# Winlink 2000 configurations for Emergency Communications

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NOTE:  In order to properly understand the information contained within this document, first carefully read the first several EmComm Presentations found on http://www.winlink.org in the "EmergencyComm" Section in the provided table of information.  Graphic illustrations along with other information provide the proper context for using Winlink 2000 in as a tool for Emergency digital e-mail communications.

**Organizational Considerations:**

The Winlink Development team will work with any not-for-profit organization that demonstrates a genuine need to deploy Winlink 2000 for Emergency Communications. The extent to which each community EmComm members and the agencies they serve coordinate and commit to the project is the extent to which it will become successful. This is not magic, and it surely prevents duplication of efforts on a community level.  A written plan is always a good place to start coordinating these efforts.  Should it ever need to become utilized in any real emergency situation, such efforts will reap their own reward. Like any other system, Winlink 2000 applications need the attention and equipment necessary to become as efficient and effective as possible.  If it is made from obsolete equipment and computers, it will operate as such. However, if the installation is taken seriously and components are supplied that allow its maximum potential as a digital EmComm system for real emergency use, it will perform to meet or exceed expectations.

Likewise, the system will successfully operate to the extent those who will benefit from its use are organized.  Remember, it is the served agencies that are our "customers," and these agencies want to view the local and regional ARRL ARES® or any other EmComm community organization, as an organization capable of providing service to them during any emergency.

Considering that each community has specific and unique requirements, including location considerations and served agency priorities, there are no set rules beyond those mentioned for an EmComm Winlink 2000 configuration and the circumstances which created it.  Each community of interest will have special needs for digital e-mail during an emergency situation. Identifying, coordinating and planning for these needs are essential for a successful deployment.  A written "Requirement Document" could and should be used to insure that the community EmComm needs are being optimized.

*Concept:*

The Winlink 2000 network (WL2K) currently consists of ***redundant***, mirror image Common Message Server Hubs, called "CMS." http://www.winlink.org/status/

These CMSs are located in secure environments, and they bridge both Internet SMTP e-mail, position Reporting, and stored bulletins to the Winlink 2000 end-user via network

Radio Message Server stations nodes called "PMBOs." These CMSs are the hub of a Star network and the PMBOs are the radio nodes. Think of theses CMSs being the hub of a wheel with spokes and at the far end of each spoke is a PMBO radio gateway station. Over the radio, the Winlink radio end-user communicates through the PMBOs.

Currently there are two separate types of PMBOs, *public* and *EmComm,* http://www.winlink.org/status/PMBOStatus.aspx each serving a different function, but each with similar software and connectivity on the network. The public PMBOs are located Worldwide ( http://www.winlink.org/stations.htm or http://www.winlink.org/positions/RMSPositions.aspx ) and are mainly used for furnishing e-mail to those who otherwise have no connectivity to the Internet. In addition to providing a radio e-mail outlet, they also provide text-based and graphic weather products, help files and several types of position reporting, http://www.winlink.org/aprs/aprs.htm or http://www.winlink.org/positions/PosReports.aspx to the WL2K 9,000 plus mobile user community, mainly offshore or in very remote areas where normal landline or satellite Internet is not otherwise available. Again, these PMBOs are set up as nodes in a star network configuration with the CMSs as the serving hubs. *These PMBO node stations have continual communications between each other through the CMS in order to maintain a transparent appearance to the end-user.* These public PMBOs primarily use HF radios to automatically scan specific frequencies on the various Amateur HF bands in order to provide users at varying distances with an available connection. More about the features of the public PMBOs may be found on http://winlink.org/features.htm.

