# WeatherWatcher

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# Introduction

**Introduction to WeatherWatcher (WW) ASCOM Compliant Observatory Conditions Server**

WWP is an advanced monitoring program is a very flexible and robust system; a must-have tool for anyone wishing to monitor weather/cloud conditions.

**Monitor** your Observatory - Monitors and reports the environmental status, temperature limits and more. System can alert owner of these events or failures Text Messaging, or Email. In addition the system can be programmed by the end-user to react to specific events. The possibilities are truly amazing.



# Release Notes

**Release Notes**

This section contains information about changes to WeatherWtacher.

**Version**

v5.0.1 - Fixed bug that misreported Cumulus inside temperature
v5.0.0. Initial release



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**Credits and Copyright**



Chuck Faranda - Author

Special thanks to Ken Archer - product testing.



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# Technical Support

**Technical Support**

Before requesting technical support, please review this manual for troubleshooting instructions.

When requesting technical support, you must include the following information via email:

- Your name
- Telephone number
- E-mail address
- Version of Windows
- **The *exact content* of all error message displayed**
- **Describe the step-by-step process that created the issue**. If we cannot replicate your problem it will be very difficult to resolve it.



# System Requirements

**System Requirements**

WeatherWatcher requires Windows 2000™, Windows XP™, Windows Vista™, or Windows 7™ (or higher).

To use all the features of WeatherWatcher one of the following weather software packages is needed:

- Davis WeatherLink (v6 or higher)
- Ambient Virtual Weather Station (Pro or Internet editions)
- Weather Display
- Cumulus
- Any device capable of generating a Boltwood capable data files (other can be accomadate upon request)
-

The following hardware is required:

- Processor – Pentium™ or equivalent, or higher
- Recommended minimum memory size is 512 MB or larger. Processing larger images or opening multiple images simultaneously will require correspondingly larger memory. 2 GB memory is recommended for processing large arrays including DSLR images and CCD images larger than 6 megapixel.
- Disk Space – 20 MB for program installation
- Video Display – 1024x768, **16-bit color** or higher.

•Mouse

•Weather Station compatible with one of the above required weather programs (see a full list here).

• Boltwood compatible Cloud Sensor.

• PCSensor TemperHum

**64-bit Operating Systems**

Windows XP x64, Windows Vista x64, and Windows 7 x64 are supported.

**Alternative Operating Systems**

It may be possible to run WeatherWatcher under other operating systems; however, some limitations may apply and some configurations are not officially supported (no technical support available).

| Operating System | Status |
|---|---|
| Apple Macintosh running Boot Camp and Windows | Supported (equivalent to running Windows on a regular PC) |
| Apple Macintosh running VMWare | Not a supported configuration; however, correct operation for both imaging and processing has been reported by customers using recent versions of VMWare. |
| Apple Macintosh running Parallels™ | Not a supported configuration; not recommended. |
| WINE/Linux | Not a supported configuration. Customer reports indicate limited functionality. |
| Windows 95, 98, ME, NT | Not a supported configuration; will not install. These obsolete versions of Windows do not support functions required by current WeatherWatcher releases. |



## Supported Weather Stations

**Ambient Virtual Weather Station (VWS) - Supported Stations:**

- All Davis Weather Stations, including the Vantage Pro, Vantage Pro Plus, Vantage Pro2, Vantage Pro2 Plus, Wizard III, Monitor II, and Perception
- All Oregon Scientific Weather Stations, including the WMR-100, WMR-918, WMR-928N, WMR-968 and WM-918
- La Crosse Technology WS-2300, WS-2305, WS-2308, WS-2310, WS-2315, WS-3600, and WS-3610
- Some Radio Shack Weather Stations, including the WX-200 and Accuweather Wireless Station 63-1016
- Huger WM-918 (same as the Oregon Scientific WM-918)
- Rainwise MKIII, WT-2000 and MH-1 Hazmat
- WeatherHawk Weather Stations

- Peet Bros Weather Stations
- Kestrel 4000
- Texas Weather Instruments Stations
- Columbia Weather Systems Weather Stations
- **Weather Display Supported Weather Stations:**
- Huger/Radio Shack/Oregon Scientific WM918/WX200,WMR-918/WMR-968/WMR-928N,WMR100,WMR200,WM-900H,63-1016
- Davis WMII, Wizard III, Grow, Vantage Pro/plus/6161/VP2 etc (with datalogger), supports soil temperature/moisture/leaf wetness and UV/solar (extracted data from logger too)
- ELV/Conrad/Huger WS2000/WS2010/WS2210/WS7000/WS2300/WS2305/WS2310/WS2315/Hyundai WS-05/WS2500PC/WS2510/3600
- La Crosse 2010,2110,2210,2308,2310,2315,2300,WS23XX,WS2350,2500,2510,3600/3610
- Peet Bros Ultimeter 100,500,800,2000,2100 and II
- Maximum Instruments Weathermax (with datalogger)
- Metron UWS 3000-ws
- Rain Wise WS2000/MK III (with data logger)
- Dallas 1 wire weather station (and version 3)
  Texas Inst. WR-25 and variations
- Heathkit ID -5001
- Climatronics Ultrasonic
- Novalynx WS-16 Weather Station
- Capricorn 2000
- ASOS station and a RAWS station
- Weather Hawk
- Environdata weather master 2000
- Kestral 4000
- Instromet
- Inspeed Vortex anenometer
  Vaisala WXT510 ultrasonic station
- HoneyWell TE923/Irox Pro/Nexus USB

- ELV WS500/La Crosse WS550 USB
- OS WMR100/200 USB
- IRDAM station via TCP
- WH1080PC via the Easy Weather Software
- Davis IP data logger (direct connection for Live data)
- PCSensor TemperHum



# Installation

**Installation**

WeatherWatcher is available via Internet download.

**Important:** WeatherWatcher require the installation of the ASCOM Platform, available at http://ascom-standards.org.

**Internet Installation**

1. Download the latest WeatherWatcher driver and software here .
2. You will be prompted to either 'Run' the installer or you can save it to a folder; double clicked the saved file with start the installer.
3. Follow the on-screen instructions to complete the installation.
4. Once the software has successfully installed you must enter the setup areas to input the proper setting before attempting to connect your hardware. To properly setup WeatherWatcher open the programs from Windows/Start/WeatherWatcher.



# Installation Troubleshooting

**Installation Troubleshooting**

We recommend that you install your new software in the daytime to allow ample time to setup and register your software.



## User-Level Accounts

**User-Level Accounts**

WeatherWatcher should be installed using an Administrator-level account. Elevation will be automatically

requested as needed in Windows Vista.

Normally software installed on Windows 2000/XP/Vista/7 from Administrator-level accounts will work on User-level accounts. In rare cases, however, users who do not have Administrator privileges will not be able to access the license information and the software will not run.

The default Windows Registry security settings will allow user-level accounts to access the serial number that was entered by the installation software. However, it is possible to set up the default Registry permissions in such a way as to disable user-level access. This occasionally occurs in large institutions that have central administration of their computer systems. To fix this, do the following:

1.Log in as Administrator.

2.Go to the Start menu and click Run...

3.Enter regedt32 and click OK.

4.Open HKEY_CLASSES_ROOT\WeatherWatcher.Watcher

5.Using the Security menu Permissions, click Add... and include the class of users you want to have access to this key. Make sure they have at least read access. Read and write access is required.

6.Click OK.



# Basic WW Operation

**Basic Operation**

In the following discussion, it is assumed that the reader is generally familiar with programs that run under the Windows operating system.

All fields must be inputted in the same units (Metric, US) as your weather station is set to report its data.



# Configure Weather Station Software



## AAG CloudWatcher

See the AAG help file for information on enabling their full data file.

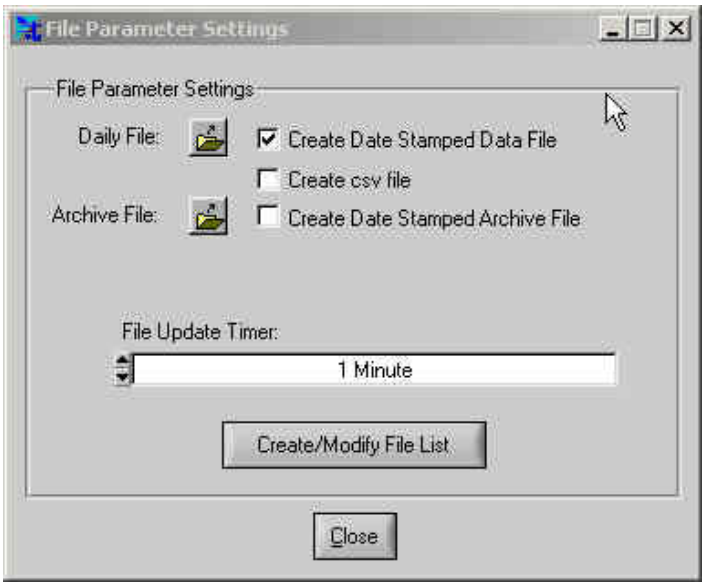
To Use:
check the 'AAG CSV' file box inWeatherWatcher's setup window
Select the AAG CSV file in the 'Sky Data From:" box



