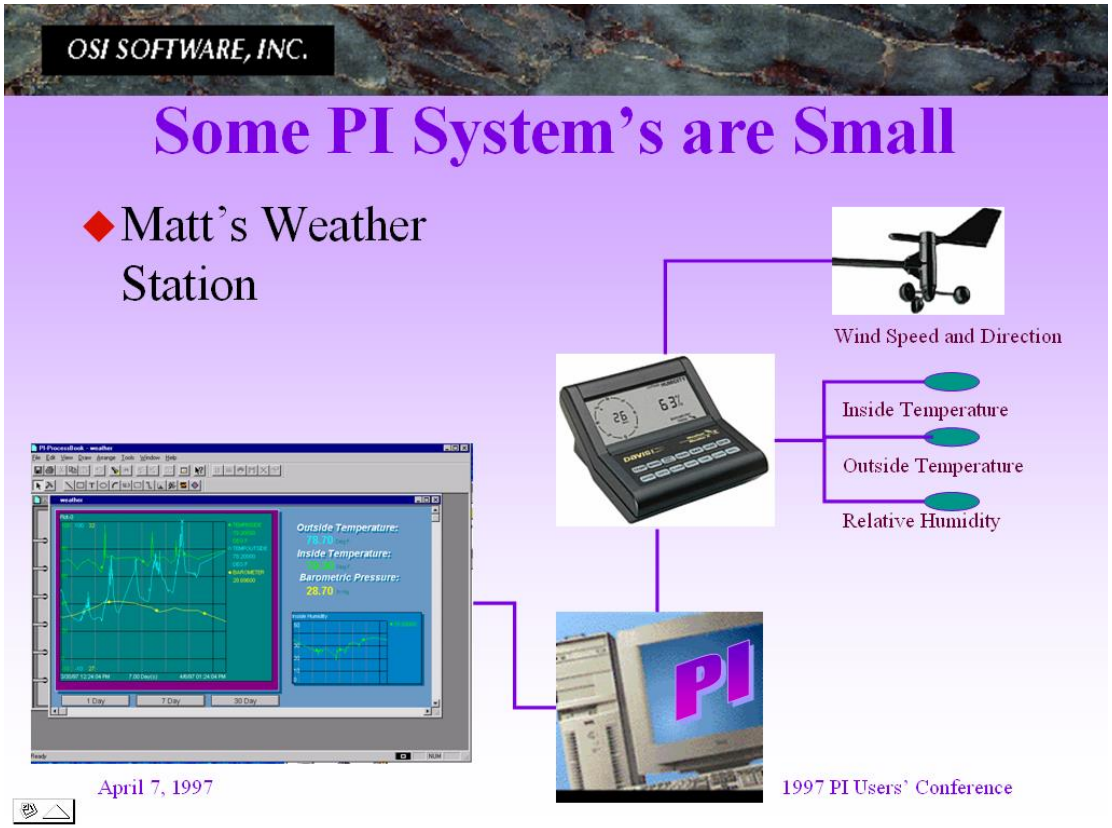
PI @ Home

Phil Ryder

Executive VP Worldwide Sales

Weather Station

- *We've had this for a long time*



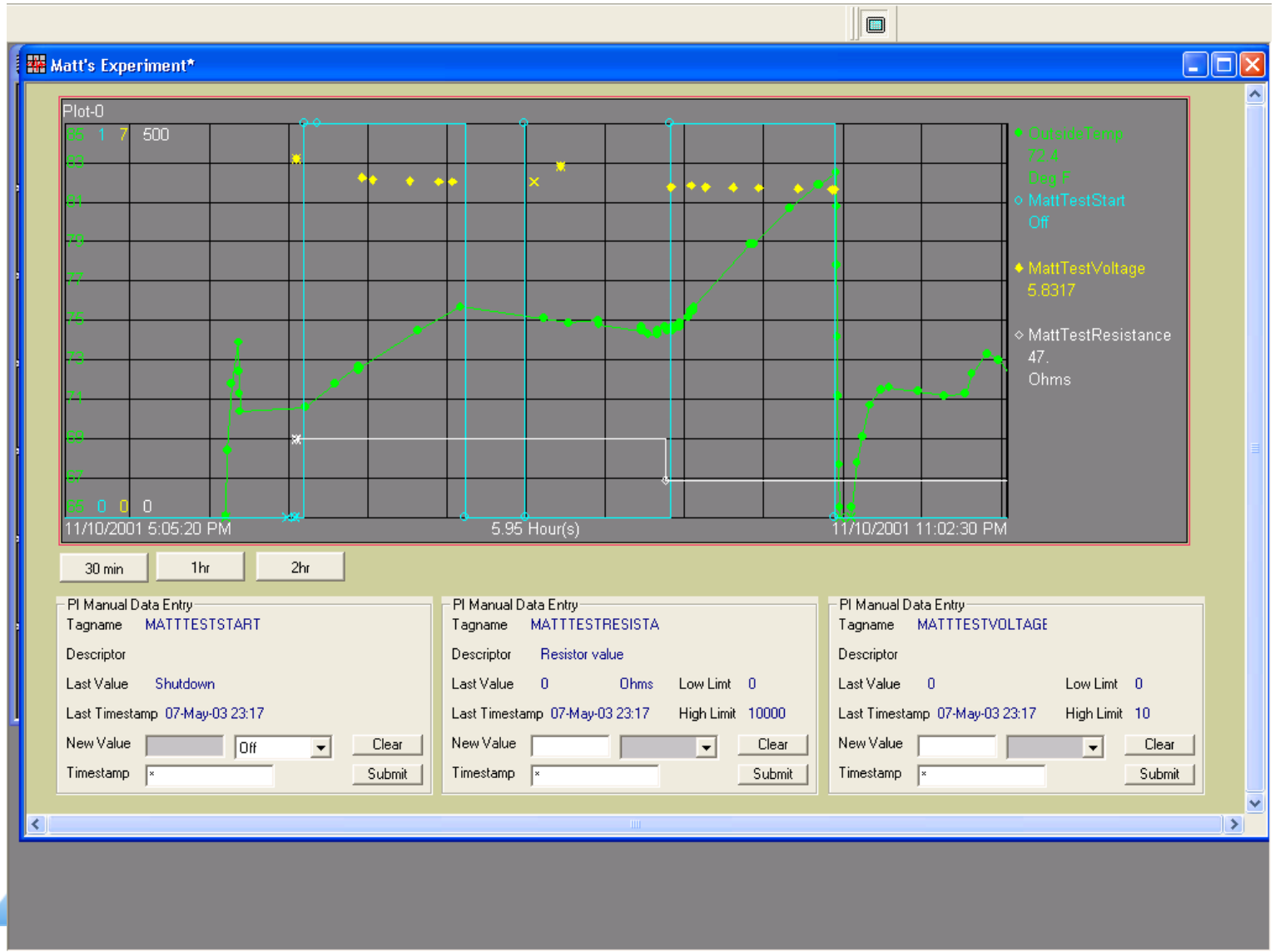
Science Fair Projects

- *Current Measurement through Calorimetery*
