Supplemental information for experiment 8

The diodes provided in the kit of parts are difficult to identify and can be different than what is listed on the box. There are basically 2 versions of the kits, the ADALP2000 and the Digilent. Digilent has very recently changed to a remarked version of the ADALP2000 and if you have that kit just follow the comments about the ADALP2000. My comments about the Digilent refer to the small box as pictured below.

Figure 1 ADALP2000 is shown the left, the Digilent kit is shown on the right.

The diodes in the kits aren't necessarily the same as what is listed on the box but they function fine for our experiments. Each kit lists four of the 1N914 diodes, one 1N3064, one 1N4735 and one 1N4001. The diodes have marking. Using the camera on your phone may help.

There are 2 issues: The diodes look alike and the actual part might be different than what the box lists.

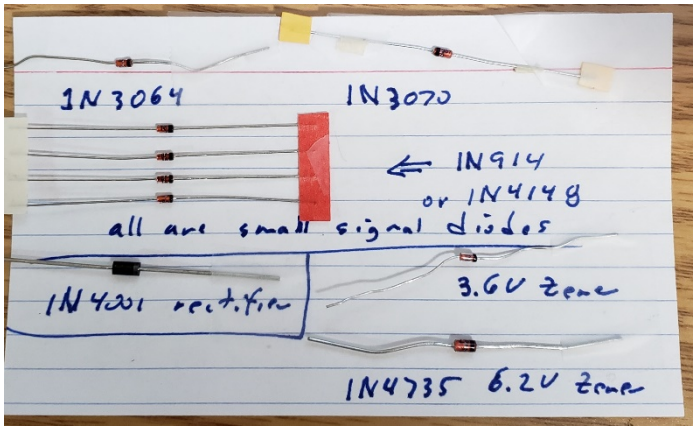


Figure 2 Diodes possibilities in the kits

For what we are doing, the 1N914 and 1N3064 can be used interchangeably. My ADALP2000 has a 1N3070 rather than the 1N3064, it works the same. If kits have 1N4148, they also work. If the experiment calls for the 1N914 or the 1N4148, use any of these small signal diodes.

The 1N4001 rectifier is black and is the only one easy to identify.

The Zener diodes are the issue.

Issues with the Zeners:

1) They look much like the small signal diodes.
2) They might have different values.

My ADALP2000 lists a 1N4735 on the box which is a 6.2V Zener, but it actually contained a 3.6V Zener with marking of C3V6. The 3V6 represents 3.6V.
My Digilent kit does have the 1N4735, and if you look you can see it is physically larger than the small signal diodes.
For LTspice the model statements, copy and paste as a spice directive:

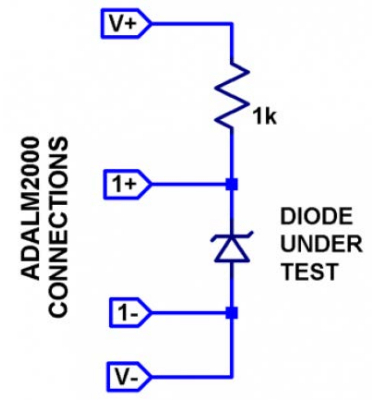
```
.model D1N4729  D(Is=2.306f Rs=2.741 Ikf=0 N=1 Xti=3 Eg=1.11 Cjo=300p M=.4641
+               Vj=.75 Fc=.5 Isr=2.405n Nr=2 Bv=3.6 Ibv=1.1936 Nbv=2.2747
+               Ibvl=19.94m Nbvl=12.64 Tbv1=-555.56u)

.model D1N4735  D(Is=1.168f Rs=.9756 Ikf=0 N=1 Xti=3 Eg=1.11 Cjo=140p M=.3196
+               Vj=.75 Fc=.5 Isr=2.613n Nr=2 Bv=6.2 Ibv=4.9984 Nbv=.32088
+               Ibvl=184.78u Nbvl=.19558 Tbv1=443.55u)
```

Note 1: If you have one of the clear glass diode that is bigger than the rest that is your Zener.
Note 2: If you can read the markings on the Zener you should be able to select it from the others.
Note 3: you probably have either a 6.2V Zener (1N4735) or a 3.6V Zener (Could be marked as 3V6 or as 1N4729) If there are other marking share them on Piazza and we will try to sort this out.

These words for from Analog Devices:

Note that the diodes can be difficult to identify. This circuit can be used to identify the Zener diode and determine whether it is the 3.6V or 6.2V model.



Set V-/V+ to -5V/+5V (or use a benchtop supply set to 10V.) The Zener diode will read ~6.2 (or ~3.6V) from 1- to 1+, a silicon or Schottky diode will read 10V.

Professor Schoch's comment: If you read about 0.6V your diode is in backwards.

Figure 3 Test of Zener diode.

Use this circuit to confirm **which diode is the Zener and the voltage of the Zene**r.
REPORT THE VOLTAGE OF THE ZENER IN YOUR REPORT.
Note 4: all of our small signal diodes are silicon diodes.

Photo Transistor (also called Infrared Transistor), PIN Diode and IR (Infrared) LED: Exp 8 and Project 4 use the IR LED and IR Transistor.
Figure 3 test circuit together with an IR source (TV remote, sun light, or incandescent light) can be used to confirm which component is the Infrared Transistor. The "old" Digilent parts kit only has the Infrared LED and IR transistor. The ADALP2000 kit has IR LED, IR transistor and an IR PIN Diode.
All of these have 2 leads. For Exp 8 and Project 4 you need the IR LED and the IR transistor.

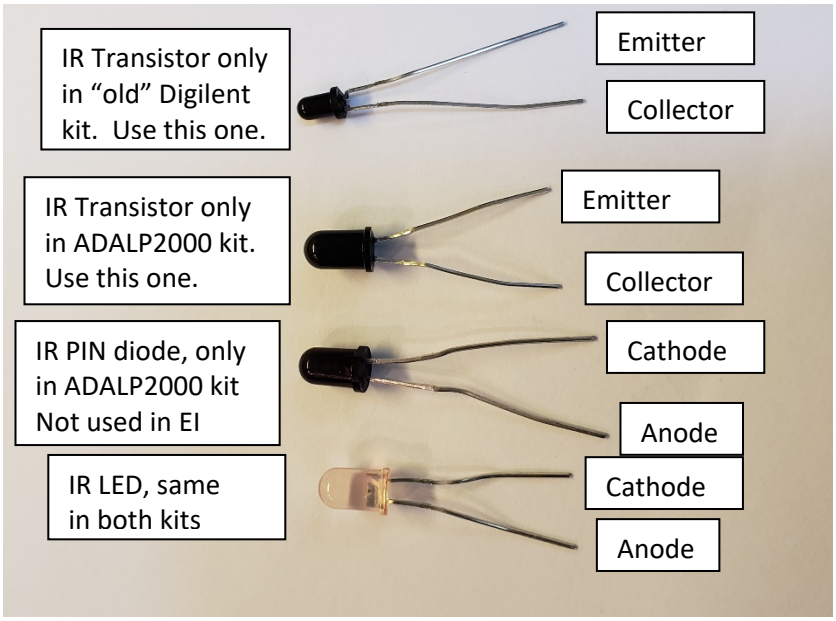


Figure 4: Components in the kit of parts. These may vary.

Use the circuit in Figure 3 to test to be sure that you have the correct IR transistor.
The emitter should be tied to V- and 1-. The collector should be tied to the 1k resistor and 1+. Set up the circuit and use an IR source that you can turn on and off or block. **The examples below are using a TV remote located close to and shining directly on tip of the transistor.**