIGNALS (Y), and ANALOG CHROMA SIGNALS (C) are sent from DEC substrate to RJK substrate by passing through 6P connector (PG2031-CN302). From RJK substrate, CVBS signals are output from output terminal J1301 and Y/C signals are output from output terminal J1302.
5-4 AUDIO CIRCUIT

AUDIO CIRCUIT is shown in Fig. 5-4-1.

AUDIO CIRCUIT is composed of D/A CONVERTER SECTOR (DEC substrate) that transforms digital audio signals output from A/V DECODER (IC1201), ANALOG PROCESSING SECTOR (RJK substrate) that consists of an operational amplifier, and MUTE CIRCUIT (DEC substrate, RJK substrate) for stopping audio output when required.

(1) D/A CONVERTER SECTOR (DEC substrate)

D/A CONVERTER SECTOR is composed of IC1502 that receives and transforms digital audio signals from A/V DECODER in analog signals and IC1504 that generates clock signals corresponding to the sampling frequency of digital audio signals from 27MHz of master clock signals.

IC1502 is a converter corresponding to L and R signals of sampling frequencies 44.1/48/96kHz and data lengths 16/20/24bit, and digital audio signals from A/V DECODER is input at φ pin.

To these digital audio signals are inserted L and R signals in time sharing mode. When they are input at φ pin, they are separated in L and R signals by R clock and after transformation analog L signals are output at φ pin and R signals at φ pin. Moreover, when there are no input signals at φ pin, a signal called ZERO MUTE is output to φ pin to mute useless noises (See paragraph on MUTE CIRCUIT.)

Every function of IC1502 is preset by MICOM and controlling signals from SH MICOM are input at @φ@φ pins.

As for presetting items, there are data length, sampling frequency, signal polarity, and de-emphasis.

On the other hand, 27MHz master clock is input at φ pin of IC1504, then passes through the internal PLL circuit and is output from φ pin as a clock signal provided to IC1502.

(2) ANALOG PROCESSING SECTOR (RJK substrate)

ANALOG PROCESSING SECTOR is composed of operational amplifier IC1508 that is a filter and operational amplifier IC1510 that mixes and amplifies audio signals and Karaoke signals.

Filter portion is composed of RC low bass filter and IC1508 formed active low bass filter and there are 3 sections. The diagram below shows its filter portion circuit (for L signals only).

R1527 R1529
C1561
R1531
C1559
R1533
C1563
IC1508

This 3-section filter constitutes a low bass filter of overall cutoff frequency of 44kHz. Audio signals after low bass filter is amplified by IC1510 by about 6dB and output to AUDIO OUT1 AND AUDIO OUT2.

Here, among audio signals, L signals are input at φ pin of IC1508 and output from φ pin, then input to φ pin of IC1510 then output from φ pin.

R signals are input at φ pin of IC1508 and output from φ pin, then input to φ pins of IC1510 then output from φ pin.

(3) MUTE CIRCUIT (DEC substrate, RJK substrate)

The principal role of MUTE CIRCUIT is the erasing of useless noises occurring when power is turned on.

Mute signal for noise erasing is generated by SH MICOM, reverse-amplified by Q1505 and Q1506. Then by putting Q1510, Q1511, Q1310, and Q1311 'ON', it mutes audio signals.

In addition, if IC1502 detects no-signal, it generates a mute signal called ZERO MUTE. This latter is reverse-amplified by Q1507 and mutes useless audio signals by putting Q1310 and Q1311 'ON'.
5.5 KARAOKE CIRCUIT (The following descriptions concern Lch signal/Rch signal) When mike is connected to the mike input terminal, “KARAOKE” will be lighted on FL tube and mode will be changed to Karaoke mode. Therefore, Karaoke functions of keycon and vocal cancel may be used. When mike is disconnected, karaoke mode is “OFF”.

