"I am proud of the fact that I never invented weapons to kill"
- Thomas Edison

Fifteen percent of all Americans spend an average of ten minutes each day searching for their television remote controls.
- Eli the Mule, CEM

GilderAppNote

Application Hints from Gilderfluke & Co.

USB-AtoD

The USB-AtoD is a small printed circuit board with connections for:

- Full speed USB 2.0 to your computer
- Eight potentiometer inputs featuring twelve bits of resolution (4096 steps between the zero and full)
- Thirty-two switch closure inputs (on/off).

The resolution of the potentiometer inputs is twelve bits. This means that there are 4096 individual steps between the zero and full scale. This is many times the resolution of a typical gaming joystick.

The terminal blocks used on the USB-AtoD don't need a screwdriver to use. Just push down on the little lever, and stick the stripped end of your wire into the hole just below. Release the lever, and the wire will be clamped in.

There are eight potentiometer inputs. Each has its own set of three terminals: +5 volts (shown as red), 'Wiper' (shown as Blue) and Ground (shown as Black). The acceptable values for your potentiometers are from 1.0K ohm to 100K ohms. Make sure the middle 'Wiper' contact is connected to the middle pin (labeled 'X', 'Y', 'Z', 'RX', 'RY', 'RZ', 'SLD', or 'DIAL') on the USB-AtoD. If you need to reverse your pot, just swap the +5 volts and Ground pins.

The USB-AtoD can also be used for programming sixteen bit and higher resolution analog channels within Pc▪MACs. Just program the channel normally using the USB-AtoD. Once you are happy with the results, perform a 'smooth' command on the analog channels. This (or any other OffLine editing command) will 'oversample' the analog channels up to the desired resolution.

The potentiometer inputs to the USB-AtoD are limited to five volts DC. If you are feeding larger analog voltages to the USB-AtoD, use a pair of 'dropping' resistors to keep the voltage within the 0-5 volt range. As an example, if the voltage you need to record is 0-10 volts, you would use two resistors (10K ohm typically, but almost any value up to 100K ohm can be used). Attach one end of the first resistor to the 0-10 volt signal, one end of the second resistor to ground. Tie the two free ends of the resistors together, and feed this voltage (which will be 0-5) to the USB-AtoD.

The thirty-two switch inputs are labeled 'B1' through 'B32'. There is a Ground (shown as black) and 'Bn' terminal (shown as green) for each switch input. You can use any kind of switches with the USB-AtoD. If you are feeding signals in from a higher voltage system to the switch inputs, use small relays (up to 32 of them) in place of the buttons to isolate and protect the USB-AtoD.

The USB-AtoD's terminals labeled 'Up', 'RGT', 'DWN' and 'LFT' are not normally used.

When you plug the USB-AtoD into your PC, it should instantly be recognized as a gaming joystick. It will be reported as a 'BU0386A'. No drivers should be needed for Windows '08/'07/Vista/XP/2000/Me/'98 and Mac OS X.

The USB-AtoD can be adjusted using the standard Windows gaming Device Calibration utility. Further adjustment and calibration can be done (if needed) using the Logitech DIView utility or simple Configuration utility.

More Info...

USB-AtoD can be used anywhere you need high resolution potentiometer or switch inputs for Pc▪MACs.

Build a Console: Just attach up to eight linear or rotary potentiometers and up to thirty-six switches to the USB-AtoD.

Build a Waldo: A 'Waldo' is a mechanical device that mimics the mechanics and shape of whatever you are controlling. Examples of Waldos include:

- A device you stick your hand in just like you would with a sock puppet and program complex mouth moves by wiggling your fingers.
- A model of an elephant trunk, dragon's neck or other 'snaky' animated figure. This lets you program it Bunraku-style.
- A motion base or other complex geometry. Our USB-MbJoystick is an example of this. You can make a fairly simple model of what you need to program, throw some pots at each corner, and then 'fly' it to program it.

Sampling Data: You may want to replace an old control system with brand new GilderGear, but want to save your existing shows. If you can get to the old controller's outputs, you can 'clip' the USB-AtoD's inputs to them and 'sample' in the old show. Small shows can be done in one pass. Larger shows may take multiple passes to record all their data. Hint: Pick one digital and record it into a different channel on each pass. You can then use these channels to align all the data perfectly.