*A PMBO for Emergency Management:*

*The EmComm PMBO* is also set up in a similar configuration, but for an obviously different purpose. Their frequencies and locations are **not** published to the general public or even to theWL2K user community since they must always be available for EmComm operations. However, like the public PMBO, these network node stations must normally be on-line 24 hours a day, seven days a week in order to provide their desired functions. Both types of PMBOs have real-time e-mail capabilities through permanent Internet connectivity that allow multiple recipients as well as multiple attachments to be sent and received. Both PMBO types use the "B2F" compressed binary protocol over the radio, http://www.winlink.org/B2F.htm and both use the redundant CMSs to obtain an e-mail outlet to the Internet. Other than being private, the main difference between public PMBO the EmComm local PMBO is the advantage gained with the use of VHF/UHF Packet, 802.11b or D-Star for "last mile" radio connectivity when normal Internet e-mail servers or Internet connectivity are temporary not available or jammed with traffic. This is because normally local and regional "last mile" traffic is the majority of traffic carried during an emergency. As we saw during the Tsunami and recent domestic hurricane disasters, this is not always true, and HF can become critical under these extreme circumstances. Obviously, each configuration may have its own emphasis, depending on the specific requirements of its community of interest. Through careful planning and with the use of both HF Pactor and VHF/UHF AX.25, 802.11b or D-Star, satellite or private pathways, several communities of Interest may be covered with a single EmComm PMBO application.

On a temporary basis and during an emergency, a local EmComm PMBO allows its community severed agencies to employ e-mail between themselves, their field offices or mobile units *without* outside connectivity to the Internet. More information may be found regarding the EmComm PMBO and its functions on http://www.winlink.org/emergency.htm

Such deployment of these EmComm PMBOs without Internet connectivity is only temporary and ALL PMBO types are normally continuously communicating to the CMSs (Common Message Servers) through the Internet.

In order to temporarily provide "last mile" e-mail between community end-users with or without the Internet, certain WL2K modules must be used. Without the Internet, these modules have much flexibility and may be co-located at the EmComm PMBO site, either on the same computer as the PMBO or on another computer in a LAN. If the Internet is available, these modules may also be remote, and when used remotely, employ local Internet connectivity to connect to the local primary PMBO or a backup distant PMBO to maintain a connection into the Internet.

*When to consider a PMBO:*

**Not all communities using Winlink 2000 "must" have a PMBO.**

1. *"We just want to be able to send and receive e-mail from the field"*

This does *NOT* require a PMBO. In order to send SMTP mail from the field, locally, while Internet access is available, the Winlink 2000 VHF/UHF *Paclink* module may be employed on a Windows 2000 Professional (Windows XP Pro recommended) computer with Outlook or Outlook Express, a VHF/UHF radio capable of transferring Packet, a Packet modem, and a VHF/UHF antenna. See http://www.winlink.org/Client.htm#Te-Pac.

On the other end of the WL2K Paclink VHF/UHF field units, the Winlink 2000 *Telpac module* should be used. This WL2K Telpac gateway, which serves as an extension between VHF/UHF Packet Radio and, a Telnet Server function of the PMBO via TCP, should be located in a secure site, and have an antenna that will allow it to cover the immediate area. Most EOC's have such a structure where the Telpac antenna may be located. If not, and the Internet connectivity is available, multiple Telpac gaeway modules must be employed to cover a "last-mile" area in order to control the "hidden transmitter effect," or, a radio network must be used that can pass the WL2K B2F protocol. Although for purposes of a speedy delivery, not recommended, this may also include digipeaters, nodes, and switches. However, it would NOT include former generations BBSs that cannot pass the Winlink 2000 B2F protocol.

2. *"Should the Internet links be down or our e-mail server fail, we only need a few outlets to send and receive e-mail."*

This does *NOT* require a PMBO. This requires either the *Airmail* client program on a laptop using Windows 98 (or greater,) an SCS modem, and some form of an HF antenna to reach distant PMBOs.

3. *"We want our community served agencies to be able to e-mail each other and their respective field representatives without the use of the Internet, and with as little interruption as possible. We also have sites that can serve adjacent communities (counties) in the same way.*

This *DOES* require the use of a local hubbing EmComm PMBO. With the use of the Paclink "mini e-mail server" function in both the served agencies, and in the field, and

with a Telpac node co-located with a locally located PMBO, all the above scenarios are readily available.

When the Internet allows the PMBO to communicate with the CMSs, both local and worldwide Internet is available. When the Internet is *temporarily* down within the local area, the PMBO may continue to hub SMTP mail that hubs through it from the various served agencies and their field representatives. Even without the Internet, the HF Airmail client as described in number 2 above will get e-mail out of the area; however, it is assumed that for most EmComm situations, communications between local or regional agencies is the bulk of such traffic.

