Vantage Pro™, Vantage Pro2™ and Vantage Vue™ Serial Communication Reference Manual

For Vantage Pro™, Vantage Pro2™, Vantage Pro Plus™ Vantage Pro2 Plus™ and Vantage Vue™ Weather Stations

Davis Instruments Corp.

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Vantage Pro, Vantage Pro2, and Vantage Vue Serial Communication Reference Manual
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Note: This document will be periodically updated along with our product development. Please check Davis Instruments' website (www.davisnet.com) for the latest version.

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Revision History

Revision	Date	Changes
2.3.0	**February 9, 2009**	**1. Fix default value errors in the document**
2.5.0	**July 30, 2012**	**1. Add section for new command "LPS" to support new loop packet type** **2. Added section to document Vue EEPOM layout.** **3. Added references to the Vantage Vue product as appropriate.**
2.6.0	**November 30, 2012**	**1. Removed unused STRMON and STRMOFF commands** **2. Added RXTEST command to get console out of "Receiving from" screen** **3. Add section for web download protocol** **4. Added Wind Cup Size EEPROM location for Vantage Vue & VP2 station.** **5. Corrected data formats in LOOP2 packet definition** **6. Corrected unit description of rain alarm and high/low values (i.e. rain clicks, not 1/100 inch) and Daily ET (1/1000 in)**
2.6.1	**March 29, 2013**	**1. Documented how to configure reception through repeaters.** **2. Added Document revision and date to footers on all pages.** **3. Corrected the response of the BAR= command from <ACK> to "OK"** **4. Fixed offset of Leaf data in HILOW format table.** **5. Corrected descriptions of dew point, wind chill, heat index, and THSW index in LOOP 2 format table.**

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Important Note:

Please note, this information is provided as is, and we do not provide application engineering or comprehensive technical support. Also, we do not guarantee our station will meet the needs of your specific application. If you have questions, they should be submitted through email and they will be answered when resources are available. Also, although we would not do so without good reason, we reserve the right to modify our weather station design without warning at any time.

I. Introduction

Thank you for choosing Davis Instruments for your weather application. This document explains the serial data protocol between the Vantage Pro, Vantage Pro2, Vantage Vue consoles (or Envoys) and a PC. This requires a WeatherLink with Standard Data Logger

Note, the serial communication between Vantage Pro and Vantage Pro2 are very similar except in a few places noted in this document. Important differences are described in section III.

Serial communication parameters are:
8 data bits, 1 start bit, 1 stop bit, and no parity.
Default baud rate is 19200. User selectable between 1200, 2400, 4800, 9600, 14400, and 19200 baud.

The console with a WeatherLink data logger has 3 types of memory:

- 132 KB archive memory, which stores up to 2560 archive records
- 4 KB EEPROM memory, which is used for calibration numbers, station latitude/longitude/elevation/timezone values, transmitter configuration, and Console graph points
- 4 KB of processor memory, which is used to store the current sensor data, today's high/low values, and other real-time values. **This memory is not directly available to the PC!** Commands such as LOOP and LPS, provide access to the most useful and important of these data values.

Commands are primarily ASCII strings. Letters should be in ALL CAPS. Please note that in some strings numeric values are in decimal, while in others are in hexadecimal.

Multi-byte binary values are generally stored and sent least significant byte first. Negative numbers use 2's complement notation. CRC values are sent and received most significant byte first.

II. Additonal Commands Not in Monitor II

1. An expanded LOOP packet is the only way to receive the current weather data. There is no command to get a single parameter (such as outside temperature).
2. Similarly there is a HILOWS command to receive all of the current daily, monthly, and yearly high/low values with corresponding dates and times.
3. A special DMPAFT command allows you to specify the last record you have previously downloaded so that only the records after that one are downloaded. There is no need to

clear the archive memory to keep download times short. The downloaded records are pre-sorted, so you do not have to determine where the first record is.
4. You can not reset individual high or low values. Instead there are commands to clear all the high values or all the low values.
5. You must make sure that the console is awake before sending commands to it.

III. Differences between Vantage Pro and Vantage Pro 2

The Vantage Pro2 serial support is almost the same as the Vantage Pro, but there are some important differences listed below.

1. Serial commands for Vantage Pro2 must be terminated by a single line feed or a single carriage return character, but not both. Older code that terminates commands with both a line feed and a carriage return will not work or will work intermittently. *Beware that some communciation programs translate a line feed to both a line feed and a carriage return.*
2. The locations of the graph data has changed in Vantage Pro2.
3. The transmission packet interval of the Vantage Pro2 ISS is 1/16 of a second longer for every station ID number. For example, ID 1 transmits at an interval of every 2.5625 seconds rather than 2.5 seconds.
4. "GAIN" command is supported in Vantage Pro but not in Vantage Pro2.
5. Vantage Pro2 does not support different transmitting period. It only supports the normal ISS transmit period.
6. Vantage Pro2 does not support SensorLink station type.
7. Vantage Pro2 with firmware 1.90 or later supports "LPS" command, but Vantage Pro does not.

IV. Differences between Vantage Pro 2 and Vantage Vue

The Vantage Vue command protocol is substantially the same as the Vantage Pro 2. The primary differences are: the "console type" value returned by the "WRD"… command is 17 instead of 16 for the Vantage Pro, the list of supported sensors and transmitter types is smaller, and the EEPROM graph memory layout is different.

V. Waking up the Console

In order to conserve battery power, the console spends as much time "asleep" as possible, waking up only when required. Receiving a character on the serial port will cause the console to wake up, but it might not wake up fast enough to read the first character correctly. Because of this, you should always perform a wakeup procedure before sending commands to the console:

Console Wakeup procedure:

1. Send a Line Feed character, '\n' (decimal 10, hex 0x0A).
2. Listen for a returned response of Line Feed and Carriage Return characters, ('\n\r').
3. If there is no response within a reasonable interval (say 1.2 seconds), then try steps 1 and 2 again up to a total of 3 attempts.
4. If the console has not woken up after 3 attempts, then signal a connection error

After the console has woken up, it will remain awake for 2 minutes. Every time the Vantage receives another character, the 2 minute timer will be reset.

Please note that this is **NOT TRUE** for the LOOP command. In the LOOP mode, we expect that the Vantage will be sending LOOP packets over time, so it will go to sleep immediately between each packet.

VI. Blackout Periods

The console will not process commands when it is in any of the Setup screens (except the first: "Receiving From…"). It will also not process commands when the console is in a number entry mode (e.g. setting an alarm value).

Similarly, when a Download is in progress, the console will not respond to key presses and will not receive data packets from remote sensors.