## Ambient Virtual Weather Station

**Setup for the Virtual Weather System Software**

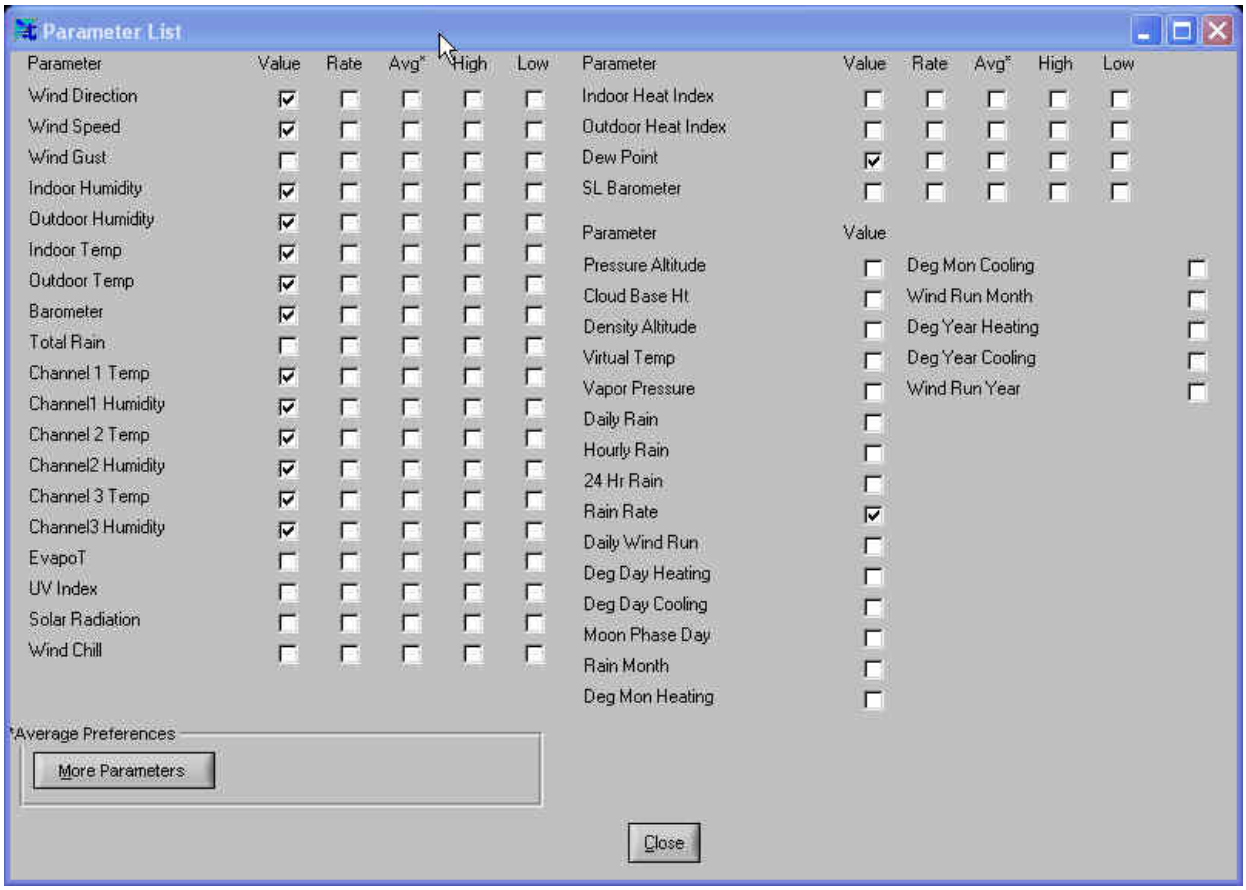
**Select 'Settings' in the 'File Settings' from VWS' main menu.**




**"File Update Timer' should be set for a one minute interval or less to adequately update WeatherWatcher of weather changes.**

**You need to set up Virtual Weather Station (VWS) so the 'Settings/File Settings/Create/Modify File List' menu has the following values checked (only these as shown below):**

Wind direction
Wind Speed
Indoor Humidity
Outdoor Humidity
Indoor Temp
Outdoor Temp
Barometer
Channel 1-3 Temp
Channel 1-3 Humidity
Dew point
Rain Rate






## Cumulus

**Setup for Cumulus**

**Please refer to the Cumulus help docs to setup Cumulus to create the 'realtime.txt' file needed by WeatherWatcher.**

**Select the location of the Cumulus 'realtime.txt' file in WeatherWatcher's setup window 'Weather Station Data From:' box (usually in the ../Cumulus main app folder), and check the 'Cumulus' check-box.**



## Davis Weather Link

**Setup for Davis WeatherLink**

Select the location of the data file (downld02.txt) in Watcher's setup window (do not include the file name, just the folder) and check the 'Weatherlink' checkbox.



## Weather Display

**Weather Display Setup Procedure**

Creating a daily.txt file in Weather Display
1) Weather Display allows the creation of custom HTML files by creating templates with a naming convention of “wxlocal” followed by a number and ending in “.html” for example, wxlocal4.html. The following format will give Weather Watcher a text file with the correct data format required by Weather Watcher:
<CODE>

%date%
Time Wind Dir Wind Spd Hum In Humidity Temp In Temp Raw Barom Temp Ch 1 Hum Ch 1 Temp Ch 2 Hum Ch 2 Temp Ch 3 Hum Ch 3 Dew Point RainRate
° mph % % °F °F in °F % °F % °F % °F in/hr
%time% %dirdeg% %avgspd% %indoorhum% %hum% %indoortemp% % temp% %baro% 0.0 0 0.0 0 0.0 0 %dew% %currentrainrate%

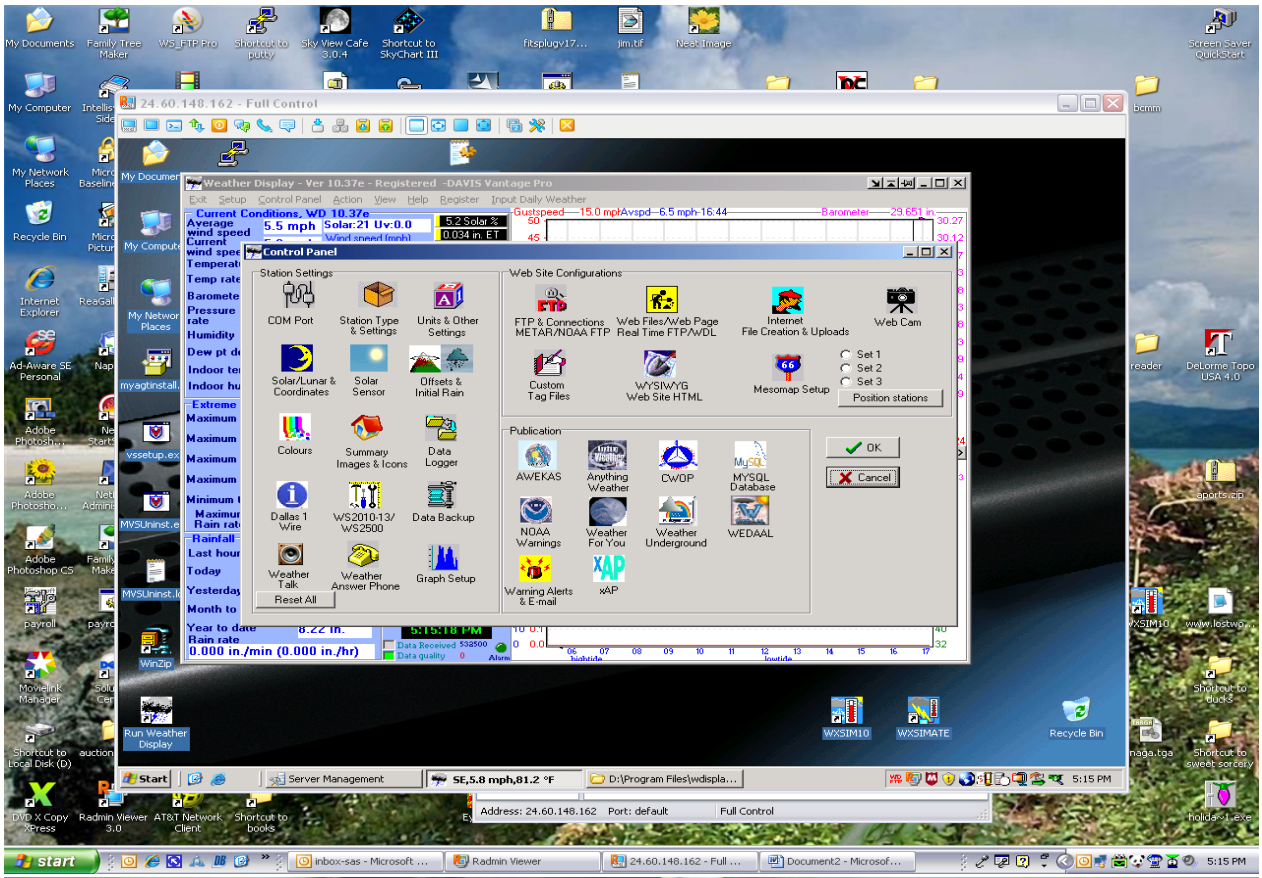
</CODE>
You can download the HTML file here.

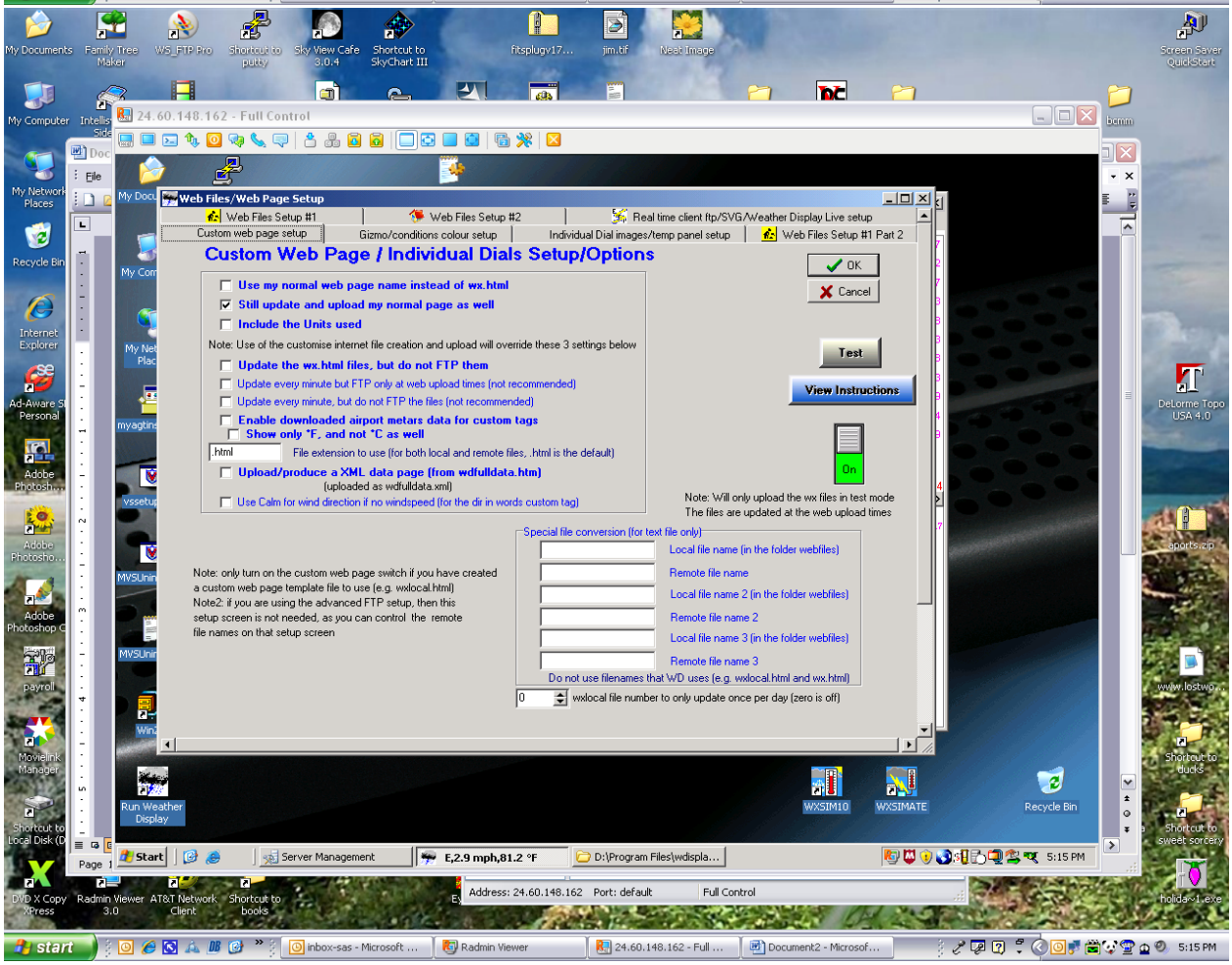
The code above is word wrapped, there should only be 4 lines of code.
Line 1 is just the tag for today’s date.
Line 2 contains the Data Descriptions.
Line 3 is The Unit symbols for each piece of data.
Line 4 is the data tags and place holders for the data you will need for Weather Watcher.