To be more specific, with the proper combination of WL2K modules, served agency employees may continue to use their normal e-mail programs on their normal office computers in their own offices simply by setting up another account on the e-mail program.  This multiple computer EmComm SMTP mail (e-mail) setup may all be accomplished with the installation of only ONE Winlink 2000 Paclink module on only ONE Windows 2000 Professional or XP computer on the agency's LAN, in front of any firewall configuration, perhaps in the DMZ.  With this configuration, universally unique tactical e-mail addresses specific to the involved agency may be deployed.

Such a Paclink installation will enable the agency to send and receive e-mail over five different levels of priory routing.  For example, the first level would be Telnet over the normal Internet to a local or distant PMBO, and then perhaps an 802.11 Telnet link be used, and down the line to D-Star. These TCP/IP paths would home into a Telnet Server module on a local PMBO.  As a bottom priority level, a 9600-baud packet link to a Telpac node either co-located with a local PMBO or perhaps to a remote Telpac node via 802.11 or D-Star where Internet connectivity may still be maintained, even without normal Internet.

### *Overview of the PMBO module set:*

Below is a discussion of the various modules used at the PMBO and their function in the EmComm environment.  These descriptions are by no means complete and are described here in order to provide a general overview of a locally located participating station for emergency purposes.

*MS ACCESS database:* The PMBOs use the MS ACCESS database. Special programming calls allow multiple "conditions" to occur with this database that are not normally allowed.  The WL2K Network engines continually automatically synchronize all the databases in the system. The network engine for the PMBOs is described below. Under normal operations Internet synchronization should be allowed to continue on-line with the CMS.)

*The PMBO CMS Link and the PMBO Message Queue Processor:*  The PMBO Message Queue Processor (QP) is the "engine" that operates the PMBO. It identifies, classifies, sorts, and moves messages in and out of the system's database. It updates the user information, messages status, position information, and it is in constant communications with the central server (CMBO.)   It knows when to automatically move among the redundant CMSs. In other words, it is the "brains" behind the entire process.  The PMBO Message Queue Processor is always up and running. When it goes down for any reason, the network status alarm let's the Network administrator know, immediately, so that repairs or reasons for its off-line status may be determined. It uses a gear as an icon.

There should be no SYSOP interaction with this module. *The PMBO CMS Link module,* which only works in harmony with the PMBO Message Queue Processor module, maintains communications with the active CMSs.

*The Stations Manager module:* This is an end-user editing and user type identification module. It provides much information about the various user types within the system and provides the PMBO system operator (SYSOP) the opportunity to make extensive changes to the status of the user. It monitors the HF user's ability to provide user definable options such as e-mail attachment limit size, forwarding addresses, Bcc receive ability, suffex/prefix to call letters, and it provides the SYSOP with the ability to also edit the users options, as well as user status and parameters on the network. It uses a Key as an icon. It only runs when such described information is needed.

*The Message Administrator module:* This is the message editor. Its purpose is to be used to look into user accounts and their messages for those who use your PMBO as well as make adjustments to the message routing process. It can be used to send messages from your PMBO to any other address, radio or e-mail. It has much functionality and can virtually change any message type or status to any other message type or status. It uses a green globe as an icon. It only runs when such described information is needed.

*The Communications Controller module:* This module is only used with the HF portion of the PMBO. It handles the different instances of the drivers used for HF Pactor. It contains access to the log files for end-user operations on the PMBO. It also handles the direct VHF/UHF Packet for the SCS controller. The icon is a purple "something" and there is really no daily SYSOP interaction with this module. This module need not run at all unless the HF portion of the operation is in use.

*The SCS_PTC driver module:* Driver for the SCS modems for HF operation. This module may run multiple instances of the SCS modems needed for multiple HF radios when configured correctly. It also must be interactively configured with the WLScanner module when using radio frequency scanning. For more information about configuring this module, contact Steve, k4cjx, the network system administrator at k4cjx@comcast.net. A yellow lighting bolt icon represents this module. Normally, there is no daily interaction between this module and the SYSOP with this module.

*The WLScanner module:* This module communicates either directly via a communications serial port (or through a USB-to-serial adaptor) or through the proper SCS modem to communicate with the radio's TTL or serial computer port in order to automatically control the radio(s) frequencies, filters and modes of operation. This module uses a camera icon. Normally, there is no daily action between this module and the SYSOP with this module unless scanning is stopped for whatever reason.

