Keyboard Interfacing

There are several types of keyboards available for computer usage. Some of the most common types are:

- Mechanical switches
- Membrane switches
- Capacitive switches
- Hall effect key switches
Keyboard Interfacing

- Most keyboards are organized as a matrix of rows and columns. Getting data from the keyboard requires the following steps:
  - Detect a key press.
  - Debounce the key press.
  - Encode the key.
Keyboard Interfacing
Keyboard Interfacing

- This flow chart shows the process necessary to detect, debounce, and encode a pressed key on the keyboard.
Detecting a Key

<table>
<thead>
<tr>
<th></th>
<th>Logic 0</th>
<th>Logic 0</th>
<th>Logic 0</th>
<th>Logic 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>5V</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>10K</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Logic 1</td>
<td>Logic 1</td>
<td>Logic 0</td>
<td>Logic 1</td>
</tr>
<tr>
<td></td>
<td>key (2,2)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Detecting a Row
Detecting a Row
Encoding a Key

- Encoding the key press:
  - Find the row and column positions (obtained from the key detection routine).
  - Calculate the offset using the following formula:
    \[ \text{OFFSET} = (\text{row} \times 8) + \text{column} \]
    - 8 is the number of columns in the keyboard matrix.
  - Find the proper character using the offset, the base address of the conversion table and XLATB instruction.