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<a name="home">

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

<a href="#">[KEMBALI KE MENU SEBELUMNYA]</a></div>

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<center>

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

<b>DAFTAR ISI</b>

<br />

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

<a href="#kondisi">1. Prosedur</a></div>

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

<a href="#gambar">2. Hardware dan diagram blok</a></div>

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

<a href="#video">3. Rangkaian Simulasi dan Prinsip kerja</a></div>

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

<a href="#prinsip">4. FlowChart</a></div>

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

<a href="#link">5.Kondisi</a></div>

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

<a href="#link">6.Video Simulasi</a></div>

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

<a href="#link">7.Download File</a></div><div style="text-align: left;"><br
/></div></div></center><span><span><b><span style="font-family: georgia; font-size: medium;"><div
style="color: #38761d; text-align: center;"><br /></div><div style="text-align: center;"><br /></div><div
style="text-align: center;"><span>PERCOBAAN 3</span></div><div style="text-align: center;"><span
style="background-color: white; color: #01ffff; font-size: medium;">Komunikasi I2C Menggunakan
Arduino</span></div><div style="text-align: center;"><span style="background-color: white; color: #01ffff;
font-size: medium;"><br /></span></div><div style="color: #38761d;"><span><span><b><span
style="color: #38761d; font-family: georgia; font-size: medium;"><br
/></span></b></span></span></div><span style="color: #01ffff;">1. Prosedur</span></span></b><span
style="font-family: georgia; font-size: medium;"><b>

```

[\[Kembali\]<div><b style="font-family: georgia;">
</div><div><ol style="text-align: left;">Rangkai semua komponen sesuai kondisi yang dipilihbuat program di aplikasi arduino IDEsetelah selesai masukkan program ke arduino \(Verify and Upload\)jalankan program pada simulasi dan cobakan sesuai dengan modul dan kondisiSelesai</div><div><div style="color: #741b47;">
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2. Hardware dan diagram blok

[Kembali]</div><div><div class="separator" style="clear: both; text-align: center;">
</div><div class="separator" style="clear: both; text-align: center;"><div style="color: #222222; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px; font-weight: 400; text-align: start;"> <a u>. hardware</u></div><div class="separator" style="clear: both; color: #222222; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px; font-weight: 400;">
</div><br style="color: #222222; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px; font-weight: 400; text-align: start;" /><div class="separator" style="clear: both; color: #222222; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px; font-weight: 400; text-align: left;">1. Modul Arduino Uno</div><div class="separator" style="clear: both; color: #222222; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px; font-weight: 400; text-align: left;"><div class="separator" style="clear: both; text-align: center;"></div>Spesifikasi Arduino</div><div class="separator" style="clear: both; color: #222222; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px; font-weight: 400; text-align: left;"><div class="separator" style="clear: both; text-align: center;"><a href="https://blogger.googleusercontent.com/img/b/R29vZ2xl/AVvXsEjdO3jrwiKG6JNU8jhZfl7IAi07nDO4JOj49K3NCws7qw3QlyQJtQ9zZqLlF25WlUpNMXTQ0CN4Zq7dBpPx2QD6ckyDkZPFOIPt_VGDRh6DXafaqGPd7UtoZFyUtMfDXKNUqyMKtqV__gl8MZ7XpIOPIE0tr5rfA5FK_K7ooP21WcvFIldu5yCNAqd9Y/s783/spesifikasi%20arduino.png" style="background-color: white; color: #993300; margin-left: 1em; margin-right: 1em;