*The Telnet Server module:* This module, which can simultaneously connect to over 20 stations, uses .NET Framework 1.1, which may be loaded from Microsoft. Actually, this download is a standard update for Windows 2000 Professional and greater, and is included in later versions of Windows XP professional. There is no interaction between the SYSOP and this module. The MS .NET Framework may be downloaded from the URL listed under Telpac Module below.

**Other Winlink 2000 modules:**

*The Telpac module:*  The Telpac module simply bridges Packet Radio to Telnet over TCP/IP. This module allows Packet Radio on one end and Telnet to the PMBO on the other.  When co-located in the PMBO computer, temporary Internet loss allows local SMTP mail hubbing to continue.  In addition, the use of the Telpac/PMBO combination allows the addition of many Packet TNCs through the AGW Packet engine. When this module is not co-located on the PMBO computer or in the LAN, it may be configured to Telnet into the PMBO Telnet Server with another PMBO used as an automatic backup. This assumes that there is local Internet connectivity. However, a Packet backbone network may be deployed to reach distant Telpac nodes.  More information about this module may be found on http://www.winlink.org/Client.htm#Te-Pac, including the actual software.

The use of Packet digi's, nodes and switches can adversely affect speed, and for that reason, must be carefully configured. Paclink client applications within the served agencies must be configured so that they reach the main co-located Telpac node if possible. Care must be given to the "hidden transmitter effect on VHF/UHF Packet in order to avoid user collisions.  In other words, all stations should be able to hear each other. As a more suitable and secure option, think about using 802.11 or D-Star for your remote Telpac gateway to reach the local hubbing PMBO.

*The Paclink Client modules:*  The Paclink AGW and Paclink PostOffice modules are actually a mini e-mail server and are located on remote sites such as that of a single user mobile unit or any served agency as a multi-unit e-mail server. On one end Paclink is a mini e-mail server (Paclink PostOffice), and on the other end it contains an alternate routing capability that has five levels of connection priority which may be automatically chosen depending on availability (Paclink AGW.)  This includes Telnet to the Internet via cable, DSL, 802.11b, D-Star, Satellite or Packet radio, and in the future, HF radio.  Like the Telpac module, Paclink may use the AGW Packet engine to drive virtually any Packet TNC or normal sound card for Packet Radio over VHF/UHF. It communicates to the Telpac module over Packet radio from the served agency or the field. It uses OUTLOOK or OUTLOOK EXPRESS (or any other SMTP/POP3 e-mail program) as its user interface on multiple computers behind a LAN with only one computer hosting the application, or it can be placed on a single laptop for portable or mobile operations. For more information about the Paclink module, go to the URL http://www.winlink.org/Client.htm#Te-Pac.

The Paclink should be of significant interest to any served agency since it transparently allows the continued use of their normal office e-mail systems on their *own* computers within their *own* offices at their *own* served agency by simply setting up another account on their e-mail program. Also, it only requires that a single installation of Paclink be placed on a single computer within their LAN. This installation may be outside their firewall in the DMZ zone or located remotely as just like any other e-mail server. The critical difference with the Paclink e-mail server is that it uses digital radio as one of its alternate routing options.

*The Airmail Client module:*  This Client program, similar to an e-mail program but with additional functionality, contains many "shortcuts" for the HF e-mail operation. It will operate as a Telnet client and as a VHF/UHF client, but its main purpose would be to employ Winlink 2000 over the HF Amateur radio bands for longer distance SMTP mail transfer, position reporting or requests, and Weather information and reporting. For

installation files and information, http://www.siriuscyber.net/ham/.  Look for the main installation of Airmail, the Propagation module, the latest SCS firmware update, and the GRIB virtual WX fax reader.

There are other modules used with the Winlink 2000 PMBO, but they exceed the purpose of this general guide. For detailed information regarding these and other PMBO modules, e-mail Steve, at k4cjx@comcast.net.

