



BAS Application Note 013

Using Another Application to View Trend Log Data

Trend Log Data can be viewed and analyzed in 3 ways:

1. Using Trend Log Viewer. This is the simplest and most common method, but no analytical functions can be performed on the data.
2. Copying the data from Trend Log Viewer to the Clipboard and then pasting the data into another application such as Microsoft Excel. This is a simple method for analyzing small amounts of data. The data is in a comma de-limited format and all readings, timestamps, addresses, etc. are scaled and formatted just as they are displayed in the Viewer screen.
3. Writing a custom application to read the Trend Log data in it's native format. This can be done using any programming language such as C or Visual Basic. Several applications, such as Microsoft Access, can also be configured to read this data directly from the Trend Log file.

This Application Note will provide the information necessary for a programmer to access the data directly from the Trend Log file. If any User has written a routine for data access that they wish to share, e-mail it to support@enertec-bas.com and we will make it available to other Users. Microsoft C format header files containing data structures and defines can be provided upon request. Since analog inputs are stored in a raw (0-255) format it is generally necessary to scale these numbers to their real world equivalent. Analog input scaling routines can also be provided upon request.

Note: Trend Logs can contain vast amounts of data. A project with the maximum possible number of Zones (1,024), stamping data once every 10 minutes (4,464 entries/Zone), will contain 4,606,848 records and a total of 147,419,136 bytes.

Trend Log Records

Trend Logs are stored in the \BAS\DATA directory. The file names for the Trend Log follow the convention TRNDMMYY.LOG where MM is the month and YY is the year of all data contained in that file. All records are of a fixed length. That length is currently 32 bytes. There are 4 types of records. Those are:

- File Header - A file header is written one time to the beginning of the Trend Log file.
- Zone Data Header - A single Data Header is written prior to recording a group of Zone entries.
- Zone I/O Data - One entry is recorded for each Zone selected to be Trend Logged. In addition to the value of all inputs and outputs, this data also includes information about the operational state of the Zone. Zone data entries are grouped and recorded by trunk.
- Override Data - Each occurrence of a Time-of-Day override is individually recorded.

A detailed breakdown of each record type follows:

File Header

Byte	Description
1	Type - Always 0x01
2	RecLen - Number of bytes in each record - Currently 32 bytes
3	Ver - Version number of this file - Currently 1
4	Rev - Revision number of this file - Currently 0
5-32	Reserved

Zone Data Header

Byte	Description
1	Type - Always 0x02
2-5	Time - Standard C Time format (the number of seconds elapsed since midnight (00:00:00), January 1, 1970, Universal coordinated time)
6	OSATemp - Outside Air Temperature, stored as a 0-255 value representing a temperature of (-12.0) - 112.5° F.
7	OSAEnth - Outside Air Enthalpy, stored as a 0-255 value representing an enthalpy of 36.0 - 18.0 BTU/lbm. (Note the inverse signal.)
8-32	Reserved

Zone I/O Data

Byte	Description
1	Type - Always 0x03
2	Trunk - Trunk number of Zone being logged (1 - 8)
3	Addr - Address of RSC containing the Zone (1 - 33)
4	SubZone - Number for the Zone on that RSC (1 - 4)
5	EquipSched - Equipment schedule number for RSC (0 - 63)
6	StateText - Occupied, Unoccupied, Warmup, etc. See list below.
	'D' (0x44) - Default
	'U' (0x55) - Unoccupied
	'O' (0x4F) - Occupied
	'E' (0x45) - Early Occupied from Warmup or Cooldown
	'W' (0x57) - Warmup
	'C' (0x43) - Cooldown
	'S' (0x53) - Load Shed

7	Stage - Heating Stages, Cooling Stages, or At Setpoint.	
	0x00	Cooling Stage 4
	0x01	Cooling Stage 3
	0x02	Cooling Stage 2
	0x03	Cooling Stage 1
	0x04	At Setpoint
	0x05	Heating Stage 1
	0x06	Heating Stage 2
	0x07	Heating Stage 3
	0x08	Heating Stage 4
	0x09	Economizer Cooling Stage 4
	0x0A	Economizer Cooling Stage 3
	0x0B	Economizer Cooling Stage 2
	0x0C	Economizer Cooling Stage 1
8	Act1Pos - The percent open position of Actuator 1 (0-100).	
9	Act2Pos - The percent open position of Actuator 2 (0-100).	
10	ControlPoint - The Zone's Control Point, stored as a 0-255 value.	
11-18	AIs[8] - Analog Inputs 1-8, stored as a 0-255 value.	
19	DIs - Digital Input byte. Each bit represents the value of the corresponding Digital Input. If bit 1 is on, then Digital Input 1 is on, etc.	
20-23	AOs[4] - Analog Outputs 1-4, stored as a 0-255 value	
24-25	Reserved	
26	DOs - Digital Output byte. Each bit represents the value of the corresponding Digital Output. If bit 1 is on, then Digital Output 1 is on, etc.	
27-28	CFM - Scaled CFM value for Zones using Pressure Independent damper control.	
29	OperHsp - The Heating Setpoint currently in use by the Zone, stored as a 0-255 value.	
30	OperCsp - The Cooling Setpoint currently in use by the Zone, stored as a 0-255 value.	
31-32	KWReading - Scaled KW meter reading of the meter assigned to this Zone if the Zone is configured for KW Load Shedding.	

Time-of-Day Override

Byte	Description
1	Type - Always 0x04
2	Condition - Event being logged.
	0x01 Begin Zone setback override
	0x02 End Zone setback override
	0x03 Begin single Zone override
	0x04 End single Zone override
	0x05 Begin all Zones override
	0x06 End all Zones override
	0x07 A Zone setback override was not terminated

- 3 State - Only used for single or all Zones override. Not used for Zone setback override.
0x00 Single or all Zones override end
0x01 Single or all Zones override to Unoccupied
0x02 Single or all Zones override to Occupied
- 4-7 Time - Time that event occurred . Standard C Time format (the number of seconds elapsed since midnight (00:00:00), January 1, 1970, Universal coordinated time)
- 8 Trunk - Trunk number of Zone being logged (1 - 8). 0 if an all Zones override.
- 9 Addr - Address of RSC containing the Zone (1 - 33). 0 if an all Zones override.
- 10 SubZone - Number for the Zone on that RSC (1 - 4). 0 if an all Zones override.
- 11 EquipSched - Equipment schedule number for RSC (0 - 63)
- 12-32 Reserved