Note: If you plan to use a remote temperature or humidity sensor instead of the main sensors for your readings, you will need to change the default placeholder values of ‘0.0’ and ‘0’ on line 4 in the appropriate columns under the ch1, 2 or 3 sensors.

2) Place your newly created template in the web files folder you defined when installing Weather Display.

3) You now need to go into Weather Display and bring up the control panel from the tool bar. Go to the “Web Site Configurations” section, click on “Web Files/ Web Page Real Time FTP/WDL” button. When the configuration window opens, click on the “Custom Web Page Setup” tab. Locate and uncheck the “Include the Units used” line. Click ok to close the window. (If you already have custom pages, unchecking this will require you to add the units back in manually to your custom page templates)

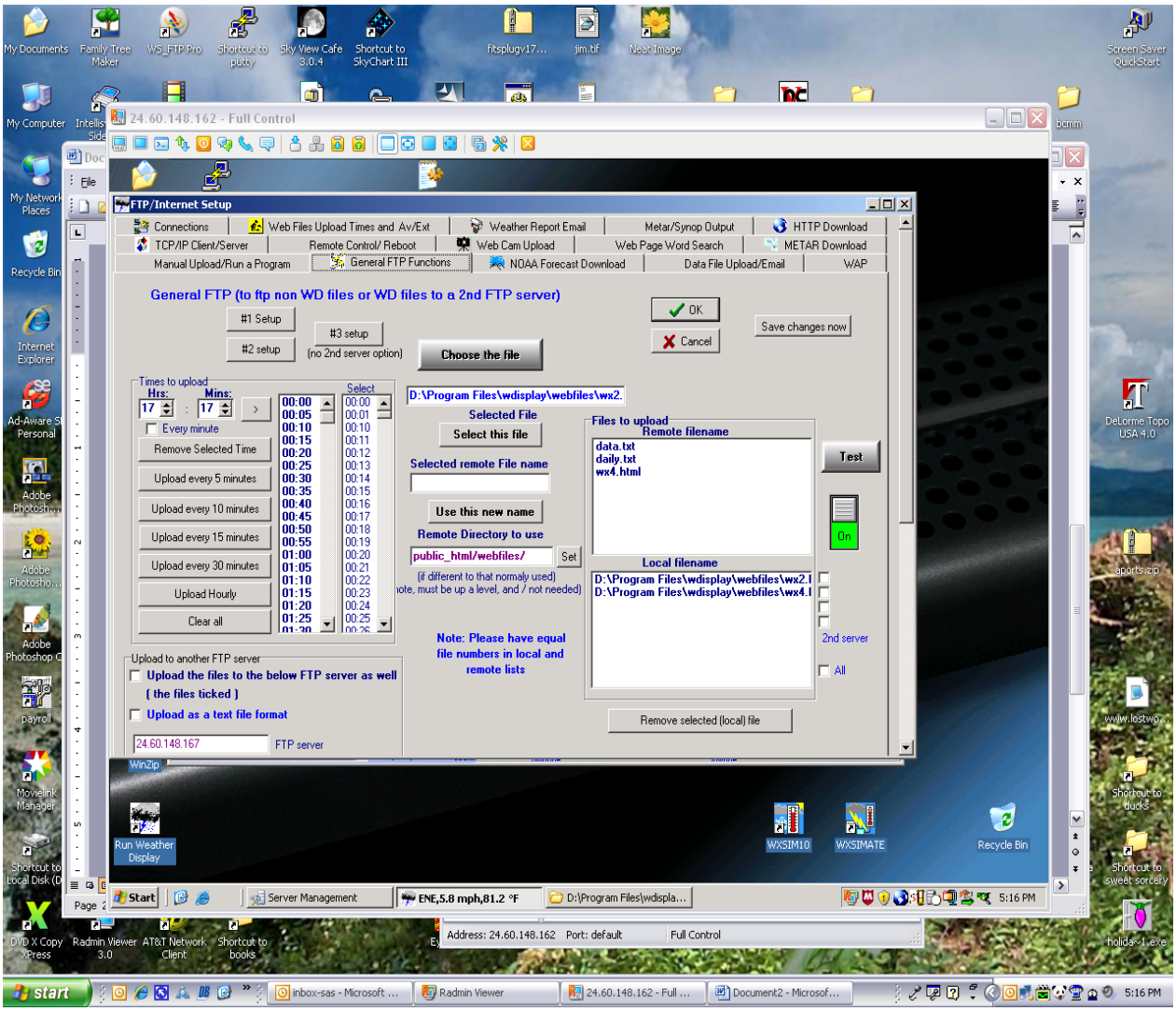



4) Back on the control panel, still under the “Web Site Configuration” section, click on “FTP & Connections

METAR/NOAA FTP” button, when the configuration window opens, click on the “General FTP Functions” tab. Click the “Choose the File” button and navigate to the Weather Display web folder and select the file that was generated by your template. If your template was named “wxlocal4.html” the generated file will be called “wx4.html”. Once the file is selected, clicking on the “Select this File” button will add the file name to the “Remote Filename” window and add the file path and file name to the “Local Filename” window.
Now go to the “Remote Filename” window and click on the file name, it will now move the filename from the “ Remote Filename” window to the “Selected Remote File Name” box. Here, change the name to “daily.txt” and click on the “Use this new name” button. The new filename of daily.txt will be listed in the “Remote Filename” window.

5) You can now setup the “upload to second server” option if you are able to directly ftp to your computer where Weather Watcher resides, or you can let the file go to your web server and use a command line utility such as “wget” to automatically retrieve the file directly from your website. Refer to Weather Display’s help file for configuring the FTP options and file generation intervals.

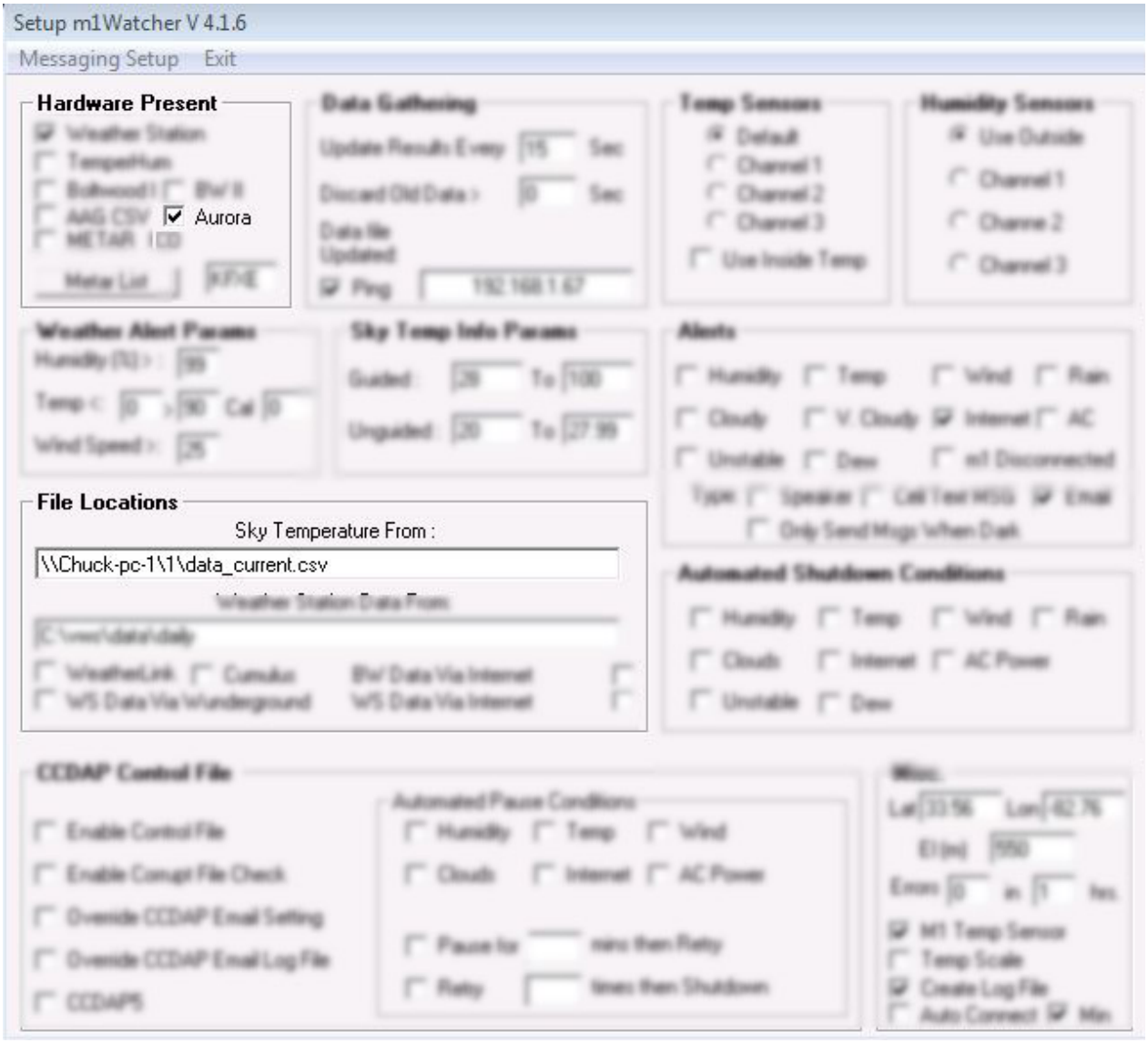



NOTE: These instructions assume you are already uploading weather data to a web site somewhere. If not, you will have to find an alternate way to move the file to where you need it unless Weather Watcher is on the same server.

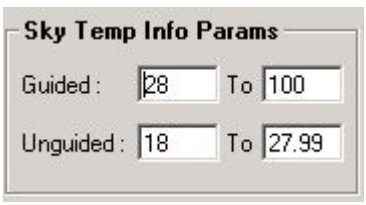
## Aurora Cloud Sensor

### For Aurora cloud sensor:

Please refer to the Aurora Cloud Sensor manual for detail on sky 'clarity' settings.  Select 'Aurora' in the Weather hardware section on the setup window, then select the file named 'data_current.csv' as shown beloe.

