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## SPECIFICATIONS

Product type: DVD Player
Discs: DVD video, Audio CD, Video CD
Output signal format: NTSC color

Frequency response:
- **DVD (linear sound):** 20 Hz to 22 kHz (sample rate: 48 kHz)
  20 Hz to 44 kHz (sample rate: 96 kHz)
- **CD:** 20 Hz to 20 kHz

Signal-to-noise ratio (S/N ratio)
- **CD:** 110 dB (JEITA)

Dynamic range
- **DVD (linear sound):** 95 dB
- **CD:** 94 dB (JEITA)

Total distortion factor
- **CD:** 0.005% (JEITA)

Wow and flutter: Below the measurement limitation (+/-0.001% W PEAK) (JEITA)

Connections
- **S-Video output:** Mini DIN 4-pin jack (75 ohm)
- **Video output:** One RCA connector, 1 Vpp (75 ohm)
- **Coaxial digital audio output:** One pin jack, 500mVpp (75 ohm)
- **Analog audio output:** Two RCA connectors (one left channel, one right channel) 2 Vrms (47 k ohm)
- **Component video output:** One pin jack (Y), 1 Vpp (75 ohm)  Two pin jacks (Cs)/(Ca), 700mVpp (75 ohm)
- **Optical digital audio output:** Optical connector (DV-P325U only)

Power source: 120 V AC +/- 10%, 60 Hz +/- 0.5%
Power consumption: 14 W (standby: 2.2W)
Operating temperature: 5°C to 40°C
Dimensions:
- **W:** 17-1/8” (435mm)
- **H:** 2-15/16” (75mm)
- **D:** 8-1/2” (216mm)

Weight: 4.63 lbs (2.1kg)

- **Designs and specifications are subject to change without notice.**
- **If there is a discrepancy between languages, the default language will be English.**

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“DTS” and “DTS Digital Out” are trademarks of Digital Theater Systems Inc.
## COMPARISON OF MODELS

<←: Same as on left

<table>
<thead>
<tr>
<th>Appearance</th>
<th>DV-P315U/P313U</th>
<th>DV-P325U/323U</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensional</td>
<td>430(W) x 240(H) x 79(D) mm</td>
<td>435(W) x 216(H) x 75(D) mm</td>
</tr>
<tr>
<td>Weight</td>
<td>4.2kg</td>
<td>2.1kg</td>
</tr>
<tr>
<td>Tray Panel</td>
<td>Black</td>
<td>Silver</td>
</tr>
<tr>
<td>Color Front / Button</td>
<td>Black/Black</td>
<td>Black/Silver (DV-P325U)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Silver/Silver (DV-P323U)</td>
</tr>
<tr>
<td>Hot Stamp</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Ultra Vision Badge</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

### General

| Drive Speed         | 1x             | ---                    |
| Laser               | 1              | 2                      |
| DVD/VCD/SVCD/CD-DA  | O / O / O / O  | O / O / --- / O        |
| CD-R/CD-RW/DVD-R    | --- / --- / --- | O / O / O              |
| DVD-RAM             | ---            | ---                    |
| JPEG Play back      | ---            | ---                    |
| MP3                 | ---            | O                      |
| OSD languages       | 6 (English, French, Spanish, Italian, German, Dutch) | 3 (English, French, Spanish) |
| Jog Shuttle on Front| ---            | Only switch Shuttle    |
| Headphone Jack / Volume | --- / --- | ---                    |
| AC Power Plug       | Flat 2p(U)     | ---                    |

### Video

| PAL Disc NTSC Out   | ---            | ---                    |
| Video Out Mode      | O / --- / ---  | ---                    |
| S-Video / Component / Composite | O / O / O | --- |
| Video D/A Converter | 10bit          | ---                    |
| Black Level Select  | O              | ---                    |
| Picture Control     | ---            | ---                    |
| Progressive Out     | ---            | ---                    |

### Audio

| Audio D/A Converter | 96kHz / 24bit | 192kHz / 24bit |
| Digital Audio Out Optical / Coaxial | O / O | O / O (DV-P325U) --- / O (DV-P323U) |
| Dolby Digital 5.1 ch Decode | --- | --- |
| DTS Digital Out     | O             | ---                    |
| Virtual Surround    | O             | O (DV-P325U) --- (DV-P323U) |
| Dynamic Range Compression (Dolby Digital) | O | --- |
| DVD Audio           | ---           | ---                    |
| Power on sound      | ---           | ---                    |

