Almost all devices require time keeping in the form of a real time clock (RTC). Abracon supplies all forms of solutions including the smallest 32.768kHz oscillator (watch-MEMS®), the lowest power standalone RTC (ABx8x5) or highest accuracy temperature compensated watchMEMS and TCXO solutions. Additionally, ESR optimized 32kHz quartz crystals (ABS07-120/ABS06-107) enable the next generation of energy saving MCU’s with more robust and reliable quartz timing solutions. To learn more see Abracon’s ultimate guide to real time clocks & 32kHz solutions: www.abracon.com/support/32kHz-ultimate-solutions.pdf

ABRACON SUPPORTS APPLICATIONS REQUIRING LOW POWER, SMALL SIZE, HIGH ACCURACY.

**ACCURACY**
- Smart meters
- Industrial sensors
- Test and measurement
- High temperature and automotive
- Health monitoring
- Machine-to-Machine (M2M)

**SIZE SENSITIVE**
- Wearables
- IoT
- Wireless connectivity

**LOW POWER**
- Wearables
- IoT
- Smart meters
- RF telemetry
- Industrial sensors

IoT OPTIMIZED LOW ESR CRYSTALS FOR ENERGY SAVING MCUs.

LONG TERM TIME KEEPING ERROR VS. PPM STABILITY

<table>
<thead>
<tr>
<th>TYPE</th>
<th>TIME KEEPING DRIFT</th>
<th>ERROR / DAY</th>
<th>ERROR / MONTH</th>
<th>ERROR/ YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PPM</td>
<td>PERCENT</td>
<td>SECONDS</td>
<td>SECONDS</td>
</tr>
<tr>
<td>Quartz or MEMS TCXO</td>
<td>5</td>
<td>0.0005</td>
<td>.43</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>0.001</td>
<td>0.86</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>0.002</td>
<td>1.7</td>
<td>53</td>
</tr>
<tr>
<td>Uncompensated Quartz Xtal</td>
<td>50</td>
<td>0.005</td>
<td>4.3</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>0.01</td>
<td>8.6</td>
<td>260</td>
</tr>
<tr>
<td>Internal MCU Oscillator</td>
<td>10000</td>
<td>1</td>
<td>860</td>
<td>26000</td>
</tr>
</tbody>
</table>

Ever wonder what ppm stability is needed to meet long term time keeping requirements? From appliances to wearables to IoT devices to industrial applications, this table shows you where your clock accuracy needs to be.