1 CAUTIONS FOR SAFETY IN PERFORMING
REPAIR ......................................................... 1-1
1-1 LASER BEAM SAFETY PRECAUTIONS ........ 1-1
1-2 IMPORTANT SAFETY PRECAUTIONS .......... 1-2
1-2-1 Product Safety Notice ............................. 1-2
1-2-2 Precautions during Servicing ................. 1-2
1-2-3 Safety Check after Servicing ................. 1-3
1-3 STANDARD NOTES FOR SERVICING ........... 1-4
1-3-1 Circuit Board Indications ....................... 1-4
1-3-2 Instructions for Connectors ................. 1-4
1-3-3 Pb (Lead) Free Solder ......................... 1-4
1-3-4 Instructions for Handling Semi-conductors . 1-4
2 GENERAL INFORMATION ............................. 2-1
2-1 SPECIFICATIONS .................................. 2-1
2-2 COMPARISON OF MODELS ....................... 2-2
2-2-1 General ............................................ 2-2
2-2-2 VCR Section ..................................... 2-2
2-2-3 DVD Section .................................... 2-3
2-3 COMPARISON OF MAIN CONTROL ICS ......... 2-4
2-4 LIST OF ABBREVIATIONS AND TERMS FOR DVD PLAYER .......................... 2-4
2-5 FUNCTION INDICATOR SYMBOLS ............. 2-6
2-6 OPERATING CONTROLS AND FUNCTIONS....... 2-7
3 MAINTENANCE AND INSPECTION .................. 3-1
3-1 TROUBLESHOOTING ................................ 3-1
3-1-1 Power Supply Section ......................... 3-1
3-1-2 DVD Section ..................................... 3-4
3-1-3 VCR Section ..................................... 3-8
3-2 FIRMWARE RENEWAL MODE .................... 3-15
3-2-1 How to Update the Firmware Version ....... 3-15
3-2-2 How to Verify the Firmware Version ......... 3-16
3-3 STANDARD MAINTENANCE ...................... 3-17
3-3-1 Service Schedule of Components .......... 3-17
3-3-2 Cleaning ........................................ 3-18
4 DISASSEMBLY ......................................... 4-1
4-1 CABINET DISASSEMBLY INSTRUCTIONS ... 4-1
4-1-1 Disassembly Flowchart ....................... 4-1
4-1-2 Disassembly Method ......................... 4-1
4-1-3 How to Eject Manually ...................... 4-5
4-2 DISASSEMBLY/ASSEMBLY PROCEDURES OF DECK MECHANISM .......... 4-6
4-3 ALIGNMENT PROCEDURES OF MECHANISM . 4-15
5 ADJUSTMENT ......................................... 5-1
5-1 PREPARATION FOR SERVICING ............... 5-1
5-1-1 How to Enter the Service Mode ............. 5-1
5-2 FIXTURE AND TAPE FOR ADJUSTMENT ....... 5-2
5-2-1 How To Use The Fixtures And Tape ......... 5-2
5-3 ELECTRICAL ADJUSTMENT INSTRUCTIONS .. 5-3
5-3-1 Test Equipment Required .................... 5-3
5-3-2 Head Switching Position Adjustment ....... 5-3
5-4 MECHANICAL ALIGNMENT PROCEDURES ...... 5-4
5-4-1 Service Information ........................... 5-4
5-4-2 Tape Interchangeability Alignment ......... 5-5
1-A. Preliminary/Final Checking and Alignment of Tape Path .................. 5-6
1-B. X Value Alignment ............................. 5-6
1-C. Checking/Adjustment of Envelope Waveform . 5-7
1-D. Azimuth Alignment of Audio/Control/Erase Head ..................... 5-8
1-E. Checking and Alignment of Tape Path during reversing .................. 5-8
6 EXPLODED VIEWS AND PARTS LIST ............ 6-1
6-1 EXPLODED VIEWS .................................. 6-1
6-1-1 Cabinet Section .................................. 6-1
6-1-2 Deck Mechanism View 1 Section .......... 6-2
6-1-3 Deck Mechanism View 2 Section .......... 6-2
6-1-4 Deck Mechanism View 3 Section .......... 6-3
6-2 REPLACEMENT PARTS LIST .................... 6-4
6-2-1 Mechanical Parts List ......................... 6-4
6-2-2 Electrical Parts List .......................... 6-6
7 APPENDIX ............................................. 7-1
7-1 SYSTEM CONTROL TIMING CHARTS .......... 7-1
7-2 IC PIN FUNCTION DESCRIPTIONS .......... 7-7
7-3 LEAD IDENTIFICATIONS ........................ 7-10
S SCHEMATIC, WIRING DIAGRAMS ............... S-1
S-1 Schematic Diagrams/CBA’s and Test Points S-1
S-2 Wiring Diagrams < VCR Section > ........ S-3
S-3 Wiring Diagrams < DVD Section > .......... S-4
S-4 Main 1/9 Schematic Diagram ................. S-5
S-5 Main 2/9, Sensor & Power SW Schematic Diagrams ....................... S-6
S-6 Main 3/9 Schematic Diagram ................. S-7
S-7 Main 4/9 Schematic Diagram ................. S-8
S-8 Main 5/9 Schematic Diagram ................. S-9
S-9 Main 6/9 Schematic Diagram ................. S-10
S-10 Main 7/9 & DVD Open/Close Schematic Diagram ....................... S-11
S-11 Main 8/9 Schematic Diagram ................. S-12
S-12 Main 9/9 Schematic Diagram ................. S-13
S-13 Power Supply & Junction Schematic Diagrams ....................... S-14
S-14 Jack-A Schematic Diagram ................... S-15
S-15 AFV Schematic Diagram ...................... S-16
S-16 DVD Main 1/3 Schematic Diagram .......... S-17
S-17 DVD Main 2/3 Schematic Diagram .......... S-18
S-18 181C101 Voltage Chart ...................... S-19
S-19 DVD Main 3/3 Schematic Diagram .......... S-20
S-20 Waveforms .................................. S-21
C CIRCUIT BOARD DIAGRAMS ..................... C-1
C-1 Main CBA Top View & Sensor CBA Top View . C-1
C-2 Main CBA Bottom View ....................... C-2
C-3 Power SW CBA Top/Bottom View & DVD Open/Close CBA Top/Bottom View C-3
C-4 Power Supply CBA Top/Bottom View & Junction CBA Top/Bottom View ........ C-4
C-5 Jack-A CBA Top/Bottom View & AFV CBA Top/Bottom View ................ C-5
B BLOCK DIAGRAMS ................................. B-1
B-1 Serve/System Control Block Diagram .......... B-1
B-2 Video Block Diagram ........................... B-2
B-3 Audio Block Diagram ........................... B-3
B-4 Hi-Fi Audio Block Diagram ................... B-4
B-5 Power Supply Block Diagram ................ B-5
B-6 DVD System Control/Servo Block Diagram . B-6
B-7 Digital Signal Process Block Diagram ........ B-7
B-8 DVD Video / Audio Block Diagram ........ B-8
7 APPENDIX ............................................. 7-1
7-1 SYSTEM CONTROL TIMING CHARTS .......... 7-1
7-2 IC PIN FUNCTION DESCRIPTIONS .......... 7-7
7-3 LEAD IDENTIFICATIONS ........................ 7-10
S SCHEMATIC, WIRING DIAGRAMS ............... S-1
S-1 Schematic Diagrams/CBA’s and Test Points S-1
S-2 Wiring Diagrams < VCR Section > ........ S-3
S-3 Wiring Diagrams < DVD Section > .......... S-4
S-4 Main 1/9 Schematic Diagram ................. S-5
S-5 Main 2/9, Sensor & Power SW Schematic Diagrams ....................... S-6
S-6 Main 3/9 Schematic Diagram ................. S-7
S-7 Main 4/9 Schematic Diagram ................. S-8
S-8 Main 5/9 Schematic Diagram ................. S-9
S-9 Main 6/9 Schematic Diagram ................. S-10
S-10 Main 7/9 & DVD Open/Close Schematic Diagram ....................... S-11
S-11 Main 8/9 Schematic Diagram ................. S-12
S-12 Main 9/9 Schematic Diagram ................. S-13
S-13 Power Supply & Junction Schematic Diagrams ....................... S-14
S-14 Jack-A Schematic Diagram ................... S-15
S-15 AFV Schematic Diagram ...................... S-16
S-16 DVD Main 1/3 Schematic Diagram .......... S-17
S-17 DVD Main 2/3 Schematic Diagram .......... S-18
S-18 181C101 Voltage Chart ...................... S-19
S-19 DVD Main 3/3 Schematic Diagram .......... S-20
S-20 Waveforms .................................. S-21
C CIRCUIT BOARD DIAGRAMS ..................... C-1
C-1 Main CBA Top View & Sensor CBA Top View . C-1
C-2 Main CBA Bottom View ....................... C-2
C-3 Power SW CBA Top/Bottom View & DVD Open/Close CBA Top/Bottom View C-3
C-4 Power Supply CBA Top/Bottom View & Junction CBA Top/Bottom View ........ C-4
C-5 Jack-A CBA Top/Bottom View & AFV CBA Top/Bottom View ................ C-5
B BLOCK DIAGRAMS ................................. B-1
B-1 Serve/System Control Block Diagram .......... B-1
B-2 Video Block Diagram ........................... B-2
B-3 Audio Block Diagram ........................... B-3
B-4 Hi-Fi Audio Block Diagram ................... B-4
B-5 Power Supply Block Diagram ................ B-5
B-6 DVD System Control/Servo Block Diagram . B-6
B-7 Digital Signal Process Block Diagram ........ B-7
B-8 DVD Video / Audio Block Diagram ........ B-8
1-1 LASER BEAM SAFETY PRECAUTIONS

This DVD player uses a pickup that emits a laser beam.

The laser beam is emitted from the location shown in the figure. When checking the laser diode, be sure to keep your eyes at least 30cm away from the pickup lens when the diode is turned on. Do not look directly at the laser beam.

Caution: Use of controls and adjustments, or doing procedures other than those specified herein, may result in hazardous radiation exposure.

Do not look directly at the laser beam coming from the pickup or allow it to strike against your skin.
1-2 IMPORTANT SAFETY PRECAUTIONS

1-2-1 Product Safety Notice

Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by a ! on schematics and in parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards. The Product’s Safety is under review continuously and new instructions are issued whenever appropriate. Prior to shipment from the factory, our products are carefully inspected to confirm with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

1-2-2 Precautions during Servicing

A. Parts identified by the ! symbol are critical for safety. Replace only with part number specified.

B. In addition to safety, other parts and assemblies are specified for conformance with regulations applying to spurious radiation. These must also be replaced only with specified replacements. Examples: RF converters, RF cables, noise blocking capacitors, and noise blocking filters, etc.

C. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

D. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation tape
   2) PVC tubing
   3) Spacers
   4) Insulators for transistors

E. When replacing AC primary side components (transformers, power cord, etc.), wrap ends of wires securely about the terminals before soldering.

F. Observe that the wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).

G. Check that replaced wires do not contact sharp edges or pointed parts.

H. When a power cord has been replaced, check that 5 - 6 kg of force in any direction will not loosen it.

I. Also check areas surrounding repaired locations.

J. Be careful that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

K. Crimp type wire connector

   The power transformer uses crimp type connectors which connect the power cord and the primary side of the transformer. When replacing the transformer, follow these steps carefully and precisely to prevent shock hazards.

   Replacement procedure
   1) Remove the old connector by cutting the wires at a point close to the connector. (Discard it.)
   2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.
   3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.
   4) Use a crimping tool to crimp the metal sleeve at its center. Be sure to crimp fully to the complete closure of the tool.

L. When connecting or disconnecting the internal connectors, first, disconnect the AC plug from the AC outlet.

Crimp type wire connector

The power transformer uses crimp type connectors which connect the power cord and the primary side of the transformer. When replacing the transformer, follow these steps carefully and precisely to prevent shock hazards.

Replacement procedure
1) Remove the old connector by cutting the wires at a point close to the connector. Important: Do not re-use a connector. (Discard it.)
2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.
3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.
4) Use a crimping tool to crimp the metal sleeve at its center. Be sure to crimp fully to the complete closure of the tool.

When connecting or disconnecting the internal connectors, first, disconnect the AC plug from the AC outlet.
1-2-3 Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts, and wires have been returned to their original positions. Afterwards, do the following tests and confirm the specified values to verify compliance with safety standards.

1. Clearance Distance

When replacing primary circuit components, confirm specified clearance distance \((d)\) and \((d')\) between soldered terminals, and between terminals and surrounding metallic parts. (See Fig. 1-2-1)

Table 1-2-1: Ratings for selected area

<table>
<thead>
<tr>
<th>AC Line Voltage</th>
<th>Clearance Distance ((d), (d'))</th>
</tr>
</thead>
<tbody>
<tr>
<td>220 to 240 V</td>
<td>(\geq 3 \text{ mm}(d)) (\geq 6 \text{ mm}(d'))</td>
</tr>
</tbody>
</table>

**Note:** This table is unofficial and for reference only. Be sure to confirm the precise values.

2. Leakage Current Test

Confirm the specified (or lower) leakage current between \(B\) (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.) is lower than or equal to the specified value in the table below.

**Measuring Method (Power ON):**

Insert load \(Z\) between \(B\) (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across the terminals of load \(Z\). See Fig. 1-2-2 and the following table.

Table 1-2-2: Leakage current ratings for selected areas

<table>
<thead>
<tr>
<th>AC Line Voltage</th>
<th>Load (Z)</th>
<th>Leakage Current ((i))</th>
<th>One side of power cord plug prongs ((B)) to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>220 to 240 V</td>
<td>2k(\Omega) RES. Connected in parallel</td>
<td>(\leq 0.7\text{ mA AC Peak}) (\leq 2\text{ mA DC})</td>
<td>RF or Antenna terminals</td>
</tr>
<tr>
<td></td>
<td>50k(\Omega) RES. Connected in parallel</td>
<td>(\leq 0.7\text{ mA AC Peak}) (\leq 2\text{ mA DC})</td>
<td>A/V Input, Output</td>
</tr>
</tbody>
</table>

**Note:** This table is unofficial and for reference only. Be sure to confirm the precise values.
1-3-1 Circuit Board Indications
1. The output pin of the 3 pin Regulator ICs is indicated as shown.

2. For other ICs, pin 1 and every fifth pin are indicated as shown.

3. The 1st pin of every male connector is indicated as shown.

1-3-2 Instructions for Connectors
1. When you connect or disconnect the FFC (Flexible Foil Connector) cable, be sure to first disconnect the AC cord.
2. FFC (Flexible Foil Connector) cable should be inserted parallel into the connector, not at an angle.

* Be careful to avoid a short circuit.

1-3-3 Pb (Lead) Free Solder
When soldering, be sure to use the Pb free solder.

1-3-4 Instructions for Handling Semi-conductors
Electrostatic breakdown of the semi-conductors may occur due to a potential difference caused by electrostatic charge during unpacking or repair work.

1. Ground for Human Body
Be sure to wear a grounding band (1MΩ) that is properly grounded to remove any static electricity that may be charged on the body.

2. Ground for Workbench
(1) Be sure to place a conductive sheet or copper plate with proper grounding (1MΩ) on the workbench or other surface, where the semi-conductors are to be placed. Because the static electricity charge on clothing will not escape through the body grounding band, be careful to avoid contacting semi-conductors with your clothing.
Overview
DV-PF5E(UK) is the model that deleted “VIDEO Plus+” function from DV-PF4E(UK).
With this, the [VIDEO Plus+] button on remote controller is also deleted.