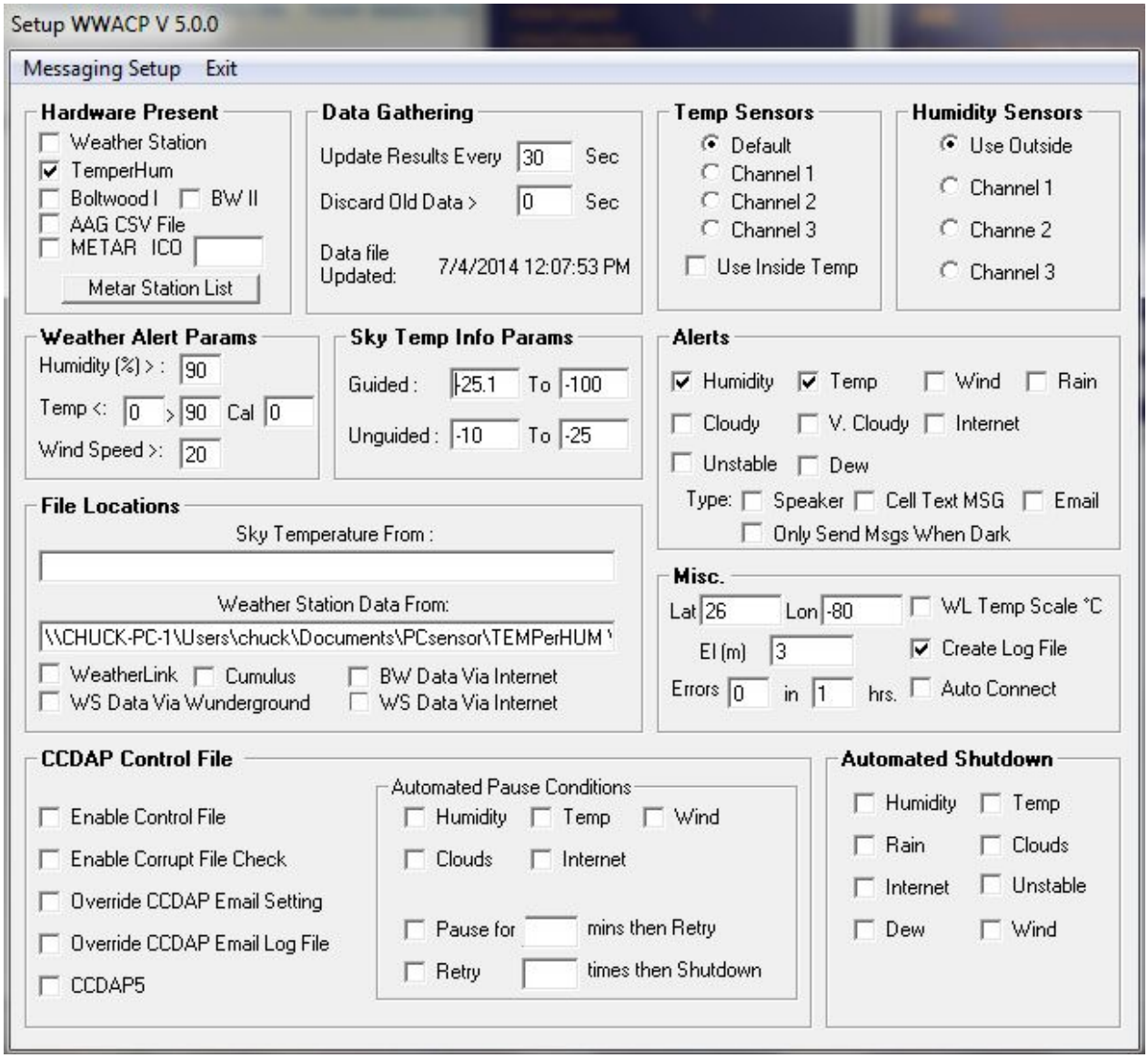



As a stating point here you can try the setting below.

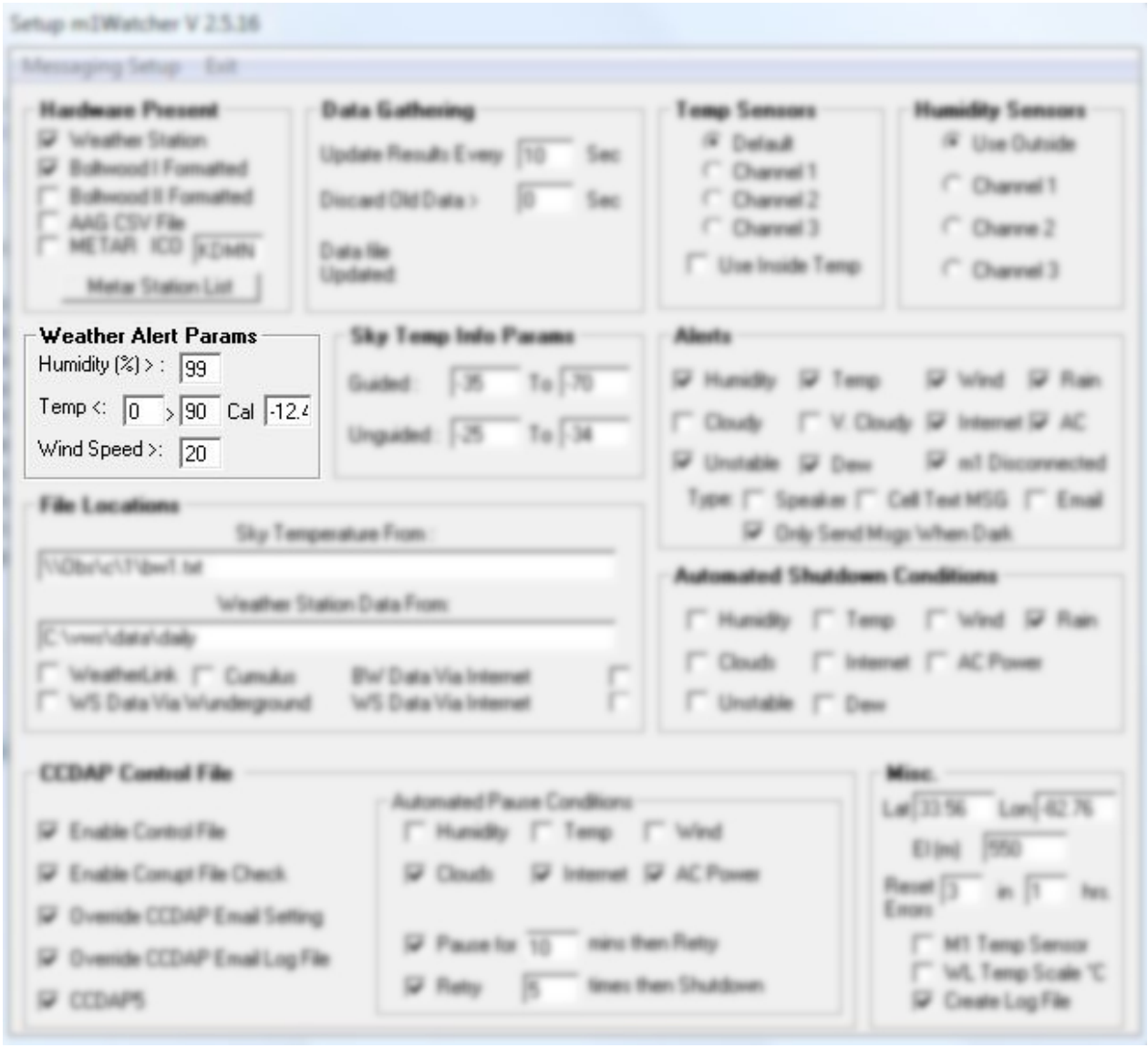


## WWACP Setup


Select 'Setup' from the menu bar in WeatherWatcher will display the following dialog.



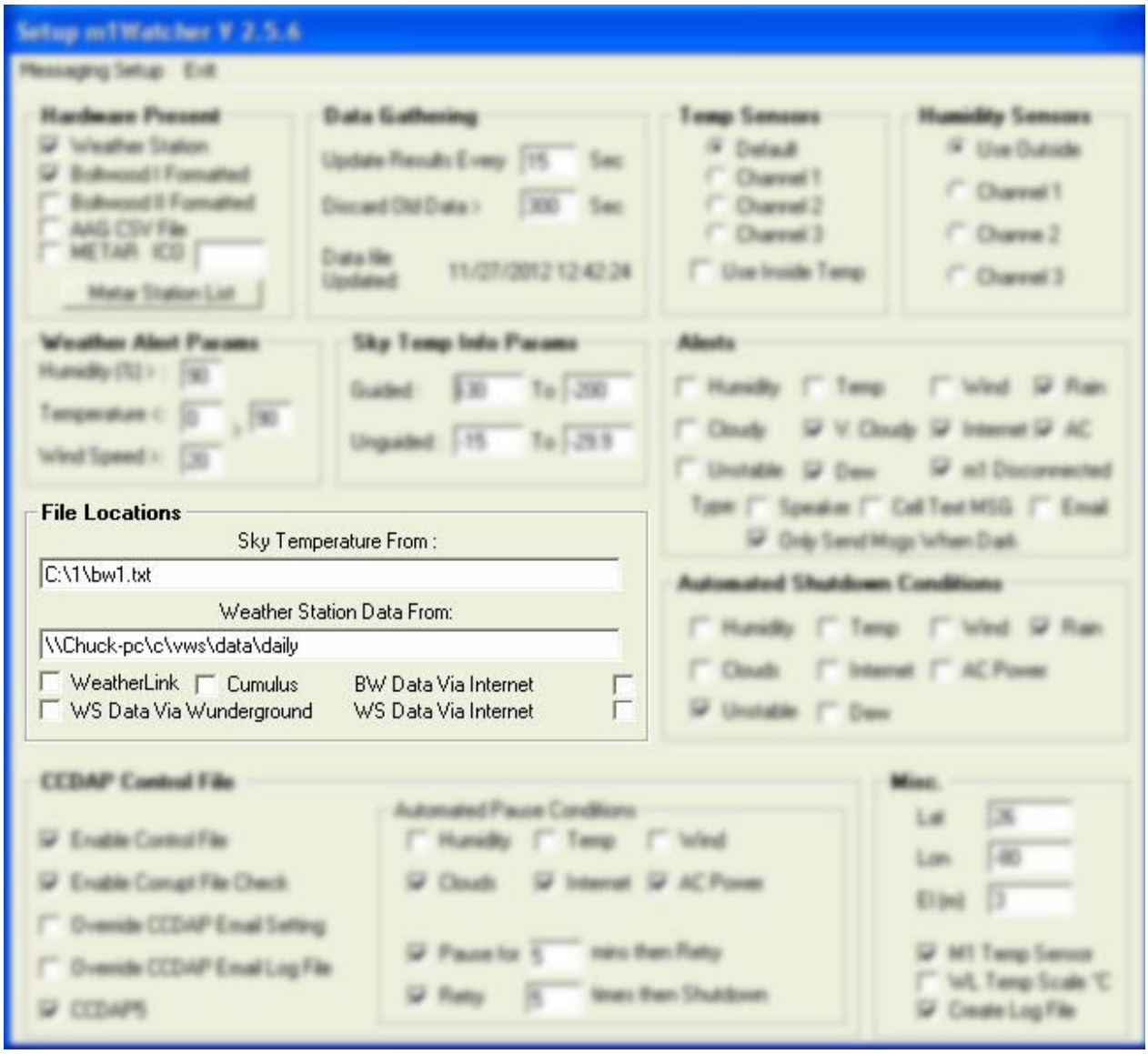
## Alert Parameters




Set these unsafe condition triggers to match your local conditions. If these limits are exceed the unsafe flag is raised.

