This page outlines how to modify a consumer wireless product (the Linksys WAP54G), by using its onboard serial port to receive data from a temperature sensor.

**Parts Needed**

Here's a list of everything used for the serial port mod:

- Linksys WAP54G
- Max233 Adapter (AD233BK w/ CTS/RTS pinouts)

Connectors purchased from [http://www.futurlec.com](http://www.futurlec.com):
- 10 pin PCB Header – IDCMIH10
- 10 pin Header Connector – IDCC10
- Multiribbon Cable – HDCONNS6
- RS232 Male Connector – DSUBSCM9

**Step by Step Guide**

Our Linksys WAP54G, fresh out of the box

1) Opening the device: The version I worked on (presumably all versions?) had screws inside the front two feet. So to actually remove the cover, first flip it over and remove the front two rubber feet. A pencil works well for this, if your fingers don’t. After removing the two screws, the purple front end should pop right off. I say should, because with both WAPs I eventually opened, the front only came off after much struggle. Your mileage may vary.
One of two screws that needed to be removed

2) Once opened, it's probably a good idea to remove the two antennae. Just reattach them whenever you're done and want to use the device again.

3) Serial Port Mod: The serial port is at pin RJP1 (I think on earlier versions it's pin J5). The 10 pin PCB header (probably after breaking off 1 pin for convenience) was soldered in. The one thing I will note is at least on my WAP (this isn't the case on earlier versions),
there was a capacitor unfortunately located very close to J1, which didn't allow the connector to sit quite flush with the board. Everything still worked though, with the plastic edge of the connector sitting against the cap instead. The 10 pin connector snaps into the header after it's attached. And that completes all the modifications necessary to the WAP board itself.

A closeup of RJP1, which is the board's idle serial port
4) A/D Converter assembly: The A/D kit we purchased comes with an instruction sheet, so it can be assembled just as described on that, with one caveat- the A/D converter is pinned out for a female RS232 port, and so that is the connector which is included. The WAP is actually pinned out for a male RS232 port. To fix this, I discarded the female connector and attached my own separately (see step 6).
5) Connections: Take a length of multiribbon cable and attach it to the 10 pin header on the Linksys board. Separate the cables at the other end, and if you wish, tie off the wires attached to Linksys pins 3, 5, 9 (they won't be connected to anything anyway). The other wires connect to the A/D converter as follows: pin 1 to Tx, 7 to Rx, 6 and 8 to GND, and 2 and 4 to +5 V.

After multiribbon cable is attached to the Linksys board

After connecting the A/D converter to the Lunksys board (which is on the other end of the wires shown)

6)'Fixing' Serial Port Problem: As mentioned, the WAP54G takes a male DB9 with DTE pinouts. The A/D kit provides a DCE connector. If you find the proper cables, there's probably an easier way to do this, but this is how we fixed it: Take another length of multiribbon cable (it may be easiest to separate each wire into individual ones here) and solder each wire into the serial port jumper on the A/D board (where the kit told you to solder the RS232-DB9 female connector). The other end of each wire goes into the same pin of an RS232-DB9 male connector, except... cross the wires for pins 2 and 3 (the Rx and Tx lines). So, for example, pin 1 on the converter goes to pin 1 on the connector, pin 4 goes to pin 4, and so on down the line; except pin 2 on the A/D board goes to pin 3 of the connector, and pin 3 on the board goes to pin 2 on the connector.
After switching the gender of the serial port

That's it for the serial port mod. If everything worked, you should be able to open a serial console on the device.

THE REMAINDER OF THE PROJECT

PARTS NEEDED:

DS1822 Temperature Sensor(s):
http://www.maxim-ic.com/products/sensors/1_wire.cfm
DS9090K 1-Wire Evaluation Kit:
http://www.maxim-ic.com/quick_view2.cfm/qv_pk/4135

For our purposes, we needed to go on to show meaningful temperature data could be gathered and transmitted cheaply. So, we used the serial port to attach a 1-wire temperature sensor, the DS1822. To do this, we built up a small 1-wire network (I only had two sensors, but theoretically many more than that are supported), and attached it to the WAP's serial port. I would note the latest revision of the 1-wire evaluation kit includes a USB connector instead of a serial one, I suppose with the necessary converters this would still work. Being lazy, I just took the connector from an older kit.
A closeup of the DS1822 Temperature Sensor. The box on the right is a connector to allow a string of sensors to be attached together.

The DS1822 with its serial port connector

Powering the sensors is a little tricky - they won't run on the 3.3/5 V supplied by the A/D converter. I wound up taking a wire and soldering it to the +12 V power pin from the WAP board (double check you have the correct pin with a voltmeter before soldering), then attaching that to the left hand pin of J1 on the A/D converter. This pin has a trace
(see pinout above) that connects it to the +5 V, which goes out to the sensors - so they should now be seeing more than enough power to run.

The cable soldered to the power pin on the underside of the Linksys board. The other end is attached to the A/D converter at pin J1.

The firmware modifications which allow this to run on the WAP are based on DigiTemp, an open source project which is dedicated to reading temperature and humidity data from 1-wire networks.
All done.