2-1 SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Video section</strong></td>
<td></td>
</tr>
<tr>
<td>TV system</td>
<td>PAL</td>
</tr>
<tr>
<td>Video head</td>
<td>Rotating 4 heads</td>
</tr>
<tr>
<td>Recording system</td>
<td>Rotating 2 head helical scan brightness signal FM method VHS standard for methods to directly record color signal low frequency conversions</td>
</tr>
<tr>
<td>Audio track</td>
<td>H-Fi audio track: 2 channel Normal audio track: 1 channel</td>
</tr>
<tr>
<td>Tape</td>
<td>VHS-type videocassette</td>
</tr>
<tr>
<td>Tape speed</td>
<td>[SP]: 23.39 mm/s  [LP]: 11.70 mm/s</td>
</tr>
<tr>
<td>Maximum record and playback time</td>
<td>[SP]: 4 hours (with E-240 used) [LP]: 8 hours (with E-240 used)</td>
</tr>
<tr>
<td>Receiving channel</td>
<td>CH Indication TV Channel 01-10 TRA-IRJ, GAP 21-69 E21-E80 74-78 X.Y.Z+1.Z+2 88-99, 100 S1-S20, GAP 121-141 S21-S41</td>
</tr>
<tr>
<td>Reception system</td>
<td>Up-heterodyne</td>
</tr>
<tr>
<td>RF converter</td>
<td>RF CONVERTER</td>
</tr>
<tr>
<td>Converter output</td>
<td>UHF 22 - 69 ch, I: 35 ch</td>
</tr>
<tr>
<td>Timer display</td>
<td>24-hour system</td>
</tr>
<tr>
<td>Video output impedance</td>
<td>75 Ω</td>
</tr>
<tr>
<td>Video output level</td>
<td>1.0 V P-P</td>
</tr>
<tr>
<td>Audio output level</td>
<td>-6 dB 1 kΩ unbalance (high impedance)</td>
</tr>
<tr>
<td>Video input level</td>
<td>0.5-2.0 V P-P</td>
</tr>
<tr>
<td>Audio input level</td>
<td>-10 dBV</td>
</tr>
<tr>
<td>Video S/N ratio</td>
<td>40 dB or more</td>
</tr>
<tr>
<td>Audio S/N ratio</td>
<td>36 dB or more</td>
</tr>
<tr>
<td>Hi-Fi audio</td>
<td>Frequency characteristic: 20-20,000 Hz Dynamic range: 70 dB or more</td>
</tr>
<tr>
<td>Disc used</td>
<td>DVD video disc, Music CD disc</td>
</tr>
<tr>
<td>Audio frequency characteristic</td>
<td>DVD (linear audio) 20 Hz - 22 kHz (48 kHz sampling frequency) 20 Hz - 44 kHz (96 kHz sampling frequency) Music CD 20 Hz - 20 kHz (JEITA)</td>
</tr>
<tr>
<td>Signal/Noise (S/N) ratio</td>
<td>CD: 70 dB (JEITA)</td>
</tr>
<tr>
<td>Dynamic range</td>
<td>DVD (linear audio): 70 dB, CD: 70 dB (JEITA)</td>
</tr>
<tr>
<td>Total distortion ratio</td>
<td>DVD: 0.1%, CD: 0.1%</td>
</tr>
<tr>
<td><strong>DVD section</strong></td>
<td></td>
</tr>
<tr>
<td>Disc used</td>
<td>DVD video disc, Music CD disc</td>
</tr>
<tr>
<td>Audio frequency characteristic</td>
<td>DVD (linear audio) 20 Hz - 22 kHz (48 kHz sampling frequency) 20 Hz - 44 kHz (96 kHz sampling frequency) Music CD 20 Hz - 20 kHz (JEITA)</td>
</tr>
<tr>
<td>Signal/Noise (S/N) ratio</td>
<td>CD: 70 dB (JEITA)</td>
</tr>
<tr>
<td>Dynamic range</td>
<td>DVD (linear audio): 70 dB, CD: 70 dB (JEITA)</td>
</tr>
<tr>
<td>Total distortion ratio</td>
<td>DVD: 0.1%, CD: 0.1%</td>
</tr>
<tr>
<td><strong>Terminal</strong></td>
<td></td>
</tr>
<tr>
<td>Antenna input</td>
<td>DIN (input) terminal</td>
</tr>
<tr>
<td>Antenna output</td>
<td>DIN (output) terminal</td>
</tr>
<tr>
<td>Video input</td>
<td>SCART JACK (AV 1, 2) FRONT PIN JACK</td>
</tr>
<tr>
<td>Video output</td>
<td>SCART JACK (AV 1, 2)</td>
</tr>
<tr>
<td>Audio input</td>
<td>SCART JACK (AV 1, 2) FRONT PIN JACK</td>
</tr>
<tr>
<td>Audio output</td>
<td>SCART JACK (AV 1, 2) PIN JACK (REAR)</td>
</tr>
<tr>
<td>S Video output</td>
<td>MINI DIN 4PIN JACK (75 Ω)</td>
</tr>
<tr>
<td>Coaxial digital audio output</td>
<td>PIN JACK</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>AC 220-240 V +/-10%, 50 Hz +/-0.5%</td>
</tr>
<tr>
<td>Power consumption</td>
<td>30 W (Standby: 5.0 W)</td>
</tr>
<tr>
<td>Back-up time</td>
<td>30 s</td>
</tr>
<tr>
<td>Temperature range for operation</td>
<td>5 °C - 40 °C</td>
</tr>
<tr>
<td>Dimensions</td>
<td>435(W) mm x 94(H) mm x 233(D) mm</td>
</tr>
<tr>
<td>Weight</td>
<td>3.2 kg</td>
</tr>
</tbody>
</table>
## 2-2 COMPARISON OF MODELS

### 2-2-1 General

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DV-PF5E(UK)</th>
<th>DV-PF4E(UK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensional</td>
<td>435(W) x 94(H) x 233(D)mm</td>
<td>↔</td>
</tr>
<tr>
<td>Weight</td>
<td>3.2 kg</td>
<td>↔</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>30W (standby: 5.0W)</td>
<td>30W (standby: 9.0W)</td>
</tr>
<tr>
<td>Tray Panel</td>
<td>Silver</td>
<td>↔</td>
</tr>
<tr>
<td>Color Front/Button</td>
<td>Silver / Silver</td>
<td>↔</td>
</tr>
<tr>
<td>Remote Controller Model Name</td>
<td>DV-RMPF5E(UK)</td>
<td>DV-RMPF4E(UK)</td>
</tr>
<tr>
<td>Jog Shuttle on Remote</td>
<td>---</td>
<td>↔</td>
</tr>
<tr>
<td>TV Control</td>
<td>---</td>
<td>↔</td>
</tr>
</tbody>
</table>

### 2-2-2 VCR Section

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DV-PF5E(UK)</th>
<th>DV-PF4E(UK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video Format</td>
<td>VHS</td>
<td>↔</td>
</tr>
<tr>
<td>Y/C Separation</td>
<td>Comb Filter</td>
<td>↔</td>
</tr>
<tr>
<td>YNR (Luminance Noise Reduction) Circuit</td>
<td>O</td>
<td>↔</td>
</tr>
<tr>
<td>Picture Control</td>
<td>O</td>
<td>↔</td>
</tr>
<tr>
<td>Video/Audio Input (Rear)</td>
<td>2/2 (AV1/AV2)</td>
<td>↔</td>
</tr>
<tr>
<td>Video/Audio Input (Front)</td>
<td>1/1 (AV3)</td>
<td>↔</td>
</tr>
<tr>
<td>Video/Audio Output (Rear)</td>
<td>2/2 (AV1/AV2)</td>
<td>↔</td>
</tr>
<tr>
<td>OSD languages (VCR)</td>
<td>1 (English)</td>
<td>↔</td>
</tr>
<tr>
<td>Stereo CM Skip Feature</td>
<td>---</td>
<td>↔</td>
</tr>
<tr>
<td>Auto Clock Feature</td>
<td>O</td>
<td>↔</td>
</tr>
<tr>
<td>Number of Timer Programming</td>
<td>8 Program / 1 year</td>
<td>↔</td>
</tr>
<tr>
<td>VIDEO Plus+</td>
<td>---</td>
<td>O</td>
</tr>
<tr>
<td>Self Diagnosis Function</td>
<td>O (4 Modes)</td>
<td>↔</td>
</tr>
<tr>
<td>Back-up Time</td>
<td>30 s</td>
<td>↔</td>
</tr>
<tr>
<td>SQPB</td>
<td>---</td>
<td>↔</td>
</tr>
<tr>
<td>Surge Absorber</td>
<td>---</td>
<td>↔</td>
</tr>
<tr>
<td>Auto Power Off Feature</td>
<td>O</td>
<td>↔</td>
</tr>
<tr>
<td>Local Broadcast Setting</td>
<td>O</td>
<td>↔</td>
</tr>
<tr>
<td>Multi Search Feature</td>
<td>O (Index, Time Search, Quick Find)</td>
<td>↔</td>
</tr>
<tr>
<td>Search Speed</td>
<td>SP: X5/X7</td>
<td>↔</td>
</tr>
<tr>
<td>FF/REW Time (E-180 Tape)</td>
<td>Approx. 100 s</td>
<td>↔</td>
</tr>
<tr>
<td>Head Composition</td>
<td>DA4+Hi-Fi</td>
<td>↔</td>
</tr>
<tr>
<td>Head Material</td>
<td>SP: Ferrite</td>
<td>↔</td>
</tr>
</tbody>
</table>

**Notes:**
- O: Yes, ---: No, ↔: Same as on left
### 2-2-3 DVD Section

O: Yes, ---: No,  ← : Same as on left

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DV-PF5E(UK)</th>
<th>DV-PF4E(UK)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENERAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DVD/VCD/SVCD/CD-DA</td>
<td>O / --- / --- / O</td>
<td>←</td>
</tr>
<tr>
<td>CD-R/CD-RW/DVD-R (Video Format)</td>
<td>O / O / O</td>
<td>←</td>
</tr>
<tr>
<td>DVD-RAM (VR Format)</td>
<td>---</td>
<td>←</td>
</tr>
<tr>
<td>MP3</td>
<td>---</td>
<td>←</td>
</tr>
<tr>
<td>OSD languages (DVD)</td>
<td>7 (English, French, Spanish, Italian, German, Dutch, Swedish)</td>
<td>←</td>
</tr>
<tr>
<td><strong>VIDEO</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAL Disc NTSC Out</td>
<td>---</td>
<td>←</td>
</tr>
<tr>
<td>Video Out Mode NTSC/PAL/PAL60</td>
<td>--- / O / O</td>
<td>←</td>
</tr>
<tr>
<td>S-Video / Component / Composite</td>
<td>O / --- / O</td>
<td>←</td>
</tr>
<tr>
<td>Video D/A Converter</td>
<td>10bit</td>
<td>←</td>
</tr>
<tr>
<td>Black Level Select</td>
<td>---</td>
<td>←</td>
</tr>
<tr>
<td>Picture Control</td>
<td>---</td>
<td>←</td>
</tr>
<tr>
<td>Progressive Out</td>
<td>---</td>
<td>←</td>
</tr>
<tr>
<td><strong>AUDIO</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audio D/A Converter</td>
<td>192kHz / 24bit</td>
<td>←</td>
</tr>
<tr>
<td>Digital Audio Out Optical / Coaxial</td>
<td>--- / O</td>
<td>←</td>
</tr>
<tr>
<td>Dolby Digital 5.1 ch Decode</td>
<td>---</td>
<td>←</td>
</tr>
<tr>
<td>DTS Digital Out</td>
<td>---</td>
<td>←</td>
</tr>
<tr>
<td>Virtual Surround</td>
<td>O</td>
<td>←</td>
</tr>
<tr>
<td>Dynamic Range Compression (Dolby Digital)</td>
<td>O</td>
<td>←</td>
</tr>
<tr>
<td>DVD Audio</td>
<td>---</td>
<td>←</td>
</tr>
<tr>
<td>Power on sound</td>
<td>---</td>
<td>←</td>
</tr>
<tr>
<td><strong>TRICK PLAY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Search Speed</td>
<td>4 Steps</td>
<td>←</td>
</tr>
<tr>
<td>Slow Speed</td>
<td>3 Steps</td>
<td>←</td>
</tr>
<tr>
<td>IP Search (Smooth 2x Play)</td>
<td>O</td>
<td>←</td>
</tr>
<tr>
<td>2x Play with Audio</td>
<td>---</td>
<td>←</td>
</tr>
<tr>
<td>Step Forward / Reverse</td>
<td>O / ---</td>
<td>←</td>
</tr>
<tr>
<td>Still Picture Select (Frame/Field)</td>
<td>Flame / Field / Auto</td>
<td>←</td>
</tr>
<tr>
<td><strong>FEATURES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disc Navigation</td>
<td>O</td>
<td>←</td>
</tr>
<tr>
<td>DVD Zoom x2 / x4</td>
<td>O / O</td>
<td>←</td>
</tr>
<tr>
<td>Program and Random Play of DVD</td>
<td>O</td>
<td>←</td>
</tr>
<tr>
<td>A-B Repeat</td>
<td>O</td>
<td>←</td>
</tr>
<tr>
<td>Repeat</td>
<td>O</td>
<td>←</td>
</tr>
<tr>
<td>Last Play</td>
<td>---</td>
<td>←</td>
</tr>
<tr>
<td>Front Panel Display Dimmer</td>
<td>---</td>
<td>←</td>
</tr>
<tr>
<td>Screen Saver</td>
<td>O</td>
<td>←</td>
</tr>
<tr>
<td>Auto Power Off</td>
<td>O (always ON)</td>
<td>←</td>
</tr>
</tbody>
</table>
## 2-3 COMPARISON OF MAIN CONTROL ICS

---: No, ←: Same as on left

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DV-PF5E(UK)</th>
<th>DV-PF4E(UK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIDEO DRIVER</td>
<td>MM1637XVBE (IC102)</td>
<td>←</td>
</tr>
<tr>
<td></td>
<td>MM1636XWRE (IC1403)</td>
<td>←</td>
</tr>
<tr>
<td>VIDEO/AUDIO SIGNAL PROCESS/HEAD AMP</td>
<td>LA71750EM-MPB-E (IC301)</td>
<td>←</td>
</tr>
<tr>
<td>Hi-Fi AUDIO SIGNAL PROCESS</td>
<td>LA72648M-MPB-E (IC451)</td>
<td>←</td>
</tr>
<tr>
<td>MICROCONTROLLER 8BIT SERVO/SYSTEM CONTROL</td>
<td>M3776AMCA-AA8GP (IC501)</td>
<td>M3776AMCA-AA9GP (IC501)</td>
</tr>
<tr>
<td>MEMORY</td>
<td>CAT24WC02J1 / BR24L02F-WE2 (IC502)</td>
<td>←</td>
</tr>
<tr>
<td>FIP</td>
<td>7-BT-298N (IC611)</td>
<td>←</td>
</tr>
<tr>
<td>FIP DRIVER</td>
<td>PT6313-S-TP (IC612)</td>
<td>PT6313-S-TP / SC16313 (IC612)</td>
</tr>
<tr>
<td>VPS</td>
<td>LC74793JM-TRM (IC631)</td>
<td>←</td>
</tr>
<tr>
<td>OUTPUT SELECT</td>
<td>TC4053BF / BU4053BCF-E2 / CD4053BCSJJX / CD4053BNSSR (IC751)</td>
<td>←</td>
</tr>
<tr>
<td>1.2V REG</td>
<td>PO070XZ5MZP (IC1002)</td>
<td>←</td>
</tr>
<tr>
<td>3.3V REG</td>
<td>BA3948FP-E2 (IC1003)</td>
<td>←</td>
</tr>
<tr>
<td>AMP</td>
<td>KIA4558P / NJM4558D (IC1201)</td>
<td>←</td>
</tr>
<tr>
<td>ERROR VOLTAGE DET</td>
<td>EL817 / LTV-817B-F / PS2561A-1(Q,W) (IC1001)</td>
<td>←</td>
</tr>
<tr>
<td>IF SIGNAL PROCESS</td>
<td>MSP3417G-QG-B8 (IC1)</td>
<td>←</td>
</tr>
</tbody>
</table>
# List of Abbreviations and Terms for DVD Player

<table>
<thead>
<tr>
<th>Index</th>
<th>Abbreviation/Term</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>AC3</td>
<td>See Dolby AC3.</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>CD-R</td>
<td>One type of DVD standard disc, to which writing once is possible (recordable type)</td>
</tr>
<tr>
<td></td>
<td>CD-RW</td>
<td>One type of CD standard disc, to which writing up to 1000 times is possible</td>
</tr>
<tr>
<td></td>
<td>Component video output terminals</td>
<td>Used for outputs of HDTV video signal format. Since signals for brightness and colors are independently handled for components signals (Y: luminance signal, PR/PB: chrominance signals), degrading of image will be reduced.</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>Dolby AC3</td>
<td>Audio coding format developed by Dolby Laboratories in U.S, also simply referred to as AC3 format: Supports 5-channel full-range sound and one channel for sub-woofer sound playback.</td>
</tr>
<tr>
<td></td>
<td>D terminal</td>
<td>This terminal, specified by EIAJ (currently JEITA), can automatically switch &quot;digital hi-vision&quot; programs of BS digital broadcast, and &quot;digital standard broadcast&quot; of current image quality. A tuner and TV can easily be connected to the D terminal. There are 5 types of D terminal, depending on the different format of video signal passing thorough the D terminal.</td>
</tr>
<tr>
<td></td>
<td>DTS</td>
<td>Digital Theater System: Sound system as for movie theaters developed by US Digital Theater Systems, Inc. The number of channels provided by DTS is the same for Dolby AC3.</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>EIAJ</td>
<td>Electronic Industries Association of Japan: An organization of manufacturers of consumer electronic devices, industrial electronic devices and electronic components, established in April 1948. EIAJ merged with JEIDA (Japan Electronic Industry Development Association) in November 2000 to become JEITA (Japan Electronics and Information Technology Industries Association).</td>
</tr>
<tr>
<td><strong>L</strong></td>
<td>Linear PCM</td>
<td>Linear Pulse Code Modulation: LPCM is a format that digitizes analog audio signal during recording and converts it back to analog signal during playback.</td>
</tr>
<tr>
<td><strong>M</strong></td>
<td>MPEG</td>
<td>Moving Picture Experts Group: Standard related to compression of digital video and audio. MPEG2 is a higher standard of MPEG and is applied to video (movie) requiring higher quality.</td>
</tr>
<tr>
<td></td>
<td>MPEG Audio Layer 2</td>
<td>One of three audio compression standards (layers 1-3) defined by MPEG</td>
</tr>
<tr>
<td></td>
<td>MP3</td>
<td>MPEG1 Audio Layer-3: Audio data digital compression technology.</td>
</tr>
<tr>
<td><strong>P</strong></td>
<td>Progressive playback function</td>
<td>This function converts interlaced images to non-interlaced images and displays them. It can play back 24-frame/second images included in DVD movie software, etc.</td>
</tr>
<tr>
<td><strong>S</strong></td>
<td>SDMI</td>
<td>Secure Digital Music Initiative: This conference was established by hardware makers, the Recording Industry Association of America (RIAA) and music industry companies, to protect copyrights of musical compositions.</td>
</tr>
<tr>
<td><strong>V</strong></td>
<td>Virtual surround</td>
<td>This technology localizes sound at any position using only two front speakers, by subjecting the L and R signals to matrix operation. It uses the four transfer functions from L/R speakers located at specified positions to both ears of listener located in a specified position, taking into account the shape of head and the effect of earlobes, and the two transfer functions from any position to both ears.</td>
</tr>
</tbody>
</table>
2-5 FUNCTION INDICATOR SYMBOLS

Note:
If a mechanical malfunction occurs, the power is turned off. When the power comes on again after that by pressing [○/1] button, an error message is displayed on the TV screen for 5 seconds.

