RS-631 MECHANISM SERIES

Specifications

Power requirements: AC; 120V, 50-60Hz
Power consumption: 10 W
Motor: Electronic control DC motor
Track system: 4-track 2-channel stereo recording and playback
Tape speed: 4.8cm/s (1-7/8ips)
Wow and flutter: 0.07% (WRMS)
Frequency response: Metal tape; 20—17,000Hz
CrO₂ tape; 20—16,000Hz
Normal tape; 20—15,000Hz
Signal-to-noise ratio: Dolby NR in; 66dB (above 5kHz)
Dolby NR out; 56dB
(signal level= max. recording level, CrO₂ type tape)
Fast forward and rewind time: Approx. 86 seconds with C-60 cassette tape

Inputs: MIC; sensitivity 0.25mV, input impedance 10kΩ
over applicable microphone impedance 400Ω—10kΩ
LINE; sensitivity 60mV, input impedance 47kΩ
 Outputs: LINE; output level 420mV, output impedance
1.4kΩ or less, load impedance 22kΩ over
HEADPHONE; output level 60mV, load
impedance 8Ω
Bias frequency: 80kHz
Heads: 2-head system;
1-MX head for record/playback
1-double-gap ferrite head for erasure
Dimensions: 41.0cm(W)×14.2cm(H)×20.5cm(D)
[16-1/8'(W)×5-9/16'(H)×8-1/16'(D)]
Weight: 4.0kg (8 lbs. 13 oz)

Specifications are subject to change without notice.
* 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories.

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## CONTENTS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION OF CONTROLS AND COMPONENTS</td>
<td>1</td>
</tr>
<tr>
<td>DISASSEMBLY INSTRUCTIONS</td>
<td>2</td>
</tr>
<tr>
<td>ASSEMBLY INSTRUCTIONS</td>
<td>3</td>
</tr>
<tr>
<td>MEASUREMENT AND ADJUSTMENT METHODS</td>
<td>3</td>
</tr>
<tr>
<td>SCHEMATIC DIAGRAM</td>
<td>7</td>
</tr>
<tr>
<td>WIRING CONNECTION DIAGRAM AND CIRCUIT BOARDS</td>
<td>8</td>
</tr>
<tr>
<td>ELECTRICAL PARTS LOCATION</td>
<td>9</td>
</tr>
<tr>
<td>MECHANISM EXPLODED VIEWS</td>
<td>9</td>
</tr>
<tr>
<td>CABINET PARTS</td>
<td>11</td>
</tr>
</tbody>
</table>

## LOCATION OF CONTROLS AND COMPONENTS

![Diagram](image)

1. Power switch (power)
2. Cassette holder
3. Tape counter and Reset button (tape counter)
4. VU meters (left-level-right)
5. Recording indication lamp (rec)
6. Pause button (pause) (II)
7. Record button (record) (O)
8. Play button (play) (●)
9. Rewind button (rew) (►◄)
10. Fast forward button (ff) (►►)
11. Stop button (stop) (■)
12. Eject button (eject) (△)
13. Microphone jacks (mic) (left/right)
14. Input selector (input select)
15. Dolby noise-reduction switch (Dolby NR)
16. Tape selector (tape select)
17. Input level controls (left/input level/right)
18. Headphones jack (phones)
19. Line input cord (LINE IN)
20. Line output cord (LINE OUT)

Fig. 1
**DISASSEMBLY INSTRUCTIONS**

![Fig. 2](image)

- The head azimuth can be adjusted by removing the cassette lid.

![Fig. 3](image)

![Fig. 4](image)

![Fig. 5](image)

![Fig. 6](image)

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Procedure</th>
<th>To remove</th>
<th>Remove</th>
<th>Shown in fig.</th>
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<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Bottom cover</td>
<td>2 screws (A)</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>1→2</td>
<td>Front panel</td>
<td>1 screw (B)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 control knobs (C)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cassette lid (D)</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>1→2→3</td>
<td>Operation button assembly and cassette holder</td>
<td>4 red screws (E)</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>1→2→3→4</td>
<td>Mechanism unit</td>
<td>6 red screws (F)</td>
<td>5</td>
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<tr>
<td>5</td>
<td>1→2→5</td>
<td>Main circuit board and oscillation circuit board</td>
<td>3 switch shelters (G)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7 screws (H)</td>
<td>5, 6</td>
</tr>
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</table>
ASSEMBLY INSTRUCTIONS

Caution:
Repair the cassette deck in its upright condition, as shown in fig. 7.
When mounting the main circuit board, lift the recording lever-A in the
direction of the arrow, as shown in fig. 7.