**Other factors to consider:**

Winlink 2000 is an operational digital network currently serving over 8,000 users Worldwide. http://www.winlink.org/stations.htm.  Its Public PMBOs pass over 150,000 messages or 287, 000 minutes monthly between its users and their e-mail recipients. Although the addition of an EmComm non-public PMBO has little to no effect on the WL2K network, maintaining tight control over the network and its component systems has been one of the reasons for its success.  *Placing additional PMBOs of any type on the Winlink 2000 network system requires time and expertise, and when such a system is employed, its "test" period will only be allowed momentarily. It must then be taken off the network until it becomes a live, functioning, operational PMBO, ready for immediate and continual use.  There is no place on the Winlink 2000 network for casual experimentation with the network structure or with its node stations.*

There are certain minimum requirements that are set forth by the Winlink development team regarding hardware, software and operational procedures for any component on a Winlink 2000 PMBO. However, in order for such an EmComm system to be as effective as possible, it must be located in the most secure location possible. It should have an antenna system that will allow optimal VHF/UHF coverage for the area should the Internet fail. It should have backup power, and perhaps even a backup system.

**INSTALLATION DETAILS FOR THE WINLINK 2000 OPERATION**

*The Telpac node* **and** *Paclink* **client installation details may be obtained on** http://www.winlink.org/Client.htm#Te-Pac. *The Airmail client* **details may be found on** http://www.siriuscyber.net/ham/.

**PMBO Installation details: (Please contact Steve, k4cjx@comcast.net prior to starting this process.)**

**NOTE: Winlink 2000 is in** *constant* **transition and enhancements are frequent. Currently, the** *entire* **architecture is under transition. The component modules of the current "PMBO" are being changed over time to become the "Radio Message Server" (RMS), which will actually take the place of the current "PMBO." Because of this, the install process is not automatic, but it will be automatic under the new RMS system. Depending on when you wish to install your PMBO, this system may or may not be in place. Because of this, additional "hand-holding" may be required. Please forgive our interference in your install process while we grow.**

*Internet Access:*  Permanent Internet Access is a requirement.

Port openings required: (Only the first two are a consideration with a home router/firewall. Most Router/firewalls will allow the out only initiation without special consideration.

- Port 12001 TCP for Telnet access. This port requires incoming initiation.
- Port 3389 for Microsoft's Remote Desktop. This port requires incoming initiation. Alternatively, Ports 5631 TCP and 5632 UDP must be opened should PCAnywhere be substituted for MS Remote Desktop.
- Port 3306 TCP open going out for database communications (zipped binary format) to the MYSQL database on the CMSs.
- Port 8778 UDP out only for PMBO module version control
- Port 2193 TCP out only for FTP to the Winlink 2000 Secure FTP site.
- Port 18005 - TCP out only for Winlink 2000 module auto-updates (future)

*Hardware requirements:* Pentium II or above with at least a 1.0 GHz processor and 512Mb RAM and at least a 10 Gb Hard drive. Since the PMBO uses a database, it will be hitting the hard disk continuously. Therefore, if possible, a 7200 RPM hard drive is preferable. An Ethernet card is required for Permanent Access to the Internet.

Backup power: Obviously, if this system is in the proper environment at an EOC, it will have all the protection necessary to operate regardless of community conditions. However, if such an option is not available, then a "smart" UPS is much preferred over a standard UPS because it has the ability to shut Windows programs down properly before running out of battery power. Remember, currently, WL2K uses an ACCESS database that does not like to "crash." The Windows operating system has the appropriate software built in for most UPS or Serial interfaced smart UPS applications. One only needs the smart UPS and required cable to interface to the computer. APC has reasonable smart UPS options.

*Software requirements:* Windows 2000 Professional, Windows XP home or Windows XP Professional (preferred.) Windows 95, Window 98 or Windows ME will NOT work for a PMBO in the Winlink 2000 network. Please use Windows UPDATES to bring the Windows operating system up to current standards, including the Microsoft .NET Framework 1.1. This .NET Framework may also be downloaded from http://www.winlink.org/Client.htm#Te-Pac.

Norton Anti-Virus Home or Corporate edition with a current "Live Update" subscription is required prior to connecting to the WL2K network as a PMBO. Some of the Winlink 2000 modules use Norton Anti-Virus for the protection of the system.

