Interfacing with the Rainwise WS-1000CC

1.0 General

The CPP offers a serial interface to the Rainwise model number WS-1000CC. The Rainwise responds to interrogation commands from a polling device and returns requested data. The CPP polls the Rainwise every fifteen seconds, and receives data values that are used to form one minute averages. The one minute averages are reported as the wind speed and wind direction preliminary (One minute) averages. The interim and final wind speed and wind direction averages are formed in separate arrays from the fifteen second samples also.

Each time the CPP polls the Rainwise for rainfall, it polls for rainfall, and then sends a reset command to the rainfall. The value received is reported as the preliminary rainfall value. Summing the preliminary averages gives the interim and final rainfall values.

The CPP Rainwise is designed to work with Comm Port #2 on the CPP. The Rainwise unit must be plugged into Comm Port #2, and Comm Port #2 must be selected in the channel setup.

2.0 Cabling

A 9 pin DB to RJ-11 connector is plugged into the rear of the Rainwise unit. The rear panel of the Rainwise unit has a male, 9 pin DB connector. A standard telephone cable connects the serial port of the Rainwise to the serial port of the CPP. The CPP requires only three wires to communicate with the Rainwise. The wiring for the 9 pin DB connector is defined below.

WS-1000CC Rear - DB-9 pin		Color	DB-9 pin To RJ-11 RJ-11 Signal
1	Gnd	Grn	3 - Gnd
2	TxD	Blk	2 - RxD
3	RxD	Yel	5 - TxD
4	RTS-		
5	CTS-	Jumper pins 4 & 5	
6	DTR-	Jumper pins 6 & 9	
9	DSR-	@ WS-1000CC end	

3.0 CPP Initialization

From the Main Menu, select channel set up, and select the desired channel. Assign channel name, units, full scale and zero values. When the CPP asks for channel input, select Rainwise as the manufacturer. The CPP responds with the following menu.

Rainwise Model # WS-1000C
1. TO   Temp Out
2. BP   Barometric Pressure
3. WD   Wind Direction
4. WS   Wind Speed
5. WC   Wind Chill
6. RF   Rainfall
7. RH   Relative Humidity

Setting = 01 **2<cr>**

Comm Port (3-00 Thru 3-08) = 3-01 3- **C2<cr> (C2 selects comm port #2)**
Half Dplx(H), Full Dplx(F) = F **<cr>**
Baud Rate
1 = 300, 2 = 1200, 3 = 2400, 4 = 4800, 5 = 9600, 6 = 19.2K, 7 = 38.4K = 5 **2 <cr>**

Instrument ID = 00 **<cr>**
IMD Installed = 00 **<cr>**
Points For Interim Avg = 01 **<cr>**
Points For Final Avg = 01 **<cr>**

Channel # = **<cr>**

The Rainwise defaults to 1200 Baud, 7 bits, 2 stop bits, and even parity. The CPP recognizes the Rainwise manufacturer and sets up Comm port #2 accordingly. The Rainwise does not need or support an instrument ID.

The next line asks if an IMD (Intelligent Multidrop Device) is installed in this comm port cabling. The IMD, manufactured by H2NS, allows a number of different instruments to be connected to a single comm cable. The instruments can have different protocols and even different baud rates. This is very useful when a collection of instrumentation is located remotely from the CPP. The IMD allows only one cable to be run between the CPP and the instruments, with the IMD providing the instrument multiplexing locally at the instruments. An IMD is required for each instrument connected to the line. The IMD supports addresses from 01 through 60. An address of 00 indicates that an IMD is not installed in this comm cabling.

The last two questions are regarding data validity qualifiers. The first asks how many valid one minute averages the CPP must have to qualify the interim average as valid. The second asks the same in regards to the final average. This is used only with parameters in which the interim and final averages are derived from the one minute averages. The wind speed and wind direction interim and final averages are not derived from the one minute averages. The are calculated in separate data arrays.

4.0 Operator Communicate With Rainwise
Via comm port #4 or #1 (using the SETQ command), an operator can communicate with the Rainwise in a **Real Time Mode**. The CPP has a menu that defines the appropriate commands associated with the Rainwise unit. Input **D43<cr>** and the CPP responds with:

Chn#	Manu	Mdl#	Type
01 =	THERMO	SO2-43C	- SO2
02 =	API	NOX-200A	- NOX
03 =	API	NO2-200A	- NOX
04 =	API	NO- 200A	- NOX
04 =	RWise	WS	- WS
05 =	RWise	WD	- WD

Selection =

At the Selection prompt, select any channel with a Rainwise parameter, *e.g.* **4>cr>.**

04 = Rainwise   WS   Selected

CMD> **?<cr>**
Time   %CK
Date & Time   %CKD
Temp In   %TI
Temp Out   %TO
Tmp O Max   %TX   Reset Tmp Out Max   %TXR
Tmp O Min   %TM   Reset Tmp Out Min   %TMR
BP   %BA
BP Max   %BX   Reset Baro Max   %BXR
BP Min   %BM   Reset Baro Min   %BMR
WD   %WD
WS   %WS
WS Max   %WX   Reset WS Max   %WXR
Wd Chill   %WC
Wd Chill Min   %WM   Reset WC Min   %WMR
Rainfall   %RF   Reset Rf   %RFR
RF Acc   %RC   Reset RF Acc   %RCR
RH   %RH
Heat Deg Days   %HD   Reset Ht Deg Days   %HDR
Cool Deg Days   %CD   Reset Cl Deg Days   %CDR
Dump   %DMP

CMD> **%CKD<cr>**

:
>CKD
DATE 12/01   TIME IS 16:20

CMD> **^<cr>** (Exit)

>   (System prompt)

After the 04 selection is made, the CPP prints a message that this is a Rainwise wind direction channel, and then asks for a command. Inputting a question mark (?) results in the CPP printing a menu of the commands to which the Rainwise responds. To execute a command, input the command desired, *e.g.* **%CKD<cr>.** The Rainwise requires a small amount of overhead prior to sending the command. The CPP will handle this protocol, intertwine the operator command with polling commands, and print the unit's response.

The percent sign (%) at the front of the command is required. It commands the CPP to send the rest of the message to the instrument and to print the response.

The CPP can return the following error messages if problems are encountered.

Can't Get Comm Port
No Response to :
Error To :
No Response To Cmd

5.0 Error Log
The CPP maintains a running error log that lets the user determine if communications are occurring properly.   After connecting instrumentation clear the error log by inputting an **EC<cr>**. After some period of time (two to three minutes) check the error log (**E<cr>**) for errors. In proper operation, there should be no errors. The Error Log lists the following.

No Response   - No response from the instrument to an interrogation
Response Error   - CPP received response but detected an error in the data field
Unknown Resp   - CPP received a response but could not decode the response
Model # Error   - CPP received a response but not from the type of instrument
                            it is configured to interrogate on this channel

The three most common causes of errors are, the cable does or does not need a null modem, or the cable is connected to the wrong comm port on the CPP, or the baud rate set in the CPP does not match that set in the instrument. The Rainwise only supports 1200 Baud, which is the CPP default.