Fig. 7

MEASUREMENT AND ADJUSTMENT METHODS

ADJUSTMENT PARTS LOCATION

Fig. 1
NOTE 1: Tape speed can be adjusted through the small hole on the back-side of main case by the \(\bigcirc\) screw driver (Non metal type) as shown in fig. 2.

Fig. 2

NOTES 2: Keep good condition, set lever switches and controls in the following positions, unless otherwise specified.
- Make sure heads are clean.
- Make sure capstan and pressure roller are clean.
- Judgable room temperature: 20±5°C (68±9°F)
- Dolby NR switch: OUT
  - Tape selector: Normal position
  - Input selector: Line in
  - Input level controls: Maximum

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MEASUREMENT &amp; ADJUSTMENT</th>
</tr>
</thead>
</table>
| **A** Head azimuth adjustment<br>Condition:  
- Playback mode<br>Equipment:  
- VTVM  
- Oscilloscope  
- Test tape (azimuth)  
- Test tape (tape path viewer)<br>  --- QZZCFM  
- Test tape (tape path viewer)<br>  --- QZZCRD | 1. Test equipment connection is shown in fig. 3.  
2. Playback azimuth tape (QZZCFM 8kHz).  
3. Adjust record/playback head angle adjustment screw (A) in fig. 4 so that output level at LINE OUT becomes maximum.  
4. Measure both channels, and adjust levels for equal output.  
5. After adjustment lock head adjustment screw (A) with lacquer. |
| **B** Tape speed<br>Condition:  
- Playback mode<br>Equipment:  
- Digital electronic counter or frequency counter  
- Test tape --- QZZCWAT | 1. Test equipment connection is shown in fig. 6.  
2. Playback test tape (QZZCWAT 3,000Hz), and supply playback signal to digital electronic counter.  
3. Measure this frequency.  
4. On the basis of 3,000Hz, determine value by following formula:  
\[
\text{Tape speed accuracy} = \left(1 - \frac{f - 3,000}{3,000}\right) \times 100% 
\]
where, \(f = \text{measured value}\)  
5. Take measurement at middle section of tape.  

Standard value: ±1.5%
<table>
<thead>
<tr>
<th>ITEM</th>
<th>MEASUREMENT &amp; ADJUSTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjustment method</td>
<td>1. Playback the test tape (middle). 2. Adjust so that frequency becomes 3,000Hz. 3. Tape speed adjustment VR shown in &quot;NOTE 1&quot; on page 4.</td>
</tr>
</tbody>
</table>
| Tape speed fluctuation | Make measurements in same manner as above (beginning, middle and end of tape), and determine the difference between maximum and minimum values and calculate as follows:  
\[
\text{Tape speed fluctuation} = \frac{f_1 - f_2}{3,000} \times 100 (\%) 
\]
\[
f_1 = \text{maximum value, } f_2 = \text{minimum value}
\]

Standard value: Less than 1% |

| Playback frequency response | 1. Test equipment connection is shown in fig. 3. 2. Place UNIT into playback mode. 3. Playback frequency response test tape (QZZCFM). 4. Measure output level at 315Hz, 12.5kHz, 8kHz, 4kHz, 250Hz, 125Hz and 63Hz, and compare each output level with standard frequency 315Hz, at LINE OUT. 5. Make measurement for both channels. 6. Make sure that the measured value is within the range specified in the playback frequency response chart. (shown in fig. 7). |

Playback frequency response chart |

| Playback gain | 1. Test equipment connection is shown in fig. 3. 2. Playback standard recording level portion on test tape (QZZCFM 315Hz), and using VTVM measure the output level at LINE OUT. 3. Make measurement for both channels. |

