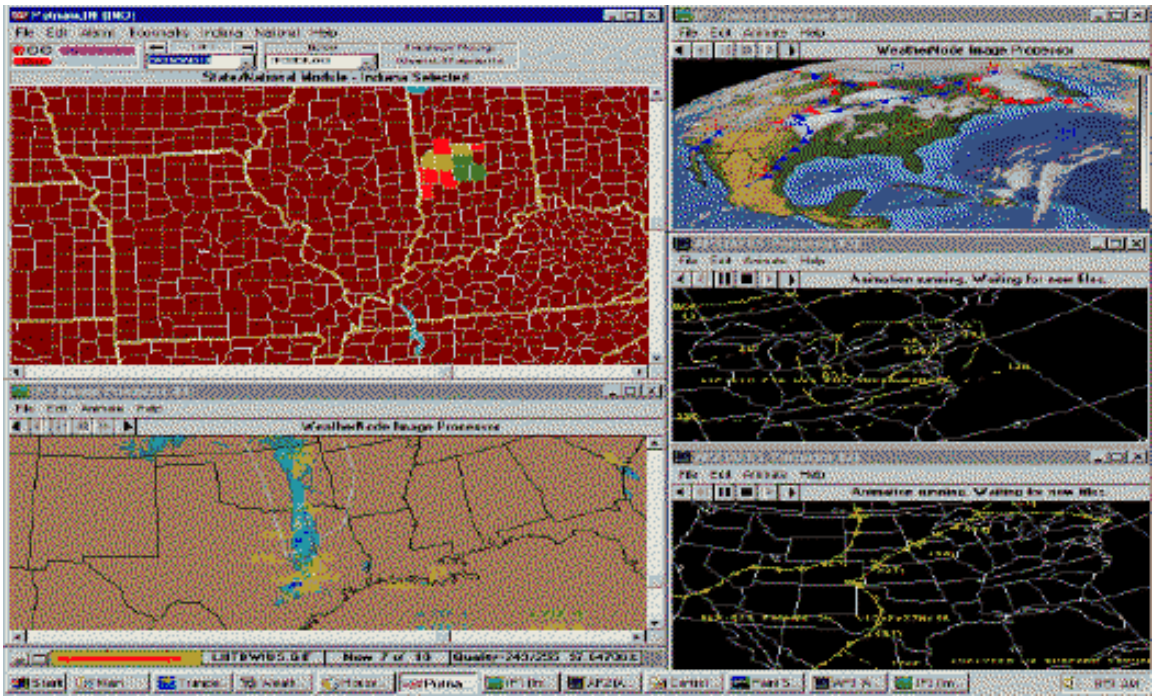
WeatherNode™ v4.0 User Guide

Weather and Emergency Data Collection/Display System



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INTRODUCTION

This system should not be used instead of official warning mechanisms, but as an additional layer of information to stay current on weather events.

Using this software and a simple radio receiver or scanner, a satellite antenna, or an Internet connection, timely global weather reports, emergency information, charts, satellite images and other emergency management data can be received. Wireless EMWIN (Emergency Managers Wireless Information Network) systems are among the first to be notified of severe weather conditions or other emergencies.

SYSTEM REQUIREMENTS

The minimum computer system required for WeatherNode is a 486DX100 with at least 16 Megabytes of ram, 20 Megabytes hard disk space, Windows 95, minimum 640 x 480 x 256 color display, and one free serial communications port, or one Internet connection. The bottom line is that this software is designed to be configurable to best accommodate available hardware. The better the computer and video are, the more that can be done with WeatherNode software, since it allows multiple windows to be displayed simultaneously.

WHAT IS WEATHERNODE?

WeatherNode is a software program that enables receipt of EMWIN information on a computer. WeatherNode can display text, set alarms, automatically print, display and animate images and graphics, and use external devices (such as pagers or strobe lights and sirens) to inform of special events as they occur. It is possible to receive information about severe weather events (such as tornadoes, earthquakes, or similar) within the same minute of issuance by government agencies.

WHAT IS EMWIN?

EMWIN is a wireless broadcast service that was developed by the National Weather Service to provide a low-cost means of transferring weather and emergency data from a central point, The National Weather Service and other participating agencies, to an unlimited number of interested parties in range of the data signals. Recently, it has also been made available on the Internet for customers who are not in range of a wireless broadcast. For an overview of the EMWIN system, see Appendix O.

WHY WIRELESS DATA?

Using a wireless broadcast allows an unlimited number of users to receive simultaneous data without the typical loading and associated slow down of shared networks such as the Internet. In addition, during an emergency, it is not unusual for telephone and similar 'wired' connectivity to be lost. A wireless signal allows reception by anyone within range of the transmission even if they are without local 'wired' services. In some areas, the EMWIN satellite transmissions are intercepted and retransmitted on a local VHF radio frequency to allow reception using a scanner or receiver and a demodulator. These local area rebroadcast stations can tailor the data stream to provide localized information that fits the needs of their emergency managers and local citizens. The National Weather

Service provides the signal to the GOES satellites, and rebroadcast of the signal is a local area effort.

Section 1 – Rapid Start

1.1 Installation: Systems receiving data from satellite.

Plug the satellite receiver's demodulator output into an available serial port on the computer then install the software using diskettes or the program downloaded from Internet. Links to active download sites can be found at http://www.weathernode.com.

Start the WeatherNode program.

On the WeatherNode screen, click Modules and select EMWIN Engine. On the EMWIN engine, set the data rate to 9600 and select the serial port where the demodulator is connected

Assemble and apply power to the receiver and satellite system as detailed in the assembly instructions included with the satellite system. If the satellite system includes a frequency-agile receiver, tune the receiver to 137.225 MHz.

The satellite antenna must be aimed either at GOES 8 (located over the equator, due south of the east coast of the US, at about 45 degrees elevation), or at GOES 9 (located over the equator, due south of the west coast of the US, at about 45 degrees elevation). As an aiming reference point, GOES 8 is 75 degrees west and GOES 9 is 135 degrees west in geostationary orbit directly above the equator. *If you use a satellite other than GOES 8 or GOES 9, contact your equipment vendor for information about aligning the antenna for best results.*

Using the above satellite locations as a guide, move the antenna until the EMWIN Engine begins to ingest data. Watch the signal level meter on the ESP-96 Signal Processor, and adjust the antenna up, down, left, and right and rotate the feed assembly until the meter is at maximum.

1.2 Installation: Systems receiving data from radio.

Plug the radio receiver's demodulator output into an available serial port on your computer then install the software using diskettes or the program downloaded from Internet. Links to active download sites can be found at http://www.weathernode.com.

Start the WeatherNode program.

On the WeatherNode screen, click Modules and select EMWIN Engine. On the EMWIN engine, set the data rate to 1200 (may be 2400 or 9600 in some areas) and select the serial port where the demodulator is connected. Now, adjust the frequency of the radio receiver

to the local transmitter. For data rate and frequency information in specific cities, check http://www.weathernode.com.

1.3 Installation: Systems receiving data from Internet.

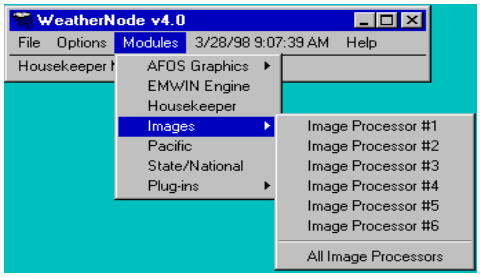
Install the software using diskettes or the program downloaded from Internet. Links to active download sites can be found at http://www.weathernode.com.

Start the WeatherNode program.
Connect to an Internet Service Provider.
On the WeatherNode screen, click Modules, Plug-ins, FTP Engine to start the FTP Engine. The WeatherNode system must be online at all times to receive full data sets.

Note: Since the internet data sets are delivered as zipped data, notification times can significantly lag the issuance of specific products. For best notification times, a direct satellite connection should be used.

