



ENERGY LOGGER - SD CARD FILE FORMAT-version1 revision2

A. Basically, there are two types of file written to the SD card:

1. **INFORMATION** File
2. **DATA** File

1. **INFORMATION** File - this file contains important information about the Energy Logger unit. This includes:

- A. Total power consumption(kwh).
- B. Total recorded time(Hour).
- C. Total ON time(hour).
- D. 10 day history of consumed power.
- E. 10 day history of record time.
- F. 10 day history of ON time.
- G. ID number of unit.
- H. Value of tariff 1 & 2
- I. Time & Date of initial setting.

2. **DATA** File - this file contains the actual data recorded by the unit. All value taken are average values and this includes Voltage, Current, and Power factor. Data logging is done every minute.

* The Energy Logger supports only **FAT16** and **FAT32** file system. Be sure that the SD card was formatted before inserting it to the unit. Be sure also that the SD card has a minimum of **3Mbyte** of free space. All data will be written in the root directory of the SD card.

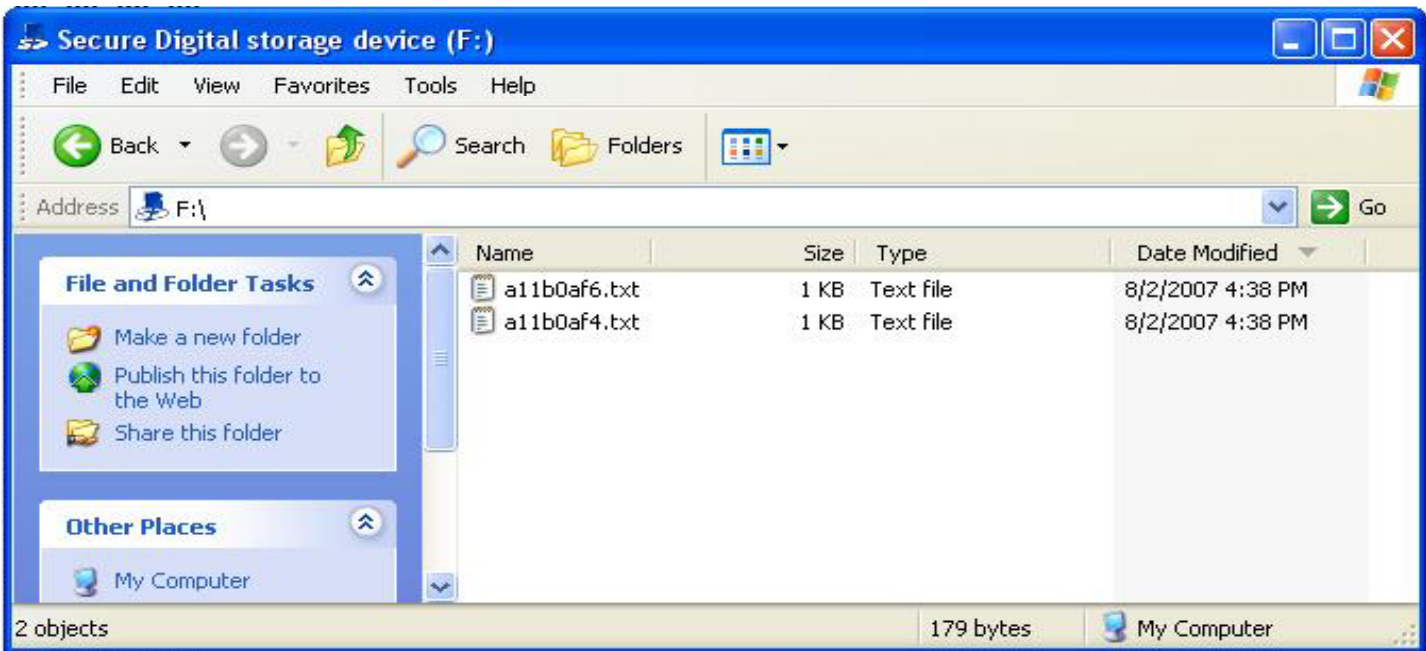
* All data written to the SD card is in text file with a **"*.txt"** file format.