### Trick Play

<p>| Search Speed        | 2 to 128 (F/R) | 2 to 60 (F/R) |
| Slow Speed          | 1/8, 1/4, 1/2 (F only) | 1/16, 1/8, 1/2 (F only) |
| IP Search (Smooth 2x Play) | O | --- |
| 2x Play with Audio  | ---           | ---                    |
| Step Forward / Reverse | O / ---      | ---                    |
| Still Picture Select (Frame/Field) | O | Auto Only |</p>
<table>
<thead>
<tr>
<th>Features</th>
<th>Disc Navigation</th>
<th>DVD Zoom x2 / x4 / x16</th>
<th>Program and Random Play of DVD / VCD</th>
<th>A-B Repeat</th>
<th>Repeat</th>
<th>Last Play</th>
<th>Closed Caption for NTSC DVD</th>
<th>Front Panel Display Dimmer</th>
<th>Screen Saver</th>
<th>Auto Power Off</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>O (DV-P315U)</td>
<td>--- (DV-P313U)</td>
<td>O / O</td>
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<td>Remote Controller</td>
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<td></td>
<td>AC Socket</td>
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<tr>
<td></td>
<td>Warranty Card</td>
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</tbody>
</table>
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.

Location: Inside Top of DVD mechanism.
IMPORTANT SAFETY PRECAUTIONS

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.

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.

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.

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

Table 1: Ratings for selected area

<table>
<thead>
<tr>
<th>AC Line Voltage</th>
<th>Clearance Distance ((d)) ((d'))</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 V</td>
<td>(\geq 3.2\text{mm (0.126 inches)})</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. 2 and the following table.

Table 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>Earth Ground ((B)) to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 V</td>
<td>0.15(\mu)F (\text{CAP.} &amp; 1.5\text{k} \Omega\ \text{RES. Connected in parallel}</td>
<td>(\leq 0.5\text{mA Peak})</td>
<td>Exposed accessible parts</td>
</tr>
</tbody>
</table>

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

Circuit Board Indications

a. The output pin of the 3 pin Regulator ICs is indicated as shown.

<table>
<thead>
<tr>
<th>Top View</th>
<th>Bottom View</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out</td>
<td>In</td>
</tr>
</tbody>
</table>

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

```
Pin 1
1  5  10
```

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

```
Pin 1
```

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.

How to Remove / Install Flat Pack-IC

1. Removal

With Hot-Air Flat Pack-IC Desoldering Machine:

(1) Prepare the hot-air flat pack-IC desoldering machine, then apply hot air to the Flat Pack-IC (about 5 to 6 seconds). (Fig. S-1-1)

(2) Remove the flat pack-IC with tweezers while applying the hot air.

(3) Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)

(1) Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

Caution:

1. Do not supply hot air to the chip parts around the flat pack-IC for over 6 seconds because damage to the chip parts may occur. Put masking tape around the flat pack-IC to protect other parts from damage. (Fig. S-1-2)

2. The flat pack-IC on the CBA is affixed with glue, so be careful not to break or damage the foil of each pin or the solder lands under the IC when removing it.
With Soldering Iron:

1. Using desoldering braid, remove the solder from all pins of the flat pack-IC. When you use solder flux which is applied to all pins of the flat pack-IC, you can remove it easily. (Fig. S-1-3)

2. Lift each lead of the flat pack-IC upward one by one, using a sharp pin or wire to which solder will not adhere (iron wire). When heating the pins, use a fine tip soldering iron or a hot air desoldering machine. (Fig. S-1-4)

3. Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)

4. Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

Note:

When using a soldering iron, care must be taken to ensure that the flat pack-IC is not being held by glue. When the flat pack-IC is removed from the CBA, handle it gently because it may be damaged if force is applied.

With Iron Wire:

1. Using desoldering braid, remove the solder from all pins of the flat pack-IC. When you use solder flux which is applied to all pins of the flat pack-IC, you can remove it easily. (Fig. S-1-3)

2. Affix the wire to a workbench or solid mounting point, as shown in Fig. S-1-5.

3. While heating the pins using a fine tip soldering iron or hot air blower, pull up the wire as the solder melts so as to lift the IC leads from the CBA contact pads as shown in Fig. S-1-5.
2. Installation

(1) Using desoldering braid, remove the solder from the foil of each pin of the flat pack-IC on the CBA so you can install a replacement flat pack-IC more easily.

(2) The “●” mark on the flat pack-IC indicates pin 1. (See Fig. S-1-7.) Be sure this mark matches the 1 on the PCB when positioning for installation. Then presolder the four corners of the flat pack-IC. (See Fig. S-1-8.)

(3) Solder all pins of the flat pack-IC. Be sure that none of the pins have solder bridges.