- *Heat of Vaporization of Dry Ice*
- *Evaporative Cooling*
- *Etc*

Voltage Measurement through calorimitery

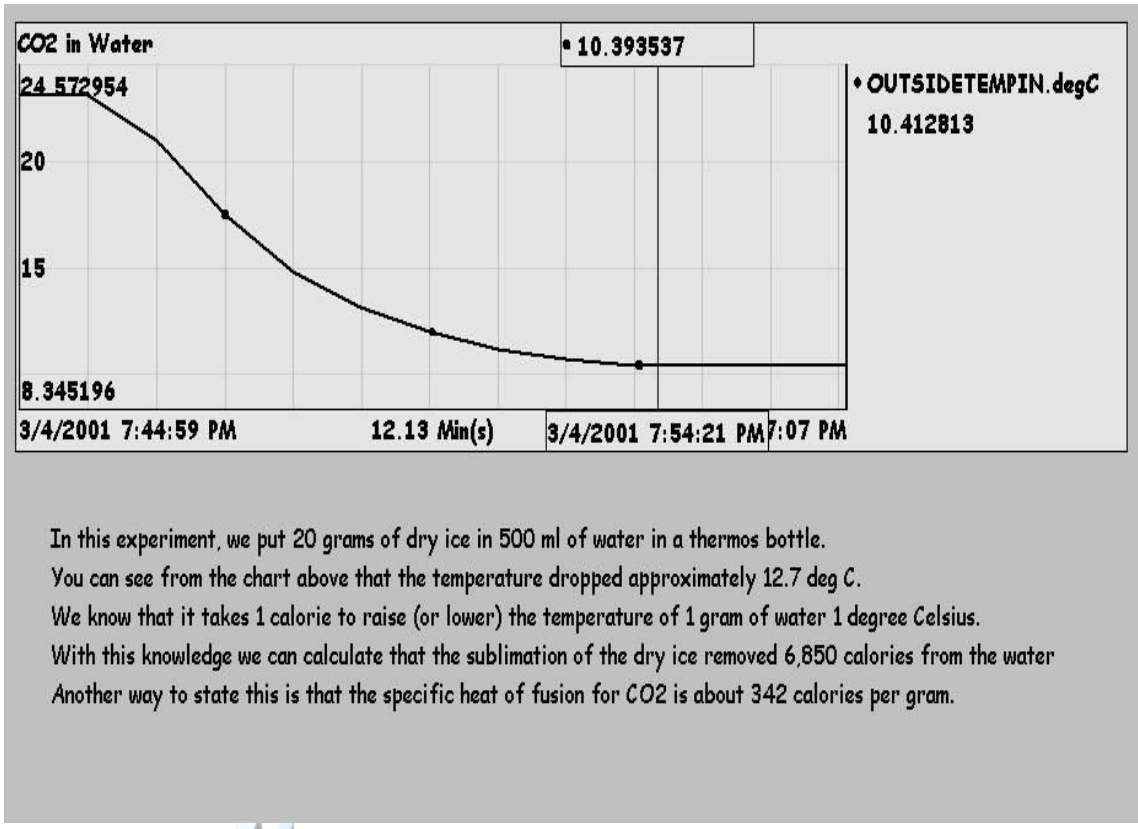
- *Infer voltage by measuring the temperature rise of a known amount of water caused by current flowing through a resister of a known value*

