TWI Commands for WLS, WRL,WR and WPS.

TWI binary record format

Commands are available in both ASCII and binary format, with replies in kind. Binary record commands includes a record header, record length, record data, checksum and record terminator'

```
      STX    record header byte, ASCII 'Start of Text', 0x02
      Len    binary number of data bytes, 0 to 255
      ...    record data bytes
      cksum  record checksum; sum of len, data and cksum must = 0
      ETX    record trailer byte, ASCII 'End of Text', 0x03

GetPrmVal STX <3> "G" "P" <prm> <cs> ETX
SetPrmval STX <5> "S" "P" <prm> <hi> <lo> <cs> ETX

  <n>  : record length, 8-bit value
  <prm>: parameter number, 8-bit value
  <hi> : high-order byte of 16-bit value
  <lo> :  low-order byte of 16-bit value
  <cs> : record checksum, 8-bit value

Reply to GetPrmVal and SetPrmVal:
  <hi> : high-order byte of 16-bit value
  <lo> : low-order  byte of 16-bit value
SCALE parameter:
  <prm>: 33
  value:
         0 FPS, English (Foot-Pound-Sec)
         1 CGS, Metric (Centimeter-Gram-Sec)
```

Binary Commands are used with an associated prm file. Prm files defines the various versions of a TWI weather stations. Use the "V" command to find the version of your weather station. On models with displays, de-power then re-power your weather station and your version number will appear in the time and date window for about 4 seconds. You can get samples of prm files by going to http://www.txwx.com/downloads/prm.zip An example of a 3500.prm file follows:

```
 -6, "TERM", "RATE", "    ", "    ", "    ", "    ", "    ", "    "
 -5, "Off ", "Off ", "Off ", "On  ", "Taux", "Tin ", "ADC1", "ADC4"
 -4, "-   ", "?   ", "?   ", "?   ", "On  ", "Off ", "On  ", "Off "
 -3, "FF  ", "LF  ", "MPH ", "KTS ", "24HR", "AMPM", "AVG ", "CUR "
 -2, "38.4", "19.2", "9600", "4800", "2400", "1200", " 600", " 300"
 -1, "    ", "Sun ", "Mon ", "Tue ", "Wed ", "Thr ", "Fri" , "Sat "
  0,    0,      255,    1,      96,     "temp: aux"
  1,    0,      255,    1,      96,     "temp: inside"
  2,    0,      255,    1,      96,     "temp: outside"
  3,    2400,   3600,   100,    0,      "barometric pressure"
 40,     0,        3,  -225,    0,      "dP/dT Stat"
 40,     0,        3,  -025,    4,      "dP/dT Temp"
 41,     0,    15000,   1,      0,      "elevation"
 22,     0,     9999,   1000,   0,      "mV @  0.0% RH"
 23,     0,     9999,   1000,   0,      "mV @ 75.3% RH"
  6,     0,     255,    .71111, 0,      "wind dir offset"
  4,     0,     3,      -4,     0,      "rain inc flag"
  5,     1,     10,     100,    0,      "rain inc value"
 27,     0,     9999,   100,    0,      "rain fall: term"
 20,     0,      1,    -015,    2,      "report MIN/MAX"
 20,     0,      1,    -113,    9,      "report end-of-day"
 20,     0,      1,    -216,    9,      "report Rain"
 21,     0,      7,    -2,      0,      "Baud Rate index"
  7,     0,     99,     1,      0,      "clock years"
```

```
 8,     1,     12,     1,      0,      "clock month"
 9,     1,     31,     1,      0,      "clock day of month"
11,     0,     23,     1,      0,      "clock hours"
12,     0,     59,     1,      0,      "clock minutes"
13,     0,     59,     1,      0,      "clock seconds"
28,     0,     24,     1,      0,      "log interval hrs"
29,     0,     59,     1,      0,      "log interval min"
33,     0,      1,     1,      0,      "Scale: 0=FPS 1=CGS"
30,     0,    255,     1,      0,      "ID number"
35,     0,      1,  -413,      2,      "Wsp units"
35,     0,      1,  -513,      4,      "Time display"
35,     0,      1,  -614,      4,      "aux Temp  "
35,     0,      1,  -713,      6,      "Wsp/Wdir"
44,     0,    127,     1,      0,      "Rx DTR Delay, sec"
```

To get an explanation of version codes go to http://www.txwx.com/doc.html and click on “version”.

TWI Single Character ASCII Commands

The following is the weather station output of the single character ASCII commands "r", "K", "z", "c". One of these characters was sent to the unit, in sequence, each 15 seconds.
Each line output from the unit ends with:
Carriage Return, Line Feed.
Except the last line of the "c" command ends with:
Carriage Return, Line Feed, Line Feed.

