There may be an occasion when you need to check that there is a phone physically connected to the Ag1171 line output (Tip / Ring). An easy way to check this is to pick up the phone receiver (Off-Hook) and if the Ag1171 SHK output responds by going high (logic 1) then you know that the phone is connected.

But what do you do, if no-one is there to pick up the phone receiver (e.g. the phone may be in another room), but you need to verify that there is a phone connected?

Providing you are using a µ-controller that has an ADC input, there is a simple way of testing the line, by generating a ringing signal and measure the Ag1171 supply current. This application note will give you an overview of how this can be done: -

Figure 1 shows how to connect the ADC input to monitor the Ag1171 supply current. A 0.1R resistor needs to be used to ensure that the voltage drop (across the Ag1171) supply rail is kept as low as possible, but to have enough voltage for the ADC to measure. The 10K and 100nF are optional, but may help smooth the measurement voltage a little bit. So if the Ag1171 draws 100mA from the supply, then the ADC input voltage will be 10mV.

The 470µF and 100nF capacitors that we recommend in the datasheet must be connected directly across the pins of the Ag1171.

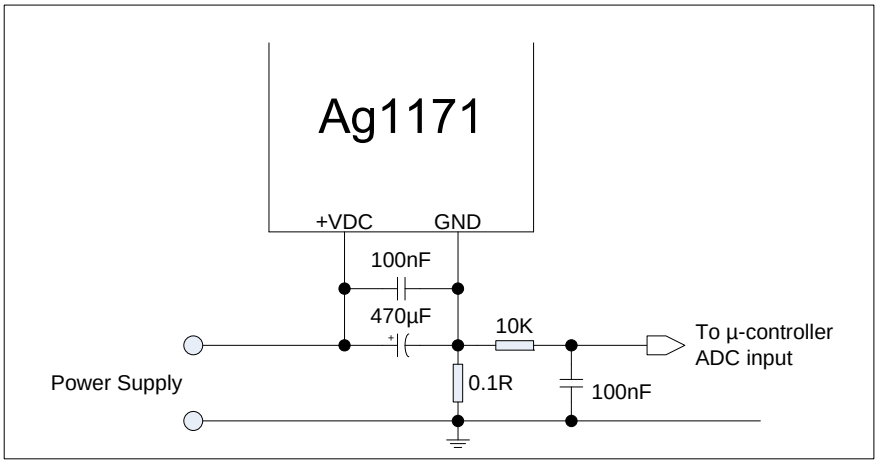

Figure 1: Ag1171 supply current monitor circuit

To test if there is a phone connected, ring the phone once (for ~1 second) by setting the RM pin high and toggle the FR pin at the ringing frequency (typically 20Hz to 25Hz). Whilst ringing, wait ~100ms before reading the ADC input monitoring the supply current. It is recommended to take multiple measurements and average, to remove some of the noise (see Figure 2).

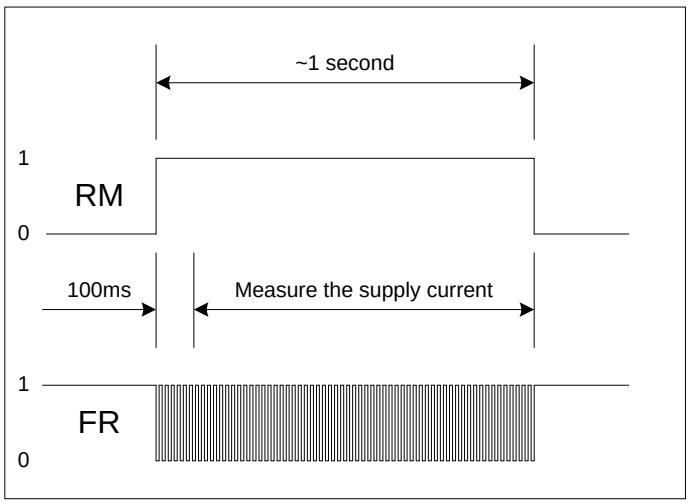

Figure 2: Measuring the supply current during ringing

This is where you will see a difference in supply current between there being a phone connected and when there isn't.

Figure 3 shows an oscilloscope trace monitoring the ADC input point (in Figure 1), when the Ag1171 supply is 5V and a phone is connected to the line.