(1) MAIN CIRCUIT
L/Rch signals output by audio circuit low bass filter, IC1508 @, @ pins pass through BUFFER (IC1509, input at @, @ pins, output at @, @ pins) and are input to IC1417 @, @. Then they are processed and sorted, by command by SH MICOM (IC1417, input at @, @ pins), in Lch MONO*, Rch MONO*, VOCAL CANCEL*, L/Rch output as it is, and then output from @, @ pins.
Afterwards, L/Rch signals pass through HF F (IC1418, input at @ pin, output at /IC1419, input at @ pin, output at @ pin), mixed with MIKE ECHO signal and KEYCON signal (IC1418, input at @ pin, output at @ pin/IC1419, input at @ pin, output at @ pin), pass switch IC that is used as keycon alternate circuit (IC1421, input at @, @ pins, output at @, @ pins), and finally flow back to the audio circuit (IC1510, input at @, @ pins).
1) Lch MONO: Lch signals output at L/Rch.
2) Rch MONO: Rch signals output at L/Rch.
3) VOCAL CANCEL: Vocal portion situated in the center of vocal source is attenuated.

(2) KEYCON CIRCUIT
L/Rch signals output from IC1417, @, @ pins, is mixed with Lch and input to IC1418, @ pin. After flowing through LPF, they enter KEYCON CIRCUIT to receive KEYCON process according to command from SH MICOM (IC1418, input at @, @, @ pins) and are output at @ pin.
After that, they flow again through LPF (IC1418, input at @ pin, output at @ pin) and are mixed with main L/Rch signals input at IC1418 @ pin/IC1419 @ pin.
As described above, signals flowing through LPF are mixed with L/Rch, so that when KEYCON is operating (Otherwise there is alternative circuit), they become pseudo stereo. LPF makes KEYCON process signals below ~3kHz.

(3) KEYCON ALTERNATIVE CIRCUIT
To prevent signals from becoming always pseudo stereo due to KEYCON CIRCUIT, they are arranged to flow in an alternative circuit when the key is natural (When KEYCON is not operating).
Signals to be output to audio circuit are switched by inputting signals before and after KEYCON process to SWITCH IC, IC1421. Signals before KEYCON process are output at IC1417 @, @ pins and input at @, @ pins. Signals resulting from the mix up of KEYCON signals and MIKE ECHO signals are output at IC1419 @ pin/IC1419 @ pin and input to IC1421 @, @ pins.
Control signal, KEYFO (Hi, when key is natural; Lo, otherwise) from SH MICOM is input to IC1423, then flows through IC1424 to reach IC1421 @, @ pins. Finally signals flow through IC1426 from IC1424 and reversed is input to IC1421 @, @ pins. With this control signal, input at IC1421 @, @ pins is output at @, @ pins; otherwise, input at IC1421 @, @ pins is output at @, @ pins. Signals output from IC1421 flow back to AUDIO CIRCUIT and are input at IC1510 @, @ pins.
When key is natural, signals flow outside MIKE ECHO signal mix circuit, therefore with KEYFO (input at IC1417 @ pin), MIKE ECHO signals are mixed with L/Rch signals in IC1417 and output at IC1417 @, @ pins.

(4) MIKE-ECHO CIRCUIT
Signals output from MIC1 are input to IC1417 @ pin, then after passing through MIKE amplifier, output to MIKE VOLUME RV1762 from @ pin, then input again to IC1417 at @ pin. Similarly, signals output from MIC2 are input to IC1417 @ pin, then after passing through MIKE amplifier, output from @ pin to MIKE VOLUME, then input again to IC1417 at @ pin.
MIC1 and MIC2 are mixed inside IC1417 then output from @ and input at @ pin. After ECHO process they are output from @ pin, pass through ECHO VOLUME RV1764, and input again to IC1417 @ pin. In IC1417, signals input at @ pin are mixed with the mixed signals, as said above by MIC1 AND MIC2, then output from @ pin.
Afterwards, they are input at TV1418 @ pin/IC1419 @ pin, and mixed with L/Rch signals.

