

```
<div><span style="font-family: times; font-size: medium;">&nbsp;<span>&nbsp;<span>&nbsp;<span>&nbsp;</span><a name="home">
```

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</a>
```

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<br />
```

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</span><div style="text-align: center;">
```

```
<span style="font-family: times; font-size: medium;"><a href="#">[KEMBALI KE MENU  
SEBELUMNYA]</a></span></div><span style="font-family: times; font-size: medium;">
```

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<br />
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</span><center>
```

```
<div style="background-color: white; border: 2px dashed rgb(23, 128, 221); height: 240px; overflow:  
auto; padding: 10px; text-align: center; width: 330px;">
```

```
<span style="font-family: times; font-size: medium;"><span><b>DAFTAR ISI</b></span>
```

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<br /></span>
```

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</span><div style="text-align: left;">
```

```
<span style="font-family: times; font-size: medium;"><a href="#satu">1. Tujuan</a></span></div>
```

```
<div style="text-align: left;">
```

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<span style="font-family: times; font-size: medium;"><a href="#dua">2. Komponen</a></span></div>
```

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<div style="text-align: left;">
```

```
<span style="font-family: times; font-size: medium;"><a href="#tiga">3. Dasar Teori</a></span></div>
```

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<div style="text-align: left;">
```

```
<span style="font-family: times; font-size: medium;"><span><a href="#empat">4. Prosedur  
Percobaan</a><br /></span>
```

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</span><div style="text-align: left;">
```

```
<span style="font-family: times; font-size: medium;"><a href="#lima">5. Prinsip Kerja</a></span></div>
```

```
<div style="text-align: left;">
```

```
<span style="font-family: times; font-size: medium;"><a href="#enam">6.  
Vidio</a>&nbsp;</span></div>
```

```
<div style="text-align: left;">
```

```
<span style="font-family: times; font-size: medium;"><a href="#tujuh">7. Download</a></span></div>
```

```
</div>
```

</p><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;c. Mengetahui pengaplikasian dari Flip-Flop<o:p></o:p></span></span></p><p class="MsoNormal"><span style="font-size: medium;"><b><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;">2. Alat dan Bahan </span></span><a href="#"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;">[kembali]</span></span></a></b></span></p><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">&nbsp;&nbsp;&nbsp;<span><b>&nbsp;&nbsp;&nbsp;</b></span></span></span></p><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">&nbsp;&nbsp;&nbsp;<span><b>&nbsp;&nbsp;&nbsp;</b></span></span></span></p><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;"><span><b>&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;</b></span></span></span><b style="color: #ffa400;">1.

Battery</b></span></p><div><span style="color: #ffa400; font-family: times; font-size: medium;"><div class="separator" style="clear: both; font-weight: bold; text-align: center;"><a

href="https://1.bp.blogspot.com/-qEoWZLQmw-w/YD4HhINqN5I/AAAAAAAAA1o/SW4fpIKy9Ww1aAWP  
Bpwm2j2EE1Ggw7c\_wCLcBGAsYHQ/s900/battery.jpg" style="color: #2288bb; margin-left: 1em;  
margin-right: 1em; text-decoration-line: none;"></a></div></span></div><div><span style="background-color: white;  
font-family: times; font-size: medium;"><div style="text-align: center;"><b>Gambar  
1. </b><i>Baterai </i></div></span></div><div><span style="background-color:  
white;"><span style="font-family: times; font-size: medium;"><b><span style="color:  
#ffa400;">2. </span></b><span style="background-color: initial; color: #ffa400;"><b>Power  
Supply</b></span></span></span><div style="background: 0px 0px rgb(255, 255, 255); border: 0px;  
color: #656565; outline: 0px; padding: 0px; vertical-align: baseline;"><span style="background: 0px 0px;  
border: 0px; color: #ffa400; font-family: times; font-size: medium; outline: 0px; padding: 0px;  
vertical-align: baseline;"><br /></span></div><div style="background: 0px 0px rgb(255, 255, 255);  
border: 0px; color: #656565; outline: 0px; padding: 0px; vertical-align: baseline;"><span  
style="background: 0px 0px; border: 0px; color: #ffa400; font-family: times; font-size: medium; outline:  
0px; padding: 0px; vertical-align: baseline;"><br /></span></div><div style="background: 0px 0px  
rgb(255, 255, 255); border: 0px; color: #656565; outline: 0px; padding: 0px; vertical-align:  
baseline;"><span style="background: 0px 0px; border: 0px; color: #ffa400; font-family: times; font-size:  
medium; outline: 0px; padding: 0px; vertical-align: baseline;"><br /></span></div><div class="separator"  
style="clear: both; text-align: center;"><div class="separator" style="clear: both;"><span  
style="font-family: times; font-size: medium;"><a  
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E8lGWtmMRSxr\_wi8hrK4LB93S6LAKC\_-39PhCrROommk417Ou5mH46OmzK-JAR" style="color: #2288bb;  
margin-left: 1em; margin-right: 1em; text-decoration-line: none;"></a><a  
href="https://blogger.googleusercontent.com/img/b/R29vZ2xl/AVvXsEhV3KXDE0os5Z9ve0-mvYQAunm\_  
mgbX93Pqr\_qyp0v0H0c-LjYASYumT4ArSsQ1buRpY-cYu60y2ugzlkH3ytUMfVyP\_S5hBvTZ8MBeeOK4BkJ1P  
YVmnjNcdOllq754fNz7DULJlqkvAmJ3BVFMfJ4L26CKSbosW6a6rnVL690cB056b50R3ae9-4uguJ4/s701/W  
hatsApp%20Image%202023-07-12%20at%2006.41.42.jpeg" style="color: #2288bb; margin-left: 1em;  
margin-right: 1em; text-decoration-line: none;"></a></span></div><div class="separator" style="clear: both;"><span style="font-family: times; font-size: medium;"><b>Gambar 2.&nbsp;</b><i>Power Supply dan Spesifikasinya</i></span></div></div><div class="separator" style="clear: both;"><div style="background: 0px 0px rgb(255, 255, 255); border: 0px; outline: 0px; padding: 0px; text-align: justify; vertical-align: baseline;"><span style="background: 0px 0px; border: 0px; outline: 0px; padding: 0px; vertical-align: baseline;"><span style="background: 0px 0px; border: 0px; font-variant-east-asian: normal; font-variant-numeric: normal; list-style: none; outline: 0px; padding: 0px; vertical-align: baseline;"><span style="background: 0px 0px; border: 0px; font-family: times; font-size: medium; outline: 0px; padding: 0px; vertical-align: baseline;"><br /></span></span></span></div></div><div><span style="background-color: white;"><span style="font-family: times; font-size: medium;"><b><span style="color: #ffa400;">3.&nbsp;</span></b><span style="background-color: initial; color: #ffa400;"><b>DC Voltmeter</b></span></span></span></div><div><span style="background-color: white;"><span style="font-family: times; font-size: medium;"><p class="MsoNormal"></p><div class="separator" style="clear: both; text-align: center;"><a href="https://1.bp.blogspot.com/-8qV7UmPnK1w/YA22f\_QtDml/AAAAAAAAABYw/51bPKhQ\_KAAZHyybeXwJX0JRKEr4W535AClCBGAsYHQ/s320/1.jpg" style="color: #2288bb; margin-left: 1em; margin-right: 1em; text-decoration-line: none;"></a><a href="https://blogger.googleusercontent.com/img/b/R29vZ2xl/AVvXsEio\_FxNcJyzaCcoKcLGsjA6T9qqNm qcYbgPQSoF0RXKvD\_gv8fHvpOu7V-5JgnNGqk6MgY9\_J3gGCAVTI16\_fn648peVyKFfQB\_IAmeh-2kcgaXwp lNjxqOHGsKtl\_9-thtdPhYliSpPHkSvcA8ku49lpiODHdyug7pWxZv-n2aE39W9M3Pjjb5JOWV4w/s430/WhatsApp%20Image%202023-07-12%20at%2006.46.35.jpeg" style="color: #2288bb; margin-left: 1em; margin-right: 1em; text-decoration-line: none;"></a></div><div class="separator" style="clear: both; text-align: center;"><b>Gambar 3.&nbsp;</b><i>DC Voltmeter dan Spesifikasinya</i></div><p></p><p class="MsoNormal"><b><span style="background-color: initial; color: #ffa400;">4.&nbsp;</span></b><span style="background-color: initial; color: #ffa400;">Ground</span></b></p></span></span><div style="background: 0px 0px rgb(255, 255, 255); border: 0px; color: #656565; outline: 0px; padding: 0px; vertical-align: baseline;"><span style="background: 0px 0px; border: 0px; color: #ffa400; font-family: times; font-size: medium; outline:

Opx; padding: 0px; vertical-align: baseline;"><br /></span></div><div style="background: 0px 0px  
rgb(255, 255, 255); border: 0px; outline: 0px; padding: 0px; vertical-align: baseline;"><div  
style="background-attachment: initial; background-clip: initial; background-image: initial;  
background-origin: initial; background-position: 0px 0px; background-repeat: initial; background-size:  
initial; border: 0px; outline: 0px; padding: 0px; vertical-align: baseline;"><span style="background: 0px  
0px; border: 0px; outline: 0px; padding: 0px; vertical-align: baseline;"><span style="background: 0px 0px;  
border: 0px; font-family: times; outline: 0px; padding: 0px; vertical-align: baseline;"><span  
style="background: 0px 0px; border: 0px; font-size: medium; outline: 0px; padding: 0px; text-align:  
justify; vertical-align: baseline;"><div class="separator" style="clear: both; color: #222222; text-align:  
center;"><a  
href="https://blogger.googleusercontent.com/img/a/AVvXsEj20bbNThQ3cGry34vn2vLyQtY7laEXXjS8myg  
m4MpiHRdYIOQc74mNtBiOpoKHWkMBHskMShNp071CU7j2NXsMgD1w1M0YAakf-HcL6WP2D5avFBX8-  
G0OjgtOqLCbhjSasv-ER1Kj20O2mWFYhmvfdMDISC9dFz0VTjGr5lzR5czH3ioxN1xc\_e7T" style="color:  
#2288bb; margin-left: 1em; margin-right: 1em; text-decoration-line: none;"></a></div><div  
class="separator" style="clear: both; color: #222222; text-align: center;"><b>Gambar  
4.</b><i><b>&nbsp;</b></i></div><div><i><br  
</i></div></span></span></span></div></div></div><p class="MsoNormal"><span  
style="font-family: times;"><span  
face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="font-size:  
medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">

</span></span></p><p class="MsoNormal"><span style="font-family: times;"><span  
face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%;

mso-bidi-font-size: 11.0pt;">&nbsp;</span></span></p><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">

</span></span></p><p class="MsoNormal"><span style="font-size: medium;"><b><span style="font-family: times;"><span face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;">Bahan:<o:p></o:p></span></span></b></span></p><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"><span><b>3. Resistor</b></span><o:p></o:p></span></span></p><div class="separator" style="clear: both; text-align: center;"><span style="font-family: times; font-size: medium;"><a

href="https://1.bp.blogspot.com/-3Lwwg8Q6oNk/YCp8gJmvhDI/AAAAAAAAACJ8/3cX\_YsRYqYcVw\_liKtmU6nY5t6Z-f2EAWCLcBGAsYHQ/s268/resistor.jpg" style="margin-left: 1em; margin-right: 1em;"></a></span></div><span style="font-size: medium;"><span style="font-family: times;"><br /></span></span><p class="MsoNormal"><span style="font-family: times; font-size: medium;"><br /></span></p><div class="separator" style="clear: both; text-align: center;"><span style="font-family: times; font-size: medium;"><a

href="https://1.bp.blogspot.com/-IU2GV5CjiD0/YCp9DsTnz6l/AAAAAAAAACKI/ozGI02dio1cKl8xJy5KeW\_qRc5Q9z9cnQCLcBGAsYHQ/s320/datasheet%2Bresistor%2B%25281%2529.JPG" style="margin-left: 1em; margin-right: 1em;"></a></span></div><span style="font-family: times; font-size: medium;"><br /></span>

face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;"><br /></span></span><div class="separator" style="clear: both; text-align: center;"><span style="font-family: times; font-size: medium;"><br /></span></div><span style="font-family: times; font-size: medium;"><span><span><span><span><b><span><span><span>

face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;"><span><span><b><span><span>&nbsp;&nbsp;&nbsp;</span></span>4. Inverter NOT (IC 74HC05)</span></b></span></span></span></span></b></span></span></span></span></div><span style="font-family: times;"><span face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;"><span><span><b><span style="font-size: medium;">&nbsp;&nbsp;&nbsp;<div class="separator" style="clear: both; text-align: center;"><a href="https://1.bp.blogspot.com/-RkrPw844bGA/YF1kJhj0Bbl/AAAAAAACx4/F5gqP6ST0YEKNGyQqvaWUNH9dpMT0Zu\_wCLcBGAsYHQ/s2048/inverter%2Bnot.jpg" style="margin-left: 1em; margin-right: 1em;"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"><a href="https://1.bp.blogspot.com/-aBnjqBE6Gk/YF2L9OTO2tI/AAAAAAAAAC0Q/-vPm6S1u8sUJ60KctDOFFMVrn9-qpAvnwCLcBGAsYHQ/s250/IC%2B74111.jpg" style="margin-left: 1em; margin-right: 1em;"></a></span></span></div><p class="MsoNormal"><span style="font-family: times; font-size: medium;"><br /></span></p><div><span style="font-family: times; font-size: medium;"><span><span><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;"><p class="MsoNormal"><span><b><span face="Arial, sans-serif">8. Encoder (IC 74147)</span></b></span></p><div class="separator" style="clear: both; text-align: center;"><span face="Arial, sans-serif"><a href="https://1.bp.blogspot.com/-PGZMOEP\_WIQ/YF2UY6QN4II/AAAAAAAAAC1I/kQSK4pRMJ2EoyS-FzV\_byqpicliGQrbdACLcBGAsYHQ/s800/74147.jpg" style="margin-left: 1em; margin-right: 1em;"></a></span></div></span></span></span></span></div><div><div><p></p><span style="font-family: times; font-size: medium;"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;"><p class="MsoNormal"><span face="Arial, sans-serif"><span class="ILfuVd"><span class="hgKElc"></span></span> </span></p></span></span><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;"><p class="MsoNormal"><b><span face="Arial, sans-serif">9. IC Counter (IC 4026)</span></b></p><div class="separator" style="clear: both; text-align: center;"><a href="https://1.bp.blogspot.com/-KwzPmWE93w/YCv7i6S519I/AAAAAAAAACYE/ZHq7vsmYo64bD6w-KRzo3O2IENoclzC2gCLcBGAsYHQ/s244/ic%2B4026.jpg" style="margin-left: 1em; margin-right: 1em;"></a></div><br /><p class="MsoNormal"><b>10. Logic State</b></p><div class="separator" style="clear: both; text-align: center;"><a href="https://1.bp.blogspot.com/-fqJYctazMj4/YCqXfQMaPkl/AAAAAAAAACOI/gsEDMqepDb0AXpBgrfPOV5jMRKujiOmmQCLcBGAsYHQ/s700/logic%2Bstate.jpg" style="margin-left: 1em; margin-right: 1em;"></a></div><br /><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="line-height: 115%;"><br /></span>

<p style="text-indent: 14.2pt;"><br /></p><p style="text-indent: 14.2pt;"><span style="font-family: times;"><span><b><span><span style="font-family: times;"><span><span><b>Komponen Input</b></span></span></span> <br /></span></b></span></span></p><p style="text-indent:

**Konfigurasi Pin :**

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a



Spesifikasi :

1. Vin : DC 5V  
9V.
2. Radius : 180 derajat.
3. Jarak deteksi : 5 7 meter.
4. Output : Digital TTL.
5. Memiliki setting sensitivitas.

auto; mso-list: l0 level1 lfo1; text-indent: -18pt;"><span style="font-family: times;"><span><span style="font-size: medium;"><span><span style="line-height: 27px;">6. Memiliki setting time delay.</span></span></span></span></span></p><p class="MsoListParagraphCxSpMiddle" style="background: none 0% 0% repeat scroll white; line-height: 24px; margin-bottom: 3.0pt; margin-left: 60.55pt; margin-right: 0cm; margin-top: 0cm; margin: 0cm 0cm 3pt 60.55pt; mso-add-space: auto; mso-list: l0 level1 lfo1; text-indent: -18pt;"><span style="font-family: times;"><span><span style="font-size: medium;"><span><span style="line-height: 27px;">7. Dimensi : 3,2 cm x 2,4 cm x 2,3 cm.</span></span></span></span></span></p><p class="MsoListParagraphCxSpLast" style="background: none 0% 0% repeat scroll white; line-height: 24px; margin-bottom: 3.0pt; margin-left: 60.55pt; margin-right: 0cm; margin-top: 0cm; margin: 0cm 0cm 3pt 60.55pt; mso-add-space: auto; mso-list: l0 level1 lfo1; text-indent: -18pt;"><span style="font-family: times;"><span><span style="font-size: medium;"><span><span style="line-height: 27px;">8. Berat : 10 gr.</span></span></span></span></span></p></div></div><span style="font-family: times;"><span style="font-size: medium;"><br />&nbsp;</span></span></div></div></div><p class="MsoNormal"><b><span style="font-family: times; font-size: medium;">12.</span></b><span face="Arial, sans-serif">Touch sensor</span></span></b></p><div class="separator" style="clear: both; text-align: center;"><span style="font-family: times; font-size: medium;"><a href="https://1.bp.blogspot.com/-45qhsQ5zw-g/YCwA8A-mbrl/AAAAAAAAACYs/aggySq9F\_Qo5zsT341Ai3SA\_3qOb\_7HLwCLcBGAsYHQ/s300/sensor%2Btouch.jpg" style="margin-left: 1em; margin-right: 1em;"></a></span></div><span style="font-family: times; font-size: medium;">

