

This document is intended to provide advanced AD 2000™ users the information necessary to adjust control parameters or to access history data from system memory. To access these features it will be necessary to directly connect the AD 2000™ to a PC or do so remotely via a dial-up modem. Temperature readouts, settings, system configuration information and data logging memory can all be accessed from the AD 2000™ Main Command Menu.

Do I need any special cables?

One of two available cables will be required depending on connection method (modem or direct). These cables are available for purchase or can be assembled per the wiring diagrams provided in the AD 2000™ Operators Manual.

What software do I need?

We recommend using a utility called HyperTerminal which is included with all Windows based PC's. It is generally located under "accessories" in the Start Menu. Another document is available for download (Setting up HyperTerminal) which explains how to properly set up HyperTerminal for use in this application.

Once you have properly connected the PC or modem to the AD 2000™ you may begin a communication session. A listing of all available commands is available in the main menu. To access the main menu at any time press **\$?** followed by the **Enter** key. If you have successfully connected the following menu should be displayed on your screen.

----- AD2000 SERIAL COMMANDS -----

\$?	- Listing of Commands	\$RVS	- Read Vanity Screen
\$SER	- Show Serial Number	\$WVLn	- Write Vanity Line (1-6)
\$VER	- Show Firmware Version	\$RRN	- Read Room Names
\$TTS	- Time-Temp Schedule	\$WRNnn	- Write Room Name (01-15)
\$TTD	- Load Default T-T Schedule	\$RND	- Load Default Room Names
\$STTnnn	- Set T-T Entry (001-336)	\$FAR	- Switch units to Fahrenheit
\$DTS	- Dump Temperature Settings	\$CEL	- Switch units to Celsius
\$WTSnn	- Write Temp Setting (01-23)	\$CFG	- Show Configuration Info
\$TDF	- Load Default Temp Settings	\$WCFn	- Write Configuration Value
\$STATUS	- Read System Status	\$CDF	- Load Default Config Values
\$STATOFF	- Turn System Off	\$TIM	- Read Clock (Time & Date)
\$STATON	- Turn System On	\$STI	- Set Clock (Time and Date)
\$STATBYP	- Put System in Bypass	\$RAT	- Read Active Temperatures
\$DLT	- Download System Template	\$DLGn	- Datalogging Group (1-4)

Note: Serial commands are case sensitive - this means you must use upper case letters (like **ABC**, not **abc**). All serial commands begin with the prefix **\$** (**dollar sign**). The **\$** prefix informs the AD 2000™ you wish to communicate.

- If a serial command is entered correctly, the AD 2000™ will make the desired change and respond "Command Completed" letting you know the change has been initiated.
- If a serial command is entered incorrectly, the AD 2000™ will send an error message, prompting the correct format for the desired command.

List of Serial Commands and description of use:

1. \$? - Listing Of Commands

Displays AD 2000™ serial command menu. An example of the serial command menu is shown on page one.

2. \$SER - Show Serial Number

Displays serial number of the AD 2000™.

Example:

```
--Serial Number--  
00001295
```

3. \$VER - Show Firmware Version

Displays the version of firmware installed on the program EPROM. Firmware is the program which tells your AD 2000™ which application it is controlling (i.e. - steam, hot water etc.).

Example:

```
--Firmware Version--  
Version: STEAM 2.6A
```

4. \$TTS - Time-Temperature Schedule

Displays current schedule of temperatures programmed into the AD 2000™ for the week. Hours are given in military time (00 - 23). The AD 2000 is adjustable every 30 minutes - 336 times during a 7-day period.

If you need to make a fine-tuning adjustment to the overall building temperature, refer to the Quick-Set adjustment in #8, \$WTS25 below.

Example:

```
--Time/Temperature Schedule--  
Temperatures in Fahrenheit
```

	MON	TUE	WED	THU	FRI	SAT	SUN
00:00>	70.0	70.0	70.0	70.0	70.0	72.0	72.0
00:30>	70.0	70.0	70.0	70.0	70.0	72.0	72.0
01:00>	70.0	70.0	70.0	70.0	70.0	71.0	71.0
01:30>	70.0	70.0	70.0	70.0	70.0	71.0	71.0
02:00>	70.0	70.0	70.0	70.0	70.0	71.0	71.0
02:30>	70.0	70.0	70.0	70.0	70.0	71.0	71.0
03:00>	70.0	70.0	70.0	70.0	70.0	71.0	71.0
03:30>	70.0	70.0	70.0	70.0	70.0	71.0	71.0
04:00>	71.0	71.0	71.0	71.0	71.0	71.0	71.0
04:30>	71.0	71.0	71.0	71.0	71.0	71.0	71.0
05:00>	72.0	72.0	72.0	72.0	72.0	72.0	72.0
05:30>	72.0	72.0	72.0	72.0	72.0	72.0	72.0
06:00>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
06:30>	73.0	73.0	73.0	73.0	73.0	73.0	73.0

07:00>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
07:30>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
08:00>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
08:30>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
09:00>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
09:30>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
10:00>	72.0	72.0	72.0	72.0	72.0	73.0	73.0
10:30>	72.0	72.0	72.0	72.0	72.0	73.0	73.0
11:00>	71.0	71.0	71.0	71.0	71.0	73.0	73.0
11:30>	71.0	71.0	71.0	71.0	71.0	73.0	73.0
12:00>	70.0	70.0	70.0	70.0	70.0	73.0	73.0
12:30>	70.0	70.0	70.0	70.0	70.0	73.0	73.0
13:00>	70.0	70.0	70.0	70.0	70.0	72.0	72.0
13:30>	70.0	70.0	70.0	70.0	70.0	72.0	72.0
14:00>	70.0	70.0	70.0	70.0	70.0	72.0	72.0
14:30>	70.0	70.0	70.0	70.0	70.0	72.0	72.0
15:00>	71.0	71.0	71.0	71.0	71.0	72.0	72.0
15:30>	71.0	71.0	71.0	71.0	71.0	72.0	72.0
16:00>	72.0	72.0	72.0	72.0	72.0	72.0	72.0
16:30>	72.0	72.0	72.0	72.0	72.0	72.0	72.0
17:00>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
17:30>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
18:00>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
18:30>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
19:00>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
19:30>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
20:00>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
20:30>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
21:00>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
21:30>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
22:00>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
22:30>	73.0	73.0	73.0	73.0	73.0	73.0	73.0
23:00>	72.0	72.0	72.0	72.0	72.0	73.0	73.0
23:30>	72.0	72.0	72.0	72.0	72.0	73.0	73.0

5. \$TTD - Load Default T-T Schedule

This command loads the time temperature defaults into memory. The default time temperature schedule is listed above in #4.

6. \$STTnnn - Set T-T Entry (001-336)

Used to set an individual time temperature entry into the schedule.

Format: \$STT 001 +070.0
 001 = Monday morning 12:00am
 002 = Monday morning 12:30am
 ...
 336 = Sunday night 11:30pm

Example: To change temperature setting for Wednesday at 5:00 AM to 75 Degrees enter:
 \$STT107 +075.0

Use this template to help locate a particular time temperature schedule location:

Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun
00:00> AM	001	049	097	145	193	241	289
00:30>	002	050	098	146	194	242	290
01:00>	003	051	099	147	195	243	291
01:30>	004	052	100	148	196	244	292
02:00>	005	053	101	149	197	245	293
02:30>	006	054	102	150	198	246	294
03:00>	007	055	103	151	199	247	295
03:30>	008	056	104	152	200	248	296
04:00>	009	057	105	153	201	249	297
04:30>	010	058	106	154	202	250	298
05:00>	011	059	107	155	203	251	299
05:30>	012	060	108	156	204	252	300
06:00>	013	061	109	157	205	253	301
06:30>	014	062	110	158	206	254	302
07:00>	015	063	111	159	207	255	303
07:30>	016	064	112	160	208	256	304
08:00>	017	065	113	161	209	257	305
08:30>	018	066	114	162	210	258	306
09:00>	019	067	115	163	211	259	307
09:30>	020	068	116	164	212	260	308
10:00>	021	069	117	165	213	261	309
10:30>	022	070	118	166	214	262	310
11:00>	023	071	119	167	215	263	311
11:30>	024	072	120	168	216	264	312
12:00> PM	025	073	121	169	217	265	313
12:30>	026	074	122	170	218	266	314
13:00> 1	027	075	123	171	219	267	315
13:30>	028	076	124	172	220	268	316
14:00> 2	029	077	125	173	221	269	317
14:30>	030	078	126	174	222	270	318
15:00> 3	031	079	127	175	223	271	319
15:30>	032	080	128	176	224	272	320
16:00> 4	033	081	129	177	225	273	321
16:30>	034	082	130	178	226	274	322
17:00> 5	035	083	131	179	227	275	323
17:30>	036	084	132	180	228	276	324
18:00> 6	037	085	133	181	229	277	325
18:30>	038	086	134	182	230	278	326
19:00> 7	039	087	135	183	231	279	327
19:30>	040	088	136	184	232	280	328
20:00> 8	041	089	137	185	233	281	329
20:30>	042	090	138	186	234	282	330
21:00> 9	043	091	139	187	235	283	331
21:30>	044	092	140	188	236	284	332
22:00>10	045	093	141	189	237	285	333
22:30>	046	094	142	190	238	286	334
23:00>11	047	095	143	191	239	287	335
23:30>	048	096	144	192	240	288	336

7. \$DTS L or H - Dump Temperature Settings

Displays current settings programmed into the Operating Temperatures mode, These 25 settings are stored in two groups, designated \$DTS L or \$DTS H.

\$DTS L

```
--Temperature Settings (01-08)--
01 Room Sensor Exclude High:      85.0 F
02 Room Sensor Exclude Low:       55.0 F
03 Room Setting Maximum:          76.0 F
04 Room Setting Minimum:          65.0 F
05 Room Differential Value:        1.0 F
06 Outdoor Cutoff (Stage1):       60.0 F
07 Stage 2 Differential:           2.0 F
08 Outdoor Cutoff (Stage2)        60.0 F
```

\$DTS H

```
--Temperature Settings (09-25)--
09 Correction for Sensor #01:      0.0 F
10 Correction for Sensor #02:      0.0 F
11 Correction for Sensor #03:      0.0 F
12 Correction for Sensor #04:      0.0 F
13 Correction for Sensor #05:      0.0 F
14 Correction for Sensor #06:      0.0 F
15 Correction for Sensor #07:      0.0 F
16 Correction for Sensor #08:      0.0 F
17 Correction for Sensor #09:      0.0 F
18 Correction for Sensor #10:      0.0 F
19 Correction for Sensor #11:      0.0 F
20 Correction for Sensor #12:      0.0 F
21 Correction for Sensor #13:      0.0 F
22 Correction for Sensor #14:      0.0 F
23 Correction for Sensor #15:      0.0 F
24 Outdoor Sensor Correction:      0.0 F
25 Quick-Set Offset Value:         0.0 F
```

8. \$WTSnn - Write Temp Setting (01-25)

This command is used to enter a new value into the two groups of settings described above in \$DTS.

Format: \$WTSnn +001.5

Example:

To increase the Quick-Set by 2 degrees enter - \$WTS25 +002.0.

9. \$TDF - Load Default Temp Settings

This command enters the default temperature settings. The default settings are listed above in #7, \$DTS - Dump Temperature Settings.

10. \$STATUS - Read System Status

Displays current status of System Mode followed by current status of each relay output.

Example:

```
--System Status--  
System - ON  
Heat Stage #1 - ON  
Heat Stage #2 - OFF  
Pump - ON
```

11. \$STATOFF - Turn System Off (Status Off)

Changes System Mode to OFF. AD 2000™ and heating system will be turned off. (Off Mode)

12. \$STATON - Turn System On (Status ON)

Changes System Mode to ON. AD 2000™ and heating system will be turned on (Automatic Mode).

13. \$STATBYP - Put System in Bypass (Status Bypass)

Changes System Mode to BYPASS. AD 2000™ will be bypassed and heating system control will be returned to existing/backup control. (Bypass /Manual Mode)

14. \$DLT - Download Template

Save time and quickly access several serial commands that include:

\$RVS	Read Vanity Screen
\$SER	Show Serial Number
\$VER	Show Firmware Version
\$TIM	Read Clock (Time and Date)
\$STATUS	Read System Status
\$CFG	Show Configuration Info
\$RNN	Read Room Names
\$RAT	Read Active Temperatures
\$DTS	Dump Temperature Settings
\$TTS	Time-Temp Schedule

Helpful Tip: Save a copy of the template before making changes to program settings. Should you forget what has been changed, a copy of the previous settings will be readily available.

15. \$RVVS - Read Vanity Screen

Displays information stored in the vanity screen. The Vanity Screen usually contains site information or name of installing contractor.

Example:

```
--Vanity Screen Lines--  
Line 1 > ESI Controls Inc  
Line 2 >  
Line 3 >   Home of the  
Line 4 > AD 2000 Control  
Line 5 >  
Line 6 > Have a Nice Day!
```

16. \$WVLn - Write Vanity Line (1-6):

The Vanity Screen is the last screen shown in "Display Temperatures". It is provided so you may enter information such as your company name, phone number and location of installation. This screen will automatically be cycled along with temperatures and Firmware Version. There are six lines of 16 characters per line available.

Format: `$WVL1 "ABCDEFGHIJKLMNPO"`

Example: To enter [Fox Apartments] on the first line of the Vanity Screen enter

`$WVL1 "_Fox_Apartments_"` press enter.

Each line of the Vanity Screen must contain exactly 16 characters. If the name you wish to enter has less than 16 characters, fill in the remaining characters with the space key. With practice, you can learn to center text in the vanity screen by inserting spaces before the words.

`$WVL1"_____"` « Must contain EXACTLY 16 characters (or spaces)

17. \$RRN - Read Room Names

Displays the names currently assigned to each room sensor.

Example:

```
--Stored Room Names--  
Sensor 01> Room #1  
Sensor 02> Room #2  
Sensor 03> Room #3  
Sensor 04> Room #4  
Sensor 05> Room #5  
Sensor 06> Room #6  
Sensor 07> Room #7  
Sensor 08> Room #8  
Sensor 09> Room #9  
Sensor 10> Room #10  
Sensor 11> Room #11  
Sensor 12> Room #12  
Sensor 13> Room #13  
Sensor 14> Room #14
```

18. \$WRNnn - Write Room Sensor Names:

The default names assigned to room sensors are Room #1, Room #2, Room #3 etc. You may want to enter a room sensor name such as [Apt. #1405] to make it easier to identify the location of the sensor and to customize the installation. Each room sensor may be given a 10 character name using the \$WRNnn command, where "nn" is the sensor to be named 01-15. This information is permanently stored in Non-volatile memory. Sensor 16 is designated outdoor sensor and can not be renamed.

Example: To rename sensor Room #1 to [Apt. #1405] enter \$WRN01"Apt. #1405" press enter.

\$WRN01"_____ " « Must contain EXACTLY 10 characters (or spaces)

19. \$RND - Load Default Sensor Names

This serial command reenters default room names. Default names are listed in #17.

20. \$FAR - Switch units to Fahrenheit

This serial command enters Fahrenheit as the active unit of temperature measurement.

21. \$CEL - Switch units to Celsius

This serial command enters Celsius as the active unit of temperature measurement.

22. \$CFG - Show Configuration Info

Displays current information programmed into System Configuration.

Example:

```
--Configuration Settings--
1> Number of Room Sensors: 04
2> Daylight Savings Mode: ON
3> Number of Heat Stages: 1
4> Min Stage 1 On Time: 03
5> Min Stage 2 On Time: 03
6> Staging Delay Time: 10
7> Pump Turn-Off Delay: 060
8> Quick-Set Feature: ON
```

23. \$WCFn - Write Configuration Value

This command is used to enter a new value into a configuration setting from the programmed System Configuration.

```
Number of sensors 01-15
Daylight Savings ON or OFF
Number of Heat Stages 1-2
On Time in minutes 05
Staging Delay in minutes 05
Pump Delay in Minutes 010
Quick Set ON or OFF
```


24. \$CDF - Load Default Config Values

This serial command reenters default Configuration Values. Default settings are listed in #22.

25. \$TIM - Read Clock (Time & Date)

Displays current time (shown in military time (00 - 23)), date and day of the week .

Example:

```
--System Time--  
19:52 02/14/02 SA
```

26. \$STI - Set Clock (Time & Date)

This serial command is used to set the correct time and date into the clock. Since the AD 2000™ automatically adjusts for daylight savings time and leap years, you probably won't be using this command.

```
Format $STI 17:25 01/30/04 FR  
Military time (hours: 00 - 23)  
Week Days: MO,TU,WE,TH,FR,SA,SU
```

Example: To enter 11:30 PM on December 31, 2004 which is a Friday:

```
$STI 23:30 12/31/04 FR
```

27. \$RAT - Read Active Temperatures

This handy command quickly displays current temperatures for each sensor.

Example:

```
--Active Temperatures--  
Sensor 01 > 78.5 F Sensor name  
Sensor 02 > 69.0 F Sensor name  
Sensor 03 > 69.0 F Sensor name  
Sensor 04 > 72.5 F Sensor name  
Outdoor > 27.5 F  
Room Ave > 72.0 F  
Set Point > 72.0 F
```

ACCESSING DATA LOGGING MEMORY

AD 2000™ data logging memory is stored in four different groups. The properties of each group are described below. AD 2000™ data is saved in Microsoft Excel™ (space delimited) format. Examples of the types of charts, which can be made with Excel from each data logging group, have been included. You can decide which data is included your graphs.

28. \$DLGn - Data Logging Group (1-4)

Use \$DLGn (n = group number) - To access the data logging memory:

1. \$DLG1

DATALOGGING GROUP #1

Cumulative Totals: Time On-line, Time Off-line and Power Faults

Totals As Of > 01/16/04 TH 11:15

On-Line (days,hrs,mins): 0621 17 49

Off-Line (days,hrs,mins): 0013 00 17

Number of Power Faults: 09

2. \$DLG2

BULK DUMP OF DATALOGGING GROUP #2

Data from all active sensors, stored every 15 minutes for 7 days

Active room sensors on the left. Last column is outdoor value.

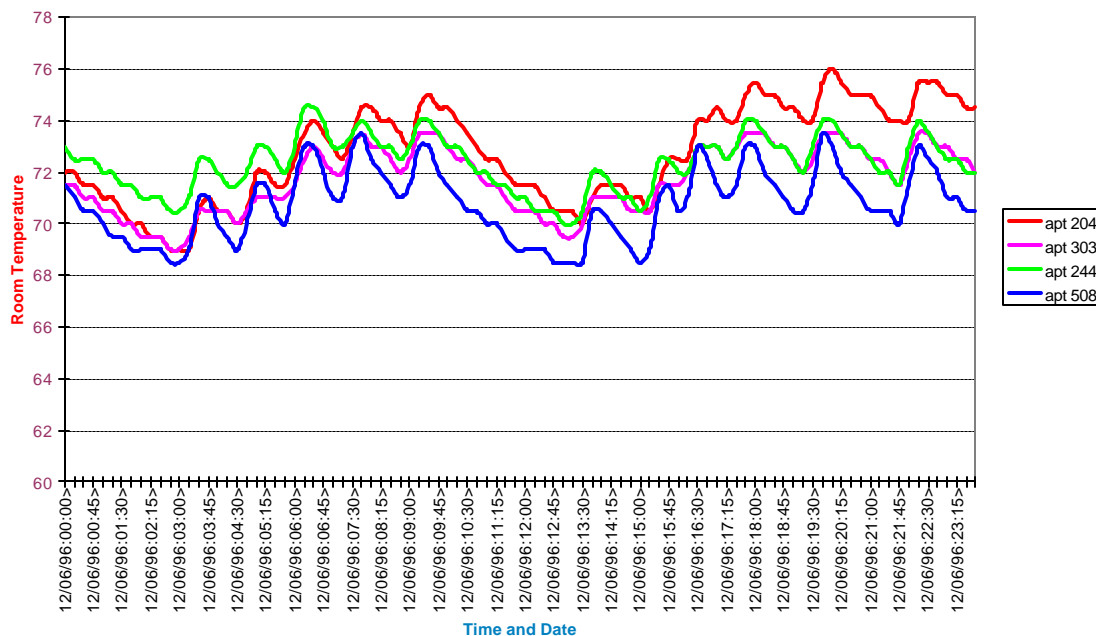
Last Sample > 01/13/01 TU 19:45

Temperatures in Fahrenheit

01/16/04:09:30>	69.5	73.5	76.5	77.5	73.0	72.5	10.5
01/16/04:09:45>	71.5	74.5	77.0	78.0	73.5	73.0	10.5
01/16/04:10:00>	71.5	74.5	77.0	78.5	73.5	72.5	10.5
01/16/04:10:15>	71.0	74.0	76.5	78.5	72.5	71.5	10.0
01/16/04:10:30>	70.0	73.5	76.0	78.5	71.5	71.0	10.5

AD 2000: History Report #1

Room Temperature Detail (Records last 7 days)



3. \$DLG3

BULK DUMP OF DATALOGGING GROUP #3

Outdoor Temp, Ave Room temp, Boiler On Minutes, and # of Heat Cycles
 Sampled every 15 minutes for up to 31 days.

Last Sample > 01/13/04 TU 20:00

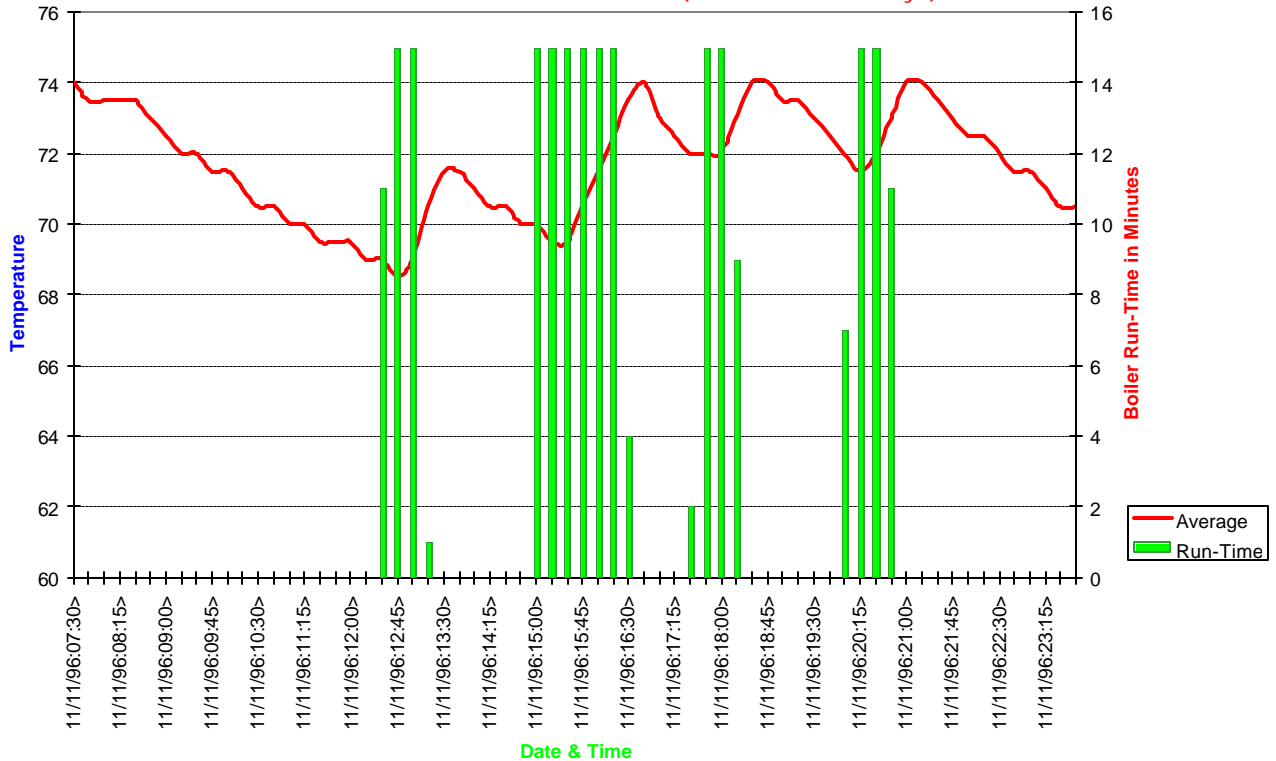
Temperatures in Fahrenheit

01/16/04:07:45>	12.5	72.5	15	0
01/16/04:08:00>	12.5	73.5	15	0
01/16/04:08:15>	12.0	74.0	1	0
01/16/04:08:30>	12.0	74.5	0	0
01/16/04:08:45>	12.0	74.5	0	0
01/16/04:09:00>	11.0	73.5	6	1
01/16/04:09:15>	10.5	73.0	15	0
01/16/04:09:30>	10.5	74.0	10	0
01/16/04:09:45>	10.5	74.5	0	0
01/16/04:10:00>	10.5	74.5	0	0
01/16/04:10:15>	10.0	74.0	0	0
01/16/04:10:30>	10.5	73.0	0	0
01/16/04:10:45>	10.0	73.0	0	0
01/16/04:11:00>	9.5	72.5	0	0
01/16/04:11:15>	9.5	72.0	0	0

<<End of List>>

AD 2000: History Report #2

24 hr Room Ave & Run-Time (Records last 31 days)



4. \$DLG4

BULK DUMP OF DATALOGGING GROUP #4

Outdoor Temp, Ave Room temp, Boiler On Minutes, and # of Heat Cycles
 Values stored once a day for up to 2 years.