(5) KARAOKE ALTERNATIVE CIRCUIT
In order to prevent deterioration of common audio sound, it is designed that Karaoke signals pass KARAOKE CIRCUIT only in Karaoke mode (i.e., when mike is connected.)
MIC SW (output from MIC2 jack J1763 @ pin) used as control signal is [Hi] when either of MIC1 or MIC2 is, or both are connected. Otherwise it is [Lo].
After passing through Q1417, MIC SW is connected to Q1419/Q1418. After passing through Q1417, MIC SW passes Q1420 and is connected to Q1511/Q1510. Q1511/Q1510 are connected to output IC1508 @, @ pins of audio circuit filter. Moreover, after passing through Q1417, MIC SW is connected to Q1422/Q1421. Q1422/Q1421 are connected to output IC1421 @, @ pins of Karaoke circuit.
In Karaoke mode, signals are output by setting Q1419/Q1418 ‘OFF’.
When Karaoke mode is ‘OFF’, signals input in Karaoke circuit are muted by setting Q1419/Q1418 ‘ON’. In addition, output signals of Karaoke circuit are muted by putting Q1511/Q1510 ‘OFF’ and muting audio signals.

(6) VOICE SW
It detects audio input in mike, and is used in AUTO VOCAL CANCEL or to playback mike input without music.
Signals having passed are mixed after output from IC1417 @ pin (MIC1) and @ pin (MIC2). Then, they are input to IC1420 @ pin, output from @ pin in DC, and finally input to Q1426 base. When sound enters mike, Q1426 is put ‘ON’ and collector becomes [Lo]. If no sound enters mike, Q1426 is put ‘OFF’ and collector become [Hi].
This collector output is named VOICE SW. VOICE SW is input to SH MICOM and used for AUTO VOCAL CANCEL control. In addition, it passes through Q1504 and Q1507 of DEC substrate, sets Q1510/Q1511 to ‘ON’ or ‘OFF’, and controls muting of audio output. In general, when there is no audio output, there is no noise output, muting is effective on audio output. When there is mike input, it puts Q1310/Q1311 ‘OFF’, lets mike input output without being muted.
Fig. 5-5-1  KARAOKE CIRCUIT (KEYCON ALTERNATIVE CIRCUIT included.)

Fig. 5-5-2  KARAOKE CIRCUIT/VOICE SW
5-6 FRONT (FSW) SUBSTRATE CIRCUIT

(1) FL MICOM (IC1701)
It performs communications with SH MICOM (Φ, Θ, Ψ - Φ, Φ, Φ, Φ pins), including the main frame KEY and remote control operation, FL tube (IC1702) drive, and lighting of power indicator. In addition, it works also in standby mode. When power is 'ON', it outputs control signal at Φ pin to start all power sources and voltages and unlock short circuit toward GND of SH MICOM reset IC (IC1605) output.

(2) INCLUSION OF MAIN FRAME KEY AND REMOTE CONTROL OPERATION
Input is done to FL MICOM at 3-8 pins for operation of S1701 - S1715 and S1761 - S1763 of mainframe KEY. Input is done to FL MICOM at Φ, Θ, Ψ-8 pins for JOG SHUTTLE SW (S1716) operation. Remote control signal is received by ultra-red receiver element (IC1703). Output at Φ pin and input to FL MICOM at Φ pin.

(3) FL TUBE DRIVE
Grid voltage of FL TUBE at 3-8 pins is controlled from FL MICOM Φ-8 pins; anode voltage of FL TUBE at 3-8 pins from FL MICOM 3-8 pins. Among which FL MICOM 65-69 pins are connected to A-20V by R1733-R1743 because no pull down resistance is built in IC.
Filament voltage (AC4.2V) is supplied from power source to FL TUBE at Φ, Ψ, Ω, Φ pins.

(4) POWER INDICATOR
Control signal output from FL MICOM Φ, Ψ pins puts LED driving transistors Q1703 and Q1704 'ON' or 'OFF'. A device with 2-color LED (LED1761) green or red. When power is 'ON', Q1704 is 'ON' and lighted green; when standby, Q1703 is 'ON' and lighted red.