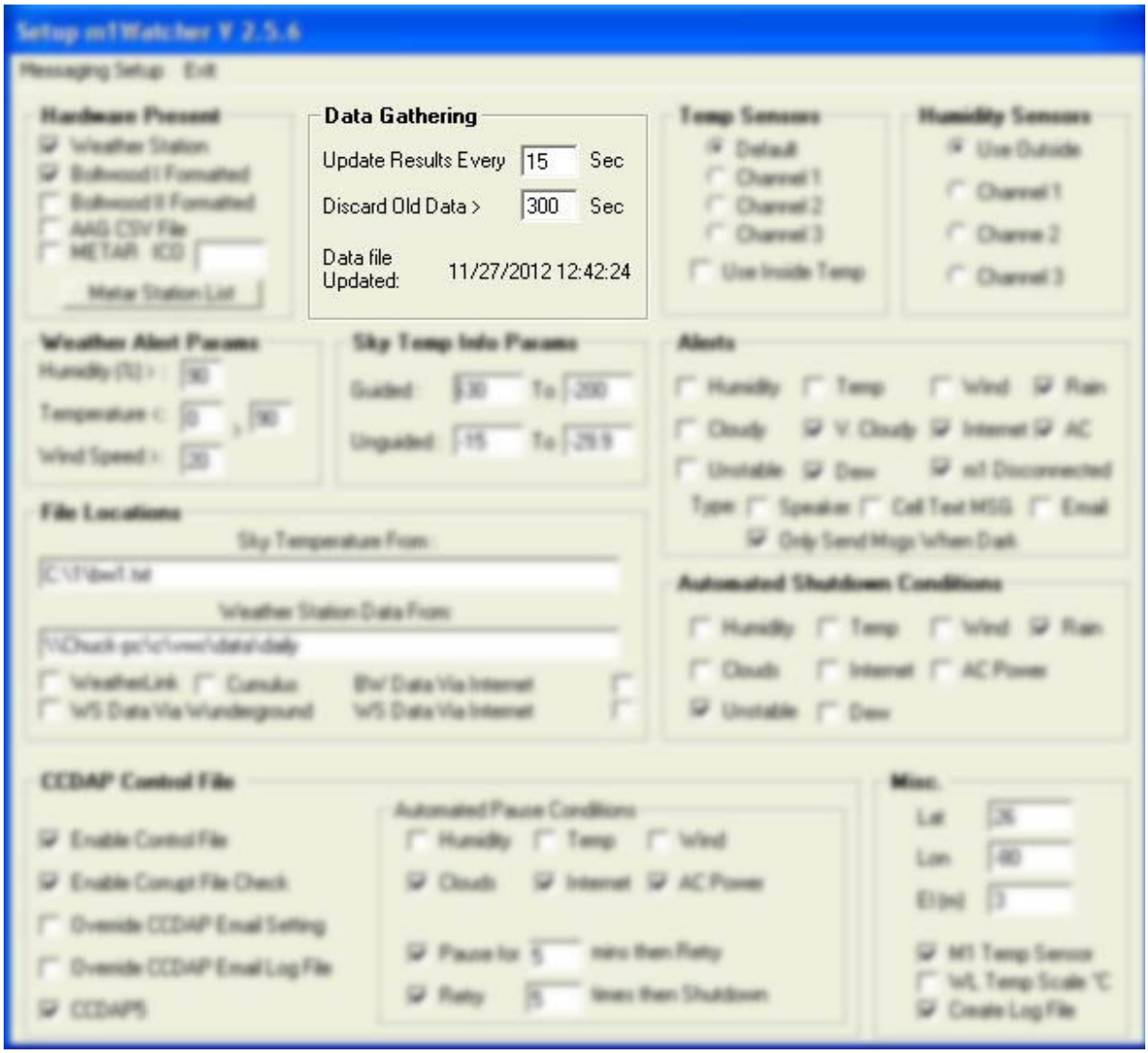
Cal - enter a number to calibrate the BW I temperature sensor

## Data File Locations




Use this area to specify the locations of the needed weather data files. Double clicking in the white input boxes will reveal Windows Explorer to help locating the appropriate files. If your data files are stored on a remote server and will be accessed vi the internet then check the appropriate boxes and input the URLs in the boxes.

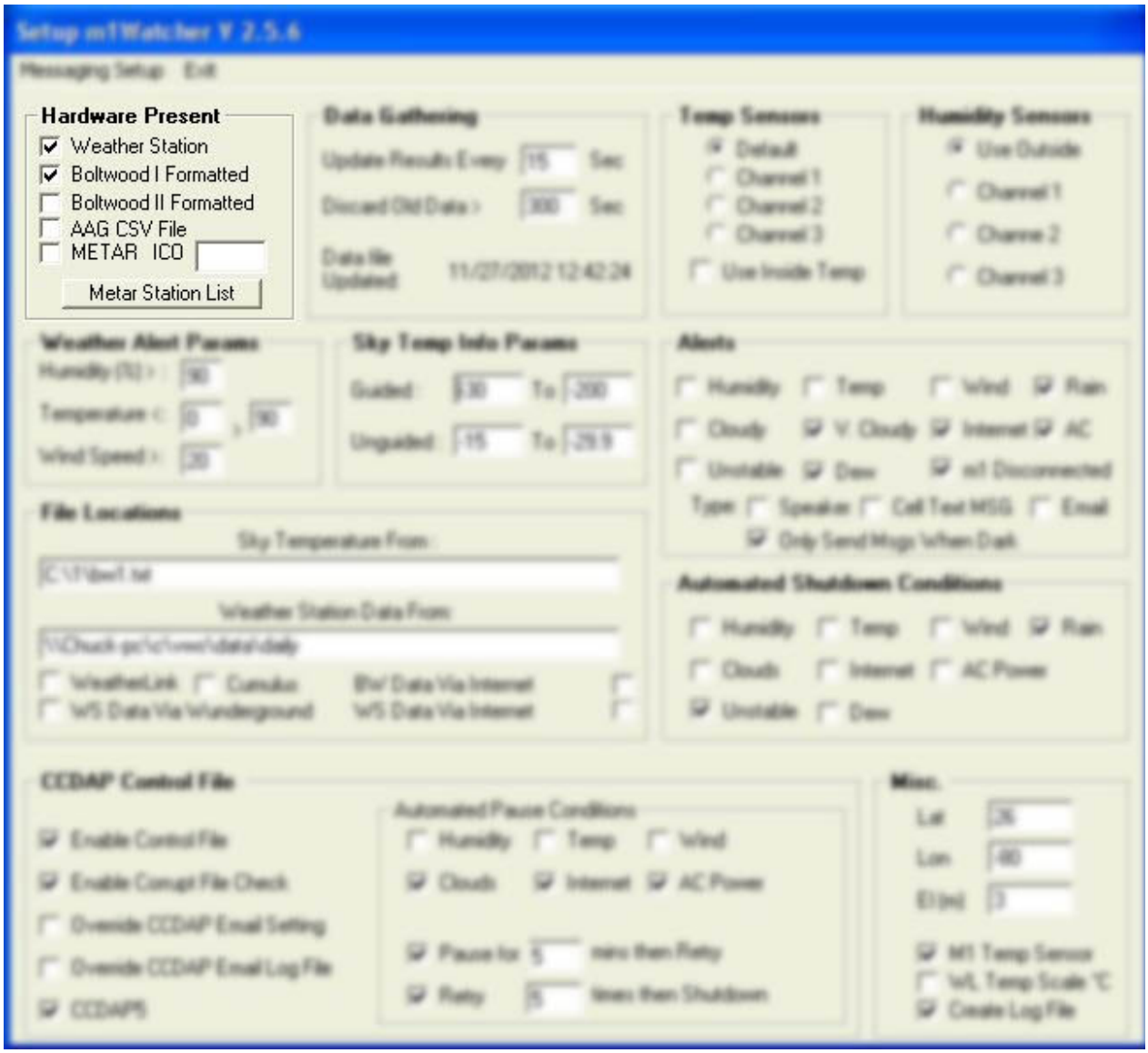
## Data Gathering




'Update Results Every' is the interval, in seconds, for how often weather data is retrieved.

'Discard Old Data >' will alert user when data file is older than set-point (max. 300), entering '0' will disable this feature.

## Hardware Present




Check the appropriate hardware to match the hardware you have installed.

**Weather Station** - check this box if you have one of the compatible weather stations and software connected then select the data file location in the 'Weather Station Data From' box. Note: double clicking inside the file selection box will bring up a file explorer to aide in locating the files. If you are not using VWS as your weather station software then check the box for the software you are using.

**PCSensor TemperHum** - WeatherWatcher will gather temperature and humidity data

You may also fetch files via the interent by placing the correct URL or IP address then checking the appropriate check boxes located below the file box.

**Boltwood I Formated** - check this box if you have a Boltwood I or any other device that stores data in the BW I file format then double click the 'Sky Temp From' box to selected the data file.

**Boltwood II Formated** - check this box if you have a Boltwood II or any other device that stores data in the BW I file format (e.g. AAG Cloud Watcher will produce a BWII file) then double click the 'Sky Temp From' box to selected the data file.