<table>
<thead>
<tr>
<th>MODE</th>
<th>INDICATOR ACTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>When reel or capstan mechanism is not functioning correctly</td>
<td>“▲ R” is displayed on a TV screen. (Refer to Fig. 1.)</td>
</tr>
<tr>
<td>When tape loading mechanism is not functioning correctly</td>
<td>“▲ T” is displayed on a TV screen. (Refer to Fig. 2.)</td>
</tr>
<tr>
<td>When cassette loading mechanism is not functioning correctly</td>
<td>“▲ C” is displayed on a TV screen. (Refer to Fig. 3.)</td>
</tr>
<tr>
<td>When the drum is not working properly</td>
<td>“▲ D” is displayed on a TV screen. (Refer to Fig. 4.)</td>
</tr>
<tr>
<td>P-ON Power safety detection</td>
<td>“▲ P” is displayed on a TV screen. (Refer to Fig. 5.)</td>
</tr>
</tbody>
</table>

TV screen
When reel or capstan mechanism is not functioning correctly

▲ R
Fig. 1

▲ D
Fig. 4

When tape loading mechanism is not functioning correctly

▲ T
Fig. 2

▲ P
Fig. 5

When cassette loading mechanism is not functioning correctly

▲ C
Fig. 3
2-6 OPERATING CONTROLS AND FUNCTIONS

Since this product comprises DVD and VCR players, it is necessary to select the correct output mode.

SWITCHING TO DVD MODE
Press DVD on the remote control.
(Verify that the DVD OUTPUT Light is lit.)

SWITCHING TO VCR MODE
Press VCR on the remote control.
(Verify that the VCR OUTPUT Light is lit.)

NOTE
• Pressing only OUTPUT on the front panel does not switch the mode of the remote control. You always need to select the correct mode on the remote control too.

FUNCTIONAL OVERVIEW

1. o/I (POWER/STANDBY)
Press to turn the power on and off.
(As to the indication of the Operate switch, “I” indicates ON and “O” indicates electrical power STANDBY.)

2. VIDEO In Jack
Connect a video cable coming from the video out jack of a camcorder, another VCR, or a video source (laser disc player, camcorder, etc.) here.

3. AUDIO In Jacks
Connect audio cables coming from the audio out jacks of a camcorder, another VCR, or an audio source here.

4. REW (REW) [VCR]
Press to rewind the tape, or to view the picture rapidly in reverse during the playback mode (Rewind Search).

5. F.FWD (F.FWD) [VCR]
Press to rapidly advance the tape, or view the picture rapidly in forward during playback. (Forward Search).

6. STOP/EJECT (STOP/EJECT) [VCR]
Press to stop the tape motion.

7. PLAY (PLAY) [VCR]
Press to begin playback.

8. REC (REC) [VCR]
Press once to start a recording. Press repeatedly to start a One Touch Recording.

9. Cassette Compartment

10. Display, Remote Sensor Window

11. PROGRAM (▲/▼) Buttons
In VCR mode, press to change TV programmes on the VCR; press to adjust the tracking during normal or slow motion playback; press to remove vertical jitter in a Still picture.

12. OPEN/CLOSE (OPEN/CLOSE) [DVD]
Press to insert discs into or remove them from the tray.

13. VCR OUTPUT Light
This light appears when the VCR output mode is selected. You can only watch tapes when the green VCR OUTPUT light is on. To make the green VCR OUTPUT light come on, VCR on the remote control or OUTPUT on the front panel.

14. OUTPUT
Press to select DVD mode or VCR mode.
You can switch the output mode either by pressing OUTPUT on the front panel, or by pressing DVD or VCR on the remote control. However, if you press OUTPUT on the front panel first, you need to re-select the corresponding mode by pressing DVD or VCR on the remote control.

15. DVD OUTPUT Light
This light appears when the DVD output mode is selected. You can only watch DVDs when the green DVD OUTPUT Light is on. To make the green DVD OUTPUT light come on, press DVD on the remote control or OUTPUT on the front panel.

16. STOP (STOP) [DVD]
Stops operation of the disc.

17. PLAY (PLAY) [DVD]
Press to begin playback.

18. Disc loading tray

Since this product comprises DVD and VCR players, it is necessary to select the correct output mode.
1. MAIN (AC Power Cord)
   Connect to a standard AC plug.
2. COAXIAL DIGITAL AUDIO OUT Jack [DVD only]
   Connect to a compatible Dolby Digital receiver. Use to connect to a Dolby Digital decoder or MPEG decoder.
3. AUDIO OUT Jacks (ANALOG Left/Right) [DVD only]
   Connect to the Audio input jacks of A/V-compatible TV or wide screen TV. Stereo system.
4. S-VIDEO OUT Jack [DVD Only]
   Use the S-Video cable to connect this jack to the S-Video jack on your A/V-compatible TV or wide screen TV for a higher quality picture.
5. EURO AV2 (DECODER) Jack [VCR only]
   Use the Euro A/V (scart) cable to connect this jack to the 21 pin scart jack on your decoder.
6. EURO AV1 (TV) Jack
   Use the Euro A/V (scart) cable to connect this jack to the 21 pin scart jack on your A/V-compatible TV or wide screen TV for a best quality picture.
7. AERIAL Jack
   Connect your antenna, Cable Box, or Direct Broadcast System.
8. RF OUT Jack
   Use the supplied aerial cable to connect this jack to the ANTENNA IN Jack on your TV.

Caution: Do not touch the inner pins of the jacks on the rear panel. Electrostatic discharge may cause permanent damage to the DVD/VCR.

---

Display

**DVD**

Lights up when the A-B repeat function is on.

Displays how long the current title or track has been played back. When a chapter or track is switched, the number of a new title, chapter or track is displayed.

Lights up when the inserted disc is being played back.

**VCR**

Lights up when a tape is in the DVD/VCR.

Lights up when the timer recording or an OTR recording has been set.

Lights up during a recording. Flashes when a recording is paused.

Works as a tape counter (hour, minute, second). Also displays a channel number, tape speed, remaining time for OTR or current time.

---

Displays During Operation

<table>
<thead>
<tr>
<th>Display</th>
<th>DVD</th>
<th>VCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:00:00</td>
<td>No disc inserted or cannot read</td>
<td>Loading the Disc</td>
</tr>
<tr>
<td>OPEN</td>
<td>Tray open</td>
<td>When a disc is being played back</td>
</tr>
<tr>
<td>CLOSE</td>
<td>Tray closed</td>
<td></td>
</tr>
</tbody>
</table>
Remote Controller

Loading the Batteries

1. Open the battery compartment cover.

2. Insert two AA batteries, with each one oriented correctly.

3. Close the cover.

Cautions On Batteries

- Use "AA" (R6P) batteries in this remote control unit.
- Replace the batteries with new ones approximately once a year, though this depends on the frequency with which the remote control unit is used.
- If the remote control unit does not operate from close to the main unit, replace the batteries with new ones, even if less than a year has passed.
- The included battery is only for verifying operation. Replace it with a new battery as soon as possible.
- When inserting the batteries, be careful to do so in the proper direction, following the + and - marks in the remote control unit’s battery compartment.
- To prevent damage or battery fluid leakage:
  - Do not use a new battery with an old one.
  - Do not use two different types of batteries such as alkaline and manganese.
  - Do not short-circuit, disassemble, heat or dispose of batteries in flames.
  - Remove the batteries when not planning to use the remote control unit for a long period of time.
  - If the batteries should leak, carefully wipe off the fluid from the inside of the battery compartment, then insert new batteries.
<table>
<thead>
<tr>
<th>Buttons on remote controller work in different ways for DVD, Audio CD and VCR: Refer to the following table for correct use.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 SURROUND/SPEED Button</td>
</tr>
<tr>
<td>To activate virtual surround.</td>
</tr>
<tr>
<td>2 POWER/STANDBY Button</td>
</tr>
<tr>
<td>3 Number Buttons</td>
</tr>
<tr>
<td>To select track directly. (CD)</td>
</tr>
<tr>
<td>4 DISC NAVIGATION Button</td>
</tr>
<tr>
<td>5 VCR Button</td>
</tr>
<tr>
<td>6 SEARCH Buttons</td>
</tr>
<tr>
<td>7 STOP Button</td>
</tr>
<tr>
<td>8 RECORD/ONE-TOUCH-RECORDING Button</td>
</tr>
<tr>
<td>9 MENU Button</td>
</tr>
<tr>
<td>10 TOP MENU Button</td>
</tr>
<tr>
<td>11 SETUP Button</td>
</tr>
<tr>
<td>12 ZOOM Button</td>
</tr>
<tr>
<td>13 MODE Button</td>
</tr>
<tr>
<td>To arrange the playing order or play randomly. (CD)</td>
</tr>
<tr>
<td>14 SUBTITLE/TIMER Button</td>
</tr>
<tr>
<td>15 ANGLE Button</td>
</tr>
</tbody>
</table>
### Tour of the remote controller

<table>
<thead>
<tr>
<th></th>
<th><strong>DVD Mode</strong></th>
<th><strong>VCR Mode</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td><strong>REPEAT Button</strong></td>
<td>—</td>
</tr>
<tr>
<td>17</td>
<td><strong>A-B REPEAT Button</strong></td>
<td>—</td>
</tr>
<tr>
<td>18</td>
<td><strong>SEARCH MODE Button</strong></td>
<td>—</td>
</tr>
<tr>
<td>19</td>
<td><strong>QUICK-FIND Button</strong></td>
<td>—</td>
</tr>
<tr>
<td>20</td>
<td><strong>RETURN Button</strong></td>
<td>—</td>
</tr>
<tr>
<td>21</td>
<td><strong>ENTER, Cursor Buttons</strong></td>
<td>Moves the cursor and determines its position.</td>
</tr>
<tr>
<td>22</td>
<td></td>
<td>Cannot use the ENTER button.</td>
</tr>
<tr>
<td>23</td>
<td><strong>DISPLAY Button</strong></td>
<td>—</td>
</tr>
<tr>
<td>25</td>
<td><strong>PLAY Button</strong></td>
<td>Begin tape playback.</td>
</tr>
<tr>
<td>26</td>
<td><strong>DVD Button</strong></td>
<td>—</td>
</tr>
<tr>
<td>27</td>
<td><strong>PAUSE/STEP Button</strong></td>
<td>—</td>
</tr>
<tr>
<td>28</td>
<td><strong>SLOW Button</strong></td>
<td>To view the tape in slow motion.</td>
</tr>
<tr>
<td>29</td>
<td><strong>CLEAR/C.RESET Button</strong></td>
<td>To reset the tape counter.</td>
</tr>
<tr>
<td>30</td>
<td><strong>SKIP/PROG Buttons</strong></td>
<td>—</td>
</tr>
<tr>
<td>31</td>
<td><strong>OPEN/CLOSE/EJECT Button</strong></td>
<td>Press to eject the video cassette from the VCR.</td>
</tr>
<tr>
<td>32</td>
<td><strong>AUDIO Button</strong></td>
<td>To select STEREO, L-CH R-CH normal.</td>
</tr>
</tbody>
</table>

**DVD Mode**
- Allows you to repeat play a chapter or title. (DVD)
- Allows you to repeat play a track or all. (CD)
- Marks a segment to repeat between A and B. (DVD/CD)
- To search chapter or title. (DVD)
- To search track. (CD)
- To search time. (DVD/CD)
- To search time. (DVD/CD)
- Search the markers. (DVD/CD)
- Allows you to search forward/backward through a tape.
- Displays the current disc mode.
- To search and confirm the contents of the recorded programme(s).
- To select the DVD output mode.
- To use the remote control in DVD mode.
- Pause disc play.
- Advances playback one frame at a time. (DVD)
- Pause tape playback or recording.
- Advances playback one frame at a time.
- Clear the markers.
- Clear the number that is entered incorrectly.
- Removes status No. in programme input. (CD)
- To skip chapters. (DVD)
- To skip tracks. (CD)
- Press to control the TV programmes.
- To adjust the tracking manually during playback.
- To open or close the disc tray.
- Press to eject the video cassette from the VCR.
- Accesses various audio functions on a disc. (DVD)
- To select STEREO, L-CH or R-CH. (CD)
3-1 TROUBLESHOOTING

Troubleshooting is how to service for the specifying malfunction or poor parts. Detect malfunction or poor parts and service as the following charts.

3-1-1 Power Supply Section

**FLOW CHART NO.1**

The power cannot be turned on.

- Is the fuse normal? Yes
  
- Is normal state restored when once unplugged power cord is plugged again after several seconds? Yes
  
- Is the AL+5V line voltage normal? Yes
  
Check each rectifying circuit of secondary circuit and service it if defective.

- No
  
See FLOW CHART No.2 <The fuse blows out.>

- Check for lead or shor-circuiting of primary circuit component and service it if defective.
  
(Q1001, Q1003, T0011, D1001, D1002, D1003, D1004, D1011, C1005, C2014)

**FLOW CHART NO.2**

The fuse blows out.

- Check the presence that the primary component is leaking or shorted and service it if defective.
  
- Check the presence that the rectifying diode or circuit is shorted in each rectifying circuit of secondary side and service it if defective.
  
After servicing, replace the fuse.

**FLOW CHART NO.3**

When the output voltage fluctuates.

- No
  
Yes

Does the secondary side photo coupler circuit operate normally?

- Check the circuit and service it if defective.
  
(IC1001, Q1004, D1019)

Check the circuit and service it if defective.

(IC1001, D1006, D1012, D1024)

**FLOW CHART NO.4**

When buzz sound can be heard in the vicinity of power circuit.

Check if there is short circuit on the rectifying diode and the circuit in each rectifying circuit of secondary side and service it if defective.

(D013, D014, D016, D018, D019, D1008, D1016, D1030, IC1002, IC1003, Q051, Q053, Q055, Q056, Q058, Q1052, Q1053, Q1055)

**FLOW CHART NO.5**

-FL is not outputted.

- Is the supply voltage of -30V fed to the anode of D018? Yes
  
- Check for load circuit short-circuiting or leak, and service it if defective.
  
- No
  
Check D018 and their periphery, and service it if defective.
FLOW CHART NO.6
P-ON+44V is not outputted.

Is 44V voltage supplied to the emitter of Q053? No
Yes

Is the "L" pulse (approximately 0V) inputted to the base of Q053? No
Yes

Replace Q053.

Is the "H" pulse (approximately 5V) inputted to the base of Q054? No
Yes

Replace Q054.

Is 5V voltage supplied to the Pin(37,99) of IC501? No
Yes

Replace IC501.

FLOW CHART NO.7
AL+9V (AL+12V) is not outputted. (P-ON+44V is outputted normally)

Is 12V voltage supplied to the collector of Q055? No
Yes

Is the "H" pulse (approximately 10V) inputted to the base of Q055? No
Yes

Replace Q055.

Is the "H" pulse (approximately 5V) inputted to the base of Q054? No
Yes

Replace Q054.

Check D014, D017, L010, C015, and their periphery, and service it if defective.

Check D054, R055, and their periphery, and service it if defective.

FLOW CHART NO.8
P-ON+5V (AL+5V) is not outputted. (P-ON+44V is outputted normally)

Is 5V voltage supplied to the collector of Q056? No
Yes

Is the "H" pulse inputted to the base of Q056? No
Yes

Replace Q056.

Check D016, L013, C017, C018, and their periphery, and service it if defective.

Check R058, R059, R060 and their periphery, and service it if defective.

FLOW CHART NO.9
EV+3.3V is not outputted.

Is 4V voltage supplied to Pin(1) of IC1003? No
Yes

Replace IC1003.

Check D1008, L1012, C1007, C2015 and their periphery, and service it if defective.

FLOW CHART NO.10
EV 1.2V is not outputted.

Is 2.8V voltage supplied to Pin(1) of IC1002? No
Yes

Replace IC1002.

Check D1030, L1009, C1035, C1107, and their periphery, and service it if defective.
FLOW CHART NO.11
DVD-P-ON+12V is not outputted. (AL+12V is outputted normally.)

Is the "L" pulse (approximately 0V) outputted to the collector of Q1054? No
   Check Q1054 and PWRCON line, and service it if defective.
   Yes
   Replace Q1053.

FLOW CHART NO.12
DVD-P-ON+5V is not outputted. (AL+5V is outputted normally.)

Is the "H" pulse (approximately 6V) inputted to the base of Q1055? No
   See FLOW CHART NO.11. <DVD-P-ON+12V is not outputted.>
   Yes
   Replace Q1055.

FLOW CHART NO.13
DVD-P-ON+3.3V is not outputted. (EV+3.3V is outputted normally.)

Is the "H" pulse (approximately 4V) inputted to the base of Q1052? No
   See FLOW CHART NO.11. <DVD-P-ON+12V is not outputted.>
   Yes
   Replace Q1052.

FLOW CHART NO.14
The fluorescent display tube does not light up.

Is 3.3V voltage supplied to Pin(6, 24) of IC612? No
   Check the EV+3.3V line and service it if defective.
   Yes

Is approximately -24V to -28V voltage supplied to Pin(15) of IC612? No
   Check the -FL line and service it if defective.
   Yes

Is there approximately 500kHz oscillation to Pin(26) of IC612? No
   Check R618, IC612 and their periphery, and service it if defective.
   Yes

Are the filament voltage applied between (1, 2) and (29, 30) of the fluorescent display tube? Also negative voltage applied between these pins and GND? No
   Check the power circuit, D1016, D1017, R1040, C1018 and their periphery, and service it if defective.
   Yes
   Replace the fluorescent display tube (IC611).
3-1-2 DVD Section

FLOW CHART NO.1

The key operation is not functioning.

- Are the contact point and the installation state of the key switches (SW2020, SW2021, SW2022) normal?
  - Yes
  - No

  When pressing each key switches (SW2020, SW2021, SW2022), do the voltage of each pin of CL1051 (shown below) change to "H" (3.3V) from "L" (0V)?
  - Yes
  - No

  SW2020 → CL1051 24PIN
  SW2021 → CL1051 26PIN
  SW2022 → CL1051 25PIN

  Replace DVD Main CBA.

FLOW CHART NO.2

No DVD operation is possible from the remote control unit. (Operation is possible from the unit.)