</span><p class="MsoNormal"><span style="font-family: times; font-size: medium;"></span></p><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"><b><span>Spesifikasi sensor touch:</span></b><o:p></o:p></span></span></p><div class="separator" style="clear: both; text-align: center;"><span style="font-family: times; font-size: medium;"><a href="https://1.bp.blogspot.com/-46i3EOCFroA/YCwD6OpYjnl/AAAAAAAAACZE/dGpwZjxH3Fon069j6qwSZRjPoSpSNrroQCLcBGAsYHQ/s661/spesifikasi%2Btouch.png" style="margin-left: 1em; margin-right: 1em;"></a></span></div><span style="font-family: times; font-size: medium;"><br /></span><p class="MsoNormal"><span style="font-family: times; font-size: medium;"><br /></span></p><p style="margin-left: 14.2pt;"><span style="font-family: times;"><span><span style="font-size: medium;"><b>Komponen Output</b></span></span></span></p><p style="margin-left: 14.2pt;"><span style="font-family: times;"><span><b><span style="font-size: medium;">13. Led</span></b></span></span></p><div class="separator" style="clear: both; text-align: center;"><span style="font-family: times;"><span style="font-size: medium;"><a href="https://1.bp.blogspot.com/-BB2-rZfbKic/X6\_9dsluNjI/AAAAAAAAABic/hKxT2ecAcNA\_ObGwplz9cEo

Xt6RjTGFNwCLcBGAsYHQ/s675/LED3\_2MA.png" style="margin-left: 1em; margin-right: 1em;"></a></span></span></div><span style="font-family: times;"><span style="font-size: medium;">

</span></span><p style="margin-left: 1cm;"><span style="font-family: times; font-size: medium;"><br /></span></p><p style="margin-left: 1cm;"><span style="font-family: times;"><span style="font-size: medium;"><b>Datasheet LED&nbsp;</b></span></span></p><div class="separator" style="clear: both; text-align: center;"><span style="font-family: times;"><span style="font-size: medium;"><b><a href="https://1.bp.blogspot.com/-YyLo1BB-qOQ/X7k42UZqc9I/AAAAAAAAAB2w/1fhtJHospbgxsmK3J4jI01EBRXiSY2pgCPcBGAYYCw/s733/Datasheet%2BLED.JPG" style="margin-left: 1em; margin-right: 1em;"></a></b></span></span></div><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"></span></span><p class="MsoNormal"><span style="font-family: times;"><span face="Arial, sans-serif" style="font-size: medium; line-height: 18.4px;"><b><span>14. 7 Segment Cathoda</span></b><o:p></o:p></span></span></p><div class="separator" style="clear: both; text-align: center;"><span style="font-family: times; font-size: medium;"><a href="https://1.bp.blogspot.com/-nx7nmVG8brU/YCqfIEJAKBI/AAAAAAACPc/AV2GewZleqEQ3ZY2XVgwLIVBxp3TNI1LgCLcBGAsYHQ/s800/7%2Bsegment.jpg" style="margin-left: 1em; margin-right: 1em;"></a></span></div><p style="margin-left: 1cm;"><span style="font-family: times; font-size: medium;"><br /></span></p><p class="MsoNormal"><span style="font-family: times; font-size: medium;"></span></p><p class="MsoNormal"><b><span style="font-family: times; font-size: medium;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;">3. Dasar Teori </span></span><span style="font-size: medium;"><a href="#"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;">[kembali]</span></span></a></span></b></p><p class="MsoNormal" style="text-align: left;"><span style="font-family: times; font-size: medium;"></span></p><ul style="text-align: left;"><li><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"><span><span style="color: red;">Resistor</span></span><o:p></o:p></span></span></li></ul><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"><br /></span></span><div class="separator" style="clear: both; text-align: center;"><span style="font-family: times;"><span style="font-size: medium;"><b><a href="https://1.bp.blogspot.com/-yVhL9gCgl3I/X6IR5yJsFNI/AAAAAAABYk/LLw66T\_SsHU50yThsy5YzHBwaYmRLwKrwCPcBGAYYCw/s391/Simbol-Resistor.jpg" style="margin-left: 1em; margin-right: 1em;"></b></span></span></div><span style="font-family: times;"><span style="font-size:  
medium;"><b><br />&nbsp;</b></span>

</span></span><p style="margin-left: 1cm;"><span style="font-family: times;"><span style="font-size:  
medium;"><b>Resistor</b> adalah komponen elektronika

yang berfungsi untuk menghambat atau membatasi aliran listrik yang mengalir

dalam suatu rangkain elektronika.</span></span></p><div class="separator" style="clear: both;  
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href="https://1.bp.blogspot.com/-Mgocl-2po9I/X6GJ1IMDbPI/AAAAAAAAABXE/EFw6fywLnnIUf4tEk-l87-jE  
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margin-right: 1em;">&nbsp;</a></span></span></div><div class="separator" style="clear: both; text-align: center;"><span  
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style="font-family: times;"><span style="font-size: medium;"><a  
href="https://1.bp.blogspot.com/-cUmTR\_gKODM/X7IDGjp6iCI/AAAAAAAAAB4I/t7ZAGGN9ljcHdKZm7cuB  
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1em;"></a></span></span></div><span style="font-size: medium;"><span style="font-family: times;"><span><span style="mso-bookmark: alat;"><span style="text-decoration: none;"><span style="color: black;"><span style="color: red;"><span>&nbsp;</span></span></span></span></span></span></span><span style="font-family: times;"><span face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;"><o:p></o:p></span></span></span><ul style="text-align: left;"><li><span style="font-family: times;"><span face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"><span><b><span style="color: red;">Transistor</span></b></span><o:p></o:p></span></span></li></ul><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"><b>Transistor NPN</b><o:p></o:p></span></span></p><div class="separator" style="clear: both; text-align: center;"><span style="font-family: times; font-size: medium;"><a href="https://1.bp.blogspot.com/-q-6Ed5vfyFE/YCsZny7mlal/AAAAAAAAACSQ/WvO7MOXW\_IM\_okzPCuiO-3TUKd0FfbT9QCLcBGAsYHQ/s317/npn.jpg" style="margin-left: 1em; margin-right: 1em;"></a></span></div><span style="font-family: times; font-size: medium;"><br /><span face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;"><br /></span></span><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">Pada transistor NPN,

semikonduktor tipe-P diapit oleh dua semikonduktor tipe-N. Transistor NPN juga

dapat dibentuk dengan menghubungkan anoda dari dua dioda sebagai base dan

katoda sebagai kolektor dan emitor. Arus mengalir dari kolektor ke emitor

karena potensial kolektor lebih besar daripada base dan emitor.<o:p></o:p></span></span></p><p class="MsoNormal"><span style="font-family: times;"><span

face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"><br /></span></span></p><p class="MsoNormal"><b><span style="font-family: times;"><span face="Arial, sans-serif" style="font-size: medium;">Transistor

PNP</span></span></b></p><div class="separator" style="clear: both; text-align: center;"><span style="font-family: times; font-size: medium;"><a href="https://1.bp.blogspot.com/-fprfqQjYwaY/YCsaWDSiOAI/AAAAAAAAACSc/jLYAjC3D\_QobYUusyHml3pDOpeTE6Q7WwCLcBGAsYHQ/s600/PNP-Transistor-Construction-Working.png" style="margin-left: 1em; margin-right: 1em;"></a></span></div><span style="font-family: times; font-size: medium;"><span><br /><span face="Arial, sans-serif"><br /></span></span>

</span><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">Pada transistor PNP,

semikonduktor tipe-N diapit oleh dua semikonduktor tipe-P. Transistor PNP juga dapat dibentuk dengan menghubungkan katoda dari dua dioda sebagai base dan anoda sebagai kolektor dan emitor. Hubungan emitter-base forward bias sementara collector-base reverse bias. Jadi, arus mengalir dari emitor ke kolektor karena potensial emitor lebih besar daripada base dan kolektor.<o:p></o:p></span></span></p>

<p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"><b>Transistor sebagai saklar</b><o:p></o:p></span></span></p>

