

## Remotely Adjustable Voltage Regulators

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This note shows how an X9312 can be used to implement a remote, adjustable regulator. The LM317 is probably the most common adjustable three-terminal voltage regulator in use today. Often it would be desirable to adjust these regulators remotely, but extending the adjustment rheostat any distance introduces noise and instability. Intersil's X9312 XDCP can provide a simple solution. By using this XDCP, the voltage output of the LM317 can be set using a simple 3-wire digital interface over practically any distance.

Figure 1 shows the LM317's usual adjustment resistor replaced with the 10kΩ version of the X9312. The pushbutton control circuitry would be located remotely (on a separate board). The adjustment range can be set remotely to fit an application by changing R7, just remember not to exceed the  $V_H$  or  $V_L$  maximum limit of +15 volts.

The standard formula for output voltage naturally still applies:

$$V_{out} = V_{ref} + V_{ref} \left[ \frac{R_{pot}}{R_{ref}} \right] + I_{adj}(R_{ref})$$

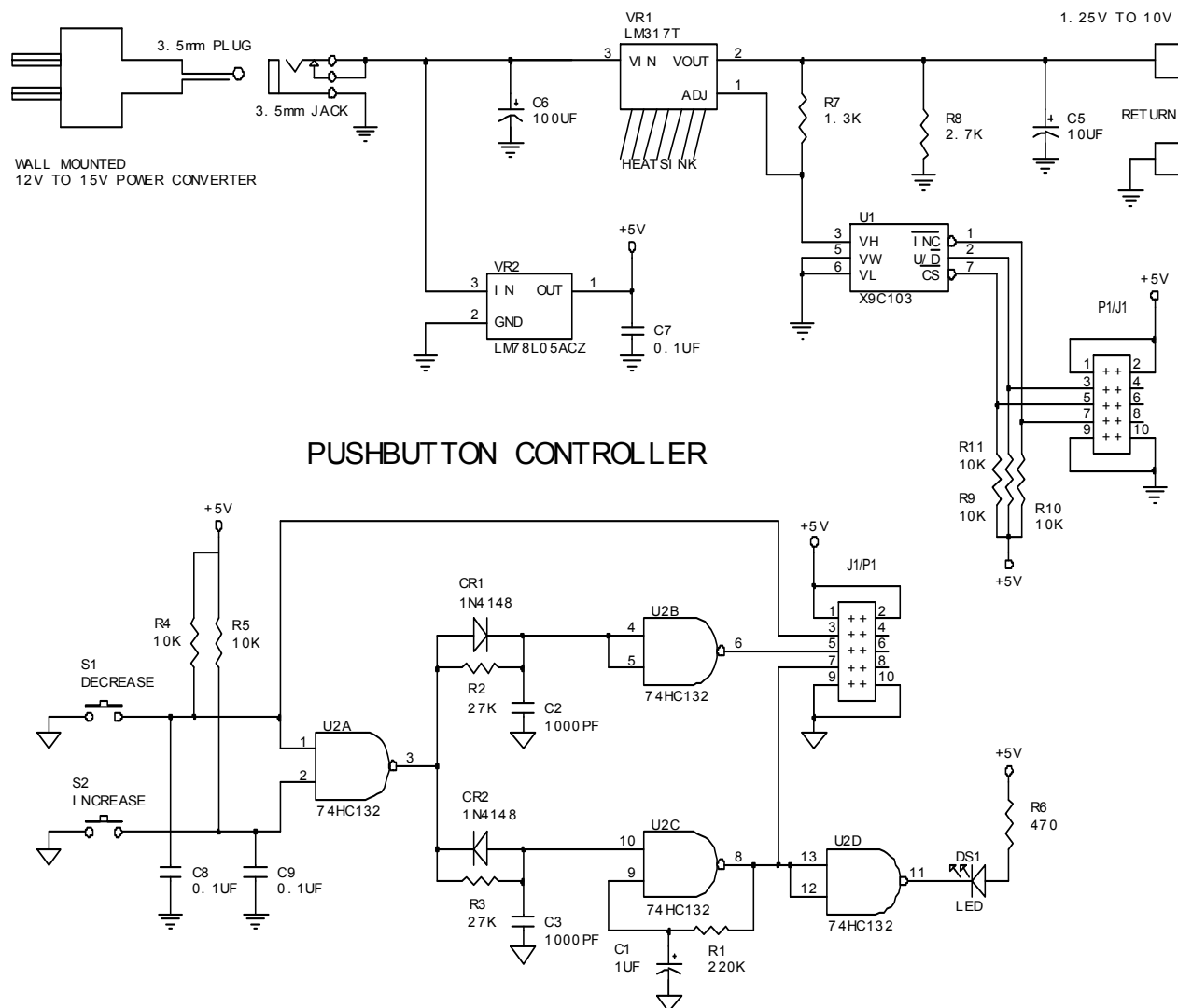
where  $V_{ref} = 1.25V$

$R_{ref} = R7$

$R_{pot} = 0$  to  $10k\Omega$  value for U1 in 99 steps.

$I_{adj} = \text{approx. } 50\mu A$  of current from the adjustment pin of the LM317

Figure 1 shows the control circuitry connected via a 10-pin connector. This allows an LM317 voltage regulator to be set and then for the control circuitry to be removed. In this configuration, it's a good idea to include a pull-up resistor on all of the control lines (R9, R10, and R11) to assure that inadvertant XDCP changes do not occur.



**FIGURE 1. 1.25V to 10V DC Supply**

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