VII. Command Formats

The command strings given in the following sections must be followed by a Line Feed characters ('\n' or 0x0A or decimal 10) before the console will execute the command.

There are 3 different types of numbers that can be used as command parameters: decimal, hexadecimal and binary. Command parameters are shown with "<parameter name-decimal>", "<parameter name-hex>", or "<parameter name-binary>" to indicate which format should be used in each case.

Please note that using the correct number of spaces is very important. For example the command `"LOOP <number of LOOP packets to send-decimal>"` should be realized with the string `"LOOP 4"` (i.e. a single space between the "P" and the "4").

There are several different types of command responses. These responses come before any other returned data values.

1. ACK response: when this command is recognized, the console responds with an ASCII ACK (0x06) character. If the command parameters are invalid, a Not Acknowledge response of (0x21) is used. If a block of data is sent with a CRC code, the response CANCEL (0x18) means that the data did not pass the CRC check.

   Note: The DMP and DMPAFT commands can use the character <0x15> for negative acknoledgements. See the detailed documentation of these commands in Section XI Download Protocol below for more details.
2. "OK" response: when this command is recognized, the console responds with the character string "\n\rOK\n\r".
3. "DONE" response: Some commands take some time to complete their operation. For example the command "CLRGRA" will clear all the console graph points. The Vantage will respond with an "OK" when it receives the command, and "DONE" when it is finished. Do not attempt to send any commands to the console until the "DONE\n\r" response has been received.

VIII. Command Summary

1. Testing commands

`"TEST"`
Sends the string “TEST\n” back.

`"WRD"<0x12><0x4d>, ACK`
Responds with a weather station type that is backward compatible with earlier Davis weather products.

`"RXCHECK"`
Sends the Console Diagnostics report.

`"RXTEST"`
Moves the console from the “Receiving from” screen to the main current conditions screen.

`"VER"`
Sends the firmware date code as a text string.

`"RECEIVERS"`
Sends the bit map of station IDs that the console can hear, This is not the byte for indicating what the console selects to listen from.

`"NVER"`
Sends the firmware version number as a text string. This command is only supported by Vantage Pro2 (Firmware 1.90 or later) and Vantage Vue.

2. Current Data commands

`"LOOP <number of LOOP packets to send-decimal>"`
Sends the specified number of LOOP packets, 1 every 2 seconds. Console sleeps between packets.

`"LPS <loop packet type bit mask-hex> <number of packets to send-decimal>"`
Sends the specified number of the different loop packet(s), 1 every 2 seconds. Console sleeps between packets.

`"HILOWS"`
Sends all the current high/low data in a single 436 byte data block, plus 2 CRC bytes.

`"PUTRAIN <Yearly Rain in rain clicks-decimal>"`
Set the Yearly rainfall amount on the Vantage Console.

`"PUTET <Yearly ET in 100th inch-decimal>"`
Set the Yearly ET amount on the Vantage Console.

3. Download Commands

`"DMP"`
Downloads the entire archive memory. See the sections X.6 and X.4 for more details.

`"DMPAFT"`
Downloads the records after a specified date and time. See the sections X.6 and X.4 for more details.

4. EEPROM Commands

`"GETEE"`
Reads the full 4K EEPROM in one data block.

`"EEWR <EE address-hex> <EE data-hex>"`
Writes one byte of data to the specified address in the EEPROM.

`"EERD <EE address-hex> <number of bytes to read-hex>"`
Reads the specified number of bytes starting at the specified address. Results are given as hex strings, one byte per line.

"EEBWR <EE address-hex> <number of bytes to write-hex>"
Writes data to the EEPROM. The data and CRC are given in binary format following an ACK response.

"EEBRD <EE address-hex> <number of bytes to read-hex>"
Reads data from the EEPROM. The data and CRC are given in binary format following an ACK response.

5. Calibration Commands

"CALED"
Sends a block of data with the current temperature and humidity values for setting calibration values.

"CALFIX"
Updates the display when calibration numbers have been changed.

"BAR=<bar value to display (in Hg * 1000)-decimal> <elevation (ft)-decimal>"
Sets the elevation and barometer offset values when setting the barometer for a new location.

"BARDATA"
Displays of the current barometer calibration parameters in text.

6. Clearing Commands

"CLRLOG"
Clears the archive data.

"CLRALM"
Clears all the alarm thresholds.

"CLRCAL"
Clears all the Temperature and Humidity calibration offsets.

"CLRGRA"
Clears all of the graph points on the Vantage console.

"CLRVAR <Data variable-decimal>"
Clears a rain or ET data value.

"CLRHIGHS <0, 1, or 2>"
Clears all of the daily (0), monthly (1), or yearly (2) high values.

"CLRLOWS <0, 1, or 2>"
Clears all of the daily (0), monthly (1), or yearly (2) low values.

"CLRBITS"
Clears the active alarm bits. Alarms will be reactivated if the alarm condition is still present.

"CLRDATA"
Clears all current data values to dashes.

7. Configuration Commands

"BAUD <New baud rate-decimal>"
Sets the console to a new baud rate. Valid values are 1200, 2400, 4800, 9600, 14400, and 19200.

"SETTIME"
Sets the time and date on the Vantage console. Data in a binary format is sent after ACK.

"GAIN <Gain State: '0' (off) or '1' (on)>"
Sets the gain of the radio receiver. This command is currently not supported in Vantage Pro2.

"GETTIME"
Retrieves the current time and date on the Vantage console. Data is sent in a binary format.

"SETPER <Archive interval in minutes-decimal>"
Sets the Vantage archive interval. Valid values are (1, 5, 10, 15, 30, 60, and 120).

"STOP"
Disables the creation of archive records.

"START"

Enables the creation of archive records, if they have been halted with the STOP command.

"NEWSETUP"

Re-initialize the Vantage console after making certain configuration changes.

"LAMPS <Lamp state: '0' (off) or '1' (on)>"

Turns the lamps on the Vantage console on or off.

IX. Command Details

All commands must be terminated by a single line feed character ('\n') or a single carriage return character ('\r'). These are not shown in the command syntax, but are shown in the examples. Beware that some systems may translate a new line character into both a new line and a carriage return which will cause intermittent operation when using a Vantage Pro2 console.

In the following command examples, lines starting with ">" are set to the console, and lines starting with "<" are received from the console.

Character symbols

Symbol	Value	Name
<CR>	0x0D	Carriage return, "\r"
<LF>	0x0A	Line Feed, "\n"
<ACK>	0x06	Acknowledge
<NAK>	0x21	Not Acknowledge
<CANCEL>	0x18	Bad CRC code
<0xdd>	0xdd	Character code specified in hex.

