A masterpiece of engineering and construction in the two basic components:

33D  Tape Transport Mechanism
R 220  Recording Amplifier with Playback Preamplifier.
General Instructions

Refer to the picture below as a guide to attaching the power cords and inter-connecting cable. The two components may be placed in any suitable position within the limits of the cables supplied.

If an amplifier of any type other than the R 220 is used, the recording head connector plug must be wired as shown in Fig. 5. In this case, it is important to prevent hum or noise that mechanism ground (12) and the ground terminal of such an amplifier must be connected using 1-pin cord which is supplied as an accessory.

**Fig. 5**

<table>
<thead>
<tr>
<th>Recording head</th>
<th>Left 8 ground 4</th>
<th>Right 9 ground 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erasing head</td>
<td>Left 3 ground 1</td>
<td>Right 10 ground 6</td>
</tr>
<tr>
<td>Speed equalizer circuit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recording button</td>
<td>Left 4</td>
<td>Right 8</td>
</tr>
<tr>
<td>relay circuit</td>
<td>+ 6</td>
<td>- 11</td>
</tr>
<tr>
<td>Amplifier short switch</td>
<td>Left 5</td>
<td>Right 7</td>
</tr>
<tr>
<td>circuit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanism ground</td>
<td></td>
<td></td>
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</tbody>
</table>

**CAUTION:** Do not attempt to touch the tape head with any testing instrument as magnetization of the head may result. However, if direct current is supplied to the head by accident, a head demagnetizer should be used.

It should be understood that another stereo amplifier is needed to operate speakers for playback sound. The R 220 amplifier component is primarily a recording amplifier specially designed to give full frequency response in recording.

Included within the R 220 is a separate stereo preamplifier circuit. This has been designed to properly pre-amplify the very low output of the playback head and match this output to the input of any good stereo amplifier for playback.

Connect the playback amplifier to the output jacks located on the left side of the R 220 as indicated in the picture above.
**Tape Deck**

Power source A.C.
Power consumption
Head, playback
  " recording
  " erase

Frequency response 19 CM/S (7½ in/sec.)
  9.5CM/S (3¾ in/sec.)
Motor, for capstan driving
  " for supply and take-up shaft
Tape speed : 2-speed
Tape speed deviation
Starting time for constant speed
Wow and flutter
Fast Forward and Rewind time
Signal to Noise Ratio
Dimensions
Weight

100V~117V 50%~60% (220 or 230V upon request)
100 V. A.
2-track~4-track
High impedance (3kΩ 1000%)
4-track
Low impedance (3kΩ 60k%)
4-track
Low impedance (300Ω 60k%)
30~20,000%  
50~12,000%

2 Speed hysteresis synchronous motor
2 Induction motors, capacitor start, dynamically balanced
19 CM/S (7½ ins./sec.) ~ 9.5 CM/S (3¾ ins./sec.)
within ± 0.5%  
within 0.5 sec.
Less than 0.1% R.M.S.
45 sec. with 7" (1,200 ft.) reel of tape
More than 45 db
16" x 14" x 9"
33 lbs. (Net in carton)

**Amplifier**

Power source A.C.
Power consumption
Recording input (Mic. input)
  (Line input)
Reproducing output
Head input terminals
  Reproducing input impedance (high)
  Recording output impedance (low)
  Erasing output impedance (low)
Frequency characteristics

Signal to Noise Ratio
Distortion harmonic
Vacuum tubes used
Case Dimension
Amplifier Dimension
Weight

100V~117V 50%~60% (220 or 230V upon request)
65V.A.
High impedance dynamic (Sensitivity −75 db)
Min. 100mV (Z=250KΩ)
Max. 1.4V cathode follower
4-track & 2-track Stereo & Monaural applicable
3KΩ 1kc/s Reproducing characteristic follows standard NARTB & CCIR
3KΩ 60kc/s Recording characteristic follows standard NARTB
300Ω 60kc/s
19cm/s (7½ in/sec.) 30~19,000%
9.5cm/s (3¾ in/sec.) 30~12,000c/s
More than 45 db
Within 1.5%
12AD7×4  12AT7×3  12AU7×2  12BH7×1  6X4×1
16"×12½"×5½"
15½"×7½"×4"
20 lbs. (Net in Carton)