**AAG CSV File** - check this box to access the AAG Cloud Watcher's long file that includes wind speed and

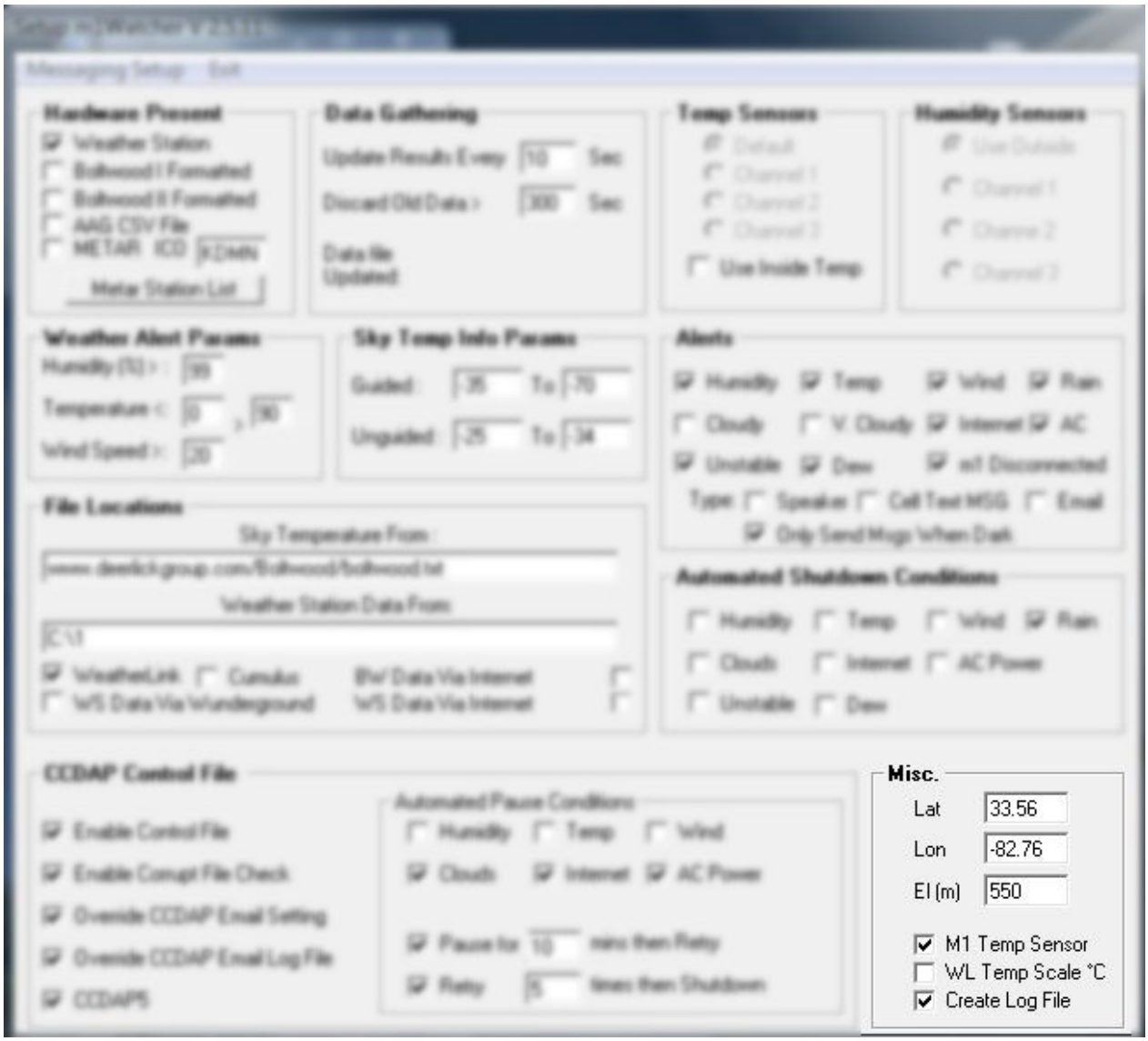
other weather station data.  This selection will disallow all other hardware selections.  Point to the AAG CSV file from the 'Weather Data From' selection box.

**METAR** - WeatherWatcher will gather weather station data from  local METAR stations in your area.  So, you can take advantage of some of th advanced features of WeatherWatcher even if you do not have weather station hardware.

| | |
|---|---|
| | If you do not have any weather station hardware checking the ‘METAR’ box will allow you access to a weather station on the METAR network in your area.  Press the ‘Metar Station List’ button to access a list of available station by State.  You will need Internet access to use this feature. |



## Misc.




Latitude, Longitude, and elevation of site.  This data is used to determine dark or light conditions (this feature is ignored and determined by the BWII when present)

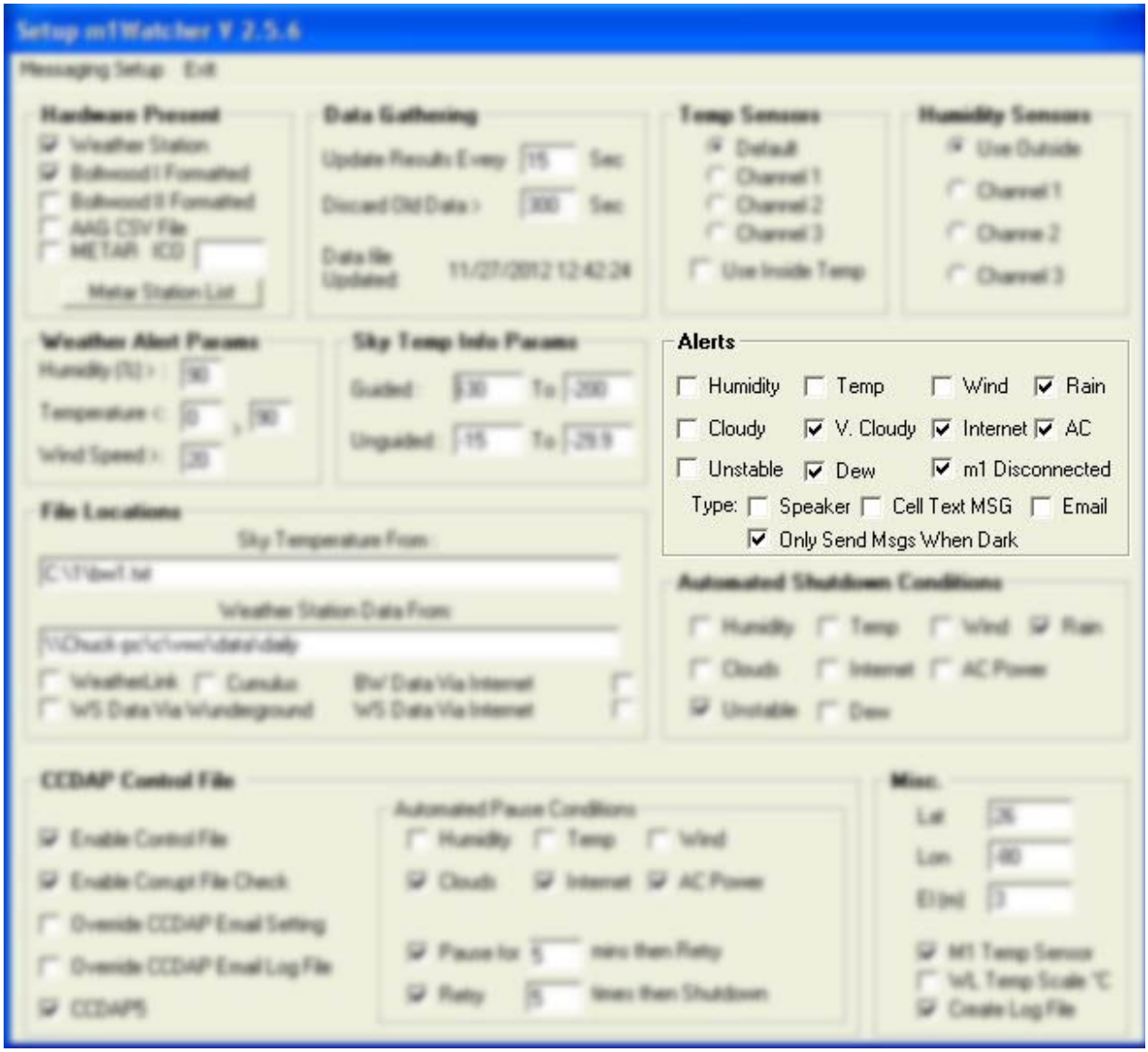
Reset Errors - input the number of errors before WeatherWatcher raises the unsafe flag, and the number of hours before counter is reset to zero

You can choose to use the temperature sensors contained in the m1's  keypad or its remote sensors instead of the ones contained in the weather station equipment

Checking the 'Create Log File' box will log all alert data and errors to a log file named 'WeatherWatcher_log.txt' in your  ..\Documents and Settings\All Users\Documents folder



## Sending Alerts



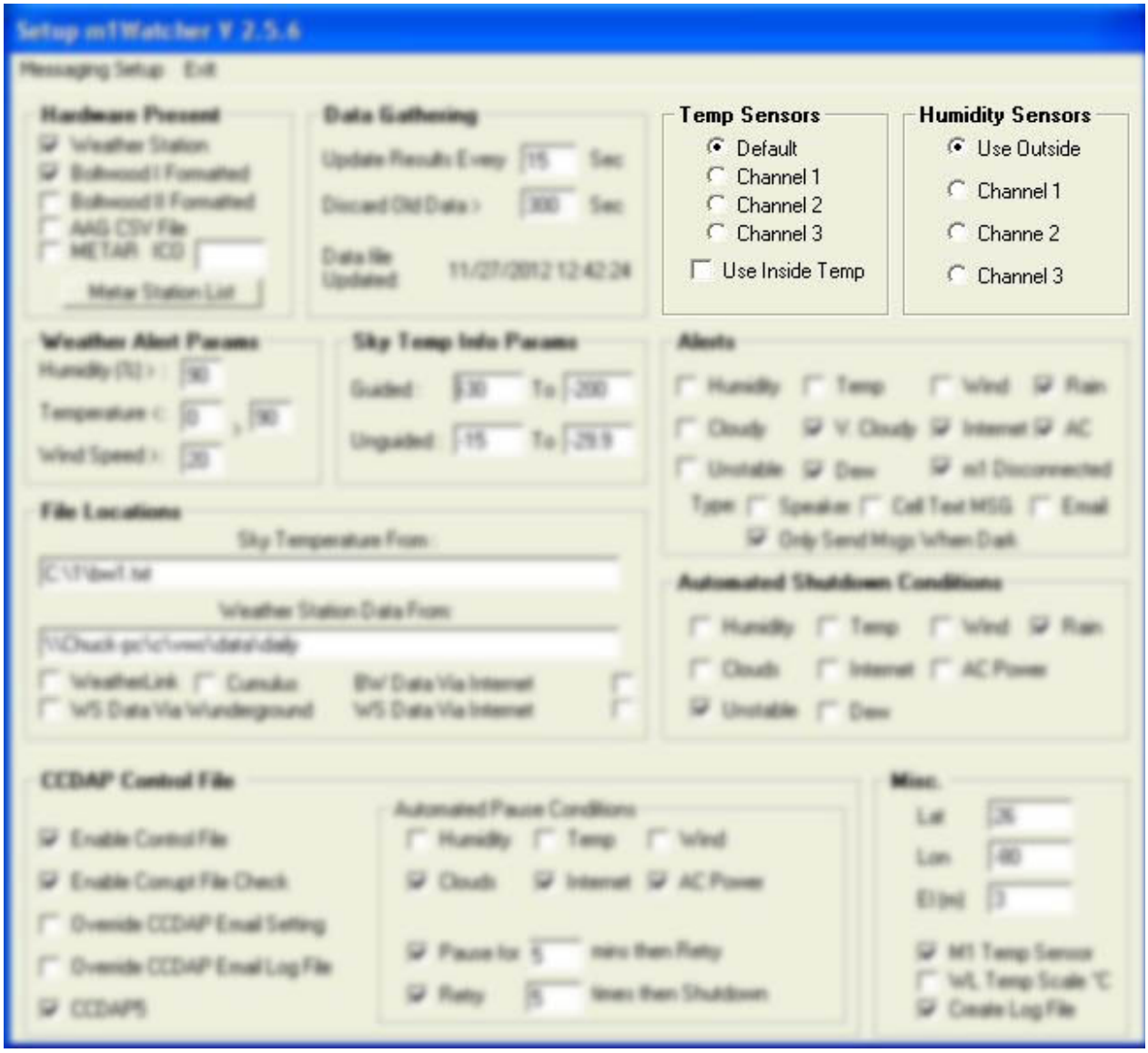

Check the boxes for events that will raise the unsafe flag to notify users and client applications that conditions are unsafe. **Users MUST check the appropriate boxes.  If no alert boxes are checked then the unsafe flag will not be raised even for rain!!!!**

Check the boxes for the type of events that will trigger WeatherWatcher to alert the user.