Section 2 - SOFTWARE OPERATION

2.1 - WeatherNode Main Menu



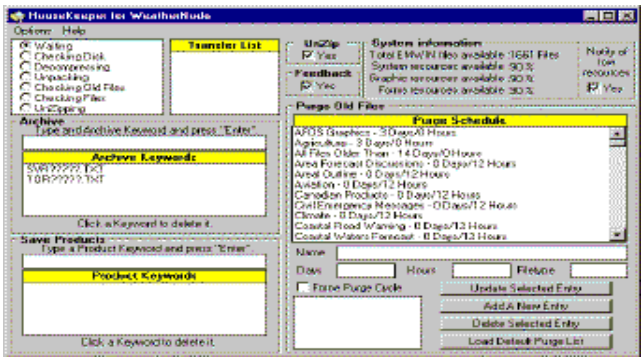
Once the software installation is complete, select Start, Programs, WeatherNode, and WNODE40 to start the program. The first time WeatherNode runs it starts two modules.

- WeatherNode Main Menu
- Housekeeper.

Every time thereafter when the WeatherNode main menu is started it will start all modules that were running the last time it was used.

Now that the WeatherNode main menu and the Housekeeper are running, start the module that gets data coming into the system. For systems using a satellite or radio input select the EMWIN engine module. For systems using the Internet, first connect to the Internet Service Provider then select Plug-ins and start the FTP Engine.

2.2 - Housekeeper



A tremendous amount of data is ingested by a WeatherNode system every day. If a WeatherNode system were configured to automatically print all text products when received, over 40,000 pages of paper per day would be printed. The Housekeeper manages data by deleting old files, controlling the files that are saved, decompressing, unpacking and archiving files.

General Information

All files received by any WeatherNode module (EMWIN Engine, FTP Engine, etc.) are stored in the pre-processing path (c:\weather\wxdata\newfiles is the default). Once every five seconds the Housekeeper checks the pre-processing path for files. If any are found, they are transferred to the post-processing path and a message is generated by the Housekeeper to tell all WeatherNode modules what file was transferred. At the top of each minute, the post-processing path is checked for the presence of any compressed files. If any are found, they are decompressed and the resultant files are moved to the pre-processing path for distribution by the Housekeeper. Housekeeper activity is monitored by the activity display. The meaning of each activity indicator is detailed below:

Waiting:

The Housekeeper is waiting for five seconds to elapse before checking the pre-processing path.

Checking Disk:

The pre-processing path is being checked. If it's the top of a minute, the post-processing path is also being checked for compressed files.

Decompressing:

A compressed file (other than .zip files) is being decompressed. Possible compressed files are:

.zag

A file created in pkzip format that is comprised of multiple messages packed into one large message then compressed. The advantage to this file is that the compression can reach 5:1 or better since the header information for each file is not stored along with the file.

.zis

A single file created in pkzip format. This file is the same as a .zip file, but is not transmitted as such due to incompatibility issues between .zip files and early versions of the WeatherNode 3.0 Housekeeper.

.zap

The same contents as the .zag file, but created using the PKWare data compression library (which is not compatible with pkunzip). The NWS no longer sends these files, but retransmission stations using the Xenocode Retransmission Engine do.

.nws

The same contents as the .zis file, but created using the PKWare data compression library. These files are no longer transmitted.

Unpacking:

Recovering files from a .zag or .zap file after it has been decompressed.

Checking Files:

Looking for a .zip file in the post-processing path.

UnZipping:

Decompressing a .zip file. Since this process happens in the background, it is not uncommon for the activity indicator to move from unzipping to Waiting or Checking Disk while the process is still active.

Save Products

It is sometimes desirable to ***ONLY*** store specific products on a WeatherNode system. If hard disk space is very limited, or WeatherNode is used for recalling information from only one state, use the Save Products keywords to limit the data WeatherNode stores. When the Housekeeper processes incoming files, it checks for the presence of Save Products keywords. If none are found, the Housekeeper saves everything it receives. If there are any Save Products keywords, ONLY products that match one of the keywords will be saved. The "?" wildcard is allowed.

Most WeatherNode installations should leave this list empty.

Here are some examples:

torbwimd.txt - Saves all tornado warnings issued by "bwi" in Maryland.

??????md.txt - Saves all messages issued from any Maryland reporting station.

tor?????.txt - Saves all tornado warnings issued by all reporting stations in all states.

????????.txt - Saves all text messages.

NOTE: It is more efficient to simply leave the keyword list empty if your WeatherNode system should save all messages received since the keyword list does not need to be searched each time a new message is received.

System Information

At the top of each minute, a check of resources is performed and the results are displayed here. In addition, every five minutes, the disk is checked for total files in the post-processing path and the results are displayed here. If any resource falls below 30% or the total number of files in the post-processing path is greater then 4,000, a message is generated that displays on all AFOS and Image Processors, and on the State/National module to alert you to a potentially unstable situation. If you see a message about resources being low or too many files, you should stop some programs and/or reduce the number of files being stored by decreasing the purge time or removing archive keywords.

Purge Old Files

Each file received by WeatherNode is stored in the post-processing path (normally c:\weather\wxdata\rxfiles) overwriting files with the same name. It is not unusual for a normal WeatherNode system to store 1000 or more files. Files marked for archiving do not overwrite previous versions as each file is assigned a numeric extension that designates the order in which it was received. An archived file set can store up to 1000 files from a single keyword (extension .000 - .999). When WeatherNode selects a county, it checks all available files to determine if a menu should be activated. The greater the number of files on a system, the longer county selection takes, so it's very important to purge old files. The Housekeeper Purge system handles this task by checking the creation date of all files against the purge schedule at the top of each hour. Files that have expired are deleted from the disk, and archive sets are renumbered as earlier versions of a file are deleted.

To change the purge schedule:

Click a file type in the Purge Schedule, change the Days and/or Hours entries and click "Update Selected Entry".

To add a new entry to the purge schedule:

Click "Add A New Entry", change the Name, Days, Hours, and File type entries, then Click "Update Selected Entry".

To delete an entry:

Highlight the entry by clicking on it, then click "Delete Selected Entry".

The Housekeeper keeps a copy of the Purge list that shipped with the program. To restore the original Purge list, simply click "Load Default Purge List".

Archive

Archiving adds a very powerful feature to WeatherNode, the ability to keep multiple versions of a message for later review. During severe weather it is not unusual for multiple

warnings to be issued for different counties within a very short period of time. Without archiving, each warning overwrites the previous one so the earlier one is no longer available. HOWEVER, archiving also increases the number of messages stored on your computer, so it should be used with caution.

To Add Archiving

Enter an archive keyword into the box indicated and press "Enter". Valid archive keywords are comprised of an 8 character filename, followed by ".txt". The ? wildcard is allowed. Here are some examples:

torbwimd.txt - Archives all tornado warnings issued by "bwi" in Maryland.

tor???md.txt - Archives all tornado warnings issued from any Maryland reporting station.

tor?????.txt - Archives all tornado warnings issued by all reporting stations in all states.

????????.txt - Archives all text products. - **CAUTION**.... This **WILL** fill your hard drive!

To delete a Keyword

Point at it and click the mouse button to highlight it, then click "Delete Keyword".

WeatherNode Data Path Configuration

Program Path:

This is where the program and all supporting files are stored.

Post-processing Files Path:

The post-processing path is where files are stored after being processed by the Housekeeper.

Tracking Files Path:

When files are received via broadcast methods, tracking files are created to track the completeness of the file. These files contain information about the creation date and what blocks were received, good, bad, or not at all.

Temporary Storage Path:

As files are being received from a broadcast system, they are stored here until all blocks have been received.

Pre-processing Files Path:

After files have been received completely, regardless of the source, they are moved to this path where the Housekeeper finds them and moves them to the post-processing path. In the process of moving the files, the Housekeeper tells all other WeatherNode applications when files have been moved.

Auto-executable Files Path:

WeatherNode has the ability to shell to an executable file that has been received. This path is where the .exe files are stored once they have been received.

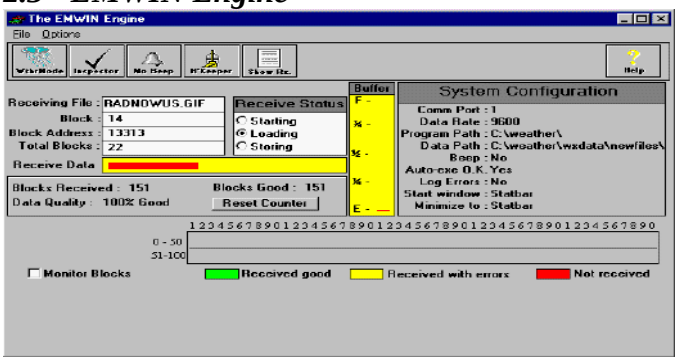
Animation Files Path:

Animation files created by AFOS and Image Processors are stored in this path.