Calorimitery



Dry Ice Experiment

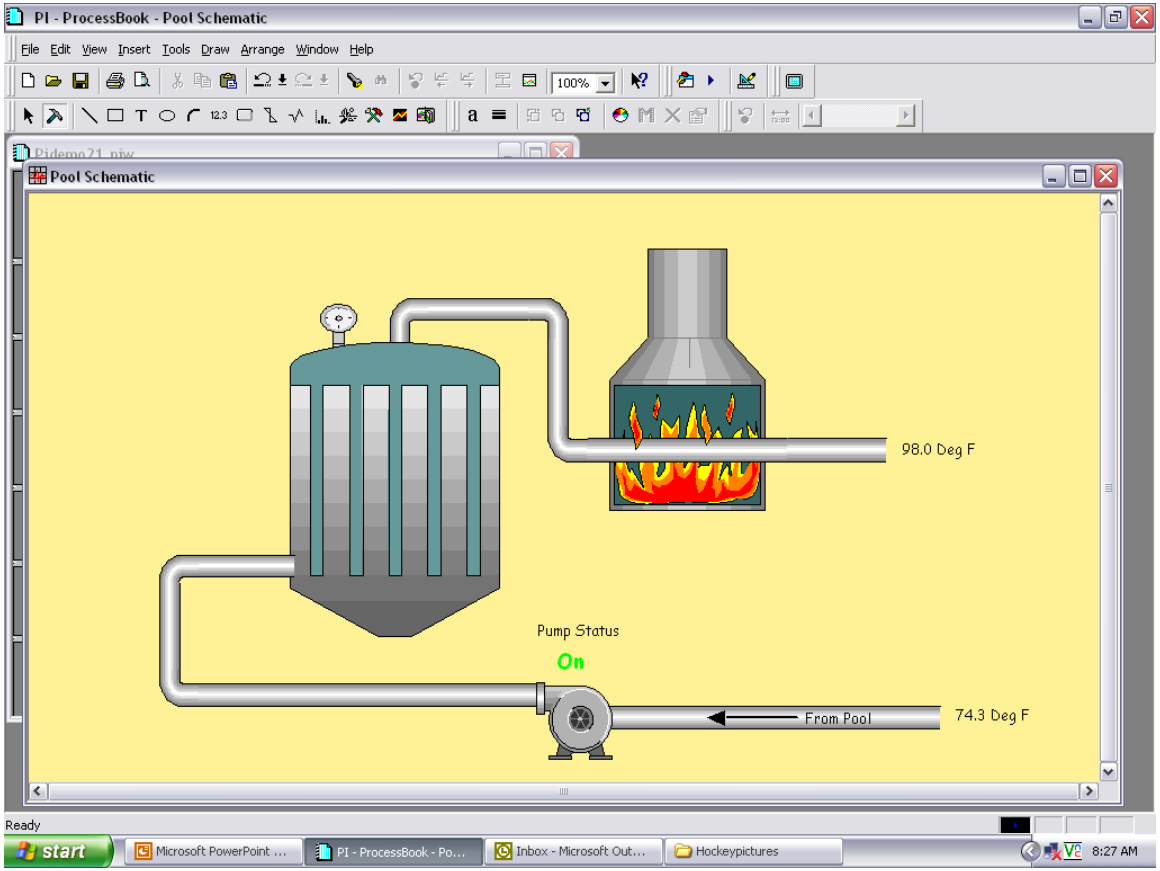
- *Kids love this one*



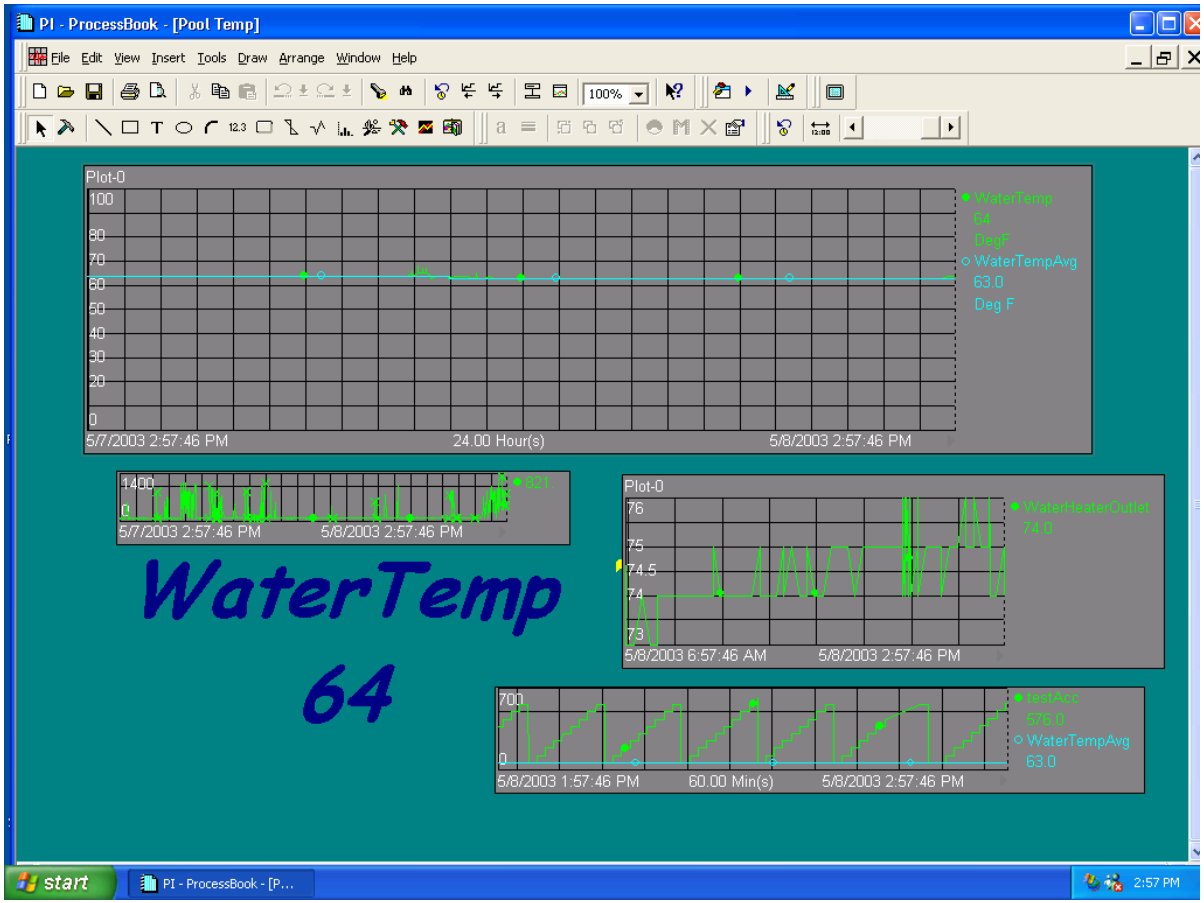
In this experiment, we put 20 grams of dry ice in 500 ml of water in a thermos bottle.
You can see from the chart above that the temperature dropped approximately 12.7 deg C.
We know that it takes 1 calorie to raise (or lower) the temperature of 1 gram of water 1 degree Celsius.
With this knowledge we can calculate that the sublimation of the dry ice removed 6,850 calories from the water
Another way to state this is that the specific heat of fusion for CO2 is about 342 calories per gram.