Select the ‘Types’ of alerts desired, the ‘Only Send Msgs When Dark’ will reduce the number of unnecessary alerts during the daytime.

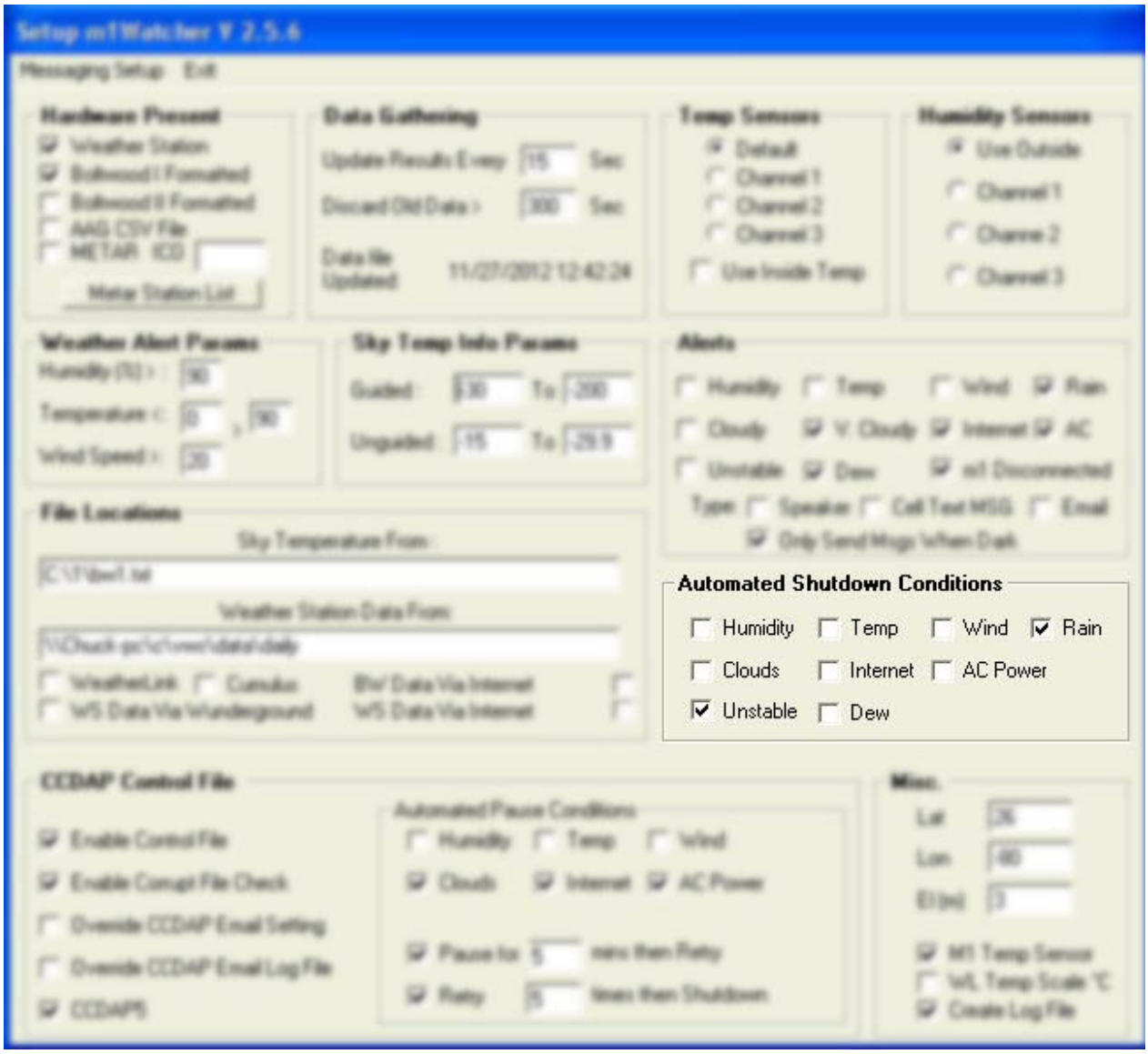


## Sensors



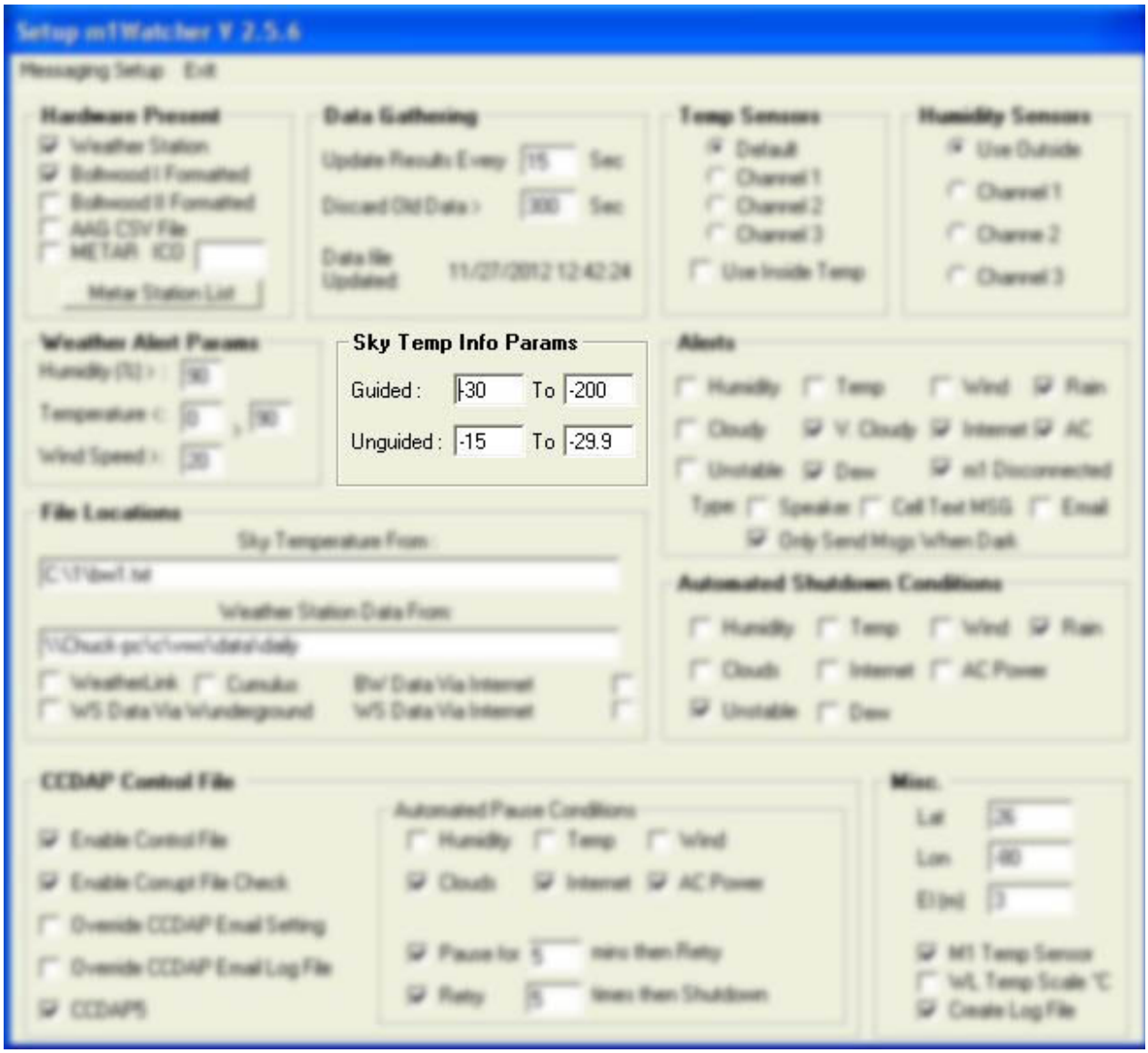

Select the channel that you your monitors occupy.

## Shutdown Triggers




Select the events that will signal your automation program (ACP, CCDAP, etc.) to shutdown your observatory

### Sky Temperature




Set the upper and lower limits for the sky temperatures that suite your guiding needs based on the sky temperature reading reported by your cloud sensor. These parameters can be different for every site based upon seeing conditions.  Therefore, some trial an error training will be needed to find the settings that best suit your needs and conditions.



## Scripting

**Scripting**

WeatherWatcher provides an ActiveX Automation interface for scripting and externally controlling the Dome via the conventions outlined in the ASCOM Platform documents.  To access these documents refer to the developer area in your ASCOM folders contained in your Windows Start menu.

WeatherWatcher's is also an ActiveX Automation interface for scripting and externally accessing the Watcher.

ActiveX can be accessed from just about any standard scripting or programming language, including

VBScript, JScript, Java, Perl, Visual Basic, Visual C++, etc. Using ActiveX, you can even control WeatherWatcher from Excel spreadsheet macros.

WeatherWatcher is compliant with ASCOM scripting. This allows it to operate with a wide variety of astronomical software products such as planetarium programs, telescope control software, and dome control systems. Sample scripts are available for downloading from the ASCOM web page http://ascom-standards.org.

#### Scripting Languages

The most commonly-used scripting languages on the Windows platform are VBScript and JScript.

VBScript looks like a simplified version of Visual Basic (thus the name), but you *do not* require Visual Basic to create or run scripts. VBScript code is run by the Windows Scripting Host, which is included in Windows.

Similarly, JScript looks like Java code. JScript is run by the very same Windows Scripting Host that runs VBScript. Deciding which version to use is simply a matter of user preference.

VBScript and JScript allow you to write simple scripts using only the **Notepad** text editor, and run by double-clicking them in the Explorer.

Full documentation on the scripting languages is also available for download; please see Windows Scripting Reference,



## Sample Scripts

#### Sample Scripts

In VBScript, you can access the WeatherWatcher as follows:

```
Dim watcher ' "The object
Set watcher = CreateObject("WeatherWatcher.ObservingConditions")
watcher.Connected = True
if Not watcher.Connected Then
wscript.echo "Failed to connect to WeatherWatcher."
Quit
End If
wscript.echo watcher.Name
watcher.Connected = False
```

If you want to try this, just copy the above code into a text file named "test.vbs". Double-click on the file to run it.



## Windows Scripting Reference

#### Windows Scripting Reference

#### Scripting Home Page

A variety of information is available on Microsoft's Scripting Home Page at http://msdn.microsoft.com/en-us/library/ms950396.aspx. Language definitions for VBScript and JScript are included on this page.