*You can open the created file using a text editor such as notepad, what you see is the CHARACTER format of the actual data. Most of the data must be converted first to **HEX** or **DECIMAL** to get the actual/true value. Kindly refer to File description discussed below on how to get the actual/true value of every data.

* **INFORMATION** File is only 102 bytes long including the EOF(End-of-file) code.

* The **DATA** File length depends on the total length of recorded time. Each file created has a maximum of 65535 bytes.

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a11b0af4.txt - **INFORMATION** file
 a11b0af6.txt - **DATA** file

17-19	3	Total kWh used for yesterday. Calculation is the same using example in bytes #14 to 16. Byte #17 = 00 Byte #18 = 00 Byte #19 = 00
20-22	3	Total kWh used 2 days ago. Calculation is the same using example in bytes #14 to 16. Byte #20 = 00 Byte #21 = 00 Byte #22 = 00
23-25	3	Total kWh used 3 days ago. Calculation is the same using example in bytes #14 to 16. Byte #23 = 00 Byte #24 = 00 Byte #25 = 00
26-28	3	Total kWh used 4 days ago. Calculation is the same using example in bytes #14 to 16. Byte #26 = 00 Byte #27 = 00 Byte #28 = 00
29-31	3	Total kWh used 5 days ago. Calculation is the same using example in bytes #14 to 16. Byte #29 = 00 Byte #30 = 00 Byte #31 = 00
32-34	3	Total kWh used 6 days ago. Calculation is the same using example in bytes #14 to 16. Byte #32 = 00 Byte #33 = 00 Byte #34 = 00
35-37	3	Total kWh used 7 days ago. Calculation is the same using example in bytes #14 to 16. Byte #35 = 00 Byte #36 = 00 Byte #37 = 00
38-40	3	Total kWh used 8 days ago. Calculation is the same using example in bytes #14 to 16. Byte #38 = 00 Byte #39 = 00 Byte #40 = 00
41-43	3	Total kWh used 9 days ago. Calculation is the same using example in bytes #14 to 16. Byte #41 = 00 Byte #42 = 00 Byte #43 = 00
44-45	2	History of total recorded time for today where "today" is the date of card insertion. The data is in character form, it must be converted first to HEX and then to DECIMAL format. Example using "a11b0af4.txt": (Refer to Table1 for HEX value) "00 15" VALUE = 0015H -->combine the 3 values to get the HEX equivalent VALUE = 0015H = 21 -->then convert to DECIMAL format. To get the True value, it must be divided by 100 . True VALUE = VALUE/100 = 21/100 = 0.21 Hours
46-47	2	Total recorded time for yesterday. Calculation is the same using example in bytes #44 to 45. Byte #46 = 00 Byte #47 = 00
48-49	2	Total recorded time 2 days ago. Calculation is the same using example in bytes #44 to 45. Byte #48 = 00 Byte #49 = 00
50-51	2	Total recorded time 3 days ago. Calculation is the same using example in bytes #44 to 45. Byte #50 = 00 Byte #51 = 00
52-53	2	Total recorded time 4 days ago. Calculation is the same using example in bytes #44 to 45. Byte #52 = 00 Byte #53 = 00
54-55	2	Total recorded time 5 days ago. Calculation is the same using example in bytes #44 to 45. Byte #54 = 00 Byte #55 = 00
56-57	2	Total recorded time 6 days ago. Calculation is the same using example in bytes #44 to 45. Byte #56 = 00 Byte #57 = 00
58-59	2	Total recorded time 7 days ago. Calculation is the same using example in bytes #44 to 45. Byte #58 = 00 Byte #59 = 00
60-61	2	Total recorded time 8 days ago. Calculation is the same using example in bytes #44 to 45. Byte #60 = 00 Byte #61 = 00
62-63	2	Total recorded time 9 days ago. Calculation is the same using example in bytes #44 to 45. Byte #62 = 00 Byte #63 = 00
64-65	2	History of total ON time for today where "Today" is the date of card insertion. The data is in character form, it must be converted first to HEX and then to DECIMAL format. Example using "a11b0af4.txt": (Refer to Table1 for HEX value) "00 0E" VALUE = 000EH -->combine the 3 values to get the HEX equivalent VALUE = 000EH = 14 -->then convert to DECIMAL format. To get the True value, it must be divided by 100 . True VALUE = VALUE/100 = 14/100 = 0.14 Hours
66-67	2	Total ON time for yesterday. Calculation is the same using example in bytes #64 to 65 Byte #66 = 00 Byte #67 = 00
68-69	2	Total ON time 2 days ago. Calculation is the same using example in bytes #64 to 65 Byte #68 = 00 Byte #69 = 00
70-71	2	Total ON time 3 days ago. Calculation is the same using example in bytes #64 to 65 Byte #70 = 00 Byte #71 = 00
72-73	2	Total ON time 4 days ago. Calculation is the same using example in bytes #64 to 65