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
(4) 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.
OPERATING CONTROLS AND FUNCTIONS

1. (POWER/STANDBY) Button
2. Disc loading tray
3. OPEN/CLOSE Button
4. PLAY Button
5. STOP Button
6. SKIP DOWN/REV Button
   Plays back from the beginning of the current chapter or track. Hold down to fast reverse playback.
7. SKIP UP/FWD Button
   Plays back from the beginning of the next chapter or track. Hold down to fast forward playback.
8. Shuttle Ring (REV/FWD)
   Turn to make rewind or fast forward speed faster in the forward or backward direction in the Play mode or Still mode. The further the Shuttle Ring is rotated, the faster the playback speed.
9. AUDIO Button
   Press to select a desired audio language or sound mode.
10. SUBTITLE Button
    Press to select a desired subtitle language.
11. SURROUND Button
12. PAUSE/STEP Button ]
13. Display, Remote Sensor Window
14. TV POWER Button
15. VIDEO/TV Button
16. VOL Button
17. CH Button
18. FF SEARCH Button
19. SETUP Button
20. TOP MENU Button
21. DISPLAY Button
22. Numeric Buttons
23. SEARCH MODE Button
24. A-B REPEAT Button
25. REPEAT Button
26. MODE Button
27. ZOOM Button
28. CLEAR Button
29. ANGLE Button
   Press to change the camera angle to see the sequence being played back from a different angle.
30. MENU Button
31. ENTER Button
32. Arrow Buttons
   Use when making settings while watching the display on a TV screen.
33. RETURN Button
34. FR SEARCH Button
LOADING THE BATTERIES

1. Open the battery compartment cover.

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

3. Close the cover.

Notes
- Do not mix alkaline and manganese batteries.
- Do not mix old and new batteries.
1. **DIGITAL AUDIO OUT JACKS:**
   Use either an optical or coaxial digital cable to connect to a compatible Dolby Digital receiver. Use to connect to a Dolby Digital decoder or DTS decoder.

2. **ANALOG AUDIO OUT JACKS**
   Connect to the Audio input jacks of A/V-compatible TV or wide screen TV, Stereo system.

3. **VIDEO OUT JACK**
   Use a video cable to connect one of the jack to Video input on your A/V-compatible TV or wide screen TV, Stereo system.

4. **COMPONENT VIDEO OUT JACKS**
   Use these jacks if you have a TV with Component Video in jacks. These jacks provide Cb, Cr and Y video. Along with S-Video, Component Video provides the best picture quality.

5. **S-VIDEO OUT JACK**
   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.

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CABINET DISASSEMBLY INSTRUCTIONS

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.

![Disassembly Flowchart Diagram]

2. Disassembly Method

<table>
<thead>
<tr>
<th>ID/LOC. No.</th>
<th>PART</th>
<th>REMOVAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>[1] Top Cover</td>
<td>1</td>
<td>5(S-1)</td>
</tr>
<tr>
<td>[3] Function CBA</td>
<td>3</td>
<td>5(S-2), Jog Shuttle Key</td>
</tr>
<tr>
<td>[4] DVD Mecha</td>
<td>4,5</td>
<td>3(S-3), *CN101, *CN401</td>
</tr>
<tr>
<td>[5] AV CBA</td>
<td>6</td>
<td>4(S-4), (S-5)-- DV-P32SU only, 4(S-6), *2(L-4), *CN1001, *CN1601</td>
</tr>
<tr>
<td>[6] DVD Main CBA Unit</td>
<td>6</td>
<td>3(S-7)</td>
</tr>
<tr>
<td>[7] Rear Panel</td>
<td>7</td>
<td>3(S-8)</td>
</tr>
</tbody>
</table>

(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), (L-2) and (L-3) are fragile. Be careful not to break them.
1-1. Connect the wall plug to an AC outlet and press the OPEN/CLOSE button to open the Tray.
1-2. Remove the Tray Panel by releasing two Locking Tabs (L-1).
1-3. Press the OPEN/CLOSE button again to close the Tray.
1-4. Press the POWER/STANDBY button to turn the power off and unplug an AC cord.
1-5. Disconnect connector CN2002.
1-7. Release two Locking Tabs (L-2). Then, release five Locking Tabs (L-3) (to do this, first release two Locking Tabs (A) at the side, and then three Locking Tabs (B) at the bottom.)