5-7 POWER SUPPLY CIRCUIT

(1) ESSENTIAL OF POWER SUPPLY CIRCUIT OPERATION
Fig. 5-7-1 shows the block diagram of the power circuit.
Power supply is R/CC switching type. Energy is stored in transformer T1, when FETQ1 is 'ON', by AC100V impressed at AC in. After that, when FETQ1 becomes 'OFF', the energy is released to the secondary side.
Power supply for diverse circuits from secondary side includes SW (SSV, S3.3V, S12V) that are put 'ON' by FL MICOM control signal (P, ON/OFF) of PG1201 Φ pin and permanently 'ON' supplies (AV5, MUTE ASV, AC4.2V, A-20V, A8V, A-8V).
Detection of secondary side voltage is by 5ASV, D6, C16, C17 composes its secondary side commutating circuit.
It is fed back by photo-coupler PHC1 to primary side and maintains stable output voltage and is supplied to FL MICOM and ultra-red reception element.
MUTE ASV is for AUDIO MUTE and supplied from 5ASV output.
SSV output is from 5ASV output and by intermediary of output control circuit Q3.
S3.3V output from SSV at 3-terminal regulator IC2.
D11 and C24 compose secondary commutating circuit of S12 that is output by 3-terminal regulator IC3 and is for DVD-ROM DRIVE use.
D11 and C24 compose secondary commutating circuits of A8V that is output by 3-terminal regulator IC4. For audio circuit proper +5V power supply, AUD SSV is produced from A8V in 5V regulator IC1506 (in DEC substrate).
D13 and C29 compose secondary commutating circuit of A-8V and it output -8V by transistor Q7 and Zener diode D20.
A-20V is negative power supply to FL tube. D14 and C33 compose its secondary commutating circuit and output -20V by transistor Q6 and Zener diode D17.
AC4.2V is for FL tube heater. To prevent fluctuation of output voltage due to that of power source, a self-exciting push-pull circuit is used. It is input from A5V, passes DC/AC inverter composed of transistors Q6, Q9, and transformer T2 and output. It supplies stable voltage without being disturbed by power source fluctuations. It plays an important role in FL tube life maintenance and against brightness decrease.

Fig. 5-7-1 BLOCK DIAGRAM OF POWER SUPPLY CIRCUITS
5-8 CLOCK CIRCUITS

5-8-1 27MHzXTAL (X201)

Block diagram 27 MHz clock circuit is shown in Fig. 5-8-1.

When power is supplied to 27 MHz XTAL, it generates 27MHz clock and input it to AV DECODER (IC1201, VIDEO ENCODER (IC2020), and PLL (IC1504).

(1) AV DECODER

At AV DECODER it is used as CLOCK VCK (input at 135 pin) of VIDEO INTERFACE signal and output digital video stream synchronized to VCK from 8bit video data bus VDATA(7:0) (output at 137, 149, 150, 151, 152 pins)

(2) VIDEO ENCODER

At VIDEO ENCODER it is used as SYSTEM CLOCK CLK (input at 10 pin) and output horizontal synchronous HSYNC (output at 10 pin) and vertical synchronous VSYNC (output at 10 pin) to AV DECODER.

(3) PLL

At PLL it is used as reference signal that generates audio external frequency clock signal DA-XCK (output at 131 pin) DA-XCK IS supplied to AV DECODER (input at 123 pin) and Audio DAC (input at IC1502 @ pin). The former is used as external clock that generates Audio bit clock DA-BCK (output at 122 pin) and LR clock DA-LRCK (output at 122 pin); the latter is used as System clock.

<table>
<thead>
<tr>
<th>DA-XCK</th>
<th>Is external clock used for generating DA-BCK and DA-LRCK. DA-XCK takes frequency 384 times the sampling frequency.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DA-BCK</td>
<td>Is Audio bit clock obtained by dividing DA-XCK in 8 equal parts. It takes frequency 48 times that of sampling.</td>
</tr>
<tr>
<td>DA-LRCK</td>
<td>Is clock that identifies channel (Lch or Rch) against all Audio sampling.</td>
</tr>
</tbody>
</table>

* The Audio Interface Unit inside AV DECODER corresponds to sampling frequencies (fs) 44.1kHz (CD-DA, Video-CD), 48kHz, 96kHz (DVD).