Pool equipment

- *Two temperatures*
- *Pump status*
- *Pressure gauge*

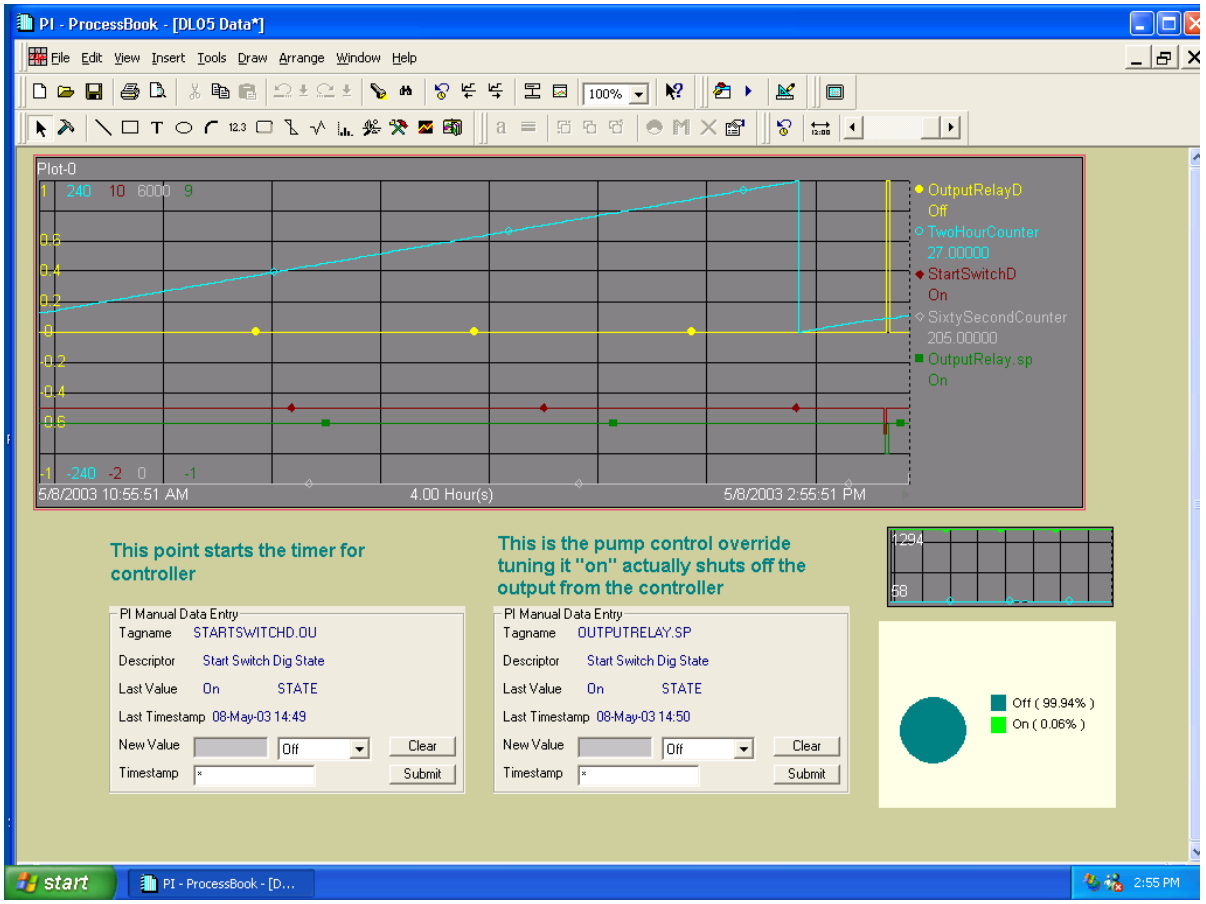


Here's the problem

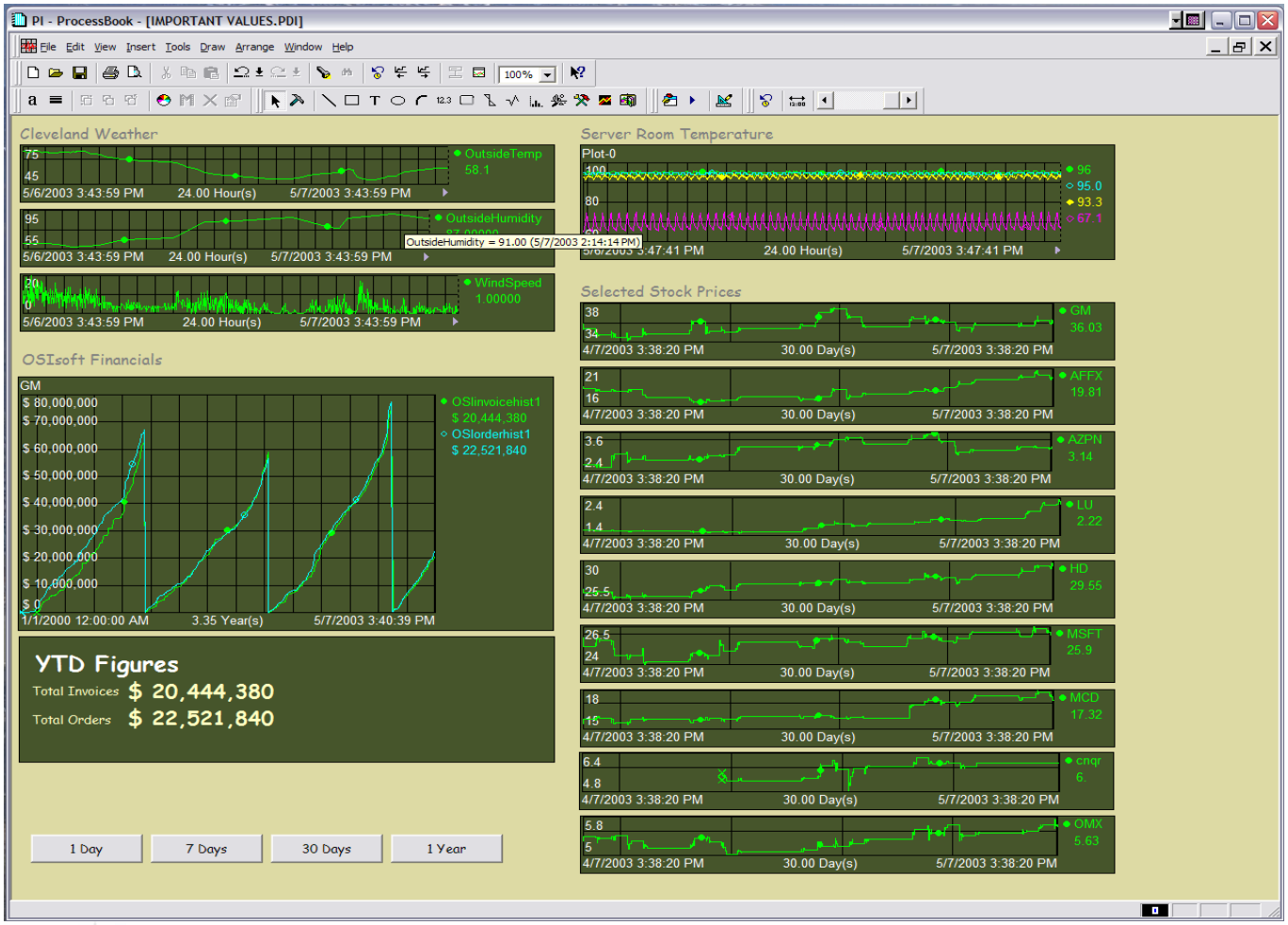


Swimming Pool

- *Pump Cycle control with temperature override*
- *Manual Input for pH, total alkalinity, and free chlorine*
- *Ace Calcs*
  - *Filter clean / dirty*
  - *Time in state*
  - *Power usage*
  - *Gas usage*


PI - ProcessBook - [DL05 Data*]
File Edit View Insert Tools Draw Arrange Window Help
Plot-0
OutputRelayD
Off
TwoHourCounter
27.00000
StartSwitchD
On
SixtySecondCounter
205.00000
OutputRelay.sp
On
5/8/2003 10:55:51 AM
4.00 Hour(s)
5/8/2003 2:55:51 PM
This point starts the timer for controller
This is the pump control override tuning it "on" actually shuts off the output from the controller
PI Manual Data Entry
Tagname STARTSWITCHD.OU
Descriptor Start Switch Dig State
Last Value On STATE
Last Timestamp 08-May-03 14:49
New Value Off Clear
Timestamp * Submit
PI Manual Data Entry
Tagname OUTPUTRELAY.SP
Descriptor Start Switch Dig State
Last Value On STATE
Last Timestamp 08-May-03 14:50
New Value Off Clear
Timestamp * Submit
Off (99.94%)
On (0.06%)
start
PI - ProcessBook - [D...
2:55 PM

Investment Tracking



Investment tracking

- *A good use of buzz-me or point watch program from the Devnet*
- *Data from stock feed*
  - *Microsoft stock ticker interface*
  - *PC Quote (Hyperfeed Technologies)*

Teenager Watch

- *Internet use*
  - *Netflow interface*
    - *What are they doing?*
    - *At what time are they doing it?*
- *Carchip – ODB2*

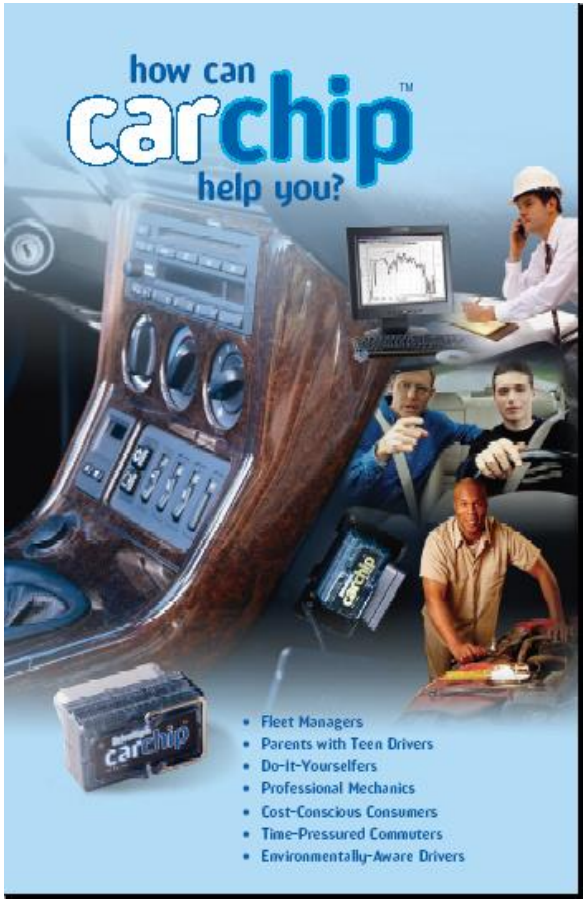
Pricing Discussion

- *Free PI for all*
  - *100 tag PI systems are now free to anyone*

What does 15 ½ mean to you?

- 137,000 lb
- 1500 hp turbine engine
- 0 to 60 – it doesn't go 60

Vehicle Monitoring



carchip
Fleet Managers
Parents with Teen Drivers
Do-It-Yourselfers
Professional Mechanics
Cost-Conscious Consumers
Time-Pressured Commuters
Environmentally-Aware Drivers

Sub-second vehicle monitoring

Microsoft Excel - SubSecond-200.xls

File Edit View Insert Format Tools Data Window PI PI-SMT Help

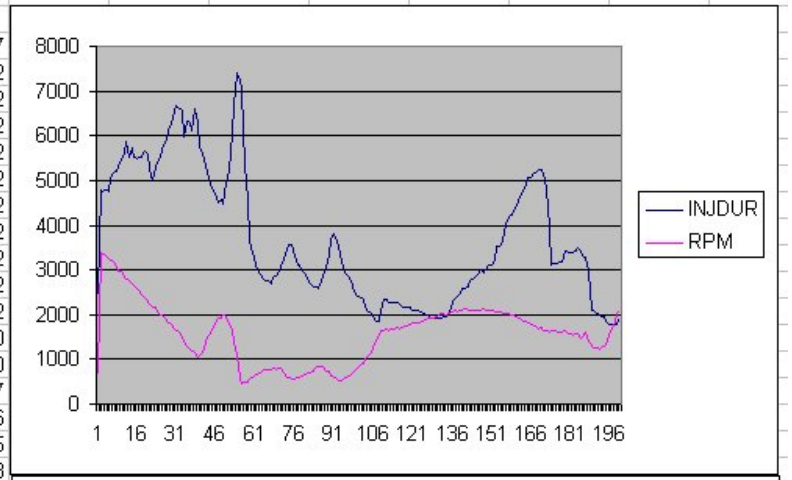
Type a question for help

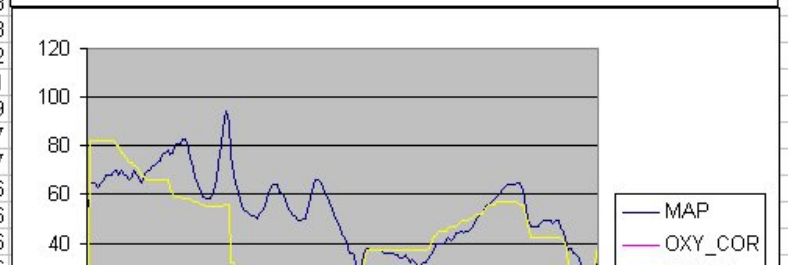
Arial 10

Reply with Changes... End Review... Security...

O4 {=PINCompDat(O3,A2,-200,0,)}

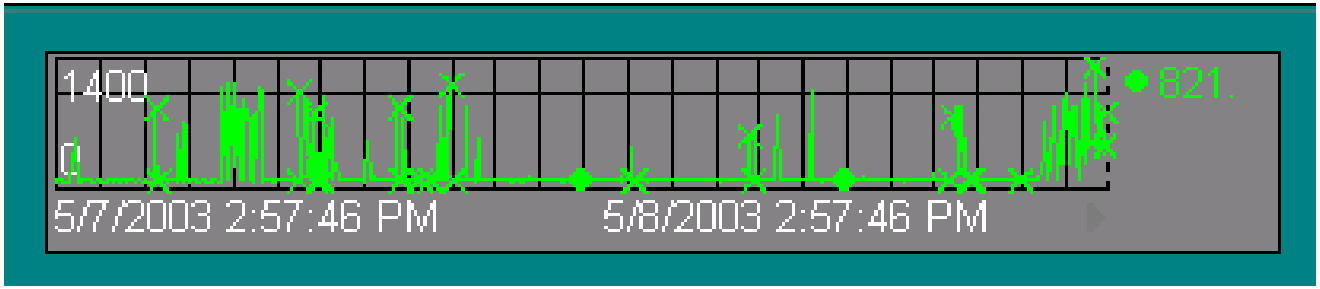
	A	B	C	D	E	F
1	**Sub-Second Data**				**View of last 200 values collected**	
2	5/10/03 10:31:54.92					
3		INJDUR	RPM	MAP	OXY_COR	THROT
4	09-May-03 12:13:46.29	2490	695	52	-33	27
5	09-May-03 12:08:37.11	4790	3405	64	-15	82
6	09-May-03 12:08:37.00	4750	3357	65	-14	82
7	09-May-03 12:08:36.89	4790	3321	64	-13	82
8	09-May-03 12:08:36.78	4750	3234	63	-12	82
9	09-May-03 12:08:36.67	5040	3210	65	-11	82
10	09-May-03 12:08:36.56	5170	3172	66	-10	82
11	09-May-03 12:08:36.44	5215	3071	68	-9	82
12	09-May-03 12:08:36.33	5305	2967	68	-9	82
13	09-May-03 12:08:36.22	5443	2971	68	-8	82
14	09-May-03 12:08:36.11	5585	2865	69	-7	82
15	09-May-03 12:08:36.00	5882	2780	70	-6	80
16	09-May-03 12:08:35.89	5537	2763	68	-5	80
17	09-May-03 12:08:35.78	5731	2702	70	-5	77
18	09-May-03 12:08:35.67	5537	2654	68	-4	76
19	09-May-03 12:08:35.56	5490	2583	68	-3	75
20	09-May-03 12:08:35.44	5537	2500	66	-2	73
21	09-May-03 12:08:35.33	5537	2448	67	-1	73
22	09-May-03 12:08:35.22	5649	2393	70	-1	72
23	09-May-03 12:08:35.11	5601	2311	68	0	71
24	09-May-03 12:08:35.00	5276	2233	66	-6	69
25	09-May-03 12:08:34.90	5013	2165	65	-6	67
26	09-May-03 12:08:34.80	5276	2157	68	-5	67
27	09-May-03 12:08:34.70	5412	2065	69	-5	66
28	09-May-03 12:08:34.60	5506	2001	70	-4	66
29	09-May-03 12:08:34.50	5797	1960	72	-3	66