Windows Path:

This is where your \windows directory is located.

2.3 - EMWIN Engine



The EMWIN Engine

This module is for use ***ONLY*** with systems that ingest data from satellite or local rebroadcast. To ingest data from the Internet, use the FTP Engine plug-in.

General Information

Careful monitoring of the indicators on The EMWIN Engine can tell you a lot about the effectiveness of your WeatherNode system. You should pay particular attention to the following:

Receiving File

The messages in this box tell you how the com port is working.

Messages Are:

Bad Com. Port - The EMWIN Engine is unable to open the selected COM port.

No Data In - The EMWIN Engine has successfully opened the COM port, but there is no data coming from the Demodulator. Check the cable between your receiver and the Demodulator, the cable between the Demodulator and your computer and the cable between the COM port connector on the back of your computer and the COM port inside the computer. This short cable has been known to be defective in approximately 10% of COM port problems. Be certain that the port you have selected is not assigned to an internal modem.

Parsing Data - The EMWIN Engine has successfully opened the COM port, and can sense data being ingested. When this message appears, The EMWIN Engine is searching the incoming data for the start of a block.

Data Interrupted - The connection between your computer and the EMWIN demodulator has been interrupted.

No Rx. Signal - The EMWIN Engine has successfully opened the COM port, but cannot find the start of a block. Either you have an extremely poor signal, or no signal at all.

Weak Rx. Signal - The EMWIN Engine has successfully opened the COM port and has found the start of a block, but the header information in the block was corrupt, so The EMWIN Engine could not save the block. You have a very marginal signal, or there is a source of interference acting on your received signal.

Filename - When a filename is shown, The EMWIN Engine has successfully opened the COM Port, has found the start of a block, and has found valid header information. Check the Monitor Blocks section for more information about the block. If a yellow block is shown, the data was received with errors. If the block is green, the block was received without errors. A very occasional yellow block is to be expected due to the nature of radio signals, but if you receive a lot of yellow blocks, you have a marginal received signal. In either case, the block is stored in a temporary directory pending receipt of the remaining blocks that make up the message.

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***Data Quality*:**
The data quality monitor on the EMWIN engine helps you determine how well your system is working. As each block is received and processed, it is added to the Blocks Received indicator. Each block that has been received without error is added to the Blocks Good indicator. The ratio of Blocks Received to Blocks Good is reflected as a percentage in the Data Quality indicator. The counter automatically resets when the block counter reaches 1000, but it can be manually reset at any time by clicking the Reset Counter button. If the System Configuration Log Errors is "Yes" then a line is added to \weather\blocklog.txt after each block is completed. The status of received blocks over time can be monitored by insuring that Log Errors is turned on, and using the View Blocklog button to check status. To insure you receive most information, you must strive for 100% good data. If your system receives 95% good blocks or better, you will probably be happy with the data received. Data Quality of 85% to 95% will result in some compressed files and graphics being decompressed, and Data Quality of less than 85% will probably deprive you of all graphics and most compressed files. The blocklog file is automatically erased when it reaches a size of 20K or greater.

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System Configuration

Com Port:

Select the com port that your demodulator is connected to. Be sure you haven't selected a com port that has been disabled by the addition of another device. Be especially aware of possible IRQ conflicts.

Data Rate
For GOES Satellite systems, select 9600 baud. For MOST other data sources, select 1200 baud. If you aren't sure, check http://www.weathernode.com/data.htm for a current list of retransmission stations and the baud rate each is using.

Beep
Sounds a beep on good blocks, bad blocks, or not at all. This is handy for monitoring a receive system for interference. By causing the Engine to beep on bad blocks, the application can be minimized and will sound a beep when incorrect data has been received. If your system is configured with a sound card, the default sound (as defined in the control panel "Sounds" setup) is played

Auto-exe O.K.
When a program with an extension of .exe is received, The EMWIN Engine transfers it to the \weather\wxdata\rxtmp\exefiles\(filename) directory and automatically starts the program. This capability was added to accommodate information that has yet to be defined. If you do not want the program to execute after it has been received, change the (Setup) System Configuration 'Allow Auto-executable' to No.

Log Errors
To allow monitoring of long-term error performance, set System Configuration Log errors to \blocklog.txt to yes. Once configured, the EMWIN Engine will add a line to the file \weather\blocklog.txt every time the block counter resets from 1000 to 1. By checking the log with the Windows Notepad, you can determine how well your system is working. NOTE IMPORTANT - The EMWIN Engine deletes this file after it reaches a size of 20K. If you want to save the contents, you should manually copy the file before it is deleted.

Start Window:
This setting determines if the EMWIN Engine starts Normal, Maximized, Minimized, or as a Statbar.

The Status bar (Statbar) is a convenient way to tell what your EMWIN Engine is doing without displaying the entire Engine. Click anywhere on the red gauge to show or hide the Statbar title.

Minimize to
Select Statbar to cause the Status Bar to appear when the minimize button on the EMWIN engine is clicked. Select Icon to make the EMWIN Engine minimize to an Icon.

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How the EMWIN Engine treats files:
Files with an extension of .TXT are transferred to the directory of available files once all blocks have been received regardless of whether or not they contain errors. This insures that, even with very poor reception, you will be alerted to severe weather conditions.

All other files (graphic and compressed) are held in the temporary directory until they have been completely received. They are not transferred to the working directory until they are known to be 100% good to eliminate the possibility of a rogue byte causing your system to stop. If they have not been received 100% good within 24 hours, they are deleted.

Options

Beep

Sounds a beep on good blocks, bad blocks, or not at all. This is handy for monitoring a receive system for interference. By causing the Engine to beep on bad blocks, the application can be minimized and will sound a beep when incorrect data has been received. If your system is configured with a sound card, the default sound (as defined in the control panel "Sounds" setup) plays.

File Inspector

Starts the File Inspector utility that shows the quality and content of received files.

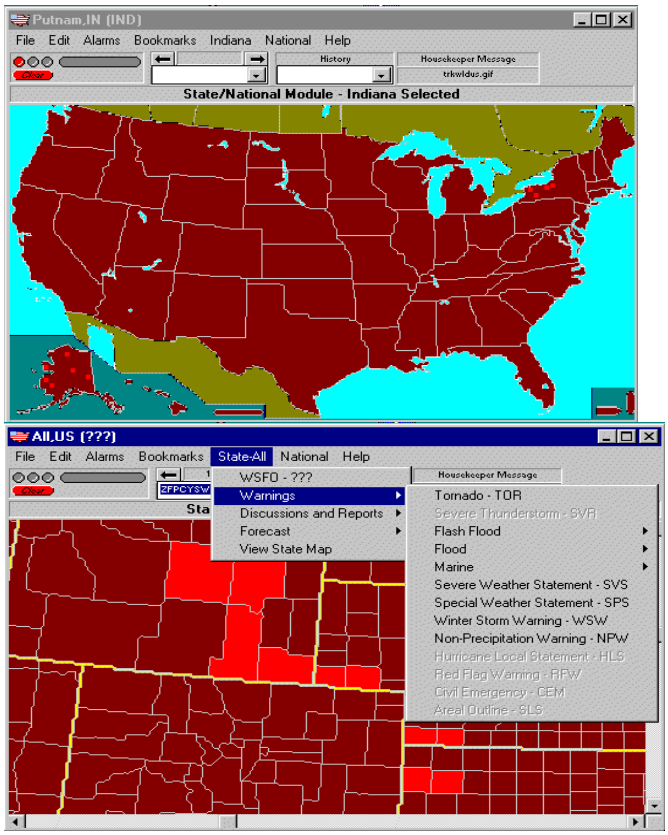
Housekeeper

Activates the Housekeeper window.

Show Receive

Toggles between display of block monitor and a text window that shows the contents of each received block.