- Is 5V voltage supplied to Pin(3) terminal of the RM2001 (remote control receiver)?
  - Yes
  - No

  Is the "L" pulse sent out from Pin(1) terminal of the RM2001 (remote control receiver) when the remote control unit is activated?
  - Yes
  - No

  Is the "L" pulse signal supplied to Pin(22) of CL1051?
  - Yes
  - No

  Replace the DVD Main CBA.

FLOW CHART NO.3

The disc tray cannot be opened and closed. (It can be done using the remote control unit.)

- Does the voltage of Pin(24) on CL1051 become 3.3V when pressing "OPEN/CLOSE" button on the unit?
  - Yes
  - No

  Refer to "FLOW CHAR NO.4" <The disc tray cannot be opened and closed.>

FLOW CHART NO.4

The disc tray cannot be opened and closed. (It can not be done using the unit and the remote control unit.)

- Replace the DVD Main CBA.
  - No improvement can be found.
  - Yes

  Original DVD Main CBA is poor.

  Replace the DVD Mechanism.
FLOW CHART NO.5
The [No Disc] indication.

Replace the DVD Main CBA.

No improvement can be found. Yes

Replace the DVD Mechanism.

No
Original DVD Main CBA is poor.

FLOW CHART NO.6
Both picture and sound do not operate normally.

Replace the DVD Main CBA.

No improvement can be found. Yes

Replace the DVD Mechanism.

No
Original DVD Main CBA is poor.
FLOW CHART NO.7

Picture does not appear normally.

Set the disc on the disc tray, and playback.

Are the video signals outputted to each pin of CN1601 on the Main CBA?

CN1601 1PIN S-Y
CN1601 10PIN S-C
CN1601 4PIN R
CN1601 8PIN G
CN1601 6PIN B

Replace the DVD Main CBA or the DVD Mechanism.

Check the line between each pin of CN1601 and each pin of IC1403 and IC102 on the Main CBA, and service it if defective.

Are the video signals shown above inputted into each pin of IC1403 and IC102?

IC1403 3PIN S-Y
IC1403 1PIN S-C
IC102 8PIN R
IC102 6PIN G
IC102 1PIN B

Replace IC1403.

Check DVD-P-ON+5V line and service it if defective.

Are the video signals outputted to each pin of IC1403 and IC102?

IC1403 6PIN CVBS
IC1403 5PIN S-Y
IC1403 7PIN S-C
IC102 10PIN R
IC102 11PIN G
IC102 15PIN B

Replace IC102.

Check AL+5V line and service it if defective.

Is 5V voltage supplied to the Pin(4,12) of IC102? 

No

Yes

Replace IC102.

Are the video signals outputted to the specific output terminal?

Are the luminance signals outputted to the S-OUT terminal (JK1401)?

No

Yes

Replace IC102.

Are the chroma signals outputted to the S-OUT terminal (JK1401)?

No

Yes

Replace IC102.

Check the periphery of JK1401 from Pin (5) of IC1403 and service it if defective.

Are the RGB video signals outputted to the Scart jack (JK101)?

No

Yes

Replace IC102.

Check the periphery of JK1401 from Pin (7) of IC1403 and service it if defective.

Check the periphery of JK101 from Pins (10, 11, 15) of IC102 and service it if defective.

Are the composite video signals outputted to Pin(19) of JK101 (Scart jack)?

No

Yes

Check the line between Pin(4) of IC751 and JK101 and service it if defective.

Are the "H" pulse inputted into Pins(9,10,11) of IC751?

No

Yes

Replace IC751.

Replace IC501.
FLOW CHART NO.8

Audio is not outputted.

Set the disc on the disc tray, and playback.

Are the analog audio signals outputted to each pin of CN1601 on Main CBA?

- CN1601 14PIN AUDIO-L
- CN1601 16PIN AUDIO-R

Yes

Are the analog audio signals outputted to each pin of CN1601 and each pin of IC1201 on Main CBA, and service it if defective.

- CN1601 14PIN → IC1201 6PIN AUDIO-L
- CN1601 16PIN → IC1201 2PIN AUDIO-R

No

Replace the DVD Main CBA or the DVD Mechanism.

Are the analog audio signals inputted to each pin of IC1201.

- IC1201 6PIN AUDIO-L
- IC1201 2PIN AUDIO-R

Yes

Check each line between each pin of CN1601 and each pin of IC1201 on Main CBA, and service it if defective.

- CN1601 14PIN → IC1201 6PIN AUDIO-L
- CN1601 16PIN → IC1201 2PIN AUDIO-R

No

Replace the DVD Main CBA or the DVD Mechanism.

Is the "H" level mute signals outputted to CN1601 on the Main CBA?

- CN1601 13PIN DVD-A-MUTE
- CN1601 15PIN DVD-A(R)-MUTE

Yes

Are the analog audio signals outputted to each pin of IC1201?

- IC1201 7PIN AUDIO-L
- IC1201 1PIN AUDIO-R

No

Replace IC1201.

Replace IC501.

Are the audio signals outputted to the specific output terminal?

- Are the audio signals outputted to the L/R OUT terminal (JK751)?
- Are the audio signals outputted to Pins(1,3) of JK101 (Scart jack)?

Yes

Check the periphery between Pins(1,7) of IC1201 and JK751, and service it if defective.

No

Check the line between Pin(14,15) of IC751 and JK101, and their periphery, and service it if defective.

Are the audio signals outputted to Pin(14,15) of IC751?

Yes

Check the line between Pin(14,15) of IC751 and JK101, and their periphery, and service it if defective.

No

Are the "H" pulse inputted into Pins(9,10,11) of IC751?

Yes

Replace IC751.

No

Replace IC751.

Are the "H" pulse inputted into Pins(9,10,11) of IC751?

Yes

Replace IC751.

No

Replace IC751.

Replace IC501.
3-1-3 VCR Section

FLOW CHART NO.1

The key operation is not functioning.

Are the contact point and the installation state of the key switches normal?  
No  Re-install some key switches correctly or replace some key switches.

Is the control voltage normally inputted into Pins(7,8) of IC501?  
No  Check the key switches and their periphery, and service it if defective.

Replace IC501.

Terminal voltage of IC501-7,8

<table>
<thead>
<tr>
<th>Voltage (V)</th>
<th>IC501-7</th>
<th>IC501-8</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.30</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>3.60</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>2.90</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>2.39</td>
<td>CH DOWN</td>
<td>----</td>
</tr>
<tr>
<td>1.98</td>
<td>CH UP</td>
<td>S-INH</td>
</tr>
<tr>
<td>1.61</td>
<td>----</td>
<td>FF</td>
</tr>
<tr>
<td>1.27</td>
<td>----</td>
<td>REW</td>
</tr>
<tr>
<td>0.92</td>
<td>OUTPUT</td>
<td>PLAY</td>
</tr>
<tr>
<td>0.51</td>
<td>POWER</td>
<td>STOP/EJECT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>REC/OTR</td>
</tr>
</tbody>
</table>

FLOW CHART NO.2

No VCR operation is possible from the remote control unit. (Operation is possible from the unit.)

Is 5V voltage supplied to the Pin(3) terminal of the RM2001 (remote control receiver)?  
No  Check AL+5V line and service it if defective.

Is the “L” pulse sent out from Pin(1) terminal of the RM2001 (remote control receiver) when the remote control unit is activated?  
No  Replace the RM2001 (remote control receiver). Replace remote control unit if need.

Is the “L” pulse signal supplied to the Pin(14) of IC501?  
No  Check the line between the RM2001 (remote control receiver) and the Pin(14) of IC501, and service it if defective.

Yes  Replace IC501.
FLOW CHART NO.3
Cassette tape can not be loaded.

When loading a cassette tape, on Pin(10) of IC501, does the "L" pulse switch to the "H" pulse? No → Check the line between the start sensor and Pin(10) of IC501, and service it if defective.

Yes → When loading a cassette tape, is the specified voltage (approximately 13V) outputted to the terminal of the Loading Motor Unit?

No → Replace the Capstan Motor Unit.

Yes → Replace the Loading Motor Unit.

FLOW CHART NO.4
Cassette tape is ejected right after the loading.

When loading a cassette tape, on Pin(10) of IC501, does the "L" pulse switch to the "H" pulse? No → Check the line between the start sensor and Pin(10) of IC501, and service it if defective.

Yes → When loading a cassette tape, on Pin(4) of IC501, does the "L" pulse switch to the "H" pulse?

No → Check the line between the end sensor and Pin(4) of IC501, and service it if defective.

Yes → When loading a cassette tape, does the LD-SW operate normally?

No → Check the line between the LD-SW(SW507) and Pin(9) of IC501, and service it if defective.

Yes → Replace IC501.

FLOW CHART NO.5
Cassette tape can not be ejected.

When pressing the eject button, does the Capstan Motor start rotating? No → Refer to "FLOW CHART NO.6 " <The Capstan Motor does not rotate>.

Yes → While the Capstan Motor is rotating, is the Takeup Reel rotating?

No → Check the Reel Disc or Reel Drive Unit, and service it if defective.

Yes → While the Takeup Reel is rotating, is the reel pulse signal inputted to Pin(80) of IC501?

No → Check the line between the Takeup Reel sensor and Pin(80) of IC501, and service it if defective.

Yes → While the reel pulse signal is inputting, is "L" pulse outputted to Pin(81) of IC501?

No → Replace IC501.

Yes → Is the specified voltage (approximately 13V) outputted to the terminal of the Lading Motor Unit?

No → Replace the Capstan Motor unit.

Yes → Is the Loading Motor rotating?

No → Replace the Loading Motor unit.

Yes → Check the Cassette Cam or Cassette Gear, etc, and service it if defective.
FLOW CHART NO.6
Capstan Motor does not rotate.

Is 5V voltage supplied to Pin(2) of CN502?

No

Check the P-ON+5V line and service it if defective.

Yes

Is over approximately 2.6V voltage supplied to Pin(5) of CN502?

No

Check the line between Pin(5) of CN502 and Pin(76) of IC501, and service it if defective.

Yes

Is 12V voltage supplied to Pin(1,11) of CN502?

No

Check the AL+12V line, AL+20.5V/12V line and service it if defective.

Yes

Replace the Capstan Motor Unit.

FLOW CHART NO.7
Drum Motor does not rotate.

Is 5V voltage supplied to Pin(2) of CN502?

No

Check the P-ON+5V line and service it if defective.

Yes

Is over approximately 2.6V voltage supplied to Pin(8) of CN502?

No

Check the line between Pin(8) of CN502 and Pin(77) of IC501, and service it if defective.

Yes

Is 12V voltage supplied at Pin(1,11) of CN502?

No

Check the AL+12V line, AL+20.5V/12V line and service it if defective.

Yes

Replace the Capstan Motor Unit or Cylinder Assembly.

FLOW CHART NO.8
Drum Motor rotates only for a few seconds.

Is the drum PG/FG signal inputted to Pin(90) of IC501?

No

Replace the Capstan Motor Unit or the Cylinder Assembly.

Yes

Is the RF-SW signal outputted to Pin(18) of IC501?

No

Replace IC501.

Yes

Is 12V voltage supplied Pin(1,11) of CN 502?

No

Check the AL+12V line, AL+20.5V/12V line and service it if defective.

Yes

Replace the Capstan Motor Unit or the Cylinder Assembly.

FLOW CHART NO.9
RF-SW signal is not outputted.

Is the Drum Motor rotating?

No

Refer to "FLOW CHART NO.7" <Drum Motor does not rotate> and "FLOW CHART NO.8" <Drum Motor rotates only for a few seconds>.

Yes

Is the drum PG/FG signal inputted to Pin(90) of IC501?

No

Replace the Capstan Motor Unit or the Cylinder Assembly.

Yes

Replace IC501.
FLOW CHART NO.10

Video E-E does not appear.

Is the Video signal inputted to Pins(48,50,52,54) of IC301? No

1) In the external input mode
■ Check the line between Pin(20) of JK101 (Scart jack) and Pin(50) of IC301, and service it if defective.
■ Check the line between Pin(20) of JK1402 (Scart jack) and Pin(52) of IC301, and service it if defective.
■ Check the line between the video input terminal (front) and Pin(54) of IC301, and service it if defective.

2) In the U/V tuner mode
■ Check the line between Pin(24) of the U/V tuner and Pin(48) of IC301, and service it if defective.

Is the C-SYNC signal outputted to Pin(67) of IC301?

Is the C-SYNC signal inputted to Pin(58) of IC501? No

Replace IC301.

Is the Video signal inputted to Pin(5) of IC751? No

Check the line between Pin(67) of IC301 and Pin(58) of IC501, and service it if defective.

Is the video signal outputted to Pin(4) of IC751? Yes

Is the video signal outputted to the emitter of Q104? Yes

Check the line between Pin(61) of IC301 and Pin(5) of IC751, and service it if defective.

Check the line between Pin(4) of IC751 and Q104, and service it if defective.

When only Line signal is not outputted...
check the line between the emitter of Q104 and Pin(19) of JK101 (Scart jack), and service it if defective.
When only RF signal is not outputted...
check the tuner (TU701), and the line between the emitter of Q104 and Pin(6) of the tuner, and service it if defective.

Is the C-SYNC signal inputted to Pin(58) of IC501? No

Check the line between Pin(67) of IC301 and Pin(58) of IC501, and service it if defective.

Is the video signal inputted into Pin(5) of IC751? No

Check the line between Pin(61) of IC301 and Pin(5) of IC751, and service it if defective.

Is the video signal outputted to Pin(4) of IC751? Yes

Check the line between Pin(4) of IC751 and Q104, and service it if defective.

When only Line signal is not outputted...
check the line between the emitter of Q104 and Pin(19) of JK101 (Scart jack), and service it if defective.
When only RF signal is not outputted...
check the tuner (TU701), and the line between the emitter of Q104 and Pin(6) of the tuner, and service it if defective.

Is approximately 5V voltage supplied to Pin(16) of IC751, or approximately -5V voltage supplied to Pin(7) of IC751? No

Check the AL+5V line and the AL-30V line (R764, R765), and service it if defective.

Is the "L" pulse inputted into Pin(9,10,11) of IC751? No

Replace IC501.

Replace IC751.

Replace IC301.
FLOW CHART NO.11

Hi-Fi E-E audio does not operate normally.

Is each signal supplied to each pin of IC451 as below?

<table>
<thead>
<tr>
<th></th>
<th>Front input terminal</th>
<th>Scart jack 1 (JK101)</th>
<th>Scart jack 2 (JK1402)</th>
<th>Tuner audio signal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L-ch</td>
<td>R-ch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pin(8)</td>
<td>Pin(54)</td>
<td>Pin(6)</td>
<td>Pin(52)</td>
<td>Pin(50)</td>
</tr>
</tbody>
</table>

No

Yes

Is the SIF signal outputted from Pin(22) of the tuner?

Yes

No

Check the peripheral circuit of the front input terminal and service it if defective.

Check the peripheral circuit of the Scart jack 1 (JK101) and service it if defective.

Check the peripheral circuit of the Scart jack 2 (JK1402) and service it if defective.

Is the 5V voltage supplied to Pins(16,32,36,46,55) of IC451, or the 9V voltage supplied to Pin(69) of IC451?

No

Yes

Check the line between Pins(4, 50) of IC451 and Pin(22) of tuner, and service it if defective.

Check the circuit of AL+5V, P-ON+5V and AL+9V, and service it if defective.

Check the serial data and the clock signal supplied to Pin(37,38) of IC451?

No

Yes

Check the line between Pin(37,38) of IC451 and Pin(71,72) of IC501, and service it if defective.

Check the line between Pin(53) of IC451 and Pin(28) of IC501, and service it if defective.

Is the "L" pulse inputted into the Pin(53) of IC451?

No

Yes

Replace IC451.

Replace IC501.

Is the audio signal outputted to Pin(65,67,74,76) of IC451?

No

Yes

Check the line between Pin(74,76) of IC451 and Pin(2,12) of IC751, and service it if defective.

Is the audio signal outputted to Pin(14,15) of IC751?

No

Yes

Check the line between Pin(14,15) of IC751 and Pin(1,3) of JK101 (Scart jack), and service it if defective.

Replace IC751.

Is the audio signal inputted into Pin(2,12) of IC751?

No

Yes

Check the line between Pin(14,15) of IC751 and Pin(1,3) of JK101 (Scart jack), and service it if defective.

Is the audio signal outputted to Pin(14,15) of IC751?

No

Yes

Check the AL+5V line and the AL-30V line (R764, R765), and service it if defective.

Replace IC451.

Is the SIF signal outputted from Pin(22) of the tuner?

Yes

No

Check the line between Pins(4, 50) of IC451 and Pin(22) of tuner, and service it if defective.

Replace the tuner.

Is the serial data and the clock signal supplied to Pin(37,38) of IC451?

No

Yes

Check the line between Pin(37,38) of IC451 and Pin(71,72) of IC501, and service it if defective.

Check the line between Pin(53) of IC451 and Pin(28) of IC501, and service it if defective.

Is the 5V voltage supplied to Pins(16,32,36,46,55) of IC451, or the 9V voltage supplied to Pin(69) of IC451?

No

Yes

Check the line between Pins(4, 50) of IC451 and Pin(22) of tuner, and service it if defective.

Check the circuit of AL+5V, P-ON+5V and AL+9V, and service it if defective.

Replace IC751.
Hi-Fi audio can not be playedback normally in the linear audio mode. (E-E mode is normal.)