The frequency of DA-BCK is defined by Formula 5-8-1:

\[
\text{fs}_{\text{DA-BCK}} = \text{Audio data bit length} \times 2 \times \text{fs} \quad \text{(5-8-1)}
\]

At AV DECODER, input to DA-XCK is divided into 8 equal parts and output as DA-BCK (Formula 5-8-2):

\[
\text{fs}_{\text{DA-BCK}} = \frac{\text{fs}_{\text{DA-XCK}}}{8} \quad \text{(5-8-2)}
\]

Therefore, DA-XCK frequency takes the value 384fs according to formulas 5-8-1 and 5-8-2. Audio data bit length is fixed 24bit. (Formula 5-8-3)

\[
\text{fs}_{\text{DA-XCK}} = \text{Audio data bit length} \times 2 \times \text{fs} = 384\text{fs} \quad \text{(5-8-3)}
\]

According to Formulas 5-8-2 and 5-8-3, AV DECODER drives DA-BCK with frequency 48 times of sampling frequency. (Formula 5-8-4)

\[
\text{fs}_{\text{DA-BCK}} = \frac{384\text{fs}}{8} = 48\text{fs} \quad \text{(5-8-4)}
\]

The relationships between Audio interface signals (DA-XCK, DA-LRCK, DA-BCK) and each sampling frequency are as follows:

* Sampling frequency: 44.1kHz (FOR CD-DA AND VIDEO-CD)
  - DA-XCK: 334.8fs
  - DA-BCK: 42.1184MHz
  - DA-LRCK: DA-BCK/4 = 104.796MHz
* Sampling frequency: 48kHz (for DVD)
  - DA-XCK: 384.8fs
  - DA-BCK: 48.432MHz
  - DA-LRCK: DA-BCK/4 = 12.108MHz
* Sampling frequency: 96kHz (for DVD)
  - DA-XCK: 384.8fs
  - DA-BCK: 48.432MHz
  - DA-LRCK: DA-BCK/4 = 12.108MHz

5-8-2 30MHzXTAL (X2202)

30 MHzXTAL (X2202), the same as 27 MHzXTAL, generates 30 MHz clock by supplying power. It is used as signal for generating AV DECODER system clock.

From input SYCLK (IC1201 152 pin) it generates inside the IC an internal 90MHz clock and is used as an interior processor as well as system clock for internal operations.

5-8-3 20MHzXTAL (X1601)

20MHz clock is generated by attaching 20MHz crystal trembler to SH MICOM (IC1601) and used as the system clock of SH MICOM. This system clock is supplied to IF/GATE ARRAY (input at IC1101 @ pin) and used as clock.
6. SERVICE POINTS

6-1 TO REMOVE TOP COVER

The top cover is fastened on the front panel with 4 clicks.

1. Disengage outside clicks and clicks ① and ②:
   (1) Lift the rear of the top cover about 15° as shown by Arrows A.
   (2) Lift both sides of the front of the top cover in the direction shown by Arrows B and disengage clicks ① and ②.

2. Disengage inside clicks and clicks ③ and ④:
   (1) After the above operations in 1, lift more and deform both sides of the front of the top cover along Arrows B to disengage clicks ③ and ④.
   (2) To facilitate the operation, you can do it in small steps.

< Caution >
Clicks on the front panel may be damaged if you lift the rear of the top cover by more than 20°.

Fig. 6-1 DISASSEMBLING OF TOP COVER

6-2 TO REINSTALL TOP COVER

Keep the top cover at about 15° inclination and engage it to the front panel clicks.

1. At this point, lift more and deform both sides of the front of the top cover along Arrows B to engage clicks ③ and ④.
2. Stop the deformation and engage outside clicks and clicks ① and ②.

< Caution >
The front cover edge may be damaged if you let E of the top cover ride edge F of the front panel while reinstalling the top cover.