text-decoration-line: none;"></div>
2. LCD</div><div class="separator" style="clear: both; color: #222222; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px; font-weight: 400; text-align: left;"><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;">
</div><div class="separator" style="clear: both;"><div class="separator" style="clear: both;">spesifikasi:</div><div class="separator" style="clear: both;">
</div><div class="separator" style="clear: both;">Tampilan 2 baris @ 16 karakter, 5 x 8 pixel</div><div class="separator" style="clear: both;">Display controller: HD44780 (standar industri LCD)</div><div class="separator" style="clear: both;">Dilengkapi lampu latar warna biru/hijau/kuning</div><div class="separator" style="clear: both;">Sudut pandang lebar dengan tingkat kontras yang dapat diatur dan terlihat jelas</div><div class="separator" style="clear: both;">Tegangan kerja: 5V DC</div><div class="separator" style="clear: both;">Dimensi modul: 80 x 36 x 12 mm</div><div class="separator" style="clear: both;">Dimensi layar tampilan: 64,5 mm x 16 mm</div><div class="separator" style="clear: both;">
</div><div>3. Keypad</div><div class="separator" style="clear: both; color: #222222; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px; font-weight: 400; text-align: left;"><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>Spesifikasi:</div><div class="separator" style="clear: both; color: #222222; font-family: Georgia, Utopia, "Palatino

Linotype", Palatino, serif; font-size: 15.4px; font-weight: 400; text-align: left;">
</div><div class="separator" style="clear: both; color: #222222; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px; font-weight: 400; text-align: left;"><div class="separator" style="clear: both;">1. Dimensi: Sekitar 70mm x 77mm x 1mm (Panjang x Lebar x Tinggi)</div><div class="separator" style="clear: both;">2. Jumlah Tombol: 12 tombol (3 baris x 4 kolom)</div><div class="separator" style="clear: both;">3. Bahan: Membrane (Plastik tipis yang sensitif terhadap tekanan)</div><div class="separator" style="clear: both;">4. Tipe Tombol: Tegangan rendah (Low Voltage)</div><div class="separator" style="clear: both;">5. Konektor: Biasanya menggunakan pin header untuk dipasang ke breadboard atau PCB</div><div class="separator" style="clear: both;">6. Kehidupan Tombol: Dalam jutaan kali tekan (bergantung pada kualitas pembuatan)</div><div class="separator" style="clear: both;">7. Resistansi Kontak: Biasanya sekitar 100 Ohm</div><div class="separator" style="clear: both;">8. Tegangan Maksimum: Biasanya 24V DC</div><div class="separator" style="clear: both;">9. Arus Maksimum: Biasanya 10mA per jalur tombol</div><div class="separator" style="clear: both;">10. Rentang Suhu: -20°C hingga +60°C</div><div class="separator" style="clear: both;">11. Kecepatan Respons: Biasanya dalam mikrodetik (µs)</div><div class="separator" style="clear: both;">12. Interface: Matriks 3x4 (Matrix 3x4)</div><div class="separator" style="clear: both;">13. Kompatibilitas: Mendukung mikrokontroler, Arduino, Raspberry Pi, dan perangkat elektronik lainnya dengan pin I/O yang sesuai</div><div class="separator" style="clear: both;">14. Indikator LED: Beberapa keypad memiliki LED di bawah tombol untuk memberikan tanda visual saat tombol ditekan</div><div class="separator" style="clear: both; text-align: center;">
</div>