1. Testing commands

"TEST"

It sends the string "TEST\n" back. Mostly useful when using HyperTerminal for testing a connection to the console.

Example:

>"TEST"<LF>

<"TEST"<LF><CR>

"WRD"<0x12><0x4d>

This is the same command sequence used by earlier Davis weather stations to read the Station Type value. The station will respond with an <ACK> and then a one byte identifier, which can be one of these values:

Value	Station	Value	Station
0	Wizard III	5	Energy Enviromontor
1	Wizard II	6	Health Enviromonitor
2	Monitor		
3	Perception	16	Vantage Pro, Vantage Pro 2
4	GroWeather	17	Vantage Vue

Example:
>"WRD"<0x12><0x4D><LF>
<<ACK><16>

"RXCHECK"

It sends the Console Diagnostics report. The following values are sent on one line as a text string: total packets received, total packets missed, number of resynchronizations, the largest number of packets received in a row., and the number of CRC errors detected.

All values are recorded since midnight, or since the diagnostics are cleared manually.

Example:
>"RXCHECK"<LF>
<<LF><CR>"OK"<LF><CR>" 21629 15 0 3204 128"<LF><CR>

It shows we received 21,629 packets, missed 15 packets, there were no resynchronizations, the maximum number of packets received in a row without an error was 3204, and there were 128 CRC errors detected.

"RXTEST"

It moves the console from the "Receiving from" screen to the main current conditions screen. This command is useful to programmatically recover from a powerloss when the console boots into the "receiving from" screen. RXTEST also clears the count of CRC errors seen in RXCHECK.

"VER"

It sends the firmware date code as a text string. Some functions on the console are implemented differently in different firmware versions. See the separate file "Vantage Console Firmware Release History.doc" or "Envoy Firmware Release History.doc" to determine which functions are available with each firmware version.

The date code is sent in the following format:
"Mmm dd yyyy"
Mmm is the three-letter English month abbreviation
dd is the day of the month
yyyy is the year.

Example:
>"VER"<LF>
<<LF><CR>”OK”<LF><CR>"Apr 24 2002"<LF><CR>

"RECEIVERS"

It sends a byte that contains the stations received in the "Receiving From …" setup screen. The station responds with “OK” followed by the bit map. For each bit position, a value of 1 indicates that that transmitter was received. Bit position 0 (least significant bit) corresponds with Tx ID 1 in the Davis Talk protocol.

Example:
>"RECEIVERS"<LF>
<<LF><CR>"OK"<LF><CR><0x01>

"NVER"

It sends the firmware version as a text string. Some functions on the console are implemented differently in different firmware versions. See the separate file "Vantage Console Firmware Release History.doc" or "Envoy Firmware Release History.doc" to determine which functions are available with each firmware version.

The version sent in the following format:
x.xx

Example:
>"NVER"<LF>
<<LF><CR>”OK”<LF><CR>"1.73"<LF><CR>

2. Current Data commands

"LOOP <number of LOOP packets to send-decimal>"

It sends the specified number of LOOP packets, 1 every 2 seconds. Console sleeps between each packet sent. The station responds with an <ACK> then with binary data packet every 2 seconds.

To halt the sending of LOOP packets before receiving all of the requested packets, send a <CR> by itself. Note that this is the same as the Wakeup sequence.

Each data packet is 99 bytes long and contains most of the current data values shown on the vantage console. In addition, the state of alarms, the battery status of the console and the transmitters, the weather forecast icon, and the sunrise and sunset times are included. Rev B and Vantage Pro2 firmware also have the 3 hour barometer trend value. A CRC value is calculated and transmitted so that the PC can validate the transmission accuracy of the data. The data format is described in detail in section X.1

Example (request 4 LOOP packets):

```
>"LOOP 4"<LF>
<<ACK>
<<99 byte LOOP packet> . . .
```

"LPS <loop packet type bit mask-decimal><number of packets to send-decimal>"

It sends the specified number of the different type LOOP packets, 1 every 2.5 seconds. It supports up to 8 different types of loop packets, with each bit maps to one type. So far only two types are supported, bit 0 for LOOP packet, bit 1 for LOOP2 packet. If both bits are set to 1s, the LOOP and the LOOP2 packet will be sent one after another. If more than one type of loop packet is selected, the number of packets to send is the total number of all the different type of loop packets. Console sleeps between each packet sent. The station responds with an <ACK> then with binary data packet every 2.5 seconds.

To halt the sending of LOOP packets before receiving all of the requested packets, send a <CR> by itself. Note that this is the same as the Wakeup sequence.

All the loop packets are 99 bytes long and contain most of the current data values shown on the Vantage Pro, Vantage Pro2 and Vantage Vue consoles. See the previous section for LOOP packet details.

Example (request 2 LOOP and 2 LOOP2 packets):

```
>"LPS 3 4"<LF>
<<ACK>
<<99 byte LOOP packet>…
Wait 2.0 seconds
<<99 byte LOOP2 packet>…
Wait 2.0 seconds
<<99 byte LOOP packet>…
Wait 2.0 seconds
<<99 byte LOOP2 packet>…
```

Example (request 1 LOOP2 packets):

```
>"LPS 2 1"<LF>
<<ACK>
<<99 byte LOOP2 packet>…
```

"HILOWS"

It sends all the current high/low data in a single data block. The station responds with an <ACK> then a 436 byte data block that includes all the daily, monthly, and yearly high and low values on the Vantage console, and then a 2 byte CRC value. This is so that the PC can validate the transmission accuracy of the data. The data format is described in detail in section X.2 .

Example:
>"HILOWS"<LF>
<<ACK>
<<436 byte hi/low packet><2-Byte CRC>

"PUTRAIN <Yearly Rain in rain clicks-decimal>"

It sets the Yearly rainfall amount on the console.

Example (set the Yearly rain to 24.83 inches):
>"PUTRAIN 2483"<LF>
<<ACK>

The console shows yearly rain of 24.83 inches (assuming that the rain collector is configured for a 0.01" collector).

"PUTET <Yearly ET in 100th inch-decimal"

It sets the Yearly ET amount on the console

Example (set the Yearly ET to 24.83 inchex):
>"PUTET 2483"<LF>
<<ACK>

The console display shows yearly ET 24.83 inches.

3. Download Commands

"DMP"

It downloads the entire archive memory. See the sections X.6 and X.4 for more details on downloading data.

"DMPAFT"

It downloads the records after a specified date and time. See the sections X.6 and X.4 for more details on downloading data.

4. EEPROM Commands

"GETEE"

It reads the full 4K EEPROM in one data block. There is also a 2 byte CRC.