74-75	2	Total ON time 5 days ago. Calculation is the same using example in bytes #64 to 65 Byte #74 = 00 Byte #75= 00
76-77	2	Total ON time 6 days ago. Calculation is the same using example in bytes #64 to 65 Byte #76 = 00 Byte #77= 00
78-79	2	Total ON time 7 days ago. Calculation is the same using example in bytes #64 to 65 Byte #78 = 00 Byte #79= 00
80-81	2	Total ON time 8 days ago. Calculation is the same using example in bytes 64 to 65 Byte #80 = 00 Byte #81= 00
82-83	2	Total ON time 9 days ago. Calculation is the same using example in bytes 64 to 65 Byte #82 = 00 Byte #83= 00
84	1	ID number of the unit. Data is in character form, it must be converted first to HEX format and then to DECIMAL. The ID number ranges from 0-9. Refer to Table1 for HEX format. ID = 00H = 0
85-88	4	Tariff1 . The data is in character format, it must be converted first to HEX format. Example: (Refer to Table1 for HEX format. " 00 01 02 05 " --> convert each byte to DECIMAL, 00 to 0, 01 to 1, 02 to 2, 05 to 5 VALUE = 0125 --> combine the equivalent DECIMAL Value. To get the value of Tariff 1, it must be divided by 1000 . True VALUE = VALUE/1000 = 125/1000 = 0.125 -->value of Tariff1
89-92	4	Tariff2 . The data is in character format, it must be converted first to HEX format Example: (Refer to Table1 for HEX format. " 01 00 00 03 " --> convert each byte to DECIMAL, 01 to 1, 00 to 0, 00 to 0, 03 to 3 VALUE = 1003 --> combine equivalent DECIMAL Value. To get the value of Tariff 1, it must be divided by 1000 . True VALUE = VALUE/1000 = 1003/1000 = 1.003 -->value of Tariff1
93	1	Value of hour during initial setting. The data is in character form,it must be converted to HEX. Range of value: HEX: 00H-17H DECIMAL: 0-23 Example: (Refer to Table1 for HEX value) " 10H " Time = 10H = 16 = 4 PM *Time is in 24-Hour format
94	1	Value of Minute during initial setting. The data is in character form, it must be converted to HEX or DECIMAL value. Range of Value: HEX: 00H-3BH DECIMAL: 0-59 Example: (Refer to Table1 for HEX value) " 19 " Minute = 19H = 25 Time : 4:25 PM --> Time of initial setting
95	1	Value of Month during initial setting.The data is in character form, it must be converted to HEX or DECIMAL value. Range of value: HEX: 01H-0CH DECIMAL: 1-12 Example: (Refer to Table1 for HEX value) " 08 " Month = 08 = August
96	1	Value of Day during initial setting. The data is in character form, it must be converted to HEX or DECIMAL value. Range of value: HEX: 01H-1FH DECIMAL: 1-31 Example: (Refer to Table1 for HEX value) " 02 " Day = 2
97	1	Value of Year during initial setting. The data is in character form, it must be converted to HEX or DECIMAL value. Range of value: HEX: 00H-63H DECIMAL: 0-99 Example: (Refer to Table1 for HEX value) " 07 " Year = 07 = 2007 Date : August 2, 2007 --> Date of initial setting
98-101	4	EOF - End of file code. It composes of 4 0xFFH data.