#### ASCOM Initiative

A master site for astronomical scripting, which includes sample scripts using WeatherWatcher and other

applications, is available on the ASCOM web page http://ascom-standards.org.



## ASCOM Properties and Methods

**ASCOM Properties and Methods**

Please refer to the ASCOM web site http://ascom-standards.org for a description of the Properties and Methods used in the ASCOM-standard interfaces.



## WWACP Properties

WeatherWatcher - See the property and methods categories for details on the available methods and properties.



### Actively Monitoring

**Property**

ActivelyMonitoring (read-only, Boolean)

**Syntax**

ActivelyMonitoring

**Remarks**

Reports whether WW is monitoring conditions.



### AmbientTemperature

**Property**

BarometricPressure (read-only, Single)

**Syntax**

AmbientTemperature

**Remarks**

Reports barometric pressure.



### BarometricPressure

**Property**

BarometricPressure (read-only, Single)

**Syntax**

BarometricPressure

**Remarks**

Reports Barometric Pressure



## Connected

**Property**

Connected (read-write, boolean)

**Syntax**

set - Connected = true/false

get - Connected

**Remarks**

Sets/Gets connected state.



## Darkness

**Property**

Darkness (read-only, String)

**Syntax**

Darkness

**Remarks**

Reports light/dark conditions



## DewPoint

**Property**

DewPoint (read-only, Single)

**Syntax**

DewPoint

**Remarks**

Reports Dew Point



## InsideTemperature

**Property**

InsidetTemperature (read-only, Single)

**Syntax**

InsideTemperature

**Remarks**

Reports Inside Temperature



## Internet

**Property**

Internet (read-only, String)

**Syntax**

Internet

**Remarks**

Reports Internet status (Ok or Problem)



## Name

**Property**

Name (read-only, String)

**Syntax**

Name

**Remarks**

Reports WeatherWatcher



## Precipitation

**Property**

Precipitation (read-only, Boolean)

**Syntax**

Precipitation

**Remarks**

Reports Precipitation condition.



## RelativeHumidity

**Property**

RelativeHumidity (read-only, Single)

**Syntax**

RelativeHumidity

**Remarks**

Reports Relative Humidity

## Safe

**Property**

Safe (read-only, Boolean)

**Syntax**

Safe

**Remarks**

Reports whether the conditions are safe.



## SkyStatus

**Property**

SkyStatus (read-only, String)

**Syntax**

SkyStatus

**Remarks**

Reports clear, cloudy, etc.



## WindDirection

**Property**

WindDirection (read-only, Boolean)

**Syntax**

WindDirection

**Remarks**

Reports Wind Direction.



## WindCondition

**Property**

WindCondition (read-only, String)

**Syntax**

WindCondition

**Remarks**

Reports calm, windy, etc.

### WindVelocity

**Property**

WindVelocity (read-only, Single)

**Syntax**

WindVelocity

**Remarks**

Reports WindVelocity.



## WWACP Methods

Precipitation



### Emailm1

**Syntax**

Emailm1 (email address to, email message)

**Parameters**

String - CSV - email address to, email message

**Returns**

Boolean - True if successful



# Using WW with other Client Software

It is highly recommended to always start WeatherWatcher as a stand-alone program and leave it running and connected before connecting any clients or performing scripts. Doing so will prevent subsequent client connections from having to re-establish Ehternet connections (this can take >5 seconds and is inherent to the protocol).



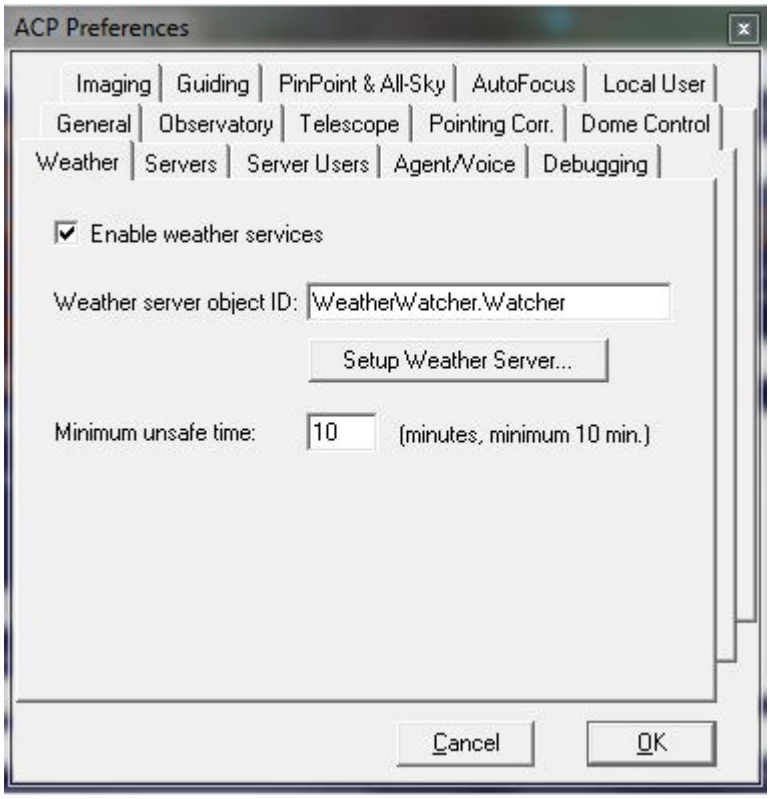
## ACP

**ACP Setup Procedure**

| | |
|---|---|
|  | If you put a script called **-Weather.xxx** (xxx=vbs,js) in the same directory as .exe, it will be automatically run when detects that the weather has become unsafe. You can use this to (at a minimum) park your scope and close your dome or roof. If you have turned on "Automatically home and close dome AFTER scope is parked" (Dome tab of Preferences), |

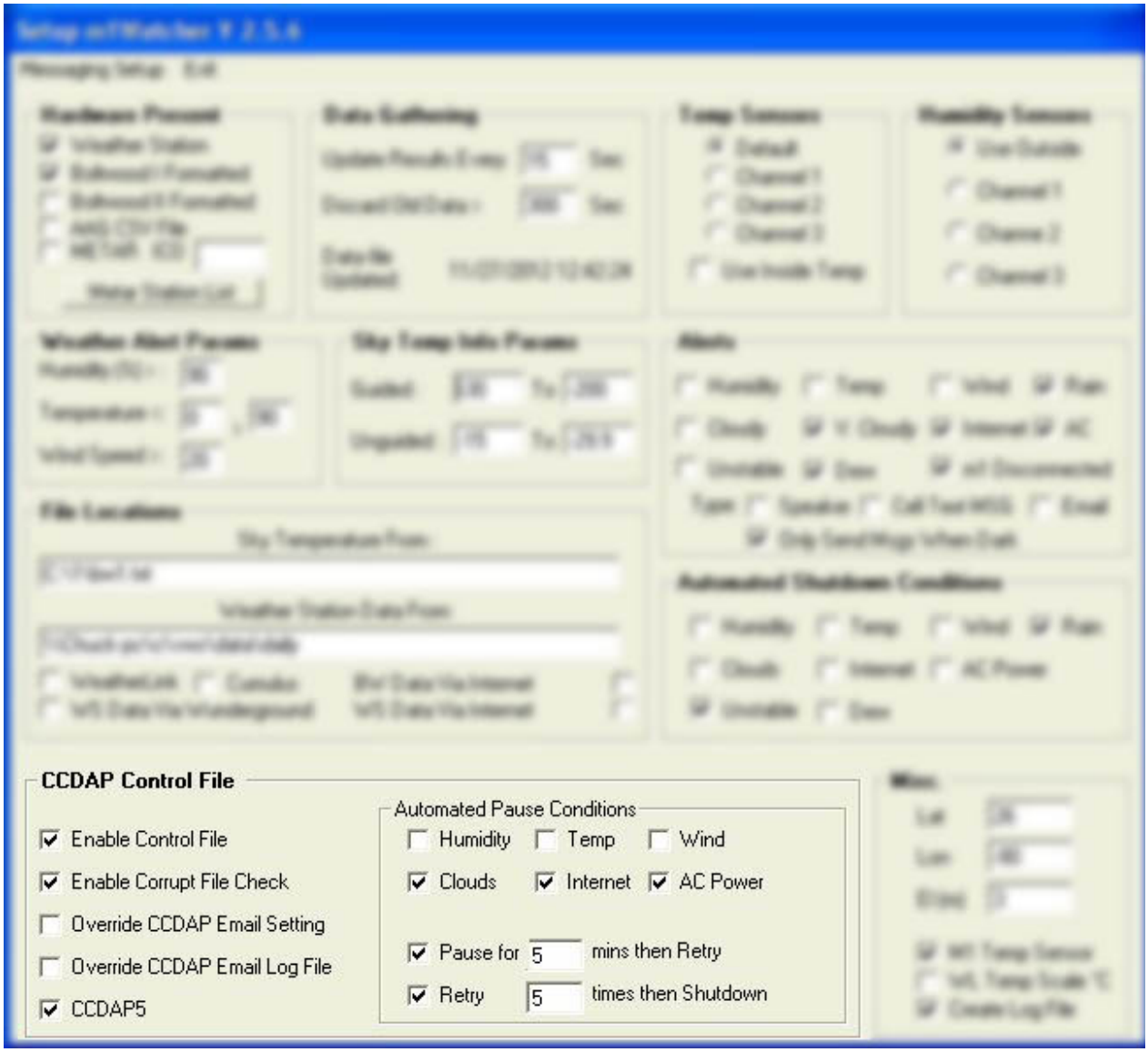
| | |
|---|---|
| | then all your weather safety script needs to contain is:<br>Sub Main()<br>  Telescope.Park<br>End Sub<br>This will call the telescope's park method, and the auto-home/close logic will take care of your dome. The logic in Telescope.Park tries its very best to assure that your scope is parked before closing the shutter or roof. |

Change! - the ACP 'Weather server object ID' should be WeatherWatcher.ObservingConditions




Under the  Preferences/Weather tab rename the file in the 'Weather Server object ID' box to WeatherWatcher.Watcher'. Then click the setup weather
server button to select where your data files are located.

## CCD Autopilot




**Usage:**

Via WeatherWatcher's very sophisticated weather/environment monitoring system, CCDAP runs can be controlled to react to numerous events such as if primary power is lost, bad weather conditions, loss of Internet. Options included pausing, aborting, and gracefully closing the observatory and shutting down. You can be notified of this by email or text message, along with any additional text, identifying the reason for the changes.

Note: WeatherWatcher produces a Boltwood II compatible file named WeatherWatcher_Data2.txt that can be use in clients like CCDAP. e.g. If you have a Boltwood I cloud detector and a Davis weather station WeatherWatcher will create a BWII file from those unit's compiled data.



## File Locations

All data files needed and/or created by WeatherWatcher are saved in the following locations:

Vista/Win7/ Win 8 = ...\ProgramData\WeatherWatcher folder
XP = ..\Documents and Settings\All Users.WINDOWS\Application Data\WeatherWatcher