Example:
>"GETEE"<LF>
<<ACK>
<<4096 byte block of EEPROM data>
<<2-Byte CRC>

"EERD <EE address-hex> <number of bytes to read-hex>"

It reads the specified number of bytes starting at the specified address. Results are given as hex strings, one byte per line. See section XIII for more details on accessing EEPROM data.

Example (Read the station Longitude [-122.1]):

```
>"EERD 0D 02"<LF>
<"OK"<LF><CR>
<"3B"<LF><CR>
<"FB"<LF><CR>
```

-- 0xFB3B = -1221

"EEWR <EE address-hex> <EE data-hex>"

It writes one byte of data to the specified address in the EEPROM. See section XIII for more details on accessing EEPROM data.

Example (It writes 0x87 to EEPROM address 0x58.):

```
>"EEWR 58 87"<LF>
<<LF><CR>"OK"<LF><CR>
```

"EEBRD <EE address-hex> < number of bytes to read-hex>"

Reads data in binary format from the EEPROM. The data and CRC is given in binary format following an ACK response. See section XIII for more details on accessing EEPROM data.

Example (It reads three bytes from the EEPROM at location 0x32.)

```
>"EEBRD 32 03"<LF>
<<ACK>
<<0x05><0xFA><0x0E><2-Byte CRC>
```

"EEBWR <EE address-hex> <number of bytes to write-hex>"

It writes data to the EEPROM. The data and CRC is given in binary format following an ACK response. See section XIII for more details on accessing EEPROM data.

Example (Set the time alarm to 7:15 am, the TIME_COMP field must also be set):

```
>"EEBWR 54 04"<LF>
<<ACK>
><0xCB><0x02><0x34><0xFD><2-Byte CRC>
```

5. Calibration Commands

"CALED"

It sends a block of data with the current temperature and humidity values for setting calibration values. These values are the current CALIBRATED sensor values. The data format is the same that is used in the **"CALFIX"** command.

Example:
>"CALED"<LF>
<<ACK>
<<43 bytes of data block with current data values><2-Byte CRC>

"CALFIX"

It updates the display when temperature and humidity calibration numbers have been changed. The values sent should be UN-CALIBRATED sensor values.

Example:
>"CALFIX"<LF>
<<ACK>
><43 bytes of data block with raw sensor values><2-Byte CRC>
<<ACK>

"BAR=<bar value to display (in Hg * 1000)-decimal> <elevation (ft)-decimal>"

It sets the elevation and barometer offset values when setting the barometer for a new location.

<bar value to display (in Hg * 1000)-decimal>
If you have a current barometer reading from a very reliable nearby reference, you can use this parameter to force the display to an exact setting. The console uses this value to fine-tune its own adjusted barometric pressure calculations. Do not use this setting alone to correct your barometer to sea-level.

Use a value of zero when you do not have an exact barometer value that you want the Vantage console to display. This also clears out any existing offset value previously set.

This value should either be zero or between 20.000” Hg and 32500” Hg.

< elevation (ft)-decimal>
This is the primary means to correct the barometer measurement. Negative values for elevation can be used.

This value should be between -2000 ft and 15000 ft.

If accepted, the console will respond with an "OK", otherwise it will respond with a Not Acknowledged (0x21 = "!") character.

Example (No local Barometer value, elevation 132 ft):
>"BAR=0 132"<LF>
<<LF><CR>"OK"<LF><CR>

Example (Barometer value = 29.491 in Hg, elevation 0 ft):
>"BAR=29491 0"<LF>
<<LF><CR>"OK"<LF><CR>

Example (Barometer value = 29.991 in Hg, elevation -75 ft):

```
>"BAR=29991 -75"<LF>
<<LF><CR>"OK"<LF><CR>
```

"BARDATA"

It retrieves the current barometer calibration parameters in text. These tell you what the current elevation setting and barometer offset values are, plus some details on the barometer correction factor being used.

Example:

```
>"BARDATA"<LF>
<<LF><CR>"OK"<LF><CR>
<"BAR 29775"<LF><CR>
<"ELEVATION 27"<LF><CR>
<"DEW POINT 56"<LF><CR>
<"VIRTUAL TEMP 63"<LF><CR>
<"C 29"<LF><CR>
<"R 1001"<LF><CR>
<"BARCAL 0"<LF><CR>
<"GAIN 1533"<LF><CR>
<"OFFSET 18110"<LF><CR>
```

Name	Value in example	Explanation
BAR	29.775 in Hg	The most recent barometer measurement.
ELEVATION	27 ft	Elevation in feet
DEW POINT	56 °F	Dew point when the barometer measurement was taken
VIRTUAL TEMP	63 °F	Temperature used in correction formula (12 hour average)
C	29	Humidity correction factor used in the formula
R	1.001	Correction ratio. Multiply the raw sensor value by this to get the corrected measurement.
BARCAL	0.000 in Hg	Constant offset correction factor. See **"BAR="** command.
GAIN		These are the factory set values to calibrate the barometer sensor on this console.
OFFSET		

6. Clearing Commands

"CLRLOG"

It clears the archived data.

Example:

```
>"CLRLOG"<LF>
<<ACK>
```

"CLRALM"

It clears all the alarm thresholds. Use **"CLRBITS"** to clear any active alarms.

This command takes time to perform, so you must wait for the console to send "DONE" before sending any further commands

Example:
>"CLRALM"<LF>
<<LF><CR>"OK"<LF><CR>
-- After some time passes --
<"DONE"<LF><CR>

"CLRCAL"

Clears all the Temperature and Humidity calibration offsets to zero.

Note that the values displayed on the console do not use the new calibration values until a new data packet arrives for that sensor. You must use the procedure from section XIV.1 to force the current display to use the new cal numbers

Example:
>"CLRCAL"<LF>
<"OK"<LF><CR>
-- After some time passes --
<"DONE"<LF><CR>

"CLRGRA"

It clears all of the graph points on the Vantage console.

Example:
>"CLRGRA"<LF>
<"OK"<LF><CR>
-- After some time passes --
<"DONE"<LF><CR>

"CLRVAR <Data variable-decimal>"

It clears a rain or ET data value from the following table:

Rain Variable Name	Number	ET Variable Name	Number
Daily Rain	13	Day ET	26
Storm Rain	14	Month ET	25
Month Rain	16	Year ET	27
Year Rain	17		

Results are undefined if you use a number not on this list

Example (Clear Month Rain value):
>"CLRVAR 16"<LF>
<<ACK>

"CLRHIGHS <0, 1, or 2>"

It clears all of the daily (0), monthly (1), or yearly (2) high values

Example (Clear Monthly High values):
>"CLRHIGHS 1"<LF>
<<ACK>

"CLRLOWS <0, 1, or 2>"

It clears all of the daily (0), monthly (1), or yearly (2) low values

Example (Clear Yearly Low values):
>"CLRLOWS 2"<LF>
<<ACK>

"CLRBITS"

It clears the active alarm bits. They will reactivate if the alarm condition is still present.

Example:
>"CLRBITS"<LF>
<<ACK>

"CLRDATA"

It clears all current data values to dashes.

Example:
>"CLRDATA"<LF>
<<ACK>

7. Configuration Commands

"BAUD <New baud rate-decimal>"

It sets the console to a new baud rate. Valid values are 1200, 2400, 4800, 9600, 14400, and 19200. If the new baud rate is accepted, an "OK" will be returned at the new baud rate. If it is not, a "NO" will be returned and the baud rate will not be changed.

Example (to set 9600 baud):
>"BAUD 9600"<LF>
<<LF><CR>"OK"<LF><CR>

"SETTIME"

It sets the time and date on the console. Data in a binary format is sent after ACK.

The data is 6 bytes plus a 2 bytes of CRC. The each field is one byte. The fields, in order, are: seconds, minutes, hour (24 hour format), day, month, year – 1900. See section XII for more information on calculating CRC values.

Example (to set 3:27:00 pm, June 4, 2003):

```
>"SETTIME"<LF>
<<ACK>
><0><27><15><4><6><103><2 Bytes of CRC>
<<ACK>
```

"GETTIME"

It retrieves the current time and date on the console. Data is sent in a binary format. The format is the same as the SETTIME command.

Example (Vantage responds with 5:17:42 am, January 28, 1998):

```
>"GETTIME"<LF>
<<ACK>
><42><17><5><28><1><98><2 Bytes of CRC>
```

"GAIN <Gain State: '0' (off) or '1' (on)>"

This command only works with the VantagePro station and is not currently implemented on the VantagePro 2 or Vue stations.

It sets the gain of the radio receiver, same as pressing the HI/LOW key on the console diagnostics screen. "GAIN 1" turns the gain on. "GAIN <Anything else>" turns the gain off:

Example (Turn on the Radio Gain):

```
>"GAIN 1"<LF>
<<LF><CR>"OK"<LF><CR>
```

Example (Turn off the Radio Gain):

```
>"GAIN 0"<LF>
<<LF><CR>"OK"<LF><CR>
```

"SETPER <Archive interval in minutes-decimal>"

It sets the console archive interval. This is the interval that archive data records are recorded into the archive memory. The smaller this value is, the faster the archive memory will fill up.

Valid values are (1, 5, 10, 15, 30, 60, and 120). Results are undefined if you try to select an archive period not on the list.

This command automatically clears the archive memory. Use the "**CLRLOG**" command to clear the archive memory. WeatherLink clears the archive memory so that all archived records in the archive memory use the same archive interval.

Example (set a 10 minute archive interval):
>"SETPER 10"<LF>
<<ACK>

"STOP"

It disables the creation of archive records.

"START"

It enables the creation of archive records, if they have been halted with the STOP command.

These two commands are not needed for normal operation.

"NEWSETUP"

It re-initializes the console after making certain configuration changes.

Make sure to issue this command after you set the Latitude or Longitude, and after you change any of the Setup bits in the EEPROM (address 43 = 0x2B) especially the Rain collector type,

Example (set a 10 minute archive interval):
>"NEWSETUP"<LF>
<<ACK>

"LAMPS <Lamp state: '0' (off) or '1' (on)>"

It turns the lamps on the Vantage console on or off.

Example (turn the lamps off):
>"LAMPS 0"<LF>
<<LF><CR>"OK"<LF><CR>

X. Data Formats

1. LOOP data format

There are two different LOOP data formats. Rev "A" firmware, dated before April 24, 2002 uses the old format. Rev "B" firmware, dated on or after April 24, 2002 uses the new format. The only difference between these formats is the inclusion of the current 3 hour barometer trend in place of the fixed value "P" in the fourth byte of the data packet.

Only values read directly from sensors are included in the LOOP packet. Desired values (i.e., Dew Point or Wind Chill) must be calculated on the PC. The LOOP packet also contains

information on the current status of all Vantage Alarm conditions, battery status, weather forecasts, and sunrise and sunset times.

Contents of the LOOP packet.

Field	Offset	Size	Explanation
"L"	0	1	Spells out "LOO" for Rev B packets and "LOOP" for Rev A packets. Identifies a LOOP packet
"O"	1	1	
"O"	2	1	
"P" (Rev A) Bar Trend (Rev B)	3	1	Signed byte that indicates the current 3-hour barometer trend. It is one of these values: -60 = Falling Rapidly = 196 (as an unsigned byte) -20 = Falling Slowly = 236 (as an unsigned byte) 0 = Steady 20 = Rising Slowly 60 = Rising Rapidly 80 = ASCII "P" = Rev A firmware, no trend info is available Any other value means that the Vantage does not have the 3 hours of bar data needed to determine the bar trend.
Packet Type	4	1	0 for LOOP and 1 for LOOP2 packet
Next Record	5	2	Location in the archive memory where the next data packet will be written. This can be monitored to detect when a new record is created.
Barometer	7	2	Current Barometer. Units are (in Hg / 1000). The barometric value should be between 20 inches and 32.5 inches in Vantage Pro and between 20 inches and 32.5 inches in both Vantatge Pro Vantage Pro2. Values outside these ranges will not be logged.
Inside Temperature	9	2	The value is sent as 10^{th} of a degree in F. For example, 795 is returned for 79.5°F.
Inside Humidity	11	1	This is the relative humidity in %, such as 50 is returned for 50%.
Outside Temperature	12	2	The value is sent as 10^{th} of a degree in F. For example, 795 is returned for 79.5°F.
Wind Speed	14	1	It is a byte unsigned value in mph. If the wind speed is dashed because it lost synchronization with the radio or due to some other reason, the wind speed is forced to be 0.
10 Min Avg Wind Speed	15	1	It is a byte unsigned value in mph.
Wind Direction	16	2	It is a two byte unsigned value from 1 to 360 degrees. (0° is no wind data, 90° is East, 180° is South, 270° is West and 360° is north)
Extra Temperatures	18	7	This field supports seven extra temperature stations. Each byte is one extra temperature value in whole degrees F with an offset of 90 degrees. For example, a value of 0 = -90°F ; a value of 100 = 10°F ; and a value of 169 = 79°F.
Soil Temperatures	25	4	This field supports four soil temperature sensors, in the same format as the Extra Temperature field above
Leaf Temperatures	29	4	This field supports four leaf temperature sensors, in the same format as the Extra Temperature field above
Outside Humidity	33	1	This is the relative humitiy in %.
Extra Humidties	34	7	Relative humidity in % for extra seven humidity stations.
Rain Rate	41	2	This value is sent as number of rain clicks (0.2mm or 0.01in). For example, 256 can represent 2.56 inches/hour.
UV	43	1	The unit is in UV index.
Solar Radiation	44	2	The unit is in watt/meter^2.
Storm Rain	46	2	The storm is stored as 100^{th} of an inch.

Field	Offset	Size	Explanation
Start Date of current Storm	48	2	Bit 15 to bit 12 is the month, bit 11 to bit 7 is the day and bit 6 to bit 0 is the year offseted by 2000.
Day Rain	50	2	This value is sent as number of rain clicks. (0.2mm or 0.01in)
Month Rain	52	2	This value is sent as number of rain clicks. (0.2mm or 0.01in)
Year Rain	54	2	This value is sent as number of rain clicks. (0.2mm or 0.01in)
Day ET	56	2	This value is sent as the 1000^{th} of an inch.
Month ET	58	2	This value is sent as the 100^{th} of an inch.
Year ET	60	2	This value is setnt as the 100^{th} of an inch.
Soil Moistures	62	4	The unit is in centibar. It supports four soil sensors.
Leaf Wetnesses	66	4	This is a scale number from 0 to 15 with 0 meaning very dry and 15 meaning very wet. It supports four leaf sensors.
Inside Alarms	70	1	Currently active inside alarms. See the table below
Rain Alarms	71	1	Currently active rain alarms. See the table below
Outside Alarms	72	2	Currently active outside alarms. See the table below
Extra Temp/Hum Alarms	74	8	Currently active extra temp/hum alarms. See the table below
Soil & Leaf Alarms	82	4	Currently active soil/leaf alarms. See the table below
Transmitter Battery Status	86	1	
Console Battery Voltage	87	2	Voltage = ((Data * 300)/512)/100.0
Forecast Icons	89	1	
Forecast Rule number	90	1	
Time of Sunrise	91	2	The time is stored as hour * 100 + min.
Time of Sunset	93	2	The time is stored as hour * 100 + min.
"\n" <LF> = 0x0A	95	1	
"\r" <CR> = 0x0D	96	1	
CRC	97	2	
Total Length	99		

Forecast Icons in LOOP packet

Field	Byte	Bit #	
Forecast Icons	89		Bit maps for forecast icons on the console screen.
Rain		0	
Cloud		1	
Partly Cloudy		2	
Sun		3	
Snow		4	

Forecast Icon Values

Value Decimal	Value Hex	Segments Shown	Forecast
8	0x08	Sun	Mostly Clear
6	0x06	Partial Sun + Cloud	Partly Cloudy
2	0x02	Cloud	Mostly Cloudy
3	0x03	Cloud + Rain	Mostly Cloudy, Rain within 12 hours
18	0x12	Cloud + Snow	Mostly Cloudy, Snow within 12 hours
19	0x13	Cloud + Rain + Snow	Mostly Cloudy, Rain or Snow within 12 hours
7	0x07	Partial Sun + Cloud + Rain	Partly Cloudy, Rain within 12 hours

Value Decimal	Value Hex	Segments Shown	Forecast
22	0x16	Partial Sun + Cloud + Snow	Partly Cloudy, Snow within 12 hours
23	0x17	Partial Sun + Cloud + Rain + Snow	Partly Cloudy, Rain or Snow within 12 hours

Currently active alarms in the LOOP packet

This table shows which alarms correspond to each bit in the LOOP alarm fields. Not all bits in each field are used. The Outside Alarms field has been split into 2 1-byte sections.

Field	Byte	Bit #	
Inside Alarms	70		Currently active inside alarms.
Falling bar trend alarm		0	
Rising bar trend alarm		1	
Low inside temp alarm		2	
High inside temp alarm		3	
Low inside hum alarm		4	
High inside hum alarm		5	
Time alarm		6	
Rain Alarms	71		Currently active rain alarms.
High rain rate alarm		0	
15 min rain alarm		1	Flash Flood alarm
24 hour rain alarm		2	
Storm total rain alarm		3	
Daily ET alarm		4	
Outside Alarms	72		Currently active outside alarms.
Low outside temp alarm		0	
High outside temp alarm		1	
Wind speed alarm		2	
10 min avg speed alarm		3	
Low dewpoint alarm		4	
High dewpoint alarm		5	
High heat alarm		6	
Low wind chill alarm		7	
Outside Alarms, byte 2	73		
High THSW alarm		0	
High solar rad alarm		1	
High UV alarm		2	
UV Dose alarm		3	
UV Dose alarm Enabled		4	It is set to 1 when a UV dose alarm threshold has been entered AND the daily UV dose has been manually cleared.
Outside Humidity Alarms	74	1	Currently active outside humidity alarms.
Low Humidity alarm		2	
High Humidity alarm		3	

Field	Byte	Bit #	
Extra Temp/Hum Alarms	75 - 81	7	Each byte contains four alarm bits (0 – 3) for a single extra Temp/Hum station. Bits (4 – 7) are not used and reserved for future use. Use the temperature and humidity sensor numbers, as described in Section XIV.4 to locate which byte contains the appropriate alarm bits. In particular, the humidity and temperature alarms for a single station will be found in different bytes.
Low temp X alarm		0	
High temp X alarm		1	
Low hum X alarm		2	
High hum X alarm		3	
Soil & Leaf Alarms	82 - 85	4	Currently active soil/leaf alarms.
Low leaf wetness X alarm		0	
High leaf wetness X alarm		1	
Low soil moisture X alarm		2	
High soil moisture X alarm		3	
Low leaf temp X alarm		4	
High leaf temp X alarm		5	
Low soil temp X alarm		6	
High soil temp X alarm		7	

2. LOOP2 Packet Format

The “LPS” command sends the different types of LOOP packet including the newer LOOP2 packet. The LOOP2 packet is NOT supported in Vantage Pro and only supported in Vantage Pro2 (Firmware 1.90 or later) and Vantage Vue.

Note: Some of the fields are included in both LOOP and LOOP2 packets.

Field	Offset	Size	Explanation
"L"	0	1	Spells out "LOO", identifies a LOOP packet
"O"	1	1	
"O"	2	1	
Bar Trend	3	1	Signed byte that indicates the current 3-hour barometer trend. It is one of these values: -60 = Falling Rapidly = 196 (as an unsigned byte) -20 = Falling Slowly = 236 (as an unsigned byte) 0 = Steady 20 = Rising Slowly 60 = Rising Rapidly 80 = ASCII "P" = Rev A firmware, no trend info is available Any other value means that the Vantage does not have the 3 hours of bar data needed to determine the bar trend.
Packet Type	4	1	0 for LOOP and 1 for LOOP2 packet
Unused	5	2	Unused field, filled with 0x7FFF
Barometer	7	2	Current Barometer. Units are (in Hg / 1000). The barometric value should be between 20 inches and 32.5 inches. Values outside these ranges will not be logged.
Inside Temperature	9	2	The value is sent as 10^{th} of a degree in F. For example, 795 is returned for 79.5°F.

Field	Offset	Size	Explanation
Inside Humidity	11	1	This is the relative humidity in %, such as 50 is returned for 50%.
Outside Temperature	12	2	The value is sent as 10th of a degree in F. For example, 795 is returned for 79.5°F.
Wind Speed	14	1	It is a byte unsigned value in mph. If the wind speed is dashed because it lost synchronization with the radio or due to some other reason, the wind speed is forced to be 0.
Unused	15	1	Unused field, filled wth 0xFF
Wind Direction	16	2	It is a two-byte unsigned value from 1 to 360 degrees. (0° is no wind data, 90° is East, 180° is South, 270° is West and 360° is north)
10-Min Avg Wind Speed	18	2	It is a two-byte unsigned value in 0.1mph resolution.
2-Min Avg Wind Speed	20	2	It is a two-byte unsigned value in 0.1mph resolution.
10-Min Wind Gust	22	2	It is a two-byte unsigned value in 0.1mph resoluation.
Wind Direction for the 10-Min Wind Guest	24	2	It is a two-byte unsigned value from 1 to 360 degrees. (0° is no wind data, 90° is East, 180° is South, 270° is West and 360° is north)
Unused	26	2	Unused field, filled with 0x7FFF
Unused	28	2	Unused field, filled with 0x7FFF
Dew Point	30	2	The value is a signed two byte value in whole degrees F. 255 = dashed data
Unused	32	1	Unused field, filled with 0xFF
Outside Humidity	33	1	This is the relative humidity in %, such as 50 is returned for 50%.
Unused	34	1	Unused field, filled with 0xFF
Heat Index	35	2	The value is a signed two byte value in whole degrees F. 255 = dashed data
Wind Chill	37	2	The value is a signed two byte value in whole degrees F. 255 = dashed data
THSW Index	39	2	The value is a signed two byte value in whole degrees F. 255 = dashed data
Rain Rate	41	2	In rain clicks per hour.
UV	43	1	Unit is in UV Index
Solar Radiation	44	2	The unit is in watt/meter^2.
Storm Rain	46	2	The storm is stored as number of rain clicks. (0.2mm or 0.01in)
Start Date of current Storm	48	2	Bit 15 to bit 12 is the month, bit 11 to bit 7 is the day and bit 6 to bit 0 is the year offseted by 2000.
Daily Rain	50	2	This value is sent as number of rain clicks. (0.2mm or 0.01in)
Last 15-min Rain	52	2	This value is sent as number of rain clicks. (0.2mm or 0.01in)
Last Hour Rain	54	2	This value is sent as number of rain clicks. (0.2mm or 0.01in)
Daily ET	56	2	This value is sent as the 1000th of an inch.
Last 24-Hour Rain	58	2	This value is sent as number of rain clicks. (0.2mm or 0.01in)
Barometric Reduction Method	60	1	Bar reduction method: 0 - user offset 1- Altimeter Setting 2- NOAA Bar Reduction. For VP2, this will always be 2.
User-entered Barometric Offset	61	2	Barometer calibration number in 1000th of an inch
Barometric calibration number	63	2	Calibration offset in 1000th of an inch
Barometric Sensor Raw Reading	65	2	In 1000th of an inch
Absolute Barometric Pressure	67	2	In 1000th of an inch, equals to the raw sensor reading plus user entered offset
Altimeter Setting	69	2	In 1000th of an inch
Unused	71	1	Unused field, filled with 0xFF
Unused	72	1	Undefined

Field	Offset	Size	Explanation
Next 10-min Wind Speed Graph Pointer	73	1	Points to the next 10-minute wind speed graph point. For current graph point, just subtract 1 (range from 0 to 23 on VP/VP2 console and 0 to 24 on Vantage Vue console)
Next 15-min Wind Speed Graph Pointer	74	1	Points to the next 15-minute wind speed graph point. For current graph point, just subtract 1 (range from 0 to 23 on VP/VP2 console and 0 to 24 on Vantage Vue console)
Next Hourly Wind Speed Graph Pointer	75	1	Points to the next hour wind speed graph point. For current graph point, just subtract 1 (range from 0 to 23 on VP/VP2 console and 0 to 24 on Vantage Vue console)
Next Daily Wind Speed Graph Pointer	76	1	Points to the next daily wind speed graph point. For current graph point, just subtract 1 (range from 0 to 23 on VP/VP2 console and 0 to 24 on Vantage Vue console)
Next Minute Rain Graph Pointer	77	1	Points to the next minute rain graph point. For current graph point, just subtract 1 (range from 0 to 23 on VP/VP2 console and 0 to 24 on Vantage Vue console)
Next Rain Storm Graph Pointer	78	1	Points to the next rain storm graph point. For current graph point, just subtract 1 (range from 0 to 23 on VP/VP2 console and 0 to 254on Vantage Vue console)
Index to the Minute within an Hour	79	1	It keeps track of the minute within an hour for the rain calculation. (range from 0 to 59)
Next Monthly Rain	80	1	Points to the next monthly rain graph point. For current graph point, just subtract 1 (range from 0 to 23 on VP/VP2 console and 0 to 24 on Vantage Vue console)
Next Yearly Rain	81	1	Points to the next yearly rain graph point. For current graph point, just subtract 1 (range from 0 to 23 on VP/VP2 console and 0 to 24 on Vantage Vue console)
Next Seasonal Rain	82	1	Points to the next seasonal rain graph point. Yearly rain always resets at the beginning of the calendar, but seasonal rain resets when rain season begins. For current graph point, just subtract 1 (range from 0 to 23 on VP/VP2 console and 0 to 24 on Vantage Vue console)
Unused	83	2	Unused field, filled with 0x7FFF
Unused	85	2	Unused field, filled with 0x7FFF
Unused	87	2	Unused field, filled with 0x7FFF
Unused	89	2	Unused field, filled with 0x7FFF
Unused	91	2	Unused field, filled with 0x7FFF
Unused	93	2	Unused field, filled with 0x7FFF
"\n" <LF> = 0x0A	95	1	
"\r" <CR> = 0x0D	96	1	
CRC	97	2	
Total Length	99		

3. HILOW data format

The "**HILOWS**" command sends a 436 byte data packet and a 2 byte CRC value. The data packet is broken up into sections of related data values.

Contents of the HILOW packet.

Field	Offset	Size	Explanation
Barometer Section	0	16	
Daily Low Barometer	0	2	
Daily High Barometer	2	2	
Month Low Bar	4	2	

Field	Offset	Size	Explanation
Month High Bar	6	2	
Year Low Barometer	8	2	
Year High Barometer	10	2	
Time of Day Low Bar	12	2	
Time of Day High Bar	14	2	
Wind Speed Section	16	5	
Daily Hi Wind Speed	16	1	
Time of Hi Speed	17	2	
Month Hi Wind Speed	19	1	
Year Hi Wind Speed	20	1	
Inside Temp Section	21	16	
Day Hi Inside Temp	21	2	
Day Low Inside Temp	23	2	
Time Day Hi In Temp	25	2	
Time Day Low In Temp	27	2	
Month Low In Temp	29	2	
Month Hi In Temp	31	2	
Year Low In Temp	33	2	
Year Hi In Temp	35	2	
Inside Humidity Section	37	10	
Day Hi In Hum	37	1	
Day Low In Hum	38	1	
Time Day Hi In Hum	39	2	
Time Day Low In Hum	41	2	
Month Hi In Hum	43	1	
Month Low In Hum	44	1	
Year Hi In Hum	45	1	
Year Low In Hum	46	1	
Outside Temp Section	47	16	
Day Low Out Temp	47	2	
Day Hi Out Temp	49	2	
Time Day Low Out Temp	51	2	
Time Day Hi Out Temp	53	2	
Month Hi Out Temp	55	2	
Month Low Out Temp	57	2	
Year Hi Out Temp	59	2	
Year Low Out Temp	61	2	
Dew Point Section	63	16	
Day Low Dew Point	63	2	
Day Hi Dew Point	65	2	
Time Day Low Dew Point	67	2	
Time Day Hi Dew Point	69	2	
Month Hi Dew Point	71	2	
Month Low Dew Point	73	2	
Year Hi Dew Point	75	2	
Year Low Dew Point	77	2	

Field	Offset	Size	Explanation
Wind Chill Section	79	8	
Day Low Wind Chill	79	2	
Time Day Low Chill	81	2	
Month Low Wind Chill	83	2	
Year Low Wind Chill	85	2	
Heat Index Section	87	8	
Day High Heat	87	2	
Time of Day High Heat	89	2	
Month High Heat	91	2	
Year High Heat	93	2	
THSW Index Section	95	8	
Day High THSW	95	2	
Time of Day High THSW	97	2	
Month High THSW	99	2	
Year High THSW	101	2	
Solar Radiation Section	103	8	
Day High Solar Rad	103	2	
Time of Day High Solar	105	2	
Month High Solar Rad	107	2	
Year High Solar Rad	109	2	
UV Section	111	5	
Day High UV	111	1	
Time of Day High UV	112	2	
Month High UV	114	1	
Year High UV	115	1	
Rain Rate Section	116	10	
Day High Rain Rate	116	2	
Time of Day High Rain Rate	118	2	
Hour High Rain Rate	120	2	
Month High Rain Rate	122	2	
Year High Rain Rate	124	2	
Extra/Leaf/Soil Temps	126	150	Each field has 15 entries. Indexes 0 – 6 = Extra Temperatures 2 – 8 Indexes 7 – 10 = SoilTemperatures 1 – 4 Indexes 11 – 14 = Leaf Temperatures 1 – 4
Day Low Temperature	126	15	(15 * 1)
Day Hi Temperature	141	15	(15 * 1)
Time Day Low Temperature	156	30	(15 * 2)
Time Day Hi Temperature	186	30	(15 * 2)
Month Hi Temperature	216	15	(15 * 1)
Month Low Temperature	231	15	(15 * 1)
Year Hi Temperature	246	15	(15 * 1)
Year Low Temperature	261	15	(15 * 1)

Field	Offset	Size	Explanation
Outside/Extra Hums	276	80	Each field has 8 entries Index 0 = Outside Humidity Index 1 – 7 = Extra Humidities 2 – 8
Day Low Humidity	276	8	(8 * 1)
Day Hi Humidity	284	8	(8 * 1)
Time Day Low Humidity		16	(8 * 2)
Time Day Hi Humidity		16	(8 * 2)
Month Hi Humidity		8	(8 * 1)
Month Low Humidity		8	(8 * 1)
Year Hi Humidity		8	(8 * 1)
Year Low Humidity		8	(8 * 1)
Soil Moisture Section	356	40	Each field has 4 entries. Indexes 0 – 3 = Soil Moistures 1 – 4
Day Hi Soil Moisture		4	(4 * 1)
Time Day Hi Soil Moisture		8	(4 * 2)
Day Low Soil Moisture		4	(4 * 1)
Time Day Low Soil Moisture		8	(4 * 2)
Month Low Soil Moisture		4	(4 * 1)
Month Hi Soil Moisture		4	(4 * 1)
Year Low Soil Moisture		4	(4 * 1)
Year Hi Soil Moisture		4	(4 * 1)
Leaf Wetness Section	396	40	Each field has 4 entries. Indexes 0 – 3 = Leaf Wetness 1 – 4
Day Hi Leaf Wetness		4	(4 * 1)
Time Day Hi Leaf Wetness		8	(4 * 2)
Day Low Leaf Wetness		4	(4 * 1)
Time Day Low Leaf Wetness		8	(4 * 2)
Month Low Leaf Wetness		4	(4 * 1)
Month Hi Leaf Wetness		4	(4 * 1)
Year Low Leaf Wetness		4	(4 * 1)
Year Hi Leaf Wetness		4	(4 * 1)
CRC	436	2	

4. DMP and DMPAFT data format

There are two different archived data formats. Rev "A" firmware, dated before April 24, 2002 uses the old format. Rev "B" firmware dated on or after April 24, 2002 uses the new format. The fields up to ET are identical for both formats. The only differences are in the Soil, Leaf, Extra Temperature, Extra Humidity, High Solar, High UV, and forecast fields (reedOpen and reedClosed fields are removed).

You can use the VER command and parse the date returned to determine the archive data format, or you can examine byte 42 in the archive record. In a Rev B record, it will have the value 0x00. In a Rev A record, this byte is used for "Leaf Wetness 4" which is never assigned a real data value, so it will always contain 0xFF. Future record formats may assign different values for this field.