Fig. 6-2 REINSTALLING OF TOP COVER

7. TROUBLE SHOOTING

7-1 VIDEO CIRCUIT

- NO IMAGE
  - ARE SIGNALS OUTPUT FROM VIDEO TERMINAL?
    - YES
    - CHECK SIGNAL CABLE/MONITOR
    - NO
  - ARE SIGNALS OUTPUT FROM IC2020 OUT (S? N?)
    - YES
    - CHECK VIDEO OUTPUT SECTOR (C021/01/0120/0202)
    - NO
  - ARE SIGNALS OUTPUT FROM IC2020 IN (S? N?)
    - YES
    - CHECK D2020/D2022/D2023
    - NO
  - ARE SIGNALS OUTPUT FROM IC2020 OUT (S? N?)
    - YES
    - CHECK IC1201/IC1101/IC1601
    - NO
  - +5V AT IC2020 B PIN (VDD)?
    - YES
    - CHECK POWER SUPPLY CIRCUIT
    - NO
  - +5V AT IC2020 B PIN (VAA)?
    - YES
    - CHECK IC3203/D3020/D2030
    - NO
  - IS VOLTAGE AT IC2020 A PIN (RESET) H LEVEL?
    - YES
    - IS VOLTAGE AT IC2020 A PIN (BLANK) H LEVEL?
    - NO
    - CHECK IC1601
    - IS CLOCK IN IC2020 A??
    - NO
    - CHECK X2020/F1218
    - YES
    - REPLACE IC2020

- CHECK
7-4 KEYCON ALTERNATIVE CIRCUIT (KEY CONTROL PRESET AT CENTER)

7-5 VOICE SW CIRCUIT  The following is in case of mike sound input.

---

8. 基本回路图
FSW [フロントスイッチ/FL管] ーA面ー
[パターンNo.JA1563-3]
11. ブロック図

DEC基板

IC1601 MICRO-CONTROLLER

* ATAPI VF
IC1101

IC1603

FLASH MEMORY (4Mbit)
IC1062

IC1051

20MHz X'TAL

X1651

IC1064 EEPROM (16Mbit)

IC1605 RESET IC

IC203

SH1 DECODER

IC1201

IC1502 AUDIO DAC

IC1504 PLL

IC1505

IC1507

IC1066

IC1067

IC1068

IC1069

IC1070 FLマイコン

IC1070 IR受光

IC1072 IC1073

IC1074

IC1075

IC1076

MIC1 JACK

MIC2 JACK

MIC1 VOL

MIC2 VOL

ECHO VOL

FJX基板

FSW基板

MVR基板

电源基板

DEC基板へ → MUTE AV
DEC基板へ → A-20V
DEC基板へ → A-8V
DEC基板へ → A-8V
ROMドライブへ → S12V
DEC基板へ → 5V
FSW基板へ → 5V
FSW基板へ → ASV

Lch AUDIO OUT1
Rch AUDIO OUT2

IC1510 MIX AMP

Q1510/Q1511 AUDIO MUTE

Q1510 FILTER

IC1417 MIC SW +4V
Q1400/Q1409 LINE MUTE
Q1419 BUFFER AMP

A+EV

A-EV

IC1420 VOICE DETECT

IC1421 KEY CONTROL SW

IC1422 KEY CONTROL IC

IC1417 VOCAL CANCEL MIC/ECO IC

IC1419(1/2) H.P.FILTER MIX AMP

IC1418(2) H.P.FILTER MIX AMP

IC1418 H.P.FILTER MIX AMP
13. 分解図

本図内の各部は、材質名を示し、各部名の関係については、下表の通りです。

<table>
<thead>
<tr>
<th>部号</th>
<th>材質名</th>
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<tr>
<td>PS</td>
<td>ポリスチレン</td>
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<tr>
<td>ABS</td>
<td>アクリロニトリル・ブタジエン・ステレン</td>
</tr>
</tbody>
</table>

分解図に示す各部の詳細は次のとおりです。

1. (ABS) 2. (PS) 3. (ABS) 4. (ABS)
### 14. PARTS LIST

**Model:** DV-K2  
**Product name:** DVD player  
**Service guide No.:** B002  
**Sale start day:** July 1998

1. A mark is put for newly adopted part. Prices are those of July 1998.
2. A mark is put for a designated part by safety consideration.

<table>
<thead>
<tr>
<th>Distinguishing marks</th>
<th>Circuit No.</th>
<th>Part name (specification and usage)</th>
<th>Part No.</th>
<th>Packing unit</th>
<th>T</th>
<th>¥</th>
<th>Remarks</th>
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<td>1</td>
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<td>003</td>
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<td>1800</td>
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<td>1000</td>
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<td>1000</td>
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<tr>
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<td>001</td>
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<td>1500</td>
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<tr>
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<td>003</td>
<td>Cord AC</td>
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The prices listed above are not including the value added taxes.