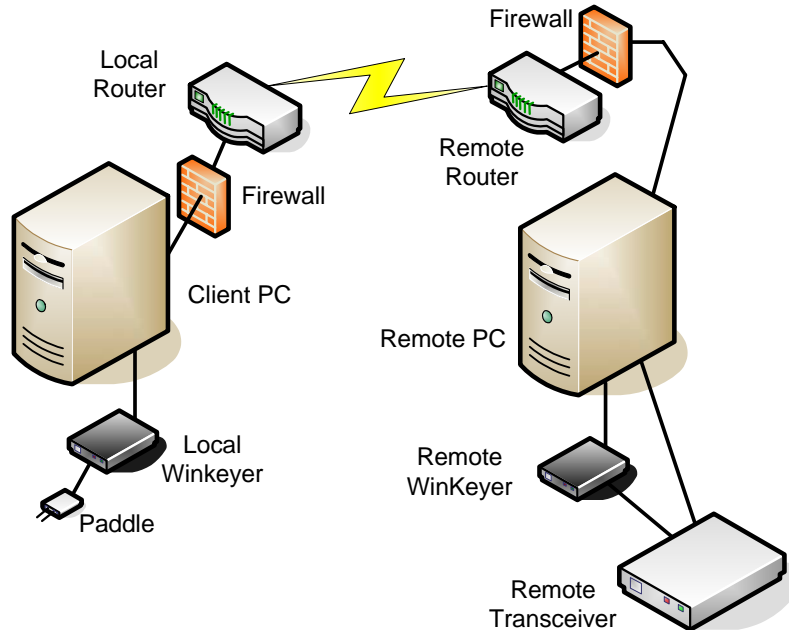


WKremote Setup

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Introduction

The block diagram above illustrates a typical WKremote setup. It consists of two computers (PCs) that are linked to each other over a network. The network can be a local home network or the Internet. This means the two PCs can be separated by a few feet or many miles. For purposes of this document, the local PC is designed as the client while the remote PC site is designated as the server. The server is connected to the transmitter while the client controls the transmitter over the network.

In the diagram, the local PC is connected to a Winkeyer and to the network through a router. Depending on the type of network connection, a cable modem or other network interface may be included. The local PC is protected from the network by a firewall.

Similarly, the remote PC is also connected to the network through a network interface and router and its own firewall. The remote PC also connects to a Winkeyer and a ham radio transceiver that is capable of being tuned and controlled over some sort of computer interface. Most commonly this is a serial interface but other interfaces are possible.

On top of this hardware is layer of control software that makes the whole thing work. Software running on the remote PC is in charge of sending commands to and retrieving status from the transceiver. Software running on the local PC presents a graphical representation of the transceiver's controls so that frequency, mode, gain, and other functions can be easily adjusted remotely. In all respects the user feels that they are sitting in front of the actual transceiver.

The radio control part of the link is not specifically discussed here since our focus is on the Winkeyer link. Suffice to say that there are many good packages out there. The only requirement is that the software works over a network link between a local PC and the remote PC/transceiver.

What is WKremote ?

WKremote is a software application that provides a way to send Morse code from the local PC to a remote station's transceiver. It allows the user to enter Morse on a paddle or on a keyboard and have this relayed to a remote Winkeyer that keys the transceiver. There are several important functions that must be provided:

- 1) Ability to change settings on the remote Winkeyer
- 2) Get visual indication of remote Winkeyer status
- 3) Enter Morse on the local paddles which in turn key the remote transceiver.
- 4) Have the option of controlling remote sidetone operation
- 5) Send messages using the local Winkeyer's message buttons

WKremote runs on both the local PC and the remote PC, one side is configured as the client while the other is the server. The two sides communicate by a network connection that must be configured properly. When connected, the two Winkeyers are effectively linked together so that anything that happens on the local Winkeyer is mirrored at the remote Winkeyer. Letters entered on the paddle are sent over to the remote Winkeyer as a complete letter, this eliminates any timing latency problems encountered over a live network. The disadvantage is that the remote Winkeyer runs one character behind the local Winkeyer. There is less latency when entering letters by keyboard since the letter is sent as soon as a key is pressed rather than having to wait for an entire letter to be 'paddled in'.