<p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">Jika ada arus yang cukup

besar di kaki basis, transistor akan mencapai titik jenuh (saturasi). Pada titik jenuh ini transistor mengalirkan arus secara maksimum dari kolektor ke emitor sehingga transistor seolah-olah short pada hubungan kolektor-emitor. Jika arus base sangat kecil maka kolektor dan emitor bagaikan saklar yang terbuka. Pada kondisi ini transistor dalam keadaan cut-off sehingga tidak ada arus dari kolektor ke emitor. Nilai resistor terhubung ke base ( $R_b$ ) dapat dihitung dengan;<o:p></o:p></span></span></p>

<p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"><math display="block">R\_b = V\_{be} / I\_b</math><o:p></o:p></span></span></p>

<p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"><b>Transistor sebagai penguat</b><o:p></o:p></span></span></p>

<p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">Transistor sebagai penguat

jika bekerja dalam daerah aktif. Tegangan, arus, dan daya dapat diperkuat

dengan beberapa konfigurasi seperti common emitter, common collector, dan common

base.<o:p></o:p></span></span></p>

<p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">DC Current Gain = Collector

Current (Ic) / Base Current (Ib)<o:p></o:p></span></span></p><div class="separator" style="clear: both; text-align: center;"><span style="font-family: times; font-size: medium;"><a href="https://1.bp.blogspot.com/-JSyl--ApaY8/YCsagVuT4II/AAAAAAAAACSg/V853G6ln2JcoLQURj8HerpglRIP2sJslgCLcBGAsYHQ/s306/transistor.jpg" style="margin-left: 1em; margin-right: 1em;"></a></span></div><span style="font-family: times; font-size: medium;"><br /><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;"><div style="background-color: white; color: #222222;"><p

class="MsoNormal" style="background-attachment: initial; background-clip: initial; background-image: initial; background-origin: initial; background-position: initial; background-repeat: initial; background-size: initial; line-height: normal; margin-bottom: 0cm; text-align: justify;">Konfigurasi Common Base adalah konfigurasi yang kaki Basis-nya di-ground-kan dan digunakan bersama untuk INPUT maupun OUTPUT.&nbsp; Pada Konfigurasi Common Base, sinyal INPUT dimasukan ke Emitor &nbsp;dan sinyal OUTPUT-nya diambil dari Kolektor, sedangkan kaki Basis-nya di-ground-kan. Oleh karena itu, Common Base juga sering disebut dengan istilah “Grounded Base”. Konfigurasi Common Base ini menghasilkan Penguatan Tegangan antara sinyal INPUT dan sinyal OUTPUT namun tidak menghasilkan penguatan pada arus.</p><p class="MsoNormal" style="background-attachment: initial; background-clip: initial; background-image: initial; background-origin: initial; background-position: initial; background-repeat: initial; background-size: initial; line-height: normal; margin-bottom: 0cm; text-align: justify;"><o:p></o:p></p><p class="MsoNormal" style="background-attachment: initial; background-clip: initial; background-image: initial; background-origin: initial; background-position: initial; background-repeat: initial; background-size: initial; line-height: normal; margin-bottom: 0cm; text-align: justify;">Konfigurasi Common Collector (CC) atau Kolektor Bersama memiliki sifat dan fungsi yang berlawanan dengan Common Base (Basis Bersama). Kalau pada Common Base menghasilkan penguatan Tegangan tanpa memperkuat Arus, maka Common Collector ini memiliki fungsi yang dapat menghasilkan Penguatan&nbsp; Arus namun tidak menghasilkan penguatan Tegangan. Pada Konfigurasi Common Collector, Input diumpankan ke Basis Transistor sedangkan Outputnya diperoleh dari Emitor Transistor sedangkan Kolektor-nya di-ground-kan dan digunakan bersama untuk INPUT maupun OUTPUT.

Konfigurasi Kolektor bersama (Common Collector) ini sering disebut juga dengan Pengikut Emitor (Emitter Follower) karena tegangan sinyal Output pada Emitor hampir sama dengan tegangan Input Basis.

Konfigurasi Common Emitter (CE) atau Emitor Bersama merupakan Konfigurasi Transistor yang paling sering digunakan, terutama pada penguat yang membutuhkan penguatan Tegangan dan Arus secara bersamaan. Hal ini dikarenakan Konfigurasi Transistor dengan Common Emitter ini menghasilkan penguatan Tegangan dan Arus antara sinyal Input dan sinyal Output. Common Emitter adalah konfigurasi Transistor dimana kaki Emitor Transistor di-ground-kan dan dipergunakan bersama untuk INPUT dan OUTPUT. Pada Konfigurasi Common Emitter ini, sinyal INPUT dimasukan ke Basis dan sinyal OUTPUT-nya diperoleh dari kaki Kolektor.

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Output.</span></div><div style="--tw-border-spacing-x: 0; --tw-border-spacing-y: 0; --tw-ring-color:
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```

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dari pemberian tegangan input VBB seperti gambar 60.</span></div><div style="--tw-border-spacing-x:  
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</span></span></span></p><ul style="text-align: left;"><li><span style="font-size: medium;"><span style="color: red;"><b><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;">&nbsp;</span><span>Inverter NOT( IC 74HC05)</span></span></b></span></span></li></ul>

<p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">Gerbang NOT atau disebut

juga "NOT GATE" atau Inverter (Gerbang Pembalik) adalah jenis gerbang

logika yang hanya memiliki satu input (Masukan) dan satu output (keluaran).

Dikatakan Inverter (gerbang pembalik) karena gerbang ini akan menghasilkan

nilai ouput yang berlawanan dengan nilai inputnya . Untuk lebih jelasnya

perhatikan simbol dan tabel kebenaran gerbang NOT berikut.<o:p></o:p></span></span></p><div class="separator" style="clear: both; text-align: center;"><span style="font-family: times; font-size: medium;"><a

href="https://1.bp.blogspot.com/-toPSnpX3fwE/YDJ\_96-50zl/AAAAAAAAAChc/0VFwP2-iqnoqZYFrVkwBSH0ZOKGX-APgCLcBGAsYHQ/s550/Simbol-Gerbang-Logika-NOT-dan-Tabel-Kebenaran-Gerbang-NOT.jpg"

style="margin-left: 1em; margin-right: 1em;"></a></span></div><span style="font-family: times; font-size: medium;"><br /><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;"><br /></span></span><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">Pada gerbang logika NOT,

simbol yang menandakan operasi gerbang logika NOT adalah tanda minus (-) diatas

variabel, perhatikan gambar diatas.<o:p></o:p></span></span></p><p class="MsoNormal">

</p><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">Perhatikan tabel kebenaran

gerbang NOT. Cara cepat untuk mengingat tabelnya adalah dengan mengingat

pernyataan berikut. "Gerbang NOT akan menghasilkan output (keluaran)

logika 1 bila variabel input (masukan) bernilai logika 0" sebaliknya

"Gerbang NOT akan menghasilkan keluaran logika 0 bila input (masukan)

bernilai logika 1<o:p></o:p></span></span></p><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"><o:p></o:p></span></span><div class="separator" style="clear: both; text-align: center;"><span style="font-family: times; font-size: medium;"><br /></span></div><ul style="text-align: left;"><li><span><span style="color: red;"><b><span style="font-family: times;"><span style="font-size: medium;">JK flip-flop (IC 74111)</span></span></b></span></span></li></ul><p class="MsoNormal"><span style="font-family: times; font-size: medium;"><!--[if gte mso 9]><xml>

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font-size:11.0pt;
font-family:"Calibri",sans-serif;
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flip-flop sering diaplikasikan sebagai komponen dasar suatu counter atau

pencacah naik (up counter) ataupun pencacah turun (down counter). JK flip flop

dalam penyebutanya di dunia digital sering di tulis dengan simbol JK -FF. Dalam

artikel yang sedikit ini akan diuraikan cara membangun sebuah JK flip-flop

menggunakan komponen utama berupa RS flip-flop. Rangkaian Dasar JK Flip-Flop</span></span></p><p

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face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%;

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1em;"></a></div><br /><a

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Name="Smart Hyperlink"/>  
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Name="Hashtag"/>  
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```
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Name="Smart Link"/>