Note: Initial setting is done during first use of the unit or restoring factory default.

2. DATA FILE

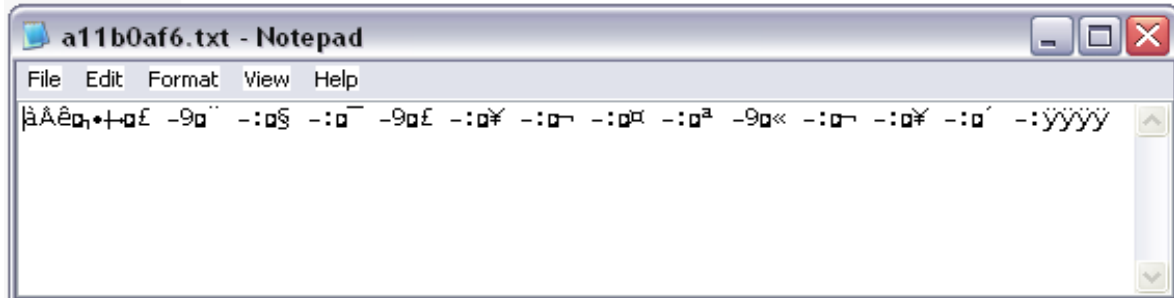


Figure 3. a11b0af6.txt. Example of a DATA file format

Converting the file "**a11boaf6.txt**" from character form to HEX format, we can have the following equivalent values:

Address	
0 - 15	E0 C5 EA 08 02 07 10 1A 08 A3 00 06 39 08 A8 00
16 - 31	06 3A 08 A7 00 06 3A 08 AF 00 06 39 08 A3 00 06
32 - 47	3A 08 A5 00 06 3A 08 AC 00 06 3A 08 A4 00 06 3A
48 - 63	08 AA 00 06 39 08 AB 00 06 3A 08 AC 00 06 3A 08
64 - 76	A5 00 06 3A 08 B4 00 06 3A FF FF FF FF

Table2. Converted HEX value.

Note: All data written in DATA FILE is in character form. Some data must be converted first to HEX value to get the true value.

The general format for **DATA** file:

StartCode + MM/DD/YY + HH:MM + DATA + DATA + DATA + DATA + DATA + EOF

*It is possible to have more than 1 StartCode between data and EOF. In this case, we will have the format:

StartCode + MM/DD/YY + HH:MM + DATA + DATA + DATA + DATA + DATA + StartCode + MM/DD/YY + HH:MM + DATA + DATA + DATA... + DATA + StartCode + MM/DD/YY + HH:MM + DATA + DATA+... DATA + EOF

DATA has the following format:

DATA = VVIIP, where:

VV --> 2 bytes for Average Voltage measured in 1 minute

II --> 2 bytes for Average Current measured in 1 minute

P --> 1 byte for Average Power Factor measured in 1 minute

Each data format will be discussed below using the data from the filename "**a11boaf6.txt**" and HEX value at Table2:

Byte Location	# of bytes	Description
0-2	3	A unique start of data character composed of 3 HEX value, " E0H C5H EAH ". If you encounter this start byte, automatically, the data follows will be: 1. DATE/TIME (MM/DD/YY & HH:MM) = start record date and time of the data 2. DATA1 3. DATA2 4. DATA3 5. DATAx... until reach the EOF code or another sequence of start code
3-5	3	Date of recording(Month/Day/Year). Using Table2, we have the HEX" 08 02 07 " for byte 3 to 5. MM/DD/YY = 08/02/07 which means the data starts on August 2, 2007 . Range of Values: MM = 1 to 12 (01H to 0CH) = January to December