All of these commands return fixed length ASCII data. A response to the "L" commands is not supplied as a unit with that feature was not readily available.

It appears I was wrong about suggesting the "K" command might be variable length.

The uppercase "c" and "d" commands are similar to the "r" command in that the last parameter changes from Term_Rain_Fall to Rain_Rate. Remember that the "d" commands give the Daily Min/Max values which are reset at midnight; the "c" commands reset the Min/Max values after the command.

Command responses for "r", "K", "z", "c"

```
16:03 11/01/02 NE 04MPH 002K 075F 051F 100% 31.03F 00.03"D 00.03"M 30.96"T
51DP 51TH 51WC
11/01 16:00 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
Min 11/01/02 SW 00MPH 000K 070F 046F 087% 30.97" 00.03"D 00.03"M 30.96"T
Max 11/01/02 NE 12MPH 022K 075F 055F 100% 31.12" 00.03"D 00.03"M 30.96"T

16:04 11/01/02 NE 08MPH 002K 075F 051F 100% 31.04S 00.03"D 00.03"M 30.96"T
51DP 51TH 49WC
11/01 16:00 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
Min 11/01/02 NE 04MPH 001K 075F 051F 100% 31.03" 00.03"D 00.03"M 30.96"T
Max 11/01/02 NE 09MPH 002K 075F 051F 100% 31.04" 00.03"D 00.03"M 30.96"T

16:05 11/01/02 NE 04MPH 001K 075F 051F 100% 31.03F 00.03"D 00.03"M 30.96"T
51DP 51TH 51WC
11/01 16:00 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
Min 11/01/02 N 01MPH 001K 075F 051F 100% 31.03" 00.03"D 00.03"M 30.96"T
Max 11/01/02 ENE 06MPH 001K 075F 051F 100% 31.04" 00.03"D 00.03"M 30.96"T
```

```
16:06 11/01/02 NE 03MPH 001K 075F 051F 100% 31.03F 00.03"D 00.03"M 30.96"T
51DP 51TH 51WC
11/01 16:00 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
Min 11/01/02 N 01MPH 001K 075F 051F 100% 31.03" 00.03"D 00.03"M 30.96"T
Max 11/01/02 NE 06MPH 001K 075F 051F 100% 31.04" 00.03"D 00.03"M 30.96"T

16:07 11/01/02 NE 04MPH 001K 075F 051F 100% 31.03F 00.03"D 00.03"M 30.96"T
51DP 51TH 51WC
11/01 16:00 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
Min 11/01/02 NE 03MPH 001K 075F 051F 100% 31.03" 00.03"D 00.03"M 30.96"T
Max 11/01/02 NE 06MPH 001K 075F 051F 100% 31.04" 00.03"D 00.03"M 30.96"T

16:08 11/01/02 NE 03MPH 001K 075F 051F 100% 31.04S 00.03"D 00.03"M 30.96"T
51DP 51TH 51WC
```

Other Command Characters

V Firmware version number
S Firmware Serial#
I Unit ID number
C Unit responds with a daily minimum and maximum of all parameters, then clears. The rainfall rate is present rather than term rain.

Sample
```
MIN 07/24/90 SW  00MPH 000K 067F 067F 054% 30.00" 00.19"D 01.38"M 00.00"R
MAX 07/24/90 SSE 25MPH 052K 071F 092F 099% 30.06" 00.19"D 01.38"M 00.72"R
```

c Unit responds with a daily minimum and maximum of all parameters, then clears. The term rain is present rather than rainfall rate. (*Note: use of the either c command will clear the logged min/max.)*

Sample
```
MIN 07/24/90 SW  00MPH 000K 067F 067F 054% 30.00" 00.19"D 01.38"M 00.00"T
MAX 07/24/90 SSE 25MPH 052K 071F 092F 099% 30.06" 00.19"D 01.38"M 00.72"T
```

The minimum and maximum associated with the *C* command is cleared automatically at midnight

D Unit responds in an identical manner as the *C* command but does not clear the system memory.

d Unit responds in an identical manner as the *c* command but does not clear the system memory

E, e Unit responds with minimum and maximums along with date and time of occurrence. This uses the same buffer as the c and d command.

M Unit responds with all term minimums and maximums with the date and time of their occurrence, then clears.

m Unit responds in an identical manner as with the *M* command but does not clear the system memory.

Sample
```
SS 10:33   038K     SS 09:32   056 K
TO 04:15   075F     TI 15:03   080 F
TO 10:33   038F     TO 16:10   056 F
RH 15:44   033%     RH 01:40   060 %
BP 16:11 29.57″     BP 10:20   30.15"
RD 04/29 00:00″     RT         01:00"
RM        03.32″    WS 00:00   000 MPH 048
```

The system has two completely separate memory buffers (C and M commands). C is cleared every midnight. M is only cleared by pressing the clear and min buttons on the display or sending an upper case M via a computer.