2.4 - State/National Module



State/National Module without and with County Level Map

File

Save

Saves the last displayed file.

Print

Prints the last displayed file on the default printer.

Exit

Saves the window size and position, then stops the program.

Edit

Clear Display

Erases test in the text display area.

Cut

Cuts text that has been selected by clicking and dragging the mouse.

Copy

Copies text that has been selected by clicking and dragging the mouse to the Windows clipboard .

Paste

Pastes text from the Windows clipboard to the current cursor position on the text display.

Restore Info Bar

Occasionally, messages may be sent that will change the Info Bar (normally says "State/National Module"). Use this selection to restore the default message.

Alarms

Activate On Alarm

This menu can be either checked or not checked (a checkmark appears to the left of the menu). When checked, it causes the State/National module to activate when an alarm is received, even if the module is minimized.

Add Selected County

Adds the selected county to the alarm configuration grid.

Add Selected State

Adds the selected state to the alarm configuration grid.

Clear Screen Alarms

Clears all screen alarms. The action of this menu is the same as clicking the "Clear" button.

Clear External Alarms

Clears all external alarms by sending a command to all active modules.

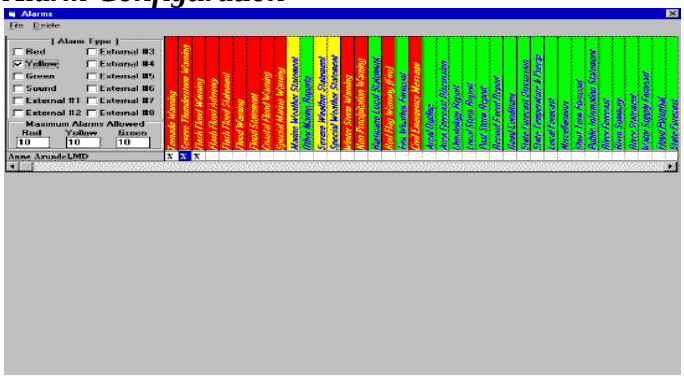
Track Alarms

This menu can be either checked or not checked (a checkmark appears to the left of the menu). When checked, it causes the State/National module to center the county affected and display the county map.

View Alarm Configuration

Displays the alarm configuration grid.

Alarm Configuration



Since the alarm configuration grid is central to all county, state and national alarms, it is essential that it be configured correctly. A well configured alarm grid will result in a system that is very informative and responsive while a poorly configured alarm grid will consume excessive processor time and cause the system to be sluggish and hard to use.

General Information

The alarm grid consists of rows, where state or county names are displayed, and columns where product types are displayed. All product types to the left of, and including, Zone Forecasts are associated with state menus and all product types to the right of Zone Forecasts are associated with the national menus. Since one national product selection is all that's required to generate an alarm, it is both redundant and system hungry to set national alarms in more than one row. *A National alarm (any product to the right of Zone Forecasts) should never be set in more than one row.* Alarms should be set for your county and a few surrounding counties to reduce the processor time required to parse incoming messages and to paint the corresponding counties. As a general rule, the more counties the State/National module must paint the harder your computer must work.

To set an alarm

Click at the intersection of the row and column to highlight the intersection. You can also click and drag through several intersections, or click an intersection, hold the shift key and click another intersection to highlight a group of rows or columns. A single intersection is highlighted by a dotted outline and multiple selections are painted blue. Once the intersections are highlighted, click the color, sound, and external alarms you want to associate with the selected products.

To clear an alarm setting

Follow the procedure above, but click the color, sound, and external alarms until none are selected.

Red, Yellow and Green

These settings determine the color an affected county will be painted when an alarm is received. See Maximum Alarms Allowed (Below).

Sound

When sound is turned on, an alarm will play the default system sound (as defined in the Windows Sounds Properties configuration screen).

External Alarms

The alarm grid informs plug-in modules when an alarm is generated by sending a notification message to all modules. The message contains the filename of the file that generated the alarm, an on/off command, and a level setting. The level setting corresponds to one, or all, of the external alarm settings. The plug-in must only monitor for the message and compare its' external alarm settings to those of the alarm grid. To set an auto-print function, for instance, you could select External #1 in the alarm grid, then

External #1 on the Auto-print plug-in and, as long as the auto-print module is running, each message that generates an External #1 alarm will automatically print.

Maximum Alarms Allowed

These settings control the maximum number of counties that can be painted in each color. If, for instance, the maximum green alarms allowed is set to 30, only 30 counties will be painted green. If you have set an alarm for an entire state, only the last 30 counties (alphabetically) will be painted (actually, all are painted, but the first painted are erased to make room for the last 30). When this happens, it appears that some counties are not alarming, but WeatherNode is following your instruction and only painting 30 counties. As the number of alarms allowed is increased, and more counties are painted, more processor time is consumed by the painting task. This will seriously slow computers with a minimal processor and/or video card. If you will alarm for an entire state, you must use a computer that's up to the task.

Bookmarks

Add

Adds the currently selected county to the bookmark list.

Remove

Removes the currently selected county from the bookmark list.

All US (???)

Causes the State menu to recall messages for all states.

State

Refresh Menu

Every time a state is selected from the county map, the post-processing path (where the files are stored) is tested to see what files are available for the state. The absence of files for any menu entry causes that entry to become disabled so it is possible to tell at a glance if products are available. If you leave your system on one state for an extended period it is a good idea to have the system check for files to update the menu to reflect new and deleted files. Simply click this menu to update both the State and National menu.

WSFO

Often, a WSFO (Weather Service Forecast Office) has responsibility to report conditions in several states. To cause the State menu to recall products based on a specific WSFO, click this menu. Once the WSFO has been selected, this entry will change to the state name. To return to product selection based on a state, click the state name.

Warnings

Displays warnings that are available for viewing.

Discussions and Reports

Displays discussion and report products.

Forecasts

Displays forecast products.

View State Map

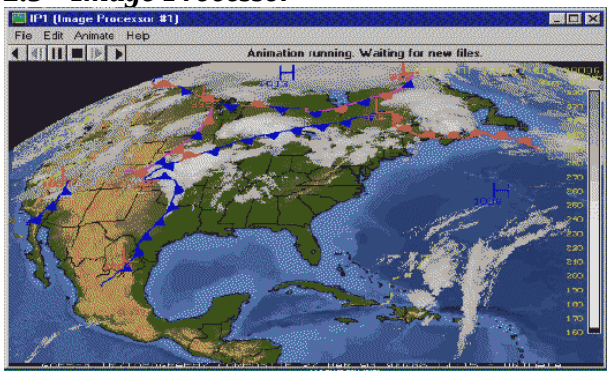
Displays a map of the state with major cities and highways. Click anywhere on the map to hide it.

National

Refresh Menu

Every time a state is selected from the county map, the post-processing path (where the files are stored) is tested to see what files are available for the state. The absence of files for any menu entry causes that entry to become disabled so it is possible to tell at a glance if products are available. If you leave your system on one state for an extended period it is a good idea to have the system check for files to update the menu to reflect new and deleted files. Simply click this menu to update both the State and National menu.

2.5 - Image Processor



Edit

Fit Window (Fine)

To reduce the size of an image and retain the best resolution possible, select this option. This option requires more processor time than the course option, but results in a better image.

Fit Window (Course)

To reduce the size of an image quickly, select this option. While this option requires much less processor time, the resultant image is not as clean as with the fine option.

Note: If either of the above options are turned on while an animation is automatically updating on receipt of new files the animation slides created from the new files will be saved as the reduced image.

Use Fixed Palette

Palettes are used by graphic displays that support 256 or fewer colors. On those systems, when running multiple windows, better color resolution can often be accomplished by forcing all windows to use a fixed palette. Using a fixed palette will slow the process of moving from one window to another.

Restore Infobar

The Infobar is the space to the right of the VCR-style buttons where information pertinent to the operation of WeatherNode is displayed. Occasionally, a message may be sent that causes this area to display text messages other than the default "WeatherNode Image Processor" information. Selecting this option will restore the Infobar to its' default message.

Animate

Auto-Animate

Toggles Auto-animation on and off.

Erase All Animation Slides

Erases all animation slides.

Reload Animation

Occasionally a slide may be incorrectly colored as a result of palette interference from another application while the animation is loading. This menu allows the animation to be reloaded and all slides to be repainted.