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. Slide out the pickup unit as shown in Fig. 5.
2-2. Short the three short lands of FPC cable with solder before removing the FFC cable (CN101) from it. If you disconnect the FFC cable (CN101), the laser diode of pickup will be destroyed. (Fig. 5)
2-3. Disconnect Connector (CN401). Remove three Screws (S-3) and lift the DVD Mecha. (Fig. 4)

CAUTION 3: When reassembling, confirm the FFC cable (CN101) is connected completely. Then remove the solder from the three short lands of FPC cable. (Fig. 5)
[1] Top Cover

Fig. D1

[2] Front Assembly

Fig. D2

[3] Function CBA

Fig. D3

[4] DVD Mecha

Fig. D4

Short the three short lands by soldering

Fig. D5

[5] AV CBA

Fig. D6

[6] DVD Main CBA Unit

Fig. D6
HOW TO MANUAL EJECT

1. Remove the Top Case.
2. Insert the eject-bar (length = approximately 80 mm, diameter = approximately 3 mm) into the manual eject hole on the DVD Mecha. Then, press it until the tray is ejected.
ROM RENEWAL MODE

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. (For closing the tray, only the “OPEN/CLOSE” button is available.)
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.

5. After programming is finished, the tray opens automatically. Fig. e appears on the screen and the checksum in (*3) of Fig. e appears on the VFD. (Fig. f)

6. For tray opening, plug the AC cord into the AC outlet.
7. Turn the power on by pressing the power button and the tray will close.
TROUBLESHOOTING

FLOW CHART NO.1
The power cannot be turned on.(1)

Is the fuse normal?
Yes
No
Replace the fuse.

Is normal state restored when once unplugged power cord is plugged again after several seconds.
Yes
No
See FLOW CHART No.3 <The fuse blows out.>

Is the EV 5V line voltage normal?
Yes
No
Check for lead or shor-circuiting of primary circuit component?
(Q1001, Q1003, D1001, D1002, D1004, D1005, D1011, T1001, C1003, C1005, etc.)

Is the voltage of EV 12V, EV -30V and filament voltage normal?
Yes
No
Check each rectifying circuit of secondary circuit.

FLOW CHART NO.2
The power cannot be turned on.(2)

Does the change from STANDBY LED indicate turn-off?
Yes
No
Check the EV 3.3V line.

Is the supply voltage of 3.3V fed to Q2021?
Yes
No
Check the SW2008 and POWER button line.

Is the supply voltage of 5V fed to pin(3) of IC2001?
Yes
No
Check the IC2001.

Is the "H" signal inputted at base of Q2021, when the POWER button activated on the DVD?
Yes
No
Check the line between the remote control receiver and the pin(125) of IC601.

Is the "H" signal inputted at base of Q2021, when the POWER button activated on the remote control unit?
Yes
Replace IC601.

The STANDBY LED indicate is flashing after 0.5 sec.
Yes (below, confirmed operating at LED turn-off of 0.5 sec. interval.)

Are the "P-CON-H" pulse outputted from the Pin(207) of IC601?
Yes
No
Replace IC601.

Is the P-CON switch circuit operated normally?
(Q1002, Q1005, Q1006, IC1002, D1036, D1046)
Yes
No
Check each component and if poor the replace.

FLOW CHART NO.3
The fuse blows out.

Is there leaking or short-circuited primary component?
Yes
Check for short-circuiting of rectifying diode and circuit in each rectifying circuit of secondary side.

No
FLOW CHART NO.4
When the output voltage fluctuates.

Does the secondary side photo coupler circuit operate normally? Yes
No
Check the circuit and replace the parts. (IC1001, IC1006, D1048, D1015, etc.)

Does the primary side photo coupler circuit operate normally? Yes
No
Check the circuit and replace the parts. (IC1001, IC1012, D1024, etc.)

Replace IC1001.

FLOW CHART NO.5
When buzz is heard from the vicinity of power circuit.

Check for short-circuiting of rectifying diode and circuit in each rectifying circuit of secondary side. (D1003, D1030, D1008, D1009, D1013, D1016, Q1002, IC1002, Q1007, Q1010, Q1011, Q1014, Q1004, etc.)

FLOW CHART NO.6
The fluorescent display tube does not light.

Is the supply voltage of 5V fed to pin(6) and pin(24) of IC2001? Yes
No
Check the EV 5V line.

Is the supply voltage of -24V fed to pin(15) of IC2001? Yes
No
Check the -FL -24V line.

Is there 500kHz oscillation at pin(26) of IC2001? Yes
No

Check the signal lines of FIP DA, FIP CK, FIP CS of IC2001 and IC601?

Are the filament voltage applied between (1), (2) and (38), (39) of the fluorescent display tube? Also negative voltage applied between these pins and GND? Yes
No
Check the fluorescent display tube and its periphery?