6-7	2	Time of recording(HH:MM). Using Table2, we have the HEX " 10 1A " for byte 6 to 7. HH:MM = 10:1A or 16:26 or 4:26 PM , this is the time storing of data starts. Range of Values: HH = 0 to 23 (00H to 17H), 24-hour format MM = 0 to 59 (00H to 3BH)
8-9	2	Average voltage for the 1st minute. From Table2: Byte #8 = 08 Byte #9 = A3 VALUE = 08A3H -->combine the 2 values to get the HEX equivalent VALUE = 08A3H = 2211 -->convert to DECIMAL value. To get the True VALUE , divide the VALUE by 10 . True VALUE = VALUE/10 = 2211/10 = 221.1 Volts
10-11	2	Average current for the 1st minute. From Table2: Byte #10 = 00 Byte #11 = 06 VALUE = 0006H -->combine the 2 values to get the HEX equivalent VALUE = 0006H = 6 -->convert to DECIMAL value. To get the True VALUE , divide the VALUE by 1000 . True VALUE = VALUE/1000 = 6/1000 = 0.006 Amperes
12	1	Average power factor for the 1st minute. From Table2: Byte #12 = 39 -->this is the HEX equivalent VALUE = 39H = 57 -->convert to DECIMAL value. To get the True VALUE , divide the VALUE by 100 . True VALUE = VALUE/100 = 57/100 = 0.57
13-14	2	Average voltage for the 2nd minute. From Table2: Byte #13 = 08 Byte #14 = A8 VALUE = 08A8H = 2216 -->this is the decimal value, to get the True VALUE , divide by 10 . True VALUE = VALUE/10 = 2216/10 = 221.6 Volts
15-16	2	Average current for the 2nd minute. Convert the character value to HEX value first, From Table2: Byte #15 = 00 Byte #16 = 06 VALUE = 0006H = 6 -->this is the decimal value, to get the True VALUE , divide by 1000 . True VALUE = VALUE/1000 = 6/1000 = 0.006 Amperes
17	1	Average power factor for the 2nd minute. From Table2: Byte #17 = 3A VALUE = 3AH = 58 -->this is the decimal value, to get the True VALUE , divide by 10 . True VALUE = VALUE/10 = 58/10 = 0.58
18-19	2	Average voltage for the 3rd minute. From Table2: Byte #18 = 08 Byte #19 = A7 VALUE = 08A7H = 2215 -->this is the decimal value, to get the True VALUE , divide by 10 . True VALUE = VALUE/10 = 2215/10 = 221.5 Volts
20-21	2	Average current for the 3rd minute.
22	1	Average power factor for the 3rd minute. From Table2: Byte #22 = 3A VALUE = 3AH = 58 -->this is the decimal value, to get the True VALUE , divide by 100 . True VALUE = VALUE/100 = 58/100 = 0.58
23-24	2	Average voltage for the 4th minute. From Table2: Byte #23 = 08 Byte #24 = AF VALUE = 08AFH = 2223 -->this is the decimal value, to get the True VALUE , divide by 10 . True VALUE = VALUE/10 = 2223/10 = 222.3 Volts