Setup

The Setup menu opens a setup box that allows slides to be added or deleted and display speed to be adjusted. The Add, Delete, and Insert buttons are inactive while the animation is running or when no animation is active. To enable the buttons, start then pause the animation by clicking the pause button.

File

Autoload Last

On startup, loads the file that was being displayed by the Image Processor when it was last stopped.

Autoload New

Loads and updates the currently displayed file when a new file with the same filename is received. If the Image Processor is animating, the new file is added to the end of the animation and the oldest file is deleted from the animation.

Lock Size

Locks the width and height of and Image Processor. This is handy if you are generating automatic animations with automatic resizing as any change in the plotting size will be reflected in the resultant animation slide.

Lock Position

Prevents an Image Processor from being moved. Note that this also does not allow the Processor to be maximized or minimized.

Load

Loads files from disk in any of the popular image formats.

Save

Saves a file to disk in any of the popular image formats. Using this feature, you can load graphics in one format and save them in another.

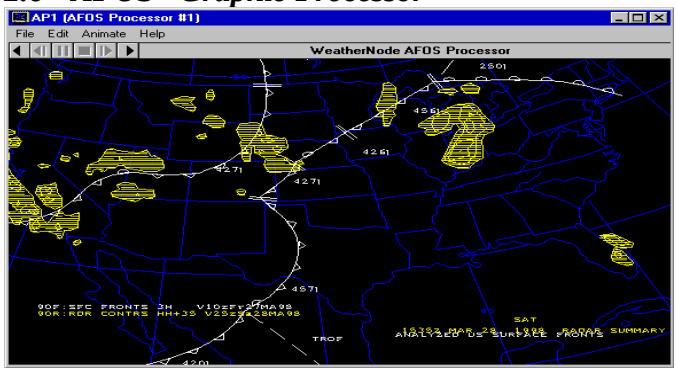
Print

Prints an image on the default system printer.

Exit

Saves the Image Processor settings and window position and stops the Processor.

2.6 - AFOS Graphic Processor*



**AFOS - Automation of Field Operations and Services - Acronym to denote the National Weather Service communications and display system that became operational in 1979. It remains the main method of distributing forecast charts and alphanumeric data to and from National Weather Service offices.*

Edit

Use Fixed Palette

Palettes are used by graphic displays that support 256 or fewer colors. On those systems, when running multiple windows, better color resolution can often be accomplished by forcing all windows to use a fixed palette. Using a fixed palette will slow the process of moving from one window to another.

Restore Infobar

The Infobar is the space to the right of the VCR-style buttons where information pertinent to the operation of WeatherNode is displayed. Occasionally, a message may be sent that causes this area to display text messages other than the default "WeatherNode

AFOS Processor" information. Selecting this option will restore the Infobar to its' default message.

Animate

Auto-Animate

Toggles Auto-animation on and off.

Erase All Animation Slides

Erases all animation slides.

Reload Animation

Occasionally a slide may be incorrectly colored as a result of palette interference from another application while the animation is loading. This menu allows the animation to be reloaded and all slides to be repainted.

Setup

The Setup menu opens a setup box that allows slides to be added or deleted and display speed to be adjusted. The Add, Delete, and Insert buttons are inactive while animations are running or when no animation is active. To enable the buttons, start then pause the animation by clicking the pause button..

File

Autoload New

Loads and updates the currently displayed file when a new file with the same filename is received. If the AFOS Processor is animating, the new file is added to the end of the animation and the oldest file is deleted from the animation.

Autosave New

Automatically saves a file that has been updated by the Autoload New option to a new file. This is a good way to present an AFOS graphic to other systems by plotting it in the AFOS Processor, then saving it as a .gif file.

Autosave

When checked, the Autosave option is turned on.

Select Filename

Enter the complete path and filename for the new file.

Lock Size

Locks the width and height of and AFOS Processor. This is handy if you are generating an automatic animation as any change in the plotting size will be reflected in the resultant animation slide.

Lock Position

Prevents an AFOS Processor from being moved. Note that this also does not allow the Processor to be maximized or minimized.

Load

Loads files that have been defined in the Select AFOS Graphic window.

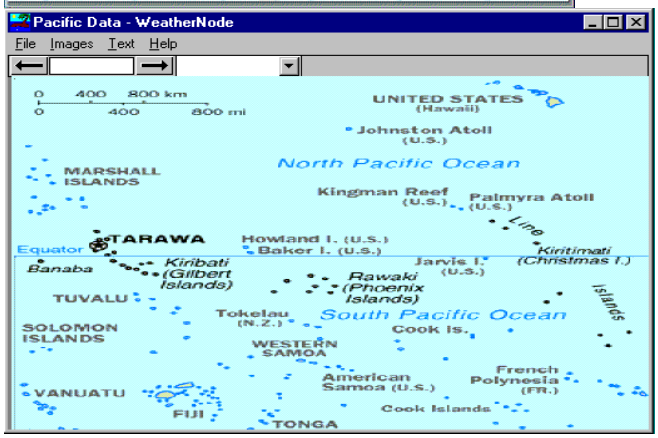
Save

Saves a file using the format and filename defined in the Save Graphic window.

Exit

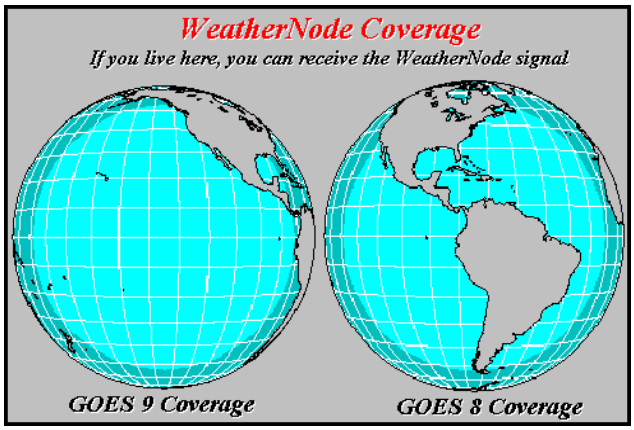
Saves the AFOS Processor settings and window position and stops the processor.

2.7 - Pacific Module



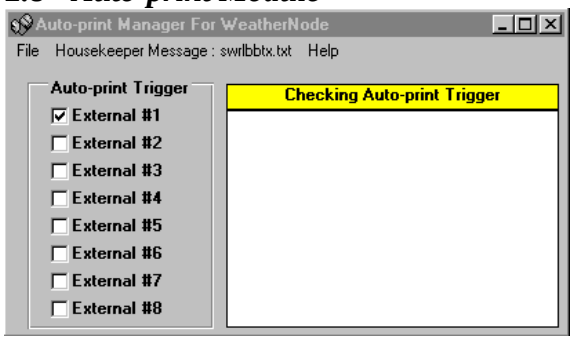
From the WeatherNode module menu, select Pacific to start the module. The Pacific module can be used to display a map of the Pacific, select individual Island Nations, and monitor text and image products of interest related to that area of the world.

GOES 8 and GOES 9 satellite footprints



Currently, the satellite footprints of EMWIN are much larger than normal satellite footprints and cover 40 times more surface of the earth than a typical CONUS only (48 United States) satellite signal. Roughly two billion people live under these footprints. The signal stretches from roughly Western Africa to Australia (East to West), and from near the Arctic to near Antarctica (North to South). The EMWIN signal has data that is needed in those areas also (Seismic, Tsunami, Cyclone, Volcanic Activity, Sea surface temperatures, local reports, and other information).

2.8 - *Auto-print Module*



File

Exit

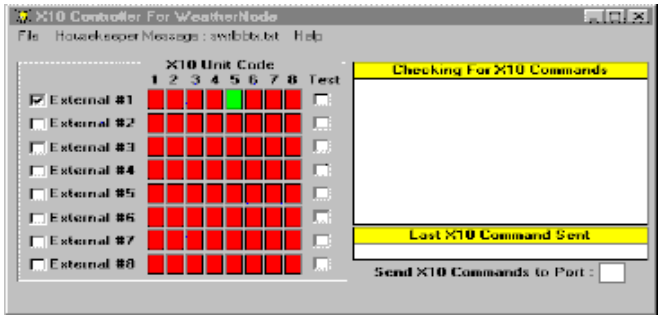
Saves the Auto-print Manager window size, position and settings and stops the module.