- Is the audio signal supplied to Pin(9) of IC301?
  - No
    - Are the CN504, the connected cable and the parts on periphery of playback amplifier normal?
      - No
        - Is there no dirt on the surface of ACE head?
          - No
            - Is the height of ACE head appropriate?
              - No
                - Replace the ACE head.
              - Yes
                - Yes
                  - Replace the ACE head.
            - Yes
              - Yes
                - Is the audio signal outputted to Pin(11) of IC301?
                  - Yes
                    - Check the line between Pin(11) of IC301 and Pin(80) of IC451, and service it if defective.
                  - No
                    - Replace IC301.
                - No
                  - Service and replace poor parts.
            - Yes
              - Yes
                - Clean the surface of ACE head.
              - No
                - Readjust the height of the ACE head.
      - Yes
        - Yes
          - Is the audio signal outputted to Pin(11) of IC301?
            - Yes
              - Check the line between Pin(11) of IC301 and Pin(80) of IC451, and service it if defective.
            - No
              - Replace IC301.
        - No
          - Service and replace poor parts.
3-2 FIRMWARE RENEWAL MODE

3-2-1 How to Update the Firmware Version

Note:
If the firmware has been changed, etc., we will use Service News, etc. to report on how to obtain new firmware data and create an upgraded disc.

1. Turn the power on and remove the disc on the tray.
2. To put the DVD player into version up mode, press [9], [8], [7], [6], and [SEARCH MODE] buttons on the remote control unit in that order. The tray will open automatically.
   Fig. a appears on the screen and Fig. b appears on the VFD.

3. Load the disc for version up.
4. The DVD player enters the F/W version up mode automatically. Fig. c appears on the screen and Fig. d appears on the VFD. If you enter the F/W for different models, “Disc Error” will appear on the screen, then the tray will open automatically.

5. After programming is finished, the tray opens automatically. Fig. e appears on the screen and the checksum in (*2) of Fig. e appears on the VFD. (Fig. f)

   “*******” differ depending on the models.

   EXIT: POWER

   Fig. a Version Up Mode Screen

   bE-up

   Fig. b VFD in Version Up Mode

   The DVD player can also enter the version up mode with the tray open. In this case, Fig. a will be shown on the screen while the tray is open.
3. Load the disc for version up.
4. The DVD player enters the F/W version up mode automatically. Fig. c appears on the screen and Fig. d appears on the VFD. If you enter the F/W for different models, “Disc Error” will appear on the screen, then the tray will open automatically.

The appearance shown in (*1) of Fig. c is described as follows:

<table>
<thead>
<tr>
<th>No.</th>
<th>Appearance</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reading...</td>
<td>Sending files into the memory</td>
</tr>
<tr>
<td>2</td>
<td>Erasing...</td>
<td>Erasing previous version data</td>
</tr>
<tr>
<td>3</td>
<td>Programming...</td>
<td>Writing new version data</td>
</tr>
</tbody>
</table>

5. After programming is finished, the tray opens automatically. Fig. e appears on the screen and the checksum in (*2) of Fig. e appears on the VFD. (Fig. f)

   “*******” differ depending on the models.

   EXIT: POWER

   Fig. e Completed Program Mode Screen

   7AbC

   Fig. f VFD upon Finishing the Programming Mode (Example)

At this time, no buttons are available.
6. Remove the disc on the tray.
7. Unplug the AC cord from the AC outlet. Then plug it again.
8. Turn the power on by pressing the [ power ] button and the tray will close.
9. Press [1], [2], [3], [4], and [DISPLAY] buttons on the remote control unit in that order.
Fig. g appears on the screen.

“*******” differ depending on the models.

   EXIT: POWER

   Fig. g
   Fig. h appears on the screen.

   "......." differ depending on the models.

   MODEL : *******
   Version : *.**
   Region : *
   EEPROM CLEAR : OK

   EEPROM CLEAR : CLEAR   EXIT: POWER

   Fig. h

When “OK” appears on the screen, the factory default will be set. Then the firmware renewal mode is complete.
11. To exit this mode, press [口/Ⅰ] button.

3-2-2 How to Verify the Firmware Version

1. After making sure that no disc is in unit, turn the power on.
2. Press [1], [2], [3], [4], and [DISPLAY] buttons on the remote control unit in that order. The Firmware version appears on the VFD and TV screen.
3. Turn the power off to reset the unit.
3-3  STANDARD MAINTENANCE

3-3-1 Service Schedule of Components

This maintenance chart shows you the standard of replacement and cleaning time for each part. Because these may replace depending on environment and purpose for use, use the chart for reference.

<table>
<thead>
<tr>
<th>Ref.No.</th>
<th>Part Name</th>
<th>1,000 h</th>
<th>2,000 h</th>
<th>3,000 h</th>
<th>4,000 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2</td>
<td>Cylinder Assembly</td>
<td>○</td>
<td>●</td>
<td>○</td>
<td>●</td>
</tr>
<tr>
<td>B3</td>
<td>Loading Motor Assembly</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B8</td>
<td>Pulley Assembly</td>
<td>●</td>
<td></td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>B587</td>
<td>Tension Lever Assembly</td>
<td>●</td>
<td></td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>B31</td>
<td>ACE Head Assembly</td>
<td></td>
<td></td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>B573, B574</td>
<td>Reel S, Reel T</td>
<td></td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B37</td>
<td>Capstan Motor</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B52</td>
<td>Cap Belt</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B73</td>
<td>FE Head</td>
<td></td>
<td></td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>B86</td>
<td>F Brake Assembly (HI)</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B133</td>
<td>Idler Assembly (HI)</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B410</td>
<td>Pinch Arm Assembly</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B414</td>
<td>M Brake (SP) Assembly (HI)</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B416</td>
<td>M Brake (TU) Assembly (HI)</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B525</td>
<td>LDG Belt</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Clean all parts for the tape transport (Upper Drum with Video Head / Pinch Roller / ACE Head / FE Head) using 90% Isopropyl Alcohol.
2. After cleaning the parts, do all DECK ADJUSTMENTS.
3. For the reference numbers listed above, refer to Deck Exploded Views.
3-3-2 Cleaning

Cleaning of Video Head
Clean the head with a head cleaning stick or chamois cloth.

Procedure
1. Remove the top cabinet.
2. Put on a glove (thin type) to avoid touching the upper and lower drum with your bare hand.
3. Put a few drops of 90% Isopropyl alcohol on the head cleaning stick or on the chamois cloth and, by slightly pressing it against the head tip, turn the upper drum to the right and to the left.

Notes:
1. The video head surface is made of very hard material, but since it is very thin, avoid cleaning it vertically.
2. Wait for the cleaned part to dry thoroughly before operating the unit.
3. Do not reuse a stained head cleaning stick or a stained chamois cloth.

Cleaning of ACE Head
Clean the head with a cotton swab.

Procedure
1. Remove the top cabinet.
2. Dip the cotton swab in 90% isopropyl alcohol and clean the ACE Head. Be careful not to damage the upper drum and other tape running parts.

Notes:
1. Avoid cleaning the ACE Head vertically.
2. Wait for the cleaned part to dry thoroughly before operating the unit or damage may occur.
4-1 CABINET DISASSEMBLY INSTRUCTIONS

4-1-1 Disassembly Flowchart
This flowchart indicates the disassembly steps to gain access to item(s) to be serviced. When reassembling, follow the steps in reverse order. Bend, route, and dress the cables as they were originally.

4-1-2 Disassembly Method

<table>
<thead>
<tr>
<th>ID/LOC. No.</th>
<th>PART</th>
<th>REMOVAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>[1] Top Case</td>
<td>D1</td>
<td>8(S-1)</td>
</tr>
<tr>
<td>[2] Front Assembly</td>
<td>D2</td>
<td>*3(L-1), *3(L-2)</td>
</tr>
<tr>
<td>[3] Top Bracket</td>
<td>D2</td>
<td>3(S-2)</td>
</tr>
<tr>
<td>[5] Partition Plate</td>
<td>D3</td>
<td>(S-4)</td>
</tr>
<tr>
<td>[6] Power Supply CBA</td>
<td>D3</td>
<td>2(S-5), CN501</td>
</tr>
</tbody>
</table>

Legend:
- P = Spring
- L = Locking Tab
- S = Screw
- CN = Connector
- *= Unhook, Unlock, Release, Unplug, or Desolder

Note:
1. Identification (location) No. of parts in the figures
2. Name of the part
3. Figure Number for reference
4. Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.
   - P = Spring, L = Locking Tab, S = Screw, CN = Connector
   - *= Unhook, Unlock, Release, Unplug, or Desolder
   - e.g. 2(S-2) = two Screws (S-2), 2(L-2) = two Locking Tabs (L-2)
5. Refer to “Reference Notes.”
Reference Notes

CAUTION 1: Locking Tabs (L-1) and (L-2) are fragile. Be careful not to break them.
1-1. Release three Locking Tabs (L-1).
1-2. Release three Locking Tabs (L-2), then remove the Front Assembly.

CAUTION 2: Electrostatic breakdown of the laser diode in the optical system block may occur as a potential difference caused by electrostatic charge accumulated on cloth, human body etc, during unpacking or repair work.
To avoid damage of pickup follow next procedures.
2-1. Disconnect Connector (CN301). Remove a Screw (S-7) and lift the DVD Main CBA Unit. (Fig. D4)
2-2. Short the three short lands of FPC cable with solder before removing the FFC cable (CN201) from it. If you disconnect the FFC cable (CN201), the laser diode of pickup will be destroyed. (Fig. D4)

CAUTION 3: When reassembling, confirm the FFC cable (CN201) is connected completely. Then remove the solder from the three short lands of FPC cable. (Fig. D4)
4. When reassembling, solder wire jumpers as shown in Fig. D6.
5. Before installing the Deck Assembly, be sure to place the pin of LD-SW on Main CBA as shown in Fig. D6. Then, install the Deck Assembly while aligning the hole of Cam Gear with the pin of LD-SW, the shaft of Cam Gear with the hole of LD-SW as shown in Fig. D6.
Short the three short lands by soldering.
( Either of two places. )
Lead with blue stripe
Desolder from bottom

[10] Deck Assembly


[12] Power SW CBA


[14] Jack-A CBA

Desolder from Capstan Motor Assembly

Desolder from FE Head

Printing side

Desolder from Cylinder Assembly

Desolder from ACE Head Assembly

Lead with blue stripe

Lead with blue stripe

Lead with blue stripe

Lead with blue stripe

Lead with blue stripe

Lead with red stripe

Desolder

Desolder

Desolder

Desolder

Desolder

SW507 LD-SW

Fig. D6

BOTTOM VIEW

Lead connections of Deck Assembly and Main CBA
4-1-3 How to Eject Manually

A. DVD
1. Remove the Top Case.
2. Rotate the roulette in the direction of the arrow as shown below.
3. Pull the tray slowly with a hand.

B. Cassette Tape
1. Disconnect the AC plug.
2. Remove the Top Case and Front Assembly.
3. Make sure that the Moving guide preparations are in the Eject Position.
4. Turn the LDG Belt in the appropriate direction as shown below until the Moving guide preparations come to the Eject Position. Stop turning when the preparations begin clicking or can not be moved further. However, the tape will be left wound around the cylinder.
5. Turn the LDG Belt in the appropriate direction continuously, and the cassette tape will be ejected. Allow a minute or two to complete this task.
# 4-2 DISASSEMBLY/ASSEMBLY PROCEDURES OF DECK MECHANISM

Before following the procedures described below, be sure to remove the deck assembly from the cabinet. (Refer to CABINET DISASSEMBLY INSTRUCTIONS on page 4-1.)

All the following procedures, including those for adjustment and replacement of parts, should be done in Eject mode; see the positions of [44] and [45] in Fig. DM1H on page 4-8. When reassembling, follow the steps in reverse order.

<table>
<thead>
<tr>
<th>STEP / LOC. No.</th>
<th>STARTING No.</th>
<th>PART</th>
<th>REMOVAL/UNHOOK/UNLOCK/RELEASE/UNPLUG/DESOLDER</th>
<th>INSTALLATION</th>
<th>ADJUSTMENT CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>[1] [1]</td>
<td></td>
<td>Guide Holder A T</td>
<td>DM3H</td>
<td>2(S-1)</td>
<td></td>
</tr>
<tr>
<td>[3] [2]</td>
<td></td>
<td>Slider (SP) T</td>
<td>DM5H</td>
<td>(S-1A), *(L-1)</td>
<td></td>
</tr>
<tr>
<td>[7] [7]</td>
<td></td>
<td>Cylinder Assembly T</td>
<td>DM1H, DM6H</td>
<td>Desolder, 3(S-2)</td>
<td></td>
</tr>
<tr>
<td>[8] [8]</td>
<td></td>
<td>Loading Motor Assembly T</td>
<td>DM1H, DM7H</td>
<td>Desolder, LDG Belt, 2(S-3)</td>
<td></td>
</tr>
<tr>
<td>[9] [9]</td>
<td></td>
<td>ACE Head Assembly T</td>
<td>DM1H, DM7H</td>
<td>(S-4)</td>
<td></td>
</tr>
<tr>
<td>[12] [11]</td>
<td></td>
<td>Pinch Arm (B) T</td>
<td>DM1H, DM8H-1, DM8H-2</td>
<td>*(P-3)</td>
<td></td>
</tr>
<tr>
<td>[14] [14]</td>
<td></td>
<td>FE Head T</td>
<td>DM1H, DM9H</td>
<td>(S-5)</td>
<td></td>
</tr>
<tr>
<td>[16] [2]</td>
<td></td>
<td>Slider Shaft T</td>
<td>DM10H</td>
<td>*(L-5)</td>
<td></td>
</tr>
<tr>
<td>[17] [16]</td>
<td></td>
<td>C Drive Lever (SP) T</td>
<td>DM10H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[18] [16]</td>
<td></td>
<td>C Drive Lever (TU) T</td>
<td>DM10H</td>
<td>(S-7), *(P-4)</td>
<td></td>
</tr>
<tr>
<td>[19] [19]</td>
<td></td>
<td>Capstan Motor B</td>
<td>DM2H, DM11H</td>
<td>3(S-8), Cap Belt</td>
<td></td>
</tr>
<tr>
<td>[20] [20]</td>
<td></td>
<td>Clutch Assembly (HI) B</td>
<td>DM2H, DM12H</td>
<td>(C-1)</td>
<td></td>
</tr>
<tr>
<td>[21] [20]</td>
<td></td>
<td>Center Gear B</td>
<td>DM12H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[22] [22]</td>
<td></td>
<td>F Brake Assembly (HI) B</td>
<td>DM2H, DM12H</td>
<td>*(L-6)</td>
<td></td>
</tr>
<tr>
<td>[23] [22]</td>
<td></td>
<td>Worm Holder B</td>
<td>DM2H, DM13H-1</td>
<td>(S-9), *(L-7), *(L-8)</td>
<td></td>
</tr>
<tr>
<td>[24] [22]</td>
<td></td>
<td>Pulley Assembly (HI) B</td>
<td>DM2H, DM13H-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[27] [22],[23], [26]</td>
<td></td>
<td>Cam Gear (A) (HI) B</td>
<td>DM2H, DM13H-1, DM13H-2</td>
<td>(C-4) (+)Refer to Alignment Sec. Page 4-15</td>
<td></td>
</tr>
<tr>
<td>[28] [26]</td>
<td></td>
<td>TR Gear C B</td>
<td>DM2H, DM13H-1</td>
<td>(C-5)</td>
<td></td>
</tr>
<tr>
<td>[29] [28]</td>
<td></td>
<td>TR Gear Spring B</td>
<td>DM13H-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[30] [29]</td>
<td></td>
<td>TR Gear A/B B</td>
<td>DM13H-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[31] [31]</td>
<td></td>
<td>FF Arm (HI) B</td>
<td>DM1H, DM14H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[32] [26]</td>
<td></td>
<td>Idler Assembly (HI) B</td>
<td>DM1H, DM14H</td>
<td>*(L-9)</td>
<td></td>
</tr>
<tr>
<td>STEP/LOC. No.</td>
<td>STARTING No.</td>
<td>PART</td>
<td>B/R</td>
<td>Fig. No.</td>
<td>REMOVE/*UNHOOK/UNLOCK/RELEASE/UNPLUG/DESOLDER</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
<td>-------------------------------</td>
<td>------</td>
<td>----------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>[33]</td>
<td>[26]</td>
<td>BT Arm</td>
<td>B</td>
<td>DM2H, DM14H</td>
<td>*(P-5)</td>
</tr>
<tr>
<td>[34]</td>
<td>[26]</td>
<td>Loading Arm (SP) Assembly</td>
<td>B</td>
<td>DM2H, DM14H</td>
<td>(+)Refer to Alignment Sec. Page 4-15</td>
</tr>
<tr>
<td>[35]</td>
<td>[34]</td>
<td>Loading Arm (TU) Assembly</td>
<td>B</td>
<td>DM2H, DM14H</td>
<td>(+)Refer to Alignment Sec. Page 4-15</td>
</tr>
<tr>
<td>[36]</td>
<td>[16],[26]</td>
<td>M Brake (TU) Assembly (HI)</td>
<td>T</td>
<td>DM1H, DM15H</td>
<td></td>
</tr>
<tr>
<td>[37]</td>
<td>[2],[26]</td>
<td>M Brake (SP) Assembly (HI)</td>
<td>T</td>
<td>DM1H, DM15H</td>
<td>*(P-6)</td>
</tr>
<tr>
<td>[38]</td>
<td>[37]</td>
<td>Tension Lever Assembly</td>
<td>T</td>
<td>DM1H, DM15H</td>
<td></td>
</tr>
<tr>
<td>[39]</td>
<td>[38]</td>
<td>T Lever Holder</td>
<td>T</td>
<td>DM15H</td>
<td>*(L-10)</td>
</tr>
<tr>
<td>[40]</td>
<td>[40]</td>
<td>M Gear (HI)</td>
<td>T</td>
<td>DM1H, DM15H</td>
<td>*(C-6)</td>
</tr>
<tr>
<td>[41]</td>
<td>[15],[40]</td>
<td>Sensor Gear (HI)</td>
<td>T</td>
<td>DM1H, DM15H</td>
<td>*(C-7)</td>
</tr>
<tr>
<td>[42]</td>
<td>[36],[40]</td>
<td>Reel T</td>
<td>T</td>
<td>DM1H, DM15H</td>
<td></td>
</tr>
<tr>
<td>[43]</td>
<td>[38]</td>
<td>Reel S</td>
<td>T</td>
<td>DM1H, DM15H</td>
<td></td>
</tr>
<tr>
<td>[44]</td>
<td>[34],[38]</td>
<td>Moving Guide S Preparation</td>
<td>T</td>
<td>DM1H, DM16H</td>
<td>*(S-11), Slide Plate</td>
</tr>
<tr>
<td>[46]</td>
<td>[19]</td>
<td>TG Post Assembly</td>
<td>T</td>
<td>DM1H, DM16H</td>
<td>*(L-11)</td>
</tr>
<tr>
<td>[47]</td>
<td>[27]</td>
<td>Rack Assembly</td>
<td>R</td>
<td>DM17H</td>
<td>(+)Refer to Alignment Sec. Page 4-15</td>
</tr>
<tr>
<td>[48]</td>
<td>[47]</td>
<td>F Door Opener</td>
<td>R</td>
<td>DM17H</td>
<td></td>
</tr>
<tr>
<td>[49]</td>
<td>[49]</td>
<td>Cleaner Assembly</td>
<td>T</td>
<td>DM1H, DM6H</td>
<td></td>
</tr>
<tr>
<td>[50]</td>
<td>[49]</td>
<td>CL Post</td>
<td>T</td>
<td>DM6H</td>
<td>*(L-12)</td>
</tr>
</tbody>
</table>

(1): Follow steps in sequence. When reassembling, follow the steps in reverse order.
These numbers are also used as identification (location) No. of parts in the figures.
(2): Indicates the part to start disassembling with in order to disassemble the part in column (1).
(3): Name of the part
(4): Location of the part: T=Top B=Bottom R=Right L=Left
(5): Figure Number
(6): Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.
P=Spring, W=Washer, C=Cut Washer, S=Screw, *=Unhook, Unlock, Release, Unplug, or Desolder
  e.g., 2(L-2) = two Locking Tabs (L-2).
(7): Adjustment Information for Installation
  (+)Refer to Deck Exploded Views for lubrication.
First, while pushing the locking tab as shown in the right, slide and pull up the right side on [2] to release Pin A and Pin B from the slots A. Then, remove Pin C and Pin D on [2] from the slots B as shown.