</w:LatentStyles>

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mso-bidi-theme-font:minor-bidi;
```

mso-fareast-language:EN-US;}

</style>

<![endif]>

</span></p><p class="MsoNormal" style="line-height: normal; margin-bottom: 0cm;"><span style="font-family: times; font-size: medium;"><span style="mso-fareast-font-family: &quot;Times New Roman&quot;; mso-fareast-language: EN-ID;">Gambar

rangkaian diatas memperlihatkan salah satu cara untuk membangun sebuah

flip-flop JK, J dan K disebut masukan pengendali karena menentukan apa yang

dilakukan oleh flip-flop pada saat suatu pinggiran pulsa positif diberikan.

Rangkaian RC mempunyai tetapan waktu yang sangat pendek, hal ini mengubah pulsa

lonceng segiempat menjadi impuls sempit. Pada saat J dan K keduanya 0, Q tetap

pada nilai terakhirnya. Pada saat J rendah dan K tinggi, gerbang atas tertutup,

maka tidak terdapat kemungkinan untuk mengeset flip-flop. Pada saat Q adalah

tinggi, gerbang bawah melewati pemicu reset segera setelah pinggiran pulsa

lonceng positif berikutnya tiba. Hal ini mendorong Q menjadi rendah . Oleh

karenanya J = 0 dan K=1 berarti bahwa pinggiran pulsa lonceng positif

berikutnya akan mereset flip-flopnya. Pada saat J tinggi dan K rendah, gerbang

bawah tertutup dan pada saat J dan K keduanya tinggi, kita dapat mengeset atau

mereset flip-flopnya. Untuk lebih jelasnya dapat dilihat pada tabel kebenaran JK

flip-flop berikut.</span><br /></span></p><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%;

mso-bidi-font-size: 11.0pt;"><br /></span></span><div class="separator" style="clear: both; text-align: center;"><a

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1em;"><span style="font-family: times; font-size: medium;"></span></a></div><span

style="font-family: times; font-size: medium;"><br /><span><br /></span></span><ul style="text-align: left;"><li><span><span style="color: red;"><span style="font-family: times;"><span

face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;"><span style="font-family: times;"><span style="font-family: times;"><span

face="&quot;Arial&quot;;&quot;sans-serif&quot;," style="line-height: 115%; mso-bidi-font-size: 11.0pt;"><span face="Arial, sans-serif" style="font-size: medium;">Encoder (IC 74147)</span></span></span></span></span></span></li></ul></div><div><span style="font-family: times; font-size: medium;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;," style="line-height: 115%; mso-bidi-font-size: 11.0pt;"><span><span><span face="&quot;Arial&quot;;&quot;sans-serif&quot;," style="line-height: 115%; mso-bidi-font-size: 11.0pt;"><span face="Arial, sans-serif">&nbsp;</span></span></span></span></span></span><span style="line-height: 107%;">Encoder

adalah suatu rangkaian logika yang berfungsi untuk mengkonversikan kode yang

lebih dikenal oleh manusia ke dalam kode yang kurang dikenal manusia. <span style="mso-bidi-font-weight: bold;">Encoder</span> adalah rangkaian yang memiliki

fungsi berkebalikan dengan dekoder. Encoder berfungsi sebagai rangkain untuk

mengkodekan data input mejadi data bilangan dengan format tertentu. Encoder

dalam rangkaian digital adalah rangkaian kombinasi gerbang digital yang

memiliki input banyak dalam bentuk line input dan memiliki output sedikit dalam

format bilangan biner. Encoder akan mengkodekan setiap jalur input yang aktif

menjadi kode bilangan biner. Dalam teori digital banyak ditemukan istilah

encoder seperti “Desimal to BCD Encoder” yang berarti rangkaian digital yang

berfungsi untuk mengkodekan line input dengan jumlah line input desimal (0-9)

menjadi kode bilangan biner 4 bit BCD (Binary Coded Decimal). Atau “8 line to 3

line encoder” yang berarti rangkaian encoder dengan input 8 line dan output 3

line (3 bit BCD).&nbsp;</span></span></div><div><span style="font-family: times; font-size: medium;"><br /><span style="line-height: 107%;"><b><span style="line-height: 107%;">Blog Diagram

Digital Encoder</span></b></span></span></div><div><span style="line-height: 107%;"><b><span style="font-family: times; font-size: medium; line-height: 107%;">&nbsp;</span></b></span></div><div><b><span style="font-family: times; font-size: medium;"><span style="line-height: 107%;"><span style="line-height: 107%;">&nbsp;</span></span></span><span style="line-height: 107%;">Encoder 4 to

2</span></span></b></div><div><span style="font-family: times; font-size: medium;"><span style="line-height: 107%;"><div class="separator" style="clear: both; text-align: center;"><a href="https://1.bp.blogspot.com/-KXpK2Buvzcl/YF2Xq1Z\_Pfl/AAAAAAAAAC1g/9PyUDLCpbIQ0RCQ6R9PpaZV9rmqEPIMpwCLcBGAsYHQ/s256/encoder%2B8%2Bto%2B3.PNG" style="margin-left: 1em; margin-right: 1em;"></a></div><br /><b>&nbsp;</b></span><b><span style="line-height: 107%;">Encoder 8 to 3 (Octal to Biner

107%;">&nbsp;</span></b></span></div><div><b><span style="font-family: times; font-size: medium;"><span style="line-height: 107%;"><span style="line-height: 107%;">&nbsp;</span></span></span><span style="line-height: 107%;">Encoder 4 to

2</span></span></b></div><div><span style="font-family: times; font-size: medium;"><span style="line-height: 107%;"><div class="separator" style="clear: both; text-align: center;"><a href="https://1.bp.blogspot.com/-KXpK2Buvzcl/YF2Xq1Z\_Pfl/AAAAAAAAAC1g/9PyUDLCpbIQ0RCQ6R9PpaZV9rmqEPIMpwCLcBGAsYHQ/s256/encoder%2B8%2Bto%2B3.PNG" style="margin-left: 1em; margin-right: 1em;"></a></div><br /><b>&nbsp;</b></span><b><span style="line-height: 107%;">Encoder 8 to 3 (Octal to Biner

2</span></span></b></div><div><span style="font-family: times; font-size: medium;"><span style="line-height: 107%;"><div class="separator" style="clear: both; text-align: center;"><a href="https://1.bp.blogspot.com/-KXpK2Buvzcl/YF2Xq1Z\_Pfl/AAAAAAAAAC1g/9PyUDLCpbIQ0RCQ6R9PpaZV9rmqEPIMpwCLcBGAsYHQ/s256/encoder%2B8%2Bto%2B3.PNG" style="margin-left: 1em; margin-right: 1em;"></a></div><br /><b>&nbsp;</b></span><b><span style="line-height: 107%;">Encoder 8 to 3 (Octal to Biner

2</span></span></b></div><div><span style="font-family: times; font-size: medium;"><span style="line-height: 107%;"><div class="separator" style="clear: both; text-align: center;"><a href="https://1.bp.blogspot.com/-KXpK2Buvzcl/YF2Xq1Z\_Pfl/AAAAAAAAAC1g/9PyUDLCpbIQ0RCQ6R9PpaZV9rmqEPIMpwCLcBGAsYHQ/s256/encoder%2B8%2Bto%2B3.PNG" style="margin-left: 1em; margin-right: 1em;"></a></div><br /><b>&nbsp;</b></span><b><span style="line-height: 107%;">Encoder 8 to 3 (Octal to Biner

107%;">&nbsp;</span></b></span></div><div><b><span style="font-family: times; font-size: medium;"><span style="line-height: 107%;"><div class="separator" style="clear: both; text-align: center;"><a href="https://1.bp.blogspot.com/-KXpK2Buvzcl/YF2Xq1Z\_Pfl/AAAAAAAAAC1g/9PyUDLCpbIQ0RCQ6R9PpaZV9rmqEPIMpwCLcBGAsYHQ/s256/encoder%2B8%2Bto%2B3.PNG" style="margin-left: 1em; margin-right: 1em;"></a></div><br /><b>&nbsp;</b></span><b><span style="line-height: 107%;">Encoder 8 to 3 (Octal to Biner

2</span></span></b></div><div><span style="font-family: times; font-size: medium;"><span style="line-height: 107%;"><div class="separator" style="clear: both; text-align: center;"><a href="https://1.bp.blogspot.com/-KXpK2Buvzcl/YF2Xq1Z\_Pfl/AAAAAAAAAC1g/9PyUDLCpbIQ0RCQ6R9PpaZV9rmqEPIMpwCLcBGAsYHQ/s256/encoder%2B8%2Bto%2B3.PNG" style="margin-left: 1em; margin-right: 1em;"></a></div><br /><b>&nbsp;</b></span><b><span style="line-height: 107%;">Encoder 8 to 3 (Octal to Biner



