



Basic stamp data logger  
w/ 7 Amp-Hour battery



“gopher” down-hole  
instrument pod

*Measurements:*

- pressure (water level)
- conductivity
- turbidity
- water motion

*Time Interval:*

- 1 sec to 15 min

*Time Period:*

- 1-2 years

## Logger Specifications

- Quiescent Power 17  $\mu\text{A}$  (compare CR-10 @ 1.3 mA)
- Separate clock chip – needs no external time.
- Memory capacity 64 MB (chip), expandable to 1 GB (on chip or multimedia card)
- Voltage Input Channels: 16 single or 8 differential, 12 bit
- Control port switches 12 V power (+ leg, not ground) for sensor power supplies
- Acquisition Rate: 1 KHz,
- Logger size: single card 3" x 4 "
- Communication via PC/Basic

# Next Generation Logger (in bench protoype)

- Based on Microchip PIC18Fxx2 chip.
- Designed for remote radar data acquisition (low freq. radar approx 8MHz) .
- Processor runs at 40MHz, with 16K of program memory, 2k of cache data memory, 8MB of non-volatile storage (can be increased to virtually any size, but we only need 8MB for our current application)
- ADC @ 40MHz feeding a FIFO buffer storing 500 conversions ( 12microsec of data)
- Timing, stacking and data storage handled by processor, 64 traces are stacked in approx 1 sec.
- Logger also includes a general purpose, 8 differential channel, 10 bit ADC, with several control lines for operating peripheral instruments, such as temperature, battery voltage etc.
- Independent clock chip for accurate long term time stamps on the data, accurate to about 10s per month.
- Complete logger consists of 5 chips on a 3x4 inch board.
- Includes serial (or USB) interface.
- Program in Basic (also C available)
- Less than 10  $\mu$ A quiescent current
- Temperature range down to  $-40^{\circ}\text{C}$
- Runs for full year on 7 AHr gel-cell battery
- Parts cost approx. \$100, current memory cost is about \$2 per MB.

# Robotic video (web) cameras



# Robotic video (web) cameras

- Commercially available (Sony, Canon, etc)
- Camera & server integrated in one unit
- Communication by hard ethernet wire, power line communication, RF telemetry, satellite (v. high bandwidth, but camera can be operated in static mode)

## **Power requirements (maximum values)**

- Heat/Deicing 6 A 24 VDC
- Streaming Camera: 1.2A 12 VDC
- Static Camera: 0.6 A 12 VDC

Power can be supplied by separate line or on ethernet cable via powered hub

