SpecWare™ Professional

Advanced Features User's Guide

Spectrum® Technologies, Inc.

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Introduction

Introduction

SpecWare Pro has several features that run with no user intervention. These features allow the user to schedule downloads and alerts as well as transfer data to the Internet. The computer must have a direct-cable or wireless connection to the weather station and be running SpecWare Pro to have access to the Alert feature (for Spec 7 Pro, Build 109 or greater is required). Please note that, while it is possible to enable a scheduled feature with weather stations connected by land-line or cellular telephone connections, the need for the program to regularly contact the weather station may incur significant phone charges.

Scheduling of Advanced Features are done in SpecWare Pro within the **WatchDog Manager**. The alert configuration screen is accessed from the **Properties** screen via the "Alert Schedule" button.   Unattended downloads are scheduled in the Autodownload scheduler screen. This screen can be accessed from the **Properties** screen or directly from the **WatchDog Manager** screen via the "Autodownload Schedule" button.

Auxilliary Programs

SpecWare makes use of two programs to carry out scheduled features:

SpecMon7.exe
Once Alert Monitoring is set up for any station, SpecMon7 is placed in the "Startup" folder so it is automatically activated when the PC is booted up. SpecMon7 initiates contact with specified stations at intervals set by the customer in SpecWare Pro. SpecMon7 is normally minimized to the Task Bar, however opening it displays a screen with a log of SpecMon7's most recently completed activity (figure 1). This screen can be reminimized, however if instead it is closed a warning message is displayed (figure 2) warning that no scheduled features will be run.
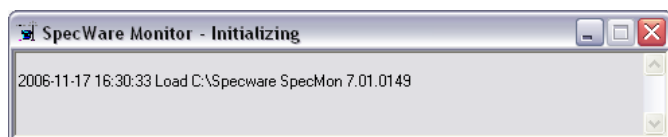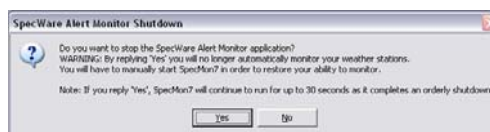

| Figure 1 | Figure 2 |

SpecADL.exe
SpecADL is activated by the Windows Scheduled Task service at the times that were specified in SpecWare Pro (See **AutoDownload Scheduler,** p. 8). SpecADL will contact and download the appropriate station and save the data to the folder with the same name as the Data Identification name on the station.

Alert Function

Adding and Deleting an Alert

An alert can be scheduled for any weather station that has been set up in the **Watch-Dog Manager** screen. See the SpecWare User's Guide for instructions on setting up a new station.

1. From the SpecWare toolbar, click the **Watch-Dog Manager** quick button or select the **WatchDog Manager** option from the **Logger** menu.
2. Select the weather station that is to be configured (see Figure 3) and click the **Properties** button at the bottom of this screen. This will bring up the **WatchDog Properties** screen (see Figure 4).
3. Click the **Alert Schedule** button to bring up the **Weather Station Alert Configuration** screen (see Figure 5).
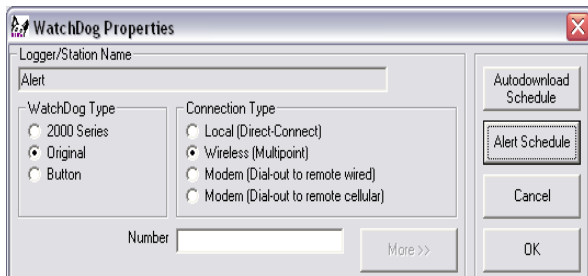
Figure 3

Figure 4

Figure 5

4. See **Features of the Alert Function** (p. 5) for details on the Alert Function itself. The value selected from the **Contact Frequency** dropdown menu is the interval the weather station will be queried by the PC for the alert condition. Generally, the **Enable All Alerts for this Station** box should be checked. Unchecking it disables all alerts (for example if a station was removed in the off-season). Individual alerts are enabled/disabled in the full **Configuration** screen (Figure 6). It is also possible to generate a log file of the sensor data read at each query by checking the **Log weather data from each contact** box (See **Logging and Web Publishing** p. 10) If a new alert is being created, click the **New** button. If a previously existing alert is being modified, select that alert from the list and click the **Edit** button. Clicking either button will open up the full **Configuration** screen. An existing alert can be deleted by clicking the **Delete** button.
5. After setting (or modifying) the alert features in the full **Configuration** screen, there are three options. Hitting the **Apply** button will save the changes for that alert but will not exit the **Configuration** screen completely. It is then possible to modify or

create further alerts for the currently selected weather station. Hitting the **OK** button will save the changes and return you to the **WatchDog Properties** screen. At this point, you can return to the **WatchDog Manager** screen and select a different weather station or return to the main SpecWare screen. Hitting the **Cancel** button will cancel any changes that have been entered since the information was last saved.

