

## ECM-1220 Download Protocol and Data Information

Communications is done using the ECM-1220's virtual COM port. The port setting for communication is: 19,200 baud, 8N1.

### The sequence for downloading is as follows:

1. The download command is sent twice to the ECM-1220. The ECM responds with an Acknowledge byte each time.
2. The PC sends an ACK byte and the ECM responds by sending 16 unit info bytes.
3. The PC sends an ACK byte again and the ECM sends a 2-byte value representing the ECM's storage interval setting.
4. The PC sends an ACK byte and the ECM responds by sending a 3-byte value representing a pointer value.
5. The PC sends an ACK and the ECM responds by sending all of the recorded data. While this data is being received, the PC looks for two consecutive &hFE (254 dec.) bytes.
6. Once the two &hFE bytes have been detected by the PC, the PC sends an "ACK" byte and the ECM responds with a single checksum byte.
7. The PC responds with an "ACK" byte followed by an "END" string to the ECM.

The ACK byte is hex value &hFC.

### The "Download" command:

Before initiating a download, it is recommended to turn off the "real-time" data if it is on. This is done using the TOG then OFF commands as explained in the "Real-time Data Protocol" document.

The download command requires first sending an ACK byte to get the ECM-1220's attention. The ECM will then respond by sending the same ACK byte and will wait (less than 1 sec) for a command. The PC sends the ASCII "DNL" 3-byte string. The ECM responds with the ACK byte. The PC send the "DNL" string once again and the ECM returns an ACK byte, followed by a block of 16 info bytes. These bytes may be disregarded as they provide unit information.

### The Data Format:

The data-logger's "data" information is sent out as one big block in step 5 above. To assemble this data, two pieces of information are required:

1. The start time and date of monitoring.
2. The storage interval

Since the ECM-1220 does not have a real-time clock, a time and date has to be provided for the beginning of the monitoring at which time the ECM was reset. The storage interval value is provided by the two bytes received in step #3 above.

Each record consists of 5 bytes:

Byte # 1: voltage (0 – 255)  
Byte # 2: CH1 msb  
Byte # 3: CH1 lsb  
Byte # 4: CH2 msb  
Byte # 5: CH2 lsb

The CH1 and CH2 bytes represent the average power in Watt consumed by the load during the interval.  
For example a stream of 5 byte with the decimal value of: 116,0,136,3,21 would signify:

116 = 116 Volt

CH1 power = ( 0 \* 256 + 136) = 136 Watt -> average CH1 power during the interval

CH2 power = (3 \* 256 + 21) = 789 Watt -> average CH2 power during the interval

**Example stream of data:**

First elapsed interval:

Byte # 1: voltage (0 – 255)

Byte # 2: CH1 msb

Byte # 3: CH1 lsb

Byte # 4: CH2 msb

Byte # 5: CH2 lsb

Second elapsed interval:

Byte # 6: voltage (0 – 255)

Byte # 7: CH1 msb

Byte # 8: CH1 lsb

Byte # 9: CH2 msb

Byte # 10: CH2 lsb

Third elapsed interval:

Byte # 11: voltage (0 – 255)

Byte # 12: CH1 msb

Byte # 13: CH1 lsb

Byte # 14: CH2 msb

Byte # 15: CH2 lsb

And so on....

**Example:**

Start of monitoring = 1:00 pm

Storage interval = 5 minutes

Byte # 1: 118

Byte # 2: 1

Byte # 3: 1

Byte # 4: 2

Byte # 5: 21

Byte # 6: 118

Byte # 7: 1

Byte # 8: 0

Byte # 9: 2

Byte # 10: 2

Byte # 11: 117

Byte # 12: 0

Byte # 13: 255

Byte # 14: 1

Byte # 15: 255

The first 5 minute interval would be completed at 1:05 pm therefore:

1:05pm	118 Volt	257 Watt (CH1)	533 Watt (CH2)
1:10pm	118 Volt	256 Watt (CH1)	514 Watt (CH2)
1:15pm	117 Volt	255 Watt (CH1)	511 Watt (CH2)

Energy consumed between 1:00 & 1:05 :

CH1 + CH2 power = 257 + 533 = 790W or .79 KW

CH1 + CH2 energy = 5min / 60 min X .79KW = .0658 KWh for this 5 minute period

Energy consumed between 1:05 & 1:10 :

CH1 + CH2 power = 256 + 514 = 770W or .77 KW

CH1 + CH2 energy = 5min / 60 min X .77KW = .0642 KWh for this 5 minute period

Energy consumed between 1:10 & 1:15 :

CH1 + CH2 power = 255 + 511 = 766W or .766 KW

CH1 + CH2 energy = 5min / 60 min X .766KW = .0638 KWh for this 5 minute period

Energy consumed between 1:00 & 1:15 = .0658 + .0642 + .0638 = 0.1938 KWh

#### **Using PC commands to reset the data-logger memory pointer:**

To be completed.....