*NO-IP host name to replace DHCP WAN IP address changes:* Because theWL2K Telnet applications Telpac and Airmail and PCAnywhere require an Internet address to communicate with the PMBO Telnet Server, a constant identifiable address must be used. In order to accomplish this, the NO-IP domain name may be substituted as a constant while the IP address continues to change. The following steps will assist with the installation of the NO-IP software, as well as the process for providing a host name for the PMBO to use as a replacement for its continually changing IP address when DHCP is employed. To obtain this ability, please follow the directions below:

1. Go to http://www.no-ip.com and then (top of page) to the "DOWNLOADS" Tab
.
2. Click on "Windows" (left of screen) and download the "no-ip DUC v2.15" 619K file by clicking on "OPEN" which will start the installation process.

3. Put your e-mail address and a password in the space provided in the program, and then go to "Options" and check "Run at Startup."

4. Go back to the original no-ip site above and on the right hand side click on "NO-IP FREE" and then go to the bottom of the page, click on "Sign Up" and fill out the required information. When you have successfully provided the information requested and checked that you agree to their conditions, click to create your new account. You will receive an e-mail from them with the correct URL to click on for completion of the process.

5. Once you have received the e-mail, and have clicked on the provided URL, put your e-mail address and password used in the actual program in the spaces provided and enter the membership area. Once there, go to "Add Host." Put the PMBO call letters in the space provided and use the slide bar to find "no-ip.org." to create the "PMBO call".no-ip.org. Add no more information, and just check out of the process as requested to create your new host name.

6. In about an hour plus or minus an hour, double click on the RED CIRCLE ICON on your taskbar and it will open the program again. You will see a smiling face with a place to check in the top window. If it is not there when you check, exit from the program and check again later. Once you check the "smiling face" ICON, you will have the new host name. You can verify this by holding your mouse curser over the red circle no-ip Icon in the taskbar tray and it should display your current IP address.

*PCAnywhereor Remote Desktop:* **A requirement of a PMBO is to install and run PCAnywhere 10.5 or greater, or Remote Desktop as a host for remote maintenance and service.** PCAnywhere encryption when denying a lower level is most secure. When using firewalls, it must be remembered that default ports 5631 and 5632 must be open for UDP and TCP in order to allow PCAnywhere to be seen outside the router/firewall. If those port numbers are already in use, there is an option to use other ports.

After PCAnywhere is installed, the following configuration should be used:

1. Go into the Host mode and in the box with the various hosts, right click and create a "New Host" (for ver.10.5) or "New Item" and then "Advanced" for 11.0 or ver. 11.5.

2. The first tab "Connection Info" should have TCP/IP already checked. Leave it as is or check it should it not already be checked.

3. For the "Settings" Tab, check Launch with Windows." Everything else should remain as is.

4. In the "Security Options" Tab, on the right, "Host and Remote" should show and under this combo box is another called Encryption level. Change the encryption level to "PCAnywhere Encryption" and check "deny lower level (ver.10.5) or change to "PCAnywhere encoding" (vers.11.0 and 11.5)

5. Go to the "Callers" Tab, and in the blank white area, right click on "New" caller or item. Put in the username and password of the caller, then go to the

"Privileges" Tab and check "SuperUser" and apply. Hit ok and Ok again to get out of the process.

6. Lastly, rename your new Host name to something you know identifies it and then right click on the host name and launch it.

**Remote Desktop** requires a port opening as well, and most of the served agency users will prefer it over PCAnywhere. Likewise, most agencies will be familiar with its setup and operation. Port 3389 outgoing TCP must be available for MS Remote Desktop.

***WS-FTP LE or WS-FTP Pro* for the Winlink FTP site:** WS-FTP LE is freeware. Write to k4cjx@comcast.net for a freeware version (PREFERRED over the "pay for" version.) A fee-based version may be obtained from the Internet. One such site is http://www.ipswitch.com/downloads/. It is called the WS-FTP Pro, and has a license fee associated. However, either product will work perfectly for downloading and uploading files to and from the Winlink FTP site.

Bring the product in and download it. If you use the WS-FTP LE freeware, check in as a student at home. Once the product is downloaded, it can be configured at a later date. This is where PMBO module updates are kept that contain new or updated versions of the installed PMBO modules. It is also where uploaded log files and other information may be transferred to the development team should problems arise.

1. Click on Connect
2. Go to the first or "General" tab on the connection form.
3. Delete all present FTP sites that come with the program.
4. Make a New Connection:
   - Profile name: Winlink FTP Site
   - Host name/Address: Winlink.org
   - Host Type: Automatic
   - User ID: WL2Ktest (case sensitive
   - Password: (Contact K4CJX for password)
   - Check "Save Pwd"
   - Apply
   - Go to the "Startup" Tab
   - Fill in /Bin for the remote directory.
   - Fill in (drive letter):\wl2k\bin (i.e.: C:\wl2k\bin for the local directory.
   - Apply
   - Go to the "Advanced" tab and check "Passive Transfer."
   - Change the port number to 2193
   - Apply, OK, and you are finished.

*NOTE: our FTP site uses a non-standard port (2193) in order to provide additional security. Please contact K4CJX for more information at the time of install.*

**PMBO Software Installation:**

1. Before the PMBO software is loaded into the computer, please have the above installations complete. *At this point, it is again appropriate to e-mail the Winlink Network Administrator, Steve, k4cjx@comcast.net, to receive an installation password to the PMBO Access page to download the modules, and to obtain an installation serial number.*

2. Once the PMBO password and the Installation serial number are provided, go to http://www.winlink.org/sysop/sysop.asp, left click on **"**Download Winlink 2000 Initial PMBO Setup File, "Click on "Open" and follow the instructions in the download.  If you have Windows 2000 and need updated components such as the JET Database Engine, you may have to reboot several times otherwise, the installation process is simply waiting for the program and system files to download and following the installation to completion.

   Notes: The installation type is "PMBO" and you wish to check "Yes" to backups. IF you plan to place the database in hard disk drive, then you must change the default, C:\WL2K\DATA, as you install the programs. This is not generally recommended unless there is some reason for changing the default drive.  If you are not interested in filling out all the information listed on the form requesting it, just push the "SKIP" button and complete the installation.

   **IMPORTANT NOTE:** There are continual additions, deletions and updates to the various program module set for the PMBO.  The installation process may need to be completed with updated or additional programs from the Winlink 2000 folder in "Check for Winlink 2000 Updates." **NEVER run an installation before checking to see if there are updates.** *When  you are finished with the installation, and before you activate the PMBO modules, contact the Winlink Network Administrator, k4cjx@comcast.net for further instructions.* Meanwhile, you may put information in the "Profile Editor" which popped up at the end of the installation process.
   - Fill in the PMBO call,
   - Check the Logging check boxes.
   - Change "2 days" to "5 days" for keeping delivered messages,
   - Move the AutoStart (Scheduler) program from "Start>Programs>Startup" to the desktop, temporarily.
   - Updates may be critical to the operation of the PMBO.

3. .NET Framework MODULE UPDATES:

   The first module to configure was the Profile Editor, which is described above.  Once it is configured, the next step is to contact K4CJX, the Winlink 2000 Network Administrator, so that he may assist with additional PMBO modules not found otherwise. He will assist with the install of these modules and then "turn your PMBO on as a true PMBO in the CMS Servers*.  Until this is accomplished, nothing else should be done.*   By activating your new PMBO, traffic may flow between the CMSs and your PMBO. Such traffic will begin with the CMS downloading a 600,000-byte file into your system to load your "stations table" in the installed database. It is all done automatically.

   - *The PMBO Message Queue Processor* "QP" installation requires a specific configuration. This will be done when the administrator is working with you.

      Once the PMBO is on-line, you should see it with the other PMBOs in a "current" status position on http://www.winlink.org/status under PMBO status. As an EmComm PMBO, you will be required to enter your EmComm PMBO call and password to view your PMBO.   It is always a good idea to have this site up and running when possible. It refreshes itself and keeps you

alert of the status of your communications with the Common Message Servers (CMS.)

- There are other modules that must be configured: The ***Scheduler module***, which determines which PMBO programs will be used, and when the automatic database backup and repiar takes place; the ***SCS_PTC module*** for HF station(s), and/or VHF/UHF Packet using the SCS DSP Packet plugin module(s); the *WLScanner module* for frequency, mode, etc. control of the HF radio(s), and the Telnet Server module.

When installing and setting up the PMBO parameters, much time may be saved by asking for direct assistance (using PCAnywhere or MS Remote Desktop) of the Winlink 2000 network administrator. In addition, there are others who are qualified to assist with various aspects of the stations configuration, and it is always wise to seek their advice and assistance.


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