25-26	2	<p>Average current for the 4th minute. From Table2: Byte # 25 = 00 Byte #26 = 06 VALUE = 0006H = 6 -->this is the decimal value, to get the True VALUE, divide by 1000. True VALUE = VALUE/1000 = 6/1000 = 0.006 Amperes</p>
27	1	<p>Average power factor for the 4th minute. From Table2: Byte #27 = 39 VALUE = 39H = 57 -->this is the decimal value, to get the True VALUE, divide by 100. True VALUE = VALUE/100 = 57/100 = 0.57</p>
28-29	2	<p>Average voltage for the 5th minute. From Table2: Byte #28 = 08 Byte #29 = A3 VALUE = 08A3H = 2221 -->this is the decimal value, to get the True VALUE, divide by 10. True VALUE = VALUE/10 = 2221/10 = 222.1 Volts</p>
30-31	2	<p>Average current for the 5th minute. From Table2: Byte # 30 = 00 Byte #31 = 06 VALUE = 0006H = 6 -->this is the decimal value, to get the True VALUE, divide by 1000. True VALUE = VALUE/1000 = 6/1000 = 0.006 Amperes</p>
32	1	<p>Average power factor for the 5th minute. From Table2: Byte #32 = 3A VALUE = 3AH = 58 -->this is the decimal value, to get the True VALUE, divide by 100. True VALUE = VALUE/100 = 58/100 = 0.58</p>
33-34	2	<p>Average voltage for the 6th minute. From Table2: Byte #33 = 08 Byte #34 = A5 VALUE = 08A5H = 2213 -->this is the decimal value, to get the True VALUE, divide by 10. True VALUE = VALUE/10 = 2213/10 = 221.3 Volts</p>
35-36	2	<p>Average current for the 6th minute. From Table2: Byte # 35 = 00 Byte #36 = 06 VALUE = 0006H = 6 -->this is the decimal value, to get the True VALUE, divide by 1000. True VALUE = VALUE/1000 = 6/1000 = 0.006 Amperes</p>
37	1	<p>Average power factor for the 6th minute. From Table2: Byte #37 = 3A VALUE = 3AH = 58 -->this is the decimal value, to get the True VALUE, divide by 100. True VALUE = VALUE/100 = 58/100 = 0.58</p>
38-39	2	<p>Average voltage for the 7th minute. From Table2: Byte #38 = 08 Byte #39 = AC VALUE = 08ACH = 2220 -->this is the decimal value, to get the True VALUE, divide by 10. True VALUE = VALUE/10 = 2220/10 = 222.0 Volts</p>
40-41	2	<p>Average current for the 7th minute. From Table2: Byte # 40 = 00 Byte #41 = 06 VALUE = 0006H = 6 -->this is the decimal value, to get the True VALUE, divide by 1000. True VALUE = VALUE/1000 = 6/1000 = 0.006 Amperes</p>
42	1	<p>Average power factor for the 7th minute. From Table2: Byte #42 = 3A VALUE = 3AH = 58 -->this is the decimal value, to get the True VALUE, divide by 100. True VALUE = VALUE/100 = 58/100 = 0.58</p>
43-44	2	<p>Average voltage for the 8th minute. From Table2: Byte #43 = 08 Byte #44 = A4 VALUE = 08A4H = 2212 -->this is the decimal value, to get the True VALUE, divide by 10. True VALUE = VALUE/10 = 2212/10 = 221.2 Volts</p>

45-46	2	<p>Average current for the 8th minute. From Table2: Byte # 45 = 00 Byte #46 = 06 VALUE = 0006H = 6 -->this is the decimal value, to get the True VALUE, divide by 1000. True VALUE = VALUE/1000 = 6/1000 = 0.006 Amperes</p>
47	1	<p>Average power factor for the 8th minute. From Table2: Byte #47 = 3A VALUE = 3AH = 58 -->this is the decimal value, to get the True VALUE, divide by 100. True VALUE = VALUE/100 = 58/100 = 0.58</p>
48-49	2	<p>Average voltage for the 9th minute. From Table2: Byte #48 = 08 Byte #49 = AA VALUE = 08AAH = 2218 -->this is the decimal value, to get the True VALUE, divide by 10. True VALUE = VALUE/10 = 2218/10 = 221.8 Volts</p>
50-51	2	<p>Average current for the 9th minute. From Table2: Byte # 50 = 00 Byte #51 = 06 VALUE = 0006H = 6 -->this is the decimal value, to get the True VALUE, divide by 1000. True VALUE = VALUE/1000 = 6/1000 = 0.006 Amperes</p>
52	1	<p>Average power factor for the 9th minute. From Table2: Byte #52 = 39 VALUE = 39H = 57 -->this is the decimal value, to get the True VALUE, divide by 100. True VALUE = VALUE/100 = 57/100 = 0.57</p>
53-54	2	<p>Average voltage for the 10th minute. From Table2: Byte #53 = 08 Byte #54 = AB VALUE = 08ABH = 2219 -->this is the decimal value, to get the True VALUE, divide by 10. True VALUE = VALUE/10 = 2219/10 = 221.9 Volts</p>
55-56	2	<p>Average current for the 10th minute. From Table2: Byte # 55 = 00 Byte #56 = 06 VALUE = 0006H = 6 -->this is the decimal value, to get the True VALUE, divide by 1000. True VALUE = VALUE/1000 = 6/1000 = 0.006 Amperes</p>
57	1	<p>Average power factor for the 10th minute. From Table2: Byte #57 = 3A VALUE = 3AH = 58 -->this is the decimal value, to get the True VALUE, divide by 100. True VALUE = VALUE/100 = 58/100 = 0.58</p>
58-59	2	<p>Average voltage for the 11th minute. From Table2: Byte #58 = 08 Byte #59 = AC VALUE = 08ACH = 2220 -->this is the decimal value, to get the True VALUE, divide by 10. True VALUE = VALUE/10 = 2220/10 = 222.0 Volts</p>
60-61	2	<p>Average current for the 11th minute. From Table2: Byte # 60 = 00 Byte #61 = 06 VALUE = 0006H = 6 -->this is the decimal value, to get the True VALUE, divide by 1000. True VALUE = VALUE/1000 = 6/1000 = 0.006 Amperes</p>
62	1	<p>Average power factor for the 11th minute. From Table2: Byte #62 = 3A VALUE = 3AH = 58 -->this is the decimal value, to get the True VALUE, divide by 100. True VALUE = VALUE/100 = 58/100 = 0.58</p>
63-64	2	<p>Average voltage for the 12th minute. From Table2: Byte #63 = 08 Byte #64 = A5 VALUE = 08A5H = 2213 -->this is the decimal value, to get the True VALUE, divide by 10. True VALUE = VALUE/10 = 2213/10 = 221.3 Volts</p>

