AtomicPi Microphone Information

The AtomicPi has a slave mode I2S audio interface that was originally designed for digital microphones. It supplies power (3.3 volts & ground) plus a bit clock and left/right (word) clock, and takes in an I2S formatted stream.

Microphones that are known to work include the InvenSense ICS-43432, a tiny surface mount mic. Another tiny mic is the Knowles SPH0645LM4H-B. Both of these are available from Digikey.com. The Knowles mic is available from Digikey or Adafruit, mounted on a small PCB that makes the mic much easier to interface to the AtomicPi. You just need to hook up six wires from the mic breakout board to CN13 (the 10 pin JST header located next to the RJ45 jack) on the AtomicPi.

Microphone Wiring:

CN13	Microphone breakout board.
Pin 1 = Vcc	3V
Pin 2 = data	DOUT
Pin 3 = bit clock	BCLK
Pin 4 = work clock	LRCL
Pin 5 = ground	GND
Pin 6 - select	SEL

The microphone is monophonic and which channel it outputs data on is selected with the SEL pin. You can hook up two microphones for stereo by tying one's SEL pin to VCC and the other's to GND, and hooking both microphone's DOUT pins together to CN13 pin 2. Both mics also share the LRCL and BCLK pins.

You will need to find a program that allows recording from the microphone. Audacity is one that works. You can install it from the System Tools menu. Select System Tools > Software > Audio & Video and then install Audiacity. When you run it, you wil need to select the input source as Mayfield and the mode as Stereo. Also be sure the Project Rate is set to 48 kHz.

Another thing that needs to be done is setting a GPIO bit to 0. There is a lookback mux on the board to allow recording from the playback pins. It's controlled by GPIO 341. Set it low before using the microphone inputs otherwise you will end up recording whatever is being played back. You can use the file method to set the GPIO. From root:
echo 341 > /sys/class/gpip/export
echo out > /sys/class/gpip/gpio341/direction
echo 0 > /sys/class/gpip/gpio341/value

The AtomicPi actually has four I2S audio channels, two on each of the 10 pin connectors, CN13 & CN14. Current xMOS firmware supports one channel on CN13. Each I2S channel is a stereo pair.

The sampling rate is currently fixed to 48 kHz. The bit clock is output from the XMOS audio chip on the AtomicPi at 3.072 MHz which is 64 times the sample rate. The sample rate is output on the word clock pin. You can use this information to hook up other I2S audio input devices to the AtomicPi.

Note that the bit clock and word clock are output twice on each CN connector. They are all the same signals, eached buffered on the AtomicPi so they can drive long cables.

Refer to the AtomicPi schematics page 31 for CN13/14 pinouts.