3M Brand Professional Audio Recording Systems are the most complete and advanced line of professional audio recorders made. Whether you're looking for a 16-track for mastering or a full-track, you can't buy better performance, more convenience or higher quality than 3M. □ Models in the line include 16-, 8-, 4-, 2- and full-track units to cover just about any audio recording requirements that you'll ever have. Whether you buy the low end or the high end of the line, you'll get the same consistent quality, convenience and performance because all models use the same transport and electronics. □ The transport is a precision piece of equipment that gives you foolproof, convenient and safe tape handling. It provides convenient tape threading and editing and handles tape without the high tensions necessary with other drive techniques. Sophisticated transport logic eliminates the possibility of damage to
the tape or machine. And for even more convenience, the 16- and 8-track models come with a remote overdub unit for remote console operation, providing individual mode selection of any or all tracks plus duplicate transport controls. The tape drive is the unique 3M Isoloop®, a differential capstan drive that provides the lowest flutter and wow in the industry. It reduces unsupported tape length to just 3⅞", maintains tape tension automatically and makes editing easier and faster than with any other equipment available.

Combining the benefits of Isoloop with sophisticated electronic techniques, 3M recording systems give you the best signal-to-noise and frequency response in the industry. You can check this out on your test equipment, but there's an easier way—just listen. The difference in performance between any model in our line and any other audio recording equipment made—full-track through 16-track—is great enough for you to hear. And that's what it's all about, isn't it?
**MODEL PAR 410 M-64**
1/4 Inch 4 Track Recorder/Reproducer

**SIGNAL-TO-NOISE RATIO:**

<table>
<thead>
<tr>
<th>Speed (ips)</th>
<th>Standby</th>
<th>Biased Tape</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>62 db</td>
<td>62 db</td>
</tr>
</tbody>
</table>

70 millit track width 20 Hz to 20 kHz bandwidth, with reference to 3% maximum third harmonic distortion level at 700 Hz, using tape specified below.

**FREQUENCY RESPONSE:**

7.5 ips reproduce 2 3 db 30 Hz to 12 kHz
7.5 ips reproduce + 1 db 30 Hz to 12 kHz
15 ips reproduce 2 3 db 30 Hz to 12 kHz
15 ips reproduce + 1 db 30 Hz to 12 kHz
30 ips reproduce 2 3 db 30 Hz to 12 kHz
30 ips reproduce + 1 db 30 Hz to 12 kHz

**FLUTTER:**

<table>
<thead>
<tr>
<th>Speed (ips)</th>
<th>Flatter Rate</th>
<th>Maximum Flutter (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>0.5 to 200</td>
<td>0.05%</td>
</tr>
<tr>
<td>15</td>
<td>0.5 to 300</td>
<td>0.08%</td>
</tr>
<tr>
<td>7.5/12</td>
<td>0.5 to 500</td>
<td>0.10%</td>
</tr>
</tbody>
</table>

**NOTE:** All measurements of flutter made by recording a tone on machine under test, winding and measuring flutter on replay. Flutter measurement is maximum cumulative unweighted.

**Phasing:** On all channels signal input to output polarity is maintained. 1 mil waveform phase error less than 90° between any two tracks.

**Channel separation:** Channel to channel crosstalk separation of greater than 50 db at 1 kHz.

**Phase correction:** playback amplifier includes phase rotation circuit to optimize square wave and transient response for each speed.

**Bias and erase oscillator:** Master oscillator includes phase rotation circuit to optimize square wave and transient response for each speed.

**Bias and erase oscillator:** Master oscillator includes phase rotation circuit to optimize square wave and transient response for each speed.

**Speed:** 3.5 to 5.0 kHz/1000 Hz

**Timmer accuracy:** ±0.1% Start time: Less than 1.0 seconds to reach sync speed.

**Stop time:** 1.0 second from play or record mode.

**Rewind time:** 1.7 minutes for 2,400 feet.

**Transport controls:** Operating controls located on lower edge of transport.

**SIZE AND WEIGHT:**

Height: 22-1/2 inches
Width: 22-1/2 inches
Depth: 22-1/2 inches
Weight: Approximately 350 pounds

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**MODEL PAR 510 M-66**
1 Inch 8 Track Recorder/Reproducer

**SIGNAL-TO-NOISE RATIO:**

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<td>62 db</td>
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</tr>
</tbody>
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70 millit track width 20 Hz to 20 kHz bandwidth, with reference to 1% maximum third harmonic distortion level at 700 Hz, using tape specified below.

**FREQUENCY RESPONSE:**

7.5 ips reproduce 2 3 db 30 Hz to 12 kHz
7.5 ips reproduce + 1 db 30 Hz to 12 kHz
15 ips reproduce 2 3 db 30 Hz to 12 kHz
15 ips reproduce + 1 db 30 Hz to 12 kHz
30 ips reproduce 2 3 db 30 Hz to 12 kHz
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**NOTE:** All measurements of flutter made by recording a tone on machine under test, winding and measuring flutter on replay. Flutter measurement is maximum cumulative unweighted.

**Phasing:** On all channels signal input to output polarity is maintained. 1 mil waveform phase error less than 90° between any two tracks.

**Channel separation:** Channel to channel crosstalk separation is greater than 50 db at 500 cycles (zero VFD).

**Phase correction:** playback amplifier includes phase rotation circuit to optimize square wave and transient response for each speed.

**Bias and erase oscillator:** Master oscillator includes phase rotation circuit to optimize square wave and transient response for each speed.

**Bias and erase oscillator:** Master oscillator includes phase rotation circuit to optimize square wave and transient response for each speed.

**Speed:** 3.5 to 5.0 kHz/1000 Hz

**Timmer accuracy:** ±0.1% Start time: Less than 1.0 seconds to reach sync speed.

**Stop time:** 1.0 second from play or record mode.

**Rewind time:** 1.7 minutes for 2,400 feet.

**Transport controls:** Operating controls located on lower edge of transport.

**Remote control:** Provides full operation of the transport from two locations.

**SIZE AND WEIGHT:**

Height: 53-3/4 inches plus 7 inches when remote control is mounted on master panel.
Width: 27 inches.
Depth: 22-1/2 inches.
Weight: Approximately 304 pounds (16 trims).