**Fig. DM3H**

Installation of [3] and [6]

**Fig. DM4H**


**Fig. DM5H**
Fig. DM6H

Desolder from bottom

Lead with Red Stripe

View for A

Fig. DM7H

Desolder from bottom

Lead with White Stripe

LDG Belt

View for A

Fig. DM8H-1

1) Remove screw (S-4A).
2) Unhook spring (P-2).
3) Release (L-4) while holding [12] with a finger.

Pin of [12]

Pin of [10]

Groove of [27]

View for A

When reassembling [10] and [12], confirm that pin of [10] and pin of [12] are in the groove of [27] as shown.
Installation of [13] and [12]

Hook spring (P-3) up to [12] and [13], then install then to the specified position so that [12] will be floated slightly while holding [12] and [13]. (Refer to Fig. A.)

Install pin of [12] in groove of [27]. (Refer to Fig. B.)


Install [11] and [10] while holding [12]. (Refer to Fig. DM8H-1.)
Installation of [26]

Position of Mode Lever when installed

Pin of [36]  Pin of [33]  Pin of [37]

Bottom View

Align [26] and [27] as shown.

First groove on [27]

First tooth on [47]

When reassembling [27], meet the first groove on [27] to the first tooth on [47] as shown.
4-3 ALIGNMENT PROCEDURES OF MECHANISM

The following procedures describe how to align the individual gears and levers that make up the tape loading/unloading mechanism. Since information about the state of the mechanism is provided to the System Control Circuit only through the Mode Switch, it is essential that the correct relationship between individual gears and levers be maintained.

All alignments are to be performed with the mechanism in Eject mode, in the sequence given. Each procedure assumes that all previous procedures have been completed.

IMPORTANT:
If any one of these alignments is not performed properly, even if off by only one tooth, the unit will unload or stop and it may result in damage to the mechanical or electrical parts.

Alignment points in Eject Position

Alignment 1
Loading Arm (SP) and (TU) Assembly
Install Loading Arm (SP) and (TU) Assembly so that their triangle marks point to each other as shown in Fig. AL2.

Alignment 2
Mode Gear
Keeping the two triangles pointing at each other, install the Loading Arm (SP) Assembly so that the last tooth of the gear meets the most inside teeth of the Mode Gear. See Fig. AL2.

Alignment 3
Cam Gear (A) (HI), Rack Assembly
Install the Rack Assembly so that the first tooth on the gear of the Rack Assembly meets the first groove on the Cam Gear (A) (HI) as shown in Fig. AL3.
5-1 PREPARATION FOR SERVICING

5-1-1 How to Enter the Service Mode

About Optical Sensors

Caution:

An optical sensor system is used for the Tape Start and End Sensors on this equipment. Carefully read and follow the instructions below. Otherwise the unit may operate erratically.

What to do for preparation

Insert a tape into the Deck Mechanism Assembly and press the PLAY button. The tape will be loaded into the Deck Mechanism Assembly. Make sure the power is on, connect TP501 (S-INH) to GND. This will stop the function of Tape Start Sensor, Tape End Sensor and Reel Sensors. (If these TPs are connected before plugging in the unit, the function of the sensors will stay valid.) See Fig. 5-1-1.

Note: Because the Tape End Sensors are inactive, do not run a tape all the way to the start or the end of the tape to avoid tape damage.

Fig. 5-1-1
## 5-2 FIXTURE AND TAPE FOR ADJUSTMENT

1. Alignment Tape (MH-2)  
   No. 7099052

2. Guide Roller Adj. Screwdriver  
   No. 7099028

3. Flat Screwdriver  
   (Purchase Locally)

### 5-2-1 How To Use The Fixtures And Tape

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Name</th>
<th>Part No.</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alignment Tape (MH-2)</td>
<td>7099052</td>
<td>● Head Switching Position</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Tape Interchangeability Alignment</td>
</tr>
<tr>
<td>2</td>
<td>Guide Roller Adj. Screwdriver</td>
<td>7099028</td>
<td>● Guide Roller</td>
</tr>
<tr>
<td>3</td>
<td>Flat Screwdriver</td>
<td>Purchase Locally</td>
<td>● X Value Alignment</td>
</tr>
</tbody>
</table>
5-3 ELECTRICAL ADJUSTMENT INSTRUCTIONS

General Note: "CBA" is an abbreviation for "Circuit Board Assembly."

NOTE:
1. Electrical adjustments are required after replacing circuit components and certain mechanical parts. It is important to do these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.
2. To perform these alignment / confirmation procedures, make sure that the tracking control is set in the center position: Press either "CHANNEL ⌽" or "CHANNEL ▲" button on the front panel first, then the "PLAY" button on the front panel.

5-3-1 Test Equipment Required
1. Oscilloscope: Dual-trace with 10:1 probe, V-Range: 0.001~50V/Div., F-Range: DC~AC-20MHz
2. Alignment Tape (MH-2)

5-3-2 Head Switching Position Adjustment

Purpose: To determine the Head Switching position during playback.

Symptom of Misadjustment: May cause Head Switching noise or vertical jitter in the picture.

<table>
<thead>
<tr>
<th>Test point</th>
<th>Adj.Point</th>
<th>Mode</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP751(V-OUT)</td>
<td>VR501 (Switching Point)</td>
<td>PLAY (SP)</td>
<td>-----</td>
</tr>
<tr>
<td>TP504(RF-SW)</td>
<td>(MAIN CBA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GND</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tape Measurement Equipment Spec.
MH-2 Oscilloscope 6.5H±1H (416μs±64μs)

Connections of Measurement Equipment

Reference Notes: Playback the Alignment tape and adjust VR501 so that the V-sync front edge of the CH1 video output waveform is at the 6.5H±1H (416μs±64μs) delayed position from the rising edge of the CH2 head switching pulse waveform.
Explanation of alignment for the tape to correctly run starts on the next page. Refer to the information below on this page if a tape gets stuck, for example, in the mechanism due to some electrical trouble of the unit.

5-4-1 Service Information

A. Method for Manual Tape Loading/Unloading
To load a cassette tape manually:
1. Disconnect the AC plug.
2. Remove the Top Case and Front Assembly.
3. Insert a cassette tape. Though the tape will not be automatically loaded, make sure that the cassette tape is all the way in at the inlet of the Cassette Holder. To confirm this, lightly push the cassette tape further in and see if the tape comes back out, by a spring motion, just as much as you have pushed in.
4. Turn the LDG Belt in the appropriate direction shown in Fig. 5-4-1 for a minute or two to complete this task.

To unload a cassette tape manually:
1. Disconnect the AC plug.
2. Remove the Top Case and Front Assembly.
3. Make sure that the Moving guide preparations are in the Eject Position.
4. Turn the LDG Belt in the appropriate direction shown in Fig. 5-4-1 until the Moving guide preparations come to the Eject Position. Stop turning when the preparations begin clicking or can not be moved further. However, the tape will be left wound around the cylinder.
5. Turn the LDG Belt in the appropriate direction continuously, and the cassette tape will be ejected. Allow a minute or two to complete this task.

B. Method to place the Cassette Holder in the tape-loaded position without a cassette tape
1. Disconnect the AC Plug.
2. Remove the Top Case and Front Assembly.
3. Turn the LDG Belt in the appropriate direction shown in Fig. 5-4-1. Release the locking tabs shown in Fig. 5-4-1 and continue turning the LDG Belt until the Cassette Holder comes to the tape-loaded position. Allow a minute or two to complete this task.

---

5-4 MECHANICAL ALIGNMENT PROCEDURES
5-4-2 Tape Interchangeability Alignment

Note:
To do these alignment procedures, make sure that the Tracking Control Circuit is set to the center position every time a tape is loaded or unloaded. (Refer to page 5-7, procedure 1-C, step 2.)

Equipment required:
Dual Trace Oscilloscope
VHS Alignment Tape (MH-2)
Guide Roller Adj. Screwdriver
Flat Screwdriver (Purchase Locally)
Note: Before starting this Mechanical Alignment, do all Electrical Adjustment procedures.

Flowchart of Alignment for tape traveling

Loading (Use a blank tape.)

Adjust the height of the Guide Rollers (Supply side and take-up side). (Use a blank tape.) (Page 5-6) 1-A

Check to see that the tape is not creasing and that there is no slack on the supply and take-up side Guide Rollers. (Use a blank tape.) 1-A

Adjust the X Value for maximum envelope. (Page 5-6) (Use Alignment Tape.) 1-B

Check the envelope. 1-C

Check the envelope. 1-C

Adjust the Audio Section. (Azimuth Alignment) (Page 5-7) 1-D

Check the audio output. 1-D

Check the following:
1. X Value (Page 5-6)
2. Envelope (Page 5-7) 1-B, 1-C

Flowchart of Alignment for tape traveling

Do the final tape-traveling test to see that the tape runs normally in play mode without creasing or slacking. 1-A

Check to see that the tape is not creasing and that there is no slack on the REV Post. (Use a blank tape.) 1-E

OK

Completion

OK
1-A. Preliminary/Final Checking and Alignment of Tape Path

**Purpose:**
To make sure that the tape path is well stabilized.

**Symptom of Misalignment:**
If the tape path is unstable, the tape will be damaged.

**Note:** Do not use an Alignment Tape for this procedure. If the unit is not correctly aligned, the tape may be damaged.

1. Playback a blank cassette tape and check to see that the tape runs without creasing at Guide Rollers [2] and [3], and at points A and B on the lead surface. (Refer to Fig. 5-4-3 and 5-4-4.)

2. If creasing is apparent, align the height of the guide rollers by turning the top of Guide Rollers [2] and [3] with a Guide Roller Adj. Screwdriver. (Refer to Fig. 5-4-3 and 5-4-5.)

3. Check to see that the tape runs without creasing at Take-up Guide Post [4] or without snaking between Guide Roller [3] and ACE Head. (Fig. 5-4-3 and 5-4-5)

4. If creasing or snaking is apparent, adjust the Tilt Adj. Screw of the ACE Head. (Fig. 5-4-6)

---

1-B. X Value Alignment

**Purpose:**
To obtain maximum PB FM envelope signal at the preset position of the Tracking Control Circuit, align the Horizontal Position of the ACE Head.

**Symptom of Misalignment:**
If the Horizontal Position of the ACE Head is not properly aligned, maximum PB FM envelope cannot be obtained at the preset position of the Tracking Control Circuit.

1. Connect the oscilloscope to TP301 (C-PB) and TP503 (CTL) on the Main CBA. Use TP504 (RF-SW) as a trigger.

2. Playback the Gray Scale of the Alignment Tape (MH-2) and confirm that the PB FM signal is present.

3. Set the Tracking Control Circuit to the preset position by pressing CH UP button on the remote control unit then “PLAY” button on the unit. (Refer to note on bottom of page 5-7.)

4. Use the Flat Screwdriver so that the PB FM signal at TP301 (C-PB) is maximum. (Fig. 5-4-6)
5. To shift the CTL waveform, press CH UP or CH DOWN button on the remote control unit. Then make sure that the maximum output position of PB FM envelope signal become within ±2ms from preset position.

6. Set the Tracking Control Circuit to the preset position by pressing CH UP button on the remote control unit. and then “PLAY” button.

1-C. Checking/Adjustment of Envelope Waveform

Purpose:
To achieve a satisfactory picture, adjust the PB FM envelope becomes as flat as possible.

Symptom of Misalignment:
If the envelope output is poor, noise will appear in the picture. The tracking will then lose precision and the playback picture will be distorted by any slight variation of the Tracking Control Circuit.

1. Connect the oscilloscope to TP301 (C-PB) on the Main CBA. Use TP504 (RF-SW) as a trigger.
2. Playback the Gray Scale on the Alignment Tape (MH-2). Set the Tracking Control Circuit to the preset position by pressing CH UP button and then “PLAY” button on the unit. Adjust the height of Guide Rollers [2] and [3] (Fig. 5-4-3, Page 5-6) watching the oscilloscope display so that the envelope becomes as flat as possible. To do this adjustment, turn the top of the Guide Roller with the Guide Roller Adj. Screwdriver.
3. If the envelope is as shown in Fig. 5-4-7, adjust the height of Guide Roller [2] (Refer to Fig. 5-4-3) so that the waveform looks like the one shown in Fig. 5-4-9.
4. If the envelope is as shown in Fig. 5-4-8, adjust the height of Guide Roller [3] (Refer to Fig. 5-4-3) so that the waveform looks like the one shown in Fig. 5-4-9.
5. When Guide Rollers [2] and [3] (Refer to Fig. 5-4-3) are aligned properly, there is no envelope drop either at the beginning or end of track as shown in Fig. 5-4-9.

---

**Note:** Upon completion of the adjustment of the Guide Rollers [2] and [3] (Refer to Fig. 5-4-3), check the X Value by pushing the CH UP or DOWN buttons alternately, to check the symmetry of the envelope. Check the number of pushes to ensure preset position. The number of pushes CH UP button to achieve 1/2 level of envelope should match the number of pushes CH DOWN button from center. If required, redo the “X Value Alignment.”
1-D. Azimuth Alignment of Audio/Control/Erase Head

Purpose:
To correct the Azimuth alignment so that the Audio/Control/Erase Head meets tape tracks properly.

Symptom of Misalignment:
If the position of the Audio/Control/Erase Head is not properly aligned, the Audio S/N Ratio or Frequency Response will be poor.

1. Connect the oscilloscope to the audio output jack on the rear side of the deck.
2. Playback the alignment tape (MH-2) and confirm that the audio signal output level is 8kHz.
3. Adjust Azimuth Adj. Screw so that the output level on the AC Voltmeter or the waveform on the oscilloscope is at maximum. (Fig. 5-4-6)

Note: Upon completion of the adjustment of Azimuth Adj. Screw, check the X Value by pushing the CH UP or DOWN buttons alternately, to check the symmetry of the envelope. Check the number of pushes to ensure preset position. The number of pushes CH UP button to achieve 1/2 level of envelope should match the number of pushes CH DOWN button from center. If required, redo the “X Value Alignment.”

1-E. Checking and Alignment of Tape Path during reversing

Purpose:
To make sure that the tape path is well stabilized during reversing.

Symptom of Misalignment:
If the tape path is unstable during reversing, the tape will be damaged.

Note: Do not use an Alignment Tape for this procedure. If the unit is not correctly aligned, the tape may be damaged.