R Unit responds with current conditions. The rainfall rate is present rather than the term rain. *(Note: in 30.04R the "R" denotes rising pressure)*

Sample
5:15 07/24/90 SSE 04MPH 052F 069F 078F 099% 30.04R 00.19"D 01.38"M 11.78"T

r Unit responds with current conditions. The term rain is present rather than the rainfall rate. *(Note: in 30.04F the "F" denotes falling pressure, a "S" character denotes steady pressure.)*

Sample
5:15 07/24/90 SSE 04MPH 052F 069F 078F 099% 30.04F 00.19"D 01.38"M 00.72"R

K Unit responds with current calculated values, for dew point, Windchill and heat index. Please note that the labels DP, TH, and WC remain fixed in the field and the data remains right justified. The "k" command is not space delimited. The space between the values can be used for characters.

Samples
58DP 73TH 79WC or –479DP-457DP-457WC

Q Unit response with hi resolution time, wind, temperature and pressure.

Sample
96/01/15 09:21:44 SSE 004.3MPH 052.6F 069.2F 078.5F 069% 30.041F 002.19"

The following commands respond if the WLS-8000 has logged data in memory.

T Data logger top, moves pointer to the top of the data records, then sends data
N Data logger next, moves pointer to the next data record, then sends data.
A Data logger again, sends same data again.
P Data logger previous, moves pointer to the previous data record, then sends data.
B Data logger bottom, moves pointer to the bottom of the data records.

Sample
96/03/07 23:00 00052K 053.2F 085.8F 070% 29.926I" 00.00"ID 007.5MPH 342D

date time temp RH bp rain wind speed direction

The "z" (lower case) command is used to output the accumulated lightning data for the current hour. At the end of the hour, the data will be logged if the hourly max count is greater than the counts per minute threshold. The threshold may be changed through the F5 routine in the TWI_LOG Software. The logged lightning data is written to the data logger memory a maximum of once per hour. It can be accessed along with other logged data using the T, B, P and N commands. See *Communicating with the W…* for more details.

```
mo/dy hr:mn  max  :00  :06  :12  :18  :24  :30  :36  :42  :48  :54
 xx xx xx xx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx

      mo     month
      dy     day
      hr     hour
      mn     minute of max count
      max    max count per minute
      :00    average count from :00 to :05
      ...
      :54    average count from :54 to :59
```

The "Z" (upper case) command is used to output current lightning data.

```
 yr/mo/dy hr:mn:sc  cur  cnt  lst  avg  max min
 xx/xx/xx xx:xx:xx xxxx xxxx xxxx xxxx xxxx :xx

      yr     year, current
      mo     month, current
      dy     day, current
      hr     hour, current
      mn     minute, current
      sc     second, current
      cur    count, current minute accumulation
      cnt    count, current full minute
      lst    count, prior full minute
      avg    count, 6 minute average
      max    count  of max in current hour
      min    minute of max in current hour
```

Leaf Wetness Command

```
"L" command output
English:
 20:28 02/11/96 050L 000 0    1.6hW 074F  003.7hC 072F  001.5hP 075F
metric:
 20:27 02/11/96 050L 000 0    094mW 023C  00220mC 022C  00091mP 024C
  |  |  |  |  |    |    | |      |     |       | |   |       | |   |
  |  |  |  |  |    |    | |      |     |       | |   |       | |   +- TPavg
  |  |  |  |  |    |    | |      |     |       | |   |       +-+---+- Prior
  |  |  |  |  |    |    | |      |     |       | |   |       +- Time
  |  |  |  |  |    |    | |      |     |       | |   |
  |  |  |  |  |    |    | |      |     |       | |   +- Tavg  [°F, °C]
  |  |  |  |  |    |    | |      |     |       +-+---+- Current Event
  |  |  |  |  |    |    | |      |     |       +- Time [hrs, min]
  |  |  |  |  |    |    | |      |     |
  |  |  |  |  |    |    | |      |     +- Tout Current [°F, °C]
  |  |  |  |  |    |    | |      +- WetTime 24hr Window [hrs, min]
  |  |  |  |  |    |    | |
  |  |  |  |  |    |    | +- WetLevel Indicator [1-Wet, 0-Dry]
  |  |  |  |  |    |    +- WetLevel Value
  |  |  |  |  |    +- WetLevel Reference
  |  |  |  |  |
  |  |  +--+--+- Date Current
  +--+- Time Current
```