65-66	2	Average current for the 12th minute. From Table2: Byte # 65 = 00 Byte #66 = 06 VALUE = 0006H = 6 -->this is the decimal value, to get the True VALUE , divide by 1000 . True VALUE = VALUE/1000 = 6/1000 = 0.006 Amperes
67	1	Average power factor for the 12th minute. From Table2: Byte #67 = 3A VALUE = 3AH = 58 -->this is the decimal value, to get the True VALUE , divide by 100 . True VALUE = VALUE/100 = 58/100 = 0.58
68-69	2	Average voltage for the 13th minute. From Table2: Byte #68 = 08 Byte #69 = B4 VALUE = 08B4H = 2228 -->this is the decimal value, to get the True VALUE , divide by 10 . True VALUE = VALUE/10 = 2228/10 = 222.8 Volts
70-71	2	Average current for the 13th minute. From Table2: Byte # 70 = 00 Byte #71 = 06 VALUE = 0006H = 6 -->this is the decimal value, to get the True VALUE , divide by 1000 . True VALUE = VALUE/1000 = 6/1000 = 0.006 Amperes
72	1	Average power factor for the 13th minute. From Table2: Byte #72 = 3A VALUE = 3AH = 58 -->this is the decimal value, to get the True VALUE , divide by 100 . True VALUE = VALUE/100 = 58/100 = 0.58
73-76	4	EOF. End of File code (FF FF FF FF). If there is any data after this code, it will be a don't care data.

If you are going to make a table for the data of the sample file given, it must be look like below:

Date	Time	Voltage (V)	Current(A)	PF(Power Factor)
8/2/2007	4:26 PM	221.1	0.006	0.57
	4:27 PM	221.6	0.006	0.58
	4:28 PM	221.5	0.006	0.58
	4:29 PM	222.3	0.006	0.57
	4:30 PM	222.1	0.006	0.58
	4:31 PM	221.3	0.006	0.58
	4:32 PM	222.0	0.006	0.58
	4:33 PM	221.2	0.006	0.58
	4:34 PM	221.8	0.006	0.57
	4:35 PM	221.9	0.006	0.58
	4:36 PM	222.0	0.006	0.58
	4:37 PM	221.3	0.006	0.58
	4:38 PM	222.8	0.006	0.58

Other considerations for **DATA** file:

1. DATA file could be more than 1 file depending on the time the unit is recording. The maximum number of bytes for every DATA file is 12kBytes and may contain a maximum of 2,105 minutes of data.
2. In case within a DATA file there exists a more than 1 start code, then it is expected that the unit has been turned off for a length of time. Since you can get the Time and Date after the start code, then you can easily get the elapse time when the unit is turned off.
3. Every filename created for DATA file and INFORMATION file is unique within a year, which means the filename created for this year will possibly be repeated next year. It is suggested that you must save and delete all created files inside the SD card before inserting it to the Energy Logger.