GnaSfKxcQLcBGAsYHQ/s0/tabel%2Bkebenaran%2Bencoder%2B4%2Bto%2B2.PNG" /></a></div><br />&nbsp;</span></b></span></span><b><span style="line-height: 107%;">Encoder 8 to 3 (Octal to Biner Encoder)</span></b></span></div><div><b><span style="font-family: times; font-size: medium; line-height: 107%;">&nbsp;</span></b></div><div><span style="font-family: times; font-size: medium;"><span style="line-height: 107%;"><div class="separator" style="clear: both; text-align: center;"><a href="https://1.bp.blogspot.com/-NNab6CQq8B0/YF2aLQgaL9I/AAAAAAAC2M/RJASwEFNorUZsGU3rt0QtsV8nAqU1SoJwCLcBGAsYHQ/s215/tabel%2Bkebenaran%2Bencoder%2B8%2Bto%2B3.PNG" style="margin-left: 1em; margin-right: 1em;"></a></div><br /><b>&nbsp;</b></span><b><span style="line-height: 107%;">Encoder 10 to 4 (Decimal to BCD Encoder)</span></b></span><p></p><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"></span></span></p><div class="separator" style="clear: both; text-align: center;"><span style="font-family: times;"><span face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"><a href="https://1.bp.blogspot.com/-xTyzh6WT5us/YF2aVL49Cgl/AAAAAAAC2U/w1pwCwvTRn8jPUX1j1sFFp9xcnZ2qDaPwCLcBGAsYHQ/s210/tabel%2Bkebenaran%2Bencoder%2B8%2Bto%2B4.PNG" style="margin-left: 1em; margin-right: 1em;"></a></span></span></div><span style="font-family: times;"><span face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"><br /></span></span><p></p><ul style="text-align: left;"><li><span style="font-family: times; font-size: medium;"><span face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;"><o:p></o:p></span><span><b><span style="color: red;"><span>IC Counter (IC 4026)</span></span></b></span></span></li></ul><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;,&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">>IC CD4026 adalah IC yang

dapat melakukan fungsi penghitung serta Driver 7-segmen. Satu IC tunggal dapat digunakan untuk menghitung dari nol (0) hingga sembilan (9) secara langsung pada tampilan 7-segmen tipe Common Cathode. Hitungannya dapat ditingkatkan hanya dengan memberikan pulsa clock yang tinggi; juga lebih dari satu digit (0-9) dapat dibuat dengan mengalirkan lebih dari satu IC CD4026. Jadi jika Anda memiliki tampilan 7-segmen (CC) di mana Anda harus menampilkan angka-angka yang

dihitung berdasarkan beberapa kondisi, maka IC ini akan menjadi pilihan yang tepat.

IC CD4026 dapat bekerja dari 3V hingga 15V, tetapi biasanya diberi daya dengan + 5V ke pin Vdd / Vcc dan pin Ground / Vss terhubung ke ground. IC memiliki 7 pin keluaran yang diberi nama dari Out A sampai Out G yang langsung dihubungkan ke display 7 segmen. Pin penghambat clock (pin 2) harus dijaga rendah (ground / 0V) agar sinyal clock dapat dikirim ke IC juga pin Enable Input (pin 3) harus dibuat tinggi (+ 5V) sehingga output pin (Out A ke G) dapat diaktifkan.

Pin 7-segmen akan menambah hitungan dengan satu angka setiap kali pin jam (pin 1) dibuat tinggi. Sumber jam ini dapat diperoleh dari IC 555 atau IC digital lain yang kompatibel dengan TTL. Mereka hanya perlu menghasilkan pulsa tegangan rendah 0V dan tegangan tinggi 5V. Di rangkaian di bawah ini saya telah menggunakan sumber clock 1Hz untuk menambah hitungan. Jadi angka tersebut akan bertambah untuk setiap ( $T = 1 / F$ ) 1 detik.

Pin Reset (pin 15) digunakan untuk mengatur ulang hitungan kembali ke nol saat dibuat tinggi. Ada tiga pin keluaran lainnya (pin 5,4,14) yang hanya akan digunakan ketika IC perlu di-cascade. Pin Carry over (CO - pin 5) akan tetap tinggi secara default, tetapi ketika hitungan mencapai "9" itu akan memberikan pulsa kecil dan penghitungan akan berlanjut dari "0" lagi. Pulsa kecil ini dapat digunakan untuk menggerakkan pin jam dari IC bertingkat untuk menampilkan lebih dari satu digit. Pin Direct Enable output (DEO) akan selalu tetap tinggi, untuk mengaktifkan IC berjenjang, jika tersedia. Pin segmen C yang tidak dilapisi (pin 14) digunakan untuk operasi pembagian apa pun; pin ini akan tetap tinggi secara default dan akan rendah saat hitungan mencapai "2".

medium;"><br /></span><ul><li><span style="font-family: times;"><span><span style="color: red;"><span style="font-size: medium;">&nbsp;LED</span></span></span></span></li></ul><span style="font-family: times; font-size: medium;"><span><span>

LED merupakan keluarga dari Dioda yang terbuat dari Semikonduktor. Cara kerjanya pun hampir sama dengan Dioda yang memiliki dua kutub yaitu kutub Positif (P) dan Kutub Negatif (N). LED hanya akan memancarkan cahaya apabila dialiri tegangan maju (bias forward) dari Anoda menuju ke Katoda.<br /></span></span>

<span><span><a href="https://teknikelektronika.com/wp-content/uploads/2014/12/Bentuk-dan-Simbol-LED.jpg"></a><br /><br />

Ketika LED dialiri tegangan maju atau bias forward yaitu dari Anoda (P) menuju ke Katoda (K), Kelebihan Elektron pada N-Type material akan berpindah ke wilayah yang kelebihan Hole (lubang) yaitu wilayah yang bermuatan positif (P-Type material). Saat Elektron berjumpa dengan Hole akan melepaskan photon dan memancarkan cahaya monokromatik (satu warna).<br /></span></span>

</span><center>

<span style="font-family: times; font-size: medium;"><span><span><a href="https://teknikelektronika.com/wp-content/uploads/2014/12/Cara-kerja-LED-Light-Emitting-Diode.jpg?x63439">

</a></span></span>

</span></center><span style="font-family: times; font-size: medium;"><span><span><br /></span></span></span>

<span><span><b>Tegangan Maju LED</b><br /></span></span>

<span><span><a href="https://1.bp.blogspot.com/-R8EskiTRAvY/X3BCj01YZkI/AAAAAAAAAGKA/ezaPgWPdL3I-bcGOCQAfrn1bCeQi0p3zgCLcBGAsYHQ/s0/Tegangan%2BLED.JPG" style="padding: 1em 0px; text-align: left;"></a></span></span></span></div><ul>

- <span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;"><span style="color: red;"><b><span>Logic State</span></b></span></span></span></li></ul><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">status logika Pengertian

logis, benar atau salah, dari sinyal biner yang diberikan. Sinyal biner adalah

sinyal digital yang hanya memiliki dua nilai yang valid. Dalam istilah fisik,

pengertian logis dari sinyal biner ditentukan oleh level tegangan atau nilai

arus sinyal, dan ini pada gilirannya ditentukan oleh teknologi perangkat. Dalam

sirkuit TTL, misalnya, keadaan sebenarnya diwakili oleh logika 1, kira-kira

sama dengan +5 volt pada garis sinyal; logika 0 kira-kira 0 volt. Tingkat

tegangan antara 0 dan +5 volt dianggap tidak ditentukan.<span></span></p><div class="separator" style="clear: both; text-align: left;"><ul style="text-align: left;"><li><span style="font-family: times;"><span><span style="color: red;"><b><span style="font-size: medium;">Sensor PIR</span></b></span></span></span></li></ul><p class="MsoNormal" style="background: none 0% 0% repeat scroll white; line-height: 150%; margin-bottom: 0cm; margin-left: 1cm; mso-margin-top-alt: auto; text-align: justify;"><span style="font-family: times;"><span style="font-size: medium;"><span lang="EN-US" style="color: black; line-height: 150%; mso-ansi-language: EN-US; mso-bidi-font-family: &quot;Times New Roman&quot;; mso-color-alt: windowtext; mso-fareast-font-family: &quot;Times New Roman&quot;; mso-fareast-language: IN;">&nbsp;</span><span style="color: black; line-height: 150%; mso-color-alt: windowtext; mso-fareast-font-family: &quot;Times New Roman&quot;; mso-fareast-language: IN;">Sensor PIR terdiri dari beberapa bagian yaitu :</span></span></span></p>

<p class="MsoNormal" style="line-height: 150%; margin-left: 1cm; mso-margin-bottom-alt: auto; mso-margin-top-alt: auto;"><span style="font-family: times;"><span><span style="font-size: medium; line-height: 150%; mso-fareast-font-family: &quot;Times New Roman&quot;; mso-fareast-language: EN-ID;">&nbsp;<span style="background: none 0% 0% repeat scroll white; color: black; mso-color-alt: windowtext;">a. Lensa Fresnel</span></span></span></p>

<p class="MsoNormal" style="background: none 0% 0% repeat scroll white; line-height: 150%; margin-bottom: 0cm; margin-left: 1cm; mso-margin-top-alt: auto; text-align: justify; text-indent: 36pt;"><span style="font-family: times;"><span><span style="color: black; font-size: medium; line-height: 150%; mso-color-alt: windowtext; mso-fareast-font-family: &quot;Times New Roman&quot;; mso-fareast-language: IN;">Lensa Fresnel

pertama kali digunakan pada tahun 1980an. Digunakan sebagai lensa yang

memfokuskan sinar pada lampu mercusuar. Penggunaan paling luas pada lensa Fresnel adalah pada lampu depan mobil, di mana mereka membiarkan berkas parallel secara kasar dari pemantul parabola dibentuk untuk memenuhi persyaratan pola sorotan utama. Namun kini, lensa Fresnel pada mobil telah ditiadakan diganti dengan lensa plain polikarbonat. Lensa Fresnel juga berguna dalam pembuatan film, tidak hanya karena kemampuannya untuk memfokuskan sinar terang, tetapi juga karena intensitas cahaya yang relative konstan diseluruh lebar berkas cahaya.

**IR Filter**

IR Filter dimodul sensor PIR ini mampu menyaring panjang gelombang sinar infrared pasif antara 8 sampai 14 mikrometer, sehingga panjang gelombang yang dihasilkan dari tubuh manusia yang berkisar antara 9 sampai 10 mikrometer ini saja yang dapat dideteksi oleh sensor. Sehingga Sensor PIR hanya bereaksi pada tubuh manusia saja.

**Pyroelectric Sensor**

<p class="MsoNormal" style="background: none 0% 0% repeat scroll white; line-height: 150%; margin-bottom: 0cm; margin-left: 1cm; mso-margin-top-alt: auto; text-align: justify; text-indent: 36pt;"><span style="font-family: times;"><span><span style="color: black; font-size: medium; line-height: 150%; mso-color-alt: windowtext; mso-fareast-font-family: &quot;Times New Roman&quot;; mso-fareast-language: IN;">Seperti tubuh

manusia yang memiliki suhu tubuh kira-kira 32°C, yang merupakan suhu panas yang khas yang terdapat pada lingkungan. Pancaran sinar inframerah inilah yang kemudian ditangkap oleh Pyroelectric sensor yang merupakan inti dari sensor PIR ini sehingga menyebabkan Pyroelectric sensor yang terdiri dari galium nitrida, caesium nitrat dan litium tantalate menghasilkan arus listrik. Mengapa bisa menghasilkan arus listrik? Karena pancaran sinar inframerah pasif ini membawa energi panas. Material pyroelectric bereaksi menghasilkan arus listrik karena adanya energi panas yang dibawa oleh infrared pasif tersebut. Prosesnya hampir sama seperti arus listrik yang terbentuk ketika sinar matahari mengenai solar cell.</span></span></span></p>

<p class="MsoNormal" style="background: none 0% 0% repeat scroll white; line-height: 150%; margin-bottom: 0cm; margin-left: 1cm; mso-margin-top-alt: auto; text-align: justify;"><b><span style="font-family: times;"><span><span lang="EN-US" style="color: black; font-size: medium; line-height: 150%; mso-ansi-language: EN-US; mso-color-alt: windowtext; mso-fareast-font-family: &quot;Times New Roman&quot;; mso-fareast-language: IN;">d.

Amplifier</span></span></span></b></p>

<p class="MsoNormal" style="background: none 0% 0% repeat scroll white; line-height: 150%; margin-bottom: 0cm; margin-left: 1cm; mso-margin-top-alt: auto; text-align: justify;"><span style="font-family: times;"><span><span style="color: black; font-size: medium; line-height: 150%; mso-color-alt: windowtext; mso-fareast-font-family: &quot;Times New Roman&quot;; mso-fareast-language: IN;">Sebuah sirkuit amplifier yang ada menguatkan arus yang masuk pada material pyroelectric.</span></span></span></p>

<p class="MsoNormal" style="background: none 0% 0% repeat scroll white; line-height: 150%; margin-bottom: 0cm; margin-left: 1cm; mso-margin-top-alt: auto; text-align: justify;"><b><span style="font-family: times;"><span><span style="color: black; font-size: medium; line-height: 150%;

mso-color-alt: windowtext; mso-fareast-font-family: "Times New Roman";  
mso-fareast-language: EN-ID;">e. Komparator</span></span></b></p>

<p class="MsoNormal" style="background: none 0% 0% repeat scroll white; line-height: 150%;  
margin-bottom: 0cm; margin-left: 1cm; mso-margin-top-alt: auto; text-align: justify; text-indent:  
36pt;"><span style="font-family: times;"><span><span style="color: black; font-size: medium;  
line-height: 150%; mso-color-alt: windowtext; mso-fareast-font-family: "Times New Roman";  
mso-fareast-language: IN;">Setelah dikuatkan

oleh amplifier kemudian arus dibandingkan oleh komparator sehingga

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[illegible]

juga mempengaruhi seberapa jauh PIR dapat mendeteksi adanya infrared dimana

semakin tinggi suhu disekitar maka semakin pendek jarak yang bisa diukur oleh

PIR.

[!\[\]\(0bb18399eb082625627c8eac5a34eb06\_img.jpg\)](https://1.bp.blogspot.com/-egwKyEdV714/X9lokMM4oSI/AAAAAAAAACTM/JHviP6ASYPYTTxCMVWr6g5mjsl7bJBC8ACLcBGAsYHQ/s972/Prinsip%2Bkerja%2Belemen%2Bsensor%2Bpiroelektrik.png)

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**Sensor touch**

Touch Sensor atau Sensor

Sentuh adalah sensor elektronik yang dapat mendeteksi sentuhan. Sensor Sentuh

ini pada dasarnya beroperasi sebagai sakelar apabila disentuh, seperti sakelar

pada lampu, layar sentuh ponsel dan lain sebagainya. Sensor Sentuh ini dikenal

juga sebagai Sensor Taktil (Tactile Sensor). Seiring dengan perkembangan

teknologi, sensor sentuh ini semakin banyak digunakan dan telah menggeser

peranan sakelar mekanik pada perangkat-perangkat elektronik.

[!\[\]\(4b09627c6aee76709902ed296c8ddffd\_img.jpg\)](https://1.bp.blogspot.com/-aRPTV5PBS4g/YDMHPperJ3I/AAAAAAAAACi0/ffn43CPT6Sk_nwur-P5j5024hEVrG9cMQCLcBGAsYHQ/s442/SENSOR-SENTUH-KAPASITIF-DAN-RESISTIF.png)

**Berdasarkan fungsinya,**

Sensor Sentuh dapat dibedakan menjadi dua jenis utama yaitu Sensor Kapasitif dan Sensor Resistif. Sensor Kapasitif atau Capacitive Sensor bekerja dengan mengukur kapasitansi sedangkan sensor Resistif bekerja dengan mengukur tekanan

yang diberikan pada permukaannya.

**Sensor Sentuh Kapasitif**

merupakan sensor sentuh yang sangat populer pada saat ini, hal ini dikarenakan

Sensor Kapasitif lebih kuat, tahan lama dan mudah digunakan serta harga yang

relatif lebih murah dari sensor resistif. Ponsel-ponsel pintar saat ini telah

banyak yang menggunakan teknologi ini karena juga menghasilkan respon yang

lebih akurat.

Berbeda dengan Sensor

Resistif yang menggunakan tekanan tertentu untuk merasakan perubahan pada

permukaan layar, Sensor Kapasitif memanfaatkan sifat konduktif alami pada tubuh

manusia untuk mendeteksi perubahan layar sentuhnya. Layar sentuh sensor

kapasitif ini terbuat dari bahan konduktif (biasanya Indium Tin Oxide atau

disingkat dengan ITO) yang dilapisi oleh kaca tipis dan hanya bisa disentuh

oleh jari manusia atau stylus khusus ataupun sarung khusus yang memiliki sifat

konduktif.

Pada saat jari menyentuh

layar, akan terjadi perubahan medan listrik pada layar sentuh tersebut dan

kemudian di respon oleh processor untuk membaca pergerakan jari tangan

tersebut. Jadi perlu diperhatikan bahwa sentuhan kita tidak akan di respon oleh

layar sensor kapasitif ini apabila kita menggunakan bahan-bahan non-konduktif

sebagai perantara jari tangan dan layar sentuh tersebut.

**Sensor Sentuh Resistif**

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kapasitif, sensor sentuh resistif ini tidak tergantung pada sifat listrik yang

terjadi pada konduktivitas pelat logam. Sensor Resistif bekerja dengan mengukur

tekanan yang diberikan pada permukaannya. Karena tidak perlu mengukur perbedaan

kapasitansi, sensor sentuh resistif ini dapat beroperasi pada bahan

non-konduktif seperti pena, stylus atau jari di dalam sarung tangan.<o:p></o:p></span></span></p><p

class="MsoNormal"><span style="font-family: times; font-size: medium;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;">&nbsp;</span><span face="Arial, sans-serif">Sensor sentuh resistif