<div class="separator" style="clear: both;">Spesifikasi :</div><div class="separator" style="clear: both;"><div class="separator" style="clear: both;"><ul style="line-height: 1.4; margin: 0.5em 0px; padding: 0px 2.5em;"><li style="margin: 0px 0px 0.25em; padding: 0px;">Tampilan 2 baris @ 16 karakter, 5 x 8 pixel<li style="margin: 0px 0px 0.25em; padding: 0px;">Display controller: HD44780 (standar industri LCD)<li style="margin: 0px 0px 0.25em; padding: 0px;">Dilengkapi lampu latar warna biru/hijau/kuning<li style="margin: 0px 0px 0.25em; padding: 0px;">Sudut pandang lebar dengan tingkat kontras yang dapat diatur dan terlihat jelas<li style="margin: 0px 0px 0.25em; padding: 0px;">Tegangan kerja: 5V DC<li style="margin: 0px 0px 0.25em; padding: 0px;">Dimensi modul: 80 x 36 x 12 mm<li style="margin: 0px 0px 0.25em; padding: 0px;">Dimensi layar tampilan: 64,5 mm x 16 mm</div></div><div><div class="separator" style="clear: both; color: #555555; font-family: times, "times new roman", serif; font-size: 13px;">
</div></div><div style="color: #222222; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px; font-weight: 400; text-align: start;"><b style="font-size: large;">
</div><div style="color: #222222; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px; font-weight: 400; text-align: start;"><b style="font-size: large;"> b. Digram Blok</div><div style="color: #222222; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px; font-weight: 400; text-align: start;"><b style="font-size: large;">
</div><div style="color: #222222; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px; font-weight: 400; text-align: start;"><div class="separator" style="clear: both; text-align: center;"><a href="https://blogger.googleusercontent.com/img/b/R29vZ2xl/AVvXsEj-fG3FHynrLb-bWfiSI189lgo_TteV1i2xqd7LpGtVO6McZ63MK6OdfreYD2Bc0m5jhjZ_Fot2utC-mZLDOoGtyAR4W5h70AewDO0EDOLT-MeLBWGTCK9oI d-Wa5HuS0IBSaWmzIMLRscPD 14xMSy1MIxRPpTp65ezdm3B lgXqWg-a htLemyRnQ/s696/Screens

Dalam loop, master menanti input dari keypad. Saat tombol ditekan, nilai yang berkaitan dikirim ke slave melalui I2C dengan fungsi Wire.beginTransmission(), Wire.write(), dan Wire.endTransmission().

Arduino slave memulai dengan mengatur LCD dan I2C. LCD menampilkan informasi kepada pengguna. Slave menerima data dari master melalui I2C dengan menggunakan library Wire.

Selama setup, slave menginisialisasi LCD dan menetapkan alamat I2C-nya. Fungsi Wire.onReceive() diatur untuk menangani data yang diterima dari master. Saat data tiba, fungsi receiveEvent() dipanggil untuk memprosesnya.

Dalam loop, slave menunggu data dari I2C. Data yang diterima diproses dan ditampilkan pada LCD sesuai program yang ditetapkan.

Ketika slave menerima angka 1 hingga 9, angka itu ditampilkan pada LCD. Jika angka ganjil, ditampilkan di kolom kedua; jika genap, di kolom pertama. Ini memastikan komunikasi efektif antara kedua Arduino dan output yang akurat pada LCD sesuai kondisi yang diprogram.

Pada Arduino master, program diawali dengan mengatur keypad dan I2C. Keypad mendeteksi tekanan tombol dan mengirim nilai yang berkaitan ke Arduino slave melalui I2C, memungkinkan master memberi instruksi ke slave berdasarkan input pengguna.

Dalam loop, master menanti input dari keypad. Saat tombol ditekan, nilai yang berkaitan dikirim ke slave melalui I2C dengan fungsi Wire.beginTransmission(), Wire.write(), dan Wire.endTransmission().

Arduino slave memulai dengan mengatur LCD dan I2C. LCD menampilkan informasi kepada pengguna. Slave menerima data dari master melalui I2C dengan menggunakan library Wire.

Selama setup, slave menginisialisasi LCD dan menetapkan alamat I2C-nya. Fungsi Wire.onReceive() diatur untuk menangani data yang diterima dari master. Saat data tiba, fungsi receiveEvent() dipanggil untuk memprosesnya.

Dalam loop, slave menunggu data dari I2C. Data yang diterima diproses dan ditampilkan pada LCD sesuai program yang ditetapkan.

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4. FlowChart

[\[Kembali\]](#)

A. Listing Program