Physical Connections

The Winkeyer is attached to the PC by either a serial or USB connection. There are two types of Winkeyers, those that use a serial interface (Winkeyer1 and Winkeyer2 Serial) and those that use USB (WKUSB). Either of these will work with WKremote. Before going any further check that each Winkeyer is operational and that the PC can connect to them and that they function properly. At the remote site connect the Winkeyer's output keying port to the keying input on the transceiver. Test that the transceiver is setup properly to allow externally keying from Winkeyer. On the local side connect a set of paddles to the local Winkeyer and test that the paddles are setup to operate properly with the local Winkeyer. Since we don't have a transceiver on the local side we must rely on Winkeyer's built in sidetone. It might be worthwhile to enter a few test messages on the local Winkeyer. Note that WKremote runs the Winkeyers in standalone mode so messages can be sent using the message pushbuttons on the local Winkeyer. A network connection, of course, is a requirement. This is the complicated part of the setup and will be covered next.

Network Setup

First of all we need an IP address. All devices that communicate over the Internet have an IP address, it is the means by which you specify who you want to communicate to, and in some ways it is similar to a telephone number. If you are a client, you need to know the IP address of the server you want to connect to. Most home network connections use a leased IP address that can change from time to time. Some folks are lucky enough to have a fixed (static) IP address but this is rare and expensive. When you connect to your IP service provider, a dynamic IP address is issued by a DHCP server. Once you have your address anyone can connect to you but if the DHCP server decides to renew your lease with a different address you are out of luck. No one can reconnect to you until you let everyone know what your new address is. This is very inconvenient ! Fortunately, there are free services that will do this for you, they keep track of your dynamically assigned IP address and handle when it changes. A couple of services that do this are www.no-ip.com and www.dynDNS.com. The way they work is: you pick a URL name such as k1el.hopto.org and this is the named IP address that others will use to connect to your PC. The trick is that k1el.hopto.org doesn't really connect directly to you, instead it connects through, in my case, no-ip.com which always knows what your IP address is. It knows because of a tiny application that runs on the PC which notifies no-ip.com when it's IP address changes. It is a great service and makes remote control over the Internet very easy. You can even go so far as setting up you own network webserver and do it without a static IP !

Getting back to the task at hand, let's assume that you have setup your server and have its IP address. This will be the address that WKremote, running on the local side, uses to find the remote server and connect to it. One point that confuses many folks is intranet IP addresses versus extranet addresses. If you are running a home network with a router, the router acts as DHCP server for the individual PCs on your home network. These addresses usually look like 192.168.0.1 and are the IP address on your local network and have no correspondence to IP addresses out on the Internet at large. The home router is what connects to the outside Internet and it answers to the Internet IP address. It translates the IP address over to your local intranet IP addresses. This brings us to the concept of ports, in addition to an IP address, a port address identifies a particular kind of traffic and is used to direct the traffic to a specific place. This allows you to have hundreds of services on your local intranet addressed through one Internet IP address.

For example, let's look at the setup at K1EL. I use no-ip.com and my assigned IP address is k1el.hopto.org if I look at it right now the numerical IP address is: 63.160.138.53 but this could change at any time. As long as I use k1el.hopto.org as my IP address, no-ip.com will always make sure I get connected to my server. Different services use different port numbers, here are a few examples:

- Port 20 – FTP (File Transfer Protocol)
- Port 23 – Telnet Service
- Port 25 – SMTP - Mail transport
- Port 43 – Internet Name Server
- Port 80 – HTTP web server access

At K1EL we have two PCs on the home network, one is a webserver and the other one is connected to a radio set up for remote operation. The home router is responsible for sending incoming Internet traffic to and from the right service running on the right PC. It does this by port forwarding. The router has a routing table that tells which PC on the network should receive incoming traffic bound to a particular port. In the K1EL intranet, the webserver has a local IP address of 192.68.0.111 while the station PC is assigned 192.68.0.110. Traffic coming in on port 80 must be sent to the webserver. Other ports want to go to station PC. We use Ham Radio deluxe on the station PC for transceiver control and it uses port 7805. So we want to direct traffic on port 7805 to the station PC. The configuration webpage for your router will have a means for doing this redirection. The configuration page for the D-link router at K1EL is shown below. I log into my router using the address 192.68.0.1, this is pretty standard but you should check in your router owner's manual. I enter the address directly into the address field of Internet Explorer and then get a login prompt for username and password. Again, you will have to check in your manual to see what to use, generally the user name is admin and the password is some generic password which you should change as soon as you get your router up and running.

In my configuration, I have several services directed to 'home-computer' which is my ham radio station PC. I use VNC to be able to remotely take control of my station PC, more on this later. VNC uses two ports, 5800 and 5900. I have port 80 traffic routed to my webserver PC (k1el-webserver) and I have port 7805 routed to my station PC for Ham Radio Deluxe. Finally I have selected port 3890 as the path for traffic sent to WKremote running on my station PC. The actual port number is not important as long as both server and client use the same one and it is not a port used by some other service.

So at this point port forwarding has been taken care of which means that traffic destined for the WKremote application will be sent to the correct place on my local network. In the case where you are not using a router but have a direct connection to the Internet from your PC, you will skip this step since WKremote traffic will come directly into your PC on port 3890 (or whatever port you decide upon).

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PORT FORWARDING APPLICATION RULES NETWORK FILTER WEBSITE FILTER FIREWALL SETTINGS ADVANCED WIRELESS ADVANCED NETWORK	PORT FORWARDING RULES : The Port Forwarding option is used to open a single port or a range of ports through your firewall and redirect data through those ports to a single PC on your network. <input type="button" value="Save Settings"/> <input type="button" value="Don't Save Settings"/>				Helpful Hints.. <ul style="list-style-type: none"> • Check the Application Name drop down menu for a list of pre-defined applications that you can select from. If you select one of the pre-defined applications, click the arrow button next to the drop down menu to fill out the appropriate fields. • You can select your computer from the list of DHCP clients in the Computer Name drop down menu, or enter the IP address manually of the computer you would like to open the specified port to. • This feature allows you to open a range of ports to a computer on your network. To do so, enter the first port in the range you would like to open in the Start field and last port of the range in the End field. • To open a single port using this feature, simply enter the same number in both the Start and End fields. 																																										
10- PORT FORWARDING RULES																																															
<table border="1"> <thead> <tr> <th></th> <th>Name</th> <th>IP Address</th> <th>Application Name</th> <th>Port</th> <th>Traffic Type</th> </tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/></td> <td>VNC1</td> <td>192.168.0.110</td> <td>Application Name</td> <td>Start: 5800 End: 5800</td> <td>Any</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>VNC2</td> <td>192.168.0.110</td> <td>Application Name</td> <td>Start: 5900 End: 5900</td> <td>Any</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>webserver</td> <td>192.168.0.111</td> <td>k1elwebserver</td> <td>Start: 80 End: 80</td> <td>Any</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>WKremote</td> <td>192.168.0.110</td> <td>Computer Name</td> <td>Start: 3890 End: 3890</td> <td>TCP</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>HamRadioDeluxe</td> <td>192.168.0.110</td> <td>Computer Name</td> <td>Start: 7805 End: 7805</td> <td>Any</td> </tr> <tr> <td></td> <td>Name</td> <td></td> <td></td> <td>Start</td> <td></td> </tr> </tbody> </table>							Name	IP Address	Application Name	Port	Traffic Type	<input checked="" type="checkbox"/>	VNC1	192.168.0.110	Application Name	Start: 5800 End: 5800	Any	<input checked="" type="checkbox"/>	VNC2	192.168.0.110	Application Name	Start: 5900 End: 5900	Any	<input checked="" type="checkbox"/>	webserver	192.168.0.111	k1elwebserver	Start: 80 End: 80	Any	<input checked="" type="checkbox"/>	WKremote	192.168.0.110	Computer Name	Start: 3890 End: 3890	TCP	<input checked="" type="checkbox"/>	HamRadioDeluxe	192.168.0.110	Computer Name	Start: 7805 End: 7805	Any		Name			Start	
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Windows Firewall

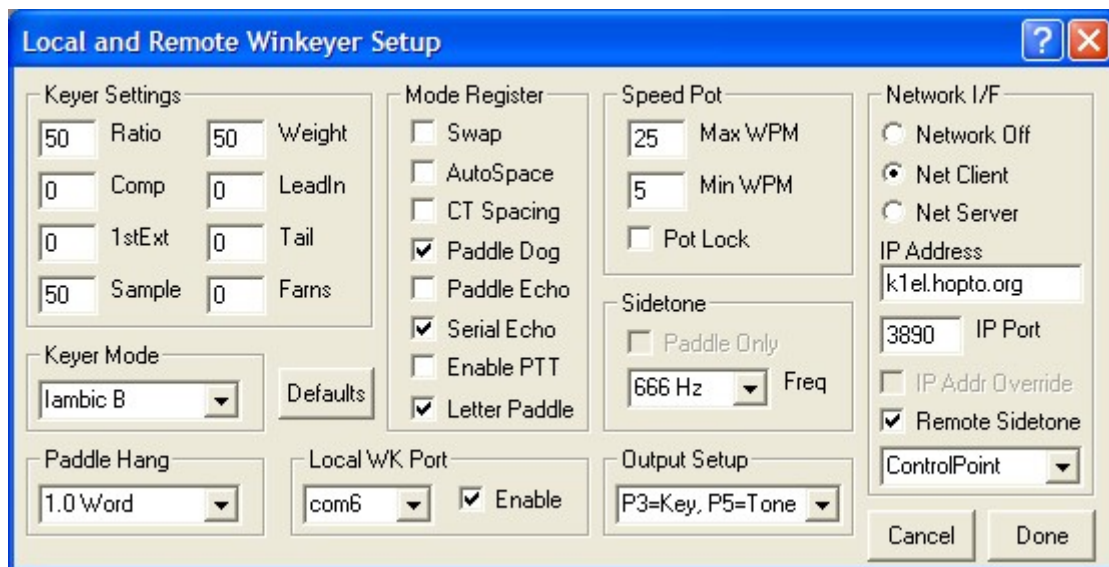
There is one small detail that you must take care of before going any further. If you have a firewall enabled on you PC it will have to be configured to allow traffic coming in on the WKremote port (3890 in my case) to be passed through. You can do this by going to the Control Panel and clicking on Security Center. From the Security Center click on Windows Firewall. First of all see if the firewall is turned on, if it isn't on you can skip this step since your WKremote traffic will not be blocked if there is no firewall. Otherwise click on Exceptions and click on Add Port. In the name field enter WKremote and in the Port field enter your WKremote port number (3890).

Install WKremote

WKremote should be installed on both the remote and client PCs. It is simple to install, just follow the setup instructions. I always request a desktop shortcut to make it easier to find and start.

Configure WKremote

Start the Server side WKremote first and click on setup. You will get this dialog box:



Click on Net Server and enter 3890 in the IP Port edit box. You will not be able to enter anything in the IP Address field if you are the server. Click on Remote Sidetone to enable sidetone on the server side. Click on the combo box under Remote Sidetone and select Remote Side, note that other settings are converse and ControlPoint, more on these later. The only other thing you must configure is the Local WK Port, serial COM port that the remote Winkeyer is connected to, the Enable checkbox will automatically be selected on the server side. None of the other settings matter at this point since they will be over-ridden by the Client side settings when the client connects to the server. Click *Done* and then click *Open* on the Remote Control dialog box.



This will open the local Winkeyer and then open the server up to accept connections on port 3890. Initialization progress will be displayed in the lower text window. If there are problems they will be printed

here. If the server started successfully it will print "Waiting for Connection" These messages can be cleared by clicking on *Clear*.

Client Side

Now on the client side, start WKremote and click setup. On this side we want to select NetClient and enter the IP address of the server. In my case the server is at k1el.hopto.org. Again enter a port address of 3890 and click Remote Sidetone. In the combo box select ControlPoint, then set the Com port, and click on enable to enable the local Winkeyer connection. As a side note, you can run WKremote with only one Winkeyer on the remote side but you will only be able to send CW from your keyboard.

Continuing with client side setup, set the Winkeyer up to you liking, whatever you set up here, speed, paddle operation, mode, etc. will be transferred over to the remote Winkeyer when you connect to it. When you are ready, click *Done* and then click *Open* to actually connect to the server. If all is well you will see a connected message and a little + sign that blinks on and off every second. This is the heartbeat telling you the connection is live. You can now paddle or enter text in the lower edit box and it will be sent on the remote Winkeyer. As letters are sent they will be echoed in the upper text window.

If you were not able to connect it could be one of many things. First of all make sure you have port forwarding setup if you are using a router, this applies to both server side and client side. Next check that the firewall settings are correct. Insure that the IP address you are using is correct, if you are using a service like no-ip.com you will enter the named IP address since you do not know what the numeric IP address is. Usually you would only enter a numeric address if it was a static IP. A numeric address looks like this: 24.123.27.98 while a named address looks like this: k1el.hopto.org.

Keep in mind that WKremote will not attempt to connect to the network if it can't first initialize its Winkeyer so that is something you need to check. It might be easier to use WKtest to check your Winkeyer Com port setup.

There have been cases where the client/server assignment must be reversed. Even though IP address is correct, the WKremote software can't connect. In this case we make the local WKremote the server and the remote WKremote the client and set the local IP address in the remote IP address field. When running in this way we have to specify the local WKremote as the ControlPoint and the remote WKremote as the RemoteSide. It's confusing but it can get you going if you can't get the remote IP address working.

While were on the subject, the third option in the combo box, namely Converse will allow to ops to send CW back and forth directly over the Internet, no radio needed. This is great for code practice or for fun.

Remote PC Access

There is one facility that you must have, the ability to access your remote PC over the Internet. There are at least two ways to do this. First is the Remote Desktop feature built into WindowsXP or the second is VNC. The downside of Remote Desktop is that the remote end station must be running the Professional version of XP. VNC is free and doesn't care about what version of XP or Vista you run. I use TightVNC which works great. I run it as a VNC server on the remote PC and run it as a viewer locally. I can connect to my remote PC and actually see its display and be able to move the mouse around and run the keyboard as if I was sitting in front of my remote PC. This allows me to start WKremote on the remote PC and check settings etc. I can also look at the remote router configuration as well.

Station Audio

It doesn't do any good to be able to transmit on a remote transceiver if you can't hear the remote audio. Routing real time audio from the remote station to your local PC over a network is challenging but not impossible. There are at least two ways to do this, namely Skype and Google Talk. These are essentially free Voice Over IP (VoIP) services that allows you to call another PC over the Internet and connect to it. Once connected you can hear on your local speaker what is fed into the remote PC's microphone input. So