Features of the Alert Function

When the Alert feature is enabled, the SpecWare monitor program, SpecMon wakes up at user-defined intervals and contacts the station to read current conditions so it can determine if an alert condition exists. If so, this program directs the PC to send an alert to a telephone, pager, and/or e-mail address. See **Adding and Deleting an Alert** (p. 4) for details on getting to the **Weather Station Alert Configuration** screen.

Important: In SpecWare, if the **Comm Port Open** option in the **Preferences/ Communication** screen has been set to **Fast** or **Pause** (see **Preferences** section in SpecWare User's Guide), there should not be a problem running the Alert feature even if SpecWare is running at the time. However, if SpecWare is running and the **Comm Port Open** option is set for **Always**, SpecMon cannot communicate and an alert cannot be sent. SpecMon will continue to attempt to communicate at each successive interval, so an alert will be possible as soon as SpecWare is closed.

Defining an Alert Condition
In addition to the weather station to which it is being applied, SpecWare needs three pieces of information to define an alert condition; the sensor of interest, the alert threshold value, and whether this is a maximum or minimum value.

Figure 6

The sensor of interest is selected from the **Alert Sensor** dropdown menu. The internal sensors (air temperature, relative humidity, wind, and rainfall) are listed explicitly by name. The external channels are listed by letter only.

Enter the threshold value in the **Value** text box. No units are assigned to this number. Take care that the entered value is consistent with the unit system (English or Metric) selected in the **Preferences** screen. Finally, select whether an alert is sent when the measured value goes **Above** or **Below** the threshold value by ticking the appropriate option.

<u>Entering Alert Contacts</u>

Sensor Alert ID

The text in the **Sensor Alert ID** field identifies the weather station that will trigger the alert. This text will only appear in alerts sent via e-mail. In this case, it may be useful to put a more complete description of the station than is possible for the **Weather Station Name**.

Multiple alerts can be scheduled for a specific weather station. These alerts can be directed to different contacts. For example, in a greenhouse, an elevated CO_2 content may alert someone to open window vents while a low soil moisture content would alert the person responsible for irrigation. However, if the same person or persons should be contacted for all alert situations, checking the **All Alerts for this station use the same contact list** box will eliminate the need to enter this information for each new alert.

Contact Information

From the **Contact Method** dropdown menu, select how the alert will be sent. If the alert will be by Phone or Pager, enter the telephone number in the **Address/Phone#** field. This number should include, if applicable, the area code and any number that must be dialed to access an outside line. If there are numbers entered into the **Pager Ext.** field, there will be a brief pause before these numbers are dialed. For phones this would indicate an extension. For a pager, this number would be the pager extension. If an e-mail alert is being sent, the e-mail address is entered in the **Address/Phone#** field instead.

The first contact listed will always be contacted when an alert condition exists. If additional contacts are available, they will receive alert messages only if the **Always** box is checked. This allows secondary contacts to be easily included or excluded during specific time periods.

<u>Enabling/Disabling Alerts</u>

The **Enable All Alerts for This Station** box at the top of the screen should always be checked unless all alerts will be disabled seasonally. For example, unchecking this box enables you to disable frost alerts in the summer without disabling every alert individually. Rechecking the box in the fall would re-enable the alerts for that station. To enable or disable a specific alert, ensure the **Enable All Alerts for This Station** box is checked and check or uncheck the **Enabled** box next to the **Alert Sensor** field appropriately.

Real-Time Monitor Log File

This older logging method was developed for the original WatchDog weather stations for users who wanted to save the data from the **Real-Time Weather Monitor** (**RTWM**) (see section 3.7 of the SpecWare User's Guide) to their hard drive or a network server drive. Because some SpecWare users have begun data logging with this module, it is still available as an option. However, the logging and web publishing formats are recommended for any new logging operation (see **Logging and Web Publishing** p. 10).