```
Master
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"Courier New", monospace; font-size: 14px; font-weight: normal; line-height: 19px;"><div
style="line-height: 19px;"><div><span style="color: #95a5a6;">>//Master Arduino</span></div><div><span
style="color: #728e00;">#include</span> <span style="color:
#005c5f;">&lt;Keypad.h&gt;</span></div><div><span style="color: #728e00;">#include</span> <span
style="color: #005c5f;">&lt;Wire.h&gt;</span></div><div><span style="color: #00979d;">const</span>
byte ROWS = <span style="color: #005c5f;">4</span>;</div><div><span style="color:
#00979d;">const</span> byte COLS = <span style="color: #005c5f;">3</span>;</div><div><span
style="color: #00979d;">char</span> <span style="color: #d35400;">keys</span>[ROWS][COLS] = <span
style="color: #434f54;">{</span></div><div>&nbsp;<span style="color: #434f54;">{</span><span>'1', '2', '3'<span
style="color: #434f54;">}</span></div><div>&nbsp;<span style="color: #434f54;">{</span><span>'4', '5', '6'<span
style="color: #434f54;">}</span></div><div>&nbsp;<span style="color: #434f54;">{</span><span>'7', '8', '9'<span
style="color: #434f54;">}</span></div><div>&nbsp;<span style="color: #434f54;">{</span><span>*', '0', '#'<span
style="color: #434f54;">}</span></div><div><span style="color: #434f54;">}</span></div><div><span
style="color: #00979d;">char</span> <span style="color: #d35400;">rowPins</span>[ROWS] = <span
style="color: #434f54;">{</span><span style="color: #005c5f;">13</span>, <span style="color:
#005c5f;">12</span>, <span style="color: #005c5f;">11</span>, <span style="color:
#005c5f;">10</span><span style="color: #434f54;">}</span></div><div><span style="color:
#00979d;">char</span> <span style="color: #d35400;">colPins</span>[COLS] = <span style="color:
#434f54;">{</span><span style="color: #005c5f;">9</span>, <span style="color: #005c5f;">8</span>,
<span style="color: #005c5f;">7</span><span style="color: #434f54;">}</span></div><div>Keypad keypad
= <span style="color: #d35400;">Keypad</span><span style="color: #434f54;">{</span><span style="color:
#d35400;">makeKeymap</span><span style="color: #434f54;">{</span><span>keys<span style="color:
#434f54;">}</span>, rowPins, colPins, ROWS, COLS<span style="color:
#434f54;">}</span></div><div><span style="color: #00979d;">void</span> <span style="color:
#d35400;">setup</span><span style="color: #434f54;">{</span><span></span></div><div><span style="color:
#434f54;">{</span><span></span></div><div>&nbsp;<span style="color: #d35400;">Wire</span>.<span style="color:
#d35400;">begin</span><span style="color: #434f54;">{</span><span></span><span style="color: #95a5a6;"> // join i2c
bus (address optional for master)</span></div><div><span style="color:
#434f54;">}</span></div><div><span style="color: #95a5a6;">//byte x = 0;</span></div><div><span
style="color: #00979d;">void</span> <span style="color: #d35400;">loop</span><span style="color:
#434f54;">{</span><span></span></div><div>&nbsp;</div><div>&nbsp;<span style="color: #00979d;">char</span> key
= <span style="color: #d35400;">keypad</span>.<span style="color: #d35400;">getKey</span><span
style="color: #434f54;">{</span><span></span></div><div>&nbsp;</div><div>&nbsp;<span style="color:
#728e00;">if</span> <span style="color: #434f54;">{</span><span>key<span style="color: #434f54;">}</span>
<span style="color: #434f54;">{</span><span></span></div><div>&nbsp;<span style="color:
#d35400;">Wire</span>.<span style="color: #d35400;">beginTransaction</span><span style="color:
#434f54;">{</span><span style="color: #005c5f;">4</span><span style="color: #434f54;">}</span><span
style="color: #95a5a6;"> // transmit to device #4</span></div><div>&nbsp;<span style="color:
#d35400;">Wire</span>.<span style="color: #d35400;">write</span><span style="color:
#434f54;">{</span><span>key<span style="color: #434f54;">}</span></div><div>&nbsp;<span style="color:
#d35400;">Wire</span>.<span style="color: #d35400;">endTransmission</span><span style="color:
#434f54;">{</span><span></span><span style="color: #95a5a6;"> // stop transmitting</span></div><div>&nbsp;<span
style="color: #434f54;">}</span></div><div><span style="color: #434f54;">}</span></div><div><span
style="color: #434f54;"><br /></span></div></div></div><div style="font-family: Consolas,
"Courier New", monospace; font-size: 14px; font-weight: normal; line-height: 19px;"><span
style="color: black; font-family: verdana; font-size: large; font-weight: 700; white-space:
normal;">Slave</span></div><div style="font-family: Consolas, "Courier New", monospace;
font-size: 14px; font-weight: normal; line-height: 19px;"><span style="color: black; font-family: verdana;
font-size: large; font-weight: 700; white-space: normal;"><br /></span></div><div style="font-family:
Consolas, "Courier New", monospace; font-size: 14px; font-weight: normal; line-height:

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19px;"><div style="line-height: 19px;"><div><div style="line-height: 19px;"><div><span style="color:
#728e00;">#include</span> <span style="color: #005c5f;">&lt;LiquidCrystal.h&gt;</span></div><div><span
style="color: #728e00;">#include</span> <span style="color:
#005c5f;">&lt;Wire.h&gt;</span></div><div>LiquidCrystal <span style="color: #d35400;">lcd</span><span
style="color: #434f54;"></span><span style="color: #005c5f;">13</span>, <span style="color:
#005c5f;">12</span>, <span style="color: #005c5f;">6</span>, <span style="color: #005c5f;">5</span>,
<span style="color: #005c5f;">4</span>, <span style="color: #005c5f;">3</span><span style="color:
#434f54;"></span>;<span style="color: #95a5a6;"> // Sesuaikan pin sesuai dengan koneksi
LCD</span></div><br /><div><span style="color: #00979d;">int</span> receivedData = <span style="color:
#005c5f;">0</span>;</div><br /><div><span style="color: #00979d;">void</span> <span style="color:
#d35400;">setup</span><span style="color: #434f54;">()</span></div><div><span style="color:
#434f54;"></span></div><div>&nbsp; <span style="color: #d35400;">lcd</span>.<span style="color:
#d35400;">begin</span><span style="color: #434f54;"></span><span style="color: #005c5f;">16</span>,
<span style="color: #005c5f;">2</span><span style="color: #434f54;"></span></div><div>&nbsp; <span
style="color: #d35400;">Wire</span>.<span style="color: #d35400;">begin</span><span style="color:
#434f54;"></span><span style="color: #005c5f;">4</span><span style="color: #434f54;"></span>;<span
style="color: #95a5a6;"> // join i2c bus with address #4</span></div><div>&nbsp; <span style="color:
#d35400;">Wire</span>.<span style="color: #d35400;">onReceive</span><span style="color:
#434f54;"></span>receiveEvent<span style="color: #434f54;"></span>;<span style="color: #95a5a6;"> //
register event</span></div><div>&nbsp; <span style="color: #d35400;">Serial</span>.<span style="color:
#d35400;">begin</span><span style="color: #434f54;"></span><span style="color:
#005c5f;">9600</span><span style="color: #434f54;"></span>;<span style="color: #95a5a6;"> // start
serial for output</span></div><br /><div>&nbsp; <span style="color: #d35400;">lcd</span>.<span
style="color: #d35400;">print</span><span style="color: #434f54;"></span><span style="color:
#005c5f;">"Silahkan Tekan"</span><span style="color: #434f54;"></span></div><div><span style="color:
#434f54;"></span></div><br /><div><span style="color: #00979d;">void</span> <span style="color:
#d35400;">loop</span><span style="color: #434f54;">()</span></div><div><span style="color:
#434f54;"></span></div><div>&nbsp; <span style="color: #d35400;">delay</span><span style="color:
#434f54;"></span><span style="color: #005c5f;">100</span><span style="color:
#434f54;"></span></div><div><span style="color: #434f54;"></span></div><br /><div><span
style="color: #00979d;">void</span> <span style="color: #d35400;">receiveEvent</span><span
style="color: #434f54;"></span><span style="color: #00979d;">int</span> <span style="color:
#434f54;">howMany</span></div><div><span style="color: #434f54;"></span></div><div>&nbsp;
receivedData = <span style="color: #d35400;">Wire</span>.<span style="color:
#d35400;">read</span><span style="color: #434f54;">()</span>;<span style="color: #95a5a6;"> //
menerima byte sebagai karakter</span></div><div>&nbsp; <span style="color:
#d35400;">Serial</span>.<span style="color: #d35400;">println</span><span style="color:
#434f54;"></span>receivedData<span style="color: #434f54;"></span>;<span style="color: #95a5a6;"> //
mencetak karakter ke Serial Monitor untuk debug</span></div><br /><div>&nbsp; <span style="color:
#728e00;">if</span><span style="color: #434f54;"></span><span style="color: #434f54;"></span>receivedData &gt;= '1' &amp;&amp;
receivedData &lt;= '9'<span style="color: #434f54;"></span><span style="color:
#434f54;"></span></div><div>&nbsp; &nbsp; <span style="color: #00979d;">int</span> number =
receivedData - '0';</div><div>&nbsp; &nbsp; <span style="color: #d35400;">lcd</span>.<span style="color:
#d35400;">clear</span><span style="color: #434f54;">()</span></div><div>&nbsp; &nbsp; <span
style="color: #728e00;">if</span><span style="color: #434f54;"></span><span style="color: #434f54;"></span>number % <span style="color:
#005c5f;">2</span> == <span style="color: #005c5f;">0</span><span style="color: #434f54;"></span><span
style="color: #434f54;"></span></div><div>&nbsp; &nbsp; &nbsp; <span style="color:
#d35400;">lcd</span>.<span style="color: #d35400;">setCursor</span><span style="color:
#434f54;"></span><span style="color: #005c5f;">0</span>, <span style="color: #005c5f;">0</span><span
style="color: #434f54;"></span>;<span style="color: #95a5a6;"> // angka genap di kolom pertama, baris