1. Insert a black cassette tape into the tray and set the unit to REV. Then confirm if the tape has been curled up or bent at the Take-up Guide Post[4] or REV Post[5]. (Refer to Fig. M11 and M13.)
Note: Components without any numbers in exploded views had not been assigned as service parts as of the date of issue of this manual.
Some Ref. Numbers are not in sequence.
THE UPDATED PARTS LIST
FOR THIS MODEL IS
AVAILABLE ON ESTA
7-1 SYSTEM CONTROL TIMING CHARTS
[ VCR Section ]

Mode SW : LD-SW

<table>
<thead>
<tr>
<th>LD-SW Position detection A/D Input voltage Limit (Calculated voltage)</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.76V~4.50V (4.12V)</td>
<td>EJ</td>
</tr>
<tr>
<td>4.51V~5.00V (5.00V)</td>
<td>CL</td>
</tr>
<tr>
<td>0.00V~0.25V (0.00V)</td>
<td>SB</td>
</tr>
<tr>
<td>1.06V~1.50V (1.21V)</td>
<td>TL</td>
</tr>
<tr>
<td>0.66V~1.05V (0.91V)</td>
<td>FB</td>
</tr>
<tr>
<td>1.99V~2.60V (2.17V)</td>
<td>SF</td>
</tr>
<tr>
<td>1.51V~1.98V (1.80V)</td>
<td>SM</td>
</tr>
<tr>
<td>3.20V~3.75V (3.40V)</td>
<td>AU</td>
</tr>
<tr>
<td>0.26V~0.65V (0.44V)</td>
<td>AL</td>
</tr>
<tr>
<td>4.51V~5.00V (5.00V)</td>
<td>SS</td>
</tr>
<tr>
<td>2.61V~3.19V (2.97V)</td>
<td>RS</td>
</tr>
</tbody>
</table>

Note:
EJ ➔ RS: Loading FWD (LM-FWD/REV “H”)
RS ➔ EJ: Loading REV (LM-FWD/REV “L”)
Stop (A) = Loading
Stop (B) = Unloading

Note:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Loading Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>EJ</td>
<td>Eject</td>
</tr>
<tr>
<td>CL</td>
<td>Eject ~ REW Reel</td>
</tr>
<tr>
<td>SB</td>
<td>REW Reel ~ Stop(B)</td>
</tr>
<tr>
<td>TL</td>
<td>Stop(B) ~ Brake Cancel</td>
</tr>
<tr>
<td>FB</td>
<td>Brake Cancel ~ FF / REW</td>
</tr>
<tr>
<td>SF</td>
<td>FF / REW ~ Stop(M), (FF / REW)</td>
</tr>
<tr>
<td>SM</td>
<td>Stop(M), (FF / REW) ~ Stop(A)</td>
</tr>
<tr>
<td>AU</td>
<td>Stop(A) ~ Play / REC</td>
</tr>
<tr>
<td>AL</td>
<td>Play / REC ~ Still / Slow</td>
</tr>
<tr>
<td>SS</td>
<td>Still / Slow ~ RS (REW Search)</td>
</tr>
<tr>
<td>RS</td>
<td>RS (REW Search)</td>
</tr>
</tbody>
</table>
Still/Slow Control Frame Advance Timing Chart

1) SP Mode

- **18 RF-SW**: The first rise of RF-SW after a rise in F-AD signal.
- **F-AD (Internal Signal)**
  - **C-DRIVE**: Acceleration Detection (T1)
  - **PB CTL**: Stop detection (T2)
  - **78 C-F/R**: Slow Tracking Value
  - **16 H-A-SW**: Reversal Limit Value
  - **15 ROTA**: 20ms

---

Fig. 1
2) LP Mode

The first rise of RF-SW after a rise in F-AD signal

Stop detection (T2)

Acceleration Detection (T1)

Slow Tracking Value

Reversal Limit Value

FRAME ADVANCE

STILL

Fig. 2
1. EJECT (POWER OFF) -> CASSETTE IN (POWER ON) -> STOP(B) -> STOP(A) -> PLAY -> RS -> FS -> PLAY -> STILL -> PLAY -> STOP(A)
2. STOP(A) -> FF -> STOP(A) -> REV -> STOP(A) -> PAUSE -> PAUSE or REC -> STOP(A) -> EJECT

Fig. 4
[ DVD Section ]

Tray Close ~ Play / Play ~ Tray Open

- **Tray IN (TL221)**
  - 3.3V
  - 0V

- **Sled Drive (TP303)**
  - 1.65V
  - 0V

- **Disc Drive (TP301)**
  - 1.65V
  - 0V

- **Focus Drive (TP304)**
  - 1.65V
  - 0V

- **Tracking Drive (TP302)**
  - 1.65V
  - 0V
## 7-2 IC PIN FUNCTION DESCRIPTIONS

### [ VCR Section ]

### IC501 (SERVO / SYSTEM CONTROL IC)

“H” ≥ 4.5V, “L” ≤ 1.0V

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>IN/OUT</th>
<th>Signal Name</th>
<th>Function</th>
<th>Active Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IN</td>
<td>SC2-IN</td>
<td>Input Signal from Pin 8 of SCART2</td>
<td>A/D</td>
</tr>
<tr>
<td>2</td>
<td>IN</td>
<td>PG-Delay</td>
<td>Video Head Switching Pulse Signal Adjusted Voltage</td>
<td>A/D</td>
</tr>
<tr>
<td>3</td>
<td>IN</td>
<td>POW-SAF</td>
<td>P-ON Power Detection Input Signal</td>
<td>A/D</td>
</tr>
<tr>
<td>4</td>
<td>IN</td>
<td>END-S</td>
<td>Tape End Position Detect Signal</td>
<td>A/D</td>
</tr>
<tr>
<td>5</td>
<td>IN</td>
<td>AFC</td>
<td>Automatic Frequency Control Signal</td>
<td>A/D</td>
</tr>
<tr>
<td>6</td>
<td>IN</td>
<td>V-ENV</td>
<td>Video Envelope Comparator Signal</td>
<td>A/D</td>
</tr>
<tr>
<td>7</td>
<td>IN</td>
<td>KEY-1</td>
<td>Key Scan Input Signal 1</td>
<td>A/D</td>
</tr>
<tr>
<td>8</td>
<td>IN</td>
<td>KEY-2</td>
<td>Key Scan Input Signal 2</td>
<td>A/D</td>
</tr>
<tr>
<td>9</td>
<td>IN</td>
<td>LD-SW</td>
<td>Deck Mode Position Detector Signal</td>
<td>A/D</td>
</tr>
<tr>
<td>10</td>
<td>IN</td>
<td>ST-S</td>
<td>Tape Start Position Detector Signal</td>
<td>A/D</td>
</tr>
<tr>
<td>11</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>13</td>
<td>OUT</td>
<td>D-V-SYNC</td>
<td>Dummy V-sync Output</td>
<td>H/Hi-z</td>
</tr>
<tr>
<td>14</td>
<td>IN</td>
<td>REMOTE-VIDEO</td>
<td>Remote Control Sensor</td>
<td>L</td>
</tr>
<tr>
<td>15</td>
<td>OUT</td>
<td>C-ROTA</td>
<td>Color Phase Rotary Changeover Signal</td>
<td>H/L</td>
</tr>
<tr>
<td>16</td>
<td>OUT</td>
<td>H-A-SW</td>
<td>Video Head Amp Switching Pulse</td>
<td>H/L</td>
</tr>
<tr>
<td>17</td>
<td>IN</td>
<td>H-A-COMP</td>
<td>Head Amp Comparator Signal</td>
<td>H/L</td>
</tr>
<tr>
<td>18</td>
<td>OUT</td>
<td>RF-SW</td>
<td>Video Head Switching Pulse</td>
<td>H/L</td>
</tr>
<tr>
<td>19</td>
<td>OUT</td>
<td>Hi-Fi-H-SW</td>
<td>Hifi Audio Head Switching Pulse</td>
<td>H/L</td>
</tr>
<tr>
<td>20</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>21</td>
<td>OUT</td>
<td>DVD-POWER</td>
<td>DVD Power Control Signal</td>
<td>H</td>
</tr>
<tr>
<td>22</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>23</td>
<td>OUT</td>
<td>POWER-LED</td>
<td>“POWER” LED Signal Output</td>
<td>H/L</td>
</tr>
<tr>
<td>24</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>25</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>26</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>27</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>28</td>
<td>OUT</td>
<td>LINE-MUTE</td>
<td>Audio Mute Control Signal</td>
<td>H</td>
</tr>
<tr>
<td>29</td>
<td>OUT</td>
<td>DVD-LED</td>
<td>“DVD” LED Signal Output</td>
<td>H/L</td>
</tr>
<tr>
<td>30</td>
<td>OUT</td>
<td>VCR-LED</td>
<td>“VCR” LED Signal Output</td>
<td>H/L</td>
</tr>
<tr>
<td>31</td>
<td>IN</td>
<td>REC-SAF-SW</td>
<td>Recording Safety SW Detect (With Record tab=&quot;L&quot; / With out Record tab=&quot;H&quot;)</td>
<td>H/L</td>
</tr>
<tr>
<td>32</td>
<td>IN</td>
<td>A-MODE</td>
<td>Hi-Fi Tape Detection Signal</td>
<td>L</td>
</tr>
<tr>
<td>33</td>
<td>OUT</td>
<td>D-REC-H</td>
<td>Delayed Record Signal</td>
<td>H</td>
</tr>
<tr>
<td>34</td>
<td>IN</td>
<td>RESET</td>
<td>System Reset Signal (Reset=&quot;L&quot;)</td>
<td>L</td>
</tr>
<tr>
<td>35</td>
<td>IN</td>
<td>XCl</td>
<td>Sub Clock</td>
<td>-</td>
</tr>
<tr>
<td>36</td>
<td>OUT</td>
<td>XCOUT</td>
<td>Sub Clock</td>
<td>-</td>
</tr>
<tr>
<td>37</td>
<td>-</td>
<td>Vcc</td>
<td>Vcc</td>
<td>-</td>
</tr>
<tr>
<td>38</td>
<td>IN</td>
<td>Xin</td>
<td>Main Clock Input</td>
<td>-</td>
</tr>
<tr>
<td>39</td>
<td>OUT</td>
<td>Xout</td>
<td>Main Clock Input</td>
<td>-</td>
</tr>
<tr>
<td>40</td>
<td>-</td>
<td>GND</td>
<td>Vss(GND)</td>
<td>-</td>
</tr>
<tr>
<td>41</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>42</td>
<td>IN</td>
<td>DVD-8PIN-IN</td>
<td>SCART 8Pin DVD Input Control Signal</td>
<td>H/L</td>
</tr>
<tr>
<td>43</td>
<td>IN</td>
<td>CLKSEL</td>
<td>Clock Select (GND)</td>
<td>L</td>
</tr>
<tr>
<td>44</td>
<td>IN</td>
<td>OSCin</td>
<td>Clock Input for letter size</td>
<td>-</td>
</tr>
<tr>
<td>45</td>
<td>OUT</td>
<td>OSCout</td>
<td>Clock Output for letter size</td>
<td>-</td>
</tr>
<tr>
<td>46</td>
<td>-</td>
<td>NUB</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>47</td>
<td>IN</td>
<td>LP</td>
<td>LP</td>
<td>-</td>
</tr>
<tr>
<td>48</td>
<td>IN</td>
<td>FSC-IN [4.43MHz]</td>
<td>4.43MHz Clock Input</td>
<td>-</td>
</tr>
<tr>
<td>49</td>
<td>-</td>
<td>OSDVss</td>
<td>OSDVss</td>
<td>-</td>
</tr>
<tr>
<td>50</td>
<td>IN</td>
<td>OSD-V-IN</td>
<td>OSD Video Signal Input</td>
<td>-</td>
</tr>
<tr>
<td>51</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>52</td>
<td>OUT</td>
<td>OSD-V-OUT</td>
<td>OSD Video Signal Output</td>
<td>-</td>
</tr>
<tr>
<td>53</td>
<td>-</td>
<td>OSDVcc</td>
<td>OSDVcc</td>
<td>-</td>
</tr>
<tr>
<td>54</td>
<td>-</td>
<td>HLF</td>
<td>LPF Connected Terminal (Slicer)</td>
<td>-</td>
</tr>
<tr>
<td>55</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>56</td>
<td>IN</td>
<td>DAVN-L</td>
<td>VPS/PDC Data Receive = “L”</td>
<td>L</td>
</tr>
<tr>
<td>Pin No.</td>
<td>IN/OUT</td>
<td>Signal Name</td>
<td>Function</td>
<td>Active Level</td>
</tr>
<tr>
<td>---------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
<td>--------------</td>
</tr>
<tr>
<td>57</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>58</td>
<td>IN</td>
<td>C-SYNC</td>
<td>Composite Synchronized Pulse</td>
<td>PULSE</td>
</tr>
<tr>
<td>59</td>
<td>OUT</td>
<td>8POUT-1</td>
<td>Control SCART 1 8Pin Level by using 8POUT-1 and 8POUT-2</td>
<td>H/L</td>
</tr>
<tr>
<td>60</td>
<td>OUT</td>
<td>8POUT-2</td>
<td>Control SCART 1 8Pin Level by using 8POUT-1 and 8POUT-2</td>
<td>H/L</td>
</tr>
<tr>
<td>61</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>62</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>63</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>64</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>65</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>66</td>
<td>OUT</td>
<td>C-POW-SW</td>
<td>Capstan Power Switching Signal</td>
<td>H/L</td>
</tr>
<tr>
<td>67</td>
<td>OUT</td>
<td>P-ON-H</td>
<td>Power On Signal at High</td>
<td>H</td>
</tr>
<tr>
<td>68</td>
<td>OUT</td>
<td>DRV-DATA</td>
<td>VFD Driver IC Control Data</td>
<td>H/L</td>
</tr>
<tr>
<td>69</td>
<td>OUT</td>
<td>DRV-STB</td>
<td>VFD Driver IC Chip Select Signal</td>
<td>H/L</td>
</tr>
<tr>
<td>70</td>
<td>OUT</td>
<td>DRV-CLK</td>
<td>VFD Driver IC Control Clock</td>
<td>H/L</td>
</tr>
<tr>
<td>71</td>
<td>OUT</td>
<td>IIC-BUS-SCL</td>
<td>IIC BUS Control Clock</td>
<td>H/L</td>
</tr>
<tr>
<td>72</td>
<td>IN/OUT</td>
<td>IIC-BUS-SDA</td>
<td>IIC BUS Control Data</td>
<td>H/L</td>
</tr>
<tr>
<td>73</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>74</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>75</td>
<td>IN</td>
<td>DVD-POWER-MONITOR</td>
<td>DVD Power Monitor Signal (P-off=&quot;L&quot;, P-on=&quot;H&quot;)</td>
<td>H/L</td>
</tr>
<tr>
<td>76</td>
<td>OUT</td>
<td>C-CONT</td>
<td>Capstan Motor Control Signal</td>
<td>PWM</td>
</tr>
<tr>
<td>77</td>
<td>OUT</td>
<td>D-CONT</td>
<td>Drum Motor Control Signal</td>
<td>PWM</td>
</tr>
<tr>
<td>78</td>
<td>OUT</td>
<td>C-F/R</td>
<td>Capstan Motor FWD/REV Control Signal (FWD=&quot;L&quot;,REV=&quot;H&quot;)</td>
<td>H/L</td>
</tr>
<tr>
<td>79</td>
<td>IN</td>
<td>S-REEL</td>
<td>Supply Reel Rotation Signal</td>
<td>PULSE</td>
</tr>
<tr>
<td>80</td>
<td>IN</td>
<td>T-REEL</td>
<td>Take Up Reel Rotation Signal</td>
<td>PULSE</td>
</tr>
<tr>
<td>81</td>
<td>OUT</td>
<td>LM-FWD/REV</td>
<td>Loading Motor Control Signal</td>
<td>H/L/Hi-z</td>
</tr>
<tr>
<td>82</td>
<td>OUT</td>
<td>OUTPUT-SELECT</td>
<td>Output Select</td>
<td>H/L</td>
</tr>
<tr>
<td>83</td>
<td>OUT</td>
<td>A-MUTE-H</td>
<td>Audio Mute Control Signal (Mute = &quot;H&quot;)</td>
<td>H</td>
</tr>
<tr>
<td>84</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
<tr>
<td>85</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
<td>-</td>
</tr>
</tbody>
</table>

Notes:
Abbreviation for Active Level:
PWM ----- Pulse Wide Modulation
A/D------- Analog - Digital Converter
### IC612 (FIP DRIVER IC)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>IN/OUT</th>
<th>Signal Name</th>
<th>Name Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IN</td>
<td>FP-CLK</td>
<td>Clock Input</td>
</tr>
<tr>
<td>2</td>
<td>IN</td>
<td>FP-STB</td>
<td>Serial Interface Strobe</td>
</tr>
<tr>
<td>3</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
</tr>
<tr>
<td>5</td>
<td>-</td>
<td>VSS</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>-</td>
<td>VDD</td>
<td>Power Supply</td>
</tr>
<tr>
<td>7</td>
<td>OUT</td>
<td>a</td>
<td>Segment Output</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>c</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>OUT</td>
<td>d</td>
<td>Segment Output</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>e</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>f</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>g</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>h</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>-</td>
<td>VEE</td>
<td>Pull Down Level</td>
</tr>
<tr>
<td>16</td>
<td>OUT</td>
<td>i</td>
<td>Segment Output</td>
</tr>
<tr>
<td>17</td>
<td></td>
<td>7G</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>6G</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td>5G</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>OUT</td>
<td>4G</td>
<td>Grid Output</td>
</tr>
<tr>
<td>21</td>
<td></td>
<td>3G</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td>2G</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td></td>
<td>1G</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>-</td>
<td>VDD</td>
<td>Power Supply</td>
</tr>
<tr>
<td>25</td>
<td>-</td>
<td>VSS</td>
<td>GND</td>
</tr>
<tr>
<td>26</td>
<td>IN</td>
<td>OSC</td>
<td>Oscillator Input</td>
</tr>
<tr>
<td>27</td>
<td>-</td>
<td>NU</td>
<td>Not Used</td>
</tr>
<tr>
<td>28</td>
<td>IN</td>
<td>FP-DIN</td>
<td>Serial Data Input</td>
</tr>
</tbody>
</table>
7-3 LEAD IDENTIFICATIONS

Note:
A: Anode
K: Cathode
E: Emitter
C: Collector
B: Base
R: Reference
S: Source
G: Gate
D: Drain
WARNING

Many electrical and mechanical parts in this chassis have special characteristics. These characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by the mark "△" in the schematic diagram and the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts that do not have the same safety characteristics as specified in the parts list may create shock, fire, or other hazards.

Capacitor Temperature Markings

<table>
<thead>
<tr>
<th>Mark</th>
<th>Capacity change rate</th>
<th>Standard temperature</th>
<th>Temperature range</th>
</tr>
</thead>
<tbody>
<tr>
<td>(B)</td>
<td>±10%</td>
<td>20°C</td>
<td>-25~+85°C</td>
</tr>
<tr>
<td>(F)</td>
<td>+30 - 80%</td>
<td>20°C</td>
<td>-25~+85°C</td>
</tr>
<tr>
<td>(SR)</td>
<td>±15%</td>
<td>20°C</td>
<td>-25~+85°C</td>
</tr>
<tr>
<td>(Z)</td>
<td>+30 - 80%</td>
<td>20°C</td>
<td>-10~+70°C</td>
</tr>
</tbody>
</table>

Capacitors and transistors are represented by the following symbols.