General Information

Auto-print Trigger

The Auto-print Manager prints files in response to external alarm triggers. The trigger can be from any WeatherNode application that is capable of generating an alarm. For example, when tornado warnings are set in the WeatherNode State/National module to color a county red and generate an external alarm #1, The Auto-print Manager will print the file when a tornado warning is received for the appropriate county if the Auto-print Trigger is set to External #1. The Auto-print manager must be running for auto-printing to take place.

2.9 - X10 Controller



File

Exit

Saves the X10 Controller window size, position, and selections and stops the module.

General Information

Send X10 Commands to port

The X10 Controller module interfaces to the computer via an unused COM port using an X10 Home Control Interface (Model CP290) or equivalent. It cannot share the COM port with any other application (including the EMWIN Engine). Enter the COM port that the CP290 is attached to in the space provided.

X10 Unit Code

The X10 Controller module sends commands to X10 modules over house wiring. Each module has switches to configure for a house code (the X10 Controller module always sends to house code "A") and a unit code. Click the unit code that corresponds to the unit code switch setting on the remote module until the corresponding red block changes to green.

External (#1-#8)

When a WeatherNode module generates an alarm, it can also inform external devices of the alarm. For example, if the Alarm Configuration Grid in the State/National module is configured to alarm on a tornado warning, and External #1 is enabled, the State/National module will send a message to all external devices to tell them that a tornado warning was received. If the X10 Controller module is monitoring External #1, it will send a command to any remote modules that are configured to respond to External #1.

Test

Clicking the Test box for an External Alarm will send a "turn on" message to each remote module. Removing the test marker will send a "turn off" message to each remote module.

2.10 - FTP ENGINE

The FTP Engine is a WeatherNode plug-in module that allows your WeatherNode system to automatically receive the latest EMWIN data on a regular basis from servers on the Internet. To use the FTP Engine, first log in with your ISP, then select the WeatherNode main module plug-ins menu and start the FTP Engine. The FTP Engine will periodically download new information and make it available to the Housekeeper for processing. While not as timely or reliable as a direct connection to the EMWIN data stream, it is the easiest to use and is an excellent method for staying informed of weather and other emergencies.
NOTE: Since Internet connections can become unreliable with loading, it is very likely that your system will not update during times of peak usage.

Section 3 - Troubleshooting
Occasionally there is a report of a system that won't receive data. This section will explain some of the most common questions and offer solutions.

Radio and Satellite users:
The primary support question received is from users who have set-up the system and cannot receive data. By far the majority of these calls are solved as soon as the computer communications (COM) port is configured properly. When the COM port is properly configured, and the demodulator is connected to a data source, the buffer indicator in the EMWIN engine will begin to fill. Be absolutely certain that the COM port you are connecting the demodulator to is an actual active com port. Many times an internal modem or a serial mouse has been installed and com1 or com2 disabled by the modem or mouse installer. The port connector on your computer may still be connected inside the computer, but jumpers of BIOS settings may have been changed to disable the port.
The second most common support questions are due to poor receive signal. On the EMWIN engine are several tuning tools to determine your receive data quality. The primary indicator is a percentage Data Quality indicator that displays system data quality level. The system is designed to function well with any level above 95%, but you should strive for 99% or higher. If you are using a local rebroadcast, you may need to improve your antenna placement to raise the signal quality. If you are using a satellite, you may need to aim your dish better or get a larger dish. Occasionally, even a normally perfect signal may receive interference from nearby transmitters or electrical noise from appliances etc.

Other support questions:
The EMWIN engine captures 2 or 3 green blocks, then misses a block, and repeats. This problem has been traced to two items:
- Some Logitech mouse drivers cause COM ports to drop a data bit, which causes the EMWIN engine to miss a data block. The only solution for this is to replace the Logitech mouse and driver.
- Some sound cards which will cause a COM port to miss a data bit. If you have set your EMWIN engine to 'beep' on good or bad blocks, try turning off the 'beep' and see if quality improves. If it does, then your current sound card and/or driver interfere with your computer COM ports. This is especially prevalent in Windows 95 installations running the

original SoundBlaster drivers. Creative Labs offers updated drivers for their cards on their web site.

When the EMWIN engine starts, the system 'locks up'.
- The EMWIN engine is a communications program and as such expects to have exclusive use of a COM port. Interrupt (IRQ) conflicts will cause your system to lock-up when a COM port tries to access an IRQ that's already assigned to another device.

When the EMWIN engine is stopped, then restarted, the system 'locks up'
- This problem is prevalent in systems that use UARTS that are not 100% compatible with the 16550 UART. The problem is in the way the UART handles the FIFO buffer. If you have this problem, edit your system.ini file and add a COM(x)FIFO=0 statement to cause the FIFO buffer to be disabled. Substitute your COM port number for (x).
The entry should look like this:
[386enh]
COM1FIFO=0

What are these files with suffixes like .ZIS and .ZIP and .ZAG?
- They are compressed data files.

Compressed data files are all actually files that were compressed using the PKWare PKZIP standard compression. The Housekeeper will automatically decompress any compressed files, including any .ZIS, .ZIP or .ZAG files put into /newfiles directory. For example, surface observations are combined into a compressed file called SAHOURLY.ZIS. By compressing the file, it's possible to fit over 220K of observations into a file that only requires 40K of transmission time. When compressed files are being transmitted, the effective throughput of the 9600 baud EMWIN data stream is nearly 56K. The NWS EMWIN obtains these high effective rates by stripping file overhead and packing the data BEFORE compression.

How often does EMWIN use compression?
- Compression is ONLY used on large data files like surface data, radar coded messages, upper air data, and other large live data sets. Your local retransmission station may add packed and compressed data files to allow the retransmission of more products at a lower data rate.

What is an Eclipse Period?
- On the current GOES satellites, the electrical power and power storage do not last long enough to allow those satellites to operate for long periods when the Earth shadow blocks the sunlight from the Satellite solar Panels. In the spring (March) and fall (September), the satellites are powered down for a little over an hour each night while in Earth's shadow. When the satellites are OFF so is EMWIN. On the new series of GOES satellites (to be launched in 2001+) the power bus has much more capability which will allow operations even during eclipse periods.

Appendix F – Frequency list of EMWIN sources

TERRESTRIAL RADIO

Florida
Seminole County - 60 Watts 156.105 MHz - 1200 baud
St. Petersburg - 100 Watts 139.2125 MHz - 1200 baud

Illinois
Wheaton - 150 Watts - 148.6375 MHz - 1200 baud

Maryland
Laurel - 100 Watts - 142.925 MHz - 2400 Baud
Brunswick - 50 Watts - 142.925 MHz - 1200 baud
Silver Spring - 300 Watts - 400.175 MHz - 1200 baud

Michigan
Battle Creek - 50 Watts - 150.500 MHz - 1200 baud

Mississippi
Pascagoula - 100 Watts - 148.375 MHz - 1200 baud

Missouri
Buffalo - 30 Watts - 139.2125 MHz - 1200 baud
Chesterfield - 200 Watts - 460.425 MHz - 1200 baud
Kansas City - 330 watts - 139.2125 MHz - 1200 baud
Nevada - 139.2125 MHz - 1200 baud

Nebraska
Wilber - 45 Watts - 156.105 MHz - 1200 baud

North Dakota
Bismarck - 40 Watts - 143.150 MHz - 1200 baud
Grand Forks - 35 Watts - 143.150 MHz - 1200 baud

Oklahoma
Atoka - 25 Watts - 153.950 MHz - 1200 baud
Clinton - 35 Watts - 148.775 MHz - 1200 baud
Durant - 25 Watts - 150.750 MHz - 1200 baud
Enid - 45 Watts - 142.950 MHz - 1200 baud
Guymon - 60 Watts - 150.750 MHz - 1200 baud
Kiamichi Mtn. - 75 Watts - 142.950 MHz - 1200 baud
McAlester - 100 Watts - 148.775 MHz - 1200 baud
Miami - 100 Watts - 150.750 MHz - 1200 baud
Norman - 50 Watts - 169.025 MHz - 1200 baud