If you have a non-zero interval entered in the **Log Interval** field in the **Preferences/ Monitor** screen (Figure 7), SpecWare will display the **Specify Monitor Log Folder** screen (Figure 8) when you bring up the **RTWM** screen. This screen allows you to name a folder where the data will be saved. If the Cancel button is clicked, the **RTWM** will still appear but the logging function will be not be enabled. Setting the **Log Interval** to zero will prevent this screen from appearing.
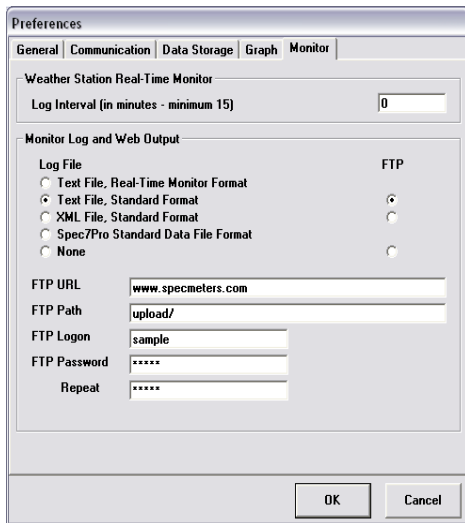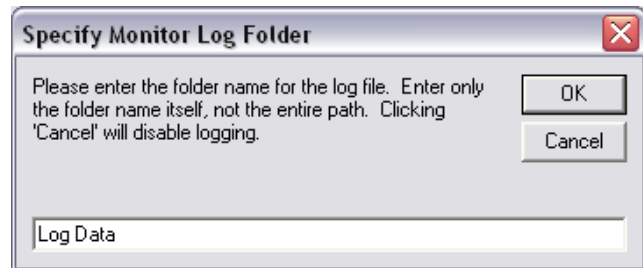
Figure 7

Figure 8

The Real-Time Monitor Log File is stored in the Station's Logger Location folder with the name "Monitor.log." It is an ASCII text file, with tab-separated variables (see figure 9). This file can easily be imported into spreadsheet-type programs such as Excel. No column headers are provided, so the user must be able to identify the sensor type for each external channel. Each variable will occupy an individual column. This file is distinct from the data recorded by the data logger.

Each time the **RTWM** is refreshed, an additional line of data is appended to the log file. In order for the log file to be continuously updated at the selected log interval, the **RTWM** must be set for **Repeat Refresh**. For record formats, see **Logging and Web Publishing File Formats** (p. 10).

```
2004-04-05 08:31 800 19.2 22.0 16.3 2.47
2004-04-06 12:04 800 37.7 37.7 24.6 2.46
2004-04-06 13:04 800 38.5 39.3 24.6 2.46
```

Figure 9: Sample Monitor.log file for a model 800 weather station reading 3 temperature sensors

Auto download Scheduler
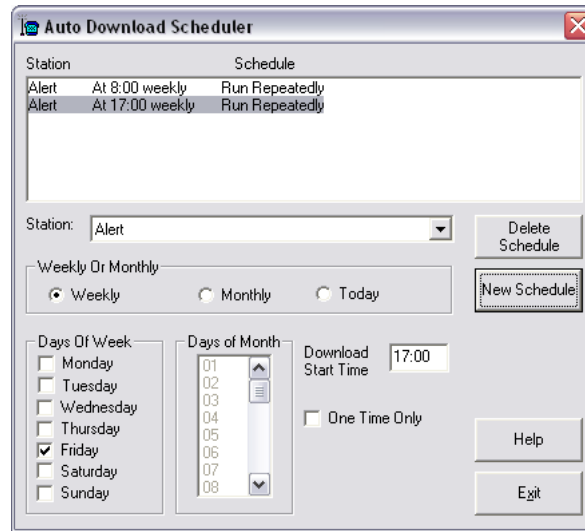
Once a station has been set up in the **WatchDog Properties** screen (see **WatchDog Manager** section in the SpedWare User's Guide), the **Autodownload Scheduler** allows the user to set up the weather station to automatically be downloaded at predetermined dates and times. This function can be enabled directly from the quick button on the **WatchDog Manager** screen or from the **WatchDog Properties** screen. See **Adding and Deleting an Alert** (p. 4) for a brief description of how to bring up these screens.

The first field shows the automatic downloads that are currently scheduled. More than one download can be scheduled for a given station. For example, if an automatic download is desired at more than one time each day, a separate scheduled download must be programmed for each download time. To delete an existing schedule, select this schedule and click on the **Delete Schedule** button.

A new schedule can be added by selecting a station from the **Station** dropdown menu, entering the desired parameters in the **Autodownload Scheduler** screen and clicking the **New Schedule** button. Automatic downloads can be scheduled on a **Weekly** or **Monthly** basis. In either case, the time to begin the download must be entered in the **Download Start Time** box. The time can be entered in 12- or 24-hour clock format (13:00 or 1:00pm). If the time is entered in 12-hour clock format the alphabetic characters are not case sensitive. If letters are not included in the time, SpecWare will assume the time is in 24-hour format. If the **Weekly** option is selected, one or more days should be scheduled from the **Days of the Week** list. Any number of days may be selected and the station will be downloaded automatically on those days. If the **Monthly** option is selected, at least one day of the month must be selected. If day 29, 30, or 31 is selected, Windows will perform the automatic download on that day if it exists for the current month. If that day does not exist, the download will be executed on the last day of the month. If only one automatic download is required, or if the date and time for the automatic downloads will be changed regularly, the **One Time Only** option should be selected.