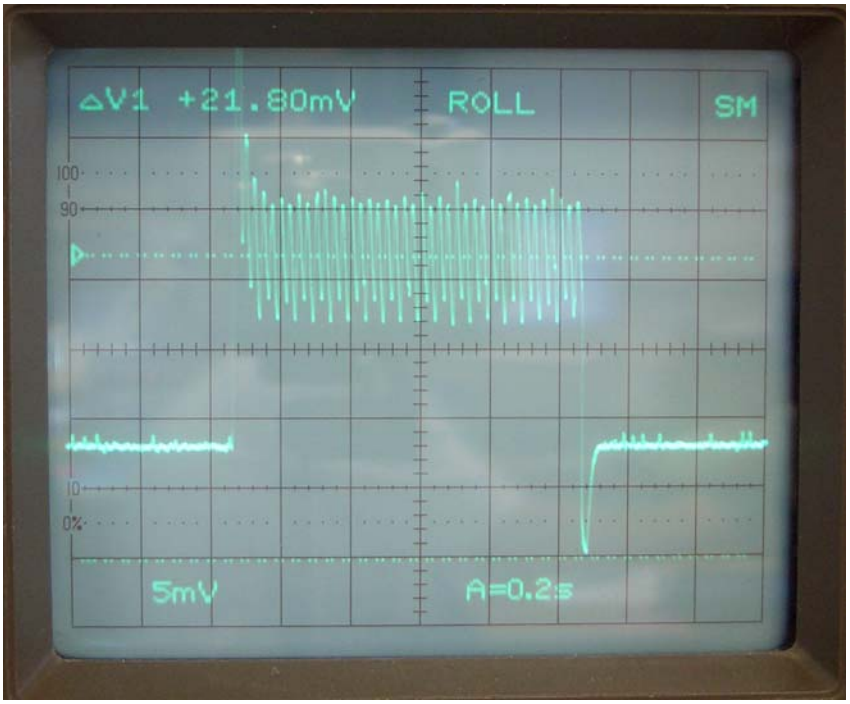

Figure 3: Ag1171 supply current (@5V) with a phone connected

Figure 4 shows an oscilloscope trace monitoring the ADC input point, when the Ag1171 supply is 5V, but this time there is no phone is connected to the line.

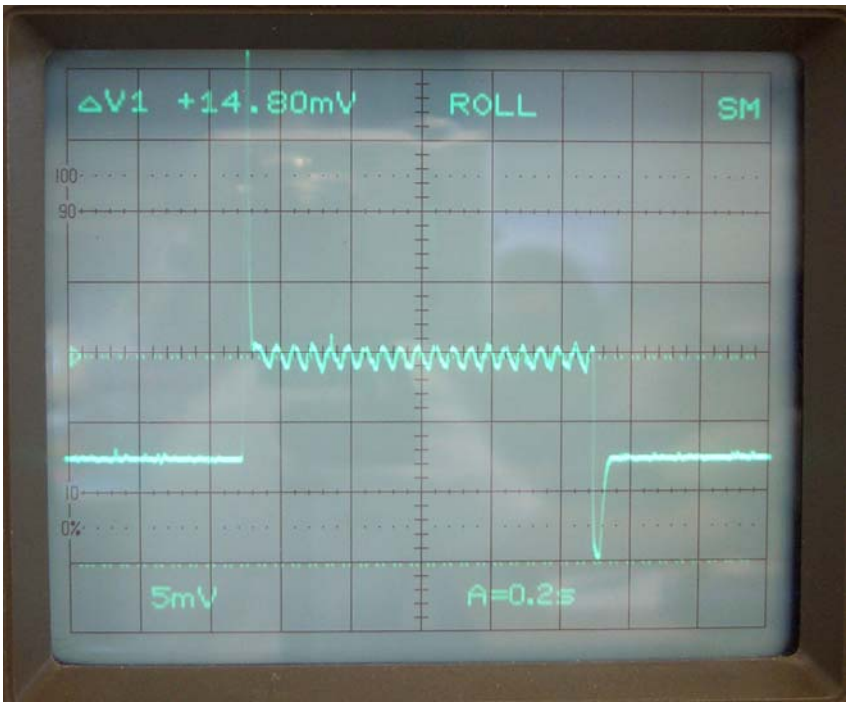

Figure 4: Ag1171 supply current (@5V) without a phone connected

As you can see the supply current is much lower when there is no phone connected to the line.