About the filename:

1. The filename is a standard DOS 8.3 format. The filename is saved to SD card in a *.txt format.

The general format for the filename is **12345678.txt**, where:

bit 1 --> the ID number of the unit ranges from **a** to **j**.

a = 0 **f = 5**

b = 1 **g = 6**

c = 2 **h = 7**

d = 3 **i = 8**

e = 4 **j = 9**

bit 2-8 --> HEX number from **000000** to **FFFFFF**, this is to avoid repetition and is based on the time & date of file creation

SD CARD PROTOCOL(Using SD Card to Set-up the EI3500)

1. FILENAME: "setupe13.bin"

The file should have the filename "setupe13.bin". It must be in lower case and saved in a binary file format. The EL3500 will read the SD card and search for this filename, if found it will read the contents and save the data if it is all valid. The file will be automatically deleted from the SD card. If setup is successful, the LCD will display "SD Init Fin". You must remove the SD card to start the usual data recording.

Note: The EL3500 will prioritize the Set-up if found the valid setup file, therefore, setup and saving of data will takes place one at a time only.

2. DATA format: The data inside the file "setupe13.bin" must all be in "HEX" format. The file is composed of 20 bytes.

Byte 0 = B8h : Fix value which signifies the start of data, 1st byte

Byte 1 = ADh : Fix value which signifies start of data, 2nd byte

Byte 2 = F2h : Fix value which signifies start of data, 3rd byte

Note: The start of the file must have a correct combination of this 3 byte so that the next following data will be considered as valid. The combination must be in the format "B8 AD F2" in hex

Byte 3 = ID number : value of ID number of the unit. Must be in the range 0h to 9h

Byte 4 = Hour Format : value of the time format

01h = 12-hour format

02h = 24-hour format

Byte 5 = Date format : value of the date format

01h = mm/dd/yy

02h = dd/mm/yy

Byte 6 = Time-Hour : value of time in hour

Range of value: 00h to 17h

Note: The value of Hour must always be in 24-hour format regardless of the selected hour format.

Byte 7 = Time-Minute : value of time in minute

Range of value : 00h to 3Bh (0 to 59 in decimal)

Byte 8 = Date-Month : value of date in month

Range: of value: 01h(January) to 0Ch(December)

Byte 9 = Date-Day : value of date in day

Range of value: 01h to 1Fh (1 to 31 in decimal)

Byte 10 = Date-Year : value of date in year

Range of value: 00h to 63h (0 to 99 in decimal)

Byte 11 = Currency : value of the currency to be used

01h = Pound

02h = SFr

04h = \$

08h = Euro

Byte 12 = Ones digit-Tariff1 : value of ones digit for tariff1/cost1
 Range of value : 00h to 09h
 Byte 13 = 1/10s digit-Tariff1 : value of 1/10s digit for tariff1/cost1
 Range of value : 00h to 09h
 Byte 14 = 1/100s digit-Tariff1 : value of 1/100s digit for tariff1/cost1
 Range of value : 00h to 09h
 Byte 15 = 1/1000s digit-Tariff1 : value of 1/1000s digit for tariff1/cost1
 Range of value : 00h to 09h

Note: For a tariff1 value of 1.642, bytes 12 to 15 must be equivalent to "01 06 04 02" in hex.

Byte 16 = ones digit-Tariff2 : value of ones digit for tariff2/cost2
 Range of value : 00h to 09h
 Byte 17 = 1/10s digit-Tariff2 : value of 1/10s digit for tariff2/cost2
 Range of value : 00h to 09h
 Byte 18 = 1/100s digit-Tariff2 : value of 1/100s digit for tariff2/cost2
 Range of value : 00h to 09h
 Byte 19 = 1/1000s digit-Tariff2 : value of 1/1000s digit for tariff2/cost2
 Range of value : 00h to 09h

Note: For a tariff2 value of 0.896, bytes 16 to 19 must be equivalent to "00 08 09 06" in hex.

Example using the following values:

ID = 5
 Time = 1:43 PM (12-hour format)
 Date = 12/18/2007 (mm/dd/yy)
 Tariff1 = \$0.635
 Tariff2 = \$1.078

The data in the "setupe13.bin" must be equivalent to:

