

Rangkaian Aplikasi Op Amp Lampu Jalan Otomatis

[KEMBALI KE MENU SEBELUMNYA]

DAFTAR ISI

1.Tujuan

2. Alat dan Bahan

3. Dasar Teori

4. Rangkaian

5. Video

6. Link Download 1. Tujuan <p style="background-color:

white;">- Untuk menyelesaikan tugas matakuliah elektronika yang diberikan oleh Bapak Dr. Darwison,M.T.</p><p style="background-color: white;">- Untuk mengaplikasikan komponen Op Amp untuk lampu jalan otomatis</p><p style="background-color: white;">2. Alat dan Bahan</p><p style="background-color: white;">a. Alat</p><p style="background-color: white;">- - Voltmeter DC</p><div class="separator" style="background-color: white; clear: both; text-align: center;"><p><span style="margin-left: 1em; margin-right: 1em;"><span style="font-family: inherit;"><img alt="Hasil gambar untuk voltmeter" class="rg_i Q4LuWd" data-atf="true" data-deferred="1" data-iml="1574" height="180"

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AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

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AAAAB/9k=" style="background-attachment: initial; background-clip: initial; background-image: initial; background-origin: initial; background-position: initial; background-repeat: initial; background-size: initial; border: 1px solid rgb(234, 234, 234); box-shadow: rgba(0, 0, 0, 0.1) 1px 1px 5px; padding: 5px;" width="252" /> </p><p style="background-color: white; text-align: center;">Berfungsi sebagai sumber tegangan pada rangkaian</p><p style="background-color: white;">- Power Supply</p><p style="background-color: white; clear: both; text-align: center;"></p><div class="separator" style="background-color: white; clear: both; text-align: center;">Power Supply berfungsi sebagai sumber energi listrik untuk menyuplai tegangan atau arus listrik.</div><p style="background-color: white; clear: both;">- Ground</p><p style="background-color: white; clear: both;"></p><div class="separator" style="background-color: white; clear: both; text-align: center;"></div><br style="background-color: white;" /><p style="background-color: white; text-align: center;">Grounding berfungsi untuk meniadakan beda potensial dengan mengalirkan arus sisa dari kebocoran tegangan atau arus pada rangkaian.</p><p style="background-color: white; text-align: left;">b. Bahan</p><h3 class="post-title entry-title" itemprop="name" style="background-color: white; color: #222222; font-stretch: normal; font-variant-east-asian: normal; font-variant-numeric: normal; font-weight: normal; line-height: normal; margin: 0.75em 0px 0px; position: relative; text-align: center;"><div style="text-align: left;">1. APDS 9002 atau Ambient Light Sensor
</div><div style="text-align: left;"> </div><div style="text-align: left;"><span style="font-family: inherit; font-size: small;"><div class="separator" style="clear: both; text-align: center;"></div><div class="separator" style="clear: both; text-align: center;"></div><div class="separator" style="clear: both; text-align: center;"></div><div class="separator" style="clear: both; text-align: center;"><img border="0" data-original-height="200" data-original-width="183"

src="https://1.bp.blogspot.com/-0wrGAuKAk24/X3PwKankhBI/AAAAAAAAAXg/VvIE9We_sWoDUbnEy7Kqzz8_ZK0i5odKgCLcBGAsYHQ/s0/apds%2B9002.jpg" style="background-attachment: initial; background-clip: initial; background-image: initial; background-origin: initial; background-position: initial; background-repeat: initial; background-size: initial; border: 1px solid rgb(234, 234, 234); box-shadow: rgba(0, 0, 0, 0.1) 1px 1px 5px; padding: 5px;" /> Spesifikasi :   * Excellent responsivity which peaks in the humanluminosity curveClose responsivity to the human eye * Miniature chipLED lead-free surface-mount packageHeight – 0.80 mmWidth – 2.00 mmDepth – 1.25 mm * Good output linearity across wide illumination range * Low sensitivity variation across various light sources * Guaranteed temperature performance-40°C to 85°C * VCC supply 2.4 to 5.5 V * Lead-free packageApplications * <span face="sans-serif" style="left: 536.6px; top:

741.55px; transform: scaleX(0.930959);">Detection of ambient light to control display back lighting Mobile devices – mobile phones, PDAsComputing devices – notebooks, webpadsConsumer devices – TVs, video cameras, digital stillcameras * Automatic residential and commercial lightingmanagement•Electronic signs and signals * Daylight and artificial light exposed devices Konfigurasi Pin :   * Pin 1 : IOUT
 * Pin 2 : VCC
 * Pin 3 : VCC * Pin 4 : No connect   Sensor LDR   <img alt="" data-original-height="155" data-original-width="320" height="155" src="https://lh3.googleusercontent.com/--umOLgkmnIE/YDFewsKascI/AAAAAAAABeg/8cm-J89Rcnse

hnKuFZCQdkDa5uVYDvojQCLcBGAsYHQ/image.png" width="320" /> Spesifikasi : <br style="color: black;" /> 5. Resistor   Spesifikasi <span face=""Arial", "sans-serif"" style="background-attachment: scroll; background-clip: initial; background-image: none; background-origin: initial; background-position: 0% 0%; background-repeat: repeat; background-size: initial;">* Resistance (Ohms) : 220 V * Power (Watts) : 0,25 W, ¼ W * Tolerance : ± 5% * Packaging : Bulk * Composition : Carbon Film <span style="font-family: inherit; font-size:

small;">* Temperature Coefficient : 350ppm/°C * Lead Free Status : Lead Free * RoHS Status : RoHs Compliant   3. Komperator   Spesifikasi :   * large input voltage range
 * no latch-up
 * high gain
 * short-circuit protection
 * no frequency compensation required
 * same pin configuration as UA709   Konfigurasi Pin :   * Pin 1 : Offset null 1

 * Pin 2 : Inverting input

 * Pin 3 : Non inverting input
 <span style="font-family: inherit; font-size:

small;">
 * Pin 4 : Vcc (-)
 * Pin 5 : Offset null 2

 * Pin 6 : Output
 * Pin 7 : Vcc (+) * Pin 8 : N.C. 4. Lamp
<br style="color: black; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px;" />Spesifikasi : - Higher lumen output: from 1850 lm to 4900 lm - Almost constant lumen maintenance throughout the entire life of the lamp due to Luxline Plus   triphosphor technology - High colour rendering (Ra85/Class1B) - For electronic ballast operation only giving greater efficiency and advantages in improved starting   and life performance - Optimised ambient operating temperature at 35° C (max lumen output) allows compact luminaire designs <p style="color: black; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px;

text-align: start;">- Reduced storage volume and transportation costs - Average rated life: up to 20000 hours 5. JFET Spesifikasi : <br style="font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px;" /> <br style="font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px;" /> <img border="0"

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background-origin: initial; background-position: initial; background-repeat: initial; background-size:
initial; border: 1px solid rgb(234, 234, 234); box-shadow: rgba(0, 0, 0, 0.1) 1px 1px 5px; padding: 5px;
position: relative;" width="640" /> - Relay <div
class="separator" style="clear: both; color: black; font-family: Georgia, Utopia, "Palatino
Linotype", Palatino, serif; font-size: 15.4px;"><a
href="https://lh3.googleusercontent.com/-q2xQQ6nCn0M/YDFfJyGGhWI/AAAAAAAABe4/pAR3LoOS
bpsg-BUapymx3kao7cueO8qJQCLcBGAsYHQ/image.png" style="color: black; margin-left: 1em;
margin-right: 1em; text-decoration-line: none;"><img data-original-height="320"
data-original-width="320" height="320"
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rgb(234, 234, 234); box-shadow: rgba(0, 0, 0, 0.1) 1px 1px 5px; padding: 5px; position: relative;"
width="320" /> <p style="color: black; font-family: Georgia, Utopia, "Palatino
Linotype", Palatino, serif; font-size: 15.4px; text-align: start;"> <p style="color: black;
font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px;
text-align: left;">Spesifikasi : <p style="clear: both; color: black; font-family: Georgia, Utopia,
"Palatino Linotype", Palatino, serif; font-size: 15.4px;"><a
href="https://1.bp.blogspot.com/-izSBkOKHtXE/YDFoj5CjFmI/AAAAAAAABhg/rX1nKJJoPk0lLahRxuqB
K-P8ZPQym_V6wCLcBGAsYHQ/s337/Screenshot%2B%2528824%2529.png" style="color: black;
margin-left: 1em; margin-right: 1em; text-decoration-line: none;"><img border="0"
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src="https://1.bp.blogspot.com/-izSBkOKHtXE/YDFoj5CjFmI/AAAAAAAABhg/rX1nKJJoPk0lLahRxuqBK
-P8ZPQym_V6wCLcBGAsYHQ/s320/Screenshot%2B%2528824%2529.png"
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background-origin: initial; background-position: initial; background-repeat: initial; background-size:
initial; border: 1px solid rgb(234, 234, 234); box-shadow: rgba(0, 0, 0, 0.1) 1px 1px 5px; padding: 5px;
position: relative;" width="320" /> <br style="color: black;
font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px;"
/> <p style="clear: both; color: black; font-family: Georgia, Utopia, "Palatino
Linotype", Palatino, serif; font-size: 15.4px;"><a
href="https://1.bp.blogspot.com/-ozbxTYXrkYA/YDFop73z_4I/AAAAAAAABhk/PUD1iDKjEcUmqC8fKa
vCE3pbEbk470ZpACLcBGAsYHQ/s429/Screenshot%2B%2528822%2529.png" style="color: black;
margin-left: 1em; margin-right: 1em; text-decoration-line: none;"><img border="0"
data-original-height="348" data-original-width="429" height="325"
src="https://1.bp.blogspot.com/-ozbxTYXrkYA/YDFop73z_4I/AAAAAAAABhk/PUD1iDKjEcUmqC8fKav
CE3pbEbk470ZpACLcBGAsYHQ/w400-h325/Screenshot%2B%2528822%2529.png"
style="background-attachment: initial; background-clip: initial; background-image: initial;
background-origin: initial; background-position: initial; background-repeat: initial; background-size:
initial; border: 1px solid rgb(234, 234, 234); box-shadow: rgba(0, 0, 0, 0.1) 1px 1px 5px; padding: 5px;
position: relative;" width="400" /> <br style="color: black;
font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px;"
/> <p style="clear: both; color: black; font-family: Georgia, Utopia, "Palatino

Linotype", Palatino, serif; font-size: 15.4px;"> 3. Dasar Teori * Ultraviolet Ultraviolet (UV) adalah gelombang elektromagnetik yang memiliki panjang gelombang sebesar 380-200 nm. Cahaya ini sulit untuk dilihat dengan mata telanjang. Cahaya ini biasanya dipancarkan oleh matahari.
* Sensor Ultraviolet
Sensor cahaya ultraviolet adalah sensor cahaya yang hanya merespon perubahan intensitas cahaya ultraviolet yang mengenainya. Sensor ini menerima input dalam bentuk intensitas cahaya ultraviolet dan menghasilkan output dalam bentuk perubahan besaran listrik.

* Ambient Light Sensor

 Sensor yang dapat mengukur besar intensitas cahaya. Pada umumnya terletak di dalam HP yang kalau terkena cahaya matahari, cahaya yang dipancarkan oleh layar HP semakin terang. Input yang diterima berupa cahaya dan output yang akan dihasillkan berupa tegangan yang dapat memicu nyala pada rangkaian yang di sini pada umumnya digunakan pada layar HP atau Smartphone. Penggunaan Ambient Light Sensor harus disertai dengan Op-Amp dikarenakan keluaran yang dihasilkan oleh Ambient Light Sensor tidak sampai sebesar 5 Volt. </h3><h3 class="post-title entry-title" itemprop="name" style="background-color: white; color: #222222; font-stretch: normal; font-variant-east-asian: normal; font-variant-numeric: normal; font-weight: normal; line-height: normal; margin: 0.75em 0px 0px; position: relative; text-align: center;"> <div

class="separator" style="clear: both; text-align: center;">

 Grafik respon sensor uv Sensor LDR LDR (Light Dependent Resistor) merupakan salah satu komponen resistor yang nilai resistansinya akan berubah-ubah sesuai dengan intensitas cahaya yang mengenai sensor ini. LDR juga dapat digunakan sebagai sensor cahaya. Perlu diketahui bahwa nilai resistansi dari sensor ini sangat bergantung pada intensitas cahaya. Semakin banyak cahaya yang mengenainya, maka akan semakin menurun nilai resistansinya. Sebaliknya jika semakin sedikit cahaya yang mengenai sensor (gelap), maka nilai hambatannya akan menjadi semakin besar sehingga arus listrik yang mengalir akan terhambat. Grafik respon sensor LDR
   <span style="font-family:

inherit;">* Komperator

 Komparator yang digunakan di sini adalah Op-Amp tipe 741 yang terdiri dari 8 kaki dan untuk membuat rangkaian ini, yang digunakan hanyalah kaki 2 yang merupakan kaki inverting, kaki 3 yaitu kaki non inverting, kaki 4 sebagai penghubung ke ground, kaki 6 mengarah kepada output yang mana output dalam rangkaian ini berupa tegangan yang dapat menyalakan LED, dan kaki 7 sebagai input tegangan atau tempat terhubung dengan VCC yang berfungsi sebagai supply energi bagi Op-Amp tersebut. Tipe Op-Amp yang digunakan berupa Op-Amp non-inverting, ditandai dengan terhubungnya kaki inverting terhadap ground dan kaki non-inverting terhadap input. Fungsi Op-Amp di sini sebagai penguat tegangan bagi rangkaian yang akan dibuat.
 * Voltmeter Volt antara 2 titik pada suatu beban listrik atau rangkaian elektronika. Konsep yang digunakan dalam sebuah volt meter DC hampir sama dengan konsep pada ampere meter. Pada volt meter arus searah atau DC volt meter tahanan shunt atau shunt resistor dipasang seri dengan kumparan putar magnet permanen (permanent magnet moving coil) PMMC yang berfungsi sebagai pengali (multiplier).meter DC merupakan alat ukur yang berfungsi untuk mengetahui beda potensial tegangan DC </h3><h3 class="post-title entry-title" itemprop="name" style="background-color: white; color: #222222; font-stretch: normal; font-variant-east-asian: normal; font-variant-numeric: normal; font-weight: normal; line-height: normal; margin: 0.75em 0px 0px; position: relative; text-align: center;"> * Resistor <div class="separator"

style="clear: both; color: black; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px;"> <br style="font-size: 15.4px;" /> <span style="background-attachment: initial; background-clip: initial; background-image: initial; background-origin: initial; background-position: initial; background-repeat: initial; background-size: initial; line-height: 18.4px;">Resistor<span style="background-attachment: initial; background-clip: initial; background-image: initial; background-origin: initial; background-position: initial; background-repeat: initial; background-size: initial; line-height: 18.4px;"> merupakan komponen elektronika dasar<span style="background-attachment: initial; background-clip: initial; background-image: initial; background-origin: initial; background-position: initial; background-repeat: initial; background-size: initial;"> yang digunakan untuk membatasi jumlah arus yang mengalir dalam satu rangkaian.Sesuai dengan namanya, resistor bersifat resistif dan umumnya terbuat dari bahan karbon. <span style="background-attachment: initial; background-clip: initial; background-image: initial; background-origin: initial; background-position: initial; background-repeat: initial; background-size: initial; line-height: 18.4px;">Resistor mempunyai nilai resistansi (tahanan) tertentu yang dapat memproduksi<span style="background-attachment: initial; background-clip: initial; background-image: initial; background-origin: initial; background-position: initial; background-repeat: initial; background-size: initial; line-height: 18.4px;"> tegangan listrik<span style="background-attachment: initial; background-clip: initial; background-image: initial; background-origin: initial; background-position: initial; background-repeat: initial; background-size: initial;"> di antara kedua pin dimana nilai tegangan terhadap resistansi tersebut berbanding lurus dengan arus yang mengalir, berdasarkan persamaan Hukum OHM : <img border="0" data-original-height="212" data-original-width="237" height="123" src="https://1.bp.blogspot.com/--Ld0y81o7ow/X4-ht5LH9mI/AAAAAAAAApU/cgsTL-6LMWInc0SzIs9c3xECqBIhUbQRACLcBGAsYHQ/w130-h123/images%2B%25281%2529.png"

style="background-attachment: initial; background-clip: initial; background-image: initial; background-origin: initial; background-position: initial; background-repeat: initial; background-size: initial; border: 1px solid rgb(234, 234, 234); box-shadow: rgba(0, 0, 0, 0.1) 1px 1px 5px; padding: 5px; position: relative;" width="130" /> <p data-adtags-visited="true" style="box-sizing: inherit; color: black; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px; margin: 0px 0px 20px; text-align: start;">Di dalam resistor, terdapat ketentuan untuk membaca nilai resistor yang diwakili dengan kode warna dengan ketentuan di bawah ini : * Relay Relay adalah saklar elektro-magnetik yang menggunakan tegangan DC rendah untuk menghidupkan dan mematikan suatu alat atau sistem yang terhubung dengan tegangan DC yang tinggi atau tegangan AC. Susunan relay yang paling sederhana terdiri atas kumparan kawat penghantar yang dugulung pada inti besi. Susunan kontak relay, secara umum terdiri dari :
* Normally Open (NO) : posisi saklar berada pada keadaan terbuka saat

relay dalam keadaan tidak dialiri arus.
* Normally Close (NC) : posisi saklar berada pada keadaan tertutup saat relay dalam keadaan tidak dialiri arus.   Berdasarkan pada prinsip dasar cara kerjanya, relay dapat bekerja karena adanya medan   magnet yang digunakan untuk menggerakkan saklar. Saat kumparan diberikan tegangan sebesar tegangan kerja relay maka akan timbul medan magnet pada kumparan karena adanya arus yang mengalir pada lilitan kawat. Kumparan yang bersifat sebagai elektromagnet ini kemudian akan menarik saklar dari kontak NC ke kontak NO. Jika tegangan pada kumparan dimatikan maka medan magnet pada kumparan akan hilang sehingga pegas akan menarik saklar ke kontak NC. * JFET FET adalah suatu semiconductor device seperti halnya bipolar transistor. Perbedaan utamanya adalah arus yang melalui device di-kontrol oleh tegangan. Sedangkan pada bipolar transistor, arus arus yang melalui device di-kontrol oleh arus.<o:p></o:p> Apabila kita hubungkan tegangan bias dari gate ke source dengan polaritas seperti diperlihatkan pada gambar 11.2 (a), VGG = 1 Volt, maka akan menghasilkan tegangan gate-source VGS = -1 Volt. Sedangkan pada drain kita berikan tegangan supply (VDD) yang dapat diatur besarnya (variabel). Dengan mengatur VDD mulai dari nol sampai dengan nilai tertentu, maka akan dihasilkan kurva karakteristik drain, seperti diperlihatkan pada gambar 11.2 (b).<o:p></o:p> <img border="0" data-original-height="181" data-original-width="364" height="199" src="https://1.bp.blogspot.com/-gEGImWuUyrI/YC_PRNamdPI/AAAAAAAABdY/eQkHTuT3dYA28ztv-Vd9AzGdL0TBt2F1ACLcBGAsYHQ/w400-h199/Screenshot%2B%2528810%2529.png" style="background-attachment: initial; background-clip: initial; background-image: initial; background-origin: initial; background-position: initial; background-repeat: initial; background-size: initial; border: 1px solid rgb(234, 234, 234); box-shadow: rgba(0, 0, 0, 0.1) 1px 1px 5px; padding: 5px;

position: relative;" width="400" />
  Sebaliknya jika tegangan bias dari gate ke source (VGG) dapat diatur besarnya (variabel), sedangkan tegangan supply (VDD) yang konstan besarnya, maka magnitudo arus drain (ID) akan berkurang dengan pertambahan magnitudo dari VGS. Sehingga besarnya arus drain (ID) dikontrol oleh besarnya tegangan gate-source (VGS), sebagaimana diilustrasikan pada gambar 11.3.<o:p></o:p> </h3>
 4. Rangkaian

 5. Video <object class="BLOG_video_class" contentid="56df2344bfb68674" height="266" id="BLOG_video-56df2344bfb68674" width="320"></object>

 6. Link Download - Download file HTML klik disini - Download file rangkaian klik disini - Download file gambar <a href="https://drive.google.com/uc?export=download&id=1TKks8rv7W5XoUsa6s2vcbBHL_5Wnv

Y2J">klik disini - Download file video klik disini - Download datasheet sensor uv klik disini - Download datasheet sensor ldr klik disini - Download datasheet op amp klik disini - Download datasheet led klik disini - Download datasheet lampu klik disini - Download datasheet resistor klik disini - Download datasheet NPN klik disini - Download datasheet POT HG klik disini - Download datasheet relay klik disini