If the resolution of the ADC is low you may need to amplify the signal going into the ADC pin.

Figures 5 and 6 show the test repeated, but here the Ag1171 supply rail is set to 3.3V.

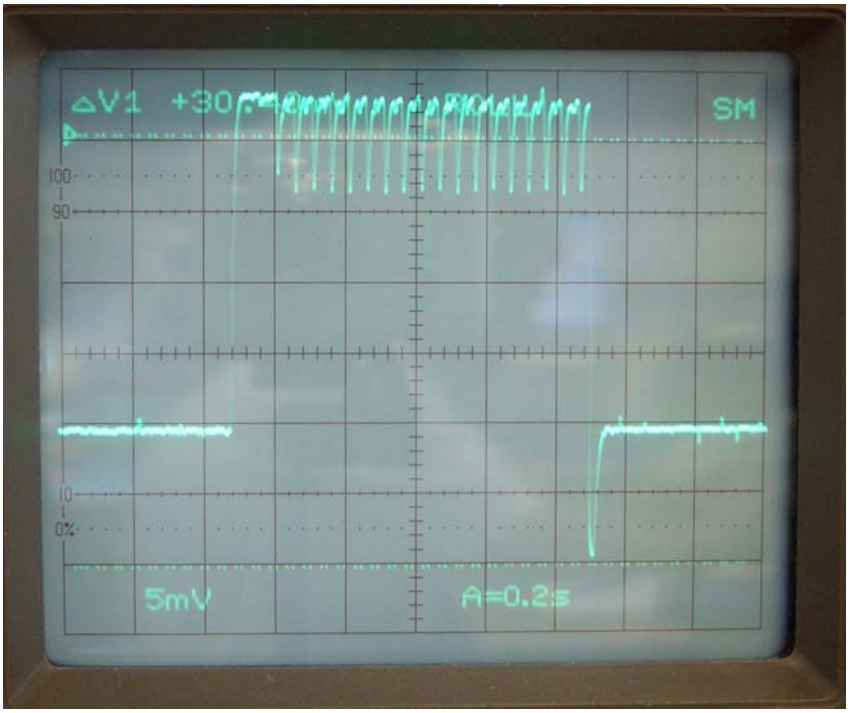

Figure 5: Ag1171 supply current (@3.3V) with a phone connected

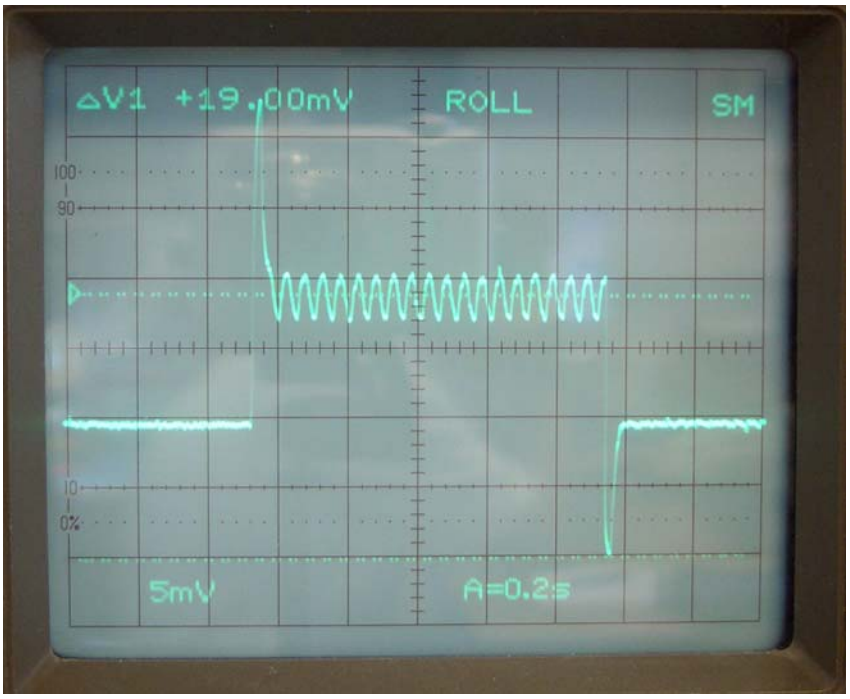

Figure 6: Ag1171 supply current (@3.3V) without a phone connected