Check the power circuit, D1017, Q2023, Q2024 and Q2025.

Replace IC1001.

FLOW CHART NO.7
The key operation is disabled.

Is key switch contact and installation state normal? Yes
No
Replace key switch.

Is the control voltage normally into the pins(3), (4), (7), (8), (9), (10) of IC2001?
FLOW CHART NO.8

No operation is possible from the infrared remote control.

- Operation is possible from the DVD, but no operation is possible from the infrared remote control?
  - No: Replace the remote control receiver or replace the remote control transmitter is necessary.
  - Yes:
    - Is 5V voltage supplied to the pin(3) terminal of remote control receiver?
      - No: Check EV 5V line.
      - Yes:
        - Is the "L" pulse sent out pin(1) terminal of receiver when the infrared remote control is activated?
          - No: Replace the remote control receiver.
          - Yes:
            - Is pulse signal supplied to the pin(125) of IC601? (Although SEARCH(1), SEARCH(+), PLAY, STILL/PAUSE, STOP, POWER and OPEN/CLOSE button.)
              - No: Check the line between the remote control receiver and the pin(125) of IC601.
              - Yes: Replace IC601.

FLOW CHART NO.9

PON 12V is not outputted.

- Is 12V voltage supplied at collector of Q1002?
  - No: Check the secondary circuit, AT 12V and the periphery circuit of Q1005 and Q1006.
  - Yes:
    - Is voltage of 12V sent out from the emitter of Q1002.
      - Yes: Check for load circuit short-circuiting or leak.
      - No: Check the Q1002 periphery circuit.
        - Yes:
          - Does the P-CON switch circuit operate normally? (Q1005, Q1006, D1036, etc.)
            - No: Check each component and if poor the replace.
            - Yes:
              - Are the "H" pulse inputted into Q1002.
                - No: Check or replace Q1005, Q1006.
                - Yes: Replace Q1002.
FLOW CHART NO.10

PON 5V is not outputted. (PON 12V is possible.)

- Is 5V voltage supplied at collector of Q1004?
  - No: Check the AT 5V line.
  - Yes: Check the Q1004 periphery circuit.

- Is voltage of 5V sent out from the collector of Q1004?
  - No: Check the AT 5V line.
  - Yes: Check the Q1004 periphery circuit.

- Is the "H" pulse inputted into the base of Q1004?
  - No: Check the Q1004 periphery circuit.
  - Yes: Replace Q1004.

FLOW CHART NO.11

EV -19V is not outputted.

- Is -19V voltage supplied at the cathode of D1003?
  - No: Check the AT -24V line.
  - Yes: Check the D1003 periphery circuit.

- Is voltage of -24V sent out from the anode of D1003?
  - No: Check the D1003 periphery circuit.
  - Yes: Replace D1003.

FLOW CHART NO.12

PON 3.3V(1), (2) is not outputted.

- Is 5V voltage supplied at collector of Q1011?
  - No: Check the secondary circuit, AT 5V line.
  - Yes: Check the Q1011 periphery circuit.

- Is voltage of 3.3V sent out from emitter of Q1011?
  - No: Check each component and if poor the replace.
  - Yes: Check or replace PON 5V line.

- Does the P-CON switch circuit operate normally? (Q1005, Q1006, etc.)
  - No: Check or replace PON 5V line.
  - Yes: Replace Q1011.
FLOW CHART NO. 13
PON 1.8V is not outputted. (PC 3.3V(1), (2) is possible)

- Is 5V voltage supplied at pin(1) of IC1002?  
  No → Check the secondary circuit, AT 5V line.  
  Yes → Is voltage of 1.8V sent out from the pin(2) of IC1002? 
  No → Check the IC1002 periphery circuit.  
  Yes → Replace IC1002.

FLOW CHART NO. 14
The disc tray cannot be opened and closed. (For remote control is possible.)

- Is 0V voltage supplied at pin(25) of CN1001 when the OPEN/CLOSE button is activated on the DVD?  
  No → Check the SW2014 and OPEN/CLOSE KEY line.  
  Yes → See FLOW CHART NO. 15. <The disc tray cannot be opened and closed.>

FLOW CHART NO. 15
The disc tray cannot be opened and closed.

- Is the signal from the pins(200, 201) of IC601 inputted into the pins(1, 2) of IC401?  
  No → Check the TFWD/TREV signal line between IC401 and IC601.  
  Yes → Replace IC401.

- Is loading motor drive voltage output from the pins(9, 10) of IC401?  
  No → Is 9V voltage applied to the pins (7, 8, 20) of IC401?  
  No → Check PC 8V line.  
  Yes → Check the line between the IC401 and the loading motor.