Last Sample > 01/12/04

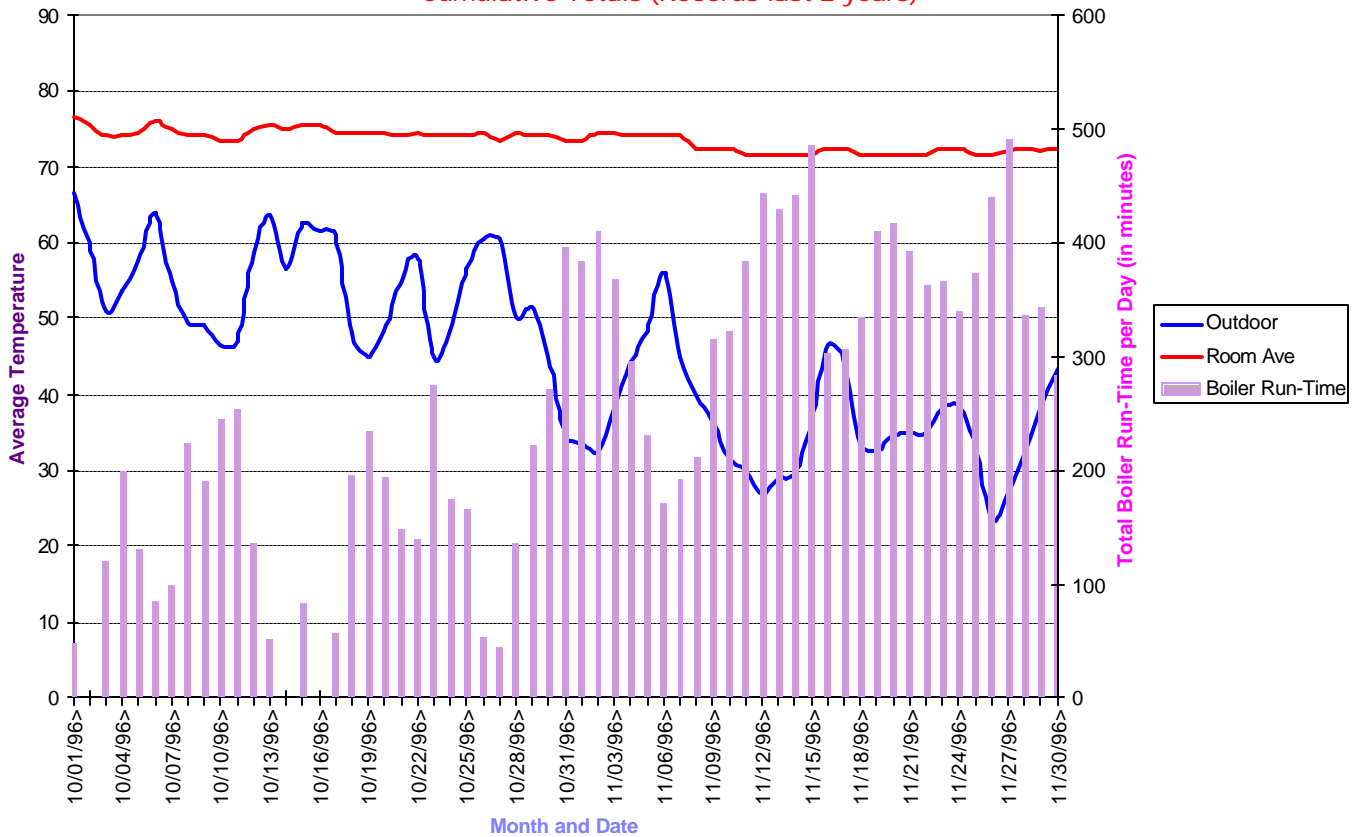
Temperatures in Fahrenheit

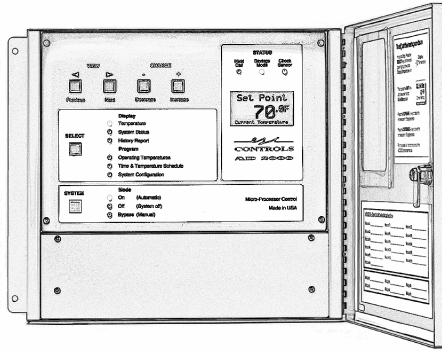
01/05/04>	30.0	73.5	464	14
01/06/04>	20.5	72.5	639	13
01/07/04>	20.5	72.5	557	16
01/08/04>	27.0	72.5	477	16
01/09/04>	30.0	72.5	471	15
01/10/04>	20.0	72.5	460	15
01/11/04>	9.5	73.0	613	18
01/12/04>	5.0	73.0	675	19
01/13/04>	10.0	72.5	608	17
01/14/04>	17.5	72.5	563	16
01/15/04>	24.5	72.5	521	16

<<End of List>>

AD 2000: History Report #3

Cumulative Totals (Records last 2 years)





AD 2000[®] Modem Setup String

Enter the following command code string to program the modem at the site of the AD 2000™ (boiler room) - preconfigured modems are available from ESI.

Note: _ = space and 0 is zero, not the letter o

AT&F_S0=1_&D0_E0_V0_&W

The command codes are described below:

- AT Command line prefix
- &F Software reset: restore default settings
- S0=1 Answer the call on the first ring (1-255)
- &D0 Ignore DTR (data terminal ready) signal from computer
- E0 Modem command echo disabled
- V0 Return result codes as numbers
- &W Save the settings you have just entered

Clearing Data Logging Memory:

To clear data logging memory and run-time counters: Remove 24Vac power from the AD 2000™, press and hold down the NEXT key for a few seconds while re-applying 24Vac power.