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pertama</div><div> else</div><div> lcd. setCursor0, 1 // angka ganjil di kolom kedua, baris kedua</div><div> </div><div> lcd. printnumber</div><div> </div><div></div>
</div></div>
</div></div><div>
</div><div>b. Flowchart</div><div class="separator" style="clear: both;">
</div><div class="separator" style="clear: both;"> Master</div><div class="separator" style="clear: both;"><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;">Slave</div><div class="separator" style="clear: both;"><div class="separator" style="clear: both; text-align: center;"></div></div><div class="separator" style="clear: both; text-align: center;"><br style="background-color: #fff9ee; color: #222222; font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px; white-space: normal;"></div></div></div></div><div>5. Video Demo [Kembali]</div><div><span style="font-family:

style="background-color: white;">Download Program Master klik disini</div><div>Download klik disini</div><div>Download Datasheet ARDUINO UNO klik disini</div><div>Download Datasheet Keypad klik disini</div><div>Download Datasheet LCD klik disini</div></div><div style="color: #222222; font-family: verdana; font-size: medium;">
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</div><div style="font-family: Arial, Tahoma, Helvetica, FreeSans, sans-serif; font-size: 16.5px;">-</div><div style="font-family: Arial, Tahoma, Helvetica, FreeSans, sans-serif; font-size: 16.5px;"> </div></div></div>