CBA Symbols

- Electrolytic Capacitor
- Transistor or Digital Transistor

Schematic Diagram Symbols

- Digital Transistor
- NPN Transistor
- PNP Transistor
- NPN Digital Transistor
- PNP Digital Transistor

Notes:

1. Do not use the part number shown on these drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since these drawings were prepared.
2. All resistance values are indicated in ohms ($K=10^3, M=10^6$).
3. Resistor wattages are 1/4W or 1/6W unless otherwise specified.
4. All capacitance values are indicated in μF ($P=10^{-6}$ μF).
5. All voltages are DC voltages unless otherwise specified.
6. Electrical parts such as capacitors, connectors, diodes, IC's, transistors, resistors, switches, and fuses are identified by four digits. The first two digits are not shown for each component. In each block of the diagram, there is a note such as shown below to indicate these abbreviated two digits.
LIST OF CAUTION, NOTES, AND SYMBOLS USED IN THE SCHEMATIC DIAGRAMS ON THE FOLLOWING PAGES:

1. CAUTION:
   FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.

2. CAUTION:
   Fixed Voltage (or Auto voltage selectable) power supply circuit is used in this unit.
   If Main Fuse (F1001) is blown, first check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

3. Note:
   (1) Do not use the part number shown on the drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since the drawings were prepared.
   (2) To maintain original function and reliability of repaired units, use only original replacement parts which are listed with their part numbers in the parts list section of the service manual.

4. Voltage indications for PLAY and REC modes on the schematics are as shown below:

5. How to read converged lines

6. Test Point Information

   ⫝̸: Indicates a test point with a jumper wire across a hole in the PCB.
   ➡: Used to indicate a test point with a component lead on foil side.
   ⫝̸: Used to indicate a test point with no test pin.
   ⫝̸: Used to indicate a test point with a test pin.
S-3 Wiring Diagrams  < DVD SECTION >

DVD MECHA

FG SENSOR

FG CBA

SPINDLE MOTOR

SLED MOTOR

DRIVE CBA

PICK UP UNIT

DETECTOR

DVD MAIN CBA

CN301

1. FG-IN
2. PON+3.3V(D)
3. SP(+)
4. SP(-)
5. TRAY-IN
6. GND
7. SL(-)
8. SL(+)
9. TRAY-OUT

CN201

1. TS(+)
2. FS(+)
3. FS(-)
4. TS(-)
5. GND(CD PD)
6. GND(DVD PD)
7. PD-MONI
8. DVD-LD
9. GND(LD)
10. CD-LD
11. GND
12. F
13. VREF
14. E
15. B
16. C
17. A
18. D
19. CD/DVD
20. P-ON+5V

CN401

1. EV+1.2V
2. EV+1.2V
3. EV+3.3V
4. EV+3.3V
5. P-ON+3.3V
6. P-ON+5V
7. EV+11V
8. EV+11V
9. GND
10. GND
11. GND
12. GND
13. GND
14. GND
15. GND
16. GND
17. PWRCON
18. FP-CLK
19. FP-DIN
20. FP-STB
21. FP-DOUT
22. REMOTE-DVD
23. DVD POWER
24. DVD OPEN/CLOSE
25. DVD PLAY
26. DVD STOP
27. OUTPUT-SELECT

CN601

1. VIDEO Y
2. FP-SW(NU)
3. ASPECT
4. VIDEO R
5. VIDEO B
6. GND
7. VIDEO G
8. GND
9. VIDEO C
10. GND
11. GND
12. DVD A/MUTE
13. DVD A/R MUTE
14. DVD A/R
15. DVD A/L
16. AUDIO+5V
17. AUDIO+3V
18. SPDIF
S-6 Main 3/9 Schematic Diagram
CAUTION!
For continued protection against fire hazard, replace only with the same type fuse.

NOTE:
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

CAUTION!
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F1001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.
<table>
<thead>
<tr>
<th>PIN.NO</th>
<th>PLAY</th>
<th>STOP</th>
<th>PIN.NO</th>
<th>PLAY</th>
<th>STOP</th>
<th>PIN.NO</th>
<th>PLAY</th>
<th>STOP</th>
<th>PIN.NO</th>
<th>PLAY</th>
<th>STOP</th>
<th>PIN.NO</th>
<th>PLAY</th>
<th>STOP</th>
<th>PIN.NO</th>
<th>PLAY</th>
<th>STOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>~</td>
<td>~</td>
<td>33</td>
<td>~</td>
<td>~</td>
<td>65</td>
<td>0</td>
<td>0</td>
<td>97</td>
<td>----</td>
<td>----</td>
<td>129</td>
<td>2.3</td>
<td>2.3</td>
<td>161</td>
<td>3.4</td>
<td>3.4</td>
</tr>
<tr>
<td>2</td>
<td>~</td>
<td>~</td>
<td>34</td>
<td>3.4</td>
<td>3.4</td>
<td>66</td>
<td>3.4</td>
<td>3.5</td>
<td>98</td>
<td>3.4</td>
<td>3.4</td>
<td>130</td>
<td>2.3</td>
<td>2.3</td>
<td>162</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>35</td>
<td>0</td>
<td>0</td>
<td>67</td>
<td>3.2</td>
<td>3.2</td>
<td>99</td>
<td>0.9</td>
<td>0.8</td>
<td>131</td>
<td>2.3</td>
<td>2.3</td>
<td>163</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>4</td>
<td>~</td>
<td>~</td>
<td>36</td>
<td>~</td>
<td>~</td>
<td>68</td>
<td>0</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>132</td>
<td>2.4</td>
<td>2.3</td>
<td>164</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>~</td>
<td>~</td>
<td>37</td>
<td>~</td>
<td>~</td>
<td>69</td>
<td>----</td>
<td>----</td>
<td>101</td>
<td>2.4</td>
<td>2.4</td>
<td>133</td>
<td>2.4</td>
<td>2.4</td>
<td>165</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>6</td>
<td>3.4</td>
<td>3.4</td>
<td>38</td>
<td>0.4</td>
<td>0.3</td>
<td>70</td>
<td>3.4</td>
<td>3.4</td>
<td>102</td>
<td>2.2</td>
<td>2.2</td>
<td>134</td>
<td>2.4</td>
<td>2.4</td>
<td>166</td>
<td>1.7</td>
<td>1.7</td>
</tr>
<tr>
<td>7</td>
<td>~</td>
<td>~</td>
<td>39</td>
<td>~</td>
<td>~</td>
<td>71</td>
<td>----</td>
<td>----</td>
<td>103</td>
<td>1.9</td>
<td>1.9</td>
<td>135</td>
<td>2.3</td>
<td>2.3</td>
<td>167</td>
<td>3.4</td>
<td>3.4</td>
</tr>
<tr>
<td>8</td>
<td>~</td>
<td>~</td>
<td>40</td>
<td>~</td>
<td>~</td>
<td>72</td>
<td>----</td>
<td>----</td>
<td>104</td>
<td>0.4</td>
<td>0.3</td>
<td>136</td>
<td>2.3</td>
<td>2.3</td>
<td>168</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>0</td>
<td>41</td>
<td>~</td>
<td>~</td>
<td>73</td>
<td>3.4</td>
<td>3.4</td>
<td>105</td>
<td>0</td>
<td>0</td>
<td>137</td>
<td>2.3</td>
<td>2.3</td>
<td>169</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>10</td>
<td>~</td>
<td>~</td>
<td>42</td>
<td>~</td>
<td>~</td>
<td>74</td>
<td>0</td>
<td>0</td>
<td>106</td>
<td>1.7</td>
<td>1.7</td>
<td>138</td>
<td>2.3</td>
<td>2.3</td>
<td>170</td>
<td>1.7</td>
<td>1.7</td>
</tr>
<tr>
<td>11</td>
<td>~</td>
<td>~</td>
<td>43</td>
<td>~</td>
<td>~</td>
<td>75</td>
<td>1.7</td>
<td>1.8</td>
<td>107</td>
<td>3.4</td>
<td>3.4</td>
<td>139</td>
<td>1.7</td>
<td>1.7</td>
<td>171</td>
<td>1.3</td>
<td>0.1</td>
</tr>
<tr>
<td>12</td>
<td>3.4</td>
<td>3.4</td>
<td>44</td>
<td>1.3</td>
<td>1.3</td>
<td>76</td>
<td>2.3</td>
<td>1.8</td>
<td>108</td>
<td>----</td>
<td>----</td>
<td>140</td>
<td>1.3</td>
<td>1.3</td>
<td>172</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>13</td>
<td>~</td>
<td>~</td>
<td>45</td>
<td>~</td>
<td>~</td>
<td>77</td>
<td>----</td>
<td>----</td>
<td>109</td>
<td>----</td>
<td>----</td>
<td>141</td>
<td>3.4</td>
<td>3.4</td>
<td>173</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>14</td>
<td>~</td>
<td>~</td>
<td>46</td>
<td>~</td>
<td>~</td>
<td>78</td>
<td>----</td>
<td>----</td>
<td>110</td>
<td>1.9</td>
<td>1.9</td>
<td>142</td>
<td>1.3</td>
<td>1.3</td>
<td>174</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>15</td>
<td>~</td>
<td>~</td>
<td>47</td>
<td>~</td>
<td>~</td>
<td>79</td>
<td>----</td>
<td>----</td>
<td>111</td>
<td>1.9</td>
<td>1.9</td>
<td>143</td>
<td>2.1</td>
<td>1.7</td>
<td>175</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>16</td>
<td>0</td>
<td>0</td>
<td>48</td>
<td>3.4</td>
<td>3.4</td>
<td>80</td>
<td>3.4</td>
<td>0.1</td>
<td>112</td>
<td>1.7</td>
<td>1.7</td>
<td>144</td>
<td>2.2</td>
<td>2.2</td>
<td>176</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>17</td>
<td>~</td>
<td>~</td>
<td>49</td>
<td>0</td>
<td>0</td>
<td>81</td>
<td>0.1</td>
<td>0.1</td>
<td>113</td>
<td>1.7</td>
<td>1.7</td>
<td>145</td>
<td>0</td>
<td>0</td>
<td>177</td>
<td>1.8</td>
<td>1.7</td>
</tr>
<tr>
<td>18</td>
<td>~</td>
<td>~</td>
<td>50</td>
<td>~</td>
<td>~</td>
<td>82</td>
<td>2.8</td>
<td>2.8</td>
<td>114</td>
<td>1.7</td>
<td>1.7</td>
<td>146</td>
<td>1.7</td>
<td>1.7</td>
<td>178</td>
<td>3.4</td>
<td>3.5</td>
</tr>
<tr>
<td>19</td>
<td>3.4</td>
<td>3.4</td>
<td>51</td>
<td>~</td>
<td>~</td>
<td>83</td>
<td>0.1</td>
<td>0.1</td>
<td>115</td>
<td>1.7</td>
<td>1.7</td>
<td>147</td>
<td>1.8</td>
<td>1.7</td>
<td>179</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>0</td>
<td>0</td>
<td>52</td>
<td>0.8</td>
<td>0.8</td>
<td>84</td>
<td>3.4</td>
<td>3.4</td>
<td>116</td>
<td>1.7</td>
<td>1.7</td>
<td>148</td>
<td>1.7</td>
<td>1.7</td>
<td>180</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>21</td>
<td>0.1</td>
<td>0.1</td>
<td>53</td>
<td>0</td>
<td>0</td>
<td>85</td>
<td>0.1</td>
<td>0.1</td>
<td>117</td>
<td>1.7</td>
<td>1.7</td>
<td>149</td>
<td>0.6</td>
<td>0.5</td>
<td>181</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>22</td>
<td>3.5</td>
<td>3.5</td>
<td>54</td>
<td>0</td>
<td>0</td>
<td>86</td>
<td>3.6</td>
<td>3.4</td>
<td>118</td>
<td>3.4</td>
<td>3.4</td>
<td>150</td>
<td>3.4</td>
<td>3.4</td>
<td>182</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>23</td>
<td>~</td>
<td>~</td>
<td>55</td>
<td>1.4</td>
<td>1.4</td>
<td>87</td>
<td>0</td>
<td>0</td>
<td>119</td>
<td>2.0</td>
<td>2.0</td>
<td>151</td>
<td>0.5</td>
<td>0.6</td>
<td>183</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>24</td>
<td>~</td>
<td>~</td>
<td>56</td>
<td>3.4</td>
<td>3.4</td>
<td>88</td>
<td>3.5</td>
<td>0.1</td>
<td>120</td>
<td>1.7</td>
<td>1.7</td>
<td>152</td>
<td>0.5</td>
<td>0.4</td>
<td>184</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>25</td>
<td>~</td>
<td>~</td>
<td>57</td>
<td>3.5</td>
<td>3.5</td>
<td>89</td>
<td>1.3</td>
<td>1.3</td>
<td>121</td>
<td>1.5</td>
<td>1.5</td>
<td>153</td>
<td>1.4</td>
<td>1.3</td>
<td>185</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>26</td>
<td>1.3</td>
<td>1.3</td>
<td>58</td>
<td>58</td>
<td>----</td>
<td>90</td>
<td>----</td>
<td>----</td>
<td>122</td>
<td>0</td>
<td>0</td>
<td>154</td>
<td>1.4</td>
<td>1.3</td>
<td>186</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>27</td>
<td>~</td>
<td>~</td>
<td>59</td>
<td>3.4</td>
<td>3.4</td>
<td>91</td>
<td>----</td>
<td>----</td>
<td>123</td>
<td>0.3</td>
<td>0.1</td>
<td>155</td>
<td>2.4</td>
<td>2.4</td>
<td>187</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>28</td>
<td>3.4</td>
<td>3.4</td>
<td>60</td>
<td>3.4</td>
<td>3.4</td>
<td>92</td>
<td>----</td>
<td>----</td>
<td>124</td>
<td>1.2</td>
<td>0.1</td>
<td>156</td>
<td>3.4</td>
<td>3.4</td>
<td>188</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>29</td>
<td>0</td>
<td>0</td>
<td>61</td>
<td>3.5</td>
<td>3.5</td>
<td>93</td>
<td>0</td>
<td>0</td>
<td>125</td>
<td>0.3</td>
<td>0.1</td>
<td>157</td>
<td>0</td>
<td>0</td>
<td>189</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>30</td>
<td>~</td>
<td>~</td>
<td>62</td>
<td>3.4</td>
<td>3.4</td>
<td>94</td>
<td>----</td>
<td>----</td>
<td>126</td>
<td>0.1</td>
<td>0.1</td>
<td>158</td>
<td>0.9</td>
<td>0.9</td>
<td>190</td>
<td>3.4</td>
<td>3.5</td>
</tr>
<tr>
<td>31</td>
<td>~</td>
<td>~</td>
<td>63</td>
<td>0</td>
<td>0</td>
<td>95</td>
<td>----</td>
<td>----</td>
<td>127</td>
<td>2.3</td>
<td>2.3</td>
<td>159</td>
<td>3.4</td>
<td>3.4</td>
<td>191</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>32</td>
<td>~</td>
<td>~</td>
<td>64</td>
<td>0</td>
<td>0</td>
<td>96</td>
<td>----</td>
<td>----</td>
<td>128</td>
<td>1.7</td>
<td>1.7</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>192</td>
<td>----</td>
<td>----</td>
</tr>
</tbody>
</table>
S-20 Waveforms

**NOTE:**
Input
VCR: COLOR BAR SIGNAL
  (WF1~WF3)
DVD: POWER ON (STOP) MODE
  (WF4~WF6)
CD: 1kHz PLAY
  (WF7~WF9)

WF2 UPPER TP301
WF1 LOWER TP504

WF3 UPPER TP751
WF1 LOWER TP504

WF3 TP751

WF4 Pin 1 of CN1601

WF5 Pin 10 of CN1601

WF6 Pin 6 of IC1403

WF7 Pin 14 of CN1601

WF8 Pin 16 of CN1601

WF9 Pin 19 of CN1601

**NOTE:**
Input
VCR: COLOR BAR SIGNAL
  (WF1~WF3)
DVD: POWER ON (STOP) MODE
  (WF4~WF6)
CD: 1kHz PLAY
  (WF7~WF9)
Circuit Board Diagrams

Sensor CBA Top View

BHF300F01011A

WF3
TP751
V-OUT
C-PB

WF2
TP301

VR501
SW-P

WF1
TP504
RF-SW

TP501
S-INH

TP503
CTL
PIN 14 OF CN1601
WF5
PIN 10 OF CN1601
WF4
PIN 1 OF CN1601
WF3
PIN 16 OF CN1601
WF2
PIN 19 OF CN1601
WF1
PIN 6 OF IC1403
WF0
C-3 Power SW CBA Top/Bottom View & DVD Open/Close CBA Top/Bottom View

Power SW CBA Top View

Power SW CBA Bottom View

DVD Open/Close

CBA Top View

CBA Bottom View
CAUTION!
For continued protection against fire hazard, replace only with the same type fuse.

NOTE:
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

CAUTION!
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F1001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER SUPPLY CIRCUIT, AN ISOLATION TRANSFORMER MUST BE USED. ALSO, IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT SLOWLY, WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY CIRCUIT, A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.
C-5 Jack-A CBA Top/Bottom View & Jack-B CBA Top/Bottom View & AFV CBA Top/Bottom View

Jack-A CBA Top View

Jack-A CBA Bottom View

AFV CBA Top View

AFV CBA Bottom View
NOTE:
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

CAUTION:
For continued protection against fire hazard, replace only with the same type T1.6AL/250V fuse.

CAUTION!
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F1001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

---

**CAUTION FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE T1.6AL/250V FUSE.**

**NOTE:**
The voltage for parts in hot circuit is measured using hot GND as a common terminal.