- Is the loading motor drive voltage applied to the terminal of loading motor?  
  No → Check for mechanism and gear engagement and breakage.

FLOW CHART NO. 16
The [No Disc] indication. (In case of focus error)

- Is FE signal outputted to the pin(22) of IC101 when the disc is set?  
  No → Is there input signal on the pins(57–60) of IC101.  
  Yes → Replace IC101.

- Is FE signal inputted into the pin(117) of IC201?  
  No → Check the connection of optical pickup cable. If it is normal, replace the optical pickup.  
  Yes → Check or replace IC201.

- Check the line between the IC101 and IC201.
FLOW CHART NO.17
The [No Disc] indication. (In case focus servo does not function.)

- Is the focus control signal outputted to the pin(115) of IC201?
  - Yes
  - No

- Check the periphery circuit of pins(57, 78, 88, 99, 109, 116, 125, 143, 156, 162) of IC201 and power source. If it is normal, replace IC201.

- Is the focus control signal from the pin(115) of IC201 inputted into the pin(6) of IC401?
  - Yes
  - No

- Check the focus control signal (DA0) line between the IC201 and IC401.

- Is the focus control drive voltage outputted from the pins(11, 12) of IC401?
  - Yes
  - No

- Replace IC401.

- Is the focus control drive voltage applied to the terminal of focus actuator?
  - Yes
  - No

- Check the connection of optical pickup cable. If it is normal, replace the optical pickup.

FLOW CHART NO.18
The [No Disc] indication. (When the laser beam does not light.)

- Is the Q101 and Q102(LD POWER ON) drive signal(LDCOI and LDCOZ) outputted to the pins(2, 4) of IC101. (Checking of symptom.)
  - Yes
  - No

- Check the line between the pins(2, 4) of IC101 and the base of Q101 through Q102.

- Is 5V voltage applied to the emitter of Q101 and Q102?
  - Yes
  - No

- Check the A 5V line.

- Is the 5V voltage supplied to the pin(12)(DVD) and pin(20)(CD) of pickup terminal?
  - Yes
  - No

- Check the connection of optical pickup cable. If it is normal, replace the optical pickup.

FLOW CHART NO.19
Both picture and sound do not operate normally.

- Set the disc on the disc tray.
  - Yes
  - No

- Check the loading switch.

- Is it possible to hold normally the disc with the check?
  - Yes
  - No

- Check for contamination of objective lens of optical pickup.

- Is the level of RF signal which is outputted from pin(35) of IC101, normal?
  - Yes
  - No

- Replace the main PWB unit.

- Replace the optical pickup unit.

- Check the video amplifier unit and the audio amplifier unit. (IC1402, IC1201)
FLOW CHART NO.20

Picture do not operate normally.

Set the disc on the disc tray.

Are the video signals outputted to each pins of main unit connector CN701?
- CN701 7PIN CVBS
- CN701 5PIN S-Y
- CN701 6PIN S-C

Yes

Check the line between each pins of main unit connector CN701 and each pins of IC1402.
- CN701 7PIN → IC1402 4PIN CVBS
- CN701 5PIN → IC1402 6PIN S-Y
- CN701 9PIN → IC1402 2PIN S-C

No

Check the main unit. (IC601 periphery circuit.)

Are the video signals shown above input into each pins of IC1402?
- IC1402 4PIN CVBS
- IC1402 6PIN S-Y
- IC1402 2PIN S-C

Yes

Are the video signals outputted to each pins of IC1402?
- IC1402 30PIN CVBS
- IC1402 27PIN S-Y
- IC1402 33PIN S-C

No

Is 5V voltage applied to the pin(1, 3, 5, 34) of IC1402?

Yes

Check or replace IC1402?

No

Are the composite video signals outputted to the VIDEO OUT terminal (JK1403)?

Yes

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

No

Check the peripheral circuit of JK1403 from the pin (30) of IC1402.

No

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

No

Check the peripheral circuit of JK1401 from the pin (27) of IC1402.

No

Check the peripheral circuit of JK1401 from the pin (33) of IC1402.
FLOW CHART NO.21

Picture do not operate normally.

Set the disc on the disc tray.

Are the analog audio interface signals outputted to each pins of main unit connector CN701?

CN701 13PIN FL
CN701 15PIN FR

Yes

Are the analog audio interface signals inputted to each pins of IC1201.

IC1201 2PIN FL
IC1201 6PIN FR

No

Yes

Are the system control interface signals outputted to each pins of main unit connector CN701?

