Regulated DC Supply

Lab 6: Digital-to-Analog Conversion

ECE 327: Electronic Devices and Circuits Laboratory I

1. Regulated 10 V\textsubscript{DC} Supply

A single regulated supply powers every receiver component. Transmitter components use a separate supply.

1. Isolate two separate sets of 0 V and 10 V supply rails on your breadboard (or use two breadboards).
2. Connect LM317 regulated output to receiver supply rail.
3. Connect unregulated DC supply (e.g., 15 V\textsubscript{DC}) to LM317 input. Make connection easy to find later.
4. A large bypass capacitor (e.g., 1–10 \(\mu\)F) may be placed near LM317 from Adjust to ground.
5. A \(\sim 0.1 \mu\)F bypass capacitor to ground can be placed at the 10 V input to each circuit component.

\[
\begin{align*}
V_{\text{unreg}} &\approx 15 \text{V DC} \\
C_{\text{unreg}} &\geq 0.1 \mu\text{F} \\
R_1 &\approx 220 \Omega \\
R_2 &\approx 1.54 \text{k}\Omega \\
V_{\text{reg}} &\approx 10 \text{V DC} \\
C_{\text{reg}} &\geq 1 \mu\text{F}
\end{align*}
\]

Because power supply is connected by long wires, input bypass capacitor \(C_{\text{unreg}}\) is highly recommended. Optional output bypass capacitor \(C_{\text{reg}}\) will help keep \(V_{\text{reg}}\) steady.

\[
\begin{align*}
V_{\text{unreg}} &\approx 15 \text{V} \\
C_{\text{unreg}} &\geq 0.1 \mu\text{F} \\
R_2 &\approx 2 \text{k}\Omega \\
\frac{R_2}{R_1} &\approx 7 \\
\frac{R_2}{R_1 + R_2} &\approx \frac{7}{8} \\
R_1 &\approx 220 \Omega
\end{align*}
\]
A Parts

(a) LM317 3-terminal adjustable regulator

(b) Electrolytic capacitor

Figure A.1: Part pin-outs.