Standard value: around 0.39V |

Adjustment | 1. If measured value is not within standard, adjust VR3 (L-CH), VR4 (R-CH) (See fig. 1 on page 3). 2. After adjustment, check "Playback frequency response" again. |

| Bias leakage | 1. Test equipment connection is shown in fig. 8. 2. Place UNIT into record mode. 3. Adjust trap coils L5 (L-CH), L6 (R-CH), so that measured value becomes minimum. 4. Make adjustment for both channels. |

| Erase current | 1. Test equipment connection is shown in fig. 9. 2. Place UNIT into record mode and measure voltage at test point 6. 3. Determine erase current with the following formula: 
\[
\text{Erase current (A)} = \frac{\text{Voltage across both ends of R304}}{1 (\Omega)} 
\]

Standard value: around 155mA (Tape selector → Metal) |

4. If measured value is not within standard, adjust as follows. |
### Adjustment

1. Open the point (A) and short the point (B) on the main circuit board in the wiring connection diagram (see page 8).
2. Make measurement for erase current.
3. Make sure that the measured value is within the erase current of 145 mA to 165 mA.
4. If it is beyond the value, carry out the following adjustments:
   - If the erase current is less than 145 mA, short the point (A).
   - If the erase current is more than 165 mA, open the points (A) and (B).

#### Bias current

- **Condition:**
  - Record mode
  - Tape selector: Normal position
  - OTR position
  - Metal position

- **Equipment:**
  - VTVM
  - Oscilloscope

- **Procedure:**
  1. Test equipment connection is shown in fig. 10.
  2. Place UNIT into record mode and tape selector to normal position.
  3. Read voltage on VTVM and calculate bias current by following formula:
     \[ \text{Bias current (A)} = \frac{\text{Value read on VTVM (V)}}{10} \]

   **Standard value:** around 400 μA (Normal position)

- **Procedure (Continued):**
  4. If measured value is not within standard, adjust VR310 (L-CH) and VR312 (R-CH) (see Fig. 7) on page 3.
  5. Set the tape selector to each position.
  6. Make sure that the measured value is within standard

   **Standard value:** around 550 μA (OTR2 position), around 830 μA (Metal position)

#### Overall gain

- **Condition:**
  - Record/playback mode
  - Input level: MIN
  - Standard input level: 500 μV
  - LINE IN: 0.775 V ± 0.04 V

- **Equipment:**
  - VTVM
  - AF oscillator
  - Resistor (600Ω)
  - Test tape (reference blank tape)
  - QZCR3 for Normal

- **Procedure:**
  1. Test equipment connection is shown in fig. 11.
  2. Place UNIT into record mode, and tape selector to normal position.
  3. Supply 1 kHz signal (24 dB) from AF oscillator, through ATT to LINE IN.
  4. Adjust ATT until monitor level at LINE OUT becomes 0.39 V.
  5. Using test tape, make recording.
  6. Playback recorded tape, and make sure the value at LINE OUT on VTVM becomes 0.39 V (7 dB).
  7. If measured value is not 0.39 V, adjust VR3 (L-CH), VR5 (R-CH) (see Fig. 1 on page 3).
  8. Repeat from step (2).

#### Overall frequency response

- **Condition:**
  - Record/playback mode
  - Tape selector: Normal position
  - OTR position
  - Metal position
  - Input level controls: MAX

- **Equipment:**
  - VTVM
  - AF oscillator
  - ATT
  - Oscilloscope
  - Resistor (600Ω)
  - Test tape (reference blank tape)
  - QZCR3 for Normal
  - QZCR3 for OTR
  - QZCR2 for Metal

- **Procedure:**
  1. Test equipment connection is shown in fig. 12.
  2. Place normal test tape (QZCR3A) in the cassette holder.
  3. Place UNIT into record mode, and tape selector to normal position.
  4. Supply 1 kHz signal from AF oscillator through ATT to LINE IN.