CN701 16PIN /AMUTE
CN701 14PIN /ZFR
CN701 12PIN /ZFL

No

Yes

Are the system control interface signals inputted to each pins of Q1203 and Q1204.

Q1203 BASE /ZFL
Q1204 BASE /ZFR
Q1203, Q1204 BASE /AMUTE

No

Yes

Are the audio signals outputted to the specific output terminal?

Are the audio signals outputted to the L/R OUT terminal (JK1201)?

No

Check the main unit. (IC601 periphery circuit.)

Check the line between each pins of main unit connector CN701 and each pins of IC1201.

CN701 13PIN → IC1201 2PIN FL
CN701 15PIN → IC1201 6PIN FR

Yes

Check or replace IC1201?

Check the main unit. (IC601 periphery circuit.)

Check the line between each pins of main unit connector CN701 and each pins of Q1203 and Q1204.

CN701 16PIN → Q1203, Q1204 BASE /AMUTE
CN701 14PIN → Q1204 BASE /ZFR
CN701 12PIN → Q1203 BASE /ZFL

No

Check or replace Q1203 and Q1204?

Check the peripheral circuit of AUDIO DAC (IC801), AUDIO AMP (IC1201) and audio mute (Q1201, Q1202, Q1203 and Q1204) circuit.
System Control Block Diagram

BLOCK DIAGRAMS

FROM/TO RF SIGNAL PROCESS/SEVO BLOCK DIAGRAM

FROM/TO DVD SIGNAL PROCESS BLOCK DIAGRAM

AV CBA

FUNCTION CBA

SWITCH CBA

DVD MAIN CBA UNIT

DVD MAIN CBA UNIT

FG CBA

RELAY CBA

FUNCTION CBA

SWITCH CBA

FROM/TO DVD SIGNAL PROCESS BLOCK DIAGRAM

FROM/TO RF SIGNAL PROCESS/SEVO BLOCK DIAGRAM

System Control Block Diagram
Power Supply Block Diagram

CAUTION!
Switching 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.

NOTE:
The voltage for parts in hot circuit is measured using hot GND as a common terminal.
SCHEMATIC DIAGRAMS / CBA’S AND TEST POINTS

Standard Notes

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.

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=10³, M=10⁶).
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.

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°C to +85°C</td>
</tr>
<tr>
<td>(F)</td>
<td>+30 - 80%</td>
<td>20°C</td>
<td>-25°C to +85°C</td>
</tr>
<tr>
<td>(SR)</td>
<td>±15%</td>
<td>20°C</td>
<td>-25°C to +85°C</td>
</tr>
<tr>
<td>(Z)</td>
<td>+30 - 80%</td>
<td>20°C</td>
<td>-10°C to +70°C</td>
</tr>
</tbody>
</table>

Capacitors and transistors are represented by the following symbols.

CBA Symbols

(Top View) (Bottom View)

: : Electrolytic Capacitor

(Bottom View)

: Transistor or Digital Transistor

Schematic Diagram Symbols

Digital Transistor

(Top View) (Top View)

NPN Transistor PNP Transistor

(Top View) (Top View)

NPN Digital Transistor PNP Digital Transistor
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.
   ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
   RISK OF FIRE-REPLACE FUSE AS MARKED.

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. **Wire Connectors**

   (1) Prefix symbol "CN" means "connector" (can disconnect and reconnect).
   
   (2) Prefix symbol "CL" means "wire-solder holes of the PCB" (wire is soldered directly).

5. **Mode: SP**

6. **Voltage indications for PLAY mode on the schematics are as shown below:**

   ![Voltage Indication Diagram]

   Unit: Volts

   Indicates that the voltage is not consistent here.

7. **How to read converged lines**

   ![Converged Lines Diagram]

   Examples:
   1. "1-D3" means that line number "1" goes to area "D3".
   2. "1-B1" means that line number "1" goes to area "B1".

8. **Test Point Information**

   ![Test Point Symbols]

   : 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.
CAUTION !
Fixed voltage 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.

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 FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES D'INCELLE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.

"This symbol means fast operating fuse."
"Ce symbole représente un fusible à fusion rapide."

ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES,
REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES D'INCELLE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.

"This symbol means fast operating fuse."
"Ce symbole représente un fusible à fusion rapide."

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

Input:

CD: 1kHz PLAY
(WF4~WF6)

DVD: POWER ON (STOP) MODE
(WF1~WF3)
AV CBA Top View

CAUTION!
Switching 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.

CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES D'INCENDIE N'UTILISER QUE DES FUSIBLES DU MEME TYPE.
RISK OF FIRE—REPLACE FUSE AS MARKED.