Oklahoma City - 200 Watts - 150.750 MHz - 1200 baud
Ponca City - 80 Watts - 150.750 MHz - 1200 baud
Poteau - 60 Watts - 150.750 MHz - 1200 baud
Stillwater - 100 Watts - 148.775 MHz - 1200 baud
Tulsa - 650 Watts - 165.0125 MHz - 1200 baud
Woodward - 100 Watts - 150.750 MHz - 1200 baud

South Carolina
Moncks Corner - 45 Watts - 141.500 MHz - 1200 baud

Tennessee
Memphis - 20 Watts - 150.750 MHz - 1200 Baud
Memphis - WYPL 89.3FM/67 KHz Subcxr - 1200 baud

Texas
Austin - 50 Watts - 150.435 MHz - 1200 baud
College Sta. - KEOS 89.1FM/67 KHz Subcxr - 1200 baud
Dallas - 60 Watts - 150.435 MHz - 1200 baud
Houston - 50 Watts - 150.435 MHz - 1200 baud
La Feria - 100 Watts - 150.435 MHz - 1200 baud
Longview - 75 Watts - 150.435 MHz - 1200 baud
Temple - 100 Watts - 150.435 MHz - 1200 baud
Wichita Falls - 50 Watts - 150.435 MHz - 1200 baud

Wyoming
Cheyenne - 159.180 MHz - 1200 baud

GOES 8 AND GOES 9 SATELLITES 9600 baud - 1690.7 MHz.

Appendix P – Product Categories
This list defines the filenames reserved for use on the EMWIN system.

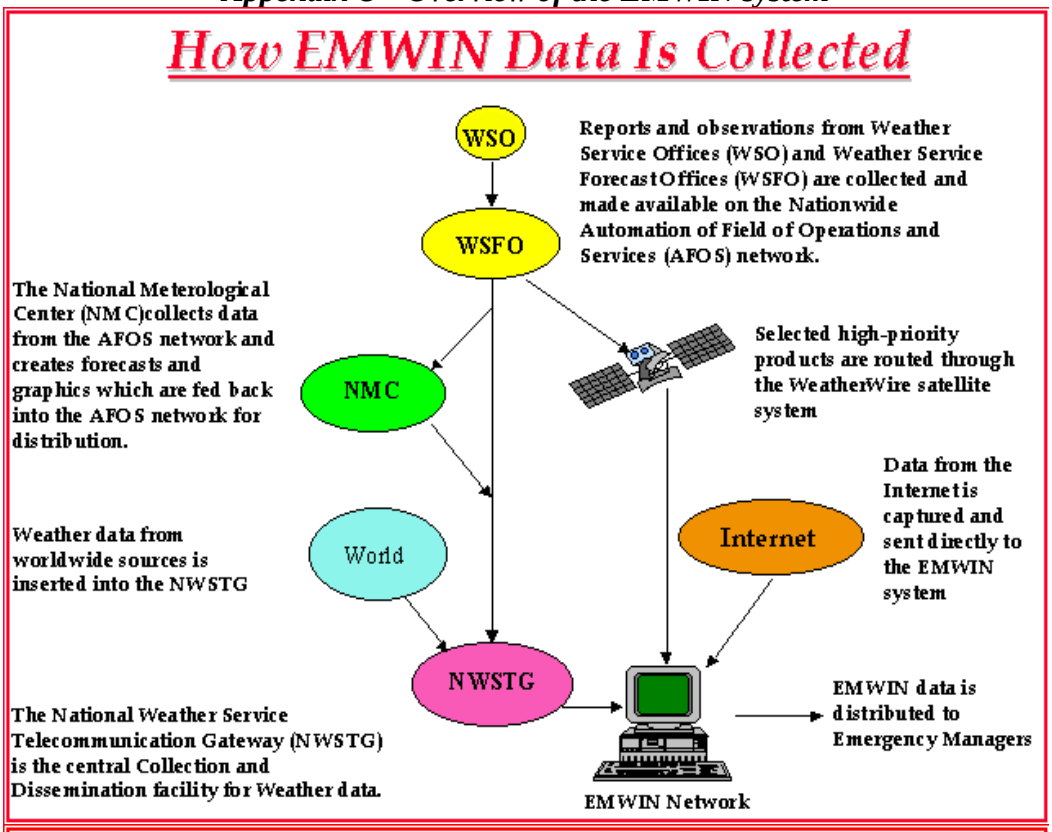
Prefix	Name
AFD	Area Forecast Discussion
AIR	Upper Air (Data)
APT	Polar Orbiter Images
ASH	Volcanic/FIRE Warnings and reports
AWS	Area Weather Summary
CEM	Civil Emergency Message
CFW	Coastal Flood Warning
CHT	Charts DIFAX/WEFAX
CLI	Climate Reports
CMP	Composite Images(CMPALLUS.GIF)
CMP	Compressed Files (CMPMxxxx.ZAG)
CWF	Coastal Waters Forecast

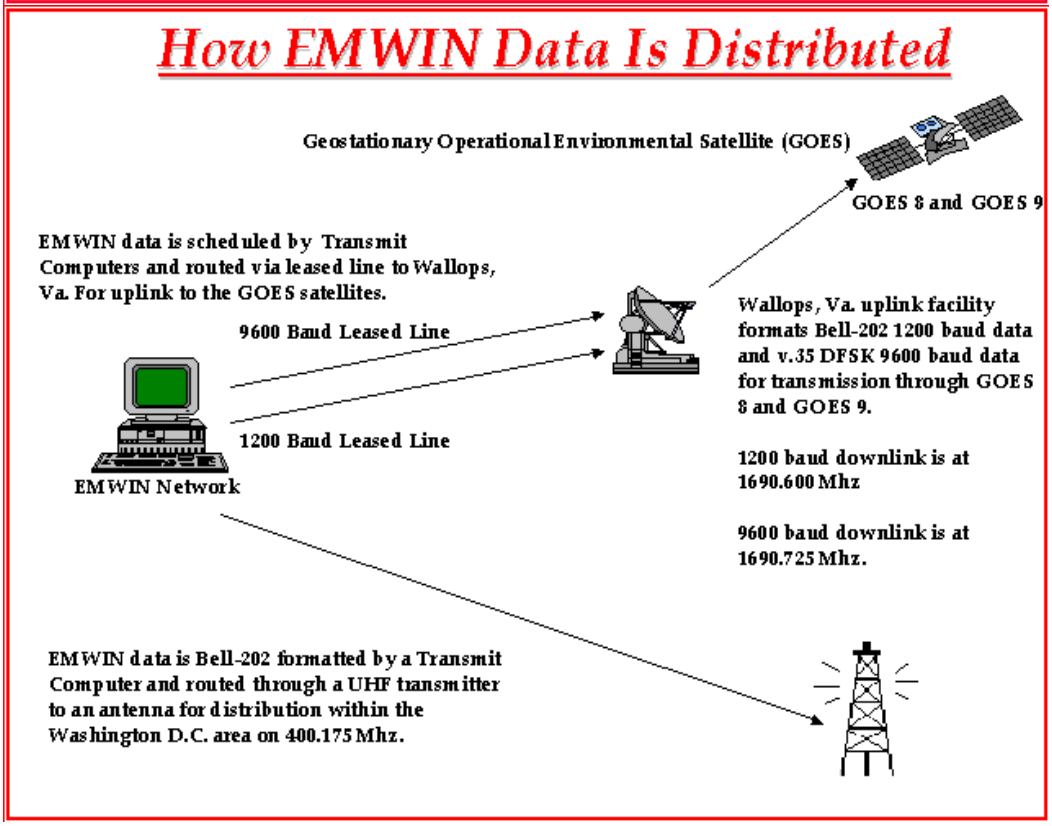
DY1	Day One Convective Outlook
DY2	Day Two Convective Outlook
ELN	El 'Nino images
EMA	Emergency manager activation msg.
EPH	Ephemeris data for satellite orbits
EQR	Earthquake Data
ESF	Flood Potential
ESS	Water Supply Forecast
FAA	Aviation Reports (Pilot briefs)
FEE	Feedback to all users
FFW	Flash Flood Warning
FFA	Flash Flood Advisory
FFS	Flash Flood Statement
FLN	National Flood Summary
FLW	Flood Warning
FWF	Fire Weather Forecast
GLF	Great Lakes Forecast
GLO	Great Lake Outlook
GLS	Great Lakes Summary
GMS	GMS Satellite Images
GO9	GOES 9 Satellite Images
G10	GOES 10 Satellite Images
GPH	Graphic Files (AFOS Graphics)
HAA	Hurricane Probabilities Atlantic
HAD	Hurricane Discussion Atlantic
HAF	Hurricane Forecast Advisory Atlantic
HAM	Hurricane NCEP Model Comparison Atlantic
HAP	Hurricane Public Advisory Atlantic
HAS	Hurricane Monthly Summary Atlantic
HAT	NCEP Tropical Discussion Atlantic
HAW	Tropical Weather Outlook Atlantic
HEA	Hurricane Probabilities East Pacific
HED	Hurricane Discussion East Pacific
HEF	Hurricane Forecast Advisory East Pacific
HEM	Hurricane NCEP Model Comparison East Pacific
HEP	Hurricane Public Advisory East Pacific
HES	Hurricane Monthly Summary East Pacific
HET	NCEP Tropical Discussion East Pacific
HEW	Tropical Weather Outlook East Pacific
HFF	High Seas Forecast
HLS	Hurricane Local Statement
HNA	Hurricane Probabilities North Pacific
HND	Hurricane Discussion North Pacific
HNF	Hurricane Forecast Advisory North Pacific
HNM	Hurricane NCEP Model Comparison North Pacific