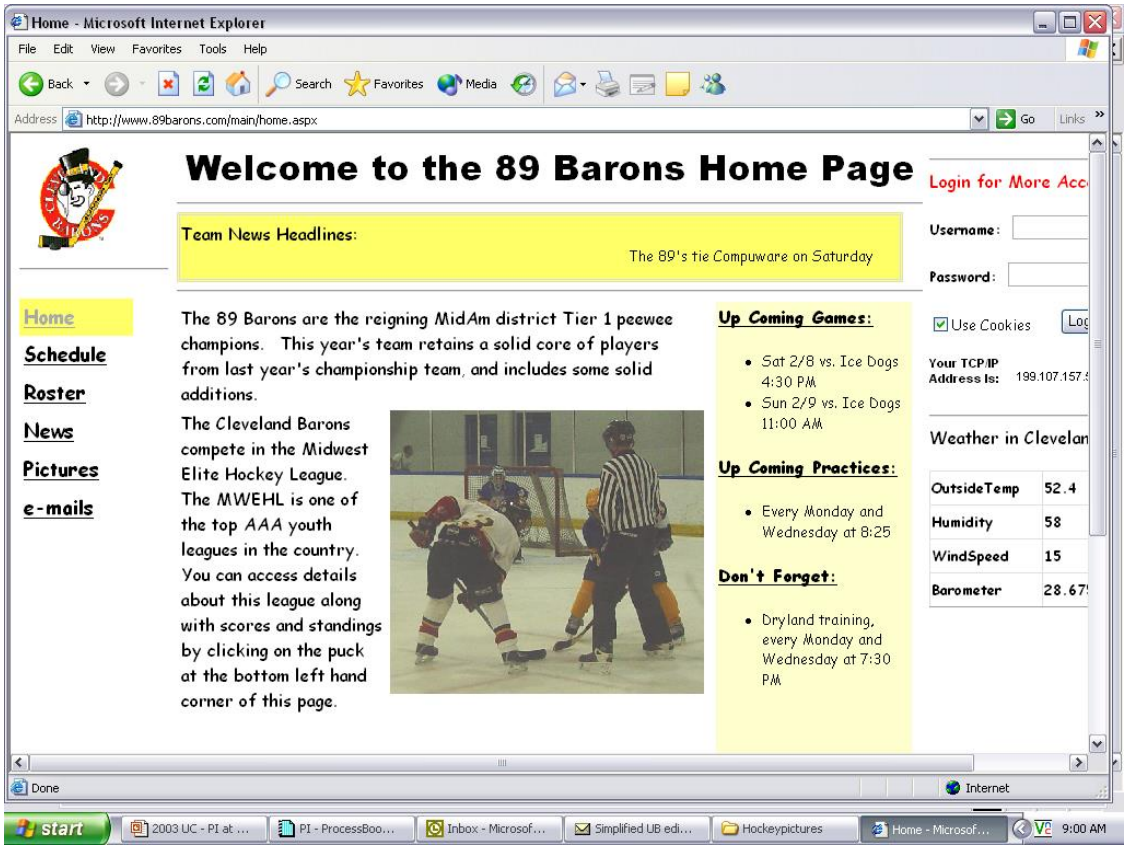
Other applications

- *HVAC*
- *UPS monitoring*
- *Internet Provider Monitoring*



My favorite home application

Hockeyboys.com



Sources of Data

- *Small PLC's*
- *Weather Stations*
- *Car Chips*
- *Home Automation systems*
  - *X10 interface?*
- *Power meters*
- *Internet*
  - *i.e. Stock price fees*

DUST Motes

- *Developed with DARPA funding since 1996.*
- *7 analog inputs and 16 DI/O*
- *Powered by a Watch battery that will last for 2-4 years.*
- *Wireless communications*
- *Sell for $25 in quantities - now about $50*
- *Ideal for AMR and appliance monitoring.*
- *See in the demo room*

Announcing

- *The first annual PI @ Home competition*
  - *Prizes that you can keep all to yourselves*
  - *Expand knowledge of PI*

New web site for PI@Home?

- *Looking into this*
- *Depends on response*

Pricing Discussion

New Price for 100 tag PI Server:

Other things that are free

- *On Davis Vantage Pro Wireless Weather Station*
- *2 Direct Logic PLC's*
  - *4 channel Analog card*
  - *24 V Power Supply*
  - *2 Omega temperature transmitters*
- *One Davis Instruments Car Chip*