“This symbol means fast operating fuse.”
“Ce symbole représente un fusible à fusion rapide.”

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.
AV CBA Bottom View

Switching 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.

CAUTION !
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQES D'INCENDIE N'UTILISER QUE DES FUSIBLES DE MEMO TYPE.
RISK OF FIRE - REPLACE FUSE AS MARKED.
*This symbol means fast operating fuse.*
*Ces symboles représentent un fusible à fusion rapide.*
SYSTEM CONTROL TIMING CHARTS

Tray close ~ Play / Play ~ Tray open

- Eject key on
- Tray close
- Disc Rotation
- Play
- Tray open

- LSW2: 0V
- LSW1: +5V
- LM-: 0V
- LM+: 0V
- I/o (TL123): 0V
- SP (TP122): 0V
- Tv (TL122): 0V
- +2V
- +5V
- +6V

Timing:
- 4.4s
- 2.0s
- 700ms
- 1.2s
- 1.7s
## IC PIN FUNCTION DESCRIPTIONS

**IC2001 [ PT6315-S (-TP) ]**

<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>CLK</td>
<td>Clock Input</td>
</tr>
<tr>
<td>2</td>
<td>In</td>
<td>STB</td>
<td>Serial Interface Strobe</td>
</tr>
<tr>
<td>3</td>
<td>In</td>
<td>K1</td>
<td>Key Data 1 Input</td>
</tr>
<tr>
<td>4</td>
<td>In</td>
<td>K2</td>
<td>Key Data 2 Input</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 / Key-1</td>
<td>Segment Output / Key Source-1</td>
</tr>
<tr>
<td>8</td>
<td>Out</td>
<td>b / Key-2</td>
<td>Segment Output / Key Source-2</td>
</tr>
<tr>
<td>9</td>
<td>Out</td>
<td>c / Key-3</td>
<td>Segment Output / Key Source-3</td>
</tr>
<tr>
<td>10</td>
<td>Out</td>
<td>d / Key-4</td>
<td>Segment Output / Key Source-4</td>
</tr>
<tr>
<td>11</td>
<td>Out</td>
<td>e / Key-5</td>
<td>Segment Output / Key Source-5</td>
</tr>
<tr>
<td>12</td>
<td>Out</td>
<td>f / Key-6</td>
<td>Segment Output / Key Source-6</td>
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LEAD IDENTIFICATIONS

Note:
A: Anode
K: Cathode
E: Emitter
C: Collector
B: Base
R: Reference
1 VCC
2 GND
3 OUT

2SA1015-Y (TPE2)
KTA1266 (Y)
2SC1815-GR (TPE2)
2SA966 (Y)
2SC2236-Y-TPE6,C

2SC2785 (H)
KTC3199 (GR)
KRA110M
KTA1273 (Y)
KRC110M-AT
BA1L3Z-T
BA1L3Z (P)
KTC3205 (Y)

PQ018EF01SZ
NJM4558D
KIA4558P
PT6315-S
PT6315-S(-TP)
KIA431-AT
AN1431-(NSC)

0C-0805T-002
MM1567AJ
LTV-817B-F
LTV-817C-F
EL817(B, C)

Note:
A: Anode
K: Cathode
E: Emitter
C: Collector
B: Base
R: Reference
1 VCC
2 GND
3 OUT
## MECHANICAL PARTS LIST

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**ELECTRICAL PARTS LIST**

*Note:* Although some parts in the schematic diagrams have different names from those in the parts list, there is no problem in replacing parts.

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**TRANSFORMER**

| T1001 | TA14491 | PULSE TRANS |

**COILS**

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| L1007 | TA14471 | CHOKE COIL 22UH |
| L1009 | TA14471 | CHOKE COIL 22UH |
| L1251 | TA14481 | INDUCTOR 0.47UH |
| L1521 | TA14471 | CHOKE COIL 22UH |
| L2001 | TA12561 | INDUCTOR 100UH |

**MISCELLANEOUS**

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| CN1601 | TE14781 | CONNECTOR |
| CN2002 | TE14791 | CONNECTOR |
| CN2201 | TE14891 | CONNECTOR |
| FL2001 | TE14801 | DISPLAY  |
| JK1201 | TE14811 | JACK      |
| JK1401 | TE14821 | JACK      |
| JK1403 | TE14831 | JACK      |
| RM2001 | TC12331 | REMOTE RECEIVER |
| SA1001 | TC10891 | SURGE ABSORBER PV1-1030714V      |
| SM2115 | TE1957  | TACT SWITCH |
| SM2201 | TE4901  | JG-SHUTTLE SWITCH |

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