HNP	Hurricane Public Advisory North Pacific
HNS	Hurricane Monthly Summary North Pacific
HNT	NCEP Tropical Discussion North Pacific
HNW	Tropical Weather Outlook North Pacific
HSA	Hurricane Probabilities South Pacific
HSD	Hurricane Discussion South Pacific
HSF	Hurricane Forecast Advisory South Pacific
HSM	Hurricane NCEP Model Comparison South Pacific
HSP	Hurricane Public Advisory South Pacific
HST	NCEP Tropical Discussion South Pacific
HSS	Hurricane Monthly Summary South Pacific
HSW	Tropical Weather Outlook South Pacific
HWA	Hurricane Probabilities West Pacific
HWD	Hurricane Discussion West Pacific
HWF	Hurricane Forecast Advisory West Pacific
HWM	Hurricane NCEP Model Comparison West Pacific
HWP	Hurricane Public Advisory West Pacific
HWS	Hurricane Monthly Summary West Pacific
HWT	Hurricane NCEP Tropical Discussion West Pacific
HWU	Hazardous Weather Update
HWW	Tropical Weather Outlook West Pacific
HTM	HTML Documents
ICE	Ice Statement
IMG	General Images (IMGALLUS.GIF)
INT	International Overviews
LFP	Local Forecast
LGT	Lightning Images
LSH	Lake Shore Forecast
LSR	Local Storm Report
MET	Meteosat Images
MIS	Miscellaneous Products
MOD	Model Run Images
MWS	Marine Weather Statement
NAH	Agriculture Products (Intn'l /National)
NSH	Near Shore Forecast
NOW	NOWcasts (Short Term Forecast)
NPW	Non-precipitation Warning
NWX	National Weather Summary
OFF	Offshore Forecast
OMR	Other/Offshore Marine Reports
PAA	Pager Messages
PNS	Public Information Statements
PRO	Propagation Reports
PSR	Post Storm Report
RAD	Radar Images (RADALLUS.GIF)

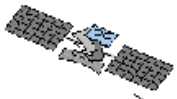
REC	Recreation Forecasts
RER	Record Event Reports
RFW	Red Flag Warning (Fire Warning)
RVA	River Summary
RVR	River Forecast
RVS	River Statement
RWS	Regional Weather Summary
SAH	Surface Observations (Data)
SAO	SAORCMUS.TXT Contains RCM's
SAW	Selected Area Watches
SCS	Selected cities (scs11-scs14)
SEL	Watch areas
SES	Seismic/Earthquake Images
SFD	State Forecast Discussion
SFP	State Forecast
SHP	Live Ship Reports
SIX	Six to Ten day outlook
SLS	Areal update
SKY	SKYWARN Activation Message
SMW	Special Marine Warning
SPS	Special Weather Statement
STP	State Temp & Precip Reports
SUM	State Weather Summary
SVR	Severe Thunderstorm Warning
SVS	Severe Weather Statement
SWO	Severe Weather Outlook
SWR	State Weather Roundup
SWX	Space Weather (solar activity)
TAF	Aviation Terminal Forecasts/airports
TID	Tide Data
TOR	Tornado Warning
TRK	Tracking Files (storm tracks)
TSU	Tsunami
TVL	Travelers Forecasts
UVI	National Ultra-Violet index
WSW	Winter Storm Warning
WWA	Weather Watch
ZFP	Zone Forecast

Appendix O - Overview of the EMWIN system





How EMWIN Data Is Retransmitted

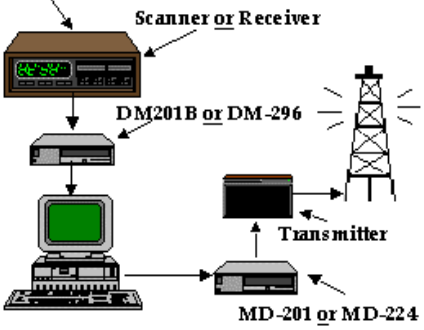


Data is transmitted from GOES 8 or GOES 9.
1200 baud at 1690.600 Mhz.
9600 baud at 1690.725 Mhz.

The signal is received using a 3 foot or larger dish antenna. It is then amplified using a Low Noise Amplifier, and down-converted to VHF frequencies for use by inexpensive police scanners.

1200 baud data is down-converted to 137.100 Mhz.
9600 baud data is down-converted to 137.225 Mhz.

A scanner is tuned to the appropriate frequency and the speaker output from the scanner is connected to a DM-201B demodulator which converts the 1200 baud signal to RS-232 data for your computer or the discriminator output from the scanner is connected to a DM-296 demodulator which converts the 9600 baud signal to RS-232 data for your computer.



Output from the Retransmission computer is modulated by an MD-201 (1200 baud) or MD-224 (2400 baud) modulator and applied to a VHF or UHF transmitter for distribution throughout an area.

A computer uses the WeatherNode™ Retransmission Engine to capture, parse and retransmit the data.

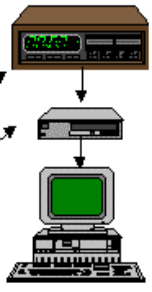
How EMWIN Data Is Received From GOES

Data is transmitted from GOES 8 or GOES 9.
1200 baud at 1690.600 Mhz.
9600 baud at 1690.725 Mhz.

The signal is received using a 3 foot or larger dish antenna. It is then amplified using a Low Noise Amplifier, and down-converted to VHF frequencies for use by inexpensive police scanners.

1200 baud data is down-converted to 137.100 Mhz.
9600 baud data is down-converted to 137.225 Mhz.

A scanner is tuned to the appropriate frequency and the speaker output from the scanner is connected to a DM-201B demodulator which converts the 1200 baud signal to RS-232 data for your computer.



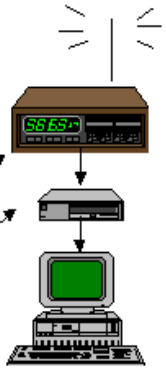
A scanner is tuned to the appropriate frequency and the discriminator output from the scanner is connected to a DM-296 demodulator which converts the 9600 baud signal to RS-232 data for your computer.

Your computer uses WeatherNode™ software to capture and display the data.

How EMWIN Data Is Received From A Local Transmitter

VHF or UHF Retransmission station transmits EMWIN data

A scanner is tuned to the appropriate frequency and the speaker output from the scanner is connected to a DM-201B demodulator which converts the 1200 baud signal to RS-232 data for your computer.



A scanner is tuned to the appropriate frequency and the discriminator output from the scanner is connected to a DM-224 demodulator which converts the 2400 baud signal to RS-232 data for your computer.

Scanner or Receiver

DM201B or DM-224

Your computer uses WeatherNode™ software to capture and display the data.