Important: An independent program (SpecADL.exe) is initiated by Windows to perform the automatic download. If the **Comm Port Open** option in the **Preferences/ Communication** screen has been set to **Fast** or **Pause** (see the **Preferences** section in the SpecWare User's Guide), there should not be a problem running the **Auto-Download Scheduler** even if SpecWare is running. However, if the **Com Port Open** option is set for **Always**, that program cannot contact the Weather Station while SpecWare is running. Therefore, the auto download should be scheduled to run at a time when the software is not expected to be running and, if the Auto Download is scheduled overnight, SpecWare should be shut down before the end of the day. If Alert Monitoring is also running, it can also conflict with AutoDownload. Because the Alert Monitor runs on the hour and at 15, 30 and 45 minutes after, it is recommended that any AutoDownloads be scheduled for times in-between.

Note: Windows 2000 or greater is required to run the AutoDownload Scheduler.

Logging and Web Publishing

The SpecWare Pro Logging and Web Publishing module uses the Frost Alert monitor module, SpecMon. The monitor module queries one or more weather stations at intervals of 15, 30, 60, or 120 minutes, then can save and publish current condition information based on options selected in the **Preferences** screen and parameters set in the **Weather Station Alert Configuration** screen (see p. 12).

Preferences screen

The Monitor tab of the **Preferences** screen is separated into 2 sections. Preference settings apply to all weather stations being monitored. The **Weather Station Real-Time Monitor** section is used to set the logging interval for the Real-time Monitor.log file (see **Real-time Monitor Log File**, p. 7). This older logging method was developed for the original WatchDog weather stations. Because some SpecWare users have begun data logging with this module, it is still available as an option. However, the logging and web publishing formats are recommended for any new logging operation. These mod-

ules allow for building log files as well as sending current conditions to a website. The **Monitor Log and Web Output** section is used to select and enter details for the web publishing options.

Important: If data logging information is being entered into the **Monitor Log and Web Output** section, the logging interval for the **Weather Station Real-Time Monitor** section should be set to 0 minutes.

SpecWare can create 2 types of data file, a Log file and an FTP file, which can be created simultaneously. The difference between the two is how the software handles the current conditions read from the station. The Log file appends the data to a file of existing data from that station. This file is located in the station's Logger Location. The FTP file is similar to the Log file, except that only the current conditions are written to a file called "Monitor.ftp.txt" in the station's Logger Location folder and the previous reading is erased. This file can then be FTP-ed to a web location (see FTP options p. 11). The different file formats are described on page 12. The XML tags and Field Descriptions are given on page 13. There is no Real-Time Monitor Format or SpecWare Standard Format file option for the FTP file.

File Formats

Text File, Real-Time Monitor Format   This format mimics that produced by the Real-Time Monitor, and should be used only to replace using the Real-Time Monitor log. Data is written to the "Monitor.log" file. This format cannot be FTP-ed to the web.

Text File, Standard Format   This ASCII text file uses tabs to separate values, with a record (line) representing each current condition obtained from the weather station. The format of the file is detailed on page 12. The file is named "Monitor.log". The current condition record for this format can be FTP-ed to a website. Specmon.php is provided as a sample program to display data in this format on a website.

XML File, Standard Format   This ASCII text file is written in XML format, with tags for each value. The format of the file is detailed on page 12. The file is named "Monitor.log". The current condition record for this format can be FTP-ed to a website.

Current SpecWare Data File Format   This text file is written in the standard format used by SpecWare (".swd"). This option should be chosen only if the station is not being downloaded by other means (this would cause data collisions between the logged data from the station and the current condition data). The file includes the standard headers, and can be read, reported, and graphed in the same way as other SpecWare data files. The files are named "SDyyyymm.SWD", where "yyyymm" is used to generate separate files for each month. This format cannot be FTP-ed to the web.

None   No file is to be created.

FTP Options
The FTP Options direct SpecMon to FTP the "FTP File" to a defined web location. Specifically, SpecMon uses FTP to log onto **FTP URL** using **FTP Logon** and **FTP Password**, and then copies the "FTP File" to the **FTP Path** directory.