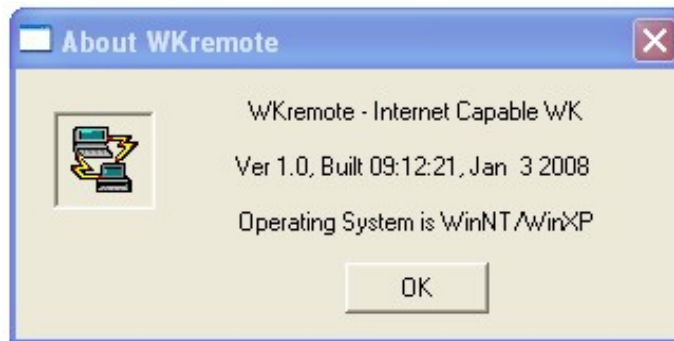
if you feed the transceiver's audio in the remote PC's microphone jack you can hear the transceiver audio in near real time. Mission accomplished. The setup for both services is similar; you will need to establish an account with email addresses and passwords. You will need two user names, one for each end and you will have to set the remote site to run in auto answer mode. This allows you to dial the remote PC, have it answer, connect, and then serve audio. The connections are long lasting. Once you are connected you can stay connected for hours provided there is audio activity. The audio path from the local PC to remote PC is also provided allowing you to talk back to the remote PC. This would be used when running phone. In CW mode this path is not utilized.

Reboot Persistence

Often times a PC will reboot unexpectedly. A power outage, hardware instability, or the dreaded Windows Update auto restart. It's a good idea to set the PC up so that it reboots into a useful state from a remote control point of view. First of all, when you install the no-ip address update application, set it up as system level application, that means it will automatically be started on reboot. The same applies to TightVNC, this insures you will be able to remotely access your PC to set things up again.

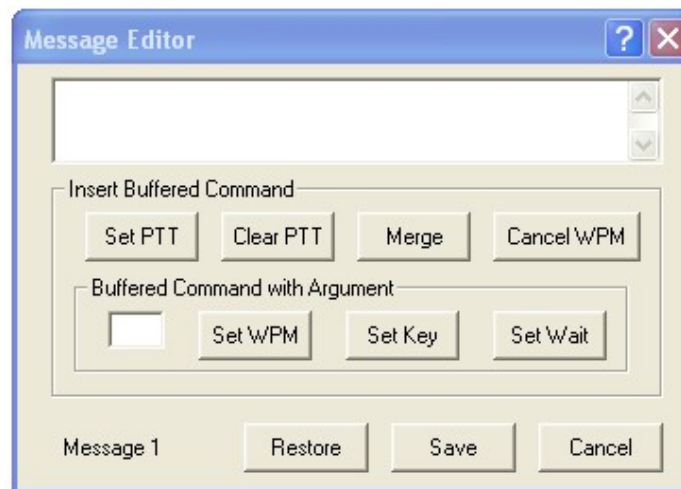
WKremote Version Info

To find out what version WKremote you have, click on the background of the main dialog box with the right mouse button. The following dialog will be displayed:



Message Entry

To enter messages click on a one of the message buttons with the right mouse button. The following dialog box will be displayed:



Enter a message in the edit box along and insert commands with the pushbutton controls. When you are finished, click Save and the message will be saved on your computer's hard drive. In other words the message will not be saved in the Winkeyer's standalone message memory.

If you make a mistake while entering a message and want to restore the previous message click on Restore. Clicking on Cancel will abort the message edit and will not save anything.

To play a message, just click on the desired message button in the main dialog box. If you are using a WKUSB you can also play a message by pushing the message buttons on top of the unit.

Wrap Up

That concludes this quick start guide to setting up WKremote with Winkeyer. I have simplified the network aspects and have glossed over some of the technical details. More information is freely available about the software packages mentioned in the article. Here links to the applications:

Skype: <http://www.skype.com/>

GoogleTalk: <http://www.google.com/talk>

TightVNC: <http://www.tightvnc.com/>

No-IP: <http://www.no-ip.com/>

DynDNS: <http://www.dyndns.com/>