#### Dolby NR circuit

- **Condition:**
  - Record modes
  - Dolby NR switch: IN/OUT
  - Input level controls: MAX

- **Equipment:**
  - VTVM
  - AF oscillator
  - ATT
  - Oscilloscope
  - Resistor (600Ω)

- **Procedure:**
  1. Test equipment connection is shown in fig. 17.
  2. Place UNIT into record mode, set the Dolby NR switch to OUT position and supply to LINE IN to obtain –34.5 dB or 0.72 V at TP7 (L-CH), TP8 (R-CH) (frequency 5 kHz).
  3. Confirm that the value at TP8 (L-CH) is 0.72 ± 0.5 dB greater than the value at OUT position of Dolby NR switch.
SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure of pressure roller</td>
<td>350 ± 50 g</td>
</tr>
<tr>
<td>Takeup tension</td>
<td></td>
</tr>
<tr>
<td>- Use cassette torque meter</td>
<td>50 ± 15 g-cm</td>
</tr>
<tr>
<td>- QZZSRKCT</td>
<td></td>
</tr>
<tr>
<td>Wow and flutter (JIS)</td>
<td></td>
</tr>
<tr>
<td>- Use test tape</td>
<td>Less than 0.12% (WRMS)</td>
</tr>
<tr>
<td>- QZZCWAT</td>
<td></td>
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## Cabinet Parts

<table>
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<tr>
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<th>Part No.</th>
<th>Part Name &amp; Description</th>
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<tbody>
<tr>
<td>G1</td>
<td>QKM1424</td>
<td>Main Case</td>
</tr>
<tr>
<td>G2</td>
<td>QKA1087</td>
<td>Case Foot</td>
</tr>
<tr>
<td>G3</td>
<td>QKR2998</td>
<td>Switch Shutter</td>
</tr>
<tr>
<td>G4</td>
<td>QYTO572</td>
<td>Volume Knob Assembly</td>
</tr>
<tr>
<td>G5</td>
<td>QYTO434</td>
<td>Cassette Lid Assembly</td>
</tr>
<tr>
<td>G6</td>
<td>XTQ3+300FN</td>
<td>Tapping Screw (3.3x10)</td>
</tr>
<tr>
<td>G7</td>
<td>QYTO668</td>
<td>Front Panel Assembly</td>
</tr>
<tr>
<td>G8</td>
<td>QCR1170</td>
<td>Bottom Cover</td>
</tr>
<tr>
<td>G9</td>
<td>QKA1083</td>
<td>Rubber Feet</td>
</tr>
<tr>
<td>G10</td>
<td>QKQ6199</td>
<td>Screw (3x8)</td>
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<tr>
<td>G11</td>
<td>QKJ3385</td>
<td>Spacing</td>
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<tr>
<td>G12</td>
<td>XTQ26+6B</td>
<td>Tapping Screw (6x2.6)</td>
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<tr>
<td>G13</td>
<td>QGQ26825</td>
<td>Monomer Plate</td>
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<td></td>
<td>QGQ26827</td>
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<tr>
<td>G14</td>
<td>QGQ1302</td>
<td>Pause Button</td>
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<td>G15</td>
<td>QGQ1579</td>
<td>Record Button</td>
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<td>G16</td>
<td>QGQ1578</td>
<td>Playback Button</td>
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<tr>
<td>G17</td>
<td>QGQ1577</td>
<td>Rewind Button</td>
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<tr>
<td>G18</td>
<td>QGQ1576</td>
<td>Fast Forward Button</td>
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<td>G19</td>
<td>QGQ1575</td>
<td>Stop Button</td>
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<td>G20</td>
<td>QGQ1574</td>
<td>Eject Button</td>
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<td>G21</td>
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<td>G22</td>
<td>QNH1861</td>
<td>Push Button Shaft-B</td>
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<td>G23</td>
<td>QMN2535</td>
<td>Push Button Shaft-A</td>
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<td>G24</td>
<td>QOA0750</td>
<td>Push Button Holding Angle Assembly</td>
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### Accessories

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<td>QPPI818</td>
<td>Holder Spring</td>
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<td>G27</td>
<td>XTR3+305</td>
<td>Tapping Screw (3x305)</td>
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<td>G28</td>
<td>QGM154</td>
<td>Lid Spring</td>
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<td>G29</td>
<td>XUC3FT</td>
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### Packing

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<td>P2</td>
<td>QPH0406</td>
<td>Poly Bag</td>
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<td>P3</td>
<td>QPH0406</td>
<td>Ped</td>
</tr>
<tr>
<td>P4</td>
<td>QPH0406</td>
<td>Spacer</td>
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