terdiri dari dua lapisan konduktif yang dipisahkan oleh jarak atau celah yang

sangat kecil. Dua lapisan konduktif (lapisan atas dan lapisan bawah) ini pada

dasarnya terbuat dari sebuah film. Film-film umumnya dilapisi oleh Indium Tin

Oxide yang merupakan konduktor listrik yang baik dan juga transparan (bening).</span></span></p><p

class="MsoNormal"><span style="font-family: times; font-size: medium;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="line-height: 115%; mso-bidi-font-size: 11.0pt;">&nbsp;</span><span face="Arial, sans-serif">Cara kerjanya hampir sama

dengan sebuah sakelar, pada saat film lapisan atas mendapatkan tekanan tertentu

baik dengan jari maupun stylus, maka film lapisan atas akan bersentuhan dengan

film lapisan bawah sehingga menimbulkan aliran listrik pada titik koordinat

tertentu layar tersebut dan memberikan signal ke prosesor untuk melakukan

proses selanjutnya.</span></span></p><p class="MsoNormal"><b><span style="font-family: times;"><span face="Arial, sans-serif" style="font-size: medium;">Grafik Respon Sensor

Touch:</span></span></b></p><div class="separator" style="clear: both; text-align: center;"><span style="font-family: times; font-size: medium;"><a

href="https://1.bp.blogspot.com/-zo8N01I1oLA/YDMEp7FXC6I/AAAAAAAAACio/2uZpTNqEAdUXzRkN59fTQdJeeeAvSNGAwCLcBGAsYHQ/s455/grafik%2Brespon%2Btouch.png" style="margin-left: 1em; margin-right: 1em;"></a></span></div><span style="font-family: times; font-size: medium;"><br /><span face="Arial, sans-serif"><br /></span></span><ul style="text-align: left;"><li><span><b><span style="color: red;"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">7 Segment

Anoda</span></span></span></b></span></li></ul><p class="MsoNormal"><span style="font-family:

times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">Seven segment merupakan

bagian-bagian yang digunakan untuk menampilkan angka atau bilangan decimal.

Seven segment tersebut terbagi menjadi 7 batang LED yang disusun membentuk angka 8 dengan menggunakan huruf a-f yang disebut DOT MATRIKS. Setiap segment ini terdiri dari 1 atau 2 LED (Light Emitting Diode). Seven segment bisa menunjukkan angka-angka desimal serta beberapa bentuk tertentu melalui gabungan aktif atau

tidaknya LED penyusunan dalam seven segment.<o:p></o:p></span></span></p><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">Supaya memudahkan

penggunaannya biasanya memakai sebuah seven segment driver yang akan mengatur aktif atau tidaknya led-led dalam seven segment sesuai dengan inputan biner yang diberikan. Bentuk tampilan modern disusun sebagai metode 7 bagian atau dot matriks. Jenis tersebut sama dengan namanya, menggunakan sistem tujuh batang led yang dilapis membentuk angka 8 seperti yang ditunjukkan pada gambar di atas. Huruf yang dilihatkan dalam gambar itu ditetapkan untuk menandai bagian-bagian tersebut.<o:p></o:p></span></span></p><p class="MsoNormal">

</p><p class="MsoNormal"><span style="font-family: times;"><span face="&quot;Arial&quot;;&quot;sans-serif&quot;" style="font-size: medium; line-height: 115%; mso-bidi-font-size: 11.0pt;">Dengan menyalakan beberapa

segmen yang sesuai, akan dapat diperagakan digit-digit dari 0 sampai 9, dan juga bentuk huruf A sampai F (dimodifikasi). Sinyal input dari switches tidak dapat langsung dikirimkan ke peraga 7 bagian, sehingga harus menggunakan decoder BCD (Binary Code Decimal) ke 7 segmen sebagai antar muka. Decoder tersebut terbentuk&nbsp; dari pintu-pintu akal yang masukannya berbetuk digit BCD dan keluarannya berupa saluran-saluran untuk



datasheet setiap komponen

diperlukan di library proteus

Sensor pir, Touch Sensor, resistor, inverter, seven segment, IC counter 4026, relay,

motor dc, logic state, dan power supply sesuai gambar rangkaian

dibawah

logic state

7. Coba dijalankan rangkaian

apabila output hidup (motor dc, lampu, led) dan seven segment menyala maka

rangkaian bisa digunakan

5. Prinsip kerja

[kembali]

[!\[\]\(e1a3463b66aafb66d05290cf7708a0f0\_img.jpg\)](https://blogger.googleusercontent.com/img/b/R29vZ2xl/AVvXsEh7neFcWGmO4wgSzTPjA4dxgAMRBmhPFjaTkztIpA0YgYTW5TuyhvmXvSTSHyMxoz1WhEcJR4Tgp-RGVbLVyhBvmBIE1Oa-SiZWTUfsNf9_e7S1LeuPZ-A2-wm8qIB76PMLTWngBIFvhnewhLBdo0Rnx9oxjkdnP5oH925qJWy5AP3-pjc2GeyYG5_rWUI/s852/WhatsApp%20Image%202023-07-21%20at%2017.21.16.jpeg)

Gambar Rangkaian Simulasi

Prinsip Kerja Rangkaian

Pada rangkaian diatas

menggunakan sensor touch sebagai penghidup stopwatch otomatis dengan menggunakan

IC counter 4026 yang

ditampilkan di seven segment common catoda. dan sensor PIR sebagai pendeteksi olahragawan yang lewat secara otomatis dengan menggunakan IC counter 74147 yang ditampilkan di seven segmen BCD.

Apabila sensor touch

berlogika 1 maka output sensor akan di umpankan ke jk FF kaki J yang

berlogika 1. maka tegangan output sebesar 5v masuk ke resistor 10k dimana tegangan setelah melewati resistor adalah sebesar 4,98v atau lebih besar dari tegangan yang dibutuhkan untuk mengaktifkan VBE transistor Q1 sebesar 0,7v sehingga transistor menjadi ON, dengan aktifnya transistor maka ada arus

dari 5v supply melewati collector terus ke emittor terus terjadi percabangan yang satu ke resistor 10k terus ke ground dan yang satunya lagi ke kaki DE1 atau kaki on dari IC counter 4026 sehingga ic tersebut akan mengcounter dimulai dari angka 1-9 kemudian output dari IC 4026 yang pertama terhubung dengan pin CLK IC 4026 yang kedua sehingga IC tersebut akan melanjutkan perhitungan dimulai dari 1-9 setelah melewati 9 maka akan dilanjutkan perhitungannya oleh IC 4026 counter MENIT karena output dari IC counter 4026 SECOND terhubung dengan CLK IC 4026 MENIT sehingga berfungsi melanjutkan perhitungan sampai selesai.

namun apabila sensor touch berlogika 0 maka tidak ada tegangan yang melewati resistor R1 sehingga tidak ada tegangan di kaki base transistor Q1 sehingga transistor tidak aktif, dengan tidak aktifnya transistor maka tidak ada arus yang melewati kaki emitter sehingga IC counter 4026 MILLISECOND tidak dapat aktif atau perhitungan counter akan berhenti sehingga stopwatch dalam keadaan berhenti menghitung.

apabila pada sensor PIR terdeteksi adanya gelakan yang melewati sensor PIR (berlogika 1)

maka

tegangan output sebesar 5v masuk ke resistor 10k dimana tegangan setelah melewati resistor adalah sebesar 4,98v atau lebih besar dari tegangan yang dibutuhkan untuk mengaktifkan VBE transistor Q1 sebesar 0,7v sehingga transistor menjadi ON, dengan aktifnya transistor maka ada arus dari 5v supply melewati collector terus ke emittor terus terjadi

percabangan yang satu ke resistor 10k terus ke ground dan yang satunya lagi ke gerbang NOR yang mana 1 kaki input dari gerbang NOR terhubung secara seri dengan PIN Reset pada IC Counter 4026 sehingga rangkaian counter akan otomatis di reset kembali menjadi 0 dan salah satu kaki input dari gerbang NOR berlogika 1 yang terhubung dengan ground. karena prinsip dari gerbang NOR adalah sama dengan gerbang OR yang bedanya hasil penjumlahan gerbang NOR di inverter sehingga logika  $0 + 1 = 1$  untuk gerbang OR di inverter menjadi logika 0 Sehingga mengaktifkan IC 74147 karena output dari gerbang NOR terhubung dengan kaki 1 dari ic 74147 sehingga menghasilkan output logika 1110 yang kemudian di inverter sehingga menghasilkan logika 0001 yang mana apabila dikonversi ke bilangan desimal menjadi 1 sehingga ditampilkan oleh seven segment yaitu angka 1. menandakan terdeteksi olahragawan yang lewat.

apabila sensor PIR berlogika 0 maka tidak ada tegangan yang melewati resistor R3 sehingga tidak ada tegangan di kaki base transistor Q2 sehingga transistor tidak aktif, dengan tidak aktifnya transistor maka

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