FTP URL   The location on the web (i.e. "www.example.com" or "www.example.com/datafiles") where the current conditions file(s) will be posted.

FTP Path   The directory location on the web site where the files are posted. If **FTP Path** contains "%FOLDER%", then the station location name will be substituted for "%FOLDER%". For example, if **FTP Path** is "stations/%FOLDER%/" and a station is named "South.Orchard", then the "FTP File" will be copied to "stations/South.Orchard/monitor.ftp.txt". Alternatively, for the same station, if **FTP Path** is "stations/", then the file will be copied to "stations/South.Orchard.txt". Note that this naming convention ensures that, if there are multiple stations, the files do not conflict.

FTP Logon   The logon name used by FTP.

FTP Password and Repeat   The password used by FTP. Only asterisks display when setting this, and is not redisplayed (the fields will appear blank when displayed, even if a password is set). Changing the password requires typing the same thing into both the **FTP Password** and **Repeat** fields. If they differ, the password will not be changed, and a message will be displayed.

Weather Station Alert Configuration screen

After the web and publishing options have been selected in **Preferences**, data logging must be enabled for all relevant stations. This is done in the **Weather Station Alert Configuration** screen. See **Adding and Deleting an Alert** (p. 4) for details on bringing up this screen. The **Weather Station Alert Configuration** screen is used to turn logging on or off for a specific station. Specific alerts do not have to be defined in order to activate logging (though they are certainly allowed). The **Contact Frequency** must be selected from the dropdown menu, and the **Log weather data from each contact** box checked, in order to activate logging per the general specifications made in the **Preferences** screen.

Specmon.php

A sample PHP program named "specmon.php" is provided to demonstrate displaying the standard text file on a web site. In a simple situation where "specmon.php" and "South.Orchard.txt" both reside in the "httpdocs/" directory, a web page link of http:// www.sample.com/specmon.php?name=South.Orchard must be provided.

Logging and Web Publishing File Format

For the "Text File", each field is separated by a tab. For the "XML File", a root tag of "datalogger" is used. Each data element includes the XML tags and is separated by a carriage-return-line-feed.
A complete description of the XML tags and the associated fields is given in the table on the following page.

Stations*	XML Tag	Field Description
All	LogTime	Data collection time in the format yyyy-mm-dd hh:nn
All	ModelNumber	Weather Station model number
All	Measure**	System of measurement ('M' (Metric) or 'E' (English))
All	BatteryLevel**	Current battery voltage
WS, 800	TotalRainfall	Total rain since the station was last launched
WS, 800	EventRainfall**	Rainfall since the station rainfall counter was last reset
WS, 800	StormRainfall**	Rainfall during last (or current) storm, delimited by two dry hours
WS	Temperature	Current Temperature (degrees Fahrenheit/Celsius)
WS	HighTemp	High temperature since midnight (Day temperature for MS2)
WS	HighTempTime	Time of high temperature
WS	LowTemp	Low temperature since midnight (Night temperature for MS2)
WS	LowTempTime	Time of low temperature
WS	RH	Current Relative Humidity (percent)
WS	HighRH	High RH since midnight
WS	HighRHTime	Time of high RH
WS	LowRH	Low RH since midnight
WS	LowRHTime	Time of low RH
WS	DewPoint**	Current computed dew point (degrees Fahrenheit/Celsius)
WS	WindSpeed	Average Wind Speed since last logged interval
WS	WindGust	High Wind Speed since last logged interval
WS	WindDir	Current Wind Direction in degrees
WS	WindDirText	Current Wind Direction as text (e.g. N, NNE, NE, ENE, etc.)
WS	ET**	24-hour ET (inches or mm)
The following group of three fields is repeated for any external sensor channels which have been assigned to a sensor:		
All	ChannelName	Name of Channel sensor (only if assigned)
All	Channel	Channel sensor value (only if assigned)
All	ChannelUnits	Channel sensor units (only if assigned)
2400, 2800	TotalRainfall	Total rain since the station was last launched
2400, 2800	EventRainfall	Rainfall since the station rainfall counter was last reset
2400, 2800	StormRainfall	Rainfall during last (or current) storm, delimited by two dry hours
The following two fields are present only in the "Classic" text format records		
WS	ET	24-hour ET (inches or mm)
All	BatteryLevel	Current battery voltage

*   The Station Abbreviation "WS" indicates all Original and 2000-Series Weather and
        Mini-Stations, except Models 800, 2400, 2800.
**   Field omitted for "Classic" text formatted (RTWM) log files.

Note: Value fields may be empty for models which do not support a given sensor, for example
        "RH" will not be filled in for the Model 2600 Weather Station.